Division of Biomedical and Health Informatics
Department of Medical Education and Biomedical Informatics
School of Medicine
University of Washington
Graduate Program for M.S. and Ph.D. Programs

Peter Tarczy-Hornoch, MD, Division Head
Fredric Wolf, PhD, Department Chair
George Demiris, M.S., Ph.D., Graduate Program Director
Ira Kalet, Ph.D., Chair Education Oversight Committee
Kelly McNeill, MSEd, Administrator and Self-Study Coordinator

February 1, 2009

Table of Contents

Section 1: Executive Summary

The mission of UW Biomedical and Health Informatics is, "1) To advance biomedical research, healthcare and the public's health by developing new theories and methodologies and applying these to problems in biomedical and health informatics. 2) To train students and post-doctoral trainees to become excellent practitioners, educators, researchers and leaders in the field."[1]

The Department of Medical Education and Biomedical Informatics (MEBI) at the University of Washington is home to the Division of Biomedical and Health Informatics (BHI). The Graduate Program is housed in MEBI, with the Division serving as the responsible entity for the running of the graduate program. BHI is a leading interdisciplinary research and graduate educational program focused on both basic and applied aspects of informatics. Research and education efforts are relevant to the spectrum of information across biomedical research, healthcare and public health. Though housed in MEBI, the BHI program shares similar opportunities and challenges of interdisciplinary programs housed in the Graduate School including: having faculty from a variety of scientific departments, conducting research that spans across academic disciplinary boundaries, and educating students from a variety of scientific backgrounds. Details on BHI interdisciplinary activities are found in sections III, V, and VI of the self study.

The field of biomedical informatics (BMI) is generally defined as, "the scientific field that deals with biomedical information, data, and knowledge – their storage, retrieval, and optimal use for problem solving and decision making." BMI is a young field with tremendous and ongoing growth and change. There is increasing recognition of the vital importance of this field by those engaged in biomedical, translational, and clinical research, the delivery of healthcare, and the practice of public health. This recognition is reflected in a number of national reports and strategic initiatives, and in increasing funding. Given the growing importance of the field there is a corresponding increased need for expertise in BMI. The UW BHI program particularly values the synergy between basic and applied research, the interplay between the technical and social sides of the discipline, and the fundamentally interdisciplinary nature of the field. BHI faculty are increasingly invited to provide expertise on collaborative grants, and graduates of the program are heavily recruited for industry and academic employment.

The program at UW has matured over the past twenty years from its inception as a loose confederation of researchers in informatics to its current state of engaging students and faculty in the theory and practice of biological, public health, and clinical informatics. Since the inception of BHI as a formal unit in 1997, the Division has achieved a number of milestones including:

- receiving funding under the University Initiatives Fund (UIF) program,
- establishing its graduate (MS/PhD) program,
- gaining permanent Washington State funding for the graduate program,
- becoming a nationally recognized program rewarded by the receipt of a National Library of Medicine (NLM) T-15 training grant, and
- establishing numerous national and international partnerships and leading research efforts

As part of this growth, BHI has hired as primary or joint eight new faculty. The Division has developed a strong research portfolio, including funding from the National Institute of Medicine

[1] As per the strategic plan the BHI mission statement will be undergoing revisions by the faculty with the assistance of an outside consultant to better present the interdisplinarity and complexity of the field.

(NIH), the Robert Wood Johnson Foundation (RWJF), the National Science Foundation, and the Centers for Disease Control (CDC) among others.

The Division faculty and students are deeply involved in broad UW research activities including:

a) leading the Biomedical Informatics Core in NIH funded Institute for Translational Health Science (ITHS),
b) leading the CDC funded Center for Public Health Informatics (CPHI),
c) leading the informatics core of the Life Sciences Discovery Fund supported by the Northwest Institute for Genetic Medicine, and
d) filling a number of leadership positions in clinical computing within UW Medicine Information Technology Services.

As presented in the BHI's portfolio of activities, its faculty and students have had broad impact and advanced the discipline through their intellectual contributions to the field.

The Division is now focusing on the next phase of program maturation, growth and advancement, which will require building on prior successes. BHI strategic plan goals are:

- strengthening its curriculum,
- expanding the student body,
- increasing its visibility,
- clearly presenting program identity,
- increasing and diversifying funding sources, and
- acquiring co-located space.

Each of these activities will require BHI to make informed and strategic decisions about its future direction and capitalize on opportunities for informatics research and funding in biomedical and health fields.

The strategic planning process for the Division helped to crystallize and clarify its future direction and areas of focus. The process helped to define the goals of the Division for its next phase and establish strategies, actions, and metrics for success of achieving the goals. The Division's strengths as outlined in the strategic plan and discussed in the self study are:

- A division esprit de corps demonstrated through dedicated faculty, strong students, and interdisciplinary research.
- Collaborative relationships/partnerships with a diverse portfolio of UW, local, national, and international organizations (see sections III, V, VI).
- Faculty with broad interests and expertise who are dedicated to successful research and education activities (see sections III and V).
- Training supported by (limited) state and federal funding (see section II.B).

The self study helps to better define BHI's plans towards these goals. Through the exercise of identifying challenges to BHI, the Division was able to better define its goals and articulate objectives to reach these goals. The current challenges identified in the strategic plan include:

- A need to further increase and diversify funding,
- Uneven distribution of faculty effort to projects outside of BHI, negatively impacting faculty time and grant revenue to support the mission of the Division.
- Insufficient and inadequate co-located space, resulting in diminished and diffused scholarly interactions amongst faculty and students alike.
- Lack of adequate visibility and clearly presented program identity especially within UW, which diminishes research and education opportunities.

- A broad field requiring a broad curriculum that also must be covered in sufficient depth for graduate education.

There are no major changes planned in the BHI unit's structure though as part of the self study the organizational chart was clarified and streamlined. BHI has had much success in the past decade as demonstrated with our involvement in prominent UW research institutes such as the Institute for Translational Health Science (ITHS) and Center for Public Health Informatics (CPHI), continued expansion of research funding from national sources such as NIH, and our continued expansion of both faculty and student bodies. The consensus is to continue on the current trajectory while addressing our strategic goals. In terms of programs offered, no major changes are planned though we may develop focused CME/CNE educational offerings.

Section II: Organization and Governance

A. Organization

The Division of Biomedical and Health Informatics (BHI) is an interdisciplinary division in the Department of Medical Education and Biomedical Informatics (MEBI), made up of 17 core faculty members and 27 extended faculty members. Core faculty are actively involved in multiple aspects of BHI including research, teaching, mentoring, service, and governance. Extended faculty have a smaller role in BHI with less involvement in research and mentoring. Given BHI's interdisciplinarity, the Division has affiliations with approximately 19 different departments across the School of Medicine, School of Public Health, College of Engineering, the Information School, and the School of Nursing. The Division also has relationships with industry partners including Microsoft Research Group, Intel, Biatech, and Novartis Pharma.

BHI is led by Peter Tarczy-Hornoch, MD, BHI Division Head, who reports to the Department Chair, Fredric Wolf, PhD. Dr. Tarczy-Hornoch is advised by an External Advisory Board comprised of leading academics in Biomedical Informatics from top US universities and an Internal Advisory Board consisting of leadership from representative affiliate departments and schools. The advisory boards provide oversight and strategic guidance to the Division regarding curriculum, research opportunities, and outreach and development activities. In the last two years, the advisory boards have been inactive, but as part of the self study and recent strategic planning process they have been reconstituted and will resume providing oversight and guidance (See Committee Membership, Appendix A for current membership of reconstituted advisory boards). The members of External Advisory Board and Internal Advisory Board have agreed to meet annually and communicate as needed throughout the year.

The BHI Graduate Program is led by George Demiris, PhD, Director who reports directly to the Division Head, and has a dotted reporting line to the Department Chair. This reporting structure reflects both the fact that per UW policy the Graduate Program is housed in the Department (not the Division) and the fact that it is the Division faculty who administers and oversees the Graduate Program. Our Graduate Program includes our M.S. and Ph.D. programs and post-doctoral training. The current graduate student body consists of 3 Masters students, 31 PhD students, and 3 post-doctoral trainees. 18 students are supported by training grant funding from the National Library of Medicine and the remaining students are supported by a variety of research assistantships provided by grant awards. Dr. Demiris is advised by the Educational Oversight Committee, led by Dr. Ira Kalet, PhD. Overall operations of the Graduate Program and BHI are coordinated via a weekly Executive Oversight Committee Meeting of the Department

Chair, Division Head, Graduate Program Director, and Department Administrator. The Graduate Program Director and the Operations Manager of the Graduate Program meet weekly as well.

The BHI Graduate Program committees are the Student Progress, Curriculum, Admissions, and Qualifying Exam Committees. The Admissions and Qualifying Exam Committees are appointed annually and meet outside of BHI faculty meetings. Curriculum and Student Progress committees are made up of the core faculty and meet during regular faculty meeting times. At least one member of the BHI graduate student body is chosen to serve on the Admissions Committee each year and one to serve on the Curriculum Committee. All decisions are presented at faculty meetings for final vetting and voting. (See Committee Membership, Appendix A.)

The Division of BHI committees are the Public Relations, Faculty Search, and Appointments and Promotions Committees. The Public Relations Committee is appointed annually and holds regular meetings. It is headed by Acting Assistant Professor, Nick Anderson, PhD, staffed by 2 staff members and reports to the faculty. Faculty Search committees are appointed for 3-6 months in duration when there is an open funded faculty position. Its members meet until candidates are chosen for visits, followed by faculty review and vote on the top candidates. The Appointments and Promotions committee consists of all faculty senior in rank to the candidate under consideration for appointment or promotion and meets at the time of appointment or promotion. In addition to these committees the BHI core faculty hold regular weekly faculty meetings on Thursdays at 12 noon. Topics of interest and issues regarding policy and program refinement, and development are typical agenda items and are used for making recommendations and obtaining faculty votes on Graduate Program and Divisional items. Roughly monthly it is a joint meeting with faculty and students focused on developing new research ideas and grants.

B. Budget

The BHI Division (DBHI) is mainly funded though both Washington State funds and research and training grants totaling $6.32M for the 07-09 biennium. The majority of DBHI funding is supplied through grants totaling $3.68M making up 58% of DBHI's budget. The Washington State funding of $1.32M primarily focused on the educational aspect of the BHI mission and supports 11 faculty salary and benefits lines and operations constituting 21% of the DBHI budget. Training grants from the National Library of Medicine and Robert Wood Johnson Foundation totaling $1.09M are the primary funding resources for the DBHI graduate students and post-doctoral trainees. The remaining DBHI funds totaling 4% of the DBHI budget are made up of Research Recovery Funds (RCR) of $160K, Faculty Start-Up funds of $52K, and Student Fees to fund the iLab (student lab for informatics) of $19K make up the remaining. The DBHI faculty continue to apply for research funding opportunities on a regular basis.

C. Resources

Resource allocation is carefully monitored by the MEBI Administrator. The Division (DBHI) maintains operations with a very small budget comparatively to other departments and divisions within the School of Medicine. Much of DBHI's operations and staffing are funded through F&A research cost recovery funds, leaving limited amounts of funding to support special projects or activities. The Chair, DBHI Head and Administrator complete monthly budget reviews and discuss available funding and any issues or concerns regarding funding. The Department and DBHI practice very conservative spending, with thoughtful vetting of each

request from faculty, students and staff for purchases and travel through the chair, division head and/or administrator.

DBHI continues to seek additional funding through grant awards and F&A recovery. However, due to the interdisciplinary nature of informatics work, most DBHI core faculty members maintain joint appointments in various departments in the School of Medicine, School of Nursing, School of Public Health, Information School, or College of Engineering. This results in shared funding arrangements for most grant activities, including the recapturing of RCR funding. In almost every case, individual faculty's primary departments favor administering grants despite MEBI having Memorandum of Understanding (MOUs) and sub-budget agreements in an attempt to share in indirect cost flow. It is with increasing difficulty that the Department continues to put administrative efforts toward capturing of funds either through direct grant submission in MEBI or sub-budgets. The Department continues to explore ways to grow our department fiscal base while continuing to provide key roles in many of the large scale evaluation and informatics initiatives across the UW. Development plans have not been fully actualized at this time. It is anticipated through consultations with the external and internal advisory boards that a formal development plan for BHI will be created. BHI also continues to cultivate its relationships with external corporate entities such as Microsoft and anticipates these relationships will become a key part of the development plan.

D. Staffing

MEBI and BHI continue to explore various mechanisms for encouraging and enhancing productivity. Regular weekly newsletters are emailed to all BHI faculty, students, and staff with information about awards (including grants), honors (internal and external to UW), upcoming guest lectures, and any other special events that will occur during the following week. Both faculty and students are provided with regular opportunities for feedback through annual surveys, faculty reviews, and student progress reports (quarterly and annually). The Division Head and Department Chair are open to formal and informal meeting requests from faculty, students, and staff alike. MEBI also holds regular social gatherings including annual holiday luncheons, a summer picnic, quarterly student luncheons, and other informal gatherings to celebrate special occasions (retirements, major employment milestones). Regular emails are circulated to the Division regarding job opportunities, important messages from the School of Medicine or University, and funding opportunities. Through these mechanisms the Division regularly promotes the message for continued excellence in research and work production.

Faculty are reviewed annually by the Division Head and Department Chair. These reviews focus on activities and accomplishments during the just-completed academic year. Faculty review sessions are intended to provide direction to each faculty for considerations of merit, and subsequently for promotion and tenure, if applicable. The first step in the process is for each faculty member to complete an annual review form. These annual review forms summarize, among other things, the individual's instructional activities. Course ratings are submitted along with this annual form. Prior to each annual review meeting, course/faculty evaluations are reviewed by the course chair and Division Head. During review sessions strengths and areas needing improvement are discussed. BHI does not use graduate students in any teaching roles though they do occasionally lead colloquia.

During this annual review process, the Division Head and Chair determine if an individual has reached a point in their career meriting promotion. Upon affirmation, the faculty member is

requested to provide supporting materials for promotion to be shared with the Dean's Office. Formal vetting and recommendation for promotion for any BHI faculty is done through the Division's Appointments and Promotions committee. The faculty member is also formally approved by the School of Medicine's Appointment and Promotions committee. Faculty salary increases and any retention requirements are discussed and determined annually during the spring quarter through the review of each member's activities and service, with input from voting faculty as required by the University's Faculty Code.

The BHI Division is primarily supported by 3 professional staff members: the Department Administrator, iLab (our computer and educational lab) Manager, and Grants Manager and 3 classified staff members (a full time program assistant dedicated to BHI, the department's central fiscal specialist and office assistant). Staff members are encouraged to seek out professional development to enhance their job activities and continue lifelong learning. Funding for professional development has been allocated from MEBI's central RCR budget and is distributed based on staff requests approved by the Administrator and Department Chair. Staff are encouraged to attend free training when offered through the Professional Development Office and the School of Medicine. Staff are also encouraged to seek out additional education and volunteer opportunities outside of the workplace and maintain a healthy work/life balance. Staff are also provided with annual salary increases as a part of their reward for performance.

Section III: Faculty, Teaching, and Degree Program

A. Teaching Responsibilities

Teaching responsibilities are assigned to faculty members with expertise and interests in particular areas. For example, the program has a clinical faculty member teaching clinical informatics while a faculty member with public health expertise provides the public health informatics courses. The Division Head teaches the introductory course and several other faculty members have willingly agreed to teach research methods and teaching methods courses. Faculty requests to rotate teaching assignments are addressed during the annual faculty reviews. Faculty teaching loads are taken into account annually along with individual research efforts, advising loads, and service commitments. Adjustments to teaching and advising loads are made based upon projected activities annually, allowing reprieve from teaching for those who are being promoted, have a heavy research load, or other extensive service commitments. Since BHI has joint faculty, teaching loads are determined in connection to the faculty member's percentage of effort, i.e., if a faculty member is 50% in BHI and 50% in the School of Public Health, it is anticipated that the faculty member would teach 2 courses in BHI and provide advising and research support to the department. Adjustments to balancing joint faculty loads between departments or schools are made on an annual basis and more frequently, if warranted.

B. Instructional Effectiveness

Since the graduate program's inception, end-of-quarter course/faculty evaluation surveys have been administered every time a course has been taught. In the first year, the School of Medicine's Online Course Evaluation System was used. Beginning in year 2, surveys from the UW's Office of Educational Assessment (OEA) have been used. At the end of each academic year, a summary report of all OEA assessments for the year is sent to the Department Chair. In addition, Dr. Craig Scott, Professor of Medical Education, administers an end of year overall programmatic survey to all students including questions pertaining to instructional effectiveness.

Instructional changes have occurred based on course evaluation data and annual program

evaluation. For example, streamlining of the core curriculum was, in part, based on these evaluations. All students are now required to complete three domain courses which include: clinical informatics; biology and informatics, and public health informatics. Another example of curriculum modification that resulted, in part from course and annual program evaluations, is the creation of the division's program-specific teaching and communications course. This course was offered in place of a teaching methods course to better meet student needs based on feedback from course evaluations.

C. Teaching and Mentoring Outside the Classroom

C-1: Undergraduate Recruitment/Outreach:

BHI does not have an undergraduate degree program. Recently, the unit has decided to offer an undergraduate-only course in informatics annually during the spring quarter. Beyond this single course, the program is not actively recruiting undergraduates to its core graduate level courses. However, some of these courses are open to enrollment by undergraduates in order to get acquainted with the field of BHI. As an outcome of participation in these courses, some undergraduates have enrolled in independent study projects. BHI faculty also have been available and actively provided mentoring and career advice for undergraduates. The description of the honors program below provides additional clarification.

Early in the BHI program, we established a Summer Undergraduate Research Program (SURP), partially funded from the program budget and augmented by faculty who have research funding and are able to accommodate summer students. Initially due to funding constraints the program was open only to Washington State residents but in 2009 BHI was able to remove this restriction. With the exception of hiatus year in 2005, BHI has hosted an average of 5 students each summer since 2000. Many of these students have continued their interest in informatics, including some who have become students of the UW BHI program or have gone on to graduate studies in informatics related fields elsewhere. Additionally, some of these students have been authors (even first authors) on publications in the scientific literature.

BHI faculty has contributed to the Honors Program through guest lecturing and two regularly offered courses. As noted above, some BHI courses are open to undergraduate students. For example BHI listed MEBI 550 with Honors A&S 396 during winter 2007. BHI has also recognized that graduate courses are not an optimal match for undergraduates and in spring 2008 offered an undergraduate-only elective course specifically to introduce BHI to undergraduates. This course was offered in cooperation with the honors program cross listed as MEBI 498 and Honors A&S 396A and will continue to be offered annually each spring. This course offering helps improve our on-campus recognition and visibility, a strategic goal of BHI.

C-2: Graduate Recruitment/Outreach:

The availability of funding through BHI programs such as the NLM training grant and the Robert Wood Johnson Training Grant (described in section VI) allows us to recruit the most talented scholars to graduate and postdoctoral study in BHI. Additionally, BHI utilizes several events as outlets for recruitment of students. For example, the Division hosts a booth every year at the annual American Medical Informatics Association (AMIA) conference facilitating visibility of BHI and the recruitment of new students. Faculty also take the opportunity at other national and international conferences they attend to recruit students. BHI participates in the annual Graduate School Showcase event on campus, which showcases graduate school programs to the array of undergraduate students working in research positions at UW during the summer.

This event hosts a diverse group of students including those from UW as well as other top universities from across the country. Many of the students are underrepresented minorities and women in the Science, Technology, Engineering, and Mathematics (STEM) fields. A majority of these students are interested in attending graduate school and in learning more about available programs. BHI hosts an event table enabling faculty and current students to showcase the BHI graduate program.

The interdisciplinary nature of the field makes targeted marketing challenging since there are no undergraduate degree programs to recruit from and our students come from very diverse undergraduate and graduate programs. BHI continues to attract international and US students each year as seen in the application statistics below. Measures used to improve recruitment efforts include increasing faculty, student, and staff involvement, increased personalized follow-up, continued contact with prospective students, and leveraging advisory boards.

Recruitment/Outreach efforts have been successful as manifested in the statistics below:

Master's Student Admissions	**Current (2007-08)**	**2006-07**	**2005-06**	**2004-05**	**4 Yr Ave**
Number Applied	9	3	11	24	12
Number Accepted	4	1	1	5	3
Number Enrolled	4	1	1	4	3
% of Applicants Accepted	44%	33%	9%	21%	27%
% of Accepted Enrolling	100%	100%	100%	80%	95%

Doctoral Student Admissions	**Current (2007-08)**	**2006-07**	**2005-06**	**2004-05**	**4 Year Average**
Number Applied	20	15	25	30	22.5
Number Accepted	7	5	8	8	7.0
Number Enrolled	4	3	4	8	4.8
% of Applicants Accepted	35%	33%	32%	27%	32%
% of Accepted Enrolling	57%	60%	50%	100%	67%

Number of minority applicants:
2008 – 53 applicants – 1 minority – 1 accepted
2007 – 28 applicants – 5 minority – 2 accepted
2006 – 18 applicants – 0 minority
2005 – 38 applicants – 0 minority
2004 – 54 applicants – 0 minority
2003 – 41 applicants – 0 minority
2002 – 48 applicants – 0 minority

Graduate Advising and Time to Degree

Every student/ trainee is assigned to a faculty advisor. Upon matriculation students are provided opportunities to participate in research rotations to gain exposure to different laboratories or research projects. These rotations facilitate the identification of the appropriate faculty who fits their research interest culminating in the agreement between faculty and student as the student's advisor. New students initially receive advising from the Graduate Program Operations Manager and/or Graduate Program Director until they are able to identify a faculty advisor.

At the beginning of each quarter, faculty advisors complete quarterly progress reports, which

also serve as an evaluation of the student's work during the prior quarter. These evaluations include a review of the student's progress relative to goals and deliverables, the advisor's feedback on quality of student/trainee performance, and the student/trainee response to the advisors' feedback. A list of goals and deliverables for the current quarter is also included. This process allows for a comprehensive and detailed assessment of student/ trainee progress over the course of their studies. Furthermore, the written documentation of goals and deliverables allows for students/ trainees to be aware of their advisor's expectations and their progress.

On an annual basis, the program faculty review all students/ trainees' performance to determine whether they are making satisfactory progress (based on the BHI satisfactory progress document described below). Criteria for student performance evaluation include course grades, quality of academic efforts (e.g., research assistantship, teaching assistantship, research study, abstracts, presentations, papers) as judged by faculty and/or outside reviewers, and written research agreements and evaluations of research and academic progress by the faculty advisors of record. In addition to the annual evaluation, program faculty quarterly review all student/ trainee progress to identify any urgent or emergent issues needing to be immediately addressed.

The BHI Satisfactory Progress document is provided to all M.S. and Ph.D. students and faculty in the BHI graduate program to clarify what constitutes satisfactory progress toward completion of a degree. The document includes a description of general expectations, persons responsible for evaluation of student progress, criteria for performance/ progress evaluation, and conditions warranting recommendation to alter a student's status. The document is available on the BHI website at: http://www.bhi.washington.edu/images/stories/bhisatprogguidelinesfinal-07b.pdf

Similarly, a document that is revised and updated annually describing the BHI PhD Qualifying Exam is made available to all PhD students and faculty and is available on our website at: http://www.bhi.washington.edu/images/stories/quals2009.pdf. The purpose of the qualifying exam is to determine whether a student is ready to form a dissertation supervisory committee. The document includes detailed description of the purpose of the exam, the scope and field of the exam, any required prerequisites, and defines what will be assessed. The document also includes the committee members for each academic year, information on grading, possible outcomes, and information on available resources/ reading material. This exam has both written and oral components and is typically scheduled during or immediately following the second year of study. General exams follow at least four months after the qualifying exam and successful completion of the general exam results in admission to candidacy for the doctoral degree. The general exam is essentially a dissertation proposal defense in the form of a grant proposal and has both written and oral components. The general exam includes a public oral presentation as well as a closed session with the student and supervisory committee. To meet a four-year completion timeline a student should pass the General Exam by autumn quarter of their third year.

Every faculty advisor works with the Graduate Program Director and Operations Manager to confirm benchmarks for each student they advise, including timelines/milestones for degree completion, procedures for committee formation, coursework, and exam and presentation requirements. These are conveyed to the students by their faculty advisor and the Graduate Program Director both orally and in writing. Standards of scholarly integrity are addressed by required training in research with human and animal subjects, quarterly colloquia, and journal club discussions. Resources on student advising and policies are made available to students during orientation and are available online on the BHI website at:

http://www.bhi.washington.edu/student-advising.html

Reminders on policies and timelines are also sent regularly to our student listserv. In 2007, the Division introduced quarterly lunch sessions that provide an opportunity for students to meet with the Division Head and the Graduate Program Director. These sessions enhance the sense of community and interaction between students and faculty as well as serve as a forum to share suggestions, concerns, updates new and existing policies, reminders of upcoming events or deadlines.. BHI also regularly uses its student listserv to disseminate information on openings for faculty positions and industry jobs. The web site also includes tips on becoming a successful academic (with external links to resources for graduate students who are making the transition from graduate school to a faculty position).

Our curriculum is designed to prepare our graduates both for academic and non-academic careers. MEBI 539 prepares students in designing a curriculum for a course of their choice and introduces pedagogical issues that arise when addressing multiple audiences with complex learning needs. Required presentations in colloquia and other courses familiarize our students with teaching and design of educational programs. MEBI 537 and elective courses MEBI 540 and MEBI 541 prepare students in grant writing and reporting, and dissemination of research findings. In addition to the in-depth training in a particular research area, BHI's Graduate Program equips students with skills necessary for an academic career (i.e., teaching, curriculum design, grant writing). Many students collaborate with faculty on grants, papers, and interactions with industry which provides further practical experience. Faculty advisors, as part of the quarterly planning process, generally include discussion of career planning and strategizing on longer term goals.

The BHI colloquia series include guest speakers from the industry who address the current employment market in the field of biomedical and health informatics, career opportunities, and ways to apply for positions in the industry. BHI encourage students to conduct internships with companies focusing in the area of informatics. The Division has established strong links to Microsoft and the Intel Corporation, where some of our students have done summer internships.

C-3: ASE Appointees:
All graduate BHI students are required to complete Health Information Portability and Accountability Act (HIPAA) and Human Subjects Training within the first year of their enrollment in the program:

HIPAA training: Institutional policies require all members of the UW Medicine workforce (including students and trainees) to be educated about privacy, confidentiality, and security of protected health information. BHI students are required to successfully complete the UW HIPAA Online Training.

Human Subjects Training: BHI policy requires all students (MS, PhD, and post-docs) totake Human Subjects training. Students are asked to take "Course 4" (combining Social/Behavioral and Biomedical Research) of the on-line training course.

All students receiving funding from the National Library of Medicine and/or the Robert Wood Johnson Foundation training grant also complete the **Biomedical Research Integrity Training** (BRIT), which is required for all NIH training grant funded trainees. Completing and documenting this training is a federal requirement for continuation of funding. For all other students, participation in the annual BRIT series is strongly encouraged.

D. Degree/Certificate Programs

Biomedical and Health Informatics offers graduate and certificate degrees. No undergraduate degrees are offer through the program.

Graduate Programs	MS (Biomedical and Health Informatics) PhD (Biomedical and Health Informatics)
Certificate Program	Graduate Certificate in Biomedical and Health Informatics

The core coursework requirements for the MS and PhD program are essentially the same, which reflects the research-intensive focus of the MS degree. This also facilitates the option for an MS student to transfer to the PhD program, after the first year of study if appropriate and approved by the Admissions Committee. The core coursework for the program is intended to be completed by the autumn quarter of the second year of study as outlined below.

MEBI 530 Introduction to Biomedical & Health Informatics (Autumn Y1)
MEBI 533 Public Health and Informatics (Spring Y1)
MEBI 534 Biology and Informatics (Autumn Y1)
MEBI 535 Clinical Topics for Informaticists (Winter Y1)
MEBI 537 Biomedical Informatics Research Methods (Autumn Y1)
MEBI 539 Teaching and Communication in Biomedical Informatics (Autumn Y2)
MEBI 550 Knowledge Representation and Applications (Winter Y1)
MEBI 554 Biomedical Information Interactions and Design (Spring Y1)

In addition to the graded courses listed above, students are required to enroll in BHI research seminars, **MEBI 591 "**Biomedical and Health Informatics Research Colloquium" and/or **MEBI 590 "**Selected Topics in Health Informatics". MEBI 590 serves as the BHI Seminar Series and is aimed both at BHI students and the broader community with speakers each quarter representing a range of basic and applied informatics scholarly work. MEBI 591 colloquia focus on more specific topics and are not always offered each quarter.

The MS degree is designed to be completed in two academic years including completion of at least 9 credits of **MEBI 700** (Thesis) and an overall completion of 60 credits, of which a minimum of 30 are graded. All MS students are required to complete a thesis and pass a final exam (thesis defense) for the MS Degree. The PhD degree is designed with the intent that students finish in 4 academic years, though the typical range is 3-5 years. The PhD degree requires completion of 90 credits, with 60 credits completed prior to scheduling the General Examination, including at least 27 **MEBI 800** (Dissertation) credits over a period of at least 3 quarters. Consistent with Graduate School policy, a master's degree from the UW or another institution may be used as a substitute for up to 30 credits of enrollment in the PhD program. To successfully complete the degree, PhD candidates must present a dissertation demonstrating original and independent investigation and significant achievement in the field of BHI, formatted according to UW Graduate School requirements. The final oral exam includes a presentation and defense of the dissertation to the student's dissertation supervisory committee, BHI faculty and students, and public, in accordance with UW Graduate School regulations.

The BHI Certificate Program in Health Informatics

The BHI's Certificate Program in Health Informatics has not been active in several years due to a lack of interested students. However, when it was offered, it was a 15-credit, 5-course graduate certificate designed to enhance the graduate education of students in several UW programs

including the Masters of Health Administration, Masters of Library and Information Science, and Masters of Public Health. The five courses offered were:

- Introduction to Health Informatics (3 credit hours)
- Computing Concepts: From Theory to Application (3 credit hours)
- Database Concepts and Applications (3 credit hours)
- Project Management for Informatics (3 credit hours)
- Capstone Project (3 credit hours)

This curriculum is designed to provide the student with a strong foundation of knowledge, skills and aptitudes in applied clinical informatics. The sequence of courses and project work is designed to fit within the existing Masters curriculum, and can generally be completed within the two years it takes to complete a Masters degree. Certificate students receive both the Masters diploma and a Health Informatics Certificate credential.

The BHI program does not use self-sustaining mechanisms to support its degree-granting or certificate programs. However, it does partner with the Clinical Informatics and Patient Centered Technologies (CIPCT) program offered in the School of Nursing. The CIPCT program offers courses in clinical informatics open to BHI students. The CIPCT program was developed with faculty partners from BHI, Health Information Management, Health Administration, and Computer Science and Engineering, with funding and space provided through the School of Nursing, Bureau of Health Professions (BHPr), Health Resources and Services Administration (HRSA), and the Department of Health and Human Services (DHHS). The CIPCT program uses distance learning technologies and is designed for students with a clinical background. The courses from the Certificate Program above are all still available as part of the CIPCT program.

D-2: Enrollment Trends:

The BHI program began in 2000 as an MS program, and the PhD degree was added in 2004. Since the inception of the PhD track, the majority of incoming students enroll in the PhD program. This owes in large part to the research strength of participating faculty and available mechanisms for funding graduate students in the Division. The primary funding mechanism is a National Library of Medicine training grant supporting 3-year pre-doctoral and 2-year postdoctoral fellowships distributed to approximately eight students in each incoming admissions cohort with 18-20 students in steady state. With limited funding for MS students (mostly RA appointments on grants), BHI has attracted a decreasing number of MS students. As discussed in the strategic plan, one Division strategic goal is to increase our MS student population.

D-3: Benefit of program to University, Region, and State:

The BHI program developed in response to a rapid and deep transformation in medicine, health care and biomedical research. Biomedical and health care research has become an information-oriented science, in which computational models, structuring of information and algorithmic interpretation of data are prominent, essential, and build upon bench biology, translational research, and clinical trials. This is not merely the automation of patient data storage and retrieval, but a revolution in the way scientists, physicians, and researchers understand fundamental biomedical concepts. Biomedical research and clinical decision making will increasingly depend on the construction and use of information-based concepts and structures.

The alumni of BHI have been recruited in leadership positions in research, teaching and practice. The job market for people trained in biomedical informatics remains strong despite the current economic downturn. BHI's educational program which relates basic research to practice is a

model for other biomedical informatics educational programs. The Division is a contributor to national efforts to define and shape this relatively new academic discipline through a variety of forums described in sections V and VI.

D-4: Desired learning outcomes and goals of the program:

Based on the original proposal for the doctoral program for the Biomedical and Health Informatics program, the Division defines its goals and learning outcomes as the following:

- Prepare students for a career as a researcher, leader, and teacher in the field of BHI.
- Mentor students and facilitate their work in the advanced study of, and research in BHI.
- Provide an environment that encourages the advancement and dissemination of new knowledge in the field.
- Create a culture that promotes collaboration among researchers and students in biomedical and health informatics as well as the related disciplines of information science, computer science, bioengineering, biostatistics, biology, and medicine

Graduates of our doctoral program will be able to:

- Thoroughly understand the core concepts in biomedical and health informatics, relate each area to the others, and explain their influence on the field in general. Students will acquire these skills through the foundational coursework and are assessed in those courses as well as through the student's qualifying examination.
- Critically assess and appraise research in biomedical informatics. Students will gain these skills through participation in the required journal club course, where they will observe other students critiquing journal articles and take a turn critiquing and presenting a journal article on their own. Faculty participate in critiquing and assessing students' presentations.
- Expertly present a body of research to diverse audiences. The research colloquium course will help students acquire these presentation skills by requiring them to present their own research as part of the course. The qualifying exam, general exam, and final defense also assess the students' effectiveness in oral communication. As students submit conference papers, it is expected that they will be presenting to national and international audiences.
- Formulate and carry out innovative research that will advance scientific knowledge in biomedical and health informatics. Students will be mentored by their advisors in developing these essential research skills as part of their research projects. Students will demonstrate their research formulation skills when they pass their general exam, and the final dissertation defense judges their ability to carry out that planned research.
- Write journal-quality papers on a body of research. In the early stages of their graduate work, the students will need to write as part of their core coursework. As their research becomes more mature, students are encouraged to write conference papers on their research. The general exam and the dissertation assess the student's research writing ability. The dissertation research is expected to lead to several journal publications.

The ability to achieve the above goals has been helped by the development of a curriculum where all the required courses in informatics (below) are taught by core BHI faculty. This has enabled the Division to span the broad range of key foundational areas and the continuum of application areas fundamental to biomedical informatics. The curriculum includes both basic and applied aspects of informatics and explicitly highlights the synergies between them.

Learning Goals from MEBI 530 – "Introduction to Biomedical and Health Informatics"

Introduction to Biomedical and Health Informatics provides an overview of the field from diverse perspectives. These perspectives are then used to look at some challenges for the field as a whole. The overview includes: a) motivations to engage in BHI, b) biomedical context of BHI, c) evolution of concepts in BHI, d) frameworks for BHI training, and e) cultural and philosophical context of BHI. The challenges explored include: a) driving problems, forces, and politics of importance to BHI, b) successes and failures of BHI, c) making sense of information, d) representing information, e) standards, f) collaboration.

Learning Goals from MEBI 535 – "Clinical Topics for Informaticists"
Content Objectives. Students who successfully complete this course will be able to critically evaluate clinical care issues using three sets of lenses, including an understanding of the history, the current state, the best practices and the future challenges in each. For a series of clinical care issues (such as the integrated delivery system, the physician clinic, quality and cost of health care) students will be able to critically evaluate the informatics implications, including the foundational principles that may apply, the current applications in use, the current and future challenges, and applicable research agendas.

Learning Goals from MEBI 537 – "Biomedical Informatics Research Methods"
Objectives include: Distinguish among the variety of different research methods that may be applied in biomedical and health informatics. Operationally, this means recognizing and describing these methods in the BHI research literature; Given an example in the literature that uses a particular research method, you should be able to critique how well (how appropriately, how completely) the work applies the research method. This is one type of critique of the *quality* of the research; Describe the pros and cons of applying different research methods to answer different research questions; Develop a respect for alternative research methods, even if you are not personally interested in carrying out work in a particular tradition. Operationally, you must understand enough about alternative research methods to converse civilly and intelligently with others that employ those methods. This objective is connected to becoming a multi-disciplinary team leader

Learning Goals from MEBI 539 – "Teaching and Communication in BHI"
Objectives include: Create and justify a quarter-length course syllabus that reflects their expertise with explicit goals and objectives, an outline of course content and deliverables, and a structure for evaluating student performance; Create and effectively deliver a specialist presentation that conveys a valuable take-away message to a range of audiences, including other specialists in the subfield, members of the biomedical and health informatics community, and the general public; Create and deliver an academic presentation employing the "assertion-evidence" model for constructing presentation materials; Create and deliver an introductory presentation that conveys their individual passion and understanding for the field of biomedical and health informatics; Convey to colleagues a familiarity with the both discipline-specific and interdisciplinary literature relating to pedagogy, and be able to provide a colleague with examples from the literature that address pertinent issues in pedagogical practice; Create and deliver a well-organized and focused public video presentation related to a specific area of academic interest; Demonstrate strategies for conveying constructive feedback on others' academic and classroom presentations; Convey an awareness of basic principles of "public relations" in making academic research accessible to broader audiences.

Learning Goals from MEBI 550 – "Knowledge Representation and Applications"
At the completion of the course, students will have a working knowledge of ideas, methods and open questions in formal knowledge representation and their application to biology, medicine and public health. Objectives include: Distinguish among various kinds of data representations and encodings used in biomedicine and give examples of the use of each; Translate biological, medical or public health factual assertions or statements of knowledge into formal logic using traditional logic notation and in a form that can be used directly by a computer program or system; Perform simple logic proofs; Describe basic properties of frame systems and write frame representations for examples of biomedical knowledge; Perform subsumption and classification of statements written in a description logic; Apply basic Bayesian probability formulas to answer questions about probabilistic biomedical problems; Analyze biomedical knowledge representation and reasoning problems and give reasons for using or not using particular programming languages, software environments or methodologies. In addition, students will have gained basic skills with programming in Common Lisp, be able to perform tasks illustrating a solid basic knowledge of core programming concepts including: object oriented programming, logic programming, and metaprogramming.

Learning Goals from MEBI 554 – "Biomedical Information Interactions and Design"
The course introduces the theoretical frameworks and research methodologies that underpin the study of human-information interactions and the design of technology to support or enhance those interactions. The course emphasizes how findings from studies of information behavior can be used to inform and improve the design of information systems in the biomedical context and provides an overview of design methodologies. Examples are drawn from clinical, consumer, bio- and public health informatics. Objectives include: Provide an understanding of the value of biomedical information interaction studies; Help students design and assess biomedical information interaction studies; Provide an overview and discussion of the main user-centered design methodologies; and Enable students to design and critically assess ways to capture end user informational needs in the biomedical and health informatics context.

As described in Section III.B, course evaluation surveys are administered through the Graduate School for every course at the completion of the quarter for which it was taught. The surveys are provided by the UW Office of Educational Assessment. Additionally, an overall programmatic survey is sent to all students at the end of each academic year (administered and coordinated by Dr. Craig Scott). During the quarterly lunch sessions with the Division Head and the Graduate Program Director, students can address any issues or concerns pertaining to the educational services of the Division. All these efforts to assess educational effectiveness and student satisfaction are reviewed by the Division Head and Department Chair to facilitate informed decisions about teaching assignments. The assessments are shared with the Educational Oversight Committee and the faculty at large to determine any necessary curricular revisions. In response to feedback by students provided through these outlets and overall advances in the field, the program faculty made extensive revisions to the core courses in the Summer of 2006 and updated the course requirements for both MS and PhD students (to ensure that courses in the domains of clinical informatics, bioinformatics and public health informatics are required for all graduate students in an effort to ensure the breadth and translational component of the curriculum). The content of individual courses was refined and/or expanded based on student feedback highlighting the need for content or format improvements.

Non-Major Course Offerings

Since BHI is only a graduate program it is atypical for non-majors to enroll in the program's courses, but some of the BHI courses are taken by non-majors as electives and have been used to satisfy requirements outside their majors. The majority of students who enroll in the aforementioned courses tend to have a general interest in bioinformatics and its application to their own research and career interests. MEBI 531 is an elective designed to be useable for this purpose. Students in other graduate programs, non-matriculated students, and undergraduates interested in the field have enrolled in this course as well as other BHI core courses. The Division has plans to redesign MEBI 531 as an undergraduate offering rather than graduate as the learning goals are adaptable in this way. MEBI 530, can be applicable and relevant to both BHI graduate students and those in other programs or GNM students. Each year 20-25% of the enrollment for this course is non-majors.

Biomedical and Health Informatics considers the following US institutions its peers for its Masters and PhD degree programs:

- Department of Biomedical Informatics, Arizona State University, Tempe, AZ
- Department of Biomedical Informatics, Columbia University, New York, NY
- Medical Informatics Program, Indiana University, Bloomington, IN/ Regenstrief Institute
- Division of Health Sciences Informatics, The Johns Hopkins University, Baltimore, MD
- Department of Biomedical Informatics, The Ohio State University, Columbus, OH
- Department of Medical Informatics and Clinical Epidemiology, Oregon Health Sciences University, Portland, OR
- Stanford Center for Biomedical Informatics Research, Stanford University, Palo Alto, CA
- Department of Health Administration, Program in Health Informatics, University of Alabama at Birmingham, Birmingham, AL
- Health Informatics, University of California at Davis, Sacramento, CA
- Division of Health Informatics, University of Minnesota, Minneapolis, MN
- Department of Health Management and Informatics, University of Missouri, Columbia, MO
- Department of Biomedical Informatics, University of Pittsburg, Pittsburg, PA
- Department of Biomedical Informatics, University of Tennessee, Knoxville, TN
- Department of Biomedical Informatics, University of Utah, Salt Lake City, UT
- Department of Biomedical Informatics, Vanderbilt University, Nashville, TN

BHI is recognized by the National Library of Medicine as a top ranked program, as designated by the award of the T-15 institutional training grant in 2002, competitively renewed in 2007 (at a time when two other previously funded programs were cut). The score received by BHI's program during this review was one of the top scores.

Our graduates are successful in obtaining postdoctoral research and faculty positions at our peer institutions and in Fortune 500 companies. Additionally, BHI is one of three US programs that are members of the International Partnership in Health Informatics Education (IPHIE) program (the other two programs are the Department of Biomedical Informatics at the University of Utah and Health Informatics at the University of Minnesota). The IPHIE network includes US and European educational programs in biomedical and health informatics and promotes student exchanges and ongoing dialogues in biomedical and health informatics training and research.

D-5: Plans & initiatives to improve quality and productivity:

The Division has continues efforts in various stages to make improvements to the graduate program. Curriculum discussions occur at regular faculty meetings, including discussions about coordinating the content and activities of the core courses. Through the recently established Educational Oversight Committee consisting of faculty in leadership positions with significant educational experience, the Division is developing educational and training initiatives and will be reviewing the curriculum and other activities aimed to strengthen the coherence and efficiency of the core offerings. The Division has also committed to completing an ongoing assessment of students' educational needs and is working to define a required skill set for all graduates. Several BHI faculty participate in the American Medical Informatics Association (AMIA) Academic Forum, of which the UW program is a charter member. AMIA is working on the development of national guidelines for core content for teaching biomedical informatics. One faculty (Dr. Kalet) is a member of the subcommittee assigned to this task. Another faculty (Dr. Demiris) is a member of the educational task force of the International Medical Informatics Association (IMIA) exploring curriculum guidelines for informatics graduate programs. BHI's leadership (Kalet, Demiris, Tarczy-Hornoch) also participate annually in the National Library of Medicine Informatics Program Directors meeting to network with our peers on strategies to advance the teaching of biomedical informatics. The reconstituted Internal and External Advisory Boards will be leveraged in this arena as well.

BHI is reviewing options to increase and improve experiential learning and teaching opportunities for its students as defined in its strategic plan (see Appendix F). Discussions are being held with industry partners, such as Microsoft to identity potential experiential learning opportunities. BHI has also reached out to collaborating departments, such as computer science and health services for allowing graduate students from the division TA opportunities.

Section IV: Diversity

BHI considers itself a member of the Science, Technology, Engineering, and Mathematical (STEM) disciplines. The Division strives to have a diverse student and faculty make-up to enriching its environment. However, BHI struggles with the same challenges facing other STEM disciplines of attracting underrepresented ethnic, racial, and cultural students and faculty minorities from the very small segment of the qualified potential minority candidates.

BHI has taken a number of strides towards improving the number of underrepresented ethnic, racial, and cultural students in its graduate program. The division has actively advertised its graduate program through the School of Medicine's Minority Affairs Office. BHI has worked with Shelia Lukehart, MD, Assistant Dean for Research & Graduate Education to advertise its graduate program at large national professional society and medical college meetings in an effort to attract students from a variety of sources that may include underrepresented minorities. As a result of these efforts, BHI has increased the number of women and minorities applying to and being accepted into the graduate program, hence increasing the number of future minority academics in the field of biomedical and health care informatics. For example, the first PhD graduate from the program was an Asian American woman who is now on the faculty of Columbia University. This year we have 2 students from Peru, 1 student from Chile, 3 African American women, 6 Asian American students, and half of the current cohort of students is women. BHI also continues to work with the GOMAP program and the Graduate School to continue to strategize way to continue to attract and enroll graduate students. BHI faculty and/or staff also participate at the annual UW Minority Graduate Student Association Summit.

BHI continues to improve its faculty diversity. The Division has increased to 5 women core faculty members over the past 5 years and continues to work with the School of Medicine to strategize on ways to attract a diverse pool of applicants. However, given the nature of the field, the number of underrepresented ethnic, racial, and cultural diversity is only a small fraction of the informatics academic population. BHI has taken steps to advertise in a broader spectrum of professional journals and strictly adheres to EEOC guidelines for the vetting and hiring of potential faculty candidates. It is hoped and anticipated that as the diversity in the student bodies and graduates of BMI programs increases nationally that the number of qualified potential minority faculty will also increase, improving the overall diversity of the field.

Section V: Research and Creativity

A key strength of BHI is the collaborative research relationships and partnerships BHI faculty have with a diverse portfolio of UW, local, national, and international organizations (see the 2008 BHI strategic plan (Appendix G)). The description of faculty research areas and affiliations and collaborative projects below clearly illustrates this strength. This collaborative interdisciplinary research approach is inherent to the field and aligns very well with the long standing UW tradition of collaborative interdisciplinary research avoiding organizational and academic compartmentalization and avoiding "siloing". The fact that the UW BHI program involves faculty collaborating from five schools across campus is not an anomaly, but one of many dozens of such interdisciplinary programs at this institution.

A. Impact of faculty research and creative work

Over the last 5 years, faculty's research and creative work has had impacts on the field of BMI and extends into other arenas inside UW and beyond. Core faculty in the BHI research training program play multiple roles in support of the program in the areas of research, mentorship, teaching, service, governance, and program administration. In the descriptions below their primary current roles are highlighted but all the core faculty play multiple secondary roles including governance and oversight as described in the organizational section of this document.

Though not listed individually, extended faculty in the BHI program also play an important role in the graduate program in that they engage in BHI related research and have in the past and/or plan to in the future advise BHI trainees. Extended faculty also include faculty who play key service roles in clinical and research computing at UW and at Seattle Children's Hospital and who thus have a significant impact translating informatics research into practice. Examples include Dr. Jim Fine, Chair of Laboratory Medicine and Chief Information Officer of UW Medicine Information Technology Services and Dr. Eugene Kolker, Chief Data Officer at Seattle Children's. Six of our core and extended faculty (Brinkley, Fuller, O'Carroll, Payne, Rosse, Tarczy-Hornoch) are fellows of the American College of Medical Informatics which is a college of elected fellows from the United States and abroad who have made significant and sustained contributions to the field of medical informatics.

In the description of research and impact of core faculty that follows, primary affiliation is **bold faced**. Trainees (MS, PhD, and postdoctoral) are historically active participants in the research projects of all those faculty who list research as one of their roles. Of note the core faculty listed include four new faculty in the last five years marked with (NEW) (Abernethy, Anderson, Demiris, Turner) and three faculty who have left in the last five years marked with (PAST) (Doctor, Karras, and Rossini) whose past and current work is described to illustrate impact they have had and continue to have in their new positions.

● **Neil Abernethy, Ph.D. (NEW)** Affiliation: **BHI, Health Services (Joint)**. Role: research, advising, teaching. Research: Public Health Informatics standards, epidemic models, and molecular epidemiology in the context of global health. Scientific and social networks as they pertain to collaborative research. Impact: improving efficiency of practice of public health in the global setting and facilitating collaborative research.
● **Nick Anderson, M.S., Ph.D. (NEW)** Affiliation: **BHI**. Role: research, advising, service. Research: Research on social and technical issues involving designing, developing, implementing and extending bioinformatics and clinical/translational research systems. Impact: advancing understanding of the importance of social issues in research and translational information systems with practical impact locally in the Institute of Translational Health Sciences Biomedical Informatics Core (ITHS BMI Core) and national impact leading a collaborative research project to integrate translational data across institutions.
● **Jim Brinkley, M.D., Ph.D.** Affiliation**: Biological Structure, BHI (Joint),** Computer Science and Engineering. Role: research, advising, teaching, service. Research: a) structural informatics and ontologies, b), data management, c) data integration, d) data visualization, e) applying research (a-d) to neuroscience (the UW Human Brain Project, for organizing functional brain map data around a structural model) and other basic biomedical research, f) experiment management systems for clinical/translational research. Impact: both advancing fundamental knowledge about these areas and applying this knowledge locally to the ITHS BMI Core to enable translational biomedical researchers to better manage and use information.
● **Brian Brown, Ph.D.** Affiliation: **BHI**. Role: teaching, advising, program administration (academic advising, admissions, recruitment). In addition to his role as lecturer he is acting as the Operations Manager of the Graduate Program and serves as liaison with the University at large regarding academic program logistics for all students and NLM trainees.
● **Valerie Daggett, Ph.D.** Affiliation: **Bioengineering,** Biochemistry, BHI. Role: research, advising. Research: a) molecular dynamics (MD) simulations of protein unfolding; b) simulation of disease-related conformational changes in proteins; and e) bioinformatics-deciphering the general rules of protein folding using molecular dynamics-generated structural databases. Impact: Nationally/internationally recognized for groundbreaking research in simulation of protein structure and for a national database of these structures.
● **George Demiris, Ph.D. (NEW)** Affiliation: **Biobehavioral Nursing and Health Systems, BHI (Joint)**. Role: research, advising, teaching, service and administration (serving as the Graduate Program Director, and Director of the Clinical Informatics and Patient Centered Technologies Program). Research: a) the use of information technology for older adults and patients with chronic conditions, the design and evaluation of "smart homes" and home-based telehealth applications, and b) examining health informatics graduate education challenges. Impact: as the population ages and healthcare costs rise, research on how to maintain independence for older adults and promote patient centered biomedical informatics applications that will have a large impact on the redesign of health care services.
● **Sherrilynne Fuller, Ph.D.** Affiliation: Professor, **BHI (Primary), Information School (Joint)**, Health Services (Adjunct). Role: research, advising, teaching, administration (Co-director, Center for Public Health Informatics, School of Public Health). Research: a) biomedical data and knowledge representation, b) biomedical information access for knowledge discovery and hypothesis exploration, c) design and evaluation of health information systems to support improved decision making d) application of a) & b) & c) in particular in public health settings in

the US and internationally. Impact: International leadership in global public health informatics with a particular focus on capacity building in Universities in resource-constrained countries.

● **John Gennari, Ph.D**. Affiliation: **BHI**. Role: research, advising, teaching. Research: a) knowledge representation (KR) and ontologies, b) KR and clinical trial protocols, c) Ontologies and knowledge sharing for biosimulation models, and (d) KR and ontology alignment for genomics in context of cell signaling pathways. Impact: involved in collaborations with the National Center for Biomedical Ontology at Stanford; leadership involvement with the ACM Knowledge Capture Conference

● **Ira Kalet, Ph.D**. Affiliation: **Radiation Oncology**, **BHI (Joint**), Biological Structure, Computer Science and Engineering. Role: research, advising, teaching, service. Research: a) Symbolic computational modeling in biomedicine, particularly in oncology (cancer biology and radiation treatment planning), b) drug interactions; c) biomedical software design and engineering, d) computer security, e) foundations of biomedical informatics. Impact: a) applying research to practice in the area of clinical systems security at UW Medicine as Chief Security Officer and b) formalizing the computational foundations of informatics via a new book on the Principles of Biomedical Informatics that is receiving widespread praise.

● **Bill Lober, M.D.** Affiliation: **Nursing**, **BHI (Joint)**, Health Services. Role: research, advising. Research: a) clinical informatics focusing on interaction between patient, provider and public health electronic records, b) public health and population based informatics focused on surveillance and bioterrorism detection and global public health. Impact: both advancing the field of applied clinical (both provider and patient centered) and population based informatics as well as addressed real world needs through applied projects

● **David Masuda, M.D., M.S.** Affiliation: **BHI**, **Health Services (Joint)**. Role: teaching, advising, administration. David is a full time lecturer delivering courses in the BHI graduate program, Health Services Masters of Health Administration program and the School of Nursing Clinical Informatics and Patient-Centered Technologies program.

● **Peter J. Myler, Ph.D.** Affiliation: **Seattle Biomedical Research Institute, UW BHI**, **UW Department of Global Health**. Role: research, advising. Research: Pathogen research with a focus on genome annotation, functional genomics, and structural genomics. Development of bioinformatics tools such as analytic software and interfaces, prediction of pathogenic genes, and process management databases. Impact: both advancing the science of applied bioinformatics and applying these tools to develop drugs and vaccines against important emerging and neglected infectious disease (*e.g*. malaria, trypanosomiasis, leishmaniasis), as well as potential bioterrorism agents.

● **Wanda Pratt, Ph.D.** Affiliation: **Information School**, **BHI (Joint)**. Role: research, advising, teaching. Research: (a) understanding the information problems faced by patients, (b) developing new information technology to help patients find, use, and manage health information, (c) evaluating the usefulness of new technologies for patients. Impact: advancing our foundational understanding of information needs of patients and applying it to help patients dealing with significant diseases (e.g. cancer, diabetes, heart disease) better manage information and empower them to be partners in medical decision making.

● **Tony Rossini, Ph.D. (PAST).** Currently Group Head EU Statistical Modeling at Novartis and in charge of IT strategy for Novartis Global Modeling and Simulation Group. Past UW Affiliation: **BHI**, Biostatistics. Past UW Roles: research, advising. Past and current research: a) statistical computing in the general sense, especially user interfaces and "statistical informatics", b) quantitative problems in human health as studied naturally and as part of the drug

development cycle, from genomics to genetics to proteomics to cytomics to pharmacometrics to clinical trials. Impact: bringing cutting edge bioinformatics to large pharmaceutical companies.
● **Linda Shapiro, Ph.D.** Affiliation: **Computer Science and Engineering**, **Electrical Engineering (Joint)**, BHI. Roles: research, advising. Research: a) object recognition for content-based image retrieval, b) structure based visual access to biomedical information, c) Foundational Model of Anatomy, d) clinical research image analysis and classification. Impact: developing new foundational methodologies of great relevance to clinical and bioinformatics.
● **Peter Tarczy-Hornoch, M.D.** Affiliation: **Pediatrics**, **BHI (Joint)**, Computer Science and Engineering. Roles: research, advising, teaching, administration (Division Head, BHI, Director NIH NLM funded BHI research training program, Director Biomedical Informatics Core of the Institute of Translational Health Sciences, Associate Director Northwest Institute of Genetic Medicine, Director of Data Integration and Web Services for UW Medicine Information Technology Services clinical computing group). Research: a) data integration for basic and translational biomedical research and public health surveillance, b) data integration for patient care and clinical research, c) using electronic medical record data for genotype/phenotype association research. Impact: a) advancing foundational methodologies for data integration and logical and probabilistic inference, b) applying these methodolgies to both advance basic and translational research and to also support clinical care, c) teaching foundations of informatics to next generation of physicians through required medical school course.
● **Anne Turner, M.D. (NEW)**. Affiliation: **Health Services, BHI (Joint)**. Role: research, advising, teaching, administration (Associate Director RWJF-NLM Public Health Informatics Fellowship Program). Research: a) public health workforce information workflow, b) public health digital libraries and c) the use of natural language processing to access to public health gray literature. Impact: advancing understanding of factors for success and failure of information technology in public health practice to ultimately improve public health.
● **Fredric Wolf, Ph.D**. Affiliation: **Medical Education and Biomedical Informatics**, Health Services, Epidemiology. Roles: research, advising, teaching, administration (Chair, MEBI). Research: a) dissemination and evaluation of new technology, including decision support systems, b) clinical decision making and judgment under uncertainty, c) evidence based medicine, and meta-analysis of educational and healthcare interventions. Impact: improving our understanding of how new medical information is disseminated and applied to clinical practice.

BHI faculty are actively engaged in collaborative research with both internal and external entities, including several larger scale collaborative projects with significant impact on the field of BHI and beyond. Below are three examples of such larger scale collaborative projects involving diverse faculty and students from BHI and elsewhere on campus with focus on basic and applied research biomedical data and knowledge in a continuum of application areas from biomedical research to translational research to healthcare and to public health.

One such project was the University of Washington Integrated Advanced Information Management Systems (IAIMS) grant led by Dr. Fuller. Nationally, the UW IAIMS grant an exemplar of how to create multidisciplinary collaborative team in healthcare research institutions to both advance understanding of biomedical information management, the field of BHI, and applying these lessons to create systems to meet user needs. Some of the local impacts of the IAIMS grant in the mid-late 90's included: a) the establishment of what is now the digital health sciences library through the Healthlinks web page, b) the development of a web based medical

record system (MINDscape), c) the establishment of a multidisciplinary research group that formed the a key part of the foundation for the establishment of BHI and its graduate program.

A current large scale collaborative project is the Biomedical Informatics Core of the Institute of Translational Health Sciences (ITHS BMI Core). ITHS is the Seattle area NIH Clinical Trasnslational Science Award (CTSA). This project is led by 3 core BHI faculty (Tarczy-Hornoch, Brinkley, Anderson) and its is to understand information capture, storage, management and analysis needs of translational researchers and use this understanding to develop new BHI methods. While it is early in the grant to assess the full impact of this project, national impacts have included a) spearheading a national collaborative CTSA project to share translational research data across organizations, b) influencing data integration approaches taken by other CTSA funded institutions, c) characterizing needs of translational researchers nationally for electronic data capture tools, and d) evaluating in parallel in a heterogeneous environment alternative data integration approaches. Local translational researchers are now able to get consultation and assistance regarding secondary use of clinical data for research, electronic data capture for research, importation of high throughput genomic data, and integration of disparate data. The ITHS BMI Core has played in important role in establishing the Institute of Genetic Medicine, a Life Sciences Development Fund institute. Over time, like IAIMS, ITHS will have even broader impact.

Another such project is the Center for Public Health Informatics (CPHI) housed in the Department of Health Services in partnership with BHI. The co-directors of the center are BHI faculty (Fuller core faculty and Oberle extended faculty), with 6 other BHI faculty and 2 BHI students involved. The CPHI mission statement makes clear the intimate relationship between the work and the ultimate intended impact "To provide an interdisciplinary environment that supports innovative research into information strategies and technologies to improve the health of the public." Impact to date has included: a) receiving one of the first two grants in the country to establish a Center of Excellence in Public Health Informatics, b) establishing the Global Partners in Public Health Informatics initiative to "develop a vision and a framework for addressing strategic population health information issues and requirements around the world", c) hosting two international conferences focused on the area of global public health informatics.

B. External influences on research, scholarship and creative work

The UW Division of Biomedical and Health Informatics has been an active participant in two paradigm shifts in the field over the last decade. One of these shifts was the transition from the more narrow scope of "medical informatics" focused primarily on physicians in clinical care to the more encompassing vision of a field focuses on people working with biomedical and health data. The UW BHI program was one of the first to adopt the name "Biomedical and Health Informatics" in 1997 to describe this broadened scope. The other shift was the explicit categorization of BHI research along dimensions of both foundational and applied aspects.

UW BHI research programs have become more team based and interdisciplinary, with emphasis on the broad scope of the field and on the synergy between basic and applied research. With global terrorism required blending expertise in bioinformatics, clinical informatics, and public health informatics UW BHI faculty and students were able to successfully compete for unique funding as with the Center of Excellence in Public Health Informatics. Over the last decade and continuing into the new Obama administration there has been an increasing emphasis on both computerizing medical record systems locally and integrating data across clinical care and public

health. This emphasis has resulted in increased funding for both basic and applied research into solving these challenges to an interoperable national health information infrastructure and UW is well positioned to leverage this funding with numerous collaborative research groups. Finally, at the NIH level, there has been a deepening recognition of the critical importance of informatics in support of basic, clinical, and translational research and BHI's emphasis on bridging across application areas and engaging in both basic and applied research makes it well positioned for to contribute to the importance of informatics in the biomedical and health sciences. The current financial crisis is clearly a threat to a broad range of sources of research funding, but BHI's diversity and collaborative approach to research will help buffer threats and allow faculty to expand research areas and emphases.

C. Faculty mentorship and productivity in an entrepreneurial interdisciplinary environment

Junior faculty in the core BHI faculty are mentored by a more senior core BHI faculty member who meets with them as needed to assist with career and research program development. BHI has established additional processes for junior faculty with joint appointments. For joint appointments, BHI ensures a comparable mentor is available in the joint department. To ensure coordination across the departments we work to ensure that both mentors meet together with the junior faculty in addition to 1:1 meetings.

The annual review process as discussed in section II is used to review progress for the past year and plan for the upcoming year to ensure all aspects of professional development (in particular scholarly productivity) are systematically addressed. For all core faculty with joint appointments (junior and senior) the annual review is coordinated with the joint department to balance expectations. For extended faculty to maintain their appointments it is ongoing annual participation in both BHI related research and in some other focused limited activities that support BHI such as advising students, collaborating on grants, and lecturing is expected.

The overall approach to faculty research projects and areas of scholarly interest is an entrepreneurial one that encourages faculty to pursue their own passions in developing an area of research excellence. At the time of faculty recruitment BHI does aim to fill gaps to balance UW BHI faculty expertise across the range of basic and applied BHI research and across the different application areas within BHI. Once faculty are hired, they are expected to excel and meet UW, School, and Department criteria for scholarly productivity and are not constrained in their choice of BHI research areas. In addition, junior faculty are provided coaching opportunities for grant preparation and submission using "mock study sections" with BHI core and extended faculty and other UW faculty as needed, and a written and oral review of near final draft grant proposals prior to submission to help maximize chances for successful funding and increased productivity. As noted in our strategic plan SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis, factors that enhance research productivity are our esprit de corps, collaborative partnerships and broad interests and expertise (the latter also illustrated in the description of individual faculty research above). Barriers to research productivity in our SWOT analysis included funding challenges related to indirect cost return with a large number of joint faculty appointments, lack of co-located and sufficient space to foster further collaboration, and finally the challenge of multiple masters with our faculty often engaged in multiple research projects and affiliated with multiple academic units. As detailed in our VSAM matrix in our strategic plan we have identified a number of ways to help alleviate these barriers to productivity.

Section VI: Collaborations and Interdisciplinarity

BHI is fundamentally an interdisciplinary research field, as has been described in other parts of this document. BHI's research bridges a variety of contributing disciplines such as computer science, information science, mathematics, management sciences and the spectrum of biomedical and health applications ranging from biomedical research, translational research, clinical research, clinical care, through to public health. As described in Section V, research done by BHI core and extended faculty and students is highly collaborative and interdisciplinary with broad impact. The extremely rich collaborative interdisciplinary research environment has been a strong factor in recruiting bright, entrepreneurial, and creative junior faculty and graduate students. New faculty hired in the last five years and the majority of students have come with interdisciplinary research experience and have chosen us and the UW for its rich environment.

The BHI Graduate Program has been interdisciplinary from its inception. During the preparation of the proposal for a graduate program in biomedical and health informatics, the Department Chair and founding Graduate Program Director met with the Health Sciences Council of Dean's to inform them of this effort and seek their guidance on their level of interested in participating in an interdisciplinary informatics program. The Deans of Nursing, Public Health and Community Medicine, Pharmacy, Dentistry, and Medicine were unanimous in their desire to develop one program to serve all Schools' needs. Similarly, the Information School (iSchool) and Department of Computer Science expressed interest in participating in the proposed new graduate program. Thus the program was designed to be interdisciplinary, with joint funding for several faculty appointments in the Department of Medical Education and Biomedical Informatics joint with the Schools of Nursing and Public Health and Community Medicine, and the iSchool and Department of Computer Science. These positions were built into the original funding proposal which was approved and awarded by the UW University Initiative Fund (UIF) and is now permanent state funding. The BHI internal advisory board reflects this collaborative interdisciplinary foundation. In addition to our students engaging in interdisciplinary research with faculty from other units, we have a number of undergraduate and graduate students from programs in other units collaborating with our faculty and students.

These interdisciplinary efforts have also resulted in the creation of CPHI (mentioned earlier) and an RWJ Foundation grant award to supplement the NIH/NLM training grant to specifically support faculty and trainees in public health informatics. Similarly, collaborations with BHI and nursing faculty have been leveraged to obtain federal funding from HRSA to develop the new M.S degree program in CIPCT (mentioned earlier), housed in the School of Nursing, to offer a more applied alternative for clinical informatics training. These interdisciplinary collaborations have enriched BHI's curricular offerings as faculty engaged in these various efforts contribute to required and elective courses and seminars, and in planning revisions and new curricular offerings. BHI's interdisplinarity has resulted in increased research opportunities for trainees and faculty, leading to peer-reviewed publications and presentations, invitations to workshops at national and international meetings, and additional grant and contract opportunities.

Section VII: Future Directions

Strategic Planning

The BHI strategic planning process since its inception as a Division in 1997 has been an ongoing and continuing iterative process involving faculty and students. Major strategic planning has occurred by both internal and external entities at the following times:

1997 - establishment of the Division;

1999 - establishment of the Graduate Program;
2002 - establishment of the NIH NLM funded research training program;
2003 - UW review of the UIF;
2004 - Development and approval of the BHI doctoral program;
2007 – NIH NLM funded research training program renewal; and
2008 – Development of the current 5 year strategic plan (Appendix F).

Interim global review of unit goals occurs at the annual faculty retreat and ongoing discussion of specific goals and next steps occurs at faculty meetings and leadership meetings throughout the year. At times, selective review of specific new or existing goals occur mid-year driven by external opportunities or challenges.

As described in Appendix F BHI's current 5 year strategic plan was developed with input from faculty and students via surveys, meetings, and a retreat using the SWOT matrix (Strengths, Weaknesses, Opportunities, Threats/Challenges) approach to set the stage and then using the VSAM (Values, Strategies, Actions, Metrics) approach to develop specific action plans. The current strategic plan aims to move BHI out of the phase of program creation and initial development and into a phase of program maturation, growth and advancement, and expansion of the student body.

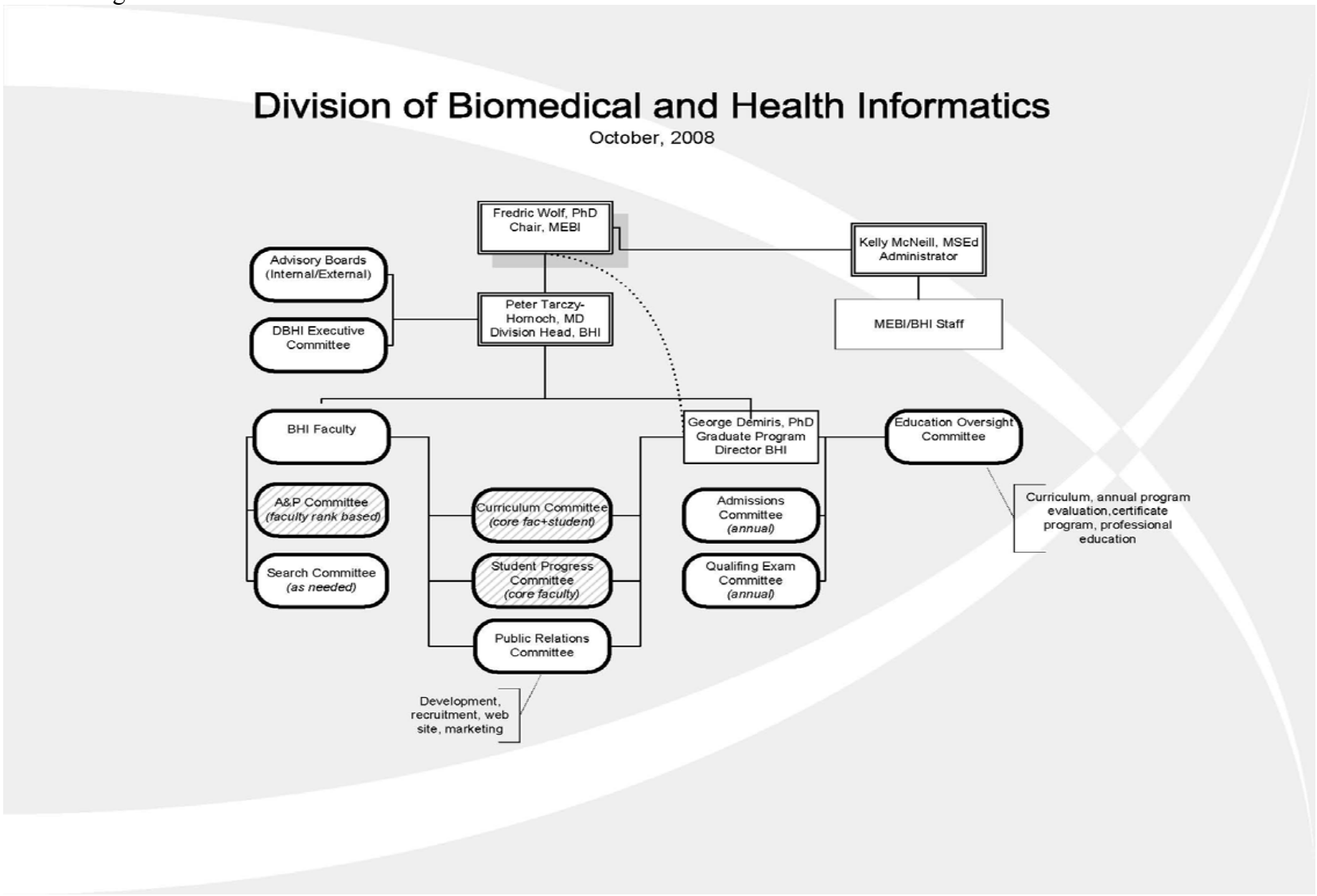
The key goals of the strategic plan for the next five years are: a) strengthening the curriculum, b) expanding the student body, c) increasing program visibility and clearly presenting program identity, d) increasing and diversifying funding, and e) acquiring co-located space. Specific strategies, actions, and metrics related to these visions are in Appendix F. These activities occur against the background of a young and evolving interdisciplinary field which is gaining in prominence and importance nationally. In the next decade, it is anticipated that the UW BHI program will play a leadership role nationally as the entire field of BHI matures. In particular BHI's strengths in interdisciplinary research and collaborations will enable the faculty to uniquely address the inherent challenges of balancing the breadth and depth of the discipline in an improved curriculum. Insights from the educational mission will help focus and advance BHI's research mission as well. As the program matures, the Division anticipates its faculty and graduates will continue to take on leadership roles both in research and pedagogy.

Achieving Goals

The VSAM approach to strategic planning explicitly includes identification of strategies, actions (next steps), and metrics related to each goal or vision. This approach lends itself to iterative refinement on an ongoing basis allowing new SWOT elements to be indentified leading to refinement of the VSAM matrix. BHI has already begun to implement elements of the strategic plan. Unfortunately, BHI will have limited ability to reallocate funds particularly with the anticipated 13% budget cuts for the next biennium on top of the 4.25% budget cuts in the current year. However, the VSAM matrix has helped identify which areas not to cut. Based on the fiscal situation and the strategic plan BHI has examined the options for expanding certificate and/or professional education opportunities and has decided not to pursue them beyond exploring a CME/CNE short course option. In terms of funding, the VSAM matrix has identified targeted areas including seeking additional funding through grants and development activities. The two most important areas that will require additional funding is expansion of the student body (requiring additional sources of funding for student RA positions) and development of funding for eventual consolidated co-located space.

Appendices

A. Organizational Chart



BHI Committee Membership

Internal Advisory Board

- Harry Bruce, PhD, Dean and Professor, The Information School
- James Fine, MD, Chairman and Associate Professor, Laboratory Medicine; Chief Information Officer, UW Medicine Information Technology Services, Adjunct Professor, Medical Education and Biomedical Informatics
- Ed Lazowska, PhD, Bill and Melinda Gates Endowed Chair and Professor, Computer Science and Engineering, Interim Director, eScience Institute
- Hank Levy, PhD, Chairman and Wissner-Slivka Chair, Computer Science and Engineering
- Mark Oberle, MD, MPH Co-Director, Center for Public Health Initiatives and Associate Dean, Public Health Practice, School of Public Health, Professor of Epidemiology and Health Services, Adjunct Professor, Medical Education and Biomedical Informatics
- Mari Ostendorf, PhD, Associate Dean, Office of Research and Graduate Students and Professor, Electrical Engineering, College of Engineering
- John Slattery, PhD, Vice Dean for Research and Graduate Education and Affiliate Professor of Pharmacology and Medicine
- The School of Nursing Member To Be Named (Nancy Woods, PhD, RN, FAAN, Professor and Family and Child Nursing and former Dean, School of Nursing previously served on the BHI Internal Advisory Board)

External Advisory Board

- Don Detmer, M.D., President and Chief Executive Officer, American Medical Informatics Association; Professor Emeritus & Professor of Medical Education, Department of Public Health Sciences, University of Virginia; and Life member, Clare Hall, University of Cambridge
- Joyce Mitchell, PhD, FACMI, FACMG, Department Chair and Professor, Biomedical Informatics, Associate Vice President for Health Sciences Information Technology and Director, Utah CTSA Biomedical Informatics Core
- Jack W. Smith, M.D., Ph.D.**,** Dean and Professor**,** University of Texas School of Health Information Sciences; Adjoint Professor, Department of Biomedical Engineering and Director, Biomedical Informatics Component, Center for Clinical and Translational Sciences University of Texas Health Science Center at Houston

Executive Oversight Committee

George Demiris, Associate Professor and Graduate Program Director
Peter Tarczy-Hornoch, Professor and Division Head
Fred Wolf, MEBI Professor and Chair
Kelly McNeill, MEBI Administrator

Appointments & Promotions Committee:

Selected based on level of position under review. Members are only those who are superior in rank to position in review.

Public Relations Committee:

Nick Anderson, Acting Assistant Professor, Chair

Kelly McNeill, MEBI Administrator
Sandy Turner, BHI Program Assistant

Educational Oversight Committee
Ira Kalet, Professor, Chair
George Demiris, Associate Professor and Graduate Program Director
Peter Tarczy-Hornoch, Professor and Division Head
Fred Wolf, MEBI Professor and Chair
Kelly McNeill, MEBI Administrator

Admissions Committee (membership for 2008-2009):
Peter Tarczy-Hornoch, Professor and Division Head, Chair
George Demiris, Associate Professor and Graduate Program Director
Brian Brown, Lecturer
John Gennari, Associate Professor
Nick Anderson, Acting Assistant Professor
Jim Tufano (student)
Noah Benson (student)
Meredith Skeels (student)

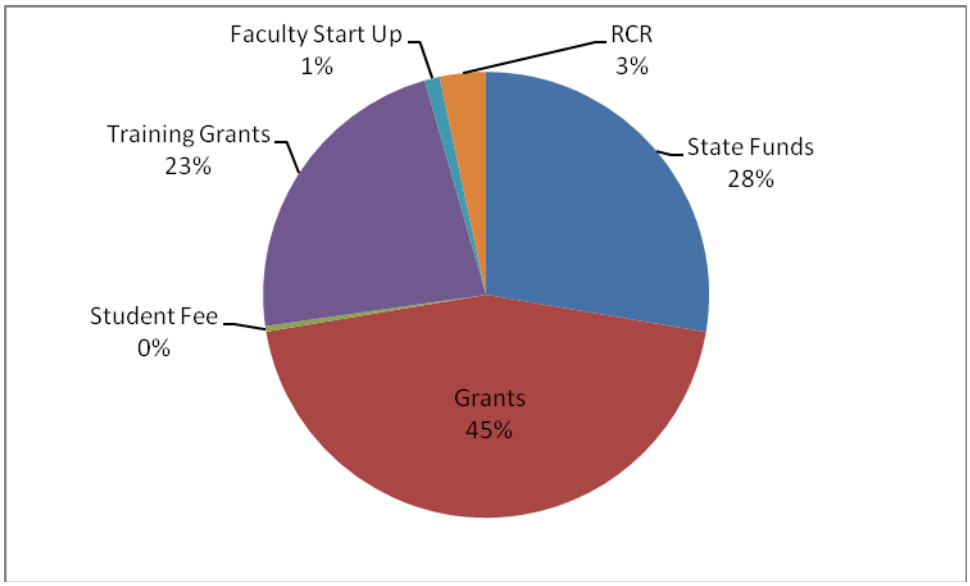
Curriculum Committee:
Core BHI faculty and 1 student

Qualifying Exam Committee (membership for 2008-2009):
George Demiris, Graduate Program Director, Chair
John Gennari, Associate Professor
David Masuda, Lecturer
Ira Kalet, Professor
James Brinkley, Professor

Student Progress Committee:
Core BHI faculty

B. Budget Summary

Biomedical and Health Informatics Division
Funding Percentages 07-09 Biennium



BHI has continued to increase its funding through grants and contracts with a total of $2.13M in grant funding and $1.09M in training grant funding as of Dec. 31, 2008. The Division also has a state budget allocation of $1.36M for the 2007-09 biennium. The Division's entire financial portfolio totals $4.77M as of Dec. 31, 2008. This year the Department increased its RCR returns and was one of only a small group of departments from the School of Medicine to have an increase. This was largely due to the successful efforts made by faculty to increase their grant support.

BHI's state funding supports $437K in faculty salaries and benefits and $307K in staff salaries and benefits. Program operations are supported by $39K with $19K allocated to the BHI iLab for students. The National Library of Medicine (NLM) T-15 training grant supports $491K in pre-doctoral stipend salaries and benefits, $208K in post-doctoral stipend salaries and benefits, and $22K in faculty and staff salaries and benefits. The training grant also supports $94K in operational expenses associated with the grant and $173K in pre and post doctoral tuition benefits.

Future financial projections for BHI are very difficult given the current global downturn. With all departments in the School of Medicine projecting budget cuts upwards of 12% for state funding, the financial outlook for BHI's funding is uncertain. With additional grant and contract funding, the Division has the potential to be able to make up the loss of state funding. However, the future of federal grant funding is also uncertain at this time due to the global economic downturn and flat NIH budgets. The Division remains financially stable, but if the economic downturn continues for an extended period, the need may arise to adjust future plans for the program.

C. Faculty

Autumn 2007 – Summer 2008

All BHI core faculty have taught or been involved with independent studies (MEBI 499,599, 600 courses) and dissertation sections (MEBI 800 course)

BHI Core Faculty Members Autumn 2007-Summer2008							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Abernethy, Neil PhD	Assistant Professor	Primary	75			0	0
Anderson, Nicholas, PhD	Acting Assistant Professor	Primary	100	MEBI 591B Translational Informatics Research Seminar	1	N/A	N/A 0
Brinkley, James, MD, PhD	Professor	Joint with Biological Structure	25	MEBI 534, Biology and Informatics MEBI 591B/CSE590R, Virtual Human Research Seminar	3 1	7	2
Brown, Brian, PhD	Lecturer fulltime	Primary	100	MEBI 530 Medical Informatics (Course chair: Peter Tarczy-Hornoch) MEBI 598 (taught first version of MEBI 539) Teaching and Communication in Biomedical Informatics MEBI 591 BHI Ethics Colloquium	3 4 1	N/A	N/A

BHI Core Faculty Members Autumn 2007-Summer2008							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Daggett, Valerie, PhD	Adjunct Professor	Adjunct		MEBI 590 Selected Topics in Health Informatics MEBI 534 Biology and Informaticists	1 3	2	8
Demiris, George, PhD	Associate Professor	Joint with Nursing	50	NURS 526 Managing Organizational Effectiveness of Health Care Systems MEBI 554/598A Biomedical Information Interactions and Design	3 3	2	1
Fuller, Sherrilynne, PhD	Professor	Primary	100	MEDED 570/LIS 528: Information Access in Health Sciences	3	3	0
Gennari, John, PhD	Associate Professor	Primary	65	MEBI 537: BHI Research Methods HA&S 396a (to become MEBI 498): Transformational technologies for biology, medicine & health MEBI 591 colloq: BioSimulation and Semantics	4 3 1	6	2
Kalet, Ira, PhD	Professor	Joint with Rad Oncology	50	MEBI 550 Knowledge Representation and Applications	3	25	1
Lober, William, MD	Associate Professor	Joint with Nursing				1	0

BHI Core Faculty Members Autumn 2007-Summer2008							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Masuda, David, MD, MS	Lecturer fulltime	Primary	50	MEBI 598a/NMETH 523 Project Management for Informatics HSMGMT 590B Introduction to Clinical Care MEBI 598C/NMETH 524 Introduction to Clinical Informatics HUBIO 553 Problem Based Learning Small Group Facilitator HUBIO 590P Medical Information for Decision Making Small Group Facilitator HSMGMT 523YA Informatics for Health Administration MEBI 535 Clinical Care and Informatics HUBIO 542 OSCE - Objective Structured Clinical Examination Examiner NMETH 527 Healthcare Information Systems and the Electronic Health Records Secondary Instructor	3 2 3 1 1 3 3 3 3	N/A	N/A

BHI Core Faculty Members Autumn 2007-Summer2008							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Myler, Peter, PhD	Research Professor	Joint with Pathobiology		MEBI 534 Biology for Informaticists (course chair J Brinkley)	3	2	2
Pratt, Wanda, PhD	Associate Professor	Joint with iSchool	50	INFO 320 Information Needs & Searching (co-taught with Efthimis Efthimiadis)	5	3	5
Shapiro, Linda, PhD	Adjunct Professor	Adjunct		CSE 473 Introduction to Artificial Intelligence CSE 576P Computer Vision	3 3	13	6
Tarczy-Hornoch, Peter, MD	Professor	Joint with Pediatrics	50	MEBI 590 Selected Topics in Health Informatics MEBI 530 Medical Informatics HUBIO 590 Medical Information for Decision Making	1-3 3 1	2	4
Turner, Anne, MD, MLIS, MPH	Assistant Professor	Joint with Health Services	55	MEBI 533/HSERV 509 Public Health and Informatics	3	1	0

BHI Core Faculty Members Autumn 2007-Summer2008							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Wolf, Fredric, PhD	Professor and Chair	Primary	100	MEBI540/HSERV 528 Critically Appraising and Applying Evidence in Health Care MEBI 541/HSERV 529/EPI 541 Introduction to Systematic Reviews and Meta-analysis of Evidence EPI 513 Epidemiologic Methods II (Meta-analysis section)	3 2 4	1	2

BHI Extended Faculty							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Astion, Michael, MD, PhD	Adjunct Professor	Adjunct	100			0	0
Brock, Doug, PhD	Associate Professor	Primary	100				
Baumgarner, Roger, PhD	Associate Professor	Affiliate	N/A				
Carline, Jan, PhD	Professor	Primary	100	MEBI 521 Evaluation in Health Professions Education MEBI 599 basic research methods course for students in the Teacher Track of the PharmD. program	3 Max. 12	2	0
Chou, David, MD	Adjunct Professor	Adjunct	100	MEBI 535 Clinical Topics for Informaticists, presented lectures	3	1	0
Coplan, Scott, MPA	Affiliate Instructor	Primary	N/A			0	0
Curioso, Walter, MD, MPH	Affiliate Assistant Professor	Primary	N/A			0	0
Edwards, Joseph, PhD	Affiliate Assistant Professor	Primary	N/A			0	0
Fine, Jim, MD	Adjunct Associate Professor	Adjunct	100			0	0
Gantenbein, Rex, PhD	Affiliate Professor	Primary	N/A	UNIVERSITY OF WYOMING HLSC 4700 Health Informatics		0	0

BHI Extended Faculty							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Hammond, Ken, MD	Clinical Associate Professor	Joint with Psychiatry	N/A			0	0
Heckerman, David, PhD,MD	Affiliate Professor	Primary	N/A			1	1
Horvitz, Eric, MD, PhD	Affiliate Associate Professor	Primary	N/A			1	0
Kimball, Ann Marie, MD, MPH	Adjunct Professor	Adjunct	97			4	0
Kolker, Eugene, PhD	Affiliate Associate Professor	Primary	N/A			0	0
Matsen, Frederick, MD	Adjunct Professor	Adjunct	100			0	0
Oberle, Mark, MD,MPH	Adjunct Professor	Adjunct	13.15			3	0
O'Carroll, Patrick, MD	Affiliate Professor	Joint with Epidemiology	N/A			0	0
Payne, Tom, MD	Clinical Associate Professor	Joint with Medicine	N/A	MEBI 598 Special Topics	1	1	0
Rose, Eric, MD	Clinical Assistant Professor	Joint with Family Medicine	N/A			0	0

BHI Extended Faculty							
Name	**Rank**	**Appointment**	**FTE %**	**# courses taught**	**# credits taught**	**# MS/ dissertation cmtes served**	**# masters/ dissertation cmtes chaired**
Ross, Brian, PhD, MD	Adjunct Professor	Adjunct	100			0	0
Rosse, Cornelius, MD	Affiliate Professor Emeritus	Adjunct	N/A				
Rossini, Anthony, ScD	Affiliate Associate Professor	Primary	N/A			0	0
Schaad, Doug , PhD	Associate Professor	Primary	100	Hubio 568 – Problem Based Learning	1	0	0
Scott, Craig, PhD	Professor	Primary	100	HuBio 559: PBL Tutor: Yr II Winter Quarter PBL Component	3	0	0
Stewart, Brent, PhD	Professor	Extended Faculty Radiology					
Zierler, Brenda, PhD	Adjunct Associate Professor	Adjunct	100			4	6

D. OAP Summary Data – Corrected by BHI Division 1/26/09

Doctoral Level Students in Program	Current (2007-08)		2006-07		2005-06		2004-05		4 Year Average	
	Number	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*
Total	26		22		19		14		20.3	
Male	16	62%	14	64%	10	53%	7	50%	11.8	58%
Female	10	38%	8	36%	9	47%	7	50%	8.5	42%
African American	2	8%	0	0%	0	0%	0	0%	0.5	2%
American Indian	0	0%	0	0%	0	0%	0	0%	0.0	0%
Asian American/ Haw./ Pac Island	6	23%	5	23%	5	26%	4	29%	5.0	25%
Hispanic/Latino	1	4%	1	5%	0	0%	0	0%	0.5	2%
Caucasian	11	42%	10	45%	9	47%	5	36%	8.8	43%
Non-Resident Alien	0	0%	0	0%	0	0%	1	7%	0.3	1%
Not Available	6	23%	6	27%	5	26%	4	29%	5.3	26%

Doctoral Student Admissions	Current (2007-08)	2006-07	2005-06	2004-05	4 Year Average
Number Applied	20	15	25	30	22.5
Number Accepted	7	5	8	8	7.0
Number Enrolled	4	3	4	8	4.8
Percentage of Applicants Accepted	35%	33%	32%	27%	32%
Percentage of Accepted Enrolling	57%	60%	50%	100%	67%

Doctoral Student Progress/ Satisfaction	Current (2006-07)
# Survey Respondents	3
Placement Rate at Time of Degree Award	66.7%
Percentage of Students Who Published During Graduate Study	100.0%
Overall Satisfaction with program (Exit Survey)	4.0

Doctoral Degrees Awarded	Current (2007-08)		2006-07		2005-06		2004-05		4 Year Average	
	Number	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*
Total	3		1		2		1		1.4	
Male	2	67%	1	100%	0	0%	0	0%	0.6	43%
Female	1	33%	0	0%	2	100%	1	100%	0.8	57%
African American	0	0%	0	0%	0	0%	0	0%	0	0%
American Indian	0	0%	0	0%	0	0%	0	0%	0	0%
Asian American/ Haw./ Pac Island	1	33%	0	0%	0	0%	0	0%	0.2	14%
Hispanic/Latino	0	0%	0	0%	0	0%	0	0%	0	0%
Caucasian	2	67%	1	100%	1	50%	0	0%	0.8	57%
Non-Resident Alien	0	0%	0	0%	0	0%	1	100%	0.2	14%
Not Available	0	0%	0	0%	0	0%	0	0%	0	0%

Master's Level Students in Program	Current (2007-08)		2006-07		2005-06		2004-05		4 Year Average	
	Number	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*
Total	6		5		8		15		8.5	
Male	2	33%	3	60%	6	75%	9	60%	5.0	58.8%
Female	4	67%	2	40%	2	25%	6	40%	3.5	41.2%
African American	0	0%	0	0%	0	0%	0	0%	0.0	0.0%
American Indian	0	0%	0	0%	0	0%	0	0%	0.0	0.0%
Asian American/ Haw./ Pac Island	2	33%	2	40%	4	50%	7	47%	3.8	44.1%
Hispanic/Latino	0	0%	0	0%	0	0%	0	0%	0.0	0.0%
Caucasian	2	33%	3	60%	4	50%	5	33%	3.5	41.2%
Non-Resident Alien	1	17%	0	0%	0	0%	3	20%	1.0	11.8%
Not Available	1	17%	0	0%	0	0%	0	0%	0.3	2.9%

Master's Student Admissions	Current (2007-08)	2006-07	2005-06	2004-05	4 Yr Ave
Number Applied	9	3	11	24	12
Number Accepted	4	1	1	5	3
Number Enrolled	4	1	1	4	3
Percentage of Applicants Accepted	44%	33%	9%	21%	27%
Percentage of Accepted Enrolling	100%	100%	100%	80%	95%

Master's Student Progress/ Satisfaction	Current (2006-07)	3 Year Average	10 Year Change
# Survey Respondents	2	5	--
Placement Rate at Time of Degree Award	50.0%	42.9%	--
Percentage of Students Who Published During Graduate Study	50.0%	50.0%	--
Overall Satisfaction with program (Exit Survey)	4.0	3.8	--

Master's Degrees Awarded	Current (2007-08)		2006-07		2005-06		2004-05		4 Year Average	
	Number	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*	*Number*	*% of Total*
Total	1		2		4		6		3.25	
Male	1	100%	2	100%	3	75%	3	50%	2.25	69%
Female	0	0%	0	0%	1	25%	3	50%	1	31%
African American	0	0%	0	0%	0	0%	0	0%	0	0%
American Indian	0	0%	0	0%	0	0%	0	0%	0	0%
Asian American/ Haw./ Pac Island	1	100%	1	50%	2	50%	3	50%	1.75	54%
Hispanic/Latino	0	0%	0	0%	0	0%	0	0%	0	0%
Caucasian	0	0%	1	50%	2	50%	1	17%	1	31%
Non-Resident Alien	0	0%	0	0%	0	0%	2	33%	0.5	15%
Not Available	0	0%	0	0%	0	0%	0	0%	0	0%

Undergraduate Majors[1]	Current 2006-07		3 Year Average		10 Year Change	
	Number	*Percent of Total*	*Number*	*Percent of Total*	*Numeric Change*	*Percent Change*
Total						
Male						
Female						
African American						
American Indian						
Asian American/ Haw./ Pac Island						
Hispanic/Latino						
Caucasian						
Non-Resident Alien						
Not Available						

Bachelors Degrees Awarded[2]	Current 2006-07		3 Year Average		10 Year Change	
	Number	*Percent of Total*	*Number*	*Percent of Total*	*Numeric Change*	*Percent Change*
Total						
Male						
Female						
African American						
American Indian						
Asian American/ Haw./ Pac Island						
Hispanic/Latino						
Caucasian						
Non-Resident Alien						
Not Available						

Student Credit Hours (SCH) by Course Level[3]	Current 2006-07		3 Year Average		10 Year Change	
	Number	*Percent of Total*	*Number*	*Percent of Total*	*Numeric Change*	*Percent Change*
Taken by Undergraduate Students						
Lower-Division Courses	0	0.0%	0.0	0.0%	--	--
Upper-Division Courses	13	40.6%	9.7	18.2%	--	--
Graduate Courses	19	59.4%	43.3	81.8%	--	--
Total	32		53.0		--	--
Taken by Graduate/Professional Students						
Lower-Division Courses	0	0.0%	0.0	0.0%	--	--
Upper-Division Courses	0	0.0%	0.0	0.0%	--	--
Graduate Courses	770	100.0%	773.8	100.0%	--	--
Total	770		773.8		--	--
Total						
Lower-Division Courses	0	0.0%	0.0	0.0%	--	--
Upper-Division Courses	13	1.6%	9.7	1.2%	--	--
Graduate Courses	789	98.4%	817.2	98.8%	--	--
Total	802		826.8		--	--

Student Evaluations of Instructional Quality[4]	Current 2006-07	5 Year Average
Lower-Division Courses		
Upper-Division Courses		
All Courses	--	3.9
Satisfaction of Recent Graduates with Instruction in Their Program[5]	**Survey of 2005 Graduates**	**Average from Surveys of 2001, 2003, and 2005 Graduates**
Overall Satisfaction with Program	--	--

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Abernethy, Neil F.	Assistant Professor
eRA COMMONS USER NAME	Division of Biomedical and Health Informatics

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
North Carolina State University, Raleigh, NC	B.S.	1993	Applied Mathematics
North Carolina State University, Raleigh, NC	BS	1993	Biochemistry
Stanford University, Stanford CA	Ph.D.	2005	Biomedical Informatics

A. POSITIONS AND HONORS

Positions

2008 - Assistant Professor, Division of Biomedical and Health Informatics, Department of Medical Education and Biomedical Informatics, School of Medicine and Department of Health Services, School of Public Health, University of Washington, Seattle, WA

2007-08 Statistical Consultant, Medical Research Council (UK) Laboratories, The Gambia, West Africa

2006-07 Post-Doctoral Scholar, Pulmonary Medicine, University of California San Francisco, San Francisco, CA

Professional Affiliation and Service

Tuberculosis Epidemiologic Studies Consortium, Process and External Relations committees
American Medical Informatics Association (AMIA)
International Society for Computational Biology (ISCB), founding member
American Journal of Public Health, reviewer
Bio-Ontologies Working Group (1998-2000)

- Committee member and web-site administrator

Tuberculosis Epidemiologic Studies Consortium (2006-2007)

- Committee member: Translating Research Into Practice, Process Evaluation, and External Relations committees
- Presenter for External Review board

CDC Pre-exposure Prophyllaxis Implementation Planning, Monitoring and Evaluation and Network Science group member

Honors and Patents

Gold Star Performance Award, University of California, San Francisco, 2007

U.S. Patent No. 6,442,566: Frame-based knowledge representation system and methods

B. SELECTED PEER-REVIEWED PUBLICATIONS

R. S. Aga, E. Fair, N. F. Abernethy, K. DeRiemer, E. Paz, L. Kawamura, P. M. Small, M. Kato-Maeda. Microevolution of the Direct Repeat Locus of *Mycobacterium tuberculosis* in a Strain Prevalent in San Francisco. Journal of Clinical Microbiology 44(4):1558-1560, April 2006.

P. K. Dewan, H. Banouvong, N. F. Abernethy, T. Hoynes, M. Woldemariam, L. Diaz, T. Ampie, J. Grinsdale, L. M. Kawamura; A Tuberculosis Outbreak in a Child Daycare – San Francisco 2002-2004; Pediatrics 117:3 pp. 863-869, 2006.

N. F. Abernethy; Automating Social Network Models for Tuberculosis Contact Investigation. Ph.D. Dissertation, Stanford University, September, 2005.

N. Abernethy; Using a Genetic Algorithm to Select Beam Configurations for Radiosurgery of the Brain; Genetic Algorithms and Genetic Programming at Stanford 2002, J. Koza, editor; Stanford, CA, 2000.

R. McEntire, P. Karp, N. F. Abernethy, et al. An Evaluation of Ontology Exchange Languages for Bioinformatics. In Proceedings of the Eighth conference on Intelligent Systems for Molecular Biology (ISMB2000), pages 239-250. AAAI Press, Menlo Park, California, 19-23 August 2000.

C. RESEARCH SUPPORT

Ongoing Research

1. National Library of Medicine, Medical Informatics Training Program fellowship, 1999-2003

2. Stanford University BASES Business Competition, winner, 1998

3. TBESC Task Order #22: "Assessing the Integration of Social Network Analysis into Tuberculosis Contact Investigation Practice"
   Grantor: CDC, TB Epidemiologic Studies Consortium
   Dates: Feb 16, 2008 - Dec 31, 2009 Budget: $175,326
   Role: Co-Principal Investigator / Project Coordinator (transferred to Phil Hopewell, MD)

E. Abbreviated Faculty Curricula Vitae

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Anderson, Nicholas	Associate Director, Biomedical Informatics Core,
eRA COMMONS USER NAME	Institute of Translational Health Science,
nick.anderson	Acting Assistant Professor, University of Washington, Seattle, WA

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Evergreen State College, Olympia, WA	B.S.	1991	Computer Science
Oregon Health & Science University, Portland, OR	M.S.	2004	Biomedical Informatics
University of Washington, Seattle, WA	Ph.D.	2007	Biomedical Informatics

A. POSITIONS AND HONORS

Selected Informatics Positions

2007 – Associate Director, Biomedical Informatics Core, Institute of Translational Health Sciences
2007 - Acting Assistant Professor, Department of Medical Education and Biomedical Informatics, University of Washington

Honors and Awards

2004 - 2007 National Library of Medicine Research Fellow

Special National Responsibilities

2005 – 2007 JAMIA Editorial Board Student Member
2008 – 2009 CTSA Informatics National Planning Committee

B. PEER-REVIEWED PUBLICATIONS

Anderson, Tarczy-Hornoch, Bumgarner, On the Persistence of Supplementary Resources in Biomedical Publications. BMC Bioinformatics 7(1):260-267, 2006

Anderson, Ash, Tarczy-Hornoch A Qualitative Study of the Implementation of a Bioinformatics Tool in a Biological Research Laboratory, International Journal of Medical Informatics 76,821-828, 2006

Anderson, Lee, Brockenbrough, Minie, Fuller, Brinkley, Tarczy-Hornoch An Assessment of the Data Management Needs of Academic Biomedical Researchers, Journal of the American Informatics Association, 14(4):478-488, 2007

Anderson, Bammler, Tarczy-Hornoch, Bumgarner, Describing Microarray Experimentation: Time, Services and Barriers, In press BMC Bioinformatics 2007

Ash, **Anderson**, Tarczy-Hornoch People and Organizational Issues in Clinical and Research Systems Implementation, Journal of the American Medical Informatics Association, 15(3),283-289, 2008

Eden K, Dolan J, Perrn N, Kocaoglu D, **Anderson NR**, Case J, Guise J. Use of a graphic-numeric scale reduced inconsistency in childbirth preference measurements in a randomized trial. In press. Journal of Clinical Epidemiology 2008

Lee, McDonald, **Anderson**, Tarczy-Hornoch Incorporating collaboratory concepts into informatics in support of translational interdisciplinary biomedical research, International Journal of Medical Informatics 2008

Bernstam EV, Hersh WR, Johnson SB, Chute CG, Nguyen H, Sim I, Nahm M, Weiner M, Miller P, DiLaura RP, Overcash M, Lehmann HP, Eichmann D, Athey BD, Scheuermann RH, **Anderson N**, Starren JB, Harris PA, Smith JW, Barbour E, Silverstein JS, Krusch DA, Nagarajan R and Becich MJ. Synergies and Distinctions between Computational Disciplines in Biomedical Research: Perspective from the Clinical and Translational Science Award Programs. Acad Med, in press. 2008

Invited Regional and National Presentations

"People and Organizational Issues in Clinical and Research Systems Implementation", Faculty for Tutorial, Fall 2007 AMIA Symposium, Chicago, IL, November 11, 2007,

"Experimental Information Management Issues and Barriers in Biomedical Research", Public Health Genetics Seminar, University of Washington, Nov 28, 2007

"An Interinstitutional Genetic Databanking Policy Perspective: The United States CTSA Initiative", Governing Genetic Biobanks Conference, Oxford, England June 26 2008

Anderson, NR Chilana,P, Tarczy-Hornoch, P "Challenges of Implementing Anonymized Cross-Institutional Federated Querying for Clinical Translational Research, CHI 2009 Conference

C. Ongoing Research Support

UL1 RR 025014-01 (Disis) 9/17/2007-5/31/2012
NCRR/NIH
Institute of Translational Health Sciences
This grant is linked to two training grants; together, the three grants fund the Institute of Translational Health Sciences, a partnership between the University of Washington, the Fred Hutchinson Cancer Research Center, Children's Hospital and Regional Medical Center, and local and regional research and community partners. As a "collaboratory," the Institute fosters collaboration, career development, education, innovative technologies and resources, and the translational health research process itself.
Role: Co-Investigator

1UL1RR025014-01-Pilot 08/01/08-07/31/09
ITHS
Developing Policy to Overcome Barriers for Biorepository Data Sharing
This project will develop policy recommendations to be evaluated and potentially adopted by ITHS partners seeking to establish informed governance over biorepository resources.
Role: Principle Investigator

RFP-08-001 011/17/08-12/31/10
NCRR/NIH
Adapting the i2b2 Architecture to Support Cross-Institutional Clinical Translational Research
This project will develop anonymous cohort discovery functionality across three CTSA institutions (UW, UCSF, UCD)
Role: Principle Investigator

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
BRINKLEY, James F.	Professor
eRA COMMONS USER NAME brinkley	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Amherst College, Mass.	B.A.	1970	Mathematics
University of Washington, Seattle	M.D.	1974	
Stanford University, California	Ph.D.	1984	Med. Comp. Eng.

A. Positions and Honors

1988 – 2006 Assistant, Associate, and Full Research Professor, Department of Biological Structure, University of Washington. Adjunct appointments in Department of Computer Science and Engineering, and Division of Biomedical and Health Informatics, Department of Medical Education

2006-present. Professor, Department of Biological Structure, University of Washington. Adjunct in Department of Computer Science and Engineering, and Joint with Department of Medical Education and Biomedical Informatics

1996-present. Director, University of Washington Structural Informatics Group

1999 Elected Fellow, American College of Informatics.

2000-present Editorial board, Journal of Biomedical Informatics

2003-present Editorial board, Methods of Information in Medicine

2004-present Advisory board, NIH Murine Atlas of Genitourinary Development (GUDMAP) Consortium

2004 Scientific Program Committee, International Medical Informatics Association Fall Symposium

1999-2004 Editorial board, Journal of the American Medical Informatics Association

1990-present Reviewer, various NIH study sections

B. Selected Publications

Tang Z, Kadiyska Y, Li H, Suciu D, Brinkley JF. Dynamic XML-based exchange of relational data: application to the Human Brain Project. In: Proceedings, AMIA Fall Symposium. Pp 649-653; 2003.

Re, C., Brinkley,J., Hinshaw, K. and Suciu,D. Distributed XQuery. In: Proceedings of the Workshop on Information Integration on the Web (IIWeb), September 2004, pp 116-121.

Detwiler LT, Chung E, Li A, Mejino JLV, Agoncillo AV, Brinkley JF, Rosse C, Shapiro LG. A relation-centric query engine for the foundational model of anatomy. In: Proceedings, MEDINFO 2004, San Francisco, CA.;2004, pp 341-345.

Cho, H., Corina, D., Brinkley, J.F., Ojemann, G.A. and Shapiro, L.G. A new template matching method using variance estimation for spike sorting, In Proceedings, IEEE EMBS 2nd International Neural Conference on Engineering, March 16-19, 2005.

Corina DP, Gibson EK, Martin RF, Poliakov A, Brinkley JF, Ojemann GA. Dissociation of action and object naming: evidence from cortical stimulation mapping. Human Brain Mapping 2005; 24(1):1-10.

Shapiro, L.G., Chung, E., Detwiler, L.T., Mejino, J.L.V., Agoncillo, A.V., Brinkley, J.F. and Rosse, C. Processes and problems in the formative evaluation of an interface to the foundational model of anatomy. J. American Medical Informatics Association 2005; 12:35-46.

Poliakov AV, Albright E, Hinshaw KP, Corina DP, Ojemann G, Martin RF, Brinkley JF. Server-based approach to web visualization of integrated 3-D brain imaging data. Journal of the American Medical Informatics Association. 2005; 12(2):140-151.

Wang K, Tarczy-Hornoch P, Shaker R, Mork P, Brinkley JF. BioMediator Data Integration: Beyond Genomics to Neuroscience Data. In: Proceedings, AMIA Fall Symposium; 2005. p. 779-783.

Warren W, Brinkley JF. Knowledge-based, interactive, custom anatomical scene creation for medical education: the Biolucida system. In: Proceedings, AMIA Fall Symposium. Washington, D.C.; 2005. p. 789-793. http://sigpubs.biostr.washington.edu/archive/00000181/

Bales N, Brinkley J, Lee ES, Mathur S, Re C, Suciu D. A framework for XML-based integration of data, visualization and analysis in a biomedical domain. In: Proceedings, Third International XML Database Symposium (XSym 2005). Trondheim, Norway; 2005. p. 207-221.

Lee, E.S., Suciu, D. and Brinkley, J.F. Automatic XQuery Generation and Generalized Visualization for an XML Interface to a Relational Database. In: Proceedings Fall AMIA Symposium, 2005, p 1019.

Smith VS, Shapiro LG, Hanlon D, Martin RF, Brinkley JF, Poliakov AV, Ojemann GA, Corina DP. Evaluating spatial normalization methods for the human brain. In: Proceedings, 27th Annual Conference of the IEEE Engineering in Medicine and Biology Society (EMBS). Shanghai, China; 2005. p. 5331-5334.

Brinkley, JF, Suciu, D, Detwiler, LT, Gennari, JH, and Rosse, C. A framework for using reference ontologies as a foundation for the semantic web. In: Proceedings AMIA Fall Symposium; 2006, p. 96-100. http://sigpubs.biostr.washington.edu/archive/00000188/

Li, H., Gennari, JH, Brinkley, JF. Model-driven laboratory information management systems. In: Proceedings AMIA Fall Symposium; 2006, pp 484-488. http://sigpubs.biostr.washington.edu/archive/00000189/.

Brinkley, J.F. and Greenes, R.G. 2006 Imaging and Structural Informatics. In: Biomedical Informatics: Computer Applications in Health Care and Biomedicine (3rd edition). Shortliffe, E.H. and Cimino, J.J.. eds., Chapter 9, pp 344-378.

Greenes, R. G. and Brinkley, J.F. 2006 Imaging Systems in Radiology. In: Biomedical Informatics: Computer Applications in Health Care and Biomedicine (3rd edition). Shortliffe, E.H. and Cimino, J.J.. eds., Chapter 18, pp 626-659.

Re, C., Brinkley, J., Suciu, D. 2006 A performant XQuery to SQL translator. Technical Report 2006-06-02. Dept. Computer Science and Engineering, University of Washington. http://silkroute.cs.washington.edu/SilkRouteII_TR.pdf.

Poliakov A, Hertzenberrg X, Moore EB, Corina D, Ojemann GA, Brinkley JF. Unobtrusive integration of data management with fMRI analysis. Neuroinformatics 5(1):3-10, 2007.

Anderson NR, Lee ES, Brockenbrough JS, Minie ME, Fuller S, Brinkley J, Tarczy-Hornoch P. Issues in biomedical research data management and analysis: needs and barriers. Journal of the American Medical Informatics Association, 14(4): 478-488, 2007.

Moore, EB, Poliakov, AV, Lincoln, P, Brinkley, JF. MindSeer: a portable and extensible tool for visualization of structural and functional neuroimaging data. BMC Bioinformatics, 8:389-, 2007. http://www.biomedcentral.com/1471-2105/8/389.

Li, X., Gennari, JH, Brinkley, JF. XGI: A graphical interface for XQuery creation. In: Proceedings AMIA Fall Symposium; 2007, pp 453-457.

Yngve, G., Brinkley, JF, Cook, D, Shapiro, LG. A model browser for biosimulation. In: Proceedings AMIA Fall Symposium; 2007, pp 836-840.

Mejino JL, Rubin DL, Brinkley J. FMA-RadLex: An application ontology of radiological anatomy derived from the Foundational Model of Anatomy reference ontology. In: Proceedings, Fall Symposium of the American Medical Informatics Association. 2008, pp 465-469.

Shaw M, Detwiler LT, Brinkley JF, Suciu D. Generating application ontologies from reference ontologies. In: Proceedings, Fall Symposium of the American Medical Informatics Association. 2008, pp 672-676.

Detwiler LT, Suciu D, Brinkley JF. Regular paths in SparQL: Querying the NCI thesaurus. In: Proceedings, Fall Symposium of the American Medical Informatics Association. 2008, pp 161-165.

Detwiler LT, Suciu D, Franklin JD, Moore EB, Poliakov AV, Lee ES, Corina D, Ojemann GA, Brinkley JF. Distributed XQuery-based integration and visualization of multimodality data: Application to brain mapping. Frontiers in Neuroinformatics. In Press 2009.

C. Research Support

Active

"Realizing the Potential of Reference Ontologies for the Semantic Web", a BISTI Collaborative grant with the Stanford Center for Bioontology
Principal Investigator: James F. Brinkley, M.D., Ph.D.
Agency: National Heart, Lung and Blood Institute
Type: RO1 HL08770, 2/15/07-12/31/10
Develop view-based approaches for creating application ontologies from large and complex reference ontologies such as our Foundational Model of Anatomy.

"Multimedia information retrieval for biological research"
Principal Investigator: Linda G. Shapiro, PhD (computer science)
Agency: National Science Foundation
Type: DBI-0543631, 7/1/06-6/30/09,
Role: Co-investigator
Develop a general framework that combines content-based retrieval with probabilistic databases.

"Institute of Translational Health Sciences"
Principal Investigator: Mary L. Disis, M.D.
Agency: NIH/NCRR (National Center for Research Resources)
Type: 1UL1 RR 025014, 9/17/07-5/31/12
Role: Associate director, informatics core
Develop informatics tools and procedures for clinical researchers

Inactive

"Structural Information Framework for Brain Mapping", a Human Brain Project grant.

Principal Investigator: James F. Brinkley, M.D., Ph.D.
Agencies: National Institute of Deafness and Other Communication Disorders, National Institute of Mental Health
Type: RO1 (DC/MH02310), years 8-14, Aug 1, 2002-July 31, 2008
Organize functional brain mapping data around a structural framework provided by a patient-specific, MR-based 3-D neuroanatomical model, make this framework available to diverse users over the Internet, and apply these tools to the study of language organization in the brain. The hypothesis is that a structural framework, when made accessible in a distributed information system, will facilitate sharing and integration of language mapping data, and will foster the generation of new theories of language organization.

"Interdisciplinary Center for Structural Informatics", a Biomedical Information Science Technology Initiative (BISTI) Center Planning grant.
Principal Investigator: James F. Brinkley, M.D., Ph.D.
Agency: National Library of Medicine
Type: P20 LM07714, Period: January 1, 2003-November 30, 2006
This was a grant awarded by the NIH BISTI initiative in order to plan for a National Center for Excellence in Biomedical Computing. The overall goal of the Center would be to foster the creation of a distributed biomedical information framework based on the structure of the body as an organizing principle.

"Beyond the Spreadsheet: Information management for GCRC investigators": University of Washington General Clinical Research Center (GCRC) Pilot grant, 3/1/06-6/30/07.
Principal investigator: James F. Brinkley, M.D., Ph.D.
The goal of this internal pilot grant was to apply local lab management tools developed as part of the Human Brain Project and BISTI to the information management needs of clinical investigators.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Brian David Brown	Lecturer
eRA COMMONS USER NAME	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Michigan State University	B.A.	1982	English
Michigan State University	B.S.	1982	Physiology
Michigan State University	M.A.	1990	Anthropology
Michigan State University	Ph.D.	1995	Anthropology

A. Positions and Honors.

Positions and Employment

2000-2001, Administrative Supervisor, Department of Management Science, School of Business, University of Washington
2001-2003, Program Manager, Department of Medical Education, School of Medicine, University of Washington
2003-2005, Academic Program Advisor, Department of Medical Education and Biomedical Informatics, School of Medicine, University of Washington
2005-present, Lecturer, Biomedical and Health Informatics, Medical Education and Biomedical Informatics, School of Medicine, University of Washington

Other Experience and Professional Memberships

American Medical Informatics Association
American Anthropological Association

Honors

1991- Excellence In Teaching Citation, , Michigan State University, , Sponsored by Office of the Provost.

BIOGRAPHICAL SKETCH

NAME Valerie Daggett	POSITION TITLE Professor
eRA COMMONS USER NAME vdaggett	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Reed College, Portland OR	BA	1979-1983	Chemistry
University of California, San Francisco, CA (Advisors: Irwin Kuntz and Peter Kollman)	PhD	1985-1990	Pharmaceutical Chemistry
Stanford University, Stanford, CA (Advisor: Michael Levitt)	Postdoc	1990-1993	Structural Biology

A. Positions and Honors

Professional Experience at the University of Washington:

2007-	Professor of Bioengineering
2007-	Director, Biomolecular Structure and Design Program
1998-	Adjunct Professor of Biochemistry
2002-	Adjunct Professor of Biomedical and Health Informatics
1993-	Member of Molecular Biophysics Program
1996-	Founding Member of Biomolecular Structure and Design Program
2002-	Member of Neurobiology and Behavior Program
2005-	Member of Computational Biology Program
2005-2007	Adjunct Professor of Bioengineering
2003-2007	Professor of Medicinal Chemistry
1998-2003	Associate Professor of Medicinal Chemistry

Honors, Awards and Service:

NIH Study Sections (Ad hoc): Project site visit, 4/97; Human Genome RFA, 8/97; Program Project Proposal, 3/03; BBCA, 2004.

Charter Member of NIH Macromolecular Structure and Function B Study Section, July 2005 - 2008. (I was on BBCA before the restructuring.)

Chair of 2004 Biopolymers Gordon Conference, vice chair 2002

Editor of first volume on Protein Simulations for *Advances in Protein Chemistry,* 2003

Elected to the Nominating Committee for the Protein Society (2000-2003)

Co-organizer of the Annual Protein Society Meeting (2002)

US Department of Energy (DOE) *Innovative and Novel Computational Impact on Theory and Experiment* (INCITE) award for research in "Molecular Dynameomics." 2005.

Senior Editor of *Protein Engineering Design and Selection (PEDS)* with Alan Fersht (January 2004-present)

Editorial Boards (current): *Biochemistry* (2003-present), *Structure* (1995-present), *Biomedical Computation Review (BCR)* (2005-present).

Editorial Boards (former): *Folding and Design* (1995-2000), *Protein Science* (1996-2003), Principal Editor for *TheScientificWorld* (2000-2001) and Structural Biology section of Biomed Central, (2001-2003).

Participant/lecturer for Royal Society Discussion Meeting on New Science from High Performance Computing, I represented the field of Biomolecular Modeling (10/2001)

Chair of 2004 Biopolymers Gordon Conference.Vice Chair 2002.

Chair of 2009 Cellular Osmoregulation Gordon Conference.Vice Chair 2007.

Contributing faculty member to 'Faculty of 1000 Biology', February 2005 – 2007.
Elected Biophysical Society Council Member, 2007-2010.
Editor, *Current Opinion in Structural Biology*, Folding and Binding Issue, 2007 and 2009.
I am invited to give 12-24 seminars a year at domestic and international institutions and meetings.

B. Publications (selected from >160 publications, >6,300 citations, ~700 citations/yr last 5 yrs, h-index = 47)

Daggett, V. and A.R. Fersht, Is There a Unifying Mechanism for Protein Folding? *Trends in Biochem. Sci.*, **28**, 18-25, 2003.

Day, R. and **V. Daggett**, All-Atom Simulations of Protein Folding and Unfolding, *Adv. Prot. Chem*., **66**, 373-403, 2003.

Walsh, S.T.R., Cheng, R.P., Alonso, D.O.V., **Daggett, V**., Vanderkooi, J., and DeGrado, W.F. The Hydration of Amides in Helices: A Comprehensive Picture from Molecular Dynamics, IR and NMR, *Protein Science*, **12**, 520-531, 2003.

Mayor, U., Johnson, C.M., Grossmann, J.G., Sato, S., Jas, G.S., Freund, S.M.V., Guydosh, N.R., Alonso, D.O.V., **Daggett, V.** and A.R. Fersht, The Complete Folding Pathway of a Protein from Nanoseconds to Microseconds, *Nature*, **421**, 863-867, 2003.

Bennion, B. and **Daggett, V**., The Molecular Basis for the Chemical Denaturation of Proteins by Urea, *Proc. Natl. Acad. Sci. USA*, **100**, 5142-5147, 2003.

Daggett, V. and Fersht, A.R. The present view of the mechanism of protein folding, *Nat. Rev. Mol. Cell. Biol*., **4**, 497-502, 2003.

Day, R., Beck, D., Armen, R. and **V. Daggett,** A Consensus View of Fold Space: Combining SCOP, CATH, and the Dali Domain Dictionary, *Protein Science*, **12**, 2150-2160, 2003.

Gianni, S., Guydosh, N.R., Khan, F., Caldas, T.D., Mayor, U., White, G.W.N., DeMarco, M.L., **Daggett, V**. and A.R. Fersht, Unifying features in protein-folding mechanisms. *Proc. Natl. Acad. Sci. USA*, **100**, 13286-13291, 2003.

Zhu, Y, Alonso, D.O.V., Maki, K., Huang, C.-Y., Lahr, S.J., **Daggett, V.,** Roder, H., DeGrado, W.F., and F. Gai, Ultrafast Folding of α_3D, A *De Novo* Designed Three-Helix Bundle Protein, *Proc. Natl. Acad. Sci. USA,* **100**: 15486-15491, 2003.

DeMarco, M.L. and **V. Daggett**, From Conversion to Aggregation: Protofibril Formation of the Prion Protein, *Proc. Natl. Acad. Sci. USA,* **101**, 2293-2298*,* 2004*.*

Bennion, B.J. and **V. Daggett**, Counteraction of urea-induced protein denaturation by TMAO: A chemical chaperone at atomic resolution, *Proc. Natl. Acad. Sci. USA,* **101**, 6433-6438, 2004.

Sato, S., Religa, T., **Daggett, V**. and A.R. Fersht, Testing protein folding simulations by experiment, *Proc. Natl. Acad. Sci. USA*, **101,** 6952-6956, 2004.

Jemth, P., Gianni, S., Day, R., Li, B., Johnson, C.M., **Daggett, V**. and A.R. Fersht, Demonstration of a low energy on-pathway intermediate in a fast folding protein, *Proc. Natl. Acad. Sci. USA*, **101**, 6450-6455, 2004.

Armen, R.S., DeMarco, M.L., Alonso, D.O.V. and **V. Daggett**, Pauling and Corey's α-pleated sheet structure may define the prefibrillar amyloidogenic intermediate in amyloid disease *Proc. Natl. Acad. Sci. USA*, **101**, 11622-11627, 2004.

Beck, D.A.C. and **V. Daggett**, Methods for Molecular Dynamics Simulations of Protein Folding / Unfolding in Solution, *Methods*, **34**, 112-120, 2004.

Bennion, B.J., DeMarco, M. and **V. Daggett**, Preventing misfolding of the prion protein by Trimethylamine N-oxide, *Biochemistry*, **43**, 12955-12963, 2004.

Rizzuti, B., **Daggett, V**., Guzzi, R., and L. Sportelli, The early steps in the unfolding of azurin, *Biochemistry*, **43**, 15604-15609, 2004.

Beck, D.A.C., Armen, R.S. and **V. Daggett**, Cutoff size need not strongly influence molecular dynamics results on solvated polypeptides. *Biochemistry*, 44, 609-616, 2005.

Esposito, L. and **V. Daggett**. Insight into ribonuclease A domain swapping by molecular dynamics unfolding simulations, *Biochemistry*, **44**, 3358-3368, 2005.

Ferguson, N., Day, R., Johnson, C.M., Allen, M.D., **Daggett, V.** and A.R. Fersht, Simulation and experiment at high temperatures: Ultrafast folding of a thermophilic protein by nucleation-condensation*, J. Mol. Biol*., **347**, 855-870, 2005.

Day, R. and **V. Daggett**, Sensitivity of the folding/unfolding transition state ensemble of chymotrypsin inhibitor 2 to changes in temperature and solvent, *Prot. Sci.*, **14**, 1242-1252, 2005.

White, G.W.N., Gianni, S., Grossman, J.G., Jemth, P., Fersht, A.R. and **V. Daggett**, Simulation and Experiment Conspire to reveal Cryptic Intermediates and the Slide from the Nucleation-Condensation to Framework Mechanism of Folding. *J. Mol. Biol*., **350**, 757-775, 2005.

Jemth, P., Day, R., Gianni, S., Khan, F., Allen, M., **Daggett, V**., and A.R. Fersht, The structure of the major transition state for folding of an FF domain from experiment and simulation, *J. Mol. Biol*., **350**, 363-378, 2005.

Day, R. and **V. Daggett**, Ensemble versus single-molecule protein unfolding. *Proc. Natl. Acad. Sci. USA*, **102**, 13445-13450, 2005.

Armen, R.S., Bernard, B., Day, R., Alonso, D.O.V. and **V. Daggett**, Characterization of a possible amyloidogenic precursor in glutamine-repeat neurodegenerative diseases**,** *Proc. Natl. Acad. Sci. USA,* **102**, 13433-13438, 2005*.*

Daggett, V., Protein Folding—Simulation, *Chemical Reviews*, **106,** 1898-1916, 2006.

Scott, K.A., Alonso, D.O.V., Pan, Y. and **V. Daggett**, The importance of context in protein folding: Secondary structural propensities versus tertiary contact-assisted secondary structure formation, *Biochem*., **45,** 4153-4163, 2006.

Scott, K.A., Randles, L.G., Moran, S.J., **Daggett, V.** and J. Clarke. The folding pathway of spectrin R17 from experiment and simulation: Using experimentally validated MD simulations to characterize states hinted at by experiment. *J. Mol. Biol*., **359**, 159-173, 2006.

Petrovich, M., Jonsson, A.L., Ferguson, N., **Daggett, V**., and A.R. Fersht. Φ-analysis at the experimental limits: Mechanism of β-hairpin formation. *J. Mol. Biol*., **360**, 865-881, 2006.

Daggett, V. α-sheet: The toxic conformer in amyloid diseases? *Acc. Chem. Res*., **39**, 594-602, 2006.

DeMarco, M.L., Silveira, J., Caughey, B., and **V. Daggett,** Structural Properties of Prion Protein Protofibrils and Fibrils: An Experimental Assessment of Atomic Models, *Biochem*., **45**, 15573-15582, 2006.

DeMarco, M.L. and **V. Daggett**, Molecular Mechanism for Low pH-Triggered Misfolding of the Human Prion Protein, *Biochem*., **46**, 3045-3054, 2007. *(Designated a 'Hot Article'. The #17 most-accessed article in 2007)*

Day, R. and **V. Daggett**, Direct observation of microscopic reversibility in protein folding, *J. Mol. Biol*., **366**, 677-686, 2007.

Scott, K.A. and **V. Daggett**, The folding mechanisms of proteins with high sequence identity but different folds, *Biochem*., **46**, 1545-1556, 2007.

Scott, K.A., Alonso, D.O.V., Sato, S., Fersht, A.R. and **V. Daggett**, Conformational Entropy of Alanine versus Glycine in Protein Denatured States, *Proc. Natl. Acad. Sci. USA*, **104**, 2661-2666, 2007.

Fersht, A.R. and **V. Daggett**. Folding and binding: implementing the game plan, *Current Opinion in Structural Biology*, **17**, 1-2, 2007.

Steward, R.E., Armen, R.S. and **V. Daggett**, Different disease-causing mutations in transthyretin accelerate the same conformational conversion, *Protein Engineering Design and Selection*, **21**, 187-19, 2008.

Smolin, N. and **V. Daggett**, Formation of ice-like water structure on the surface of an antifreeze protein, *Journal of Physical Chemistry B*, **112**, 6193-6206, 2008.

Beck, D.A.C., Alonso, D.O.V., Inoyama, D. and **V. Daggett**, The intrinsic conformational propensities of the twenty naturally occurring amino acids and reflection of these propensities in proteins, *Proc. Natl. Acad. Sci. USA*, **105**, 12259-12264**,** 2008.

C. Current Research Projects

1. "**Molecular Dynamics Simulations of Protein Unfolding**"
   Principal Investigator: Valerie Daggett
   Agency: National Institutes of Health
   Type: R01 (GM-50789) Period: 8/1/04-7/31/09

Goal: To perform computer simulations of protein unfolding

2. "**Molecular Dynameomics**"
   Principal Investigator: Valerie Daggett
   Agency: Department of Energy
   Type: Award of 3 million CPU hours at NERSC supercomputer facility. Period: 1/15/09 – 1/14/10
   Goal: To perform multiple molecular dynamics simulations of representatives of all protein folds.
   This is an award of computer time and we will be given more time after exhausting our allocation.

3. "**Tools for Protein Folding / Protein Unfolding**"
   Principal Investigator: Valerie Daggett
   Agency: Microsoft Corporation
   Type: Grant Period 6/16/06-6/15/09 (being renewed)
   Goal: To develop a database of molecular dynamics simulations of representatives of all known protein folds, as well as the associated web services and data mining tools.

4. "**Computer Cluster for Protomics**"
   Principal Investigator: David Goodlett (20% allotment to Daggett)
   Agency: National Institutes of Health
   Type: Equipment Grant Period: 10/1/06- whenever the machines die
   We perform simulations and analysis on this system.

5. "**The Folding of Helical Repeat Proteins**"
   Principal Investigator: Lynne Regan (PD, Yale University), Daggett (Co-PI), Haran (Co-PI, Israel), D'Andrea (Co-PI, Italy)
   Agency: Human Frontiers of Science Program
   Type: Small Grant Period: 6/1/07-5/31/10
   Goal: We are pursuing a multifaceted, interdisciplinary approach to the study of the folding of repeat proteins. Although repeat proteins are widely found in nature, and perform a range of essential functions, they have been much less extensively studied than globular proteins.

6. "**Characterization of prion protein conformational changes**"
   Principal Investigator: Valerie Daggett
   Agency: National Institutes of Health
   Type: R01 (GM-81407) Period: 8/1/07-7/31/11
   Goal: To characterize conformational changes associated with amyloidosis in the prion protein from different species in the isolated protein in solution, and when attached to a membrane and glycosylated.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Demiris, George	Associate Professor
eRA COMMONS USER NAME gdemiris	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Ruprecht-Karls University of Heidelberg, Germany	BS	1991	Medical Informatics
Ruprecht-Karls University of Heidelberg, Germany	MS	1994	Medical Informatics
University of Minnesota	PhD	2000	Health Informatics

B. Positions and Honors.

Positions and Employment

2001 Visiting Professor at the National School of Public Health, Athens, Greece
2001 Project Manager, ATKOSoft SA, Athens, Greece
2002-2006 Assistant Professor, Department of Health Management and Informatics-University of Missouri, Columbia
2003-2006 Director, Health Informatics Graduate Program; Department of Health Management and Informatics-University of Missouri, Columbia.
2006- Associate Professor, Biobehavioral Nursing and Health Systems, School of Nursing; and Biomedical and Health Informatics, School of Medicine (joint appointment), University of Washington
2007- Director of Graduate Program, Biomedical and Health Informatics, School of Medicine & Director of Clinical Informatics and Patient Centered Technologies, School of Nursing, University of Washington

Honors

2001 Diana E. Forsythe Award Finalist for the paper "The Nature of Communication in Virtual Home Care Visits" Amercian Medical Association.
2005 MU Sinclair School of Nursing Interdisciplinary Faculty Award for Excellence
2003 Catherine Pouget Award for Research Improving Quality of Life at the End of Life
2003 University of Missouri Alumni Association Faculty Incentive Grant
2005 MU Sinclair School of Nursing Interdisciplinary Faculty Award for Excellence

B. Selected peer-reviewed publications (in chronological order, out of 72 total).

- **Demiris G**, Speedie S, Finkelstein S, Harris I. Communication patterns and technical quality of virtual visits in home care. *Journal of Telemedicine and Telecare* 2003; 9(4):210-215
- Patrick TB, **Demiris G**, Folk LC, Moxley DE, Mitchell JA, Tao D. *Evidence-Based Retrieval in Evidence-Based Medicine*. Journal of the Medical Library Association 2004; 92(2): 196-199
- **Demiris G,** Speedie SM, Hicks LL. Assessment of Patients' Acceptance of and Satisfaction with Teledermatology. Journal of Medical Systems 2004; 28(6): 575-579.

- Parker Oliver D, **Demiris G.** An assessment of the readiness of hospice organizations to accept technological innovation. Journal of Telemedicine and Telecare 2004; 10(3): 170-174.
- **Demiris G**, Patrick TB, Mitchell JA, Waldren S. To Telemedically Err is Human. The Joint Commission Journal on Quality and Safety 2004; 30(9):521-527.
- **Demiris G**, Patrick TB, Boren SA. Assessing Patient Safety Awareness and Needs in Rural Hospitals. Informatics in Primary Care 2004; 12(3): 157-162.
- **Demiris G**, Rantz M, Aud M, Marek K, Tyrer H, Skubic M, Hassam A. Older adults' attitudes towards and perceptions of "smart home" technologies. Medical Informatics and the Internet in Medicine 2004; 29(2): 87-94.
- **Demiris G**, Tao D. An analysis of specialized scientific literature in the field of telemedicine. Journal of Telemedicine and Telecare 2005; 11(6): 316-319.
- **Demiris G**, Parker Oliver DR, Courtney KL, Porock D. Use of Technology as a Support Mechanism for Caregivers of Hospice Patients. Journal of Palliative Care 2005; 21(4): 303-309.
- Parker Oliver D, Porock D, **Demiris G**, Courtney K. Patient and Family Involvement in Hospice Interdisciplinary Teams. Journal of Palliative Care 2005; 21(4): 270-276.
- Parker Oliver D, **Demiris G**, Porock D. The usability of videophones for seniors and hospice providers: A brief report of two studies. Computers in Biology and Medicine 2005; 35(9): 782-790.
- Courtney KL, **Demiris G**, Parker Oliver D, Porock D. Conversion of the CQLI to an interview instrument-Research In Brief. European Journal of Cancer Care 2005; 14(5): 463-464.
- **Demiris G.** The Diffusion of Virtual Communities in Health Care: Concepts and Challenges. Patient Education and Counseling 2006; 62:178-188.
- **Demiris G**, Parker Oliver DR, Courtney KL. Ethical Considerations for the Utilization of Telehealth Technologies in Home and Hospice Care by the Nursing Profession. Nursing Administration Quarterly 2006; 30(1):56-66.
- Parker Oliver DR, **Demiris G**, Day M, Courtney KL, Porock D. Tele-hospice support for elder caregivers of hospice patients: two case studies. Journal of Palliative Medicine 2006;9(2):264-267.
- **Demiris G**, Hensel BK, Skubic M, Rantz M. Senior residents' perceived need of and preferences for "smart home" sensor technologies. International Journal of Technology Assessment in Health Care 2007; 24(1): 102-124.
- Washington K, **Demiris G**, Parker Oliver D, Day M. Home Internet Use among Hospice Service Recipients: Recommendations for Web based Interventions. Journal of Medical Systems 2007; 31:385-389.
- Courtney KL, Alexander G, **Demiris G.** Information technology from novice to expert: implementation implications. Journal of Nursing Management (In Press).
- **Demiris G**, Parker Oliver D, Courtney KL, Day M. Use of Telehospice Tools for Senior Caregivers: A Pilot Study. Clinical Gerontologist 2007; 31(1): 43-57.
- Wittenberg-Lyles EM, Parker Oliver D, **Demiris G**, Courtney KL. Assessing the Nature and Process of Hospice Interdisciplinary Team Meetings. Journal of Hospice & Palliative Nursing 2007; 9(1):17-21.
- Willis L, **Demiris G**, Parker Oliver DR. Internet Use by Hospice Families and Providers: A Systematic Review. Journal of Medical Systems 2007;31(2):97-101.
- Day M, **Demiris G**, Parker Oliver DR, Courtney KL, Hensel B. Exploring Underutilization of Videophones in Hospice Settings. Telemedicine and e-health 2007; 13 (1): 25-32.
- Parker Oliver D, Wittenberg-Lyles E, **Demiris G**, Washington K, Porock D, Day M. Barriers to Pain Management: Caregivers' Perception and Pain Talk by Hospice Interdisciplinary Teams. Journal of Pain and Symptom Management (In Press).
- **Demiris G**, Afrin LB, Speedie S, Courtney KL, Sondhi M, Vimarlund V, Lovis C, Goossen W, Lynch C. Patient-centered applications: use of information technology to promote disease management and

wellness: A White Paper by the AMIA Knowledge in Motion Working Group. Journal of the American Medical Informatics Association 2008; 15(1):8-13.

- **Demiris G**, Parker Oliver D, Dickey G, Skubic M, Rantz M. Findings from a Participatory Evaluation of a Smart Home Application for Older Adults. Technology and Health Care 2008; 16:111-118.
- **Demiris G**, Washington K, Doorenbos A, Parker Oliver D, Wittenberg-Lyles E. Use of the Time, Interaction and Performance Theory to Study Hospice Interdisciplinary Team Meetings. Journal of Hospice and Palliative Nursing (In Press).
- Washington KT, **Demiris G**, Parker Oliver D, Day M. Telehospice acceptance among providers: A multidisciplinary comparison. American Journal of Hospice and Palliative Medicine (In Press).
- **Demiris G**, Parker Oliver D, Hensel B, Dickey G, Rantz M, Skubic M. Use of Videophones for Distant Caregiving: an enriching experience for families and residents in Long-Term Care. Journal of Gerontological Nursing 2008; 34(7):50-55.
- **Demiris G,** Wittenberg-Lyles E, Parker Oliver D, Courtney KL. A survey on the use of technology to support hospice interdisciplinary team meetings. International Journal of Electronic Healthcare (In Press)
- **Demiris G**, Washington K, Parker Oliver D, Wittenberg-Lyles E. A Study of Information Flow in Hospice Interdisciplinary Team meetings. Journal of Interprofessional Care (In Press)

C. Research Support

Ongoing Support:

- National Institutes of Health (NIH)/ National Institute for Nursing Research
  1R21NR010744-01 Demiris (PI) 6/1/08 - 5/31/10
  A Technology Enhanced Intervention for Hospice Caregivers
  This project explores the use of commercially available videophones to deliver a nursing intervention aiming to improve problem solving skills of hospice caregivers. The study design is that of an equivalence trial examining the delivery of the coping skills intervention delivered face-to-face and via videophone.
  Role: Principal Investigator
- National Institutes of Health (NIH)/ National Institute for Nursing Research (NINR) R21NR010725-01
  Doorenbos (PI) 6/01/08-5/31/10
  Enhancing Cultural Congruence in Hospice Care
  Enhancing Cultural Congruence in Hospice Care This cluster-randomized trial has three specific aims: To evaluate the effect of a web-based cultural competence communication intervention for hospice nurses (1) on quality of communication as assessed by family caregivers; (2) on family caregiver outcomes of anxiety, caregiver burden, and trust of the nurse; and (3) on the processes reflective of hospice nurse's cultural competence.
  Role: Co-Investigator
- NSF-ITR 0428420 Skubic (PI) 10/1/04-10/1/08
  Technology Interventions for Elders with Mobility and Cognitive Impairments $1,200,000
  This project aims to develop and evaluate "smart home" technologies in an independent living facility. The technology based interventions aim to improve senior residents' quality of life, independence and clinical outcomes.
  Role: Co-Investigator
- National Institutes of Health (NIH)-R21 CA120179-01 Oliver (PI) 9/1/06-8/30/08
  Patient and Family Participation in Hospice Meetings $367,500
  This project explores how the involvement of patients and family caregivers in hospice interdisciplinary teams affect communication, pain management and the caregiving experience.

Role: PI of Subcontract

- National Institutes of Health (NIH)-1R21 AG026412-02 He (PI) 7/1/07-6/30/09
  Automated video sensor network for eldercare $288,197
  This project aims to explore new information technologies to assist the independent living of elderly people and enhance their quality of life at home, while efficiently utilizing the time and attention of caregivers and eldercare specialists. A privacy-protecting wireless video sensor network will be developed to collect continuous video data about the activities of elderly residents at home.
  Role: PI of subcontract with the University of Missouri
- NSF-IIS-0703692 Skubic (PI) 1/1/08 - 12/31/10
  Elder-Centered Recognition Technology for the Assessment of Physical Function $900,000
  This project investigates visual sensor networks to assess physical function of older community welling adults. The focus is on end-users' perceptions of privacy and perceived need as well as reliability and validity of the proposed visual sensor assessment of physical function.
  Role: PI of subcontract with the University of Missouri
- Department of Health and Human Services-Health Resources and Services Administration
  D09HP09358 Demiris (PI) 07/01/08 -06/30/11
  Nursing Informatics Graduate Education (Training Grant) $821,075
  This training grant aims to deliver clinical informatics and patient centered technologies graduate education to health care professionals using a distance learning format and based on problem based learning.
  Role: PI

Completed Support:

- John A Hartford Foundation Parker Oliver (PI) 9/1/04-9/1/06
  Geriatric Telemedicine Intervention for Social Work Practitioners
  This project seeks to explore the use videophones as an intervention tool for social workers in a rural hospice program. The project seeks to help social workers lower caregiver anxiety through the use of virtual visits in place of standard telephone contact.
  Role: Co-Investigator
- NLM-NIH 5T15 LM007089-13 Caldwell (PI) 8/1/05-8/30/06
  Biomedical and Health Informatics Research Training Grant
  This project is the training program sponsored by the National Library of Medicine for pre- and postdoctoral fellows who receive training in biomedical and health informatics.
  Role: Co-PI
- US Administration on Aging Rantz (PI) 9/29/05-9/1/06
  Technology to Enhance Aging in Place at TigerPlace
  The focus of this project is the development and evaluation of information technology applications that support older adults' independence and quality of life.
  Role: Co-PI
- University of Missouri Research Board Demiris (PI) 9/1/05-8/31/06
  Video-Mediated Communication in Hospice Care
  This project investigates the use of video-mediated communication tools in home hospice and explores their impact on caregivers and hospice providers.
  Role: PI
- Catherine Pouget Research Award, MAPI Research Institute 1/1/04-1/1/06
  Exploring the potential of telehospice

This project is a pilot study that focuses on the usability of commercially available videophones and their potential use in a hospice setting where the videophone could potentially enhance hospice services delivered to patients and their caregivers at their home.
Role: PI

- Missouri Department of Mental Health Farmer (PI) 6/1/04-5/30/05
  Missouri Autism Project Registry
  The goal of the Missouri Autism Project Registry is to provide a comprehensive information resource that will direct Missouri state policies and service decisions; provide families and health care providers with supportive, relevant autism information; and facilitate research that will improve the outcomes of Missouri children and adults with autism.
  Role: Co-PI
- EU Center, University of Missouri, Faculty Research Grant
  Demiris (PI) 5/1/03-10/1/03
  e-Health: Examination of Policies in the US and EU
  This project included a comparison of legislative efforts in the United States and the European Union in the area of e-health. Specifically, within this project, an analysis and comparison of HIPAA and the European Data Directive were completed.
  Role: PI

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Sherrilynne Fuller	Professor
eRA COMMONS USER NAME sfuller	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Indiana University, Bloomington	BA	1967	Biology
Indiana University, Bloomington	MLS	1968	Special Libraries
University of Southern California, Los Angeles	PhD	1984	Library & Info Management

A. Positions and Honors.

Positions and Employment

1997-2001 Founding Head, Division of Biomedical & Health Informatics, Medical Education
2001- Professor, Department of Medical Education and Biomedical Informatics, School of Medicine
2001- Professor (Joint), Information School
2006-2008 Associate Dean of University Libraries
2006- Co-Director, Center for Public Health Informatics, School of Public Health & Community Medicine

Professional Experience and Memberships (selected)

1997-2002 President's (White House) Information Technology Advisory Committee (PITAC)
2002-2006 Member, Board of Scientific Counselors, Lister Hill Center, NIH, National Library of Medicine, Chair 2003-2006

Honors and Specific/Technical Accomplishments

1994 Fellow, American College of Medical Informatics

Selected peer-reviewed publications (in chronological order)

1. Fuller S, Masuda D, Gorman P, Lindberg DAB. Medical informatics and information access. IN: Textbook of Rural Medicine, McGraw-Hill 2001.
2. Hart G, Larson E, Tarczy-Hornoch P, House P, Masuda D, Fuller SS, Dyck S, Norris T. WWAMI rural telemedicine network. Amer Board Family Prac 2002; 15(2):123-127.
3. Stewart BK, Fuller SS, Ramey JA, Lober WB, Chou D, Weghorst SJ, Langer SG, Martin KP, Ketchell DS, Robinson TA, Maberry R, Li H. Tumor conferencing tools for regional collaborative cancer care using the next generation internet. Proceedings, Amer Medical Informatics Assn, Annual Symposium 2001:836.
4. Norris TE, Fuller SS, Tarczy-Hornoch P, Goldberg H, co-editors. Informatics in Primary Care. New York, Springer-Verlag 2002.
5. Fuller SS, Revere D, Bugni P, Martin G. A knowledgebase system to enhance scientific discovery: Telemakus. Biomedical Digital Libraries; 1:2-15, 2004.

6. Watson L, Fuller SS. Managing and leveraging organizational knowledge: commentary. In: Detmer D, Steen E. The Academic Health Center: Leadership and Performance. Cambridge, England, Cambridge University Press, 2005.
7. Revere D, Madhavan A, Kimball AM, Turner A, Bugni P, Fuller S. myPublicHealth: Research in Public Health Knowledge Management to Support Evidence-Based Practice. In proceedings of the CDC's *4th Annual Public Health Information Network (PHIN) Conference*, September 2006 (poster), Atlanta, GA.
8. Anderson N, Lee ES, Brockenbrough JS, Minie M, Fuller S, Brinkley J, Tarczy-Hornoch P. Issues in Biomedical Research Data Management and Analysis: Needs and Barriers. JAMIA, April 24, 2007
9. Curioso, WH, Hansen JR, Centurion-Lara, A. Garcia PJ, Wolf FM, Fuller S., Holmes KK, Kimball AM. Evaluation of a joint Bioinformatics and Medical Informatics international course in Peru. *BMC Medical Education* 2008, **8:**1
10. Kimball AM, Curioso WH, Arima Y, Fuller S, Garcia PJ, Segovia-Juarez J, Castagnetto J, Leon-Velarde, F. Holmes K. Developing Capacity in Health Informatics in a Resource Poor Setting: A Case Study from Peru. *Human Resources for Health* (Submitted)

Ongoing Research Support

1 P01 CD000261-01 Oberle (PI) 2005-2008
Center of Excellence in Public Health Informatics (CEPHI), Centers for Disease Control
CEPHI, an interdisciplinary research center, supports innovative research into information strategies and technologies to improve the health of the public throughout the Pacific Northwest and beyond.
Role: Co-PI

5D43 TW007551-02 Fuller (PI) 2004-2009
International Health and Biomedical Research and Training. Fogarty International Center, NIH
The goal of this project is to support the development of biomedical informatics programs at universities in Peru, South America.
Role: PI (with Ann Marie Kimball Co-PI)

Building the Global Partners in Public Health Informatics. Fuller (PI) 2008-2009
Rockefeller Foundation.
Role: PI

Training HIV Program Managers for Kenya Pending) Kiarie (PI) 2008-2010
Grantee: University of Nairobi; Role: Educator

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Gennari, John	Associate Professor
eRA COMMONS USER NAME GENNARI	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Colgate University, Hamilton, NY	B.A.	1983	Math/Computer Science
University of Wisconsin, Madison, WI	M.S.	1985	Computer Science
University of California, Irvine, CA	Ph.D.	1990	Information & Computer Science

B. Positions and Honors.

Academic Positions

1998-2001 Assistant Adjunct Professor, Information and Computer Science Dep't, University of California, Irvine, CA

2002-2007 Assistant Professor, Biomedical & Health Informatics, University of Washington, Seattle, WA

2007-present Associate Professor, Biomedical & Health Informatics, University of Washington, Seattle, WA

National Responsibilities

2001 Organizing committee member & Treasurer, ACM International Conference on Knowledge Capture

2002 Scientific Program Committee, American Medical Informatics Association Fall Symposium

2003 National Science Foundation Review Panelist

2003 Co-Chair, ACM International Conference on Knowledge Capture

2004 National Library of Medicine Grants Review Panelist

2007 Scientific Program Committee, The 22nd National Conference on Artificial Intelligence

2007 Workshop chair, ACM International Conference on Knowledge Capture

B. Selected peer-reviewed publications (in chronological order)

1. **Gennari JH**, Reddy M (2000). Participatory design and an eligibility screening tool. In *Proceedings of the AMIA Annual Symposium*, pp. 290–294. Los Angeles, CA.

2. **Gennari JH**, Sklar D, Silva J (2001). Cross-tool communication: From protocol authoring to eligibility determination. In *Proceedings of the AMIA Annual Fall Symposium*, pp. 199–203. Washington, D.C.
3. Weng C, Kahn M, **Gennari JH** (2002). Temporal knowledge representation for scheduling tasks in clinical trial protocols. In *Proceedings of the AMIA Annual Fall Symposium,* pp. 879-883. San Antonio, TX.
4. **Gennari JH**, Musen MA, Fergerson RW, Grosso WE, Crubezy M, Eriksson H, Noy NF, Tu SW (2003). The Evolution of Protégé: An environment for knowledge-based systems development. *International Journal of Human-Computer Studies,* 58(1), 89–123.
5. Pratt W, Reddy MC, McDonald DW, Tarczy-Hornoch P, **Gennari JH** (2004). Incorporating Ideas from Computer-Supported Cooperative Work. *Journal of Biomedical Informatics,* 37, 128–137.
6. **Gennari JH**, Weng C, McDonald DW, Benedetti J, Green S (2004). An ethnographic study of collaborative clinical trial protocol writing. In *Proceedings of MedInfo 2004,* pp. 1461–1465, San Francisco, CA.
7. Weng C, McDonald DW, **Gennari JH** (2004). A collaborative clinical trial protocol writing system. In *Proceedings of MedInfo 2004,* pp. 1481–1485, San Francisco, CA.
8. Weng C, **Gennari JH** (2004). Asynchronous collaborative writing through annotations. *The ACM Conference on Computer Supported Cooperative Work*, pp. 578–581, Chicago, IL.
9. McDonald DW, Weng C, **Gennari JH** (2004). The Multiple Views of Inter-organizational Authoring, *Proc of ACM Conference on Computer-supported Cooperative Work (CSCW'04)*, pp. 564–73, Chicago, IL.
10. **Gennari JH**, Silberfein A, Wiley JC (2005). Integrating genomic knowledge sources through an anatomy ontology. *Proceedings of the Pacific Symposium on Biocomputing 2005*, pp. 115–126.
11. **Gennari JH**, Weng C, Benedetti J, McDonald DW (2005). Asynchronous communication among clinical researchers: A study for systems design. *The International Journal of Medical Informatics*, 74(10), 797–807.
12. Travillian, R.S., **Gennari, J.H**., and Shapiro, L.G. (2005) Of Mice and Men: Design of a comparative anatomy information system. *Proceedings of the AMIA Annual Fall Symposium,* pp. 735-739, November, Washington DC.
13. Brinkley JF, Suciu D, Detwiler LT, **Gennari JH**, Rosse C (2006). A framework for using reference ontologies as a foundation for the semantic web. *Proceedings of the AMIA Annual Fall Symposium* Nov. 2006, pp. 101–105, Washington DC.
14. Li H, **Gennari JH**, Brinkley JF (2006). Model Driven Laboratory Information Management Systems. *Proceedings of the AMIA Annual Fall Symposium*, Nov. 2006, pp. 484–488, Washington DC.
15. Au A, Li X, **Gennari JH** (2006). Differences Among Cell-structure Ontologies: FMA, GO, & CCO. *Proceedings of the AMIA Annual Fall Symposium*, Nov. 2006, pp. 16–20, Washington DC.
16. Weng,, C., McDonald, DW, Sparks, D, McCoy, J, and **Gennari, J.H.**, (2007). Participatory design of a collaborative clinical trial protocol writing system. *The International Journal of Medical Informatics*, **76**(S1), 245-251.
17. Cook DL, Wiley JC, **Gennari JH** (2007). Chalkboard: Ontology-based pathway modeling and qualitative inference of disease mechanisms. *Proceedings of the Pacific Symposium on Biocomputing*, pp.16–27, 2007.

18. Weng C, **Gennari JH**, Fridsma D (2007). User-centered semantic harmonization: A case study. *Journal of Biomedical Informatics.* 40(3), 353–364.
19. Li X, **Gennari JH**, Brinkley JF. XGI: A Graphical Interface for XQuery Creation. Proceedings of the AMIA Annual Fall Symposium, Nov. 2007, pp. 453–457.
20. **Gennari JH**, Neal ML, Carlson B, Cook DL (2008). Integration Of Multi-Scale Biosimulation Models Via Light-Weight Semantics. *Proceedings of the Pacific Symposium on Biocomputing,* pp. 414-425, 2008.
21. Lin, C., Payne, TH, Nichol, WP, Hoey, PJ, Anderson, CL, and **Gennari, JH** (2008). Evaluating Clinical Decision Support Systems: Monitoring CPOE Order Check Override Rates. *Journal of the American Medical Informatics Association,* **15**(5), 620–626.
22. Cook, D.L., Mejino, J.L.V., Neal, M.L., and **Gennari, JH** (2008). Bridging Biological Ontologies and Biosimulation: The Ontology of Physics for Biology. *Proceedings of the AMIA Annual Fall Symposium* (2008), pp. 136-140, Washington, DC**.**
23. Solti I., Aaronson B, Fletcher G, Solti M, **Gennari, JH**, Cooper M, and Payne T (2008). Building an Automated Problem List Based on Natural Language Processing: Lessons Learned in the Early Phase of Development. *Proceedings of the AMIA Annual Fall Symposium* (2008), pp. 687-691, Washington, DC.
24. Neal, ML, **Gennari, JH,** Arts, T., and Cook, DL (in press). Advances in semantic representation for multiscale biosimulation: A case study in merging models. *Proceedings of the Pacific Symposium on Biocomputing, 2009.*

C. Research Support

Ongoing Research Support

1R01HL087706-01 Brinkley, J (PI) 2/15/07 – 12/31/10

National Heart Lung and Blood Institute (NIH)

"Realizing the potential of reference ontologies for the semantic web"

Goals: Use the notion of *reference ontologies* to integrate vast amounts of complex biomedical information into a holistic understanding of biological function. These reference ontologies will provide a foundation for semantic web data sharing. An crucial sub-goal is to develop languages and tools for mapping between reference and application ontologies.

Role: Co-investigator

1R01LM009143-01A2 Pratt, W (PI) 9/15/07 – 9/14/10

National Library of Medicine (NIH)

"Managing Health Information in your Life"

Goals : Understand the *work* that cancer patients carry out when diagnosed and faced with treatment options. Building tools to help patients better manage the information around cancer, and integrate that information with other aspects of their life.

Role: Co-investigator

11/15/08 – 11/15/10

National Center for Research Resources (NIH) – contract managed through Booz Allen Hamilton Foundation

"Adapting the i2b2 Architecture to Support Cross-Institutional Clinical Translational Research"

Goals: Establish a collaborative information exchange that allows for querying across clinical data at UW hospitals, UC-Davis and UCSF. Technically, we will build on Semantic Web ideas, and specifically on the i2b2 architecture. Our goal is to support cross-site cohort discovery for clinical trials under development.
Role: Co-investigator

Completed Research Support

5 P20 LM07714 Brinkley, J (PI) 1/1/04 – 11/30/06
National Programs of Excellence in Biomedical Computing (NIH)
"**Interdisciplinary Center for Structural Informatics**"
Goals: To create a Center for Excellence in Biomedical Computing that will bring about an information framework that would link together vast amounts of biomedical data and knowledge in a worldwide information system.
Role: Project lead for development project #2, "Ontology Alignment" of biomedical ontologies and knowledge bases. Investigator, planning for full center development.

W81XWH-04-2-0012 Rosse, C (PI) 1/1/04 – 5/31/05
Defense Advanced Research Project Agency
"The Virtual Soldier"
Goals: Contribute to a large, multi-institution, collaborative effort to develop knowledge bases and infrastructure needed for the construction of a complete, functioning, accessible simulation of the human thorax.
Role: Investigator, contributing to two sub-goals: (a) integration of the Foundational Model of Anatomy with other resources, and (b) development of appropriate ontologies for human physiology.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed for Form Page 2.
Follow the sample format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Kalet, Ira J.	Professor, Radiation Oncology, joint with Medical Education and Biomedical Informatics

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Cornell University	A.B.	1965	Physics
Princeton University	Ph.D.	1968	Theoretical Physics

A. Positions and Honors

Positions and Employment

Regular and joint appointments

Physics Department, University of Washington, Seattle, WA: Research Associate, 1968-1969
Hutchins School, Sonoma State College, Rohnert Park, CA: Assistant Prof., 1969-1970
Mathematics Education, University of Pennsylvania, Phila., PA: Lecturer, 1974-1975
Radiation Oncology Dept., University of Washington, Seattle, WA: Research Associate, 1980-1982; Assistant Professor, 1982-1988; Associate Professor, 1988-2004; Professor, 2004-present
Medical Education and Biomedical Informatics, University of Washington, Seattle, WA: Associate Professor, 1999-2004; Professor, 2004-present

Adjunct appointments, University of Washington

Computer Science: Assistant Prof., 1984-1988, Associate Prof., 1988-2004, Professor, 2004-present
Biological Structure: Associate Professor, 1991-2004, Professor, 2004-present
Bioengineering: Associate Professor, 1992-2004, Professor, 2004-2005
Medical Education: Associate Professor, 1997-1999 (joint after 1999)

Honors

1965-68	National Science Foundation pre-doctoral Fellowship
1978-80	National Research Service Award, National Cancer Institute
1985	Best paper, Amer. Assoc. for Medical Systems and Informatics (AAMSI) Spring Congress
1996	Dozor Visiting Prof., Faculty of Health Sciences, Ben-Gurion Univ., Be'er Sheva, Israel
2002	Distinguished Lecturer, Faculty of Computer Science, Dalhousie University, April
2003, 2006, 2008	Biomedical and Health Informatics Excellence in Teaching Award

B. Selected peer-reviewed publications (in chronological order)

1. Paluszyński, W., Kalet, I. Design Optimization Using Dynamic Evaluation. Proceedings of the Eleventh International Joint Conference on Artificial Intelligence, August 1989, Detroit, Michigan, American Association for Artificial Intelligence, 1989.

2. Kalet, I.J., Paluszyński, W. Knowledge-based Computer Systems for Radiotherapy Planning. American Journal of Clinical Oncology, 13, 344-351 (1990).

3. Jacky, J., Kalet, I., Chen, J., Coggins, J., Cousins, S., Drzymala, R., Harms, W., Kahn, M., Kromhout-Schiro, S., Sherouse, G., Tracton, G., Unger, J., Weinhous, M. and Yan, D. Portable Software Tools for 3-D Radiation Therapy Planning. Int. J. Radiat. Oncol. Biol. Phys., 30, 921–928 (1994).

4. Austin-Seymour, M., Kalet, I., McDonald, J., Kromhout-Schiro, S., Jacky, J., Hummel, S., and Unger, J. Three Dimensional Planning Target Volumes: A Model and a Software Tool. International Journal of Radiation Oncology, Biology and Physics, 33, 1073–1080 (1995).

5. Sullivan, K.J., Kalet, I.J., and Notkin, D. Evaluating the Mediator Method: Prism as a Case Study. IEEE Transactions on Software Engineering, 22, 563–579 (1996).

6. Kalet, I., Jacky, J., Austin-Seymour, M., Hummel, S., Sullivan, K., Unger, J. Prism: A New Approach to Radiotherapy Planning Software. Int. J. of Radiat. Oncol., Biol. and Phys., 36, 451–461 (1996).
7. Ketting, C., Austin-Seymour, M., Kalet, I., Unger, J., Hummel, S., and Jacky, J. Consistency of Three-Dimensional Planning Target Volumes Across Physicians and Institutions. International Journal of Radiation Oncology, Biology and Physics, 37, 445–453 (1997).
8. Ketting, C., Austin-Seymour, M., Kalet, I., Jacky, J., Kromhout-Schiro, S., Hummel, S., Unger, J., Fagan, L. and Griffin, T. Automated Planning Target Volume Generation: An Evaluation Pitting a Computer-based Tool Against Human Experts. International Journal of Radiation Oncology, Biology and Physics, 37, 697–704 (1997).
9. Kalet, I.J., Wu, J., Lease, M., Austin-Seymour, M.M., Brinkley, J.F., and Rosse, C. Anatomical Information in Radiation Treatment Planning. Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium, pp. 291–295, Nancy M. Lorenzi, ed. Hanley & Belfus, Inc, 1999.
10. Kalet, I.J., Giansiracusa, R.S., Avitan, D. A New Design for a DICOM-3 Server. Proceedings of the 13th International Conference on Computers in Radiotherapy, pp. 76–78, W. Schlegel and T. Bortfeld, eds., Springer–Verlag, Heidelberg, Germany, May 2000.
11. Kalet, I.J., Whipple, M., Pessah, S., Barker, J., Austin-Seymour, M.M., Shapiro, L.G. A Rule-based Model for Local and Regional Tumor Spread. Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium, pp. 360–364, Isaac S. Kohane, ed., Hanley & Belfus, Inc., 2002.
12. Teng, C.C., Austin-Seymour, M.M., Barker, J., Kalet, I.J., Shapiro, L.G., Whipple, M. Head and Neck Lymph Node Region Delineation with 3-D CT Image Registration. Proc. of American Medical Informatics Association (AMIA) Fall Symposium, pp. 767–771, Isaac S. Kohane, ed., Hanley & Belfus, Inc., 2002.
13. Kalet, I.J., Giansiracusa, R., Jacky, J., and Avitan, D. A Declarative Implementation of the DICOM-3 Network Protocol. Journal of Biomedical Informatics, vol. 36, no. 3, pp. 159–176, 2003.
14. Meyer, J., Phillips, M.H., Cho, P.S., Kalet, I.J., and Doctor, J.N. Application of Influence Diagrams to Prostate IMRT Plan Selection. Physics in Medicine and Biology, vol. 49, no. 9, pp. 1637–1653, 2004.
15. Boyce, R.D., Collins, C., Horn, J., and Kalet, I.J. Qualitative Pharmacokinetic Modeling of Drugs. Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium, pp. 71–75, Charles P. Friedman, Joan Ash and Peter Tarczy-Hornoch, Eds., American Medical Informatics Association, 2005.
16. Teng, C.C., Shapiro, L.G., and Kalet, I.J. Head and Neck Lymph Node Region Delineation Using a Hybrid Image Registration Method. Proceedings of the IEEE International Symposium on Biomedical Imaging, 2006, pp. 462-465, IEEE Computer Society, 2006.
17. Teng, C.C., Shapiro, L.G., and Kalet, I.J. Automatic Segmentation of Neck CT images. Proceedings of the 19th IEEE International Symposium on Computer-based Medical Systems, pp. 442-445, D.J. Lee, Brian Nutter, Sameer Antani, Sunanda Mitra, and James Archibald, Eds., IEEE Computer Society, 2006.
18. Benson, N., Whipple, M. and Kalet, I.J. A Markov Model Approach to Predicting Regional Tumor Spread in the Lymphatic System of the Head and Neck, Proceedings of the American Medical Informatics Association Fall Symposium, pp. 31–35, David W. Bates, John H. Holmes and Gilad Kuperman, Eds., American Medical Informatics Association, 2006.
19. Teng, C.C., Shapiro, L.G., Kalet, I.J., Rutter, C. and Nurani, R. Head and Neck Cancer Patient Similarity Base on Anatomical Structural Geometry. Proceedings of the 2007 IEEE International Symposium on Biomedical Imaging (ISBI): From Nano to Macro, pp. 1140–1143, IEEE Engineering in Medicine and Biology (EMB) Society, 2007.
20. Boyce, R., Collins, C., Horn, J.R., and Kalet, I.J. Modeling Drug Mechanism Knowledge Using Evidence and Truth Maintenance. IEEE Transactions on Information Technology in Biomedicine (TITB), volume 11, number 4, pp. 386–397, 2007.
21. Smith, W.P., Doctor, J., Meyer, J, Kalet, I.J., and Phillips, M.H.. A Decision Aid for IMRT Plan Selection in Prostate Cancer Based on a Prognostic Bayesian Network and Markov Model. Artificial Intelligence in Medicine, 2008, in press.

C. Research Support

Completed Research

National Library of Medicine, National Institutes of Health, Publication Grant G13 LM008788, "Foundations of Biomedical Informatics", March 2006 through February 2008.

A recurring theme in discussions with biologists, medical researchers, health care providers, and computer scientists is the question, "What is biomedical informatics?" The goal of this project is to write a monograph that develops the technical foundations of the intellectual content of the field of biomedical informatics. Thus, the main goal of the monograph is to provide an exposition of important fundamental ideas and methods in biomedical informatics, using actual working code that can be read and understood. The project was completed, and the book was published in October, 2008.

Ongoing Research Support

National Cancer Institute, National Institutes of Health, Research Grant R01 CA112505, "Multiattribute decision theory for IMRT plan selection", April 2006 through February 2010, Investigator.

This project is investigating two applications of Bayesian networks in inverse planning. They can be used in place of a cost function used in the inverse planning process. They can also be coupled with utility functions to form decision networks to aid in the selection of solutions, particularly when no solution can achieve all of the objectives.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Lober, William B.	Associate Professor
eRA COMMONS USER NAME WLOBER	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Tufts University, Medford, MA	BSEE	1976-80	Electrical Engineering
University of California, Berkley	MS	1989-92	Health Sciences
University of California, San Francisco	MD	1992-94	Medicine
University of Arizona, Tucson, AZ	Resident	1994-97	Emergency Medicine
University of Washington, Seattle, WA	Fellowship	1998-99	Structural Informatics
NLM Extramural Fellowship	Fellowship	1999-01	Medical Informatics

A. Positions and Honors.

Positions and Employment

2000 - … Director, Clinical Informatics Research Group, University of Washington.
2001 - 05 Research Assistant Professor, Med Ed & Biomedical Informatics, UW
2004 - 05 Research Assistant Professor (Adjunct), Health Services, School of Public Health & Comm. Med.
2005 - … Associate Professor, School of Nursing, University of Washington
2005 - … Associate Professor (Adjunct), School of Public Health and Community Medicine, UW
2006 - … Associate Professor (Joint), School of Medicine, University of Washington
2006 - … Associate Director, Center for Public Health Informatics, University of Washington.

Related Regional and National Activities

2004 - … *Award Committee*, Davies Public Health Award, Health Information Management Sys Society
2005 - … *Board of Directors*, International Society for Disease Surveillance
2005 - … *Program Committee*, 3rd, 5th Annual National Syndromic Surveillance Conference
2006- … *Co-Editor in Chief*, Advances in Disease Surveillance

Honors

1997 Outstanding Senior Research Project Award Univ of Arizona Section of Emergency Medicine

B. Selected peer-reviewed publications (in chronological order).

(Sample from 72 peer-reviewed journal articles, abstracts, posters & conference proceedings)

- Crane HM, Lober W, Webster E, Harrington RD, Crane PK, Davis TE, Kitahata MM. Routine collection of patient-reported outcomes in an HIV clinic setting: the first 100 patients. *Curr HIV Res.* 2007 Jan;5(1):109-18

- Kitahata MM, Rodriguez B, Haubrich R, Boswell S, Mathews WC, Lederman MM, Lober WB, Rompaey SE, Crane HM, Moore RD, Bertram M, Kahn JO, Saag MS. Cohort profile: the Centers for AIDS Research Network of Integrated Clinical Systems. *Int J Epidemiol.* 2008 Feb 8.
- Doctor JN, Baseman JG, Lober WB, Davies J, Kobayashi J, Karras BT, Fuller S., Time-tradeoff utilities for identifying and evaluating a minimum data set for time-critical biosurveillance., Med Decis Making. 2008 May-Jun;28(3):351-8. Epub 2008 May 13.
- Lober WB, Quiles CC, Wagner S, Sibley J, Webster E, Cassagnol R, Lamothe R, Alexis DR, Joseph P, Sutton P, Puttkammer N, Kitahata MM. Three years experience with the implementation of a networked electronic medical record in Haiti. *AMIA Annu Symp Proc*. 2008 Nov 6:434-8.

C. Research Support (Sample from 29 sponsored projects)

NIH/NIAID 12/04-3/05
CNICS
Develop a large scale data integration repository to support HIV/AIDS observational research across a network of 6 Centers for Aids Research. Investigator (Informatics Lead).

8 P01 HK 000027-03REV (Oberle) 9/30/08-09/29/09
Centers for Disease Control and Prevention (CDC)
Center of Excellence in Public Health Informatics
The UW Center of Excellence in Public Health Informatics (CEPHI) multidisciplinary research program consists of two public health informatics research projects; “Surveillance Integration and Decision Support” investigating public health surveillance and epidemic detection methods, and three supporting cores. Interacts with Model Health Information Exchange. Investigator (Associate Director).

1 R24 AI067039-1 (M. Saag) 9/1/07 – 8/31/11
PHS/NIH/NIAID/University of Alabama Birmingham UW subcontract
Unsolicited R24 for the CFAR Network of Integrated Clinical Systems, CNICS
The CFAR Network of Integrated Clinical Systems (CNICS) project is a multi-site, electronic medical records resource to advance current HIV research. This project will continue to develop a network of real-time integrated clinical data for observational research across a network of Centers for AIDS Research and will expand this to include individual sites and existing networks to increase the cohort beyond the current 11,000 patients. Informatics Lead (Data Core).

(B. Lober) 12/01/06 – 12/31/08
City of Seattle/King County
King County Care Information Systems
This community collaborative program seeks to improve health outcomes for adults with chronic conditions in this vulnerable and underserved population. This program will offer a comprehensive, voluntary program that incorporates care management, education and assistance to clients to assist them in managing their disease, and coordination of medical services.

1U01AI069918 - 01 (R. Moore) 7/1/06 – 6/30/11
NIAID
NA/ACCORD
The NA-ACCORD is a regional collaboration of cohorts initially representing over 50 sites with greater than 60,000 patients from both academic medical centers and community-based facilities that deliver HIV primary and specialty care, and combines classical epidemiologic and

clinical HIV cohorts in a unique collaboration to address HIV/AIDS research questions that cannot be accomplished through smaller cohorts or randomized clinical trials. These sites represent one of the 7 global regions in the IeDEA consortium. Informatics Lead (Data Core).

6U69 GA 0004701 (K. Holmes) 3/1/05 – 3/31/09
HRSA/PEPFAR
International Training and Education Center on HIV
The purpose of this project is to support data collection from clinics taking care of HIV/AIDS patients in developing nations, including Haiti, as part of the President's Emergency Program for AIDS Relief. We developed an interactive web application and repository being tested through the Haiti office of CDC. Investigator (Informatics Lead).

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed for Form Page 2.
Photocopy this page or follow this format for each person.

NAME	POSITION TITLE
David L. Masuda	Lecturer, Department of Medical Education and Biomedical Informtatics, School of Medicine Adjunct Lecturer, Department of Health Services, School of Public Health

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
North Dakota State University, Fargo, North Dakota	BS	1976	Zoology
University of North Dakota, Grand Forks, North Dakota	MD	1980	Medicine
Sacred Heart Medical Center, Spokane, Washington	Residency	1984	Diagnostic Radiology
University of Wisconsin-Madison, Madison, Wisconsin	MS	1996	Administrative Medicine
University of Washington, Seattle, Washington	Post-doctoral Fellowship	1999	Biomedical and Health Informatics

RESEARCH AND PROFESSIONAL EXPERIENCE: Concluding with present position, list, in chronological order, previous employment, experience, and honors. Include present membership on any Federal Government public advisory committee. List, in chronological order, the titles, all authors, and complete references to all publications during the past three years and to representative earlier publications pertinent to this application. If the list of publications in the last three years exceeds two pages, select the most pertinent publications. **DO NOT EXCEED TWO PAGES.**

FACULTY POSITIONS

Lecturer 1999 - present
Division of Biomedical Informatics
The University of Washington School of Medicine
Seattle, Washington

Lecturer 1999 - present
Department of Health Services
The University of Washington School of Public Health and Community Medicine
Seattle, Washington

Senior Lecturer 1998 - 2002
Department of Preventive Medicine
School of Medicine
The University of Wisconsin – Madison
Madison, Wisconsin

Senior Lecturer 2000 - 2002
School of Public Health and Tropical Medicine
Tulane University
New Orleans, Louisiana

HOSPITAL POSITIONS

Bonner General Hospital 1984 - 1998
Active Staff
Sandpoint, Idaho

The North Idaho Health Network 1995 - 1997
President
Coeur d'Alene, Idaho

PROFESSIONAL ORGANIZATIONS

The American College of Physician Executives
The American Medical Informatics Association
American College of Radiology
American Board of Radiology

BIBLIOGRAPHY

Manuscripts in Refereed Journals:

"Low-bandwidth, low-cost telemedicine consultations in rural family practice."; Norris TE, Hart GL, Larson EH, Tarczy-Hornoch P, Masuda DL, Fuller SS, House PJ, Dyck SM.; J Am Board Fam Pract. 2002 Mar-Apr;15(2):123-7. J Am Board Fam Pract. 2002 Mar-Apr;15(2):123-7.

"Development and Evaluation of Public Health Informatics at the University of Washington"; Karras B; O'Carrol P; Oberle M; Masuda D; Lober W; Robins L; Schaad D; Scott C; Journal of Public Health Management and Practice; Vol. 8, No.3; May 2002

"Teaching Technology with Technology: Learning Management Systems and Anchored Modular Inquiry in Graduate Health Administration Education"; Journal of Health Administration Education; in preparation

Other Publications:

"Evaluation Strategies and Findings from a Regional Integrated Telemedicine Testbed"; Fuller, S, Tarczy-Hornoch, P, Masuda, D, Cannava, T, Hard, G, Larson, E, Johnson, C, Dyck, S, Kramer, W, Norris, T. " Telemedicine & Telecommunications: Options for the New Century, Proceedings, 93-94, 2001

"Using a Large Group Interactive Audience Response System to Enhance Medical Student's Understanding of Risk Information"; Wolf FM, Masuda D, Pinsky LP; May 3; Pacific Grove, CA.; 2006. OpenURL

Books:

"Medical Informatics and Information Access.", Fuller SS; Masuda D; Gorman P; Lindberg DA, Chapter 15, Textbook of Rural Medicine, Geyman J; Norris T; Hart G, Editors, McGraw-Hill, 2001

“Telecommunications in Primary Care”; Masuda D.; Chapter 15; Primary Care Informatics, Norris T, Editor; 2002

“Careers in Clinical Computing and Medical Informatics”; Masuda D.; Chapter 15; in Practical Guide to Clinical Computing Systems: Design, Operations, and Infrastructure; Elsevier; Payne P, Editor; 2008

Posters:

“Hospital Quality Outcomes: The results of a pilot study performed to define risk adjustment and Internet report specifications”, Meyer K; Posse C; Masuda D; AMIA 2001 Poster

“Inquiry-based learning and Online Environments: Moodling About...”; The University of Washington Scholarship of Teaching and Learning Symposium; Seattle, WA, May, 2007

“The Devil with the Internet: Plagiarism Prevention Tools for Writers”; The University of Washington Scholarship of Teaching and Learning Symposium; Seattle, WA, May, 2008

“Moodling About: Early Experience with Inquiry-based Instructional Design in Online Environments”; Association of University Programs in Health Administration Annual Meeting; Washington, DC; November, 2008

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Peter J. Myler, Ph.D.	Full Member
eRA COMMONS USER NAME PMYLER	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Queensland, Brisbane, QLD, Australia	B.Sc.(Hons)	1978	Biochemistry
University of Queensland, Brisbane, QLD, Australia	Ph.D.	1979-1982	Biochemistry
Issaquah Health Research Institute	Post-doc	1982-1983	Molecular Parasitology
Washington State University	Post-doc	1984-1985	Molecular Parasitology
Seattle Biomedical Research Institute	Post-doc	1985-1989	Molecular Parasitology

A. Positions and Honors

Positions

1997-2004 Research Associate Professor, Department of Pathobiology, University of Washington, Seattle, WA

2000-2003 Associate Member, Seattle Biomedical Research Institute, Seattle, WA

2001-2004 Adjunct Research Associate Professor, Department of Medical Education and Biomedical Informatics, University of Washington, Seattle, WA

2004-present Full Member, Seattle Biomedical Research Institute, Seattle, WA

2004-2008 Research Professor, Department of Pathobiology, and Department of Medical Education and Biomedical Informatics, University of Washington, Seattle, WA

2007-2008 Adjunct Research Professor, Department of Global Health, University of Washington, Seattle, WA

2008-Present Affiliate Professor, Departments of Global Health & Medical Education and Biomedical Informatics, University of Washington, Seattle, WA

Honors

1986-present Invited speaker at 30 international meetings and session chair at 13 meetings

1999-2001 USDA, Sustaining Animal Health and Well-being (study section member)

2003 Leishmaniasis Review panel for Military Infectious Diseases Research Program of the US Army, Navy, and Air Force; Joint Medical Technology Workshop.

2001-present Editorial board, Kinetoplastid Biology and Disease

2008-2009 Scientific Committee for 4th World Congress on Leishmaniasis

B. Selected peer-reviewed publications (in chronological order)

1. Martinez-Calvillo, S., Nguyen, D.T., Stuart, K.D., and **Myler, P.J.** (2004) Transcription initiation and termination on *Leishmania major* chromosome 3. **Eukaryot. Cell 3:**506-517.
2. Laurentino, E.C., Ruiz, J.C., Degrave, W., **Myler, P.J.**, Fazelinia, G., Ribeiro, J.M., and Cruz, A.K. (2004) A survey of *Leishmania braziliensis* genome by shotgun sequencing. **Mol. Biochem. Parasitol. 137:**81-86.

3. Zhou,S., Kile,A., Kvikstad,E., Bechner,M., Severin,J., Forrest,D., Runnheim,R., Churas,C., Anantharaman,T.S., **Myler,P.J.**, Vogt,C., Ivens,A.C., Stuart,K.D., and Schwartz,D.C. (2004) Shotgun optical mapping of the entire *Leishmania major* Friedlin genome. **Mol. Biochem. Parasitol. 138:**97-106.
4. Sahin, A., Lemercier, G., Tetaud, E., Espiau, B., **Myler, P.**, Stuart, K., Bakalara, N., and Merlin, G. (2004) Trypanosomatid flagellum biogenesis: ARL-3A is involved in several species. **Exp. Parasitol. 108:**126-133.
5. Kim, D., Chiurillo, M. A., El-Sayed, N., Jones, K., Santos, M. R. M., Cerda, P. P., Andersson, B., **Myler, P.**, Da Silveira, J. F., and Ramirez, J. L. (2005) Telomere and subtelomere of *Trypanosoma cruzi* chromosomes are enriched in (pseudo)genes of retrotransposon hot spot and trans-sialidase-like gene families: the orginis of *T. cruzi* telomeres. **Gene 346:**153-161.
6. Martinez-Calvillo, S., Stuart, K., and **Myler, P. J.** (2005) Ploidy changes associated with disruption of two adjacent genes on *Leishmania major* chromosome 1. **Int. J. Parasitol. 35:**419-429.
7. El-Sayed, N.M.A., **Myler, P.J.**, (42 other authors) and Hall, N. (2005) Comparative genomics of the trypanosomatids. **Science 306:**404-409.
8. El-Sayed, N.M.A., **Myler, P.J.**, (79 other authors) and Andersson, B. (2005) The genome sequence of *Trypanosoma cruzi*, etiological agent of Chagas' disease. **Science 306:**409-415.
9. Ivens, A.C., (98 other authors) and **Myler, P.J.** (2005) The genome of the kinetoplastid parasite, *Leishmania major*. **Science 306:**436-442.
10. Worthey,E.A. and **Myler,P.J.** (2005) Protozoan genomes: gene identification and annotation. **Int. J. Parasitol. 35:**495-512.
11. Caruthers, J., Zucker, F., Worthey, E., **Myler, P.J.**, Buckner, F.S., Van Voorhis, W., Mehlin, C., Boni. E., Feist, T., Luft, J., Gulde, S., Lauricella, A., Kalyuzhniy, O., Anderson, L., Le Trong, I., Holmes, M.A., Earnest, T., Soltis, M., Hodgson, K.O., Hol, W.G.J., and Merritt, E.A. (2005) Crystal structures and proposed structural/functional classification of three protozoan proteins from the isochoristamase superfamily. **Protein Science 14:**2887-2894.
12. Padmanabhan, P.K., Mukherjee, A., Singh, S., Chattopadhyaya, S., **Myler, P.J.**, Srinivasan, N., and Madhubala, R. Glyoxalase I from Leishmania donovani. (2005) A potential target for anti-parasite drug. **Biochem. Biophys. Res. Commun. 337:**1237-1248
13. Robien, M.A., Bosch, J., Buckner, F.S., Van Voorhis, W.C.E., Worthey, E.A., **Myler, P.**, Mehlin, C., Boni, E.E., Kalyuzhniy, O., Anderson, L., Lauricella, A., Gulde, S., Luft, J.R., DeTitta, G., Caruthers, J.M., Hodgson, K.O., Soltis, M., Zucker, F., Verlinde, C.L.M.J., Merritt, E.A., Schoenfeld, L.W., and Hol, W.G.J. (2005) Crystal structure of glyceraldehyde-3-phosphate dehydrogenase from *Plasmodium falciparum* at 2.25Å resolution reveals intriguing extra electron density in the active site. **Proteins Struc. Funct. Genet. 62:**570-577.
14. Caruthers, J., Bosch, J., Buckner, F., Van Voorhis, W., **Myler, P.**, Worthey, E., Mehlin, C., Boni, E., DeTitta, G., Luft, J., Lauricella, A., Kalyuzhniy, O., Anderson, L., Zucker, F., Soltis, M., and Hol, W.G.J. (2006) Structure of a ribulose phosphate epimerase from *Plasmodoium falciparum* . **Proteins Struc. Funct. Genet. 62:**338-342.
15. Dobson, D.E., Scholtes, L.D., **Myler, P.J.**, Turco, S.J., and Beverley, S.M. (2006) Genomic organization and expression of the expanded SCG/L/R gene family of *Leishmania major*: Internal clusters and telomeric localization of SCGs mediating species-specific LPG modifications. **Mol. Biochem. Parasitol. 146:**231-241.
16. Arakaki, T., LeTrong, I., Phizicky, E., Quartley, E., DeTitta, G., Luft, J., Lauricella, A., Anderson, L., Kalyuzhniy, O., Worthey, E., **Myler, P.J.**, Kim, D., Baker, D., Hol, W.G., and

Merritt, E.A. (2006) Structure of Lmaj006129AAA, a hypothetical protein from *Leishmania major*. **Acta Crystallograph. Sect. F. Struct Biol Cryst. Commun 62:**175-179.

17. Mehlin, C., Boni, E., Buckner, F.S., Engel, L., Feist, T., Gelb, M.H., Haji, L., Kim, D., Liu, C., Mueller, N., **Myler, P.J.**, Reddy, J.T., Sampson, J.N., Subramanian, E., Van Voorhis, W.C., Worthey, E., Zucker, F., and Hol, W.G.J. (2006) Heterologous expression of proteins from *Plasmododium falciparum*: results from 1000 genes. **Mol. Biochem. Parasitol. 148:**144-160.
18. Bosch, J., Robien, M.A., Mehlin, C., Boni, E., Riechers, A., Buckner, F.S., Van Voorhis, W.C., **Myler, P.J.**, Worthey, E.A., DeTitta, G., Luft, J.R., Lauricella, A., Gulde, S., Anderson, L.A., Kalyuzhniy, O., Neely, H.M., Ross, J., Earnest, T.N., Soltis, M., Schoenfeld, L., Zucker, F., Merritt, E.A., Fan, E., Verlinde, C.L., and Hol, W.G. (2006) Using fragment cocktail crystallography to assist inhibitor design of *Trypanosoma brucei* nucleoside 2-deoxyribosyltransferase. **J. Med. Chem. 49:**5939-5946.
19. Saxena, A., Lahav, T., Holland, N., Aggarwal, G., Anapuma, A., Huang, Y., Volpin, H., **Myler, P.J.**, and Zilberstein, D. (2007) Analysis of the *Leishmania donovani* transcriptome reveals an ordered progression of transient and permanent changes in gene expression during differentiation. **Mol. Biochem. Parasitol. 152:**53-65.
20. Martinez-Calvillo, S., Saxena, A., Anderson-Green, A., Leland, A., and **Myler, P.J.** (2007) Characterization of the RNA polymerase II and III complexes in *Leishmania major*. **Int. J. Parasitol. 37:**491-502.
21. Kraemer, S.M., Kyes, S., Aggarwal, G., Springer, A.L., Nelson, S.O., Christodoulou, Z., Smith, L.M., Wang, W., Levin, E., Newbold, C. I., **Myler, P.J.** and Smith, J. D. (2007) Comparisons of *var* gene repertoires in *Plasmodium falciparum* support a unifying mechanism of evolution. **BMC Genomics 8:**45.
22. Souza, R.T., Santos, M.R.M., Lima, F.M., El Sayed, N.M., **Myler, P.J.**, Ruiz, J., and Franco da Silva, J. (2007) Identification of a new site-specific retroelement in the human protozoan parasite Trypanosoma cruzi. **Eukaryot.Cell 6:**1228-1238.
23. Sukumaran, B., Jain, M., **Myler, P.J.**, Stuart, K.D., and Madhubala, R. (2007) Creation of tetracycline regulatable knockouts of ORFF gene from the LD1 locus of *Leishmania donovani* . **Am. J. Biochem. & Biotech. 3:**207-215.
24. Jain, M., Dole, V.S., **Myler, P.J.**, Stuart, K.D., and Madhubala, R. (2007) Role of Biopterin Transporter (BT1) Gene on Growth and Infectivity of *Leishmania*. **Am. J. Biochem. & Biotech. 3:**199-206.
25. Panigrahi, A.K., Zikova, A., Dalley, R.A., Acestor, N., Ogata, Y., Anupama, A., **Myler, P.J.**, and Stuart, K.D. (2008) Mitochondrial complexes in Trypanosoma brucei: a novel complex and a unique oxidoreductase complex. **Mol. Cell Proteomics 7:**534-545.
26. Zikova, A., Panigrahi, A.K., Dalley, R.A., Acestor, N., Anupama, A., Ogata, Y., **Myler, P.J.**, and Stuart, K. (2008) *Trypanosoma brucei* mitochondrial ribosomes: affinity purification and component identification by mass spectrometry. **Mol. Cell Proteomics 7:**1286-96. PMID: 18364347.
27. **Myler, P.J.** (2008) Searching the Tritryp genomes for drug targets. **Adv. Exp. Med. Biol. 625:**133-40. PMID: 18365664
28. Rosenzweig, D., Smith, D., **Myler, P.J.**, Olafson, R.W., Zilberstein, D. (2008) Post-translational modification of cellular proteins during *Leishmania donovani* differentiation. **Proteomics 8:**1843-50. PMID: 18398879
29. Fan, E., Baker, D., Fields, S., Gelb, M.H., Buckner, F.S., Van Voorhis, W.C., Phizicky, E., Dumont, M., Mehlin, C., Grayhack, E., Sullivan, M., Verlinde, C., Detitta, G., Meldrum, D.R., Merritt, E.A., Earnest, T., Soltis, M., Zucker, F., **Myler, P.J.**, Schoenfeld, L., Kim, D., Worthey, L., Lacount, D., Vignali, M., Li, J., Mondal, S., Massey, A., Carroll, B., Gulde, S.,

Luft, J., Desoto, L., Holl, M., Caruthers, J., Bosch J., Robien, M., Arakak,i T., Holmes, M., Le Trong, I., Hol, W.G. (2008) Structural genomics of pathogenic protozoa: an overview. **Methods Mol. Biol. 426:**497-513. PMID: 18542886

30. Cadag, E., Tarczy-Hornoch, P., **Myler, P.J.** (2008) Learning pathogenic proteins across fractured and heterogeneous data. **AMIA Annu. Symp. Proc. 6:**889. PMID: 18999001
31. Panigrahi, A.K., Ogata, Y., Zíková, A., Anupama, A., Dalley, R.A., Acestor, N., **Myler, P.J.**, Stuart, K.D. (2008) A comprehensive analysis of *Trypanosoma brucei* mitochondrial proteome. **Proteomics 9:**434-50. PMID: 19105172

Plus another 75 publications in peer-reviewed publications, 7 reviews, 16 book chapters and 1 edited book.

C. Research Support

Ongoing Research Support

R01 AI053667 Myler (PI) 1/1/03 – 12/31/08
(Renewal Application Pending, Currently JIT)
NIH/NIAID
Transcription of Protein-coding Genes in *Leishmania*
The major goals of this project are to characterize the components of the RNA polymerase II transcription complex in *Leishmania major* and to elucidate the molecular mechanisms involved in pol II-mediated transcription of protein-coding genes.

1364 Duffy (PI) 7/31/05 – 7/31/10
FNIH/GCGH
Protective Immunity Against Severe Malaria in Young Children
The goal of this project is to identify the immune responses that prevent severe disease and death due to malaria. The project involves a consortium of African, European, and American scientists who are evaluating phenotypes and gene/protein expression profiles of parasites causing severe disease, as well as the acquisition of immune responses that correlate with protection against malaria in longitudinal studies of young children. Identifying correlates of protection will guide the development and testing of malaria vaccines.

HHSN272200700057C Myler (PI) 9/28/07 – 9/27/12
NIH/NIAID
Center for Structural Genomics of Infectious Diseases
The primary goal of this project is to determine the structure of 75-100 protein targets from NIAID Category AC and emerging/re-emerging infectious disease organisms each year for a period of five years. This will be accomplished by employing a high-throughput gene-to-structure pipeline involving a multi-pronged serial escalation approach to protein expression followed by structure solution using X-ray crystallography and NMR spectroscopy.

Grant Number 50097 Roos (PI) 11/1/08-10/31/10
Bill & Melinda Gates Foundation
TrypDB: A Bioinformatics Tool for Target Discovery Research on Trypanosomatid Parasites
The purpose of the grant is to leverage infrastructure and tools via the ApiDB project to rapidly and economically improve access to genomic-scale datasets for kinetoplastid researchers.

Complete Research Support

AI45039 Stuart (PI) 3/15/00-02/28/06
NIH/NIAID U01
***Trypanosoma cruzi* Genome**

The major goals of this project were to sequence the genome of *Trypanosoma cruzi*, a human pathogen of global importance, as part of an interactive research project with the Karolinska Institute (Sweden) and the Institute of Genomic Research (USA). The PI on this grant was Dr. Kenneth Stuart, but Dr. Myler was responsible for the day-to-day direction of this project.

GM064655 Hol (PI) 9/28/01-8/31/05
NIH/NIGMS P50
Structural Genomics of Pathogenic Protozoa (SGPP)
The goals of this project were to use a high-throughput structural genomics approach to elucidate the sequence-to-structure relationships for several hundred to thousands of proteins from *Leishmania*, *Trypanosoma* and *Plasmodium*.

2003237 Zilberstein (PI) 10/1/04-9/30/08
United States-Israel Binational Science Foundation (BSF)
Molecular characterization of the development of the intracellular pathogen *Leishmania*"
The major goals of this proposal are to use DNA microarray and proteomic analyses to identify genes that are up- and down-regulated during differentiation in *Leishmania donovani*, and begin to characterize their function.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Pratt, Wanda	Associate Professor
eRA COMMONS USER NAME Wandapratt	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Kansas, Lawrence, KS	B.S.	1987	Electrical Engineering
University of Texas, Austin, TX	M.S.	1991	Computer Science
Stanford University, Stanford, CA	Ph.D.	1999	Medical Informatics

A. Positions and Honors.

Positions and Employment

1998-2001 Assistant Professor, Information & Computer Science Dept, University of California, Irvine
2002-2005 Assistant Professor, Information School, University of Washington
2002-2005 Assistant Professor, Biomedical & Health Informatics, University of Washington
2005-present Associate Professor, Information School, University of Washington
2005-present Associate Professor, Biomedical & Health Informatics, University of Washington

Other Experience and Professional Memberships

2000, 2003 Review Panelist for National Science Foundation (NSF)
2001-present Editorial Board of Journal of Biomedical Informatics (JBI)
2002 Mentor for ASIS&T's Doctoral Consortium
2002, 2003, 2008 Program Committee for American Medical Informatics Association (AMIA) Fall Symposium
2003 Organizing committee for NSF workshop for Information and Data Management Program
2004 Grant Reviewer for United States-Israel Binational Science Foundation (BSF)
2004-2008 Member of the Biomedical Library and Informatics Review Committee, NIH study section
2006 Co-chair of ACM's Conference on Information Retrieval (SIGIR) Doctoral Consortium

Honors

1989 Lockheed Innovation Award for the exercise knowledge-based system for astronauts
1995–1998 National Library of Medicine Predoctoral Training Fellowship
1997 Award for presentation at the National Library of Medicine Fellowship Meeting, Bethesda, MD
2002 2002 Diana E. Forsythe Best Paper Award
2007 Journal of the American Society for Information Science & Technology (JASIS&T) Best Paper Award

B. Selected peer-reviewed publications (of over 50)

1. Blake, C., **Pratt, W.** (2000). Multiple categorizations of search results: An extension to dynamic categorization. *Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium*, 81-85.
2. **Pratt, W.**, & Wasserman, H. (2000). QueryCat: Automatic categorization of MEDLINE queries. *Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium*, 655-659.
3. **Pratt, W.,** & Fagan, L. (2000). The usefulness of dynamically categorizing search results. *Journal of the American Medical Informatics Association (JAMIA), 7*(6), 605-617. (selected by the International Medical Informatics Association to be reprinted in their annual Yearbook of best papers)
4. Reddy, M., Dourish, P., & **Pratt, W**. (2001). Coordinating heterogeneous work: Information and representation in medical care. *European Conference on Computer Supported Cooperative Work (ECSCW'01)*, 239-258.
5. Muramatsu, J., & **Pratt, W**. (2001). Transparent queries: Investigating users' mental models of search engines. *SIGIR-01: Proceedings of the Twenty-fourth International ACM Conference on Research and Development in Information Retrieval*, 217-224.
6. Blake, C., & **Pratt, W.** (2002). Collaborative information synthesis. *Proceedings of the 65th American Society for Information Science and Technology (ASIST) Annual Meeting, 39*, 44-56.
7. Reddy, M., **Pratt, W.**, Dourish, P., & Shabot, M. (2002). Asking questions: Information needs in a surgical intensive care unit. *Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium*, 647-651. (winner of Diana Forsythe Best Paper Award)
8. Reddy, M., **Pratt, W.**, Dourish, P., & Shabot, M. (2003). Sociotechnical requirements analysis for clinical systems [Special issue]. *Methods of Information in Medicine, 42*, 437-442.
9. Reddy, M., **Pratt, W.**, McDonald, D., & Shabot, M. (2003). Challenges to physicians' use of a wireless alert pager. *Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium*, 544-548. (nominated for Diana Forsythe Best Paper of the Year Award)
10. **Pratt, W.**, & Yetisgen-Yildiz, M. (2003). A study of biomedical concept identification: MetaMap vs. people. *Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium*, 529-533.
11. **Pratt, W.**, & Yetisgen-Yildiz, M. (2003). LitLinker: Capturing connections across the biomedical literature. *Proceedings of the International Conference on Knowledge Capture (K-Cap'03)*, 105-112.
12. **Pratt, W.,** Reddy, M., McDonald, D., Tarczy-Hornoch, P., & Gennari, J. (2004). Incorporating ideas from computer supported cooperative work. *Journal of Biomedical Informatics, 37*, 128-137.
13. Skeels, M., Henning, K., Yetisgen-Yildiz, M., & **Pratt, W**. (2005). Interaction design for literature-based discovery. *Proceedings of the ACM International Conference on Human Factors in Computing Systems (CHI)*, 1785-1788.
14. Reddy, M., McDonald, D., **Pratt, W.**, & Shabot, M. (2005). Technology, work, and information flows: Lessons from the implementation of a wireless alerts pager system. *Journal of Biomedical Informatics, 38*, 229-238.
15. **Pratt, W.**, Unruh, K., Civan, A., & Skeels, M. (2006). Managing health information in your life. *Communications of the Association for Computing Machinery (CACM), 49*(1), 51-55.
16. Civan, A., & **Pratt, W**. (2006). Supporting consumers by characterizing the quality of online health information: A multidimensional framework. *Proceedings of the 39th Hawaii*

International Conference on System Sciences (HICSS). January 4-7, 2006, Computer Society Press. Ten pages.

17. Blake, C., & **Pratt, W**. (2006). Collaborative information synthesis I: A model of information behaviors that surround synthesis activities. *Journal of the American Society for Information Science and Technology (JASIST)*. v57n11:1740-1749. (Best Paper)
18. Blake, C., & **Pratt, W**. (2006). Collaborative information synthesis II: System recommendations. *Journal of the American Society for Information Science and Technology (JASIST)* v57n12:1888-95 (Best Paper)
19. Reddy, M., Dourish, P., & **Pratt, W**. (2006). Temporality in medical work: Time also matters. *Journal of Computer-Supported Cooperative Work (JCSCW)*. vol. 15, no. 1, p. 29-53.
20. Yetisgen-Yildiz, M., & **Pratt, W**. (2006). Using statistical and knowledge-based approaches for literature-based discovery. *Journal of Biomedical Informatics (JBI)*. 39(6):600-11
21. Unruh, K., & **Pratt, W**. (2007). Patients as actors: The patient's role in detecting, preventing, and recovering from medical errors. *International Journal of Medical Informatics*. v76: 236-244
22. Civan, A. & **Pratt, W.** (2007) Threading Together Patient Expertise. Proceedings of the American Medical Informatics Association Fall Symposium (AMIA'07). Chicago, IL. (Distinguished Paper Nomination)
23. Civan, A., **W. Pratt**. (2007), Characterizing and Visualizing the Quality of Health Information. Communications of the Association for Information Systems, vol. 20, article 18 12.
24. C. Shore, Z. Birchmeier, M. desJardins, **W. Pratt**, and H. Schielka, (2007) "Time-to-degree: Some suggestions for keeping on schedule as a PhD student," APS Observer Student Notebook.
25. M. Yetisgen-Yildiz and **W. Pratt.** (2008) *Evaluation of Literature-based Discovery Systems*. Literature based Discovery, Editors: P.D. Bruza and M. Weeber, Springer, 2008.
26. M. Yetisgen-Yildiz, **W. Pratt** (2008). Finding the Meaning of Medical Concept Correlations, *Proceedings of the American Medical Informatics Association (AMIA) Fall Symposium*
27. Unruh, K., & **Pratt, W**. (2008) Barriers to Organizing Information during Cancer Care: "I don't know how people do it" Proceedings of the American Medical Informatics Association Fall Symposium (AMIA'08). Washington D.C. (Diana Forsythe Award nomination)
28. K. T. Unruh and **W. Pratt**. (2008) The Invisible Work of Being a Patient and Implications for Health Care: "[the doctor is] my business partner in the most important business in my life, staying alive." *Conference Proceedings: Ethnographic Praxis in Industry Conference (EPIC '08)*. Copenhagen.
29. M. Yetisgen-Yildiz, **W. Pratt** (2009). A New Evaluation Methodology for Literature-Based Discovery Systems. Journal of Biomedical Informatics. DOI: 10.1016/j.jbi.2008.12.001

C. Research Support

Ongoing Research Support

(1) National Library of Medicine, *Managing Health Information in Your Life*, (**PI – Wanda Pratt**) Sept 2007-Sept 2010.

Our goal in this grant is to study the information work that breast cancer patients do, to use participatory design methodologies to develop new personal health information management tools to help them accomplish that work, and evaluate the tool with breast cancer patients.

(2) Robert Woods Johnson Foundation, *Video Games for Dietary Behavior Change and Improved Glycemic Control in Diabetes* (**PI – Wanda Pratt**) May 2008 – May 2009

Our goal in this grant is to develop simple games to help diabetics learn how to estimate the carbohydrate content and energy density of common foods that they eat. The hypothesis is that these skills would translate into improved gylcemic control, and we will be testing that hypothesis in a randomized controlled trial of 150 diabetics.

(3) Microsoft HealthVault Be Well Fund Award, *Using Mobile Technologies to Uncover Barriers to Healthy Behavior in Heart Disease Patients* (**PI – Wanda Pratt**) July 2008 – July 2009

Our goal in this project is to leverage mobile technology and Microsoft HealthVault to help patients, providers, and researchers utilize personalized information to improve cardiac patients' lifestyle changes. We propose to use mobile phones and wearable sensors to study contextual factors that shape the behavior change process of heart disease patients and to store this information in the HealthVault to enable data trending, exploration, and use in combination with patients' other HealthVault records.

Completed Research Support (from last 3 years)

(1) National Science Foundation, *CAREER: Intelligent interfaces for searching, managing, and sharing the scientific literature.* (**PI – Wanda Pratt**) July 2002 to June 2008.

Our goal in this grant is to develop tools that would promote interdisciplinary use of scientific literature by facilitating discovery from MEDLINE and integrating this discovery tool into the normal document management and sharing tasks of a researcher.

(2) National Science Foundation, Research Experiences for Undergraduates supplement to CAREER award. (**PI – Wanda Pratt**) July 2003 to July 2005.

The goal for this project is to encourage research experiences for undergraduates by including them in the research process.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Linda G. Shapiro	Professor
eRA COMMONS USER NAME LGSHAPIRO	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Illinois, Urbana	B.S.	1970	Mathematics
University of Iowa, Iowa City	M.S.	1972	Computer Science
University of Iowa, Iowa City	Ph.D.	1974	Computer Science

A. Positions and Honors

Employment:

Professor, Dept. of Computer Science & Engineering and Dept. of Electrical Engineering, University of Washington, Seattle, Washington, 1990-present,

Adjunct Professor, Dept. of Medical Education and Biomedical Informatics, University of Washington, 2001-present.

Recent Service:

Program Committee, IEEE Workshop on Content-Based Access of Image and Video Libraries, 1997-2001.

Co-Organizer, Dagstuhl Seminar on Content-Based Image and Video Retrieval, 2002.

Co-Track Chair, International Conference on Pattern Recognition, Medical and Multimedia Track, 2002.

Program Committee, International Conference on Pattern Recognition, Computer Vision Track, 2004.

Program Committee, IEEE Workshop on Computer Vision for Biomedical Image Applications, 2005.

Co-Chair, IEEE Conference on Computer Vision and Pattern Recognition, 2008

Honors:

Pattern Recognition Society Best Paper Awards, 1984, 1989, and 1995.

Fellow of the IEEE (Institute for Electrical and Electronics Engineers), 1996.

Fellow of the IAPR (International Association for Pattern Recognition), 2000.

B. Selected Publications

Selected Recent:

Pulli, K. and L. G. Shapiro, "Surface Reconstruction and Display from Range and Color data," *Graphical Models,* Vol. 62, 2000, pp. 165-201.

Costa, M. S. and L. G. Shapiro, "3D Object Recognition and Pose with Relational Indexing," *Computer Vision And Image Understanding, Vol. 79, No. 3, 2000,* pp. 364-407.

Hinshaw, K. P., A. V. Poliakov, E. B. Moore, R. F. Martin, L. G. Shapiro, and J. F. Brinkely, "Shape-Based Cortical Surface Segmentation for Visualization Brain Mapping," *Neuroimage*, Vol. 16, 2002, pp. 295-316.

Chou, Y. and L. G. Shapiro, "A Hierarchical Multiple-Classifier Learning Algorithm," *Pattern Analysis and Applications*, Vol. 6, 2003, pp. 150-168.

Ye, M. R. M. Haralick, and L. G. Shapiro, "Estimating Piecewise-Smooth Optical Flow with Global Matching and Graduated Optimization," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 25, No. 12, 2003, pp. 1625-1630.

Li, Y., J. Bilmes, and L. G. Shapiro, "Object Class Recognition using Images of Abstract Region,s" *Proceedings of the International Conference on Pattern Recognition*, 2004.

Detwiler, L. T., E. Chung, A. Li, J. L. V. Mejino Jr., A. V. Agoncillo, J. F. Brinkley, C. Rosse and L. G. Shapiro, "A Relation-Centric Query Engine for the Foundational Model of Anatomy," *Proceedings of MedInfo*, 2004.

Smith, V. S., R. F. Martin, A. V. Poliakov, J. F. Brinkley, L. G. Shapiro, D. Van Essen, G. A. Ojemann, D. Corina, "Evaluating Anatomical Normalization Methods," *Neuroscience 2004*, Online, http:/sfn.scholarone.com.

Lin, H. J., S. Ruiz-Correa, L. G. Shapiro, D. Gatica-Perez, A. V. Hings, M. I. Cunningham, M. L. Speltz and R. W. Sze, "Symbolic Shape Descriptors for Classifying Craniosynostosis Deformations From Skull Imaging," *IEEE EMBS*, September 2005.

Lin, H. J., S. Ruiz-Correa, R. W. Sze, M. L. Cunningham, M. L. Speltz, A. V. Hing, and L. G. Shapiro, "Efficient Symbolic Signatures for Classifying Craniosynostosis Skull Deformities," *Proceedings of the Workshop on Computer Vision for Biomedical Image Applications*, October 2005, pp. 302-313.

Mortensen, E., H. Deng, and L. Shapiro, "A SIFT Descriptor with Global Context," *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2005.

Li, Y., I. Atmosukarto, M. Kobashi, J. Yuen, and L. G. Shapiro, "Object and Event Recognition for Aerial Surveillance," *Proceedings of the SPIE Conference on Optics and Photonics in Global Homeland Security*, Vol. 5781, April 2005, pp. 139-149.

Ruiz-Correa, S., R. W. Sze, H. J. Lin, L. G. Shapiro, M. L. Speltz, M. L. Cunningham, "Classifying Craniosynostosis Deformations by Skull Shape Imaging," *IEEE CBMS*, 2005.

Shapiro, L. G., E. Chung, L. Detwiler, J. Mejino, Jr., A. Agoncillo, J. F. Brinkley, and C. Rosse, "Processes and Problems in the Formative Evaluation of an Interface to the Foundational Model of Anatomy Knowledge Base," *Journal of the American Medical Informatics Association*, Vol. 12, 2005, pp. 35-46.

Pan, S., G. Shavit, M. Penas-Centeno, D.-H. Xu, L. G. Shapiro, R. Ladner, E. Riskin, W. Hol, "Automated Classification of Protein Crystallization Images Using Support Vector Machines with Scale-Invariant Texture and Gabor Features," *Biological Crystallography*, Vol. D62, 2006.

Travillian, R. S., K. Diatchka, T. K. Judge, K. Wilamowska, and L. G. Shapiro, "A Graphical User Interface for a Comparative Anatomy Information System: Design, Implementation and Usage Scenarios," Proceedings of the *AMIA 2006 Annual Symposium*, 2006.

Saad, A., L. G. Shapiro, *et a*l., "Shape Decomposition Approach for Ultrasound Color Doppler Image Segmentation," *International Conference on Pattern Recognition*, 2006.

Teng, C., L.G. Shapiro, and I. Kalet, "Automatic Segmentation of Neck CT Images," *Proc. IEEE International Symposium on Computer-Based Medical Systems (CMBS)*, June 2006.

Lin, H. J., S. Ruiz-Correa, L. G. Shapiro, M. L. Cunningham, M. Speltz, W. R. Sze, "Predicting Neuropsychological Development from Skull Imaging," *28th IEEE EMBS Annual International Conference*, 2006.

Teng, C., L. G. Shapiro, and I. Kalet, "Head and Neck Cancer Patient Similarity Based on Anatomical Structural Geometry,'" *IEEE International Symposium on Biomedical Imaging*, 2007.

Larios, N., H. Deng, W. Zhang, M. Sarpola, J. Yuen, R. Paasch, A. Moldenke, D. Lytle, S. Ruiz Correa, E. Mortensen, L. Shapiro, T. Dietterich, "Automated Insect Identification through Concatenated Histograms of Local Appearance Features," *Machine Vision and Applications*, Vol. 19, No. 2, 2007, pp. 105-123.

Sarpola, M. J., R. K. Paasch, E. N. Mortensen, T. G. Dietterich, D. A. Lytle, A. R. Moldenke, L. G. Shapiro, "An Aquatic Insect Imaging System to Automate Insect Classification," *Transactions of the ASABE*, Vol. 51, No. 6, 2008.

Saad, A. A.,T. Loupas, and L. G. Shapiro, "Computer Vision Approach for Ultrasound Doppler Angle Estimation," *Journal of Digital Imaging*, 2008.

Yuen, J., Y. Li, L. G. Shapiro, J. I. Clark, E. Arnett, E. Helene Sage, J. F. Brinkley, "Automated, Computerized, Feature-Based Phenotype Analysis of Slit Lamp Images of the Mouse Lens," *Experimental Eye Research*, 2008.

Teng, C., L. G. Shapiro, J. Ver Halen, and R. Hopper, "Pediatric Cranial Defect Surface Analysis for Craniosynostosis Postoperation CT Images," *International Symposium on Biomedical Imaging*, 2008.

Atmosukarto, I., R. S. Travillian, J. D. Franklin, L. G. Shapiro, J. F. Brinkley, D. Suciu, J. I. Clark, M. L. Cunningham, "A Unifying Framework for Combining Content-Based Image Retrieval with Relational Database Queries for Biomedical Applications," *Society of Imaging Informatics in Medicine Annual Symposium*, 2008

Ruiz-Correa, S., D. Gatica-Perez, H. J. Lin, L. G. Shapiro, R.W. Sze, "Bayesian Hierarchical Model for Classifying Craniofacial Malformations from CT Imaging," *IEEE Engineering in Medicine and Biology Society Annual International Conference*, 2008.

Tungaraza, R. F., J. Guan, L. G. Shapiro, J. F. Brinkley, J. Ojemann, J. D. Franklin, "A Similarity Retrieval Tool For Functional Magnetic Resonance Imaging (fMRI) Statistical Maps," *Artificial Intelligence in Medicine*, to appear, 2009.

Books:

Shapiro, L. G. and G. Stockman, *Computer Vision*, Prentice Hall, 2001.

C. Research Projects Ongoing or Completed During the Last 3 Years:

Ongoing:

0705765-IIS, "Machine Learning for Robust Recognition of Invertebrate Specimens in Ecological Science," National Science Foundation, 10/07-9/10,
Co-PI (PI: Thomas Dietterich at Oregon State).

The goal of this multidisciplinary project is to develop more advanced computer vision and machine learning techniques for classification of invertebrate specimens. This is a follow-on award to IIS-0326052.

CNS-0613550, "SoD-TEAM: Problem-Solving Methodology in Collaborative Design," National Science Foundation, 8/15/06-7/31/10,
Senior Personnel (PI: Steven Tanimoto).
The goal of this project is to develop computer-based methods of collaborative design. The approach uses the artificial intelligence concept of state-based search to allow users a simple, but effective way to explore different design options. Applications to game development and architecture are being studied.

DBI-0543631, "Multimedia Information Retrieval for Biological Applications,"
National Science Foundation, 7/1/06-6/30/09, Principal Investigator (with co-PIs Brinkley and Suciu).

The goal of this project is to develop a unified methodology for organization and content-based retrieval of biological data from scientific experiments. The project includes the development of similarity measures, the design of queries, and the development of a probabilistic framework for content-based retrieval.

Completed:
IIS-0326052, "ITR: Pattern Recognition for Ecological Science and Environmental Monitoring,"
National Science Foundation, 9/1/03-8/31/07,
Co-PI (PI: Thomas Dietterich at Oregon State).
The goal of this ITR project is to develop a highly-automated approach to the classification of insect specimens. The project includes the development of computer vision and machine learning algorithms for automatic classification of insects from images according to family, genus, and species. Potential applications include measuring soil diversity and monitoring freshwater streams.

"High-Throughput, Capillary-Based Protein Crystallography,"
NIH/NIGMS, 9/1/03 to 8/31/06,
Investigator (Deirdre Meldrum: PI).
The emphasis of this R01 program is the rigorous evaluation of proposed capillary preparation methods for robustness, identification of areas of technical risk, and when required the development of innovative new methods to achieve the goal of robust, cost-effective, high-throughput, high-quality, beam ready crystals in capillaries, including automated analysis of crystallography images.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Tarczy-Hornoch, Peter	Professor of Pediatrics Division Head and Professor of Biomedical and Health Informatics
eRA COMMONS USER NAME tarczyhornoch	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Stanford University, Stanford, CA	B.S.	1985	Biology
Stanford University School of Medicine, Stanford,	M.D.	1989	Medicine
University of Minnesota, Minneapolis, MN	Residency	1992	Pediatrics
University of Washington, Seattle, WA	Fellowship	1995	Neonatology

C. POSITIONS AND HONORS

Faculty Positions

1998-01 Assistant Professor, Division of Neonatology, University of Washington
1998-01 Adjunct Assistant Professor, Division of Biomedical and Health Informatics (BHI), Department of Medical Education (MEBI), University of Washington
2001-06 Associate Professor, Division of Neonatology, University of Washington
2001-06 Associate Professor, Div. of BHI, Dept. of MEBI, University of Washington
2003-06 Adjunct Associate Professor, Dept. of Computer Science and Engineering, U. of Washington
2001- Head, Div. of Biomedical and Health Informatics, Dept. of MEBI, University of Washington
2006- Professor, Division of Neonatology, University of Washington
2006- Professor, Div. of BHI, Dept. of MEBI, University of Washington
2006- Adjunct Professor, Dept. of Computer Science and Engineering, U. of Washington

Selected Informatics Positions

1995-01 Clinical Informatics Consultant (until 2000 Lead/Architect), Focus: MINDscape Web electronic medical record Medical Center Information Systems, University of Washington
1999-02 **Chair**, Curriculum Committee, Biomedical Informatics Graduate Program
2001-02 Clinical Computing Steering Committee, University of Washington Academic Medical Centers
1995- **Director**, Genetic Informatics Group, Division of Biomedical and Health Informatics
2001- **Deputy Graduate Program Director**, Biomedical Informatics Graduate Program
2002- **Program Director**, University of Washington Biomedical and Health Informatics Research Training Program (funded by the NIH National Library of Medicine)
2006- **Director**, Data Integration & Web Services, UW Medicine Information Technology Services
2007- **Director**, Biomedical Informatics Core, Northwest Institute of Translational Health Science
2008- **Associate Director**, Northwest Institute of Genetic Medicine

Selected Honors and Awards

2004- Fellow American College of Medical Informatics (ACMI) (elected fellow)

Selected Special National Responsibilities

2000-03 NIH Human Genome Initial Review Group ELSI Study Section
2002 NIH Special Emphasis Panel – Bioinformatics / BISTI
2004-05 **Co-chair**, AMIA 2005 Scientific Program Committee, **Chair**, Foundations Track
2001- AMIA Genomics Working Group (**Chair Elect** '02, **Chair** '03-4, **Past-Chair** '05)
2003- AMIA Working Group Steering Committee
2003- Gene Ontology Advisory Board
2004- Journal of the American Medical Informatics Association Editorial Board
2004- **Co-chair,** Intl. Med. Inform. Assoc. "Informatics in Genomic Medicine" Working Group
2004- Program Committee, 2nd International Workshop on Data Integration for the Life Sciences
2005- External Advisory Board, Harvard NCBC "Informatics for Integrating Biology and the Bedside"
2008- Journal of Biomedical Informatics Editorial Board
2008- External Advisory Board, University of Utah Clinical Translational Science Award (CTSA)
2009- Executive Committee, American College of Medical Informatics (elected)

B. SELECTED PEER-REVIEWED PUBLICATIONS (from 56 articles, 4 book chapters, 1 book edited)

Tarczy-Hornoch P, Shannon P, Baskin P, Espeth M, Pagon RA. GeneClinics: a hybrid text/data electronic publishing model using XML applied to clinical genetic testing. *JAMIA* 2000; 7: 267-76.

McEntire R, Karp P, Abernethy N, Olken F, Kent RE, DeJongh M, **Tarczy-Hornoch P**, et al. An evaluation of ontology exchange languages for bioinformatics. *Intell Syst Mol Biol* 2000; 8: 239-50.

Donelson L, **Tarczy-Hornoch P**, Mork P, Dolan C, et al. The BioMediator system as a data integration tool to answer diverse biologic queries. *Medinfo* 2004; 11: 768-72.

Mork, P, Shaker, R, **Tarczy-Hornoch, P**. "The Multiple Roles of Ontologies in the BioMediator Data Integration System" Lecture Notes in Computer Science. Volume 3615/2005. D*ata Integration in the Life Sciences: Second International Workshop*, DILS 2005, San Diego, CA, USA, July 20-22, 2005. Proceedings Editors: Bertram Ludäscher, Louiqa Raschid. Page 96-104

Wang K*, **Tarczy-Hornoch P***, Shaker R, Mork P, Brinkley J. BioMediator data integration: beyond genomics to neuroscience data. AMIA Fall 2005 Symposium Proceedings 779-783, 2005.

Anderson, NA, Ash, JS, **Tarczy-Hornoch, P.** "A Qualitative Study of the Implementation of a Bioinformatics Tool in a Biological Research Laboratory". **Int J Med Inform 2006 Nov 2**

Tarczy-Hornoch P, Markey MK, Smith JA, Hiruki T. Bio*Medical informatics and genomic medicine: research and training. J Biomedical Informatics 2007; 40: 1-4

Louie, B, Mork, P, Martin-Sanchez, F, Halevy, A, **Tarczy-Hornoch, P**. "Data Integration and Genomic Medicine" *J Biomedical Informatics* 2007; 40: 5-16

Anderson, NA, Lee, ES, Brockenbrough, JS, Minie, ME, Fuller, S, Brinkley, J, **Tarczy-Hornoch, P**. "Issues in Biomedical Research Data Management and Analysis: Needs and Barriers". JAMIA, 2007, 14(4):478-88

Ash, JS, Anderson, NR, **Tarczy-Hornoch, P**. "People and Organizational Issues in Research Systems Implementation". JAMIA 15(3):283-9 (2008)

Louie, B, **Tarczy-Hornoch, P**, Higdon, R, Kolker, E. "Validating Annotations for Uncharacterized

Proteins in Shewanella oneidesis". OMICS. Sep;12(3):211-5 (2008)

Lee, ES, McDonald, DW, Anderson, NA, **Tarczy-Hornoch, P.** ""Incorporating collaboratory concepts into informatics in support of translational interdisciplinary biomedical research." Int Jour Med Inf 78:10-21 (2009)

Overby, C, **Tarczy-Hornoch, P**, Demner-Fushman, D. "The Potential for Automated Question Answering in the Context of Genomic Medicine: An Assessment of Existing Resources and Properties of Answers." *Trans. Bioinf Summit 2009*

Selected Invited Regional and National Presentations (from 55)

"People and Organizational Issues in Clinical and Research Systems Implementation", Faculty for Tutorial, November 11, 2007, Fall 2007 AMIA Symposium, Chicago, IL

"Instrumenting the Medical Enterprise for Discovery: Dissolving the Barriers between Clinical Care and Research", Panelist, 2008 AMIA Translational Bioinformatics Summit, March 12, 2008, San Francisco, CA

C. RESEARCH SUPPORT

Ongoing Research

3 T15 LM007442-04S2 Tarczy-Hornoch (PI) 7/1/05-6/30/09
NIH: NLM, Robert Wood Johnson Foundation
Public Health Informatics Training
Goals: Creation and refinement of a public health informatics training track as an extension of the NLM funded Biomedical and Health Informatics Research Training Program.
Role: PI, coordination with Public Health Informatics Track Chair (Mark Oberle MD MPH)

P01 CD 000261 Oberle (PI) 9/30/05-9/29/09 CDC
Center of Excellence in Public Health Informatics
Goals: The center is focused on three areas: a) Surveillance Integration and Decision Support, b) Customizable Knowledge Management Repository System for Prevention. Partners include WA Department of Health, Kitsap County Health Department, the Public Health Informatics Institute, and Inland Northwest Health Services.
Role: Co-Investigator, Internal Steering Committee

IIS-0513877 Halevy, Alon (PI) 9/1/05-8/31/09 NSF
Information Integration in the Presence of Uncertainty
Goals: The overall goal of this proposal is the design and implementation of information integration systems that handle uncertainty about data and results at all levels of the integration process. We therefore propose to build the U2 System (short for UII {Uncertain Information Integration}) that will model uncertainty at all levels of the system. To begin, U2 will represent uncertainty in the mediated schema, the model used to formulate queries, and will enable users to pose queries with uncertainty.
Role: Co-PI

2 T15 LM007442-06 Tarczy-Hornoch (PI) 7/1/07-6/30/12 NIH: NLM
Biomedical and Health Informatics Research Training Program
Goals: To continue the existing informatics research and training activities of the Division of Biomedical and Health Informatics (DBHI) and its Graduate Program in Biomedical and Health Informatics (BHI) at the University of Washington (UW) by continuing to provide funding for our pre-doctoral and post-doctoral trainees.
Role: PI, Program Director

1 UL1 RR 025014-01 (Disis) 9/17/07 - 5/31/12 NIH/NCRR
(National Center for Research Resources)

Institute of Translational Health Science
The Institute of Translational Health Science provides an academic structure to enhance collaboration & support for clinical translation & human research at UW & it's partner institutions, Fred Hutchinson Cancer Research Center, Children's Hospital and Regional Medical Center, Group Health Cooperative, Benaroya Research Institute, and community partners in the five-state WWAMI region (Washington, Wyoming, Alaska, Montana, and Idaho). The focus of Biomedical Informatics Core (BMIC) includes research and application development focused on: a) secondary use of electronic medical record data for research purposes, b) access to electronic data capture and study data management tools, c) development of interfaces to high throughput biomedical research instrumentation, d) data integration across a-c, and e) collaboratory and information technology infrastructure
Role: Director, Biomedical Informatics Core

5 K12 RR023265-03 Deyo (PI) 9/23/04 – 7/31/09 NIH/NCRR
UW Multidisciplinary Clinical Research Training (RMI)
Goals: To train approximately 7 or 8 clinical research scholars a year; to train investigators who have depth in a specific area of research, but also breadth of knowledge about the spectrum of clinical investigation.
Role: Faculty Mentor

1 R01 LM009157-01A1 (Doctor) 6/1/07 – 5/31/09 NIH/NLM
Detecting Errors in Blood Labs Using Bayesian Networks
The long-term objective of this project is to evaluate if Bayesian networks are more accurate than laboratory experts in detecting errors in clinical laboratory data.
Role: Subaward PI

Washington Life Sciences Development Fund (Jarvik) 5/1/08 – 4/30/12
Institute for Genetic Medicine
The major aims are to 1) enhance the capabilities of investigators to carry out cutting edge research on the etiology, prevention, and treatment outcomes of common human disease by: - developing a large repository linked to detailed clinical data; improving access to quality electronic medical records and coordinating and increasing access to existing human subject approval and sample collection resources; coordinating and increasing access to existing and developing high-throughput genotype, sequencing, and proteomics services; providing new resources for study design, data-basing, and analysis,2) Initiate outcomes research on the clinical use of genetic technology, 3) Assist in the protection of research subjects and explore the ethical delivery of genetic medicine, 4) Facilitate communications among the faculty, trainees, and industry partners working in translational genetic medicine.
Role: Associate Director of Institute, Director of Biomedical Informatics Core

<u>Completed Research</u>

5 R01 HG002288 Tarczy-Hornoch (PI) 8/15/00-9/30/03, 9/30/03-8/31/06
NIH: NHGRI, NLM
BioMediator: Biologic Data Integration and Analysis System
(Original title of project 8/15/00-10/31/03: GeneSeek: a data integration system for genetic databases)
Goals: Collaborate with a diverse group of biology researchers with real world needs to develop and distribute a general-purpose system (BioMediator) to permit integration and analysis of diverse types of biologic data.
Role: PI, Informatics Lead

Brinkley (PI) 1/1/03-12/31/05 NIH: NLM

BISTI Planning Grant for Interdisciplinary Center for Structural Informatics
Goals: Plan and develop an interdisciplinary center for structural informatics. Includes: a) administrative core, b) computing core, c) educational core, d) planning core, and three development projects: 1) experimental data management systems, 2) ontology alignment, 3) peer data management systems.
Role: Co-PI, Co-Director

LM-06001-08 Pagon (PI) 2/1/02-1/31/05 NIH: NLM, P41
GeneTests: Genetic Testing Resource (formerly Helix)
Goals: Enhance the GeneTests – www.genetests.org database of available clinical and research testing for genetic disorders including 1) ongoing expansion and maintenance of content and streamlining workflow, 2) refining the underlying data model to better reflect genotype: phenotype relationships, 3) integration of decision support tools, 4) collaboration with LOINC on nomenclature, 5) expanded support for research laboratories, 6) expansion of educational materials.
Role: PI and Informatics Lead on Informatics Subcontract

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Turner, Anne McNaughton, MD, MLIS, MPH	Co-Investigator

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of California, Irvine, CA	BS	1981	Biology
Brown University, Providence, RI	MD	1985	Medicine
University of Washington, Seattle, WA	Fellowship	1992	Pediatric Hem/Oncology
University of Washington, Seattle, WA	MLIS	2001	Information Science
Oregon Health & Science University, Portland, OR	Fellowship	2004	Medical Informatics
University of Washington, Seattle, WA	MPH	2005	Public Health

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present memberships on any Federal Government public advisory committee.

1996-Present: Staff Physician, Department of Pediatrics, Group Health Permanente, Seattle, WA.

1999-present: Staff Physician, Department of Pediatrics, Children's Hospital Center Urgent Care Clinic, Seattle, WA.

06/00-08/00: Research Intern and Medical Consultant, Center for Natural Language Processing, Syracuse University, Syracuse, NY.

09/00-06/01: Research Assistant, Department of Library and Information Science, ISchool, University of Washington, Seattle, WA.

06/01-08/01: Research Intern and Medical Consultant, Center for Natural Language Processing, Syracuse University, Syracuse, NY.

09/01-08/04: National Library of Medicine, Informatics Postdoctoral Fellow, Oregon Health & Science University, Portland, OR.

09/05-9/06 Faculty, Research Associate, School of Public Health and Community Medicine, University of Washington, Seattle, WA.

10/06- 8/08 Faculty, Acting Assistant Professor, UW Center for Public Health Informatics, University of Washington, Seattle, WA.

8/08- present Faculty, Assistant Professor, UW Center for Public Health Informatics, University of Washington, Seattle, WA.

Honors and Awards:

Beta Phi Mu, UW (2001)

Publications: Selected peer-reviewed publications (in chronological order). Do not include publications submitted or in preparation.

1. **Turner, A.M.**, Liddy, E.D., Bradley, J., Wheatley, J.A. and Corieri, S.B. Progress Towards Automated Grey Literature Public Health Intervention Summaries. Sixth International Conference on Grey Literature, New York. NYAM, 2004.
2. Streichert, L.C., O'Carroll, P., Gordon, P., Stevermer, **Turner, A.M.** and Nicola, R.M.**:** Using Problem-Based Learning for Cross-Discipline Emergency Preparedness Training *Journal of Public Health Management and Practice*, Supplement, November 2005, S95-S992005.
3. **Turner, A.M**., Liddy, E.D., Bradley, J. and Wheatley, J.: Modeling public health interventions for improved access to the public health grey literature. *Journal of the Medical Library Association*; 93(4):487-94. 2005
4. Revere D, **Turner AM**, Madhaven AM, Rambo N, Bugni PA, Kimball A, Fuller S. Understanding the information needs of public health professionals: A literature review to inform design of an interactive digital knowledge management system. *J Biomed Inform*. 2007;40(4):410-21.
5. **Turner, A.M.**, Stavri, P.Z., Revere, D. and Altamore, R. From the ground up: Determining the information needs and uses of local public health nurses in Oregon. *J Med Libr Assoc*, 2008: 96(4):335-42.
6. **Turner, A. M.**, Ramey, J and Lee, S. Connecting public health IT systems with enacted work: Report of an ethnographic study. *AMIA Annu Symp Proc*. 2008 Nov 6: 737-41
7. **Turner, A. M.,** Petrochilos**,** D, Nelson, DE, Allen, E, Liddy E.D. Access and Use of the Internet for Health Information Seeking: A Survey of Local Public Health Professionals in the Northwest. *Journal of Public Health Management and Practice*. 2009:15(1):67-69.

Current Support

7/1/05-6/30/08 *Biomedical and Health Informatics Training Program* $99,100 25%
Budget Period
Principal Investigator: Peter Tarczy-Hornoch, MD
Funding: 3 T15 LM007442-04S1
Robert Wood Johnson Foundation/National Library of Medicine
Role: Associate Track Director
Goals: Develop public health informatics curriculum and core course for Biomedical and Health Informatics graduate programs. Advise and serve as mentor for fellows involved in public health informatics research.

9/30/05-9/29/08 *Improving the Public's Health through Information* $1,038,000 5%
Integration Research
Principal Investigator: Mark Oberle, MD, MPH
Funding: 1 P01 CD000261-01
Centers for Disease Control and Prevention
Role: Co-Investigator
Goals: The Center of Excellence research focuses on two major areas; 1) improving decision support and integration of communicable disease surveillance; and 2) developing a customizable knowledge management system for public health practice and decision making. Partners include the Washington

State Department of Health, Kitsap County Health District, the Public Health Informatics Institute, and the Inland Northwest Health Services.

1/1/06-11/30/09 *Kitsap County Health District: Our Business is Your Business* $668,900 20%
Principal Investigator: Scott Lindquist, MD
Funding: 59773
Robert Wood Johnson Foundation
Role: Principal Investigator of subcontract with the Kitsap County Health Department
Goals: Analyze the current business processes involving the chronic disease activities at the Kitsap County Health District. Redesign business processes to eliminate duplicated efforts and maximize efficiency. Develop requirements for an information system that will integrate and manage chronic disease information.

3/1/06-3/14/09 *Improving Public Health Grey Literature Access for Public Health Workforce* $448,800 10%
Principal Investigator: Elizabeth Liddy, PhD, MLS
Funding: 1 G08 LM008983-01 National Library of Medicine Translational Informatics Grants
Role: Subcontractor, domain expert
Goals: 1) Analyze the information seeking behavior and preferences of local public health professionals and incorporate quality criteria used by public health professionals to design a natural language processing system to search the Internet for quality public health information. 2) Extend, test, and evaluate a public health grey literature information system designed for serving the local public health workforce.

10/1/07-9/30/08 *Kitsap County Health District Workflow and Evaluation* $200,000 30%
Principal Investigators: Anne Turner MD, MPH, MLIS and Janet Baseman, PhD, MPH
Funding: P01CD000261-01 Centers for Disease Control and Prevention Centers of Excellence in Public Health Informatics Supplement Grant
Role: Co-Principal Investigator
Goals: Identify work tasks of personnel involved in the communicable disease activities at the Kitsap County Health District. With local health department personnel identify a set of performance indicators related to work activities and evaluate costs and performance through application of the WHO adopted Public Health Action Model.

12/01/08-11/31/09 *Business continuity for disaster preparedness* $30,000 10%
Principal Investigator: Anne Turner, MD, MPH, MLIS
Funding: Centers for Disease Control and Prevention

Role: Principal Investigator
Description: A pilot study with the Community Health Services Division of Public Health Seattle King County to investigate the information needs and information system requirements for a decision support tool for business continuity planning.

BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Wolf, Fredric M.	Professor & Chair, Medical Education & Biomedical Informatics

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Wisconsin, Madison, WI	B.S.	1967	Political Science
Kent State University, Kent, OH	M.Ed.	1977	Learning & Development
Kent State University, Kent, OH	Ph.D.	1980	Educational Psychology/ Evaluation & Measurement

A. POSITIONS, HONORS, AND SERVICE

1997-present Professor & Chair, Dept of Medical Education & Biomedical Informatics, School of Medicine, & Adjunct Professor, Dept of Health Services & Dept of Epidemiology, School of Public Health & Community Medicine, University of Washington, Seattle

Fellow, American Educational Research Association, 2008; American Psychological Assoc, 1990; American Psychological Society, 1990; Royal Statistical Society, 1986

1990-present Member, Editorial Board, Evaluation & the Health Professions
1999-present Reviewer, Stemmler Medical Education Research Fund, National Board of Medical Examiners
1999, 2004 Member, Special Emphasis Panel, NIH K30 Clinical Research Curriculum Awards, NHLBI
2000-present Advisory Committee, Best Evidence Medical Education Collaboration, Dundee, Scotland, UK
2001-present Member, Editorial Boards BMC Medical Education (2001-), BMC Medicine (2003-)
2002 Medical Education Outcomes Research Expert Meeting, AHRQ
2003 Meta-analysis consultant to the Comprehensive Review Group, Behavioral Research Program, Division of Cancer Control & Population Sciences, National Cancer Institute
2003-2008 Member, Board of Directors, National Board of Examiners in Optometry
2007-present Member, CTSA National Evaluation Steering Committee, NCRR, NIH

B. SELECTED PEER REVIEWED PUBLICATIONS (From 2 books, 18 chapters, and 143 articles)

1. Freemantle N, Harvey EL, Wolf F, et al. Printed educational materials: effects on professional practice and health care outcomes. Cochrane Database of Systematic Reviews 2000;(2): CD000172.

2. Hunt DD, Ferguson B, Ketchell DD, Wolf FM, Ramsey PG. University of Washington School of Medicine. In: MB Anderson (Ed). A snapshot of medical students' education at the beginning of the 21st century. Acad Med 2000; 75(9; Suppl): S395-S397.
3. Mozurkewich EL, Luke B, Avni M, Wolf FM. Working conditions and adverse pregnancy outcome: A meta-analysis. Obstet Gynecol 2000; 95(4):623-635.
4. Wolf FM. Summarizing evidence for clinical use. In JP Geyman, RA Deyo, SD Ramsey (eds). Evidence-based Clinical Practice (pp. 133-143). Woburn, MA: Butterworth Heinemann, 2000.
5. Zweifler AZ, Oh MS, Wolf FM, Fitzgerald JT, Hengstebeck L. The importance of race in medical student performance of an AIDS risk assessment interview with simulated patients. Med Educ 2000;34(3):175-181.
6. Wolf FM. Lessons to be learned from evidence-based medicine: Practice and promise of evidence-based medicine and evidence-based education. Medical Teacher 2000; 22(3): 251-259.
7. Wolf FM, Shea JA, Albanese MA. Toward setting a research agenda for systematic reviews of evidence of the effects of medical education. Teaching & Learning in Medicine 2001;13 (1): 54-60.
8. O'Brien T, Freemantle N, Oxman AD, Wolf F, et al. Continuing education meetings & workshops: effects on prof practice & health care outcomes. Cochrane Database of Systematic Reviews 2001;2:CD003030.
9. Geyman JP, Wolf, FM. Evidence-based medicine. In TE Norris, SS Fuller, HL Goldberg, P Tarczy-Hornoch (Eds.). Informatics for primary care: Strategies in information management for the healthcare provider (pp. 71-88). New York: Springer, 2002.
10. Anderson RM, Wolf FM, Musch DC, et al. Conducting community-based, culturally specific, eye-disease screening clinics for urban African Americans with diabetes. Ethnicity & Disease 2002;12 (3): 404-410.
11. Anderson RM, Musch DC, Nwanko RB, Wolf, FM, et al. Personalized follow-up increases return rate at urban eye screening clinics for African Americans with diabetes: Results of a randomized trial. Ethnicity & Disease 2003;13: 40-46.
12. Kempainen RR, Migeon MB, Wolf FM. Understanding our mistakes: A primer on errors in clinical reasoning. Medical Teacher 2003; 22: 177-181.
13. Wolf FM, Guevara J, Grum C, Clark N, Cates C. Educational interventions for asthma in children (Cochrane Review). Cochrane Database of Systematic Reviews 2003;(1): CD000326.
14. Guevara JP, Wolf FM, Grum CM, Clark NM. Effects of asthma self management educational interventions in children and adolescents: a systematic review and meta-analysis. BMJ 2003; 326 (14 June): 1308-1309.
15. Gillespie RS, Wolf FM. Intravenous iron therapy in pediatric hemodialysis patients: a meta-analysis. Pediatric Nephrology, 2004; 19: 662-666.
16. Guevara JP, Berlin J, Wolf FM. Meta-analytic methods for pooling rates when follow-up duration varies: A case study. BMC Medical Research Methodology, 2004; 4: 17. [http://www.biomedcentral.com/1471]
17. Wolf FM. Methodological quality, evidence, and Research in Medical Education (RIME) Academic Medicine 2004; 79: S68-69.
18. Wolf FM, Schaad DC, Carline JD, Dohner CW. Medical education research at the Univ of Washington School of Medicine: Lessons from the past and potential for the future. Acad Med 2004; 79: 1007-11.
19. Friedman CP, Gatti G, Franz TM, Murphy GC, Wolf FM, et al. Do physicians know when their diagnoses are correct? Implications for decision support and error reduction. J Gen Intern Med 2005;20 (4): 334-9.

20. Leopold SS, Morgan HD, Kadel NJ, Gardner GC, Schaad DC, Wolf FM. Impact of educational intervention on confidence and competence in the performance of a simple surgical task. J Bone Joint Surg 2005; 87A: 1031-37.
21. Bond GE, Burr R, Wolf FM, Price M, McCurry SM, Teri L. Preliminary findings of the effects of comorbidities on a web-based intervention on self-reported blood sugar readings among adults age 60 and older with diabetes. Telemed J E Health. 2006;12(6):707-10.
22. Wolf FM. Medical statistics and research design. In D. Wedding & M. Stuber (Eds.). Behavior and medicine (4th edition, pp. 333-349). Cambridge, MA and Gottingen, Germany: Hogrefe & Huber, 2006.
23. Bond GE, Burr R, Wolf FM, Price M, McCurry SM, Teri L. The effects of a Web-based intervention on the physical outcomes associated with diabetes among adults age 60 and older: A randomized trial. Diabetes Technol Ther. 2007 Feb;9(1):52-9..
24. Lenters TR, Franta AK, Wolf FM, Leopold SS, Matsen FA 3rd. Arthroscopic compared with open repairs for recurrent anterior shoulder instability. A systematic review and meta-analysis of the literature. J Bone Joint Surg 2007;89(2):244-54.
25. Smith S, Hanson J, Tewksbury L, Christy C, Talib N, .Harris M, Beck G, Wolf FM. Teaching medical students patient communication skills: a review of randomized controlled trials. Eval Health Prof 2007;30(1):3-21.
26. Lynch JR; Cunningham MRA; Warme WJ; Schaad DC, Wolf, FM, Leopold SS. Commercially-funded and United States-based research is more likely to be published; good-quality studies with negative outcomes are not. J Bone Joint Surg; 2007:89-A(5): 110-18.
27. Curioso WH, Hansen JR, Centurion-Lara A, Garcia PJ, Wolf FM, Fuller S, Holmes KK, Kimball AM. Evaluation of a joint bioinformatics and medical informatics international course in Peru. BMC Medical Education; 2008; 8:1. [http://www.biomedcentral.com/1472-6920/8/1]
28. LaVallie DL, Wolf FM, Jacobsen C, Buchwald D. Barriers to cancer clinical trials participation among Native Elders. Ethnicity & Disease; 2008: 18, 210-217.
29. Howe C, Huber P, Wolf FM, Matsen F 3rd. Differential suture loading in an experimental rotator cuff repair. Am J Sports Med; 2008:36; Oct 8. [Epub ahead of print]
30. Farmer AP, Légaré F, Turcot L, Grimshaw J, Harvey E, McGowan JL, Wolf F. Printed educational materials: effects on professional practice and health care outcomes. Cochrane Database Syst Rev. 2008 Jul 16;(3):CD004398. Review
31. Deshazo JP, Lavallie DL, Wolf FM. Publication trends in the medical informatics literature: 20 Years of "Medical Informatics" in MeSH. BMC Med Inform Decis Mak. 2009 Jan 21;9(1):7. [Epub ahead of print]

C. Research Support

<u>Ongoing Research Support</u>

5 T15 LM007442 (Tarczy-Hornoch) 07/01/2002 - 06/30/2012 NIH, National Library of Medicine
Role: Mentor
Biomedical and Health Informatics Training Program
The goal of this project is to prepare leaders for careers in academia, government and the healthcare industry. Predoctoral trainees obtain a PhD and postdoctoral trainees obtain additional training (with an optional MS) in biomedical and health informatics (BHI). The BHI Graduate Program is an interdisciplinary program in the School of Medicine, in collaboration

with other Health Sciences Schools (Nursing, Public Health, Pharmacy, Dentistry), and with the Information School and Computer Science and Engineering.

1 T32 HS13853 (Martin) 07/01/2003 - 06/30/2008 Agency for Healthcare Research and Quality
Role: Mentor
Health Services Research Training at the University of Washington
The goal of this project is to prepare leaders for careers in academia, public health, government and the health industry. Predoctoral trainees obtain a PhD and postdoctoral trainees obtain an MPH/MS in health services.

1 U01 CA114642-01 (Buchwald) 04/01/2005 – 03/31/2010 NIH/National Cancer Institute
Role: Co-Investigator
Regional Native American Community Networks Program
Community-based participatory methods are used to achieve these Specific Aims: 1) increase cancer education activities among American Indians/Alaska Natives (AI/ANs); 2) build the capacity of tribal colleges & universities to become partners & leaders of cancer-related investigative & dissemination efforts; 3) enhance cancer training opportunities for AI/ANs researchers; 4) conduct community-based research into access to care; health promotion, & disease prevention activities targeting key cancer disparity issues in AI/ANs.

1 UL1 RR 025014 (Disis) 9/17/2007 - 5/31/2012NIH/NCRR (National Center for Research Resources)
Role: Evaluation Research Core (Director)
Institute of Translational Health Science
The Institute of Translational Health Science provides an academic structure to enhance collaboration & support for clinical translation & human research at UW & it's partner institutions, Fred Hutchinson Cancer Research Center, Children's Hospital and Regional Medical Center, Group Health Cooperative, Benaroya Research Institute, and community partners in the five-state WWAMI region (Washington, Wyoming, Alaska, Montana, and Idaho).

Completed Research Support

DP-04-003 (Buchwald) 09/30/2005 - 09/29/2008 Centers for Disease Control and Prevention
Role: Co-Investigator
SIP 10-05 An Innovative and Interactive CVD Curriculum for Native Youth; Competing supplement to SIP 07-05 Determinants of Patient Dropout from Cancer Treatment and Follow-up (Logerfo)
Specific aims are to: 1) develop, pilot-test, & evaluate a cultural & age appropriate grade 7-12 health education curriculum focusing on cardiovascular health for American Indian/Alaskan Native (AI/AN) youth; 2) compare knowledge & attitudes about CVD & behaviors such as body mass index & physical activity in a pre- and post curriculum design; and 3) disseminate the curriculum to interested schools with AI/AN students.

1T32HD052268-01 (Mitchell) 12/01/2005 - 09/17/2007 NIH/NICHD Roadmap
Role: Co-Investigator (Evaluation)
Multidisciplinary Predoctoral Clinical Research Training Program
The goal is to provide basic clinical research training to all predoctoral students enrolled in dentistry, medicine and nursing, as well as health professions programs in rehabilitation science, pharmacy, and public health. In addition, 12 predoctoral students are enrolled annually

in a short summer program and in a year-long clinical research graduate certificate program, respectively.

1 P20 RR023522-01 (Disis) 9/1/2006 - 8/31/2007 NCRR
Role: Co- Investigator, Evaluation Research Core
Planning Grant for Institutional Clinical and Translational Science
The goal is to design an academic structure for the Institute of Translational and Clinical Science (ITCS) to enhance collaboration & support for clinical translation & human research at UW & its partner institutions.

1 U18 HS015898 (Zierler) 07/01/2005 - 06/30/2007
Agency for Healthcare Research and Quality Role: Co-Investigator
DVT Tool Kit: A Systems Approach to Safe Practice
The purpose of this project is to increase the implementation of safe practice interventions for patients at risk for or who are diagnosed with venous thromboembolism (VTE), through use of an evidenced-based and system-supported interactive VTE Safety Toolkit.

NLM-04-39/HBG Wolf (PI) 12/15/03 - 12/14/04
Office of Extramural Research, National Library of Medicine Role: PI
Designing a Process and Outcome Evaluation of the NIH Clinical Research Curriculum Award Program

China Medical Board Dohner (PI) 09/01/03 – 08/31/05
China Medical Board Role: Co-Investigator
Center for Medical Education Research, North China University Medical School, Shenyan

R01 LM05630 Friedman (PI, parent project) 9/1/99 - 5/31/04
NIH/National Library of Medicine Role: PI, University of Washington subproject
Effects of Decision Support Systems on Clinical Reasoning: Multicenter Study of Two Diagnostic Systems

R01 LM06316 Brinkley (PI) 4/1/01 - 5/31/03
NIH/National Library of Medicine NLM Role: Co-Investigator
Structure Based Visual Access to Biomedical Information: develop on-line combined spatial and symbolic methods for representing, storing, retrieving and visualizing anatomical information

R01 LM06822-01 Rosse (PI) 5/1/99 - 6/30/01
NIH/National Library of Medicine Role: Co-Investigator
Foundational Model of Anatomy: develop a formalized, symbolic model of the structural organization of the human body

HRSA 1 D12 PE50098 Stevens (PI) 97/1/97 - 6/30/01
PHS/HRSA Role: Co-Investigator
Faculty Development Programs for the Five State WWAMI Region

F06 TW 02123 Wolf (PI) 3/1/95 - 2/28/00
NIH/ Fogarty International Center Role: PI, Senior International Fellowship
Effectiveness of Asthma Education on Behavioral Outcomes

F. Strategic Plan

Strategic Plan

2008 – 2012

Division of Biomedical and Health Informatics

Department of Medical Education and Biomedical and Health Informatics

School of Medicine

University of Washington

December 2008

Executive Summary

The Division of Biomedical and Health Informatics (BHI), located within the Department of Medical Education and Biomedical Informatics (MEBI) at the University of Washington is a leading interdisciplinary research and educational program focused on biological, clinical, and population informatics. Over the past decade since its establishment as a formal unit in 1997, BHI has honed its activities, engaging student and faculty in the theory and practice of biological, public health, and clinical informatics. The Division's aim is to advance the field of biomedical and health informatics research and data, and its application across a variety of healthcare arenas. The Division is now focusing on the next phase of growth and advancement, which will require building on prior successes, strengthening its curriculum, expanding the student body, increasing its visibility, forming a better defined program identity, and increasing and diversifying funding sources. All of these activities will require BHI to make informed and strategic decisions about its future direction and capitalize on opportunities for informatics research and funding in biomedical and health fields.

The field of biomedical informatics is still a young field, with tremendous and ongoing growth and change. However, the program at UW has matured over the past twenty years, from its inception in the late 1980's a loose confederation of researchers in informatics, to a program funded by a UW University Initiatives Fund (UIF) in 1999, to its current status as one of the largest nationally funded training program in the US. Today, BHI has 17 core faculty, 27 affiliate faculty, and 37 graduate and postdoctoral students that span across the entire UW Medicine enterprise and 4 schools (Engineer, Information School, Nursing, and Public Health). The program is also nationally supported by a training grant from the National Library of Medicine (NLM), providing support for both PhD student and postdoctoral trainees. The Division's faculty are active researchers with a number of National Institute of Health (NIH) and NLM funded research projects, including leadership involvement in the $62 million University of Washington Institute of Translational Health Sciences funded through the NIH Clinical and Translational Science Awards (CTSAs) (heading the Biomedical Informatics Core). The active research productivity and excellent education offerings have brought BHI to where it is today and provides a solid foundation for the Division to plan its future.

Strategic Planning Method

The Division engaged in a formal strategic planning process beginning in spring 2008 by conducting an anonymous survey of faculty and students to identify areas of strengths, weaknesses, opportunities, and threats. The survey also captured responses regarding identification of key goals and learning outcomes, and pathways to achieve suggested goals for the Division. Response rates varied for each question posed in the survey. The survey results were reviewed and summarized by the Graduate Program Director to maintain anonymity and

presented to the faculty in preparation for an all day retreat held on August 7, 2008 led by the MEBI Department Chair and BHI Division Head.

The retreat agenda was focused on the vetting of the SWOT analysis, refinement of the Division mission and vision statements, and initial drafting of goals and objectives with the Division faculty. During the SWOT analysis vetting process, the faculty refined the survey responses resulting in lists of key areas to use towards creating goals and objectives in the strategic plan. The mission and vision statements were discussed, with a number of suggestions for improvement and a revised draft was created to be further vetted at a future faculty meeting. The second half of the retreat focused on developing a Vision, Strategy, Action, and Metrics (VSAM) matrix, the main document to be used as the strategic plan for the Division for 2008 – 2013. The faculty proceeded through the SWOT analysis to flush out the VSAM matrix, with the end result of a rough draft of 5 visions, with corresponding strategies and actions. Metrics were scheduled to be addressed at a faculty meeting at a later date. Throughout August and September, the Division faculty were presented revised drafts of the VSAM matrix, with proposed metrics. Formal votes were held resulting in unanimous approval of the final versions of both the SWOT and VSAM documents.

The final SWOT and VSAM documents are the guides that will be utilized by the faculty to improve and grow the BHI Division over the course of the next 5 years. It is anticipated that the VSAM matrix will remain a "living" document, with annual assessment of progress towards achieving the visions and strategies as defined in the metrics set forth in the VSAM. Adjustments are anticipated to be made as strategies are achieved and new ones are identified.

Biomedical and Health Informatics Division

SWOT Matrix

Revised – August 25, 2008

Strengths:	**Opportunities:**
• A division esprit de corps demonstrated through dedicated faculty, strong students, and interdisciplinary research. • Collaborative relationships/partnerships with a diverse portfolio of UW, local, national, and international organizations. • Faculty with broad interests and expertise who are dedicated to successful research and education activities. • Training supported by (limited) state and federal funding.	• Exploration of untapped collaborative research opportunities both on and off campus, taking advantage of the interdisciplinarity of the division. • Expanded education offerings to undergraduate and international students • Investigation into future development of professional training programs. • Current excitement and interest in biomedical informatics field, leading to funding opportunities, student growth, and expanded career opportunities
Weaknesses:	**Threats:**
• **Funding**: Insufficient generation of grant proposal writing and submissions demonstrated in diminished indirect cost recapture. • **Multiple masters**: Uneven distribution of faculty effort to projects outside of the division resulting in faculty time spread thin, diminished grant revenue due to lack of sub-budgets, all negatively impacting mission of the division. • **Space:** Deficiency of sufficient and co-located space, resulting in diminished and diffused scholarly interactions amongst faculty and students alike. A related weakness – a non-optimal organizational structure. • **Visibility and Identity**: Lack of visibility and no clearly articulated identity especially within UW, negatively impacting research and education opportunities. • **Curriculum**: A curriculum conflicted by breadth and depth of focus and influenced by opportunism related to available research funds. *Additional faculty discussion needed to achieve consensus around education/training goals.*	• Unclear definition of informatics field, both locally and nationally. • Continually changing landscape funding opportunities amid a weakening economy • Continually changing employment requirements/needs related to field. • Competition from peers for research funding and student recruitment. • Too much excitement and growth in the field, creating a lack of understanding of necessary resources to conduct research.

BHI VSAM Matrix-FINAL 10/2/08

Vision	Strategy	Action	Metrics
Strengthen curriculum	Improve coordination of curriculum activities	• Regular meetings of teaching faculty with shared information on courses • Formation of a educational oversight committee that regularly and systematically reviews learning objectives for all core courses	• # of implemented actions resulting from faculty meetings focused on course coordination • # of implemented actions resulting from educational oversight committee meetings • Overall teaching evaluation scores of courses • Student satisfaction • Satisfaction with curriculum as noted in annual survey of students
	Identification and communication of experiential learning and teaching opportunities	• Identify and disseminate internship opportunities to students • Explore collaboration with industry partners for experiential learning • Create and facilitate teaching experience opportunities for BHI trainees	• # of internship opportunities made available to trainees (including academia and industry) during their training • # of teaching opportunities made available to trainees
	Improve quality of curriculum content (addressing depth vs. breadth)	• Ongoing assessment of students' educational needs and definition of required skill sets • Integration of ongoing assessment findings into work of educational oversight committee • Review of course objectives and syllabi by internal and external academic board to assess appropriateness and degree to which curriculum addresses emerging areas of scholarship	• Marketability of graduates measured by # of informatics-related job offers made to them • Evaluation of curriculum by academic advisory board • Satisfaction with curriculum as noted in annual survey of students • Survey of alumni re: how well curriculum prepared them for employment

Expand student body	Increase student recruitment into existing MS, PhD and postdoc programs	• Define profile of target audience for recruitment efforts • Recruit international students in the program • Identify funding for international students • Expand advertising and recruitment efforts to attract additional prospective students • Increase overall exposure and marketing of course offerings and ultimately increase student enrollment in courses, including advertising the undergraduate course on campus. • Identify potential informatics service courses for the broader academic community • Increase pool of appropriate student advisors beyond the core faculty	• # of qualified applicants per year • # of accepted trainees per year • # of enrolled trainees per year • # of appropriate student advisors • # of enrolled students in BHI courses
	Examine the creation of expanded MSc tracks (research vs. professional)	• Discussion at faculty meetings and educational oversight committee meetings • Survey potential students, community and the market to determine interest/need for program • Define profile of target audience for recruitment efforts • Define relationship of expanded MSc effort to existing CIPCT collaborative effort	• Final decision made by faculty pertaining to the nature of the Master's degree (and creation of tracks and/or certificate programs if found to be feasible during the examination)
	Examine certificates and range of professional/ continuing educational opportunities	• Survey potential students, community and the market to determine interest/need for program. • Define profile of target audience for certificate programs and potential CME short course • Discussion at educational oversight committee and faculty meetings with follow-up plans developed • Define relationship of professional course or CME offerings to existing CIPCT collaborative effort	

		• Publish mission statement drafted at Summer 2008 BHI retreat	
Strengthen program identity and visibility	Continuously update mission statement	• Continued discussion of mission and definitions of the field as it evolves • Publish updated mission statements • Contribute to definition of the field nationally and internationally	• Clarity, accessibility and visibility of mission statement • Participation in national/ international discussions defining the field • # of events of national and international prestige and recognition where unit is represented
	Promote DBHI visibility	• Promote DBHI at academic and professional informatics and non-informatics forums • Promote DBHI in lay press • Promote DBHI within the UW • Collect and publicize current and historical accomplishments/ achievements of the unit • Nominate faculty members to ACMI and other honorary societies that recognize important contributions to informatics by BHI faculty	• Availability of current list of major accomplishments on web site and brochure • # of publications and presentations in professional outlets and the community • # of sustained links to/ partnerships with other UW units • # of inquiries about BHI training opportunities • # of national/international organizations BHI faculty play a leadership role in
	Create a "Friends of BHI" community	• Annual showcase/ open house of BHI	
	Strengthen alumni relationships	• Create an alumni community and utilize different tools for communication (e.g., mailing list, web-page, newsletter) • Invite alumni to campus to give guest lectures and interact with students	• # of alumni lectures • Regular communication with the alumni community • # of events that involve alumni
	Seek feedback and consultation from	• Establish corporate advisory board • Establish external academic advisory board • Establish internal academic advisory board	• # of results implemented following meetings and reports of the established boards

	internal and external sources		
Increase and diversify funding	Explore untapped collaborative research opportunities both on and off campus, taking advantage of the interdisciplinarity of the division and leveraging esprit de corps and existing partnerships	• Invite faculty from other units to research seminars and BHI events • Promote BHI research initiatives and findings on campus • Ensure MEBI/BHI sub-budgets are created for interdisciplinary projects where appropriate/possible • Explore alternative solutions to increase revenue to BHI from interdisciplinary research • Meet with campus leadership that is looking at addressing the issue of indirect fund flow for interdisciplinary research	• Involvement with campus efforts to address issue of indirect fund flow for interdisciplinary research • Overall amount of research funding (inc. direct and indirect costs) coming to MEBI/DBHI • Grand total of research funding including grants with MEBI/DBHI faculty as PI/co-PI that run through other UW departments • # of federal research grants submitted/ funded per year • # of foundation research grants submitted/ funded per year • # of gift funding per year • # of training grants submitted/ funded per year • # of mock review study sections • # of grants per faculty per year
	Identify appropriate sources of gift funding leveraging current excitement about BHI field	• Set up meetings with SOM Development Office • Promote BHI research initiatives and findings off campus	
	Increase foundation and corporate funding leveraging current excitement about BHI field	• Explore potential linkage with local and national industry partners and foundations • Promote visibility of the program to the local industries and foundations	
	Improve competitiveness for federal funding	• Continue to hold external mock review study sections • Continue to schedule grant brainstorming sessions/ research updates • MEBI/DBHI leadership to meet 1:1 with faculty throughout year to develop grant submission plans • Increase number of grants per faculty per year	

	Explore potential for BHI to assume an additional service role on campus	• Identify service roles that could provide funding for faculty and students • Analyze the benefits and challenges associated with a new service role • Identify funding opportunities for student research assistant positions	• Final decision reached by faculty as to whether a service role should be added to BHI
Acquire co-located space	Continue to assess and highlight the space shortage Explore potential future opportunities for space availability	• Quantify and characterize current use of space and current shortage of space • Quantify and characterize current and anticipated space needs • Discuss potential space opportunities as they emerge and potential trade-offs	• A summary document summarizing space used and needed that is never more than 3 months out of date

G. HEC Board Summary

EXISTING PROGRAM REVIEW: HEC BOARD SUMMARY

Name of unit: Division of Biomedical and Health Informatics, Department of Medical Education and Biomedical Informatics

Name of school/college: School of Medicine

Degree title(s): Masters of Science(MS) and PhD (Doctor of Philosophy); Certificate in Biomedical and Health Informatics

Year of last review: Nor prior Program Review; 2004 Review by The Graduate School for approval of the BHI doctoral program

Current date: February 1, 2009

A. Documentation of continuing need, including reference to the statewide and regional needs assessment (excerpt from Section III.D.3 above).

The BHI program developed in response to a rapid and deep transformation in medicine, health care and biomedical research. Biomedical and health care research has become an information-oriented science, in which computational models, structuring of information and algorithmic interpretation of data are prominent, essential, and build upon bench biology, translational research, and clinical trials. This is not merely the automation of patient data storage and retrieval, but a revolution in the way scientists, physicians, and researchers understand fundamental biomedical concepts. Biomedical research and clinical decision making will increasingly depend on the construction and use of information-based concepts and structures. The job market for people trained in biomedical informatics remains strong and BHI's educational program which relates basic research to practice is a model for other biomedical informatics educational programs. The Division is a contributor to national efforts to define and shape this relatively new academic discipline through a variety of forums described in sections V and VI.

B. Assessment information related to expected student learning outcomes and the achievement of the program's objectives (excerpt from Section III.D.4 above).

Based on the original proposal for the doctoral program for the Biomedical and Health Informatics program, the Division defines its goals and learning outcomes as the following:

- Prepare students for a career as a researcher, leader, and teacher in the field of BHI.
- Mentor students and facilitate their work in the advanced study of, and research in BHI.
- Provide an environment that encourages the advancement and dissemination of new knowledge in the field.
- Create a culture that promotes collaboration among researchers and students in biomedical and health informatics as well as the related disciplines of information science, computer science, bioengineering, biostatistics, biology, and medicine

Graduates of our doctoral program will be able to:

- Thoroughly understand the core concepts in biomedical and health informatics, relate each area to the others, and explain their influence on the field in general. Students will acquire these skills through the foundational coursework and are assessed in those courses as well as through the student's qualifying examination.
- Critically assess and appraise research in biomedical informatics. Students will gain these skills through participation in the required journal club course, where they will observe other students critiquing journal articles and take a turn critiquing and presenting a journal article on their own. Faculty participate in critiquing and assessing students' presentations.
- Expertly present a body of research to diverse audiences. The research colloquium course will help students acquire these presentation skills by requiring them to present their own research as part of the course. The qualifying exam, general exam, and final defense also assess the students' effectiveness in oral communication. As students submit conference papers, it is expected that they will be presenting to national and international audiences.
- Formulate and carry out innovative research that will advance scientific knowledge in biomedical and health informatics. Students will be mentored by their advisors in developing these essential research skills as part of their research projects. Students will demonstrate their research formulation skills when they pass their general exam, and the final dissertation defense judges their ability to carry out that planned research.
- Write journal-quality papers on a body of research. In the early stages of their graduate work, the students will need to write as part of their core coursework. As their research becomes more mature, students are encouraged to write conference papers on their research. The general exam and the dissertation assess the student's research writing ability. The dissertation research is expected to lead to several journal publications.

The ability to achieve the above goals has been helped by the development of a curriculum where all the required courses in informatics (below) are taught by core BHI faculty. This has enabled the Division to span the broad range of key foundational areas and the continuum of application areas fundamental to biomedical informatics.

C. Plans to improve the quality and productivity of the program (excerpt from Section III.D.5 above).

The Division has continues efforts in various stages to make improvements to the graduate program. Curriculum discussions occur at regular faculty meetings, including discussions about coordinating the content and activities of the core courses. The Division is developing educational and training initiatives and will be reviewing the curriculum and other activities aimed to strengthen the coherence and efficiency of the core offerings. The Division has also committed to completing an ongoing assessment of students' educational needs and is working to define a required skill set for all graduates. Several BHI faculty participate in national profession biomedical informatics organization and participate in meeting to network with our peers on strategies to advance the teaching of biomedical informatics. The Internal and External Advisory Boards are leveraged in this arena as well.

BHI is reviewing options to increase and improve experiential learning and teaching opportunities for its students as defined in its strategic plan. Discussions are being held with industry partners, such as Microsoft to identity potential experiential learning opportunities. BHI has also reached out to collaborating departments, such as computer science and health services for allowing graduate students from the division TA opportunities.

Number of instructional faculty, students enrolled, and degrees granted over last three years (Autumn-Summer)

	04-05	05-06	06-07	Total
FTE Instructional Faculty	**5.25**	**5.25**	**5.25**	**5.25**
FTE Graduate Teaching Assistants	**0**	**0**	**0**	**0**
Degree Program: PhD				
Headcount of enrolled Students	**14**	**19**	**22**	**55**
Number of Degrees Granted	**1**	**2**	**1**	**4**
Degree Program: MS				
Headcount of enrolled Students	**15**	**8**	**5**	**28**
Number of Degrees Granted	**6**	**4**	**2**	**12**
Total Enrolled Students	**29**	**27**	**27**	**83**
Total Degrees Awarded	**7**	**6**	**3**	**16**

TOTAL

NOTE: "Headcount of enrolled students" (undergraduate) = number of declared majors as of 10th day of Autumn Quarter.