

# AQUATIC & FISHERY

SCIENCES

NEWSLETTER OF THE SCHOOL OF AQUATIC & FISHERY SCIENCES UNIVERSITY OF WASHINGTON

AUTUMN 2007

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## Genetics Research at SAFS

SAFS HAS LONG BEEN a leading center for addressing major issues in conservation and management of aquatic organisms, a center where students learn and conduct research in various disciplines such as ecology, biology, and physiology. Students are also expected to develop a “toolbox” of skills—techniques and methods necessary to pursue research hypotheses to their logical conclusion. In recent years, perhaps the greatest expansion of the toolbox has been in developing molecular techniques for genetics research.

SAFS has been conducting genetics research since the 1970s. To recognize the historical importance of this discipline, our School and NOAA’s Northwest Fisheries Science Center recently sponsored a symposium, “Six Decades of Fishery Genetics,” which was dedicated to Fred Utter, a SAFS affiliate faculty member (see page 5) who is considered by many to be the father of fisheries genetics.

Since the early 1990s, our School’s genetics program has grown considerably. In 1993, SAFS and UW Oceanography established the Marine Molecular Biology Lab (MMBL), where faculty members Lorenz Hauser and Kerry Naish apply

molecular techniques to address pressing issues in fisheries science and management. More recently, our genetic “pool” has increased with the addition of Claire Horner-Devine and Steven Roberts to the faculty. Carolyn Friedman also uses molecular methods in her disease-related research of molluscs (see “Ongoing SAFS Genetics Studies,” page 3). And this fall, Jim and Lisa Seeb—both geneticists—joined our faculty (see page 2).

Researchers use molecular tools to study genetic systems and genes to better understand DNA, RNA, protein synthesis, and their interconnections. Molecular techniques are applied to issues ranging from genetic stock structure to host–parasite co-evolution to understanding how genes work. The techniques fall into three broad categories: macromolecular amplification (e.g., polymerase chain reaction), separation (e.g., electrophoresis), and gene expression (e.g., microarrays), and may be used singly or in combination to access the extensive information stored in genomes.

Steven Roberts gave context to the importance of genetics research at our School: “Other departments have genetics programs, but I think our program goes especially deep. For example, we have people conducting research involving protein–protein interaction, steroid transport across membranes, metagenomics, and bacteria physiology. By integrating our genetics studies with other disciplines, we are well positioned to effectively address the big issues in fishery management and natural resource conservation.”



*Sockeye salmon  
returning to spawn*

Tom Quinn

<http://fish.washington.edu>

# Jim and Lisa Seeb—Fisheries Geneticists



*Jim Seeb*

*PhD 1987*

*UW Fisheries Chromosome set manipulation in salmonids: survival and allozyme expression of triploid interspecific hybrids and gene-centromere mapping in gynogens*



*Lisa Seeb*

*PhD 1986*

*UW Fisheries Biochemical systematics and evolution of the Scorpaenid genus *Sebastes**

JIM AND LISA SEEB are the newest members of our faculty, having joined the program in autumn 2007. Both are graduates of the then School of Fisheries, and after several decades in academic and government positions, have come “back to the fold.” With the help of a Moore Foundation grant, they are setting up their genetics lab at SAFS and will be working in particular with the Alaska Salmon Program (ASP).

SAFS faculty and ASP member Daniel Schindler noted, “Jim and Lisa have led the development of genetics-based techniques that can be applied to...ecological problems at ‘industrial’ scales. The ability to rapidly and precisely identify the population of origin of organisms opens doors to many important questions about marine ecosystems—Where in the ocean do salmon from different rivers live? What migration pathways do salmon take back to their natal rivers? What are the exploitation rates on individual populations in mixed-stock fisheries?”

MD: What motivated you to pursue fishery genetics?

Jim: Ever since fourth or fifth grade, I remember being really interested in fish and thinking about aquatic systems. I fished a lot for small trout in Montana streams. After high school, I hitch-hiked from home in Montana to Washington and went salmon fishing at Westport. It was one of the most pivotal experiences in my life: I really enjoyed being on the ocean, catching the salmon, and thinking about them.

Lisa: I came from the natural history and evolution side. I did my undergraduate work at the Museum of Vertebrate Zoology at Berkeley and earned a Master’s degree in population genetics at the University of Montana (UM) on a frog species. Once I started looking for a job, a switch from frogs to salmon seemed like a good career move.

MD: What did you study at SAFS?

Jim: For my Master’s, I focused on using allozymes for stock identification—Fred Utter was my thesis advisor. For my PhD, I expanded this interest in genetics by working on polyploid salmonids with Utter and Gary Thorgaard who was at Washington State University (WSU).

Lisa: For my Master’s, I worked with Fred Allendorf, who was also a student of Utter’s. For my PhD, I was supported by the RACE Division of NMFS on a graduate student appointment working on *Sebastes* systematics with Don Gunderson as chair.

Jim: We’re all a little inbred, you know!

MD: How did you two meet?

Jim: Fred Allendorf and I had Utter as our graduate mentor at the same time, so we got to know each other. Then Allendorf joined the UM faculty where he became Lisa’s graduate advisor. Meanwhile, I was working in Utter’s lab at NOAA, and Allendorf knew we were looking for some help, so he referred Lisa.

Lisa: That was the one and only time I ever worked for Jim.

MD: Describe your activities after graduating from the UW.

Jim: After a brief stint at the University of Idaho as research assistant professors, we competed for the same position (something we’ve done on several occasions) at Southern Illinois University (SIU),

—continued on page 4





# Ongoing SAFS Genetics Studies

**CAROLYN FRIEDMAN** uses molecular methods to study endangered, at-risk, and commercially exploited invertebrates. Her research identified the organism responsible for Withering Syndrome in abalone species, and showed that seed oyster mortalities are caused by a herpes virus. She also recently developed a novel molecular tool to identify and count marine invertebrate larvae in water samples to help shed light on population connectivity, a critical marine ecology issue.



Courtesy of C. Friedman

*Carolyn Friedman*

**LORENZ HAUSER** is interested in the application of molecular genetic markers to investigate demography, dispersal, and reproduction of anadromous salmonids and marine species, not only to identify self-recruiting populations as units for management and conservation, but also to resolve mechanisms of dispersal and demographic variability.



Kerry Naish

*Lorenz Hauser*

**CLAIRE HORNER-DEVINE** employs environmental genomics to search for unifying patterns and processes common to all domains of life, with special emphasis on microbial communities. Her research is yielding evidence that ecological patterns do exist in micro-organisms and that in many cases, these patterns are similar to those observed for macro-organisms, a phenomenon that as little as 10 years ago was unknown.



Marcus Duke

*Claire Horner-Devine*

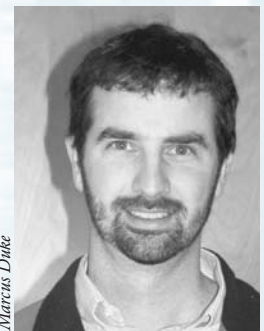
**KERRY NAISH** studies how aquatic organisms, particularly Pacific salmon, evolve, diversify, and adapt in response to environmental changes and human activities. The long-term survival of a species depends on its genetic diversity and hence its ability to adapt to a changing environment. Her group uses genomic and statistical approaches to study how fitness-related traits may respond to effects such as harvest, hybridization, inbreeding, and selection.



Lorenz Hauser

*Kerry Naish*

**STEVEN ROBERTS** uses a molecular approach to study the physiology of aquatic organisms. By characterizing the transcriptome (the expressed portion of the genome) of these organisms, he hopes to better understand normal physiological processes and how the environment influences these processes. ■



Marcus Duke

*Steven Roberts*

background image: Courtesy of MMBL

—continued from page 2

Carbondale. SIU decided to create two positions and offered jobs to both of us. Then, in 1990, we both took positions with the Alaska Department of Fish & Game (ADFG).

**MD:** [What were your goals at ADFG and what were some highlights?](#)

**Jim:** We were hired primarily to use genetic markers (allozymes) to provide management tools to better understand structure and boundaries of salmonid and marine fish stocks.

**Lisa:** During the first few years there, our lab grew rapidly and we were drawn into analyzing a number of highly contentious fisheries, including sockeye salmon from Cook Inlet, and Pacific Salmon Treaty fisheries for Chinook salmon from Southeast Alaska. We concluded that highly transparent and standardized analyses and high laboratory throughput were needed to successfully monitor fisheries. We also started exchanging data with laboratories across the Pacific Rim. In combination, these experiences lead us to conduct research on single nucleotide polymorphisms (SNPs, pronounced “snips”).

**MD:** [What are SNPs all about?](#)

**Jim:** In the last four to five years, we’ve been using SNPs, a DNA sequence variant for which no sequencing of DNA is required. Some “tricky” chemistries now allow us to rapidly and inexpensively interrogate single bases in DNA. So, we started doing a lot of sequencing to find the SNPs and then, using this tricky chemistry, score them in many individual samples. This enabled us to quickly and inexpensively identify different fish stocks on a much finer scale than ever before—whether with large numbers of samples post-season or smaller numbers in-season—which helped ADFG better manage fisheries.

**MD:** [What have SNPs yielded?](#)

**Jim:** Consider the management problem of distinguishing side-by-side fish populations in tributaries in the same lake. Neutral variation seen in various DNA markers may not distinguish these closely related stocks. But SNP frequencies in candidate genes may diverge at much more rapid rates, and we have found a number of “high-resolution” SNPs in Pacific salmon. This is our most satisfying finding: using SNPs, we can provide managers with much more accurate information to identify what and when stocks are being caught.

**MD:** [You’re both involved with North Pacific Anadromous Fisheries Commission \(NPAFC\).](#)

**Lisa:** We’ve been working with SAFS fishery biologist Kate Myers (leader of the School’s High Seas Salmon Program), who has been central to NPAFC activities since the 1980s. She introduced us to some of the problems of identifying high-seas salmon stocks in the 1990s. She invited us to work with her, using gene markers to improve stock identification.

We’ve also collaborated with Japanese and Russian investigators, looking at high-seas sockeye using SNPs. The NPAFC work is probably central to why the Moore Foundation invited us to work on the project we’ll be focusing on at SAFS.

**MD:** [How did this come about?](#)

**Jim:** For the last five to six years, we’ve been working with ASP to collect samples and create detailed baseline datasets in Bristol Bay. Those same datasets for sockeye are important components of the NPAFC datasets we’re building. So we have this simultaneous work underway with the ASP group and the High-Seas Salmon Program.

The Moore Foundation has been funding ASP research. Consequently, their people attend the same conferences we attend, including an NPAFC meeting where I discussed using SNP data to help address salmon distribution, migration, and bycatch issues. Moore was very interested in all of this, and after intensive discussions, they decided to fund us to move our program from Alaska to a university.

**MD:** [What was Moore’s motivation?](#)

**Jim:** When you work for an agency like ADFG, you have to address problems that are important to Alaskans. Moore saw that if we could broaden our focus, we could better contribute to conserving and managing Pacific salmon beyond the boundaries of Alaska. That appealed to Moore and to us very much.

Besides providing funding for us to instantly replicate our ADFG lab here, they’re also funding three graduate students for three years. And they’re funding research into new SNPs. The funds also support small pilot projects focusing on stock structure of the Copper River sockeye salmon and salmon bycatch in the pollock fishery.

Moore will also enable us to host Asian and Russian students and scientists so they can learn our techniques and take them back to their labs. Our mutual goal is to

generate Pacific Rim-wide databases for SNPs that will be open access and available on the web.

MD: The Moore grant appears to be a catalyst for a long-term program.

Jim: Considering the opportunity to attract extramural funds and the importance of this research in the future, Moore decided to plant a seed. By transplanting our program, they hope it will flourish and the UW will show some global leadership in promoting responsible conservation and management using genetic data.

MD: Can you describe a practical application using SNPs?

Jim: The Bristol Bay sockeye salmon fishery occurs primarily over a two-week period, with 30–50 million fish migrating through the area. If you have millions of fish migrating to different drainages, how does ADFG know when to open and close the fisheries so that the surplus is harvested and weaker stocks are protected? ADFG collects SNP data at the test fishery at Port Moller a week before the sockeye enter the commercial districts. These SNP data provide ADFG managers in-season updates on relative run strengths which, along with other data, enable them to better determine when a district should be opened more aggressively or kept closed.

Lisa: There are many applications outside Alaska, too. The Washington Department of Fish and Wildlife has a very aggressive SNP program, and we look forward to working with them. And many very exciting studies of ecological genetics, population genetics, and aquacultural genetics can be done with SNPs. We really look forward to attracting graduate students to work in the new lab! ■

## Fred Utter, Father of Fishery Genetics

Last September, the Northwest Fisheries Science Center (NWFSC) and SAFS sponsored a public symposium, “Six Decades of Fishery Genetics,” which was dedicated to Fred Utter, an affiliate faculty member of SAFS since 1971. Utter was presented a special award as one of the National Oceanic and Atmospheric Administration’s (NOAA) “History Makers.”

Known as the founding father of the field of fishery genetics, Utter began his research at NWFSC in 1959. His pioneering research helped transform how fishery resources are managed. He developed methods that were used to help answer questions about central problems for fishery management for the past century.

On its website ([http://celebrating200years.noaa.gov/historymakers/side\\_hon\\_mentions.html](http://celebrating200years.noaa.gov/historymakers/side_hon_mentions.html)), NOAA says this of Utter:

*He was a pioneer in the development of genetic methods for the study of natural populations and a visionary in his early advocacy of the critical importance of genetic information for managing fish populations. ...today it is axiomatic that wise stewardship of living marine resources requires reliable information about stock structure and...biodiversity. This transformation in thinking about marine conservation can be attributed in no small part to the profound and long-lasting influence Dr. Utter has had on the field.*

Utter gave many of our students the opportunity to learn how to apply genetics and evolutionary biology to fisheries management issues. Many of these students are now prominent figures in the field. The importance of Fred’s contribution to our students’ education is borne out by the fact that he was chairman for several graduate student committees, a service normally limited to core faculty.

On behalf of SAFS, we congratulate Fred for his years of outstanding service in pursuit of excellence in scientific research and teaching, and especially thank him for the role he has played as a mentor for our students. ■

*l to r: Usha Varanasi, Fred and Nancy Utter, Robin Waples*





# Degrees Awarded, 2006–2007



The following lists acknowledge students who earned degrees for the 2006–2007 academic year. Student research encompassed a broad array of disciplines, including biology, statistics, ecology, disease and genetics; it also comprised diverse, numerous foci, with species including salmon, rockfish, cod, invertebrates, and marine mammals, and issues including marine reserves, bycatch, population dynamics modeling, and aquatic herbicides. Our students' work illustrates the breadth and scope of graduate research and highlights topical investigations at SAFS. (Advising professors for graduate students are indicated in parentheses.)

## BS Degrees

Kevin Adams	Brian Lane
Dionne Andersen	Dayna Lange
Sarah Ashworth	Brian Langseth *†
Kenneth Behen	Alan Lin
Sydney Boyle	Chelsea Lorenz
Benjamin Eastham	Rebecca Monti
Robert Fisk	Vija Pelekis
Adam Fleischer	Joelle Pomraning
Christen Foehring *	Andrew Ryznar
Robert Freyer	Rui Saito
Benjamin Hunter	Christopher Spicher
Trevor Hutton	Jamie Thompson
JaeChul Kim	Sharon VillageCenter
	Ben Warren

\* Four-year honors

† Magna Cum Laude (UW GPA-based honors)

## MS Degrees

Bennett, Todd (Wissmar): Movement, Growth, and Survival of Juvenile Coho Salmon and Trout in the East Twin River, Washington

Bouma, Joshua (Friedman): Early Life History Dynamics of Pinto Abalone (*Haliotis kamtschatkana*) and Implications for Recovery in the San Juan Archipelago, Washington State

Cunningham, Kathryn (Hauser): Population Genetics of Pacific Cod (*Gadus macrocephalus*): Evidence for Large and Small Scale Population Structure

Curran, Catherine (Grue): Olfactory-Mediated Behavior in Juvenile Salmonids Exposed to Aquatic Herbicides

Dauer, Michael (Naish): Conservation Genetics in a Steelhead Hatchery; An Assessment of the Effects of Inbreeding, and Potential for Reproduction between Hatchery and Wild Populations

Franks, James (Hauser): Phylogeography and Population Genetics of Spiny Dogfish (*Squalus acanthias*)

Hayden-Spear, Jessica (Gunderson): Nearshore Habitat Associations of Young-of-Year Copper (*Sebastes caurinus*) and Quillback (*S. maliger*) Rockfish in the San Juan Channel, Washington

Lin, Jocelyn (Hauser): Genetic Divergence among Distinct Phenotypes of Sockeye Salmon (*Oncorhynchus nerka*)

Maney, Roger "Chipper" (Conquest): An Assessment of Surveyor Precision and Bias in Experimental Designs for Programmatic Stream Rehabilitation

Marshall, Kristin (Essington): Integrating Energetics and Interaction Strengths in Natural Ecosystems

McGilliard, Carey (Hilborn): The Importance of Space and the State of the Fishery in Models of No-Take Marine Reserves



Tom Quinn



Johnny Armstrong

Mitchell, Danielle (Hauser): Biocomplexity and Meta-population Dynamics of Pacific Herring (*Clupea pallasii*) in Puget Sound, Washington

Reum, Jonathan (Essington): Spatial and Temporal Variation in the Puget Sound Food Web

Sethi, Suresh (Conquest): Poaching and the Performance of Marine Reserves as Ocean Management Tools

Watson, Jordan (Essington): Trade-offs in the Design of Fishery Closures: Silky Shark Bycatch Management in the Eastern Pacific Ocean Tuna Purse Seine Fishery

Westley, Peter (Hilborn): Biocomplexity and Rapid Natural Habitat Change in the Chignik Lake System, Alaska

## PhD Degrees

Carlson, Stephanie (Quinn): The Evolutionary Effects of Bear Predation on Salmon Life History and Morphology

Eldridge, William (Naish): Human Impacts on the Genetic Diversity of Wild Fish Populations: Examples from Pacific Salmon

Hoberecht, Laura (VanBlaricom): Investigating the Use of Blubber Fatty Acids to Detect Stellar Sea Lion (*Eumetopias jubatus*) Foraging on Ephemeral High-Quality Prey

Holsman, Kirstin (Armstrong): Structural Complexity Associated with Habitat Created by Autogenic Ecosystem Engineers Shapes the Littoral Ecology of a Mobile Benthic Predator, *Cancer magister*, in Willapa Bay, Washington

Hoff, Gerald (Pietsch): Reproductive Biology of the Alaska Skate, *Bathyraja parmifera*, with Regard to Nursery Sites, Embryo Development and Predation

McDonald, Patrick Sean (Armstrong): Biotic Resistance and Other Factors Affecting the Distribution, Habitat Use and Potential Impacts of Invasive European Green Crab, *Carcinus maenas*, in the Northeastern Pacific

Rice, Casimir (Karr): Evaluating the Biological Condition of Puget Sound

Ward, Eric (Hilborn): Incorporating Model Selection and Decision Analysis into Population Dynamics Modeling ■



# Alumni News

## SAFS Students First Endowment

The UW is committed to providing financially disadvantaged students with access to a university education. A recent UW initiative entailed the formation of a matching scholarship program—Students First—to provide financial support for undergraduate and graduate students. To ensure more students get the most out of their UW education, these scholarships will be awarded based on financial need for up to four years per student.

We are excited to tell you about a new campaign that was designed specifically to support students in our School. Like the UW model, the SAFS Students First Endowment provides a 50% match from the UW for gifts \$100,000 and above. Two features to this new initiative stand out: The \$100,000 minimum can be made up of multiple gifts from any number of people in a “consortium” version. And while the deadline for making pledges is June 30, 2008, the pledge amount can be paid over five years.

Joining me as co-chair of this campaign is SAFS alumnus John Williams (UW BS 1969, MS 1975, PhD 1978). John was sought for this position because he embodies a committed alumnus. His belief in the importance of our School’s teaching and research is evident in numerous ways.

He has participated in graduate-level courses, teaming with faculty to tell students about the many complicated issues of salmon recovery and conflict resolution on the Columbia River. He regularly attends SAFS seminars, engaging the speakers and audience in questions and discussion. John attended the two recent AFS receptions hosted by our School, where he helped to engage alumni.

John and his wife have generously contributed to SAFS student programs for years—in fact they made the first gift to the SAFS Student First Endowment. The value John sees in the education and experience he received while attending SAFS makes him among the most passionate of alumni. As a result I am most grateful that he has agreed to co-chair the SAFS Students First campaign.

In each fall issue, we enclose an envelope for those of you who wish to help perpetuate the legacy of giving at SAFS. This envelope allows you to make a choice of where you would like your donation to go. Alternatively, you may make a contribution online at [fish.washington.edu/fund](http://fish.washington.edu/fund). Please know that we greatly appreciate your continuing support of our research and teaching mission.

We can’t say often enough nor passionately enough how important your contributions are in helping us provide world-class training, education, and research opportunities for our students. Our School is particularly committed to providing broad participation as a way of enhancing diversity among those who seek an education in our program....Students First will help us to achieve this goal. For more information, please contact Linda Maxson, [lmaxson@u.washington.edu](mailto:lmaxson@u.washington.edu), 206-221-6808, or Cara Mathison, [caram@u.washington.edu](mailto:caram@u.washington.edu), 206-685-1456.

—David Armstrong, Director  
UW School of Aquatic and Fishery Sciences



Tom Quinn





Courtesy of John Williams

## John Williams, Co-Chair

Coming from a family of UW alumni, including his grandmother and mother, John earned all three of his degrees at UW Fisheries. When asked why he chose to pursue fisheries science in school, he responded, “My mom and [past Washington State Governor] Dixie Lee Ray were friends. Dixie suggested to my mom that I might look into UW Fisheries instead of Zoology.”

Since the late 1980s, John has been working at the Northwest Fisheries Sciences Center (NWFSC), where he studies fish passage issues at Columbia River dams. Over time, he has increasingly approached these issues in the broader ecosystem context of the effects of hydropower systems on salmon populations.

He observed, “How does one put into context all the life-cycle factors that affect salmon? We have the four H’s—harvest, habitat, hydropower, hatcheries—but ocean conditions are also a factor. Despite extensive monitoring, getting the larger context is still challenging.”

His research has taken him around the world. At SAFS, John has collaborated with faculty John Skalski and Jim Anderson, and served frequently on their graduate student committees.

John explained why he accepted the co-chair position: “Many people, like me, have benefited from their education here and would like to give something back.” He sees the co-chair as an opportunity to tell people, “The benefits you got from your education here were partly because people who came before you wanted to ensure that future generations would get the same value they did. Here’s your chance to do something so that future students will have the same opportunities.” ■



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## Alumni Reception

*September 3rd, 2007, San Francisco*

In September 2007, SAFS hosted its second reception for alumni and associates at the annual meeting of the American Fisheries Society (AFS) in San Francisco. Once again, we had a strong turn-out, with 200 alumni and friends attending the event—essentially one out of every 10 people who attended the conference.

As we had hoped, there was a lot of laughter and reminiscing, and the venue provided opportunities for our current students and alumni to forge new connections. Outgoing AFS President Jennifer Nielsen, Executive Director Ghassan “Gus” Rassam, and the newly elected President Mary Fabrizio attended the reception as well. They applauded SAFS for its remarkable progress in reestablishing its world position as the premier academic organization in fisheries sciences.

A highlight of the reception was the announcement, by Director David Armstrong, of a new campaign, dubbed the “SAFS Students First Endowment.” This new endowment is part of a campus-wide initiative designed to fund tuition and other expenses for students who otherwise could not afford to attend the UW (see preceding article). ■

# Awards

## Bob Francis 2007 Oscar Elton Sette Award



Marcus Duke

We are pleased to announce that Bob Francis is the recipient of the 2007 Oscar Elton Sette Award.

Dr. Sette is considered by many as the father of modern fisheries oceanography in the USA. In memory of Dr. Sette, the American Fisheries Society makes an annual award for outstanding contributions to marine fisheries science. The award is given on the basis of “sustained excellence in marine fishery biology through research, teaching, administration, or a combination of all three.”

Kate Myers, Project Leader of our School’s High Seas Salmon Program, submitted one of the nominations for Bob, noting:

*Francis’ professional life exemplifies the description of the Sette Award. [His] experience, interest, and knowledge in fishery management and population dynamics, and his leadership ability led to his selection in 1986 as Director of the Fisheries Research Institute, School of Fisheries. ...He led the way in combining the School’s teaching and research in Fisheries Science and Management, believing that a thoroughly integrated program is essential to achieving excellence in all phases of academia and research. Over his many years at the University of Washington, Bob dramatically diversified his research with new emphasis on fisheries oceanography, climate change, and conservation biology, and [he] embraced undergraduate teaching.*

Bob is renowned for his studies of large marine ecosystems and how they are affected by factors such as harvest and climate change. But those of us who know Bob personally might suggest his passion for teaching is what really makes him tick. (Many of his friends also know him as a fine pianist.)

Bob’s courses covered a broad spectrum, from introductory fishery sciences to advanced resource modeling, all steeped in readings of contemporary aquatic conservation and fishery topics, critical debate, and writing. Many of his past students hold high-level positions in fishery agencies, organizations, and academia.

On behalf of current members, alumni, and friends of SAFS, we say “Congratulations, Bob.” ■

*Over the course of a year, our faculty, staff, and students receive numerous awards and honors. Such recognition of merit spans people’s lives, from the beginning of their college studies—when the generous funding from our many alumni and friends can play a critical role in their education—to the culmination of career, when senior faculty and staff are acknowledged for a lifetime of dedication to teaching, research, and service. Each fall issue, we recognize student awards for the academic year. This year, we expand the scope of this column to tell you about honors accrued by our emeritus faculty, James Karr and Bob Francis.*

## Student Awards 2007-2008

At our Honors Convocation each fall, we acknowledge award-winning students and their benefactors. We are fortunate to have numerous endowments that help recruit outstanding students and support their education and research. Our endowments also fund faculty and student programs, and equipment and facilities upgrades, and they help develop additional funding sources.

### Melvin G. Anderson Scholarship in Fisheries

Lisa Crosson

### Achievement Rewards for College Scientists

Eric Larson

### Donald E. Bevan Endowed Fund in Fisheries

This fund supports the annual Bevan Seminar Series on Sustainable Fisheries held each winter quarter.



# & Honors

## **Wilbert McLeod Chapman Memorial Scholarship**

Laurel Kanawyer

## **John N. Cobb Scholarship in Fisheries**

Eva Dusek

## **Herbert T. Domenici Scholarship**

Miguel West

## **Lauren R. Donaldson Scholarship**

Larissa Felli

## **Claire L. and Evelyn S. Egtvedt Fellowship**

Christopher Eaton, Cristiane Elfes, Emily Howe, Scott Stolnack

## **Floyd E. Ellis Memorial Scholarship**

Jacob Montgomery

## **James and Joy Ellis Scholarship in Fisheries**

Devin Creek

## **Faculty Merit Award**

William Eldridge, Brian Langseth, Carey McGilliard

## **Fisheries Memorial Award**

Anne Beaudreau

## **Jack D. Geil Memorial Award**

Katherine Armintrout

## **DeWitt Gilbert Fisheries–Journalism Scholarship**

Brittany Cummings, Sean Luis

## **Gilbert Ichthyology Research Fund**

Rachel Arnold, Zachary Baldwin, Adam Fleischer, Christopher Kenaley, Dawn Roje, Kimberly Sawyer

## **Graduate School Top Scholar Award**

Charlotte Boyd

## **John E. Halver Fellowship**

Sage Chaiyapechara

## **Theodor Jacobsen, Jr. and Sr. Fisheries Scholarship**

Kimberly Sawyer

—continued on page 12

# James Karr Honored for Thinking “Out of the Box”

In recognition of Jim Karr’s career and accomplishments—and in celebration of his retirement—a special symposium was held at the annual meeting of the American Fisheries Society last September.

Titled “Building better science and management: the advantages of integration,” the symposium spoke to the importance of “thinking beyond the boundaries of traditional academic disciplines and across conceptual frameworks.” Symposium organizers Paul Angermeier, Bob Hughes, and Kurt Fausch have a special connection with Karr: Angermeier is a former graduate student and Hughes and Fausch worked with Jim as post-docs. They see such “integrative thinking” as a trademark of Karr’s illustrious career, and further noted it was a “prominent intellectual ‘gene’ expressed in many of his advisees and collaborators.”

The organizers observed that the work of Karr and his associates has had a common theme that underscores the importance of thinking outside and across conceptual boxes. In keeping with this theme, they assembled speakers whose expertise and topics ranged beyond that typically represented at “fisheries” meetings to “present their personal perspectives on, and examples of, the importance of integrative thinking.” Catalyzing the audience into new ways of thinking was indeed an appropriate way to honor Karr, who has dedicated his life to inspiring his students and colleagues to think beyond conventional boundaries in search of innovative approaches to addressing important environmental issues. ■

*Jim Karr (center) with his first (Owen Gorman, left) and last (Casimir Rice, right) graduate students*



Courtesy of Jim Karr

# Student Awards, 2007-2008 *continued*



## **Roy Jensen Research Fellowship**

Juilan Burgos, Marine Brieuc

## **H. Mason Keeler Endowed Scholarship in Fisheries**

William Atlas

## **H. Mason Keeler Endowment for Excellence**

Jonathan Armstrong, Neala Kendall, Caroline Paulsen, Michael Schrimpf, Morgan Sternberg

## **H. Mason Keeler Lake Washington Fund in Fisheries**

Tessa Francis, Joel Kramer, Elizabeth Perkin

## **Marsha Landolt and Robert Busch Endowed Fund in Aquatic and Fishery Sciences**

Jennifer Tran

## **Vincent Liguori Fellowship**

Emily Howe

## **Shao-Wen Ling Memorial Scholarship**

Erin McClelland

## **Victor and Tamara Loosanoff Fellowship**

Jennifer Griffiths, Eric Larson, Jessica Silver, Kristina Straus

## **Galen and Helen Maxfield Fisheries Scholarship**

Joanna Smith

## **Gilbert B. Pauley Award**

Catherine Curran, Erik Schoen

## **John G. Peterson Scholarship**

Andrew Chung

## **William H. Pierre, Sr. Fellowship**

Sarah Spilseth, Juan Valero

## **Edward Allen Power Scholarship in Fisheries**

Sophie Pierszalowski

## **Quistorff Fund in Fisheries**

Kerensa King

## **Robert E. Resoff Scholarship**

Benjamin Frable

## **Samuel and Althea Stroum Scholarship**

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The fund supports faculty, staff, and students conducting research on Alaska salmon.

*We also recognize those endowments from which no award was made this year but which will continue to support our students, faculty, and staff in the future, including the following two funds:*

## **Gerald J. Paulik Memorial Fund**

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*In order to remain consistent with each donor's expressed intent, SAFS frequently designates a combination of endowments to create a single award package for select students, including tuition, research expenses, and stipends. ■*



Sue Johnson



# Bivalve Aquaculture & the Environment Northwest Workshop

*Geoduck, along  
with other  
shellfish species,  
contribute an  
important  
ecosystem service  
by filtering  
pollutants from  
the water column  
and recycling  
nutrients*

Our School has a long history of studying shellfish. Initially, the focus was in support of shellfish aquaculture, but over time, the scope of the research broadened to consider the importance of species such as oysters, mussels, and geoducks in contributing “ecosystem services” (ecosystem conditions and processes that affect health and status of biological communities, including human populations).

For example, in one of several current geoduck studies by SAFS faculty—funded by Washington Sea Grant (WSG)—Tim Essington, Glenn VanBlaricom, Loveday Conquest, and David Armstrong hope to determine whether historical geoduck declines are contributing to the hypoxia problem in Hood Canal, Washington (see [cofs.washington.edu/docs/nl\\_spring\\_2004.pdf](http://cofs.washington.edu/docs/nl_spring_2004.pdf), page 8). This speaks to the idea that geoduck, along with other shellfish species, contribute an important ecosystem service by filtering pollutants from the water column and recycling nutrients.

The increasing interest in the potential effects of shellfish aquaculture on the Puget Sound

environment, in particular geoduck culture, led our School and WSG, along with other academic and governmental organizations, to co-sponsor the “Northwest Workshop on Bivalve Aquaculture and the Environment,” which was held in September 2007.

The purpose of this workshop was to determine what we know about on-bottom intertidal aquaculture and how it affects the environment, and to identify the information and research needed to sustainably manage geoduck and other shellfish resources.

The workshop entailed presentations by experts from the USA, Canada, and Europe on topics including genetics and disease, culture of native species, habitat utilization, and water quality. The speakers and the audience—comprising tribal members, state and federal regulatory agencies, academic institutions, and private citizens—engaged in discussions throughout the workshop. For more information, including presentation videos, please see [wsg.washington.edu/research/geoduck](http://wsg.washington.edu/research/geoduck). ■



Brent Vadopalas

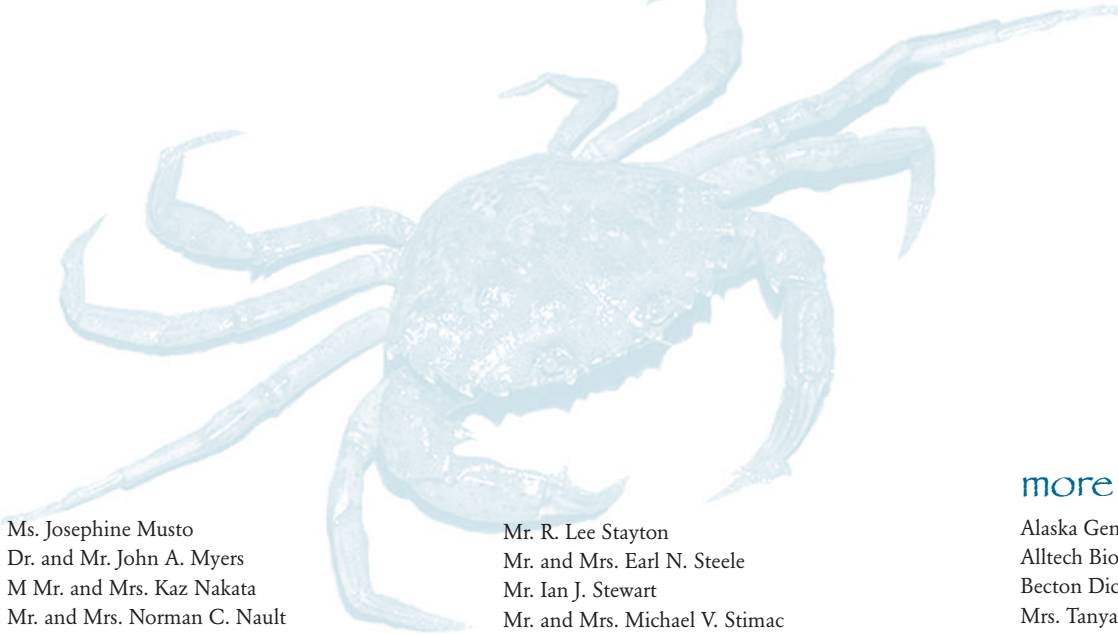
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*The many alumni and friends of our school play an important role in supporting our programs through their generous financial gifts. During the 2006–2007 academic year, our donors continued their longstanding charitable support of our School. We acknowledge and thank our many benefactors for their sustained support.*

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