WASHINGTON STATE
Academy of Sciences

6TH ANNUAL MEETING & SYMPOSIUM

SEPTEMBER 12, 2013 | MUSEUM OF FLIGHT, SEATTLE, WA

PROGRAM AGENDA

9:30 – 12:00 **Registration**

10:00 – 11:30 **Business Meeting – Members only**

Guest: Micheal Kern, Director, William D. Ruckelshaus Center

11:30 – 12:00 **Break**

12:00 – 1:15 **K-12 Activities and Lunch**

1:30 – 6:00 **Symposium – Energy: Environmentally Acceptable Choices for Washington State**

Symposium Chair: *Dr. Subhash C. Singhal, President-Elect, WSAS*

Symposium Moderator: *Dr. Jud Virden, Associate Laboratory Director - Energy and Environment Directorate, Pacific Northwest National Laboratory*

1:30 – 2:00 **Building a Clean, Adequate, and Innovative Power Supply for the Northwest**

Dr. Howard Schwartz, Northwest Power and Conservation Council and Washington State Department of Commerce

2:00 – 2:30 **The Role of Hydropower in Serving Pacific Northwest Power Needs**

Greg Delwiche, Bonneville Power Administration

2:30 – 3:00 **The Promise of Natural Gas**

Dan Kirschner, Northwest Gas Association

3:00 – 3:30 **A Role of Washington State in Developing Advanced Nuclear Energy Options**

Dr. Alan Waltar, Past President, American Nuclear Society

3:30 – 4:00 **Break**

4:00 – 4:30 **Opportunities and Barriers for Sustainable Ocean Energy Development in Washington**

Dr. Charles A. Brandt, Pacific Northwest National Laboratory

4:30 – 5:00 **Modernized Power System for a Clean Energy Future**

Dr. Carl H. Imhoff, Pacific Northwest National Laboratory

5:00 – 5:30 **Residential Energy Monitoring and Feedback**

Professor Shwetak N. Patel, University of Washington

5:30 **Concluding Remarks**

Dr. Jud Virden, Pacific Northwest National Laboratory

6:00 – 9:00 **Reception and Dinner**

The Future of Electric Power Systems

Dr. Edmund O. Schweitzer III, President, Schweitzer Engineering Laboratories, Inc.

JAY INSLEE
Governor

STATE OF WASHINGTON
OFFICE OF THE GOVERNOR
P.O. Box 40002 • Olympia, Washington 98504-0002 • (360) 902-4111 • www.governor.wa.gov

Greetings from the Governor

September 12, 2013

I am pleased to extend warm greetings to all of those attending the Sixth Annual Washington State Academy of Sciences (WSAS) Symposium: Energy & Environmentally Acceptable Choices for Washington State.

I'd like to take this opportunity to thank WSAS for its commitment to informing public policymaking through expert scientific, non-partisan analysis and to increasing the role of science in Washington State. Your work is critically important, and, as you gather to discuss energy at this year's Symposium, I'd like to share my vision for clean energy in our state.

As many of you know, I've made addressing climate change and reducing greenhouse gases a top priority of my administration. Climate change isn't merely an academic argument; it's real and it's already negatively impacting our state. In order to successfully tackle this escalating threat, we will need both energy efficiency and clean, renewable energy. Through clean energy we will reduce harmful air emissions, increase our energy independence and promote job creation. In fact, job creation rates in Washington's clean energy economy are already well above those in other sectors – and clean energy jobs provide good, family wages. A study conducted by the West Coast States concluded that with a continued strong focus on clean energy, jobs in these industries could see a 200 percent growth in the period from 2010 to 2020.

This past legislative session, we made progress toward a clean energy future. As part of my Working Washington jobs agenda, we established a new Clean Energy Fund, which will invest $40 million in clean energy technologies. In addition, I'm pleased to report that we extended our state tax incentives for producing renewable energy to support wind, solar and other renewable sources. We also extended our tax incentives for solar manufacturing and enacted policy improvements for businesses that produce energy from geothermal sources and organic waste. We will also fund the creation of a Clean Energy Institute at the University of Washington, which will focus on research and development of technologies that advance storage of electricity and solar power.

By the end of this year, the Climate Legislative and Executive Workgroup will recommend a state program of actions and policies to reduce greenhouse gas emissions, in order to achieve the state's emission targets enacted in 2008. I am chairing this bipartisan effort, and together we will determine how the state will tackle carbon pollution, avoid or minimize the worst impacts of climate change, and capture the economic opportunities of a clean energy future.

Innovation is key to increasing the use of clean energy and will form the foundation of sustainable growth for renewable energy here in Washington State and around the world. Washington is known for its culture of innovation and is ideally positioned to grow as a center for renewable energy transformation. We can and will lead on this issue, and in the process we will strengthen our economy and protect our state's natural resources for future generations.

Thank you for coming, and please accept my best wishes for a productive meeting.

Very truly yours,

Jay Inslee
Governor

BUSINESS MEETING AGENDA

Thursday, September 12, 2013 - 10:00 to 11:30 AM
Museum of Flight, Seattle

Welcome and Introductory Remarks
Guy Palmer, President

Guest Introduction, Michael Kern, Director, William D. Ruckelshaus Center
Guy Palmer, President

Induction of New Members by Section
Guy Palmer, President
Nancy Woods, Membership Committee Chair

Secretary's Report
Ed Lazowska, Secretary

Executive Director's Report
Robert Bates, Executive Director

Treasurer's Report
Eugene Nester, Treasurer

Membership Committee Report and Discussion
Nancy Woods

K-12 Committee Report and Discussion
James Krueger

Open Discussion with WSAS Members
Guy Palmer, President

Introduction of new Officers and Board Members
Guy Palmer, President

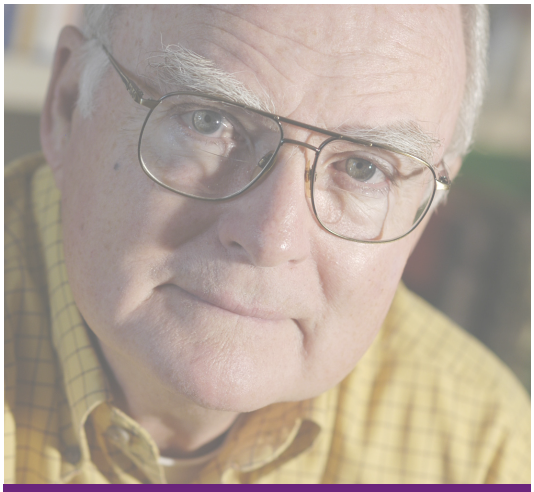
Transfer of Gavel to Incoming President Subhash Singhal
Guy Palmer, President

Adjourn

WASHINGTON STATE UNIVERSITY

THE WILLIAM D. RUCKELSHAUS CENTER

UNIVERSITY OF WASHINGTON



"Unfortunately, we have historically lacked an institutional theater in which science and policy-making can come together efficiently, and produce more light than heat."

– WILLIAM D. RUCKELSHAUS

For more information on the William D. Ruckelshaus Center, please visit our web site at: http://RuckelshausCenter.wsu.edu

about the center

Mission & Vision

The mission of the William D. Ruckelshaus Center is to act as a neutral resource for collaborative problem solving in the State of Washington and Pacific Northwest. The Center provides expertise to improve the quality and availability of voluntary collaborative approaches for policy development and multi-party dispute resolution.

The Center is a joint effort of Washington's two research universities and was developed in response to requests from community leaders. Building on the unique strengths of the two institutions, the Center is dedicated to assisting public, private, tribal, non-profit and other community leaders in their efforts to build consensus and resolve conflicts around difficult public policy issues. The Center also advances the teaching and research missions of the two universities by bringing real-world policy issues to the academic setting.

The Center envisions a future in which governmental leaders, policy makers, stakeholders and citizens in the state of Washington and the Pacific Northwest routinely employ the tools of collaborative decision making to design, conduct and implement successful public policy processes.

Services

The Center can:

- Provide a neutral and safe forum for parties to define and resolve issues
- Conduct a situation assessment to determine the most productive means of addressing the issues
- Provide facilitation, mediation, dispute resolution, project management, strategic planning and other services that help parties reach consensus and resolve issues
- Serve as an information portal for resources and research to be used by the parties
- Perform applied research and fact finding
- Provide knowledge, training, and infrastructure development to improve the collaborative problem-solving capacity of the parties and institutions
- Host policy discussions

"Good environmental policy is crafted by involved citizens working in partnership with government. It requires a delicate balancing of viewpoints and a creative and civil search for solutions. The courtroom is no substitute for intelligent cooperation."

–DANIEL J. EVANS

Projects

The Center offers assistance, training, and research to advance some of the most challenging issues in the state, including natural resources policy, socio-economic issues, and regulatory reform. The Center provides expertise in the process of defining the issues, enhancing the ability of stakeholders to address the substance of the issues and come to agreement.

Prior to conducting a project, the Center follows a deliberate approach of first seeking confidence of the affected and interested parties through consultation with key stakeholders. The Center's role is to improve understanding among parties and enhance the possibilities for progress on issues, rather than dictate an answer from the universities. The results belong to the parties themselves; the Center provides an independent forum and neutral resources that create the possibility for these results to take shape.

Governance and Funding

The Center is hosted at the University of Washington by the Daniel J. Evans School of Public Affairs, and at Washington State University by WSU Extension. The Center has offices in Seattle, Olympia and Pullman. It is overseen by an advisory board chaired by William Ruckelshaus and composed of prominent local and state leaders representing a broad range of constituencies and geographic locations in the region. Funding for the Center is sought from a mix of sources, including foundations, corporations, individuals, agencies, other state and federal sources, and fees for services when appropriate.

WSU Extension and UW Evans School of Public Affairs programs and employment are available to all without discrimination.

7/18/13

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WASHINGTON STATE UNIVERSITY EXTENSION

EVANS SCHOOL OF PUBLIC AFFAIRS
UNIVERSITY of WASHINGTON

The William D. Ruckelshaus Center Advisory Board

Bill Ruckelshaus, Board Chair
Madrona Venture Group*

Michael Kern, Director

NEW MEMBERS

New members inducted into the Washington State Academy on September 12, 2013

Section 1 – Physical and Mathematical Sciences

Steven Flynn Ashby	Deputy Director for Science & Technology, Pacific Northwest National Laboratory
Theodore W. Bowyer	Laboratory Fellow, Pacific Northwest National Laboratory
Krzysztof Burdzy	Professor of Mathematics, University of Washington
Allison A. Campbell	Director, Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory
Charles T. Campbell	B. Seymour Rabinovitch Endowed Chair in Chemistry, University of Washington
Kerry Wayne Hipps	Chairman, Chemistry Department, Washington State University
Lai-Yung "Ruby" Leung	Laboratory Fellow, Pacific Northwest National Laboratory

Section 2 – Engineering and Technology

David G. Castner	Director, National ESCA and Surface Analysis Center for Biomedical Problems, University of Washington
Samson A. Jenekhe	Boeing - Martin Professor of Chemical Engineering, University of Washington
Patrick Sean Stayton	Director of the Molecular Engineering and Science Institute, College of Engineering, University of Washington
H. David Stensel	Professor, Department of Civil Engineering, University of Washington
Minrou Taya	Professor of Mechanical Engineering, University of Washington
Paul Yager	Hunter and Dorothy Simpson Endowed Chair, Department of Bioengineering, University of Washington

Section 3 – Biological Sciences

Michael J. Smerdon	Regents Professor, School of Molecular Biosciences, Washington State University

Section 4 – Medicine and Health Sciences

Stanley C. Froehner	Professor and Chair, Department of Physiology & Biophysics, University of Washington
Margaret Heitkemper	Chair, Biobehavioral Nursing and Health Systems, University of Washington
Robert C. Ritter	Professor of Neuroscience and Physiology Washington State University
John Donald Scott	Krebs-Speights Professor of Cell Signaling and Cancer Biology, University of Washington

Section 5 – Anthropology, Economics, Social and Political Sciences

Richard F. Catalano, Jr.	Director, Social Development Research Group, School of Social Work, University of Washington
Kyle D. Crowder	Professor of Sociology, University of Washington

NEW MEMBERS

New members inducted into the Washington State Academy on September 12, 2013

Members inducted as 2013 members of National Academies

Christopher J. Elias	President, Global Development, Bill and Melinda Gates Foundation, IOM
Thomas R. Fleming	Professor, Department of Biostatistics, University of Washington, IOM
Andy S. Stergachis	Professor, Epidemiology and Global Health Adjunct Professor of Pharmace and Health Services Director, Global Medicines Program, University of Washington, IOM
Eric Horvitz	Managing Co-Director, Microsoft Research, Microsoft Corporation, NAE
Robin Podmore	President, IncSys, Inc., NAE

WASHINGTON STATE

Academy of Sciences

2013 PRESIDENT'S REPORT

Science in the Service of Washington State

SEPTEMBER 12, 2013

To: Members, Staff, and Friends of the Washington State Academy of Sciences

Subject: President's Report for 2013

From: Guy Palmer, President

Date: September 12, 2013

I am pleased to report on the progress and status of the Washington State Academy of Sciences, now in its seventh year. During the year the Academy completed two published studies at the request of the State of Washington, published the proceedings of the annual symposium, and continued its outreach to K-12 students and teachers. Importantly, we welcome 25 new members to the Academy. The Academy is fiscally sound.

Academy Studies and Reports

Root Diseases of Douglas Fir: The study, at the request of the Washington State Department of Natural Resources and chaired by Academy member and former President, R. James Cook, was completed in 2013 and underwent independent review directed by the Study Oversight Committee, according to Academy guidelines. The study is currently being published; there will be a limited number of hard copies available with full public access to the report in pdf form via the Academy website. Members will be notified by email when the pdf is available on-line.

I-522 Mandatory Labeling of Foods with Ingredients from Genetically Modified Plants and Animals: The Washington State Academy of Sciences has been charged by the legislature of the State of Washington to provide a "white paper" with an evidence based analysis addressing the science underlying the use of food ingredients derived from genetically-modified organisms and the impacts of required labeling of these foods as would be mandated by Initiative 522. The Statement of Task was prepared in April 2013 and a provisional committee appointed. A period for public comment on both the Statement of Task and the committee composition was instituted; this period closed May 20. The Statement of Task and committee were then finalized. The committee was co-chaired by Academy members, Thomas Marsh (Market Economics) and Eugene Nester (Microbiology), and included Janet Beary (Graduate Program in Dietetics, WSU-Spokane), B.W. (Joe) Poovaiah (Academy member & WSU Plant Biology), Dustin Pendell (Economics, Colorado State University). The report has been fast tracked due to a September timeline for report delivery. As of September 1, the committee had drafted the report and provided the report for internal review by the Study Oversight Committee. Following addressing comments raised during review, the report will be released to the sponsors and made public. For more information, links have been provided for Initiative 522, the Statement of Task, and the Committee.

Initiative 522: Labeling of genetically modified foods: http://www.washacad.org/initiatives/index.html

The Statement of Task (SOT): http://www.washacad.org/about/files/WSAS_SOT_Initiative_I_522.pdf

The committee members are listed at http://www.washacad.org/about/files/wsas_i522_committee.pdf

Water, Washington and the World: Ensuring Economically and Environmentally Sustainable Water Resources

The 2012 Annual Symposium topic on water resources was published with full access to the pdf to all Academy members as well as to the public. Edited by Donna Matrazzo based on the speakers' presentations and the discussion, the proceedings provided a summary of each speaker's presentation, the questions and answers following presentations, and the panel discussion on "Effecting Policy Change at the State Level". The report was widely distributed to the Governor, the Departments of Agriculture, Ecology, and Natural Resources, state legislators, and staff of key legislative committees.

The Symposium was well attended, including 21 high school students who had been winners of various awards at Washington State Science and Engineering Fairs and their high school STEM teachers. Their participation was enabled by grants from the Pacific Northwest National Laboratory managed by Battelle, Microsoft Research, the Boeing Company, and Seattle City Light.

Governance

The WSAS is governed by an Executive Committee comprised of the President, President Elect, Secretary, Treasurer and Past-President, and a Board of Directors. The terms begin and end at the Annual Meeting.

2013: The Board serving this past year was:

President – Guy Palmer, Washington State University (2013)
President Elect – Subhash Singhal, Pacific Northwest National Laboratory (2013)
Secretary – Ed Lazowska, University of Washington (2013)
Treasurer – Eugene Nester, University of Washington (2014)
Past-President – Earll Murman, Massachusetts Institute of Technology (2013)

Board of Directors (end-date)
Philip Bernstein, Microsoft (2015)
Anjan Bose, Washington State University (2016)
Bonnie Dunbar (2013)
David Eaton, University of Washington (2015)
Kristina Katasaros, National Oceanic and Atmospheric Administration (2014)
Allan Konopka, Pacific Northwest National Laboratory (2014)
Estella Leopold, University of Washington (2013)
Donald Patrick, University of Washington (2014)
R. G. Hamish Robertson, University of Washington (2014)
Ronald Thom, Pacific Northwest National Laboratory (2016)
Nancy Woods, University of Washington (2013)

The Board met in Seattle on January 11, 2013 and had a meeting by conference call on June 28, 2013. Interim business was conducted by e-mail.

Governance 2014

President – Subhash Singhal, Pacific Northwest National Laboratory (2014)
President Elect – Nancy Woods, University of Washington (2014)
Secretary – R. Curtis Graeber, The Graeber Group (2015)
Treasurer – Eugene Nester, University of Washington (2014)
Past-President – Guy Palmer, Washington State University (2014)

Board of Directors (end-date)

Philip Bernstein, Microsoft (2015)
Anjan Bose, Washington State University (2016)
George ("Pinky") Nelson, Western Washington University (2016)
David Eaton, University of Washington (2015)
Kristina Katasaros, National Oceanic and Atmospheric Administration (2014)
Allan Konopka, Pacific Northwest National Laboratory (2014)
Thomas Marsh, Washington State University (2016)
Donald Patrick, University of Washington (2014)
R. G. Hamish Robertson, University of Washington (2014)
Ronald Thom, Pacific Northwest National Laboratory (2016)
Usha Varanasi, University of Washington (2016)
Position to be filled

Staff

The WSAS headquarters in Olympia, WA is staffed by

Executive Director Robert Bates (20% time)
Executive Assistant Sherri Willoughby (75% time)
Policy Associate Laurel le Noble (25% time)

Membership

Membership Committee: The WSAS conducted its fourth election of new members during the spring/summer of 2013. Chaired by Nancy Woods, the section chairs and co-chairs for 2013 were:

Section 1 Physical and Mathematical Sciences

David Kaplan, University of Washington
Sue Clark, Washington State University

Section 2 Engineering and Technology

David McAlees, Siemens
Kelvin Lynn, Washington State University

Section 3 Biological Sciences

Thomas Daniel, University of Washington
B.W. (Joe) Poovaiah, Washington State University

Section 4 Medicine and Health Sciences

Terry McElwain, Washington State University
David Eaton, University of Washington

Section 5 Anthropology, Economics, Social, and Political Sciences

Donald Patrick, University of Washington
Donald Dillman, Washington State University

New Members: The final ballot of nominees was presented to the Academy membership for approval. With 7 new National Academies members (2 of whom were previously directly elected to WSAS) and 20 directly elected to WSAS, 25 new members will be inducted on September 12, 2013.

Funding

Finance Committee: Funding for the Academy is provided by legislative appropriation, private gifts, and endowment. The Finance Committee is chaired by Eugene Nester; members are Phil Bernstein, Terry McElwain and Peter Greenberg.

Legislative Funding: In FY14, the legislature has appropriated $153,000 for the operation of the Academy. All funds are held in the two budgets of the UW and WSU. The budgets are allocated for staff salaries, office lease and other expenses associated with the headquarters in Olympia, travel of board members and staff, allowable expenses for the annual meeting, and commissioned work of the Academy.

Member Gifts and Endowment: The Annual Appeal drive resulted in donations of $3,375 from our members. Since founding of the WSAS, members have donated $31,675 for support of the Academy; $25,000 has been invested for use as an endowment. The endowment is held in a private business bank account, with $15,000 (plus realized and unrealized income) invested in the Harbor Bond Fund and $10,000 in the Vanguard Dividend Growth Fund.

Annual Meeting Expenses: Expenses of the annual meeting such as rent of meeting rooms, services of a videographer, speakers' travel and other incidentals are paid from the state appropriation. All annual meeting registration fees are paid into the business account and used to cover the catering expenses.

Support for K-12 Activities: The Academy has received generous support for the participation of students and their science teachers and mentors in the Annual Symposium and for support of their travel to the American Junior Academy of Sciences (AJAS). In 2013, Boeing, Pacific Northwest National Laboratory managed by Battelle, the Paul G. Allen Family Foundation, and the Schweitzer Engineering Laboratory collectively donated $13,000 in support of travel and other expenses for Washington State K-12 math and science teachers and high-school student scientists invited to attend our 2013 symposium and to participate in the AJAS annual meeting.

Reporting: As a 501(c)(3) organization, the WSAS must report all sources of income and expenditures annually to the IRS.

AJAS award winners Sampath Duddu and Kelly Giffey with Subhash Singhal, WSAS President-elect and 2012-13 K-12 Chair

K-12 Activities

2012-13 K-12 Activities Committee: In 2012-13, the committee was chaired by Subhash Singhal and was composed of Bonnie Dunbar, B.W. "Joe" Poovaiah, Ron Thom, and Robert Bates (ex officio). The K-12 Activities Committee followed a competitive selection process to sponsor two high school students to attend the 2013 American Junior Academy of Sciences meeting in Boston. This annual meeting is held in conjunction with the National Association of Academy of Sciences meeting; WSAS is a member of the NAAS. Two students were sponsored by WSAS to attend this meeting.

- **Sampath Duddu**, Junior, Capital High School, Olympia, WA (Research Topic: Can You Hear Me Now?)
- **Kelly Giffey**, Senior, W. F. West High School, Chehalis, WA (Research Topic: The Correlation between Dietary Intake and Agouti-Related Protein Expression in Zebrafish, Danio rerios)

2011-12 President Earll Murman and 2012-13 President-elect Subhash Singhal present the award acknowledging Sophie Shoemaker as recipient of The Stockholm Junior Water Prize

The students exhibited and discussed their research posters at the WSAS Annual Meeting in Seattle. Bonnie Dunbar, WSAS Board Member, accompanied these students to the AJAS meeting in Boston.

In addition, since the 2012 WSAS Annual Symposium was on Water, Washington and the World, winners of the Stockholm Junior Water Prize, the world's most prestigious youth award for a water-related science project, were invited to the Symposium:

Washington State Winner: Anjani Patel, Cedarcrest High School Science; Teacher – Bruce Murdock

Washington State Finalist: Sophie Shoemaker, Camas High School; Science Teacher – Ronald Wright

Parents and teachers were also present to witness their students receive WSAS student certificates and awards. Students of the Advanced Placement Environmental Science Class at Mount Vernon High School and their teacher, Rebecca Krueger, were invited to the Symposium for the opportunity to meet with leading scientists engaged in water resource science and policy.

2013-14 K-12 Activities Committee: In 2013-14, the committee was chaired by James Krueger and was composed of Bonnie Dunbar, B.W. "Joe" Poovaiah, Ron Thom, Gary Foss and Robert Bates (ex officio). The K-12 Activities Committee followed a competitive selection process to recognize 11 finalists at the Annual Symposium. The finalists are: Quinn Brown, "The Effect of Different Concentrations of Diesel/Biodiesel Mixture and Temperature on the Viscosity of Biodiesel"; Isabelle Crary, "The Effect of Heel Strike Compared to Forefoot Strike Running on the Peak Deceleration Rate of the Tibia"; Isaac Harper, "Enhancing Maturation of Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes by Triiodothryonine Treatment and Nanopatterned Substrates"; Jacqueline Nguyen, "Minimizing Size and Weight in Standard Military Rations (MRE) for Increased Optimization for Field Use"; Shruti Parikh, "Phytoremediation of Arsenic in Coal Dust Using Polystichum munitum"; Alisha Saxena, "Improving Cardiovascular Health and Fitness Levels by Optimizing Workout Efficacy with a Microprocessor Controlled, Cloud Connected Device"; Meghal Sheth, "Using Zebrafish as a Model to Identify the Causes of Mechanosensory Hair Cell Death and Hearing Loss in Humans"; Sophie Shoemaker, "Biomarkers of Vasodilation in Decidual Tissue Associated with Obesity in Non-Human Primates"; Swetha Shutthanandan, "Green Energy: Synthesis, Characterization and Solar Cell Application of Zinc-Oxide Nano-Structures"; Meera Srinivasan, "Rett Syndrome: Determining the Optimal Viral System for Gene Therapy"; Thorsen Wehr, "Focusing Sound Waves Using a Two-Dimensional Non-Linear System. Three of these finalists, Alisha Saxena, Meghal Sheth, and Thorsen Wehr were selected to be the State Delegates to the National AJAS Meeting in Chicago, February 2014.

Julie Kim, Lauren Crom, and Maddie Rodgers and their mentor, Carl Greninger, of Microsoft are also participating in the Annual Symposium. These 3 students are participants in the Northwest Nuclear Consortium, a nuclear engineering laboratory which is offering DOE nuclear engineering curriculum for students interested in exploring careers in nuclear engineering.

Study Oversight Committee

The study oversight committee has the responsibility for conducting thorough peer reviews of WSAS studies and reports. The committee is chaired by Anjan Bose with members Edward Miles, James Fredrickson, and Donald Dillman. In 2012-13, the committee has been responsible for review oversight for two studies: "Root Diseases of Douglas Fir" and "I-522 Mandatory Labeling of Foods with Ingredients from Genetically Modified Plants and Animals".

2013 Annual Meeting Committee

Planning for the 2013 Annual Meeting and Symposium was led by President-Elect Subhash Singhal (chair), Anjan Bose, and Ronald Thom. The symposium topic, Energy: Environmentally Acceptable Choices for Washington State, continues the focus of the Academy on global and national issues that have significant impacts in the state.

Acknowledgements

It has been an honor and privilege to have served as the 4th President of the Academy. Most impactful has been the ability to witness first-hand the continued growth of the Academy: the broadening and deepening of its membership, an expanding role in service to the legislature and people of the state, and continuing engagement in K-12 science education. Having had the opportunity to see this growth from its birth in 2007 to where we sit today, going into our 7th year, emphasizes the leadership of those who have devoted time, effort, and wisdom to the Academy. The progress we have made would not be possible without the engagement of our membership, the support of the legislature, our universities, and our donors, and the dedication of our Olympia staff. I am proud of where the Academy sits today and look forward to its continued catalytic role in promoting science and evidence-based policy in Washington.

WSAS LEADERSHIP 2013- 2014

Officers

Subhash Singhal, President, Pacific Northwest National Laboratory (emeritus)
Nancy F. Woods, President-Elect, University of Washington
R. Curtis Graeber, Secretary, The Graeber Group, Ltd.
Eugene Nester, Treasurer, University of Washington
Guy Palmer, Past-President, Washington State University

Board members

Phillip Bernstein, Microsoft Research
Anjan Bose, Washington State University
David Eaton, University of Washington
Kristina Katsaros, National Oceanic and Atmospheric Administration, (retired)
Allan Konopka, Pacific Northwest National Laboratory
Thomas Marsh, Washington State University
George "Pinky" Nelson, Western Washington University
Donald Patrick, University of Washington
R.G. Hamish Robertson, University of Washington
Usha Varanasi, University of Washington
Ronald Thom, Pacific Northwest National Laboratory
Position to be filled

WSAS Committees

Executive Committee, Subhash Singhal, Chair
Finance Committee, Eugene Nester, Chair
Membership Committee, Vacant
K-12 Activities Committee, James Krueger, Chair
2014 Annual Meeting Committee, Nancy Woods, Chair
Study Oversight Committee, Anjan Bose, Chair
Nominations Committee for Election of Officers, Guy Palmer, Chair
Study Oversight Committee, Anjan Bose, Chair

WSAS American Junior Academy of Sciences (AJAS) Award Recipients

Representing Washington at the 2014 Annual AJAS Convention

Students selected for their excellent academic record, with strong scientific merit and a strong interest in science or engineering and research.

Alisha Saxena
Improving Cardiovascular Health and Fitness Levels by Optimizing Workout Efficacy with a Microprocessor Controlled, Cloud Connected Device
Interlake High School

Meghal Sheth
Using Zebrafish as a Model to Identify the Causes of Mechanosensory Hair Cell Death and Hearing Loss in Humans
Camas High School

Thorsen Michael Wehr
Focusing Sound Waves Using a Two-Dimensional Non-Linear System
Odessa High School

Finalists for the AJAS Award

Quinn Brown

Isabelle Crary

Isaac Harper

Jacqueline Nguyen

Shruti Parikh

Sophie Shoemaker

Swetha Shutthanandan

Meera Srinivasan

Students with the Northwest Nuclear Consortium

Julie Kim

Lauren Crom

Maddie Rogers

We would like to thank these sponsors on behalf of our students, teachers, and mentors!

BOEING

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WASHINGTON STATE
Academy of Sciences

6TH ANNUAL MEETING & SYMPOSIUM

September 12, 2013 | Museum of Flight, Seattle, WA

WASHINGTON STATE SCIENCE FAIRS & SYMPOSIA

Members of the Washington State Academy of Sciences are encouraged to attend and participate (e.g. as a judge or a student mentor) in the activities of the various annual state fairs and symposia. Following is a listing of such events and contact persons:

Mid-Columbia Regional Science and Engineering Fair (http://www.mcsf.net/)

Kennewick, WA

March

Joyce Stark, Fair Director

Phone: 509 837-2601; E-mail: director@mcsf.net

Larry Chick, Judging Director

Phone: 509-375-2145; E-mail: larry.chick@pnl.gov

South Science Regional Science Fair (http://www.plu.edu/scifair/)

Pacific Lutheran University, Tacoma, WA

March - April

Steve Colgan, Fair Director

Phone: 253-535-7148; E-mail: colgansj@plu.edu

Central Sound Regional Science and Engineering Fair (http://scidiv.bellevuecollege.edu/sami/scifair/)

Bellevue College, WA

March

Kent Short, Judging Director

Phone: 425-564-3055; E-mail: kent.short@bellevuecollege.edu

Southwest Washington Science & Engineering Fair

Vancouver, WA

February - March

Carol Ramsey, Fair Director; E-mail: carolramsey1@comcast.net

Washington State Science and Engineering Fair (http://www.wssef.org/)

Bremerton, WA

March - April

Michael Huey, President

Lois Jane Lugg, Fair Director;
E-mail: ljlugg@bpa.gov

Gary Foss, Educational Outreach Chairman

E-mail: gary.c.foss@boeing.com

Washington Junior Science and Humanities Symposium (http://wjshs.org/)

Seattle Pacific University, Seattle, WA

March

Ray Myers, Director

Phone: 206-218-8830; E-mail: remyers@spu.edu

Northwest BioExpo (http://nwabr.org/teachers/student-bio-expo-teachers/about-expo)

Jeanne Chowning, Expo Director

E-mail: jchowning@nwabr.org

WSU Imagine Tomorrow http://imagine.wsu.edu/

Pullman, WA

May

M. Grant Norton, Chair, College of Engineering and Architecture, WSU; Email: norton@mme.wsu.edu

SPEAKERS

Energy: Environmentally Acceptable Choices for Washington State

Symposium Chair: *Dr. Subhash C. Singhal, President-Elect, WSAS*

Symposium Moderator: *Dr. Jud Virden, Associate Laboratory Director, Energy and Environment Directorate, Pacific Northwest National Laboratory*

Dr. Jud Virden, Associate Laboratory Director, Energy and Environment Directorate, Pacific Northwest National Laboratory

Dr. Virden leads a team of 1,000 staff at Pacific Northwest National Laboratory in delivering science and technology solutions for energy and environmental challenges. In fiscal year 2012, EED's research sales to government and industry clients totaled $210 million. Dr. Virden joined PNNL in 1991 as a researcher. During his more than two decades at the Laboratory, he has served in many key roles within PNNL, including technical group manager, program manager, deputy associate laboratory director, director of business operations, and director of energy market sectors. Prior to his current role, he was EED's Chief Science and Technology Officer, managing the directorate's science and technology capabilities to ensure they impact energy and environment challenges.

As part of Dr. Virden's involvement in the strategic direction and growth of PNNL energy programs, he has helped shape national and international public/private technology partnerships to accelerate technology deployment. In 2009 he was assigned to DOE Headquarters to assist in development of U.S.-China technical research priorities. In 1994 he served on a two-year assignment at General Motors in Flint, Mich., working with the United States Council for Automotive Research, where he initiated and developed multiple government/industry advanced vehicle technology development projects. Dr. Virden served as co-chair for the DOE 21st Century Truck Partnership National Laboratory Council, working with industry and research institutions to create national technology goals and research partnerships to reduce heavy duty truck emissions and increase vehicle efficiency. Dr. Virden has received R&D 100 and Federal Laboratory Consortium awards, a Discover Award with Massachusetts Institute of Technology, and he contributed to a Financial Times Global Automotive Award. He currently serves on the American Council for an Energy Efficient Economy board and on the University of Michigan Energy Institute's external advisory committee.

Dr. Virden holds a bachelor's and doctorate degrees in Chemical Engineering, both from the University of Washington.

Dr. Howard Schwartz, Senior Energy Policy Analyst, Northwest Power and Conservation Council and the Washington Department of Commerce Energy Office

Dr. Howard Schwartz is Senior Energy Policy Analyst for the Washington members of the Northwest Power and Conservation Council and for the Washington Department of Commerce Energy Office. He has worked in executive, policy and academic positions in the Northwest for over thirty years. He has most recently been engaged with the 6th Northwest Power Plan, the Western Renewable Energy Zone project, the Western Climate Initiative and implementation of the Washington Renewable Portfolio Standard and now is the Governor's representative to WECC/ WGA transmission planning committees. Dr. Schwartz is also an Adjunct Professor at The Evergreen State College in Olympia where he teaches graduate and undergraduate courses in energy policy and public administration.

Prior to his current mix of responsibilities Dr. Schwartz held a number of management positions at the Washington State Energy Office, served as administrator of Missoula County, Montana and taught at the University of Montana and The Evergreen State College. He holds a Ph.D. in Political Science from Stanford University.

Greg Delwiche, Senior Vice President - Power Services, Bonneville Power Administration

Greg Delwiche is responsible for BPA's power scheduling functions, generation asset management, power contracts and rates, power purchases and acquisitions, and business relationships with BPA's retail utility customers. Power Services provides power products and services in all markets that are designed to meet customer needs, in addition to providing customers with the benefits of the highest quality and the most competitively priced electricity. Power Services produces revenues of nearly $3 billion per year from the sale of about 11,000 average megawatts of power.

Delwiche's previous position was BPA's vice president of Environment, Fish & Wildlife (EF&W) during the period 2004-2010. EF&W is responsible for fulfilling BPA's implementation obligations under the Endangered Species Act and Northwest Power Act, ensuring agency compliance with the National Environmental Policy Act, National Historic Preservation Act, and other environmental regulations under which the BPA has compliance responsibilities, as well as overseeing the agency's environmental responsibilities with the operation and maintenance of its high-voltage transmission system to minimize environmental risks.. Delwiche was one of the principal BPA negotiators of the 2008 Columbia Basin Fish Accords.

Delwiche has spent his entire 27-year professional career in numerous roles all related to Columbia River resource management. From 1983 to 1991, he was employed at the U.S. Army Corps of Engineers Reservoir Control Center in Portland where he worked in Columbia and Willamette reservoir system operations planning. In 1992, he moved to BPA to manage its power operations planning function.

In November 1998, he became BPA's vice president for Generation Supply. There he was responsible for power and operations planning for Columbia River dams, real-time power scheduling, and operations and maintenance funding for the U.S. Army Corps of Engineers and Bureau of Reclamation dams and powerhouses and Energy Northwest's Columbia Generating Station nuclear power plant.

Delwiche was born and raised in western New York and has undergraduate and graduate civil engineering degrees from the University of Florida and Oregon State University, respectively.

Dan Kirschner, Executive Director, Northwest Gas Association

Dan Kirschner has been the Executive Director of the Northwest Gas Association (NWGA) since 2002. An expert on natural gas matters in the Pacific Northwest, Kirschner works to foster understanding among opinion leaders and informed decision-making by governing officials on issues related to natural gas in the region.

Kirschner adds an MBA to his policy and public affairs experience giving him a unique perspective on the intersection of public policy and business imperatives. His duties with the NWGA include formulating and disseminating market intelligence, policy analysis on issues affecting the Northwest regional natural gas market and communicating the industry's perspective on a variety of issues to an array of stakeholders.

Dr. Alan Waltar, Past President, American Nuclear Society

Dr. Alan E. Waltar recently retired as Director of Nuclear Energy at the Pacific Northwest National Laboratory after previously retiring as Professor and Head of the Department of Nuclear Engineering at Texas A&M University. He is Past President and Fellow of the American Nuclear Society. He holds a PhD in Engineering Science from the University of California, Berkeley. Dr. Waltar capped a nearly 30-year career with Westinghouse Hanford Company, mainly focusing on fuels and safety roles for fast reactors. Along with over 75 open literature scientific articles, he has authored or co-authored four books (Fast Breeder Reactors, 1981; America the Powerless: Facing our Nuclear Energy Dilemma, 1995; Radiation and Modern Life: Fulfilling Marie Curie's Dream, 2004; and Fast Spectrum Reactors, 2011).

Dr. Waltar was instrumental in the formation of the World Nuclear University (WNU) Summer Institute (SI) and has served as a mentor, lecturer, and MC for all eight of the SIs to date—as well as both WNU Radioisotopes Schools in Korea (2010 and 2012). He also led a People-to-People Ambassadors Nuclear Delegation to China in October 2007 and India in 2009. Dr. Waltar currently serves as a consultant to numerous governmental national and international nuclear organizations as well as several private nuclear firms.

Dr. Charles A. Brandt, Manager, Coastal Sciences Division, Pacific Northwest National Laboratory

Dr. Brandt is Director of the Marine Sciences Laboratory within Pacific Northwest National Laboratory. His division's work focuses on sustainable ocean energy, understanding and mitigating effects of population growth and climate change on coastal systems, and coastal security. Prior to his current position, Dr. Brandt managed PNNL's business portfolio in environmental sustainability, served as a technical group manager, and was a senior staff scientist.

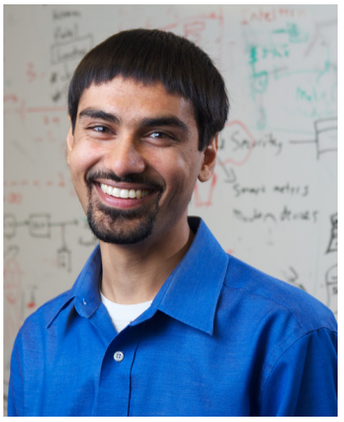
Dr. Brandt is an evolutionary ecologist conducting research primarily in the area of contaminant transport and effects in aquatic and terrestrial biota. He serves as a peer reviewer for several international journals in the areas of mammalian field studies, oil and gas industry effects on the environment, and ecological risk assessment. Dr. Brandt is also an adjunct professor in the Zoology Department at Washington State University.

Dr. Carl H. Imhoff, Manager, Electricity Infrastructure Market Sector, Pacific Northwest National Laboratory

Dr. Carl Imhoff manages the Electricity Infrastructure market sector within Pacific Northwest National Laboratory's Energy and Environment Directorate. The sector conducts advanced electric infrastructure research and product development with the U.S. Department of Energy, state governments, vendors, and commercial energy firms. In this role he is responsible for PNNL's research and development programs on innovations in the areas of advanced power transmission reliability concepts, demand response, development of improved integration concepts for renewable energy generation technologies, policy and strategy for smart grid concepts, and cross-cutting grid analytic tools in visualization and high performance computing. It's widely recognized that PNNL's grid activities bring substantial impact and thought leadership to the nation's smart grid agenda.

During his 30 years at PNNL, Dr. Imhoff has conducted and managed a broad range of energy research. His technical work emphasizes systems engineering and operations in the areas of power system reliability, smart grid, energy efficiency, energy storage, and clean generation. He has been actively involved in a number of electric power system organizations, including the North American SynchroPhasor Initiative, the GridWise Alliance, the Consortium for Electric Reliability Technology Solutions and the Western Electricity Coordinating Council. In 2011, he was appointed to the Consumer Advisory Council of the New York Independent System Operator and is a member of IEEE.

Professor Shwetak N. Patel, Associate Professor, Departments of Computer Science and Engineering and Electrical Engineering, University of Washington



Professor Patel's research interests are in the areas of Human-Computer Interaction, Ubiquitous Computing, Sensor-enabled Embedded Systems, and User Interface Software and Technology. He is particularly interested in developing new sensing technologies with a particular emphasis on energy monitoring and health applications. Dr. Patel was a founder of Zensi, Inc., a demand side energy monitoring solutions provider, which was acquired by Belkin, Inc. in 2010. He received his Ph.D. in Computer Science from the Georgia Institute of Technology in 2008 and B.S. in Computer Science in 2003.

Dr. Patel received a MacArthur Fellowship in 2011, is a Sloan Fellow, received the TR-35 award in 2009, was named top innovator of the year by Seattle Business Magazine, was named Newsmaker of the year by Seattle Business Journal, and was a recipient of the Microsoft Research Faculty Fellowship in 2011. His past work was also honored by the New York Times as a top technology of the year in 2005. Dr. Patel is also a member of the World Economic Forum's Global Shapers Community. He was selected as a Seattle Shaper in March 2012.

Dinner Speaker

Dr. Edmund O. Schweitzer, III, President, Schweitzer Engineering Laboratories, Inc.

Dr. Edmund O. Schweitzer, III is recognized as a pioneer in digital protection. In 2002, he was elected a member of the National Academy of Engineering, and in 2008, a founding member of the Washington State Academy of Sciences. He is a Fellow of IEEE, and received the 2012 Medal in Power Engineering, the highest award given by IEEE, for his leadership in revolutionizing the performance of electrical power systems with computer-based protection and control equipment.

Dr. Schweitzer is the recipient of the Graduate Alumni Achievement Award from Washington State University and the Purdue University Outstanding Electrical and Computer Engineer Award. He has also been awarded honorary doctorates from both the Universidad Autónoma de Nuevo León in Monterrey, Mexico, and the Universidad Autónoma de San Luis Potosí in San Luis Potosí, Mexico, for his contributions to the development of electric power systems worldwide. He has written dozens of technical papers in the areas of digital relay design and reliability and holds more than 35 patents pertaining to electric power system protection, metering, monitoring, and control.

Dr. Schweitzer received his Bachelor's and Master's degrees in electrical engineering from Purdue University, and his Ph.D. from Washington State University. He served on the electrical engineering faculties of Ohio University and Washington State University, and in 1982, he founded Schweitzer Engineering Laboratories, Inc. (SEL) to develop and manufacture digital protective relays and related products and services. Today, SEL is an employee-owned company, which serves the electric power industry worldwide, and is certified to the international quality standard ISO-9001. SEL equipment is in service at voltages from 5 kV through 500 kV, to protect feeders, motors, transformers, capacitor banks, transmission lines, and other power apparatus.