

# 5<sup>TH</sup> ANNUAL MEETING & SYMPOSIUM

SEPTEMBER 20, 2012 | MUSEUM OF FLIGHT, SEATTLE, WA

## PROGRAM AGENDA

9:30 – 12:00 **Registration**

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

10:00 *Museum of Flight tour for students and teachers*

11:30 – 12:00 **Presentations by the State Winners of the Stockholm Junior Water Prize**

*The Stockholm Junior Water Prize is the world's most prestigious youth award for a water-related science project.*

12:00 – 12:15 **WSAS Awards for American Junior Academy of Sciences Annual Convention**

12:15 – 1:15 **Lunch**

1:30 – 6:00 **Symposium – Water: Washington and the World**

Ensuring Economically and Environmentally Sustainable Water Resources

1:30 – 3:30 **Session I – Climate Change and Hydrologic Implications**

*Session Chair: Ed Miles, Professor Emeritus of Marine Studies and Public Affairs at the, University of Washington*

**Keynote on Global Climate Change and Water Resources**

*Robert W. Corell, Principal, Global Environment and Technology Foundation and its Center for Energy and Climate Solutions (DC) and Chair, The Climate Action Initiative*

**Climate Dynamics**

*Ed Sarachik, Professor Emeritus of Atmospheric Sciences, University of Washington*

**Hydrological Implications**

*Dennis P. Lettenmaier, Professor of Civil and Environmental Engineering, University of Washington*

**Speaker Panel with Audience Q&A**

3:30 – 4:00 **Break**

4:00 – 5:00 **Session II – Hydrologic Impacts**

*Session Chair: Robert W. Corell*

**Modeling Hydrological Impacts in Agriculture**

*Jennifer Adam, Assistant Professor of Civil and Environmental Engineering, Washington State University*

**Water rights, markets, and prices: Helping water flow toward high-valued use**

*Jonathan Yoder, Professor of Economics, Washington State University*

**Panel Discussion – Effecting Policy Change at the State Level with Audience Q&A**

**Panelists:**

*Peter Goldmark, Commissioner, Department of Natural Resources*

*Kirk Cook, Natural Resources Assessment Section Manager, Washington State Department of Agriculture*

*Hedia Adelman, Senior Policy Advisor, Department of Ecology*

*Ron Tressler, Strategic Advisor/Environmental Affairs Division, Seattle City Light*

6:00 – 9:00 **Reception and Dinner**

*Howard Frumkin, Dean, University of Washington School of Public Health:  
"Water and Public Health: A Global View"*

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## BUSINESS MEETING AGENDA

Thursday, September 20, 2012 - 10:00 to 11:30 AM

Seattle Museum of Flight

Welcome and Introductory Remarks

***Earll Murman, President***

Induction of New Members by Section

***Earll Murman, President***

***Nancy Woods, Membership Committee Chair***

Secretary's Report

***Earll Murman for Ed Lazowska***

Treasurer's Report

***Eugene Nester***

Membership Committee Report and Discussion

***Nancy Woods***

By-laws Revisions

***Earll Murman***

Open Discussion with WSAS Members

***Earll Murman***

Introduction of new Officers and Board Members

***Earll Murman***

Transfer of gavel to Incoming President Guy Palmer

***Earll Murman***

Adjourn

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NEW MEMBERS

New members inducted into the Washington State Academy on September 20, 2012

## Section 1 – Physical and Mathematical Sciences

<b>James Bardeen</b>	Professor Emeritus, University of Washington
<b>Sue B. Clark</b>	Regents Professor of Chemistry and Staff Scientist Washington State University
<b>Karen I. Goldberg</b>	Nicole A. Boand Endowed Professor and Director, Center for Enabling New Technologies through Catalysis (CENTC), University of Washington
<b>Blayne R. Heckel</b>	Professor and Chair, University of Washington
<b>Clifford F. Mass</b>	Professor, University of Washington
<b>George D. "Pinky" Nelson</b>	Director, Science, Mathematics and Technology Education Program, Western Washington University
<b>Ann Nelson</b>	Professor, University of Washington
<b>Gunther Uhlmann</b>	Walker Family Endowed Professor in Mathematics, University of Washington

## Section 2 – Engineering and Technology

<b>Larry Dalton</b>	B. Seymour Rabinovitch Chair in Chemistry, George Kauffman Professor of Chemistry, University of Washington
<b>Kai Li</b>	Professor of Computer Science at the School of Engineering and Applied Science, Princeton
<b>Kelvin G. Lynn</b>	Director, Center for Materials Research, Westinghouse Distinguished Professor in Materials Science Boeing Chair of Advanced Materials, Washington State University
<b>Henrique Malvar</b>	Professor, Microsoft Research
<b>Roger M. Myers</b>	Executive Director, Aerojet Redmond Operations
<b>James Joseph Riley</b>	Professor, Mechanical Engineering, University of Washington
<b>David Stahl</b>	Professor, Civil and Environmental Engineering, University of Washington
<b>Leung Tsang</b>	Professor, Electrical Engineering, University of Washington

## Section 3 – Biological Sciences

<b>E. Virginia Armbrust</b>	Director and Professor, School of Oceanography, University of Washington
<b>Thomas Daniel</b>	Professor of Biology and Komen Endowed Chair, University of Washington
<b>Michael H. Dickinson</b>	Benjamin Hall Professor of Biology, University of Washington
<b>Evan Eichler</b>	Professor Genome Sciences, Dept. of Genome Sciences, University of Washington
<b>John Reganold</b>	Regents Professor of Soil Science and Agroecology, Washington State University
<b>Keiko U. Torii</b>	HHMI/Gordon and Betty Moore Foundation Investigator, University of Washington

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## Section 4 – Medicine and Health Sciences

<b>Ana Mari Cauce</b>	Provost and Executive Vice President, Earl R. Carlson Professor of Psychology, University of Washington
<b>Charles Chavkin</b>	Allan and Phyllis Treuer Endowed Chair in Pain Research and Professor, Pharmacology, University of Washington
<b>Michael H Gelb</b>	Harry and Catherine Jayne Boand Endowed Professor of Chemistry and professor of Biochemistry, University of Washington
<b>James M. Krueger</b>	Eminent Professor Washington State University
<b>Pamela Holsclaw Mitchell</b>	Robert G. and Jean A. Reid Interim Dean, School of Nursing Professor, Biobehavioral Nursing and Health Systems, University of Washington
<b>Charles Emerson Murry</b>	Co-Director, Institute for Stem Cell and Regenerative Medicine Professor, Department of Pathology and Professor, Department of Bioengineering, University of Washington

## Section 5 – Anthropology, Economics, Social and Political Sciences

<b>Cathryn Booth-LaForce</b>	Professor, Family and Child Nursing, University of Washington
<b>George S Bridges</b>	President, Whitman College
<b>Ron C. Mittelhammer</b>	Regents Professor of Economic Sciences and Statistics, Washington State University
<b>Robert D Plotnick</b>	Professor and Associate Dean for Academic Affairs, Evans School of Public Affairs, University of Washington
<b>David Takeo Takeuchi</b>	Professor and Associate Dean for Research, School of Social Work, University of Washington
<b>Engelberta "Betty" Thompson</b>	Member, Public Health Sciences Division Fred Hutchinson Cancer Research Center

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WSAS LEADERSHIP 2012 - 2013

## Officers

Guy H. Palmer, President, Washington State University

Subhash Singhal, President-Elect, Pacific Northwest National Laboratory (emeritus)

Edward D. Lazowska, Secretary, University of Washington

Eugene Nester, Treasurer, University of Washington

## Board members

Phillip Bernstein, Microsoft Research

Anjan Bose, Washington State University

Bonnie J. Dunbar, The Boeing Company

David Eaton, University of Washington

Kristina Katsaros, National Oceanic and Atmospheric Administration, (retired)

Allan Konopka, Pacific Northwest National Labs

Estella Leopold, University of Washington (emeritus)

Donald Patrick, University of Washington

R.G. Hamish Robertson, University of Washington

Ronald Thom, Pacific Northwest National Laboratory

Nancy F. Woods, University of Washington

## WSAS Committees

Executive Committee, Guy Palmer, Chair

Finance Committee, Eugene Nester, Chair

Membership Committee, Nancy Woods, Chair

K-12 Activities Committee, Subhash Singhal, Chair

2012 Annual Meeting Committee, Subhash Singhal, Chair

Study Oversight Committee, Anjan Bose, Chair

Nominations Committee for Election of Officers, Guy Palmer, Acting Chair

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BYLAWS - REVISIONS

## REVISION OF BYLAWS AND MEMBERSHIP COMMITTEE STRUCTURE AND ELECTION PROCEDURES

**WSAS MEMBERS:** Attached revisions to the WSAS Bylaws and Membership Committee Structure and Election Procedures for your approval. The revisions address the following topics, incorporating our experience during the past few years.

### Bylaws

1. Establishing a standing Membership Committee of the Board of Directors, as put forth in the Membership Committee Structure and Election Procedures adopted after the Bylaws were adopted.
2. Harmonizing the Bylaws to agree with the Membership Committee Structure and Election Procedures
3. Adding the Past President as an Officer, which regularizes what has been an ad hoc practice.
4. Modifying membership eligibility to include non state residents whose primary employment is in Washington State. This allows people who live across the Idaho or Oregon borders to be WSAS members if they are permanently employed in Washington
5. Establishing an emeritus member category for members who move away from WA or who wish to resign for personal reasons.
6. Establishing a deceased member category.
7. Deletion of an article requiring Board members to provide bonds to the Academy.
8. Minor edits

Article XV of the Bylaws specified the procedures for adopting these amendments, which will be followed.

### Membership Committee Structure and Election Procedures

1. Changes in the formation of the Membership Committee to recognize what has worked in practice.
2. Better definition of the Section Membership Subcommittees and procedures
3. Harmonization with the Bylaws
4. Several additions to the nomination forms
5. Specification of when the class size will be set for the annual election.

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GUEST TEACHERS AND STUDENTS AND THEIR SPONSORS

## WSAS American Junior Academy of Sciences(AJAS) Award Recipients

### Representing Washington at the 2013 Annual AJAS Convention

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

#### Kelly Giffey

*The Correlation Between Dietary Intake and Agouti-Related Protein Expression in Zebrafish, Danio rerios*  
W. F. West High School

#### Sampath Duddu

*Can You Hear Me Now*  
Capital High School

## The Stockholm Junior Water Prize

The world's most prestigious youth award for a water-related science project.

### Washington Winner

#### Anjani Patel

*Cleaning Up Various Oil Spills Using Bioremediation*  
Cedarcrest High School  
Science Teacher – Bruce Murdock

### Washington Finalist

#### Sophie Shoemaker

*Recycled Aquaponics: The Agriculture of the Future*  
Camas High School  
Science Teacher – Ronald Wright

The WSAS would also like to welcome the Advanced Placement Environmental Science Class from Mt. Vernon High School with teacher Ms. Rebecca Krueger.

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



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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](mailto:director@mcsf.net)

Larry Chick, Judging Director

Phone: 509-375-2145; E-mail: [larry.chick@pnl.gov](mailto: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](mailto:colgansj@plu.edu)

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

Bellevue College, WA

March

Kate Souza, Program Manager

Phone: 425-564-3055; E-mail: [kathryn.souza@bellevuecollege.edu](mailto:kathryn.souza@bellevuecollege.edu)

## Southwest Washington Science & Engineering Fair

Vancouver, WA

February - March

Carol Ramsey, Fair Director; E-mail: [carolramsey1@comcast.net](mailto: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](mailto:ljlugg@bpa.gov)

Gary Foss, Educational Outreach Chairman

E-mail: [gary.c.foss@boeing.com](mailto: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](mailto:remyers@spu.edu)

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

Jeanne Chowning, Expo Director

E-mail: [jchowning@nwabr.org](mailto: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](mailto:norton@mme.wsu.edu)



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SPEAKERS, SESSION CHAIRS & PANELISTS

## Session I – Climate Change and Hydrologic Implications

**Session Chair:** Ed Miles, Professor Emeritus of Marine Studies and Public Affairs at the, University of Washington



**Dr. Robert W. Corell** is a Principal at the Global Environment Technology Foundation and Leads its Center for Energy and Climate Solutions. He has several academic appointments: Senior Fellow, College of Arts and Science and its School of Environment, Arts and Society, Florida International University, The Arctic Chair and Professor II at the University of Tromsø (Norway), and Professor II at the Research Institute at the University of the Arctic. He is a Member of the Modeling Team at Climate Interactive Initiative, Council Member of the Global Energy Assessment (GEA) and Lead Author of GEA's Chapter 3 on Environment and Energy. He is Founder in 2008 and Chair of the Global Climate Action Initiative established to assist international negotiators (US, China, Indonesia, etc.) in the UNFCCC and beyond processes and in 2010, Dr. Corell founded the non-profit Global Science Associates, an interdisciplinary nucleus for the world's best science experts

and collaboratories. He lead the Arctic Climate Impact Assessment (2005) and most recently lead a comprehensive study of governance issues in the circumpolar Arctic. He was recognized with the other scientists for the 2007 Nobel Peace Prize for his work with the International Panel on Climate Change (IPCC) assessments and in 2010, Dr. Corell was awarded an *Honorary Doctor of Veterinarian Medicine* by the Norges Veterinærhøgskole (Norwegian School of Veterinarian Science)

Dr. Corell is actively engaged in research concerned with the sciences of global change and the interface between science and public policy, particularly research activities that are focused on global and regional climate change, related environmental issues, and science to facilitate understanding of vulnerability and sustainable development. Dr. Corell was Assistant Director for Geosciences at the National Science Foundation where he had oversight for the Atmospheric, Earth, Ocean Sciences, Polar Programs and was Chair for over a decade of the United States Global Change Research Program reporting to the White House's Office of Science and Technology Policy. He was also a professor and academic administrator at the University of New Hampshire. Dr. Corell is an oceanographer and engineer by background and training, having received Ph.D., M.S., and B.S. degrees at Case Western Reserve University and MIT with has PhD graduate studies in oceanography at the Scripps Institution of Oceanography. He has also held appointments at the Woods Hole Institution of Oceanography, the Scripps Institution of Oceanography, the, University of Washington, and Case Western Reserve University. He has published several dozen peer-reviewed articles and book chapters during the past decade, the most recent of which will be released in June: a section of the book on mid-century climate projections in "*2052 - A Global Forecast for the Next Forty Years*" by Jorgen Randers.



**Edward S. Sarachik** was Professor of Atmospheric Sciences and Adjunct Professor of Oceanography and Applied Mathematics at the, University of Washington and is now Emeritus Professor of Atmospheric Sciences. His areas of scientific expertise are: tropical meteorology and oceanography especially the ENSO phenomenon; the role of the ocean in climate; natural and anthropogenically modified climate variability on all time scales; and the application of climate information.

Sarachik has participated in a number of National Research Council Committees and Reports (in particular he Chaired the committee that produced the report Improving the Effectiveness of U.S. Climate Modeling, NRC 2001), serves as the Chair of the International Research Institute for Science and Society's International Science and Technology Advisory

Committee, and served as Chair of the UCAR Community Climate Systems Model Advisory Board. He is a fellow of the American Meteorological Society, the American Geophysical Union, and the American Association for the Advancement of Science. Along with three thousand other scientists, he shared the 2008 Nobel Prize for Peace awarded to the IPCC.



**Dennis Lettenmaier** received his B.S. in Mechanical Engineering (summa cum laude) at the, University of Washington in 1971, his MS in Civil, Mechanical, and Environmental Engineering at the George Washington University in 1973, and his PhD at the, University of Washington in 1975. He joined the, University of Washington faculty in 1976. In addition to his service at the, University of Washington, he spent a year as visiting scientist at the U.S. Geological Survey in Reston, VA (1985-86) and was the Program Manager of NASA's Land Surface Hydrology Program at NASA Headquarters in 1997-98. He is a member of the American Geophysical Union, the American Water Resources Association, the European Geosciences Union, the American Meteorological Society, and the American Society of Civil Engineers, and the American Association for the Advancement of Science. He was a recipient of ASCE's Huber Research Prize in 1990, and the American Geophysical Union's Hydrology Section

Award in 2000. He is a Fellow of the American Geophysical Union, the American Meteorological Society, and the American Association for the Advancement of Science, and is a member of the International Water Academy. He is an author or co-author of over 250 journal articles. He was the first Chief Editor of the American Meteorological Society Journal of Hydrometeorology, and is the President of the Hydrology Section of the American Geophysical Union. He is a member of the National Academy of Engineering. His areas of research interest are large scale hydrology, hydrologic aspects of remote sensing, and hydrology-climate interactions.

## Session II – Hydrologic Impacts

*Session Chair: Robert W. Corell*



**Jennifer Adam** has been an Assistant Professor in the Civil and Environmental Engineering Department at Washington State University for 4.5 years. She came most recently from the University of Washington where she obtained her graduate degrees, both of which with Dr. Dennis Lettenmaier. Prior to graduate school, Dr. Adam served as a Peace Corps Volunteer in the Solomon Islands ('97-'99) after receiving her B.S. in Civil Engineering at the University of Colorado in Boulder.

Dr. Adam's research involves the use of process-based computer models to understand climate and land-use change impacts on the hydrologic cycle. She is involved in a number of climate change impact studies from small watershed to global scales. She is also interested in land/atmosphere interacts as well as the coupled interactions between biogeochemistry,

hydrology, and climate. Dr. Adam is also committed to education and is involved in research to improve learning in undergraduate engineering courses.



**Jonathan Yoder** is Professor of Economics in the School of Economic Sciences at Washington State University. His research specialization is natural resource and environmental economics, with a focus on policy design and impact analysis, law, and contracts. He received a Ph.D. in Economics from North Carolina State University with a minor in statistics, a Master's degree in Applied Economics at Montana State University, and a Bachelor's degree in Biology, Journalism, and African Studies from Indiana University.

Yoder has contributed to a series of water demand and policy analysis for the Washington State Department of Ecology, and is currently a PI on multiple multidisciplinary projects focusing on dynamic environmental/economic systems with a focus on nutrient cycling in hydrologic systems

funded by NSF and USDA. He has published on water demand in Africa, and has contributed to research on water quality in the Midwestern U.S., fisheries habitat management, and water-based recreation. He currently serves as a WSU delegate to the Universities Council on Water Resources (UCOWR), and has served on the Inland Northwest Research Alliance (INRA) Water Research Consortium Steering Committee.

Yoder has also published in the area of energy, biofuel, and climate policy, and has led and collaborated on several biofuel policy projects for the Washington State Legislature and Washington State Departments of Commerce, Agriculture, and Ecology. He is currently involved in several grant-funded projects in this arena as well.

More broadly, Yoder has published on topics such as the economics of wildfire management and prescribed fire use, wildlife management, allocation mechanisms for public resource access, agricultural land lease contracts, remittances, as well as econometric models of futures markets and hedging strategies. He recently became an Adjunct Professor in the School for Global Animal Health at Washington State University to pursue research on economics and policy for livestock infectious disease with a focus on Sub-Saharan Africa.



**Session II – Panel Discussion – Effecting Policy Change at the State Level with Audience Q&A***Session Chair: Robert W. Corell***Panelists**

As the elected Commissioner of Public Lands, **Peter Goldmark** manages the Washington State Department of Natural Resources (DNR) and administers a \$625 million, two-year budget.

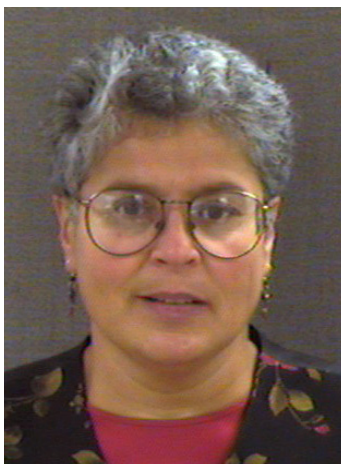
Peter chairs the state Board of Natural Resources, which sets policy for the management of state trust lands. The Department of Natural Resources also manages approximately 2.6 million acres of aquatic lands, which include shorelines, tidelands, lands under Puget Sound and the coast, and navigable lakes and rivers and natural lakes.

After receiving his Ph.D. in molecular biology from the University of California at Berkeley in 1971, he traveled to Harvard University for a postdoctoral fellowship in neurobiology. Goldmark has had a lifelong involvement with agriculture, science, education, and public service.

Goldmark maintains a small scientific research facility at his ranch and has published scientific articles in national and international journals. He is currently working on a wheat-breeding program at his facility and has recently released new varieties for Washington wheat farmers.



**Kirk Cook** is the Senior Science Policy Advisor to the Director at the Washington State Department of Agriculture. Kirk also supervises the Department's Natural Resource Assessment Section and serves as the agency's Climate Change expert. Kirk has co-authored several state publications regarding agriculture/water resources and climate change including the 2007 agricultural chapter of the Preparing for Impact of Climate Change in Washington, the 2008 Recommendations for the Development of Agricultural Sector Carbon Offsets in Washington State, and the working land chapters of recently released Preparing for a Changing Climate – WA State Integrated Climate Response Strategy. Kirk is a licensed geologist and hydrogeologist in Washington and Oregon and has worked in the environmental field for over 35 years.



**Ms. Hedia Adelsman** serves as Executive Policy Advisor in the Director's Office on major statewide policies and programs implementing some of the Governor's and the Agency's priority initiatives. She works on greenhouse gas emissions reduction and adaptation policies and programs, ocean acidification, energy facilities siting and development, and innovative water management initiatives. She managed the State Water Resources Program, and led major efforts on statewide salmon recovery planning and funding, and regulatory integration and streamlining (SEPA /GMA/ SMA).



**Ron Tressler** has been with Seattle City Light since 2008. He works with hydroelectric project operators, climate scientists, hydrologists, planners, engineers, ecologists, and geomorphologists to study impacts of climate change on the public utility's hydroelectric projects on the Skagit, Tolt, Cedar, and Pend Oreille rivers.

Ron works on helping to determine climate change impacts on City Light hydro operations as well as adapting strategies for utility operations to minimize impacts on ecosystems, federally protected salmon, and plants and wildlife. He has been working with researchers from universities, tribes, and state and federal agencies on the Skagit Climate Science Consortium to understand climate change impacts and reduce vulnerability of human communities and ecosystems in the Skagit River

basin. Ron also served on the Washington Climate Change Response Strategy Topic Advisory Group working on species, habitats and ecosystems.

Prior to joining City Light, Ron spent more than 20 years in environmental consulting with an emphasis on examining ecological impacts of electric utility and U.S. Army Corps of Engineers water resource projects throughout the western United States. Ron has a B.S. in wildlife science from the Pennsylvania State University and a M.S. in wildlife ecology from the University of Idaho.

### Dinner Speaker



**Howard Frumkin** is Dean, and Professor of Environmental and Occupational Health Sciences, at the, University of Washington School of Public Health. He is also an internist, environmental and occupational medicine specialist, and epidemiologist, who has worked in academia and public service.

He has held leadership roles at the U.S. Centers for Disease Control and Prevention, first as director of the National Center for Environmental Health and Agency for Toxic Substances and Disease Registry (NCEH/ATSDR), and later as Special Assistant to the CDC Director for Climate Change and Health.

His research interests include public health aspects of the built environment, climate change, energy policy, and nature contact; toxic effects of chemicals; and environmental health policy. He is the author or co-author of more than 200 scientific journal articles and chapters.