

**WSSS @ Tufts University and WRRC @ UMass Amherst
present the Fourth Annual Interdisciplinary Water Symposium**

Feeding Ourselves Thirsty:

The Future of Water and Food Production



Friday, April 5, 2013

8:00 am - 6:00 pm

Cohen Auditorium, Aidekman Arts Center

Tufts University

www.tufts.edu/water/symposium



The 4th Annual Interdisciplinary Water Symposium

Feeding Ourselves Thirsty:

The Future of Water and Food Production

Presented by Tufts WSSS and UMass Amherst WRRC

Supported by the Tufts University Office of the Provost, the U.S. Geological Survey and the generous donations of our valued sponsors

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Letter of Welcome

Our conference theme, “Feeding Ourselves Thirsty: The Future of Water and Food Production,” is motivated by the increasing necessity to unify concepts and methodologies to solve real-world problems in our food production systems. Today, two keynote speakers, three panels of esteemed water and food production experts and a special guest speaker will provide key insights on the issues facing the future of agricultural production, creating a discussion platform that reaches across a variety of academic disciplines.

We thank our keynotes, panelists, sponsors, and conference attendees in joining us today as we explore issues at the nexus of water and agriculture, including conflicting resource demands, sustainability, and water quality. Join us as we explore the following questions throughout the day of the conference: What are the most effective practices and policies for reducing contamination without adversely affecting agricultural production? How can we more efficiently allocate water in order to ensure sufficient food production, while still meeting the needs of competing industries and users? How do these approaches ensure fairness and equity? What are some examples of successful interdisciplinary approaches to water resource management?

We are excited to have such a diverse gathering of people with water knowledge joining us today, and we encourage you to join the conversation during both formal and informal events. Thank you for attending the fourth annual interdisciplinary water symposium at Tufts University!

Yours Sincerely,

The 2013 Water Symposium Planning Committee:

Glennon Beresin, Noah Cohen-Cline, Lauren Cole, Laura Crossley, Franklin Crump, Meghan Flanagan, Stephanie Galaitsis, Gabrielle Gareau, Jory Hecht, Elliot Hohn, Elisabeth Holden, Yudan Jiang, Margaret Kurth, Kate McMahon, Jessica Morrison, Kate Olson, Lesley Pories, Laura Read, Anne Sexton, Gabrielle String, Jeff Walker, Adam Weinberg, Ruiruo Wu, and Shuo Zhao



Schedule

8:00 – 9:00 am	Registration and Breakfast
9:00 – 9:10 am	Welcoming Remarks
9:10 – 9:55 am	Keynote Address: Craig Cox
10:00 – 10:55 am	Panel 1: Approaches for Mitigating Agricultural Water Contamination in the United States
10:55 – 11:15 am	Coffee Break
11:15 – 12:10 pm	Panel 2: Water, Food, and Conflicting Resource Demands
12:10 – 1:20 pm	Lunch and Poster Session
1:20 – 1:35 pm	Alternative Perspectives: Food and Water Practices of the Mashpee Wampanoag
1:40 – 2:35 pm	Panel 3: Solutions for Sustainable Water Resource Management
2:35 – 2:55 pm	Coffee Break
2:55 – 3:40 pm	Keynote Address: Dr. Roberto Lenton
3:45 – 4:15 pm	Closing Remarks and Student Awards
4:15 – 6:00 pm	Cocktail Hour with Live Music by Cold Chocolate

All symposium events take place in the Aidekman Auditorium building

Talks take place in the Cohen Auditorium

Breaks, lunch and cocktails are served in the Remis Sculpture Court



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The Fletcher School of Law and Diplomacy at Tufts University (The Fletcher School)—the first exclusively graduate school of international affairs in the United States—has prepared the world’s leaders to tackle complex global challenges since 1933.

The School’s alumni represent the highest levels of leadership in the world, including hundreds of sitting ambassadors, heads of global non-profit organizations, and executive leadership of some of the world’s largest for-profit companies. The Fletcher School offers a collaborative, flexible and interdisciplinary approach to the study of international affairs, featuring a distinguished faculty and diverse student body.

The Fletcher School awards professional degrees, including a two-year Master of Arts in Law and Diplomacy (MALD); a one-year Master of Arts for mid-career professionals; a one-year, mid-career Global Master of Arts (GMAP); a Ph.D. program; a Master of Arts in International Business (MIB); and a Master of Laws in International Law (LL.M.)—as well as joint degrees, summer school and certificate programs.



WATER: SYSTEMS, SCIENCE & SOCIETY

tufts.edu/water

WSSS is an interdisciplinary graduate research and education program at Tufts University. It was founded in 2004 to provide the interdisciplinary perspectives and tools to manage water related problems around the world. Participating students fulfill the WSSS requirements in addition to the student’s degree requirements. Upon completion of these activities, students receive a Certificate in Water: Systems, Science, and Society as well as their graduate degree.



Tufts Institute of the **ENVIRONMENT**
environment.tufts.edu

The Tufts Institute of the Environment (TIE) is an interdisciplinary university-wide institute that initiates, facilitates, and promotes environmental education, research, and outreach toward a sustainable future. TIE offers fellowships and travel grants and hosts guest researchers. We also support the Office of Sustainability in its efforts to improve campus sustainability.



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SEI is an independent international research institute. We have been engaged in environment and development issues for more than 20 years. Our goal is to bring about change for sustainable development by bridging science and policy.



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Boston Organics is a locally owned, independent organic produce and grocery delivery service. We promote and support healthy living in a sustainable way that respects the environment, supports local farms, local businesses, and fair-trade practices.

Equal Exchange's mission is to build long-term trade partnerships that are economically just and environmentally sound, and to demonstrate the contribution of worker co-operatives and Fair Trade to a more equitable and sustainable world.

Cold Chocolate guitarist/songwriter Ethan Robbins believes that the rootsy sounds of bluegrass music were meant to be fused with the backbeat of funk. Joined by upright bassist Kirsten Lamb, the jazz-inflected banjo of James McIver and Ariel Bernstein on drums, Cold Chocolate proves to be an innovative Americana act with their debut album *This Old Way*.

Underwriting Sponsors



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The Tufts WSSS program is grateful for the support of the Tufts University Office of the Provost. The Office of the Provost is responsible for setting institutional and budgetary priorities that advance the University's mission.



usgs.gov

The USGS is proud to support the WRRC at UMass Amherst. The USGS is a science organization that provides impartial information on the health of our ecosystems and environment, and the core science systems that help us provide timely, relevant, and usable information.



Keynote Address

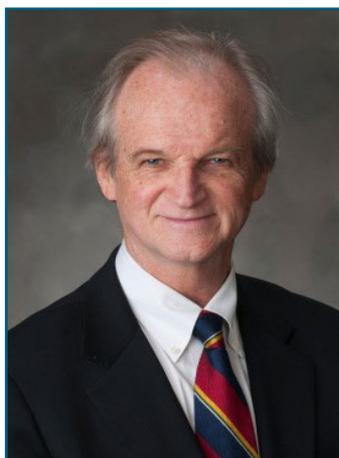
Roberto Lenton, PhD

Founding Executive Director,
Robert B. Daugherty Water for Food Institute
University of Nebraska

Dr. Roberto Lenton is the Founding Executive Director of the Robert B. Daugherty Water for Food Institute at the University of Nebraska and Professor of Biological Systems Engineering at the University of Nebraska-Lincoln. A specialist in water resources and sustainable development with 40 years of international experience in the field, Dr. Lenton earned a civil engineering degree from the University of Buenos Aires and a PhD from the Massachusetts Institute of Technology (MIT).

He has served as chair of the Water Supply and Sanitation Collaborative Council and of the Technical Committee of the Global Water Partnership, and is a co-author of *Applied Water Resources Systems Planning*, a co-editor of *Integrated Water Resources Management in Practice*, and a lead author of *Health, Dignity, and Development: What Will it Take?*, the final report of the United Nations Millennium Project Task Force on Water and Sanitation, which he co-chaired.

Until January of last year, Dr. Lenton was Chair of the World Bank Inspection Panel. Earlier, he was senior advisor at the Earth Institute at Columbia University, director of the Sustainable Energy and Environment Division of the United Nations Development Programme in New York, director general of the International Water Management Institute in Sri Lanka, and program officer in the Rural Poverty and Resources program of the Ford Foundation in New Delhi and New York. He has served as adjunct professor in the School of International and Public Affairs at Columbia University and assistant professor of civil and environmental engineering at MIT.





Keynote Address

Craig Cox

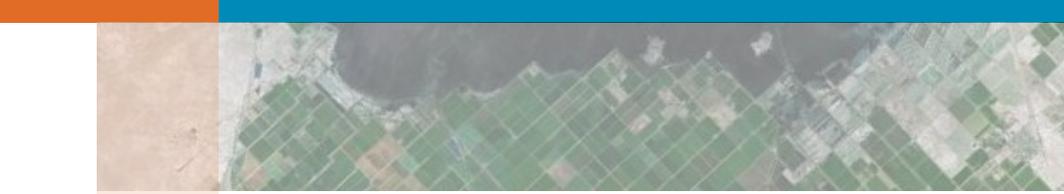
Senior Vice President,
Environmental Working Group

Craig Cox has devoted his working life to conservation since joining the Minnesota Department of Natural Resources in 1977 as a field biologist. In 1989 Craig moved to Washington DC to accept a position as Senior Staff Officer with the Board on Agriculture of the National Academy of Sciences, where he completed three major studies, including *Soil and Water Quality: An Agenda for Agriculture*.

In 1994, he joined the staff of the Senate Committee on Agriculture, Nutrition and Forestry to lead the development of the conservation title of the farm bill that was passed in March 1996. Craig then joined the USDA Natural Resources Conservation Service as a Special Assistant to the Chief and served briefly as Acting Deputy Under-Secretary for Natural Resources and Environment in the Department of Agriculture before moving to Iowa in 1998 to become Executive Director of the Soil and Water Conservation Society.

In August 2008 he joined the Environmental Working Group (EWG). He leads the organization's research and advocacy work in agriculture, renewable energy, and climate change and directs EWG's Midwest office in Ames, Iowa. He has degrees in Wildlife Ecology and Agricultural Economics from the University of Minnesota and is an avid fly fisherman, hunter and hiker.





Panel Discussions

Panel 1: Approaches for mitigating agricultural water contamination in the United States

10:00 - 10:55 am

The United States is one of the world's leading agricultural producers. However, many gains in agricultural productivity over the past half century have come at the expense of surface and groundwater quality. Consequences of freshwater contaminants range from increased water treatment costs to restricted recreational opportunities and harm to human health and aquatic ecosystems. This session will explore the key point and non-point source water contamination issues stemming from agricultural practices in the United States, and will address the questions: What are the most effective practices and policies for reducing contamination without adversely affecting agricultural production? Which stakeholders in watersheds need to be involved in these efforts to make them most effective?

Wayne Castonguay *Ipswich River Watershed Association*

Peter Kleinman *USDA, Agricultural Research Service*

Jonathan Todd *John Todd Ecological Designs, Inc.*

Gregory C. Watson *MA Department of Agricultural Resources*

Moderator: Tim Griffin *Tufts University*

Panel 2: Water, food and conflicting resource needs

11:15 am - 12:10 pm

Throughout history, competition for limited resources has led to conflict. With the global population expected to reach nine billion by mid-century, and global climate change introducing increasing uncertainty into the agricultural sector, competition for food and the resources required to grow it will increase as well. This panel will discuss the economics and political economy of water allocation, and its impacts on development, food security, and political stability, addressing the questions: What role will water play in these conflicts? How can we more efficiently allocate water in order to ensure sufficient food production, while still meeting the needs of competing industries and users? How do these approaches ensure fairness and equity?

John Briscoe *Harvard University*

Muthoni Muriu *Oxfam America*

Peter Walker *Feinstein International Center*

Timothy Wise *Global Development and Environment Institute*

David Zilberman *University of California, Berkeley*

Moderator: William Moomaw *Tufts University*



Panel Discussions

Panel 3: Solutions for sustainable water resource management

1:40 - 2:35 pm

From technological innovation to local stakeholder organization campaigns and international and federal policy initiatives, there are many approaches that can be used for sustainable water resource management. Collaboration, interdisciplinary work, and systems-based thinking are pillars of the WSSS program. This panel will highlight some promising multidisciplinary approaches for reducing water consumption, increasing water use efficiency, and reducing the overall impact of food production on social welfare. This panel will address questions such as: What are some examples from the field of successful interdisciplinary approaches to water resource management? What are the limitations or hurdles to interdisciplinary work, and how should we go about addressing them?

Ujjayant Chakravorty *Tufts University*

Danielle Nierenberg *Food Tank: The Food Think Tank*

Christian Peters *Tufts University*

Kenneth Strzepek *Massachusetts Institute of Technology*

Moderator: Sean Cash *Tufts University*



Panel 1: Mitigating Agricultural Water Contamination



Moderator: Timothy Griffin, PhD

Associate Professor and Director, Agriculture, Food and Environment Program, Friedman School of Nutrition Science and Policy, Tufts University

Dr. Timothy Griffin received his PhD in crop and soil science from Michigan State University. His primary research interest is the intersection of agriculture and the environment, and the development and implementation of sustainable production systems. Additional current research interests include environmental impacts of agriculture, impacts of policy on adoption of agricultural practices and systems, and development and implementation of equitable food systems at the local to regional scales.



Gregory C. Watson

Commissioner, Massachusetts Department of Agricultural Resources

Gregory Watson was sworn in as the Department's 19th Commissioner on April 2, 2012. He also served as Commissioner (1990 to 1993) under then Governors Dukakis and Weld. Commissioner Watson has a long connection to and appreciation of agriculture starting in his childhood where his grandmother tended a vegetable garden and fruit trees and visiting his uncle's working farm in Tennessee. His first hands-on experience with agriculture started in 1978 as he worked with urban community groups and rural farmers to develop a network of six neighborhood-based farmers' markets in Greater Boston. He seeks to expand access to locally grown food across the Commonwealth with emphasis on building robust urban infrastructure solutions.



Peter Kleinman, PhD

Research Leader, United States Department of Agriculture, Agricultural Research Service

Dr. Peter Kleinman is the Research Leader of the USDA Agricultural Research Service's Pasture Systems and Watershed Management Research Unit in State College, Pennsylvania. Dr. Kleinman explores the interactions between land management and landscape processes that control the transfer of nutrients from land to water. His specialty is in the study and management of phosphorus, an element he has pursued from the rainforests of Borneo to the pastoral landscapes of the Chesapeake Bay watershed. He obtained his PhD in Soil Science from Cornell University in 1999. He is a Fellow of the American Society of Agronomy and a Fellow of the Soil Science Society of America.



Panel 1: Mitigating Agricultural Water Contamination



Jonathan Todd

President, John Todd Ecological Design, Inc.

After working as a captain in the Merchant Marines, Jonathan Todd joined his father in founding John Todd Ecological Design. Jonathan began working to integrate his father's natural ecological technologies as they evolved into the company's growing client base. Working with engineers and other project designers, Jonathan helped to bring Dr. Todd's discoveries to a commercial scale. He worked with The Omega Institute to develop the concept for the Omega Center for Sustainable Living. He was lead designer for JTED throughout the design, construction and implementation of this Living Building Challenge and LEED platinum award winning project. Jonathan has been contracted as a consultant for architectural and engineering firms in the design of ecological exhibits, eco-industrial parks, and innovative large-scale water treatment systems. As a personal mission, he has a keen interest in developing sustainable water solutions for refugee populations throughout the world.



Wayne Castonguay

Executive Director, Ipswich River Watershed Association

Wayne Castonguay is the Executive Director of the Ipswich River Watershed Association, an advocacy organization that serves as the voice of the river and works to ensure that there is enough clean water for people and nature. Because of its designation as one of America's most endangered rivers due to environmental impacts, he works in many areas of water policy and management. Previously, he served as Agriculture Program Director for the Trustees of Reservations and General Manager of Appleton Farms, a diversified vegetable and livestock operation and one of the largest farms in Massachusetts. Wayne has an extensive background in municipal and agricultural non-point source pollution and its mitigation. Wayne has a BS in Fisheries and Wildlife Biology and an MS in Oceanography and lives in Ipswich, Massachusetts.



Panel 2: Water, Food and Conflicting Resource Needs



Moderator: William Moomaw, PhD

Professor of International Environmental Policy, Fletcher School of Law and Diplomacy, Tufts University

Dr. William Moomaw is Professor of International Environmental Policy and Director of the Center for International Environment and Resource Policy at The Fletcher School. He received his PhD in physical chemistry at Massachusetts Institute of Technology. Following a 26-year career in science, he began working on climate change and other global issues including water, forests, agriculture and energy. He has

been an author of 5 Intergovernmental Panel on Climate Change Reports including the Renewable Energy and Climate Change Report published in January 2012.



Peter Walker, PhD

Director, Feinstein International Center, Tufts University

After 25 years of field work in humanitarian crises around the world, Dr. Peter Walker was appointed as the Director of the Feinstein International Center. He was instrumental in championing the need to professionalize the disaster response business, developing the global *Code of Conduct for Disaster Relief Workers* and steering the development of the international *Sphere Standards*, a major NGO

and UN collaborative effort to develop universal competence standards in humanitarian assistance. At the Feinstein International Center, Walker is involved in research examining the future global drivers of humanitarian crises, the effectiveness of international humanitarian systems, and the creation of international professional accreditation systems.



Muthoni Muriu

Director for Regional Programs, Oxfam America

Muthoni Muriu provides strategic leadership and management oversight for Oxfam America's Regional Programs Department. In addition to steering policymaking and systems integration, she is responsible for ensuring that Oxfam's regionally based programs are well resourced and have impact on the lives of poor men and women. She has 20 years of experience in international development work and has a passion for social justice issues. She holds a BSc in Politics and

International Relations from the London School of Political Science and Economics and an MSc in Public Policy and Management from the School of Oriental and African Studies, University of London.



John Briscoe, PhD

Gordon McKay Professor of the Practice of Environment Engineering and Environmental Health, Harvard University

Dr. John Briscoe directs the Harvard Water Security Initiative and teaches undergraduate and graduate courses on water management and development. His career has focused on the issues of water, natural resources and economic development. He has worked as an engineer in the government water agencies of South Africa and Mozambique; as an epidemiologist at the Cholera Research Center in Bangladesh; and as a professor of water resources at the University of North Carolina. For 20 years at the World Bank, he held high-level technical positions. He received his PhD in Environmental Engineering at Harvard University and his BSc in Civil Engineering at the University of Cape Town, South Africa.



Timothy Wise

Director, Research and Policy Program, Global Development and Environment Institute

Timothy A. Wise is Director of the Research and Policy Program at the Global Development and Environment Institute, Tufts University, and leads its Globalization and Sustainable Development Program. With a background in international development, he specializes in agricultural policy and rural development. He is involved in ongoing research in the areas of: Sustainable Rural Development, Beyond Agricultural Subsidies, Mexico Under NAFTA, WTO and Global Trade. He is the former executive director of Grassroots International, a Boston-based international aid organization. He holds a Masters in Public Policy from Tufts' Urban and Environmental Policy and Planning Department.



David Zilberman, PhD

Professor, Department of Agriculture and Resource Economics, University of California Berkeley

Dr. David Zilberman holds the Robinson Chair in the Department of Agriculture and Resource Economics at UC Berkeley. He is also co-director of the Center for Sustainable Resource Development in the campus' College of Natural Resources. Dr. Zilberman's areas of expertise include agricultural and environmental policy, biotechnology, bioenergy and climate change, and the economics of innovation, risk, marketing, water, and pest control. He is a fellow of the American Agricultural Economics Association and won the association's Quality of Communication Award and Outstanding Review of Agricultural Economics Article in 2007. He received his BA in economics and statistics at Tel Aviv University, Israel, and his PhD at UC Berkeley.



Panel 3: Solutions for Sustainable Water Resource Management



Moderator: Sean Cash, PhD

Associate Professor, Friedman School of Nutrition Science and Policy, Tufts University

Dr. Sean B. Cash is Associate Professor in the Agriculture, Food and Environment program in the Department of Food Policy and Applied Nutrition. His research focuses on how food, nutrition, and environmental policies affect both producers and consumers. He also conducts research in the areas of environmental regulation and resource conservation, including household valuation of water system improvements in Mexico. Additionally, Dr. Cash has been involved extensively in policy and public-facing work, including testimony on childhood obesity interventions to the Canadian Parliament and service on a National Academy of Sciences panel on invasive species impacts of food trade.



Danielle Nierenberg

Co-Founder, Food Tank: The Food Think Tank

Danielle Nierenberg is an expert on sustainable agriculture and food issues. She recently spent two years traveling to more than 35 countries across sub-Saharan Africa, Asia, and Latin America meeting with farmers and farmers' groups, scientists, researchers, policymakers, government leaders, students, academics, and journalists, collecting their thoughts on what's working to help alleviate hunger and poverty, while also protecting the environment.

Her knowledge of global agriculture issues has been cited widely in more than 3,000 major publications. Danielle served as the Director of the Food and Agriculture program at the Worldwatch Institute. She also worked for two years as a Peace Corps volunteer in the Dominican Republic.

Christian Peters, PhD

Assistant Professor, Friedman School of Nutrition, Tufts University

Dr. Christian Peters is an Assistant Professor within the Friedman School of Nutrition Science and Policy at Tufts University. He studies the land requirements of human dietary patterns and the capacity for food needs to be met through local and regional food systems. His work builds on his graduate and postdoctoral research, which focused on developing geospatial modeling approaches for mapping potential foodsheds for New York State. With funding from the W. K. Kellogg Foundation, Dr. Peters is adapting these approaches to other states (Michigan, Mississippi, New Mexico) and the conterminous U.S.



Panel 3: Solutions for Sustainable Water Resource Management



Kenneth Strzepek, PhD

Research Scientist, Massachusetts Institute of Technology

Dr. Kenneth Strzepek is a Research Scientist at MIT's Joint Program on the Science and Policy of Global Change and Professor Emeritus of Civil, Environmental and Architectural Engineering at the University of Colorado. He is also Senior Research Associate at the UNU-World Institute for Development Economics Research. He has spent over 30 years as a researcher and practitioner at the nexus of engineering, environmental and economics systems. His work includes applications of operations research, engineering economics, micro-economics and environmental economics to a broad range of applications: from project scale to national and global investment policy studies. He was a Arthur Maass-Gilbert White Fellow at the Institute for Water Resources of the US Army Corps of Engineers and received the Department of Interior Citizen's Award for Innovation in the Applications of Systems Analysis to Water Management. He is also co-recipient of the Zayed International Prize for the Environment and, as a lead author for IPCC, he is a co-recipient of the 2007 Nobel Peace Prize.



Ujjayant Chakravorty, PhD

Professor of Economics, Tufts University

Dr. Ujjayant Chakravorty is Professor of Economics at Tufts University and Fellow at the Toulouse School of Economics and CESifo. He was previously Professor and Canada Research Chair at the University of Alberta and has also taught at Emory University. He has worked on the economics of fossil fuels and clean energy and the economics of water resources. His current work includes developing a theory of groundwater depletion in India and China, and modeling the supply of nuclear power and the effect of biofuel mandates on food prices and poverty. He has been visiting professor at Sorbonne and the Graduate School of International Studies at Geneva. He is on the Editorial Board for the Journal of Environmental Economics and Management, Resource and Energy Economics and Environmental Economics and Policy Studies. He is Co-Editor of the book "India and Global Climate Change." Dr. Chakravorty has a BS in Civil Engineering from IIT Delhi and a PhD in Resource and Environmental Economics from the University of Hawaii.



Alternative Perspectives

Annawon Weeden

Member, Mashpee Wampanoag Tribe

Currently, Massachusetts has some of the most innovative low impact development (LID) techniques for regulating stormwater runoff in the country. However, in spite of conservation and restoration goals that commonly aim to recreate the water quality and hydrology of watercourses in pre-settlement conditions, these environmental management efforts seldom examine pre-colonial land and water management practices. What did pre-colonial New England look like? The Mashpee Wampanoag, along with other indigenous tribes of the region, valued water and food production in very different ways than we do now. What can we learn from these practices to improve our agricultural water management practices in New England today?



Annawon is an enrolled member of the Mashpee Wampanoag tribe who devotes his time to preserving the history and culture of his people while sharing it with the world. His work can be found throughout many museums, books, school curriculums and other areas of teaching. Annawon has made appearances on The History Channel, The Discovery Channel, and most recently he portrayed the role of Metacom, or “King Phillip” for the PBS *We Shall Remain* series. He is a proud father of five and works to improve the world which all children will inherit.



Student Poster Session

Improving water access in rural Uganda

Marisa Simmons, Kevin Han, Michelle Chen, Massachusetts Institute of Technology; Helen D'couth, Harvard Medical School

Diesel-powered submersible pump for improved groundwater irrigation in eastern India

Emily Gorbaty, Massachusetts Institute of Technology

Water planning and climate change in the Northeast and the Southwest

An Pham, Erin Baker, Jenna Marquard, Casey Brown, UMass Amherst

Permeability of electrospun mats under pressure driven flow

Simon Choong, Philip Reiser, Matthew Mannarino, Greg Rutledge, Massachusetts Institute of Technology

Electrochemical carbon nanotube network: Kinetics as a function of mass transport

Han Liu, Chad Vecitis, Harvard University

Do increasing concentrations of triclosan assist bacteria to become chlorine tolerant?

Danielle Byer, Bridgewater State University

New topology for two-wire intelligent irrigation systems

Steve Shoap, Massachusetts Institute of Technology

Phasing out the sale of bottled water and installing water bottle filling stations at WPI

Britney Atwater, Frank Ascoti, Mark McCabe, Nick Rallis, Worcester Polytechnic Institute

Accuracy and usability of free chlorine residual testing methods

Anna Murray, Dr. Daniele Lantagne, Tufts University

Water: Systems, Science, and Society (WSSS): Spring 2013 Aida refugee camp practicum

Ayah Badran, Jennifer Bogle, Aniela Czajkowski, Amy Hunter, Megan Keegan, Matt Simon, Tufts University

Arsenic speciation and groundwater chemistry at Shepley's Hill Landfill, Devens, Massachusetts

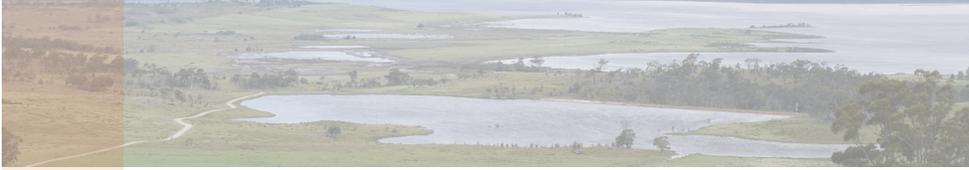
Brendan Hildum, Boston College

A hindcast comparing field observation of the response of the Souhegan River to dam removal with simulations of the Dam Removal Express Assessment Model-1

Maricate Conlon, Noah P. Snyder, Boston College

Removal of endocrine disrupting compounds and pharmaceuticals from water by sorption onto graphene particles

Nan Cai, Philip Larese-Casanova, Northeastern University



Student Poster Session

Temporal and spatial associations between meteorological factors, water quality and enteric infections in South India

Alexandra Kulinkina, Dr. Elena N. Naumova, Tufts University; Vinohar Blaraj, M. Venkata Raghava, Christian Medical College

Nanostructured chitosan-cinnamaldehyde materials inactivate microbes

Katrina A. Rieger, Nathaniel M. Eagan, Jessica D. Schiffman, UMass Amherst

Chitosan:pectin assemblies: Engineering green nanoparticles and hydrogels

Nathan P. Birch, Elena P. Pandres, Jessica D. Schiffman, UMass Amherst

Isotopic and hydrogeochemical assessment of groundwater quality of Punjab and Haryana, India.

Vijaya Jyoti, Ellen Douglas, Robyn Hannigan, University of Massachusetts Boston

Temporal trends in snowmelt runoff in New England

Shabnam Rouhani, Dr. Ellen Douglas, Dr. Crystal Schaaf, University of Massachusetts Boston

Precipitation-based flood early warning system in the Manafwa River basin for the Uganda Red Cross Society

Francesca Cecinati, Fidele Bingwa, Yan Ma, Massachusetts Institute of Technology

Spatial correlation of high-density animal production and gastrointestinal hospitalizations among the elderly: an exploratory analysis

Graham Jeffries, Alexander Liss, Dr. Elena Naumova, Tufts University

Statistical bias correction and GCM bias stationarity over the contiguous United States

Caitlin Spence, Casey Brown, UMass Amherst

Decision making under uncertainty: Managing an urban water utility for an uncertain future

Margaret Garcia, Shafiqul Islam, Tufts University

PipeGuard: A new in-pipe leak detection system

Dimitris Chatzigeorgiou, You Wu, Dalei Wu, K. Youcef-Toumi, Massachusetts Institute of Technology

Predicting coastal dead zone size: a statistical approach using GIS

Austin Nijhuis, Boston College

SPME as a replacement for liquid-liquid extraction in the processing of water samples to cut back solvent use

Scott Gorman, Bridgewater State University

Quantifying the relationship between external N loading and export to/ from lakes and reservoirs

Xiaodan Ruan, Ferdi Hellweger, Northeastern University

The Niger Inner Delta: Systems model representations

Mehmet Umit Taner, Katherine Lownsbery, UMass Amherst



Water: Systems, Science and Society

WSSS

An Interdisciplinary Research and Education Program
for Graduate Students at Tufts University

About the Program

"In the 21st century we have to develop an integrated approach across the disciplines to understand the complexity of water issues worldwide." -Rita R. Colwell

To meet this challenge, Tufts University established the Water: Systems, Science and Society (WSSS) Graduate Interdisciplinary Certificate Program. The purpose of the WSSS program is to provide the interdisciplinary perspectives and tools to manage water related problems around the world.

For more information about the program, courses, and research areas, please visit www.tufts.edu/water

Water Resources Research Center

WRRC

Supporting Research, Education, and Outreach on
Water Resources Issues

Mission

The Massachusetts Water Resources Research Center (WRRC) is a center within the Environmental Institute whose mission is to support research, education, and outreach on water resources issues of state, regional, and national importance as part of the national system of institutes authorized under the Water Resources Research Act of 1964.

The Center encourages an interdisciplinary approach to resolving state and regional water problems and has involved the University system and many other Massachusetts colleges and universities in Center research.

For more information, please visit: www.umass.edu/tei/wrrc



Symposium Organization

2013 Symposium Student Organizing Committee

The 2013 Organizing Committee is comprised of students from Tufts University in the Department of Civil and Environmental Engineering, Friedman School of Nutrition Science and Policy, Department of Urban and Environmental Policy and Planning and the Fletcher School of Law and Diplomacy.

Glennon Beresin	Margaret Kurth
Noah Cohen-Cline	Kate McMahon
Lauren Cole	Jessica Morrison
Laura Crossley	Kate Olson
Franklin Crump	Lesley Pories
Meghan Flanagan	Laura Read
Stephanie Galaitsis	Anne Sexton
Gabrielle Gareau	Gabrielle String
Jory Hecht	Jeff Walker
Elliot Hohn	Adam Weinberg
Elisabeth Holden	Ruiruo Wu
Yudan Jiang	Shuo Zhao

WSSS Faculty Steering Committee

John Durant, Department of Civil and Environmental Engineering
Timothy Griffin, Friedman School of Nutrition Science and Policy
Rusty Russell, Department of Urban and Environmental Policy and Planning

WRRRC Staff

Paula Rees, Director
Marie-Françoise Hatte, Associate Director

Tufts Institute of the Environment Staff

Emily Geosling, Program Coordinator
Antje Danielson, Administrative Director



Acknowledgements

The 2013 Symposium Student Organizing Committee would like to extend their gratitude to those whose support and participation has been essential:

All speakers and panel participants

Student poster presenters

WSSS students and participating faculty

Emily Geosling

Poster session judging volunteers

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