



Reuse In Rhode Island
a state-based approach to complex exposures



SUPERFUND TRAINING CORE

Core Director: Agnes B. Kane, M.D., Ph.D., Department of Pathology and Laboratory Medicine

NIEHS P42 ES013660-07



Goals and Objectives

- To provide a unique interdisciplinary didactic, research, and community engagement experience for Brown University undergraduate and graduate students and postdoctoral research associates.
- To inspire our students to pursue advanced training in environmental sciences and engineering with the goals of prevention and remediation of industrial and environmental pollution through partnerships with communities, public agencies, universities, and industry.

Specific Aim 1

To develop and implement a sequence of didactic courses, workshops, and laboratory experiences related to environmental contaminants, human health effects, and rehabilitation of Brownfield and Superfund sites.

- Environmental Technologies and Human Health (BIOL 2840/EN 2920)*
- Environmental Health and Disease (BIOL 1820)
- Human Reproductive Biology and Toxicology (BIOL 2840)
- Cancer Biology (BIOL 1290)
- Topics in Cancer Biology (BIOL 2840E)
- Small Wonders- Science, Technology and Human Health Impacts of Nanomaterials (EN 2920/BIOL 2840)
- Human Health, the Environment, and Public Policy (BIOL 28401)*
- Instrumental Analysis with Environmental Applications (CHEM 1660/GEOL 1660-S01)
- Chemical and Transport Processes in the Environment (EN 2910L)
- Environmental Ethics Workshop (Spring 2011 and 2012)*

*required of all Superfund trainees

Specific Aim 2

To organize interdisciplinary research teams of undergraduate, graduate students, and postdoctoral research associates based on the biomedical and engineering research projects supported by this Superfund Basic Research Grant.

- Gene Expression Changes in the Testis Following X-Radiation and 2,5-Hexanedione Exposure (Natasha Catlin, Sarah Champion, Devin Koestler, Kim Boekelheide)
- Biological Behavior of Graphene-Family Materials (Yang Qui, Agnes Kane, Robert Hurt)

Specific Aim 3

To provide opportunities for field work, community outreach, and communication.

- Yijun Yao, Vapor Intrusion Gorham Site, Providence, RI
- Rui Shen, Analysis of Field Data, Somerville, MA
- David Ciplet, Sociology Graduate Student



Dioxins
TCE, PCE
Metals (Pb, Cd, Cu, As)
SVOCs: PAHs
PCBs

October 28, 2011: The Environmental Protection Agency issued a proposed \$101 million cleanup plan for the Centredale Manor Superfund site in North Providence. David Ciplet has been working with local community groups and councils related to toxic waste and Superfund sites in Rhode Island.

Community Environmental College

Create a shared knowledge base about environmental justice issues in the community and provide opportunities for teaching. This is an eight week summer program for local high school students.



Success Stories

- Former postdoctoral research associate and state agency liaison, Kelly Pennell, Ph.D. is Assistant Professor of Engineering at the University of Massachusetts at Dartmouth.
- Former graduate student trainees in academia:
 - Elizabeth Hoover, Ph.D. Assistant Professor, American Studies, Brown University
 - Jillian Goldfarb, Ph.D. Assistant Professor, Chemical Engineering, University of New Hampshire
 - Laura Senier, Ph.D. Recipient of the Karen Wetterhan Award in 2008 and Assistant Professor of Community & Environmental Sociology and Family Medicine, University of Wisconsin.
 - Alison Cohen, M.P.H. Ph.D. student, University of California at Berkeley
 - James Rice, Ph.D. Postdoctoral Research Associate and state agency liaison, Brown Superfund program
- Former graduate student trainees in industry:
 - Xinyuan Liu, Ph.D. Materials Chemist, Corning Incorporated

Success Stories

Banyan Environmental Inc., *Science for Sustainability*
One Davol Square, Providence, RI



Love Sarin '05, '10, PhD, CEO, Founder and President of Banyan Environmental, Inc.

Ruben Spitz, '09, ScM, Research Engineer

Robert Hurt, PhD, Co-Founder and Chief Scientific Advisor

Impact in Rhode Island and Future Directions



- Revive the Rhode Island economy and provide new jobs in nanotechnology and environmental remediation.
- RI Consortium for Nanoscience and Nanotechnology (RIN2): enhance human resources and research infrastructure.
- Help Rhode Island make the transition from traditional manufacturing to a knowledge-based economy.

DARTMOUTH SUPERFUND RESEARCH PROGRAM

TRAINING CORE

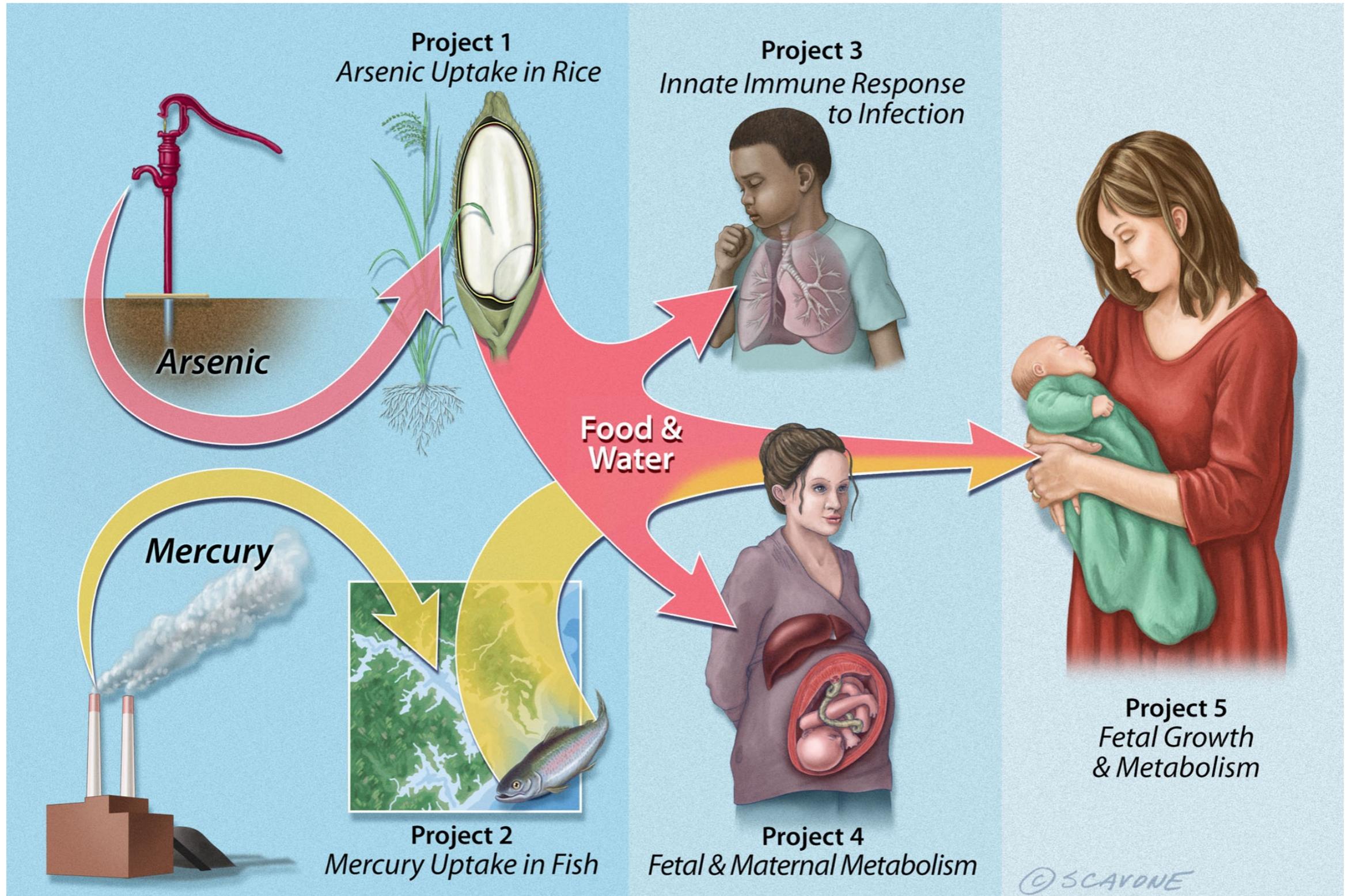
Bruce A. Stanton, Ph.D., Core Leader

Tracy Punshon, Ph.D., Co-Leader



GEISEL
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MEDICINE
AT DARTMOUTH

“Sources and Protracted Effects of Early Life Exposure to Arsenic and Mercury”



Our overarching goals are to understand whether, and to what extent, pregnant mothers and their offspring are uniquely sensitive to low-dose As and Hg exposure leading to long-term deleterious health consequences, to develop innovative models for understanding the fetal basis of adult disease as it relates to *in utero* As and Hg exposure, and to integrate this knowledge with other mechanistic information, and with exposure assessment information to understand the effects of As and Hg on human health.



OVERARCHING GOALS OF TRAINING CORE

- The Training Core (TC) supports interdisciplinary training activities in environmental health sciences for graduate students and postdoctoral fellows and directs their progression to independence.
- The activities organized by the TC are designed to provide unique interdisciplinary training and research experiences and to develop leaders in the field of environmental health who effectively communicate with a broad spectrum of audiences.

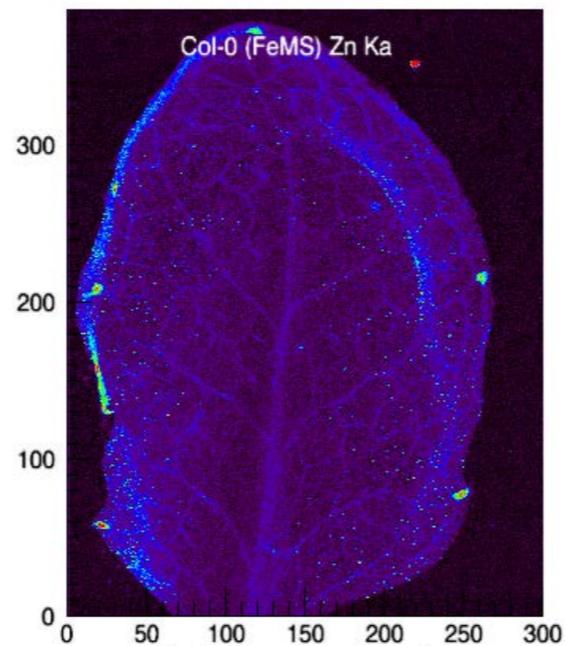
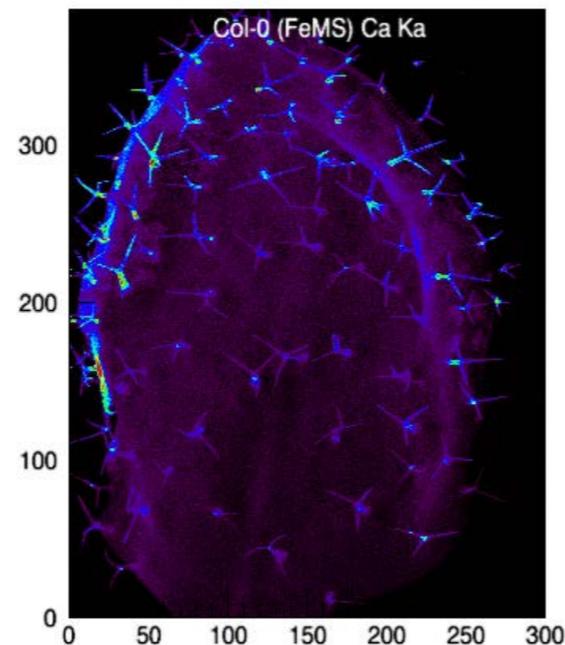
UNIQUE TRAINING CORE ACTIVITIES

- Workshop I: “Synchrotron X-ray Microprobe Analysis in Environmental and Life Sciences”
- Workshop II: “Applied Bioinformatics”
- Workshop III: “Lab Management and Leadership Skills”
- “Superfun Day”



“Synchrotron X-ray Microprobe Analysis in Environmental and Life Sciences”

- This new one-week course is the result of a long-term collaboration between the Dartmouth SRP and the National Synchrotron Light Source (Brookhaven National Laboratory, Upton, NY) formalized in the previous grant period.



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“Synchrotron X-ray Microprobe Analysis in Environmental and Life Sciences”

- The course is taught by Drs. Tracy Punshon (Dartmouth) and Tony Lanzirotti (U. Chicago), and includes a research visit to the NSLS hard X-ray microprobe beamline X26A at Brookhaven National Laboratory, during which trainees will operate a synchrotron beamline, analyze materials prepared as part of their research projects, and learn how to analyze and interpret data.



Dr. Tracy Punshon



Dr. Antonio Lanzirotti

- Available to all SRP trainees.



“Applied Bioinformatics”

- This course was developed at the suggestion of our External Advisory Committee for trainees in the environmental sciences who have little to no experience in bioinformatics.
- Goal: to provide hands-on bioinformatics training for biologists and environmental scientists. Available to all SRP trainees.
- October 4-9, 2012.
- Mount Desert Island Biological Laboratory, Bar Harbor, Me
- Tuition subsidized by Dartmouth SRP and travel funds may be requested from the SRP.

http://www.mdibl.org/courses/Applied_Bioinformatics/434/



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“Lab Management and Leadership Skills”

- Two day workshop for advanced GSs and PDs-in collaboration with Trainees / SRP Training Core PIs / NIEHS / SRPs – 2013.
- Responsive to the SRP goal of training the next generation of leaders in the Environmental Sciences.
- Topics to include:
 - Personality and Leadership Styles
 - Lab Management and People Management
 - Building a Successful Research Program
 - Time Management
 - Conflict Resolution and Reduction
- Available to all SRP trainees.



“Superfun Day”

- Idea for “Superfun Day” emanated from our monthly lunch with trainees and faculty. Lunch meetings enhance and encourage program participation.
- The annual “Superfun Day” is a day-long retreat for trainees and faculty focused on enhancing interdisciplinary research, leadership and career development. Talks / posters / dinner.
- In 2009 the topic was Careers in Environmental Sciences. The keynote speaker was Lt. Colonel Curt Thalken (Ret), CO of the Army Core of Engineers in Iraq and New England, and who is now a Vice President of Normandeau Engineering, an environmental consulting firm that works on Superfund sites.
- In 2012 the topic is Community Engagement.
- Trainees from the Brown, Columbia, Dartmouth, Harvard, and Northeastern SRPs are invited.
- Karen Wetterhahn Environmental Scholar Award is given to the trainee(s) who conduct outstanding interdisciplinary research and who take a leadership role in communicating this research to our stakeholders and communities.



SUMMARY OF GOALS OF TRAINING CORE

- Provide a unique inter- and multi-disciplinary education in the environmental sciences.
- Train scientists to effectively communicate with a broad spectrum of audiences.
- Develop leaders in the environmental sciences.
- To these ends we offer a “standard set of courses and learning experiences” as well as four novel learning experiences, including workshops on:
 - “Synchrotron X-ray Microprobe Analysis in Environmental and Life Sciences”
 - “Applied Bioinformatics”
 - “Lab Management and Leadership Skills”
 - “Superfun Day”

