

Superfund Research Program e-Posted Notes

SRP Annual Meeting Special Edition

E-POSTED NOTES SPECIAL EDITION: 2017 SRP ANNUAL MEETING

SRP Annual Meeting a Success

The NIEHS SRP marked its 30th anniversary at the 2017 SRP Annual Meeting Dec. 6-8 in Philadelphia. More than 350 SRP researchers, administrators, trainees, and partners from across the nation came together to share findings and discuss their experiences.

This special edition e-Posted Notes newsletter provides a recap of sessions, photos, and other moments throughout the week in Philadelphia. Thanks to everyone involved in the SRP Annual Meeting, and a special thanks to the hosts from the University of Pennsylvania SRP Center, for making it such a success!

For a broad overview of the meeting, visit the [NIEHS Environmental Factor](#).

CELEBRATING 30 YEARS OF THE SRP

Welcoming Grantees

The meeting kicked off with remarks from members of the University of Pennsylvania community. Penn SRP Center Director **Ian Blair** thanked everyone for attending and introduced **J. Larry Jameson**, the dean of the Penn Perelman School of Medicine, and **Steven J. Fluharty**, the dean of the Penn School of Arts and Science. Jameson emphasized how the SRP themes align with the ideals of Penn's founder, Benjamin Franklin, and the importance of using basic science to improve public health. Fluharty described the importance of promoting collaboration and looking across schools and disciplines to fuel innovation and solve challenges.



Meeting attendees listen intently to the opening speakers. (Photo courtesy of the Penn SRP Center)

In an opening message delivered via video, NIEHS and National Toxicology Program Director **Linda Birnbaum** praised SRP as a problem-solving program that produces tangible results. According to SRP Director **Bill Suk**, as the SRP celebrates 30 years, this meeting focused on how fundamental research has stimulated knowledge, research translation, and training activities.

Recounting Memories from 30 Years of the Program

Before the meeting, grantees were encouraged to send in their old photos and SRP milestones or bring them to the meeting to add to the

timeline. Old and new grantees loved going through the timeline and learning about big events from the program over the last 30 years. During breaks, attendees enjoyed the photo slideshow, which included photos of SRP grantees and staff over the years.

The timeline included programmatic changes to the program, pictures of important meetings, Center kick-off photos, and community engagement events. It also included information about significant scientific advancements over the years and key publications that have helped move the environmental health field forward.

Thanks to everyone who contributed to the timeline and slide show. We enjoyed looking back at these memories!



Part of the “30 years of the Superfund Research Program” timeline featured at the meeting. Attendees brought photographs, notecards, and publications for significant milestones throughout the SRP’s 30-year history. (Photo courtesy of the Penn SRP Center)

KEYNOTE SPEAKERS DESCRIBE IMPORTANT RESEARCH ADVANCES

Joseph Shaw: Mapping the Chemosphere

Joseph Shaw, a former SRP postdoc at Dartmouth and current assistant professor at Indiana University, described his work that seeks to proactively reveal which chemicals are prevalent in our environments, how we are exposed to them, and how they affect our health. Building on important discoveries in genomics, metabolomics, and chemical detection, and with increased computational power, he aims to create a systems approach to chemical testing and monitoring. According to Shaw, this approach will help identify patterns in data within the chemical world that may reveal threats to human health and may enable industries to innovate toward safer and more sustainable products.



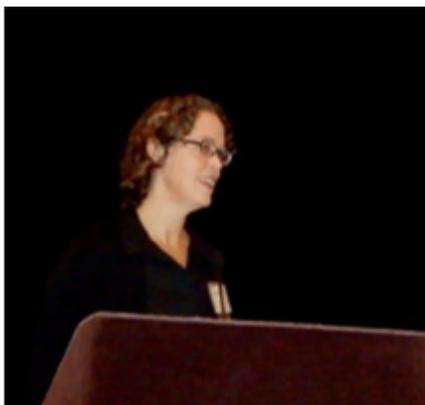
Shaw described how worldwide, our indoor and outdoor environments are increasingly saturated with chemicals, producing the “chemosphere” in which we live. (Photo courtesy of the Penn SRP Center)

Sarah Tishkoff: Genomic Adaptation to Diverse Environments in Africa

Penn Professor **Sarah Tishkoff** described her work studying how different populations in Africa have adapted to diverse environments. She is looking at genomic differences and the potential role of the environment in these differences. They have found differences in susceptibility to tuberculosis, diabetes, hypertension, and resistance to malaria. There are also large differences in lifestyle factors such as diet, urban/rural dwelling, and subsistence farming in these populations. They are working to integrate genetic and environmental factors in more robust analyses. Tishkoff shared how European bias in genome studies of disease is a challenge and how her work seeks to address this bias by studying indigenous populations in Ethiopia, Tanzania, and other parts of Africa. She also emphasized the importance of returning results to study participants.

Madeleine Scammell: Transdisciplinary Research in Response to Mesoamerican Nephropathy

Madeleine Scammell, who began her work with the Boston University Community Engagement Core (CEC) as a graduate student, now leads the Boston CEC and recently received an NIEHS Outstanding New Environmental Science (ONES) Award. She described her ongoing ONES award research on the roles of heat stress, heavy metals, and herbicide exposures on the risk of developing chronic kidney disease among agricultural workers in El Salvador, where death rates from the disease are very high. With funding from Nicaragua, she is also extending her work to a population of agricultural workers there. Because of rapidly growing mortality rates of chronic kidney disease of unknown origin in Central America, Scammell is investigating potential environmental links. Her hypothesis is that a combination of herbicides, heat stress, and arsenic may be contributing to this epidemic.



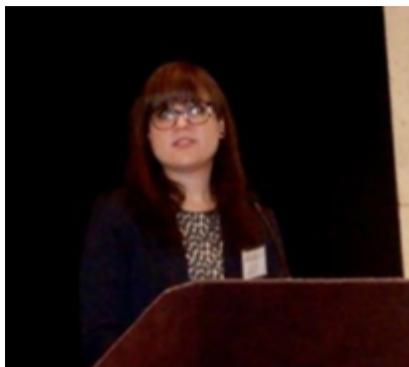
Scammell discussed how her current research is influenced by her experiences in the SRP throughout the years. (Photo courtesy of the Penn SRP Center)

MAIN MEETING SESSIONS: SCIENTIFIC INNOVATIONS

Session 1: Understanding Environmental Exposures Using Big Data Approaches

In the first scientific session, SRP-funded researchers described how they are using and interpreting large amounts of data to better understand sources and potential health effects of environmental chemicals.

- UC Berkeley researcher **Daniel Nomura** explained how his team has pioneered the use of chemoproteomic technologies to map targets of widely used environmental chemicals across the proteome to identify proteins that might not be typical toxicological endpoints, but have downstream impacts in the body.
- **Andrew Morris** from the University of Kentucky described his work using lipidomics that linked increases in hepatic lipid synthesis to an increased risk of hepatic steatosis and associated co-morbidities, including cardiovascular diseases in individuals exposed to polychlorinated biphenyls (PCBs).
- UC Davis graduate student **Gabrielle Black** discussed her work to profile contaminants and identify endocrine-active compounds from various consumer products in sewage sludge using target, suspect, and non-target analytical approaches.
- **Jennifer Guelfo**, a postdoctoral research fellow at Brown University, described how she is using a geospatial framework to identify possible sources of per- and polyfluoroalkyl substances (PFASs) in groundwater by leveraging publicly available data.
- **Kathryn Demanelis**, a postdoc at the University of Chicago, shared her findings suggesting that differences in DNA methylation from exposure to arsenic may be important indicators of arsenic toxicity.



Demanelis uses data from the Health Effects of Arsenic Longitudinal Study (HEALS) cohort in Bangladesh. (Photo courtesy of the Penn SRP Center)

Session 2: Fundamental Research for Innovation and Environmental Health

In the second session, SRP grantees emphasized how fundamental research has stimulated

knowledge and generated innovation in environmental health science research.

- University of Iowa graduate student **Eric Uwimana** explained his work suggesting that specific forms of the human cytochrome P450 enzyme play an important role in the oxidation of neurotoxic PCBs to hydroxylated metabolites in humans, which are also potentially toxic to the developing brain.
- Penn graduate student **Ralph Pietrofesa** described how the molecule LGM2605, a synthetic counterpart to a component of flaxseed, reduced damage from copper-based nanoparticles in mouse cells, supporting its possible use in preventing toxicity in airways induced by copper-based nanoparticles.
- **Tess Leuthner**, a graduate student at Duke University, used genomics approaches to investigate DNA differences in water fleas exposed to cadmium and found differences at certain DNA sites that may explain variability in cadmium sensitivity.
- UC San Diego postdoc **Reginald McNulty** explained his research to understand the structure and mechanism of toxicant-induced NLRP3 inflammasome activation, which is a major mediator in toxicant-induced disease and cancer.
- Using data from the National Health and Nutrition Examination Survey, Columbia University graduate student **Anne Nigra** described her work to estimate potential health outcomes after the EPA lowered maximum levels of arsenic in 2006. She estimated that the decrease in arsenic exposure was equivalent to a reduction of 200 to 900 lung and bladder cancer cases per year.

Session 3: Environmental Impacts in Ecosystems

In session 3, SRP grantees described how research they are conducting enhances the ability to assess or predict the damage that hazardous substances can cause to ecosystems. In addition to understanding the effects on wildlife, these findings can lead to an improved understanding of the impact of hazardous substances on human health.

- Woods Hole Oceanographic Institute researcher **Mark Hahn** discussed how population genomics and genome editing can be used to understand the genetic mechanisms of adaptation to polluted environments.
- Duke University graduate student **Jordan Kozal**, who described her work in fish on metabolic plasticity and thermal stress response capacity from exposure to Benzo(a)pyrene, found that multi-generational impacts can be observed after a single exposure event.
- **James Minick**, a graduate student at Oregon State University, described the model he developed using passive sampling measurements to predict polycyclic aromatic hydrocarbon (PAH) levels in butter clams, a traditional food source for Native populations.
- University of Maryland, Baltimore County graduate student **James Sanders** described his work developing and testing a novel equilibrium passive sampling technique to measure methyl mercury in sediment and pore waters.
- University of Arizona postdoc **Aditi Sengupta** laid out an approach to understand patterns of microbial community diversity in soils, which may be used to develop predictive estimates of how microbial communities respond to contaminants over spatiotemporal scales.



Attendees peppered presenters with thought-provoking questions. Shown here, University of Kentucky researcher Dibakar Bhattacharyya asks a question. (Photo courtesy of the Penn SRP Center)

Session 4: Contaminant Fate and Transport

In the fourth session, SRP-funded researchers discussed their work to better understand how

contaminants move through the environment and how they may be detected or removed from water and soil to protect human health.

- **Livia Capaldi**, a Dartmouth College graduate student, described how mercury may be released from floodplains, and how this information provides insight into the total flux of mercury within a local and regional ecosystem.
- Columbia University graduate student **Athena Nghiem**, explained her work investigating how a method that forms magnetite to capture arsenic, which has been shown to work in the lab, may be scaled up into the field to remove arsenic from groundwater.
- **Ali Seiphoori**, a University of Pennsylvania postdoc, discussed his work determining the factors that affect whether asbestos fibers may be mobilized and move through water or soil.
- Johns Hopkins University graduate student **Steven Chow** shared how he is working with a dual-biofilm reactive barrier to degrade chlorobenzenes in a model column system.
- Northeastern University postdoc **Renee Wurth** discussed a project she worked on in California to use spatial water system and school data to create visual reports on water quality and share her findings with relevant stakeholders.

Session 5: Emerging and Re-emerging Superfund Issues

In session 5, SRP-funded researchers discussed their work to address concerns from both newly emerging and legacy contaminants.

- **Jennifer Horney**, Texas A&M researcher and CEC leader, discussed efforts to sample and test for chemicals in Houston neighborhoods following Hurricane Harvey and the need to improve the understanding of exposure risks resulting from the hurricane.
- **Wendy Heiger-Bernays**, Research Translation Core (RTC) leader and researcher from Boston University, explained work identifying the New Bedford Harbor Superfund site as a source of PCBs in nearby air and efforts with the community to understand their risks from exposure.
- Using zebrafish, **Alicia Timme-Laragy**, a Karen Wetterhahn Award alumna who is now at the University of Massachusetts Amherst, described her work linking embryo malformation and effects on the pancreas to perfluorobutane sulfonic acid (PFBS), a major substitute of PFOS.
- Harvard researcher **Diana Ceballos-Ochoa** shared findings that surfaces at electronics recycling sorting and refurbishing facilities were positive for metals such as lead, including surfaces in the dining area, suggesting the need for regular and effective surface cleaning.
- **Sara Flanagan**, a graduate student at Columbia University, discussed her project to promote testing private wells for arsenic and found that targeting specific areas using personally-relevant outreach materials succeeded in motivating testing among many households.



Timme-Laragy received the ninth annual Karen Wetterhahn Memorial Award in 2006, when she was a doctoral student at Duke University. (Photo courtesy of the Penn SRP Center)

Session 6: Advances in Determining Susceptibility to Superfund Contaminants

Session 6 highlighted SRP-funded researchers working to understand why the same exposure to contaminants may lead some people to get sick while others do not.

- Michigan State University graduate student **Peter Dornbos** described how he used a population of genetically diverse mice to identify genetic modulators of

2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) -induced immunotoxicity and found that a specific gene plays a protective role against TCDD-mediated immunosuppression.

- **Michael Petriello**, a postdoc at the University of Kentucky, found that mice exposed to dioxin-like PCBs showed increased diet-derived Trimethylamine N-oxide (TMAO), a marker of cardiovascular disease risk. He also found links between TMAO and exposure to multiple dioxin-like pollutants in a human population in Anniston, Alabama.
- **Jessica Laine**, a postdoc from the University of North Carolina at Chapel Hill, discussed her work to determine whether nutrients involved in one-carbon metabolism, such as vitamin B12, folate, and homocysteine, influence arsenic metabolism and birthweight.
- Dartmouth College graduate student **Kevin Hsu** explained his findings suggesting that mice exposed in utero to arsenic from maternal drinking water exhibit enhanced inflammatory and immunopathologic responses to influenza A infection as adults.
- University of Pennsylvania postdoc **Juliette Aka** described her work to better understand the roles of estrogens and androgens in malignant mesothelioma.



From left, Dornbos with session moderators Peter Raynor and Nishad Jayasundara. (Photo courtesy of the Penn SRP Center)

HIGHLIGHTING AND REWARDING TRAINEE SUCCESSES

Wetterhahn Award: Angela Gutierrez

The SRP selected Angela Gutierrez of the University of Kentucky as the 20th recipient of the annual Wetterhahn Memorial Award. Gutierrez is pursuing her doctoral degree under the mentorship of Zach Hilt and Thomas Dziubla. She was recognized for her innovative research to develop magnetic nanoparticles coated with polyphenols from plants. The nanoparticles are designed to capture and remove PCBs from water. Read more about Gutierrez and her research in the [NIEHS Environmental Factor](#).

KC Donnelly Award Talks

The scientific presentations, described above, included talks from the [2016 KC Donnelly Externship Award winners](#), who described their experiences and results from an SRP-funded externship at another SRP Center or at a federal or state agency. The trainees described interesting and innovative research they could perform as a result of the KC Donnelly Award.

Graduate Student Poster Winners

The graduate student poster competition provided an opportunity for SRP graduate students to explain their research and showcase innovative findings. Congratulations to the four students who received awards in the annual poster competition.



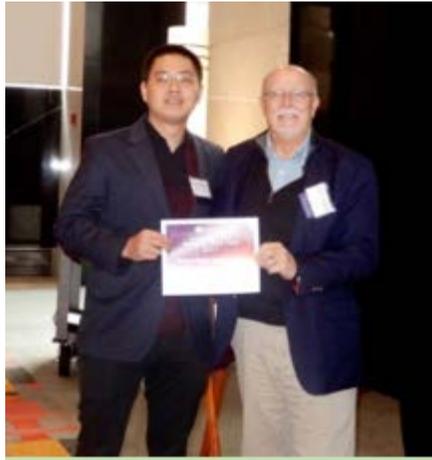
Gutierrez, right, with NIEHS Division of Extramural Research and Training Director Gwen Collman, left, and her advisor, Hilt, center. (Photo courtesy of the Penn SRP Center)

In the environmental sciences and engineering category, the winners were:

- Stephanie Kim, Boston University
"Application of digital gene expression to identify adipogenic gene signatures of environmental metabolism-disrupting chemicals"
- Hongyi Wan, University of Kentucky
"Understanding the role of Fe/Pd nanoparticles in functionalized membrane systems for PCB degradation"

In the health sciences category, the winners were:

- Kelly Fader, Michigan State University
"Dioxin increases bone density in male and female mouse femurs"
- Meichen Wang, Texas A&M University
"Development of broad-acting entero-sorbents for the mitigation of Superfund chemicals and mixtures during emergencies and natural disasters"



Wan, left, received his poster award from SRP Director Suk. (Photo courtesy of the Penn SRP Center)

Congratulations to the 2017 poster winners! And thanks to everyone who presented a poster during the meeting. It was great to hear about the wonderful research in the program.

A SPOTLIGHT ON RESEARCH TRANSLATION AND COMMUNITY ENGAGEMENT

BoRit Superfund Site Comes to Philadelphia

As part of the RTC and CEC satellite meeting, Penn SRP and their partners provided a snapshot of the experience of living near and working with the Ambler BoRit Superfund site.

- Penn SRP Center CEC Director **Ted Emmett** kicked off the session with the history of the site and a description of the remediation approaches and community concerns over the years.
- **Bob Adams**, co-chair of the BoRit Community Advisory Group (CAG), discussed the role of the CAG throughout the process and how they have worked with EPA to make decisions about the site. According to Adams, the Penn SRP Center brought additional resources and expertise to the CAG.
- **Sharon Vargas**, a resident of West Ambler and former business owner, as well as a co-chair of the BoRit CAG, provided more of the community perspective. She emphasized the importance of taking other concerns and stressors, such as increased cost of living in the area, into consideration when looking at community concerns surrounding a Superfund site.
- Agency for Toxic Substances and Disease Registry (ATSDR) Regional Director **Lora Werner** described the effect of extreme weather on the site as well as her experience with the community and the importance of making connections across programs.
- Whitpain Township Commissioner **Fred Conner** discussed action plans moving forward and how they hope to make the best use of this land and revitalize it for community use.



Vargas, who was raised in West Ambler, provided an excellent community perspective on the issues and concerns from the community. (Photo courtesy of the Penn SRP Center)

In addition to the excellent session about the issues and actions surrounding the BoRit site,

RTC/CECs also got a taste of what it was like to live in Ambler during its industrial past. As part of the RTC/CEC dinner, attendees viewed three entertaining and thought-provoking one-act plays that were inspired by oral histories from Ambler and written by some of Philadelphia's top playwrights. The plays explored issues of public health, environmental justice, community, and land use in the Superfund community of Ambler.

Disaster Preparedness and Public Health Challenges

RTC/CEC satellite meeting talks also focused on disaster preparedness and highlighted NIEHS efforts to prepare and respond to disasters. Talks emphasized how SRP infrastructure has enabled grantees to hit the ground running in response to environmental disasters.

- **Carmen Milagros Velez Vega**, the Northeastern SRP Center CEC leader at the University of Puerto Rico, described their team's efforts to address basic needs in Puerto Rico after Hurricane Maria. She stressed how important networks, collaborations, and allies have been to face the aftermath of the disaster.
- Texas A&M SRP CEC leader **Jennifer Horney** described their engagement and outreach with communities after the Houston area was hit by Hurricane Harvey.
- NIEHS Senior Medical Advisor **Aubrey Miller** provided an overview of the NIEHS Disaster Research Response (DR2) program. DR2 is building a repository of tools for scientists to use following disasters, including a protocol that can be easily tailored to reduce the time to initiate data collection.
- **Joseph Hughes**, director of the NIEHS Worker Training Program (WTP), provided an overview of the WTP and their efforts to train workers who respond to environmental disasters. He also shared lessons learned from disasters and keys to disaster preparedness.



From left, Hughes; Miller; Horney; Vega; and Phil Brown, Ph.D., spoke during the RTC/CEC program session on disaster preparedness. (Photo courtesy of the Penn SRP Center)

Introduction to the Translational Research Framework

As part of the RTC/CEC satellite meeting, NIEHS Health Science Administrator **Kristi Pettibone** introduced the NIEHS translational research framework as a way to assess the translational nature of a research project. The framework reflects grantee input and builds on previous NIH models that focus on improving health via clinical strategies. To ensure broad applicability, it includes environmental health prevention strategies, mechanistic and epidemiological research, engineering strategies, clinical research, community engagement, and policy. The framework is an approach to track and describe research as it moves through the translational research spectrum from fundamental to applied.

Advancing Risk Communication Panel

In a joint session with trainees, RTC, and CEC members, attendees heard about strategies and lessons learned in communicating risk of environmental contaminants to communities.

- EPA Superfund and Technology Liaison **Jonathan Essoka** discussed the importance of involving communities early and often in the process of cleaning up hazardous substances at sites. He described efforts at the EPA Office of Research and Development to engage and

connect with regions to meet their needs and strengthen work with communities and partners.

- Discussing her project to encourage homeowners with private wells to test their water for arsenic, Columbia trainee **Sara Flanagan** explained how no single message will work for everyone. She also discussed how it is important to understand barriers to action to improve communication to encourage that action, such as arsenic testing.
- **Tracy Carluccio**, the deputy director of the Delaware River Keeper Network, emphasized an informed public is a key asset and necessary for open discourse and that getting to know the community is important. She added that disclosing research findings helps educate the public, build trust, and helps to enable change.
- **Dan Romer**, the research director at the Penn Annenberg Public Policy Center, described the importance of creating messages that resonate with people. He discussed the challenge of communicating risk in a way that generates an emotional response to something that is theoretical or may not occur until much later in the future.



Carluccio, left, and Essoka, center, with Penn SRP Center RTC leader Rich Pepino, the moderator of the risk communication session. (Photo courtesy of the Penn SRP Center)

TRAINING FUTURE SCIENTIFIC LEADERS

Overview of Trainee Satellite Meeting

A special trainee program featured sessions on scientific writing and public speaking. It also introduced trainees to diverse professional career tracks and provided networking opportunities with SRP trainee alumni. **Lisa B. Marshall**, a communications professional, provided tips on giving effective scientific presentations. **Judith Swan** of Princeton University focused on the importance of writing from a reader's perspective and explained the importance of effective scientific communication.

SRP trainee alumni participated in the career panel and the professional introduction and networking session. These sessions provided trainees with an opportunity to learn about the different avenues they can take after graduate school including positions in academia, government, industry, and nonprofit organizations.

A special thank you to the SRP alumni who participated: **Kate Buckman**, Dartmouth College; **Elena Craft**, Environmental Defense Fund; **Andres Cardenas**, Harvard University; **Vanessa De La Rosa**, Silent Spring Institute; **Nishad Jayasundara**, University of Maine; **Roxanne Karimi**, Stonybrook; **Courtney Kozul-Horvath**, Novartis; **Bradley Newsome**, NIH/NHLBI; **Kathleen Radloff**, Gradient Inc.; **Monica Ramirez-Andreotta**, University of Arizona; **James W. Rice**, Gradient Inc.; **Vivien Taylor**, Dartmouth College; and **Alicia R Timme-Laragy**, University Massachusetts, Amherst.



As part of the professional introduction and networking session, trainees sat at different tables based on their career interests. Each table included SRP alumni who could talk to them about that career field. (Photo courtesy of the Penn SRP Center)

Poster Sessions Facilitate Collaboration

As part of the meeting, more than 150 SRP graduate students, postdoctoral researchers, and principal investigators presented groundbreaking SRP-funded research. In addition to work from the SRP Centers (P42), SRP grantees with individual research projects (R01) and occupational and safety training education programs (R25) presented during the poster session. Visit the [SRP Annual Meeting Full Program](#) for a list and abstracts for each poster.



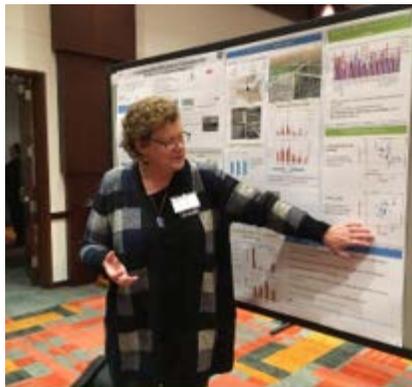
Attendees filled the poster session halls to learn more about SRP research. (Photo courtesy of the Penn SRP Center)

On Wednesday, the RTC and CECs had a separate poster session to showcase their work related to recent accomplishments in research translation and community engagement. There was also an R01 poster preview on Wednesday afternoon, which featured work by the individual research project grantees. These sessions provided a more focused time for the groups to learn about others who are doing related work and facilitated collaborations between the projects and cores.

Productive Exchanges Between Grantees and Partners

Throughout the meeting, attendees met new people and were enthusiastic about the scientific exchange fostered by the gathering. In addition to SRP-funded grantees, representatives from the EPA and local community partners also participated.

SRP grantees held breakout meetings during lunch throughout the week to catch up with colleagues. For SRP Center Administrators, a satellite meeting enabled them to get to know one another and NIEHS staff, and to learn about new NIEHS guidelines.



Cindy Gilmour at the R01 poster preview. (Photo courtesy of Heather Henry)



From left, Dartmouth College SRP Center Director Bruce Stanton, Blair, Northeastern SRP Center Director Akram Alshawabkeh, and Penn SRP Center Deputy Director Trevor Penning, led the scientific planning committee. (Photo courtesy of the Penn SRP Center)