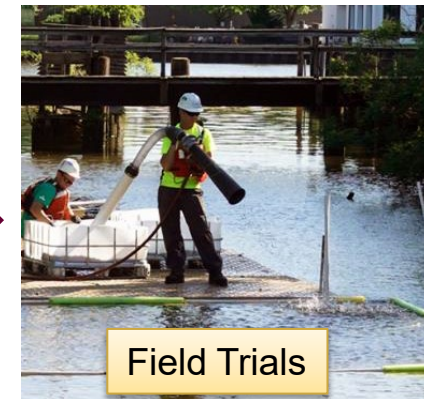
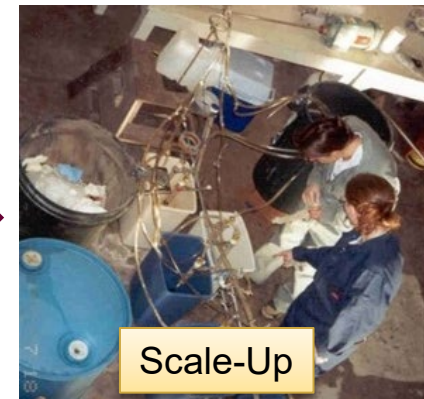
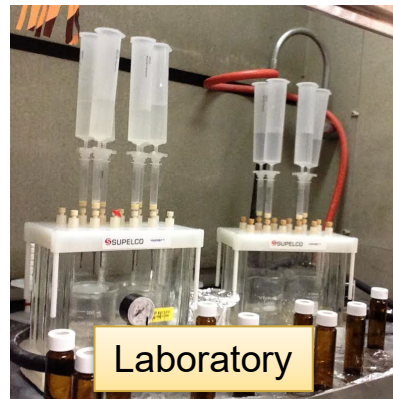




NIEHS Superfund Research Program (SRP) Research Translation and Technology Transfer Activities

Heather Henry, Ph.D.
Superfund Research Program
National Institute of Environmental Health Sciences (NIEHS)

FRTR Fall Meeting November 8, 2022



SRP Funding Mechanisms Advertise in TechDirect Newsletter and Funding Opportunity Webinars

Multi-Project Centers (P42)

Designed to integrate basic and application-oriented research across disciplines:

- Biomedical and Environmental Science and Engineering research.
- Community Engagement, Research Translation, Data Science, and Training.

OPENING April 2023

[Spring 2023 Webinar](#)

Small Business Research Grants (SBIR) (R43-44 and SB1)

Commercializing technologies relevant to hazardous substance clean-up and monitoring.

OPEN

[August 2022 Webinar](#)

Individual Research Projects (R01)

Bioremediation and materials science grants for emerging contaminants and mixtures.

Closed 2020

[Spring 2022 Webinar](#)

Time-Sensitive Grants (R21)

Research on unpredictable events with a limited window to collect samples or data. **OPEN**

Occupational Training (R25)

Emerging issues in EHS training. Closed 2020

ViCTER (R01) Virtual Consortium for Translational Transdisciplinary Environmental Research for cross-disciplinary research. **OPEN**

Conference Grants (R13)

Funding for conferences related to SRP mandates. **OPEN**

Supplement Awards

Opportunities limited to current grantees for trainee externships, diversity supplements, and technology transfer for SBIRs etc.

Who We Fund...

- Search Grantees (by area of research, key words, site work)



reporter.nih.gov

NIH RePORTER

Quick Search

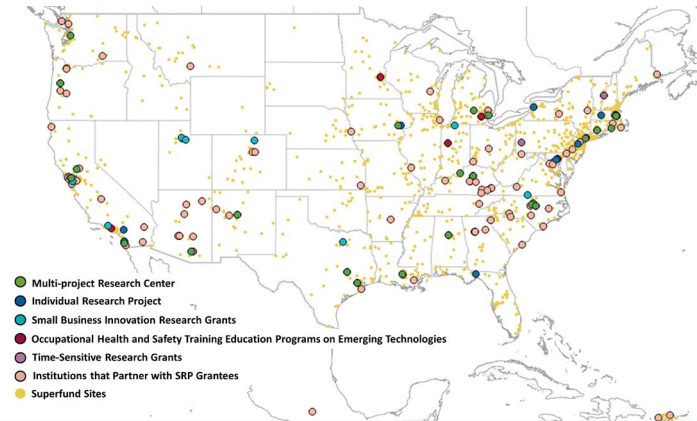
Search RePORTER

Welcome to the NIH RePORTER

Active Funding by State

Active Projects by Institute/Center

<https://reporter.nih.gov/>



<https://tools.niehs.nih.gov/srp/sites/www.cfm>

SRP Search Tools

Superfund Research Program

The SRP has five tools to help you learn more about the projects and researchers funded by the Program. Refer to the [Search Tips](#) page for additional information.

These tools search only the SRP webpages and databases. For NIEHS-wide searches, please use the NIEHS search tool, located in the white page banner at the top of any NIEHS webpage.

Table of Contents

Keyword Search

The Keyword Search allows you to search SRP content by entering keyword(s), phrases, or names into

<https://tools.niehs.nih.gov/srp/search/index.cfm>

NIH National Institute of Environmental Health Sciences

Health & Education | Research | Funding Opportunities | Careers & Training | News & Events | About NIEHS

Research

Table View

Superfund Research Program

Multiproject Center Grants (P42)

Number of rows to display: 10 20 All

Grantee	Project	Funding	City	State

Information on locations of hazardous waste sites and SRP grantees is [available for download!](#)

SRP Research Grant Portfolio and NIH Grant Process

Investigator Initiated

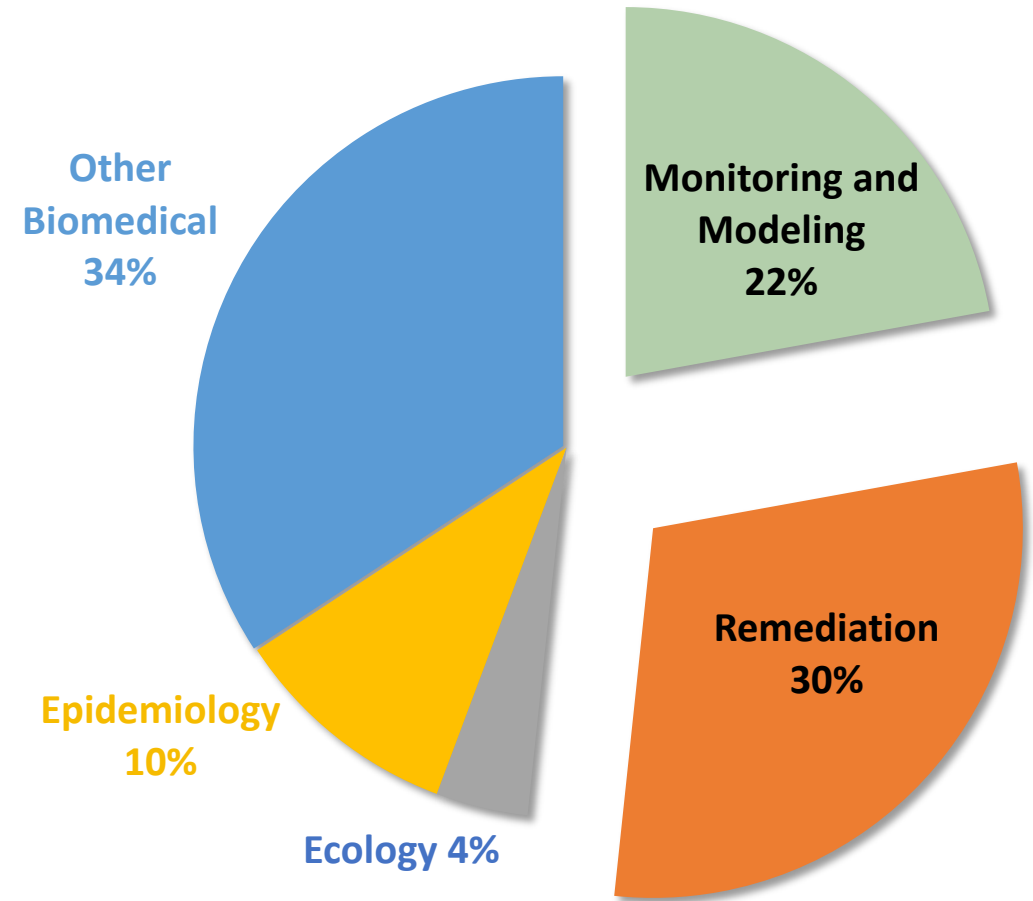
- Stakeholder-input for Funding Announcements
- Applicant has flexibility to prioritize aims they think are important
- Working on Superfund Site is not required

Encourage Practical, Sustainable Approaches

- Low carbon footprint, reduced waste generation, practical for adoption by impacted communities, resilient to climate change
- Cost competitive (review element for SBIRs)

Promising *Innovative* Technologies

- Integrating omics to optimize bioremediation, machine learning to tailor design of novel sorbents/filters, nanotechnology-based sensors and treatment approaches



150 Projects

Technology Readiness and Research Translation

Technology Readiness Level

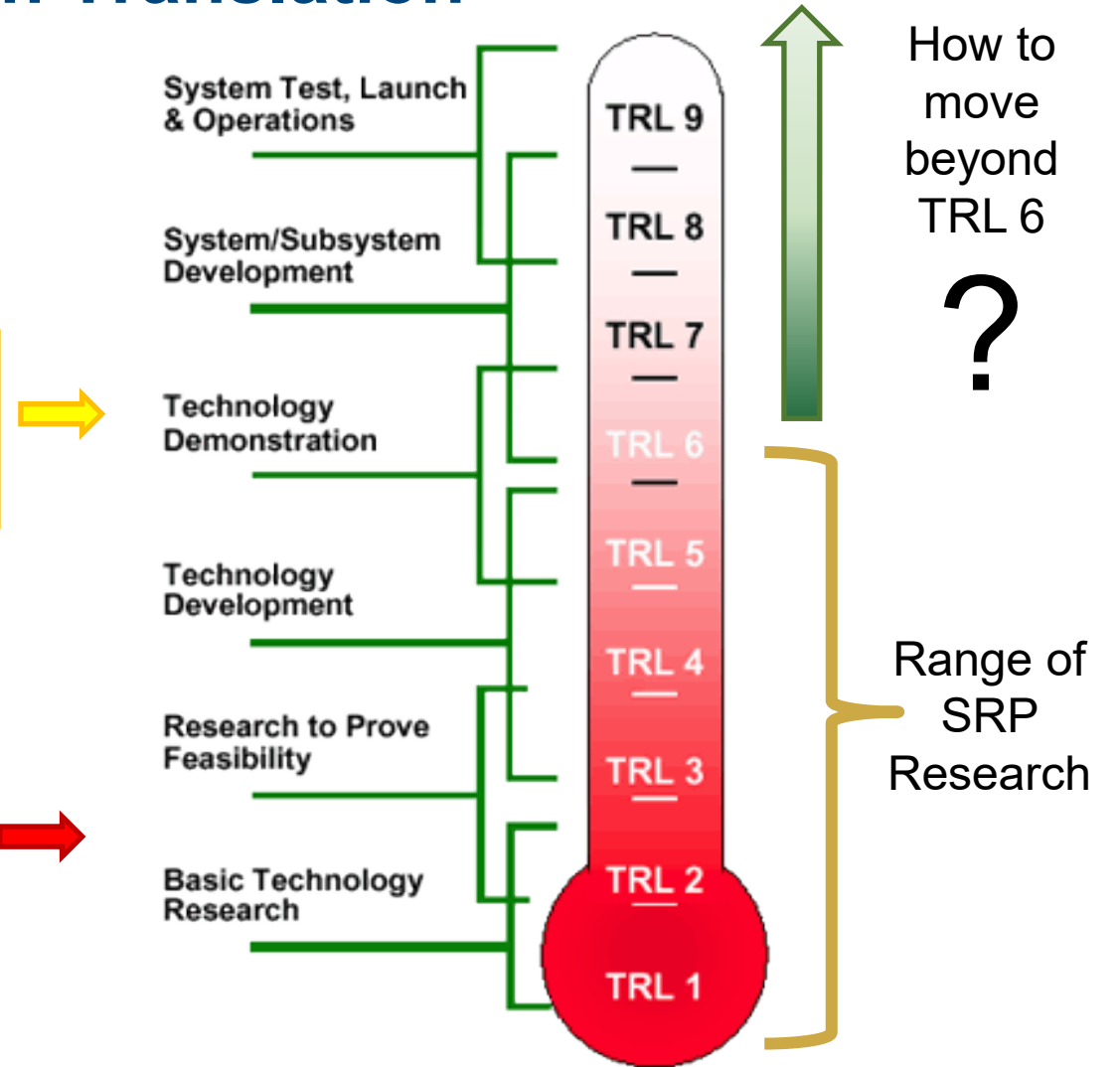
- SARA Mandates say “basic research and training”
- Generally between TRL 1 and TRL 6

Research Translation: All applicants required to include plans for moving science to end-users

- Identifying industry / government liaison to advise during technology development
- Communication strategies
 - Publications
 - Other media (web-based, flyers, press releases)
- Gaining access to a site or site samples
- Data sharing requirement

TRL 6 – Technology Demonstration (e.g. SBIRs)

TRL 1 – Basic Principles Observed and Reported



Additional Research Translation Efforts

- SRP Centers Research Translation / Data Sharing
 - Research Translation Coordinators: tailor a plan for each project to establish partnerships with government, technology transfer, and broad communication plans
<https://tools.niehs.nih.gov/srp/outreach/outreach2.cfm>
 - Data Management and Analysis Cores: identify appropriate database / sharing platforms for research data
- Small Business Grantee Opportunities
 - Application Assistance Program – help in getting application in for SBIR
 - I-Corps (customer discovery) supplement to grantees
 - TABA Funding – technical and business assistance consulting
 - Commercialization Readiness Program (Ph II “plus”) - \$200K for 2 years manufacturing / production to prepare for scale-up

Limitations - Grants are not “deliverables-based”

Funding for Tech Transfer – Generally, must use funds already committed to the grant (no new \$)

Tracking Period – limited annual reporting, no tracking permitted after grant ends

Multi-Project Research Translation Coordinators

Example: Connecting Vapor Intrusion Modeling Expertise with Rapid/Mobile Detection Device at Reg 9 Plume

- UK SRP Center and [Entanglement Technologies](#) worked together with EPA Region 9 to merge an innovative rapid TCE detection technology with conceptual modeling expertise.
- Partnership resulted in [publication](#) on alternative pathways for intrusion; improvements in portability of the real-time TCE VI monitor prototype.



Research Translation and Technology Transfer – What We Do...

- Promoting Awareness of Grantees and Their Successes

RISKeLearning




YouTube



Research Translation and Technology Transfer – What We Do...

Monthly Research Brief (and podcast)




NIH
NIEHSSRP

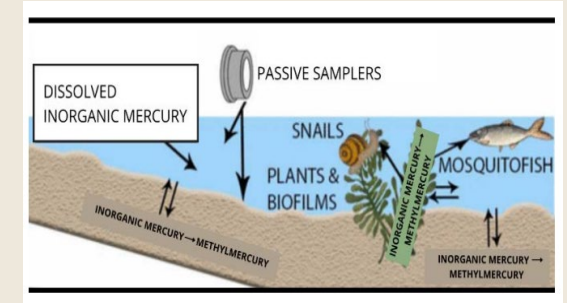
NIEHS Superfund Research Program - Research Brief Podcasts
NIEHS Superfund Research Program

Science
★★★★★ 5.0 • 2 Ratings

[Listen on Apple Podcasts ↗](#)



- [Improving How Microbes Break Down PFAS](#)
- [Sampling Device May Predict Methylmercury Accumulation in Wetlands](#)



RISK e-Learning Webinar Series



RISK eLearning

- [Climate Change and Health](#)
- [Risk Communication to Reduce Exposures and Improve Health](#)



Science Digest: Quarterly Summary of Findings

June 2022 Past Issue

Superfund Research Program Science Digest
Balancing Scientific Excellence with Research Relevance

Director's Letter Features Science Leadership Hot Off the Press Technology Profile

- **Features** “Technology Profile” overview of innovative remediation or detection device
- **Recent Feature:** QBI machine learning water sensor

Technology Profiles
Superfund Research Program

Below is a list of recent SRP grantee Technology Profiles featured in the [Science Digest](#)

Quantitative BioSciences, Inc.: Customizable continuous water monitoring
September 2022

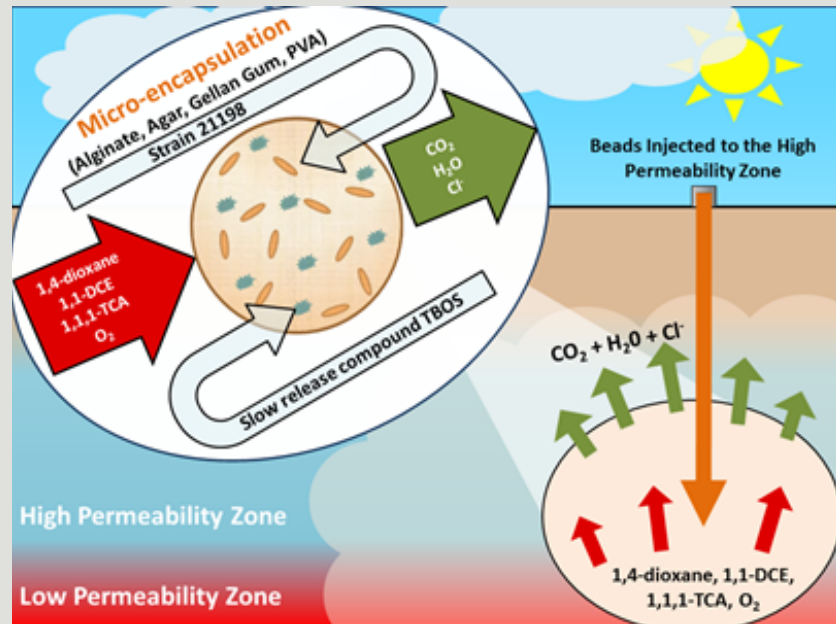
Quantitative BioSciences, Inc., has developed a customizable sensor to continuously monitor water for arsenic, mercury, and cadmium, among other contaminants. A Business Innovation Research Grant from the NIEHS Superfund Research Program supported early work on the device.

https://www.niehs.nih.gov/research/supported/centers/srp/science_digest

Research Translation and Technology Transfer – What We Do...

Progress in Research Webinars: Engaging with end-users early in research process

Spring 2022: [Utilizing Innovative Materials Science Approaches to Enhance Bioremediation](#)



Semprini (OSU): Bacteria encapsulated in hydrogel beads

Spring 2023: Featuring [newly funded Multi-project Centers \(P42s\)](#)!



UNM SRP Center researchers address metals exposure on Tribal lands

See all: <https://www.niehs.nih.gov/research/supported/centers/srp/events/inprogresswebinar/index.cfm>

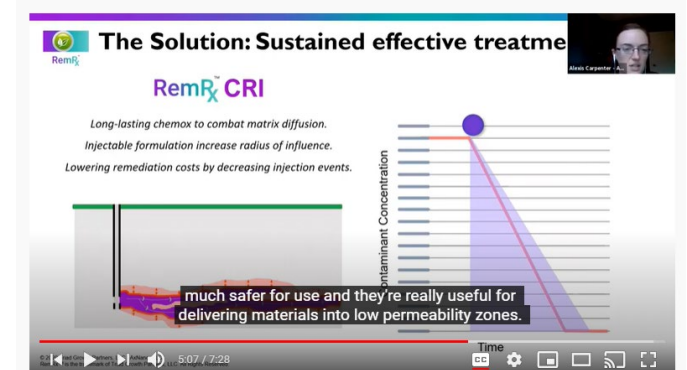
Research Translation and Technology Transfer – What We Do...

- **Virtual Technology Fairs:** Showcase of Small Business Grantees – 5 min webinar briefings with end-users, archived on YouTube (Dec 2020)



**NIEHS Virtual Technology Fair for Small Business Grantees
(Remediation and Detection Technologies)**

- 1 **AxNano: Chlorinated Solvent Remediation – NIEHS Virtual Technology Fair (December 2020)**
NIEHS
7:29
- 2 **Bluegrass Advanced Materials: Poly- and Perfluorinated Substance Remediation**
NIEHS
9:06
- 3 **CycloPure: Poly- and Perfluorinated Substance Treatment – NIEHS Virtual Technology Fair**
NIEHS
10:55



The Solution: Sustained effective treatment

RemRx CRI

Long-lasting chemox to combat matrix diffusion.
Injectable formulation increase radius of influence.
Lowering remediation costs by decreasing injection events.

much safer for use and they're really useful for delivering materials into low permeability zones.

5:07 / 7:28

AxNano: Chlorinated Solvent Remediation – NIEHS Virtual Technology Fair (December 2020)
YouTube Video Shorts: SBIR Grantees

Research Translation and Technology Transfer – What We Do...

Tweets



Amplifying grantee messages, publications, press releases through SRP and NIEHS Twitter Accounts



https://twitter.com/srp_niehs?lang=en

Technology Innovation News Survey

CLU-IN | In The News | Technology Innovation News Survey

Technology Innovation News Survey Entries for September 1-15, 2022

Market/Commercialization Information

ENHANCED AQUIFER RECHARGE PERFORMANCE AND POTENTIAL RISK IN DIFFERENT REGIONAL AND HYDROGEOLOGIC SETTINGS

EPA Office of Science Advisor, Policy and Engagement, Office of Research and Development
Funding Opportunity EPA-G2022-STAR-J1, 2022

The U.S. Environmental Protection Agency (EPA), as part of its Science to Achieve Results (STAR) program, is seeking applications proposing research to improve understanding of fit-for-purpose uses and risks to advance the scientific and technical foundation of enhanced

- Market/Commercialization Information
- Cleanup News
- Demonstrations/Feasibility Studies
- Research
- General News
- Recent Issues
- Archives Database
- Subscribe
- Download This Issue in PDF

Recent SRP Feature: DIRECT INJECTION ANALYSIS OF PER AND POLYFLUOROALKYL SUBSTANCES IN SURFACE AND DRINKING WATER BY SAMPLE FILTRATION AND LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY

Sending publications of interest to OSRTI for consideration in their communication products (TINS)



<https://clu-in.org/products/tins/>

Technology Transfer Successes



Steam Vapor Extraction



Sedimite and Rembac

35 Year Anniversary



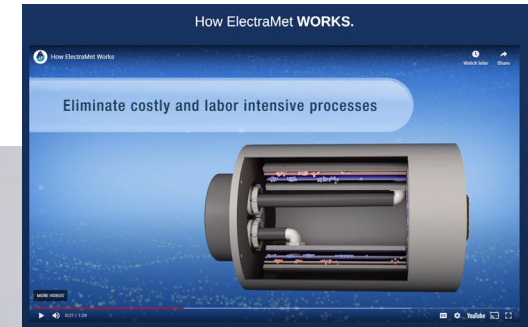
New Covid Mask



MyExposome Personal Monitor



Picoyune Mercury Sensor



ElectraMet Lead Removal



NanoAffix Lead Sensor

Public Health Impact Stories:

<https://www.niehs.nih.gov/research/supported/centers/srp/phi/index.cfm>

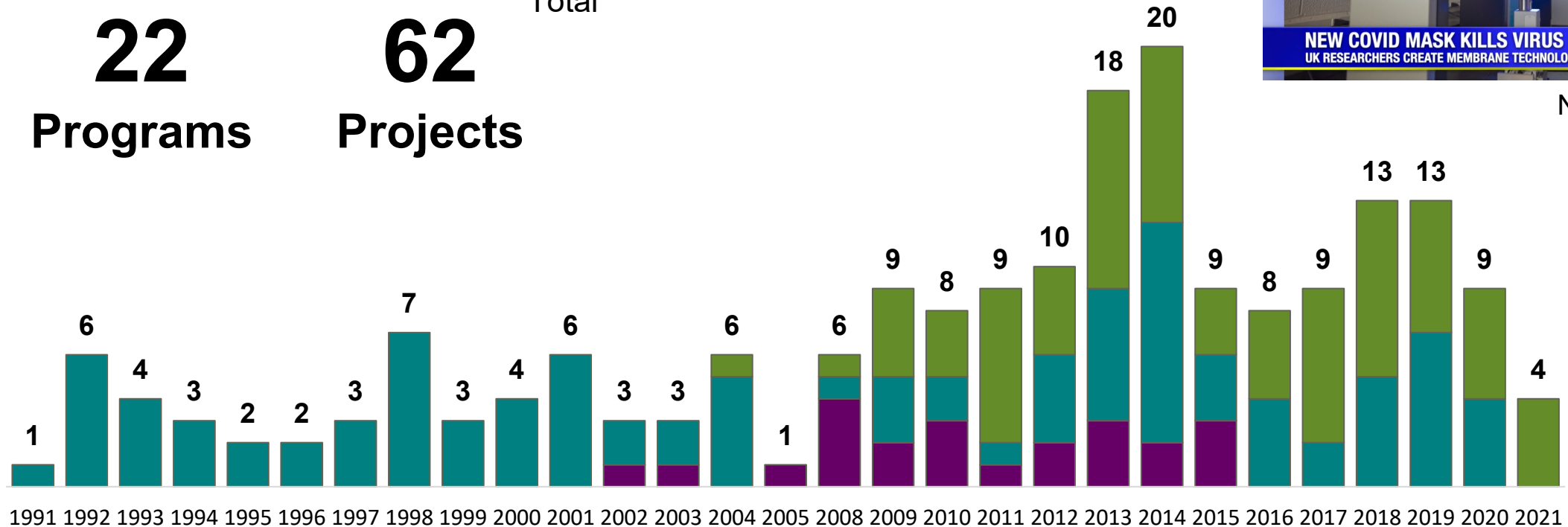
Patents for SRP-related work

196
Patents

22
Programs

62
Projects

■ Pending
■ Issued
■ Expired
Total



• [Antiviral Mask and Antiviral Filter Made from a Breathable Microporous Polymeric Membrane](#)
 • **Number:** 63/034,057, **Year:** 2021, **Authors:** Bhattacharyya, D., R. Mills, Y. Wei, J.T. Hastings, T.D. Dziubla, R.J. Vogler



New Covid Mask

Picoyune (Jay James)

Technology:

- Gold nanoparticle-based **portable mercury analyzer** for on-site measurement of soil, water, and air

Basic Research:

- UC Berkeley SRP Center

Small Business Grant:

- R44ES032383
- SBIR Phase II: 2022-2023



<https://picoyune.com/>

Statera Environmental (Damien Shea)

Technology:

- Composite Integrative **Passive Sampler to measure thousands** of organic chemicals in water

Basic Research:

- NCSU SRP Center

Small Business Grant:

- R43ES030662
- SBIR Phase I: 2019-2020



<https://statera.org/>

MyExposome (Kim Anderson)



Technology:

- Silicone wristband **personal passive samplers**
- Untargeted analysis of thousands of chemicals

Basic Research:

- Oregon State University SRP Center



<https://www.myexposome.com/>

Glycosurf (Chett Boxley)

Technology:

- Microbially produced surfactants to filter out **metals from acid mine drainage**
- **Basic Research:**
- Arizona SRP Center

Small Business Grant:

- R44ES031897
- SBIR Phase II: 2022-2023

Bluegrass Advanced Materials (Angela Gutierrez)

Technology:

- “Smart” temperature responsive, polymer **flocculant to remove PFAS** from contaminated water

Basic Research:

- UK SRP Center

Small Business Grant:

- R43ES032380
- SBIR Phase I: 2020-2021

RemBac (Craig Amos)

Technology:

- **Activated carbon pellets** w/ microorganisms for contaminated sediments

Basic Research:

- UMBC R01 (Ghosh)

Small Business Grant:

- R43ES032365
- Phase I: 2020-2021

GLYCOSURF™

<https://www.glycosurf.com/>



<http://www.bgamaterials.com/>



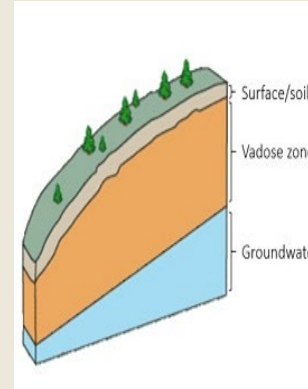
<https://www.rembac.com/>

Economic Savings: 5 SRP-Funded Technologies, Over \$100 Million Savings



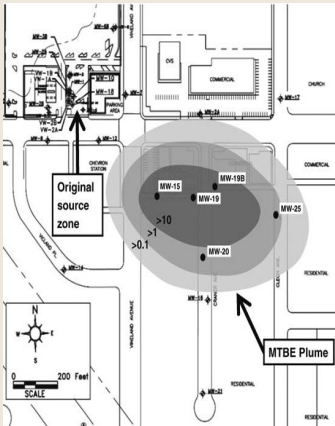
UC Berkeley (Udell)

- Steam injection for groundwater remediation
- Total cleanup decreased from 3,000 years to **4 years**
- Resulted in an estimated **\$50 million** in savings



U Arizona (Brusseau)

- New methods to predict contaminant movement; evaluate effectiveness of remediation
- Decreased work needed at U.S. DOE Hanford site in Washington state, **saving estimated \$6.35 million**



UC Davis (Scow)

- Enhancing bioremediation of MTBE in groundwater
- Decreased contaminant concentration from $>100,000$ ppb to **<1 ppb** in North Hollywood, CA
- **\$14–\$21 million** in savings; allowed re-injection of water



UW (Gordan, Newman)

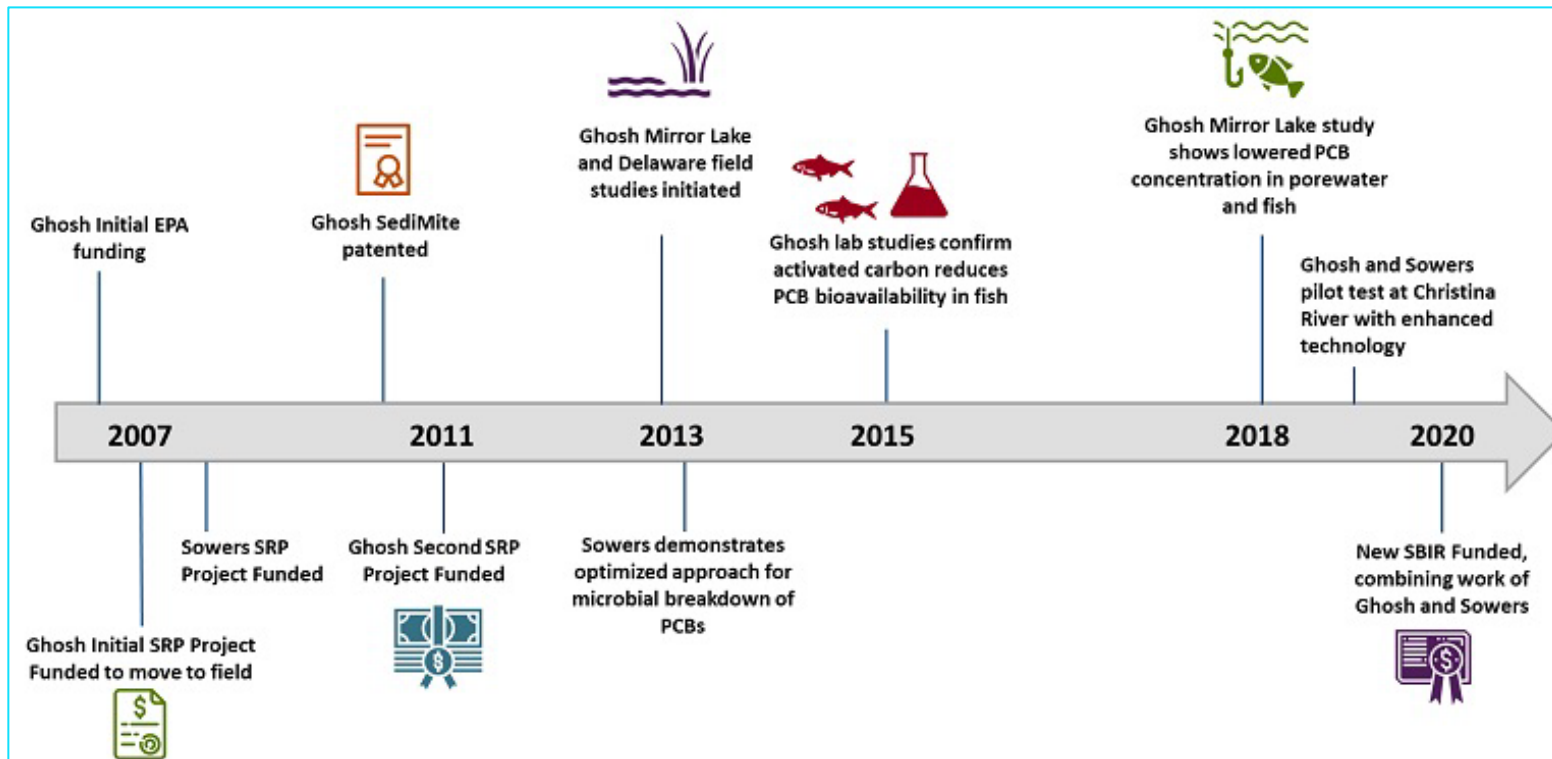
- Phytoremediation with hybrid poplar and cypress trees
- **\$8.5–\$10.5 million in savings** at Undersea Naval Warfare Center, Keyport, WA
- **\$2.4 million in savings** at Argonne National Laboratory, Batavia, IL

Economic Savings: 5 SRP-Funded Technologies, Over \$100 Million Savings (continued)



UMBC (Ghosh, Sowers)

- Activated carbon pellets to sequester and biodegrade PCBs
- Estimated **\$22 million saved** compared to traditional sediment removal in Middle River, Maryland
- Collaboration led to additional R01 and small business funding



- It takes a village...
 - Multiple funding sources
 - Multiple students, staff, different skill sets from lab vs market
 - Willing / motivated partners at contaminated sites
 - Lots of time (an entire career??)

How to Better Facilitate Technology Development? (FRTR Spring 2021)

Funding Opportunities

- Need for mechanisms for **funding technology development, pilot testing, and application**

Site Materials and Site Access

- Matching technology developers with the most ideal **test sites / sample materials**
- Establishing more **“study” sites?**
- **Incentivize** trying out new technologies at sites

Need for **information/data sharing** between researchers and stakeholders

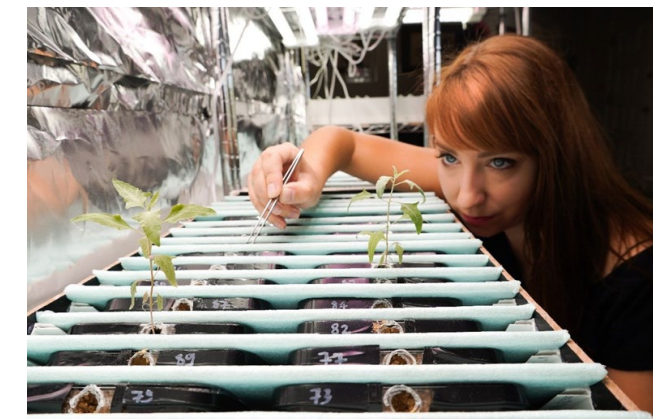
- **Coordinating / facilitating connections** between researchers and stakeholders at an early stage of research
- Finding **ways to “package” information** about ongoing work without being overwhelming - leverage existing information pipelines (TINS)
- **Leverage existing data** about tested technologies (avoid reinventing the wheel)

Need for **mentoring** to take the next step for technology transfer

- Effectively engage **stakeholders** to facilitate research translation early on in development
- Seek opportunities for **cross-training younger generation** to learn more about real world sites (and vice versa...cross-training not-so-young generation)



EnChem Engineering PFAS at JBCC



U Arizona Metal Tolerant Plants

Thank you!!

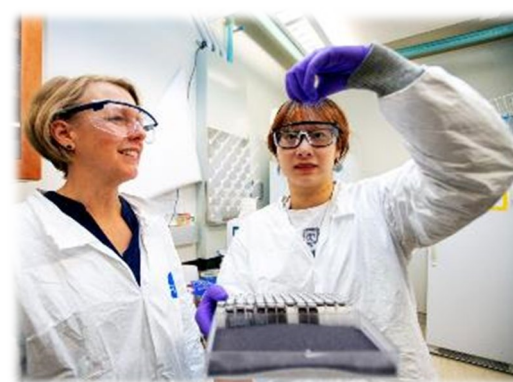
Questions:

Heather Henry, PhD

919-609-6061 heather.henry@nih.gov

Please Contact SRPinfo@nih.gov

to receive monthly Research Briefs,
quarterly Science Digests, etc.



System AppRoAches for Innovative and Inclusive Environmental Health Solutions

December 14-16, 2022, Raleigh, NC
SRP 35th Anniversary Annual Meeting
<https://conferences.coned.ncsu.edu/srp2022/>

SRP: Sites Where We Work

Information on locations of hazardous waste sites and SRP grantees is [available for download!](#)



The screenshot shows the NIH website interface. At the top, there is a search bar labeled "Search NIEHS" and a navigation menu with options: Health & Education, Research, Funding Opportunities, Careers & Training, News & Events, and About NIEHS. The "Research" section is active, and a sidebar menu lists: Funded by NIEHS Grants, Centers, Interagency Collaborations, and Consortia, Superfund Research Program, Where We Work, Research and Engagement at Hazardous Waste Sites, and Table View (which is highlighted).

Table View

Superfund Research Program

The following tables represent the HTML table view of the "Where We Work" map in a format that is accessible. An Excel version is also available for [download](#).

> Table of Contents

Multiproject Center Grants (P42)

Number of rows to display: 10 20 All

Grantee	Project	Funding	City	State
Baylor College of Medicine	Polycyclic Aromatic Hydrocarbons: Ultrasensitive Detection, Early-Life Exposures - Clinical Outcomes (Preterm Births, Chronic Lung Disease, and Neurocognitive Deficits), Prevention and Remediation	2020-2025	Houston	Texas
Columbia University	Columbia University and Northern Plains Partnership for the Superfund Research Program	2022-2027	New York	New York
Duke University	Duke University Superfund Research Center - Developmental Co-Exposures: Mechanisms, Outcomes, and Remediation	2022-2027	Durham	North Carolina

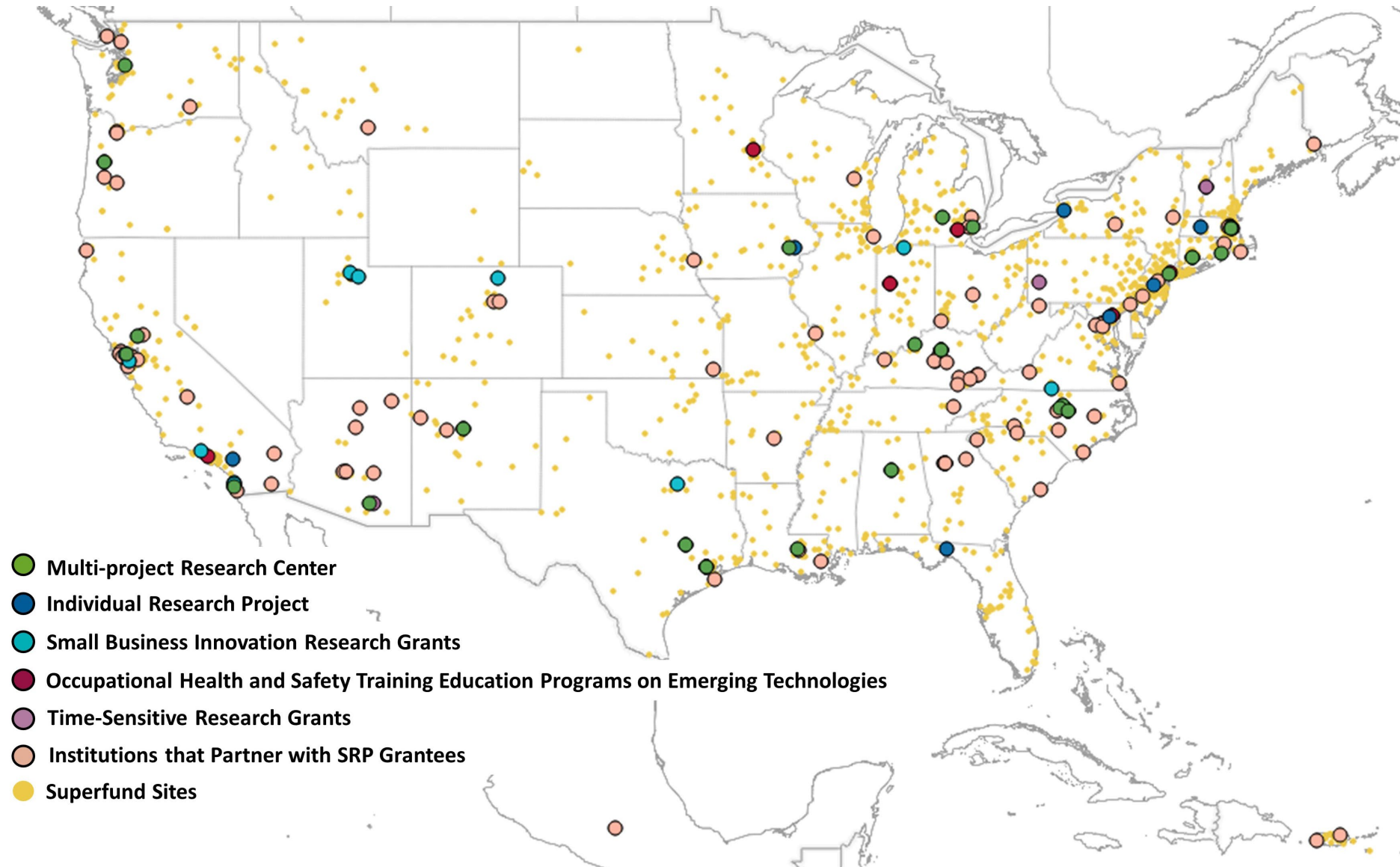
Learn More:

Learn more about SRP-funded research through NIH RePORTER at <https://reporter.nih.gov/>

And by using the SRP Search Tools (projects, people, publications, datasets) <https://tools.niehs.nih.gov/srp/search/index.cfm>

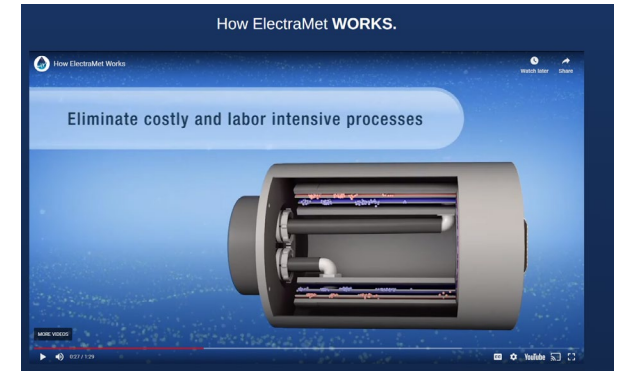
The screenshot shows the NIH RePORTER website. At the top, there is a navigation bar with the NIH logo and links for RePORT, RePORTER, FAQs, API, and ExPORTER. Below the navigation bar is a 'Quick Search' section with a search box labeled 'Search RePORTER' and a 'Search' button. Below the search box is an 'Advanced Search' button. To the right of the search box is a 'Welcome to the NIH RePORTER' message, which states: 'Each award supported by NIH promotes efforts to seek fundamental knowledge about the nature and behavior of living systems and/or the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.' Below the message are 'Guided Tour' and 'Feedback' buttons. Below the search section is a 'Table of Contents' link. Below the 'Table of Contents' link is a 'Keyword Search' section. The 'Keyword Search' section includes a description: 'The Keyword Search allows you to search SRP content by entering keyword(s), phrases, or names into the Search Term box. Use the check boxes to limit the search, and then click on the Search button.' It also states: 'Search results are displayed in order of relevance.' and 'Refer to the Search Tips page for additional information to customize your search.' Below the description is a 'Search Term: (Required)' input field. At the bottom of the 'Keyword Search' section is a 'Please choose from the following search areas:' section with two checked checkboxes: 'Research Briefs' and 'People'. To the left of the 'Keyword Search' section is a 'Active Funding by State' section with a map of the United States. The map is titled 'Active Funding by State' and has a subtitle 'Select a state to view projects'. The map shows various states shaded in different colors, representing active funding. The map is located at the bottom left of the screenshot.

SRP Across the Country



SBIR Successes

- ElectraMet (formerly PowerTech) patented INCIION technology to preferentially remove metals from water. It uses an active filtration process with proprietary carbon electrodes.
- Cyclopure commercialized DEXSORB+, made from renewable cyclodextrin, to remove PFAS from drinking water via dual mechanisms of hydrophobic and electrostatic interactions. Recent release of table-top water pitcher for PFAS.
- Enchem developed a two-phase process to remove PFAS from soil and groundwater using two proprietary technologies: Extra Contact Technology to flush PFAS from media, and a chemical OxyZone to destroy them.
- AxNano patented RemRx CRI, a controlled release injectant for sustained ISCO reagents directly into contaminated area with one application. They are also developing smart PFAS-collectors for high-throughput detection.



ElectraMet's technology removes metals from drinking water

**Awarded new SB1 SBIR/STTR
Commercialization Readiness Pilot
(CRP) Program Technical Assistance**

SBIR Successes

- [NanoAffix Science, LLC](#) developed a new **portable device to detect lead in tap water** in real time. The team launched its first commercial device, called [NanoAquaSense](#).
- [Ondavia](#) deployed their easy-to-use water testing technology at NIH campus in Bethesda, Maryland. The system uses spectroscopy and nanotech for rapid and inexpensive laboratory-grade chemicals testing in water.
- [Microbial Insights](#) is commercializing its big data and molecular tools that monitor the biologically-based break down of environmental contaminants.



NanoAffix's device connects via Bluetooth to an app

SBIR/STTR Funding Opportunity Overview (August 25, 2022)






- EPA, NIEHS, NSF, NOAA

August 25, 2022: SBIR/STTR Funding Opportunities for Water Nanotechnologies Archive Overview Submit Feedback

National Nanotechnology Initiative (NNI) & U.S. Environmental Protection Agency (EPA) Public Webinar

SBIR/STTR Funding Opportunities for Water Nanotechnologies

August 25, 2022, 1-2:30 PM ET

 <p>April Richards Program Manager, SBIR Program, EPA</p>	 <p>Heather Henry, Ph.D. Health Science Administrator, NIEHS</p>	 <p>Genevieve Lind, Ph.D. Program Manager, SBIR Program, NOAA</p>	 <p>Rajesh Mehta, Ph.D. Program Director, SBIR/STTR Program, NSF</p>	 <p>Moderator: Jean Balent EPA Technology Innovation and Field Services Division</p>
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Webinar viewers will be able to submit questions for the panelists to answer during the Q&A period. Submitted questions will be considered in the order received and may be posted on the NNI website. A moderator will identify relevant questions and pose them to the speakers. Due to time constraints, some questions may be grouped and some may not be addressed during the webinar.

Engage with us!
Website: [Nano.gov](https://nano.gov)
Email: info@nnco.nano.gov
Twitter: [@NNINanoNews](https://twitter.com/NNINanoNews)
LinkedIn: [National Nanotechnology Initiative](https://www.linkedin.com/company/national-nanotechnology-initiative)

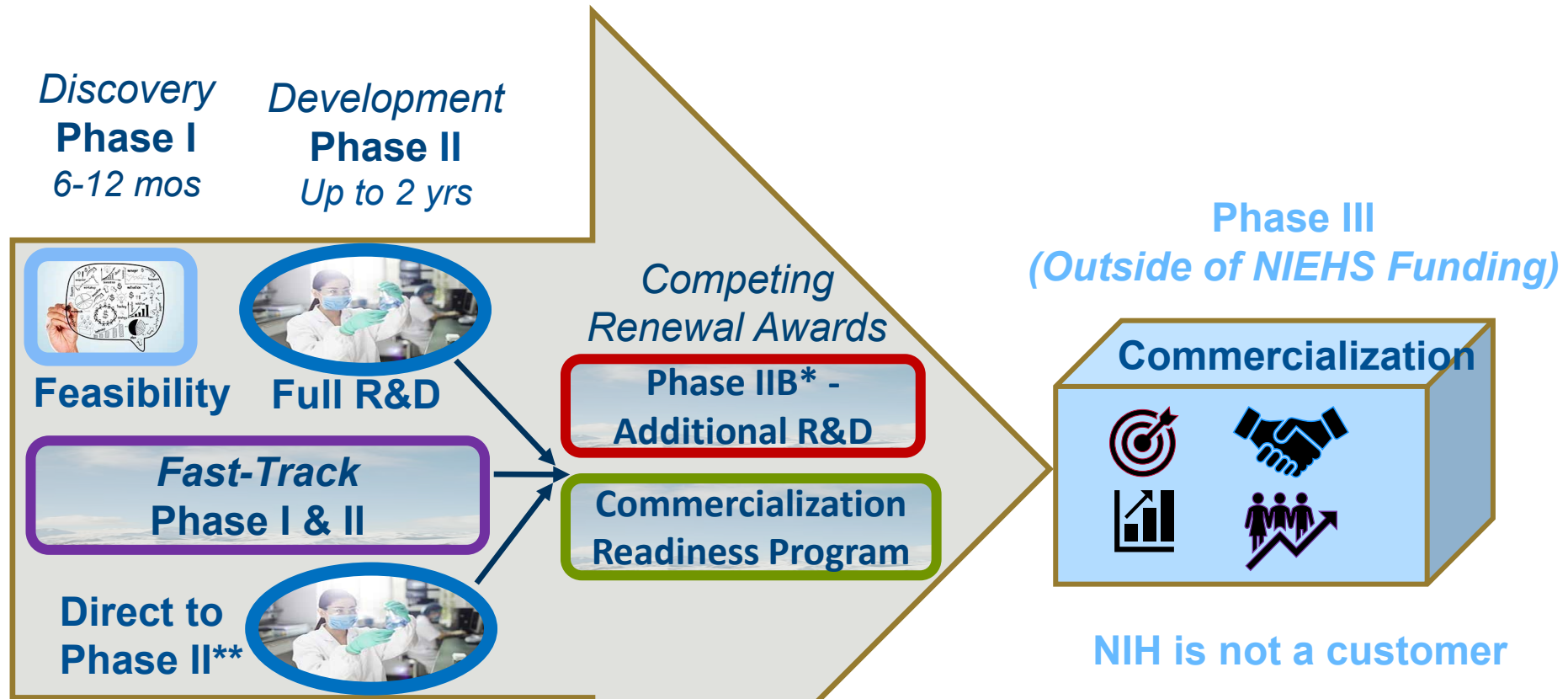
0:09 / 1:27:15

Moderator: Jean Balent

Agency NIEHS Summary Table

Program name	NIEHS SBIR/STTR
URL	<p style="text-align: center;">General NIEHS: https://www.niehs.nih.gov/funding/grants/mechanisms/sbir/index.cfm Superfund (Remediation / Detection): https://www.niehs.nih.gov/research/supported/centers/srp/funding/hwaerp/index.cfm</p>
Contact information	<p>Dan Shaughnessy (General NIEHS) Heather Henry (Superfund)</p>
Next deadline	Sept 5 th , Jan 5 th , May 5 th
Mechanisms funded	<p>Phase I, Phase II, Direct to Phase II, Fast Track SBIR and STTR*</p> <p><small>* Note Superfund does not offer STTR</small></p>
Amount awarded (Total Direct Costs, Indirect Costs, Fees)	<p>Phase I = \$173,075 – \$275,766 Phase II = \$1,153,834 - \$1,838,436</p>

NIEHS SBIR/STTR Program – Funding Mechanisms



Phase I = \$173,075 – \$275,766
Phase II = \$1,153,834 - \$1,838,436