United States Environmental Protection Agency

EPA Tools and Resources Webinar: Small Business Innovation Research (SBIR)

Presenters:
April Richards, EPA SBIR Program Manager, US EPA Office of Research and Development
Selma Mededovic, DMAX
Jeffrey Blair, AethLabs
Thomas Coleman, DTEC Systems

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Presentation Outline

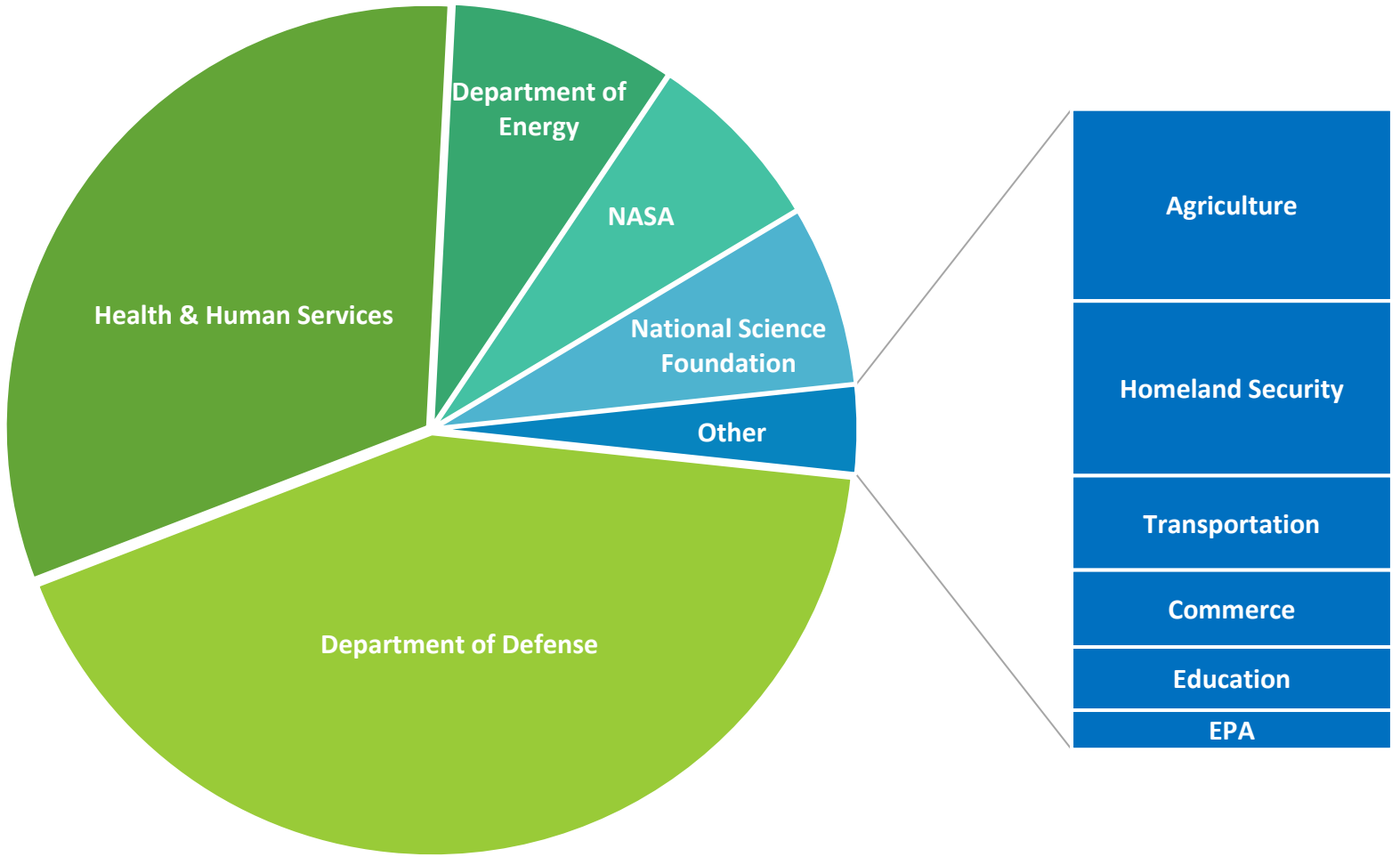
- Background
- Project examples
  - PFAS
  - Wildfire sensors
  - Wastewater treatment
  - HABs detection
  - Flare monitoring
  - Energy Efficiency
  - Mushroom materials
- Outreach and Program Impact
- Take home messages

Background

- Federal SBIR program
  - Set-aside program for small businesses to engage in federal R&D
  - Goal = develop and commercialize technologies
  - 11 agency participants
  - Budget = over $3.2B across federal government
  - Structure – projects awarded in phased approach
  - Eligibility – U.S. small businesses

- EPA SBIR Program
  - Focus on high priority environmental issues where technology could be a solution
    - Topic areas: Water, Air, Land, Materials, Chemicals, Homeland Security, Risk Assessment
  - Budget = ~$5M annually

11 Federal SBIR Agencies



SBIR Program

- EPA SBIR (Annual) Process
  - Topic development
  - Funding Opportunity/Solicitation (open June 16-August 3, 2021)
  - Proposal review
  - Projects funded
  - Results
  - Communicate results

- More information on the SBIR program
  - Federal
    - www.SBIR.gov (all 11 SBIR programs, state resources (e.g. Small Business Development Centers (SBDCs))
  - EPA SBIR
    - www.epa.gov/sbir
    - https://www.epa.gov/sbir/sbir-listserv

SBIR Program

- **EPA SBIR Process**
  - **Topic Development**
    - Gather input from EPA program offices, centers and regions on priority environmental issues that could be solved with technology
    - Broad topic areas largely stay the same; specific topics change from year to year
  - **Solicitation Release** (Open Now https://www.epa.gov/sbir/sbir-funding-opportunities)
    - U.S. small businesses with less than 500 employees eligible
  - **Proposal Review**
    - Reviewed for technical and commercial strength and relevancy to topic
    - EPA experts review for technical and relevancy
    - Commercial review contracted out
  - **Projects Funded**
    - Program structured in a phased approach
      - Phase I is for "proof of concept" = $100,000 for 6 months
      - Phase II is for development and commercialization = $400,000 for 2 years
  - **Communicate Results**
    - www.epa.gov/sbir
    - @EPAResearch
    - https://www.epa.gov/sbir/sbir-listserv

Project Example – PFAS

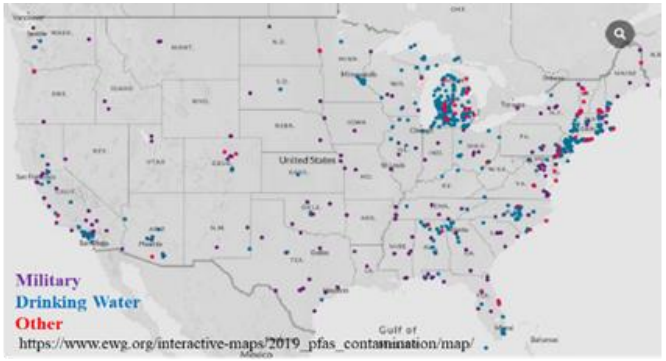
Detection

- 2WiTech, LLC, San Diego, CA: Fieldable zero chemical release molecular imprinting-based sensing technology for trace amounts of PFOA and PFOS in water
- Faraday Technology, Inc., Englewood, OH: Electrokinetic concentration PFAS in soil, with PFAS degradation through application of pulsed electric field processing
- Seacoast Science, LLC , Carlsbad, CA: Fieldable device for broad-spectrum, onsite analysis of PFAS in water, soil, and sediments

Treatment/Destruction

- AAPlasma LLC, Warminster, PA: Non-thermal plasma treatment to regenerate activated carbon
- Polykala Technologies LLC, San Antonio, TX: Electrospun polymer nanofiber mats for the selective removal of PFAS from landfill leachate
- Framgery Inc., Wilmington, DE: Nanostructured sorbent for effective removal of PFAS with highly selective adsorption and photocatalytic properties
- Faraday Technology Inc., Englewood, OH: Electrocatalytic technology for degradation of PFAS in industrial wastewaters/landfill leachates to benign species

➢ DMAX Plasma LLC Potsdam, NY; Electrical discharge plasma to destroy PFAS in water



PFAS contaminated sites (as of March 2019).

Stage of Development

- SBIR Phase II
- Some piloting (e.g., DOD Environmental Security Technology Certification Program (ESTCP))
- Establishing commercial partners

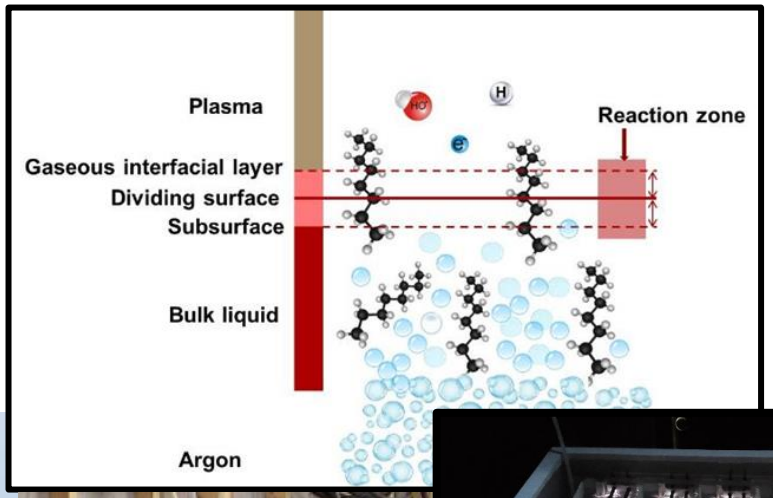
Communications

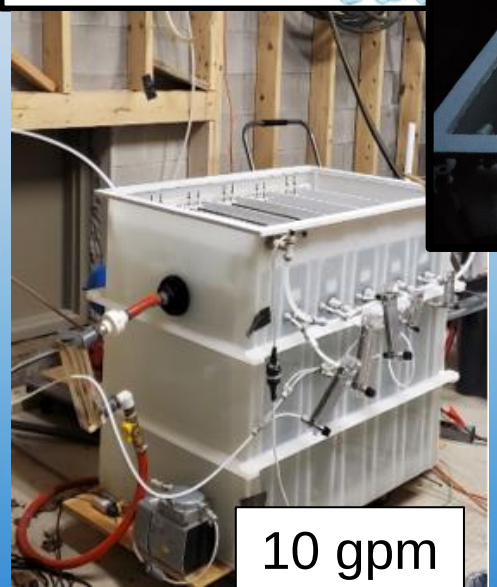
- Hosted webinar on these projects with EPA Region 9

An Enhanced Contact Plasma Reactor: A Competitive Remediation Technology for Per- and Polyfluoroalkyl Substances (PFAS) Contaminated Water

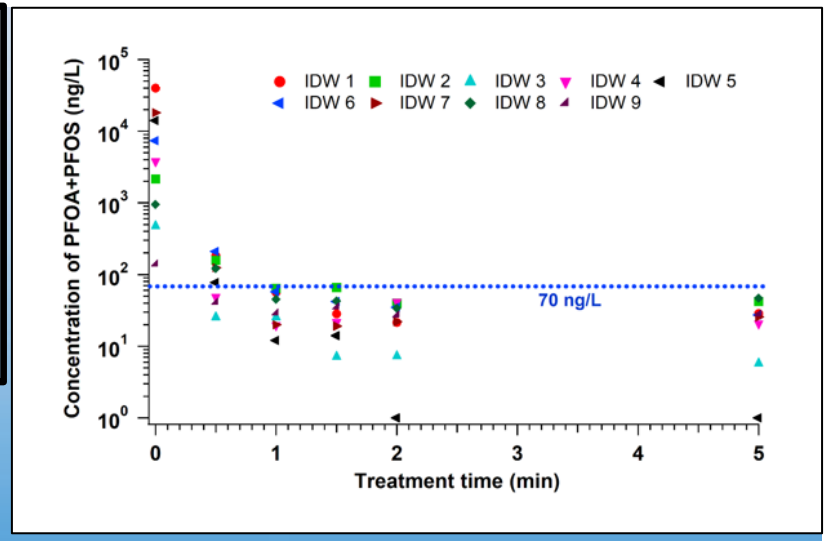
Nick Multari (PI), Tom Holsen and Selma Mededovic Thagard

Potsdam, NY





- Rapid destruction of long-chain PFAS and PFAS precursors
- Short-chain (<C4) PFAS degraded in the presence of a surfactant
- Treatment insensitive to co-contaminants and effective on a range of PFAS source water



CAPABILITY•MOBILITY•SCALABILITY

Project Examples – Wildfire Sensors

- Intellisense Systems, Inc., Torrance, CA: Remote Air Quality Reporting (RAQR) system, capable of sending air quality data through a robust network of small, low-cost nodes for monitoring air pollution from wildland fires
- KWJ Engineering Incorporated, Newark, CA: Lightweight sensor package that monitors air quality and pollution hazards from wildland fires. This technology can be worn by personnel, used for perimeter monitoring or deployed on drones

➢ AethLabs, San Francisco, CA: Integrated black carbon, PM1, PM2.5, PM10 and carbon dioxide sensor platform for both ambient air quality measurements and real-time identification and analysis of emissions from fires

Stage of Development

- SBIR Phase II
- EPA supported field testing
- Establishing commercial partners

Communications

- Hosted webinar on these projects with EPA Region 9

AETHLABS

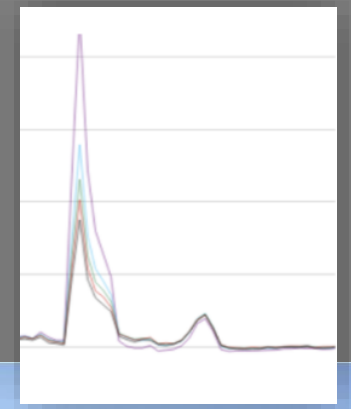
Multi-sensor Measurement Platform Can Distinguish Between Wildfire and Traffic Smoke

- Principal Investigator: Jeff Blair
- Location: San Francisco, CA
- Tech Description: **Black Carbon, CO2, particulate matter size, count & mass, with active aerosol dryer, wireless data transmission and data visualization, rugged temperature controlled enclosure, API data access**

- Stage of development: **Field testing, prototypes sold to NASA for 5 year ground monitoring project**
- Impact: **Black carbon, traffic emissions, wildfire smoke, fence-line and near-road monitoring**

- Developing low-cost sensor variants for PM monitoring

We want to partner with you for field evaluations, testing, equipment rentals



www.aethlabs.com

jeff.blair@aethlabs.com

Project Example – Wastewater/Nutrient Removal

dTEC Systems LLC, Seattle, WA

Technology

- Wastewater treatment process to maximize phosphorus and nitrogen biological nutrient removal without chemical addition
- Achieves enhanced biological phosphorus removal (EBPR) and aerobic granular sludge (AGS) using innovative modifications to the sequencing batch reactor (SBR) process to change the structure and function of the microbial communities

Stage of Development

- SBIR Phase II completed
- Full-scale demonstrations at two wastewater treatment plants (WWTPs) in Washington State and a new SBR application of the technology is under design
- Implemented in a continuous flow WWTP with exceptional N and P removal

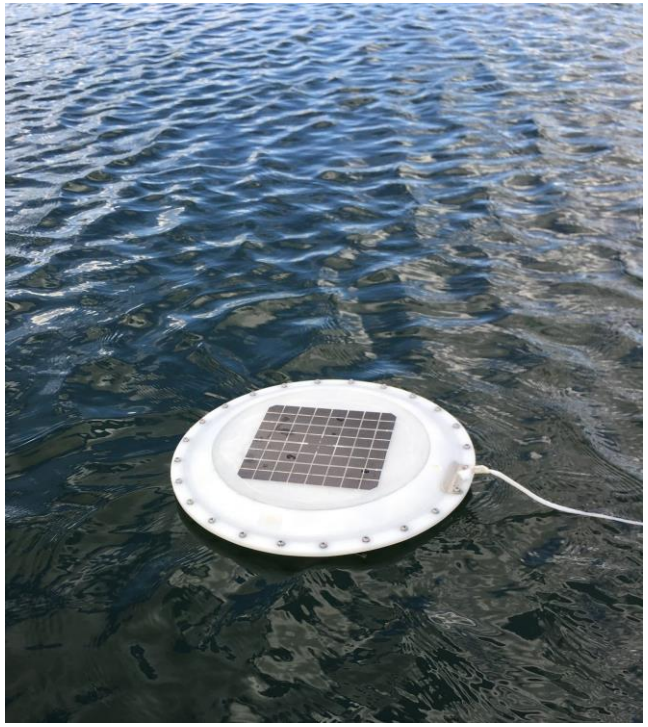
Project Example – HABs Detection

- AquaRealTime, Boulder, CO

- Technology
  - Early detection system for water contamination (including harmful algal blooms (HABs)), reducing closures, expenses, and health hazards, leveraging Internet of Things (IOT) sensors and data analytics
  - Network of floating HABs sensor buoys

- Stage of Development
  - SBIR Phase II

- Successes
  - Currently sell data to multiple government clients



Project Example – Flare Monitoring

- Providence Photonics, Baton Rouge, LA

- Technology
  - Real-time industrial flare combustion efficiency monitor (Mantis™)
  - Utilizes Video Imaging Spectro-Radiometry (VISR) to provide capabilities for direct, remote, and continuous flare monitoring

- Successes
  - Sold units and provide product as service
  - Deployed technology all over the world
  - De facto reference method for measuring flare performance
  - Plays role in the oil and gas industry's global initiatives to reduce methane emissions
  - EPA has used for flare inspection

Project Example – Energy Efficiency

- Lucid Design Group (now part of Atrius), Oakland, CA

- Technology
  - Software and Internet of Things technology to drive behavioral energy savings in commercial buildings
  - Engage building occupants in reducing peak electricity demand and associated utility bill costs

- Successes
  - Developed BuildingOS® business intelligence platform – used by more than 500 customers and provides analytics for more than 15,000 buildings
  - Clients include DC government
  - Now part of Atrius, a brand within the Intelligent Spaces Group at Acuity Brands

Project Example – Mushroom Materials

- Ecovative Design, Albany, NY

- Technology
  - Mushroom-based materials for packaging, construction materials, furniture
  - Bio-fabrication using mycelium grown on natural/waste products

- Successes:
  - Clients include Ikea, Dell and Crate & Barrel
  - Licensing mushroom packaging
  - $60M Series D financing for textiles, packaging and food
  - Spun out Atlast Food Co. – mycelium as super ingredient in plant-based meats

Outreach and Program Impact

- Source of new technologies
  - Use SBIR as pipeline for new technology solutions
    - www.SBIR.gov – database of all projects funded by all 11 SBIR agencies
    - www.epa.gov/sbir – database of all EPA SBIR projects
      - 1215 Phase I awards totaling $80M (since 1983)
      - 437 Phase II awards totaling $99M (since 1983)
      - total of 1652 awards overall for a total of $180M
    - https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/outlinks.sbir/
- Communication: We are happy to organize webinars to share results
  - Most companies would be eager to engage with states and tribes on the applicability of their technologies
  - Please feel free to share funding opportunities with small businesses in your areas
- Other ideas?

Take Home Messages

- SBIR is a large source of government-funded new technology
- EPA SBIR focuses on technologies in high priority environmental areas
- Communications
  - Share information about SBIR-funded technologies
  - Companies would be eager to share directly with decision makers
- Welcome your feedback on how you think SBIR could benefit states, tribes and local governments

Contact

April Richards
EPA SBIR Program Manager
US EPA Office of Research and Development
richards.april@epa.gov

For more Information visit:

SBIR website: www.SBIR.gov
EPA SBIR website: www.epa.gov/sbir
EPA SBIR listserv: https://www.epa.gov/sbir/sbir-listserv

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