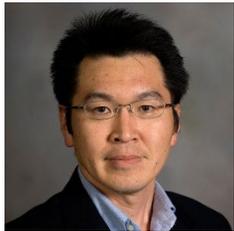


# NanoEarth (Virginia Tech National Center for Earth and Environmental Nanotechnology Infrastructure)

NNCI Annual Conference, October 21, 2022



Murayama  
Site Director



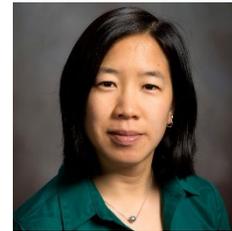
Michel  
Deputy Director



Hochella  
Director of User  
Development



Hull  
Facility Director;  
AD Innovation &  
Entrepreneurship



Marr  
Technical AD



Pruden  
Technical AD



Schreiber  
Technical AD



Vikesland  
Technical AD



Pruitt  
Assistant  
Director



Sowers  
Facility  
Admin.



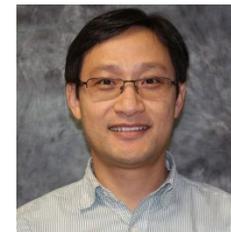
Velasquez  
Diversity & Outreach  
Coordinator



Lade  
Postdoctoral  
Associate



Angle  
Instrument  
Specialist



Leng  
Instrument  
Specialist



McCartney  
Instrument  
Specialist



Singerling  
Instrument  
Specialist

will address:

What steps has your site taken to expand access of your site facilities and expertise to underrepresented students, faculty, and research disciplines?

Seeking strategies to better serve populations that may  
have previously been overlooked

# NanoEarth's Mission & Focus

## Mission

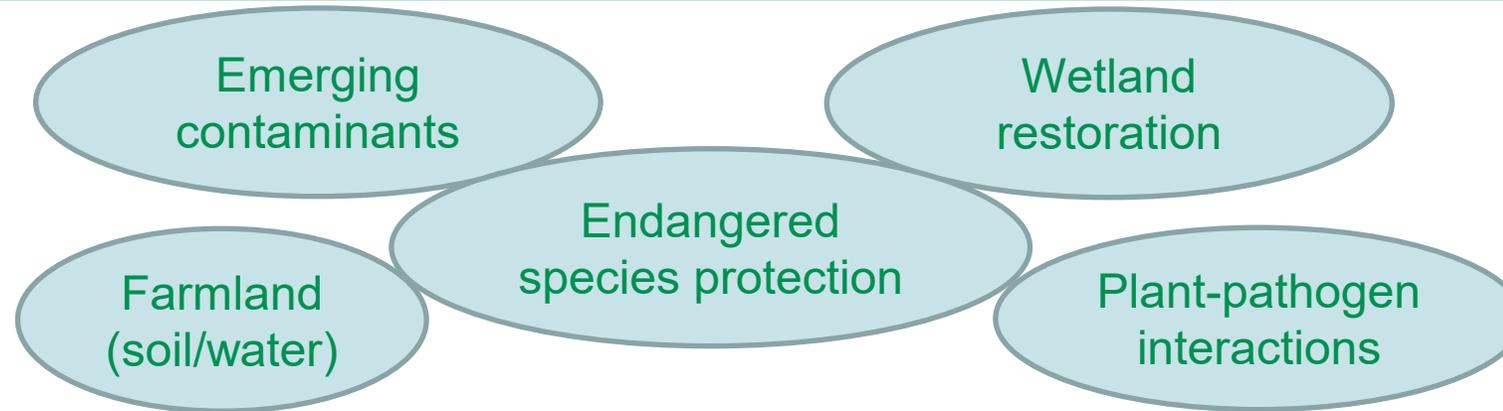
The mission of NanoEarth is to stimulate discovery and innovation, and to share knowledge of Earth and environmental nanoscience and nanotechnology

## Focus Areas

- Non-traditional areas of study
  - Geo and Earth Sciences
  - Environmental Sciences
  - Agricultural Sciences
- Diversity – MUNI (Multicultural & Underserved Nanoscience Initiative)
- Innovation & Entrepreneurship



# NanoEarth: Embodying National/International Research Priorities

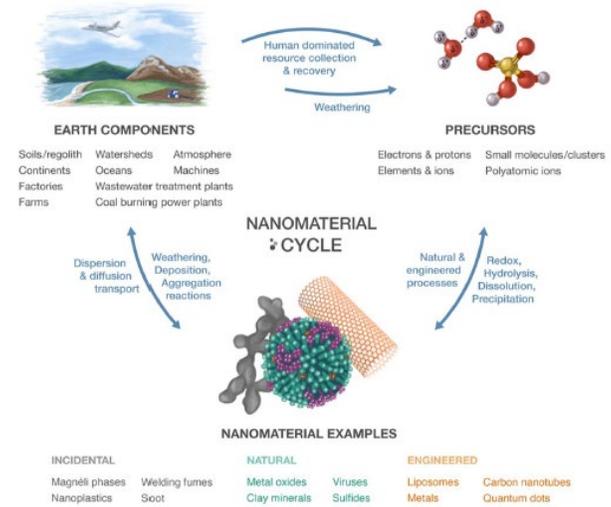
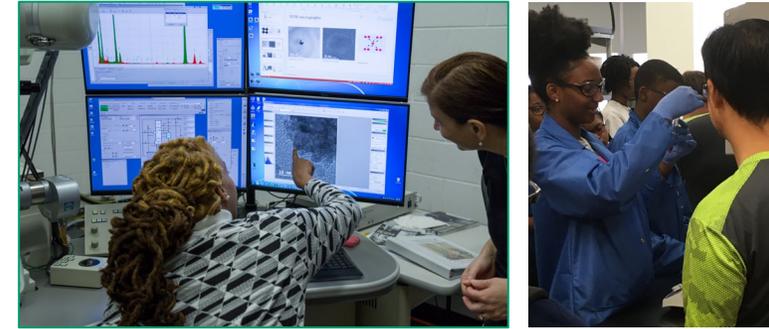


- NNI Signature Initiative – *Water Sustainability through Nanotechnology*
- NAE Grand Challenge - *Providing Access to Clean Water*
- NSF 10 Big Ideas – *Growing Convergence Research*



# Selected Accomplishments in Years 1-5, 2015-2020

- MUNI (Multicultural & Underserved Nanoscience Initiative)
- NanoEarth Innovation Ecosystem
  - NTEC (NanoTechnology Entrepreneurship Challenge)
  - E-in-R (Entrepreneur-in-Residence)
  - Industry Engagement (Industry Seminar Series, Contaminants of Concern Workshop, SBIR, etc.)
- NanoEarth – JEOL joint summer school
  - 2016 (User experience / Workforce development - Metrology)
- Nanoscience in the Earth and Environmental Sciences Workshops at Goldschmidt (with MONT)
  - 2017 (Research and Teaching) & 2018 (From Theory to Practice)
- *Science*: Natural, incidental, and engineered nanomaterials and their impacts on the Earth system (Hochella et al., 2019)

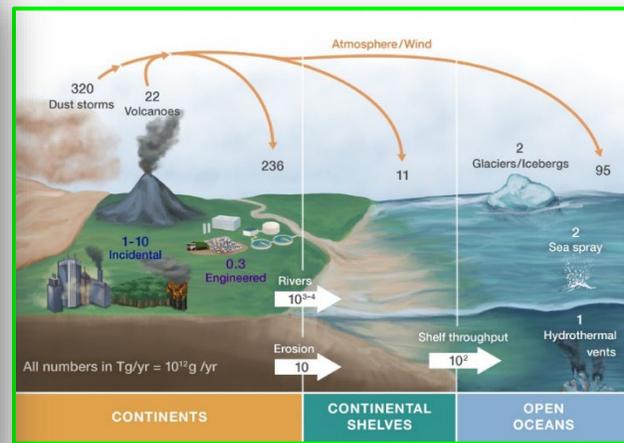
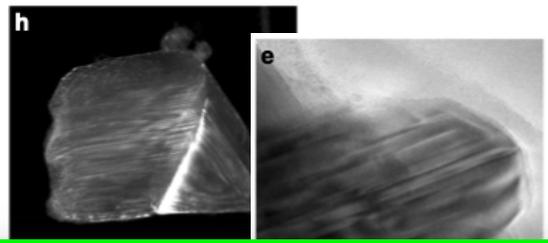


# Find evidence-based ways to formulate/articulate “From Theory to Practice”

Field Sampling

Characterizing

Understanding

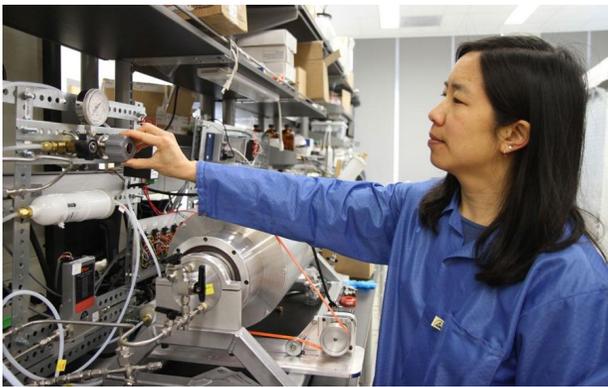


Nanomaterials

Contaminants

# Selected Accomplishments in Years 6-7, 2020-2022

- COVID-19 pandemic response efforts (Marr, Hull, Michel, Pruden/Vikesland)
- Website portal for non-traditional users & educational module development
- Expanding the NanoEarth team: Diversity and Outreach Coordinator Sylvianne Velasquez
- Nanoscience in the Earth and Environmental Sciences Research Community
  - Two virtual workshops



# GlycoMIP: A National Science Foundation Materials Innovation Platform

## Accelerating glycomaterials discovery through:

Research

Education and Outreach

A Unique National User Facility

- Virginia Tech and the University of Georgia
- Targeted Synthesis of Carbohydrates
- Comprehensive Structure Determination
- Molecular Modeling of Glycans and Glycan interactions
- Solution and Solid-state Molecular Interaction Measurements
- Minimal user fees, often only cost of consumable supplies



Connect with us @Glycomip on



[www.glycomip.org](http://www.glycomip.org)

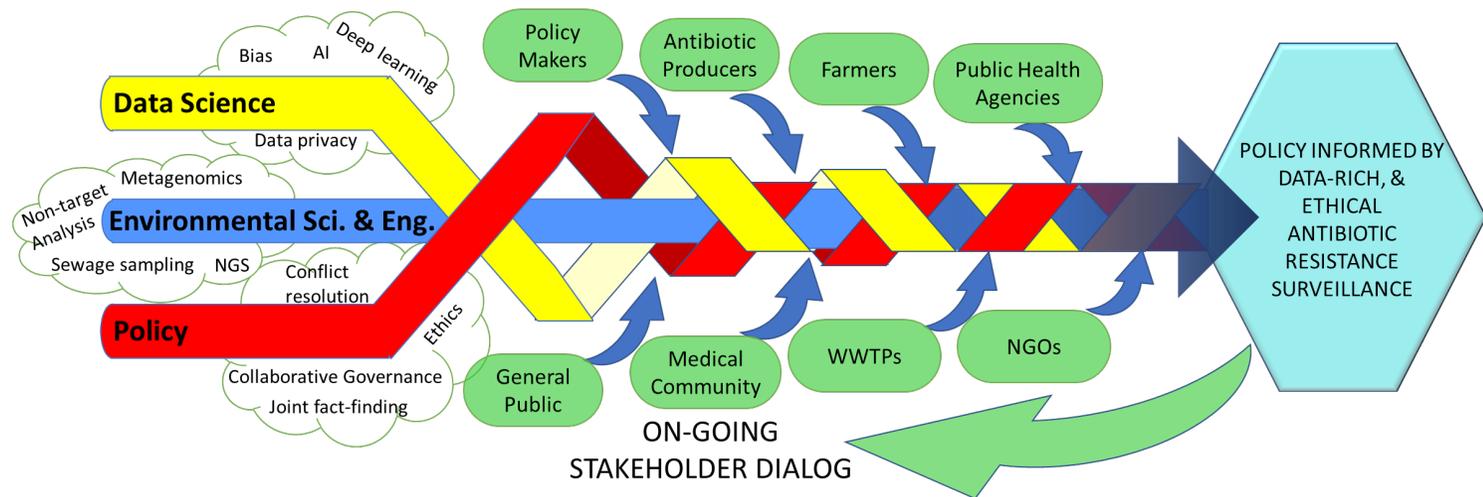


# HDR: NRT: Convergence at the Interfaces of Policy, Data Science, and Environmental Science and Engineering to Combat the Spread of Antimicrobial Resistance

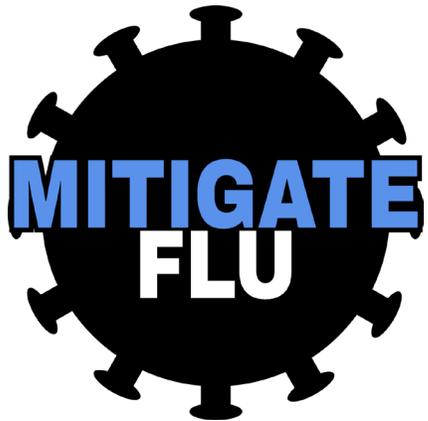
The **institutional transformational goal**: *to promote integrated training in Science, Technology, and Engineering in Policy (STEP)* across VT's graduate curriculum providing a unified pedagogical platform for advancing holistic, science-based policy while developing convergent solutions to societal grand challenges.

**Example Project**: Building a cyber-enabled sewage surveillance systems for monitoring antimicrobial resistance.

Led by NanoEarth co-PI Amy Pruden, \$3M for 5 years and over 20 trainees in the first two years.



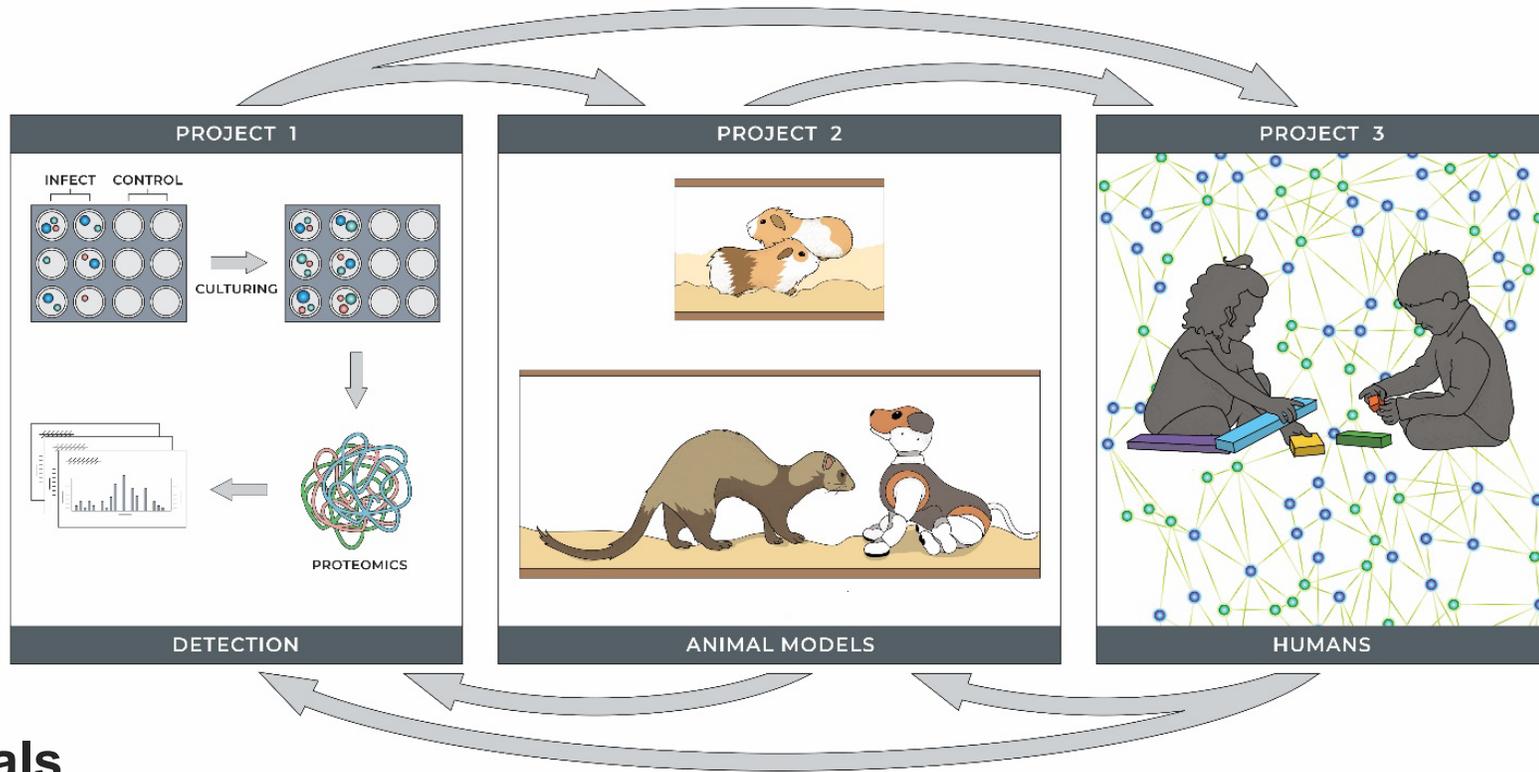
# Multidisciplinary InvestIGATION to Ease



PI Linsey Marr,  
Virginia Tech

## Overall goals

1. Determine how behavioral and environmental factors affect transmission
2. Identify the most effective interventions for reducing transmission in child care centers



\$8.7 million

# Going Forward: Years 8-10, 2022-2025



## Expanding the NanoEarth Team: Postdoctoral Associate Bipin Lade

- Developing sampling protocols for nanoscale characterization of samples from natural environments and other complex media (e.g. wastewater)
- Expanding our userbase by developing new partnerships with researchers from non-traditional fields in nanoscience and nanotechnology especially in geosciences, environmental sciences, **water and soil sciences, agricultural sciences, and related fields**
- Expanding user support by cultivating collaborative relationships to:
  - develop advanced research questions
  - assess required characterization techniques
  - support data collection, analysis and interpretation
  - contribute to preparation of peer-reviewed publications

# Acknowledgements



INSTITUTE FOR CRITICAL TECHNOLOGY  
AND APPLIED SCIENCE  
VIRGINIA TECH.



U.S. DEPARTMENT OF  
**ENERGY**

