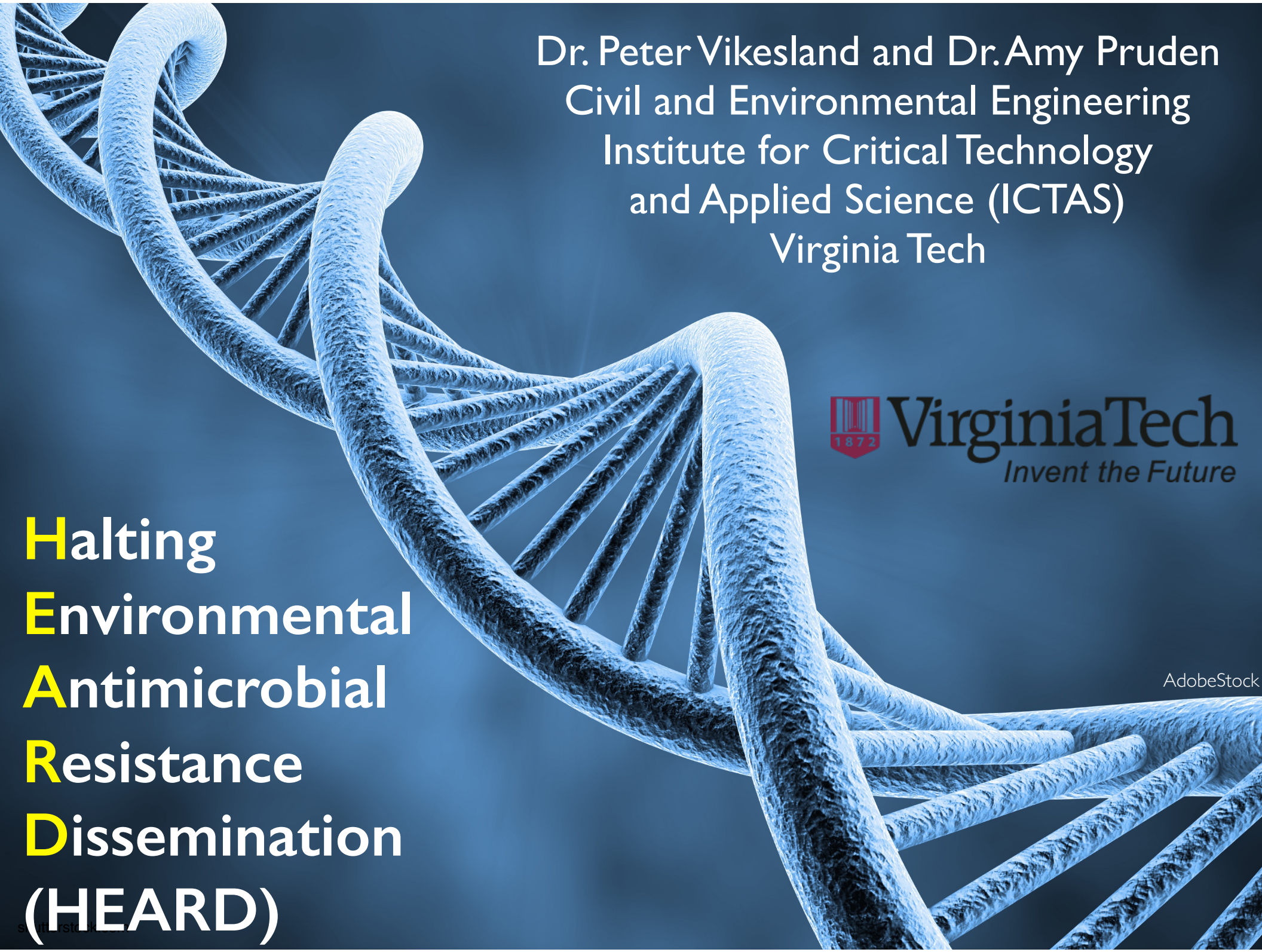
Dr. Peter Vikesland and Dr. Amy Pruden
Civil and Environmental Engineering
Institute for Critical Technology
and Applied Science (ICTAS)
Virginia Tech



Halting Environmental Antimicrobial Resistance Dissemination (HEARD)

AdobeStock

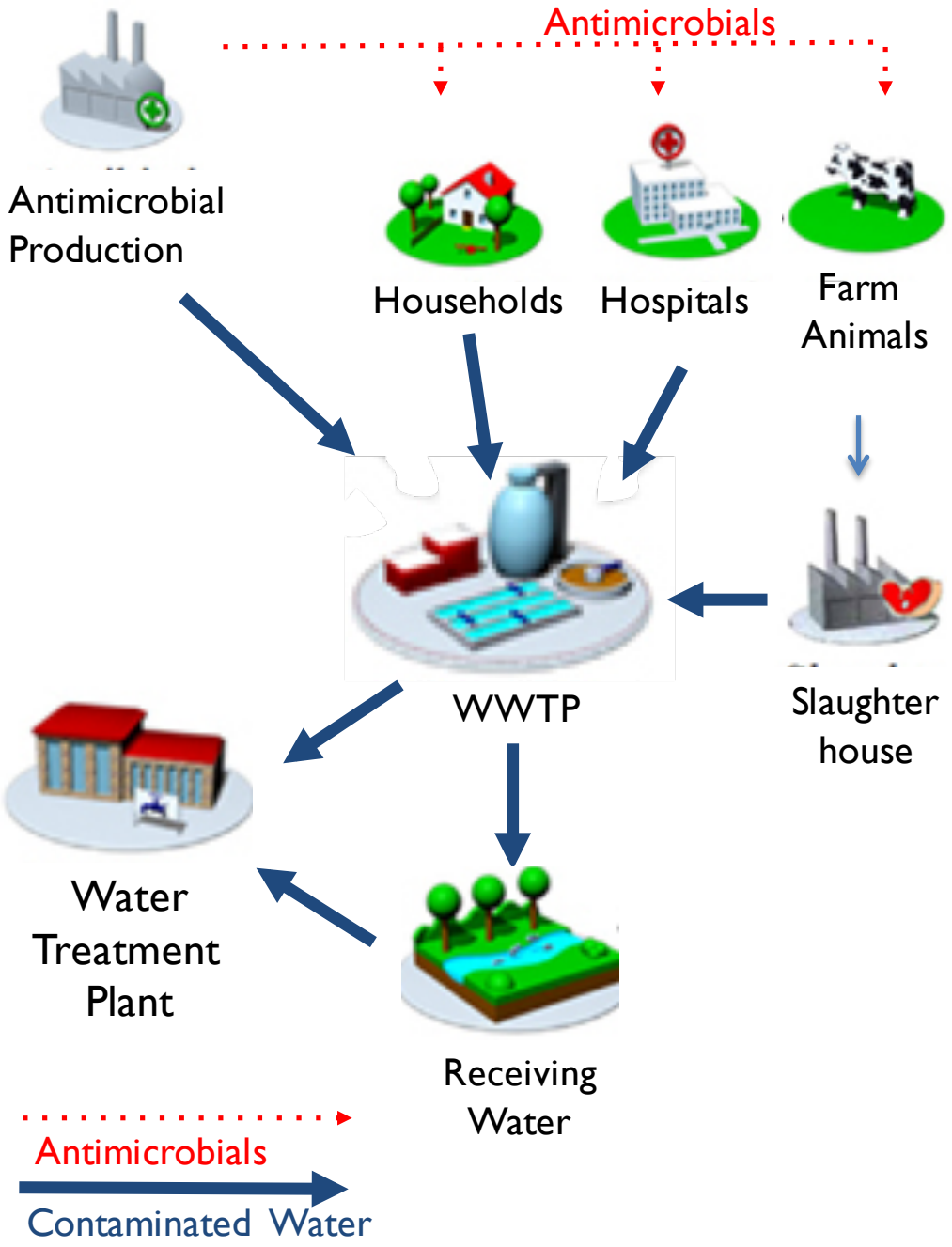
"Antibiotic resistance is a global health problem that requires international attention and collaboration, because bacteria do not recognize borders"

2015 US National Action Plan for Combating Antibiotic-Resistant Bacteria

The HEARD PIRE is a US National Science Foundation initiated international collaborative focused on quantifying the role that wastewater treatment plays in global dissemination and potentially the control of antimicrobial resistance.

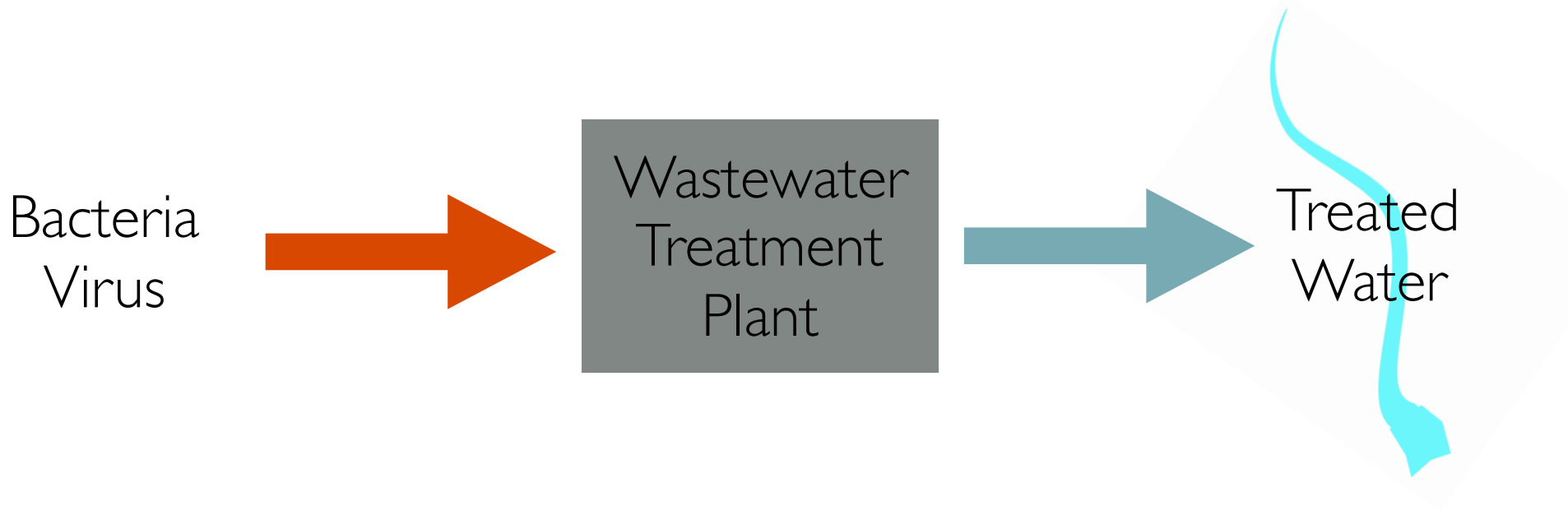
Halting Environmental Antimicrobial Resistance Dissemination

HEARD quantifies how wastewater treatment processes affect antimicrobial resistance and how wastewater treatment plants and the receiving environment interact to affect this spread.



After : *Stadler et al. 2012*

Wastewater treatment is a critical link between antimicrobial use and the potential dissemination of antibiotic resistant bacteria (ARBs) and antibiotic resistance genes (ARGs).



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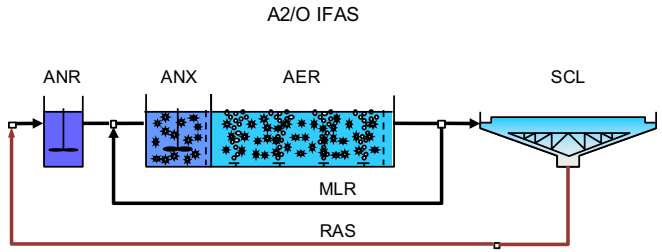
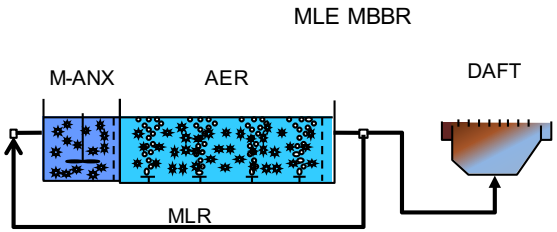
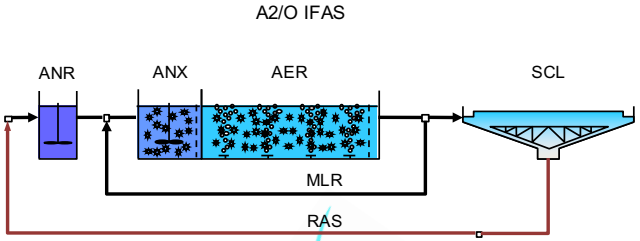
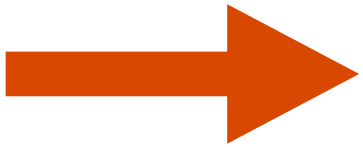


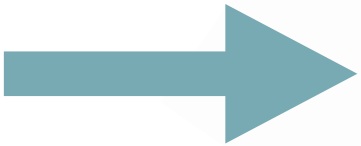




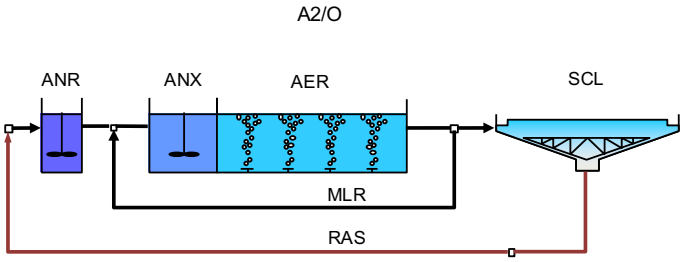
Bacteria
Virus

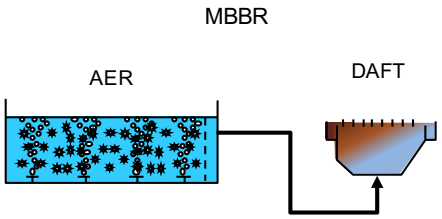


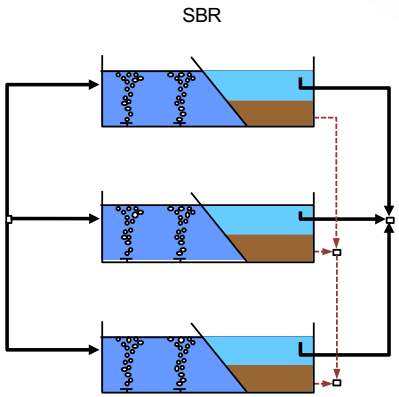
Wastewater Treatment Plant



Treated Water







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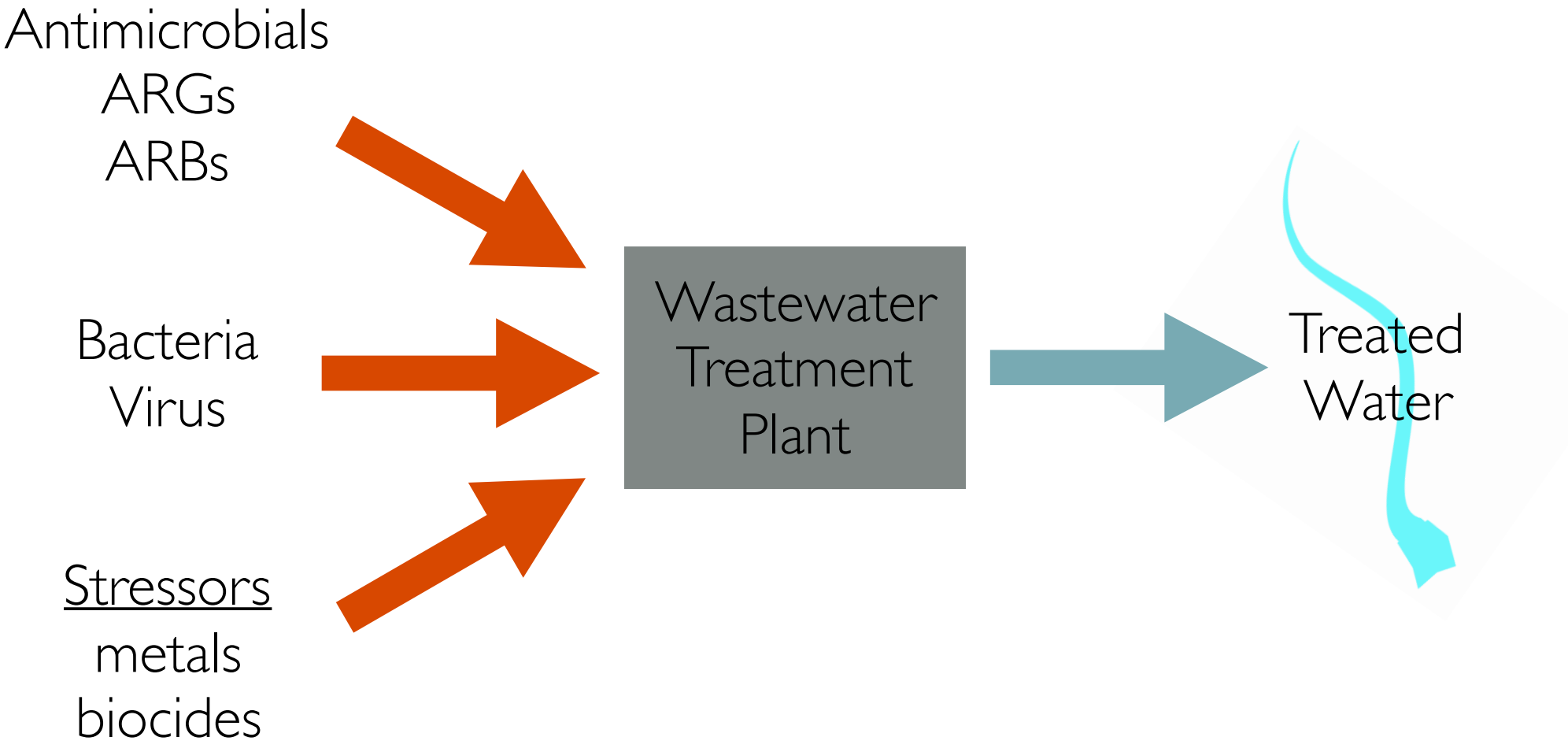

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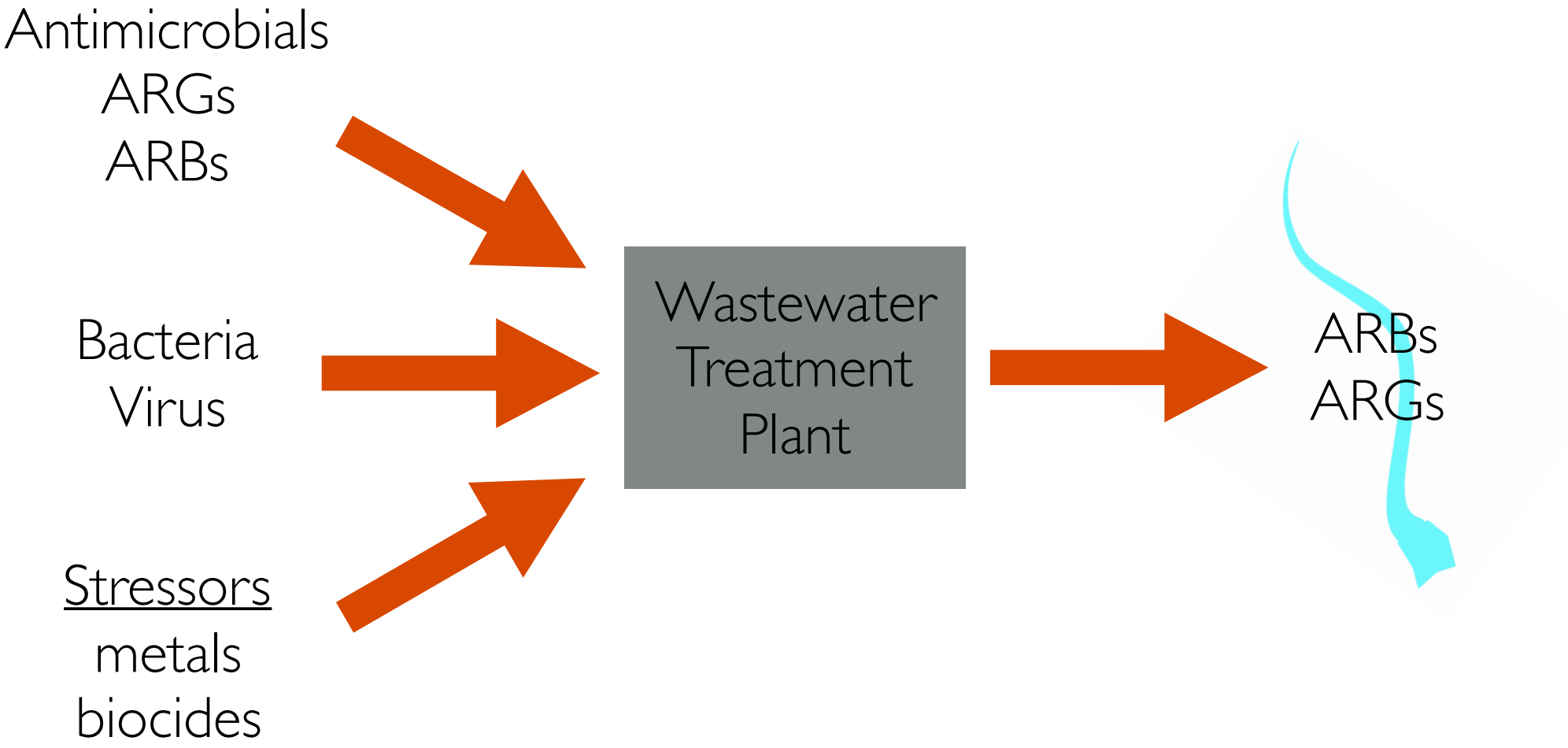
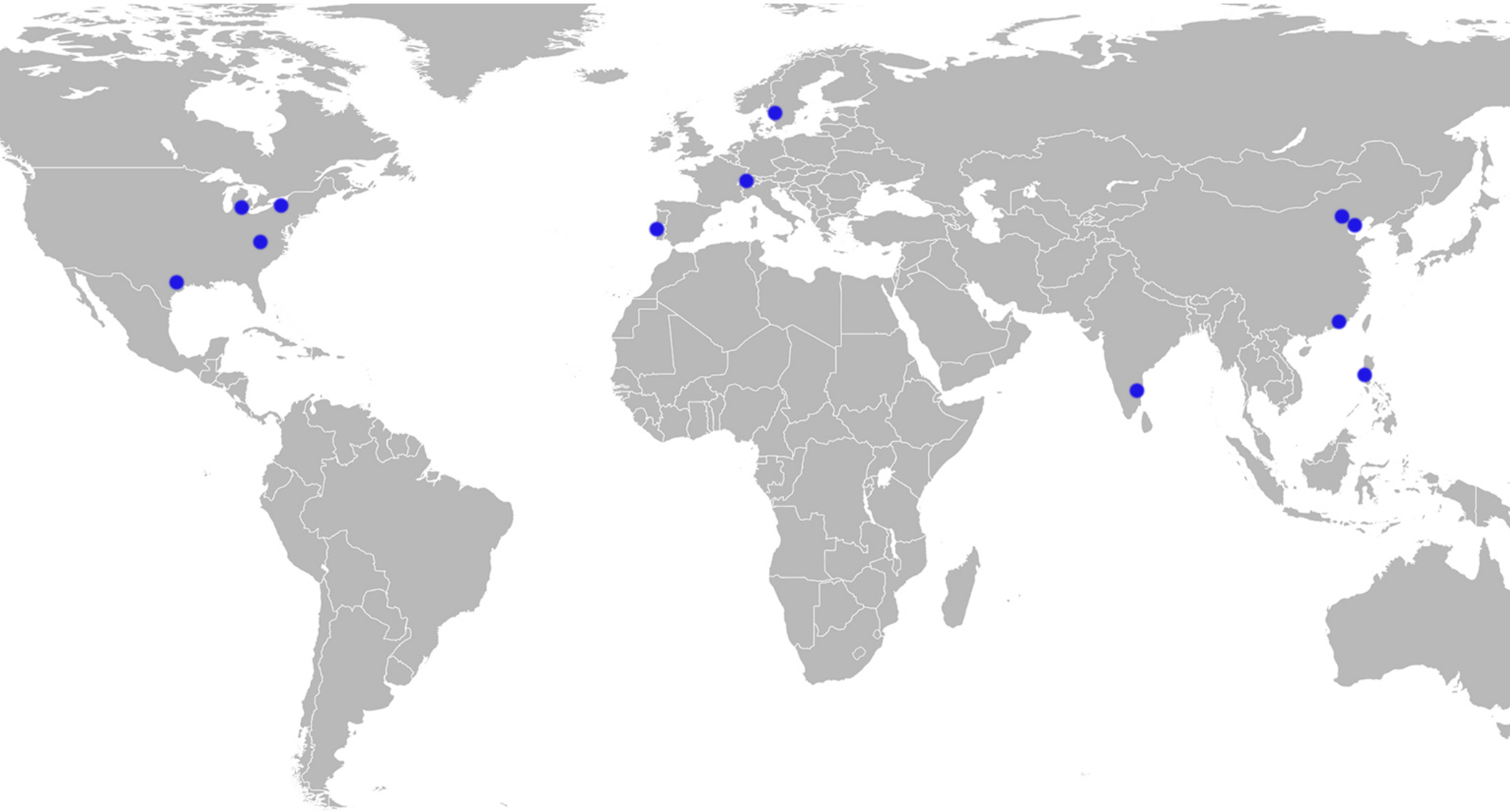




HEARD connects researchers from across the world to collectively address the threat of antimicrobial resistance

Who are we?

Krista Wigginton (co-PI)

University at Buffalo
The State University of New York

Diana Aga (co-PI)

Glenda Kelly

Peter Vikesland (PI)
Amy Pruden (co-PI)
Marc Edwards
Venkataramana Sridhar
Lenwood Heath
Liqing Zhang
Kathy Laskowski

Pedro Alvarez (co-PI)
Qilin Li
Lauren Stadler

Who are we?

The University of Hong Kong

Tong Zhang

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Xiangdong Li

Indumathi Nambi

中國科學院
CHINESE ACADEMY OF SCIENCES

Yong-Guan Zhu

南開大學
Nankai University

Yi Luo

Giselle Conception

Who are we?

GÖTEBORGS UNIVERSITET

Joakim Larsson

CATÓLICA PORTO
BIOTECNOLOGIA

Célia Manaia

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Tamar Kohn

eawag
aquatic research

Juliane Hollender

Helmut Bürgmann

Why do we need an international approach?

Antimicrobial Use and Disposal

Why do we need an international approach?

Antimicrobial Use and Disposal

Indiscriminate

Restricted

Controlled

Treatment Techniques

Untreated

Conventional Activated Sludge (AS)

Alternative Strategies

Why do we need an international approach?

Antimicrobial Use and Disposal

- Indiscriminate
- Restricted
- Controlled

Treatment Techniques

- Untreated
- Conventional Activated Sludge (AS)
- Alternative Strategies

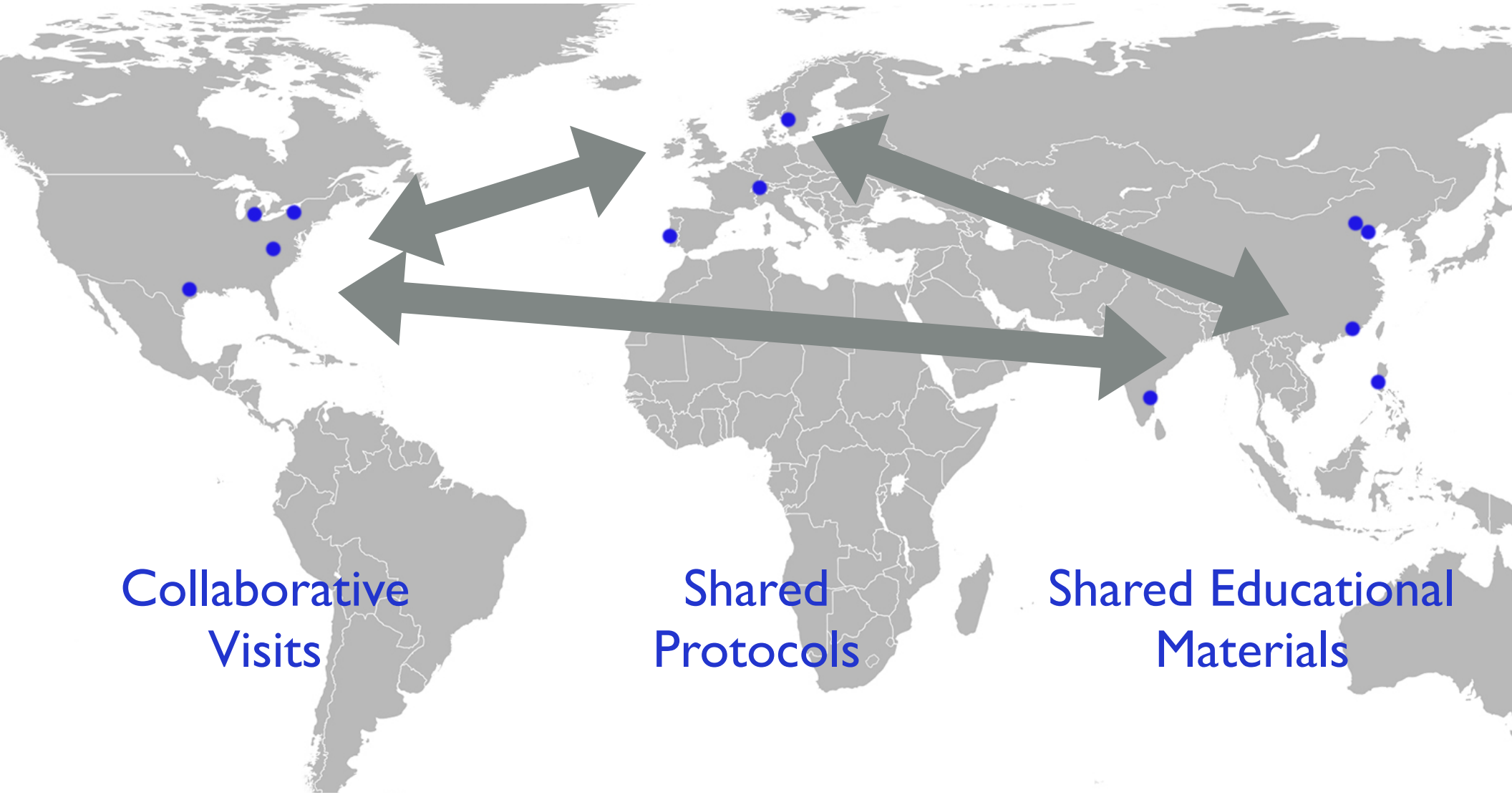
Receiving Environment

- Fresh Waters
- Saline Waters
- Oceans
- Reused Waters

The knowledge gained with any one particular system has the potential to inform other systems, but only if consistent methodologies and approaches are used.

Why do we need an international approach?

To provide opportunities for students and faculty to develop appreciation for other peoples cultures.



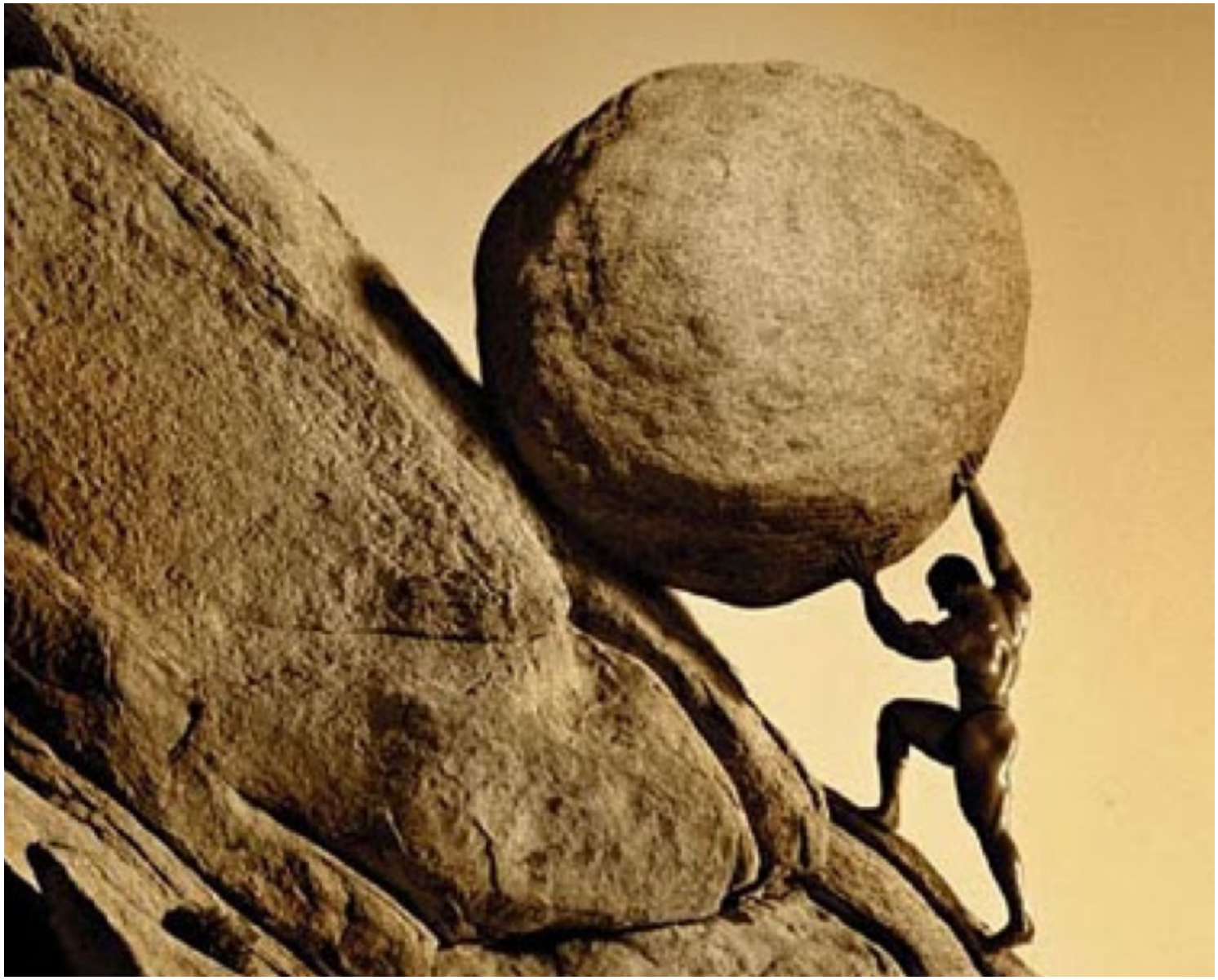

SUSTAINABLE
DEVELOPMENT
GOALS

6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.b Support and strengthen the participation of local communities in improving water and sanitation management

"Diversity in opinions, ideas, and experiences fuels creativity and innovation"

G. Richmond, President AAAS



Wastewater mediated dissemination of antimicrobial resistance is a major global challenge that must be addressed. Through its activities, HEARD will help set the global research agenda.