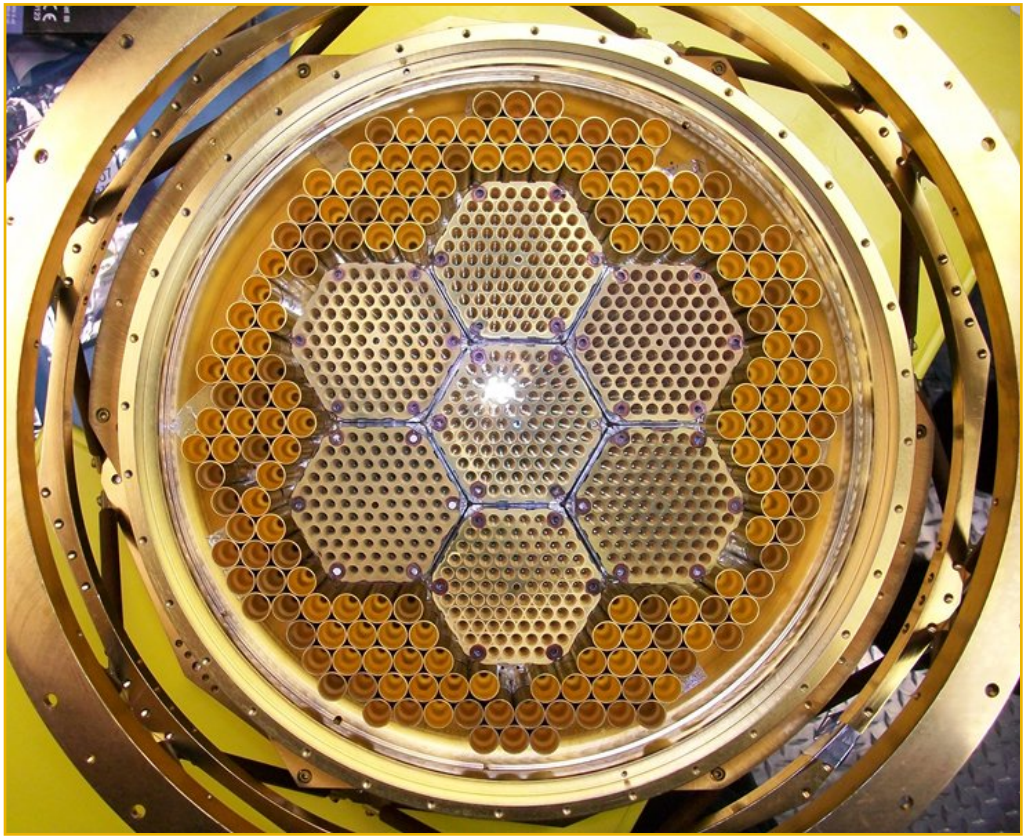
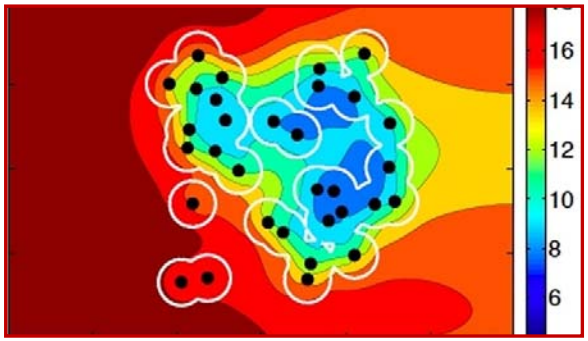
NSF Highlights: *Getting the Word Out*





Amber Jones & Jackie Conciatore
Office of Legislative & Public Affairs
National Science Foundation

- **How does NSF use highlights?**
- **How do I write a good highlight?**

A highlight shows:

- **Outcome of NSF investment**
- **Transformative results**
- **Impacts/benefits**

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December 06, 2012

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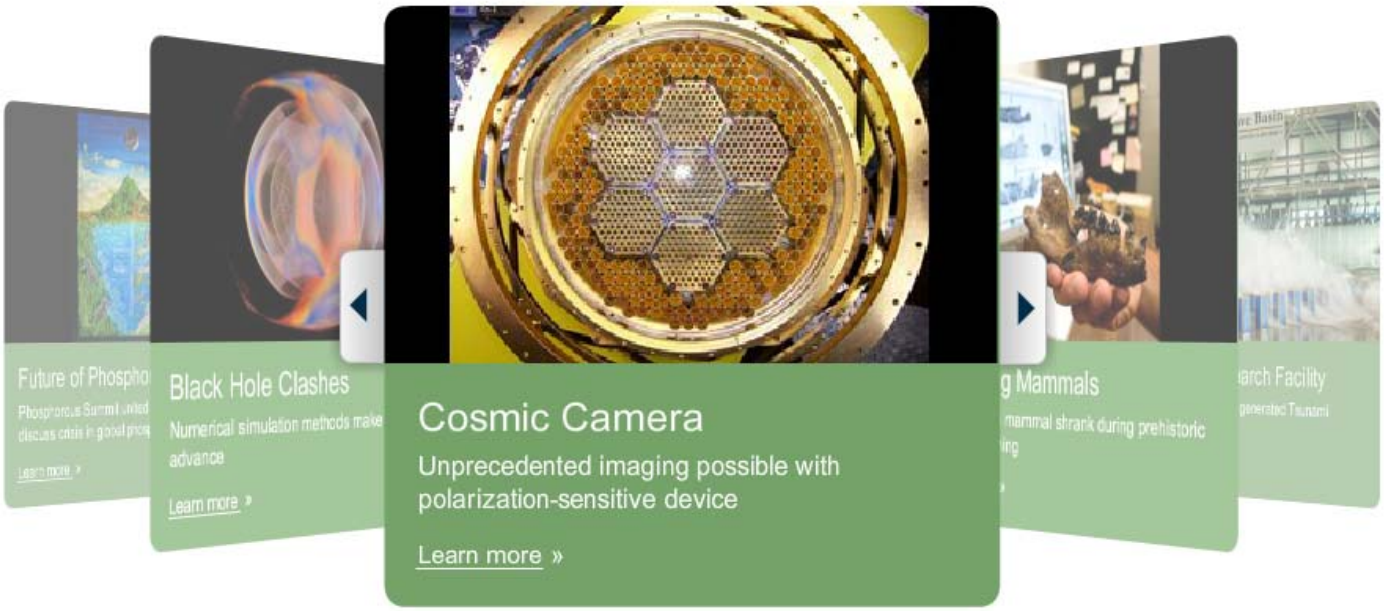

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Texturized Silver Improves Sensors

Back to Previous Page

NSF Award: Oxide and Metal Nanoparticles-The Interface between Life Sciences and Physical Sciences (University of Texas at San Antonio)

State: Texas

Congressional Districts: Texas District 23

Research Areas: Nanoscience, Chemistry & Materials

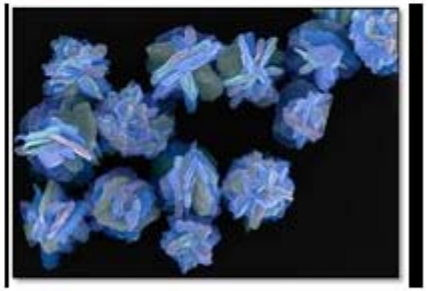
Partnership for Research and Education and Materials (PREM) researchers at the University of Texas at San Antonio (UTSA) have developed a way of making very small silver structures that have the look and texture of flowers. These structures are nano-sized particles--roughly 10,000 times smaller than the width of a human hair.

Because of their small size and unusual shape, the silver particles are expected to have very special optical properties that may lead to new, cheaper and portable chemical and biological detectors.

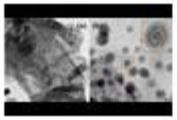
Many groups are contributing to the broad area of chemical and biological detectors to positively impact global health and security. The UTSA research demonstrates an inexpensive approach to texturizing metal nanoparticles that improve detection limits.

PREM awards encourage underrepresented minority groups to participate in materials research by forming partnerships with NSF to support centers, institutes and national facilities. The UTSA PREM is partnered with the Materials Research Science and Engineering Center at Northwestern University.

Image



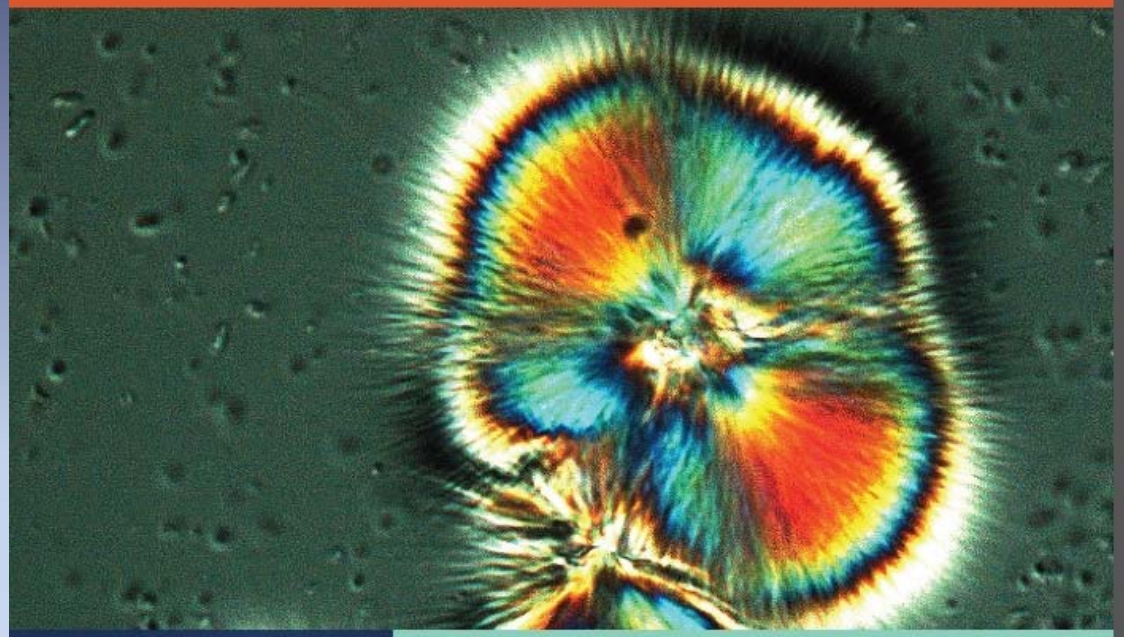
Recent Award Highlights



Magnetic Material Attracts Pollutants
Novel material removes heavy metals from water

Research Areas: Engineering, Chemistry & Materials, Nanoscience
Locations: Texas

UNITED STATES
National Science Foundation



FY 2012

Agency Financial Report

Investing in America's Future

inclusive, seeking to include contributions from all sources while reaching out, especially to groups that are underrepresented in science and engineering.

All NSF programs and activities are driven by three interrelated strategic goals—*Transforming the Frontiers, Innovating for Society,* and *Performing as a Model Organization*. Our pursuit of our mission can be assessed through our success in achieving our performance goals, which include measureable targets for our near-, mid-, and long-term actions. Figure 4 (page I-11) depicts our FY 2011–2016 strategic plan, which we continued to use in FY 2012 as our roadmap to achieving the NSF mission and vision.[6]

Photo credit: Lisa Hunter, University of Hawaii. James Linden built this thermal enclosure for the ATS telescope.

Alumni of the NSF-supported Akamai Workforce Initiative are finding high-tech jobs within the state of Hawaii. This is a major triumph for the program and a success of the model that provides internships and ongoing support for undergraduate students with high-tech companies and observatories on the islands of Maui and Hawaii. In addition to supporting the advancement of STEM learning within Hawaii, Akamai also cultivates local talent and places that talent into jobs within the state, an outcome that is especially important to Native Hawaiian students and students who have lived in Hawaii for all or most of their lives. See http://cfao.ucolick.org/EO/awi for more information.

Following the Money

NSF is funded primarily through six congressional appropriations, which totaled $7,033 million in FY 2012 (Figure 1).[7] Research and Related Activities (R&RA), Education & Human Resources (EHR), and Major Research Equipment and Facilities Construction (MREFC) fund the agency's programmatic activities and account for 95 percent of NSF's total appropriations.

- R&RA supports basic research and education activities at the frontiers of science and engineering, including high-risk and transformative research. It accounted for 81 percent of FY 2012 funding.
- EHR supports activities that ensure a diverse, competitive, and globally engaged U.S. science,

UNITED STATES
National Science Foundation

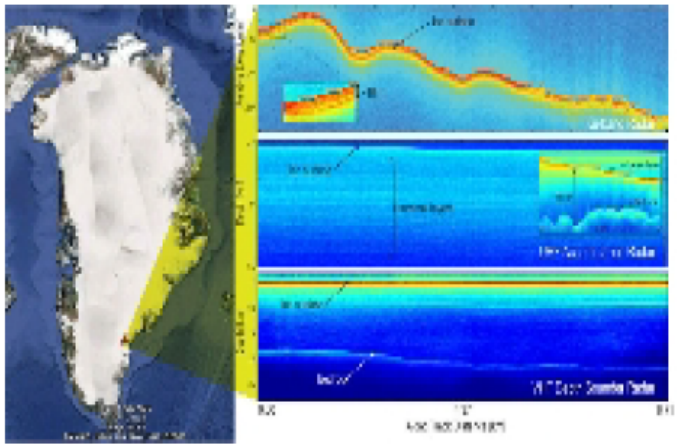
FY 2013
BUDGET REQUEST TO CONGRESS

Credit: Dr. Harris Wang, Harvard University

The Design and Evolution of Organisms Through Genome Programming

NSF Graduate Research Fellow Harris Wang invented the Multiplex Automated Genome Engineering (MAGE) platform, an engineering technique that allows researchers to rapidly increase "the design and evolution of organisms with new and improved properties." Engineering bacterial cells by manipulating their genomes is a very slow and laborious process. The MAGE platform allows efficient development of customized microorganisms for bioengineers. MAGE is applied towards solving global challenges by enabling bioengineers to program cells quickly and easily. Examples of the future applications from the lab's research include: production of pharmaceuticals, including artemisinin for malaria treatment, Taxol to fight cancer, and lycopene as an anti-oxidant dietary supplement; production of biofuels such as ethanol, butanol, diesel, and other hydrocarbons; and cell-based therapies.

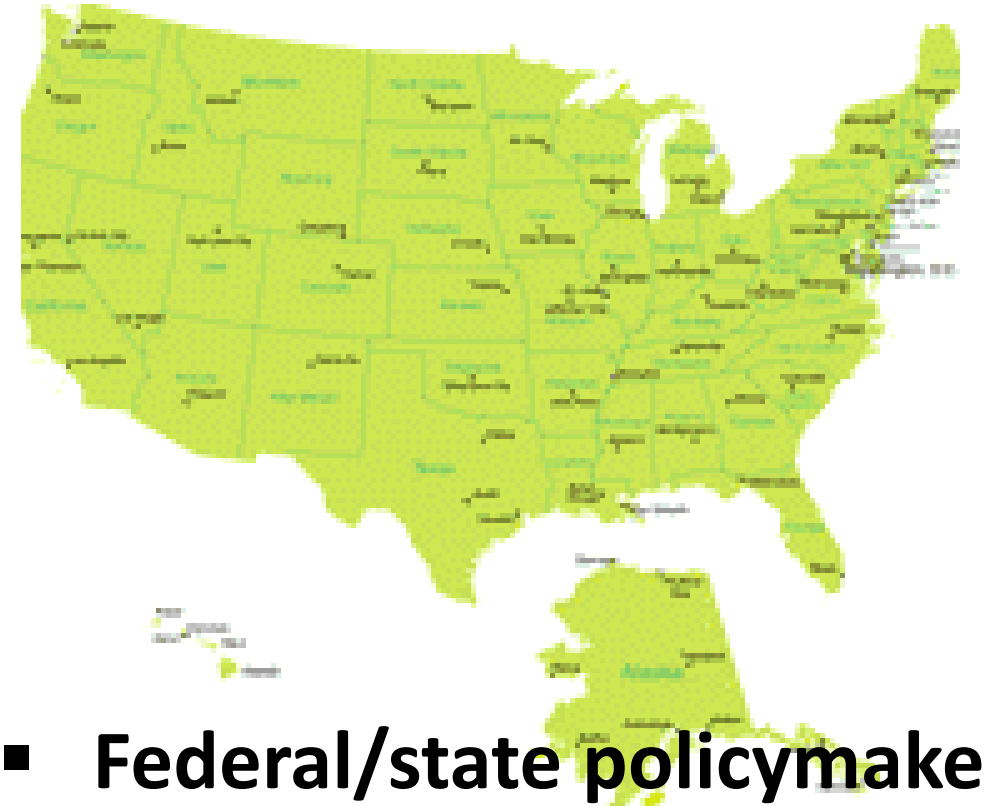
Multi-Radar Mapping of Polar Ice



Credit: CReSIS, the University of Kansas; map from Google maps

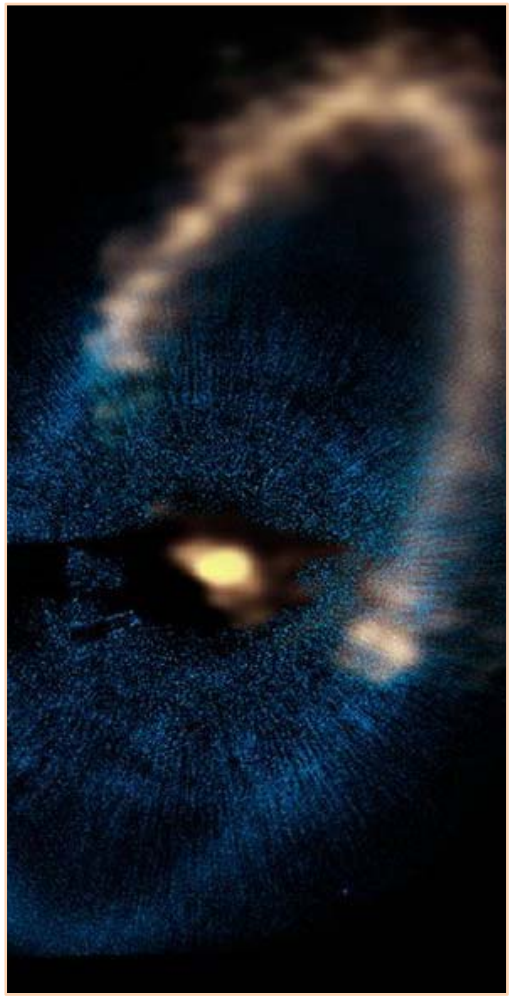
The NSF-supported Center for Remote Sensing of Ice Sheets (CReSIS) has developed several types of radar (Ku-band radar, ultra high frequency accumulation radar and very high frequency depth sounder) to probe the ice on land and sea in Greenland and Antarctica. Researchers apply advanced signal processing techniques to radar data to create images of the interior structure of the ice sheets and hidden terrain below. The data collected with CReSIS radars provide ice sheet modelers with information essential to developing more accurate estimates of the contributions of the Antarctic and Greenland ice sheets to climate change and to better capture rapid changes currently observed. In the future, the radars will fly on remotely operated aircraft to acquire detailed ice sheet maps at times and

Audiences:



- Federal/state policymakers
- Business and industry
- Students and teachers
- Public
- Scientific community

A good highlight:



- Describes the outcome
- Describes the impact/benefit
- Includes simple images

When writing:

DO write for the public.

DO write short, straightforward sentences.

DO use simple language.

DON'T write for scientists.

DON'T use long sentences with multiple clauses.

DON'T use jargon.

***Outcome**:*

Researchers at xxxx have created a model that predicts the evolution of strain gradients and exotic properties such as flexoelectricity in multiferroic heterostructures.

Water (H20) can react with oxygen ions (O2-) on the surface of an oxide ceramic to form hydroxyl groups (OH-). The hydroxyl ion (OH-) is smaller and lower charge than (O2-), potentially allowing for faster diffusion (movement) into a ceramic.

***Outcome**:*

Researchers at xxxx are investigating high-temperature testing methods that can reach half the surface temperature of the sun, in order to study their ceramic materials oxidation resistance.

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Researchers at xxxx are investigating high-temperature testing methods that can reach half the surface temperature of the sun, in order to study their ceramic materials oxidation resistance.

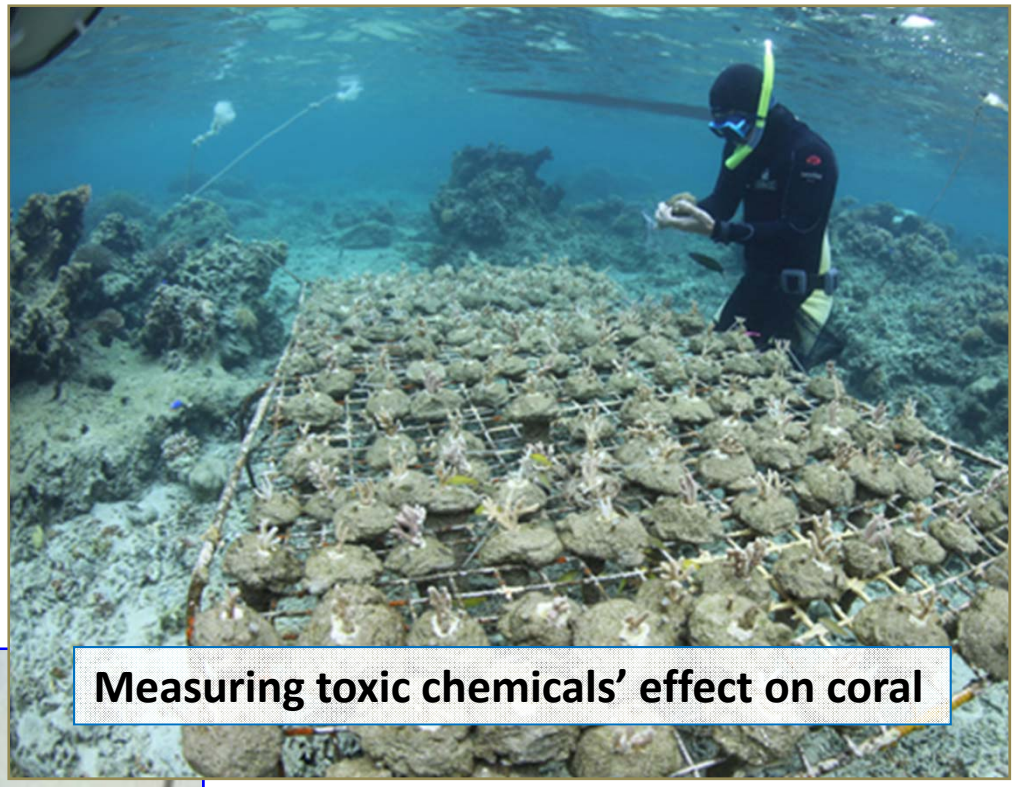
***Outcome**:*

Polluted water can contain a toxic and carcinogenic form of the heavy metal chromium. Researchers at xxxx have demonstrated the ability of a magnetic material to remove this metal from water, through a process called adsorption. Chromium molecules bind to the magnetic material, allowing researchers to quickly separate the heavy metal from the material after adsorption using a magnet.

Impact/benefits:

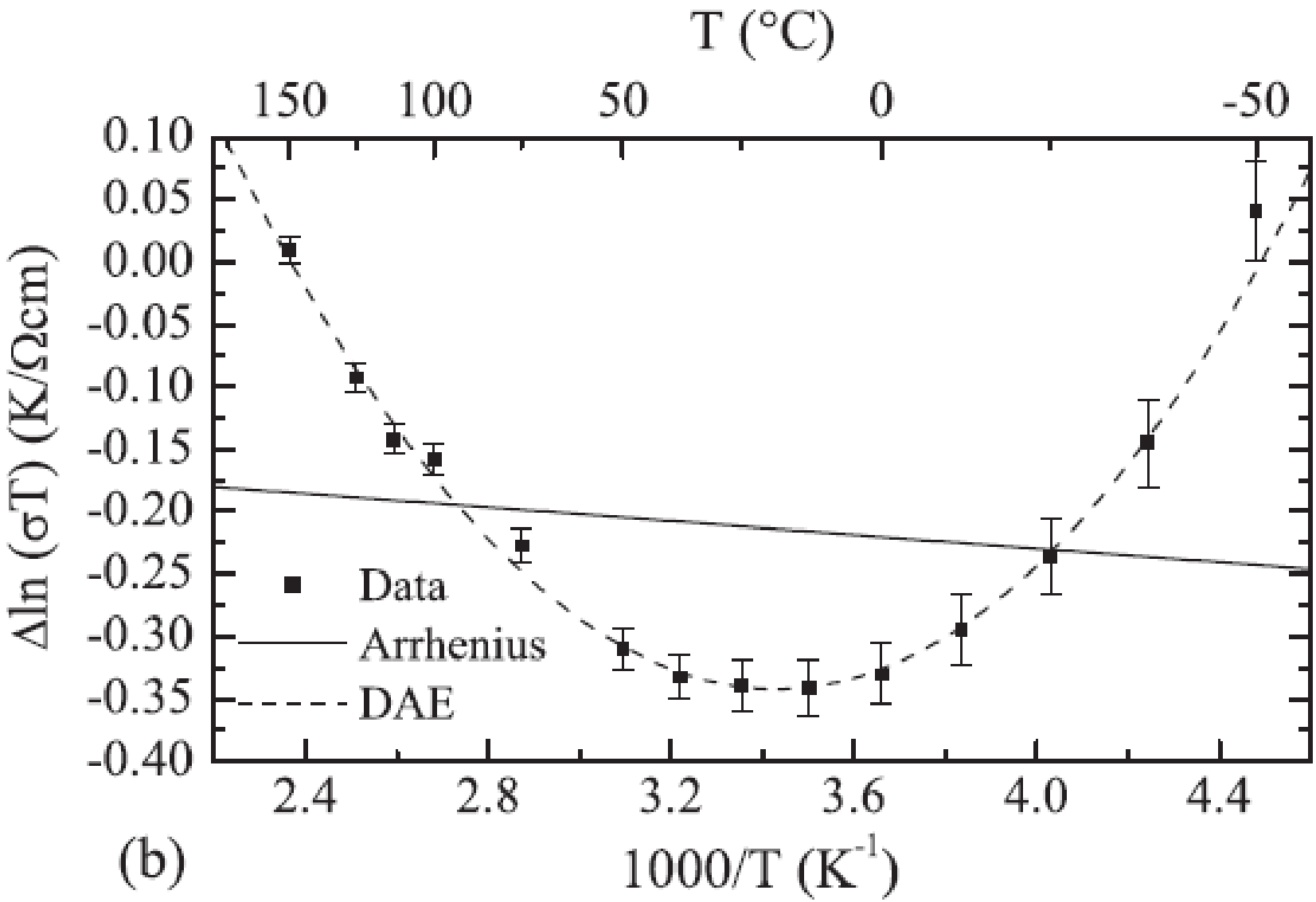
A major bottleneck to developing filters for purifying water is the size of the pores, since they restrict flow of the water. The new materials circumvent this problem by not only enlarging the pore sizes, but also by coating the inside of each pore with polymers that interact favorably with water.

Images draw in viewers



Measuring toxic chemicals' effect on coral

Analyzing pigment in artwork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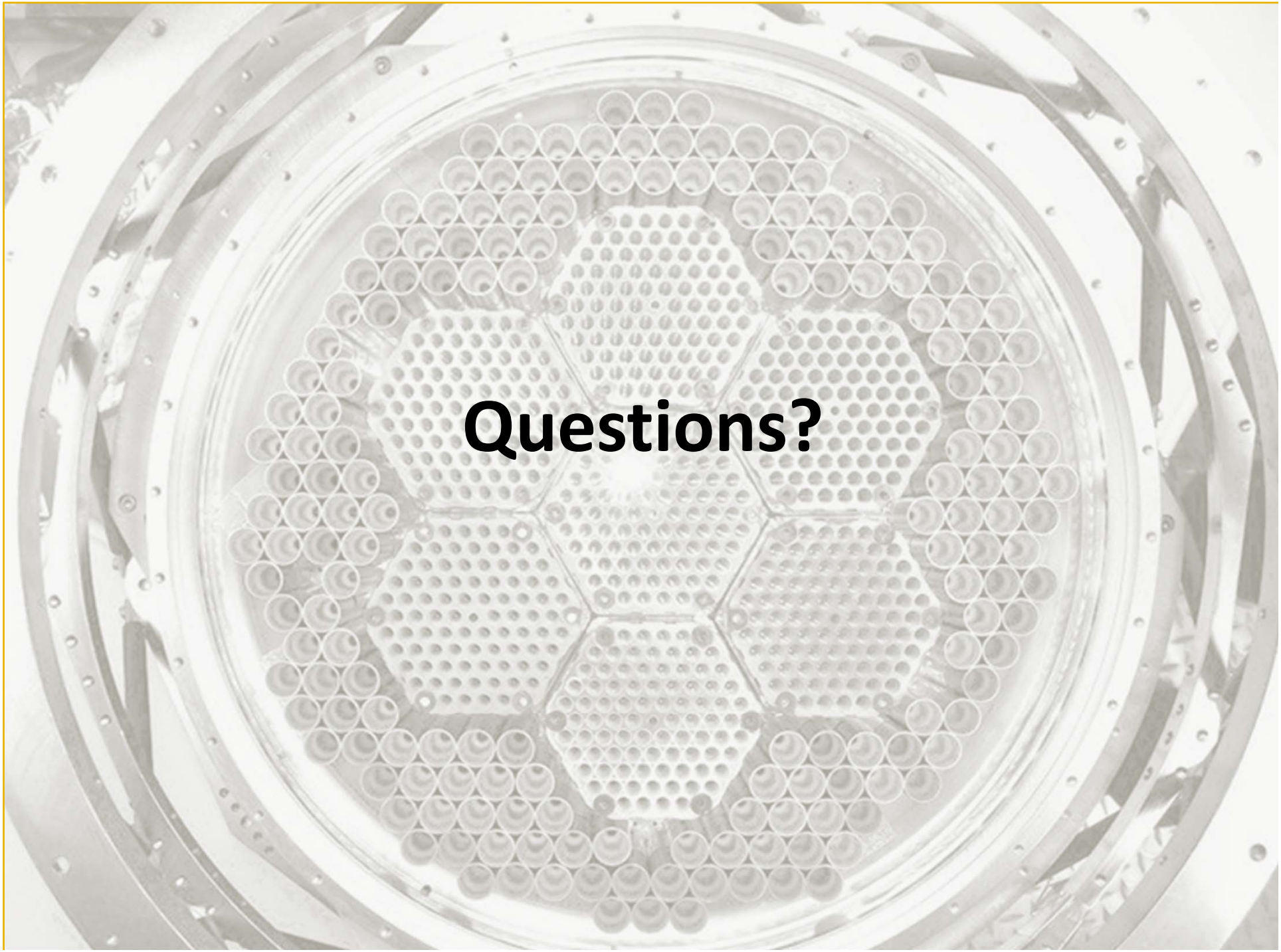
Questions?