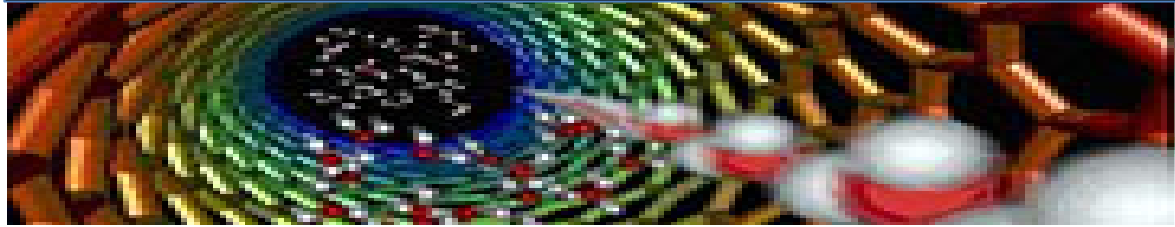




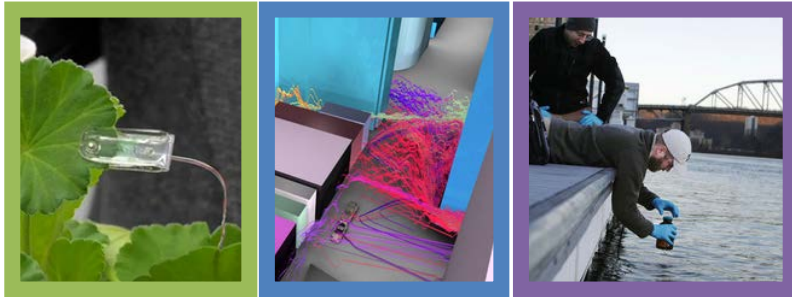
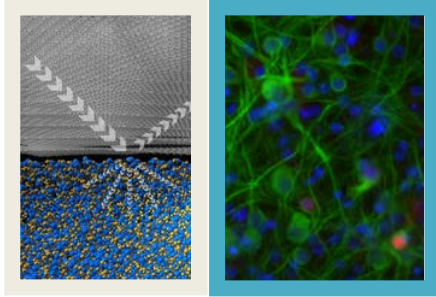
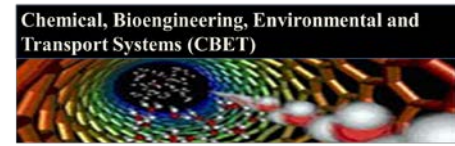
Chemical, Bioengineering, Environmental and Transport Systems (CBET)



NANOTECHNOLOGY PROGRAM

**D.\r. Nora Savage
Program Director
Nano EHS
Interfacial & Transport Processes
Chemical, Bioengineering, Environmental and
Transport Systems (CBET)
Engineering Directorate
National Science Foundation**

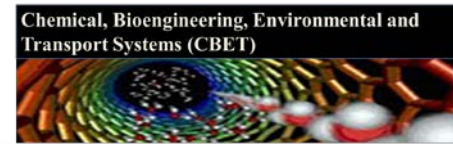
The Directorate for Engineering



Invests in novel:

- Engineering
- Education
- Small Business

National Science Foundation | Directorate for Engineering Chemical, Bioengineering, Environmental, and Transport Systems Division (CBET)



Updated October 2014



Division Director
JoAnn Lighty

Deputy Division Director
Susan Kemnitzer



Chemical and Biochemical Systems

Bioengineering and Engineering Healthcare

Environmental Engineering and Sustainability

Transport, Thermal, and Fluid Phenomena

Vacant

1401 - Catalysis and Biocatalysis
Maria Burka (Acting)



1491 - Biotechnology and Biochemical Engineering
Friedrich Srenc



7644 - Energy for Sustainability
Gregory Rorrer



1407 - Combustion and Fire Systems
Ruey-Hung Chen



1417 - Chemical and Biological Separations
Rose Wesson



5345 - Biomedical Engineering
Thanassis Sambanis



1440 Environmental Engineering
William Cooper



1443 Fluid Dynamics
Dimitrios Panavassiliou



1403 - Process and Reaction Engineering
Maria Burka



7236 Biophotonics
Leon Esterowitz



1179 - Environmental Health & Safety of Nanotechnology
Nora Savage

Vacant

1414 - Interfacial Processes and Thermodynamics
Nora Savage (Acting)



Nano-Biosensing and Age Related Disabilities Engineering
Rajakkannu Mutharasan



7643 Environmental Sustainability
Bruce Hamilton



1415 - Particulate and Multiphase Processes
William Olbricht

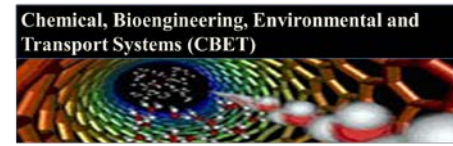


Alex Leonessa

Vacant

1406 - Thermal Transport Processes
Ruey Chen (Acting)

Coordinated Nano Initiatives



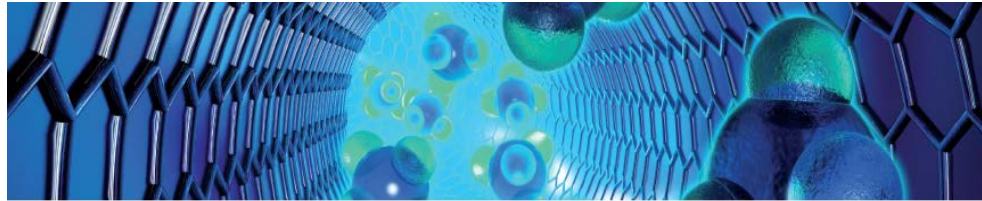
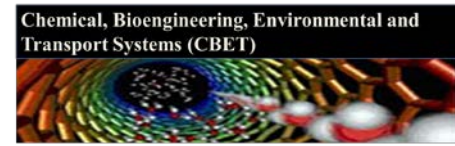
ERA NET SIINN

- 3rd Call

Nanomanufacturing

- ENG multi-division activity

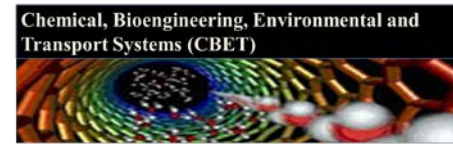
ERA NET SIINN



- NSF, CPSC & NIEHS/NIH
- DCL Issued November 15-022
- 18 Proposals w/ US Teams
- Joint Review end of June
- US at least \$2 M

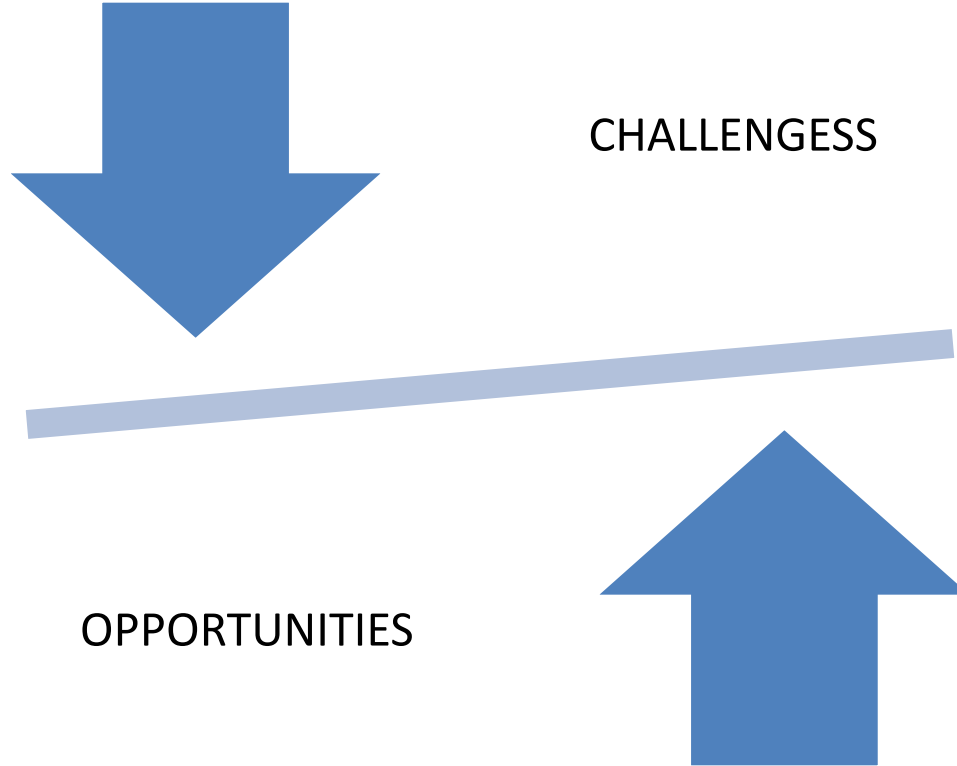
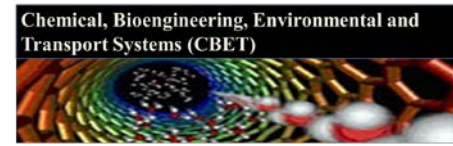


Nanomanufacturing

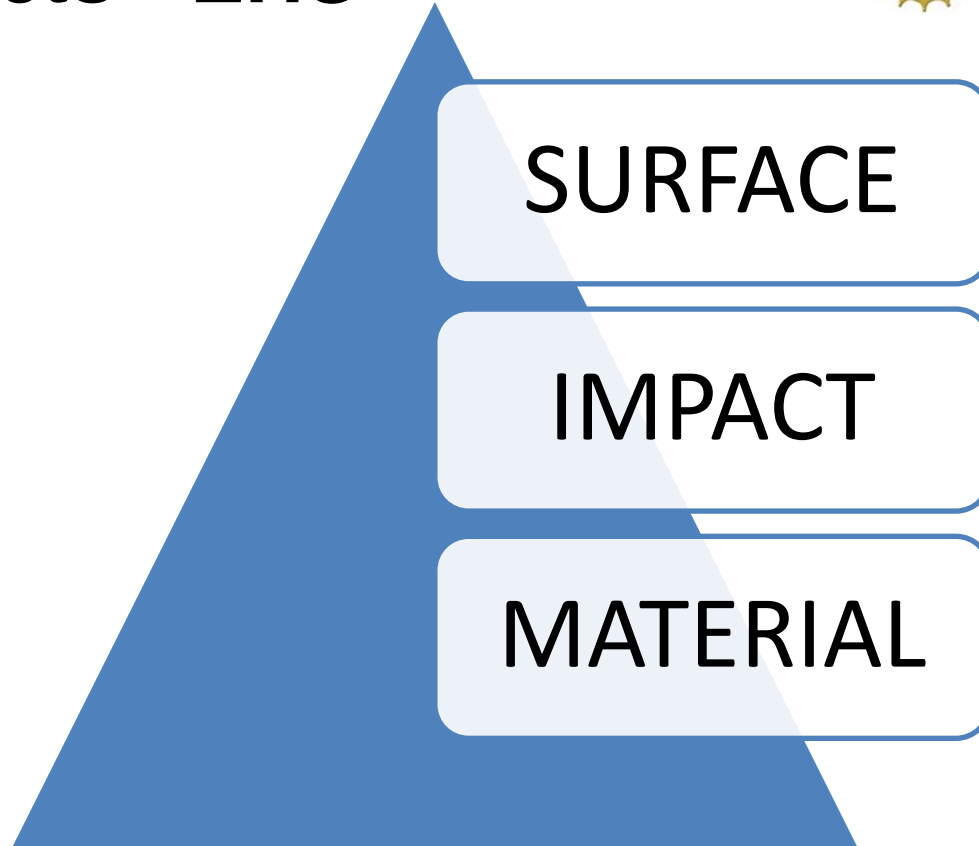
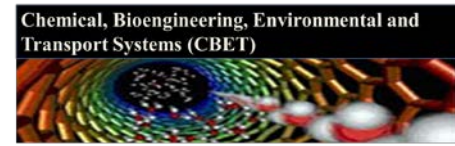


- **Mode of Support: Nanoscale Interdisciplinary Research Teams (NIRT)**
- **Grant: \$1.5M max. over 4 years, \$375K per year**
- **Collaborative: Multi-disciplinary**
- **Overcome barriers to nanomanufacturing w/ environmental considerations**

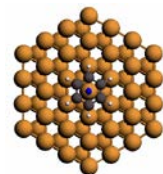
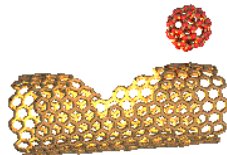
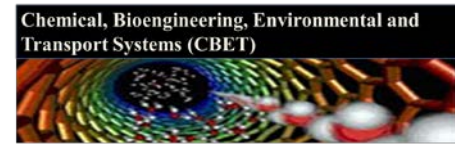
Nano Impacts - EHS



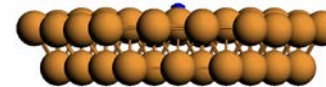
Nano Impacts - EHS



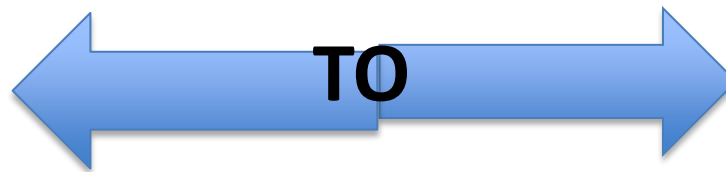
Nano Impacts - EHS



Zurich Research Group

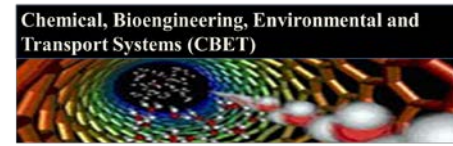


SURFACE



SURFACE

Nano Program

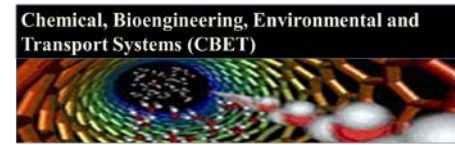


Interfacial Processes & Thermodynamics

Nano Environmental Health & Safety

Interfacial Characterization
Interfacial Dynamics
Surface Properties

Nano Program



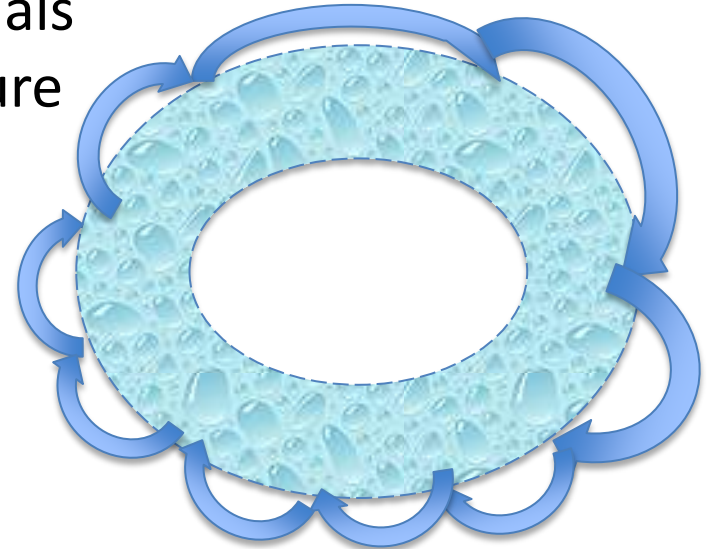
NEW NANO PROGRAM TITLE

...

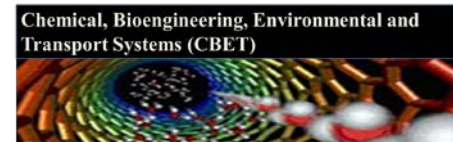
Interfacial Characterization
Interfacial Dynamics
Surface Properties

CORONA

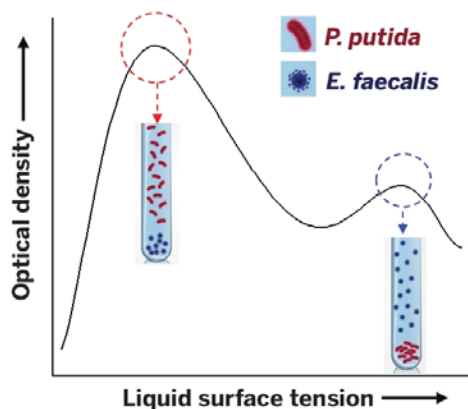
The protein adsorption layer (protein corona)
forms on the surface of colloidal nanoparticles
plays role in interaction with living materials
Biological response resulting from exposure



Yi Zuo-IPT CAREER U of HI



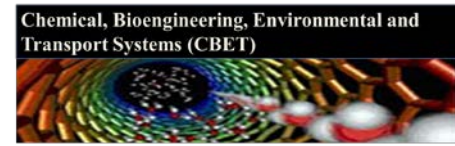
Work on surface free-energies led to new concept of label-free, high-throughput cell-sorting:



Insight: The colloidal stability of a particle suspension depends on the balance between van der Waals attraction and electrostatic repulsion. A minimum van der Waals attraction, and maximum dispersion, can be achieved by dispersing the particles in a liquid medium whose surface tension is close to the surface free-energy of the particles,

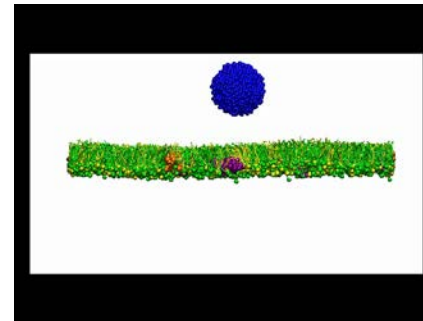
Anal. Chem. 2014, DOI: 10.1021/ac503100a;
C&E News "A Quicker Way To Sort Cells"
<http://cen.acs.org/articles/92/web/2014/09/Quicker-Way-Sort-Cells.html>

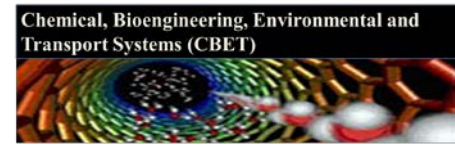
Yi Zuo- Nano EHS U of HI



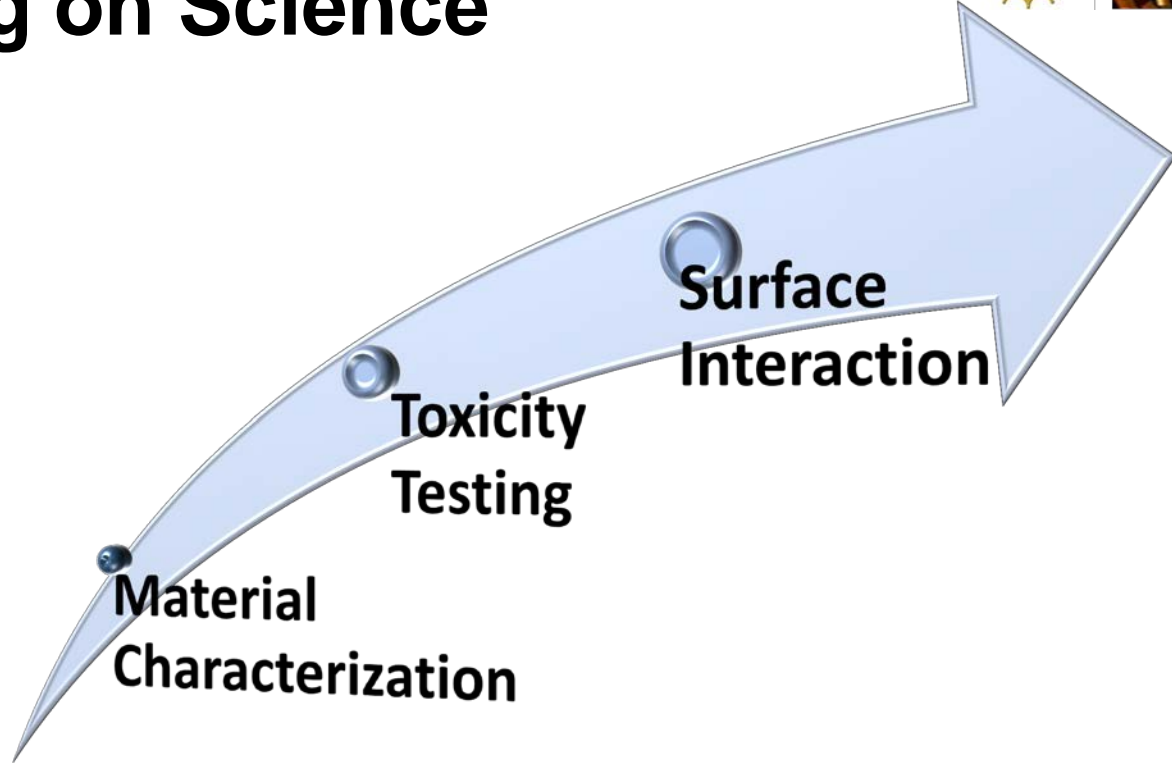
Work on MD simulation of drug/PS film led to nanoparticle/PS film interactions (EHS Nano) highlight

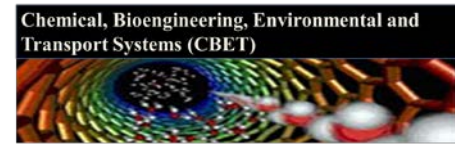
Correlated experimental and computer simulation methods to understand the molecular mechanism of nano-bio interactions. This video clip shows formation of a lung surfactant lipoprotein corona on a negatively charged hydrophobic nanoparticle.



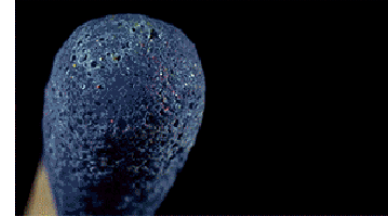


Building on Science





OUR MISSION...



Forge path explore nm surface interaction

- Understand effects of nps
- Design improved nano devices → np addition
- Devise holistic assessment
- Embrace systems approach



THANK YOU

Questions?

