

NCI-SW Site Overview

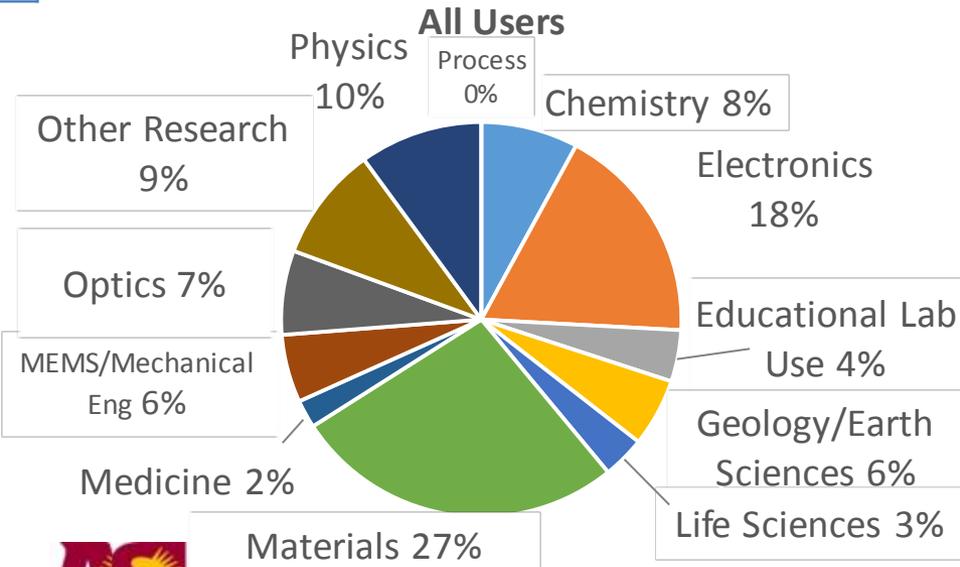
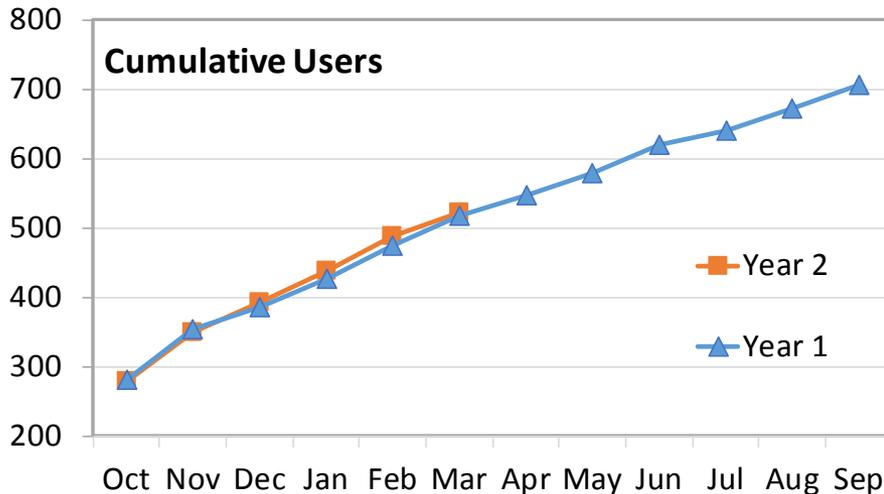
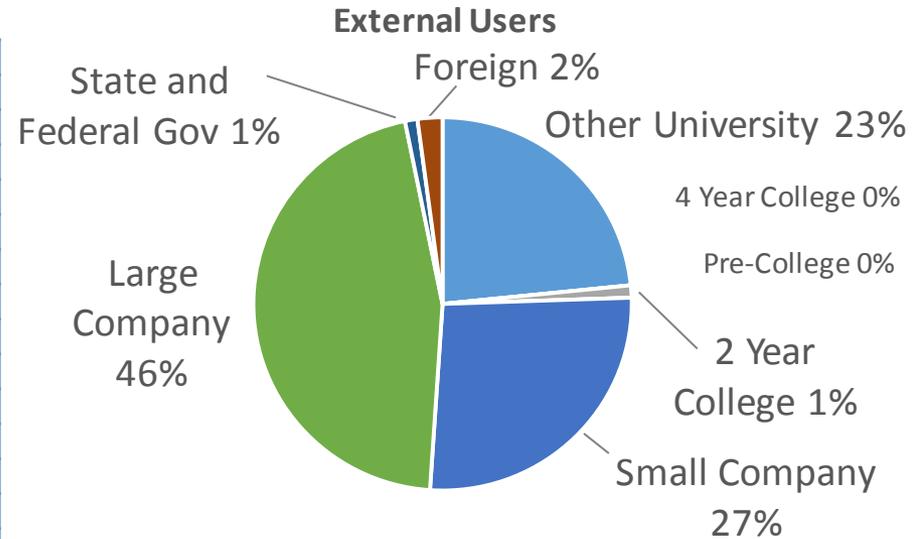
The Nanotechnology Collaborative Infrastructure Southwest (NCI-SW) comprises six research facilities at ASU supported by Science Foundation Arizona and Maricopa County Community College District

- ASU Nanofab
- LeRoy Eyring Center for Solid State Science
- User Facility for the Social and Ethical Implications of Nanotechnology
- Center for the Lifecycle of Nanomaterials in the Environment (new for Year 2)
- Peptide Array Core Facility
- Solar Power Lab



NCI-SW User Data – Year 2

| Yearly User Data Comparison | | |
|---------------------------------------|-------------------|-------------------|
| | Year 1(12 months) | Year 2 (6 months) |
| Total Users | 705 | 522 |
| Internal Users | 536 | 428 |
| External Users | 169 (24%) | 94 (18%) |
| Total Hours | 43,098 | 19,829 |
| Internal Hours | 32,883 | 15,955 |
| External Hours | 10,215 (24%) | 3,874 (20%) |
| Average Monthly Users | 271 | 280 |
| Average External Monthly Users | 43 (16%) | 36 (13%) |
| New Users | 275 | 275 |
| New External Users | 47 (17%) | 18 (7%) |



Facility Upgrades, New Tools, and New Staff

- FEI Titan Krios Cryo TEM
 - 2-3Å resolution in biological macromolecules
 - Single particle analysis of proteins
 - Cryo-electron tomography of cell structures



Dr. Katia March
external user
contact for STEM
applications.



Dewight
Williams will
establish the
cryo-TEM lab.

- AnnealSys rapid thermal processor
acquired through the Defense University
Research Instrumentation Program

Allows precise control of annealing in a variety of atmospheres including argon, oxygen, nitrogen and forming gas.



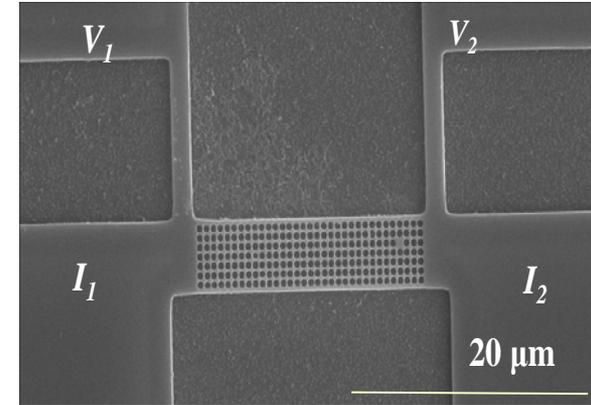
Scott Ageno 30+
years' experience in
the semiconductor
industry

External User Research Highlights

“Study of Nanoporous and Nanograined Materials for Thermoelectric Applications”

Qing Hao, Aerospace and Mechanical Engineering,
University of Arizona

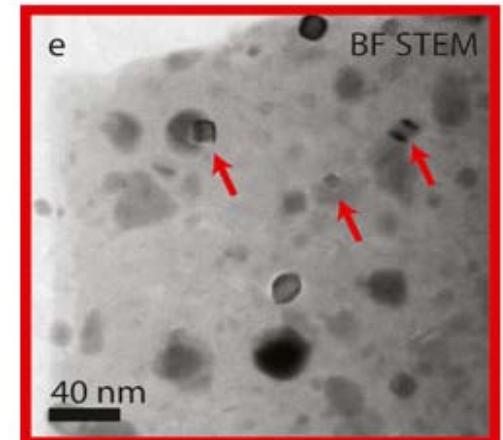
A nanostructuring approach has been used to reduce the thermal conductivity of semiconductor thin films but still maintain the bulk electrical properties.



“In situ experimental formation and growth of Fe nanoparticles and vesicles in lunar soil”

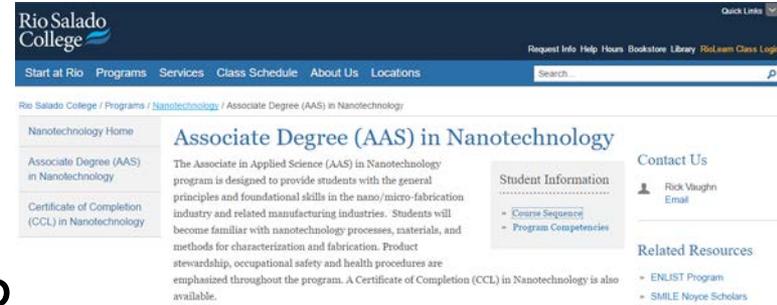
M. S. Thompson, T. J. Zega, U. of Arizona and Jane Y. Howe, University of Toronto

Slow- and rapid-heating experiments were performed inside the transmission electron microscope to understand the chemical and microstructural changes in surface soils resulting from space-weathering processes. Data confirms that the formation of Fe nanoparticles begins at $\sim 575^\circ\text{C}$ and mimics micrometeorite space-weathering processes occurring on airless body surfaces.



Education and Outreach

- Rio Salado College is using NCI-SW laboratories for its 2-year Associate Degree in Nanotechnology
- Remote access sessions with a desktop scanning electron microscope
- Four community college REU students, one iREU from Japan and one RET high school teacher
- Archived webinar series: A total of 287 people registered in advance for the webinars, with 151 watching the live stream and a further 282 viewing the recording.



The screenshot shows the Rio Salado College website. The main heading is "Associate Degree (AAS) in Nanotechnology". Below this, there is a description of the program: "The Associate in Applied Science (AAS) in Nanotechnology program is designed to provide students with the general principles and foundational skills in the nano/micro-fabrication industry and related manufacturing industries. Students will become familiar with nanotechnology processes, materials, and methods for characterization and fabrication. Product stewardship, occupational safety and health procedures are emphasized throughout the program. A Certificate of Completion (CCL) in Nanotechnology is also available." There are also sections for "Student Information" (Course Sequence, Program Competencies), "Contact Us" (Rick Vaughn, Email), and "Related Resources" (ENLIST Program, SMLE Noyce Scholars).



Education and Outreach

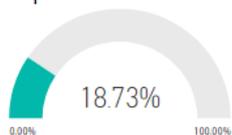
Newsletters

- Contains a mixture of news, research updates from faculty and graduate students, as well as upcoming events
- E-mailed each quarter to a distribution list of over 5,000 individuals
- 17% of the recipients opened the link to review the newsletter on-line

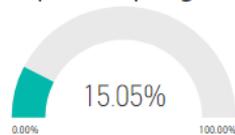
Newsletter Data Summary

| Newsletter | Sent Date | # of Distribution | # Opens | % Opens | Unique Click Throughs | % Unique Click Throughs |
|--------------|-----------------------------|-------------------|-------------|----------------|-----------------------|-------------------------|
| Winter 2016 | Thursday, December 01, 2016 | 5196 | 973 | 18.73 % | 79 | 1.52 % |
| Spring 2017 | Monday, March 13, 2017 | 5144 | 774 | 15.05 % | 136 | 2.64 % |
| Total | | 10340 | 1747 | 33.77 % | 215 | 4.16 % |

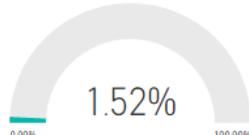
% Opens - Winter 2016



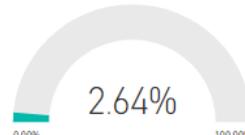
% Opens - Spring 2017



% Click Throughs - Winter 2016



% Click Throughs - Spring 2017



Dear Teachers,

Hello & welcome back to the busy world of NCI-SW. We are very excited to share news with you about happenings with NNCI and in particular, NCI Southwest. Articles today will range from updates from the annual NNCI Meeting to information about the ASU, Solar Power Lab. You'll learn from Susan Bowden, about the purpose, beginnings, and journey of the Quantum Energy and Sustainable Solar Technology (QESST) Engineering Research Center at ASU. Then, our colleague Rick Vaughn will tell you about the exciting work being done with MEMS technology at Rio Salado College, part of the Maricopa County Community College District (MCCCD). Our teammate, Roy Yau, will report out on the happenings at the annual Night of the Open Door, held at Arizona State University campuses. And as the first of a regular series focused on student research projects, PhD candidate Robert Sarkar will share his latest research results using the photolithography and deep reactive ion etching tools in the CSSR cleanrooms to fabricate a unique MEMS based tactile testing device. All in all, a very busy quarter to catch you up on, so let's begin.



revor's Update

to annual meeting of the National Nanotechnology Coordinated Infrastructure (NNCI) as held at Georgia Institute of Technology during 1-19 January.

[read Article](#)



he A SU Solar Power Lab

SU has a long history of developing solar power technology dating back to the energy crisis of the 1970s...

[read Article](#)



IEM 8 Is the Word at Rio Salado College, Maricopa Community College

a unique partnership to give students hands-on learn opportunities.

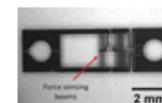
[read Article](#)



light of the Open Door of A SU

annual signature event, where Arizona State University invites the general public to visit all five (5) campuses, to learn about the work and capabilities at the school.

[read Article](#)



colting Student Research

nanocrystalline metals and alloys exhibit a plethora of enhanced mechanical properties like increased strength and toughness.

[read Article](#)

Upcoming

We are very excited to share that NCI-SW with NACK, our colleagues from Penn State, will be offering an exciting webinar on Friday, April 21. As soon as details are confirmed, we will be sure to share them with you.

Network Activities

- Winter School on Responsible Innovation and Emerging Technologies held from 3-10 January at Saguaro Lake Ranch. Thirteen students from four countries participated.



- Science Outside the Lab (SOtL) is a one-week science policy bootcamp for graduate student scientists and engineers at the ASU Washington DC campus during 4-6 June.

Thirteen participants from seven NNCI sites (ASU, Washington, Northwestern, NC State, Minnesota, U-Penn and Nebraska)

- NNCI Workforce Development and Community College Working Group – Dr. Ray Tsui (Chair)

Network Activities

“Research Experiences for Teachers across the National Nanotechnology Coordinated Infrastructure”

Research Experiences for Teachers (RET) in Engineering and Computer Science Supplements and Sites

PROGRAM SOLICITATION
NSF 17-575

REPLACES DOCUMENT(S):
NSF 15-536



National Science Foundation

Directorate for Engineering
Engineering Education and Centers

Directorate for Computer & Information Science & Engineering

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

October 10, 2017

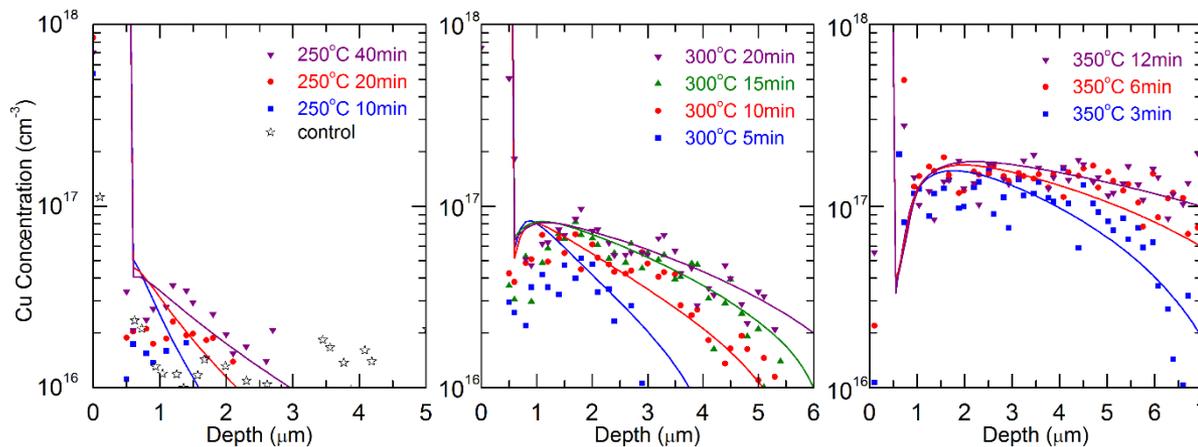
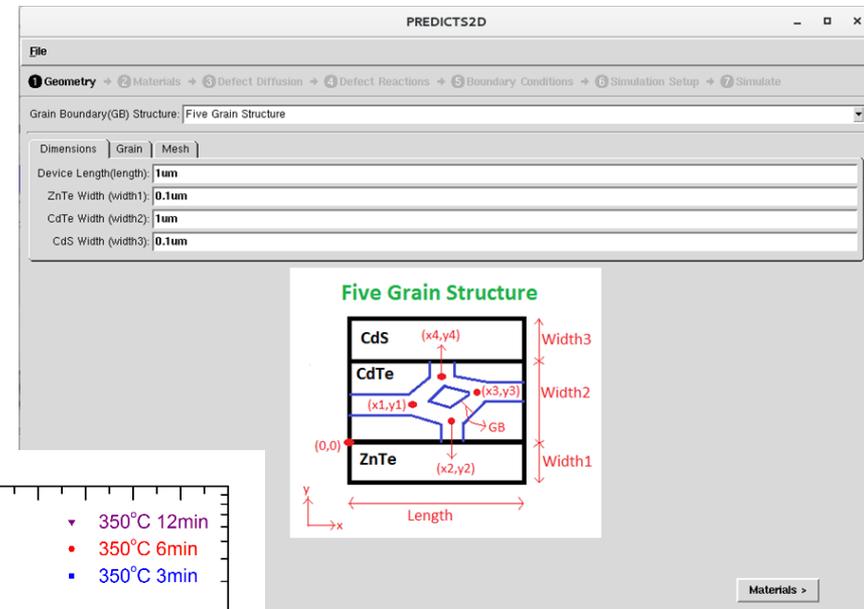
a six-week summer research experience, with continuing support during the following academic year, for 20 high school teachers and community college faculty with projects focused on nanoscale science and engineering

Arizona State University
Georgia Institute of Technology
U. of Minnesota
U. of Louisville
U. of Nebraska, Lincoln.

Computational Activity

PREDICTS2D uploaded to NCN NanoHUB

- Grain boundary simulator
- Developed by NCI-SW co-PI Dragica Vasileska and used by First Solar Inc to explain meta-stabilities resulting from copper doping in CdHgTe solar cells



“Numerical Simulation of Copper Migration in Single Crystal CdTe”
IEEE J. of Photovoltaics, Vol. 6,
pp. 1286-1291 (2016).

New Education and Outreach Concepts

NNCI Workforce Development and Community College Working Group - Recommendations

- A majority of NNCI sites have long-term interactions with local community colleges

NNCI develops a database of community college interactions for all sites?

- A survey of local industry hiring plans is a useful instrument to gauge workforce development needs. Surveys completed within the last 5 years at ASU, GA Tech and U. Penn

NNCI implements an industry survey across all sites?