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nano solutions for mega problems

nano@illinois Research Experiences for Teachers (RET)

Carrie Kouadio
Program Coordinator, Center for Nanoscale Science and Technology (CNST)

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Objectives

• The Center for Nanoscale Science and Technology (CNST) was created as a campus-wide initiative to facilitate research and education in nanotechnology

• To facilitate development efforts to commercialize patentable ideas, processes, and products; through collaborative efforts between academia, industry, and policy makers
Center for Nanoscale Science and Technology

- STEM outreach: synergy with research
- Strong efforts through entire educational pipeline
- Commitment to increasing STEM diversity
  - Nano-CEMMS (2003-2013)
  - NanoSTRuCT (2013-2015)
    - Booker T. Washington STEM Academy
    - Engineering Open House
    - Science at the Market
  - nano@illinois RET (2014-2017)
  - nano@illinois REU (2014-2016)
  - EBICS REU (2011-2020)

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<th>RET/REU Programs</th>
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CMMB: Cellular for Molecular Mechanics and Bionanotechnology-NSF
EBICS: Emergent Behavior of Integrated Cellular Systems- NSF
M-CNTC: Midwest-Cancer Nanotechnology Training Center- NIH/NCI

ENGINEERING AT ILLINOIS

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The **REU: Research Experience for Undergraduates** students are becoming engaged in cutting-edge research in nanotechnology, to solidify their interest in graduate research and education, train them in critical elements of leadership, ethics, teamwork, mentoring, outreach, and improve their ability to communicate their research results to professional and lay audiences. (2014-2017)
NanoSTaCT: Nanoscale Science and Technology Resources for Community Teaching

Training the next generation of leaders in STEM will begin long before students step foot onto a university campus. Excitement about STEM fields is built as children learn about science. To that end, the Center for Nanoscale Science and Technology Student Initiative (CNST-SI) has partnered with Booker T. Washington STEM Academy (BTW) to engage the 3rd grade level with a six-week long program of nanotechnology and STEM themed activities. (2014-15)
The *nano@illinois* Research Experience for Teachers (RET) at the University of Illinois at Urbana-Champaign annually exposes a diverse set of in-service and pre-service science, technology, engineering, and mathematics (STEM) teachers and community college faculty from across the nation to cutting-edge research in nanotechnology.

http://nano.illinois.edu/education/nanoret.html
Participants conduct research in world-class labs and engage in other activities over 6 weeks on a full-time basis, with 4 follow-up sessions during the school year.
The nano@illinois RET: Research Experience for Teachers participants are mentored and trained in broad areas of nanotechnology, as they delve deeper into their chosen area of interest, including nanoelectronics, nanophotonics, nanomanufacturing, nanomaterials, or nanobiotechnology. These participants connect their research experiences and programmatic experiences to their content areas, including physics, chemistry, biology, math, and engineering. The teachers develop high-quality modules based on their experiences.
nano@illinois RET Program (2014-2017)

Program Management

Xiuling Li, PI, Participating Faculty, Electrical and Computer Engineering

Lynford Goddard, co-PI, Participating Faculty, Electrical and Computer Engineering

Irfan Ahmad, Executive Director, Center for Nanoscale Science and Technology

Carrie Kouadio, Program Coordinator, Center for Nanoscale Science and Technology
nano@illinois RET Program (2014-2017)

Overview

- nano@illinois RET runs 2014-2017
- 6 week program: June 13-July 22, 2016
- 8:30 am-6:00 pm generally; other times as well
- Coordinated by the Center for Nanoscale Science and Technology
- Rich professional development activities
- Lab research and related activities, hours determined by mentors

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Logistics

• Stipend: $7000 for practicing teachers, $3500 for pre-service teachers
• $500 directly to school for materials and supplies
• Lab trainings included
• Professional development credits
• Wireless access given
• Participants bring laptop every day
Program benefits

- Hands-on research
- Faculty/peer mentoring
- Professional development
- Networking/social events
- Lab training
- Generous stipend, to be disbursed over duration of program, with final payment after completion of all required responsibilities
- $500 materials support for classroom activities
Requirements

• Work in lab as long as required
• Participate in all program activities
• Products: module, poster, and presentation
• Integrate module into curriculum/use with students
• Gather data about integration
• Create all teacher/student resources for module to disseminate nationally
Products

- Poster, July 22, 2015
- Presentation, July 22, 2015
- Final Module, due May 1, 2017
- Final Session Presentation and Poster, TBD, June 2017 (videoconference attendance for non-local participants)
Module

• A high-quality multi-day instructional module with associated instructional resources that is grounded in the research you conducted throughout the summer and research area you worked in.
Resources will include:
- Presentation
- Teacher Guide
- Student Guide
- Worksheet(s)
- Assessment(s)
- Video
Lessons and modules that are developed will be published through the TeachEngineering online website, a digital library at http://teachengineering.org, nanoHub (www.nanohub.org), and will also be accessible through the University of Illinois Center for Nanoscale Science and Technology (CNST) Resource page (www.nano.illinois.edu). CNST staff will add modules to these websites.
Opportunities

- Rich program
- Professional growth this summer
- Development of modules
- Contributing to STEM education publications
- Presenting at conferences
- Grant-writing
Contact information

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nano@illinois RET Program (2014-2017)

Research Experience for Teachers (RET)

6-week nanotechnology research experience at the
University of Illinois at Urbana-Champaign
June 13-July 22, 2016

Who should apply?
- Applicants must be practicing science, technology, engineering, or
  mathematics (STEM) teachers/community college faculty who have
  bachelor’s degrees or higher in STEM (science, technology, engineering,
  and math) education or a STEM-related field OR pre-service STEM
  teachers who are currently enrolled in an undergraduate STEM
  education program (as a rising junior or higher).
- Applicants must be U.S. citizens, U.S. nationals, or permanent residents.
- Applicants must have an average technical grade point average of 3.0/4.0.
- The selection committee supports diversity among RET participants and
  their school populations.

Benefits include:
- $7000 stipend (teachers)
- $1500 stipend (pre-service)
- Partnership with Summer Research Opportunities Program
- Materials stipend
- Travel support (non-local)
- Room and board
- Hands-on research
- Faculty/Peer mentoring
- Professional development
- Networking

Contact
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CNST
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We would like to thank all RET participants, faculty mentors, research mentors, and staff for their contributions to the nano@illinois RET.

Questions?