

Materials & Nanoscience Outreach News

Materials and Nanoscience outreach and education activities
in Nebraska

Recent Outreach Activities

STEM/Nano Fall After School Program

Faculty members, NCMN students and staff continued the STEM/Nano After School program to junior high students at Culler Middle School this fall. A second club was added each week where presentations were given to students who have limited knowledge of STEM/nanoscience. Information included videos, hands-on activities, giveaways and discussions about graphene, carbon nanotubes, fabrication, light and nanotechnology, aerodynamics, structural design, chemical reactions, Newtonian fluids and a tour of the Nanoscience Center.

Presenters included Professors Alexey Kovalev (Physics), Eva Schubert (Eng.), Stephen Morin (Chemistry), postdocs Tom George (Physics), Wei Xiong (Eng), graduate students Wenjia Hou (Eng), Anil Rajapitamahuni (Physics), and undergraduate students Seth Kurfman and Andrew O'Connell.



STEM Summer Camp at Culler Middle School



This summer a special 3 day STEM camp was provided for LPS' Culler Middle School for over 100 students. Seward high school science teacher Steve Wignall taught the basics of how angles can affect the direction and distance an object can travel and challenged 100+ junior high students perceptions of car crashes and how smart engineering can result in saving lives in real life. This program brought UNL, LPS, and students together for exciting experiences focused on science.



Upward Bound High School Nanoelectronics Camp 2014



NCMN partnered with the Upward Bound program this summer to support student learning in the ever growing area of Nanoelectronics. Topics covered during the 3 day event covered Supercapacitors, Quantum Tunneling Composites (QTC) technology, Graphene, LED's, Batteries, and how these can be incorporated into electrical circuits. Students worked in groups to construct apparatus' for testing or demonstrating concepts and the science background of each analysis technique being used.

Administrative Support Available for NCMN Member Outreach Activities

NCMN offers additional outreach help, including some administrative services to NCMN faculty members in fulfilling the Broader Impacts outreach component in NSF grants. **Contact:** Terese Janovec, Assistant Director and Education/Outreach Coordinator, 855 N. 16th Street, Room N201C, phone: 402 472-2716, fax: 402 472-6148, e-mail: tjanovec3@unl.edu.

Teacher Conferences and Workshops— NAG, AIM, and NATS



STEM/Nano concepts were shared at a variety of teacher workshops and conferences in 2014. In February we participated in the Nebraska Association for the Gifted (NAG) Conference for over 400 teachers and educators. We showcased our nanokits at a booth and Dr. Axel Enders presented a break out session on “Nanotechnology...How to Engage K-12 students” for teachers which provided practical ideas and hands-on activities supporting the “nano awareness” learning process.

In April Dr. Enders was invited to give a presentation to business entrepreneurs at the 2014 AIM/Infotec Conference in Omaha on the scientific trends and product applications of nanotechnology in a variety of areas but specifically in computing technology and what the future might hold for us. AIM is a non profit community organization that promotes technology to empower people, enhance organizations, and create brilliant communities.



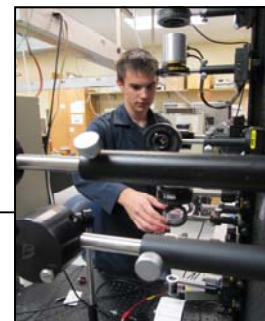
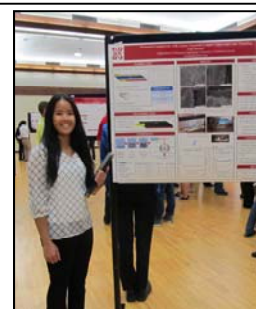
We also provided workshops and an information booth at the annual Nebraska Association of Teachers of Science (NATS) this fall. Dr. Rebecca Lai, UNL Chemistry, and her graduate students explored science topics related to the Harry Potter book series which included new types of invisible ink, concepts behind water resistant and self cleaning maters, and the synthesis of nanogold. Basic STEM/nanoscience concepts using packaged nanokits and hands on activities were also taught by Steve Wignall, NCMN guest lecturer.

High School Summer Internships



Thanks to a generous gift from a UNL Alum our second Summer High School STEM/Nano Internship program was held for 8 weeks from June through July 2014. Select Lincoln area high school students, 16 years and older were eligible and received guidance and training in experimental and theoretical techniques in Chemistry, Physics, and Engineering labs at UNL.

Each high school student had a faculty advisor and a graduate student mentor that worked closely with them on their research project. The program included guest lectures, student research project presentations and a final poster presented at the Nebraska Summer Research Symposium.



NanoDays Big Success again this year!



For the fifth year in a row, NanoDays was held at Lincoln's Gateway Mall and offered fun educational activities about nanoscale science. The event featured 12 stations and included interactive demonstrations and games to engage people of all ages. The first 100 students who visited each of the stations received a free 'I Love Nano' t-shirt and middle and elementary schools with the highest participation were given complimentary educational kits on nanoscience. NanoDays is organized annually by the Nanoscale Informal Science Education Network (NISE Net). Locally it is sponsored by Nebraska EPSCoR in collaboration with the University of Nebraska's MRSEC and NCMN.



Traveling Nano Exhibit Award



NCMN recently received a Nano mini-exhibit from the Nanoscale Informal Science Education Network (NISE Net) and will be partnering with Nebraska Epscor in bringing STEM/nanoscience programming to six Nebraska museums in the state over the next two years. **Nano** is an interactive exhibition that engages family audiences in nanoscale science, engineering, and technology. Hands-on activities present the basics, introduce some real world applications, and explore the societal and ethical implications of this new technology. Host museums include the Wayne State College Museum, the Strategic Air & Space Museum, Hastings Museum, Edgerton Explorit Center in Aurora, Kearney Area Children's Museum, and the Eleanor Barbour Cook Museum in Chadron.

NISE Net is a national community of researchers and informal science educators dedicated to fostering public awareness, engagement, and understanding of nanoscale science, engineering, and technology. NISE Net has made available a limited number of mini exhibits to support initiatives by NISE Net partners. NISE net, originally launched in 2005, is funded by NSF.

Partnership with Hasting Museum



A grant from the Nanoscale Informal Science Education Network (NISE Net) in 2014 expanded our STEM

Nano learning experiences to new rural areas where audiences are underserved in terms of science opportunities. Partnering with Hastings Museum we showcased 14 Nanoart pictures created from actual research at the University along with several nano activity kits this summer. Museum staff were trained to make presentations to thousands of visitors over the summer. The exhibit was held in conjunction with the Museum's showing of National Geographic's new IMAX movie "Unseen World".

Outreach Recognition

Many faculty, postdocs, and students contributed to the success of our educational outreach efforts in 2014. We recognized 4 outstanding faculty this year with our NCMN Ambassador Award plaque. They were Eva Schubert (Eng.), Steve Ducharme (Physics), Christian Binek (Physics), and Rebecca Lai (Chemistry). Another 15 faculty received thank you certificates.



Dr. Axel Enders, NCMN Outreach Chair with his award certificate

NCMN Outreach Upcoming Events 2015

Nebraska Robotics Expo
February 21
Strategic Air & Space Museum

Nebraska Association for the Gifted Conference (NAG)
February 26 & 27
Embassy Suites, Omaha

NanoDays
Gateway Mall
April 2015

Nano Mini Exhibit
March-May
Wayne State College Museum

Nano Mini Exhibit
June-August
Strategic Air & Space Museum

Nebraska Center for Materials and Nanoscience *Bridging Nanoworld Opportunities in Nebraska...*

The Nebraska Center for Materials and Nanoscience (NCMN) at the University of Nebraska is a multidisciplinary research organization involving 85 faculty members from the Departments of Physics and Astronomy, Chemistry, Electrical Engineering, Mechanical and Materials Engineering, Chemical & Biomolecular Engineering, and others. The NCMN strives for excellence in research, graduate and postdoctoral education and service in materials science and engineering, and nanoscience. It is on the forefront of research in a high-priority national program, the National Nanotechnology Initiative. The NCMN also works with state and national industries in support of Nebraska's overall economic development.

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