

SPECIAL POINTS OF INTEREST



Network Science Center at West Point



Advancing the Study of Network Science

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Network Science in Education

Last month, in conjunction with NetSci 2012, the Network Science community held the first NetSciEd satellite symposium on education to highlight current efforts to infuse Network Science into K-16 education and to discuss how researchers could further develop outreach opportunities. Education outreach is an important goal of the Network Science Center. To prepare the next generation of network scientists and military officers capable of operating effectively in a complex, network-centric environment, NSC faculty has completed several outreach activities for students from all over the United States. The classes and activities which are built on universal student knowledge

and using networks to look at cooperation within a team. Working on these problems using this new network perspective brought about a shift in how to approach problem solving.

With the advancement and accessibility of technology today, the spread of social networking is of major interest to the high school students. Facebook, Twitter, and other social media sites connect them to people and ideas like never before. Lori Sheetz teaches another class to high school students which highlights social networks and uses the students' facebook connections to learn network properties like centrality, transitivity, and degree of separation. The students use an API to input their facebook information into a network visualization program. The students get firsthand experience using technology and they also get a firsthand look at what those properties represent within their own ego network.

Networks are an effective tool to teach STEM to a younger level as well. A group of over one hundred middle school students from around the United States were selected to travel to New York and participate in the Middle School STEM program at West Point. One of the activities these students participated in was a QR code scavenger hunt where they learned about engineered networks and networks found in

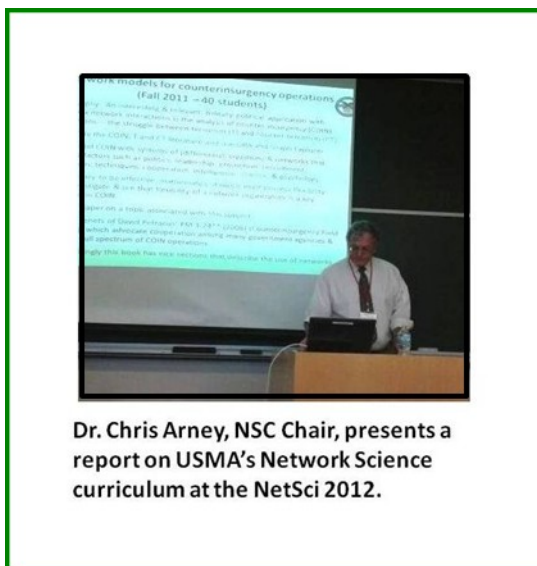
See website for more information:

www.netscience.usma.edu

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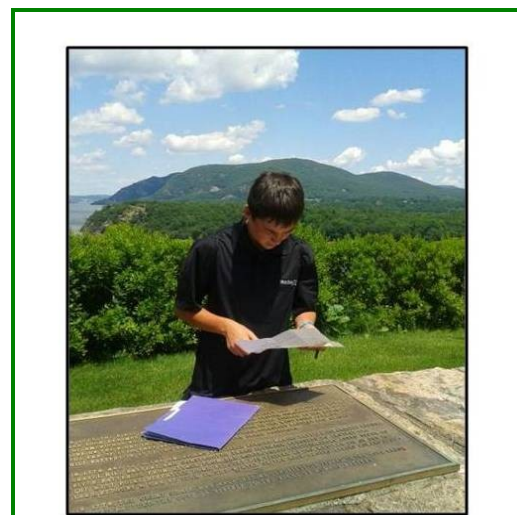
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Dr. Chris Arney, NSC Chair, presents a report on USMA's Network Science curriculum at the NetSci 2012.

and behavior, introduce the students to network terminology, properties and problem solving skills.

Dr. Chris Arney, Chair and Director of Curriculum Integration and Interdisciplinary Activities, had the opportunity to present information about some of the undergraduate classes being taught at West Point as part of an effort to teach a technical knowledge of network science to the next generation of leaders. He spoke on the importance of expanding undergraduate classes to include modeling, analyzing, and understanding large dynamic systems and networks. The network science classes at West Point are being team taught by faculty from both the Math and Behavioral Sciences and Leadership Departments. At the end of his talk he discussed ideas on how to bring these con-



A middle school student takes time to chart out route on the QR code scavenger hunt.



High school students learn network modeling during Summer Leaders Seminar

cepts to younger students.

Dr. Arney introduced high school juniors to network modeling during a math class as part of the Summer Leaders Seminar, SLS. The students used an oil/gas flow network to define the components of a network and then used this new knowledge to look at a variety of problems including: planning efficient routes, solving systems of equations within a flow network, tracking

nature, attributes and properties of networks, and why scientists want to study network behavior. The stations had QR codes which used email, voicemail, SMS, and internet to allow teams to communicate ideas and pictures as they were on the "hunt" to find the shortest distance through the network. Led by Ms. Sheetz, these students were able to explore West Point while expanding their knowledge of why we study networks and network involvement in our everyday lives.

Since we are surrounded by networks every day, from social and neural networks to power grids, transportation systems and the Internet, students of all levels already use and have a general knowledge of networks. Their behavior along with the inherent interdisciplinary nature of Network Science makes it the ideal tool to teach basic Science, Technology, Engineering, and Mathematics (STEM) principles. By leveraging the knowledge, ideas, and creativity of the NSC faculty, the Network Science Center is in a unique position to lead in the development of curricula to produce a new generation of students and leaders with the ability to think in terms of networks and complex systems.

The Erdos-Rényi Prize:

This prize recognizes a scientist making contributions in the field of Network Science at the young age of under 40 years old. Named after Paul Erdos and Alfred Renyi the award recognizes the progress both theoretical and experimental that a young scientist is achieving. This year's recipient Roger Guimera is known for his major contribution in the development of cartographic methods for the characterization of large complex models. Even at a young age, many are making a difference and progressing the study of network science. This provides encouragement and motivation for the younger generation of network scientists that are evolving through the STEM education.

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