



**ADMISSIONS** **ACADEMICS** **MILITARY** **ATHLETICS** **LEADERSHIP** **COMM.**  
**ABOUT US**

## News

### USMA's Newest Academic Minor: Network Science

Network Science is a popular interdisciplinary subject in universities around the world. Many universities have at least one, sometimes several, research institutes on the subject and graduate programs that involve elements of Network Science. The US military sponsors many projects and initiatives in the Network Science research areas. Network Science topics have been taught in courses in many disciplines for decades but they never had a focused home or title. Northeastern University now offers a PhD in the subject and the Naval Postgraduate School has recently established a graduate certificate. China's universities seem to lead the way in this interdisciplinary education topic, with numerous programs and entire colleges devoted to the subject. However, most of this recent ground-breaking action has been either at the graduate level or in other countries. Starting next year, as the USMA Class of 2017 looks at their disciplinary offerings, they will find an exciting and modern five-course minor in Network Science. This undergraduate program may be one of the very first at the undergraduate level with that specific Network Science title. (U/Penn and other Ivies and technical schools often have networking programs in engineering and applied sciences programs, but are usually not titled or as broad as Network Science.)

USMA has been the home of the West Point Network Science Center for the past five years. The current faculty members at the Academy that perform this state-of-the-art research and teach the Academy's Network Science courses are considered national experts, not only in military system networks, but in many areas and topics in Network Science. Net-centric warfare, modern intelligence analysis, and mission command, as doctrinal elements of US Army operations, are directly impacted by Network Science theory and practice. So much so, the Army has made Network Science one of its top-funded research areas. With networks becoming increasingly prevalent on the battlefield and in garrison, it is not surprising that Network Science is considered a valuable intellectual and problem solving tool for future Army officers. Processing, interpreting, and making informed decisions based upon network analysis are skills officers can use to develop and perform their leadership duties. From a social perspective, network thinking is an empowering element of leadership and management. The ability to understand and use network modeling are important skills in today's Army. This minor provides cadets with an understanding of diverse and complex networks, highlights key topic areas, discusses the development of current and future tools in Network Science, and introduces intellectual challenges that require further investigation. Through this exciting minor, cadets have the opportunity to become leaders who are able to address the complexity of the Army's future challenges.

### Network Science in High School

The Network Science Center has been working with New York Hall of Science(NYSCI), Boston University, Binghamton University, and local schools on a project called NetSci High to bring the study of networks to high school students. The goal of this effort is to prepare the next generation of scientists and policymakers to understand and solve some of the world's most complex problems.

In a recent article on **Huffington Post's Impact X**, Dr. Steve Uzzo, VP, Science & Technology,

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NYSCI and coPI for the NetSci High project, shared the impetus behind the project, emphasized future goals, and highlighted some of the initial results of the program which indicate that:

- Network science is teachable to diverse groups of high school students and is a compelling way into understanding complex data-driven sciences that motivates and empowers students to solve real-world, complex problems,
- Network science motivates students to learn computer programming through purposeful research projects, even students who did not think of themselves as computer programmers, and
- Network science represents a way to increase interest in science, technology, engineering and math among underrepresented populations (minorities, females, and first generation immigrants).

For more information about NetSci High visit the website:

<https://sites.google.com/a/nyscience.org/netscihigh/home>

## NSC team creates ORCA software to help combat criminal street gangs

We are pleased to announce our some of our latest research in social network mining with the ORCA (Organizational, Relationship and Contact Analyzer) software that is designed to help law enforcement personnel better combat criminal street gangs. We are actively working with a major American police department to field this package. A recent paper on ORCA was accepted to the FOSINT-SI conference held in Niagara Falls this August (<http://fosint-si.cpsc.ucalgary.ca/>). A pre-print of this paper is available online (<http://arxiv.org/abs/1306.6834>).

To learn more about this project please read the articles in BBC

<http://www.bbc.com/future/story/20130709-unmask-crime-networks-with-data/>

and the MIT technology review

<http://www.technologyreview.com/view/516701/how-military-counterinsurgency-software-is-being-adapted-to-tackle-gang-violence-in/>

## International Workshop on Network Science

The International Workshop on Network Science was held April 29- May 1 at Hotel Thayer. The three day workshop included was kicked off with a welcome speech and activity from COL John M. Graham. The keynote speakers discussed advances in Network Science Research. The first speaker, Dr. Boleslaw K. Szymanski, (Dept. Computer Science, RPI) gave a talk titled 'Impact of Social Networks on Human Mobility and Consensus', Dr. Bruce J. West (ARO) gave the Tuesday keynote speech discussing 'Complex Networks: Individuality, limitation and Influence'. Dr. Chris Amey (Network Science Center and Math Dept. at West Point) gave the Tuesday luncheon speech 'Network Science: Interdisciplinary Problem Solving Tools' and finally, Dr. Erik Mettala (Advanced Coordination Technologies) opened the last day of the workshop with his keynote speech, which was a great wrap up to the keynote speeches. Participants included West Point faculty Dr. John James, LTC Tony Johnson, Dr. Charles Thomas, MAJ Paulo Shakarian, Dr. Kate Coronges, Dr. Cyril Cassagnes and COL Kevin Huggins as well as researchers from the United States and overseas.

## Projects Day

The NSC presents the Network Science Excellence Award which is awarded each year to NSC cadets who work diligently on network science related projects. The projects are judged by a panel. This year the judges were Dr. Scott Fish (University of Texas), Dr. Steve Uzzo (NY Hall of Science), Ms. Catherine Cramer (NY Hall of Science), and Dr. John James (Network Science Center). There were seventeen projects from multiple departments judged this year. The judges stated they had a difficult time choosing the winners and as such there were four winners, two of which were tied for second place.

### 1st Place:

Leveraging Host Protein Network Topology to Identify Cancer-Causing Pathogens. Speaker: CDT