Argonne National Laboratory

Argonne National Laboratory is the nation's first national laboratory, chartered in 1946. It's a U.S. Department of Energy laboratory managed by UChicago Argonne, LLC. In 2008, *The Scientist* ranked Argonne in the top 20 best places for postdocs to work.

Recognized for its excellence in connecting basic research to innovative technology, Argonne is a direct descendant of the University of Chicago's Metallurgical Laboratory, part of the World War Two Manhattan Project. It was at the Met Lab where, on Dec. 2, 1942, Enrico Fermi and his band of about 50 colleagues created the world's first controlled nuclear chain reaction in a racquets court at the University of Chicago. Fermi believed that a collaborative approach to science would deepen understanding and result in greater value. Over the years, Argonne has embraced Fermi's beliefs, creating one of the world's broadest scientific institutes, bringing together many areas of science, engineering and technology.

Today, the laboratory has approximately 2,800 employees, including about 1,000 scientists and engineers, of whom about 750 hold doctorate degrees. Argonne's annual operating budget of about $530 million supports upwards of 200 research projects, ranging from studies of the atomic nucleus to global climate change research. Since 1990, Argonne has worked with more than 600 companies and numerous federal agencies and other organizations. The Laboratory hosts several thousand visiting scientists each year, and views postdocs as an integral and important part of its R&D.

Argonne occupies 1,500 wooded acres in DuPage County, Ill. The site is surrounded by forest preserve about 25 miles southwest of Chicago's Loop.

The Argonne Vulnerability Assessment Team

The Vulnerability Assessment Team (VAT) was located at Los Alamos National Laboratory from 1992 to 2007. In October of 2007, the VAT moved to Argonne National Laboratory, where it has approximately 5000 square feet of classified and unclassified laboratory space and offices.

The award-winning VAT undertakes cutting-edge R&D in physical security, nuclear safeguards, cargo security, intrusion detection, and

product tampering & counterfeiting. This includes studying human factors in security, developing novel security devices and strategies, and finding vulnerabilities and suggesting countermeasures for a wide range of physical security devices such as tags, seals, locks, biometrics and other access control devices, RFIDs, contact memory buttons, GPS, and nuclear safeguards equipment.

   The VAT has been called "[probably] the most impressive physical security research team in the world…" by Prof. Ross Anderson, Cambridge University (http://www.lightbluetouchpaper.org/2006/11/07)   More information about the VAT can be found at http://www.ne.anl.gov/capabilities/vat/index.html and via email at rogerj@anl.gov.

   A security clearance is not required for the following projects, but might be obtained during the course of the work. Argonne is quite flexible on start dates.

   Project 1, Guard Turnover Rates (Social Sciences) - The high turnover rate for proprietary guards (40%-400% per year) is not just a huge economic problem, it is also a serious security problem. The techniques of Industrial/Organization Psychology have successfully reduced employee turnover rates in many different industries, but have not been applied to any extent to the field of security. This project investigates whether these pre- and post-hire methods can help reduce turnover.

DHS Research Areas: Social, Behavioral, and Economic Sciences; Human Factors

Mentor: Roger G. Johnston, Ph.D., CPP

Project 2, Cognitive Dissonance (Social Sciences) - The most difficult challenge for a vulnerability assessor isn't finding security vulnerabilities or suggesting fixes, it's typically getting organizations (especially government and large organizations) to acknowledge the vulnerabilities and seriously consider implementing countermeasures. Anecdotally, cognitive dissonance seems to play an important role, particularly in ignoring the insider threat. This project investigates resistance to making improvements

in physical security, and tries to determine if cognitive dissonance is indeed a factor. The goal is to find ways to make it easier for vulnerability assessors to encourage security managers and organizations to make prudent security improvements.

DHS Research Areas: Social, Behavioral, and Economic Sciences; Human Factors

Mentor: Roger G. Johnston, Ph.D., CPP

Project 3, Seal Inspections (Social Sciences) - Most tamper-indicating seals are still inspected manually. Whether seals are manually inspected, or inspected using an automated reader, we know that some people are good at spotting seals or containers that have been tampered with, while others are not. We don't know why. This project attempts to understand what good seal inspectors are doing differently, or what attributes they possess, that make them effective. The hope is that what we learn can help us choose seal inspectors, and improve the training for those chosen.

DHS Research Areas: Social, Behavioral, and Economic Sciences; Human Factors; Maritime & Port Security

Mentor: Roger G. Johnston, Ph.D., CPP

Project 4, Novel Physical Security Devices (Physics/Electrical Engineering/Computer Science) - This project involves designing, constructing, and testing a wide range of novel prototype microprocessor, optical, and radio-frequency devices for physical security. Applications include cargo security, intrusion detection, access control, GPS, nuclear safeguards, and detecting product tampering & counterfeiting.

DHS Research Areas: Maritime & Port Security; Food & Agricultural Security

Mentor: Jon S. Warner, Ph.D.

Project 5, Product Tampering & Counterfeiting (Physics/Engineering/Business) - Current approaches to product tampering and counterfeiting are wholly inadequate to the challenge. This project involves developing new and better approaches.

DHS Research Areas: Food & Agricultural Security; Maritime & Port Security

Mentor: Jon S. Warner, Ph.D.
Co-Mentor: Roger G. Johnston, Ph.D., CPP

Project 6, Better Approaches to Protecting Security Hardware (Physics/Engineering/Nuclear Nonproliferation) - There are better possible approaches to securing monitoring hardware such as CCTV, radiological/chemical/biological monitors, nuclear safeguards equipment, and biometrics & other access control devices. This project involves developing and testing novel strategies and hardware.

DHS Research Areas: Maritime & Port Security; Infrastructure Protection; Chemical Threats & Countermeasures; Biological Threats & Countermeasures

Mentor: Roger G. Johnston, Ph.D., CPP
Co-Mentor: Jon S. Warner, Ph.D.