University of Nevada, Las Vegas (UNLV)
Howard R. Hughes College of Engineering

Overview of Security Engineering Research

http://engineering.unlv.edu/
Engineering various security systems are of the utmost importance to our State of Nevada as well as the nation. UNLV researchers have been addressing many challenges related to security engineering. This research has addressed questions related to many fields, including blast containment, shock mitigation, and smart grid security. Our researchers have been funded by various federal and state agencies as well as industrial partners.

We would like to introduce you to some of our researchers. Please feel to contact us if we can help with future collaboration.

http://engineering.unlv.edu/
Why UNLV?

UNLV has a strong team of researchers who have collaborated on various areas of security engineering studies.

UNLV researchers also have developed strong collaboration with key industrial partners including:

- **National Security Technologies, LLC (NSTec):** NSTec manages operations at the Nevada National Security Site (NNSS) -- formerly known as the Nevada Test Site -- and its related facilities and laboratories for the Department of Energy's National Nuclear Security Administration.

- **Varian Medical Systems:** Varian's Security and Inspection Products group, based in Las Vegas, provides cargo screening systems with linear accelerators for X-ray imaging for cargo screening operations.

UNLV is in the process of acquiring a linear accelerator, K9, which can be used for various applications, including cargo imaging for Homeland Security and U.S. Customs; we are also involved in radio-pharmaceutical production and medium-to-high dose rate research.
Security Engineering Research at UNLV

Our researchers have been involved in the development of many key security technologies.

Security Engineering research is a collaborative effort among faculty of the:

- Department of Electrical and Computer Engineering
- Department of Mechanical Engineering
- School of Computer Science
- Center for the Advanced Study of Algorithms (CASA)
- Center for Information and Communications and Technology (CICT)
- Center for Materials and Structures
- Energy Materials Interaction Technology Initiative of Nevada (EMITION) Center
Faculty involved in Security Engineering Research

- **Dr. Wolfgang Bein**  
  Professor, School of Computer Science  
  Director, Center for the Advanced Study of Algorithms (CASA)

- **Dr. William Culbreth**  
  Associate Professor, Department of Mechanical Engineering

- **Dr. Yingtao Jiang**  
  Associate Professor, Department of Electrical & Computer Engineering

- **Dr. Juyeon Jo**  
  Associate Professor, School of Computer Science

- **Dr. Yoowan Kim**  
  Associate Professor, School of Computer Science

- **Dr. Shahram Latifi, P.E.**  
  Professor, Department of Electrical & Computer Engineering  
  Director, Center for Information and Communications and Technology (CICT)

- **Dr. Brendan J. O’Toole**  
  Associate Professor, Department of Mechanical Engineering  
  Director, UNLV Center for Materials and Structures

- **Dr. Emma Regentova**  
  Associate Professor, Department of Electrical & Computer Engineering

- **Dr. Stephen Rice, CPHIT, P.E.**  
  Professor, Department of Mechanical Engineering

- **Dr. Aly Said, P.E.**  
  Assistant Professor, Department of Civil and Environmental Engineering

- **Dr. Robert Schill**  
  Professor, Department of Electrical & Computer Engineering  
  Director, Energy Materials Interaction Technology Initiative of Nevada (EMITION) Center

- **Dr. Ying Tian**  
  Assistant Professor, Department of Civil and Environmental Engineering

- **Dr. Mohamed Trabia**  
  Professor, Department of Mechanical Engineering  
  Associate Dean for Research, Graduate Studies, and Computing
Dr. Wolfgang Bein
Professor, School of Computer Science
Director, Center for the Advanced Study of Algorithms (CASA)

- Sensor networks
- Open Source Algorithm implementation
- Survey articles on issues in security
- Design of highly competitive online algorithms against different adversaries
- Smart use of randomization
- Approximations for hard combinatorial optimization problems

Email: wolfgang.bein@unlv.edu  Phone: (702) 895-1477
Security Engineering Research at the HRH College of Engineering, UNLV

**Dr. William Culbreth**  
Associate Professor, Department of Mechanical Engineering

**Mr. Daniel Lowe**  
Mr. Robert O’Brien  
Research Engineers, Department of Mechanical Engineering

- Computational modeling of radiation transport and nuclear criticality problems
- Experimental assessment of radiation detectors
- Active neutron interrogation and detection of Special Nuclear Material
- Dense Plasma Focus accelerator development for neutron production
- Design of alpha detectors for airflow measurements
- UAV flights and novel radiation detector development for UAVs
- Geologic nuclear reactor modeling

Email: william.culbreth@unlv.edu  
Phone: (702) 895-3699
Dr. Yingtao Jiang
Associate Professor, Department of Electrical & Computer Engineering

- Sensor technologies and instrumentation for safety monitoring and process control of nuclear reactors
- Radiation shielding materials, including nano-material-enhanced shielding
- Development of detection algorithms and adaptive signal processing
- Uncertainty reduction for quantification of spent nuclear fuel

Email: yingtao.jiang@unlv.edu  Phone: (702) 895-2533
Dr. Juyeon Jo  
Associate Professor, School of Computer Science

- Secure and Reliable Communication Protocol for UAV (Unmanned Aerial Vehicle)
- Critical infrastructure/ smart grid security
- Man-In-The-Middle (MITM) Attack with a Tempered SSL Certificate Detection
- Thwarting DDoS (Distributed Denial-of-Service) Attack
- Digital Search Warrant
- Transportation Security Imaging and Secure Communication Software Development
Dr. Yoohwan Kim
Associate Professor, School of Computer Science

- Secure protocol development for software and network applications
- Critical infrastructure / smart grid security and privacy
- Wireless mesh network routing and security
- DDoS (Distributed Denial of Service) attack prevention
- Secure and reliable communication scheme for UAV (unmanned aerial vehicle)
- Airport security inspection software design and DICOS standard development

Email: yoowan.kim@unlv.edu  Phone: (702) 895-5348
Dr. Shahram Latifi, P.E.
Professor, Department of Electrical & Computer Engineering
Director, Center for Information and Communications and Technology (CICT)

- Search and rescue
- Disaster relief
- Homeland Security
- Nuclear non-proliferation
- Biometrics

Email: shahram.latifi@unlv.edu    Phone: (702) 895-4016
Dr. Brendan O’Toole
Associate Professor, Department of Mechanical Engineering
Director, UNLV Center for Materials and Structures

Dr. Mohamed Trabia
Professor, Department of Mechanical Engineering
Associate Dean for Research, Graduate Studies, and Computing

- Structural analysis
- Failure analysis
- Experimental mechanics
- Structural dynamics
- Explosives and impact analysis
- Material characterization
- Computational simulation of highly dynamic events

Email: brendan.otoole@unlv.edu or mohamed.trabia@unlv.edu
Phone: (702) 895-3885 / 5097

Security Engineering Research at the HRH College of Engineering, UNLV
Dr. Emma Regentova
Associate Professor, Department of Electrical & Computer Engineering

- Pulsed ray radioscopy to detect nuclear materials
- Radioscopic cargo screening using megavoltage energy barriers

Email: emma.regentova@unlv.edu  Phone: (702) 895-3187
Security Engineering Research at the HRH College of Engineering, UNLV

**Dr. Stephen Rice, CPHIT, PE**
Professor, Department of Mechanical Engineering

- Security and Privacy of Health Records
- Secure Electronic Records System (ERS)
- HIPAA Privacy and Security Rules
- Security policy and procedures to ensure legal compliance

Email: stephen.rice@unlv.edu  
Phone: (702) 895-4240
Dr. Aly Said, P.E.
Assistant Professor, Department of Civil and Environmental Engineering

Dr. Ying Tian
Assistant Professor, Department of Civil and Environmental Engineering

- Progressive collapse of reinforced concrete frame and flat-plate (beamless) structures
- Static and dynamic tests of large-scale reinforced concrete structural systems

Email: aly.said@unlv.edu or ying.tian@unlv.edu  
Phone: (702) 895-2722 / 4917
Dr. Robert Schill
Professor, Department of Electrical & Computer Engineering
Director, Energy Materials Interaction Technology Initiative of Nevada (EMITION) Center

- Pulsed power and plasma physics
- Microwaves and optics
- Materials science
Security Engineering Research

CV and Publications
Dr. Wolfgang Bein
Professor, School of Computer Science
Director, Center for the Advanced Study of Algorithms (CASA)

Contact Information

College of Computer Science
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154-4019
Phone: (702) 895-1477
Email: wolfgang.bein@unlv.edu

Specialties
- Sensor networks
- Open Source Algorithm implementation
- Survey articles on issues in security
- Design of highly competitive online algorithms against different adversaries
- Smart use of randomization
- Approximations for hard combinatorial optimization problems
**Dr. Wolfgang Bein**

**Recent Publications**

Dr. William Culbreth  
Associate Professor, Department of Mechanical Engineering

Contact Information

Howard R. Hughes College of Engineering  
University of Nevada, Las Vegas (UNLV)  
Las Vegas, NV 89154-4026  
Phone: (702) 895-3699  
Email: william.culbreth@unlv.edu

Specialties

- Computational modeling of radiation transport and nuclear criticality problems  
- Experimental assessment of radiation detectors  
- Active neutron interrogation and detection of Special Nuclear Material  
- Dense Plasma Focus accelerator development for neutron production  
- Design of alpha detectors for airflow measurements  
- UAV flights and novel radiation detector development for UAVs  
- Geologic nuclear reactor modeling
Dr. William Culbreth

Recent Publications


Dr. Yingtao Jiang
Associate Professor, Department of Electrical & Computer Engineering

Contact Information
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154-4026
Phone: (702) 895-2533
Email: yingtao.jiang@unlv.edu

Specialties
- Sensor technologies and instrumentation for safety monitoring and process control of nuclear reactors
- Radiation shielding materials, including nano-material-enhanced shielding
- Development of detection algorithms and adaptive signal processing
- Uncertainty reduction for quantification of spent nuclear fuel
Dr. Yingtao Jiang

Recent Publications


Dr. Juyeon Jo
Associate Professor, School of Computer Science

Contact Information
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154-4026
Phone: (702) 895-5873
Email: juyeon.jo@unlv.edu

Specialties
- Secure and Reliable Communication Protocol for UAV (Unmanned Aerial Vehicle)
- Critical infrastructure/ smart grid security
- Man-In-The-Middle (MITM) Attack with a Tempered SSL Certificate Detection
- Thwarting DDoS (Distributed Denial-of-Service) Attack
- Digital Search Warrant
- Transportation Security Imaging and Secure Communication Software
Dr. Juyeon Jo

Recent Publications

• Kevin Benton, Ju-Yeon Jo, and Yoohwan Kim, “SignatureCheck: A Protocol to Detect Man-In-The-Middle Attack in SSL”, 7th Annual Cyber Security and Information Intelligence Research Workshop, Oak Ridge, TN, Oct. 2011


Dr. Yoohwan Kim
Associate Professor, School of Computer Science

Contact Information

Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154
Phone: (702) 895-5348
Email: yoohwan.kim@unlv.edu

Specialties

- Secure protocol development for software and network applications
- Critical infrastructure / smart grid security and privacy
- Wireless mesh network routing and security
- Distributed Denial of Service (DDoS) attack prevention
- Secure and reliable communication scheme for Unmanned Aerial Vehicles (UAVs)
- Airport security inspection software design and DICOS standard development
Dr. Yoohwan Kim

Recent Publications

Dr. Shahram Latifi, P.E.
Professor, Department of Electrical & Computer Engineering
Director, Center for Information and Communications and Technology (CICT)

Contact Information
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154
Phone: (702) 895-4016
Email: shahram.latifi@unlv.edu

Specialties
- Search and rescue
- Disaster relief
- Homeland Security
- Nuclear non-proliferation
- Biometrics
Dr. Shahram Latifi, P.E.

Recent Publications

- D. Walker and S. Latifi, “Software Reliability in Data Portals for Climate Change in Nevada”, 19th Int’l Conf. on Software Eng. and Data Eng, June 2010, pp. 140-144.
Dr. Brendan O’Toole
Associate Professor, Department of Mechanical Engineering
Director, UNLV Center for Materials and Structures

Contact Information

Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154-4027

Phone: (702) 895-3885
Fax: (702) 895-3936
Email: brendan.otoole@unlv.edu
Website: http://www.egr.unlv.edu/~bj/

Specialties
- Structural analysis
- Failure analysis
- Experimental mechanics
- Structural dynamics
- Explosives and impact analysis
- Material characterization
- Computational simulation of highly dynamic events
Dr. Brendan O’Toole

Recent Publications


Dr. Emma Regentova
Associate Professor, Department of Electrical & Computer Engineering

Contact Information
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154

Phone: (702) 895-3187
Email: emma.regentova@unlv.edu

Specialties
- Pulsed ray radioscopy to detect nuclear materials
- Radioscopic cargo screening using megavoltage energy barriers
Dr. Emma Regentova

Recent Publications


Dr. Stephen Rice, CHPIT, PE
Professor, Department of Mechanical Engineering

Contact Information
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154

Phone: (702) 895-4240
Email: stephen.rice@unlv.edu

Specialties
- Security and Privacy of Health Records
- Secure Electronic Records System (ERS)
- HIPAA Privacy and Security Rules
- Security policy and procedures to ensure legal compliance
Dr. Stephen Rice, CHPIT, PE

Recent Publications

Dr. Aly Said, P.E.
Assistant Professor, Civil and Environmental Engineering

Contact Information
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154
Phone: (702) 895-2722
Email: aly.said@unlv.edu

Specialties
- Progressive collapse of reinforced concrete frame and flat-plate (beamless) structures
- Static and dynamic loading tests of reinforced concrete beams
Dr. Aly Said, P.E.

Recent Publications


Dr. Robert Schill
Professor, Department of Electrical & Computer Engineering
Director, Energy Materials Interaction Technology Initiative of Nevada (EMITION) Center

Contact Information

Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154
Phone: (702) 895-1526
Email: robert.schill@unlv.edu

Specialties
- Pulsed power and plasma physics
- Microwaves and optics
- Materials science
Dr. Robert Schill

Recent Publications


Patents

Dr. Ying Tian
Assistant Professor, Department of Civil and Environmental Engineering

Contact Information
Howard R. Hughes College of Engineering
University of Nevada, Las Vegas (UNLV)
Las Vegas, NV 89154
Phone: (702) 895-4917
Email: ying.tian@unlv.edu

Specialties
- Progressive collapse of reinforced concrete frame and flat-plate (beamless) structures
- Static and dynamic loading tests of reinforced concrete beams
Dr. Ying Tian

Recent Publications

Dr. Mohamed Trabia  
Professor, Department of Mechanical Engineering  
Associate Dean for Research, Graduate Studies, and Computing

Contact Information
4505 Maryland Parkway  
UNLV Box 454026  
Las Vegas, NV 89154-4026  
Phone: (702) 895-0957  
Email: Mohamed.Trabia@unlv.edu

Specialties
- Structural analysis
- Failure analysis
- Experimental mechanics
- Structural dynamics
- Explosives and impact analysis
- Material characterization
- Computational simulation of highly dynamic events
Dr. Mohamed Trabia

Recent Publications


Additional Resources

- Center for Materials and Structures
  http://www.egr.unlv.edu/~bj/CMS/CMS_Home.htm

- Energy Materials Interaction Technology Initiative of Nevada (EMITION) Center
  http://emandpplabs.nscee.edu/home1/index.htm

- Center for the Advanced Study of Algorithms (CASA)
  http://www.egr.unlv.edu/~bein/casa/

- Center for Information and Communications and Technology (CICT)
  http://cict.unlv.edu/