Security Program Overview

Nasir Memon
Computer Science Department
Highlights

• 8 faculty members actively involved
• More than a dozen PhD students
• More than a dozen specialized courses in security
• More than $10 million in external funding for research and education over last 4 years
• Host university to NSF/NSA Cyber Corps Program
• NSA Center of Excellence in IA Education
• NY State funded Cybercrime Initiative
Broad Areas of Research

• **Hardware for Secure Systems**
  – R. Karri and J. Chao

• **Host/Device Security**
  – N. Saxena, A. Keromytis, N. Memon

• **Network Security**

• **Software Security**
  – P. Frankl , A. Keromytis, G. Naumovich, N. Memon

• **Multimedia Security**
  – N. Memon, E. Wong, Y. Wang
Hardware for Secure Systems

- Scan Chains In Crypto Hardware
  - R. Karri
- Cyber Security Processor (CYSEP)
  - J. Chao
- Fault Attack Resistant High-Speed Crypto Architectures
  - R. Karri
- Embedded Processing
  - R. Karri
- 2 Faculty, 4 Ph.D. students, many MS and BS students
- Funding from Cisco, NSF
Network Security

Active projects in this area include:

- Robust DDoS Defense System
  - J. Chao. (Lucent)
- High Speed IPS
  - J. Chao (Avaya, Telcordia)
- VoIP security
  - N. Memon (NSA, DoD)
- Countering DoS Attacks With Stateless Multipath Overlays
  - A. Keromytis (Intel, Cisco)
- Wireless Fingerprinting
  - N. Memon (NSA/DoD)
- While list based spam filtering
  - H. Schulzrinne (Intel, Cisco)
- NABS: Network Abuse Detection
  - N. Memon
- ForNet: A Distributed Network Forensics System
  - N. Memon, H. Bronnimann, J. Wein, B. Hery, D. Salane, A. Schwartz
  - (NSA/DoD, NSF, CUNY John Jay)
- Infection Detection
  - N. Memon, Vivic Networks.
- RFID Security and Privacy; Secure Pairing of Personal Devices
  - N. Saxena
Host/Device Security

- Disk Forensics - Reassembly of Scattered File Fragments
  - N Memon, H. Bronnimann. (NSF STTR, Digital Assembly).
- Secure Device Pairing
  - N. Saxena (Nokia)
- RFID Security
  - N. Saxena
- Visual Passwords – Design and Evaluation
  - N. Memon (NSF)
- Secure Biometric Storage
  - N. Memon (NSF)
Software Security

- Static analysis of distributed application security
  - G. Naumovich, IBM, NSF
- Code obfuscation
  - G. Naumovich, N, Memon, Panasonic
- White-box Testing for Application Vulnerabilities
  - Phyllis Frankl
- Application security assessment and management
  - Penn State Business School, Bill Hery
- 3 active PhD students, many MS and BS students
- Funding from IBM, Panasonic, NSA/DoD, NSF
Multimedia Security

- Digital Watermarks
  - N. Memon (NSF, HP)

- Audio/Video Authentication
  - N. Memon

- Steganography, Steganalysis
  - N. Memon, E. Wong (NSF, AFOSR, AFRL, IDZap STTR)

- Image Forensics
  - N. Memon (AFOSR, NIJ)

- Digital Rights Management
  - N. Memon HP Research, Thomson Research

- 4 faculty, 2 Postdoc, 6 PhD students, many MS and BS students.
Education

• NSACOE – NSA Center of Excellence in Information Assurance Education.
• Information Systems and Internet Security (ISIS) Laboratory – NSF and Cisco funded. [http://isis.poly.edu](http://isis.poly.edu).
• VITAL – Virtual Lab for education and research in security
Graduate Education in Security

- Courses
  - Computer Security
  - Network Security and Management
  - Information Security Management
  - Cryptography
  - Biometrics
  - Application Security
  - Penetration Testing and Vulnerability Analysis
  - Digital Forensics

- NSA 4011 and 4013 certificates
- Online certificate in security
- Online MS in security – Planned.
- About a dozen Ph.D students currently pursuing security related topic.
Cyber Corps program

- Recipient of NSF Scholarship for Service (SFS or Cyber Corps) program grant. 45 students graduated.
CSAW 2007

- Sponsors – Avaya, BAE Systems, Microsoft, CitiBank, Pitney Bowes, Inter Digital, NikSun, MITRE etc.
- Looking for Sponsors for 2007!!
- 500 – 5K only!
- [http://isis.poly.edu/csaw](http://isis.poly.edu/csaw) for more information.
Cybercrime Initiative

• $1.6 M grant as part of Polytechnic’s Center for Advanced Technology in Telecommunications (CATT)
  – CATT has been supported by NY State for over 20 years
  – Extensive cooperation with industry
• April, 2006 kick-off for the Cybercrime Initiative
Cyber Crime Initiative Objectives

• Provide seed funding to projects that aim to create new technologies and tools for the prevention, detection and attribution of cybercrimes.

• Create an infrastructure in partnership with Polytechnic's BEST incubator to facilitate quick commercialization and deployment of new technologies.

• Provide a laboratory for small businesses in NY State to research, test and prototype new designs and products, and to showcase them to potential customers.

• Establish a forum that brings together law enforcement, academia, small businesses and large corporations for information sharing on the problems, experiences, expertise, and research needs of each community.

• Create a training program that helps create a workforce with a good understanding of tools and techniques for combating cybercrime.