Information Assurance and Computer Security at UB

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Advisory Board Meeting
May 8, 2008

Outline

- History
- Advisory Board
- IA Related Courses
- IA Certificate Program
- IASP Program Accomplishments
- SFS Program Accomplishments
- Research Accomplishments
- Publication Activities and Student Placement
- Other Creative and Collaborative Activities
- Path Forward

1. History

- **CEISARE is a Multidisciplinary Center, certified by NSA in 2002 and re-designated in 2005 and 2008 by NSA and DHS**
  - Computing, mathematical, legal and managerial
- **Curriculum mapped to CNSS No. 4011 and CNSS No. 4013 (Committee on National Security Systems)**
  - CNSS 4011– National Training Standard for Information Systems Security (INFOSEC) Professionals (certified in 2002, 2004 and 2007)
    - minimum course content for the training of INFOSEC professionals in telecommunications security and automated information systems (AIS) security (awareness level and performance level)
  - CNSS 4013 – National Information Assurance Training Standard For System Administrators (certified in 2004, 2007)
    - minimum standards for administrators of national security systems for administrators of unclassified systems

Prior NSA Site Visits

- **Site Visit 1 (March 6, 2003)**
  - Tim Mucklow and Cathey Fillare
  - CSE, CCR and SOM Lab tours
  - Lunch meeting at M&T Bank (hosted by John Walp)
  - Meeting with IASP scholars, faculty, Deans
- **Site Visit 2 (May 8, 2003)**
  - Robert McGraw and Tim Mucklow
  - Meeting with the PIs, visitor from AFRL (Kevin Kwiat)
  - Meeting with deans of SEAS, SOM and VP for Research
  - Research posters, CEDAR tour
- **Site Visit 3 (March 30, 2006)**
  - Robert McGraw and Lynn Hathaway
  - Half-Day meeting, research posters, meeting with Chairs

2. Center Advisory Board

- **Board members**
  - Mr. Kevin Comerford, Commissioner, Central Police Services, Erie County
  - Dr. Kevin Kwiat, Principal Computer Engineer, AFRL, Cyber Defense
  - Ms. Margaret Grayson, President, Coalescent Technologies
  - Mr. Charles Dunn, CIO, UB
  - Ms. Helene Kershner, Assistant Chair, CSE Dept., UB
  - Mr. John Reel, Senior Software Engineer, General Dynamics
  - Mr. Robert Vail, Manager, EDS Corporate Security Network Compliance Organization
  - Mr. John Walp, VP E-commerce security, M&T Bank

3. CEISARE Courses

- **Courses with IA Content**
  - CSE 565 Computer Security
  - CSE 566 Wireless Networks Security
  - CSE 512 Applied Crypto and Computer Security
  - LAW 629 Computers, Law, Technology and Society
  - LAW 645 Copyright
  - Law 956 E-Commerce Law
  - MGA 615 Fraud Examination
  - MGS 650 Information Assurance
  - MGS 651 Network Management
  - MGS 659 E-Commerce Security
  - MGT 681 Intellectual Property
  - MTH 529/530 Introduction to the Theory of Numbers I/II
  - MTH 535 Introduction to Cryptography
  - MTH 567 Stream Ciphers
- **Other Courses Planned**
  - Computer Forensics

4. Graduate Certificate in IA

- **Effort started with funds from DoD in fall 2003**
  - Funding was to create a new integrative course in IA
- **Two tracks – technical and managerial**
- **Requirements**
  - 6 credits of core courses in the track
  - 5-6 credits of elective in the dept.
  - 3 credits of required integrative course
- **Technical track**
  - Core – Intro. to Crypto, Computer security, Wireless networks security (choose two courses)
- **Managerial track**
  - Core – Network management, E-Commerce security

5. IASP Program Accomplishments

- **5 IASP scholarships from DoD since 2002**
  - Alex Eisen (Joined DISA, Sept. 2004)
    - MS Project: Development of a basic framework for emergency first responder systems
  - Melissa Thomas (Joined NAVAIR, Dec. 2004)
    - MS Project: Study of Copyright law and personal computer security
  - Daniel Britt (Joined NSA, Jan. 2006)
    - MS Project: Enhancing situational awareness through the classification of IDS alerts and the defragmentation of attack tracks using a host based sensor
  - Daniel Krawczyk (Joined SPAWAR, Jan. 2007)
    - MS Project: Study of IPSec
  - Richard Giomundo (Joined NSA, June 2006)
    - MS Project: A comprehensive fusion system for real-time awareness of multistage cyber-attacks
  - Chris Crawford (Will join DISA in June 2009)

Capacity Building Initiatives from DoD

- **Capacity building grant 1 from DoD (2002)**
  - Develop information security lab, develop an IA course
- **Capacity building grant 2 from DoD (2004)**
  - Develop Wireless security course, support research on intrusion detection and response
- **Capacity building grant 3 from DoD (2007)**
  - Vulnerability Aggregation and anlaysis
- **Equipment grant from Cisco (2005)**
  - Improve security labs
- **A poster on security labs being displayed at today's workshop**

6. SFS Program Accomplishments

- **Capacity building grant 1 from NSF (2004)**
  - Develop wireless security lab, develop e-commerce security course
  - Jointly with GCC to promote faculty development at GCC
  - Both the lab and the courses have been completed and are being taught
  - Joint Cyber Security workshop on March 31, 2006
    - Co-hosted by ECC, FBI Cyber Task Force
- **Capacity building grant 2 from NSF (2007)**
  - To develop faculty development and technical expertise for faculty in computer forensics
  - Jointly with Hilbert College
  - Several faculty at UB, ECC, GCC, Hilbert College will undergo training
  - Joint Cyber Security workshop 2008 (today) is a direct outcome of this grant
- **We believe that our program is now mature enough to receive the SFS Scholarship grant**

7. Research Accomplishments

- **Research Areas**
  - Information Assurance, Network Security, Wireless Netowrks Security, Biometrics, Web Assurance, E-commerce, Cryptography, Programming Languages, Internet Law, Privacy, Fraud Detection
- **Funding**
  - Over 3M from NSF, DARPA, NSA/ARDA, AFRL, DoD
  - Research, education, infrastructure
  - Couple of internal grants
    - HIPAA Compliant Medical Data Repository for Teaching
    - Analyzing Emergency Response Management Systems in the Context of Katrina and Rita Disasters – A first responder focus

Sample Research Projects (Sponsored)

- Protecting documents from malicious insiders (ARDA)
- Event correlation for cyber attack recognition (ARDA)
- Insider threat modeling and analysis in a corporate intranet or military environment (DARPA)
- Security and Incentives in emerging applications (NSF)
- A Framework for Trusted and Reliable Cyber Interactions (AFRL)
- Women and Cyber Security: Gendered Tasks and (In)equitable Outcomes (NSF)
- Citizen Centric Analysis of Anti/Counter-Terrorism e-Government Services (NSF)

Security-related Faculty

- **Shambhu Upadhyaya (CSE)**
  - Intrusion detection, insider threat modeling, alert correlation, wireless networks security, sensor networks security
- **Hung Ngo (CSE)**
  - Network security, insider threat analysis
- **Chunming Qiao (CSE)**
  - Network survivability
- **Sheng Zhong (CSE)**
  - Security and Incentive based protocols
- **Bharat Jayaraman (CSE)**
  - Language based security issues
- **Ramalingam Sridhar (CSE)**
  - Embedded systems security
- **Venu Govindaraju (CSE)**
  - Biometrics
- **H.R. Rao (MSS, also adjunct faculty in CSE)**
  - Secure e-commerce, web assurance
- **Raj Sharman (MSS)**
  - Database security, emergency response systems, sensor networks security
- **Tom Cusick (Math)**
  - Cryptography
- **Mark Bartholomew (Law)**
  - Intellectual property regime, copyright

8. Publications and Student Placement

- **More than 60+ publications in key journals, conferences and workshops**
- **Some Key papers and Books**
  - Towards a Theory of Insider Threat Assessment, IEEE DSN, June 2005
  - Secure Knowledge Management and the Semantic Web, Communications of the ACM, Dec. 2005
  - Secure Knowledge Management, Encyclopedia Article, IDEA Group, 2005
  - Special Issue on Secure Knowledge Management in IEEE Transactions on SMC, Part A, May 2006
  - A Book on Managing Information Assurance in Financial Services
  - Publications at ESORICS 2007, SRDS 2007, INFOCOM 2008
- **Several Ph.D. Dissertations**
- **Students Placed at OSU, Cisco, Symantec, Microsoft, Qualcomm, M&T Bank**

9. Collaborative Activities & Dissemination

- **Collaboration with ECC (2004 - 07)**
  - Developing an undergrad. Certificate program in IA at ECC
- **Collaboration with GCC (2004 - 07)**
  - Curriculum and faculty improvement at GCC
  - Add security content in their courses, faculty training in security
- **Collaboration with Town of Amherst**
  - Digital government project (2003-04)
- **Collaboration with M&T Bank**
  - Several MBA students working in the security area
- **Collaboration with local FBI branch**
  - Joint workshops, possible internships, computer forensics initiative
- **Collaboration with AFRL, CMIF**
- **High School Cyber Security Workshops**

Collaborative Activities with other CAEs

- **Participation and conducting surveys at Cyber Corps 2005 (Syracuse University)**
- **Participation in Security Week, 2005, 2006 (Polytechnic University) – students won prizes**
- **Secure Knowledge Management Workshop 2004 at Buffalo, NY**
  - 10 technical sessions
  - 3 keynote talks
  - 2 plenary sessions
  - 1 dinner banquet talk
  - 1 luncheon keynote
  - 1 high power panel on women and cyber security
  - 1 technical poster session
- **Secure Knowledge Management Workshop 2006 at Brooklyn Polytechnic, NY**
- **Secure Knowledge Management Workshop 2008 at Dallas, TX**

SKM 2008 Workshop

- **November 3 - 4, 2008**
  University of Texas at Dallas, Dallas, TX
- **Important Dates:**
  - Abstract submission: June 13, 2008
    Paper submission: July 11, 2008
    Author Notification: August 22, 2008
    Camera Ready Copy: Sep 22, 2008
    Workshop: November 3-4, 2008
- **http://cs.utdallas.edu/skm2008/index.htm**

SKM 2008 Topics

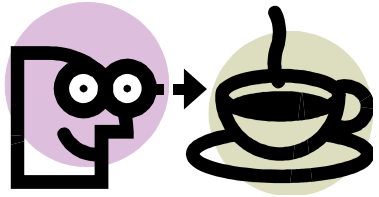
- Secure Languages (Secure Knowledge Query Manipulation Language, Security Assertion Markup Language, B2B Circles of Trust)
- Return of Investment on Secure Knowledge Systems
- Digital Rights Management (Digital Policy Management)
- Secure Content Management (Secure Content Management in Authorized Domains, Secure Content Delivery, Content Trust Index)
- Knowledge Management for National Security (Securing and Sharing What We Know: Privacy, Trust and Knowledge Management, Identity Security Guarantee, Building Trust and Security in the B2B Marketplace)
- Security and Privacy in Knowledge Management
- Wireless security in the context of Knowledge Management

SKM 2008 Organizing Committee

- **Steering Committee**
  - Bhavani Thuraisingham - *University of Texas, Dallas*
    Kevin Kwiat - *Air Force Research Lab*
    Raghav Rao - *SUNY at Buffalo*
    Shambhu Upadhyaya - *SUNY at Buffalo*
- **General Chair**
  - Bhavani Thuraisingham, The University of Texas at Dallas
- **Program Chair**
  - Murat Kantarcioglu, The University of Texas at Dallas
- **Publicity Chair**
  - Jaideep Vaidya, Rutgers University
- **Local Arrangements Chair**
  - Wei T. Yue, The University of Texas at Dallas
  - Jingguo Wang, The University of Texas at Arlington

Path Forward (Discussion Points)

- Alignment with UB 2020 Strategic Strength – ICT
- Forensics Initiative – collaboration with RCFL
- NSF Federal Cyber Service scholarships
- Teach security policies, business integrity
- Research on emergency management, first responder systems



List of Posters

- Activity Theory Guided Role Engineering, *Manish Gupta, School of Management, University at Buffalo*
- Adaptive Workflow Framework for Effective Emergency Response in Hospitals, *Sumant Dutta, Ashwin Kumar Narayanan, School of Management, University at Buffalo*
- An Investigation of Factors Affecting Effective Emergency Management during the 2006 October Snow Storm in Buffalo, *Minkyun Alex Kim, School of Management, University at Buffalo*
- Cyber Security Laboratory Development at UB, *Vishal Padhye, School of Management, University at Buffalo*
- Detecting Privilege Abuse by Malicious Insiders, *Sunu Mathew, Department of Computer Science and Engineering, University at Buffalo*
- Digital Forensics Initiative at UB, Rajarshi Chakraborty, Venkatasairam Yanamandram, *Department of Computer Science and Engineering, University at Buffalo*
- Managing Private Information Safety in Blogs, *Sangmi Chai, School of Management, University at Buffalo*
- Perceived Risk, Resilience, and Hospital Information Infrastructure Effectiveness in the Context of Disasters, Insu Park, *School of Management, University at Buffalo*
- Phoney: Mimicking User Response to Detect Phishing Attacks, Madhusudhanan Chandrasekaran, *Dept. of Computer Science and Engineering, University at Buffalo*
- Protection Motivation and Deterrence: A Framework for Security Policy Compliance in Organizations, *Tejaswini Herath, School of Management, University at Buffalo*
- Secure and Robust Localization in Sensor Networks*, Murtuza Jadliwala, Dept. of Computer Science and Engineering, University at Buffalo*
- SpyCon: Emulating User Activities to Detect Evasive Spyware, *M. Chandrasekaran and S. Vidyaraman, Department of Computer Science and Engineering, University at Buffalo*
- Trust Utilization for Routing Robustness in Wireless Mesh Networks, Aniket Patankar, Shrey Ajmera and Mohit Virendra, *Department of Computer Science and Engineering, University at Buffalo*