

# Debin Liu

PhD in Informatics at Indiana University  
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## **OBJECTIVE**

Seeking a full time position to apply my research and analytical skills in Information Security to help secure systems and applications: reviewing actual and perceived security vulnerabilities, identifying consumer experience trouble spots, assessing risk and outlining remediation strategies

## **QUALIFICATION SUMMARY**

- Strong research capabilities as an interdisciplinary researcher
- Creative thinker and quick learner
- Strengthened quantitative and statistical skills
- Excellent interpersonal, organizational and time management skills
- Fluent in both oral and written Mandarin and English

## **EDUCATION**

**PhD in Informatics** August 2005-present  
Major in Information Security  
Minor in Finance and HCI  
Indiana University, Bloomington, IN, U.S.

**MS in Physics** August 2003-August 2005  
Texas A&M University, College Station, TX, U.S.

**BS in Modern Physics** August 1999-July 2003  
University of Science & Technology of China, Hefei, China

## **EMPLOYMENT**

**Security Consultant** March 2010-present  
Extricatatus, LLC

- Review actual and perceived security vulnerabilities of the client's website and user messaging
- Analysis and research on the potential trends with focus on fraud and usability

**Research Intern** June 2009-September 2009  
Payment System Function in Research Department at Federal Reserve Bank of Kansas City

- Designed internal control mechanism to protect payment transaction date
- Analyzed payment card fraud survey data
- Research on payment card customer fraud experience and behaviors
- Received trainings of bank examination

**Doctoral Research Assistant** August 2006-present  
School of Informatics at Indiana University

- Research on incentive-based access control to manage operational risk
- Modeling and analysis of insider threats
- Usable privacy and user-centered security design
- Human-subject studies of security behaviors and experience
- Information security risk modeling and analysis

**Associate Instructor** August 2006-May 2007  
School of Informatics at Indiana University

- Taught undergraduate courses in Computer Science

**Teaching Assistant**

August 2003-August 2005

Department of Physics at Texas A&amp;M University

- Taught and assisted with various undergraduate courses in Physics

**SELECTED PROJECTS**Data Access Model in Banking Organizations

- *Problem:* An effective data access control is a critical component of bank management and a foundation for the safe and sound operation of banking organizations.
- *Problem solving:*
  - Proposed an payment-based policy model of internal control;
  - Used incentive contract to induce employees to provide appropriate risk control efforts;
  - Developed a learning model of users' behavior history;
  - Completed economic evaluation and analysis.

Mitigation of Inadvertent Insider Threats with Incentives

- *Problem:* Inadvertent insiders are individuals who do not have malicious intent but behave in a manner that creates organizational risk. They have long been identified as a grave security threat to organizations.
- *Problem solving:*
  - Modeled inadvertent insider threats using incentive engineering;
  - Designed a risk budget mechanism to limit risk and regulate users' risk behaviors;
  - Conducted human-subject experiments and game theoretic analysis.

Game Theoretic Modeling and Analysis of Malicious Insiders

- *Problem:* Malicious insiders are among the most serious and difficult threats to organizations' information assets.
- *Problem solving:*
  - Built a game theoretic modeling of the problem of malicious insider;
  - Analyzed insider threats and produced optimal defend strategy;
  - Completed two real-world case studies.

Evaluation and Analysis of Proof-of-Work Anti-Spam Mechanism

- *Problem:* Proof-of-Work is a set of cryptographic mechanisms to increase the cost of initiating a connection. It has been proposed as a candidate solution to the problem of spam, DDoS and other forms of resources abuse.
- *Problem solving:*
  - Constructed and evaluated a mathematical model of Proof-of-Work grounded in cryptography and economics;
  - Proposed to mitigate the problem of spam using Proof-of-Work by combining it with a reputation system.

Design and Analysis of Computer Risk Communication

- *Problem:* Risk communication plays an important role in informing risks behavior. It's always a challenge to design effective risk communication.
- *Problem solving:*
  - Implemented mental model study to analyze computer risk communication;
  - Built a Flash/PHP/MySQL Server-based online experiment system using pile sorting for data collection.

Evaluation of Phishing Education

- *Problem:* Phishing is a scam conducted for the purposes of information theft. Phishing "IQ tests" are believed to help individuals assess their vulnerability to phishing scams.
- *Problem solving:*

- Examined the change on a phishing “IQ test” before and after phishing education;
- Drew statistical conclusion that suggests phishing education to improve performance fails.

## **COMPUTER SKILLS**

Programming Languages: *C, C++, Perl, R, PHP, JavaScript*  
Software Specialized: *Matlab, SPSS*  
Operating Systems: *Windows, Linux, MacOS*  
Familiar with MS office products

## **PUBLICATIONS**

### **Peer Reviewed Journals**

Debin Liu, L. Jean Camp, XiaoFeng Wang and Lusha Wang, “Using Budget-Based Access Control to Manage Operational Risks Caused by Insiders”, *Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications*, Vol. 1, No. 1, pp. 29-45.

Debin Liu, XiaoFeng Wang and L. Jean Camp, “*Game Theoretic Modeling and Analysis of Insider Threats*”, *International Journal of Critical Infrastructure Protection*, Volume 1, December 2008, pp. 75-80.

Debin Liu, “*The Economics of Proof-of-Work*”. *I/S: A Journal of Law and Policy for the Information Society*, Winter 2007.

Alexey Belyanin, Feng Xie, Debin Liu, Federico Capasso and Mariano Troccoli, “*Coherent nonlinear optics with quantum cascade structures*”. *Journal of Modern Optics*, Vol. 52, No. 16, November 2005.

### **Peer Reviewed Conferences**

Debin Liu, L. Jean Camp, XiaoFeng Wang, and Lusha Wang, “Using Budget-Based Access Control to Manage Operational Risks Caused by Insiders”. MIST10, Morioka, Iwate, Japan, June 2010.

Debin Liu, L. Jean Camp and XiaoFeng Wang, “*Mitigating Inadvertent Insider Threats with Incentives*”. FC09, Barbados, February 2009.

Debin Liu, L. Jean Camp and XiaoFeng Wang, “*Game Theoretic Modeling and Analysis of Insider Threats*”. IFIP WG 11.10, Arlington, Virginia, March 2008.

Farzaneh Asgarpour, Debin Liu and L. Jean Camp, “*Mental Models of Computer Security Risks*”. WEIS 2007, Pittsburgh, PA, 7-8 June 2007.

Debin Liu, Farzaneh Asgharpour and L. Jean Camp, “*Risk Communication in Security using Mental Models*”. Usable Security 07, Tobago, February 2007.

Debin Liu and L. Jean Camp, “*Proof of Work Can Work*”. WEIS 2006, Cambridge, MA, 26-28 June 2006.

L. Jean Camp and Debin Liu, “*Proof of Work {cannot, can, does currently} Work*”, TPRC, Arlington, VA, September 30 2007.

Vivek Anandpara, Andrew Dingman, Markus Jakobsson, Debin Liu and Heather Roinestad, “*Phishing IQ Tests Measure Fear, Not Ability*”, Usable Security 07, Tobago, February 2007.

## **Presentations**

“Using Budget-Based Access Control to Manage Operational Risks Caused by Insiders”. MIST10, Morioka, Iwate, Japan, June 2010.

“*Information Security and Risk Management using Incentive Contract*”, Federal Reserve Bank of Kansas City, Kansas City, MO, September 2009.

“*Analysis and Mitigation of Insider Threats*”, Federal Reserve Bank of Kansas City, Kansas City, MO, June 2009.

“*Mitigating Inadvertent Insider Threats with Incentives*”, Financial Cryptography and Data Security 09, Barbados, February 2009.

“*Game Theoretic Modeling and Analysis of Insider Threats*”, The Second Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Arlington, Virginia, March 2008.

“*Game Theoretic Fight against Insider Threat*”, The Fourth Midwest Security Workshop, Chicago, Illinois, October 2007.

“*Proof of Work can Work*”, The Fifth Workshop on the Economics of Informatics Security, Cambridge, U.K., June 2006.

## **HONORS AND ACTIVITIES**

Program Committee Member: 2<sup>nd</sup> International Workshop on Managing Insider Security Threats (MIST 2010), Morioka, Iwate, Japan, June 15, 2010.

External Reviewer for International Journal of Critical Infrastructure Protection, August 2009.

Research Mentor: led 2 undergraduate students on security research to improve risk communication, Indiana University, Spring 2009-Spring 2010.

Graduate Assistant: 30 hours tuition fee remission with monthly stipend, Indiana University, August 2005-present.

HCI Designer: led focus group, conducted contextual inquiry and designed visualization interface to help the Indiana Information Referral System, September 2007-May 2008.

Vice President of Chinese Students and Scholars Association at Texas A&M University, September 2003-August 2004.

Chairman of Student Association at University of Sci.&Tech. of China, September 1999-August 2000.

First Prize of Olympic Physics Contest of Sichuan Province, 1998.

Second Prize of National Olympic Physics Competition, 1998.

## **RELEVANT COURSES**

Security Courses: *Applied Cryptography, Cryptographic Protocols, Social Informatics of Security*

HCI Courses: *Usability and Evaluation Methods, Human-Computer Interaction Design Theory*

Business Courses: *Corporate Finance, Risk Management, Asset Pricing Theory, Market Microstructure*

Other: *Computer Algorithms, C Programming Language, Probability Theory and Math Statistics*