

Curriculum Vitæ

FARIBA KHAN

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RESEARCH INTERESTS

Security and Networking. Recently worked on Distributed Denial-of-Service, Attribute-Based Systems, Attribute-Based Routing in Sensor Networks.

EDUCATION

- May, 2011 **PhD** in Computer Science, University of Illinois at Urbana-Champaign (UIUC)
Expected Advisor: Professor Carl A. Gunter
 Dissertation title: “Assuring Network Service with Integrity Based Queuing”
- Dec 2006 **MS** in Computer Science, University of Illinois at Urbana Champaign (UIUC)
 Sohaib and Sara-Abbasi Fellow, 2004-05, 2005-06
- 2004 **BS** in Computer Science & Engineering
 Bangladesh University of Engineering and Technology, (BUET)

RESEARCH POSITIONS

- 2006- **Research Assistant**, Illinois Security Lab, University of Illinois
present Worked on topics on denial-of-service(DoS), attribute-based messaging, attribute authority, identity management, sensor network security.
- 2007 **Internship**, University of Pennsylvania, Supervisor: Professor Sanjeev Khanna
Summer Analyzed Internet depth and bandwidth for practical DoS defense deployment
- 2006 **Internship**, National Center for Supercomputing Applications (NCSA)
Summer Attribute-Based Messaging citeBobbaFKGK06, Supervisor: Dr. Himanshu Khurana
- 2005 **Internship**, National Center for Supercomputing Applications (NCSA)
Summer Supervisor: Dr. Himanshu Khurana, Reviewed multi-party messaging challenges, attribute-based access control (ABAC), eXtensible Access Control Markup Language (XACML)

SELECTED RESEARCH PROJECTS

Integrity Based Queuing (thesis proposal) [3] In this work we expect that source integrity of packets will not be perfect, but observe that even an imperfect implementation can improve the effectiveness of queuing when parities with better a integrity level are incentivized. Our approach is called Integrity Based Queuing (IBQ). IBQ gateways classify packets according to the likelihood that they are from a spoofed origin and allocate bandwidth to high, medium and low integrity flows. Fair queuing for high integrity flows has high effectiveness as each flow get its own bucket. Gateways impose a differential rate limit while fair queuing medium integrity flows where the rate limit is imposed as a function of integrity. The low integrity flows receive general queuing.

Adaptive Selective Verification (ASV) [1, 5] An adaptive mechanism to defend against denial-of-service attack by having the senders increase the rate of sending so that they are not washed out by attack flood. We provide proof of client success. Experimental evaluations over ns2 back the theory and show reasonable bandwidth consumption.

Attribute-Based Messaging (ABM) [2, 6, 7] A focused addressing and messaging mechanism where the recipients are defined by attribute policies. ABAC sending policies control user access and ABE protects confidentiality from mail servers. ABM system uses attributes from the enterprise database and is built on top of enterprise MTA and performs at seconds of latency.

TEACHING POSITIONS

2011 Spring	Instructor , Computer Security II . Teaching the course
2010 Spring &	Teaching Assistant , Computer Security II .
2009 Spring	Lab design and selective lectures: Security Policies, DDoS
2009 Fall	Teaching Assistant , Computer Security I Lectures: Integrity Policies (Clark-Wilson, CISS, RBAC, ABAC).
2007 Spring	Teaching Assistant , Computer Security Architecture . Lectures: Attribute-Based Systems, Identity on the Web, Intrusion Detection Guided class projects, wrote and graded exams.
2004 Summer	Lecturer , AUST Bangladesh, Courses: Assembly Language, Digital Logic.
2002-2003	Lecturer , ICT BUET, Course: Data structures in C for non CS majors. Designed and co-taught the course with another instructor.

TEACHING LAB DESIGN

Health Information Security. Spring 2011
A semester-long project for students to work on client-server security in a health information system.

Denial-of-Service Analysis Using ns2. Spring 2009 and Spring 2010
A semester-long lab designed for advanced undergrads in the course CS463: Computer Security II. Students used ns2 to write the network application ASV [5]. They experimented with spoofing, topology and traffic rates.

MENTORING & ACADEMIC SERVICE

TA Mentor, University of Illinois, Spring 2010
Mentor for three new TA's in the department of Computer Science. Meeting them twice this semester to give them feedback on student communication. We discuss issues such as how to best prepare for a lecture, grading styles and graduate life in general.

Co-Organizer, Applying for Academic & Research Positions, 2010-11
With another graduating student, we have started a group among the graduating PhD students this year from the computer science department. We are sharing resources, arranging talks by faculty and practice job talks.

Member, Fellowships, Assistantships and Admissions Committee, 2007-08
Reviewed applications for the PhD program with about twenty faculty and two other students. Students members had equal responsibility as faculty. Gained valuable understanding of the admission process from the inside.

PROFESSIONAL SERVICE

- 2010 *PC Member*, ICPADS, Security and Trustworthy Computing
2006-2009 Technical Reviewer for the *Journal of Computer Security (JCS)*.
2009 Technical Reviewer for the *IEEE Int'l Conference on Distributed Computing Systems (ICDCS)*.
2008 Technical Reviewer for the *IEEE Workshop on Policies for Distributed Systems and Networks (Policy)*.
2007, 2006 Technical Reviewer for the *ACM Workshop on Privacy in the Electronic Society (WPES)*.
2006 Technical Reviewer for the *IEEE International Conference on Network Protocols (ICNP)*.

OUTREACH

- 2007-present Public Relations Officer, BUET CSE Alumni Association (non-profit).
<http://www.csebuet.org/association/index.html>
Organised fund-raising drives for travel-grants, ACM subscriptions and scholarships for under-represented high-school students.
2004-present Member, Women in Computer Science, UIUC.
2004-present Member, Bangladesh Student Association, UIUC.
Organised programs and shows promoting Bangladesh.

PROGRAMMING EXPERTISE

(fluent) C, C++, C#, (experienced) Java, XML, XACML, XQuery, Tcl/Tk, ns2, ASP, Oracle, SQL Server, HTML, JavaScript

RECENT COURSES

Advanced Computer Security, Advanced Distributed Systems, Advanced Topics in Network Protocols, Architectures and Applications, Computer Security Architecture, Privacy Enhancing Technologies, Computer Systems Analysis, Security Reading Group, Topics in Software Engineering.

PANELS & PRESENTATIONS

- Sep 2010 Panelist, “Life as a Grad Student”, UIUC Workshop for undergrads.
- Mar 2010 Guest Lecture, “Trust Models”, ECE422: Information Assurance, University of Illinois.
- Feb 2010 Guest Lecture, “DoS Analysis”, CS463: Computer Security II, University of Illinois.
- Feb 2010 Guest Lecture, “DoS Detection and Defense”, CS463: Computer Security II, University of Illinois.
- Oct 2009 Guest Lecture, “Integrity Policies”, CS461: Computer Security I, University of Illinois.
- Mar 2009 Guest Lecture, “Security Policies”, CS463: Computer Security II, University of Illinois.
- Feb 2009 Guest Lecture, “DoS Detection and Defense”, CS463: Computer Security II, University of Illinois.
- Feb 2009 Guest Lecture, “DoS Defense by Proof”, CS463: Computer Security II, University of Illinois.
- Feb 2009 Guest Lecture, “DoS Analysis”, CS463: Computer Security II, University of Illinois.
- Apr 2007 Guest Lecture, “Intrusion Detection”, CS498CSA: Computer Security Architecture, University of Illinois.
- Mar 2007 Invited Talk, “Road to Admission”, a talk to encourage undergraduate students to apply for grad school Bangladesh University of Engineering Technology.
- Mar 2007 Guest Lecture, “Representing Identity on the Web”, CS498CSA: Computer Security Architecture, University of Illinois.
- Jan 2007 Guest Lecture, “Attribute-Based Systems”, CS498CSA: Computer Security Architecture, University of Illinois.
- Dec 2005 Poster Presentation, “Attribute-Based Messaging”, ITI Workshop on Dependability and Security, University of Illinois.

AWARDS AND HONORARIES

- 2010 USENIX OSDI Student Travel Grant.
- 2008, 2010 Grace Hopper Conference. Student Travel Award. Sponsored by Yahoo.
- 2007-08 [Graduate Student Outstanding Service Award, 2007-08.](#)
Awarded for service at UIUC CS Graduate Admission Committee.
- 2005-06 & Sohaib and Sara-Abbasi Fellow, University of Illinois.
- 2004-05 Fellowship for outstanding students, providing one-year stipend of \$20,000 and a full waiver of tuition. Awarded in two consecutive years.
- 2001-2003 Dean’s Choice Award, awarded for excellent performance over the academic year, BUET.
- 2000 University Merit Scholarship, awarded to outstanding freshman, BUET, 2000.

PUBLICATIONS

Journal Articles

- [1] Sanjeev Khanna, Santosh S. Venkatesh, Omid Fatemieh, Fariba Khan, and Carl A. Gunter. Adaptive selective verification: An Efficient Adaptive Countermeasure to Thwart DoS Attacks. (Submitted) In *IEEE/ACM Transactions on Networking (ToN)*
- [2] Rakesh Bobba, Omid Fatemieh, Fariba Khan, Arindam Khan, Carl A. Gunter, Himunshu Khurana, and Manoj Prabhakaran. (First three authors in an alphabetic order) Attribute-Based Messaging: Access Control and Confidentiality. In *ACM Transactions on Information and System Security (TISSEC)*, Vol 13 No. 4, Dec 2010. [\[pdf\]](#)

Refereed Conference and Workshop Articles

- [3] Fariba Khan, Carl A. Gunter. Tiered Incentive for Integrity Based Queuing. In *Workshop on the Economics of Networks, Systems, and Computation (NetEcon '10)*, 2010, Vancouver, BC, Canada, (Co-located with OSDI '10). [\[pdf\]](#) [\[bib\]](#)
- [4] Fariba Khan. Network Assurance Using Bandwidth and Integrity Based Fairness. In the PhD Forum of Grace Hopper Celebration of Women in Computing, Sep 2010, Atlanta, USA.
- [5] Sanjeev Khanna, Santosh S. Venkatesh, Omid Fatemieh, Fariba Khan, and Carl A. Gunter. Adaptive selective verification. In *IEEE Conference on Computer Communications (INFOCOM '08)*, 2008. [\[pdf\]](#) [\[bib\]](#)
- [6] Rakesh. Bobba, Omid. Fatemieh, Fariba. Khan, Carl A. Gunter, and Himanshu Khurana. (First three authors in an alphabetic order) Using attribute-based access control to enable attribute-based messaging. In *ACSAC '06: Proceedings of the 22nd Annual Computer Security Applications Conference*, pages 403–413, Washington, DC, USA, 2006. IEEE Computer Society. [\[pdf\]](#) [\[bib\]](#)

Theses

- [7] Fariba Khan. Using Attribute-Based Access Control to Enable Attribute-Based Messaging. Master's Thesis, University of Illinois at Urbana-Champaign, October 2006. [\[pdf\]](#) [\[bib\]](#)
- [8] Fariba Khan. Cryptography Using Huffman Codes Bachelor's Thesis, Bangladesh University of Engineering and Technology, April 2004.

REFERENCES

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