

Ragib Hasan

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RESEARCH INTERESTS Cloud Computing, Trustworthy Databases and File Systems, Secure Provenance, Regulatory Compliant Systems, Policy Management, and Trust Management.

EDUCATION **University of Illinois at Urbana Champaign**, Urbana, Illinois
PhD in Computer Science, October 2009

- Dissertation title: Trustworthy History and Provenance for Files and Databases
- Advisor: Professor Marianne Winslett, UIUC
- Co-advisor: Professor Radu Sion, SUNY-Stony Brook
- Other committee members: Carl Gunter, Nikita Borisov, and Himanshu Khurana

MS in Computer Science, December 2005

- Thesis title: Synergy: A Trust-aware Policy-driven Information Dissemination Framework
- Advisor: Professor Marianne Winslett, UIUC

Bangladesh University of Engineering and Technology, Dhaka, Bangladesh
B.Sc Computer Science and Engineering, February 2003

- Graduated **Summa Cum Laude** in a class of 45, GPA 3.99/4.00
- Received Chancellor Award for highest GPA among students of all departments

EMPLOYMENT **Johns Hopkins University**
NSF/CRA Computing Innovation Fellow and Assistant Research Scientist 10/2009–current
Department of Computer Science

University of Illinois at Urbana-Champaign
Graduate Research Assistant, Department of Computer Science 08/2003–09/2009

Google Inc.
Software Engineering Intern, Internal Security Group 05/2007–08/2007

Bangladesh University of Engineering and Technology
Lecturer, Department of Computer Science 03/2003–08/2003

GRANTS **PI**, NSF Award 0937060/Sub Award CIF-389 10/2009–09/2010
Trustworthy History and Provenance for Files, Databases, and Clouds \$140,000

RESEARCH EXPERIENCE **Johns Hopkins University**
NSF/CRA Computing Innovation Fellow October 2009–current

As the PI of an NSF/CRA funded research grant under the Computing Innovation Fellow (CIFellows) project, I am working on the theory and practice of securing data provenance in databases, files, and cloud computing systems. Protecting the origin and lineage of data is very important as it is created, processed, and transmitted through semi-trusted or untrusted domains. My research focuses on providing the necessary integrity assurances for data history and provenance, in multiple application domains, and in different granularities.

Based on my proposal titled “Trustworthy History and Provenance for Files, Databases, and Clouds”, I have been awarded the highly competitive 2009 NSF Computing Innovation Fellowship (acceptance rate < 5% for International students, < 12% overall). This project will be conducted in collaboration with Prof. Randal Burns at the Johns Hopkins University.

University of Illinois at Urbana-Champaign

Graduate Research Assistant

August 2005-September 2009

DAIS group: Trust and Compliance Storage subgroup

Worked on Secure Provenance, Term-immutable Databases, Storage Security, and Trust Management under Prof. Marianne Winslett. Developed theoretical models and implemented prototype application layer libraries for Secure Provenance in Storage Systems and databases. Explored design of regulatory compliant term-immutable database architectures. This research has been published in ACM Transactions on Storage [JL02], EDBT 2010 [CW18], USENIX FAST 2009 [CW16], CIDR 2009 [CW14], StorageSS 2007 [CW11], VLDB SDM 2007 [CW10], USENIX ;login: Magazine [MAG01], and in a book-chapter [BK02].

NCSA / TCIP Project

Summer Research Assistant

Summer 2008

Designed an NS-2 based simulator for NASPINet for the Power Grid, with capability to analyze the effect of different security schemes. This research has been published in IEEE PSCE 2009 [CW15].

Google Inc., Mountain View, CA

Software Engineering Intern

Summer 2007

Designed and implemented *Delegated Authorization Using Permits* for Google’s single sign-on system. The permit-based mechanism allows disjoint applications to be joined together using *Mash-ups* while providing appropriate access control and authorization capabilities. This research has been published in ACSAC 2008 [CW13].

NCSA Storage Security and Survivability group

May 2004-August 2006

Developed a comprehensive *Threat Model* for secure storage. Performed detailed analysis of *Storage Breach Incidents* and created a database resource for further research. Worked on immutable and tamper-proof models of storage security. Work done in this area has been published in [CW01, 02, 03, 04, 05, 07, 08, 09].

NCSA Radio Astronomy Imaging group

Graduate Research Assistant

January 2004-May 2005

Created an *Automated Code Translation Tool* that generates BABEL interfaces for legacy C/C++ and Fortran code, for use under the Common Component Architecture (CCA) model, allowing translation of 2 million lines of MYRIAD/AIPS++ code. This work has been published in SP&E Journal [JL01].

PABLO Research Group, Dept. of Computer Science, UIUC

Graduate Research Assistant

August 2003-December 2003

Worked with **SvPablo Instrumentation Suite** for Parallel Computing, under the supervision of Prof. Dan Reed and analyzed statistical sampling techniques for performance evaluation.

TEACHING
EXPERIENCE

Johns Hopkins University, Baltimore, Maryland

CS 600.412 Security and Privacy in Cloud Computing

Spring 2010

Designed a new graduate level course on cloud computing security. Will be solely responsible for teaching the course to graduate students at the Department of Computer Science at Hopkins.

University of Illinois at Urbana-Champaign, Urbana, Illinois.

CS 591MW2 Advanced Data Security, Guest Lecturer

Fall 2009, Spring 2008

Taught about provenance in computing, and secure provenance techniques.

CS 563, Advanced Computer Security, Guest Lecturer

Spring 2006

Talked about trusted hardware and different techniques for compromising such devices.

Bangladesh University of Engineering and Technology, Dhaka Bangladesh *Lecturer* **March 2003-August 2003**

Taught 42 hours of undergraduate level course (CSE307 Microprocessors) at the Department of Computer Science and Engineering. Was responsible for lectures, exams, homework assignments, and grades. Total class size was 60.

Institute of Information and Communication Technology, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

Instructor

May-June, 2002

Taught Linux System Administration and Computer Programming courses on PHP and Java. Shared responsibility for lectures, exams, homework assignments, and grades.

Ahsanullah University of Science and Technology, Dhaka, Bangladesh

Lecturer

January-June, 2003

Taught 42 hours of undergraduate level course at the department of Computer Science and Engineering. Was responsible for lectures, exams, homework assignments and grades.

Dhaka International University, Dhaka, Bangladesh

Lecturer

January-June, 2003

Taught undergraduate level course on E-commerce. Was responsible for lectures, exams, homework assignments, and grades.

Manarat International University, Dhaka, Bangladesh

Lecturer

January-June, 2003

Taught undergraduate level course on Management of Information Systems. Was responsible for lectures, exams, homework assignments, and grades.

Green University of Bangladesh, Dhaka, Bangladesh

Lecturer

January-June, 2003

Taught undergraduate level course on real-time computing systems. Was responsible for lectures, exams, homework assignments, and grades.

Misc

Programming language tutor

1998-2002

Tutored approximately 120 undergraduate students at Bangladesh University of Engineering and Technology. Taught them different programming languages such as C, C++, and Java.

PUBLICATIONS

Under Submission

[US01] Ragib Hasan and Marianne Winslett, “Efficient Audit-based Compliance for Relational Data Retention”, under submission.

Journal

[JL02] Ragib Hasan, Radu Sion, and Marianne Winslett, “Preventing History Forgery with Secure Provenance”, ACM Transactions on Storage (TOS), Volume 5:4, pp 1–43, December 2009.

[JL01] Athol J. Kembal, Richard M. Crutcher, and Ragib Hasan, “A Component-based Framework for Radio-astronomical Imaging Software Systems”, Software: Practice and Experience (SP&E), Volume 38, Issue 5 (April 2008), pp. 493-507 .

Book Chapters

[BK02] Ragib Hasan, Marianne Winslett, Soumyadeb Mitra, Windsor Hsu, and Radu Sion, “Trustworthy Record Retention”, in *The Handbook of Database Security: Applications and Trends*, M. Gertz and S. Jajodia (editors), Springer Verlag, 2007.

[BK01] Dongyi Li, Will Winsborough, Ragib Hasan, and Marianne Winslett, “Trust Management”, in *The Handbook of Database Security: Applications and Trends*, M. Gertz and S. Jajodia (editors), Springer Verlag, 2007.

Conference and Workshops

[CW18] Ragib Hasan and Marianne Winslett, “Trustworthy Vacuuming and Litigation Holds in Long-term, High-integrity Records Retention”, Proceedings of the 13th International Conference on Extending Database Technology (EDBT’10), Lausanne, Switzerland, March 2010. (acceptance $54/307=18\%$)

[CW17] Ragib Hasan, “Protecting the Past and Present of Data with Applications in Secure Provenance and Regulatory Compliant Databases”, Proceedings of the 3rd SIGMOD PhD Workshop on Innovative Database Research (IDAR), Providence, RI, June 28, 2009.

[CW16] Ragib Hasan, Radu Sion, and Marianne Winslett, “The Case of the Fake Picasso: Preventing History Forgery with Secure Provenance”, Proceedings of the 7th USENIX Conference on File and Storage Technologies (FAST), February 2009. (acceptance $23/102=22.5\%$)

[CW15] Ragib Hasan, Rakesh Bobba, and Himanshu Khurana, Analyzing NASPINet Dataflows, IEEE Power System Conference and Expo (PSCE), Seattle, Washington, March 15-19, 2009.

[CW14] Ragib Hasan, Radu Sion, and Marianne Winslett, “Remembrance: The Unbearable Sentience of Being Digital”, 4th Biennial Conference on Innovative Data Systems Research (CIDR), January 2009 (Perspectives Track).

[CW13] Ragib Hasan, Richard Conlan, Brian Slesinsky, Nandu Ramani, and Marianne Winslett, “Please Permit Me: Stateless Delegated Authorization in Mashups”, Annual Computer Security Applications Conference (ACSAC), Anaheim, CA, December 2008. (acceptance $42/173=24.2\%$)

[CW12] Jodie P. Boyer, Lars E. Olson, Ragib Hasan, Nikita Borisov, Carl A. Gunter, and David Raila, “Improving Multi-Tier Security Using Redundant Authentication”, in the First Computer Security Architecture Workshop (CSAW), in conjunction with ACM CCS, Alexandria, VA, November 2007.

[CW11] Ragib Hasan, Radu Sion, and Marianne Winslett, “Introducing Secure Provenance: Problems and Challenges”, in Workshop on Storage Security and Survivability (StorageSS 2007), in conjunction with ACM CCS 2007, Alexandria, VA, October 2007.

[CW10] Ragib Hasan, Marianne Winslett, and Radu Sion, “Requirements of Secure Storage Systems for Health-care Records”, in the 4th VLDB Workshop on Secure Data Management (SDM), in conjunction with 33rd International Conference on Very Large Data Bases (VLDB), University of Vienna, Austria, September 2007.

[CW09] Ragib Hasan and William Yurcik, “A Statistical Analysis of Disclosed Storage Security Breaches”, in International Workshop on Storage Security and Survivability (StorageSS) in conjunction with 12th ACM Conference on Computer and Communications Security (CCS 2006), October 31, 2006.

[**CW08**] Ragib Hasan and William Yurcik, “Beyond Media Hype: Empirical Analysis of Disclosed Privacy Breaches 2005-2006 and a DataSet/Database Foundation for Future Work”, in Workshop on the Economics of Securing the Information Infrastructure (WESII), October, 2006

[**CW07**] William Yurcik and Ragib Hasan, “Toward One Strong National Breach Disclosure Law - Justification and Requirements”, in Workshop on the Economics of Securing the Information Infrastructure, October, 2006

[**CW06**] Ragib Hasan and Marianne Winslett, “Synergy: A Trust-aware, Policy-driven Information Dissemination Framework”, IEEE International Conference on Intelligence and Security Informatics (ISI 2006), San Diego, USA, May 23-24, 2006.

[**CW05**] Ragib Hasan, Suvda Myagmar, Adam J. Lee, and William Yurcik, “Toward a Threat Model for Storage Systems”, International Workshop on Storage Security and Survivability (StorageSS) in conjunction with 12th ACM Conference on Computer and Communications Security (CCS 2005), November 11, 2005.

[**CW04**] Ragib Hasan, William Yurcik, and Suvda Myagmar, “The Evolution of Storage Service Providers: Techniques and Challenges to Outsourcing Storage”, International Workshop on Storage Security and Survivability (StorageSS) in conjunction with 12th ACM Conference on Computer and Communications Security (CCS 2005), November 11, 2005.

[**CW03**] Ragib Hasan, Zahid Anwar, William Yurcik, Roy Campbell, “A Survey of Peer-to-Peer Storage Techniques for Distributed File Systems”, IEEE International Conference on Information Technology (ITCC), Las Vegas, NV, April 2005.

[**CW02**] Joseph Tucek, Paul Stanton, Elizabeth Haubert, Ragib Hasan, Larry Brumbaugh, and William Yurcik, “Trade-offs in Protecting Storage: A Meta-Data Comparison of Cryptographic, Backup/Versioning, Immutable/Tamper-Proof, and Redundant Storage Solutions,” 22nd IEEE - 13th NASA Goddard Conference on Mass Storage Systems and Technologies (MSST), Monterey CA USA, April 2005.

[**CW01**] Ragib Hasan, Joseph Tucek, Paul Stanton, William Yurcik, Larry Brumbaugh, Jeff Rosendale, and Roelof Boonstra, “The Techniques and Challenges of Immutable Storage for Applications in Multimedia”, IS&T/SPIE International Symposium Electronic Imaging / Storage and Retrieval Methods and Applications for Multimedia (EI121), San Jose, CA, January 2005.

Tech Reports and Magazine Articles

[**MAG01**] Ragib Hasan, Radu Sion, and Marianne Winslett, “Secure Provenance: Protecting the Genealogy of Bits”, USENIX ;login: Magazine, June 2009 issue.

[**TR03**] Ragib Hasan, Marianne Winslett, and Soumyadeb Mitra, “Efficient Audit-based Compliance for Relational Data Retention”, UIUC Dept. of Computer Science Tech Report, UIUCDCS-R-2009-3044, March 2009.

[**TR02**] Ragib Hasan, Radu Sion, and Marianne Winslett, “Secure Provenance”, Stony Brook University Tech Report, TR-SB-NSAC-07-2007, November, 2007.

[**TR01**] William Yurcik, Cristina Abad, Ragib Hasan, Moazzam Saleem and Shyama Sridharan, “UCLog+ : A Security Data Management System for Correlating Alerts, Incidents, and Raw Data From Remote Logs”, ACM Computing Research Repository (CoRR) Tech report cs.CR/0607111, July 2006.

Undergraduate Research

[UR03] Ragib Hasan, Meetesh Barua, Pradipta P. Mitra, Jalal Uddin Mahmud and Saidur Rahman, "Design of a Graph Drawing and Visualization System", Proceedings of the 5th International Conference on Computer and Information Technology (ICCIT), Dec 27-28 2002.

[UR02] Pradipta P. Mitra, Ragib Hasan, M. Kaykobad, "On Linear Time Algorithm for Single Source Shortest Path Problem", Proc. of the International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangladesh, 2001.

[UR01] Pradipta P. Mitra, Ragib Hasan, M. Kaykobad, "A Linear Time Algorithm for Single Source Shortest Path Problem", Proc. of the International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangladesh, December 2000.

Internet Publications

[IP01] Ragib Hasan, "*History of Linux*" available at <http://netfiles.uiuc.edu/rhasan/linux>. This comprehensive article has been translated to Hebrew, Bulgarian, Japanese, Chinese, Romanian, Lithuanian, and Portuguese language. The website for the article has received 250,000 unique visitors since 2002.

Presentations and Conference Talks

[PR14] Fake Picassos, Tampered History, and Digital Forgery: Protecting the Genealogy of Bits with Secure Provenance, Systems Seminar, University of Wisconsin-Madison, November 9, 2009

[PR14] Fake Picassos, Tampered History, and Digital Forgery: Protecting the Genealogy of Bits with Secure Provenance, CERIAS Security Seminar, Purdue University, September 2, 2009

[PR13] Protecting the Past and Present of Data with Applications in Secure Provenance and Regulatory Compliant Databases, SIGMOD PhD Workshop, June 28, 2009

[PR12] Fake Picassos, Tampered History, and Digital Forgery: Protecting the Genealogy of Bits with Secure Provenance, Yahoo!-DAIS Seminar, UIUC, May 5, 2009

[PR11] The Case of the Fake Picasso: Preventing History Forgery with Secure Provenance, USENIX FAST, February 25, 2009

[PR11] Preventing History Forgery with Secure Provenance, Trust and Security Seminar, ITI, UIUC, February, 2009

[PR10] Remembrance: The Unbearable Sentience of Being Digital, CIDR, January 2009

[PR09] Please Permit Me: Stateless Delegated Authorization in MashUps, ACSAC, December 2008

[PR08] Provenance: Documenting the History of Digital Objects, CS 591MW2/SB 690 guest lecture, Spring 2008

[PR07] Introducing Secure Provenance: Problems and Challenges, ACM StorageSS, 2007

[PR06] A Statistical Analysis of Disclosed Storage Security Breaches, ACM StorageSS, 2006

[PR05] Context Based Automated Attribute Generation in Ubiquitous Systems, Midwest Security Workshop, September 2006

[**PR04**] Synergy: A Trust-aware, Policy-driven Information Dissemination Framework, IEEE ISI, May 2006

[**PR03**] Breaking the Chip: Vulnerabilities of Cryptographic Processors and Smart Cards, CS 563 guest lecture, Spring 2006

[**PR02**] The Evolution of Storage Service Providers: Techniques and Challenges to Outsourcing Storage, ACM StorageSS, October 2005

[**PR01**] The Techniques and Challenges of Immutable Storage with Applications in Multimedia, SPIE Electronic Imaging, January 2005

Posters

[**PS06**] SPROV 2.0: A Highly-Configurable Platform-Independent Library for Secure Provenance, ACM CCS, November 2009.

[**PS05**] SPROV: A Library for Secure Provenance, USENIX Annual Technical Conference, June 2009.

[**PS04**] Secure Provenance for Digital Objects, Midwest Database Workshop, October 2008.

[**PS03**] Context Based Automated Attribute Generation in Ubiquitous Systems, ITI Dependability Workshop, December 2006.

[**PS02**] The Ra Anonymizer: A Messaging System for Anonymous Communication, CS Department Affiliates Conference, April 2006.

[**PS01**] Synergy: A Policy-driven Information Sharing Infrastructure, ResCUE Project All Hands Meeting, Irvine, California, January, 2006.

HONORS AND AWARDS

Academic Awards

- NSF/CRA Computing Innovation Fellowship, 2009. (acceptance < 5% for International students, < 12% overall)
- USENIX Technical student grant, 2009
- SIGMOD student travel grant, 2009
- USENIX FAST student grant, 2009
- CIDR Graduate student scholarship, 2009
- Inducted into **Tau Beta Pi** Engineering Honor Society, 2007.

Bangladesh University of Engineering and Technology

- Chancellor award for graduating Summa Cum Laude, 2003
- Sharfuddin Gold Medal for graduating Summa Cum Laude, 2003
- Dean's List Award, 1998-2002
- Best Student Award 2000

Programming Contests

- Runner-up, ACM International Collegiate Programming Contest, Asia Regional, 2001
- Runner-up, National Computer Programming Contest, 2000

Others

- Invited Speaker, 3rd Johurul Hoque-Abdullah Al Muti Shorfuddin Memorial Lecture, January, 2007.

- RECENT PROJECTS
- **Accountable Cloud Computing:** Designing mechanisms to make cloud computing trustworthy and accountable.
 - **Regulatory Compliant Databases:** A term-immutable, tamper-evident database for regulatory compliance.
 - **Secure Provenance:** A prototype application layer library for secure provenance (i.e. documented, verifiable, tamper-evident, non-repudiable history of digital objects).
 - **DelAuth:** A delegated authorization system using permits for providing stateless authorization in a distributed environment. (Intern project at Google)
 - **Building Automation:** A multi-layered security system for smart buildings (prototype being deployed at UIUC).
 - **BreachDB:** Analysis of storage security breach incidents.
 - **Synergy:** A framework for trust-aware, policy driven interchange of information in open systems.
 - **VisiResCUE:** A situational-awareness and disaster management system built on top of synergy.
 - **Prohori:** A trust-based intrusion detection and access delegation system for smart buildings.
- COMPUTER SKILLS
- Languages: C, C++, Java, Pascal, PHP, Unix shell scripting,
 - Applications: ArcGIS, Apache, L^AT_EX,
 - Tools: P4, Subversion, CVS
 - Unit Testing: JUnit, Check.
 - Operating Systems: Unix/Linux, Windows.
- RELATED COURSEWORK
- CS498 Computer Security, CS598cag Advanced Computer Security, ECE598NB Privacy Enhancing Technologies, CS598yyz Information Storage Systems, CS523 Advanced Operating Systems, CS598ig Scattered and Distributed Systems, CS421 Programming Languages, CS433 Computer Architecture
- PROFESSIONAL SERVICE
- Program Committee: WISTP (2010), IEEE IDCS (2009, 2008), ACM StorageSS (2005).
 - Web and Proceedings Chair: ACM WPES (2008).
 - External Reviewer: SIGMOD, VLDB, ICDE, CCS, IEEE S&P, Policy, IFIP-TM, SSDBM, WWW, SACMAT, ESORICS, PET Symposium, MSW, ICICT, iTrust, Reactivity on the Web, EDBT, WIA, PASSAT, USENIX FAST.
- PROFESSIONAL AFFILIATIONS
- Honor Society: Tau Beta Pi
 - Student Member, ACM
- VOLUNTEER ACTIVITIES
- Member, UIUC Advisory Committee on International Student & Scholar Services, 2009.
 - Core Member, Bangladesh Open Source Network, 2006-current.
 - Emergency translator/interpreter, Office of International Student and Scholar Services, University of Illinois at Urbana-Champaign. 2006-2009.
 - Mentor, UIUC CS Department Women in Computer Science Undergraduate Mentor program, 2009.
 - Mentor for International Students, International Student Office, UIUC. 2007-2009.
 - New graduate student mentor, Department of Computer Science, University of Illinois at Urbana-Champaign. 2007-2009.
 - Director, BUET Dept. of Computer Science and Engineering Alumni Association of North America. 2007-current.
 - Webmaster, BUET Dept. of Computer Science and Engineering Alumni, www.csebueth.org, 2005-current
- EXTRA-CURRICULAR ACTIVITIES
- Administrator, English Wikipedia, 2005-current.
 - Bureaucrat and Administrator, Bengali Wikipedia, 2006-current.
 - Media Appearances: Interviewed by BBC World Bengali Service Radio (2006), Deutsche-Welle World Service Radio (2009) for my pioneering work on Bengali Wikipedia.

REFERENCES

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- **Prof. Radu Sion**
Dept. of Computer Science,
Stony Brook University,
Email:sion@cs.sunysb.edu
Phone: (765) 543-9147
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- **Prof. Carl Gunter**
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University of Illinois at Urbana-Champaign,
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- **Prof. Nikita Borisov**
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