Hasini Gunasinghe

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Education

- **Ph.D. in Computer Science** — Fall 2013 – Summer 2021
  Purdue University — *West Lafayette, IN, USA*
- **M.S. in Computer Science** — Fall 2013 – Spring 2016
  Purdue University — *West Lafayette, IN, USA*
- **B.Sc. (First-Class Honours) in Computer Science and Engineering** — May 2006 – Sept 2010
  University of Moratuwa — *Moratuwa, Sri Lanka*

Industry Experience

- **Google Inc., Mountain View, CA, USA** — *April 2020 – Present*
  Software Engineer - Android Security and Privacy Team
  - Contributed to the design, development and deployment of the following key security and privacy features of the Android operating system and its eco-system, which is used by over 3 billion users.
    * AuthGraph - a new framework for protecting user data gated by user authentication.
    * Keymint - the reference implementation of the hardware backed cryptographic engine for the Android operating system and its implementation for Pixel 8 devices.
    * DICE for AVF (Device Identifier Composition Engine for the Android Virtualization Framework) - provisioning of hardware backed cryptographic secrets and a verifiable identity for protected virtual machines on Pixel 7 devices.
    * Keystore - a central system component of the Android operating system that provides hardware backed cryptographic services to the Android applications and other system components.
- **IBM T. J. Watson Research Center, Yorktown Heights, NY, USA** — *May 2017 – Aug. 2017*
  Research Intern - Information Security Team
  - Designed and developed a protocol for privacy preserving and secure exchange of digital identity assets in a decentralized identity management ecosystem backed by a permissioned blockchain.
- **Salesforce Inc., San Francisco, CA, USA** — *May 2016 – Aug. 2016*
  Software Engineering Intern - Infrastructure Security Team
  - Contributed to the development of the next generation access control solution for Salesforce data centers.
- **WSO2 Inc., Colombo, Sri Lanka** — *Sept 2010 – May 2013*
  Software Engineer - Security and Identity Management Team
  - Designed and implemented the SCIM (System for Cross-domain Identity Management) based identity provisioning feature for the WSO2 Identity Server, which is an open source digital identity management solution, currently used by over 1500 organizations world wide, managing over a billion identities.
  - Represented WSO2 in the first SCIM interoperability event at the IETF (Internet Engineering Task Force) 83rd meeting held in Paris, France in March 2012.
  - Co-conducted a pre-conference tutorial on the topic: *Enterprise Security and Identity Management with WSO2 Identity Server* at the WSO2Con 2013 held in London, UK.
  - Managed two releases of WSO2 Identity Server (3.2.3 and 4.0.0).

Publications

- **Conference Papers and Presentations:**
  - H. Gunasinghe, A. Kundu, E. Bertino, H. Krawczyk, S. Chari, K. Singh, D. Song. **PrivIdEx: Privacy Preserving and Secure Exchange of Digital Identity Assets.** The World Wide Web Conference (WWW) 2019, San Francisco, CA, USA. (*acceptance rate: 18%*)

  - H. Gunasinghe, E. Bertino. [Invited Paper] **RahasNym: Pseudonymous Identity Management System for Protecting against Linkability.** The 2nd IEEE International Conference on Collaboration and Internet Computing, CIC 2016, Pittsburgh, PA, USA.
  - H. Gunasinghe, E. Bertino. [Poster Paper] **RahasNym: Protecting against Linkability in the Digital Identity Ecosystem.** The 35th IEEE International Conference on Distributed Computing Systems, ICDCS 2015, Columbus, OH, USA, June 2015.
  - H. Gunasinghe, E. Bertino. **Privacy Preserving Biometrics-Based and User Centric Authentication Protocol.** The 8th International Conference in Network and System Security, NSS 2014, Xian, China.

- **Journal Papers:**
  - H. Gunasinghe, M. Atallah, E. Bertino. **PEBASI: A Privacy preserving, Efficient Biometric Authentication Scheme based on Irises.** ACM Transactions on Privacy and Security, Volume 27, Issue 3, Article No.: 25, August 2024.
  - H. Gunasinghe, E. Bertino. **PrivBioMTAuth: Privacy Preserving Biometrics-Based and User Centric Protocol for User Authentication from Mobile Phones.** IEEE Transactions on Information Forensics and Security, vol. 13, no. 4, p. 1042-1057, April, 2018.

Patents

- S. Chari, H. Gunasinghe, H. Krawczyk, A. Kundu, K. K. Singh, D. Su. **Protection of Confidentiality, Privacy and Ownership Assurance in a Blockchain Based Decentralized Identity Management System**. U.S. Patent 10 833 861, Nov. 10, 2020.
- S. Chari, H. Gunasinghe, A. Kundu, K. K. Singh, D. Su. **Protection of confidentiality, privacy and financial fairness in a blockchain based decentralized identity management system**. U.S. Patent 10 715 317, Jul. 14, 2020.
- S. Chari, H. Gunasinghe, A. Kundu, K.K. Singh, D. Su. **Privacy-preserving identity asset exchange**. U.S. Patent 10 944 560, Mar. 14, 2020.

Awards

- **Research Awards and Recognitions:**
  - Bisland Dissertation Fellowship awarded by the Graduate School, Purdue University in 2019.
  - Emil Stefanov Memorial Fellowship for originality and creative thinking in security research in 2019.
  - IBM PhD Fellowship in 2018.
  - The paper titled: "RahasNym: Pseudonymous Identity Management System for Protecting against Linkability" was featured in the "IEEE Computing Now" magazine under the theme: *Improving Cybersecurity: User Accountability and Sociotechnical Systems* in April 2017[1].
  - Research grant awarded by the Google ATAP program for the proposal titled: "Privacy Preserving Multimodal Biometrics-based Continuous Authentication System for Smart Phones" in 2015.
  - Best Poster Paper Award in the 35th IEEE ICDCS, Columbus, OH, USA, June 2015.
  - Best Paper Award in the 8th International Conference on Network and Systems Security, China, 2014.
- **Industry Awards and Recognitions:**
  - Android Security Acknowledgements in January 2021 for reporting and fixing the CVE-2021-0320.
  - Outstanding Contributor Award by WSO2 Inc. for the years 2011 and 2012.
  - Second Runners-Up in the Imagine Cup 2008, organized by Microsoft, Sri Lanka.
- **Teaching Awards:** (by the Computer Science Department, Purdue University)
  - Raymond Boyce Graduate Teacher Award in 2017, which is listed in the department's hall of fame.
  - Harris Graduate Teaching Assistant Award in 2016, in recognition of supporting women students in core classes.

[1]The link is from a web archive because IEEE Computer Society has moved from IEEE Computing Now to IEEE Tech News.

- **Travel Grants for:**
  - The 2nd Zero Knowledge Proof Workshop 2019 (by the Zero Knowledge Proof Steering Committee).
  - Summer School on Secure Multi Party Computation 2016 (by the National Science Foundation).
  - Grace Hopper Women in Computing 2016 (by Purdue University) .
  - IEEE ICDCS 2015 (by the National Science Foundation).

Teaching Experience

- Graduate Teaching Assistant (GTA) for the Software Engineering (CS 307) and Senior Software Engineering (CS 407) courses offered by the Department of Computer Science at Purdue University (*Jan 2015 - May 2018*).

Volunteered Professional Services

- Conducted an invited guest lecture on "Authenticated Key Exchange" in the seminar course on Computer and Network Security (CSCE A465) at the University of Alaska Anchorage in March 2024.
- Conducted two tech talks at Google:
  - "Zero Knowledge Proof Protocols" for the Android Hardware backed Security Team in Jan. 2022.
  - "Zero Knowledge Proofs for Android Identity Credentials" in the Trusted Applet Workshop in Oct. 2023.
- Served as a reviewer for the ASPIRE (Android Security and PrIvacy REsearch) program at Google in 2020.
- Conducted a guest lecture on "Zero knowledge proofs and their applications in digital identity management" in the seminar course on Data Security and Privacy (CS 59000-DSP) at Purdue University in Spring 2019.
- Served as a reviewer/sub reviewer for the following renowned journals and conferences:
  - Journals: IEEE TIFS (*2018-2019*), IEEE TDSC (*2014-2019*)
  - Conferences: ACM WWW (*2019*), IEEE ICDCS (*2019*), ACM SSACMAT (*2015*), ACM AsiaCCS (*2014, 2015*), ACM CODASPY (*2015, 2018*)

Contributions to Open Source and Open Standards

- **Android Open Source Project (AOSP)**:
  - Contributed several key security features to the Android operating system and Trusty (the secure operating system that provides a Trusted Execution Environment (TEE) for Android devices).
- **Google Summer of Code (GSoC) 2015 with Apache Airavata**:
  - Designed and developed an access control solution for Apache Airavata.
  - Earned the committership in the Apache Software Foundation for the Airavata Project.
- **WSO2 Charon - An Open Source SCIM Implementation**:
  - Initiated the project and released 1.0 as the sole contributor.
    WSO2 Charon:
    - is one of the first implementations of the open standard: SCIM (System for Cross Domain Identity Management), released under Apache 2.0 licence.
    - successfully interoperated with the other SCIM implementations at the first SCIM interoperability event (at the IETF 83rd meeting held in Paris, France in March 2012).
    - has now grown into a project with 75+ contributors and 150+ forks.
    - is integrated with WSO2 Identity Server, a leading open source identity management solution.
- **SCIM Standardization Working Group** (2012):
  - Contributed several fixes to the specification.