Hari Venugopalan

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Research Interests

Systems, Security, Privacy, Machine Learning, Anti-fraud, Healthcare, Hardware Side-channels

Education

Current PhD (Computer Science) at **University of California Davis**
2020 MS (Computer Science) at **University of California Davis**
2014 B.Tech (Production Engineering) at **National Institute of Technology Tiruchirappalli**

Work Experience

Graduate Student Researcher, UC Davis, Davis CA Sep 2018 - Present

Diabetes management research

- *GlucOS:* Designed and implemented the first end-to-end secure system for automated insulin delivery.
- *BeaGL:* Built a predictive alerting app to provide individuals with agency and trust in managing diabetes.
- Currently driving HCI research to help individuals develop deeper intuition over their metabolism.

Authentication / Bot detection research

- *FP-Rowhammer:* Proposed a novel technique to exploit the uniqueness and stability of Rowhammer bit flips to identify devices including those with identical hardware and software configurations.
- *FP-Inconsistent:* Conducted large-scale measurement and analysis of browser fingerprint inconsistencies to detect evasive bots in the wild.
- *Javelin:* Conceived a glycemic biometric to provide zero-effort authentication for individuals with diabetes.
- *CPUPrint:* Currently leading DVFS-based timing side-channel for device fingerprinting.

Financial fraud research

- *Boxer:* Deployed an advanced card scanning system to recover false positives from fraud detection to combat card-not-present credit card fraud.
- *Daredevil:* Designed and implemented ethical anti-fraud system to support card scanning on resource-constrained devices.
- Financial fraud research led to my advisor starting a company with the research software having run on over a billion devices, saving an estimated 100 mn+ in fraud, culminating in acquisition by Stripe.

Privacy research

- *Aragorn:* Designed an implemented the first automated and extensible privacy-enhancing system for mobile cameras.
- *Inception:* Currently collaborating on research to characterize and prevent privacy leaks across iFrames.

Applied Scientist Intern, Amazon, New York City NY Jun 2025 - Present (Until Sep 2025)

- Drove research on LLM domain adaptation for fraud assessment.

ML Research Intern, Blue Hexagon Inc, Sunnyvale CA Jun 2019 - Sep 2019

– *eXeGAN:* Conceptualized a GAN-based functionality-preserving malware mutation technique to evade static detection.

Research Collaborator, UofA, Remote Jan 2015-May 2017

– *MultiLock:* Collaborated on face recognition based graded authentication in mobile apps.

Member of Technical Staff, Oracle India Pvt. Ltd, Bengaluru, India Jun 2014-Jul 2017

– *Oracle Social Network:* Developed analytics framework and webclient features for enterprise social network.

Publications

FP-Rowhammer: DRAM-Based Device Fingerprinting
Hari Venugopalan, Kaustav Goswami, Zainul Abi Din, Jason Lowe-Power, Samuel T. King and Zubair Shafiq
ACM ASIA Conference on Computer and Communications Security 2025

FP-Inconsistent: Measurement and Analysis of Fingerprint Inconsistencies in Evasive Bot Traffic
Hari Venugopalan, Shaoor Munir, Shuaib Ahmed, Tangbaihe Wang, Samuel T. King and Zubair Shafiq
ACM Internet Measurement Conference 2025

Aragorn: A Privacy-Enhancing System for Mobile Cameras
Hari Venugopalan, Zainul Abi Din, Trevor Carpenter, Jason Lowe-Power, Samuel T. King and Zubair Shafiq
UbiComp 2024 (Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies)

Doing good by fighting fraud: Ethical anti-fraud systems for mobile payments
Zainul Abi Din, *Hari Venugopalan*, Henry Lin, Adam Wushensky, Steven Liu and Samuel T. King
IEEE Symposium on Security and Privacy 2021

Boxer: Preventing fraud by scanning credit cards
Zainul Abi Din, *Hari Venugopalan*, Jaime Park, Andy Li, Weisu Yin, Haohui Mai, Yong Jae Lee, Steven Liu and Samuel T. King
USENIX Security 2020

Credit Card Fraud Is a Computer Security Problem
Samuel T. King, Patrick Traynor, Christian Peeters, Nolen Scaife, Zainul Abi Din and *Hari Venugopalan*
IEEE Security and Privacy Magazine 2021

GlucOS: Security, correctness, and simplicity for automated insulin delivery
Hari Venugopalan, Shreyas Madhav Ambattur Vijayanand, Caleb Stanford, Stephanie Crossen and Samuel T. King
In review at ASPLOS 2026

Enabling trust and agency in predictive glucose alerting: co-design and pilot testing of the BeaGL application in young adults living with type 1 diabetes
Hari Venugopalan, Samuel T. King, Salvador Lopez, Jun Min Kim, Grace Cheng, Tim Stewart, Sriram Magesh, Brendan Leung and Stephanie Crossen
In review at JMIR Diabetes 2025 (Journal of Medical Internet Research)

Adaptability, Extensibility and Simplicity of the MetabolicOS
Hari Venugopalan, Shreyas Madhav Ambattur Vijayanand and Samuel T. King
ACM BioSys Workshop at ASPLOS 2024

MultiLock: Biometric-Based Graded Authentication for Mobile Devices

Shravan Aras, Chris Gniady and *Hari Venugopalan*
MOBIQUITOUS: Mobile and Ubiquitous Systems 2019

HammerSim: A Tool to Model Rowhammer
Kaustav Goswami, Ayaz Akram, *Hari Venugopalan* and Jason Lowe-Power
Young Architect Workshop at ASPLOS 2023

Open Source Software Computed Risk Framework
Jon Chapman and *Hari Venugopalan*
IEEE International Conference on Computer Science and Information Technologies 2022

Awards, Patents and Impact

- Financial fraud research led to a startup which was acquired by Stripe. Software from the research has run on over a billion devices, saving an estimated 100 mn+ in fraud.
- Six individuals have been using the predictive alerting iOS app from my research for over 6 months, resulting in statistically significant improvements in reducing hypoglycemia while simultaneously reducing cognitive load. Currently working with the UC Davis Startup Center for wide real-world deployment on the App store.
- One individual has been running the secure system for automated insulin delivery from my research to manage their diabetes for the past year, resulting in glycemic control to match that of non-diabetics (A1C of 5.8%). Currently working on integrating the security mechanism within Trio, a widely used automated insulin delivery system.
- My early-stage startup, Kingsmen Health, spawning from my diabetes research was awarded Mentor's choice award at UC Davis early-stage cohort accelerator program, PLASMA.
- My collaboration, Multilock, led to a US patent being filed by the University of Arizona.
- GlucOS: A secure, safe and extensible system for automated insulin delivery was recognized as the AI-Selected best poster at the IEEE Symposium on Security and Privacy 2024.
- GGCS summer fellowship by the department of Computer Science at UC Davis in 2022 and 2024.
- Ranked within the top 200 in India at the regional ACM-ICPC contest in 2013.

Talks

- **GlucOS: Security, correctness, and simplicity for automated insulin delivery** MIT (December 2024), UC Davis (October 2024), FairComp workshop (October 2024)
- **Aragorn: A Privacy-Enhancing System for Mobile Cameras** UbiComp (October 2024), ProperData (January 2022)
- **FP-Rowhammer: DRAM-Based Device Fingerprinting** ProperData (February 2024)
- **FP-Inconsistent: Measurement and Analysis of Fingerprint Inconsistencies in Evasive Bot Traffic** IMC (Upcoming in November 2025)
- **eXeGAN: Not all Malware is created Equal** Blue Hexagon Inc(September 2019)

Media Coverage

- **Stripe acquires Bouncer, will integrate its card authentication into the Radar fraud detection tool**
  TechCrunch article by Ingrid Lunden

- **RAM-ramming Rowhammer is back – to uniquely fingerprint devices**
  The Register article by Thomas Claburn
- **Centauri: Practical Rowhammer Fingerprinting**
  YCombinator News post by Paul Houle
- **Innovative Device Fingerprinting Technique Developed by University of California Researchers**
  Bitdefender article by Vlad Constantinescu
- **Serious Security: Rowhammer returns to gaslight your computer**
  Naked Security article by Paul Ducklin
- **With AI, a New "Metabolic Watchdog" Takes Diabetes Care from Burden to Balance**
  UC Davis Engineering Progress Magazine by Jessica Heath
- **Todd Austin's Post**
  Linkedin post by Dr. Todd Austin
- **Tidepool Article**
  Article by Tidepool
- **BeaGL app wins the Mentor's Choice award of $5000**
  UC Davis College of Engineering article by Jessica Heath

Teaching

ECS 150: Operating Systems Teaching Assistant	Sep 2024-Apr 2025
ECS 152A: Computer Networks Teaching Assistant	Sep 2023-Dec 2023
ECS 153: Computer Security Teaching Assistant	Jan 2022-Mar 2022
ECS 140: Programming Languages Teaching Assistant	Apr 2018-Jun 2018
ECS 265: Distributed Database Systems Teaching Assistant	Jan 2018-Mar 2018
ECS 40: Software Development and Object-Oriented Programming TA	Sep 2017-Dec 2017

Services

- PC member AISec Workshop 2023, 2024 and 2025 (Co-located with ACM CSS)
- PC member SecWeb Workshop 2023 (Co-located with IEEE S&P)
- Shadow PC member IMC 2025
- External reviewer ACM Interactive Mobile Wearable Ubiquitous Technologies (IMWUT/Ubicomp) 2023
- External reviewer IEEE Internet of Things Journal 2023
- Artifact Reviewer PETS 2024 and PETS 2025

Leadership

- Certified Competent Communicator and Advanced Leader Bronze by Toastmasters International.
- President (Jun 2016-Dec 2016), Lexicon Toastmasters, corporate chapter of Toastmasters International at Oracle India Pvt. Ltd.
- Head (Jul 2013-May 2014), Google Developer Group, NIT Trichy.

Skills

C, C++, Python, Swift, Java, JavaScript

Last updated: September 28, 2025