# Nojan Sheybani

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**US Citizen**

## Education

**University of California San Diego** — San Diego, CA
*PhD Student in Electrical and Computer Engineering* — May 2025

**University of Virginia** — Charlottesville, VA
*BS in Computer Engineering With Highest Distinction.* Cumulative GPA: 3.93 Major GPA: 3.93 — May 2020

## Research Interests

Privacy-Preserving Computation, Zero Knowledge Proofs, Hardware Security, Computer Architecture, HW/SW Co-design, Robust Machine Learning, and IoT applications

## Work Experience

**University of California San Diego** — San Diego, CA
*Graduate Research Assistant Advised by Prof. Farinaz Koushanfar* — June 2020 — Present

- Leveraging hardware and software co-design to develop intelligent, data-intensive and secure embedded computing applications and systems
- Applying efficient zero-knowledge proof (ZKP) protocols in several learning paradigms and generic applications, and characterizing open-source ZKP libraries towards a systematization of knowledge (SoK)

**Visa Research** — Palo Alto, CA
*Identity and Authentication Research Intern* — May 2023 — August 2023

- Utilizing secure multi-party computation to develop private and secure end-to-end biometric recognition workflows for powering payments through Visa

**Intel Labs** — San Diego, CA & Hillsboro, OR
*DARPA DPRIVE Security and Privacy Graduate Research Intern* — June 2022 — September 2022

- Studied feasibility & practicality of DARPA DPRIVE accelerator to support Zero-Knowledge Succinct Non-Interactive Arguments of Knowledge (zkSNARKs) for Fully Homomorphic Encryption integrity

*Security and Arithmetic Circuits Research Intern* — June 2021 — September 2021

- Invented 2 novel techniques for efficient hardware implementation of FHE operations for the DARPA DPRIVE accelerator, resulting in co-inventor status on 3 invention disclosures
- Developed Python model to simulate core operation for FHE bootstrapping, which shows latency, memory access patterns, and other crucial attributes pertaining to hardware performance

**Cisco** — San Diego, CA
*Security Engineering Intern* — August 2020 — September 2020

- Developed the backend of the Cloud Trust Anchor Service, a cloud neutral, self-managed trust anchor service

**University of Virginia** — Charlottesville, VA
*Undergraduate Research Assistant Advised by Prof. Benton Calhoun* — September 2016 — May 2020

- Conducted research on low-power digital circuits and low energy electronics for research/medical applications, with a focus on piezoelectric rectifiers
- Characterized tradeoffs between dynamic-leakage suppression transistor configuration and static-CMOS for self-powered systems

**Appian** — McLean, VA
*Software Engineering Intern* — June 2019 — August 2019

- Worked on the Kubernetes Operator written in Go, which deploys the Appian platform in Kubernetes and manages it automatically, and pushed code to internal production daily

**AT&T (DIRECTV)** — El Segundo, CA
*Software Engineering Intern* — May 2018 — August 2018

- Automated generation and upload of channel stream configuration files for ads using Ansible and Yospace API

**Trivium Financial Group** Charlottesville, VA
*Software Engineering Intern* July 2017 — August 2017

- Assisted in development of major risk-mitigating financial modeling platform, which condensed the amount of time taken to generate a complex financial model from a few weeks to a few hours

## Technical Skills

**ECE**: VHDL/Verilog, Cadence, Vivado HLS, NI Multisim, NI Ultiboard, LabVIEW, Virtual Bench, Logisim
*Courses*: VLSI, Embedded Systems, Embedded Testing and Validation, Electronics, Computer Architecture, Computer Networks, Self-Powered IoT Systems, Signal Processing, Probability and Random Processes

**CS**: PyTorch, Tensorflow, Python, C/C++, MATLAB, R, Go, Bash, React/React Native, Git
*Courses*: Learning Algorithms, Neural Networks, Operating Systems, Data Structures, Algorithms, Data Science, Software Development

## Publications and Presentations

**zPROBE: Zero Peek Robustness Checks for Federated Learning** *July 2023*
Z. Ghodsi*, M. Javaheripi*, **N. Sheybani***, X. Zhang*, K. Huang, F. Koushanfar
**Equal contribution*
*ICCV 2023* link

**Tailor: Altering Skip Connections for Resource-Efficient Inference** *July 2023*
O. Weng, G. Marcano, V. Loncar, A. Khodamoradi, **N. Sheybani**, F. Koushanfar, K. Denolf, J. Duarte, R. Kastner
*IEEE Transactions on Reconfigurable Technology and Systems* link

**NetFlick: Adversarial Flickering Attacks on Deep Learning Based Video Compression** *June 2023*
Jung-Woo Chang*, **Nojan Sheybani***, Shehzeen Hussain, Mojan Javeheripi, Seira Hidano, Farinaz Koushanfar
**Equal contribution*
*In review for IEEE Transactions on Multimedia Computing Communications and Applications* link

**NetFlick: Adversarial Flickering Attacks on Deep Learning Based Video Compression** *March 2023*
Jung-Woo Chang, **Nojan Sheybani**, Shehzeen Hussain, Mojan Javeheripi, Seira Hidano, Farinaz Koushanfar
*ICLR ML4IoT Workshop 2023* link

**ZKROWNN: Zero Knowledge Right of Ownership for Neural Networks** *February 2023*
**N. Sheybani**, Z. Ghodsi, R. Kapila, F. Koushanfar
*DAC 2023*

**zPROBE: Zero Peek Robustness Checks for Federated Learning** *December 2022*
Z. Ghodsi*, M. Javaheripi*, **N. Sheybani***, X. Zhang*, K. Huang, F. Koushanfar
**Equal contribution*, Outstanding Paper Award
*NeurIPS Trustworthy and Socially Responsible Machine Learning Workshop 2022* link

**Tailor: Altering Skip Connections for Resource-Efficient Inference** *November 2022*
O. Weng, G. Marcano, V. Loncar, A. Khodamoradi, **N. Sheybani**, F. Koushanfar, K. Denolf, J. Duarte, R. Kastner
*Poster for FPGA 2023*

**SenseHash: Computing on Sensor Values Mystified at the Origin** *November 2022*
**N. Sheybani**, X. Zhang, S. U. Hussain, F. Koushanfar
*IEEE Transactions of Emerging Topics in Computing Special Section on Hardware Security Journal* link

**FastStamp: Accelerating Neural Steganography and Digital Watermarking of Images on FPGAs** *October 2022*
S. Hussain*, **N. Sheybani***, P. Neekhara*, X. Zhang, J. Duarte, F. Koushanfar
**Equal contribution*
*ICCAD 2022* link

**AccHASHTAG: Accelerated Hashing for Detecting Fault-Injection Attacks on Embedded Neural Networks** *June 2022*
**N. Sheybani**, M. Javaheripi, J. Chang, F. Koushanfar
*Hardware Demo for HOST 2022*

**HAtNet: Hardware Attestation of Neural Networks** *June 2022*
**N. Sheybani**, H. Chen, X. Zhang, S. Hussain, F. Koushanfar

*Hardware Demo for HOST 2022*

**Is Revolutionary Hardware for Fully Homomorphic Encryption important? What else is needed?** *October 2021*
C. Bonte, R. Cammarota, W. Dai, J. Fryman, H. Gong, D. Kim, R. Kumar, K. Laine, P. Lalwaney, **N. Sheybani**, A. Rajan, A. Reinders , M. Steiner, V. Suresh, S. Taneja, M. Trifan, A. Viand, W. Wang, W. Wang, C. Wilkerson, J. Yang
*COSADE 2021* link

**A Self-Powered and LoRa-Based Fleet Tracker: Demonstrating Improved Reliability in the IoT** *March 2020*
V. Lin, J. Dugan, **N. Sheybani**, N. Krzysztofowicz, M. Miller, H. Powell
*IEEE Southeastcon 2020* [link]

**The Role of Affective Skills in the Engineering Classroom** *March 2020*
**N. Sheybani**, M. Miller, H. Powell, J. Dugan
*American Society for Engineering Education Southeastern Section Conference 2020, Poster (Accepted but could not attend)*

**Qualitative Skill Development in Engineering Education** *May 2019*
*Presentation for 2019 Innovations in Pedagogy Summit*
**N. Sheybani**, M. Miller

## Professional Services

**IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems** *Reviewer*
**IEEE Security & Privacy** *Poster Reviewer*
**International Workshop on Cyberspace Security and AI (workshop for IEEE TrustCom)** *TPC*
**IEEE Transactions on Dependable and Secure Computing** *Reviewer*

## Teaching Experience

**Advanced Digital Design Project (ECE 111), UCSD** *TA to Prof. Farinaz Koushanfar* Fall 2021
**Computer Architecture (ECE 4435/6435), UVA** *TA to Prof. Ronald Williams* Spring 2020
**Digital Logic Design (ECE 2330), UVA** *TA to Prof. Joanne Dugan* Spring 2020
**Nao Robots (ECE 1501), UVA** *Instructor* Spring 2019
**Electronics (ECE 2660), UVA** *TA to Prof. Ronald Williams* Fall 2018
**Electronics (ECE 2660), UVA** *TA to Prof. Scott Barker* Spring 2018
**Introduction to Engineering (ENGR 1620), UVA** *TA to Prof. Keith Williams* Fall 2017

## Honors and Awards

**DAC Young Fellow** *UCSD* 2021
**Halicioğlu Data Science Institute Graduate Prize Fellowship** *UCSD* 2020
**Electrical and Computer Engineering Department Fellowship** *UCSD* 2020
**Graduation with Highest Distinction** *UVA* 2020
**Best Senior Capstone** *Awarded to team with best project as decided by UVA ECE faculty* 2020
**Raven Society** *UVA* 2020
**IEEE Eta Kappa Nu Leadership** *UVA* 2019
**Intermediate Honors** *UVA* 2018
**Dean's List** *UVA* 2016-2020

## Community Involvement

**Jacobs Undergraduate Mentorship Program (JUMP)** September 2020 — Present
**Raven Society** *Member* November 2019 — Present
**Institute of Electrical and Electronics Engineers (IEEE)** *Member* August 2016 — Present
**Association for Computing Machinery (ACM)** *Member* August 2016 — Present
**Eta Kappa Nu** *Leadership* May 2019 — May 2020
**HackCville** *Student Member* May 2017 — May 2020
**Madison House** *Youth Soccer Coach* September 2017 — November 2017
**Kids Making A Difference, LLC** *Founder and President (curesearch.org/nojan-sheybani)* May 2015 — July 2017