Steven M. Hernandez, Ph.D.

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EDUCATION

Virginia Commonwealth University Richmond, VA
Ph.D. Computer Science *2018-2023*
Dissertation: "WiFi Sensing at the Edge Towards Scalable On-Device Wireless Sensing Systems"
Advisor: Eyuphan Bulut

Virginia Commonwealth University Richmond, VA
B.S. Computer Science *2016 – 2018*

ACADEMIC AND INDUSTRY EXPERIENCE

Google June 2023 - Present
Research Scientist

Mobile and Wireless Networking Group (MoWiNG) Lab August 2018 - May 2023
Graduate Research Assistant - Edge WiFi Sensing

Google June 2022 - August 2022
Research Scientist Intern - On-Device Speech Recognition and Model Compression

Facebook May 2020 - August 2020
Ph.D. Software Engineering Intern - Spatial Computing, AR/VR

Mobile and Wireless Networking Group (MoWiNG) Lab May 2017 - August 2018
Undergraduate Research Assistant - App Development

Foster Made July 2016 - August 2018
Software Developer - Back-End and Front-End Application Development

Spark Product Development May 2016 - September 2017
Research and Development (Freelance) - Internet of Things (IoT)

CoolerTags August 2014 - March 2016
Software Developer - Back-End and Front-End Application Development

AWARDS

Fellowship: NSF Graduate Research Fellowship Program 2018 – 2023
(15% acceptance rate)

Assistantship: Graduate School Dissertation Assistantship January 2023 – May 2023
Virginia Commonwealth University, Graduate School

Award: Outstanding Dissertation Award April 2024
Virginia Commonwealth University, College of Engineering, Department of Computer Science
"WiFi Sensing at the Edge Towards Scalable On-Device Wireless Sensing Systems"

Award: Outstanding Paper Award April 2023

Virginia Commonwealth University, College of Engineering, Department of Computer Science
"WiFi Sensing on the Edge: Signal Processing Techniques and Challenges for Real-World Systems"

Award: Outstanding Paper Award May 2022

Virginia Commonwealth University, College of Engineering, Department of Computer Science
"WiFederated: Scalable WiFi Sensing using Edge Based Federated Learning"

Award: Outstanding Graduate Student Research Award April 2022

Virginia Commonwealth University, College of Engineering

Award: Best Demo Paper Award March 2020

IEEE Conference on Pervasive Computing and Communications (PerCom 2020)
"Performing WiFi Sensing with Off-the-shelf Smartphones"

Grant: IEEE Travel/Conference Grant February 2023

IEEE Conference on Pervasive Computing and Communications (PerCom 2023)

Grant: IEEE Travel/Conference Grant March 2020

IEEE Conference on Pervasive Computing and Communications (PerCom 2020)

INVITED TALKS/LECTURES

Edge Learning and Collaboration in Mobile Sensor Networks: CMSC 628 Mobile Networks Lecture, Virginia Commonwealth University, Richmond, Virginia, USA, April 2023

Edge WiFi Sensing: Improving Scalability through TinyML and Edge Learning: Invited Talk for Google ATAP (Advanced Technology and Projects) Group, Mountain View, California, USA, September 2022

Sharing Low Rank Conformer Weights for Tiny Always-On Ambient Speech Recognition Models: Google Assistant - Speech Recognition, Mountain View, California, USA, September 2022

Practical Introduction to Machine Learning: Foster Made, Richmond, Virginia, USA, August 2018

Internet of Things for Engineers: Spark Product Development, LCC, Richmond, Virginia, USA, June 2017

CONFERENCE PRESENTATIONS/POSTERS

Sharing Low Rank Conformer Weights for Tiny Always-On Ambient Speech Recognition Models: PerCom 2023, Rhodes, Greece, June 2023

WiFi Sensing at the Edge to Improve the Scalability of Wireless Sensing Systems: Dissertation Final Defense, Richmond, Virginia, United States, April 2023

Poster: Elderly Community Health Tracking with WiFi Sensing – Interdisciplinary Work: VCU Nursing Research, UNlocking New Collaborations, Richmond, Virginia, United States, April 2023

Scheduled Spatial Sensing against Adversarial WiFi Sensing: PerCom 2023, Atlanta, Georgia, United States, March 2023

WiFi Sensing at the Edge to Improve the Scalability of Wireless Sensing Systems: Dissertation Proposal, Richmond, Virginia, United States, June 2022

Online Stream Sampling for Low-Memory On-Device Edge Training for WiFi Sensing: WiseML 2022, Austin, Texas, United States, May 2022

Poster: Securing WiFi Sensing Against Eavesdroppers: CCI Symposium 2022, Richmond, Virginia, United States, April 2022

Towards Dense and Scalable Soil Sensing Through Low-Cost WiFi Sensing Networks: LCN 2021, Edmonton, Canada, October 2021

Adversarial Occupancy Monitoring using One-Sided Through-Wall WiFi Sensing: ICC 2021, Montreal, Canada, June 2021

Lightweight and Standalone IoT based WiFi Sensing for Active Repositioning and Mobility: WoWMoM 2020, Cork, Ireland, September 2020

Performing WiFi Sensing with Off-the-shelf Smartphones: PerCom 2020, Austin, Texas, United States, March 2020

TrinaryMC: Monte Carlo based Anchorless Relative Positioning for Indoor Positioning: CCNC 2020, Las Vegas, Nevada, United States, January 2020

ACADEMIC SERVICE

Mentorship and Leadership :

Undergraduate ($\times 7$):	Deniz Erdag, Saumya Trivedi, Josh Foster, Rachel William, Dimayri Romero, Fatma Saafan, Sekai Clayton.
Graduate (Masters) ($\times 1$):	Bret Dereski.
Graduate (Ph.D.) ($\times 2$):	Md. Touhiduzzaman, Soumita Ghosh.

Conference/Journal Reviewer:

2024 ($\times 1$):	IEEE PerCom ($\times 1$).
2023 ($\times 9$):	IEEE WoWMoM ($\times 2$), IEEE Internet of Things Journal ($\times 1$), IEEE Access ($\times 1$), IEEE Transactions on Artificial Intelligence ($\times 1$), IEEE ASRU ($\times 1$), IEEE PerCom ($\times 2$), IEEE Wireless Communications Letters ($\times 1$).
2022 ($\times 12$):	IEEE Transactions on Mobile Computing ($\times 2$), IEEE Communications Magazine ($\times 1$), Elsevier Computer Networks Journal ($\times 1$), IEEE Access ($\times 1$), ACM WiSec WiseML ($\times 4$), IEEE ICC ($\times 1$), IEEE WoWMoM ($\times 2$).
2021 ($\times 2$):	IEEE Access ($\times 1$), IEEE Journal on Selected Areas in Communications ($\times 1$).
2020 ($\times 1$):	IEEE WoWMoM ($\times 1$).
2019 ($\times 1$):	IEEE VTC2019 ($\times 1$).

Seminar Coordination: 2 Invited Speakers: Research Scientist, Industry ($\times 1$), Academic ($\times 1$).

OPEN SOURCE

StevenMHernandez/ESP32-CSI-Tool: > 150 stars, 50 forks, 5 contributors. (owner)

StevenMHernandez/Android-CSI-Labelling-App: > 15 stars, 5 forks. (owner)

StevenMHernandez/Android-ESP32-CSI: > 10 stars, 5 forks. (owner)

StevenMHernandez/Survero: (owner)

tensorflow/lingvo: 1 commit (contributor)

Miscellaneous - Art Installation

Series: ROBOs (2015-2023): Personal Project - Online ⧉

Electronic Window Display (2017): Foster Made - Richmond, Virginia ⧉

Glitch Wall (2015): Community Room, Dog Days - 1708 Gallery - Richmond, Virginia ⧉

Arduino Projection Mapping (2015): Virginia Commonwealth University - Richmond, Virginia ⧉

Interactive Pi Portrait (2014): Community Room, This One's For You - Gallery 5 - Richmond, Virginia ⧉

Interactive Portrait Online (2014): Global - Online ⧉

Conference and Journal Papers

[1] **S. M. Hernandez**, D. Zhao, S. Ding, A. Bruguier, R. Prabhavalkar, T. N. Sainath, Y. He, and I. McGraw, "Sharing Low Rank Conformer Weights for Tiny Always-On Ambient Speech Recognition Models," in *2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (Work completed during Google Research Internship)*, Rhodes, Greece, Jun. 2023.

[2] **S. M. Hernandez** and E. Bulut, "Scheduled Spatial Sensing against Adversarial WiFi Sensing," in *Proceedings of the International Conference on Pervasive Computing and Communications (PerCom 2023) (CORE A*)*, Atlanta, USA, Mar. 2023.

[3] **S. M. Hernandez** and E. Bulut, "WiFi Sensing on the Edge: Signal Processing Techniques and Challenges for Real-World Systems," *IEEE Communications Surveys & Tutorials (IF: 33.840)*, 2023, Awarded Outstanding Paper Award - 2023 - VCU Computer Science Department.

[4] **S. M. Hernandez**, M. Touhiduzzaman*, P. E. Pidcoe and E. Bulut, "Wi-pt: Wireless sensing based low-cost physical rehabilitation tracking," in *IEEE International Conference on E-health Networking, Application & Services (HealthCom), Genoa, Italy*, 2022.

[5] **S. M. Hernandez** and E. Bulut, "Online Stream Sampling for Low-Memory On-Device Edge Training for WiFi Sensing," in *Proceedings of the 4th ACM Workshop on Wireless Security and Machine Learning (WiseML 2022)*, Austin, Texas, United States, May 2022.

[6] **S. M. Hernandez** and E. Bulut, "WiFederated: Scalable WiFi Sensing using Edge Based Federated Learning," *IEEE Internet of Things Journal*, 2022, Awarded Outstanding Paper Award - 2022 - VCU Computer Science Department.

[7] **S. M. Hernandez**, D. Erdag*, and E. Bulut, "Towards Dense and Scalable Soil Sensing Through Low-Cost WiFi Sensing Networks," in *2021 IEEE 46th Conference on Local Computer Networks (LCN 2021)*, Edmonton, Canada, Oct. 2021.

[8] **S. M. Hernandez** and E. Bulut, "Adversarial Occupancy Monitoring using One-Sided Through-Wall WiFi Sensing," in *2021 IEEE International Conference on Communications (ICC): IoT and Sensor Networks Symposium (IEEE ICC'21 - IoTSN Symposium)*, Montreal, Canada, Jun. 2021.

[9] **S. M. Hernandez** and E. Bulut, "Using perceived direction information for anchorless relative indoor localization," *Journal of Network and Computer Applications*, vol. 165, p. 102714, 2020.

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* Indicates mentored student.

[10] **S. M. Hernandez** and E. Bulut, "Lightweight and Standalone IoT based WiFi Sensing for Active Repositioning and Mobility," in *21st International Symposium on "A World of Wireless, Mobile and Multimedia Networks" (WoWMoM 2020)*, Cork, Ireland, Jun. 2020.

[11] **S. M. Hernandez** and E. Bulut, "Performing WiFi Sensing with Off-the-shelf Smartphones," in *PerCom Demos 2020: 18th Annual IEEE International Conference on Pervasive Computing and Communications Demonstrations (PerCom Demos 2020)*, Austin, USA, Mar. 2020, Awarded Best Demo Award.

[12] **S. M. Hernandez** and E. Bulut, "TrinaryMC: Monte Carlo Based Anchorless Relative Positioning for Indoor Positioning," in *2020 IEEE 17th Annual Consumer Communications & Networking Conference (CCNC 2020)*, Las Vegas, USA, Jan. 2020.

[13] E. Bulut, **S. M. Hernandez**, A. Dhungana, and B. K. Szymanski, "Is Crowdcharging Possible?" in *2018 27th International Conference on Computer Communication and Networks (ICCCN 2018)*. IEEE, 2018, pp. 1–9.