Sarah Hooper

EDUCATION

Stanford University, Stanford, California 2017 – 2023
Ph.D. in Electrical Engineering
M.S. in Electrical Engineering
Thesis: Label-efficient machine learning for medical image analysis

Rice University, Houston, Texas 2013 – 2017
B.S. in Electrical Engineering
Minor in Global Health Technologies
Summa Cum Laude
Distinction in Research and Creative Work

EXPERIENCE

National Institutes of Health 2021 – present
Research Scientist at the National Heart, Lung, and Blood Institute

Stanford University, Graduate Researcher 2017 – 2023
Topic: Deep learning for medical image analysis
Advisors: Dr. Christopher Ré (Computer Science), Dr. Curtis Langlotz (Radiology)

Bill and Melinda Gates Foundation 2018
Intern with the Malaria team and Innovative Technology Solutions team

Rice University, Undergraduate Researcher
Topic: Algorithms and FPGA implementation for automated seizure detection 2016 – 2017
Advisors: Dr. Behnaam Aazhang and Dr. Gary Woods (Electrical Engineering)

Topic: Low-cost bCPAP temperature regulator for resource-limited settings 2015 – 2017
Advisors: Dr. Maria Oden and Dr. Rebecca Richards-Kortum (Bioengineering)

FELLOWSHIPS

Hertz Foundation Fellowship 2018

National Science Foundation Graduate Research Fellowship 2017

Stanford Graduate Fellowship in Science and Engineering 2017

PUBLICATIONS

Papers

M. Varma, J.B. Delbrouck, **S. M. Hooper**, A. Chaudhari, C. Langlotz. ViLLA: Fine-Grained Vision-Language Representation Learning from Real-World Data. ICCV, 2023.

S. M. Hooper, S. Wu, R. H. Davies, E. B. Schelbert, A. Bhuva, J. C. Moon, P. Kellman, H. Xue, C. Langlotz, C. Ré. Semi-supervised Learning for Training Medical Image Segmentation Models

with Orders of Magnitude Less Labeled Data: Applications in Cardiac Magnetic Resonance imaging. Journal of Medical Imaging, 2023.
Cover of Journal of Medical Imaging | Vol. 10 No. 2 | March 2023

M. Wardak, **S. M. Hooper**, S. Huang, C. Schiepers, W. Chen, T. F. Cloughesy, S. S. Gambhir. Multi-Tracer PET Imaging Using Deep Learning: Applications in Patients with High-Grade Gliomas. International Workshop on Predictive Intelligence in Medicine at MICCAI, 2022.

K. Saab, **S. M. Hooper**, M. Chen, M. Zhang, D. Rubin, C. Ré. Reducing Reliance on Spurious Features in Medical Image Classification with Spatial Specificity. Machine Learning for Healthcare, 2022.

S. M. Hooper, M. Wornow, Y. H. Seah, P. Kellman, H. Xue, F. Sala, C. Langlotz, C. Ré. Cut Out the Annotator, Keep the Cutout: Better Segmentation with Weak Supervision. ICLR, 2021.

S. M. Hooper*, J. A. Dunnmon,* M. P. Lungren, D. Mastrodicasa, D. L. Rubin, C. Ré, A. Wang, B. N. Patel. Impact of Upstream Medical Image Processing on the Downstream Performance of a Head CT Triage Neural Network. Radiology AI, 2021.

K. Saab, **S. M. Hooper**, N. Sohoni, J. Parmar, B. Pogatchnik, S. Wu, J. Dunnmon, H. Zhang, D. Rubin, C. Ré. Observational Supervision for Medical Image Classification using Gaze Data. MICCAI, 2021.

J. Kim, B. Park, J. Ha, I. Steinberg, **S. M. Hooper**, C. Jeong, E. Park, W. Choi, T. Liang, J. Bae, R. Managuli, Y. Kim, S. Gambhir, D. Lim, and C. Kim. Multiparametric Photoacoustic Analysis of Human Thyroid Cancers In Vivo. Cancer Research, 2021.

I. Steinberg, J. Kim, M. K. Schinder, D. Hyun, A. Zlitni, **S. M. Hooper**, T. Klap, G. A. Sonn, J. J. Dahl, C. Kim, S.S. Gambhir. Superiorized Photo-Acoustic Non-NEgative Reconstruction (SPANNER) for Clinical Photoacoustic Imaging. IEEE Transactions on Medical Imaging, 2021.

S. M. Hooper*, J. Dunnmon*, M. Lungren, S. S. Gambhir, C. Ré, A. Wang, B. Patel. Assessing Robustness to Noise: Low-Cost Head CT Triage. AI for Affordable Healthcare Workshop at ICLR, 2020.

D. Fu*, M. Chen*, F. Sala, **S. M. Hooper**, K. Fatahalian, C. Ré. Fast and Three-rious: Speeding Up Weak Supervision with Triplet Methods. ICML, 2020.

S. M. Hooper, E. Biegert, M. Levy, J. Pensock, L. Van der Spoel, X. Zhang, T. Zhang, N. Tandon, B. Aazhang. On Developing an FPGA Based System for Real Time Seizure Prediction. Asilomar Conference on Signals, Systems, and Computers, 2017.

Abstracts

S. M. Hooper, S. Wu, R. H. Davies, J. C. Moon, P. Kellman, H. Xue, C. Langlotz, C. Ré. Speeding Up Cardiac MR Segmentation with Semi-Supervision: Applications in Cine Imaging. Artificial Intelligence in CMR, Joint Summit of EACVI and SCMR, 2022.

B. Park, J. Kim, J. Ha, I. Steinberg, **S. M. Hooper**, C. Jeong, E. Park, W. Choi, T. Liang, J. S. Bae, R. Managuli, Y. Kim, S. S. Gambhir, D. Lim, C. Kim. Photoacoustic Score as a Novel Classification Method for Thyroid Cancer Nodules In Vivo. Photons Plus Ultrasound: Imaging and Sensing, 2021.

J. Kim, B. Park, J. Ha, I. Steinberg, E. Park, W. Choi., **S. M. Hooper**, S. S. Gambhir, D. Lim, C. Kim. Multispectral Photoacoustic Assessment of Thyroid Cancer Nodules In Vivo. SPIE Photonics West, 2020.

J. Kim, I. Steinberg, B. Park, **S. M. Hooper**, J. Ha, D. Lim, S. S. Gambhir, D. Lim, C. Kim. Clinical Trial to Identify the Malignancy of Thyroid Nodules with Multispectral Photoacoustic Analysis. Early Detection of Cancer Conference, 2019.

S. M. Hooper*, M. Wardak*, S. Huang, C. Schiepers, T. F. Cloughesy, S. S. Gambhir. Using Deep Learning to Predict a Positron Emission Tomography Image Without Injecting a Tracer. World Molecular Imaging Conference, 2019.

I. Steinberg, D. M. Huland, **S. M. Hooper**, T. Klap, S. Gambhir. Improved Photoacoustic and Ultrasonic Image Reconstruction of Clinical Data. World Molecular Imaging Conference, 2018.

S. M. Hooper, E. Biegert, M. Levy, J. Pensock, L. Van der Spoel, X. Zhang, T. Zhang, N. Tandon, B. Aazhang. Machine Learning System for Real-time Seizure Prediction in Epileptic Patients. Gulf Coast Undergraduate Research Symposium, 2016.

S. M. Hooper, F. Phuathavornskul, F. Prieto, T. Zhang, B. Aazhang. Machine Learning System for Real-time Seizure Prediction in Epileptic Patients. NeuroX Research Symposium, 2016.

S. M. Hooper, K. Powers, R. Wettermann, R. Richards-Kortum. Bubble Continuous Positive Airway Pressure Temperature Regulation System to Prevent Neonatal Hypothermia in Low Resource Settings. National Undergraduate Global Health Technologies Design Competition, 2015.

Patents

S. M. Hooper, M. Wardak, S. S. Gambhir. Systems and Methods for Synthetic Medical Image Generation. United States Patent, granted 2022.

SELECTED INVITED TALKS

Artificial Intelligence in Medicine & Imaging Research Seminars, Stanford University. “Tailor-made: training cardiac magnetic resonance segmentation models with orders of magnitude less labeled data.” 2022.

MedAI Research Seminars, Stanford University. “Training medical image segmentation models with less labeled data.” 2021.

Deep Learning Crash Course, National Institutes of Health. “Methods and challenges training networks with limited labeled data.” 2021.

Machine Learning Seminar, Naval Research Laboratory. “Using weak supervision to train medical image segmentation networks with little labeled data.” 2021.

ACTIVITIES AND SERVICE

Mentor, Women’s STEM Mentorship Program, Stanford University	2022
Student representative, AIMI/IBIIS Retreat Committee, Stanford University	2022

Student representative, MSEE Admissions, Stanford University 2020, 2021

Conference reviewer

- NeurIPS 2021, 2023
- CVPR 2021
- Workshop on Weakly Supervised Learning, ICLR 2021
- ICCV 2021
- AI for humanitarian assistance and disaster relief workshop, NeurIPS 2020

Mentor, Underrepresented Minorities in CS Mentorship Program, Stanford University 2020

Mentor, Partnership for the Advancement and Immersion of Refugees, Rice Univ. 2013 – 2017

IEEE Eta Kappa Nu EE Honor Society, Vice President at Rice University Chapter 2016 – 2017

Course Creator and Instructor, *Our Place in the Future of Global Health*, Rice University 2016

Peer Academic Advisor, Office of Academic Advising, Rice University 2015 – 2016

Coordinator, Engineering Orientation Week, Polytechnic University of Malawi 2015

Volunteer, Women's Resource Center, Rice University 2013 – 2015

HONORS AND AWARDS

Human-Centered AI and GCP Research Proposal ($37.5k in research credits) 2021 – 2023

Second Best Student Paper at Asilomar Conference on Signals, Systems, and Computers 2017

First Place Excellence in Engineering at Rice Engineering Design Showcase 2017

Bill Wilson Prize for Best Engineering Design at Rice EE Affiliates Day 2017

Distinguished Senior Engineering Student in Rice University's School of Engineering 2017

Rice University Global Health Technologies Service Award 2017

Donald R. Baker Award for Highest GPA in Brown College 2014, 2015, 2017

Rice University Trustee Distinguished Scholar 2013 – 2017

Outstanding Junior Engineering Student in Rice University's School of Engineering 2016

Outstanding Junior Engineering Student in Electrical and Computer Engineering 2016

Louise J. Walsh Scholarship for Outstanding Academic Achievement 2014, 2015, 2016

R.K.M. Dickson Award for Research that Benefits Society 2015

Rice University Physics and Astronomy Research Fellowship 2014