

Sarah Hooper

EDUCATION

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| Stanford University, Stanford, California | 2017 – 2023 |
| Ph.D. in Electrical Engineering | |
| M.S. in Electrical Engineering | |
| Dissertation: Label-efficient machine learning for medical image analysis | |
| Rice University, Houston, Texas | 2013 – 2017 |
| B.S. in Electrical Engineering | |
| Minor in Global Health Technologies | |
| <i>Summa Cum Laude</i> | |
| <i>Distinction in Research and Creative Work</i> | |

EXPERIENCE

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| 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

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| Hertz Foundation Fellowship | 2018 |
| National Science Foundation Graduate Research Fellowship | 2017 |
| Stanford Graduate Fellowship in Science and Engineering | 2017 |

PUBLICATIONS

Papers

S. M. Hooper, M. Chen, K. Saab, K. Bhatia, C. Langlotz, C. Ré. A case for reframing automated medical image classification as segmentation. NeurIPS, 2023.

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. Bhuvu, 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

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| Mentor, Women’s STEM Mentorship Program, Stanford University | 2022 |
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| Student representative, AIMI/IBIIS Retreat Committee, Stanford University | 2022 |
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| 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, <i>Our Place in the Future of Global Health</i> , 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

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| 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 |