

# Sarah Hooper

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## EDUCATION

<b>Stanford University, Stanford, California</b>	2017 – 2023
Ph.D. in Electrical Engineering (4.0 GPA)	
M.S. in Electrical Engineering (4.0 GPA)	
Dissertation: Label-efficient machine learning for medical image analysis.	
Advisors: Dr. Christopher Ré (Computer Science), Dr. Curtis Langlotz (Radiology)	
<b>Rice University, Houston, Texas</b>	2013 – 2017
B.S. in Electrical Engineering (4.1 GPA)	
Minor in Global Health Technologies	
<i>Summa cum laude</i>	
<i>Distinction in Research and Creative Work</i>	

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## EXPERIENCE

<b>National Institutes of Health</b>	
Research Scientist in the Office of AI Research	2023 – present
Guest Scientist with the Imaging AI Program	2021 – 2023
<b>Stanford University</b>	
Graduate Researcher	2017 – 2023
<b>Bill and Melinda Gates Foundation</b>	
Intern with the Malaria team and Innovative Technology Solutions team	2018
<b>Rice University</b>	
Undergraduate Researcher	2013 – 2017
Intern in the Rice 360° Global Health Technologies Internship	2015

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## FELLOWSHIPS

<b>Hertz Foundation Fellowship</b>	2018
<i>Competitive national fellowship awarded to ten PhD students in the applied physical, biological, and engineering sciences for outstanding potential and creativity in research.</i>	
<b>National Science Foundation Graduate Research Fellowship</b>	2017
<i>National fellowship awarded to graduate students in STEM for demonstrated potential in research and commitment to broader societal impacts.</i>	
<b>Stanford Graduate Fellowship in Science and Engineering</b>	2017
<i>Awarded to outstanding incoming Stanford graduate students in science and engineering for exceptional academic achievements and research potential.</i>	

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## PUBLICATIONS

### Papers

- S. M. Hooper**, H. Xue. A Study on Context Length and Efficient Transformers for Biomedical Image Analysis. *Machine Learning for Health*, 2024.
- 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. Bhuva, J. C. Moon, P. Kellman, H. Xue, C. Langlotz, C. Ré. Evaluating semi-supervision methods for medical image segmentation: 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.  
*Runner-up Best Paper Award*

## Abstracts

- M. Rahman, A. Rahman, **S. M. Hooper**, C. Combs. Few-shot image denoising with a pretrained convolutional transformer backbone. EPFL Latsis Symposium on Smart Microscopy, 2024.
- H. Xue, **S. Hooper**, A. Rehman, I. Pierce, T. Treibel, R. Davies, et al. Imaging transformer for MRI denoising with SNR unit training: enabling generalization across field-strengths, imaging contrasts, and anatomy. ISMRM, 2024.
- H. Xue, **S. Hooper**, A. Rehman, R. Ramasawmy, A. Javed, Y. Yang, W.P. Bandettini, I. Pierce, T. Treibel, J. Moon, et al. Routine CMR at 0.55 T with Standard Spatial Resolution Using an Imaging Transformer. Journal of Cardiovascular Magnetic Resonance, 2024.
- H. Xue, A. Rehman, **S. Hooper**, I. Pierce, T. Treibel, A. Javed, W.P. Bandettini, R. Ramasawmy, Y. Yang, J. Moon, et al. Spatio-temporal CNN Imaging Transformer for CMR Imaging. Journal of Cardiovascular Magnetic Resonance, 2024.
- H. Xue, A. Rehman, **S. Hooper**, I. Pierce, R. Ramasawmy, A. Javed, et al. Characterizing the Signal-to-noise Ratio and Spatio-temporal Resolution of an Imaging Transformer Model for CMR. Journal of Cardiovascular Magnetic Resonance, 2024.
- H. Xue, I. Pierce, T. Treibel, **S. Hooper**, A. Rehman, W.P. Bandettini, et al. High Resolution Quantitative Perfusion CMR with the Spatio-temporal CNN Imaging Transformer. Journal of Cardiovascular Magnetic Resonance, 2024.
- 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.

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### SELECTED ACTIVITIES AND SERVICE

Mentor, Summer Internship Program, National Institutes of Health	2024
Mentor, High School Student Mentorship Program, Westlake High School	2024
Reviewer (including NeurIPS, CVPR, ICLR, ICCV)	2020 – 2024
Mentor, Undergraduate Women’s STEM Mentorship Program, Stanford University	2022
Student representative, MSEE Admissions, Stanford University	2020, 2021
Mentor, Underrepresented Minorities in CS Mentorship Program, Stanford University	2020
Mentor, Partnership for the Advancement and Immersion of Refugees, Rice University	2013 – 2017
Vice President, IEEE Eta Kappa Nu EE Honor Society, 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, Bioengineering Orientation Week, Polytechnic University of Malawi	2015

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### SELECTED HONORS AND AWARDS

Human-Centered AI and GCP Research Proposal (\$37.5k in research credits)	2021 – 2023
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 Trustee Distinguished Scholar	2013 – 2017
Rice University Global Health Technologies Service Award	2017
Donald R. Baker Award for Highest GPA in Brown College	2014, 2015, 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