JEREMIAS SULAM

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EDUCATION

Ph.D., Computer Science March 2018
Technion – Israel Institute of Technology
Thesis: From Local to Global Sparse Modeling,
Advisor: Michael Elad

Biomedical Engineering March 2013
(summa cum laude)
Universidad Nacional de Entre Ríos, Argentina

WORK EXPERIENCE

Assistant Professor and William R. Brody Faculty Scholar 10-2018 – present
Johns Hopkins University
Biomedical Engineering Department (primary),
Computer Science Department (secondary, since 2020)
Applied Math and Statistics (secondary, since 2022)

Institutes Affiliations: Mathematical Institute for Data Science (MINDS), Center for Imaging Science (CIS), KAVLI Neuroscience Discovery Institute, Data Science and AI Institute (DSAI)

IBM Research Labs Summer 2016
Research Intern, Medical Imaging Analytics Group, Haifa, Israel
Deep learning for breast cancer classification,
Digital Mammography Dream Challenge Organizer.

AWARDS & HONORS

William R. Brody Faculty Scholar 2025
Johns Hopkins University

Catalyst Award Winner 2024
Johns Hopkins University

National Science Foundation's Early CAREER Award 2023
Interpretable and Robust Machine Learning Models: Analysis and Algorithms
(NSF CISE)

Karen Toffler Charitable Trust 2022
Toffler Scholar

WSE Teaching and Mentoring Awards Finalist 2022
Johns Hopkins University

Best Paper Award 2021
ICML Workshop on Interpretable Machine Learning in Healthcare, 2021.

Best Student Poster Award 2017
Signal Processing Meets Deep Learning
IEEE Summer School on Signal Processing, Italy

Best Graduates of Argentine Universities 2013
Argentinean National Academy of Engineering.

Student Paper Award 2012
XX Jornadas de Jovens Pesquisadores AUGM. Curitiba, Brasil.

GRANTS AND RESEARCH SUPPORT

My group has received more than **$4,400,000**, and I have contributed to over $17.9M in collaborative projects, since joining Hopkins in 2018.

Current

NSF Mathematical Foundatoins of AI (DMS) (coPI) $1,000,000 (share 30%) 08/2023 – 07/2028
title: MFAI: Any-Dimensional Equivariant Learning

NSF CAREER (PI) $572,922 (share 100%) 07/2023 – 06/2028
title: Interpretable and Robust Machine Learning Models: Analysis and Algorithms

NIH RO1 SCH (PI) $888,750 (share: 81%) 07/2023 – 06/2026
title: Quantifying and Mitigating Demographic Biases of Machine Learning in Real World Radiology

NSF Collaborative Research: (MPI) $399,994 (share: 100%) 07/2023 – 06/2026
title: CIF: Medium: Principles for Optimization, Robustness and Generalization via Deep Neural Collapse

Chan Zuckerberg Initiative (MPI) $100,000 (share: 100%) 01/2024 – 06/2025
title: Collaborative Pairs Pilot Project: Brain-wide maps of myelin patterns in plasticity and repair

Catalyst Award, Johns Hopkins (PI) $75,000 (share: 100%) 07/2024 – 06/2025
title: Understanding Large Language Models, one hypothesis at a time

Discovery Award, Johns Hopkins (PI) $100,000 (share: 25%) 07/2024 – 06/2025
title: Data Valuation in Distributed and Private Large-Scale Radiology

NSF Collaborative Research (co-PI) $900,000 (share: 33.3%) 07/2023 – 06/2026
title CIF: Medium: Understanding Robustness via Parsimonious Structures

NIH P41 Collaborative Research (co-PI) $939,770 (share: 24%) 07/2021 – 04/2026
title: MRI Resource for Physiologic, Metabolic and Anatomic Biomarkers

NIH R21 (co-PI) $669,997 (share: 17%) 07/2022 – 06/2025
title: General Linear Modeling For Magnetic Resonance Spectroscopy

NIH R01 (co-PI) $574,322 (share: 19%) 08/2024 – 04/2028
title: Model Selection for Magnetic Resonance Spectroscopy

Past

NSF Collaborative Research (PI) $281,251 (share: 100%) 07/2020 – 06/2023
title: CIS: Small: Deep Sparse Models: Analysis and Algorithms

DARPA GARD (co-PI) $1,002,497 (share: 8%) 01/2020 – 08/2022
title: Understanding and Improving Robust Learning Against Adversarial Attacks

NIH R01 (senior personnel) $3,550,431 (share: 2%) 09/2019 – 08/2022
title: Accessible technologies for high-throughput, whole-brain reconstruction of molecularly characterized mammalian neurons

NIH R01(co-PI) $2,013,158 (share: 3%) 01/2021 – 12/2022
title: Nonlinear performance analysis and prediction for robust low dose lung CT

The Lung Ambition Alliance (PI) $50,000 (share: 100%) 01/2021 – 12/2021
title: Modeling and Synthesis of COVID-19 Positive Chest Radiographs & Computed Tomography Scans in Lung Cancer Patients via Deep Learning Generative Models

NSF TRIPODS (co-PI) $1,500,000 (share: 3%) 10/2019 – 09/2022
title: Institute for the Foundations of Graph and Deep Learning

Malone Center Seed Grant (co-PI) $50,000 (share: 100%) 07/2021 – 06/2022
title: Evaluating and Solving Performance Biases Against Underrepresented Populations in Deep Learning-Based Diagnosis of Disease on Chest Radiographs

Karen Toffler Charitable Trust (PI) $30,000 (share: 100%) 04/2022 - 03/2023
title: Data-driven methods for susceptibility tensor imaging in vivo

CISCO Tech for Health Grant (PI) $103,725 (share: 100%) 06/2021 – 08/2022
title: Weakly supervised learning for biomarkers discovery in medical imaging

Johns Hopkins Discovery Award (co-PI) $100,000 (share: 25%) 06/2021 – 06/2022
title: Evaluating and Overcoming Performance Biases Against Underrepresented Populations in Deep Learning for Diagnosis of Disease on Medical Images

Canon Medical Systems (co-PI) $368,000 (share: 50%) 01/2022 – 12/2023
title: Advanced CT Denoising Neural Networks: Task, Control, and Certainty

PENDING

NIH R21 (MPI) $450,313 04/2025 – 03/2027
Identification of imaging biomarkers using data on multiplexed digital pathology to predict clinical outcomes in triple-negative breast cancer. **Share: 5%.**

CZI Acceleration Award (MPI) $1,600,000 12-2025 – 11-2029
Brain-wide mapping of myelin patterning in plasticity and repair. **Share: 40%.**

NIH P41 Collaborative Research (co-PI) $939,770 *Planned renewal.* 07/2026 – 04/2031
MRI Resource for Physiologic, Metabolic and Anatomic Biomarkers. **Share: 24%.**

ARPA-H (co-PI) $939,770 09/2025 – 08/2030
DITTO: DIgiTal Twin Optimized Scaffolds for Regenerating Facial Bones. **Share: 6.3%.**

PUBLICATIONS

Citations > 2,900. h-index: 27. i10-index: 44 Google Scholar Profile
Advised or co-advised students colored.

Submitted and Working papers

- J. Teneggi, Z. Wang, P.H. Yi, T. Shu, **J. Sulam**, "Aligning Explanations with Human Communication", *submitted.*
- Z. Fang, S. Buchanan, M. Diaz Diaz, **J. Sulam** "Beyond Scores: Proximal Diffusion Models", *submitted.*
- R. Muthukumar, **J. Sulam**, "Generalization through local stability analysis", *under preparation.*
- J. Teneggi, N. Varela-Long, P. H. Yi, **J. Sulam** "Testing for explanations in medical imaging: a flexible betting framework", *under preparation.*

Journal Papers

[J-40] Z. Wang, C.A. Santa-Maria, A.S. Popel, **J. Sulam**. "Bi-level Graph Learning Unveils Prognosis-Relevant Tumor Microenvironment Patterns from Breast Multiplexed Digital Pathology", PATTERNS (CELL PRESS) – (COVER FEATURE), 2025.

[J-39] P.H. Yi, P. Bachina, B. Bharti, S.P. Garin, A. Kanhere, P. Kulkarni, D. Li, V.S. Parekh, S.M. Santomartino, L. Moy, **J. Sulam**. "Pitfalls and Best Practices in Evaluation of AI Algorithmic Biases in Radiology", RADIOLOGY, Vol. 315 No. 2, 2025.

[J-38] M. Tivnan, J. Teneggi, T.C. Lee, R. Zhang, K. Boedeker, L. Cai, G.J. Gang, **J. Sulam**, J.W. Stayman. "Fourier diffusion models: A method to control mtf and nps in score-based stochastic image generation", IEEE TRANSACTIONS ON MEDICAL IMAGING, 2025.

[J-37] A. Pal, R. Vidal, **J. Sulam**. "Certified Robustness against Sparse Adversarial Perturbations via Data Localization", TRANSACTIONS OF MACHINE LEARNING RESEARCH, 2024.

[J-36] N. Goldenstein, **J. Sulam**, Y Romano. "Pivotal Auto-Encoder via Self-Normalizing ReLUN", IEEE TRANSACTIONS ON SIGNAL PROCESSING, 2024.

[J-35] H.J. Zöllner, C. Davies-Jenkins, D. Simicic, A. Tal, **J. Sulam**, G. Oeltzschner. "Simultaneous multi-transient linear-combination modeling of MRS data improves uncertainty estimation", MAGNETIC RESONANCE IN MEDICINE, 2024.

[J-34] K. Venkatesh, S. Mutasa, F. Moore, **J. Sulam**, P.H. Yi. "Gradient-based saliency maps are not trustworthy visual explanations of automated AI musculoskeletal diagnoses", Journal of Imaging Informatics in Medicine, 2024.

[J-33] C.L. LiBrizzi, Z. Wang, **J. Sulam**, A.W. James, A.S. Levin, C.D. Morris. "The use of weakly supervised machine learning for necrosis assessment in patients with osteosarcoma: A pilot study", Journal of Orthopaedic Research, 2024.

[J-32] J. Teneggi, B. Bharti, Y. Romano, **J. Sulam**. "SHAP-XRT: The Shapley Value Meets Conditional Independence Testing", Transactions of Machine Learning Research (TMLR), 2023.

[J-31] J. Teneggi, P. H. Yi, **J. Sulam**. "Examination-level Supervision for Deep Learning–based Intracranial Hemorrhage Detection at Head CT", Radiology: Artificial Intelligence – (cover feature), 2023.

[J-30] R. Muthukumar, **J. Sulam**. "Adversarial robustness of sparse local Lipschitz predictors", SIAM Journal on Mathematics of Data Science, 5.4: 920-948, 2023.

[J-29] X. Jiang, T. Borkum, S. Shprits, J. Boen, S. Arshavsky-Graham, B. Rofman, M. Strauss, R. Colodner, **J. Sulam**, S. Halachmi, H. Leonard, E. Segal. "Accurate Prediction of Antimicrobial Susceptibility for Point-of-Care Testing of Urine in Less than 90 Minutes via iPRISM Cassettes", Advanced Science, 2023.

[J-28] P. van Gelderen, X. Li, J.A. de Zwart, E.S. Beck, S.V. Okar, Y. Huang, K. Lai, **J. Sulam**, P.C. van Zijl, D.S. Reich, J.H. Duyn. "Effect of motion, cortical orientation and spatial resolution on quantitative imaging of cortical R2* and magnetic susceptibility at 0.3 mm in-plane resolution at 7 T", NeuroImage, 270:119992, 2023.

[J-27] Z. Fang, K.W. Lai, P. van Zijl, X. Li, **J. Sulam**. "DeepSTI: Towards Tensor Reconstruction using Fewer Orientations in Susceptibility Tensor Imaging", Medical Image Analysis, 87:102829, 2023.

[J-26] Y.K.T. Xu, A.R. Graves, ..., R.L. Huganir, D.E. Bergles, A.S. Charles, **J. Sulam**. "Cross-modality supervised image restoration enables nanoscale tracking of synaptic plasticity in living mice", Nature Methods, 2023: 1-10, 2023.

[J-25] S. Garin, V.S. Parekh, **J. Sulam**, P.H. Yi. "Medical imaging data science competitions should report dataset demographics and evaluate for bias", Nature Medicine, 2023: 1-2, 2023.

[J-24] A. Pal and **J. Sulam**. "Understanding Noise-Augmented Training for Randomized Smoothing", Transactions on Machine Learning Research, 2023.

[J-23] D. Li, B. Bharti, J. Wei, **J. Sulam**, P.H. Yi. "Sex imbalance produces biased deep learning models for knee osteoarthritis detection", Canadian Association of Radiologists Journal, 74.1: 219-221, 2023.

[J-22] Z. Wang, C. Saoud, S. Wangsiricharoen, A.W. James, A.S. Popel, **J. Sulam**. "Label Cleaning Multiple Instance Learning: Refining Coarse Annotations on Single Whole-Slide Images", IEEE Transactions on Medical Imaging, 2022.

[J-21] K. Venkatesh, S.M. Santomartino, **J. Sulam**, P.H. Yi. "Code and Data Sharing Practices in the Radiology AI Literature: A Meta-Research Study", Radiology: Artificial Intelligence, 2022.

[J-20] J. Teneggi, A. Luster, **J. Sulam**. "Fast Hierarchical Games for Image Explanations", IEEE Transactions on Pattern Analysis and Machine Intelligence, 2022.

[J-19] Z. Murphy, K. Venkatesh, **J. Sulam**, P.H. Yi. "Visual Transformers And Convolutional Neural Networks For Disease Classification In Radiographs: A Comparison of Performance, Sample Efficiency, and Hidden Stratification", Radiology: Artificial Intelligence, 4.6: e220012, 2022.

[J-18] **J. Sulam**, C. You, Z. Zhu. "Recovery and generalization in over-realized dictionary learning", Journal of Machine Learning Research, 23(135): 1-23, 2022.

[J-17] D. Li, C.T. Lin, **J. Sulam**, P.H. Yi. "Deep learning prediction of sex on chest radiographs: a potential contributor to biased algorithms", Emergency Radiology, 29(2): 365-370, 2022.

[J-16] J.A. Ruffolo, **J. Sulam**, J.J. Gray. "Antibody structure prediction using interpretable deep learning", Patterns, 3.2: 100406, 2022.

[J-15] Y.K.T. Xu, C.L. Call, **J. Sulam**, D.E. Bergles. "Automated in vivo tracking of cortical oligodendrocytes", Frontiers in Cellular Neuroscience, 2021.

[J-14] G. Franca, **J. Sulam**, D.P. Robinson, R. Vidal. "Conformal symplectic and relativistic optimization", Journal of Statistical Mechanics: Theory and Experiment, 2020(12): 124008, 2020.

[J-13] W. Gao, S.P. Mahajan, **J. Sulam**, J.J. Gray. "Deep Learning in Protein Structural Modeling and Design", Patterns, 100142, 2020.

[J-12] H. Mi, C. Gong, **J. Sulam**, E.J. Fertig, A.S. Szalay, E.M. Jaffee, V. Stearns, L.A. Emens, A.M. Cimino-Mathews, A.S. Popel. "Digital pathology analysis quantifies spatial heterogeneity of CD3, CD4, CD8, CD20, and FoxP3 immune markers in triple-negative breast cancer", Frontiers in Physiology, 11, 2020.

[J-11] I. Rey Otero, **J. Sulam**, M. Elad. "Variations on the Convolutional Sparse Coding Model", IEEE Transactions on Signal Processing, 2020.

[J-10] Y. Romano, A. Aberdam, **J. Sulam**, M. Elad. "Adversarial Noise Attacks of Deep Learning Architectures – Stability Analysis via Sparse Modeled Signals", Journal of Mathematical Imaging and Vision, 2020.

[J-9] **J. Sulam**, A. Aberdam, A. Beck, M. Elad. "On Multi-Layer Basis Pursuit, Efficient Algorithms and Convolutional Neural Networks", IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2019.

[J-8] D. Simon, **J. Sulam**, Y. Romano, Y. Lue, M. Elad. "Improving Pursuit Algorithms Using Stochastic Resonance", IEEE Transactions on Signal Processing, 2019.

[J-7] A. Aberdam, **J. Sulam**, M. Elad. "Multi Layer Sparse Coding: the Holistic Way", SIAM Journal on Mathematics of Data Science, 1:1, 46-77, 2019.

[J-6] V. Papyan, Y. Romano, **J. Sulam**, M. Elad. "Theoretical Foundations of Deep Learning via Sparse Representations", IEEE Signal Processing Magazine, 35:4, 72-89, 2018.

[J-5] **J. Sulam**, V. Papyan, Y. Romano, M. Elad. "Multi-Layer Convolutional Sparse Modeling: Pursuit and Dictionary Learning", IEEE Transactions on Signal Processing, 66:15, 4090-4104, 2018.

[J-4] V. Papyan*, **J. Sulam***, M. Elad. "Working Locally Thinking Globally: Theoretical Guarantees for Convolutional Sparse Coding", IEEE Transactions on Signal Processing, 65:21, 5687-5701 (*contributed equally), 2017.

[J-3] **J. Sulam**, Y. Romano, R. Talmon. "Dynamical system classification with diffusion embedding for ECG-based person identification", Signal Processing, Vol. 130, 403–411, 2017.

[J-2] **J. Sulam**, M. Elad. "Large Inpainting of Face Images with Trainlets", IEEE Signal Processing Letters, 2016.

[J-1] **J. Sulam**, B. Ophir, M. Zibulevsky, M. Elad. "Trainlets: Dictionary Learning in High Dimensions", IEEE Transactions on Signal Processing, 64:12, 3180–3193, 2016.

Conference Papers

[C-33] B. Bharti, M.V. Clemens-Sewall, P.H. Yi, **J. Sulam**. "Multiaccuracy and Multicalibration via Proxy Groups", International Conference on Machine Learning (ICML), 2025.

[C-32] R. Muthukumar, A. Pal, **J. Sulam**, R. Vidal. "Disentangling Safe and Unsafe Corruptions via Anisotropy and Locality", Conference on Computer Vision and Pattern Recognition (CVPR), 2025.

[C-31] Z. Wang, A.S. Popel, **J. Sulam**. "CBM-zero: Concept Bottleneck Model With Zero Performance Loss", 2nd Conference on Parsimony and Learning (CPAL), 2025.

[C-30] B. Bharti, P.H. Yi, **J. Sulam**. "Sufficient and Necessary Explanations (and What Lies in Between)", 2nd Conference on Parsimony and Learning (CPAL), 2025.

[C-29] J. Teneggi, **J. Sulam**. "Testing semantic importance via betting", 38th Conference on Neural Information Processing Systems (NeurIPS), 2024.

[C-28] S. Orenstein, Z. Fang, P. van Zijl, X. Li, **J. Sulam**. "ProxiMO: Proximal Multi-operator Networks for Quantitative Susceptibility Mapping", International Workshop on Machine Learning in Clinical Neuroimaging @ MICCAI, 2024.

[C-27] Z. Fang, S. Buchanan, **J. Sulam**. "What's in a prior? Learned proximal networks for inverse problems", International Conference on Learning Representations, 2024.

[C-26] B. Bharti, P.H. Yi, **J. Sulam**. "Estimating and Controlling for Fairness via Sensitive Attribute Predictors", 37th Conference on Neural Information Processing Systems (NeurIPS), 2023.

[C-25] A. Pal, **J. Sulam**, R. Vidal. "Adversarial Examples Might be Avoidable: The Role of Data Concentration in Adversarial Robustness", 37th Conference on Neural Information Processing Systems (NeurIPS), 2023.

[C-24] Z. Fang, H.G. Shin, P. van Zijl, X. Li, **J. Sulam**. "WaveSep: A Flexible Wavelet-Based Approach for Source Separation in Susceptibility Imaging", International Workshop on Machine Learning in Clinical Neuroimaging, Springer Nature Switzerland, pp. 56-66, 2023.

[C-23] J. Teneggi, M. Tivnan, J.W. Stayman, **J. Sulam**. "How to trust your diffusion model: A Convex Optimization Approach to Conformal Risk Control", International Conference on Machine Learning (ICML), PMLR, 2023.

[C-22] R. Muthukumar, **J. Sulam**. "Sparsity-aware generalization theory for deep neural networks", Conference on Learning Theory (COLT), PMLR, 2023.

[C-21] M. Tivnan, T.C. Lee, R. Zhang, K. Boedeker, L. Cai, **J. Sulam**, J.W. Stayman. "Task-driven CT image quality optimization for low-contrast lesion detectability with tunable neural networks", Medical Imaging 2023: Physics of Medical Imaging, SPIE, Vol. 12463, pp. 338-343, 2023.

[C-20] M. Tivnan, G. Gang, P. Noel, **J. Sulam**, J.W. Stayman. "Tunable neural networks for multi-material image formation from spectral CT measurements", 7th International Conference on Image Formation in X-Ray Computed Tomography, SPIE, Vol. 12304, pp. 185-191, 2022.

[C-19] J. Li, W. Wang, M. Tivnan, **J. Sulam**, J.L. Prince, M. McNitt-Gray, . . ., G.J. Gang. "Local linearity analysis of deep learning CT denoising algorithms", 7th International Conference on Image Formation in X-Ray Computed Tomography, SPIE, Vol. 12304, pp. 174-178, 2022.

[C-18] J. Agterberg, **J. Sulam**. "Entrywise Recovery Guarantees for Sparse PCA via Sparsistent Algorithms", 25th International Conference on Artificial Intelligence and Statistics (AISTATS), 2022.

[C-17] J.A. Ruffolo, J.J. Gray, **J. Sulam**. "Deciphering antibody affinity maturation with language models and weakly supervised learning", Machine Learning for Structural Biology Workshop, NeurIPS, 2021.

[C-16] Z. Zhu, T. Ding, J. Zhou, X. Li, C. You, **J. Sulam**, Q. Qu. "A Geometric Analysis of Neural Collapse with Unconstrained Features", Advances in Neural Information Processing Systems (NeurIPS), 34, 2021.

[C-15] J. Teneggi, A. Luster, **J. Sulam**. "Fast Hierarchical Games for Image Explanations", ICML Workshop on Interpretable Machine Learning for Healthcare, Best Paper Award, 2021.

[C-14] **J. Sulam**, R. Muthukumar, R. Arora. "Adversarial Robustness of Supervised Sparse Coding", Conference on Neural Information Processing Systems (NeurIPS), 2020.

[C-13] H. Cherkaoui, **J. Sulam**, T. Moreau. "Learning to solve TV regularised problems with unrolled algorithms", Conference on Neural Information Processing Systems (NeurIPS), 2020.

[C-12] G. França, **J. Sulam**, D.P. Robinson, R. Vidal. "Conformal Symplectic and Relativistic Optimization", Conference on Neural Information Processing Systems (NeurIPS), 2020.

[C-11] K.W. Lai, X. Li, M. Aggarwal, P.V. Zijl, **J. Sulam**. "Learned Proximal Networks for Quantitative Susceptibility Mapping", International Conference on Medical Imaging Computing & Computer Assisted Intervention (MICCAI), 2020.

[C-10] J.A. Ruffolo, C. Guerra, S.P. Mahajan, **J. Sulam**, J.J. Gray. "Geometric potentials from deep learning improve prediction of CDR H3 loop structures", Bioinformatics, Volume 36, Issue Supplement 1, Pages i268–i275, 2020.

[C-9] E. Zisselman, **J. Sulam**, M. Elad. "A Local Block Coordinate Descent Algorithm for the CSC Model", CVPR, 2019.

[C-8] **J. Sulam**, V. Papyan, Y. Romano, M. Elad. "Projecting onto the Multi-Layer Convolutional Sparse Coding Model", ICASSP, Oral Presentation @ Special Session on Learning Signal Representation using Deep Learning, 2018.

[C-7] V. Papyan, Y. Romano, **J. Sulam**, M. Elad. "Convolutional Dictionary Learning via Local Processing", ICCV, 2017.

[C-6] **J. Sulam**, R. Ben-Ari, P. Kisilev. "Maximizing AUC with Deep Learning for Classification of Imbalanced Mammogram Datasets", Eurographics Workshop on Visual Computing for Biology and Medicine, 2017.

[C-5] **J. Sulam***, Y. Romano* and M. Elad. "Gaussian Mixture Diffusion", ICSEE International Conference on the Science of Electrical Engineering, 2016.

[C-4] J. Turek, **J. Sulam**, I. Yavne, M. Elad. "Fusion of Ultrasound Harmonic Imaging with Clutter Removal Using Sparse Signal Separation", International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2015.

[C-3] **J. Sulam**, M. Elad. "Expected Patch Log Likelihood with a Sparse Prior", EMMCVPR, Oral Presentation, 2015.

[C-2] **J. Sulam**, B. Ophir, M. Elad. "Image Denoising Through Multi-Scale Learnt Dictionaries", IEEE International Conference on Image Processing (ICIP), Oral Presentation, 2014.

[C-1] **J. Sulam**, G. Schlotthauer, M.E. Torres. "Nonlinear slight parameter changes detection: a forecasting approach", 41st Argentinean Workshop on Informatics JAIIO, ISSN 1850-2806, p. 168-179, 2012.

Book Chapters

[B-1] A. Aberdam, **J. Sulam**. Deep Learning as Sparsity-Enforcing Algorithms. Mathematical Aspects of Deep Learning. Cambridge University Press. 2022 Dec 22:314.

Patents

[P-1] R. Ben-Ari, P. Kisilev, **J. Sulam**. *Classifying medical images using deep convolution neural network (cnn) architecture*, U.S. Patent Application No. 15/697,454, 2020.

Thesis

[T-1] **J. Sulam**. From Local to Global Sparse Modeling. Computer Science Department, Technion - Israel Institute of Technology, 2018.

INVITED TALKS AND SEMINARS

06-2025: Tutorial Foundations of Interpretable AI @ CVPR 2025 (w/R. Vidal and A. Chattopadhyay).

06-2025: Invited Talk AWS Responsible AI Seminar Series (online).

02-2025: Invited Talk Theory of Interpretable AI Seminar (online).

01-2025: Invited Talk International Biomedical and Astronomical Signal Processing (Switzerland).

12-2024: Invited Talk International Conference on Statistics and Data Science, Nice (France).

12-2024: Invited Panelist Mentoring hour LatinX@Neurips, Vancouver.

11-2024: Invited Seminar ASSET Seminar, University of Pennsylvania. *Host: René Vidal.*

10-2024: Invited Seminar University of Michigan at Ann Arbor. *Host: Jeffrey Fessler.*

10-2024: Invited Talk Mathematics of Interpretable AI @ SIAM MDS. *Organizer: A. Miroshnikov.*

09-2024: Invited Talk Math. and Scient. Foundations of Deep Learning, SIMONS Foundation.

09-2024: Invited Seminar Cornell Biomedical Engineering Seminar. *Host: Steve Adie.*

09-2024: Invited Talk Comp. Harmonic Analysis in Data Science, Oaxaca. *Host: T. Strohmer.*

07-2024: Invited Seminar JHU Applied Physics Lab.

07-2024: Invited Talk NIH Office of Data Science Strategy Track @ ISBM 2024, Montreal.

05-2024: Invited Seminar École Normale Supérieure de Lyon. *Host: Rémi Gribonval.*

05-2024: Invited Seminar Graz University, Austria. *Host: Thomas Pock.*

04-2024: Invited Seminar Applied Math. and Statistics Department, Johns Hopkins University.

03-2024: Invited Seminar Boston University, BME/CISE/Hariri. *Host: John White.*

12-2023: Panelist Emerging Tech Governance Symposium @ JHU 555 Penn, Washington DC.

11-2023: Invited Seminar Toyota Technological Institute at Chicago (TTIC). *Host: Sam Buchanan.*

11-2023: Invited Seminar University of Madison-Wisconsin, SILO Series. *Host: Robert Nowak.*

11-2023: Contributed Talk RSNA Deep Learning Lab: Evaluating for Fairness of AI Radiology.

11-2023: Invited Talk Institute for Basic Biomedical Sciences, Johns Hopkins Medicine.

08-2023: Invited Talk MSRI@Berkeley. Algorithms, Fairness, and Equity. *Host: Moon Duchin.*

08-2023: Invited Talk Foundations of Computational Math (FoCM), Paris.

03-2023: Invited Seminar University of California Berkeley, *Host: Bruno Olshausen.*

03-2023: Invited Talk Khipu: Latin American Meeting in Artificial Intelligence, Montevideo (Uruguay).

09-2022: Invited Talk Int. Conference on Comp. Harmonic Analysis. *Host: Gitta Kutyniok.*

09-2022: Invited Seminar Applied Mathematics Seminar, Yale University. *Host: Ofir Lindenbaum.*

08-2022: Invited Seminar Institute for signals, systems and computational intelligence, Argentina.

04-2021: Invited Seminar Biomedical Engineering, Columbia University. *Host: Andrew Laine.*

10-2020: Invited Seminar Computer Science Department, Johns Hopkins University.

09-2019: Invited Seminar SEAS, Harvard University. *Host: Demba Ba.*

05-2019: Invited Talk Deep Geometric Learning of Big Data (IPAM) *Hosts: R. Willett, X. Bresson.*

12-2018: Invited Talk Neurips Workshop on Deep Learning Theories, *Host: Richard Baraniuk.*

10-2018: Invited Talk Facultad de Ingeniería, UNER (Argentina).

12-2017: Invited Lecture CoSIP Intense Course on Deep Learning, Berlin. *Host: Gitta Kutyniok.*

IN THE MEDIA

Podcasts

04-2024 Research Renaissance: Exploring the future of Brain Sciences:
Revolutionizing Brain Imaging.

02-2023 Radiology AI Podcasts — RSNA: *Weakly-Supervised Learning for Global, Examination Labels and Code-Sharing Practices*

General Audience Online Articles

12-2024 Wanna bet? Testing conceptual importance for more explainable AI
JHU Computer Science Department

02-2024 Small changes, big consequences: Defending machine learning against adversarial attacks JHU Computer Science Department.

04-2023 Scientists Use Machine Learning to 'See' How the Brain Adapts to Different Environments. Hopkins Medicine News and Publications.

10-2023 Putting trust to the test. JHU Computer Science Department.

12-2023 Brain imaging technique allows researchers to achieve more with less data. Hopkins HUB.

11-2022 Should expert radiologists label individual images or entire examinations?
Microsoft Research.

TEACHING

WSE Teaching and Mentoring Awards Finalist 2022
Johns Hopkins University

Sparse Representations in Computer Vision and Machine Learning Johns Hopkins Uni.
EN.580.709, Instructor
Fall 2019, 2020, 2021
Graduate & Under-graduate
Last student rating of 4.75/5 (department mean: 3.99, school mean: 4.15)

Gateway Data Science Johns Hopkins University
EN.500.115, co-Instructor and co-designer
Spring 2022
Under-graduate
Last student rating of 4.4/5 (school mean of 4.17)

Advanced Data Science for Biomedical Engineering Johns Hopkins University
EN.580.464, Instructor
Spring 2023, 2024, 2025
Graduate & Under-graduate
Average student rating 4.23/5 (department mean 3.96)

MENTORING

Ph.D. Students

Ambar Pal **Johns Hopkins University**
PhD Student, CS (Graduated, now @ Amazon Research) 2018 – 2024
Research: Theory and Algorithms for Adversarially Robust Machine Learning via Geometric Properties of Data Distributions
Co-advised w/R. Vidal

Jeff Ruffolo **Johns Hopkins University**
Ph.D Student, Molecular Biophysics (Graduated, now @ Profluent) 2019 – 2023
Research: Deep Learning Methods for Antibody Structure Prediction and Design
Co-advised w/J. Gray.

Ramchandran Muthukumar **Johns Hopkins University**
Ph.D. Student, CS – GBO: completed 10-2023. Graduation: August 2025 2019 – Present
Research: Robust and Parsimonious Machine Learning
Thesis defense planned for Feb 2025.

Y.K.T. (Tiger) Xu **Johns Hopkins University**
Ph.D. Student, Neuroscience – GBO: completed 2021 2021 – Present
Research: Computational Methods in Oligodendrocytes Analysis
Co-advised w/Dwight Bergles; Thesis defense scheduled for May 1st, 2025

Beepul Bharti **Johns Hopkins University**
Ph.D. Student, BME – DBO: completed 03-2023 2021 – Present
Research: Fair and Interpretable Machine Learning

Zhenzhen Wang **Johns Hopkins University**
Ph.D. Student, BME – DBO: completed 10-2023 2021 – Present
Research: Machine Learning Methods in Computational Pathology
Co-advised w/Aleksander Popel

Zhenghan Fang **Johns Hopkins University**
Ph.D. Student, BME – DBO: completed 11-2023 2021 – Present

Research: Data-Driven Methods for Inverse Problem in Neuroimaging

Jacopo Teneggi — **Johns Hopkins University**
Ph.D. Student, CS — 2022 – Present
Research: Interpretability for Machine Learning

Emeline Haroldsen — **Johns Hopkins University**
Ph.D. Student, ChemBE — 2024 – Present
Research: Data-Driven Methods in Protein Docking
Co-advised w/Jeff Gray

M.S. Students

Zhenzhen Wang — **Johns Hopkins University**
M.S.E., BME — 2019 – 2021
Research: Machine Learning Methods in Computational Pathology

Jacopo Teneggi — **Johns Hopkins University**
M.S.E. Student, BME — 2020 – 2022
Research: Interpretability for Machine Learning

Kuo-Wei Lai — **Johns Hopkins University**
M.S.E. Student, Robotics — 2018 – 2020
Research: Quantitative Susceptiblity Mapping

Undergraduate Student (research mentoring)

Joseph Boen — **Johns Hopkins University**
BME Major — 2019 – 2022
Research: Sample-efficient Generative Models

Kesavan Venkatesh — **Johns Hopkins University**
BME Major — 2021 – 2022
Research: Interpretability in ML for Radiology

Malika Shah — **University of Maryland**
Bachelor of Science in Mathematics on the Statistics — 2020 – 2022
Research: Neuronal Tracing in Microscopy Imaging
Johns Hopkins Neuroscience Scholar Program

Taher Haitami — **Johns Hopkins University**
BME Major — 2023 – 2024
Research: Generalization Studies in Deep Learning

Nicolás Varela-Long — **Universidad Nacional de Entre Ríos, Argentina**
Visiting Student — Aug-2024 – Dec-2024
Research: Explainability for Medical Imaging

External Mentoring

Vitória Barin Pacela — **University of Helsinki**
MSE in Data Science — 2020 – 2021
Research: Independent component analysis for binary data
Mentee in the LatinX in AI Mentoring Program (now at Mila, Université de Montréal, Meta FAIR)

Carlos Mendoza — **University of Delaware**
Ph.D., Electrical and Computer Engineering — 2020 – 2020
Research: Dictionary learning in signal processing
Mentee in the LatinX in AI Mentoring Program (now at Twitch)

Students Recognitions

- **Radiology Society of North America, Trainee Research Prize 2022**, awarded to PhD mentee Jacopo Teneggi, for his work "Weakly Supervised Learning Significantly Reduces the Number of Labels Required for Intracranial Hemorrhage Detection on Head CT".
- **Society for Imaging Informatics in Medicine, Roger A. Bauman, MD Award 2022**, awarded to JHU undergraduate mentee K. Venkatesh for his work "Can We Trust Saliency Maps to Explain Deep Learning Algorithms for Musculoskeletal Radiograph Abnormality Detection?".
- **Rising Star award from the Conference on Parsimony and Learning 2024**, awarded to PhD Candidate in my Lab Ramchandran Muthukumar, for his work "Sparsity-aware generalization theory for deep neural networks".

PROFESSIONAL COMMUNITY SERVICE AND OUTREACH

University Service

Biomedical Engineering Department Faculty Search co-chair — 2025

Rising Stars in Engineering and Health Organizing Committee member (JHU) — 2022 – present

KAVLI Neuroscience Discovery Institute Steering Committee member — 2024 – present

DSAI Colloquium Committee, *Inaugural Chair of the committee until 2024* — 2022 – present

Biomedical Engineering Department — 2020 – present
Diversity, Inclusion, Culture and Equity (D.I.C.E.), Committee Member

Biomedical Engineering Department — 2020 – 2023
Biomedical Data Science Graduate Program, Lead.

MINDS Awards Committee Chair — 2019 – 2022

Mathematical Institute for Data Science (MINDS) — 2020-2022
Faculty Search, committee member in 2 searches

CIS & MINDS Seminar series organizer — 2018 – 2022

External Organizations

IEEE Signal Processing Society's Computational Imaging — Jan 2025 – Dec 2027
Technical Committee

"Theory and Methods of Machine Learning," — March 2025 – Dec 2026
Technical Committee 7 (TC7) of the International Federation for Information Processing (IFIP)
Member.

Scientific Meetings

DeepMath Conference, organizing committee — 2022 – 2024

Seeking Low-dimensionality in Deep Neural Networks SlowDNN 2020–2024
Organizing committee

Mathematics of Interpretable Machine Learning Organizer 2022
at SIAM's Conference on Mathematics of Data Science.

Mathematics of Trustworthy Machine Learning Organizer 2024
at SIAM's Conference on Mathematics of Data Science.

Conference on Parsimony and Learning (CPAL) 2024–2025
Program Chair for 2025

Outreach

LatinX in AI Faculty Mentor (see Mentoring) 2020 – 2022

Whiting Internships in Science and Engineering (WISE) 2023 – present
Connects Baltimore City Public Schools students to STEM research

ISPEED Faculty Mentor 2023 – present

Johns Hopkins Neuroscience Scholar 2020
Supports underrepresented, and/or deaf/hard of hearing undergraduate students in neuroscience

Editorial Services

(Associate Editor) Medical Imaging Analysis

(Associate Editor) Information and Inference: a Journal of the IMA

(Action Editor) Transactions of Machine Learning Research

(Associate Editor) Medical Physics (*ad-hoc*)

(Area Chair) Int. Conf. on Med. Image Computing and Computer-Assisted Intervention (MICCAI)

(Area Chair) Conference on Neural Information Processing Systems (Neurips)

(Area Chair) International Conference on Learning Representations (ICLR)

(Area Chair) International Conference on Machine Learning (ICML)

Technical Reviewing

Journals: Transactions of Machine Learning Research (TMLR), Journal of Machine Learning Research (JMLR), IEEE Transactions on Signal Processing (IEEE TSP), IEEE Transaction on Image Processing (IEEE TIP), Journal of Mathematical Imaging and Vision (JMIV), SIAM Journal on Imaging Sciences, SIAM Journal on Mathematics of Data Science, IEEE Signal Processing Letters.

Conferences: Conference on Neural Information Processing Systems (Neurips), IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), International Conference on Learning Representations (ICLR), International Conference on Machine Learning (ICML), International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), IEEE International Conference on Acoustics, Speech, and Signal Processing (ICCASP).