Adam Li

Neural Data Scientist · Applied Machine Learning · Statistics and Mathematics · Engineering Leadership and Project Management

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Positions

Postdoctoral Fellow in the Causal AI Lab — *New York City, NY*

Columbia University | Computer Science Department (Advisor: Elias Bareinboim) — *Jan. 2022 - Present*

- NSF Computing Innovation Fellow

Education

PhD in Biomedical Engineering — *Baltimore, MD*

Johns Hopkins University | GPA: 3.8 — *Aug. 2015 — Dec 2021*

- Advisor: Dr. Sridevi Sarma | Thesis: *Computational Localization of the Epileptogenic Zone*
- NIH NETI Fellow, NSF-GRFP Fellow, Whitaker Fellow, Chateaubriand Fellow, ARCS Chapter Scholar

MS in Applied Mathematics and Statistics — *Baltimore, MD*

Johns Hopkins University | GPA: 3.8 — *Aug. 2019 — May 2021*

- Coursework in: Statistical Learning Theory, Optimization, Matrix Analysis, Real Analysis

B.S. Bioengineering, B.S. Mathematics - Applied Sciences — *La Jolla, CA*

University of California San Diego | Major GPA: 3.75 — *Sep. 2010 — Mar. 2015*

- Tau Beta Pi, Gordon Scholar & Fellow, Provost's Honors

Journal Publications, Preprints and Working Submissions

Neural Fragility as an EEG Marker of the Seizure Onset Zone - pdf — *2021*

Adam Li, et al. — *Nature Neuroscience (Oct Cover)*

Manifold Oblique Random Forests: Closing the Gap on Convolutional Neural Networks - pdf — *2021*

Adam Li*, et al. — *ArXiv (in review at SIMODS)*

Classification of Stereo-EEG Contacts in White Matter vs. Gray Matter Using Recorded Activity - pdf — *2021*

P. Greene, **Adam Li**, J. González-Martínez, S. V. Sarma — *Frontiers in Neurology*

Using network analysis to localize the epileptogenic zone from invasive EEG recordings in intractable focal epilepsy - pdf — *2018*

Adam Li*, et al. — *Network Neuroscience*

Source-sink connectivity: A novel interictal EEG marker for seizure localization - pdf — *2021*

Gunnarsdottir, K., **Li, Adam**, et al. — *In Review at Brain*

Neural Fragility of the Intracranial EEG Network Decreases after Surgical Resection of the Epileptogenic Zone - pdf — *2021*

Adam Li, P. Myers, N. Warski, K. Gunnarsdottir, S. Kim, V. Jirsa, A. Oichi, H. Otusbo, G. Ibrahim, S. V. Sarma — *In Review at Brain Communications*

Patents

GEAR (Game Enhancing Augmented Reality) - A lower limb alternative control interface for computers. — *Patent Application No. 16309183*

Gyorgy Levay, Adam Li, Nate Tran — *May 23rd, 2016*

Identifying the Epileptogenic Zone using Network Fragility Theory — *Patent Application No. 62421037*

Sridevi Sarma, Adam Li, Jorge Gonzalez — *Nov. 11th, 2017*

Identifying the Epileptogenic Zone using Virtual Cortical Stimulation — *Provisional Patent*

Sridevi Sarma, Adam Li, Jorge Gonzalez — *Feb. 11th, 2019*

Peer-Reviewed Conference Proceedings

Network Fragility in Seizure Genesis in an Acute in vivo Model of Epilepsy — *IEEE EMBS - EMBC*

Adam Li, Daniel Ehrens, Fadi Aeed, Yitzhak Schiller, Sridevi V Sarma — *Montreal, Canada 2020*

Evaluating Invasive EEG Implantations in Medically Refractory Epilepsy with Functional Scalp EEG Recordings and Structural Imaging Data — *IEEE EMBS - EMBC*

Anil Palepu, Adam Li, Zachary Fitzgerald, Katherine Hu, Julia Costacurta, Juan Bulacio, Jorge Martinez-Gonzalez, Sridevi V Sarma — *Berlin, Germany 2019*

Virtual Cortical Stimulation Mapping of Epilepsy Networks to Localize the Epileptogenic Zone — *IEEE EMBS - EMBC*

Adam Li, Sridevi V Sarma, Zachary Fitzgerald, Jennifer Hopp, Emily Johnson, Nathan Crone, Juan Bulacio, Jorge Martinez-Gonzalez, Sara Inati, Kareem Zaghloul — *Berlin, Germany 2019*

Linear Time-Varying Model Characterizes Invasive EEG Signals Generated from Complex Epileptic Networks — *IEEE EMBS - EMBC*

Adam Li, Kristin M. Gunnarsdottir, Sara Inati, Kareem Zaghloul, John Gale, Juan Bulacio, Jorge Martinez-Gonzalez, Sridevi Sarma — *Jeju, South Korea 2017*

Fragility in epileptic networks: The epileptogenic zone — *American Control Conference*

Adam Li, Sara Inati, Kareem Zaghloul and Sridevi Sarma — *Seattle, WA 2017*

Estimating Unmeasured Invasive EEG Signals Using a Reduced Order Observer — *IEEE EMBS - EMBC*

Kristin M. Gunnarsdottir, Adam Li, Juan Bulacio, Jorge Gonzalez-Martinez, Sridevi V. Sarma — *Jeju, South Korea 2017*

Honors & Awards

2020	**ARCS Chapter Fellowship**, 1 of 3 awardees - Pre-doctoral Fellowship	*Washington, DC*
2019	**Whitaker Conclusion Grant**, 1 of 5 teams awarded $100k - Outreach Fellowship	*USA*
2017	**Chateaubriand STEM Research Fellowship**, Pre-doctoral international fellowship	*France*
2017	**Whitaker Research Fellowship**, Pre-doctoral international fellowship	*France*
2017	**NSF**, Graduate Research Fellowship	*USA*
2016	**NSF**, Graduate Research Fellowship - Honorable Mention	*USA*
2016	**Intel Cornell Cup**, 1st place	*USA*
2015	**NIH NETI**, Graduate training fellowship	*Baltimore*
2015	**Frontiers of Innovation Scholars**, undergraduate research fellowship	*UCSD*
2014	**IDEA Center Scholar**, undergraduate research fellowship	*UCSD*
2014	**Gordon Fellow**, undergraduate leadership award	*UCSD*
2014	**ASAIO Student Design Competition**, top 27 in USA	*USA*
2013	**Amgen Scholar**, undergraduate research fellowship	*UCSD*
2013	**Gordon Leadership Scholar**, undergraduate leadership	*UCSD*
2012	**CalIT Scholar**, undergraduate research fellowship	*UCSD*

Entrepreneurial Awards

2021 **NSF SBIR Phase I Grant**,

2019 **Maryland Innovative Initiative (MII) Grant**,

2018 **NSF SBIR Phase I Grant**,

2014 **NCIIA E-Team Grant**,

2013 **Health and Life Sciences Grant**,

2013 **Von Liebig NSF I-Corps Fellow** ,

Grants

NSF Computing Innovation Fellowship Grant (2127309) - Postdoctoral Fellowship *$150k*

January 1, 2022 — January 1, 2024 | Causal Reinforcement Learning with Unknown Causal Structure: An Application to Treatment of Drug-Resistant Epilepsy Patients

NSF SBIR Phase-I Grant (2112011) - Co PI *$256k*

May 15, 2021 — April 30, 2022 | Improving Diagnosis of Epilepsy by Applying Network Analytics to Non-Seizure Scalp EEG Data

Whitaker Phase I Conclusion Grant - Co PI *$100k*

Jan. 2019 — Jan. 2023 | Outreach for Biomedical Science story-telling around the world.

Experience

Co-Founder and CTO, Neurologic Solutions Corp. *Sep. 2018 — Mar. 2021*

- Raised over $600K non-dilutive funds to-date (Two NSF SBIR Phase I $225k, Mayland Innovation Initiative $150k, $10K JHTV Pitch Competition).
- Filed provisional patents and full patents in the USA, European and Japan markets through collaboration with Johns Hopkins Technology Ventures (JHTV).
- Led product development of software product with team of 3 software engineers for helping clinicians localize the epileptogenic zone in epileptic patients (**AWS** infrastructure with Kubernetes and Flux, **REST API**, **algorithm development**, UX design and **data engineering**).
- Led **510k FDA** approval process with a team of 5 engineers, consultants and advisors involving risk analysis, software requirements, design specifications, and user-testing (unit testing, continuous integration, and software documentation).
- Led research of EEG, imaging and clinical datasets to validate machine learning algorithms to inform clinical decision making in epilepsy patient treatment.

Graduate Research Assistant, Neuromedical Control Systems Lab, Johns Hopkins University *Aug. 2015 — Present*
Advisor: Dr. Sridevi Sarma

- Coordinated data pipeline of electrophysiological and clinical data of epilepsy patients from 5 hospitals in coordination with clinicians in setting up a HIPAA-compliant server for highly parallelized data analysis, resulting in **Nature Neuroscience publication**.
- Identified and developed signal processing and statistical analysis of clinical multi-modality datasets that resulted in over 400 pull requests merged in open-source packages with up to 1,000's of users (**Git, CI, unit-testing, software design & development**)
- Developed statistical and machine learning models on multivariate time series EEG, clinical and neuroimaging MRI and CT data to analyze different seizure localization models (model building & validation with **scikit-learn/keras/pytorch**, data wrangling with **pandas,numpy**).
- Coordinated open-source discussions on EEG and iEEG data formatting in a 79 international team of researchers on Github (**technical communication of the Brain Imaging Data Structure - BIDS**)
- Coordinated a team of engineers to develop a structure-aware Random Forest algorithm in Python and Cython to perform manifold learning (to be implemented as a PR into **scikit-learn**).

Visiting Research Scientist, Theoretical Neurosciences Group, Aix-Marseille University *Sep. 2017 — Sep. 2018*
Advisors: Dr. Viktor Jirsa, Dr. Sridevi Sarma

- Developed a high-throughput parallelized data pipeline for multi-modality 3D brain imaging using **Bash and Snakemake (Python DAG engine)** resulting in robust 3D brain visualizations.
- Designed **nonlinear biophysical models** with **linear dynamical systems analysis** to predict the surgical outcome in epileptic patients resulting in a paper to be submitted to Brain
- Developed a supervised deep learning pipeline using nonlinear computational modeling and a Recurrent-CNN model to perform patient-specific seizure detection (**Python/Keras/Pytorch**)
- Implemented open-source code on *The Virtual Brain* (a Human Brain Project) for generating observational noise, analysis of simulated source signals and scientific demos

Work Experience

Co-Founder and CTO, Neurologic Solutions Corp. *Sep. 2018 — Present*

- Raised over $600K to-date (Two NSF SBIR Phase I $225k, Mayland Innovation Initiative $150k, $10K JHTV Pitch Competition).
- Filed provisional patents and full patents in the USA, European and Japan markets through collaboration with Johns Hopkins Technology Ventures (JHTV).
- Led product development of software product with team of 3 software engineers for helping clinicians localize the epileptogenic zone in epileptic patients (AWS infrastructure with Kubernetes and Flux, REST API, algorithm development, UX design and data engineering).
- Led **510k FDA** approval process with a team of 5 engineers, consultants and advisors involving risk analysis, software requirements, design specifications, and user-testing (unit testing, continuous integration, and software documentation).

Co-Founder, Biometrics Analytics *Jun. 2012 — Sep. 2015*

- Researched & developed novel ways to evaluate Parkinson's Disease using biometric sensors and robust data analysis; led team in data acquisition of human data, data analysis and statistical analysis using MATLAB and Python.
- Led data acquisition of clinical data and full-body pose data from the Microsoft Kinect. Performed data analysis using machine learning and image processing algorithms (MATLAB, Python and C++).
- Raised over $20,000 and obtained an IRB for a pilot clinical human study, resulting in the Gordon Fellowship Award for outstanding engineering leadership (awarded to 3 students/year at UCSD).
- Worked in a team of 4 for the Von Liebig NSF I-Corps Program and the NCIIA Entrepreneurship Program (15% acceptance rate) for startup incubation.

Data Processing Intern, West Health Institute 501(C) *Jun. 2014 — Jun. 2015*

- Wrote pymongo queries running on an event scheduler (Python, MongoDB) that provided computed features of game play and behavior for the clinical team to analyze behavior during experiments.
- Developed clinical web forms using HTML, CSS, JavaScript, which are then linked to an AWS server running MongoDB with Node.js (git and general version control).
- Built an Android application that created a custom launch screen for the clinical team with Java and XML.
- Researched and recommended technological improvements to data collection that could be incorporated into the analytics group at the institute for the treatment of Autism Spectrum Disorder.

Project Team Leader, West Health Institute 501(C) *Jun. 2014 — Jun. 2015*

- Wrote pymongo queries running on an event scheduler (Python, MongoDB) that provided computed features of game play and behavior for the clinical team to analyze behavior during experiments.
- Developed clinical web forms using HTML, CSS, JavaScript, which are then linked to an AWS server running MongoDB with Node.js (git and general version control).
- Built an Android application that created a custom launch screen for the clinical team with Java and XML.
- Researched and recommended technological improvements to data collection that could be incorporated into the analytics group at the institute for the treatment of Autism Spectrum Disorder.

Process Development Engineering Intern and College Ambassador, Genentech *Aug. 2010 — Aug. 2011*

- Collaborated with Genentech College Programs to improve online engagement by 60%, while coordinating events with directors and human resources that drew in over 200 attendees.
- Implemented a new batch control process using Rockwell Automation and PLCs to automate chromatography purification process (used SQL and Python).

Teaching

Teaching Assistant *Baltimore, MD*

NeuroData Design Course (BME 580.638) - develop open source contributions to Python scientific computing libraries *Sep. 2019 — Jan 2020*

Head Teaching Assistant *Baltimore, MD*

Systems Bioengineering II Course (BME 580.424) - 150 students and 6 TAs *Jan. 2019 — May 2019*

Teaching Assistant *La Jolla, CA*

Data Structures Course (CSE 12) - C, C++ *Sep. 2014 — May 2015*

Conference Presentations and Posters

Neural Fragility of the Intracranial EEG Network Decreases Intraoperatively after Surgical Resection of the Epileptogenic Zone in Children with Epilepsy *Chicago, USA*

American Epilepsy Society *Dec. 2021*

Adam Li, Patrick Myers, Chester Huynh, Nebras Warsi, Kristin M. Gunnarsdottir, Soo Kyung S. Kim, Viktor Jirsa, Sridevi V. Sarma and George M. Ibrahim

Neural Fragility as an EEG Marker of the Seizure Onset Zone *Chicago, USA*

American Epilepsy Society *Dec. 2021*

Patrick Myers, **Adam Li**, C. Huynh, Z. Fitzgerald, I. Cajigas, D. Brusko, J. Jagid, A. Claudio, A. Kanner, J. Hopp, S. Chen, J. Haagensen, E. Johnson, W. Anderson, N. Crone, S. Inati, K. Zaghloul, J. Bulacio, J. Gonzalez-Martinez, S. V. Sarma

Automated classification of stereo-EEG contacts in white matter versus gray matter using recorded activity — *Montreal, Canada (virtual)*

IEEE Engineering in Medicine and Biology — *Jul. 2020*

Adam Li, Patrick Greene, Jorge Martinez-Gonzalez, Sridevi Sarma

Towards Automatic Localization and Anatomical Labeling of Intracranial Depth Electrodes in Brain Images — *Montreal, Canada (virtual)*

IEEE Engineering in Medicine and Biology — *Jul. 2020*

Adam Li, Chester Huynh, Jorge Martinez-Gonzalez, Sridevi Sarma

Semi-Automatic SEEG Localization and Interactive Neuroimage Visualization in Epilepsy Patients — *Montreal, Canada*

Organization for Human Brain Mapping — *June 23 - July 3, 2020*

Adam Li, Chester Huynh, Christopher Coogan, Sridevi Sarma

MNE-BIDS: MNE-Python + BIDS = easy dataset interaction (Version 1.0.1) — *Montreal, Canada*

Organization for Human Brain Mapping — *June 23 - July 3, 2020*

Stefan Appelhoff, **Adam Li**, et al. - 10.5281/zenodo.3891836

Identification of the Epileptogenic Zone from Intracranial Electrocorticography with a Novel Network Fragility Algorithm in Patients with Temporal-Lobe Epilepsy — *Virtual*

AANS — *Jun. 2020*

Iahn Cajigas, Damian Brusko, Angel Claudio, **Adam Li**, Sridevi Sarma, Andres Kanner, Jonathan Jagid

Application of A Network Fragility Algorithm for the Identification of the Epileptogenic Zone from Intracranial Electrocorticography in Patients with Temporal-Lobe Epilepsy — *Baltimore, MD*

American Epilepsy Society — *Nov. 2019*

Adam Li, Iahn Cajigas, Damian Brusko, Angel Claudio, Andres Kanner, Jonathan Jagid, Sridevi Sarma

Using personalized brain models to augment datasets for deep learning — *Janelia, HHMI, USA*

Workshop on Machine Learning and Computer Vision — *Apr. 2019*

Adam Li, Sridevi Sarma, Viktor Jirsa

Integrating Large Brain Networks and Network Analysis to Understand The Epileptogenic Zone — *Seattle, WA*

Organization for Computational Neuroscience — *Jul. 2018*

Adam Li, Marmaduke Woodman, Sridevi Sarma, Viktor Jirsa

Integrating Large Brain Networks and Network Analysis to Understand The Epileptogenic Zone — *Tuscany, Italy*

Advanced Course on Data Science & Machine Learning — *Jul. 2018*

Adam Li, Sridevi Sarma, Viktor Jirsa

T101. Use of a quantitative algorithm to help predict seizure lateralization in a patient with bitemporal epilepsy and responsive nerve stimulation — *Seattle, WA*

Clinical Neurophysiology — *2018*

Jennifer J. Haagensen, Stephanie Chen, Jennifer L. Hopp, **Adam Li**, Sridevi Sarma

Open Source Software

MNE-Connectivity | https://github.com/mne-tools/mne-connectivity — *Google Summer of Code 2021*

Developer - (connectivity analysis for neural data) — *2021 — Present*

Stereotactic EEG Kit (SEEK) | https://github.com/ncsl/seek

Developer - (data pipeline for neuroimaging data) — *2019 — Present*

MNE-HFO | https://github.com/adam2392/mne-hfo

Developer - (High-frequency oscillations in Python) — *2020 — Present*

BIDS | https://github.com/bids-standard/bids-specification

Electrophysiology Team Member - (Open-Access Scientific Data) *2019 — Present*

MNE-Python | https://github.com/mne-tools/mne-python

Contributor - Electrophysiological data analysis *2019 — Present*

MNE-BIDS | https://github.com/mne-tools/mne-bids

Contributor - BIDS IO for MEG/EEG/iEEG *2019 — Present*

pybids | https://github.com/https://github.com/bids-standard/pybids

Contributor - Querying of BIDS datasets *2019 — Present*

bids-validator | https://github.com/https://github.com/bids-standard/bids-validator

Contributor - Validation of BIDS datasets *2019 — Present*

pyDMD | https://github.com/mathLab/PyDMD

Contributor - Dynamic Mode Decomposition *2019 — Present*

The Virtual Brain (TVB) | https://github.com/the-virtual-brain/tvb-root

Contributor - Computational Neuroscience Platform *2017 — 2018*

Leadership and Volunteer Work

EverydayBME - Co-Founder *2019 — Present | Worldwide*

Design and aggregate digital storybooks of Biomedical science (researchers, students, etc.) over the world.

Worked with BMESDiversity and Whitaker Foundation to highlight under-represented groups in STEM.

AAMPLIFY 501(C) - Director of Leadership *2017 — Present | San Francisco, CA*

Planned and implement a summer leadership and advocacy program for under-served AAPI youth. Also involved in raising over $5000 as a non profit organization.

Engineering & Medicine Exchange - Co-Founder *2016 — 2017 | JHU*

Plan events for collaborations between engineering, medicine and public health. Arduino workshop, Machine Learning in Healthcare workshop, and Electronic Health Records for Engineering workshop.

Yale School of Management Pre-MBA Program - Global Pre-MBA Leadership Program *2014 | Yale*

Placed 3rd in Audubon Business Concept Pitch Plan, and 2nd in Audience Choice Award.

BME PhD Council - Social Chair *2016 — 2017 | JHU*

Coordinate and plan events for increasing collaboration within department.

Alpha Kappa Psi - Class President *2012 — 2014 | UCSD*

Led class of 16 individuals.

Mentoring

Anil Palepu

MIT PhD *2015-2017*

Chester Huynh

Microsoft Software Engineering *2018-2021*

Patrick Myers

Director of Product Development *2019-2022*

Academic Service

Network Neuroscience

Reviewer *2022*

NeuroImage

Reviewer *2021-2022*

IEEE Engineering in Medicine and Biology

Reviewer *2020*

https://github.com/ncsl

Lab Git Manager *2017 — Present*

Skills

Programming Bash, Python, MATLAB, Scikit-learn, Pandas, Numpy, Keras, Pytorch, Cython

Misc. Open-source, Git, Software Design and Engineering, Software Quality Control, Software Testing