

JESSIE R. LIU

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San Francisco, California.

EDUCATION

Ph.D. Candidate, Bioengineering

August 2017 - Present

Advisor: Edward F. Chang, M.D.

Course focus: Machine learning for neuroprosthetics

UC Berkeley - UCSF Graduate Program in Bioengineering

Berkeley & San Francisco, CA, USA.

B.S., Bioengineering

2013 - 2017

Minors: Chemistry, Korean

Summa cum laude

University of Pittsburgh

Pittsburgh, PA, USA.

RESEARCH

Graduate student researcher

May 2018 - Present

Chang Lab, UCSF.

San Francisco, CA

Advisor: Edward F. Chang, M.D.

- Develop computational algorithms for a speech brain computer interface using signal processing and machine learning.
- Research the neural basis of speech production.

Research assistant

Jan 2014 - July 2017

Modo Lab, University of Pittsburgh.

Pittsburgh, PA

- Characterized the distribution of thrombospondin in the extracellular matrix of healthy cortical tissue.
- Developed pipelines for automated histology analyses.

AWARDS AND HONORS

2013 - 2017	University of Pittsburgh Engineering Dean's List
Summer 2016	Swanson School of Engineering Undergraduate Summer Research Internship
Summer 2015	Swanson School of Engineering Undergraduate Summer Research Internship
Summer 2015	<i>(awarded but declined)</i> University of Pittsburgh Honors College Health Sciences Fellowship
2013 - 2017	University of Pittsburgh Chancellor's Scholarship Nominee Merit Scholarship
2013 - 2017	University of Pittsburgh Kerschgens Engineering Alumni Scholarship

TEACHING

Winter 2021 **Teaching Assistant**
Neural and Behavioral Data Analysis, Dept. of Neuroscience
University of California, San Francisco, CA.

Fall 2016 & Spring 2017 **Teaching Assistant**
Cell Biology I & II, Dept. of Bioengineering
University of Pittsburgh, PA.

Spring 2015 & Spring 2016 **Conference Co-Chair**
First-Year Engineering Conference, Swanson School of Engineering
University of Pittsburgh, PA.

OUTREACH

2021 - Present **Code tutorial leader**
Lead Chang Lab coding tutorials with ENVISION Interns
<https://github.com/ChangLabUcsf/changlabXenvision>
ENVISION Internship Program
UCSF Dept. of Neurological Surgery

2018 - 2021 **Peer Advisor**
Bioengineering Student Association
UC Berkeley - UCSF Graduate Program in Bioengineering
Berkeley & San Francisco, CA.

2018 **Internal Networking Committee**
Bioengineering Student Association
UC Berkeley - UCSF Graduate Program in Bioengineering
Berkeley & San Francisco, CA.

TECHNICAL SKILLS

Programming

Expert in Python 3 with PyTorch, Tensorflow, Pandas, and other common scientific computing packages.
Proficient in Bash and Matlab.
Some experience with PyQtGraph.

PUBLICATIONS

Peer reviewed articles

* indicates equal contribution

Moses*, D. A., S. L. Metzger*, **J. R. Liu***, G. K. Anumanchipalli, J. G. Makin, P. F. Sun, J. Chartier, M. E. Dougherty, P. M. Liu, G. M. Abrams, A. Tu-Chan, K. Ganguly, and E. F. Chang. "Neuroprosthesis for Decoding Speech in a Paralyzed Person with Anarthria". In: *New England Journal of Medicine* 385.3 (July 2021), pp. 217–227. DOI: 10.1056/nejmoa2027540.

Liu, J. R. and M. Modo. "Quantification of the Extracellular Matrix Molecule Thrombospondin 1 and Its Pericellular Association in the Brain Using a Semiautomated Computerized Approach". In: *Journal of Histochemistry & Cytochemistry* 66.9 (Apr. 2018), pp. 643–662. DOI: 10.1369/0022155418771677.

Wahlberg, B., H. Ghuman, **J. R. Liu**, and M. Modo. “Ex vivo biomechanical characterization of syringe-needle ejections for intracerebral cell delivery”. In: *Scientific Reports* 8.1 (June 2018). DOI: 10.1038/s41598-018-27568-x.

Ghuman, H., M. Gerwig, F. J. Nicholls, **J. R. Liu**, J. Donnelly, S. F. Badylak, and M. Modo. “Long-term retention of ECM hydrogel after implantation into a sub-acute stroke cavity reduces lesion volume”. In: *Acta Biomaterialia* 63 (Nov. 2017), pp. 50–63. DOI: 10.1016/j.actbio.2017.09.011.

Nicholls, F. J., **J. R. Liu**, and M. Modo. “A Comparison of Exogenous Labels for the Histological Identification of Transplanted Neural Stem Cells”. In: *Cell Transplantation* 26.4 (Apr. 2017), pp. 625–645. DOI: 10.3727/096368916x693680.

Modo, M., T. K. Hitchens, **J. R. Liu**, and R. M. Richardson. “Detection of aberrant hippocampal mossy fiber connections: Ex vivo mesoscale diffusion MRI and microtractography with histological validation in a patient with uncontrolled temporal lobe epilepsy”. In: *Human Brain Mapping* 37.2 (Nov. 2015), pp. 780–795. DOI: 10.1002/hbm.23066.

Conference poster presentations

* indicates equal contribution

Moses*, D. A., S. L. Metzger*, **J. R. Liu***, G. K. Anumanchipalli, J. G. Makin, P. F. Sun, J. Chartier, M. E. Dougherty, P. M. Liu, G. M. Abrams, A. Tu-Chan, K. Ganguly, and E. F. Chang. “Speech neuroprosthetic technology in a person with severe paralysis and anarthria”. In: P558.05. Society for Neuroscience. Nov. 2021.

Liu, J. R. and M. Modo. “An Automated Comparison of the Distribution of Extracellular Matrix Molecules in the Brain”. In: Biomedical Engineering Society. Minneapolis, MN, Oct. 2016.

– “Mapping The Extracellular Matrix: An Automated Analysis of the Striatal Distribution of Thrombospondin”. In: Biomedical Engineering Society. Tampa, FL, Oct. 2015.

Invited talks

Liu, J. R. *Developing a speech neuroprosthesis for assisted communication*. University of Minnesota “The Talking Brain”, Mar. 2022.

Liu, J. R., D. A. Moses, and S. L. Metzger. *Neuroprosthesis for decoding speech in a paralyzed person with anarthria*. L.A.S.E.R. Talks, Oct. 2021. URL: https://www.youtube.com/watch?v=AwUgTI56BmQ&ab_channel=PieroScaruffi.

Liu, J. R., D. A. Moses, and S. M. Wilson. *Neuroprosthesis for decoding speech in a paralyzed person with anarthria with David Moses and Jessie Liu*. The Language Neuroscience Podcast, Aug. 2021. URL: <https://langneurosci.org/podcast/#ep13>.