

Yuanning Li

Curriculum Vitae

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Education

- 2014–2018 **Ph.D.**, *Carnegie Mellon University, Pittsburgh, PA.*
Joint Neural Computation and Machine Learning Ph.D. program
Dissertation: Neural dynamics and interactions in the human ventral visual pathway
Committee: Avniel Singh Ghuman (co-advisor), Max G. G'Sell (co-advisor), Robert E. Kass, Christopher I. Baker
- 2011–2013 **M.S.**, *Carnegie Mellon University, Pittsburgh, PA.*
Electrical and Computer Engineering
- 2007–2011 **B.S.**, *Beihang University (BUAA), Beijing, China.*
Electrical Engineering, School of Advance Engineering (Honors College)

Work Experience

- 2022– **Assistant Professor**, *ShanghaiTech University, Shanghai, China.*
School of Biomedical Engineering
- 2021– **Visiting Investigator**, *Fudan University, Shanghai, China.*
Neurosurgical Institute of Fudan University, Huashan Hospital
- 2019–2022 **Postdoctoral Scholar**, *University of California, San Francisco, CA.*
Department of Neurological Surgery/Center for Integrative Neuroscience
Advisor: Edward Chang
- 2014–2018 **Graduate Research Assistant**, *Carnegie Mellon University, Pittsburgh, PA.*
Center for the Neural Basis of Cognition/Machine Learning Department
Advisors: Avniel Ghuman and Max G'Sell
- 2013–2018 **Graduate Research Assistant**, *University of Pittsburgh, Pittsburgh, PA.*
School of Medicine, Department of Neurological Surgery
Advisor: Avniel Ghuman

Research Interests

Neural basis of speech and language perception. Computational models of high-level sensory perception. Statistical machine learning for large scale neural data.

Awards and Honors

- 2020 Outstanding Scholars in Neuroscience Award (OSNAP), National Institutes of Health (NIH)
- 2018 Trainee Professional Development Award (TPDA), Society for Neuroscience (SfN)
- 2018 Fellow of the Kavli Summer Institute in Cognitive Neuroscience, Lake Tahoe, CA
- 2015 Fellow of the Summer Institute in Cognitive Neuroscience, Santa Barbara, CA

- 2015 Multimodal Neuroimaging Training Program (MNTP, NIH training grant), CMU-Pitt
 2014 R. K. Mellon Presidential Fellowship, CMU
 2012 Carnegie Institute of Technology Dean's Fellowship, CMU

Publications

(# equal contributions, * corresponding author)

Preprints

Yuanning Li*, Gopala K. Anumanchipalli, Abdelrahman Mohamed, Junfeng Lu, Jinsong Wu, Edward Chang*. Dissecting neural computations of the human auditory pathway using deep neural networks for speech. *Submitted*, preprint: bioRxiv, 484195, doi: <https://doi.org/10.1101/2022.03.14.484195>

Huzheng Yang, Shanghang Zhang, Yifan Wu, **Yuanning Li***, & Shi Gu*. (2021). Effective ensemble of deep neural networks predicts neural responses to naturalistic videos. bioRxiv, 457581. doi: <https://doi.org/10.1101/2021.08.24.457581>

Emily P. Stephen, **Yuanning Li**, Sean Metzger, Yulia Oganian, Edward F Chang. Latent neural dynamics encode temporal context in speech. (preprint doi: <https://doi.org/10.1101/2021.07.15.452519>)

Junfeng Lu#, **Yuanning Li**#, Jinsong Wu, and Edward Chang. The control of lexical tone production in human laryngeal motor cortex. (Manuscript in preparation for submission)

Peter Elliott, Matthew Boring, **Yuanning Li**, R. Mark Richardson, Avniel Singh Ghuman, Max G'Sell. Shrinkage Classification for Overlapping Time Series: An interpretable method for mapping stimulus-differentiated evoked response (Submitted, preprint doi: <https://doi.org/10.1101/733279>)

Matthew Boring, Elizabeth Hirshorn, **Yuanning Li**, Michael Ward, R. Mark Richardson, Julie Fiez, Avniel Singh Ghuman. The left midfusiform gyrus interacts with early visual cortex and the anterior temporal lobe to support word individuation (preprint doi: <https://doi.org/10.1101/411579>)

Published journal articles

- 2021 **Yuanning Li**#, Claire Tang#, Junfeng Lu#, Jinsong Wu, and Edward Chang. Human cortical encoding of pitch in tonal and non-tonal languages. *Nature Communications*, 12:1161 (2021). doi: [10.1038/s41467-021-21430-x](https://doi.org/10.1038/s41467-021-21430-x)
- 2020 **Yuanning Li***, Michael Ward, R. Mark Richardson, Max G'Sell, and Avniel Singh Ghuman. Endogenous activity modulates neural tuning and predicts perceptual behavior. *Nature Communications*, 11:4014 (2020). doi: [10.1038/s41467-020-17729-w](https://doi.org/10.1038/s41467-020-17729-w)
- 2018 **Yuanning Li***, R. Mark Richardson, and Avniel Singh Ghuman. Posterior Fusiform and Midfusiform Contribute to Distinct Stages of Facial Expression Processing. *Cerebral Cortex*. 29, no. 7 (2018): 3209-3219. doi: [10.1093/cercor/bhy186](https://doi.org/10.1093/cercor/bhy186)
- 2017 **Yuanning Li***, R. Mark Richardson, and Avniel Singh Ghuman. Multi-Connection Pattern Analysis: decoding the representational content of neural communication. *NeuroImage*. 162 (2017) pp. 32-44. doi: [10.1016/j.neuroimage.2017.08.033](https://doi.org/10.1016/j.neuroimage.2017.08.033)

- 2017 Hassan Albalawi, **Yuanning Li**, and Xin Li. Training Fixed-Point Classifiers for On-Chip Low-Power Implementation. *ACM Transactions on Design Automation of Electronic Systems (TODAES)*. 22, no. 4 (2017): 69. doi: 10.1145/3057275
- 2016 Elissa Aminoff, **Yuanning Li**, John Pyles, Michael Ward, R. Mark Richardson, Avniel Singh Ghuman. Associative hallucinations result from stimulating left ventral temporal cortex. *Cortex*. 83, (2016): 139-144. doi: 10.1016/j.cortex.2016.07.012
- 2016 Elizabeth Hirshorn#, **Yuanning Li**#, Michael Ward, R. Mark Richardson, Julie Fiez, and Avniel Singh Ghuman. Decoding and disrupting left midfusiform gyrus activity during word reading. *Proceedings of the National Academy of Sciences*. 113, no. 29 (2016): 8162-8167. doi: 10.1073/pnas.1604126113
- 2014 Avniel Singh Ghuman, Nicolas Brunet, **Yuanning Li**, Roma Konecky, John Pyles, Shawn Walls, Vincent Destefino, Wei Wang, and R. Mark Richardson. Dynamic encoding of face information in the human fusiform gyrus. *Nature Communications*. 5:5672 (2014), doi: 10.1038/ncomms6672
- Peer-reviewed conference proceedings*
- 2014 Hassan Albalawi, **Yuanning Li**, and Xin Li. Computer-aided design of machine learning algorithm: training fixed-point classifier for on-chip low-power implementation. *Proceedings of the 51st ACM/EDAC/IEEE Design Automation Conference (DAC)*. 2014. doi: 10.1145/2593069.2593110 (acceptance rate: 174/787 = 22.1%)
- Book chapters*
- 2020 Ashburn, S. M., et al. Toward a Socially Responsible, Transparent, and Reproducible Cognitive Neuroscience. In Poeppel, D., Mangun, G. R., & Gazzaniga, M. S. (Eds.). (2020). *The Cognitive Neurosciences* (6th Ed.). MIT Press.

Conferences and Workshops

Contributed talks

- 2018 **Yuanning Li**, Michael Ward, R. Mark Richardson, Max G G'Sell and Avniel Singh Ghuman, Endogenous pre-stimulus activity modulates category tuning in ventral temporal cortex and influences behavior, *48th Annual Meeting of Society for Neuroscience (SfN 2018)*, San Diego, CA, 2018
- 2018 **Yuanning Li**, Michael Ward, R. Mark Richardson, Max G G'Sell and Avniel Singh Ghuman, Endogenous oscillatory activity modulates category tuning in ventral temporal cortex, *Vision Sciences Society Eighteenth Annual Meeting (VSS 2018)*, St. Pete Beach, FL, 2018.
- 2018 Matthew Boring, Edward Silson, **Yuanning Li**, Michael Ward, Christopher Baker, R. Mark Richardson, and Avniel Singh Ghuman, Interdigitation of words and faces in the ventral visual stream: reevaluating the spatial organization of category selective cortex using intracranial EEG, *Vision Sciences Society Eighteenth Annual Meeting (VSS 2018)*, St. Pete Beach, FL, 2018. (Talk given by Matthew Boring)
- 2016 **Yuanning Li**, Michael Ward, Witold Lipski, R. Mark Richardson, and Avniel Singh Ghuman, Neurodynamics of expression coding in the core face network, *46th Annual Meeting of Society for Neuroscience (SfN 2016)*, San Diego, CA, 2016

Poster presentations

- 2021 Emily Stephen, **Yuanning Li**, Sean Metzger, Yulia Oganian, and Edward Chang, Multivariate temporal receptive fields in speech perception reflect low-dimensional dynamics. *Computational and Systems Neuroscience (Cosyne 2021)*, 2021
- 2019 **Yuanning Li**, Claire Tang, Junfeng Lu, Jinsong Wu, and Edward Chang, Lexical tone processing in human superior temporal gyrus, *49th Annual Meeting of Society for Neuroscience (SfN 2019)*, Chicago, IL, 2019
- 2018 **Yuanning Li**, Michael Ward, R. Mark Richardson, Max G G'Sell, and Avniel Singh Ghuman, Endogenous pre-stimulus activity modulates category tuning in ventral temporal cortex and influences perceptual behavior, *2018 Conference on Cognitive Computational Neuroscience (CCN 2018)*, Philadelphia, PA, 2018
- 2017 **Yuanning Li**, Michael Ward, Witold Lipski, R. Mark Richardson, and Avniel Singh Ghuman, Neurodynamics of expression coding in the core face network, *Vision Sciences Society Seventeenth Annual Meeting (VSS 2017)*, St. Pete Beach, FL, 2017. doi: 10.1167/17.10.821
- 2016 **Yuanning Li**, and Avniel Singh Ghuman. Distributed information processing across OFA and FFA represents individual face identities, *Vision Sciences Society Sixteenth Annual Meeting (VSS 2016)*, St. Pete Beach, FL, 2016. doi: 10.1167/16.12.1232
- 2016 Avniel Singh Ghuman, **Yuanning Li**, Elizabeth Hirshorn, Julie Fiez, and R. Mark Richardson. Information processing dynamics in human category-selective fusiform gyrus, *Vision Sciences Society Sixteenth Annual Meeting (VSS 2016)*, St. Pete Beach, FL, 2016. doi: 10.1167/16.12.254
- 2015 **Yuanning Li** and Avniel Singh Ghuman. Multi-connection pattern analysis (MCPA): multivariate discriminant analysis of functional connectivity between neural populations, *45th Annual Meeting of Society for Neuroscience (SfN 2015)*, Chicago, IL, 2015
- 2015 Elissa Aminoff, **Yuanning Li**, John Pyles, Michael Ward, Gena Ghearing, R. Mark Richardson, Avniel Singh Ghuman. Stimulating Associations, *45th Annual Meeting of Society for Neuroscience (SfN 2015)*, Chicago, IL, 2015
- 2015 **Yuanning Li**, Elizabeth Hirshorn, Michael Ward, Roma Konecky, Ellyanna Kessler, Breana Gallagher, R. Mark Richardson, Julie Fiez, and Avniel Singh Ghuman. Decoding the temporal dynamics of left mid-fusiform gyrus activity during word reading, *Seventh International Workshop on Statistical Analysis of Neuronal Data (SAND7)*, Pittsburgh, PA, 2015
- 2014 **Yuanning Li**, Nicolas Brunet, Ellyanna Kessler and Avniel Singh Ghuman. Spatiotemporal analysis of human face individuation. *19th International Conference on Biomagnetism (BIOMAG)*, Halifax, Canada, 2014

Invited Talks

- 2021 brAln Seminar Series, Carnegie Mellon University, Pittsburgh, PA
- 2021 Xinqingnian Psychology Symposium, IDG/McGovern Institute, Peking University, Beijing, China

- 2021 Research Club Seminar, Department of Neurosurgery, University of Pittsburgh, Pittsburgh, PA
- 2017 Young Scholar Seminar Series, East China Normal University, Shanghai, China

Peer Reviewing

- Editorial Board Frontiers in Neuroimaging - review editor
- Ad-hoc Reviewer IEEE Transactions on Neural Systems & Rehabilitation Engineering (TNSRE), IEEE Journal of Biomedical and Health Informatics (JBHI), PLOS One, PLOS Computational Biology, NeuroImage, Journal of Neurophysiology, Science Advances, AAAI Conference on Artificial Intelligence (AAAI), Journal of Neuroscience Methods

Teaching

- Spring 2018 **Teaching Assistant**, *Carnegie Mellon University*, Pittsburgh, PA.
10-708 Probabilistic Graphical Models (Machine Learning Ph.D. core course)
- Summer 2016 **Teaching Assistant**, *Center for the Neural Basis of Cognition, CMU-Pitt*.
Summer course for the undergraduate program in neural computation (uPNC)
- Spring 2013 **Teaching Assistant**, *Carnegie Mellon University*, Pittsburgh, PA.
18-202 Mathematical Foundations of Electrical Engineering (ECE undergraduate course)

Programming Skills

- Proficient in Python, MATLAB, \LaTeX
- Capable in C, C++, Java, R

References

- Edward F. Chang**, *edward.chang@ucsf.edu*.
Professor, University of California San Francisco
- Avniel Singh Ghuman**, *ghumana@upmc.edu*.
Associate Professor, University of Pittsburgh
- R. Mark Richardson**, *mark.richardson@mgh.harvard.edu*.
Associate Professor, Harvard Medical School
- Max G. G'Sell**, *mgsell@andrew.cmu.edu*.
Assistant Professor, Carnegie Mellon University
- Robert E. Kass**, *kass@stat.cmu.edu*.
Professor, Carnegie Mellon University
- Julie A. Fiez**, *fiez@pitt.edu*.
Professor, University of Pittsburgh