



Leila Wehbe

Associate Professor of Biomedical Data Science and of Neurology and Neurological Sciences (Adult Neurology)

Department of Biomedical Data Science

Bio

BIO

Leila Wehbe is an Associate Professor of Biomedical Data Science and of Neurology and Neurological Sciences at Stanford University. Her research focuses on understanding how the human brain represents and processes information during naturalistic cognition. She brings together neuroscience and machine learning, using tools like fMRI and MEG to build computational models of brain activity during complex cognitive processes such as language comprehension and high-level visual processing. Her work examines what brains and artificial systems can reveal about one another.

ACADEMIC APPOINTMENTS

- Associate Professor, Department of Biomedical Data Science
- Associate Professor, Adult Neurology

ADMINISTRATIVE APPOINTMENTS

- Co-director, Center for Neural Data Science, (2026- present)

HONORS AND AWARDS

- CAREER Award, NSF (2023)
- Faculty Research Award, Google (2018)

Publications

PUBLICATIONS

- **Flexibility and Invariance of Object Representations in the Human Brain.** *ArXiv*
Dirani, J., Chawla, S., Wehbe, L., Mahon, B. Z.
2026
- **Higher visual areas act like domain-general filters with strong selectivity and functional specialization** *NATURE COMMUNICATIONS*
Khosla, M., Wehbe, L.
2026; 17 (1)
- **Low-Rank Tensor Encoding Models Decompose Natural Speech Comprehension Processes.** *bioRxiv : the preprint server for biology*
Lewis, L., Pitkow, X., Wehbe, L.
2025
- **Origins of food selectivity in human visual cortex** *TRENDS IN NEUROSCIENCES*
Henderson, M. M., Tarr, M. J., Wehbe, L.
2025; 48 (2): 113-123

- **A Generalist Intracortical Motor Decoder.** *bioRxiv : the preprint server for biology*
Ye, J., Rizzoglio, F., Smoulder, A., Mao, H., Ma, X., Marino, P., Chowdhury, R., Moore, D., Blumenthal, G., Hockeimer, W., Kunigk, N. G., Mayo, J. P., Batista, et al
2025
- **Stacked regressions and structured variance partitioning for interpretable brain maps** *NEUROIMAGE*
Lin, R., Naselaris, T., Kay, K., Wehbe, L.
2024; 298: 120772
- **Computational Language Modeling and the Promise of In Silico Experimentation.** *Neurobiology of language (Cambridge, Mass.)*
Jain, S., Vo, V. A., Wehbe, L., Huth, A. G.
2024; 5 (1): 80-106
- **Divergences between Language Models and Human Brains**
Zhou, Y., Liu, E., Neubig, G., Tarr, M. J., Wehbe, L.
edited by Globerson, A., Mackey, L., Belgrave, D., Fan, A., Paquet, U., Tomczak, J., Zhang, C.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2024
- **Better models of human high-level visual cortex emerge from natural language supervision with a large and diverse dataset** *NATURE MACHINE INTELLIGENCE*
Wang, A. Y., Kay, K., Naselaris, T., Tarr, M. J., Wehbe, L.
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- **Neural Data Transformer 2: Multi-context Pretraining for Neural Spiking Activity.** *bioRxiv : the preprint server for biology*
Ye, J., Collinger, J. L., Wehbe, L., Gaunt, R.
2023
- **A Texture Statistics Encoding Model Reveals Hierarchical Feature Selectivity across Human Visual Cortex** *JOURNAL OF NEUROSCIENCE*
Henderson, M. M., Tarr, M. J., Wehbe, L.
2023; 43 (22): 4144-4161
- **Semantic Representations during Language Comprehension Are Affected by Context** *JOURNAL OF NEUROSCIENCE*
Deniz, F., Tseng, C., Wehbe, L., la Tour, T., Gallant, J. L.
2023; 43 (17): 3144-3158
- **Low-level tuning biases in higher visual cortex reflect the semantic informativeness of visual features** *JOURNAL OF VISION*
Henderson, M. M., Tarr, M. J., Wehbe, L.
2023; 23 (4): 8
- **Selectivity for food in human ventral visual cortex** *COMMUNICATIONS BIOLOGY*
Jain, N., Wang, A., Henderson, M. M., Lin, R., Prince, J. S., Tarr, M. J., Wehbe, L.
2023; 6 (1): 175
- **Neural Data Transformer 2: Multi-context Pretraining for Neural Spiking Activity**
Ye, J., Collinger, J. L., Wehbe, L., Gaunt, R.
edited by Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023
- **Brain Dissection: fMRI-trained Networks Reveal Spatial Selectivity in the Processing of Natural Images**
Sarch, G. H., Tarr, M. J., Fragkiadaki, K., Wehbe, L.
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NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023
- **Brain Diffusion for Visual Exploration: Cortical Discovery using Large Scale Generative Models**
Luo, A. F., Henderson, M. M., Wehbe, L., Tarr, M. J.
edited by Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S.
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- **Combining computational controls with natural text reveals aspects of meaning composition.** *Nature computational science*
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- **Brainprints: identifying individuals from magnetoencephalograms** *COMMUNICATIONS BIOLOGY*
Wu, S., Ramdas, A., Wehbe, L.
2022; 5 (1): 852
- **Same Cause; Different Effects in the Brain.** *Proceedings of machine learning research*
Toneva, M., Williams, J., Bollu, A., Dann, C., Wehbe, L.
2022; 177: 787-825
- **Single-Trial MEG Data Can Be Denoised Through Cross-Subject Predictive Modeling.** *Frontiers in computational neuroscience*
Ravishankar, S., Toneva, M., Wehbe, L.
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- **Incremental Language Comprehension Difficulty Predicts Activity in the Language Network but Not the Multiple Demand Network** *CEREBRAL CORTEX*
Wehbe, L., Blank, I., Shain, C., Futrell, R., Levy, R., von der Malsburg, T., Smith, N., Gibson, E., Fedorenko, E.
2021; 31 (9): 4006-4023
- **A Deep Learning Model for Automated Classification of Intraoperative Continuous EMG.** *IEEE transactions on medical robotics and bionics*
Zha, X., Wehbe, L., Scialbassi, R. J., Mace, Z., Liang, Y. V., Yu, A., Leonardo, J., Cheng, B. C., Hillman, T. A., Chen, D. A., Riviere, C. N.
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- **Can fMRI reveal the representation of syntactic structure in the brain**
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- **Modeling Task Effects on Meaning Representation in the Brain via Zero-Shot MEG Prediction**
Toneva, M., Stretcu, O., Poczos, B., Wehbe, L., Mitchell, T. M.
edited by Larochelle, H., Ranzato, M., Hadsell, R., Balcan, M. F., Lin, H.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2020
- **The lexical semantics of adjective-noun phrases in the human brain** *HUMAN BRAIN MAPPING*
Fyshe, A., Sudre, G., Wehbe, L., Rafidi, N., Mitchell, T. M.
2019; 40 (15): 4457-4469
- **Language Processing in the Brain: Mapping Neural Activity to Language Meaning** *HUMAN LANGUAGE: FROM GENES AND BRAINS TO BEHAVIOR*
Wehbe, L., Fyshe, A., Mitchell, T. M.
edited by Hagoort, P.
2019: 325-335
- **Neural Taskonomy: Inferring the Similarity of Task-Derived Representations from Brain Activity**
Wang, A. Y., Tarr, M. J., Wehbe, L.
edited by Wallach, H., Larochelle, H., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2019
- **Interpreting and improving natural-language processing (in machines) with natural language-processing (in the brain)**
Toneva, M., Wehbe, L.
edited by Wallach, H., Larochelle, H., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2019
- **Self-Discriminative Learning for Unsupervised Document Embedding**
Chen, H., Hu, C., Wehbe, L., Lin, S., Assoc Computat Linguist
ASSOC COMPUTATIONAL LINGUISTICS-ACL.2019: 2465-2474
- **Inducing brain-relevant bias in natural language processing models**
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NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2019

- **REGULARIZED BRAIN READING WITH SHRINKAGE AND SMOOTHING.** *The annals of applied statistics*
Wehbe, L., Ramdas, A., Steorts, R. C., Shalizi, C. R.
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- **The Spatio-Temporal Representation of Natural Reading**
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edited by Yang, Q., Wooldridge, M.
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- **Nonparametric Independence Testing for Small Sample Sizes**
Ramdas, A., Wehbe, L.
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- **Simultaneously Uncovering the Patterns of Brain Regions Involved in Different Story Reading Subprocesses** *PLOS ONE*
Wehbe, L., Murphy, B., Talukdar, P., Fyshe, A., Ramdas, A., Mitchell, T.
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- **Tracking neural coding of perceptual and semantic features of concrete nouns** *NEUROIMAGE*
Sudre, G., Pomerleau, D., Palatucci, M., Wehbe, L., Fyshe, A., Salmelin, R., Mitchell, T.
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