
Laura Gwilliams

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Education

- 2015–2020 *Ph.D., Psychology*
New York University, USA
Thesis Title: Towards a mechanistic account of speech comprehension
Supervisors: Alec Marantz and David Poeppel
Committee: Eero Simoncelli, Liina Pyykkänen, Nima Mesgarani
- 2012–2013 *M.Sc., Cognitive Neuroscience of Language*
Basque Center on Cognition, Brain and Language (BCBL), Spain
Supervisors: Arthur Samuel and Phillip Monahan
- 2009–2012 *B.A., Linguistics*
Cardiff University, UK
Supervisor: Lise Fontaine

Research positions

- 2023–present *Assistant Professor*, Department of Psychology, Stanford University
Faculty Scholar Wu Tsai Neurosciences Institute and Stanford Data Science
Courtesy appointment in the Linguistics Department
PI of the Laboratory of Speech Neuroscience (GLySN) Lab
- 2020–2023 *Post-doctoral Fellow*, University of California, San Francisco
- 2013–2015 *Research Assistant*, New York University Abu Dhabi

Grants and Awards

2024	<i>Early Career Research Grant</i> , Whitehall Foundation, \$300,000
2024	<i>Community of Shared Research Platforms</i> , Stanford University, \$1,982,000
2023	<i>BRAIN Research Award</i> , The BRAIN Foundation, \$178,202
2022	<i>Trainee Professional Development Award</i> , Society for Neuroscience (SfN)
2021	<i>Glushko Dissertation Prize</i> , The Cognitive Science Society
2021	<i>Douglas H. and Katharine Fryer Thesis Award</i> , New York University (Award for Best Doctoral Thesis)
2020	<i>Dissertation Award</i> , Society for the Neurobiology of Language
2020	<i>Martin Braine Fellowship</i> , New York University
2019	<i>William Orr Dingwall Dissertation Fellowship</i> Fellowship in the Cognitive, Clinical, and Neural Foundations of Language
2019	<i>Facebook PhD Fellowship</i> , Facebook (Finalist)
2018	<i>Trainee Professional Development Award</i> , Society for Neuroscience (SfN)
2018	<i>Travel Award</i> , Society for the Neurobiology of Language Conference
2018	<i>Travel Award</i> , Cognitive Modelling and Computational Linguistics
2017	<i>Travel Award</i> , Cognitive Computational Neuroscience Conference
2016	<i>Dean's Travel Grant</i> , New York University
2016	<i>Travel Award</i> , Society for the Neurobiology of Language Conference
2015	<i>Henry M. MacCracken Fellowship</i> , New York University (Full funding of PhD tuition and maintenance)
2012	<i>Tuition Waiver</i> , Basque Center on Cognition, Brain and Language
2012	<i>Dell Hymes Commendation for Academic Achievement</i> , Cardiff University (Awarded to the top graduating student within the department)

Publications

Preprints & Manuscripts

- [1] **Gwilliams, L.**, Marantz, A., Poeppel, D. & King, JR. (submitted). Hierarchical dynamic coding coordinates speech comprehension in the brain. [bioRxiv](#)
- [2] Abrams, E., Marantz, A., & **Gwilliams, L.** (submitted). Dynamics of pitch perception in the auditory cortex. [bioRxiv](#)
- [3] Kries, J., De Clercq, P., Vandermosten, M. & **Gwilliams, L.** (in prep). The spatio-temporal dynamics of phonetic encoding in aging and aphasia.
- [4] Ergin, I., Kries, J., Gupta, S. & **Gwilliams, L.** (in prep). Measuring Naturalistic Speech Comprehension in Real Time.
- [5] **Gwilliams, L.**, Bhaya-Grossman, I., Zhang, Y., Scott, T., Harper, S., Levy, D (in press). Computational Architecture of Speech Comprehension in the Human Brain. Annual Reviews.

Peer-reviewed articles

- [6] Degano, G., Donhauser, P., **Gwilliams, L.** Merlo, P., & Golestani, N. (2024). Speech prosody enhances the neural processing of syntax. DOI: [10.1038/s42003-024-06444-7](#)
- [7] Zuanazzi, A., Ripollés, P., Lin, WM., **Gwilliams, L.**, *King, JR & *Poeppel, D (2024). Negation mitigates rather than inverts the neural representations of adjectives. *PLOS Biology*. DOI: [10.1371/journal.pbio.3002622](#)
- [8] ***Gwilliams, L.**, *Leonard, M.K., Sellers, K.K., Chung, J.E., Dutta, B., & Chang, E.F. (2023). Large-scale single-neuron speech sound encoding across the depth of human cortex. *Nature*. DOI: [10.1038/s41586-023-06839-2](#)
- [9] **Gwilliams, L.**, Flick, G., Marantz, A., Pyllkanen, L., Poeppel, D. & King, J.R. (2023). Introducing MEG-MASC a high-quality magneto-encephalography dataset for evaluating natural speech processing. *Nature Scientific Data*. DOI: [10.1038/s41597-023-02752-5](#)
- [10] **Gwilliams, L.**, Marantz, A., Poeppel, D. & King, J.R. (2023). Top-down information shapes lexical processing when listening to continuous speech. *Language, Cognition and Neuroscience*. DOI: [10.1080/23273798.2023.2171072](#)
- [11] *Chung, J.E., *Sellers, K.K., Leonard, M.K., **Gwilliams, L.**, Xu, D., Dougherty, M., Kharazia, V., Welkenhuysen, M., Dutta, B., Chang, E.F. (2022). High density single-unit human cortical recordings using the Neuropixels probe. *Neuron*. DOI: [10.1016/j.neuron.2022.05.007](#)
- [12] **Gwilliams, L.**, King, JR., *Marantz, A. & *Poeppel, D. (2022). Neural dynamics of phoneme sequences: Position-invariant code for content and order. *Nature Communications*. DOI: [10.1038/s41467-022-34326-1](#)
- [13] Dikker, S., Mech, EM., **Gwilliams, L.**, West, T., Dumas, G. & Federmeier, KD. (2022). Exploring age-related changes in inter-brain synchrony during verbal communication. *Psychology of Learning and Motivation*. DOI: [10.1016/bs.plm.2022.08.003](#)
- [14] Iemi, L., **Gwilliams, L.**, Samaha, J., Auksztulewicz, R., Cycowicz, Y., King, JR., Thesen, T., Doyle, W., Devinsky, O., Schroeder, C.E., Melloni, L. & Haegens, S. (2021). Ongoing neural

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- oscillations influence behavior and sensory representations by suppressing neuronal excitability. *NeuroImage*. DOI: [10.1016/j.neuroimage.2021.118746](https://doi.org/10.1016/j.neuroimage.2021.118746)
- [15] ***Gwilliams, L.**, *Blanco-Elorrieta, E., Marantz, A. & Pykkänen, L. (2021). Perceptual adaptation to accented speech: prefrontal cortex aids attunement in auditory cortices. *Nature Scientific Reports*. DOI: [10.1038/s41598-020-79640-0](https://doi.org/10.1038/s41598-020-79640-0)
 - [16] **Gwilliams, L.** & King, JR. (2020). Recurrent processes support a cascade of hierarchical decisions. *eLife*. DOI: [10.7554/eLife.56603](https://doi.org/10.7554/eLife.56603)
 - [17] Dikker, S., Assaneo, F., **Gwilliams, L.**, Wang, L. & Kösem, A. (2020). MEG and Language: Using Magnetoencephalography to Study the Neural Basis of Language. *Neuroimaging Clinics of North America*. DOI: [j.nic.2020.01.004](https://doi.org/j.nic.2020.01.004)
 - [18] **Gwilliams, L.** (2020). Hierarchical oscillators in speech comprehension: A commentary on Meyer, Sun & Martin. *Language, Cognition and Neuroscience*. DOI: [10.1080/23273798.2020.1740749](https://doi.org/10.1080/23273798.2020.1740749)
 - [19] **Gwilliams, L.** (2019). How the brain composes morphemes into meaning. *Philosophical Transactions of the Royal Society B*. DOI: [10.1098/rstb.2019.0311](https://doi.org/10.1098/rstb.2019.0311)
 - [20] Stockall, L., Manouildiou, C., **Gwilliams, L.**, Neophytou, K., & Marantz, A. (2019). Prefix Stripping Re-Re-Re-visited: MEG Evidence. *Frontiers in Psychology*. DOI: [10.3389/fpsyg.2019.01964](https://doi.org/10.3389/fpsyg.2019.01964)
 - [21] **Gwilliams, L.**, & Wallisch, P. (2019). Immediate ambiguity resolution in speech perception based on prior acoustic experience. [PsyArXiv](https://arxiv.org/abs/1908.00000)
 - [22] **Gwilliams, L.**, Linzen, T., Poeppel, D., & Marantz, A. (2018). In spoken word recognition the future predicts the past. *Journal of Neuroscience*. DOI: [10.1523/JNEUROSCI.0065-18.2018](https://doi.org/10.1523/JNEUROSCI.0065-18.2018)
 - [23] **Gwilliams, L.**, Poeppel, D., Marantz, A., & Linzen, T. (2018). Phonological (un)certainly weights lexical activation. In *Proceedings of the 8th Workshop on Cognitive Modeling and Computational Linguistics (CMCL 2018)* (pp. 29-34). [arXiv](https://arxiv.org/abs/1808.00000)
 - [24] **Gwilliams, L.** & Marantz, A. (2018). Morphological representations are extrapolated from morpho-syntactic rules. *Neuropsychologia*. DOI: [10.1016/j.neuropsychologia.2018.04.015](https://doi.org/10.1016/j.neuropsychologia.2018.04.015)
 - [25] Brodbeck, C., **Gwilliams, L.** & Pykkänen, L. (2016). Language in context: MEG evidence for modality general and specific responses to reference resolution. *eNeuro*. DOI: [10.1523/ENEURO.0145-16.2016](https://doi.org/10.1523/ENEURO.0145-16.2016)
 - [26] **Gwilliams, L.**, & King, JR. (2017). Performance-optimized hierarchical models only partially predict neural responses during perceptual decision making. *NIPS workshop: Cognitively Informed Artificial Intelligence: Insights From Natural Intelligence* [bioRxiv](https://arxiv.org/abs/1705.00000)
 - [27] **Gwilliams, L.**, Lewis, G. & Marantz, A. (2016). Functional characterisation of letter-specific responses in time, space and current polarity using magneto-encephalography. *NeuroImage*. DOI: [10.1016/j.neuroimage.2016.02.057](https://doi.org/10.1016/j.neuroimage.2016.02.057)
 - [28] Brodbeck, C., **Gwilliams, L.** & Pykkänen, L. (2015). EEG can track the time course of reference resolution in small visual worlds. *Frontiers in Psychology*. DOI: [10.3389/fpsyg.2015.01787](https://doi.org/10.3389/fpsyg.2015.01787)
 - [29] **Gwilliams, L.** & Marantz, A. (2015). Tracking non-linear prediction in a linear speech stream: Influence of morphological structure on spoken word recognition. *Brain and Language*. DOI: [10.1016/j.bandl.2015.01.004](https://doi.org/10.1016/j.bandl.2015.01.004)

[10.1016/j.bandl.2015.04.006](https://doi.org/10.1016/j.bandl.2015.04.006)

- [30] **Gwilliams, L.**, Monahan, P., & Samuel, A. (2015). Sensitivity to morphological composition: Evidence from grammatical and lexical decision tasks. *Journal of Experimental Psychology: Language, Memory and Cognition*. DOI: [10.1037/xlm0000130](https://doi.org/10.1037/xlm0000130)
- [31] **Gwilliams, L.** & Fontaine, L. (2015). Indeterminacy in process type classification. *Functions of Language*. DOI: [10.1186/s40554-015-0021-x](https://doi.org/10.1186/s40554-015-0021-x)
- [32] Politzer-Ahles, S. & **Gwilliams, L.** (2015). Involvement of prefrontal cortex in scalar implicatures: Evidence from magnetoencephalography. *Language and Cognitive Neuroscience*. DOI: [10.1080/23273798.2015.1027235](https://doi.org/10.1080/23273798.2015.1027235)

Published Datasets, Corpora and Open Source Code

- [1] *Lewis, G., *van Rijn, P., **Gwilliams, L.**, Larrouy-Maestri, P., Poeppel, D. & Ghitza, O. NyU-BU contextually controlled stories Corpus: NUBUC. DOI: [10.5281/zenodo.4075183](https://doi.org/10.5281/zenodo.4075183)
- [2] **Gwilliams, L.**, Flick, G., Marantz, A., Pytkkanen, L., Poeppel, D. & King, J.R. (2023). Introducing MEG-MASC a high-quality magneto-encephalography dataset for evaluating natural speech processing. *Nature Scientific Data*. DOI: [10.1038/s41597-023-02752-5](https://doi.org/10.1038/s41597-023-02752-5)
- [3] Waskom, M., Larson, E., Brodbeck, C., Gramfort, A., Burns, S ... **Gwilliams, L.**, King, JR., Liu, D. nipy/PySurfer:0.10.0. [\[Link\]](#)
- [4] Larson, E., Gramfort, A., Engemann, DA., Leppakangas, J., Brodbeck, C ... **Gwilliams, L.**, ... mne-python-v1.2.0 [\[Link\]](#)

Book chapters

- [1] Stockall, L. & **Gwilliams, L.** (2023). Distributed morphology and neurolinguistics. In *The Cambridge Handbook of Distributed Morphology*.
- [2] **Gwilliams, L.** & Marantz, A. (2022). Neural processing of morphological structure in speech production, listening and reading. In *Current Issues in the Psychology of Language*.
- [3] **Gwilliams, L.** & Davis, M.H. (2021). Extracting language content from speech sounds: The information theoretic approach. In *The Auditory Cognitive Neuroscience of Speech Perception*. [Link](#)
- [4] King, JR., **Gwilliams, L.**, Holdgraf, C., Sassenhagen, J., Barachant, A., Engemann, D., Larson, E. & Gramfort, A. (2020). Encoding and Decoding Framework to Uncover the Algorithms of Cognition. In *The Cognitive Neurosciences*.

Presentations

Invited talks

- [1] *Colloquium Speaker, UC San Diego*. CA, USA. (2025, January).
- [2] *Plenary address, Society for Language Development*. Boston, MA, USA. (2024, November).
- [3] *NSF workshop, New horizons in language science*. Alexandria, VA, USA. (2024, May).

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- [4] *University of California, Santa Cruz Colloquium Speaker*. Santa Cruz, CA, USA. (2024, April).
 - [5] *EARS - Electronic Auditory Research Seminars*. Online. (2024, February).
 - [6] *ARO - Association for Research in Otolaryngology. Symposium speaker*. Anaheim, CA, USA. (2024, February).
 - [7] *McGovern Institute Special Seminar, MIT*. Cambridge, MA, USA. (2024, February).
 - [8] *Johns Hopkins University Colloquium Speaker*. Baltimore, MD, USA. (2024, February).
 - [9] *Keynote Speaker, Annual Meeting on Phonology (AMP)*. Online. (2023, October).
 - [10] *Center for Computer Research in Music and Acoustics*. Stanford University, CA, USA. (2023, October).
 - [11] *UC Irvine Colloquium Speaker*. Irvine, CA, USA. (2023, October).
 - [12] *UC San Francisco, Houde and Nagarajan Lab*. San Francisco, CA, USA. (2023, September).
 - [13] *NeuroMorphic Computing*. Telluride, CO, USA. (2023, July).
 - [14] *Keynote Speaker, Neurolinguistics in Sweden; Lund University*. Lund, Sweden. (2023, June).
 - [15] *CogHear Workshop*. Maryland, USA. (2023, June).
 - [16] *Levy Lab, MIT*. Boston, USA. (2023, March).
 - [17] *Cambridge University*. Cambridge, UK. (2023, February).
 - [18] *Queen Mary University London*. London, UK. (2023, February).
 - [19] *Stanford University*. California, USA. (2023, February).
 - [20] *NeuroSpin*. Paris, France. (2022, December).
 - [21] *Psycholinguistics of Language Representation (PoLaR) Lab at UiT the Arctic University of Norway*. Tromsø, Norway. (2022, November).
 - [22] *19th SIGMORPHON Workshop, NAACL*. Seattle, USA. (2022, July).
 - [23] *Meta AI and ENS*. Paris, France. (2022, May).
 - [24] *Max Planck Institute for Psycholinguistics. Special Talk Series. Neurobiology of language: Key issues and ways forward II*. (2022, March).
 - [25] *New York University*. New York, USA. (2022, February).
 - [26] *Duke University, Duke Institute for Brain Sciences*. North Carolina, USA. (2021, November).
 - [27] *University of Massachusetts Amherst, Linguistics Department*. Amherst, USA. (2021, April).
 - [28] *University of California, Davis*. Davis, USA. (2021, April).
 - [29] *University of Oxford*. Oxford, UK. (2021, March).
 - [30] *Institute of Neuroscience and Psychology, University of Glasgow*. Glasgow, UK. (2021, January).
 - [31] *Mini-Workshop on Morphological Processing*. (2020, December).
 - [32] *University of Maryland, Linguistics Department*. Maryland, USA. (2020, December).

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- [33] *Cognitive Computational Neuroscience*. Generative Adversarial Collaborations Debate. (2020, October).
 - [34] *Society for the Neurobiology of Language*. Symposia presentation. (2020, October).
 - [35] *Society for the Neurobiology of Language*. Dissertation award talk. (2020, October).
 - [36] *Martin Lab, Max Planck Institute for Psycholinguistics*. Nijmegen, The Netherlands. (2020, July).
 - [37] *Kriegeskorte Lab, Columbia University*. New York City, USA. (2020, January).
 - [38] *Cognitive, computational neuroscience: Breakout session host*. Berlin, Germany. (2019, September).
 - [39] *Max Planck Institute for Empirical Aesthetics*. Frankfurt, Germany. (2019, July).
 - [40] *BCBL Colloquium*. Donostia, Basque Country. (2019, June).
 - [41] *Bedny Lab, Johns Hopkins University*. Baltimore, USA. (2019, May).
 - [42] *University of Maryland, Linguistics Department*. Maryland, USA. (2019, April).
 - [43] *École Normale Supérieure & Facebook AI Research*. Paris, France (2019, February).
 - [44] *Mesgarani Lab, Columbia University*. New York, USA. (2018, December).
 - [45] *brainLENS Lab, UCSF*. San Francisco, USA. (2018, November).
 - [46] *Perception and Brain Dynamics Lab, NYU Langone Medical Center*. New York, USA. (2018, October).
 - [47] *Trueswell Lab, University of Pennsylvania*. Philadelphia, USA. (2018, August).
 - [48] *Max Planck Institute for Empirical Aesthetics*. Frankfurt, Germany. (2018, July).
 - [49] *Shadlen Lab, Columbia University*. New York, USA. (2017, October).
 - [50] *Cognition and Brain Sciences Unit, Cambridge University*. Cambridge, UK. (2017, June).
 - [51] *HLP Lab, University of Rochester*. New York, USA. (2016, November).
 - [52] *Presentation at 17th international morphology meeting*. Vienna, Austria. (2016, February).

Teaching

2024 Spring *Instructor, Stanford University*
 Data Science for Neuroscience Capstone, Undergraduate

2021&2022 *Guest Lecturer, New York University*
 Linguistics and Cognitive Science, Undergraduate
 Instructor: Alec Marantz

2021	<i>Instructor</i> , Cognition and Natural Sensory Processing Workshop Decoding models
2021	<i>Instructor</i> , Universitat Rovira Neurolinguistics Summer Course Experimental design, neural recording techniques and statistical methods
2018-2020	<i>Tutor</i> , New York University Advanced Stats, Undergraduate <i>Instructor</i> : Pascal Wallisch
2018	<i>Teaching Assistant</i> , New York University Cognition, Undergraduate <i>Instructor</i> : Pascal Wallisch
2018	<i>Guest Lecturer</i> , Columbia University Cognitive Neuroscience, Undergraduate
2017	<i>Guest Lecturer</i> , New York University Problem of Babel, Undergraduate <i>Instructor</i> : Alec Marantz
2016	<i>Teaching Assistant</i> , New York University Mathematical Tools for Cognitive and Neural Science, Graduate <i>Instructor</i> : Eero Simoncelli
2016	<i>Guest Lecturer</i> , New York University Neural Bases of Language: Auditory Lexical Access, Undergraduate <i>Instructor</i> : Liina Pylkkänen
2016	<i>Guest Lecturer</i> , New York University Linguistics as a Cognitive Science, Undergraduate <i>Instructor</i> : Alec Marantz
2016	<i>Guest Lecturer</i> , New York University Neural Bases of Language: Perceptual Attunement, Undergraduate <i>Instructor</i> : Liina Pylkkänen

Supervision

2024-	<i>Atlas Kazemian</i> , PhD Student, Stanford University Psychology
2024-	<i>Caroline Kaicher</i> , PhD Student, Stanford University Psychology
2024-	<i>William Turner</i> , Postdoc, Stanford University Psychology
2023-	<i>Irmak Ergin</i> , PhD Student, Stanford University Psychology
2023-	<i>Jill Kries</i> , Postdoc, Stanford University Psychology
2023-	<i>Ellie Abrams</i> , PhD Student, New York University
2022	<i>Alvincé Pongos</i> , PhD Student, UC Berkeley Bio Engineering Project: <i>Neural encoding of grammatical class during natural listening</i>
2022	<i>Jenn DiSanto</i> , UCSF lab rotation student Project: <i>Recurrent processes support speech-sound perception</i>
2020	<i>Praxal Patel</i> , Center for Data Science Summer Project, New York University Project: <i>Developing automated neural data analysis tools for neuro-typical and atypical populations</i>
2019–2020	<i>Ben Lang</i> , Research Assistant, New York University
2017	<i>Jessa Alexander</i> , Intern, New York University
2017	<i>Anna Cho</i> , Honours student, New York University Project: <i>Neurological mechanisms of perceptual attunement to accented speech</i>
2015–2016	<i>Lena Warnke</i> , Honours student, New York University Project: <i>Unconscious, arbitrary visual symbols as a cue for phoneme identification</i>

Service

2024	Thesis Committee	Linnea Evanson, <i>Ecole Normale Supérieure</i>
2024	Thesis Committee	Ajay Subramanian, <i>Stanford University</i>
2024	Thesis Committee	Alicia Mason, <i>New York University</i>
2024	Dissertation Chair	Jiayi Lu, <i>Stanford University</i>
2024	Dissertation Chair	Nay San, <i>Stanford University</i>
2023	Thesis Committee	Vinay Raghavan, <i>Columbia University</i>
2023	Thesis Committee	Jill Kries, <i>KU Leuven</i>
2022	Thesis Committee	Juliett Millet, <i>Université de Paris</i>
2022	Thesis Committee	Théo Desbordes, <i>Meta AI & Neurospin</i>
2024–	DEI Representative	<i>Cognitive Computational Neuroscience</i>
2022–	Program Committee	<i>Cognitive Computational Neuroscience</i>
2020–2022	Review editor	<i>Frontiers in Psychology</i>
Ad-hoc	Reviewer	<i>Nature Neuroscience, Nature Human Behaviour, PNAS, eLife, PLOS Biology, Journal of Neuroscience, NeuroImage, Human Brain Mapping, Cognition, Frontiers in Neuroscience, Glossa, Neurobiology of Language, Experimental Psychology, European Journal of Neuroscience, Mind Brain & Education, Cerebral Cortex, Psychonomic Bulletin & Review, Brain & Language, PLOS ONE, Cortex</i>
Ad-hoc	Reviewer	<i>National Science Foundation (USA)</i>