

Laura E. Gwilliams

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Education

Ph.D. 2015 - Present

Cognition and Perception

New York University, USA

Supervisors: Prof. Alec Marantz & Prof. David Poeppel

M.Sc. 2012 - 2013

Cognitive Neuroscience of Language

Basque Center on Cognition, Brain and Language (BCBL), Spain

Grade: *Excellent*

Supervisors: Prof. Arthur Samuel & Dr. Philip Monahan

B.A. 2009 - 2012

Linguistics

Cardiff University, UK

Grade: *1st Class with honours*

Supervisor: Dr. Lise Fontaine

Awards and Scholarships

2018 *Poster Prize*, Salzburg Mind Brain Annual Meeting (SAMBA)

2018 *Travel Award*, Society for the Neurobiology of Language Conference

2018 *Travel Award*, Cognitive Modelling and Computational Linguistics

2017 *Travel Award*, Cognitive Computational Neuroscience Conference

- 2016 *Dean's Travel Grant*, New York University
- 2016 *Travel Award*, Society for the Neurobiology of Language Conference
- 2016 *Helmsley Fellowship*, Cold Spring Harbor
(*Genetics and Neurobiology of Language Course* attendance fee)
- 2015 *Henry M. MacCracken Fellowship*, New York University
(Full funding of PhD tuition and maintenance)
- 2012 *Tuition Waiver*, Basque Center on Cognition, Brain and Language
- 2012 *Dell Hymes Commendation for Academic Achievement*, Cardiff University
(Awarded to the top graduating student within the department)

Publications

King, J-R., Gwilliams, L., Holdgraf, C., Sassenhagen, J., Barachant, A., Engemann, D., Larson, E. & Gramfort, A. (to appear). Encoding and decoding the dynamics of neural responses: Methods to uncover the algorithm of cognition.

Gwilliams, L., Linzen, T., Poeppel, D., & Marantz, A. (2018). In spoken word recognition the future predicts the past. *Journal of Neuroscience*. [\[PDF\]](#).

Gwilliams, L. & Marantz, A. (2018). Morphological representations are extrapolated from morpho-syntactic rules. *Neuropsychologia*. [\[PDF\]](#).

Gwilliams, L., Poeppel, D. & Marantz, A., Linzen, T. (2018). Phonological (un)certainly weights lexical activation. *Cognitive Modelling and Computational Linguistics (CMCL)*. [\[PDF\]](#).

Gwilliams, L. & King, J-R. (2017). Performance-optimized hierarchical models only partially predict neural responses during perceptual decision making. *NIPS workshop: Cognitively Informed Artificial Intelligence: Insights From Natural Intelligence*.

Gwilliams, L. & King, J-R. (2017). Perceptual decision making unfolds in a processing cascade within and across brain regions. *Cognitive Computational Neuroscience*. [\[PDF\]](#).

Brodbeck, C., Gwilliams, L. & Pylkkänen, L. (2016). Language in context: MEG evidence for modality general and specific responses to reference resolution. *eNeuro*. [\[PDF\]](#).

Gwilliams, L., Lewis, G. & Marantz, A. (2016). Functional characterisation of letter-specific responses in time, space and current polarity using magnetoencephalography. *NeuroImage*. [\[PDF\]](#).

Brodbeck, C., Gwilliams, L. & Pykkänen, L. (2015). EEG can track the time course of reference resolution in small visual worlds. *Frontiers in Psychology*. [\[PDF\]](#).

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*. [\[PDF\]](#).

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*. [\[PDF\]](#).

Gwilliams, L. & Fontaine, L. (2015). Indeterminacy in process type classification. *Functions of Language*. [\[PDF\]](#).

Politzer-Ahles, S., & Gwilliams, L. (2015). Involvement of prefrontal cortex in scalar implicatures: Evidence from magnetoencephalography. *Language and Cognitive Neuroscience*. [\[PDF\]](#).

Manuscripts

Gwilliams, L. & King, J-R. (In Prep). Tracking the temporal dynamics of perceptual decision making.

Stockall, L, Manouildiou, C., Gwilliams, L., Neophytou, K., & Marantz, A. (In Prep). Prefix Stripping Re-Re-Re-visited: MEG Evidence.

Invited Talks

Gwilliams, L. (2018, August). Towards a mechanistic account of speech comprehension in the human brain. Trueswell Lab, University of Pennsylvania. Philadelphia, USA.

Gwilliams, L. (2018, July). Towards a mechanistic account of speech comprehension in the human brain. Max Planck Institute for Empirical Aesthetics. Frankfurt, Germany.

Gwilliams, L. (2018, March). Back to the future: Investigating the neural mechanisms supporting speech comprehension. Chang Lab, University of California San Francisco. USA.

Gwilliams, L. (2018, February). Back to the future: Investigating the neural mechanisms supporting speech comprehension. Neuroscience Society, Columbia University. USA.

Gwilliams, L. (2018, January). Postdictive processing in spoken word recognition. Mesgarani Lab, Columbia University. USA.

Gwilliams, L. (2017, October). Decomposing hierarchical perceptual decision making. Shadlen Lab, Columbia University. USA.

Gwilliams, L. (2017, June). In spoken word recognition the future predicts the past. Cognition and Brain Sciences Unit, Cambridge University. UK.

Gwilliams, L. (2016, November). In spoken word recognition the future predicts the past. HLP Lab, University of Rochester. NY, USA.

Gwilliams, L. & Marantz, A. (2016, February). Taking Morphology Seriously: MEG Studies of Morphological Representations. Presentation at 17th International Morphology Meeting, Vienna, Austria

Slide Presentations

Gwilliams, L. & King, J-R. (2018, August). *From brain responses to algorithms: advances in parsing the computational architecture of perceptual decision making with MEG and machine learning*. Symposia presentation, BioMag. Philadelphia, USA.

Gwilliams, L., King, J-R. & Poeppel, D. (2018, August). *Parsing continuous speech into linguistic representations*. Presentation at the Society for the Neurobiology of Language Conference. Québec City, Canada.

Gwilliams, L., Poeppel, D. & Marantz, A., Linzen, T. (2018, January). *Phonological (un)certainly weights lexical activation*. Presentation at Cognitive Modelling and Computational Linguistics (CMCL). Salt Lake City, USA.

Gwilliams, L. Linzen, T., Neophytou, K., Poeppel, D. & Marantz, A. (2016, September). *Phonological commitment and sensitivity to subphonemic detail are independent*. Presentation at AMLAP. Bilbao, Basque Country.

Stockall, L., Manouilidou, C., Gwilliams, L. & Marantz, A. (2016, February). Un/Re-packing argument and event structure restrictions on prefixation: MEG evidence. Workshop on the syntax of argument structure: empirical advancements and theoretical relevance. Leipzig, Germany.

Gwilliams, L. & Marantz, A. (2015, June). *Abstract representation of the root morpheme: A magnetoencephalography study of spoken Arabic*. Presentation at the 9th Morphological Processing Conference, Potsdam, Germany.

Gwilliams, L. & Marantz, A. (2015, March). *Decomposition of spoken Arabic words into root morphemes during processing: Evidence from magnetoencephalography*. Presentation at the Linguistics in the Gulf 5 Conference, Doha, Qatar

Gwilliams, L. (2015, March). *Letter specific sensitivities in the brain: located in time, space and current direction*. Presentation at the Neuroscience of Language Workshop 2015, Abu Dhabi, UAE

Gwilliams, L., & Marantz, A. (2015, February). *Non-linear processing of a linear speech stream*. Presentation at the NYUAD Annual Research Conference 2015, Abu Dhabi, UAE.

Gwilliams, L. & Fontaine, L. (2014, July). *Ambiguity in process type selection in systemic functional linguistics*. Presentation at the 25th European Systemic Functional Linguistics Conference, Paris, France.

Brodbeck, C., Gwilliams, L. & Pylkkänen, L. (2014, February). *Reference resolution and prediction in a visual world: MEG evidence from English and Arabic*. Presentation at the NYUAD Annual Research Conference 2014, Abu Dhabi, UAE.

Poster Presentations

Gwilliams, L. & King, J-R. (2018, August). Perceptual decision making is supported by a hierarchical processing cascade in both biological and artificial neural networks. Identifying the neural architecture of perceptual decision making with normative, shallow and deep neural network approaches. Poster presented at BioMag, Philadelphia, USA.

Gwilliams, L. & King, J-R. (2018, July). Perceptual decision making is supported by a hierarchical processing cascade in both biological and artificial neural networks. Poster presented at cuttingEEG, Paris, France.

Gwilliams, L. & King, J-R. (2018, July). Perceptual decision making is supported by a hierarchical processing cascade in both biological and artificial neural networks. Poster presented at the Salzburg Mind Brain Annual Meeting (SAMBA), Salzburg, Austria.

Gwilliams, L. & King, J-R. (2018, March). Perceptual decision making is supported by a hierarchical processing cascade in both biological and artificial neural networks. Poster presented at the Cognitive Neuroscience Society conference (CNS), Boston, USA.

*Gwilliams, L., *King, J-R. & Poeppel, D. (2017, November). Decoding how the human brain parses continuous speech into linguistic representations. Dynamic poster presented at the Society for Neuroscience, Washington D.C., USA.

Gwilliams, L. & King, J-R. (2017, November). Uncovering the cascade of computations involved in ambiguity resolution: Decoding from MEG and neural network activity. Poster presented at the 2017 Society for the Neurobiology of Language Conference, Baltimore, USA.

Gwilliams, L. & King, J-R. (2017, September). Perceptual decision making unfolds in a processing cascade within and across brain regions. Poster presented at Annual Conference on Cognitive Computational Neuroscience, New York, USA.

Gwilliams, L. Linzen, T., Neophytou, K., Poeppel, D. & Marantz, A. (2016, September). *Phonological commitment and sensitivity to subphonemic detail are independent* Presentation at the Society for the Neurobiology of Language. London, UK.

Mow, J., Gwilliams, L., Khalighinsjad, B., Mesgarani, N. & Marantz, A. (2016, September). *Encoding and organisation of phonemes by feature in STG*. Poster presentation at the Society for the Neurobiology of Language. London, UK.

Gwilliams, L., Linzen, T., Neophytou, K., Warnke, L., Poeppel, D. & Marantz, A. (2016, April). *Early and asymmetric sensitivity to phonological boundaries and within-category variation across hemispheres*. Poster presented at the 2016 CNS Annual meeting, New York, USA

Brodbeck, C., Gwilliams, L. & Pyllkanen, L. (2016, April). *Amodal reference resolution in medial parietal cortex*. Poster presented at the 2016 CNS Annual meeting, New York, USA

Gwilliams, L., Linzen, T., Neophytou, K., Warnke, L., Poeppel, D. & Marantz, A. (2016, March). *Phoneme ambiguity is reflected very early in primary auditory cortex*. Poster presented at the 29th Annual CUNY Conference on Human Sentence Processing, Florida, USA

Brodbeck, C., Gwilliams, L. & Pyllkanen, L. (2016, March). *Modality general and specific brain responses during reference resolution*. Poster presented at the 29th Annual CUNY Conference on Human Sentence Processing, Florida, USA

Gwilliams, L. & Marantz, A. (2015, October). *Representations stems you can't see: An MEG study of morphological decomposition*. Poster presented at the Society for the Neurobiology of Language Conference, Chicago, USA

Stockall, L., Gwilliams, L., Manouilidou, C. & Marantz, A. (2015, October). *Access to lexical category and verb argument structure in the early stages of processing morphologically complex words: MEG investigations of prefixation*. Poster presented at the Society for the Neurobiology of Language Conference, Chicago, USA

Gaston, P., Gwilliams, L. & Marantz, A. (2015, October). *The time-course of cohort restriction in syntactic context: MEG evidence for a single auditory word-form*. Poster presented at the Society for the Neurobiology of Language Conference, Chicago, USA

Oseki, Y., Gwilliams, L., Blanco-Elorrieta, E., Gaston, P., Pyllkanen, L. & Marantz, A. (2015, October). *Neural Dynamics of Morphological and Phrasal Composition*. Poster presented at the Society for the Neurobiology of Language Conference, Chicago, USA

Brodbeck, C., Gwilliams, L. & Pyllkanen, L. (2015, October). *EEG can track the time course of successful reference resolution in small visual worlds*. Poster presented at the Society for the Neurobiology of Language Conference, Chicago, USA

Gwilliams, L., Lewis, G., & Marantz, A. (2014, August). *Revealing the cortical dynamics of letter string perception*. Poster presented at the Society for the Neurobiology of Language Conference, Amsterdam, Netherlands. [PDF].

Linzen, T., Gaston, P., Gwilliams, L. & Marantz, A. (2014, August). *Competition and prediction in the auditory processing of morphologically complex words*. Poster presented at the Society for the Neurobiology of Language Conference, Amsterdam, Netherlands. [PDF].

Gwilliams, L., Monahan, P., & Samuel, A. (2013, June). *Why an Avalanche is faster than an Explosion*. Poster presented at The 8th International Morphological Processing Conference, Cambridge, UK. [PDF].

Gwilliams, L., Monahan, P., & Samuel, A. (2013, March). *Decompositional processing of nominalisations*. Poster presented at the Basque Center on Cognition, Brain and Language (BCBL), San Sebastian, Spain.

Teaching

- 2018: Guest Lecturer
 Cognitive Neuroscience
 Department: Neuroscience
- Teaching Assistant
 Cognition
 Department: Psychology
 Instructor: Prof. Pascal Wallisch
- 2017: Guest Lecturer
 Problem of Babel
 Departments: Psychology and Linguistics
 Instructor: Prof. Alec Marantz
- 2016: Teaching Assistant
 Mathematical Tools for Cognitive and Neural Science
 Departments: Psychology and Neural Science
 Instructor: Prof. Eero Simoncelli
- Guest Lecturer
 Neural Bases of Language: Auditory Lexical Access
 Departments: Psychology and Linguistics
 Instructor: Prof. Liina Pyllkanen
- Guest Lecturer
 Neural Bases of Language: Perceptual Attunement
 Departments: Psychology and Linguistics
 Instructor: Prof. Liina Pyllkanen
- Guest Lecturer
 Linguistics as a Cognitive Science
 Departments: Psychology and Linguistics
 Instructor: Prof. Alec Marantz

Research Positions

- 2013 - 2015 *Research Assistant, New York University Abu Dhabi*
 Supervisors: Dr. Alec Marantz and Dr. Liina Pylkkänen
- 2012 - 2014 *Research Assistant, Cardiff University*
 Supervisor: Dr. Lise Fontaine
- 2011 - 2012 *Graduate Research Team, Cardiff University*

Mentoring

Spring 2017: Supervised an undergraduate intern.

Spring 2017: Supervised an undergraduate independent study student

Project title:

Neurological mechanisms of perceptual attunement to accented speech

Spring 2016: Supervised an undergraduate independent study student

Project title:

Unconscious, arbitrary visual symbols as a cue for phoneme identification

Fall 2015: Supervised an undergraduate intern

Reviewer for

- *PLOS Biology*
- *NeuroImage*
- *Cognition*
- *Cerebral Cortex*
- *Psychonomic Bulletin & Review*
- *Brain & Language*
- *PLOS ONE*
- *Cortex*

Programming Languages

- *Python (particularly scikit-learn, MNE, keras): 5 years, highly proficient*
- *MATLAB: 4 years, highly proficient*

- *R: 3 years, competent*
- *JavaScript, Perl, Bash, C++: Some knowledge*