

DR MÁTÉ ALLER

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CURRENT POSITION

MRC Cognition and Brain Sciences Unit from July 2019
University of Cambridge, UK
Research Associate
Investigating the neural mechanisms of speech perception.

EDUCATION

University of Birmingham, UK December 2013
DPhil in Cognitive Neuroscience - July 2019
Investigated the neural dynamics of multisensory integration and recalibration in humans.

Semmelweis University, Hungary September 2009
Coursework and research toward DPhil in Neuroscience - December 2013
Investigated the pharmacological protection against sensorineural hearing losses in mouse models.

University of Szeged, Hungary September 2003
Doctor of Medicine (summa cum laude) - September 2009

RESEARCH SKILLS

Deep general understanding of human cognitive processes especially related to audio-visual perception, speech and language processing.

Broad experience in designing and running human psychophysics, neurolinguistics, and neuroimaging experiments (M/EEG, fMRI, eye-tracking).

Extensive experience in analysing, visualizing, and interpreting high dimensional neuroimaging and neurophysiological time series data

Solid understanding of univariate and multivariate analysis tools (representational similarity analysis, support vector machines) and statistical methods applied to neural data.

Experience in modelling human cognitive and neural processes using encoding and decoding models, generative models (Bayesian causal inference, Pattern Component Modelling) and artificial neural networks (CNNs, RNNs, LSTMs).

Advanced programming experience in Python including (1) human neurophysiological data analysis in MNE-Python, (2) machine learning using scikit-learn, (3) tabular data analysis and visualization using pandas, NumPy, and matplotlib, and (4) deep learning using Tensorflow and PyTorch. Advanced programming experience in MATLAB.

Working knowledge of operating in a Linux environment, workflow management (BASH-based scripting, SLURM), and using collaborative tools for code development such as git (see my [GitHub repositories](#)).

SUPERVISION AND TRAINING

Connor Doyle <i>Co-supervisor, MPhil in Basic and Translational Neuroscience</i> <i>University of Cambridge, UK</i>	from January 2023
Jacqueline von Seth <i>Advisor, DPhil in Cognitive Neuroscience</i> <i>University of Cambridge, UK</i>	from October 2021
Olivia Matheson, Charlotte Webber <i>Co-supervisor, Year 3 project, BA in Psychology</i> <i>University of Birmingham, UK</i>	September 2015 - February 2016
Freya Horrocks, Caroline Howe <i>Co-supervisor, Year 3 project, BA in Psychology</i> <i>University of Birmingham, UK</i>	September 2014 - February 2015

SMALL GROUP TEACHING

Tutorial on MNE-BIDS and MNE-BIDS-Pipeline <i>COGNESTIC workshop, MRC CBU</i>	September 2023 Cambridge, UK
Tutorial on dimensionality reduction (PCA and SVA). <i>Introduction to Signal Analysis in MATLAB Workshop,</i> <i>MRC CBU</i>	November 2019 Cambridge, UK
Tutor in pharmacology <i>Faculty of Medicine, Semmelweis University</i>	2012 – 2013 Budapest, Hungary
Undergraduate tutor in molecular biology <i>Faculty of Medicine, University of Szeged</i>	2005 – 2009 Szeged, Hungary

CLINICAL EXPERIENCE

Military Hospital Hungarian Defence Forces, Budapest, Hungary Junior doctor in emergency medicine	May 2011 - November 2013
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PUBLICATIONS

Cognitive neuroscience

Aller, M., Solberg-Økland, H., MacGregor, L. J., Blank, H., & Davis, M. H. (2022). Differential auditory and visual phase-locking are observed during audio-visual benefit and silent lip-reading for speech perception. *Journal of Neuroscience*.

Aller, M., Mihalik, A., & Noppeney, U. (2022). Audiovisual adaptation is expressed in spatial and decisional codes. *Nature Communications*, 13(1), Article 1.

Aller, M., & Noppeney, U. (2019). To integrate or not to integrate: Temporal dynamics of hierarchical Bayesian causal inference. *PLOS Biology*, 17(4), e3000210.

Delong, P., **Aller, M.,** Giani, A. S., Rohe, T., Conrad, V., Watanabe, M., & Noppeney, U. (2018).

Invisible Flashes Alter Perceived Sound Location.
Scientific Reports, 8(1), 12376.

Deroy, O., Faivre, N., Lunghi, C., Spence, C., **Aller, M.**, & Noppeney, U. (2016).
The complex interplay between multisensory integration and perceptual awareness.
Multisensory Research, 29(6–7), 585–606.

Aller, M., Giani, A., Conrad, V., Watanabe, M., & Noppeney, U. (2015).
A spatially collocated sound thrusts a flash into awareness.
Frontiers in Integrative Neuroscience, 9, 16.

Basic Neuroscience

Berekméri, E., Deák, O., Téglás, T., Sághy, É., Horváth, T., **Aller, M.**, ... Zelles, T. (2019).
Targeted single-cell electroporation loading of Ca²⁺ indicators in the mature hemicochlea preparation.
Hearing Research, 371, 75–86.

Horváth, T., Polony, G., Fekete, Á., **Aller, M.**, Halmos, G., Lendvai, B., ... Zelles, T. (2016).
ATP-evoked intracellular Ca²⁺ signaling of different supporting cells in the hearing mouse hemicochlea.
Neurochemical Research, 41(1–2), 364–375.

Delmaghani, S., Defourny, J., Aghaie, A., Beurg, M., Dulon, D., ... Zelles, T., **Aller, M.**, ... Petit, C. (2015).
Hypervulnerability to sound exposure through impaired adaptive proliferation of peroxisomes.
Cell, 163(4), 894–906.

Polony, G., Humli, V., Andó, R., **Aller, M.**, Horváth, T., Harnos, A., ... Zelles, T. (2014).
Protective effect of rasagiline in aminoglycoside ototoxicity.
Neuroscience, 265, 263–273.

Farkas, I., Sárvári, M., **Aller, M.**, Okada, N., Okada, H., Likó, I., & Liposits, Z. (2012).
ECa²⁺ influx in neurons through L-type voltage-gated Ca²⁺ channels.
Neurochemistry International, 60(6), 631–639.

Lendvai, B., Halmos, G. B., Polony, G., Kapocsi, J., Horváth, T., **Aller, M.**, ... Zelles, T. (2011).
Chemical neuroprotection in the cochlea: the modulation of dopamine release from lateral olivocochlear efferents.
Neurochemistry International, 59(2), 150–158.

TALKS

Parallels and divergences in spoken word recognition between humans and a neural network model <i>Methods Day, MRC CBU</i>	December 2022 Cambridge, UK
Visual speech is utilized differently in auditory and visual cortex: evidence from MEG and partial coherence analysis <i>Cambridge Hearing Group Christmas Symposium</i>	December 2021 Cambridge, UK
Decoding predictions, speech signals and their combination in MEG responses <i>Language Group Meeting, MRC CBU</i>	January 2021 Cambridge, UK
The neural dynamics of multisensory integration and recalibration <i>Federation of European Neuroscience Societies (FENS) Virtual Forum</i>	June 2020 Online

Can we decode auditory prediction error as a new form of brain-computer interface? <i>Language Group Meeting, MRC CBU</i>	May 2020 Cambridge, UK
The neural dynamics of audio-visual integration and recalibration <i>Wednesday Lunchtime Seminar, MRC CBU</i>	January 2020 Cambridge, UK
Two distinct neural mechanisms of audio-visual recalibration <i>Cambridge Hearing Group Christmas Symposium</i>	December 2019 Cambridge, UK
The neural dynamics of Bayesian causal inference <i>Language Group Meeting, MRC CBU</i>	October 2019 Cambridge, UK
Interactions across the senses in the emergence of multisensory consciousness <i>International Multisensory Research Forum (IMRF)</i>	2015 Pisa, Italy

CONFERENCE PRESENTATIONS

Time-course of neural computations supporting perception and misperception of degraded speech <i>15th Annual Meeting of the Society for the Neurobiology of Language (SNL)</i>	October 2023 Marseille, France
Efficiency and (lack of) flexibility in a deep learning model of human spoken word recognition. <i>Analytical Connectionism Summer Course Gatsby Computational Neuroscience Unit, UCL</i>	August 2023 London, UK
Parallels and divergences in spoken word recognition between humans and a neural network model <i>Cambridge Language Sciences Annual Symposium</i>	November 2022 Cambridge, UK
How and when are acoustic-phonetic predictions formed during silent reading? <i>13th Annual Meeting of the Society for the Neurobiology of Language (SNL)</i>	October 2021 Online
Audio-visual comprehension of degraded speech: Does visual speech enhance auditory entrainment of MEG signals? <i>12th Annual Meeting of the Society for the Neurobiology of Language (SNL)</i>	October 2020 Online
Resolving audiovisual recalibration in time and space <i>Neuroscience (SfN) 2018</i>	November 2018 San Diego, USA
Spatial representations formed from vision and audition depend on task context <i>Annual Meeting of the Organization for Human Brain Mapping (OHBM)</i>	July 2016 Geneva, Switzerland

COMMITTEES, PROFESSIONAL MEMBERSHIPS

Member of Postdoctoral Society, Trinity College, Cambridge	from January 2023
Member of IT Steering Group, MRC CBU, Cambridge	from July 2022
Member of Postdoc Committee, MRC CBU, Cambridge	from April 2020
Member of the Society for the Neurobiology of Language	2020 - 2023
Member of the Society for Neuroscience	2018 - 2022
Member of the Hungarian Neuroscience Association	from January 2014
Member of the Hungarian Medical Chamber	from September 2009

JOURNAL REVIEWING

The Journal of Neuroscience, PLoS Computational Biology, eLife, eNeuro, Neurobiology of Language, European Journal of Neuroscience, Journal of Cognitive Neuroscience, Current research in Neurobiology, Frontiers in Human Neuroscience, Journal of Mathematical Psychology. For a full list of my reviewer activity please visit my [ORCID](#) page.

PROFESSIONAL DEVELOPMENT

Analytical Connectionism Summer Course <i>Gatsby Computational Neuroscience Unit, UCL, certificate</i>	August 2023 London, UK
Machine Learning in Python with scikit-learn course <i>Inria, certificate 2021, 2023</i>	2021 and 2023 Online
Deep Learning Nanodegree <i>Udacity, certificate</i>	2018 Online
EuroHear Therapy Training Course <i>EuroHear</i>	2009 Padova, Italy

LANGUAGE SKILLS

Hungarian – Native proficiency
English – Full professional proficiency
German – Limited working proficiency