

Newsletter

JANUARY 2023



Neurobiology of Language - Volume 3, Issue 4 Now Available

We're pleased to announce the publication of Volume 3 Issue 4 of the Neurobiology of Language journal. Among the highlights of this issue is the following paper:

Causal Contributions of the Domain-General (Multiple Demand) and the Language-Selective Brain Networks to Perceptual and Semantic Challenges in Speech Comprehension.

Lucy J. MacGregor, Rebecca A. Gilbert, Zuzanna Balewski, Daniel J. Mitchell, Sharon W. Erzinçlioğlu, Jennifer M. Rodd, John Duncan, Evelina Fedorenko, Matthew H. Davis;

Neurobiology of Language 2023; 3 (4): 665–698.



The challenges of making sense of speech are very apparent when you're in a noisy pub, or struggling to understand a foreign language. But, which brain networks do we use to make sense of difficult to understand sentences? A new paper by Lucy MacGregor and colleagues shows that the answer to this question depends on the type of challenge to speech understanding – whether words are difficult to hear (a perceptual challenge) or have ambiguous meanings (a semantic challenge).

In this collaboration between the MRC-CBU in Cambridge (UK), and MIT in Cambridge (USA), they recruited volunteers who, despite not having aphasia, had chronic brain injuries that damaged one of two frontal networks that are often activated in brain imaging studies of speech comprehension: (1) a fronto-temporal language-responsive network or (2) a fronto-parietal, domain-general brain network often termed the "Multiple Demand" system. By correlating damage to these networks with performance on behavioural tests of speech perception, sentence comprehension and adaptation, they showed that both networks make a causal contribution to a specific aspect of speech understanding. Adaptation to ambiguous

word meanings is impaired by damage to the language selective network, whereas the Multiple Demand network plays a causal role in supporting the recognition of degraded spoken words in sentences. These findings show how evidence from brain injured individuals can go beyond functional imaging in showing how specific brain regions help listeners to overcome different challenges to comprehension.

You can find out more by reading the paper:

https://direct.mit.edu/nol/article/3/4/665/113064/Causal-Contributions-of-the-Domain-General

You can read other papers from volume 3 issue 4 of the Neurobiology of Language, here:

https://direct.mit.edu/nol/issue/3/4

Left Frontal White Matter Links to Rhythm Processing Relevant to Speech Production in Apraxia of Speech

Rose Bruffaerts, Jolien Schaeverbeke, Ahmed Radwan, Manon Grube, Silvy Gabel, An-Sofie DeWeer, Eva Dries, Karen Van Bouwel, Timothy D. Griffiths, Stefan Sunaert, Rik Vandenberghe

Neurobiology of Language (2022) 3 (4): 515-537.

Hierarchy, Not Lexical Regularity, Modulates Low-Frequency Neural Synchrony During Language Comprehension

Chia-Wen Lo, Tzu-Yun Tung, Alan Hezao Ke, Jonathan R. Brennan Neurobiology of Language (2022) 3 (4): 538–555.

Can You Hear What's Coming? Failure to Replicate ERP Evidence for Phonological Prediction

Victoria R. Poulton, Mante S. Nieuwland Neurobiology of Language (2022) 3 (4): 556–574.

Supramodal Sentence Processing in the Human Brain: fMRI Evidence for the Influence of Syntactic Complexity in More Than 200 Participants

Julia Uddén, Annika Hultén, Jan-Mathijs Schoffelen, Nietzsche Lam,

Karin Harbusch, Antal van den Bosch, Gerard Kempen, Karl Magnus Petersson, Peter Haaoort

Neurobiology of Language (2022) 3 (4): 575–598

Event-Related Potential Correlates of Learning to Produce Novel Foreign Phonemes Henry Railo, Anni Varjonen, Minna Lehtonen, Pilleriin Sikka Neurobiology of Language (2022) 3 (4): 599–614.

The Musical Abilities, Pleiotropy, Language, and Environment (MAPLE) Framework for Understanding Musicality-Language Links Across the Lifespan

Srishti Nayak, Peyton L. Coleman, Enikő Ladányi, Rachana Nitin, Daniel E. Gustavson, Simon E. Fisher, Cyrille L. Magne, Reyna L. Gordon Neurobiology of Language (2022) 3 (4): 615–664.

With the completion of volume 3, the editors-in-chief would also like to thank all the editors, reviewers and authors for their contributions to the journal in 2022. There's a full list of reviewers online here:

https://direct.mit.edu/nol/article-abstract/3/4/699/114498/Neurobiology-of-Language-Volume-3-Reviewers-List



<u>Neurobiology of Language</u> is the open-access journal sponsored by the Society for the Neurobiology of

Language and MIT Press. Launched in March 2019, the journal provides a new venue for articles across a range of disciplines addressing the neurobiological basis of speech and language. To learn more about Neurobiology of Language and how to submit articles, go to https://www.mitpressjournals.org/nol.





Job Postings and Announcements

If you have a job posting, general announcement, or conference that you would like to include in the SNL Newsletter, please send it to newsletter@neurolang.org





Job Postings

Two Post-Doctoral Research Positions University of South Carolina

Postdoctoral Fellows: Cognitive Neuroscience of Semantics. Two post-doctoral research positions are available in the laboratory of Dr. Rutvik Desai at the University of South Carolina, Department of Psychology. The lab focuses on cognitive neuroscience of language and neural representation of concepts using neuroimaging, brain stimulation, patient studies, lesion-symptom mapping, and computational modeling. Excellent facilities for fMRI, TMS, tDCS, EEG, and eye tracking are available. The Fellow will have an exciting opportunity to pursue collaborative and self-directed projects at the Institute for Mind and Brain (http://mindandbrain.sc.edu/). Opportunities to work on a large multi-modal neuroimaging dataset that includes fMRI of naturalistic language, as well as those for collaborations with computer scientists to develop cutting-edge analysis methods using machine learning/Deep Learning methods, are available.

Candidates with a PhD in any of the cognitive sciences (e.g., Psychology, Neuroscience, Computer Science) are welcome to apply. A research background in cognitive neuroscience/cognitive science, relevant to semantic or language processing, is required. Expertise with fMRI (including MVPA; one of AFNI/SPM/FSL), or brain stimulation (TMS or tDCS) is required. Experience in one or more of lesion-symptom mapping, behavioral testing or imaging of patient populations, EEG, connectionist modeling, or machine learning is also a positive, along with skills in programming and statistics (e.g., Python, Matlab, R). A promising publication record is desirable. Salary will be commensurate with experience. Applications should include a CV, brief statement of research experience and interests, and names of three referees (who will be asked for a reference letter if necessary; actual letters are not required initially). Expected starting date is Spring-Summer 2023, but is flexible. Applications should be sent to rutvik@sc.edu and will be assessed as they arrive.

The University of South Carolina is an affirmative action, equal opportunity employer. Women and minorities are encouraged to apply. The University of South Carolina does not discriminate in educational or employment opportunities or decisions for qualified persons on the basis of race, color, religion, sex, national origin, age, disability, sexual orientation or veteran status.



Funded PhD Candidate Positions at the BCBL The Basque Center on Cognition Brain and Language San Sebastián, Basque Country, Spain)

The Basque Center on Cognition Brain and Language (San Sebastián, Basque Country, Spain) offers funded 4 PhD candidate positions:

- <u>FUNDED PHD CANDIDATE POSITION LANGUAGE AND MEMORY CONTROL</u> <u>GROUP</u>
- FUNDED Ph.D. CANDIDATE POSITION NEUROBIOLOGY OF LANGUAGE GROUP
- FUNDED Ph.D. CANDIDATE POSITION SPEECH AND BILINGUALISM GROUP
- <u>FUNDED Ph.D. CANDIDATE POSITION SIGNAL PROCESSING IN NEUROIMAGING</u> GROUP

INFORMATION ABOUT THE POSITIONS IN https://www.bcbl.eu/en/join-us/job-offers



Faculty Position Computational Scientist Neurobiology of Language and Semantic Cognition Neuroscience Institute, Medical College of Wisconsin

The Medical College of Wisconsin Neuroscience Institute invites applications for a tenure-track faculty position in Neurology and Neurosurgery at the rank of Assistant or Associate Professor, with specialization in computational science. Our language research group (https://www.neuro.mcw.edu/) studies basic neural mechanisms of language processing and aphasia recovery using fMRI, magnetoencephalography (MEG), electrocorticography (ECoG), and computational models. The lab has had continuous NIH funding for over 25 years and is well supported through NIH and intramural awards. This recruitment is part of an institutional goal of expanding computational neuroscience research under the auspices of MCW's Neuroscience Research Center and newly created Neuroscience Institute.

Applicants should have expertise in standard connectionist models of language as well as deep learning approaches, including large language transformer models (GPT-x, BERT). The aims of the research are to optimize ECoG and MEG decoding models, with a focus on concept decoding under an embodied cognition framework, and to apply computational methods to modeling language relearning after focal brain lesions. Our long-term goals are to develop novel brain-computer interface applications for people with aphasia and to optimize language training and brain stimulation methods to enhance neural plasticity in aphasia.

The successful applicant will join a multi-disciplinary team that includes cognitive neuroscientists, neuropsychologists, neurosurgeons, imaging scientists, and biomedical engineers engaged in a range of thematically related programs. Campus resources include state-of-the-art MRI and MEG research platforms, active neurosurgical oncology and epilepsy programs, and a large clinical and research program in aphasia. A competitive salary and start-up package will be offered.

The Medical College of Wisconsin (https://www.mcw.edu/) is a private non-profit medical school, pharmacy school, and graduate school of sciences located in Milwaukee, WI. It ranks in the top third of US medical schools in NIH research support, with notable strengths in neuroscience, biophysics, and biomedical engineering. The institution recently committed to a 10-year plan to further expand neuroscience research. Milwaukee is a vibrant and progressive city on the shores of Lake Michigan known for its beauty, lakefront recreational activities, cultural festivals, rich history, and student life.

Review of applications will begin February 1, 2023, and continue until the position is filled, with an expected start date in fall 2023. To apply, please email a CV and statement of research interests and relevant experience to Bill Gross, MD, PhD (baross@mcw.edu). MCW is an Equal Opportunity, Affirmative Action Employer.



Postdoctoral Research Fellow - The benefits of regular physical exercise for language, cognition and brain health in aging (full-time, 1 year) University of Birmingham

Applications are invited for a full-time Research Fellow position (start date May 1st 2023, end date April 30th 2024) to work at the Centre for Human Brain Health, University of Birmingham (Grade 7.29). The successful candidate will join a team of researchers studying the benefits of regular physical exercise for language, cognition and brain health in ageing. This will be done under direct supervision of Dr. Katrien Segaert (PI) and Dr. Sam Lucas (co-I), and in collaboration with researchers at the University of Agder (Norway). The project is funded by the Norwegian Research Council.

The project entails a randomized-controlled exercise intervention to investigate how exercise benefits grey matter brain structure (MRI), baseline cerebral blood flow (ASL), brain function (fMRI: tip-of-the-tongue task), cognitive performance (several language production/comprehension tasks, switching, ANT, working memory, processing speed).

While data-collection for the project has recently been concluded, we are looking for a motivated research fellow with strong (f)MRI data-analysis skills and an interest in ageing to join our team. Main responsibilities will be to conduct data-analyses, prepare manuscripts, contribute to high quality publications as lead author and co-author, and present research findings at conferences.

The candidate will take part in supervision of research assistants and students, and will be an active member of the Centre for Human Brain Health, the School of Psychology and the School of Sport, Exercise and Rehabilitation Sciences at the University of Birmingham.

To apply, please upload a cover letter and CV by January 31 st 2023.

We will interview in two stages. Stage 1: Shortlisted candidates will be interviewed online (expected February 2023). Stage 2: If successful in stage 1, candidates will be invited for a formal interview in person or online (expected end of Feb 2023).

Further information – contact Dr. Katrien Segaert: k.segaert@bham.ac.uk and Dr. Sam Lucas s.j.e.lucas@bham.ac.uk

To apply: https://www.jobs.ac.uk/job/CVX125/research-fellow



FUNDED POSTDOCTORAL CANDIDATE POSITION BRAIN RHYTHMS AND COGNITION GROUP at the BCBL Basque Center on Cognition Brain and Language (San Sebastián, Basque Country, Spain) www.bcbl.eu

- INFORMATION ABOUT THE POSITION
- Position: Post-doc

- Researcher Profile: R2, Recognised Researcher (PhD holders or equivalent who
 are not yet fully independent) / R3, Established Researcher (Researchers who
 have developed a level of independence)
- Number of vacancies: 1
- Project: Neurospeech
- Location: Spain > San Sebastian
- Research Field: Neuroscience > Cognition and Language
- Type of contract/Duration of Contract: Temporary > until November 30th 2025
- Job Status: Full-timeHours per week: 35
- Starting date: As early as possible
- Application deadline: January 31st

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Information about the project: The project is based on a collaboration between teams in Spain (BCBL) and the U.S. (University of Connecticut and Oregon State University) to yield new theoretical insight into the cognitive, neural, and computational bases of mono- and multilingual language representation and processing. The aims are the following:

- 1. Adapt a cutting-edge **neural network model** of human speech recognition to multiple languages to develop concrete predictions about cross-language interaction during mono- vs multilingual language processing in single and multilanguage contexts.
- 2. Use speech-tracking analysis of MEG and neural network responses to **single** words to assess cross-language interaction during mono- vs. multilingual processing in single and multi-language contexts.
- 3. Determine impact of **continuous speech** context on cross-language interaction in MEG (and neural network) responses during mono- and multilingual processing in single and multi-language contexts.

Job description: The selected candidate will be involved all the different aspects of the MEG experimental activities. Experiment planning, participants selection, stimuli preparation, data collection, data analysis and preparation of scientific reports. This will take place in the MEG lab at the BCBL and under the supervision of the Pls of the project. All these activities will be coordinated with the U.S. researchers, to pursue state-of-the art analysis of the MEG data in response to natural speech stimuli.

Pl and research group: Nicola Molinaro, Brain Rhythms and Cognition group

CANDIDATES' PROFILE AND SELECTION CRITERIA

Required skills:

- Knowledge of the relevant literature
- Demonstrated ability to conceptualize relevant theoretical questions, and design appropriate experimental tests of these questions
- Solid relevant statistical ability
- Strong written and spoken English
- Previous experience with neuroimaging methods (EEG, fMRI, MEG)
- Programming skills (e.g., Python, Matlab, R, and/or ability to program experiments)

Desirable skills:

Knowledge of Spanish and/or Basque (or a willingness to learn some) is a plus

WORKING CONDITIONS

Salary: Gross salary € 28.000 - € 30.000

Entitlements and other benefits: https://www.bcbl.eu/en/join-us/what-is-like-to-work-bcbl

Training opportunities and Career development plan:

Researchers at any stage of their career, regardless of their contractual situation, are given an opportunity for professional development and for improving their employability through access to a Personal Career Development Plan which includes (1) Training through individually personalized research projects under senior supervision

(2) Exchanging knowledge with the scientific community and the general public

- (3) Network-wide training in theory and methods
- (4) Complementary training courses
- (5) Involvement in proposal writing, task coordination
- (6) Development of skills for the organization of training and scientific events BCBL seeks to foster an **environment** where all talents can flourish, regardless of gender, age, cultural background, nationality or impairments. If you have any questions relating to accessibility or support contact us.

• OTHER RELEVANT INFORMATION:

Language policy

- The corporative language at the Center is English but the national language will be an asset for this particular position
- The center provides initial level Spanish and Basque lessons to all the international staff members
- The interview will be conducted entirely in English
- APPLICATION PROCESS:

Submission of the application and documentation:

To submit your application, please follow this **link**: applying for "Postdoc NEUROSPEECH 2023" and attach the following documentation:

- A curriculum vitae
- A statement outlining research interests and motivation to apply for the position
- Two letters of recommendation

Application process timetable:

- 1. Deadline for application: 30/01/2023
- 2. Evaluation by committee: 01/02/2023-15/02/2023
- 3. Interviews: 15/02/2023-20/02/2023
- 4. Final decision: 20/02/2023
- 5. Feedback to all applicants: 20/02/2023-22/02/2023
- 6. Work contract start date: as soon as possible

Contact details for enquiries: hr@bcbl.eu



Multiple Program Director Positions at the National Science Foundation

The National Science Foundation is searching for program directors for both the Linguistics and the Cognitive Neuroscience programs, with both rotator and permanent roles available. The responsibilities of NSF Program Directors are dynamic and constantly evolve. However, fundamental tasks include the administration of the merit review process and proposal recommendations, program budget administration, participation in strategic planning for the program, division, directorate, and agency, the preparation of public-facing materials highlighting advances in the research supported, as well as coordination with related programs in NSF or in other agencies and organizations.

Application for rotator positions is available at the following

link: https://www.usajobs.gov/job/698071400?

<u>utm_medium=email&utm_source=govdelivery.</u> The application for the permanent Linguistics position is available here: https://www.usajobs.gov/job/698069500? utm_medium=email&utm_source=govdelivery. The application for the permanent Cognitive Neuroscience position is available

here: https://www.usajobs.gov/job/698068900? utm_medium=email&utm_source=govdelivery Simon Fischer-Baum Director, Perception, Action and Cognition Program National Science Foundation 2415 Eisenhower Avenue Alexandria, VA 22314

Tel: 703.292.7238 Fax: 703.292.9068

NOTE: There is a new <u>Proposal & Award Policies & Procedures Guide (PAPPG)</u>, <u>effective January 30, 2023</u>

Prospective Pls should also consult:

- 1. A brand-new search engine to find NSF funding opportunities.
- 2. The <u>PAC program</u> webpage.
- 3. The <u>Dear Colleague Letter: Effective Practices for Data</u>, and <u>Dear Colleague Letter: A Broader Impacts Framework for Proposals Submitted to NSF's Social</u>, Behavioral, and Economic Sciences Directorate.
- 4. Need to talk with a Program Director?
 - 5. Send us a one-page description of the proposed research.
 - 6. Book a time, if needed: https://outlook.office365.com/owa/calendar/NSFBookingsPerce ptionActionandCognition@nsf.onmicrosoft.com/bookings/



Animal vocalization analysis and annotation tool (Bordeaux, France)

Al internship offer at Inria and Bordeaux Neurocampus (France) on Canapy: an Animal vocalization analysis and annotation tool.

Application and more

info: https://github.com/neuronalX/internships/blob/main/2022-2023_MSc-or-BSc_Trouvain-Leblois-Hinaut_Canapy_Songbird-GUI_EN.pdf

The main objectives of the internship will be:

- 1. to develop a graphical interface to train vocalization annotation models, to visualize their performance and to re-annotate parts of the dataset accordingly (in a similar fashion as semi-supervised learning);
- 2. to develop the corresponding software backend: data management (audio and annotations), serving and local persistence of the models (MLOps);
- 3. to collaborate with the project members to define the needs, establish the specifications or integrate pre-existing tools. This objective also implies collaborating with international researchers, and making an open source tool available to the public.

The development will be incremental: a first prototype will allow to train models and to present their evaluation on the interface. A second prototype will offer advanced editing possibilities of the dataset (re-annotation of parts of the audio according to the results of the model), and the final version will integrate advanced analysis tools (dataset errors detection, spectrograms dimensionality reduction for visualization and/or clustering, syntactic analysis of song sequences, ...)

The student will have to develop an interface, preferably web, in javascript/typescript (React...) or directly in Python (bokeh/panel/holoviz...).

The software backend will serve Machine Learnnig models defined in Python (type scikit-learn/reservoirpy at first, eventually type tensorflow/pytorch).

The tool could be inspired by or integrated with the VocalPy initiative [3]. The student will be encouraged to collaborate with the project collaborators. For example, the data could follow the convention defined by the VocalPy crowsetta package.

Once complete, the tool will be made public, on Github, along with its documentation. The goal is to impact a large international community, like

ReservoirPy [4], a library already developed in the Mnemosyne team for the ML community.

- [1] N. Trouvain et X. Hinaut, « Canary Song Decoder: Transduction and Implicit Segmentation with ESNs and LTSMs », in ICANN 2021 30th International Conference on Artificial Neural Networks, Bratislava, Slovakia, sept. 2021, vol. 12895, p. 71 82. doi: 10/gq43sk.
- [2] Y. Cohen, D. A. Nicholson, A. Sanchioni, E. K. Mallaber, V. Skidanova, et T. J. Gardner, « Automated annotation of birdsong with a neural network that segments spectrograms », eLife, vol. 11, p. e63853, janv. 2022, doi: 10/gq43sd.
- [3] « VocalPy ». https://github.com/vocalpy
- [3] « ReservoirPy ». https://github.com/reservoirpy/reservoirpy



The National Science Foundation is hiring one permanent Program Director and/or one rotator (2-3 years) for the Cognitive Neuroscience Program.

The CogNeuro program supports research aimed at increasing understanding of the neural mechanisms of human cognition, including attention, learning, memory, decision-making, language, social cognition and emotions.

Rotator positions are great opportunities for faculty and other (typically more senior) scientists to play an important role at NSF and for their disciplines. There are different mechanisms with somewhat different details, but in sum rotators typically take a leave from their regular faculty positions for 1-3 years to take on a scientific leadership role for a program or programs at NSF. See https://beta.nsf.gov/careers/rotator-programs for more information about NSF rotator positions.

Permanent Program Directors work for the National Science Foundation but still get time to pursue their own research and education.

Apply on

USAJOBS: https://www.usajobs.gov/GetJob/ViewDetails/698068900 and https://www.usajobs.gov/GetJob/ViewDetails/698071400.

Applications for all of these BCS openings are currently being accepted until February 6, 2023.

Interested applicants can reach out to Betty Tuller (btuller@nsf.gov).



Other

Master in Cognitive Neuroscience of Language – BCBL Abstract submissions for <u>Clinical Aphasiology Conference 2023</u> are open!

This will be a hybrid meeting, with both in-person and virtual attendance options. The abstract deadline is January 16th, 2023.

- CAC 2023 DATES: May 30 June 3, 2023
- Conference Location: <u>Resorts Casino Atlantic City</u>, Atlantic City, New Jersey USA
- Abstract submission portal
- Call for papers and abstract submission guidelines
- Information about <u>student fellowships</u>, including a new Career Development track

For more information, please contact Maya Henry, CAC 2023 Program Chair: maya.henry@austin.utexas.edu



Announcing the Lila R. Gleitman Prize

The Cognitive Science Society is pleased to announce the Lila R. Gleitman Prize for Early-Career Contributions to Cognitive Science in honor of Lila R. Gleitman's foundational role in the field of cognitive science.

The recipient will be an early-career woman in cognitive science whose outstanding research and scholarly promise best represent the intellectual depth, ingenuity and significance of the work carried out by Lila R. Gleitman throughout her long scientific career.

The award is jointly directed by the Cognitive Science Society Governing Board and the leadership of the Society for Language Development which Gleitman founded and led for many years.

The recipient of the prize will be honored at the Cognitive Science Society's Annual Meeting in a ceremony in which a framed certificate and a monetary award of \$35,000 will be presented. In addition, the recipient will be invited to give a talk on her work during one of the regular sessions of the Annual Meeting.

We are currently accepting nominations. The deadline for nominations is March 6, 2023.

For details on the nomination and selection process, please visit the **Gleitman Prize** website

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