



SOCIETY FOR THE
NEUROBIOLOGY OF
LANGUAGE

Newsletter

AUGUST 2023



SNL 2023

Society for the Neurobiology of Language
15th Annual Meeting, October 24–26
Palais du Pharo, Marseille, France

This month's highlight paper in Neurobiology of Language is summarised by [Maria Ashna](#) formerly of the Brain and Creativity Institute at the University of Southern California. Anyone else interested in writing a paper summary should reach out to [Dr Matt Davis](#) (SNL Publications Officer).



Neurobiology
of Language

When we are reading or listening, recognizing words and accessing their meaning is critical for language processing. But, how the brain supports this “neural dictionary” of familiar words remains unclear. This is particularly true for spoken words which have been less studied with brain imaging. However, using fMRI with rapid adaptation, a study by Srikanth Damera and colleagues provides evidence for an Auditory Word Form Area or AWFA that they locate in the Left Anterior Superior Temporal Gyrus.

The idea behind the fMRI adaptation method is that it highlights brain areas that distinguish word pairs with small sound changes compared to when the same word is presented twice (e.g. hearing “rain”, “rain”). A first scanning run showed that the AWFA area produced a bigger response to similar sounding word pairs such as “rain” and “pain”, equivalently to highly dissimilar pairs (“rain” and “feet”). Consistent with a specific contribution to processing familiar words, a second scanning run showed that equivalent fMRI responses were not apparent in the AWFA for unfamiliar pseudoword pairs (comparing “thap”, “shap” and “thap”, “scoo”). Before the third scanning run, participants were trained so that they became familiar with these sets of pseudowords. After training, adaptation in the AWFA region was shown to be similar for trained pseudowords as when participants listened to real words. Furthermore, the AWFA was shown to be connected to a left posterior fusiform cortex, an area previously suggested as the location of a Visual Word Form Area; showing the convergent roles of these auditory and visual areas in recognizing written and spoken words.

Localising auditory representations of words may have far reaching impacts in finding effective therapies for speech disorders caused by traumatic brain injuries or stroke. Knowing the neural pathways for recognising familiar words can be a first step towards neural methods of speech rehabilitation that focus on these regions.

Evidence for a Spoken Word Lexicon in the Auditory Ventral Stream
Srikanth R. Damera, Lillian Chang, Plamen P. Nikolov, James A. Mattei, Suneel Banerjee, Laurie S. Glezer, Patrick H. Cox, Xiong Jiang, Josef P. Rauschecker, Maximilian Riesenhuber
Neurobiology of Language (2023) 4 (3): 420–434.

<https://direct.mit.edu/nol/article/4/3/420/116025/Evidence-for-a-Spoken-Word-Lexicon-in-the-Auditory>



Neurobiology of Language 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>.



Neurobiology
of Language



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



Funded Postdoctoral Positions at the BCBL Basque Center on Cognition Brain and Language (San Sebastian, Basque Country, Spain)

The Basque Center on Cognition Brain and Language (San Sebastián, Basque Country, Spain) offers funded 2 Postdoctoral positions:

[Funded Postdoctoral Researcher Candidate Position Neurolinguistics and Aphasia Group - Dr. Simona Mancini](#)

[Funded Postdoctoral Researcher Candidate Position Consciousness Group - Prof. David Soto](#)

Information about the positions in <https://www.bcbcl.eu/en/join-us/job-offers>



Post-doctoral position (24 months) on Brain and Language Research at the LPL (Aix-Marseille University & CNRS, France) with Dr. Kristof Strijkers and Prof. Liina Pyllkkänen as external collaborator

We are looking for a motivated post-doctoral researcher for a period of 24 months to work on the ANR funded project 'The Spatiotemporal Dynamics of Syntax across the Language Modalities (DynSyn),' with Dr. Kristof Strijkers of AMU-France as PI and with Prof. Liina

Pykkänen of NYU-USA as an external collaborator. In this project, we investigate whether our brains compute syntax similarly in language production and language perception.

As a post-doctoral researcher, you would have two principal roles:

- (1) be the lead in a research project investigating syntactic processing in production and perception with fMRI and/or EEG/MEG (we offer flexibility in paradigm, technique, etc.)
- (2) collaborate on M/EEG studies on the same topic with a Ph.D. candidate in the team (Bissera Ivanova).

Applicants should hold a Ph.D. in a relevant discipline (e.g., cognitive science, linguistics, psychology, neuroscience, biology), and have prior experience with neuroimaging techniques like EEG, MEG, and/or fMRI. A strong background in psycho-/neuro-linguistic theory will be considered a significant plus.

Start: January-February 2024

Duration: 24 months

Monthly salary: ~2200€ net/month (dependent on experience)

A complete application (via email; see below) should contain:

1. up to date CV
2. Letter of motivation (max. 2 pages)
3. Two reference letters

All documents should be sent via email to [Kristof Strijkers](#)

Deadline: 15 October, 2023



Bangor University, UK **Faculty Position (Research and Teaching)**

The Department of Psychology at Bangor University seeks to make a permanent, full-time appointment of a research-active Lecturer (Grade 7 Teaching & Research; equivalent to research-track Assistant Professor). Whilst we welcome applications from all areas of Psychology/Neuroscience, we particularly encourage applications from candidates with clinically focused research expertise, including translational neuroscience (neurodevelopmental, neurodegenerative and acquired disorders).

The School has a rich history of internationally-renowned research, steering theoretical advancement in cognitive science and cognitive neuroscience, as well as applied research on wellbeing, health, and resilience. The appointed person will sit within the Institute of Cognitive Neuroscience or the Institute of Wellbeing Research and will be expected build upon the excellence in research and teaching that already exists. Our research is supported by state-of-the-art neuroscience facilities, including a recently upgraded, in-house, research-dedicated Phillips 3T MRI, multiple eye-tracking labs; high-density EEG systems, MRI-guided stimulation techniques including TMS and tDCS, and access to computational resources for modelling approaches, as well as specialised participant panels including neurological and dyslexia panels.

We seek an individual with an emergent international profile of scholarly activity; they should be able to demonstrate a record of high-quality publications in peer-reviewed journals, evidence of successful grant capture and / or the potential to attract research and enterprise funding. The candidate should have a desire to promote the School's activity through outreach and public engagement activity. Candidates should ideally possess relevant teaching qualifications or experience, or be willing to complete these in the first years of the appointment.

The Closing Date for applications is 13/08/2023. The successful candidate will be expected to commence 09/10/2023 (or as soon as possible thereafter).

For inquiries, interested individuals are welcome to have a confidential conversation with the Head of School, [Professor Dave Richardson](#)) and/or [Professor Manon Jones](#), Director of Research.

For more information, see: <https://jobs.bangor.ac.uk/details.php.en?id=QLYFK026203F3VBQB7V68LOTX&nPostingID=7619&nPostingTargetID=8169&mask=stdext&lg=UK>



Scientific Employee (m/f/d) (100,00 %, pay grade 13 TV-L)

Starting at 01.12.2023. The employment is initially limited for a period of 4 years and 2 months with an option for prolongation. It is a qualification position in the sense of the Act of Academic Fixed-Term Contract (Wissenschaftsvertragsgesetz – WissZeitVG), which is to promote the scientific qualification of the employee.

Your tasks:

The successful candidate will write the dissertation on experimental work in the area of focus (interface pragmatics/information structure/psycholinguistics), which they will prepare themselves.

They teach two seminars per semester, actively participate in the research and administration of the institute and review BA theses.

Our requirements:

- Master's degree in linguistics with a focus on psycholinguistics, or Master's degree in a related field (e.g., psychology, cognitive science)
- Strong background in linguistics
- Excellent English language skills
- Strong mathematics skills (not afraid of functions)
- Basic knowledge of a script-based programming language such as Python, Matlab, R...
- Optional: experience in experimental work

The pay scale grouping will be, depending on the personal qualification of the applicant, up to pay grade 13 TV-L.

In principle, the employment can also take place part-time, if no compelling official reasons are opposed in an individual case.

Heinrich Heine University Düsseldorf aims at increasing the percentage of employed women. Applications from women will therefore be given preference in cases of equal aptitude, ability and professional achievements unless there are exceptional reasons for choosing another applicant. Applications from suitably qualified severely disabled persons or disabled persons regarded as being of equal status according to Book IX of the German Social Code (SGB – Soziales Gesetzbuch) are encouraged.

Your contact person in case of questions is Univ.-Prof. [Dr. Katharina Spalek](#).

Please submit your application documents (Academic CV and letter of intent. Please indicate your expertise with respect to each requirement in your letter of intent) citing reference no. 148.23 – 3.1 until 23.08.2023

preferably by email to:
bewerbung-linguistik@hhu.de

or in writing to:
Heinrich Heine University Düsseldorf
Faculty of Arts and Humanities
Institute of Linguistics
Attn. Univ.-Prof.



Lab Manager Position, Auditory Cognitive Neuroscience Research Laboratory at Binghamton University

The ACNR laboratory (PI: Sung-Joo Lim <https://sites.google.com/inghamton.edu/limlab/>) in the Psychology Department at Binghamton University is seeking a Lab Manager (Research Technician). Our research focuses on understanding the cognitive and brain mechanisms underlying speech and language processing. This position offers opportunities to implement and conduct behavioral and neuroimaging studies (e.g., MRI and EEG), as well as to process and analyze data. Additionally, the candidate will be responsible for managing participant scheduling and recruitment, and overseeing the lab's daily operations. This position is ideal for individuals interested in pursuing a research career in the fields of psychology, cognitive neuroscience, or communication sciences and disorders.

Expected commitment for this position is 2 years, but the position may be extended. The position will begin in Fall 2023, though the start date is flexible. Please consider joining us!

For more information and to apply, please visit: <https://binghamton.interviewexchange.com/jobofferdetails.jsp?JOBID=164990>

Review of applications will begin immediately and continue until the position is filled.



PhD position available at Inria, Bordeaux, France: "From Reservoir Transformers to BrainGPT"

Keywords

Transformers; Reservoir Computing; Computational Neuroscience

Duration & start date

3 years starting 1st October 2023 (estimated)

Context

This PhD thesis is part of the BrainGPT "Inria Exploratory Action" project. In the wake of the emergence of large-scale language models such as ChatGPT, the BrainGPT project is at the forefront of research in Artificial Intelligence and Computational Neuroscience. These models, although remarkably powerful, do not reflect the way in which our brains process and learn language. BrainGPT is rising to the challenge by focusing on the development of models that are more faithful to human cognitive functioning, inspired by data on brain activity during listening or reading. The ambition is to create more efficient models that are less dependent on intensive calculations and massive volumes of data. BrainGPT will open up new perspectives on our understanding of language and cognition.

Project and Work description

The rapid rise in performance of language models, as demonstrated by the recent appeal of ChatGPT, is undeniable. However, the computational cost and environmental impact associated with such models are often overlooked [1]. These models rely on Transformers [2], which facilitate unsupervised learning on a large volume of data. These same models are used to predict brain activity from functional magnetic resonance imaging (fMRI) or magnetoencephalography (MEG), an application our team also exploits [3].

The main ambition of the BrainGPT project is to combine the explainability of mechanistic models with the predictive power of Transformers to analyze brain imaging data. Today, on

the one hand we have explanatory but less predictive mechanistic models, such as those based on Reservoir Computing, and on the other hand, high-performance predictive models, but not explanatory, like Transformers. Our goal is to combine the best of these two approaches, to develop more efficient ("sample efficient") models inspired by Transformers, which more faithfully reflect the how the brain works, while improving the predictive power of mechanistic models.

Towards this ambition, the BrainGPT project seeks to identify the key mechanisms that allow Transformers to predict brain activity. Furthermore, our project strives to build models that are more biologically plausible than Transformers, incorporating the most relevant components for predicting brain activity, while integrating constraints derived from human cognition studies.

The long-term objectives of the BrainGPT project are as follows:

- Making Transformers more biologically plausible, which could improve the prediction of brain activity by imaging (fMRI, MEG, etc.).
- Proposing new perspectives and computing paradigms that do not rely exclusively on gradient backpropagation, given its high computational and energy cost.
- Reducing the energy footprint of Transformers by minimizing the computational costs associated with their learning.

In summary, the thesis will mainly consist of developing new bio-inspired models inspired by the mechanisms, learning methods, and emerging behaviors of Large Language Models (LLMs) and Transformers. Subsequently, in collaboration with our collaborators, these models will be tested to assess their ability to predict brain activity from imaging data.

1. Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021, March). On the dangers of stochastic parrots: Can language models be too big? In Proc. of the 2021 ACM conference on fairness, accountability, and transparency (pp. 610-623).
2. Vaswani, A. et al. (2017) Attention is all you need. In Proc. of Advances in neural information processing systems.
3. Oota, S. R., Trouvain, N., Alexandre, F., & Hinaut, X. (2023, August). MEG Encoding using Word Context Semantics in Listening Stories. In Proc. of INTERSPEECH 2023.

Contact & Application

Informal contact/questions and application: email to [xavier dot hinaut at inria dot fr](mailto:xavier.hinaut@inria.fr)

Application & More info: <https://recrutement.inria.fr/public/classic/en/offres/2023-06611>

All positions available: <https://github.com/neuronIX/phd-and-postdoc-positions>

Deadline: Applications will be considered on a rolling basis. A candidate will be selected as soon as a suitable profile is found.

Skills

Ideal Candidate Profile:

- Holds an engineering or scientific degree and/or a PhD in digital sciences (computer science, automation, signal processing).
- Has a first professional experience (6 months of internship or more) in Machine Learning and Python development. Especially in one or more of the following: Recurrent Neural Networks (in particular Reservoir Computing), Transformers, Large Language Models.
- Possesses strong expertise in the scientific Python software and scientific stack (numpy/scipy).
- Demonstrates a solid grasp of linear algebra concepts.
- Proficiency in technical English is crucial, as it enables efficient collaboration with our international partners and effective presentations at conferences.
- Has proven experience with version management, familiarity with Git, and proficiency in using the GitHub platform.

Advisor & Location

Xavier Hinaut

Inria Bordeaux & Institute for Neurodegenerative diseases (Pellegrin Hospital Campus, Bordeaux).



Tenure-Track Position – The Department of Cognitive Sciences, School of Psychological Sciences, University of Haifa

The Department of Cognitive Sciences at the School of Psychological Sciences, University of Haifa, Israel, invites applications for an open-rank tenure-track position, beginning in Oct. 2024. The academic rank will be matched to the candidate's qualifications.

The deadline for application is Aug. 30, 2023. The screening of applications will continue until the position is filled.

The Department of Cognitive Sciences is an interdisciplinary department, within **The School of Psychological Sciences** at the University of Haifa, Israel. The department was established in 2018, with the aim to combine different theoretical and methodological perspectives to the study of cognitive processes. We draw on research from, Psychology, Neuroscience, Computational Sciences Linguistics and Philosophy. We currently have an undergraduate program, and our goal is to establish a graduate program in the near future. This provides a great opportunity for young scientists to influence the development of the curriculum and the department.

We are particularly interested in applicants whose research and training is of an interdisciplinary nature within the fields of computational cognitive sciences, with an expertise in development and application of computational analysis methods to study brain and behavior. The candidate should be able to teach and cooperate scientifically with researchers from varied backgrounds on topics related to cognition. The successful candidate should demonstrate the potential to develop a strong research program, supervise student research, and teach undergraduate and graduate courses.

Please send: (1) Curriculum Vitae, (2) 2-3 selected publications, (3) research statement (up to 3 pages) highlighting past work as well as your plans, (4) teaching statement (1 page), and (5) three names and email address for individuals who can send reference letters upon request.

These include the PhD advisor, the postdoctoral advisor (if applicable), and an additional reference. Please send all the information to: **Meital Malul**, the administrative manager of the Department of Cognitive Sciences, University of Haifa.

Final appointment is at the discretion of the Dean and Rector of the University of Haifa

Other



August 29th – 30th, 2023, Neuroscience of the Everyday World Conference

At the first **Neuroscience of the Everyday World conference**, we are bringing together leaders in the fields of computer science, biomedical engineering, cognitive science, neurology, and clinical neuroscience to present state-of-the-art research, all focused on the study of continuous brain measurement in real-world activities. The presentations will all focus on innovative methodologies (e.g., fNIRS, EEG, BCI+real time feedback), different real-world contexts (e.g., measurements at home, in the clinic/hospital), and a range of healthy and disease states (e.g., dementia, stroke).

The detailed agenda is available at https://openfnirs.org/trainings-conferences/2023_new/.

You can register for free to attend in person or virtually.

The conference will be at **Boston University at 610 Commonwealth Ave in rm 101.**



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