

Léo Varnet

Curriculum Vitae

Laboratoire des Systèmes Perceptifs
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Current position

2019–... **Chargé de Recherche**, *CNRS*, Paris.
[Section 34](#), Linguistics
Working at the [Laboratoire des Systèmes Perceptifs \(ENS-PSL, DEC\)](#)

Previous positions

- 2018–2019 **Honorary Researcher**, *University College of London*, London.
Developping a modulation spectra analysis of speech sounds within the Speech Hearing and Phonetic Sciences ([SHaPS](#)) department. Collaboration with S. Rosen and V. Hazan.
- 2016–2018 **Postdoctoral Fellow**, *École Normale Supérieure*, Paris.
Exploring the cue weighting functions of normal-hearing and aided hearing-impaired listeners for phoneme categorization (supervision C. Lorenzi). Collaboration with Starkey Hearing Technologies.
- 2015–2016 **Postdoctoral Fellow**, *École Normale Supérieure*, Paris.
Working on the analysis of a large cross-linguistic corpus of speech recordings in terms of modulation spectra (supervision C. Lorenzi). Collaboration with Judit Gervain from the Laboratoire Psychologie de la Perception.

Education & internships

- 2012–2015 **PhD in Neurosciences**, *Institut des Sciences Cognitives*, Lyon.
Thesis title: “[Identification of acoustic cues used in degraded speech comprehension](#)”.
Supervisors: M. Hoen & F. Meunier.
- 2012 **Research engineer**, *Centre de Recherche en Neurosciences de Lyon*, Lyon.
Brain Dynamics and Cognition Team (dir. M. Hoen & F. Meunier.)
- 2011 **Research intern (6m)**, *Centre de Recherche en Neurosciences de Lyon*, Lyon.
Intelligibility and neural oscillations (EEG). Part of the [SpiN ERC project](#) (dir. M. Hoen & F. Meunier)
- 2011 **Research intern (3m)**, *GIPSA lab*, Grenoble.
Developping “Brain Invaders”, a prototype of an open-source P300-speller-based video game working with the OpenViBE platform (dir. M. Congedo & B. Rivet)
- 2010–2011 **Master’s Degree in Cognitive Science**, *Université Joseph Fourier*, Grenoble.
- 2008–2011 **Signal Processing Engineer Diploma**, *Grenoble INP, Phelma*, Grenoble.
Specialized in “Signal and Image Processing, Communication Systems, Multimedia”

- 2006–2008 **Preparatory classes for the French “Grandes Écoles”**, *Lycée Champollion*, Grenoble.
2006 **Baccalauréat S (High School Diploma in Sciences)**, *Lycée Mounier*, Grenoble.

Teaching

- 2023–... **Introduction to psycholinguistics**, *Taras Shevchenko Nat. Univ. of Kyiv*, Online.
2h, Master level
2021–... **Introduction à la psycholinguistique**, *École Normale Supérieure*, Paris.
As part of the [PSL week](#) “Audition : du gène à la perception”, 1h, Master level
2021–... **Perception et psycholinguistique**, *Le Mans Université*, Le Mans.
12.5h, level: M2

Grants & fundings

- 2012–2015 **Thesis scholarship**.
NSCo Doctoral School, L. Varnet’s “bourse de thèse du Ministère de la Recherche”
2021–2023 **ANR grant**.
Agence Nationale de la Recherche, [projet fast-ACI](#) (172 800 €)
2023–2025 **FRAL grant**.
FRAL (Agence Nationale de la Recherche and Deutsche Forschungs Gemeinschaft), projet DRhyaDS (300 128 €). Collab. Alessandro Tavano (Max Planck Institute for Empirical Aesthetics; Goethe University Frankfurt)
2023 **Public-private partnership**.
Research partnership with Audika (2 000 €)

Scientific event organization

- 2022 **2nd Auditory Modeling Toolbox Workshop**, *Paris*.
2019 **2-days European conference ARCHES**, *Paris*.
2018 **Wikipedia project for Hearing sciences**, *Paris*.
Creating the Wikipedia page “[temporal envelope and fine structure](#)”
2013–2015 **General public debates “les saisons du CRNL”**, *Lyon*.
Biannual debates about Neuroscience and Ethics

Scientific & research management commitments

- 2023–... **Correspondant égalité CNRS (EDI contact person) for the LSP**.
2023–... **Correspondant communication for the LSP**.
2021–... **Member of the Copilbox, the experimental platform steering committee from the DEC**.
2021–... **Member of the *Sélection Internationale Scientifique* jury**.
Selection jury for ENS-PSL & EHESS [master’s degree in cognitive science](#)
2020–... **Member of the [Ethics committee](#) from Université Paris Descartes**.

Thesis juries.

Examiner for 1 PhD thesis

Reviewer for international journals.

The Journal of the Acoustical Society of America, Journal of the Association for Research in Otolaryngology, Plos One, Developmental Science, Ear and Hearing, Frontiers in Psychology

Outreaching activities and science popularization

Personal science popularization blog [De Bouche À Oreille](#) and publication of articles on various institutional websites ([CNRS](#), [ENS](#), [DEC](#)).

Active contributor to the English and French Wikipedia.

- 2018–... **General public lectures at ENS Paris.**
For the “[Semaine du Cerveau](#)” (2018, 2021) and the “[Fête de la science](#)” (2020, 2022).
- 2019–... **General public lectures on hearing loss.**
For the “[Journée Nationale de l’Audition](#)”, “[Semaine de la santé auditive au travail](#)” and “[Enseignement Post-Universitaire en Audioprothèse](#)” (2019, 2020, 2021)
- 2015, 2020 **[Pint of Science](#) in Lyon and in Paris.**
- 2022, 2023 **Interventions in secondary schools.**
“[Rencontre avec un chercheur en neurosciences](#)” (2022, 2023) as a member of [Association Cerveau en Seine](#)
- 2024 **Podcast “[Qrieux, la série](#)”.**
Collaboration with [Ça Fait Science](#) to produce a YouTube video
- 2024 **Interview, *Le Journal du CNRS*.**
Article “[L’écriture inclusive par-delà le point médian](#)”
- 2023 **Interview, *France Culture*.**
Radio program “[Avec Science](#)”, episode “[Écriture inclusive : le point médian supprime les biais de genre](#)”
- 2023 **Interview, *Radio France Internationale*.**
Radio program “[Saúde em dia](#)”, episode “[A linguagem neutra pode ajudar na luta contra a percepção de gênero? Veja o que diz a Ciência](#)”
- 2023 **Interview, *Science et Avenir*.**
Article “[Écriture inclusive : ce qu’en dit la science](#)”
- 2023 **Interview, *Marie-Claire*.**
Article “[L’écriture inclusive permet au cerveau de n’exclure aucun genre, confirme une étude](#)”
- 2022 **Interview, *Radio Campus Paris*.**
Radio program “[Gestalt](#)”, episode “[Perception, audition et création](#)”
- 2017 **Interview, *M6*.**
TV show [E=m6](#), episode “[Crissement de craie, bruit de mastication : pourquoi certains bruits nous sont-ils insupportables ?](#)”
- 2023 **Science outreach project with students from the graphic arts school [EPSAA](#).**
In this collaborative project, the students produce drawings illustrating the scientific work of the lab.

Publications

Peer-reviewed articles

- [1] Alejandro Osses and Léo Varnet. A microscopic investigation of the effect of random envelope fluctuations on phoneme-in-noise perception. *Journal of the Acoustical Society of America*, 155(2):1469–1485, February 2024. Publisher: Acoustical Society of America.
- [2] Elsa Spinelli, Jean-Pierre Chevrot, and Léo Varnet. Neutral is not fair enough: testing the efficiency of different language gender-fair strategies. *Frontiers in Psychology*, 14, 2023.
- [3] Samira Souffi, Léo Varnet, Meryem Zaidi, Brice Bathellier, Chloé Huetz, and Jean-Marc Edeline. Reduction in sound discrimination in noise is related to envelope similarity and not to a decrease in envelope tracking abilities. *The Journal of Physiology*, 601(1):123–149, 2023. [_eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1113/JP283526](https://onlinelibrary.wiley.com/doi/pdf/10.1113/JP283526).
- [4] Nihaad Paraouty, Justin D. Yao, Léo Varnet, Chi-Ning Chou, SueYeon Chung, and Dan H. Sanes. Sensory cortex plasticity supports auditory social learning. *Nature Communications*, 14(1):5828, September 2023. Number: 1 Publisher: Nature Publishing Group.
- [5] Alejandro Osses, Elsa Spinelli, Fanny Meunier, Etienne Gaudrain, and Léo Varnet. Prosodic cues to word boundaries in a segmentation task assessed using reverse correlation. *JASA Express Letters*, 3(9):095205, September 2023.
- [6] Léo Varnet and Christian Lorenzi. Probing temporal modulation detection in white noise using intrinsic envelope fluctuations: A reverse-correlation study. *The Journal of the Acoustical Society of America*, 151(2):1353–1366, February 2022. Publisher: Acoustical Society of America.
- [7] Alejandro Osses, Léo Varnet, Laurel H. Carney, Torsten Dau, Ian C. Bruce, Sarah Verhulst, and Piotr Majdak. A comparative study of eight human auditory models of monaural processing. *Acta Acustica*, 6:17, 2022. Publisher: EDP Sciences.
- [8] Laurianne Cabrera, Irene Lorenzini, Stuart Rosen, Léo Varnet, and Christian Lorenzi. Temporal integration for amplitude modulation in childhood: Interaction between internal noise and memory. *Hearing Research*, 415:108403, 2022. Publisher: Elsevier.
- [9] Léo Varnet, Agnès C. Léger, Sophie Boucher, Crystel Bonnet, Christine Petit, and Christian Lorenzi. Contributions of Age-Related and Audibility-Related Deficits to Aided Consonant Identification in Presbycusis: A Causal-Inference Analysis. *Frontiers in Aging Neuroscience*, 13, 2021.
- [10] Emmanuel Ponsot, Léo Varnet, Nicolas Wallaert, Elza Daoud, Shihab A. Shamma, Christian Lorenzi, and Peter Neri. Mechanisms of Spectrotemporal Modulation Detection for Normal- and Hearing-Impaired Listeners. *Trends in Hearing*, 25:2331216520978029, December 2021.

- [11] Sarah Attia, Andrew King, Léo Varnet, Emmanuel Ponsot, and Christian Lorenzi. Double-pass consistency for amplitude- and frequency-modulation detection in normal-hearing listeners. *Journal of the Acoustical Society of America*, 150(5):3631–3647, November 2021. Publisher: Acoustical Society of America.
- [12] Vitor C. Zimmerer, Chris J.D. Hardy, James Eastman, Sonali Dutta, Léo Varnet, Rebecca L. Bond, Lucy Russell, Jonathan D Rohrer, Jason D. Warren, and Rosemary A. Varleya. Automated profiling of spontaneous speech in primary progressive aphasia and behavioral-variant frontotemporal dementia: An approach based on usage-frequency. *Cortex*, 133:103–119, December 2020. Publisher: Elsevier.
- [13] Etienne Thoret, Léo Varnet, Yves Boubenec, Régis Fériere, François-Michel Le Tourneau, Bernie Krause, and Christian Lorenzi. Characterizing amplitude and frequency modulation cues in natural soundscapes: A pilot study on four habitats of a biosphere reserve. *The Journal of the Acoustical Society of America*, 147(5):3260–3274, May 2020. Publisher: Acoustical Society of America.
- [14] Samira Souffi, Christian Lorenzi, Léo Varnet, Chloé Huetz, and Jean-Marc Edeline. Noise-Sensitive But More Precise Subcortical Representations Coexist with Robust Cortical Encoding of Natural Vocalizations. *Journal of Neuroscience*, 40(27):5228–5246, July 2020. Publisher: Society for Neuroscience Section: Research Articles.
- [15] Léo Varnet, Chloé Langlet, Christian Lorenzi, Diane S. Lazard, and Christophe Micheyl. High-Frequency Sensorineural Hearing Loss Alters Cue-Weighting Strategies for Discriminating Stop Consonants in Noise. *Trends in Hearing*, 23, November 2019.
- [16] Andrew King, Léo Varnet, and Christian Lorenzi. Accounting for masking of frequency modulation by amplitude modulation with the modulation filter-bank concept. *The Journal of the Acoustical Society of America*, 145(4):2277–2293, April 2019.
- [17] Laurianne Cabrera, Léo Varnet, Emily Buss, Stuart Rosen, and Christian Lorenzi. Development of temporal auditory processing in childhood: Changes in efficiency rather than temporal-modulation selectivity. *The Journal of the Acoustical Society of America*, 146(4):2415–2429, October 2019.
- [18] Nicolas Wallaert, Léo Varnet, Brian C. J. Moore, and Christian Lorenzi. Sensorineural hearing loss impairs sensitivity but spares temporal integration for detection of frequency modulation. *The Journal of the Acoustical Society of America*, 144(2):720–733, August 2018.
- [19] Nihaad Paraouty, Arkadiusz Stasiak, Christian Lorenzi, Léo Varnet, and Ian M. Winter. Dual Coding of Frequency Modulation in the Ventral Cochlear Nucleus. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, 38(17):4123–4137, April 2018.
- [20] Léo Varnet, Maria Clemencia Ortiz-Barajas, Ramón Guevara Erra, Judit Gervain, and Christian Lorenzi. A cross-linguistic study of speech modulation spectra. *The Journal of the Acoustical Society of America*, 142(4):1976, October 2017.

- [21] Léo Varnet, Fanny Meunier, Gwendoline Trollé, and Michel Hoen. Direct Viewing of Dyslexics' Compensatory Strategies in Speech in Noise Using Auditory Classification Images. *PLOS ONE*, 11(4):e0153781, April 2016.
- [22] Léo Varnet, Tianyun Wang, Chloe Peter, Fanny Meunier, and Michel Hoen. How musical expertise shapes speech perception: evidence from auditory classification images. *Scientific Reports*, 5:14489, 2015.
- [23] Léo Varnet, Kenneth Knoblauch, Willy Serniclaes, Fanny Meunier, and Michel Hoen. A Psychophysical Imaging Method Evidencing Auditory Cue Extraction during Speech Perception: A Group Analysis of Auditory Classification Images. *PLoS ONE*, 10(3):e0118009, March 2015.
- [24] Mathilde Ménoret, Léo Varnet, Raphaël Fargier, Anne Cheylus, Aurore Curie, Vincent des Portes, Tatjana A. Nazir, and Yves Paulignan. Neural correlates of non-verbal social interactions: a dual-EEG study. *Neuropsychologia*, 55:85–97, March 2014.
- [25] Léo Varnet, Kenneth Knoblauch, Fanny Meunier, and Michel Hoen. Using auditory classification images for the identification of fine acoustic cues used in speech perception. *Frontiers in Human Neuroscience*, 7::865, 2013.

Monographs

- [26] Léo Varnet. *Identification des indices acoustiques utilisés lors de la compréhension de la parole dégradée*. Theses, Université Claude Bernard - Lyon I, Lyon, France, November 2015.

Conferences and Workshops Presentations

- [27] Léo Varnet and Géraldine Carranante. Listening strategies and inter-individual variability in stop consonant perception, October 2023. Publisher: University of Salamanca Published: ARCHES meeting.
- [28] Léo Varnet. Using reverse correlation to study speech perception, October 2023. Publisher: Laboratoire Bases, Corpus, Langage (BCL), Université Nice Côte d'Azur Published: Dyslexia and Speech Processing workshop.
- [29] Alejandro Osses, Léo Varnet, and Christian Lorenzi. The fastACI toolbox: A flexible framework to investigate auditory perception using reverse correlation, January 2023. Publisher: Acoustics Research Institute (ARI), Austrian Academy of Sciences Published: 15th General Meeting Aural Assessment by Means of Binaural Algorithms (AABBA) meeting.
- [30] Alejandro Osses and Léo Varnet. Using auditory models to mimic human listeners in reverse correlation experiments from the fastACI toolbox. In *Forum Acusticum*, Turin, Italy, September 2023.

- [31] Alejandro Osses and Léo Varnet. Reverse correlation to derive listeners' internal templates in a word-in-noise test: Methodological aspects and relevance of a human readable goodness-of-fit metric, April 2023. Published: WASdag: Meeting Werkgemeenschap Auditief Systeem.
- [32] Géraldine Carranante and Léo Varnet. Etude des indices acoustiques des consonnes plosives du français par corrélation inverse, November 2023. Published: Journées Perception Sonore de l'IRCAM.
- [33] Géraldine Carranante, Maria Giavazzi, and Léo Varnet. Auditory reverse correlation applied to the study of place and voicing: four new phoneme-discrimination tasks. In *Forum Acusticum 2023 : 10th Convention of the European Acoustics Association*, Turin, Italy, September 2023.
- [34] Léo Varnet and Alejandro Osses. Auditory Classification Images: A Psychophysical Paradigm to Explore Listening Strategies in Phoneme Perception, February 2022. Published: ARO Midwinter Meeting.
- [35] Léo Varnet, Christian Lorenzi, and Alejandro Osses. Probing Amplitude-Modulation Detection and Phoneme Categorization with Auditory Reverse Correlation, April 2022. Publisher: Société Française d'Acoustique and Laboratoire de Mécanique et d'Acoustique Published: 16ème Congrès Français d'Acoustique, CFA2022.
- [36] Alejandro Osses, Léo Varnet, and Christian Lorenzi. Simulating the perception of soundscapes, speech-, AM- and FM- sounds, February 2022. Publisher: Acoustics Research Institute (ARI), Austrian Academy of Sciences Published: Aural Assessment by Means of Binaural Algorithms (AABBA) meeting.
- [37] Alejandro Osses and Léo Varnet. Using reverse correlation to study individual perception: Including an auditory model in the experimental design loop, November 2022. Published: ARCHES meeting.
- [38] Alejandro Osses and Léo Varnet. Trial-by-Trial Analysis of Phoneme-in-Noise Perception using a Model of Monaural Auditory Processing, February 2022. Published: 45th Annual MidWinter Meeting of Association for Research in Otolaryngology.
- [39] Alejandro Osses and Léo Varnet. Auditory Reverse Correlation on a Phoneme-Discrimination Task: Assessing the Effect of Different Types of Background Noise. February 2022. Published: ARO 2022.
- [40] Alejandro Osses, Christian Lorenzi, and Léo Varnet. Assessment of individual listening strategies in amplitude-modulation detection and phoneme categorisation tasks. In *24th International Congress on Acoustics (ICA 2022)*, pages ABS-0173, Gyeongju, South Korea, October 2022.
- [41] Alejandro Osses and Léo Varnet. Consonant-in-noise discrimination using an auditory model with different speech-based decision devices. In *DAGA, 47th Annual Conference on Acoustics DAGA 2021 Wien*, pages 298-301, Vienne, Austria, August 2021.

- [42] Louis-Marie Lorin, Lorenzo Maselli, Léo Varnet, and Maria Giavazzi. Acoustic Properties of Strident Fricatives at the Edges: Implications for Consonant Discrimination. In *Interspeech 2020*, pages 636–640, Shanghai, Chine, France, 2020. ISCA.
- [43] Léo Varnet and Christian Lorenzi. Probing AM detection in noise with reverse correlation – a pilot study, 2019.
- [44] Léo Varnet, Chloé Langlet, Christian Lorenzi, Diane S. Lazard, and Christophe Micheyl. Comparing the perceptual strategies of normal-hearing and hearing-impaired listeners in a consonant discrimination task, 2019.
- [45] Léo Varnet, Christophe Micheyl, and Christian Lorenzi. Caractérisation des stratégies individuelles d’écoute de la parole au moyen d’un blob noise. Le Havre, France, April 2018.
- [46] Léo Varnet, Chloé Langlet, Christian Lorenzi, and Christophe Micheyl. Perceptual strategies for consonant discrimination in individuals with and without hearing loss. Tahoe City, California., 2018.
- [47] Emmanuel Ponsot, Léo Varnet, Shihab Shamma, Nicolas Wallaert, and Peter Neri. Mechanisms of spectro-temporal modulation detection and discrimination in normal-hearing and hearing-impaired listeners. In *ARCHES 2018 Proceedings*, Nottingham, UK, 2018.
- [48] Sarah Attia, Andrew King, Léo Varnet, and Christian Lorenzi. Internal noise for AM and FM detection: Effects of modulation rate and age. In *ARCHES 2018 Proceedings*, Nottingham, UK, 2018.
- [49] Andrew King, Leo Varnet, and Christian Lorenzi. Modelling modulation masking between frequency modulation and amplitude modulation. In *Proceedings of the ARCHES meeting*, Leuven, Belgium, November 2017.
- [50] Léo Varnet, Fanny Meunier, and Michel Hoen. Speech reductions cause a de-weighting of secondary acoustic cues. In *Proceeding of Interspeech 2016*, 2016.
- [51] Tianyun Wang, Léo Varnet, Chloé Peter, Gustavo Estivalet, Fanny Meunier, and Michel Hoen. How does musical expertise shape speech perception? Visual evidence from Auditory Classification Images. In *Conference Proceedings*, page 202, Amsterdam, 2014. Cambridge University Press.
- [52] Léo Varnet, Gwendoline Trollé, Willy Serniclaes, Kenneth Knoblauch, Fanny Meunier, and Michel Hoen. Auditory Classification Images: How noise can reveal the acoustic cues used in phoneme categorization. In *Proceedings of the 6th SpiN Workshop*, Marseille, France, January 2014.
- [53] Léo Varnet, Willy Serniclaes, Kenneth Knoblauch, Fanny Meunier, and Michel Hoen. Identification of functional acoustic cues involved in speech perception: recent advances using Auditory Classification Images. In *Conference Proceedings*, page 201, Amsterdam, 2014. Cambridge University Press.

- [54] Léo Varnet, Kenneth Knoblauch, Fanny Meunier, and Michel Hoen. Show me what you listen to! Auditory classification images can reveal the processing of fine acoustic cues during speech categorization. In *Proceeding of Interspeech 2013*, pages 3167–3171, 2013.
- [55] Léo Varnet, Julien Meyer, Michel Hoen, and Fanny Meunier. Phoneme resistance during speech-in-speech comprehension. In *Proceeding of Interspeech 2012*, 2012.
- [56] Léo Varnet, Fanny Meunier, and Michel Hoen. Oscillations corticales et intelligibilité de la parole dégradée. In *Actes de la conférence conjointe JEP-TALN-RECITAL 2012*, pages 673–680, 2012.
- [57] Stéphane Pota, Elsa Spinelli, Véronique Boulenger, E. Ferragne, Léo Varnet, Michel Hoen, and Fanny Meunier. La mie de pain n'est pas une amie : une étude EEG sur la perception de différences infraphonémiques en situation de variations. In *Actes de la conférence conjointe JEP-TALN-RECITAL, 2012*.
- [58] Marco Congedo, Matthieu Goyat, Nicolas Tarrin, Gelu Ionescu, Léo Varnet, Bertrand Rivet, Ronald Phlypo, Nisrine Jrad, Michael Acquadro, and Christian Jutten. "Brain Invaders": a prototype of an open-source P300- based video game working with the OpenViBE platform. In *Proceedings of the 5th International Brain-Computer Interface Conference 2011*, pages 280–283, Graz, Autriche, September 2011.