

Isabelle Hoxha

Postdoctoral researcher in computational neuroscience

Summary

My work has been guided by a coherent interest in understanding prediction and decision-making across different levels of analysis. During my PhD in Paris-Saclay, I combined experimental approaches (EEG and behavioral measures) with machine learning, and progressively expanded towards more theoretical questions in nonlinear dynamical systems. During my first postdoctoral position at Ecole Normale Supérieure, I shifted to reinforcement learning and simulation-based approaches, focusing on *in silico* modeling of behavior. My current postdoctoral work in the Netherlands further extends this trajectory toward deep learning methods for animal models (mice), allowing me to bridge data-driven approaches with controlled experimental settings. Across these experiences, I have deliberately explored complementary methodologies (experimental, computational, and theoretical) which converge toward a unified objective: understanding how agents learn, anticipate, and make decisions in uncertain environments.

Experience

Research

- 2025–2027 **Fysen postdoctoral fellow**, *Leiden University*, The Netherlands
“Cognition, Computation and Systems” Team (dir. Anne E. Urai)
Project 1: Using Disentangled Recurrent Neural Networks to decompose variance in mouse behavior and predict aging effects.
Project 2: Balance between statistical learning and sensory processing in human perceptual decision-making, using Bayesian inference.
- 2023–2024 **Postdoctoral Researcher**, *INSERM/Ecole Normale Supérieure*, Paris, France
Human Reinforcement Learning team (dir. Stefano Palminteri)
Project 1: Normative study of cognitive biases (positivity bias and perseveration)
Project 2: Normative mechanisms of social imitation
Project 3: Building a unified framework for reinforcement learning experiments
- 2020–2023 **Doctoral Researcher**, *Université Paris-Saclay*, Orsay, France
Faculté des Sciences du Sport
“Complexité, Innovation, Activités Motrices et Sportives” laboratory (dir. Michel-Ange Amorim, Sylvain Chevallier, Arnaud Delorme)
Project 1: Modelling perceptual decision-making as a dynamical system
Project 2: Classification of EEG anticipatory activity using Riemannian geometry
- 2019 **Research assistant**, *DZNE/Technical University of Munich*, Germany
Human German Center for Neurodegenerative Diseases (dir. Thomas Misgeld, Martina Schifferer)
Processing of electron microscopy images
Mitochondria and myelin segmenting and classification
Application to neuromyelitis optica and lateral amyotrophic sclerosis.

* 26 August 1996

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Teaching

2020–2023 **Teaching assistant**, *Faculté des Sciences du Sport, Université Paris-Saclay, Orsay, France*

Courses taught:

- Master level
 - Anthropomorphic robotics (54 hours, tutorials and practicals)
- Bachelor level
 - Introduction to brain-computer interfaces (3 hours, lecture)
 - Neurophysiology (12 hours, tutorials)
 - Biomechanics (124.5 hours, tutorials)

2019–2020 **Teaching assistant**, *Technical University of Munich, Germany*

Courses taught:

- Master level
 - Large-scale modelling and large-scale data analysis (25 hours, tutorials and practicals)
 - Fundamentals of neuro-electronics (25 hours, lectures)

Education

2020–2023 **Doctorate in Psychology**, *Faculté des Sciences du Sport, Université Paris-Saclay, Orsay, France*

Topic: Neurocognitive mechanisms of perceptual anticipation in decision-making

2018–2020 **Master of Science in Neuroengineering**, *Technical University of Munich, Germany, Pass with honours*

- 6-week internship at the Institute for Neuronal Cell Biology/DZNE (dir. Thomas Misgeld) about electron microscopy image processing (later hired as a data scientist)
- 8-week internship at the Neuromuscular Diagnostics Lab (dir. David Franklin) on task-dependent switching of feedback controllers
- Project on using auditory steady-state responses for brain-computer interfaces, at the Institute for Cognitive Systems
- Master thesis: “Evolution of functional connectivity across training in motor-imagery BCI tasks”

2016–2020 **Electrical engineering**, *CentraleSupélec (Supélec), Gif-sur-Yvette, France*

Dual degree at the Technical University of Munich

- 1st year project: Phase amplitude coupling in a neuronal population model. Supervision: Antoine Chaillet
- 2nd year project: Developing a reading tool for children with dyslexia. Supervision: Marc-Antoine Weisser

2014–2016 **Classe préparatoire MPSI/MP***, *Lycée Pothier, Orléans, France*

Integrated CentraleSupélec, cursus Supélec

Other certifications

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2026-2030 *Qualification Maître de Conférences (section CNU 69)* - qualifying certificate for French assistant professor positions in Neuroscience

2025-2029 *Qualification Maître de Conférences (section CNU 61)* - qualifying certificate for French assistant professor positions in Signal Processing

Supervision

- 2022, Clark Bäker (Friedrich-Alexander-Universität Erlangen-Nürnberg), Bachelor project (6 weeks full time) “History effect contributions to anticipation”, supervision 1 day a week. Produced a poster at the Bernstein Conference 2022.
- 2021, Aya Yaacoub (CentraleSupélec), Master thesis (6 months full time) “Trial history effects in decision-making”, supervision 1 day a week. Successful defence in October 2021.

Responsibilities and community service

Reviewer activity

- Journals (**n=7**): PNAS, Plos Computational Biology, Journal of Neuroscience, Journal of Cognitive Neuroscience, Journal of Experimental Psychology, AI and Society, Neuropsychologia
- Conferences (**n=4**): Cognitive Computational Neuroscience (CCN), Neuroergonomics, Bernstein, Computational Neuroscience (CNS*)

Organisation of conferences

- 2023-2024: Organizing the Neuroeconomics seminar series at Ecole Normale Supérieure
- 2023: CORTICO day 2023 (French Brain-Computer Interface Society)
- 2022: 5th Neuromatch Conference

Administrative responsibilities

- 2024: Head of the communications and marketing department at Neuromatch and Climatematch
- since 2021: Member of the communications and marketing department at Neuromatch
- 2020-2023: Creation and organization of a Journal Club at the CIAMS laboratory
- 2020-2023: Student representative at the Ecole Doctorale SSMMH
- 2020-2023: Student representative at the Graduate School SMFH
- 2018-2020: Student representative of the MNSE master program

Science outreach

2025 **Presentation at the Show “Fragiles”**, *Le Trianon*, Paris, France
Organized by the Fondation Antoine Alléno. The importance of anticipation and attention behind the wheel

2023 **Pints of Science**, Paris, France
Presentation “Action, réaction, anticipation”. Pint of Science is an annual international festival, where researchers present their work to the general public in bars.

- 2022 **Radio Interview**, *in Spanish*, Radio France International, Latin Americal section
Interview about anticipation and my experience in *Ma thèse en 180 secondes*
- 2022 **Neuromatch for Kids: how we make decisions**

Grants and fellowships

2025-2027	Fyssen Foundation: Postdoctoral Fellowship (wrote the grant)	90k€
2026	International Brain Lab: Mobility grant (lab visit at UCL+DeepMind)	2200£
2022	BayFrance starter kit, to recruit Clark Bäker (contributed to writing)	950€
2021	Féd. Demenÿ-Vaucanson, to recruit Aya Yaacoub (wrote the grant)	2k€
2020	FENS IBRO/PERC Travel grant (wrote the application)	Cancelled (Covid)
2018-2019	Erasmus+ study grant	2k€

Awards and prizes

2022	Fédération Demenÿ-Vaucanson	Best presentation award (700€)
2021	Grand Challenge: Passive BCI Hackathon	3rd place
2021	3rd Neuroergonomics conference	Best reviewer award
2021	EUGLOH Summer School in Neuroscience	Best PhD talk (200€)

Collaborations

- 2025–present **Kevin Miller**, *Google DeepMind*, London, UK
Modifying Disentangled RNNs to incorporate inter-individual differences.
- 2025–present **Derek Mikola**, *Institute for Replication*, International
Testing the reproducibility of findings in behavioral sciences.
- 2024–present **Marcel Binz**, *Helholtz Institute*, Munich, Germany
Psych 201: modelling inter-individual differences in bandit tasks using LLMs
- 2022–2023 **John Butler**, *Trinity College*, Dublin, Ireland
Computational Neuroscience for children
- 2021 **Marie-Constance Corsi**, *Paris Brain Institute*, Paris, France
Ensemble learning based on functional connectivity and Riemannian geometry for robust workload estimation
- 2021-2023 **Stefan Glasauer**, *Brandenburgische Technische Universität Cottbus-Senftenberg*, Berlin, Germany
Dynamical modelling of perceptual decision-making

Invited talks, oral presentations and seminars

Invited talks at conferences

- Keynote presentation at “Journée CORTICO” 2023

Conference talks

- Paris Ile-de-France Neuroscience, Theory and Systems 2025: “ Moments melt into years: how intertrial variability in decision-making evolves with age”

- 20th NVP Dutch Society for Brain and Cognition Winter Conference 2025: “It’s about time: intertrial variability in aging”

Conference chairing

- Paris Ile-de-France Neuroscience, Theory and Systems 2024: Chair of the “Cognitive Neuroscience” session

Seminars




- 2026: “Inferring cognitive aging in rodents using Disentangled Recurrent Neural Networks” Cortextlab (dir. Kenneth Harris and Matteo Carandini), University College London
- 2025: “Why look on the bright side? a tale of positivity and perseveration” Affective Brain Lab (dir. Tali Sharot), University College London
- 2024: “Evolving choice hysteresis in reinforcement learning: comparing the adaptive value of positivity bias and gradual perseveration”, Lab meeting of the Laboratoire de Neurosciences Cognitives et Computationnelles (LNC², Ecole Normale Supérieure, CNRS, INSERM)
- 2024: “The adaptive value of positivity and perseveration”, Human and Machine Cognition Lab (dir. Charley Wu), Max Plank Institute Tubingen (now at TU Darmstadt)

Laboratory visits



- Feb. 2026: Visit DeepMind, London, UK (3 weeks)
- May 2022: Visit of the Joint Research Center (JRC) of the European Commission, Ispra, Italy (3 days)

Publications

Accepted publications

- Hoxha, I.**, S. Chevallier, A. Delorme, and M.-A. Amorim 2026. “Modality-specific predictive templates in pre-stimulus EEG activity”. In: *Neuropsychologia* 229, p. 109486. ISSN: 0028-3932. DOI: <https://doi.org/10.1016/j.neuropsychologia.2026.109486>. 
- Hoxha, I.**, L. Sperber, and S. Palminteri 2025. “Evolving choice hysteresis in reinforcement learning: Comparing the adaptive value of positivity bias and gradual perseveration”. In: *Proceedings of the National Academy of Sciences* 122, e2422144122. 
- Hoxha, I.**, S. Chevallier, M. Ciarchi, S. Glasauer, A. Delorme, and M.-A. Amorim 2023. “Accounting for endogenous effects in decision-making with a non-linear diffusion decision model”. In: *Scientific Reports* 13, p. 6323. 

Conference papers

- Hoxha, I.**, N. Mudrik, A. E. Urai, D. Kienigiel, J. Forest, M. Abdelhack, M. Peters, N. Halper, R.-Y. Zhang, X. Lu, and J. S. Butler 2023. “Opening Computational Neuroscience to a Wider Audience: Virtual Escape Room for Kids”. In: *Conference on Cognitive Computational Neuroscience*. 
- Corsi, M.-C., S. Chevallier, Q. Barthélemy, **I. Hoxha**, and F. Yger 2021. “Ensemble learning based on functional connectivity and Riemannian geometry for robust workload estimation”. In: *Neuroergonomics conference 2021*. Virtual event, Germany. 

Hoxha, I., M. Ciarchi, S. Chevallier, A. Delorme, and M.-A. Amorim 2021. “A non-linear evidence accumulation model that accounts for single-trial dynamics”. In: *Journal of Computational Neuroscience*. Vol. 49, S29–S30. [🔗](#)

Preprints

Binz, M., E. Akata, A. Almaatouq, M. Alsobay, O. Ariasov, F. Brändle, D. Broska, J. W. Burton, N. Busch, F. Callaway, V. Cheung, B. Christian, J. Coda-Forno, C. Demircan, V. Dentella, M. K. Eckstein, N. Éltető, M. Franke, T. L. Griffiths, F. Günther, S. Haridi, S. Hellmann, S. Herytash, L. Hof, E. Holton, **I. Hoxha**, Z. Hussain, A. Jagadish, E. Kara, V. Kriegmair, E. Leivada, L. Ji-An, T. Ludwig, M. Maier, M. G. Mattar, M. Mathony, A. Modirshanechi, R. Na, M. Nadverniuk, A. Nasioulas, S. S. Nath, H. Niemeyer, K. Nussenbaum, S. Olschewski, T. Pachur, S. Palminteri, A. Petrenco, C. V. Phaneuf-Hadd, A. Pirrone, M. Rausch, L. Raveling, S. Reddy, M. Rmus, E. M. Russek, T. Saanum, K. Sandbrink, L. Schiekiera, J. A. Schubert, L. M. S. Buschoff, N. Singhi, L. H. Somerville, M. S. Spektor, X. Sui, C. Summerfield, M. Thalmann, A. I. Thoma, T. Tikhomirova, V. Truong, P. Tsvilodub, K. Voudouris, K. Witte, S. Wu, D. U. Wulff, H.-D. Xiong, S. Xu, L. Ying, X. Zhang, J.-Q. Zhu, and E. Schulz 2026. *Post-training makes large language models less human-like*. arXiv: 2605.07632 [cs.CL]. [🔗](#)

Hoxha, I., A. Asseo-Milford, and S. Palminteri 2026. *The blessing and curse of Value-Shaping imitation*. Preprint, under review at PLOS Computational Biology. [🔗](#)

In preparation

Institute for Replication 2026. *Mass Reproducibility in Psychological Science*. In preparation / internal review.

Conference abstracts

Hoxha, I. and S. Palminteri 2025. *Introducing the CORTEX database: COntext-dependent Reinforcement learning and Transfer Experiments*. Conference on Cognitive Computational Neuroscience, Poster. [🔗](#)

Hoxha, I. and A. E. Urai 2025. *Uncovering the Structure of Trial-to-Trial Variability in Perceptual Decision-Making Using Disentangled Recurrent Neural Networks*. Conference on Cognitive Computational Neuroscience, Poster. [🔗](#)

– 2025. *Uncovering the Structure of Trial-to-Trial Variability in Perceptual Decision-Making using Disentangled Recurrent Neural Networks*. 20th NVP Winter Conference, Oral presentation. [🔗](#)

Hoxha, I. and S. Palminteri 2024. *The blessing and curse of value-shaping imitation*. Society for Neuroeconomics, Poster. [🔗](#)


Hoxha, I., C. Bäker, S. Chevallier, S. Glasauer, and M. Amorim 2022. *Generating stimulus anticipation from stimulus and prediction history*. Bernstein Conference, Poster. [🔗](#)


Hoxha, I., A. F. Boirac, G. Orellana, L. Klaver, J. Coutinho, and F. Solari 2022. *Four grid cell modules can code for a precise location at a low error*. FENS Forum, Poster. [🔗](#)

Hoxha, I., S. Chevallier, A. Delorme, A. Boutin, and M. A. Amorim 2021. *Decodable anticipation from prestimulus activity*. Neuroergonomics Conference, Poster. [🔗](#)


Hoxha, I., F. Del Duca, S. K. Ehrlich, F. Bergner, N. Berberich, and G. Cheng 2020. *Improving user comfort in auditory-steady-state-response brain-computer interface by using a co-adaptive stimulus*. FENS Forum, Poster. [🔗](#)


Datasets


Binz, M. et al. 2026. *Psych-201*. <https://github.com/marcelbinz/Psych-201>. Dataset repository. 


Hoxha, I., M.-A. Amorim, et al. 2026. *Modality-specific predictive templates in pre-stimulus EEG activity*. Dataset. 


Software and source code

Chevallier, S. et al. 2026. *passive-bcchy-hackathon*. <https://github.com/sylvchev/passive-bcchy-hackathon>. Project repository. 

Google DeepMind 2026. *disentangled_rnn*s. https://github.com/google-deepmind/disentangled_rnns. Software repository. 

Hoxha, I. et al. 2026. *AnticipatoryModality*. <https://github.com/IsabHox/AnticipatoryModality>. Source code. 

– 2026. *Hoxha_Imitation*. https://github.com/hrl-team/Hoxha_Imitation. Source code. 

– 2025. *OptimismPerseveration*. <https://github.com/hrl-team/OptimismPerseveration>. Source code. 

– 2022. *nl-DDM*. <https://github.com/IsabHox/nl-DDM>. Source code. 