

Yseult Héjja-Brichard

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ACADEMIC POSITION

Postdoctoral researcher

November 2021 - Present

UMBC Biological Sciences, Baltimore, MD, USA

Postdoctoral researcher

November 2020 - October 2021

Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier, France

How information theory can inform the evolution of sexual signaling patterns in darters (*Etheostoma* spp.)

Collaboration between France and the US. *Behavioural experiments, image analysis, deep learning.*

EDUCATION

PhD studies in Neuroscience, Cognition, and Behaviour

2020

Université Paul Sabatier and CerCo (CNRS), Toulouse, France

Supervisor: Benoit R. Cottureau, within the Eco-3D team.

Title of the thesis: Spatial and temporal integration of binocular disparities in primates.

Functional neuroimaging, visual behaviour, comparative visual cognition (macaques and humans)

Msc in Neuroscience, Cognition, and Behaviour (2nd year)

2015

Université Paul Sabatier, Toulouse, France

Research internship at CerCo, Toulouse. Supervised by Benoit R. Cottureau & Jean-Baptiste Durand.

Research project: Cortical networks involved in 3D orientation processing in primates.

Msc in Cognitive and Social Psychology (1st year)

2014

Université de Grenoble-Alpes, Grenoble, France

Research internship at the LPNC, Grenoble. Supervised by Olivier Pascalis.

Research project: Role of the eyes in a face categorisation task.

Clinical internship in Neuropsychology at the Hospital of Grenoble. Supervised by Eugénie Lhommée.

Bsc in Psychology

2013

Université de Grenoble-Alpes, France & Universität Leipzig, Germany

Research assistant at the Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany
Department of social neuroscience (April-July 2013). Supervised by Natacha Mendes.

In charge of coding chimpanzees' vocalisations collected for an experiment investigating Schadenfreude.

RESEARCH SKILLS

Computer skills

- **Programming:** Matlab, R, Python (NumPy, PyTorch)
- **Neuroimaging:** SPM12, caret5 (software for monkey data), PRoNTo (Pattern recognition toolbox)
- **Stimulus presentation:** EventIDE, jsPsych, PsychToolbox
- **Writing:** LaTeX, RMarkdown, Office
- **Graphics editor:** Adobe Illustrator, Photoshop, GIMP
- **Data and article sharing:** Github, Open Science Framework, bioRxiv, EcoEvoRXiv
- **Web development:** HTML, CSS, JavaScript
- **Version control:** Git, Github, Gitlab
- **Other tools:** MEGA software (phylogenetic data), LimeSurvey (survey tool), Blender (video animation)

Data analysis

- Functional neuroimaging data (univariate, retinotopic, and multivariate pattern analyses)
- Psychophysical and behavioural data modelling
- Eye-tracking analyses
- Image analysis (pattern recognition, signal processing)

SCIENTIFIC PRODUCTION

Publications

Under review or in preparation

- **Héjja-Brichard, Y.**, Renoult, J.P., Mendelson, T.C. (*under review*). Mate preference in sympatric and allopatric darters (genus *Etheostoma*): comparative evidence for a sex effect in reinforcement. [Preprint]
- Renoult, J.P., **Héjja-Brichard, Y.** (*in prep*). Deep learning and visual ecology.

Peer-reviewed journal articles

- ManyPrimates et al. (including **Héjja-Brichard, Y.**) (2022). The evolution of primate short-term memory. *Animal Behavior and Cognition*. <https://doi.org/10.26451/abc.09.04.06.2022> [Preprint]
- Guiomar, N., Krol, L.R., Combrisson, E., Dubarry, A.-S., Elliott, M.A., François, C., **Héjja-Brichard, Y.**, ... Chaumon, M. (2022). Good Scientific Practice in MEEG research: Progress and Perspectives. *Neuroimage*. <https://doi.org/10.1016/j.neuroimage.2022.119056>. [Preprint]
- Audurier, P., **Héjja-Brichard, Y.**, De Castro, V., Kohler, P.J., Norcia, A.M., Durand, J.-B., Cottureau, B.R. (2021). Symmetry processing in the macaque visual cortex. *Cerebral Cortex*. <https://doi.org/10.1093/cercor/bhab358>. [Preprint]
- De Castro, V., Smith, A.T., Beer, A.L., Leguen, C., Vayssière, N., **Héjja-Brichard, Y.**, Audurier, P., Cottureau, B.R. & Durand, J.B. (2021). Connectivity of the cingulate sulcus visual area (CSv) in macaque monkeys. *Cerebral Cortex*. <https://doi.org/10.1093/cercor/bhaa301>
- **Héjja-Brichard, Y.**, Rima, S., Rapha, E., Durand, J.-B. & Cottureau, B.R. (2020). Stereomotion processing in the non-human primate brain. *Cerebral Cortex*, 30(8), 4528-4543. <https://doi.org/10.1093/cercor/bhaa055>. [Preprint & OSF project]
- Rima, S., Cottureau, B.R., **Héjja-Brichard, Y.**, Trotter, Y. & Durand, J.B. (2020). A new visuotopic cluster in macaque posterior parietal cortex revealed by wide-field retinotopy. *Brain Structure and Function*. <https://doi.org/10.1007/s00429-020-02134-2>
- Chauhan, T., **Héjja-Brichard, Y.**, & Cottureau, B.R. (2020). Modelling binocular disparity processing from statistics in natural scenes. *Vision Research*, 176. <https://doi.org/10.1016/j.visres.2020.07.009>
- Cottureau, B.R., Smith, A.T., Rima, S., Fize, D., **Héjja-Brichard, Y.**, Renaud, L., ... & Durand, J.-B. (2017). Processing of Egomotion-Consistent Optic Flow in the Rhesus Macaque Cortex. *Cerebral Cortex*, 27(1), 330–343. <https://doi.org/10.1093/cercor/bhw412>

Presentations

Invited talks

- **Héjja-Brichard, Y.** (2022) AI methods to study sexual selection. Imaginecology2: machine learning for image and sound processing and analysis in ecology, Villeurbanne, France.
- **Héjja-Brichard, Y.** (2020). Rethinking our Narratives: The Challenge of Slow Science. LiveMEEG.
- **Héjja-Brichard, Y.** & Mercier M.R. (2018). Data visualisation in cognitive neuroscience: Functional neuroimaging and electrophysiology. Toulouse Data Visualization group, Toulouse.
- **Héjja-Brichard, Y.** (2018). Open Science: Why and How? CerCo's Young Scientist Meeting, Toulouse.

Conference talks

- Renoult, J.P. & **Héjja-Brichard, Y.** (2022) Using deep neural networks to study the evolution of visual signals. International Conference on Ecological Sciences, SFE2-GfÖ-EEF joint meeting, Metz, France.
- **Héjja-Brichard, Y.** (2021). Workshop on Research Culture based on the Café Culture Kit developed by the Wellcome Foundation. Conférence Science Ouverte Lente Durable, Nantes, France.
- Audurier, P., **Héjja-Brichard, Y.**, Kohler, P.J., Norcia, A.M., Durand, J.-B., Cottureau, B.R. (2019). Processing of rotational symmetry in the non-human primate brain. Annual meeting of the French research group 'GDR Vision', Marseille, France.

Conference posters

- **Héjja-Brichard, Y.**, Renoult, J.P., Mendelson, T.C. (2022, July). Strength of preference for conspecifics in Darters (genus *Etheostoma*): A meta-analysis. Animal Behavior Society, San José, Costa Rica.
- Audurier, P., **Héjja-Brichard, Y.**, Kohler, P.J., Norcia, A.M., Durand, J.-B., Cottureau, B.R. (2019, Oct.). Processing of symmetry in the non-human primate brain. Society for Neuroscience, Chicago, USA.
- De Castro, V., LeGuen, C., **Héjja-Brichard, Y.**, Audurier, P., Cottureau, B.R., Durand, J.-B. (2019, Oct.). Functional and structural connectivity of the cingulate sulcus visual (CSv) area in macaque monkeys. Society for Neuroscience, Chicago, USA.
- **Héjja-Brichard, Y.**, Bruzzone, S.E.P., Rapha, E., Durand, J.-B., Cottureau, B.R. (2019, Sept.). Influence of natural statistics on depth perception. Predictive Brain Conference, Marseille, France.
- **Héjja-Brichard, Y.**, Rima, S., Rapha, E., Durand, J.-B., Cottureau, B.R. (2018, Nov.). Stereomotion processing in the non-human primate brain. Society for Neuroscience, San Diego, USA.
- Rima, S., Cottureau, B.R., **Héjja-Brichard, Y.**, Trotter, Y., Durand, J.-B. (2017, Nov.). Wide-field retinotopy reveals a new visuotopic cluster in IPS. Society for Neuroscience, Washington DC, USA.
- **Héjja-Brichard, Y.**, Rima, S., Durand, J.-B., Cottureau, B.R. (2017, Aug.). Stereomotion processing in the non-human primate brain. European Conference on Visual Perception, Berlin, Germany.
- **Héjja-Brichard, Y.**, Rima, S., Trotter, Y., Banks, M.S., Durand, J.-B., Cottureau, B.R. (2015, Oct.). Adaptation to the 3D properties of the environment in non-human primates. GDR Vision annual forum, Grenoble, France.

TEACHING & SUPERVISING EXPERIENCE

Temporary teaching assistant (2019-2020) for Bsc Psychology students (1st year) - 48 hrs

Department of Psychology, Université Toulouse Jean Jaurès, Toulouse, France.

Tutorial classes: *Introduction to Psychophysiology*

Graduate teaching assistant (2015-2018) for Bsc Biology students (2nd and 3rd years) - 193 hrs

Department of neuroscience and behavioural science, Université Paul Sabatier, Toulouse, France.

Practical works and tutorial classes: *Nervous and cerebral functions, Behavioural ecology, Neurophysiology, Neuroscience*

Student supervision

- 2022: Undergraduate students (n=6) in Biological Sciences, UMBC, USA - Behavioural experiments
- 2019: PhD student in Neuroscience, University of Toulouse - fMRI analyses and behavioural experiments
- 2019: Master's student in Neuroscience, Università degli studi di Trieste, Italy - Psychophysics
- 2018: Master's student in Neuroscience, University of Bordeaux, France - fMRI analyses

GRANTS & AWARDS

- 2023: Travel grant to attend the COSYNE 2023 conference in Montréal, QC, Canada
- 2022: Travel grant to attend the Brains Minds & Machines summer course in Woods Hole, MA, USA
- 2022: Travel award to attend the annual conference of the Animal Behavior Society in Costa Rica
- 2020: Three-month extension to finalise my doctoral thesis, Internal funding, CerCo - CNRS

PROFESSIONAL MEMBERSHIPS

- Animal Behavior Society (2022)
- Comparative Cognition Society (2022)
- Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology (2021 - present)
- National Postdoctoral Association (2021 - present)
- Association for the Study of Animal Behaviour (2020 - present)

EXTRACURRICULAR ACTIVITIES

Lab & Community Involvement

- Organisation of the Lab Student Day (2019) and the Lab Winter School (2017, 2018)
- Co-creation of a Welcome Kit for new students and postdocs (2019)
- Student representative at the Lab Council (2017-2018)
- Co-organisation of a conference to promote open, slow, and sustainable scientific practices for the French speaking community: [SOLD21](#) (July 2021)
- Ambassador for the Center for Open Science: [COS](#) (2018-present)

Personal Implication in Science Popularisation

- Coordination of a thematic issue on Altruism in animals for the magazine "[Perspectives](#)" (Spring 2022).
- Moderator of a discussion on slow science and research outside academia (March 2021), [WEPASCO](#)
- Public presentation on visual illusions (March 2019) for the Brain Awareness Week in Toulouse.
- Public presentation on the study of 3D vision in animals (February 2017), Museum de Toulouse.
- Article for the Museum of Natural History in Toulouse (2017, in French) about the evolution of 3D vision in animals: Y. Héjja-Brichard & B.R. Cottureau "[Evolution et vision : le vivant a de la profondeur!](#)"
- Member of [InCOGnu](#) - an organisation of students and young researchers in cognitive science in the Toulouse area. Organisation of monthly conferences, workshops for the general public.
- Member of [FRESCO](#), a French organisation uniting at the national level all the regional organisations involved in popularising cognitive science that also has projects on its own. There, I am part of the Perspectives team that aims to create a new magazine targeting different audiences.

Complementary Skills and Training

- **Languages** – French (native), English (full proficiency), German (good command in speaking, level B2), Spanish (basic communication skills, level B1), Italian (basic understanding, level A2).
- **Summer Schools** – [Neuromatch Academy: Deep Learning](#) (August 2021). Group project: "Assessing the robustness against word permutations of CNNs and LSTMs in semantic similarity learning."; [Center for Brains, Minds & Machines](#): Summer school on the problem of intelligence (Woods Hole, MA, August 2022). Personal project on multi-agent reinforcement learning.