Nathanael LARIGALDIE

Born in Ruffec, France

Education

07/2021 *Durham University (United Kingdom)*: PhD in Psychology – Computational Neuroscience

09/2015 *Université catholique de Louvain (UCLouvain, Belgium)*: Master's degree in Psychological Sciences – focus in research methods, statistics and neuropsychology – obtained with Grande Distinction (Magna Cum Laude)

06/2013 *UCLouvain*: Preparatory year for the Master's degree

08/2011 *Université de Poitiers (France)*: Bachelor's degree in Psychology

02/2006 *Lycée de l'Immaculée Conception de Laval (France)*: two-years technical degree in Computer science

Employment and professional experience

09/2022 – now Postdoctoral researcher (Cognitive sciences) at Aarhus University (*Denmark*)

11/2019 – 02/2022 Technical consultant (developer) at Delaware Consulting (*Belgium*)

01/2014 – 07/2014 Research internship at the Numerical Cognition Group (*UCLouvain*)

10/2011 – 08/2013 Web programmer (PHP/SQL/HTML/CSS/JavaScript)
http://www.f1h2o.com; http://www.cuph2o.com; http://www.aquabike.net

Research projects, publications and communication

Publications

Larigaldie, N., & Beierholm, U. (writing in progress). Effects of space, timbre and frequency in auditory scene analysis reveal the importance of attention in the stream formation process. Durham University.

Larigaldie, N., Yates, T., & Beierholm, U. (writing in progress). Perceptual clustering in auditory streaming. Durham University.

Andres, M., Masson, N., **Larigaldie, N.**, Bonato, M., Vandermeeren, Y., & Dormal, V. (2020). Transcranial electric stimulation optimizes the balance of visual attention across space. Clinical Neurophysiology, 131 (4), 912-920. https://doi.org/10.1016/j.clinph.2019.12.415

Dormal, V., **Larigaldie, N.**, Lefèvre, N., Pesenti, M., & Andres, M. (2018). Effect of perceived length on numerosity estimation: Evidence from the Müller-Lyer illusion. Quarterly Journal of Experimental Psychology, 71 (10), 2142-2151. https://doi.org/10.1177/1747021817738720

Yates, T., **Larigaldie, N.**, & Beierholm, U. (2017). A non-parametric Bayesian prior for causal inference of auditory streaming. Computational Foundations of Cognition, 1381-1386. Annual Conference of the Cognitive Science Society. London, UK.

Doctoral thesis

Larigaldie, N. (2021). A nonparametric Bayesian clustering approach to auditory perception. Supervised by Ulrik Beierholm. Its aim was to create a Bayesian statistical model to mimic a possible probabilistic approach of the brain to auditory perception, and conduct several behavioural experiments based on the model's predictions. The thesis is available in electronic format at http://etheses.dur.ac.uk/13977/

Master thesis

Larigaldie, N., & Dormal, V. (2015). Les différences hémisphériques de l'appréhension des quantités numériques et spatiales. The goal of my Master's thesis was to establish whether or not there is a clear lateralization of the intraparietal sulci regarding numerical and spatial quantities estimation. To this end, we used transcranial Direct Current Stimulation (tDCS) during a numerical Stroop task

Conferences and oral presentations

Larigaldie, N., Yates, T., & Beierholm, U. (2018). Using a nonparametric Bayesian prior for modelling human perceptual auditory streaming. Oral communication at the 12th Annual Postgraduate Research Conference (Durham, 07/03/18)

Larigaldie, N. (2015). Introduction to PsychoPy. Presentation of the PsychoPy software to the Laboratory for Experimental Psychopathology (Louvain-la-Neuve, 25/02/15)

Larigaldie, N., Andres, M., Lefèvre, N., Pesenti, M., & Dormal, V. (2014). Numerosity and length interaction in the Müller-Lyer illusion. Presentation to the Numerical Cognition Group (Louvain-la-Neuve, 02/04/14)

Poster presentations

Larigaldie, N., & Beierholm, U. (2019). Explaining human auditory scene analysis through Bayesian clustering. Poster presentation at the Basic Auditory Science Meeting at the University College London (London, 5/09/19)

Larigaldie, N., Yates, T., & Beierholm, U. (2018). Auditory grouping: insights from a Bayesian clustering algorithm. Poster presentation at the Durham Computational Biology Symposium (Durham, 14/11/18)

Larigaldie, N., Yates, T., & Beierholm, U. (2017-2018). Using a nonparametric Bayesian prior for modelling human perceptual auditory streaming. Poster presentation at the British Psychological Society Cognitive Section Conference (Newcastle, 30/08/17) and the Probabilistic Brain Workshop (Durham, 24/03/18)

Mejias, S., **Larigaldie, N.**, & Schiltz, C. (2015). Link between Mathematical skills and schools' socio-economic index (SEI): A (longitudinal) study by multiple correspondence analysis. Poster presentation at the Annual meeting of the Belgian Association of Psychological Sciences (Brussels, 28/05/15)

Larigaldie, N., Andres, M., Lefèvre, N., Pesenti, M. & Dormal, V. (2015). The Perceptual origin of length and numerosity interaction: Evidence from the Müller-Lyer. Poster presentation at the Annual meeting of the Belgian Association of Psychological Sciences (Brussels, 28/05/15). The same poster was presented during the IPSY day 2015 at UCLouvain and won the 3rd best poster award (Louvain-la-Neuve, 29/05/15)

Others

Computerization of the Shape Memory Test (Couvreur, 2013): Under supervision of Dana Samson and Laëtitia Leloup (*UCLouvain*), we used Python and PsychoPy to develop a computer version of this test to use in the field (2016)

Creation of "dots line creator", a software firstly written in C++ then ported in C# using WPF, to easily generate lines made of dots with varying sizes and controls for experiments (2015-2016)

Creation of a statistical-based voice recognition program, to circumvent some limitations of E-Prime. The program was written in Python and is still used in the Numerical Cognition Group (2015)

Creation of an 'impulsivity profiler', an online questionnaire with personalised feedback based on the short French version of the UPPS-P Impulsive Behaviour Scale (2015): http://uclep.be/profiler

Courses taught at Durham University

Introduction to Psychological Research (Level 1). Course including tutorials about key studies in Cognitive and Biological Psychology and a hands-on design & realisation of research projects in small groups of students using basic research methods and statistics, followed by a class presentation.

Research Methods in Psychology (Level 2). A direct continuation of the former course, more focused on research and statistical methods and less on existing studies. Included more complex research projects and statistics.

Advanced Statistics for Psychology and the Behavioural Sciences (Postgraduate). A course going back from simple statistical methods such as t-tests or chi-squared, to more complex ones such as logistic regressions and meta-analyses.

Techniques in Cognitive Neuroscience (Postgraduate). Matlab programming courses, which featured going from zero programming knowledge to being able to create a whole psychophysics experiment using Matlab and Psychtoolbox.

Relevant Skills

Computer skills

Proficient in Python, Matlab, R, C, C++, Java, PHP, HTML, CSS, SQL, Javascript and LaTeX
Basic knowledge of C# and Kotlin
Android app development in Java using Android Studio
Basics of 2D game development in Unity
Basic Arduino projects
Common machine learning techniques & algorithms (shallow & deep learning, gradient descent,

Bayesian learning, …)
Psychological experiment design software (PsychoPy + Pavlovia, E-Prime, OpenSesame)
Office and OpenOffice suites (Excel/Calc, Powerpoint/Impress, Word/Writer)
Common databases management (MySQL, NoSQL)
Webmastering

Statistics & Data Science

SPSS and R (RStudio and RCommander) software
Generalized linear model and its common applications (linear and logistic regressions, ANOVAs …)
Multivariate statistics (PCA, MFA, MCA, clustering)
Bayesian probabilities and statistics
Data cleaning (e.g. Tidyverse in R)
Dataviz & results communication techniques (Matlab reports, Shiny apps, Jupyter notebooks)

Neuroscience

Computational cognitive modelling in neuroscience (esp. Bayesian approaches)
Transcranial stimulation techniques (tDCS, tACS, tRNS)

Miscellaneous

Good public speaker (in either French or English)
Strong team spirit

Notable courses attended

Summer School in Computational Sensory-Motor Neuroscience 2018

The goal of this Summer School was to provide cross-disciplinary training in mathematical modelling techniques relevant to understanding brain function, dysfunction and treatment. Included several lectures given by world-class researchers (e.g. Gunnar Blohm, Konrad Kording & Paul Shrater). Our final team project, "Hysteresis in stereoscopic fusion: A phenomenon with a surprising amount of depth", won the award of the best project.

Psychological science courses

Prediction in psychology (linear regression, multilevel, causal models, causal tracks; *UCLouvain*)

Multivariate methods in psychology (*UCLouvain)*

Research methods and data collection techniques in psychology (*UCLouvain)*

Techniques of examination of particular data (single case, epidemiology, nonparametric…; *UCLouvain*)

Others (maths, computer science & data science)

Object-oriented design and data management (*Louvain School of Engineering*)

Algorithmics and data structures (*Louvain School of Engineering*)

Discrete mathematics and its applications (*Louvain School of Engineering*)

Machine Learning (Stanford University, online on Coursera)

The Data Scientist's Toolbox; R Programming; Exploratory Data Analysis; Getting and Cleaning Data (Johns Hopkins University, online on Coursera)

Crash course on Python; Using Python to Interact with the Operating System (Google, online on Coursera)

Further information

2018 Poster coordinator at the Probabilistic Brain Workshop (Durham, 23-24/03/18)

2015 Drummer at the "Revue FLTR", drummer and actor at the "Revue Psycho": yearly, 2 hours long shows in Louvain-la-Neuve including theatre and music

2013 Drummer at the "Revue FLTR"

2011 Project manager of the "Psychology week": Yearly event in the Université de Poitiers allowing people to discover psychological sciences through talks and lectures from local researchers

2010-2011 President of "Psy'Cause", a student association for Psychology in Poitiers

Punctual contributions to the PsychoPy software development (Python code debug & new functionalities)

Languages: French (native), English (IELTS overall score: 8/9, 03/2016), Spanish (basics)

Hobbies: Music (drumming), programming, sports (fitness)

French driving licence (B)