Pierre Hieu Guilleminot

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EDUCATION

2019 - 2023 **PhD in Neurotechnology - Computational Cognitive Neuroscience**
Imperial College London, UK - Centre for Neurotechnology,
Thesis: *Neural Mechanisms of Audio Tactile Speech Integration*
Skills: *EEG Signal Processing, Spiking Neural Network, Statistics, Computational Modelling*

2018 - 2019 **MRes in Neurotechnology** (*Distinction*)
Imperial College London, UK - Centre for Neurotechnology,
Thesis: *Engineering Tactile Signals for Hearing Aids*
Skills: *Speech Processing, Speech recognition, Biostatistics, Deep Learning, Cognitive Neuroscience*

2015 - 2018 **Msc in Bioengineering** (*Distinction*)
Grenoble INP - Phelma, France - Department of Bioengineering
Thesis: *A Robotic Supernumerary Thumb for Complex Musical Tasks*
Skills: *Signal Processing, Robotics, Software Engineering*

2015 - 2016 **BEng in Engineering** (*Distinction*)
Grenoble INP - Phelma, France - Department of Physics and Signal Processing
Main Courses: *Maths, Signal Processing, Physics*

2012 - 2015 **Preparatory Classes for Grande Ecoles**
Lycee Condorcet Paris, France
Major: *Maths, Physics*
Minor: *Computer Science*

RESEARCH EXPERIENCE

2024 - now **Postdoctoral Researcher - Computational Cognitive Neuroscience**
Institute of System Neuroscience - Dynamics of Cognitive and Auditory Processes Team
Duties: *Computational Modelling. Information Theory. Reservoir Networks. Machine Learning. Electrophysiology.*

2022 - 2023 **Data Scientist (part-time) - Neural Data Processing**
INBRAIN Neuroelectronics - INNERVIA Bioelectronics - Data Intelligence
Duties: *Neural Interface Characterization. Neural Data Analysis. Computational Modelling. Machine Learning.*

2022 - 2022 **Research Scientist Intern - Neural Interface**
INBRAIN Neuroelectronics - INNERVIA Bioelectronics - Data Intelligence
Duties: *Neural Interface Characterization. Software Engineering on a Neural Interfacing System. Neural Data Analysis. Computational Modelling.*

2017 - 2018 **Research Intern**
Imperial College London - Brain And Behaviour Lab
Duties: *Design and Control of a Robotic Supernumerary Finger. Experimental Setup and Analysis of finger usage for Complex Musical Tasks.*

SKILLS & AREAS OF EXPERTISE

Quantitative background: Broad training in engineering, applied mathematics and statistics with focus on biosignal processing, information theory, computational modelling and data analysis. Experience in developing and applying custom machine learning (scikit-learn), topological data analysis (giotto-tda) and deep learning (pytorch) frameworks.

Programming and computational background: Strong programming skills in Python. Demonstrable experience in high-performance computing, deep learning and general software engineering.

Speech signal processing: Speech processing with particular focus on offline/online feature extraction using signal processing and deep learning.

Neuroscience tools: Electrophysiological data (M/s/EEG) analysis and modelling. Nerve recording analysis and modelling. Machine learning, deep learning and spiking neural networks for biologically-constrained models (brian2). Multisensory Stimulation and Inertial Measurement Unit (IMU) for BCIs.

PUBLICATIONS & PREPRINT

P Guilleminot, C Graef, E Butters, T Reichenbach (2023). Audiotactile stimulation can improve syllable discrimination through multisensory integration in the theta frequency band. *JOCN*

E Varano, **P Guilleminot**, T Reichenbach (2022). AVbook, a high-frame-rate corpus of narrative audio-visual speech for investigating multimodal speech perception. *JASA*

P Guilleminot*, M Kegler*, E Varano* (2021). sPyEEG: Package for modelling EEG responses to speech. (Zenodo)

P Guilleminot, T Reichenbach (2021). Enhancement of speech-in-noise comprehension through vibro-tactile stimulation at the syllabic rate. *PNAS*

A Shafti, S Haar, R Mio, **P Guilleminot**, AA Faisal (2021). Playing the piano with a robotic third thumb: Assessing constraints of human augmentation. *Scientific Reports*

J Cunningham, A Hapsari, **P Guilleminot**, A Shafti, AA Faisal (2018) The Supernumerary Robotic 3rdThumb for Skilled Music Tasks. *Biorob 2020*

MENTORING & RESEARCH SUPERVISION

Laure Deyna
PhD Student - Cognitive Neuroscience (2023-now)
Project: *Computational models of multi-scale Temporal Predictions in Speech Processing Interaction between dorsal and ventral pathway*

Clement Sauvage
PhD Student - Cognitive Neuroscience (2023-now)
Project: *Spectral Spatio-Temporal Decomposition of Entropy and Surprisal in the Electrophysiological response to Natural Speech*

Cosima Graef
Msc Student - Bioengineering (2021-2022)
Project: *Characterizing the brain responses to multisensory stimuli by relating EEG and behavioural data.*

Arianne de St-Victor
Msc Student - Bioengineering (2020-2021)
Project: *Sensory substitution of hearing by touch using data from a robotic hand.*
Model of rigid contact body sounds.

Emilia Butters
Msc Student - Translational Neuroscience (2019-2020)
Project: *Exploring the roles of neural oscillations in syllables parsing.*
Stochastic modelling of behavioural responses to speech.

TEACHING

Brain-Machine Interfaces
Imperial College London, UK - Department of Bioengineering (2018-2022)
Teaching Award 2021
Description: *Supervise students during a machine learning competition. Teach neural data analysis and visualisation methods.*

Reinforcement Learning
Imperial College London, UK - Department of Computing (2021-2022)
Description: *Supervise students during practicals covering basic reinforcement learning (Bellman Equation, Markov Modelling) and deep reinforcement learning*

Probability and Statistics
Imperial College London, UK - Department of Bioengineering (2018-2022)
Description: *Teach the bases of probability and statistics*

Modelling in Biology
Imperial College London, UK - Department of Bioengineering (2019-2020)
Description: *Stochastic processes, differential equations and their applications to biology.*

Maths II
Imperial College London, UK - Department of Bioengineering (2019-2020)
Description: *Linear algebra and differential equations*

VOLUNTEERING & PUBLIC ENGAGEMENT

Science Communication Workshops
Imperial College London 2019-2021
Description: Presenting neuroscience research to a general public.

Bioeng Summer School Imperial College London
Imperial College London, 2021
Description: Promote neuroscience to highschool students.

Girls who ML - Lecture Series Winter 2021
Description: Volunteered to demonstrate workshops on machine learning and its application to different fields.

Co-organizer of the CDT Neurotechnology stand
Imperial Science Festival 2019
Description: Presenting neuroscience research to a general public.

LANGUAGES

English: Professional proficiency (IELTS C2 Level)
French: Native speaker
German: Elementary knowledge (A2)
Spanish: Elementary knowledge (A2)

HOBBIES

Art: Drawing
Game Theory: Automating solutions to various games
Musical Training: Violin, Bass guitar