Sébastien Naze, PhD

COMPUTATIONAL NEUROSCIENTIST

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🏠 119 Dillon Road
The Gap, 4061 QLD, Australia

🌐 Citizenship: French

> "The best way to make your dreams come true is to wake up."
>
> *Paul Valéry*

PROGRAMMING SKILLS

Python, C/C++, Java, Bash
Distributed and parallel computing
Multi-Objective Optimization
Evolutionary Algorithms
Object Oriented & Service Architectures
Cloud Computing (docker, k8s, SQLite, Redis)
Git – GitLab
Jupyter Lab / Notebook
Agile methodology – CI/CD

SCIENTIFIC SKILLS

Time series analysis (Fourier, Wavelets)
Machine Learning / Deep Learning
Graph Signal Processing
Dynamical Systems Modeling & Analysis
Neuroimaging & Bayesian Statistics

COMMUNICATION & LEADERSHIP

Client presentations
Teaching sessions
Student / Intern Supervision
Fluent in English, French & Spanish

PROFESSIONAL EXPERIENCE

QIMR RESEARCH FELLOW

📍 Queensland Institute of Medical Research, Brisbane, Australia   *2021 - current*

- Data engineering, analysis of multimodal dataset, and multiscale modeling of neurostimulation in obsessive-compulsive disorders.

IBM RESEARCH SCIENTIST

📍 IBM Research, Melbourne, Australia   *2019 - 2021*

- Designed and implemented an interface between brain modeling and machine learning algorithms in Python and C++.
- Performed parameter optimization using evolutionary algorithms.
- Integrated libraries into service architecture for cloud computing.
- Worked in international team of 4-12 people operating from multiple countries.

IBM POSTDOCTORAL RESEARCHER

📍 IBM T. J. Watson Research Center, New York, USA   *2016 – 2019*

- Delivered IBM Solutions in brain modeling to clients (CHDI, Pfizer) investigating Huntington's disease phenotypes in-silico.
- Delivered quarterly reports in due time with client presentations and ThinkLab speeches at client's events.
- Developed software patches for IBM Neural Graph Simulator.
- Served as IBM team co-lead on joint collaborative research projects (signed JSA) with Stanford University Department of Medical Neuroscience and University Health Network, Toronto.

RESEARCH ASSISTANT

📍 Institute of Systems Neuroscience, Marseille, France   *2011 – 2015*

Preparation of PhD Thesis entitled Multiscale Modeling of Epileptic Seizure Dynamics.

TECHNICAL ASSISTANT

📍 Vrije Universiteit, Amsterdam, The Netherlands   *2010 – 2011*

Preparation of MSc Thesis entitled Computational Agent Modeling of Post-Traumatic Stress Disorders.

EDUCATION

PHD COMPUTATIONAL NEUROSCIENCE
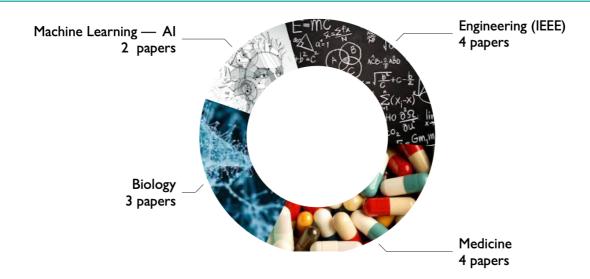Aix-Marseille Université, France
2015

MSC INFORMATION SCIENCE
Vrije Universiteit, The Netherlands
2011

BSC SOFTWARE ENGINEERING
Heriot-Watt University, United Kingdom
2009

PUBLICATIONS

Machine Learning — AI — 2 papers

Engineering (IEEE) — 4 papers

Biology — 3 papers

Medicine — 4 papers

L. Cocchi, **Naze S**, Robinson C, Webb L, Sonkusare S, Hearne L, Whybird G, Saffron G, Scott G, Hall C, Nott Z, Grasby K, Jentjens J, Scott J, Marcus L, Savage E, Zalesky A, Burgher B, Breakspear M (2023) Effects of noninvasive stimulation of the rostromedial prefrontal cortex on symptoms and frontostriatal connectivity in obsessive-compulsive disorder. *Nature Mental Health* (in press).

Naze S, Hearne LJ, Roberts JA, Sanz-Leon P, Burgher B, Hall C, Sonkusare S, Nott Z, Marcus L, Savage E, Robinson C, Zalesky A, Breakspear M, Cocchi L (2022) Mechanisms of imbalanced frontostriatal functional connectivity in obsessive-compulsive disorder. *Brain* (in press).

Sihag S, **Naze S**, Taghdiri F, Gumus M, Tator C, Green R, Colella B, Blennow K, Zetterberg H, Garcia Dominguez L, Wennberg R, Mikulis DJ, Tartaglia M-C, Kozloski JR (2022) Functional brain activity constrained by structural connectivity reveals cohort-specific features for serum neurofilament light chain. *Nature Communications Medicine* 2(1):1-14.

Naze S, Tang J, Kozloski JR, Harrer S (2021) Features importance in seizure classification using scalp EEG reduced to single timeseries. *IEEE EMBC* 329-332.

Naze S, Proix T, Atasoy S, Kozloski JR (2021) Robustness of connectome harmonics to local gray matter and long-range white matter connectivity changes. *Neuroimage* 224:117364.

Sihag S, **Naze S**, Taghdiri F, Tator C, Wennberg R, Mikulis D, Green R, Colella B, Tartaglia M-C, Kozloski JR (2020) Multimodal Dynamic Brain Connectivity Analysis Based on Graph Signal Processing for Former Athletes With History of Multiple Concussions. *IEEE Transactions on Signal and Information Processing over Networks* 6:284-299.

Sihag S, **Naze S**, Taghdiri F, Tartaglia M-C, Kozloski JR (2019) GSP Analysis of Brain Imaging Data from Athletes with History of Multiple Concussions. *IEEE ISIP* 1-5.

Naze S, Caggiano V, Sun Y, Lucas MV, Etkin A, Kozloski JR (2019) Classification of TMS evoked potentials using ERP time signatures and SVM versus deep learning. *IEEE EMBC* 3539-3542.

Naze S, Humble J, Zheng P, Barton S, Rangel-Barajas C.R, Rebec G.V, Kozloski J.R. (2018) Cortico-striatal cross-frequency coupling and gamma genesis disruptions in Huntington's disease mouse and computational models. *eNeuro* 5:6.

Naze S, Bernard C, Jirsa V.K. (2015) Computational modeling of seizure dynamics using coupled neuronal networks: factors shaping epileptiform activity. PLoS Comp Biol 11:5.

Bernard C, **Naze S**, Proix T, Jirsa V.K. (2014) Modern concepts of seizure modeling. *Annual Reviews on Neurobiology* 114:120-153.

Naze S, Treur J. (2012) A Computational Agent Model for Post-Traumatic Stress Disorders. *International Conference on Neural Information Processing.* 7664:141-151.

Naze S, Treur J. (2011) A computational model for development of post-traumatic stress disorders by hebbian learning. *Biologically-inspired Cognitive Architectures.* 233:249-261.

CONFERENCE PRESENTATIONS

Naze S. (2022) Mechanisms of imbalanced fronto-striatal functional connectivity in obsessive-compulsive disorder. *Biological Psychiatry Australia,* Newcastle, Australia.

Naze S. (2021). Features importance in seizure classification using scalp EEG reduced to single timeseries. *IEEE Engineering in Medicine and Biology Conference* (Online).

Naze S. (2020). Functional requirements of intentional control over the integrated cortico-thalamo-cortical and basal ganglia systems using neural computations. *Organization for Computational Neurosciences 29th Annual Meeting* (Online).

Naze S. (2019) Classification of TMS evoked potentials using ERP time signatures and SVM versus deep learning. *IEEE Engineering in Medicine and Biology Conference,* Berlin, Germany.

Naze S. (2019) Robustness of connectome harmonics to local gray matter and long-range white matter connectivity changes. *Organization for Computational Neurosciences 28th Annual Meeting,* Barcelona, Spain.

Naze S. (2018) Sensitivity analysis of the connectome harmonics framework and applications to neurodegenerative diseases. *Organization for Computational Neurosciences 27th Annual Meeting,* Seattle, United Sates.

Naze S. (2017) Cortico-striatal cross-frequency coupling and gamma genesis disruptions in Huntington's disease mouse and computational models. *Society for Neuroscience,* Washington D.C., United States.

Naze S. (2015) Computational modeling of initiation and propagation of epileptic seizures. *7th International Workshop on Seizure Prediction,* Melbourne, Australia.

Naze S. (2011) A Computational Agent Model of Post-Traumatic Disorders. *Biologically-Inspired Cognitive Architectures,* Washington D.C., United States.

REFERENCES

Dr. James Kozloski (Manager)
IBM Research, 1101 Kitchawan Road, Yorktown Height, New York 10598, United States.
kozloski@us.ibm.com

Dr. Luca Cocchi (Principal Investigator)
QIMR Berghofer Medical Research Institute, 300 Herston Road, Brisbane 4006, Australia.
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Dr. Stefan Harrer (Chief Innovation Officer)
Digital Health CRC, 520 Bourke Street, Melbourne 3000, Australia.
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