# **GEORGIOS IS. DETORAKIS, PH.D.**

Five years of experience in industrial applications of machine and deep learning, time series analysis, and natural language processing. Eleven years of research experience in scientific laboratories of various disciplines such as computational neuroscience, machine learning, neuromorphic computing, control theory, and robotics. Strong abilities in combining and bridging different fields such as machine learning, neuroscience, computer science, and mathematics. Strong skills in machine and deep learning, linear algebra, dynamical systems, signal processing, probability theory, mathematical modeling, and neuromorphic computing. Long experience in programming ( $\sim25$  years) in system and scripting languages.

### CONTACT

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in Georgios Is. Detorakis

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**Publication list** 

#### **SKILLS**

**Signal Processing** 

**Dynamical Systems** Linear Algebra

**Probability Theory** 

#### **Programming**

**Python** 

C C++

**Shell Script** 

Matlab/Octave

**LaTeX** 

Software & Tools

## **Machine Learning**

(e.g., Pytorch, Keras, Sklearn)

(e.g., Hugging Face, spaCy)

Visualisation

(e.g., Gnuplot, Paraview, Graphviz)

Data handling/analysis

(e.g., Pandas)

**Numerical Libraries** 

(e.g., FEniCS, LAPACK/BLAS) **HPC Libraries** 

(e.g., MPI, OpenMP, CUDA)

**Neural Simulators** 

(e.g., Neuron, Brian) Linux

#### Languages

Greek **English** 

French

# ## 11/2020 - Now Independent Contractor, Irvine, CA, USA

**C** WORK HISTORY

Machine Learning Engineer

Developing and deploying machine and deep learning algorithms for time series forecasting and analysis for financial data and sentiment analysis for economic news.

08/2019 - 11/2020

Data Science Architect adNomus Inc., San Jose, CA, USA

Developed NLP algorithms for recommendation systems, and algorithms for time series (behavioral data) forecasting.

**1** 02/2016 - 07/2019

**Q** University of California, Irvine, CA, USA

Postdoc Researcher

Developed algorithms for stochastic deep neural networks. Developed a neuromorphic framework, NSAT, and its simulator. Integrated neuromorphic sensors (DVS camera) with neuromorphic algorithms.

**12/2013 - 12/2015** 

**♀** CentraleSupelec, Gif-sur-Yvette, France

Postdoc Researcher

Developed mathematical models for closed-loop control systems with applications for Parkinson's disease. Developed algorithms for spike-sorting and online electrophysiological recordings.

### EDUCATION

**10/2010 - 10/2013** 

Ph.D. in Computer Science **♀** University of Lorraine, Nancy (France) Cortical plasticity, dynamic neural fields and self-organization

**1** 01/2007 - 04/2009

University of Crete, Heraklion (Greece)

M.Sc. in Brain & Mind Sciences

09/2002 - 09/2006

University of Crete, Heraklion (Greece)

**B.Sc.** in Applied Mathematics

Mathematical methods and software development track

# **SOFTWARE**

GAIM

A C++ library for Genetic Algorithms and Island Models

A C/Python simulator for the Neural and Synaptic Array Transceiver (NSAT) neuromorphic framework

A C++ interface of CARLsim for the NSAT neuromorphic framework

SPySort

A Python package for spike sorting

#### **TALKS**

- ➡ Biologically plausible contrastive divergence: Towards an abstract complementary learning system, Hughes Research Laboratory (HRL), Malibu CA (USA), 2017
- Closed-loop deep brain stimulation for Parkinson's disease: A computational study, University of California Irvine, Irvine CA (USA), 2016
- Neural Fields 101, CentraleSupélec, Gif-sur-Yvette (France), 2015
- ★ The perception of touch: A computational approach, Aix Marseille University, Marseille (France), 2014

# **SELECTED PUBLICATIONS**

**	S. Dutta, <b>G. De</b>	g machine with stochastic synapse allows brain-like learning and inference torakis, A. Khanna, B. Grisafe, E. Neftci, and S. Datta  Nature Communications 13, 2571
Randomized Self-Organizing Map  N.P. Rougier and G. Is. Detorakis		
₩	2021	Meural Computation, 33(8)
	-	is of a neural field self-organizing map A. Chaillet, and N.P. Rougier
₩	2020	■ The Journal of Mathematical Neuroscience, 10 (20)
	AIM: A C++ lik G. Detorakis, a	orary for Genetic Algorithms and Island Models
		■ The Journal of Open Source Software, 4(44), 1839
	_	nt Normalization in Stochastic Neural Networks 5. Dutta, A. Khanna, B. Grisafe, S. Datta, and E. Neftci
		NeurIPS (NIPS) Conference, Vancouver (Canada)
Contrastive Hebbian Learning with Random Feedback Weights  G. Detorakis, T. Bartley, E. Neftci		
		. Bartiey, E. Nettci  Neural Networks, 114
	G. Detorakis, S	aptic Array Transceiver: A Brain-Inspired Computing Framework for Embedded Learning 5. Sheik, C. Augustine, S. Paul, B.U. Pedroni, N. Dutt, J. Krichmar, G. Cauwenberghs, E. Neftci Frontiers in Neuroscience (Neuromorphic section) 12
Event-Driven Random Back-Propagation: Enabling Neuromorphic Deep Learning Machines  L. Neftci, S. Paul, C. Augustine, <b>G. Detorakis</b>		
₩	2017	Frontiers in Neuroscience 11, 2017
Incremental stability of spatiotemporal delayed dynamics and application to neural fields  G. Detorakis and A. Chaillet		
		Control and Decision Conference, Melbourne (Australia), 2017
	Event-Driven Random Backpropagation: Enabling Neuromorphic Deep Learning Machines  L. Neftci, C. Augustine, S. Paul, G. Detorakis	
		■ IEEE ISCAS, Baltimore (MD, USA)
Closed-loop stimulation of a delayed neural fields model of parkinsonian STN-GPe network: a theoretical and computational study		
<u></u>	G. Is. Detoraki	s, A. Chaillet, S. Palfi, and S. Senova
₩	2015	Frontiers in Neuroscience, 9:237
Structure of Receptive Fields in a Computational Model of Area 3b of Primary Sensory Cortex  G. Is. Detorakis and N.P. Rougier		
₩	2014	Frontiers in Computational Neuroscience, 8(76)
A Neural Field Model of the Somatosensory Cortex: Formation, Maintenance and Reorganization of Ordered Topographic Maps  G. Is. Detorakis and N.P. Rougier		
₩	2012	<b>■</b> PLoS ONE 7(7): e40257
Self-Organizing Dynamic Neural Fields		
N.P. Rougier and G. Is. Detorakis		
₩	2011	Advances in Cognitive Neurodynamics III, Hokaido (Japan)