GEORGIOS IS. DETORAKIS, PH.D.

Four 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 (~ 20 years) in system and scripting languages.

CONTACT

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Publication list

SKILLS

Science

Machine and Deep Learning
Signal Processing
Dynamical Systems
Linear Algebra
Probability Theory

Programming

Python
C
C++
Rust
Shell Script
Matlab/Octave
LaTeX

Software & Tools

Machine Learning
(e.g., Pytorch, Keras, Sklearn)
NLP
(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

WORK HISTORY

11/2020 – Now
Independent Contractor, Irvine, CA, USA
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
adNomus Inc., San Jose, CA, USA
Data Science Architect
Developed NLP algorithms for recommendation systems, and algorithms for time series (behavioral data) forecasting.

02/2016 - 07/2019
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
University of Lorraine, Nancy (France)
Ph.D. in Computer Science
Cortical plasticity, dynamic neural fields and self-organization

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

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

NSATcarl
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

Neural sampling machine with stochastic synapse allows brain-like learning and inference

S. Dutta, **G. Detorakis**, A. Khanna, B. Grisafe, E. Neftci, and S. Datta

2022 Nature Communications 13, 2571

Randomized Self-Organizing Map

N.P. Rougier and **G. Is. Detorakis**

2021 Neural Computation, 33(8)

Stability analysis of a neural field self-organizing map

G. Detorakis, A. Chaillet, and N.P. Rougier

2020 The Journal of Mathematical Neuroscience, 10 (20)

GAIM: A C++ library for Genetic Algorithms and Island Models

G. Detorakis, and A. Burton

2019 The Journal of Open Source Software, 4(44), 1839

Inherent Weight Normalization in Stochastic Neural Networks

G. Detorakis, S. Dutta, A. Khanna, B. Grisafe, S. Datta, and E. Neftci

2019 NeurIPS (NIPS) Conference, Vancouver (Canada)

Contrastive Hebbian Learning with Random Feedback Weights

G. Detorakis, T. Bartley, E. Neftci

2019 Neural Networks, 114

Neural and Synaptic Array Transceiver: A Brain-Inspired Computing Framework for Embedded Learning

G. Detorakis, S. Sheik, C. Augustine, S. Paul, B.U. Pedroni, N. Dutt, J. Krichmar, G. Cauwenberghs, E. Neftci

2018 Frontiers in Neuroscience (Neuromorphic section) 12

Event-Driven Random Back-Propagation: Enabling Neuromorphic Deep Learning Machines

E. Neftci, S. Paul, C. Augustine, **G. Detorakis**

2017 Frontiers in Neuroscience 11, 2017

Incremental stability of spatiotemporal delayed dynamics and application to neural fields

G. Detorakis and A. Chaillet

2017 Control and Decision Conference, Melbourne (Australia), 2017

Event-Driven Random Backpropagation: Enabling Neuromorphic Deep Learning Machines

E. Neftci, C. Augustine, S. Paul, **G. Detorakis**

2017 IEEE ISCAS, Baltimore (MD, USA)

Closed-loop stimulation of a delayed neural fields model of parkinsonian STN-GPe network: a theoretical and computational study

G. Is. Detorakis, 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 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)