

GEORGIOS IS. DETORAKIS, PH.D.



Almost six years of experience in industrial applications of machine and deep learning, time series analysis, natural language processing, and image 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, dynamical systems, signal processing, mathematical modeling, and neuromorphic computing. Long experience in programming (~ 27 years) in system and scripting languages.

CONTACT

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- 📖 Publications list

SKILLS

Science

Neuroscience

Machine and Deep Learning

Neuromorphic Computing

Signal Processing

Dynamical Systems

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Programming

Python

C

C++

Rust

Shell Script

Matlab/Octave

LaTeX

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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

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Languages

Greek

English

French

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WORK HISTORY

- 📅 11/2020 - Now

📍 Independent Contractor, Irvine, CA, USA

Machine Learning Engineer

Developing and deploying machine/deep learning algorithms for time series forecasting and analysis for financial data | NLP for economic news | Deep learning for object detection, tracking & image processing | Developing controllers for TEC based on RL
- 📅 08/2019 - 11/2020

📍 adNomus Inc., San Jose, CA, USA

Data Science Architect

Developed NLP algorithms for recommendation systems | 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

📍 CentraleSupélec, 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

SELECTED TALKS




- 📌 *Biologically plausible contrastive divergence: Towards an abstract complementary learning system*, Hughes Research Laboratory (HRL), Malibu CA (USA), 2017
- 📌 *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)