ANTOINE BRIAS

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antoine.brias@gmail.com

Education

2013–2016 **Ph.D. in Computer Science**
Dissertation: Dispell the curse of dimensionality in the computation of the viability kernel by using parallelization on graphic card and reliability theory: application to environmental dynamics
LISC, IRSTEA (National Research Institute of Science and Technology for Environment and Agriculture), Aubière, France

2011 **Master's Degree in Engineering** at the ISIMA College of Engineering in Computer Science, Modeling and Applications
ISIMA, Aubière, France

2011 **Master's Degree in Applied Mathematics** at the Université Blaise Pascal
Université Blaise Pascal, Aubière, France

Work Experience

2023 April-Dec. **Research engineer position:** *Dentex dentex* stock assessment around Corsica island;
– multi-source data analysis: on-board, interview and weather data.
– statistical analysis of UVC (Under water Visual Census) and protocol comparison.
Stella Mare Lab, Université de Corse, Biguglia, France

2020-2022 **Post-doctoral position:** management of ecosystem services in a complex territory with heterogeneous data;
– qualitative and quantitative modeling of a socio-ecosystem
– application of robustness/viability/adaptation methods to maintain a set of ecosystem services over the long term
– grant writing and supervision of interns
Geolab, UCA, Clermont-Ferrand, France

2017–2020 **Post-doctoral position:** multi-species fisheries management using non-parametric approaches;
– models and tools implementation to offer sustainable fisheries policies, handling multi-objectives problems
– non-linear forecasting methods: Gaussian Process regression applied to simulated and real data
– optimal control: approximate dynamic programming using Gaussian Process forecasts to produce optimal policies
– high performance computing grant writing
UCSC, Santa Cruz, CA, USA

2013–2016 **Ph.D in Computer Science:** Dispell the curse of dimensionality in the computation of the viability kernel by using parallelization on graphic card and reliability theory: application to environmental dynamics;
– calibration of a lake eutrophication model: case-study of Lake Bourget (stochastic phosphorus dynamics calibrated on data from 2004 to 2014). Correlation study between rainfall variability and nutrient loading, and analysis of rainfall variability scenarios
– bycatch fishery management by using viability theory
– GPU parallel computing to speed up viability calculations
– methodology: links between viability theory and time-variant reliability
LISC, IRSTEA, Aubière, France

2011–2013 **Scientific computing:** Drug diffusion simulation through the intestinal wall;
– study of Lattice-Boltzmann methods
– implementation of a finite difference solver in C++ with graphic interface
Integrative BioComputing, Clermont-Ferrand, France

2011 April-Sept. **Computer engineering:** High performance computing in structural mechanics;
– MPI parallelization of nonlinear finite elements solvers in C++
Michelin, Clermont-Ferrand, France

2010 April-Sept. **Scientific computing:** Mathematical optimization;
– use of a genetic algorithm to solve optimization problems in financial mathematics
– mutual information calculation in MATLAB
Université du Québec à Montréal, Montréal QC, Canada

Skills

ENGLISH	Three years in USA, Advanced plus (ACTFL), TOEIC: 805
FRENCH	Mother tongue, distinguished
DEVELOPING	C++, C, MATLAB, Shell, Python, Linux, Qt
MODELING	PDE, ODE, Solid mechanics, Finite differences, Finite element solver, Stochastic processes
ANALYSIS	Graph theory, Linear programming, Optimization, Statistics
PARALLELIZATION	MPI, GPU (CUDA)
OFFICE SUITES	Microsoft Office (Word, Excel, PowerPoint) and OpenOffice.org (Writer, Calc, Impress)

Personal Interests

3D PRINTING	Braille converter script
ELECTRONICS	Coupling electroencephalography (EEG) toys and neural networks
SPORTS	Practice of handball and badminton

References

Guillaume Deffuant	Research director, head of LISC, INRAE, Clermont-Ferrand, France. Viability and resilience of complex systems +33 4 73 44 06 14 guillaume.deffuant@inrae.fr
Jean-Denis Mathias	Research director at LISC, INRAE, Clermont-Ferrand, France. Modeling of complex environmental systems. +33 4 73 44 06 80 jean-denis.mathias@inrae.fr
Steve Munch	Professor at the Ecology and Evolutionary Biology Department, UCSC, Santa Cruz, CA, USA, Population dynamics, Non-parametric prediction methods. +1 831-420-3909 smunch@ucsc.edu

Talks

2022 A. Brias, J.-B. Pichancourt & A. Bonis *Towards the viability of social-ecological system : modeling approach for multiple ecosystem services related to hedgerows in rural landscapes.* SFE², Metz, France, November 2022

2021 A. Brias, J.-B. Pichancourt & A. Bonis *How to organize and adapt a complex social-ecological landscape where global change pressures the sustainability of multiple ecosystem services: case study in a French rurban area.* Complex System Conference 2021, Lyon, France, October 2021

2020 A. Brias, S. Munch *Ecosystem-based management using Empirical Dynamic Programming.* American Naturalist 2020, Monterey CA, USA, January 2020

2018 A. Brias, S. Munch *Near-optimal multi-species ecosystem management using Empirical Dynamic Programming.* Nonlinear Dynamics in Fisheries Workshop, November 2018

2016 A. Brias, J.-D. Mathias & G. Deffuant *Accelerating viability kernel computation with CUDA architecture: application to bycatch fishery management.* Computational Management Science 13 (3), 2016

2016 A. Brias, J.-D. Mathias & G. Deffuant *Computing the reliability kernel of a time-variant system: application to a corroded beam*. 8th IFAC Conference on Manufacturing Modelling, Management and Control, Troyes, MIM 2016

2015 A. Brias, J.-D. Mathias & G. Deffuant *Computing the reliability kernel in time-variant analysis.* Safety and Reliability of Complex Engineered Systems ESREL, Zurich, 2015

2015 A. Brias, J.-D. Mathias & G. Deffuant *Application of the stochastic viability to the management of lake eutrophication*, World Conference on Natural Resource Modeling RMA, Bordeaux, 2015

2014 A. Brias, J.-D. Mathias & G. Deffuant *Using CUDA architecture to accelerate ultidimensional viability kernel computing*, 3rd international workshop At the boundaries of Dynamic Games, Control and Viability, Saint-Nicolas la Chapelle, 2014

Publications

2024 S. Munch & A. Brias *Empirical dynamic programming for model-free ecosystem based management*. Methods in Ecology and Evolution. https://doi.org/10.1111/2041-210X.14302

2021 A. Giron Nava, E. Ezcurra, A. Brias, E. Velarde, E. Deyle, A. Cisneros-Montemayor, S. Munch, G. Sugihara, *Environmental variability and fishing effects on the Pacific sardine fisheries in the Gulf of California.* Canadian Journal of Fisheries and Aquatic Sciences. July 2020.

2020 A. Brias, S. Munch *Ecosystem-based management using Empirical Dynamic Programming.* Ecological Modeling. April 2020.

2019 S. Munch, A. Brias, T. Rogers & G. Sugihara *Food for Thought Frequently asked questions about nonlinear dynamics and empirical dynamic modelling.* ICES Journal Of Marine Science, 2019

2018 A. Brias, J.-D. Mathias & G. Deffuant *Inter-annual rainfall variability may foster lake regime shifts: An example from Lake Bourget in France.* December 2018, Ecological Modelling

2016 A. Brias, J.-D. Mathias & G. Deffuant *Accelerating viability kernel computation with CUDA architecture: application to bycatch fishery management.* Computational Management Science 13 (3), 2016

2017 A. Brias, J.-D. Mathias & G. Deffuant *Computing the reliability kernel of a time-variant system: application to a corroded beam*. Special issue, 8th IFAC Conference on Manufacturing Modelling, Management and Control, Troyes, France, MIM 2016

Submitted publication

A. Brias, M. Karnauskas, W. Harford, S. Munch *Single-species stock assessment using Empirical Dynamic Programming.*

A. Brias, J.-B. Pichancourt & A. Bonnis *Adaptation Pathways Maps in agro-ecosystem management.* Prepartion to a submission to Ecology & Society

A. Brias, J.-D. Mathias & G. Deffuant *Approximate dynamic programming using reliability techniques: application to environmental dynamic.*

J.-D. Mathias, G. Deffuant & A. Brias *Regime shift of uncertain social-ecological systems.* Submitted to Journal of Environmental Management.