Bruno Magalhaes

PhD Neuroscience candidate with Computer Science background

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Lausanne CH Native in Portuguese, fluent in English and French, fair in Spanish and Slovenian

Education

ongoing – Mar 2015 | PhD Neuroscience, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- Title : Large-scale Asynchronous Simulation of Neuronal Activity
- Teaching Assistant (400 hours) for Unsupervised and reinforcement learning in neural networks, Projects in neuroinformatics and *In silico* neuroscience
- Visiting scholar at Center for Research in Extreme Scale Tech., Indiana University (US), Summers 2015-17

C | C++ | Python | HPX-5 | MPI | LaTeX | tensorflow | google test | TCLAP | Sundials CVODEs API | IBM BlueGene/Q

Sep 2009 – Oct 2008 | MSc Advanced Computing, Imperial College London, UK
- Final thesis on multi-core CPU, GPU and parallel computation of large Markov models in heterogeneous networks, awarded distinction and published at NSMC'10. Finished degree with Merit.

C | NVIDIA CUDA | Message Passing Interface (MPI) | Posix threads | Java

Jul 2007 – Oct 2002 | BEng (5 year programme) Systems Engineering and Computer Science, University of Minho, Portugal
- Exchange student at the University of Maribor, Slovenia, 2005/2006. Finished degree with final grade A.

Work Experience

Feb 2015 – Mar 2011 | Scientific Assistant and HPC Engineer, The Blue Brain Project, EPFL, Lausanne, Switzerland
- Parallel algorithms for spatial decomposition of neural networks
- Parallel algorithms for distributed task-stealing programming models on neural networks
- Parallel algorithms for synaptic map reconstruction via efficient distributed sparse matrix transposition
- Algorithms for the distributed spatial indexing of detailed neuron morphologies

C | C++ | Message Passing Interface (MPI) | OpenMP | CMake | IBM BlueGene/P and /Q | parallel IO (MPI, HDF5)

Feb 2011 – Sep 2009 | Junior Architect for IT infra-structures, Noble Group, Worldwide
- Network design of a contingency data centre for all EU Power & Gas trading infrastructure, London, UK
- Network and infrastructure design of a port and warehouse for coffee and soy beans, Santos, Brazil
- Implementation of a web-based software for metals and coffee trading, New York, USA

Cisco and 3Com network devices | ASP .NET

Oct 2008 – Mar 2007 | Analyst programmer, MSCI (former IPD - Investment Property Databank), London,UK
- Development of a web-based geographical system for real estate data search and analytics
- Development of software for data query and warehousing

C# | Visual Basic | F# | ASP .NET | MS SQL Server | SSIS | google maps API | javascript

Sep 2005 – Jan 2005 | Software developer (part-time), Department of Physics, University of Minho, Portugal
- Development of parallel algorithms for analysis of collisions of particles, in collaboration with CERN

Fortran | Message Passing Interface (MPI) | C

Publications

peer reviewed ; first author unless mentioned otherwise

in preparation	An Efficient Algorithm for The Distributed Transpose Of Large-Scale Graphs And Sparse Matrices With High-Cardinality Cell Structures
in preparation	Distributed Asynchronous Execution Model Speeds and Scales Up Over Hundredfold The Detection Of Contacts Between Detailed Neuron Morphologies
submitted	Fully Implicit, Fully Asynchronous, Variable Order, Variable Timestep Simulation of Detailed Neural Networks
submitted	Asynchronous SIMD-Enabled Branch-Parallelism of Morphologically-Detailed Neuron Models
submitted	Fully-Asynchronous Cache-Efficient Simulation of Detailed Neural Networks, Proc. International Conference on Computational Science (ICCS 2019), Faro, Portugal
2019	Exploiting Implicit Flow Graph of System of ODEs to Accelerate the Simulation of Neural Networks, Proc. International Parallel & Distributed Processing Symposium (IPDPS 2019), Rio de Janeiro, Brazil
2016	An efficient parallel load-balancing strategy for orthogonal decomposition of geometrical data, Proc. International Super Computing (ISC 2016), Frankfurt, Germany
2015	*(co-author)* Reconstruction and Simulation of Neocortical Microcircuitry, Cell 163, 456–492.
2010	*(MSc final project)* GPU-enabled steady-state solution of large Markov models, Proc. 6th International Workshop on the Numerical Solution of Markov Chains (NSMC 2010), Williamsburg, Virginia