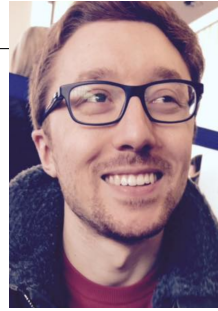


Roberto PORCÙ

Curriculum Vitae



Ph.D. Student in Applied Mathematics

PERSONAL DATA

PLACE AND DATE OF BIRTH: Spoleto (PG), Italy | 22 June 1988

ADDRESS: Via Emilio Faà di Bruno 14, 20137, Milano (MI), Italy

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SKYPE ID: roberto.porcu88

SEX: Male

WORK EXPERIENCE

<p>JULY 2013 - SEPT. 2013</p>	<p>ESA - Summer of Code in Space (SOCIS) 2013 <i>European Space Agency</i></p> <p>MENTOR ORGANIZATION: GNU Octave org.</p> <p>PROJECT NAME: Octave Geometric Integrators for Hamiltonian Systems.</p> <p>BLOG: http://geointegratorssocis.blogspot.it</p> <p>MAIN TASK: development of a new set of functions for multidimensional geometric integration which adds new potentialities to the Octave ODEPKG package. Geometric integrators are very important for classical mechanics problems since they preserve the energy and the other geometric properties of mechanical systems, thus reducing numerical diffusion issues. Among the new functions, the implemented spectral variational integrator method is of relevant interest since it allows for arbitrarily high order numerical schemes.</p> <p>LINK: https://sourceforge.net/p/octave/odepkg/ci/default/tree/inst</p> <p>MENTOR: Carlo DE FALCO (GNU Octave, Politecnico di Milano)</p> <p>MENTOR: Edie MIGLIO (Politecnico di Milano)</p> <p>MENTOR: Mattia PENATI (Politecnico di Milano)</p>
<p>OCT. 2012 - MARCH 2013</p>	<p>Stage at AGUSTAWESTLAND S.p.A., Cascina Costa (VA), Italy <i>Helicopter design and manufacturing company</i></p> <p>MAIN TASK: multi-GPU parallelization of a Fortran serial code used to numerically simulate the brownout phenomenon around a helicopter. Particles dynamics are considered in a Lagrangian way under the effect of the aerodynamic and gravitational fields. The parallelization is very effective and final speedup, obtained on a 2-GPUs node, is about 290 X.</p> <p>MENTOR: Alessandro SCANDROGLIO (AgustaWestland)</p> <p>MENTOR: Renzo MOSCA (AgustaWestland)</p>

EDUCATION

- NOV. 2013 - OCT. 2016 | Ph.D. in Applied Mathematics
SUBJECT: *Mathematical and Numerical Modeling of Plate Tectonics*
Politecnico di Milano, Milan (MI), Italy
DISSERTATION TITLE: “Three-dimensional nonlinear elasto-visco-plasticity for finite strain deformations in geodynamic applications”.
MAIN TOPIC: development of a multithreaded parallel C++ code based on the deal.II finite element library for the numerical simulation of continental rifting. According to the nature of the problem a three-dimensional finite strain deformations regime is considered and nonlinear elasto-visco-plastic rheologies have been implemented. In particular the Kröner-Lee multiplicative decomposition of the deformation gradient is taken into account and the exponential return map for the inelastic part of the deformation is used. The purely nonlinear approach represents something new for geodynamic applications and has excellent perspectives since it appears to naturally catch the classical shear-bands patterns observed in continental rifts.
ADVISOR: Prof. Edie MIGLIO
CO-ADVISOR: Dr. Mattia PENATI
- SEPT. 2014 | 23rd Summer School on Parallel Computing
Cineca, Segrate (MI), Italy
TOPICS: HPC architectures, MPI, OpenMP, MPI+OpenMP, CUDA, OpenCL.
LINK: <http://www.hpc.cineca.it/content/23rd-summer-school-parallel-computing>
- OCT. 2010 - APRIL 2013 | Master’s degree in Mathematical Engineering
SUBJECT: *Computational Sciences for Engineering*
Politecnico di Milano, Milan (MI), Italy
110/110
DISSERTATION TITLE: “Numerical methods and programming techniques for the acceleration of a non-interacting particles dynamical model” (in italian).
MAIN TOPIC: multi-GPU parallelization of a Fortran serial code for the numerical simulation of brownout around a helicopter. The parallelization is very effective and final speedup is about 290X. Derivation and analysis of an arbitrarily high order numerical scheme based on spectral variational integrators. This scheme is compared with other standard variational integrators, like the semi-implicit Euler scheme which is implemented in the brownout simulation code. Convergence and performance analyses show that spectral variational integrators can provide a further significative speedup to the parallel brownout simulation.
LINK: <https://www.politesi.polimi.it/handle/10589/78108?locale=en>
ADVISOR: Prof. Nicola PAROLINI (Politecnico di Milano)
CO-ADVISOR: Dott. Mattia PENATI (Politecnico di Milano)
CO-ADVISOR: Alessandro SCANDROGLIO (AgustaWestland)

SEPT. 2007 - SEPT. 2010	Bachelor's degree in Mathematical Engineering Politecnico di Milano , Milan (MI), Italy 105/110
SEPT. 2002 - JULY 2007	High School Diploma Liceo Scientifico R. Donatelli , Terni (TR), Italy 100/100

PUBLICATIONS

Under review

- E. Miglio, N. Parolini, M. Penati and R. Porcù. GPU parallelization of brownout simulations with a non-interacting particle dynamics model. *The International Journal of High Performance Computing Applications*.
- E. Miglio, N. Parolini, M. Penati and R. Porcù. High-order variational time integrators for particle dynamics. *Communications in Applied and Industrial Mathematics*.

CONFERENCE PRESENTATIONS

- “Nonlinear elasto-plasticity for finite-strain deformations”, SIMAI2016, September 2016, Milan, Italy.

TEACHING EXPERIENCE

- Academic Year 2015/2016:
 1. Laboratory for the course of “Curves and Surfaces for Design” given by Prof. N. Parolini at the Politecnico di Milano, Design Faculty, first year course, approx. 40 hrs and 190 students. Software used: POV-Ray.
- Academic Year 2014/2015:
 1. Laboratory for the course of “Curves and Surfaces: a geometric-differential analysis” given by Prof. E. Miglio at the Politecnico di Milano, Design Faculty, first year course, approx. 40 hrs and 130 students. Software used: POV-Ray.
- Academic Year 2013/2014:
 1. Laboratory for the course of “Curves and Surfaces: a geometric-differential analysis” given by Prof. E. Miglio at the Politecnico di Milano, Design Faculty, first year course, approx. 40 hrs and 120 students. Software used: POV-Ray.

LANGUAGES

LANGUAGE	WRITTEN	SPOKEN	
ITALIAN	mother tongue	mother tongue	
ENGLISH	advanced	advanced	SEPT. 2009 - TOEFL IBT 99/120 C1 LEVEL
SPANISH	intermediate	intermediate	

COMPUTER SKILLS

PROGRAMMING LANGUAGES	Fortran, C, C++, Python
PARALLEL PROGRAMMING LIBRARIES	CUDA, MPI, OpenMP, OpenCL
OPERATING SYSTEMS	Windows, Linux, macOS
SCIENTIFIC SOFTWARE	Matlab, Octave, Paraview, POV-Ray
SCIENTIFIC LIBRARIES	FEniCS, deal.II, FreeFEM++

OTHER INFORMATIONS

DRIVING LICENSE	Class B
TRAVEL AVAILABILITY	Complete availability to travel for work.
PIANO CERTIFICATE	5 th -year Diploma in Piano released on Sept. 2004 by "Istituto Briccialdi", Terni (TR), Italy.

I authorize the processing of personal data contained in my curriculum vitae according to art. 13 of the Legislative Decree 196/2003 of Italian law.