Bastien Chaudet-Dumas

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Research Experience

Postdoctoral researcher, *University of Geneva*, Geneva, Switzerland — Aug 2020 - present

(under the supervision of Pr. Martin Gander)
Domain decompositions methods, cross-points, wave propagation, multigrid methods.

PhD candidate, *Laval University*, Quebec, Canada — Jan 2015 - Jan 2020

(under the supervision of Pr. Jean Deteix)
Shape optimization, elliptic variational inequalities, level set methods, contact mechanics.

Graduate student researcher, *Atomic Energy Commission*, Paris, France — Apr 2014 - Nov 2014

(under the supervision of Dr. Jean-Philippe Braeunig)
Computational fluid dynamics, Euler equations, finite volume method, Lagrange-remap scheme.

Graduate student researcher, *Moscow State University*, Moscow, Russia — May 2013 - Jul 2013

(under the supervision of Pr. Vasiliy Sazonov)
Computational geometry, lofting, interpolation of surfaces.

Teaching Experience

Teaching assistant, *University of Geneva*, Geneva, Switzerland — Aug 2020 - present

- Analysis I, BSc in mathematics/computer science/physics.
- Numerical analysis, BSc in mathematics/computer science.
- Probabilty and statistics, BSc in computer science.
- General mathematics (statistics), BSc in earth and environmental science/information systems.
- Mathematics for computer scientists, BSc in computer science.

Lecturer, *Laval University*, Quebec, Canada — Fall 2016 and Fall 2018

- Mathematics for engineers, BSc in engineering.

Teaching assistant, *Laval University*, Quebec, Canada — Jan 2016 - Jan 2020

- Analysis I, BSc in mathematics.
- Differential equations, BSc in mathematics.
- Functions of several variables, BSc in mathematics.
- Numerical analysis for engineers, BSc in engineering.

Supervision of research projects

Co-supervision of a PhD student, *University of Geneva*, Geneva, Switzerland — Nov 2022 - present

Co-supervision of Aušra Pogoželskytė's PhD project on space-time multigrid algorithms.

Co-supervision of a MSc student, *University of Geneva*, Geneva, Switzerland — Apr 2022 - Dec 2022

Co-supervision of Jamil Hamad's MSc thesis on time multigrid methods.

Education

Jan 2015 - Jan 2020 **PhD in Applied Mathematics**, *Laval University*, Quebec, Canada
Shape optimization, elliptic variational inequalities, contact mechanics.

Sep 2013 - Sep 2014 **MSc in Mathematics and Applications**, *Sorbonne University*, Paris, France
Numerical analysis, partial differential equations.

Sep 2011 - Sep 2014 **MSc in Mathematical Engineering**, *IP Paris (ENSTA)*, Paris, France
Mathematical modeling, numerical simulation.

Sep 2008 - Sep 2011 **"Classes préparatoires MP"**, *Lycée Montaigne*, Bordeaux, France
Intensive training in mathematics and physics.

Honours and Awards

Governor general's academic gold medal, Quebec, Canada Oct 2020

Issued by The Governor General of Canada.

Honour roll of the Faculty of Graduate Studies, Quebec, Canada Apr 2020

Issued by Laval University.

Publications and Preprints

[1] B. Chaudet-Dumas. "A shape optimization algorithm based on directional derivatives for three-dimensional contact problems". In: *International Journal for Numerical Methods in Engineering (in revision)* (2023).

[2] B. Chaudet-Dumas and M. J. Gander. "Cross-points in the Dirichlet-Neumann method I: well-posedness and convergence issues". In: *Numerical Algorithms* 92.1 (2023), pp. 301–334.

[3] B. Chaudet-Dumas and M. J. Gander. "Cross-points in the Dirichlet-Neumann method II: a geometrically convergent variant". In: *(preprint)* (2023).

[4] B. Chaudet-Dumas and M. J. Gander. "Cross-points in the Neumann-Neumann method". In: *Domain Decomposition Methods in Science and Engineering (in revision)* (2023).

[5] B. Chaudet-Dumas, M. J. Gander, and A. Pogoželskytė. "An optimized Space-Time Multigrid algorithm for parabolic PDEs". In: *(preprint)* (2023).

[6] B. Chaudet-Dumas and J. Deteix. "Shape derivatives for an augmented Lagrangian formulation of elastic contact problems". In: *ESAIM: Control, Optimisation and Calculus of Variations* 27 (2021), S14.

[7] B. Chaudet-Dumas and J. Deteix. "Shape derivatives for the penalty formulation of elastic contact problems with Tresca friction". In: *SIAM Journal on Control and Optimization* 58.6 (2020), pp. 3237–3261.

[8] J.-P. Braeunig and B. Chaudet. "Study of a collocated Lagrange-remap scheme for multi-material flows adapted to HPC". In: *International Journal for Numerical Methods in Fluids* 83.8 (2017), pp. 664–678.

Talks in Conferences

[1] "A geometrically convergent variant of the Dirichlet-Neumann method in the presence of cross-points". In: *International Conference on Domain Decomposition Methods, Prague, Czech Republic* (2022).

[2] "Cross-points in the Neumann-Neumann method". In: *International Conference on Domain Decomposition Methods, Prague, Czech Republic* (2022).

[3] "On the Neumann-Neumann method in the presence of cross-points". In: *SIAM Conference on Partial Differential Equations, Berlin, Germany (held virtually)* (2022).

[4] "Analysis of Dirichlet-Neumann and Neumann-Neumann methods for the Helmholtz equation". In: *SIAM Conference on Computational Science and Engineering, Seattle, USA (held virtually)* (2021).

[5] "On the Dirichlet-Neumann method in the presence of cross-points". In: *Swiss Numerics Day, Lausanne, Switzerland* (2021).

[6] "Shape optimization for the augmented Lagrangian formulation of contact problems". In: *MAFELAP The Mathematics of Finite Elements and Applications, London, UK* (2019).

[7] "Shape gradients for three-dimensional contact problems with Tresca friction". In: *IFIP TC7 Conference on System Modeling and Optimization, Essen, Germany* (2018).

[8] "A scalable Lagrange-Remap scheme for compressible multimaterial Euler equations with sharp interface reconstruction". In: *Trends in Numerical and Physical Modeling for Industrial Multiphase Flows, Cargèse, France* (2014).

Organization of Scientific Events

Research school on "Iterative methods for PDEs" (planned May 2023)

(with L. Lu and L. Perrin) Two-days event dedicated to young researchers, Paris, France.

Minisymposium on "Non-overlapping domain decomposition methods" Jul 2022

(with L. Lu) International Conference on Domain Decomposition Methods, Prague, Czech Republic.

Minisymposium on "Parallel methods for PDEs" Jun 2022

(with M. Gander and L. Lu) Congrès National d'Analyse Numérique, Evian-Les-Bains, France.

Skills

Programming	C, C++, Matlab, Python, Maple, LaTex.
Languages	French (native), English (fluent), Spanish (advanced), German (beginner).

Hobbies

Sports	Trail running, long distance running, ski touring.
Music	80's American hip-hop, 70's experimental rock.