Gonzalo Gonzalez de Diego

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personal website

Professional Experience

2023- **Postdoctoral research associate**, *New York University (NYU)*, New York, USA.
Modeling and numerical simulation of sea ice dynamics. I am developing numerical methods for inferring continuum models for sea ice from data generated with the discrete element method Subzero. Part of the Sea Ice MURI project (project website).

supervisor Prof. Georg Stadler.

2017-2018 **Research Assistant**, *University Duisburg-Essen*, Essen, Germany.
Research into (i) least-squares finite element methods for linear elasticity and hyperelasticity and (ii) the Scaled Boundary Finite Element Method (SBFEM) at the Numerical Mathematics group of the Faculty of Mathematics.

2015–2016 **Internship**, *Energy research Centre of the Netherlands (ECN)*, Alkmaar, The Netherlands.
Computational and experimental analysis of aeroelastic instabilities of wind turbine blades.

2014 **Internship**, *National Institute for Aerospace Technology (INTA)*, Madrid, Spain.
Study of the wake formed over the landing deck of a scaled model of a frigate using Laser Doppler Anemometry (LDA).

Education

2019–2023 **PhD in Applied Mathematics**, *University of Oxford*.
DPhil in Mathematics (4 year programme).

thesis *Viscous contact problems in glaciology* (link to thesis).

supervisors Prof. Ian Hewitt and Prof. Patrick Farrell.

date of viva 4th September 2023

2018–2019 **Master of Science**, *University of Oxford*, *Distinction*.
MSc in Mathematical Sciences.

courses Functional Analysis, Functional Analytic Methods in PDEs, Differentiable Manifolds, Fixed Point Methods for Nonlinear PDEs, Finite Element Methods for PDEs, Lie Groups.

thesis *Semiuniform stability of C_0-semigroups.*

supervisor Dr. David Seifert.

2014–2017 **Master of science**, *Delft University of Technology*, *8.75/10 Cum Laude*.
MSc in Aerospace Engineering, Aerodynamics and Wind Energy.

thesis *A physics-compatible solver for turbidity currents.*

supervisors Dr.ir. M.I. Gerritsma, Dr.ir. A. Palha.

2010–2014 **Bachelor of Science**, *Universidad Politécnica de Madrid*, *8.04/10*.
BSc in Aerospace Engineering, specialisation in Aerospace Science and Technologies.

Publications

[1] *Numerical simulation of glacier terminus evolution using the dual action principle for momentum balance*, D. Shapero, G.G. de Diego. *To appear in Journal of Glaciology* (2024).

[2] *Modeling sea ice in the marginal ice zone as a dense granular flow with rheology inferred from a discrete element model*, G.G. de Diego, M. Gupta, S.A. Gering, R. Haris, G. Stadler. *To appear in Journal of Fluid Mechanics* (2024). Arxiv.

[3] *On the finite element approximation of a semicoercive Stokes variational inequality arising in glaciology*, G.G. de Diego, P.E. Farrell, I.J. Hewitt. *SIAM Journal of Numerical Analysis*. Volume 61 (1), 1-25 (2023) Publisher.

[4] *Numerical approximation of viscous contact problems applied to glacial sliding*, G.G. de Diego, P.E. Farrell, I.J. Hewitt. *Journal of Fluid Mechanics*, Volume 938, A21 (2022) Publisher.

[5] *Convergence analysis of the scaled boundary finite element method for the Laplace equation*, F. Bertrand, D. Boffi, G.G. de Diego. *Advances in Computational Mathematics*, Volume 47, no. 34 (2021) Publisher.

[6] *Inclusion of no-slip boundary conditions in the MEEVC scheme*, G.G. de Diego, A. Palha, M. Gerritsma. *Journal of Computational Physics*, Volume 378, pp. 615-633 (2019) Publisher.

[7] *A spectral analysis of laser Doppler anemometry turbulent flow measurements in a ship air wake*, R. Bardera-Mora, M.A. Barcala-Montejano, A. Rodriguez-Sevillano, G. Gonzalez de Diego, M. Ruiz de Sotto. Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, Vol. 229 (12), pp. 2309-2320 (2015) Publisher.

Academic events

Invited talks

2024 *A Numerical Method for Solving the Stokes Contact Problem Arising in Marine Ice Sheet Dynamics*, FEM@LLNL, Lawrence Livermore National Laboratory.

2023 *Numerical approximation of viscous contact problems in glaciology.*, (invited) AGU23, San Francisco

2022 *A numerical exploration of glacier sliding with cavitation*, Maths on Ice seminar, online

2022 *Numerical approximation of viscous contact problems in glaciology*, MPE seminar, Imperial College London

2021 *Convergence analysis of the scaled boundary finite element method for the Laplace equation*, SACS seminar, Unviersity of Twente.

Conferences

2025 Minisymposium co-organizer for *Inference of Constitutive Relations from Micro-scale Simulation or Observational Data*, SIAM CSE25, USA.

2022 Minisymposium co-organizer for *Nonlinear Viscous Flow: Numerical Methods and Applications*, SIAM AN22, USA.

Teaching and supervision experience

2024 **Supervision of undergraduate summer project.** Supervision of Zhenyu Hong's project on the numerical solution of the SIA variational inequality for steady ice sheet configurations.

2019-2023 **C6.4 Finite Element Method for PDEs**, **B6.1 Numerical Solution of Differential Equations I** and **Prelims Analysis I - III** *University of Oxford* (Tutor and Teaching Assistant).

2017-2018 **Introduction to Numerical Methods** (INM), *University Duisburg-Essen*, MSc in Computational Mechanics (with Prof. Dr. Gerhard Starke).

2016 **Ethics and Engineering**, *Delft Technical University*, MSc in Aerospace Engineering (Teaching Assistant).

Prizes

2022 Best student presentation in the IGS Symposium ISS Bilbao.

Other Skills

Languages

- **Spanish**. *Mother tongue.*
- **English**. *Fluent.*
- **French**. *Intermediate.*
- **German**. *Beginner.*

Computer Skills

- **Python**. *Advanced*, extensive use in Numerical Analysis applications throughout MSc, Research Assistanship and PhD.
- **Firedrake** and **FEniCS**, computing platforms for solving partial differential equations. *Advanced*, extensive use in Numerical Analysis applications throughout MSc, Research Assistanship and PhD.
- **Latex**. *Advanced*, extensive use since BSc.
- **Matlab**. *Advanced*, extensive use throughout BSc and MSc.