

Giacomo Cristinelli

MSC MRES GRADUATE · MATHEMATICAL SCIENCES

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Education

University of Twente

Enschede, NL

PHD APPLIED MATHEMATICS

Ongoing

- *Research group*: Mathematics for Imaging and AI.
- *Thesis advisors*: dr. José A. Iglesias & prof. Christoph Brune
- *Tentative title*: Sparse optimization methods for non-smooth regularization in geometric inverse problems

University of Houston

Houston, US

RESEARCH INTERNSHIP

April, 2025

- Two months visiting period to collaborate with dr. Nicolas Charon and dr. Emmanuel Hartman.

Utrecht University

Utrecht, NL

MSC MRES MATHEMATICAL SCIENCE

March 2022

- *Specialization*: Differential Topology and Geometric Analysis.
- *Thesis advisors*: dr. Alvaro del Pino and prof. Gil Cavalcanti
- *Thesis title*: Anisotropic deformation on contact three-manifolds.
- *Thesis grade*: 8.5/10 (Dutch grading system)

University of Barcelona

Barcelona, SP

ERASMUS+ PROGRAM

2017-2018

- Courses: Functional analysis, Statistics & Philosophy of science

University of Trento

Trento, IT

BSc MATHEMATICAL SCIENCE

July 2019

- *Thesis advisor*: prof. Francesco Serra Cassano
- *Thesis title*: the Area formula, some topics of Geometric Measure Theory.
- *Thesis grade*: 30/30 with honours (Italian grading system)

Publications

PUBLISHED

G.C., J.A. Iglesias, D. Walter, Conditional gradient for total variation regularization with PDE constraints: a graph cut approach, *Computat Optim Appl*, 2025.

IN REVIEW

G.C., J.A. Iglesias, D. Walter, Linear convergence of a one-cut conditional gradient method for total variation regularization, 2025

G.C., J.A. Iglesias, Towards sparse optimization over convex loops: Equivalence of Square Root Velocity distance and Wasserstein-Fisher-Rao, 2026

IN PREP

G.C., J.A. Iglesias, G. Pai, C. Brune. computational optimal transport in the Heisenberg group.

G.C., J.A. Iglesias, VariSplat: a variational approach to 3D Gaussian splatting.

Awards, Scholarships, & Grants

2025 Travel grant, University of Twente

9500 €

2020	“Premio di merito”: award for excellent results, University of Trento	500 €
2017	Erasmus+ scholarship , Università di Trento	3300 €

Oral Contributions

INVITED TALKS

Conditional gradient for PDE constrained minimization, CalcVar 2024, July 2024, Schiermonnikog, NL.

Introduction to Tikz & PGF library, practical skills session, CalcVar 2024, July 2024, Schiermonnikog, NL.

Sparse optimization for discretized PDE constraint problems, CalcVar 2023, July 2023, Schiermonnikog, NL.

CONTRIBUTED TALKS

Sparse optimization on length measures towards PDE constrained problems, MIA PhD seminar, April 2025, University of Twente, NL.

Conditional gradients for total variation regularization with PDE constraints, Math PhD seminar, January 2024, University of Twente, NL.

Graph cuts in discretized perimeter-minimizing problems, MIA PhD seminar, December 2023, University of Twente, NL.

A brief introduction to tangent distributions. MIA PhD Seminar, December 2022, University of Twente, NL.

Anisotropic deformation on contact 3-manifolds. Master's thesis presentation, March 2022, Utrecht University, NL.

Intersection form on 4-manifolds. Seminar on Seiberg-Witten equations, May 2021, Utrecht University, NL.

Clifford structures on vector bundles. Seminar on Seiberg-Witten equations, March 2021, Utrecht University, NL.

Area formula and applications. Bachelor's thesis presentation, July 2019, University of Trento, NL.

CONTRIBUTED POSTERS

Conditional gradients for total variation regularization with PDE constraints, Optimal Trasport conference, March 2024, Weierstrass institute Berlin, DE.

Sparse optimization of TV regularized inverse problems with PDEs, 4th annual meeting of the Dutch inverse problems community, November 2024, University of Delft.

Teaching Experience

2025-2026	Vector calculus for Mechanical Engineering BSc , Teaching Assistant	University of Twente
2024-2025	Vector calculus for Electronic Engineering BSc , Teaching Assistant	University of Twente
2024-2025	Analysis 3 for Applied Mathematics BSc , Teaching Assistant	University of Twente
2023-2024	Linear Algebra for Mechanical Engineering BSc , Teaching Assistant	University of Twente
2023-2024	Linear Algebra for Computer Science BSc , Teaching Assistant	University of Twente
2023-2024	Analysis 3 for Applied Mathematics BSc , Teacher	University of Twente
2022-2023	Linear Algebra for Computer Science BSc , Teaching Assistant	University of Twente
2021-2022	Topology and Geometry for Mathematics BSc , Teaching Assistant	Utrecht University

Professional Development _____

SEASONAL SCHOOLS

Spring school “geometric methods in Data Science” (February 2023), organized by Braude college and Max Planck institute, Karmiel (IS). Topics included: metric curvatures for networks, persistent topology, and discrete Morse Theory.

Summer school “Mathematics and Machine Learning for Image Analysis” (June 2024) organized by MiVA University of Bologna, Bologna (IT). Topics included: numerical optimization methods in imaging, Functional optimization methods for machine learning.

Summer school “Evolutionary PDEs” (July 2025) organized by MIMUW University of Warsaw, Warsaw (PL). Topics included: Level set and variational methods for geometric flows, Stable solutions to nonlinear elliptic PDE.

ONLINE COURSES

Shape Analysis (June 2022), powered by MIT OpenCourseWare. Speaker: dr. Justin Solomon. Topics included: curvatures on triangle meshes, geodesic distance algorithm, discrete Laplace operator and application in graphics and vision.

Skills _____

Coding

- $\text{\LaTeX}$: excellent knowledge
- Python: good knowledge. Experience with the following libraries: Numpy, Pandas, TensorFlow, Matplotlib, ScyPy, Pytorch, and Fenics.
- Cpp: experience with finite elements libraries (MFEM, libMesh), and graphics (OpenGL).
- Matlab: basic knowledge.

Communication

- English: fluent (IELTS 7.0)
- Italian: native
- Spanish: basic

Soft Skills

- Excellent attention to details
- Critical thinking
- Self-reflective attitude

Outside activities _____

Sports

- Chess: $\approx$ 1800 Fide ELO
- Table-tennis: competition level
- Bouldering and climbing: amateur

Music

- I can play various string instruments, including guitar and bass. I can also play piano at a beginner level.