Daniele Catanzaro

Professor of Discrete Optimization • Center for Operations Research & Econometrics • Université Catholique de Louvain

Short Bio

I am Professor of Discrete Optimization, currently serving as Head of the Center for Operations Research and Econometrics (CORE) (https://uclouvain.be/fr/node/71486) of the Université Catholique de Louvain (https://uclouvain.be/fr/index.html).

I graduated summa cum laude in Automation & Computer Science Engineering at the Universitá degli Studi di Palermo (https://www.unipa.it/), Italy (2003), and I was awarded the Ph.D. in Computer Science by the Université Libre de Bruxelles (https://www.ulb.be/en) (2008), for my studies in discrete optimization, network design and computational phylogenetics. Prior to joining the Université Catholique de Louvain in 2014, I was appointed Chargé de Recherches at the Belgian National Fund for Scientific Research (http://frs-fnrs.be/fr/) (2009-2013) and Assistant Professor of Discrete Optimization at the Faculty of Economics and Business (https://www.rug.nl/feb/?lang=en) of the Rijksuniversiteit Groningen (https://www.rug.nl/) (2013-2014).

I served as an Associate Editor for Soft Computing (https://www.springer.com/journal/500) from 2021 to 2024. I am currently member of the program committee for ISCO 2024 (https://eventos.ull.es/isco-2024/Committees), panel member for the Canadian NSERC/CRSNG (https://www.nserc-crsng.gc.ca/NSERC-CRSNG/committees-comites/CivilIndustrial-CivilIndustriel_eng.asp) (calls

2022-2025), and appointed Expert for the European Research Executive Agency for the REA Marie Skłodowska-Curie European Postdoctoral Fellowships (https://marie-sklodowska-curie-actions.ec.europa.eu/actions/postdoctoral-fellowships) calls 2022 and 2023.

Linkedin (https://www.linkedin.com/in/danielecatanzaro/?originalSubdomain=be)

Research Activities

I am a **computer scientist** and an **applied mathematician**.

My research interests focus on **discrete optimization**, **search algorithms**, **massive parallelism**, and **high performance computing**. Specific optimization problems I worked on include: linear, nonlinear and uncertain network design problems, (versions of) the Steiner tree problem, colouring, covering, and partitioning problems, routing problems, (generalised versions of) the traveling salesman and the quadratic assignment problems, and nonlinear inverse problems. I am also particularly interested in specific topics from the area of **data compression** & **encryption**, **bioinformatics** (namely, the development of predictive models for **tumorigenesis**, **genome-wide association studies**), and in the combinatorics and computational aspects of **molecular evolution and phylogenetics**, with special focus on **distance methods** and **balanced minimum evolution** **(https://en.wikipedia.org/wiki/Minimum_evolution)**.

My research activities have been supported by the Belgian National Fund for Scientific Research (http://frs-fnrs.be/fr/) (FNRS**),** the Louvain Foundation (https://uclouvain.be/fr/chercher/fondation-louvain), the U.S. National Institutes of Health (https://www.nih.gov) (NIH), the Belgian American Educational Foundation (https://baef.be) (BAEF), and the European Marie Curie Fellowship Program (https://marie-sklodowska-curie-actions.ec.europa.eu).

Mathematical Genealogy (https://www.danielecatanzaro.com/wp-content/uploads/2020/11/catanzaro2.pdf)

Selected & Recent Publications

H. Dehaybe, D. Catanzaro, and P. Chevalier. Continuous deep reinforcement learning for non-stationary stochastic inventory optimization. European Journal of Operational Research, accepted, 2023.

A. Gasparin, and F. J. C. Verdù, D. Catanzaro, and L. Castelli. An evolution strategy approach for the balanced minimum evolution problem. Bioinformatics, 39(11), btad660, 2023.

D. Catanzaro, M. Frohn, O. Gascuel, and R. Pesenti. A Massively Parallel Branch-&-Bound Algorithm for the Balanced Minimum Evolution Problem. Computers & Operations Research, 158, 106308, 2023.

D. Catanzaro, M. Frohn, O. Gascuel, and R. Pesenti. A Tutorial on the Balanced Minimum Evolution. European Journal of Operational Research, 300(1): 1-19, 2022. Invited article.

D. Catanzaro, R. Pesenti, and L. Wolsey. On the Balanced Minimum Evolution Polytope. Discrete Optimization, 36: 100570, 2020.

D. Catanzaro, M. Frohn, and R. Pesenti. An information theory perspective on the Balanced Minimum Evolution Problem. Operations Research Letters, 48(3): 362-367, 2020.

D. Catanzaro, S. E. Shackney, A. A. Schäffer, and R. Schwartz. Classifying the progression of Ductal Carcinoma from single-cell sampled data via integer linear programming: A case study. IEEE/ACM Transactions in Computational Biology and Bioinformatics, 13(4):643–655, 2016.

Full scientific production

(https://www.danielecatanzaro.com/publications/)