

# Davide Gurnari

Dioscuri Centre for Topological Data Analysis  
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<b>EDUCATION</b>	<b>PhD in Mathematics</b> Polish Academy of Sciences, Warsaw, PL	October 2020 - ongoing
	<b>Master's Degree in Data Science</b> Università degli Studi di Padova, Padova, IT	September 2020
	<b>Bachelor's Degree in Physics</b> Università degli Studi di Padova, Padova, IT	April 2017

## **PUBLICATIONS** **Published Articles**

- [1] A. Mahdi, P. Blaszczyk, P. Dlotko, D. Salvi, T.-S. Chan, J. Harvey, D. Gurnari, Y. Wu, A. Farhat, N. Hellmer, A. Zarebski, B. Hogan, and L. Tarassenko, "OxCOVID19 Database, a multimodal data repository for better understanding the global impact of COVID-19," *Scientific Reports*, vol. 11, no. 1, pp. 1–11, 1 Apr. 29, 2021, ISSN: 2045-2322. DOI: 10.1038/s41598-021-88481-4.

## **Preprints**

- [2] P. Dlotko, D. Gurnari, and R. Sazdanovic, "Knot invariants and their relations: A topological perspective," Sep. 2, 2021, arXiv:2109.00831.

## **SELECTED TALKS AND POSTERS**

"Extensions of Mapper-type algorithms and their applications to knot theory" Poster - Young Topologists Meeting, Copenhagen, Jul. 19 2022;

"Euler Characteristic Curves (and Profiles)" - Applied Topology in Będlewo 2022, Będlewo - Jul. 04 2022;

"Distributed algorithms for Euler Characteristic Curves (and Profiles)" - Machine Learning 4 Society seminar, Oxford, online, Jan. 26 2022;

"Good data and where to find them: the challenges in modelling the pandemic" - 60th ERSA Congress, online, Aug. 25 2021 ;

"Euler Characteristic Curves" - Second Symposium on Machine Learning and Dynamical Systems, Fields Institute, online, Sep. 21 2020.

## **TEACHING**

**Invitation to Topological Data Analysis** Summer term 2022  
Group instructor University of Warsaw, PL

**Linear Algebra** Winter term 2021-22  
Group instructor University of Warsaw, PL

**Mathematical Analysis 2** Summer term 2021  
Group instructor University of Warsaw, PL

## **RELEVANT EXPERIENCES**

**PhD candidate** IMPAN - University of Warsaw  
October 2020 - ongoing Warsaw, PL

My research projects are on distributed computations of persistence curves and extensions of mapper-type algorithms.

**Collaboration**

April 2020 - January 2021

I contributed to the OxCOVID19 project. I helped handling the data about administrative divisions, social statistics and weather.

University of Oxford  
Oxford, England, UK

**Erasmus+ Traineeship**

March 2020 - June 2020

I worked with Dr Paweł Dłotko on large scale computations of Euler Characteristic Curves of high dimensional datasets. This work resulted in my Master's thesis and it is currently being extended in my PhD research.

Swansea University  
Swansea, Wales, UK

**Collaboration**

July - August 2019

I worked with Professor Luciano Serafini in the development of an algorithm for incremental learning of discrete planning domains.

Fondazione Bruno Kessler  
Trento, Italy

**RESEARCH  
SOFTWARE**

**PyBallMapper**

Python implementation of the Ball Mapper algorithm.

[github.com/dgurnari/pyBallMapper](https://github.com/dgurnari/pyBallMapper)

**pyEulerCurves**

Python package to compute Euler Characteristic Curves.

[github.com/dgurnari/pyEulerCurves](https://github.com/dgurnari/pyEulerCurves)

**TECHNICAL  
SKILLS**

**Python:** good knowledge, in particular *NumPy*, *Pandas*, *Scikit-learn* and *PyTorch*;

**R:** discrete knowledge;

**C++:** discrete knowledge;

**LaTeX:** good knowledge.

**LANGUAGE  
SKILLS**

**Italian:** Native

**English:** C1

**Polish:** A1