

# Sebastiano Cultrera di Montesano

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## EDUCATION / ACADEMIC TRAINING

<b>Broad Institute of MIT and Harvard, Postdoctoral Fellow</b> Eric and Wendy Schmidt Fellow, Part of Project Ex-vivo	<b>Cambridge, USA</b> June 2024 - Present
<b>Institute of Science and Technology Austria, PhD in Mathematics</b> Thesis: Persistence and Morse Theory for Discrete Geometric Structures	<b>Vienna, Austria</b> Sep. 2018 – Mar. 2024
<b>University of Cambridge, Master of Advanced Studies in Pure Mathematics</b> Thesis: Topological Hochschild Homology	<b>Cambridge, UK</b> Sep. 2017 - Jun. 2018
<b>University of Glasgow, Bachelor in Mathematics with First Class Honours</b> Thesis: Hopf Algebras and Quantum groups   Awarded 4 academic prizes for top exams' performance	<b>Glasgow, UK</b> Sep. 2013 - Jun. 2017

## WORK EXPERIENCE

<b>Research Scientist, Owkin Inc.</b> <ul style="list-style-type: none"><li>Built a geometric &amp; topological framework to study cells' interactions in the tumor microenvironment</li><li>Complemented deep learning algorithms developed by Owkin with interpretable geometric features</li></ul>	<b>Paris, France</b> May. 2021 - Dec. 2021
<b>Research Scientist, University of Glasgow (School of Mathematics and Statistics)</b> <ul style="list-style-type: none"><li>Selected and funded by the London Mathematical Society</li><li>Applied techniques from algebraic geometry and representation theory to study phylogenetic trees</li></ul>	<b>Glasgow, UK</b> Jun. 2016 - Aug. 2016
<b>Research Scientist, University of Glasgow (School of Neuroscience and Psychology)</b> <ul style="list-style-type: none"><li>Selected and funded by the Wellcome Trust Foundation</li><li>Investigated how the brain integrates visual information into prior expectation with fMRI</li></ul>	<b>Glasgow, UK</b> Jun. 2015 - Jul. 2015

## PUBLICATIONS AND PREPRINTS (authors are listed in alphabetical order)

Chromatic Topological Data Analysis, with O. Draganov, H. Edelsbrunner, M. Saghaian, to appear in *Discrete Geometry and Appl.*, 2025  
Banana Trees for the Persistence of Time Series Experimentally, with H. Edelsbrunner and L. Ost, *SoCG*, 2025  
Persistent Homology of Chromatic Alpha Complexes, with O. Draganov, H. Edelsbrunner, M. Saghaian, to appear in *FoDS*, 2025  
On the Size of Chromatic Delaunay Mosaics, with R. Biswas, O. Draganov, H. Edelsbrunner, M. Saghaian, to appear in *DCG*, 2025  
Dynamically Maintaining the Persistent Hom. of Time Series, with H. Edelsbrunner, M. Henzinger, L. Ost, *SODA*, 2024  
Depths in Arrangements: D-S-E Relations with Applications, with R. Biswas, H. Edelsbrunner, M. Saghaian, *JACT*, 2023  
Geometric Characterization of the Persistence of 1D Maps, with R. Biswas, H. Edelsbrunner, M. Saghaian, *JACT*, 2023  
Cont. and Discr. Radius Funct. on Vor. Tess. and Del. Mos., with R. Biswas, H. Edelsbrunner, M. Saghaian, *DCG*, 2022  
Counting Cells of Order-k Vor. Tess. in  $R^3$  with Morse Theory, with R. Biswas, H. Edelsbrunner, M. Saghaian, *SoCG*, 2021

## SCHOLARSHIPS AND AWARDS

### Academic:

Best Student Presentation at 37 <sup>th</sup> Symp. on Comp. Geometry (23 students presentations)	2021
London Mathematical Society Summer School, Selected with 50 of the best UK maths undergraduates of that year	2016
LMS Undergraduate Research Bursary, Awarded for my research project in Mathematics	2016
Dougall Prize, Awarded to most distinguished students in Mathematics (awarded twice)	2015, 2016
Lanfine Bursary, Awarded on the recommendation of the Head of Department (awarded twice)	2015, 2016
Wellcome Trust Vacation Scholarship, Awarded for my research project in Neuroscience	2015
Borsa di Studio Mario Negri, Italian student with a first class average (awarded four consecutive times)	2014, 2015, 2016, 2017

### Non-academic:

University of Cambridge Full Blue, Excellent basketball performance (best 4 players in the team)	2017
University of Glasgow Gordon Josey Bursary, Excellent basketball performance (awarded to 2 players in the team)	2016
Student-Athlete of the year for the Glasgow University Basketball Club, Best combined performance	2015

## INVITED TALKS

<b>Asia Pacific Seminar on Applied Topology and Geometry</b> , Kyoto University, Chromatic Alpha Complexes	17/11/23
<b>MIA Lightning Talk, Broad Institute of MIT and Harvard</b> , The Shape of a Point Set	11/10/23
<b>Structural Biology Seminar at the Menche Lab</b> , The Shape of a Point Set	24/05/23
<b>Rabadan Group Meeting at Columbia</b> , Chromatic Alpha Complexes	22/05/23
<b>Applied Topology Seminar at the EPFL</b> , Chromatic Alpha Complexes	18/04/23
<b>European Institute of Oncology, Milan</b> , Chromatic Alpha Complexes in Spatial Biology	30/01/23
<b>Workshop on Topological Methods in Data, Heidelberg</b> , Chromatic Point Clouds – Combinatorics and Topology	30/09/22
<b>Young Topologists Meeting, Copenhagen</b> , Geometric Characterization of Persistence Pairs of 1D Maps	26/07/22
<b>Policlinico Gemelli, Rome</b> , Predicting BRCA mutation from H&E slides	27/04/22
<b>Medical University of Vienna, Vienna</b> , Geometry and Topology in Digital Pathology	02/03/22
<b>Owkin, Paris</b> , Introduction to Topological Data Analysis	08/07/21
<b>Symp. on Computat. Geometry, Online</b> , Counting Cells of Order-k Voronoi Tessellations in $R^3$ with Morse Theory	11/06/21
<b>TopApp Workshop, Vienna</b> , Discrete Morse Theory in Action	24/04/19

## EXTRACURRICULAR ACTIVITIES

Models, Inference and Algorithms (MIA) seminar at the Broad Institute (organizer)	Jan. 2025 – Present
XBIO Course– Building a Biomedical Business (selected participant)	Apr. 2023 – Jun. 2023
Entrepreneurship Lab at ISTA Technology Transfer	Oct. 2020
Young Scientist Symposium: Motion in Nature and Technology (organizer)	May 2019
TopApp Workshop (main organizer)	Apr. 2019
President of the Glasgow University Men's Basketball Club	May 2015 – Jun. 2017

## LANGUAGES

Italian (native speaker), French (fluent), Spanish (fluent), English (fluent)