

Alberto Cazzaniga

Personal Details

Full Name: Alberto Cazzaniga
Date of birth: 1986
Place of birth:
Address:
Email address:
Phone number:

Research Interests

Machine Learning and Deep Learning, specially applied to image processing and image recognition.
Algebraic Geometry, Mathematical Physics.

Employment

June 2019- **Assegnista di Ricerca**, *CNR-Istituto Officina dei Materiali, Trieste*.
June 2020
Jan. 2017- **Claude Leon Postdoctoral Fellow**, *AIMS-South Africa, University of Stellenbosch*.
March 2019
6- **Research Fellow and Teaching Assistant**, *AIMS-South Africa, Cape Town*.
Dec. 2016
Sept. 2015- **Stipendiary Lecturer**, *Hertford College, Oxford*.
Dec. 2015

Education

Sept. 2019- **Master in High Performance Computing**, *ICTP, SISSA*, In progress..
Today
Sept. 2011- **PhD, Algebraic Geometry**, *University of Oxford, Lincoln College*.
Feb. 2016 Date awarded: 29/02/2016
Thesis title: On some computations of refined Donaldson-Thomas invariants.
Supervisor: Prof. Balazs Szendrői.
Oct. 2010- **MRI Masterclass in Moduli Spaces**, *Utrecht University*.
June 2011 Date awarded: 23/06/2011
Thesis title: Hurwitz Theory with Completed Cycles and r -Spin Structures.
Supervisor: Prof. Sergey Shadrin.
Oct. 2008- **Master Degree in Mathematics**.
Oct. 2010 Date awarded: 16/09/2010
Thesis title: Degenerazioni Toriche e Mirror Symmetry.
Supervisors: Prof. Gilberto Bini, Prof. Bert van Geemen
Grade awarded: 110/100 cum Laude.
Oct. 2005- **Bachelor Degree in Mathematics**, *Universita' degli Studi di Milano Bicocca*.
Oct. 2008 Date awarded: 08/10/2008
Thesis title: Funzioni Meromorfe su Superfici di Riemann.
Supervisor: Dr. Alessandro Ghigi
Grade awarded: 110/100 cum Laude.

Awards and Scholarships

- Jan. 2017- **Claude Leon Foundation, South Africa.**
Dec. 2018 Claude Leon Postdoctoral Fellowship and Travel Grant.
Sept. 2011- **University of Oxford, UK.**
Sept. 2015 EPSRC Programme Grant "Motivic Invariants and Categorification", full scholarship.
Sept. 2011- **Mathematical Research Institute (MRI), The Netherlands.**
Sept. 2015 Masterclass in Moduli Spaces, full scholarship.

Computing skills

Operating systems.

Knowledge of the fundamentals of the Ubuntu/Xubuntu Linux operating system. Familiarity in dealing with the basic command line operations in a Linux environment. Knowledge of the fundamentals of Unix Shell needed to interact with a computing cluster.

Programming Languages.

Familiarity with Python syntax, specially with the libraries Numpy and Pandas, and with (some parts) of the Sklearn, SciPy and PyTorch libraries. Basic knowledge of C, C++, Fortran.

Software.

Sound knowledge of the \LaTeX system. Familiarity with GitHub. Some minor experience in working with Matlab/Octave, Mathematica, and software for symbolic calculus.

Algorithms.

Basic knowledge of (and deep interest for) the main supervised and unsupervised machine learning techniques. Familiarity with the core concepts of deep-learning algorithms. Particular interest in clustering algorithms, dimensional reduction techniques, and feature extraction.

Publications and pre-prints

- A. Cazzaniga, A. T. Ricolfi
Framed sheaves on projective space and Quot schemes
arXiv:2004.13633, (2020), 11 pages, submitted.
- A. Cazzaniga, A. T. Ricolfi
Framed motivic Donaldson-Thomas invariants of small crepant resolutions
arXiv:2004.07837, (2020), 12 pages, submitted.
- A. Cazzaniga, D. Ralaivaosaona, A. T. Ricolfi
Higher rank motivic Donaldson-Thomas invariants of \mathbb{A}^3 via wall-crossing, and asymptotics
arXiv:2004.07020, (2020), 18 pages, submitted.
- A. Cazzaniga, A. Morrison, B. Pym, B. Szendrői
Motivic Donaldson-Thomas invariants of some quantized threefolds
Journal of Noncommutative Geometry 11, (2017), 1115-1139

Selected Talks

- Sept. 2018 **Higher rank refined DT invariants and geometric engineering**, "Joburg String Theory Workshop", WITS Rural Facility, Kruger Park, SA.
Aug. 2018 **On some computations of refined DT-invariants**, "Nairobi Workshop in Algebraic Geometry", University of Nairobi, KE.
Dec. 2017 **Motivic Donaldson-Thomas invariants of (some) noncommutative threefolds**, "Counting Problems in Quantum Field Theories and String Theory", WITS Rural Facility, Kruger Park, SA.

- Apr. 2017 **Higher Rank Refined DT-Invariants and Geometric Engineering**, *String Theory Seminar*, WITS University, Johannesburg, SA.
- May 2016 **Higher rank refined DT-invariants and invariants of surfaces**, "*Giornate di Geometria Algebrica e Argomenti Correlati*", Catania, IT.
- Jan. 2015 **Towards an example of DT-Nekrasov correspondence**, *MICA Workshop*, University of Oxford, UK.
- Dec. 2014 **Invariants of threefolds and invariants of surfaces**, "*Seminario di Natale*", Università degli Studi di Milano, IT.
- July 2014 **Higher rank phenomena in (refined) DT theory**, "*Workshop on instanton counting, moduli spaces and integrable systems*", contributed talk, Lorenz Center, Leiden, NL.

Thesis Supervision

- June 2018 **Supervisor, joint with B. Szendrői, AIMS-SA.**
Jean Michel Menjanahary, Title: *Resolutions and deformations of Du Val singularities.*
- June 2018 **Supervisor, joint with D. Martinelli, AIMS-SA.**
Mahefa Ratsisetra Ravelonanosy, Title: *Group actions on Riemann surfaces.*
- June 2017 **Supervisor, joint with B. Szendrői, AIMS-SA.**
Andriamahenina Ramanantoanina, Title: *Lines on the cubic surface.*
- June 2016 **Supervisor, joint with B. Szendrői, AIMS-SA.**
Stephen Kadedesya, Title: *On the finite subgroups of $SU(2)$ and $SO(3)$.*
Heritiana Ravelomanantsoa Andriantsilavo, Title: *Surfaces in 3-dimensional projective space.*

Teaching

- Aug. 2018 Elliptic Curves, "Nairobi Pre-Workshop in Algebraic Geometry", *University of Nairobi, KE*, one two hours lecture, one exercise session.
- March 2017 Short lecture series on moduli of quiver representations and related topics for some research affiliates of AIMS-SA, *three two hours lectures.*
- Jan.- Dec. 2016 Assisting teaching for several courses at AIMS-SA.
- Mich. Term 2015-2016 Tutor for Geometry, first year course, Lincoln College, Oxford.
- Mich. Term 2015-2016 Tutor for Algebra I, Algebra II, Analysis I, first and second year courses, Hertford College, Oxford.
- Hilary Term 2014-2015 Tutor for Geometry of Surfaces, third year courses, two classes, University of Oxford.
- Hilary Term 2012-2013 Tutor (one class) and teaching assistant (one class) for Algebraic Curves, third year courses, University of Oxford.

Other

- Aug. 2017 Organiser of the Pre-Workshop Week for Master and PhD students preceding the Nairobi Workshop in Algebraic Geometry, University of Nairobi, KE.
- 2016-present Referee for JMP.
- Dec. 2015 Admission interviewer for Hertford College, Oxford.
- Dec. 2013 Admission interviewer for St. Peter's College, Oxford. 