Claudia Rella

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EDUCATION

Master of Science in Mathematical and Theoretical Physics – Distinction   Oct 2018 – Jul 2019
Mathematical Institute and Department of Physics, St John's College, University of Oxford, UK

Thesis: *Motivic Amplitudes* supervised by Prof. Francis Brown.

Coursework in Physics: General Relativity – Relativistic Quantum Field Theory – Gauge Field Theory – Bosonic String Theory – The Standard Model and Beyond – Topological Quantum Field Theory – Topological Quantum Matter – Topological Quantum Computation – Radiative Processes and High-Energy Astrophysics.

Coursework in Mathematics: Groups Representations – Algebraic Geometry – Algebraic Topology.

Bachelor of Science in Physics – Summa cum Laude   Sep 2015 – Jul 2018
Department of Physics, University of Rome La Sapienza, Italy

Thesis: *Photonic Bloch Waves* supervised by Prof. Fabio Sciarrino.

Coursework in Physics: Classical, Analytical and Relativistic Mechanics – Inorganic Chemistry – Thermodynamics – Non-Relativistic Electromagnetism – Non-Relativistic Quantum Mechanics – Classical and Quantum Statistical Mechanics – Nuclear and Subnuclear Physics – Atomic and Molecular Physics – Optics and Photonics.

Laboratory Coursework: Mechanics – Thermodynamics – Electronics – Signals and Systems – Optics.

Coursework in Mathematics: Number Theory – Linear Algebra – Groups, Rings and Fields – Galois Theory – Modules and Algebras – Lie Groups and Lie Algebras – Representation Theory – Numerical Semigroups – Real Analysis – Complex and Functional Analysis – PDEs – Affine and Projective Geometry – Differential Geometry – Riemannian Geometry – General, Algebraic and Differential Topology – Probability Calculus.

Coursework in Informatics: C Programming Language – Numerical Analysis – Algorithms.

RESEARCH EXPERIENCE AND INTERNSHIPS

Master Class in Mathematical Physics   Sep 2019 – present
Department of Mathematics, University of Geneva, Switzerland

Coursework (up to Jan 2020): 2D Random Growth – Random Matrices.

Research (up to Jan 2020): Collaborating with Prof. Francis Brown, University of Oxford, on a research project in the field of Motivic Amplitudes. Collaborating with Prof. Francesco Riva, University of Geneva, on a research project in the field of Effective Field Theories.

Software Engineering Internship   2019, Jul
Pangea Formazione, Rome, Italy

Specific contributions: Contributed to Deep Learning predictive model for preventative maintenance of large infrastructures equipped with alarm nets. Project implemented using Bayesian Neural Networks and programming language R.

Research Internship   2017, Sep – Nov
LNF (National Laboratories of Frascati), INFN (National Institute of Nuclear Physics), Italy

Specific contributions: Contributed to Monte Carlo optical simulation of the Small-Angle Calorimeter using software Geant4 and programming language C++. Characterised performance of PbF_2 crystal attached to Hamamatsu R13478UV photomultiplier tube. Part of the experimental project PADME (Positron Annihilation into Dark Matter Experiment).

PUBLICATIONS

Characterization and Performance of PADME's Cherenkov-Based Small-Angle Calorimeter   2019, Mar
A. Frankenthal et al., Nuclear Instruments and Methods in Physics Research A, (vol. **919**, 1 March 2019, pages 89-97), https://doi.org/10.1016/j.nima.2018.12.035.

TALKS

Research Seminar on Lie Groups and Moduli Spaces   2019, Nov
Department of Mathematics, University of Geneva, Switzerland

Invited talk: Introduction to Motivic Amplitudes.

Conference on Representation Theory and Integrable Systems   2019, Aug
ETH, Zurich, Switzerland

Contributed talk: Motivic Scattering Amplitudes.

PADME Weekly Meeting   2017, Dec
INFN-LNF, Frascati, Italy

Invited talk: Monte Carlo Simulation of PADME's Small-Angle Calorimeter.

WORK AND TEACHING EXPERIENCE

Lecturer on Topological Surfaces   2019, Oct
Master Class in Mathematical Physics – Department of Mathematics, University of Geneva, Switzerland

Topics of lectures: Introduction to Topological Spaces – Hausdorff Separation Axiom – Connectedness and Compactness – Abstract Topological Manifolds and Surfaces – Normal Forms for Surfaces – Real Projective Plane in detail.

Remote Specialist Academic Editor in Mathematics and Statistics   2019, Oct
AsiaEdit, Hong Kong

Marker of the Mathematics Admission Test   2018, Nov
Mathematical Institute, University of Oxford, UK

Lecturer on Riemannian Geometry   2018, Mar – May
Excellence Program in Physics – Department of Mathematics, University of Rome La Sapienza, Italy

Topics of lectures: Introduction to Riemannian Geometry – Riemannian Manifolds with Non-Positive Curvature – Jacobi Fields and Conjugate Points – Cartan-Hadamard Theorem – Killing Fields.

ACADEMIC ACHIEVEMENTS AND SCHOLARSHIPS

Excellence Fellowship   2019
NCCR (National Centre of Competence in Research) SwissMAP, Switzerland

Degree Prize for Distinction   2019
St. John's College, University of Oxford, UK

Torno Subito Scholarship   2018
Department of Education, Research and University, Lazio, Italy

Best Student Award – Course in Nuclear and Subnuclear Physics   2018
University of Rome La Sapienza and INFN, Italy

Summer Student Scholarship   2017
INFN, Italy

Excellence Program   2016 – 2018
Department of Physics, University of Rome La Sapienza, Italy

Deserving Student Scholarship   2015 – 2018
University of Rome La Sapienza, Italy

ATTENDANCE AT CONFERENCES, WORKSHOPS, ETC.

SwissMAP Winter School in Mathematical Physics   2020, Feb
Les Diablerets, Switzerland

6th SwissMAP General Meeting
Villars-sur-Ollon, Switzerland

2019, Sep

School on Modular Forms, Periods and Scattering Amplitudes
ETH-ITS, Zurich, Switzerland

2019, Feb

Workshop on Quantum Foundations. New frontiers in testing quantum mechanics
INFN-LNF, Frascati, Italy

2017, Nov

Workshop on Quantum Foundations. The physics of "what happens" and the measurement problem
INFN-LNF, Frascati, Italy

2017, May

MEMBERSHIPS

Mentee of LeadTheFuture Mentorship Program   Sep 2019 – present
Invited Fellow of Italian Physics Society (SIF)   Jan 2019 – present

SKILLS

Italian Language	Native
English Language	Level C2 (CEFRL) - Cambridge ESOL Level 3 Certificate

Programming Languages	C, C++, HTML, Perl, R, Python
Version-control Systems	Git
Data Analysis Software	MATLAB, ROOT, gnuplot
Simulation Software	Geant4