Curriculum Vitæ

Florent Leclercq
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Personal Information

Born on January 17th, 1988 in Neuilly-sur-Seine (Hauts-de-Seine, France).
French citizen

Contact

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Research interests

Cosmology – The large-scale structure of the Universe: reconstruction and analysis of the morphology and formation history of the cosmic web, as probed by galaxy surveys; nonlinear cosmological structure formation; weak gravitational lensing; Bayesian and information-theoretic methods in cosmology; link with high energy physics.

Academic Employment

2017–. **Research Fellow** – Imperial Centre for Inference and Cosmology, Imperial College, London, UK.

2015–2017. **Senior Research Associate** – Institute of Cosmology and Gravitation, University of Portsmouth, Portsmouth, UK.

2012–2015. **PhD Student** – Institut d'Astrophysique de Paris (IAP, UMR 7095 CNRS–UPMC), Paris, France.

Postgraduate education from École Doctorale d'Astronomie et d'Astrophysique d'Île-de-France (ED 127), Paris, France, and Université Pierre et Marie Curie, Paris, France.

Thesis: *Bayesian large-scale structure inference and cosmic web analysis.*

Advisor: Benjamin Wandelt, professor and international chair of theoretical cosmology at the UPMC, director of the Institut Lagrange de Paris (ILP)

Graduation date: 24 September 2015.

Defence committee: Bertrand Laforge (*président*), Benjamin Wandelt (*directeur de thèse*), Oliver Hahn (*rapporteur*), Alan Heavens (*rapporteur*), Ofer Lahav (*examinateur*), Will Percival (*examinateur*), Rien van de Weijgaert (*invité*), Matías Zaldarriaga (*invité*).

Post-master courses: complementary education in various specialised topics including astrostatistics, theoretical cosmology, numerical simulations and high-performance computing.

Education

2011–2012. École polytechnique, Palaiseau, France and ETH, Zürich, Switzerland

Postgraduate degree (Master 2): *High Energy Physics* joint master program (Ranked first, GPA: 4.29)

Theoretical and experimental education in high energy physics: theoretical and observational cosmology, particle and astroparticle physics, the standard model of electroweak interactions and its supersymmetric extensions, strong interactions and quantum chromodynamics, general relativity and quantum gravity (string theory), tools and methods of experimental physics.

2008–2011. École polytechnique, Palaiseau, France

"*Ingénieur Polytechnicien*" program: high-level multidisciplinary scientific education, with specialisation in particle physics and astrophysics. A human, military and sportive training forms an integral part of the curriculum.

- 2010-2011, Third year: "From particles to stars" master program (GPA: 3.93)
- 2009-2010, Second year (GPA: 3.54)

- 2008-2009, First year (GPA: 4.03)

2005–2008. Lycée Henri IV, Paris, France

Classes préparatoires aux Grandes Écoles, voie MP: preparatory years for nationwide competitive examination to the elite French *Grandes Écoles* for scientific studies.

2005. Baccalauréat Scientifique. French secondary school diploma in sciences.

Diploma awarded with very high honours.

Research Internship Projects

02/2012–08/2012. Institut d'Astrophysique de Paris, Paris, France

Project: *Approaching Non-Linear Cosmic Structure Formation*, under the supervision of Benjamin Wandelt.

04/2011–07/2011. Institut d'Astrophysique de Paris, Paris, France

Project: *Dark Matter and Stars*, under the supervision of Fabio Iocco.

Grants & Fellowships

2017. Imperial College Research Fellowship (2017–2021). Total value: approx. **£ 210k**, including a research and travel grant of **£ 28k**.

Individual fellowship awarded among 21 in all disciplines in 2017, including 2 in physics.

2016. Agence Nationale de la Recherche.

Co-investigator of the ANR project *BIG4* (ANR-16-CE23-0002, January 2017–December 2020, PI : Guilhem Lavaux, 316 k€).

2015. Senior Research Associate appointment (2015–2018). Value: approx. **£ 105k**.

Position funded by the European Research Council grant *Darksurvey* (ERC 614030, June 2014–May 2020, PI : Will Percival, 2.1 M€).

2015. CITA National Fellowship (declined).

2012. Lagrange PhD Thesis Fellowship (2012–2015). Value: approx. **10 k€**.

Title and research grant (travel, equipment) awarded by the Institut Lagrange de Paris.

2012. AMX PhD Student Fellowship (2012–2015). Value: approx. **100 k€**.

Grant specifically aimed at former École polytechnique "*Ingénieur*" alumni. 40 fellowships awarded among all disciplines in 2012.

Awards & Honours

2015. Very honourable mention for my PhD thesis and defence. Unanimous congratulations from the jury for the "exceptionally strong scientific content of this PhD, which pushes forward the state of the art".

2011. Very honourable mention for my involvement in the year-long student seminar on Quantum Field Theory at the Centre de Physique Théorique (CPHT, UMR 7644 École polytechnique–CNRS), directed by Christoph Kopper.

2010. Second prize for the scientific project (*Projet Scientifique Collectif*) of the École polytechnique, out of 80 projects.

Research Supervision Experience

Formally recognised as an Assistant Supervisor by Imperial College in October 2018.

10/2018–. Supervisor, Mariem Magdy Ali Mohamed (master student in the MSc Physics with Extended Research at Imperial College).

Project: *Cosmology with deep sky surveys* (duration: 1 year).

05/2018–. Assistant Supervisor and mentor withing the Aquila Consortium, George Kyriacou, PhD student co-supervised by Alan Heavens & Andrew Jaffe at Imperial College.

PhD project: *Bayesian analysis of large-scale structure and lensing.*

02/2018–. Assistant Supervisor, Arrykrishna Mootoovaloo, PhD student co-supervi-

sed by Alan Heavens & Andrew Jaffe at Imperial College.

PhD project: *Bayesian hierarchical modelling of weak gravitational lensing.*

06/2017–. Mentor, Wolfgang Enzi (master student supervised by Jens Jasche at the Excellence Cluster Universe, Garching).

Project: *The Approximate Bayesian Computation of power spectrum reconstruction with galaxy surveys* (duration: 1 year).

03/2017–07/2017. Supervisor, Baptiste Faure (research intern, third-year student at the École polytechnique, equivalent to French master level M1).

Project: *Cosmological simulations: toward a massively parallel algorithm* (duration: 4 months).

Teaching Experience

03/2017. Institute of Cosmology and Gravitation, University of Portsmouth, Portsmouth, UK.

Cosmology with Bayesian statistics and information theory: advanced lectures for PhD students (6 hours).

2012–2013. Université Pierre et Marie Curie, Paris, France

Teaching assistant in the department of physics (72 hours):

- Experimental wave optics
- Physics lectures (thermodynamics and wave physics) for biologists

2011–2012. École polytechnique, Palaiseau, France

Teaching assistant in the department of physics (60 hours). In charge of tutoring undergraduate students in Quantum Mechanics.

10/2008–04/2009. Inspection académique des Pyrénées-Orientales, Perpignan, France

Eight-month pedagogy and leadership training, a part of the École polytechnique curriculum. In charge of the development and coordination of the scientific training of primary school teachers. In charge of helping teachers to develop good practice examples for teaching science.

Academic Service

Peer reviewing

Referee for A&A (2016–), Galaxies (2016–), JCAP (2017–), and ApJ (2017–).

Committees

2017–2018. Member of the Scientific Organizing Committee (SOC) of COSMO21: Statistical Challenges in 21st Century Cosmology (23–25 May 2018, Valencia, Spain).

Institutional activities

2017–. Representative of Imperial College Astrophysics at the London Institute of Cosmology.

2014–2015. Representative of PhD students at the IAP Laboratory Council.

Meeting organisation

2017–. Organiser of the monthly London Cosmology Discussion Meeting (*LCDM*).

2014. Organiser of the weekly meeting between students and the IAP seminar speaker (*student pre-seminar*).

2012–2013. Organiser of the weekly student seminar at the Institut d'Astrophysique de Paris (*YMCA@IAP*).

Memberships

International collaborations

2018–. Euclid Consortium, Galaxy Clustering science working group, work package "additional probes".

2016–. Aquila Consortium for Bayesian large-scale structure inference – founding member, lead responsible for the "cosmic web" and "weak gravitational lensing" programmes.

Institutional affiliations

2015–2017. The Extended Baryon Oscillation Spectroscopic Survey (eBOSS)

2015–2017. The Dark Energy Survey (DES)

Scientific socities

Société Française d'Astronomie et d'Astrophysique (SF2A)

European Astronomical Society (EAS)

Royal Astronomical Society (RAS) – elected as Fellow in December 2018.

Public Engagement

Press releases and media coverages

2017. Media coverage of Leclercq *et al.* 2017:

- Main contact for the press release from the University of Portsmouth ("*Cosmologists produce new maps of dark matter dynamics*"), covered by phys.org among others.
- Author of the announcement on the website of INSU ("*De nouvelles cartes des flots de matière noire dans notre voisinage cosmique*", in French).
- Featured in Discover magazine ("*Charting the unseen sky*").
- Interviewed by Pan European Networks ("*A light in the dark*").
- Main contact for the science highlight of the Institut d'Astrophysique de Paris ("*The origin of the large-scale structure of the Universe and dark matter flows in our cosmic neighborhood*")

2012. Media coverage of Iocco *et al.* 2012:

- Involved in a press article featured by PhysOrg.com ("*Stars containing dark matter should look different from other stars*").

Diffusion of scientific knowledge and scientific communication

2012–. Regular participant in outreach events and science festivals (Fête de la science, Stargazing Live, etc.).

2017–2018. Contributor to Entropy, a collaboration of artists and scientists organising outreach demonstrations telling the cosmic story of creation: in charge of the translation of the script into French.

Languages

French: native

English: fluent (C2)

Spanish, Japanese: basic notions (A1)

Computer Skills

Operating systems: Linux (Ubuntu), Windows

Software: most common office software products, image processing

Programming: C, C++, Python, Java, HTML, PHP, SQL

Parallel and GPU programming: OpenMP, MPI, CUDA

Scientific tools: LaTeX, Beamer, Matplotlib, GNUPlot, Mathematica, TensorFlow

Astrophysical and cosmological simulations

Statistical methods for inference in high dimensional parameter spaces, Markov Chain Monte Carlo techniques for sampling, processing of large data sets

Interests & Activities

Sports: fencing (12 years' experience), artistic fencing, and hiking

Member of an artistic fencing and theatrical company, *les Corsaires de La Ciotat*. Regularly organising and participating in artistic fencing shows. Former president of the association for artistic fencing at the École polytechnique.

Former member of the École polytechnique fencing team.

President of the 18th International Fencing Challenge of the École polytechnique (200 competitors, 3 days, budget 25 k€): in charge of an organising team of about 30 students.

Literature: interested in fantasy and historical fiction.

Creative writing

Travels: 32 countries visited in the world.