Francesca **Capel**

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RESEARCH EXPERIENCE

Postdoctoral Researcher — 2020 – Present
Technische Universität München — Germany

- ORIGINS Excellence Cluster & Data Science Laboratory
- Guest at the Max Planck Institute for Physics
- Research: Statistical methods in astro- & particle physics

Young Graduate Trainee — 2014 – 2015
ESTEC, European Space Agency — The Netherlands

- Development of a highly miniaturised radiation monitor
- Department of Space Environments and Effects ESTEC/TEC-EPS

Nuffield Science Bursary holder — Jul – Aug 2009
Cardiff University — United Kingdom

- Development of a near-field microwave microscope
- Department of Electrical Engineering

EDUCATION

PhD in Physics — 2015 – 2020
KTH Royal Institute of Technology — Sweden

- Thesis: *Cosmic clues from astrophysical particles*
- Supervised by C. Fuglesang & D. J. Mortlock

Master thesis — 2012 – 2013
École Polytechnique Fédérale de Lausanne — Switzerland

- Thesis: *Characterisation of scrape-off layer plasmas using Langmuir probes in the TCV tokamak*
- Supervised by I. Furno & B. Labit

Msci. (Hons.) Degree in Physics — 2010 – 2014
Imperial College London — United Kingdom

- First class honours

TALKS

2020	**ORIGINS Excellence Cluster - Science Week, Online** Multi-messenger astrophysics through hierarchical modelling
2020 Invited	**Max Planck Institute for Extraterrestrial Physics - Retreat, Ringberg** Constraining the astrophysical neutrino source population
2019 Invited	**American Statistical Assoication - JSM, Denver** A Bayesian hierarchical model for UHECR associations
2019 Invited	**European Physical Society - High Energy Physics, Ghent** Multi-messenger astrophysics via hierarchical modelling
2019	**IMAGINE Consortium - Workshop, Nijmegen** Connecting UHECR theory to data with Bayesian methods
2018 Invited	**Max Planck Institute for Astrophysics - Bayes Forum, Munich** A Bayesian hierarchical model for UHECR associations
2018	**Max Planck Institute for Extraterrestrial Physics - CRC 1258 Seminar, Munich** Impact of using the UHECR arrival energies to constrain source associations
2018	**Oskar Klein Center - Extreme objects seminar, Stockholm** A hierarchical model for the sources of UHECRs
2018	**TeV Particle Astrophysics, Berlin** Connecting UHECR theory to data with Bayesian hierarchical models
2018 Invited	**Univesity of Turin - Research Seminar, Turin** Scientific goals of the Mini-EUSO experiment
2017 Invited	**European Space Agency - Science Coffee, Noordwijk** Mini-EUSO: Towards a space-based UHECR observatory
2015	**Partikeldagarna, Uppsala** Towards a space-based UHECR observatory

AWARDS & GRANTS

2019	1 455 600 SEK from the Swedish National Space Agency for postdoctoral work on the analysis of Mini-EUSO data *Co-applicant with C. Fuglesang and P. Carlson*
2019	Shortlisted as one of four finalists for the American Statistical Association's Best Astrostatics Student Paper Award
2019	9 800 SEK travel grant from Jubileumsanslaget
2019	15 000 SEK travel grant from Galöstiftelsen
2018	18 900 SEK travel grant from Signeuls Stiftelsen
2018	500 EUR TeVPA award for *Excellent Young Scientists*
2017	50 000 SEK research grant from Alexandra och Bertil Gyllings Stiftelsen
2017	2 700 SEK travel grant form the Swedish National Space Board

TEACHING

Teaching assistant - ORIGINS Data Science Laboratory

Block Courses on *Introduction to Probabilistic Reasoning* and *Introduction to Numerical Methods and Machine Learning* — 2020

Teaching assistant - KTH Royal Institute of Technology

Laboratory course on *Radiation, Protection, Dosimetry and Detectors* - SH2603 — 2015 & 2016

Lecture course on *Modern Physics* - SH1012 — 2015 & 2016

Supervisor - Bachelor theses within the KTH MIST CubeSat project

C. Eriksson & V. Minoz, *Development of a Helmholtz coil for the MIST satellite* — 2019

M. Al-Janabi & L. Fischer, *A subsystem simulator for the MIST satellite* — 2019

Supervisor - Bachelor theses at the KTH Department of Physics

F. Hülphers, *Identification of UHE cosmic rays using neural networks* — 2018

P. Bühlmann & J. Sigvant, *Simulation study of meteors for Mini-EUSO* — 2017

Supervisor - Erasmus theses from the University of Turin

D. D'Ago, *Simulations of UHECR-induced air showers in ESAF* — 2017

S. Durando, *Data analysis for the EUSO-SPB mission* — 2017

A. Liberatore, *Optimization of the L2 trigger algorithm for Mini-EUSO* — 2016

SKILLS

Programming

Advanced	C/C++, Python, Stan, ROOT
Competent	Julia, FORTRAN, R, MATLAB
Familiar	VHDL
Software	Tensorflow, Geant4, CAD

Languages

- ●●●●● English
- ●●●● French
- ●●●● Swedish
- ●● German

SERVICES

Referee for Nature Astronomy, Monthly Notices of the Royal Astronomical Society and the Journal of Open Source Software

Contributor to large open-source software projects such as BAT.jl and 3ML

Spokesperson for the ORIGINS Excellence Cluster postdocs (2020 – present)

Organiser of the ORIGINS Data Science Laboratory Journal Club (2020 - present)

Organiser of the 18th JEM-EUSO Collaboration Meeting in Stockholm (2015)

OUTREACH

2020 **Interview** for the Research in Germany initiative, to be published online

2019 **Press release** on the KTH website for the launch of Mini-EUSO (in Swedish) — Link

2018 **Popular science seminar** on gravitational waves for KTH undergraduate students

2018 **Lectures** on cosmic rays at Vetenskapens Hus for high school students in Stockholm

2018 **Public seminar** on cosmic rays at KTH Library — Link

2018 **Interview** with the Swedish National Space Agency (in Swedish) — Link

2017 **Popular science talk** on gravitational waves at the KTH PhD Conference in Helsinki

2014 **Volunteer** at the European Space Agency's open day at ESTEC