ELIOT AYACHE

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Born 01/05/1994, French

PROFESSIONAL EXPERIENCE

2021 - 2023	**Postdoctoral researcher**, SUMO group, OSKAR KLEIN CENTRE, STOCKHOLM UNIV.

HIGHER EDUCATION

2017 - 2021	**Ph.D.**, Computational Astrophysics, UNIVERSITY OF BATH Supervisor: Dr. Hendrik van Eerten
2015 - 2017	**M.Sc.**, Astronomy, Astrophysics and Space Engineering, OBSERVATOIRE DE PARIS, PSL UNIV.
2013 - 2016	**Diplôme d'ingénieur (**equiv **M.Sc.** Executive Engineering), MINES PARISTECH, PSL UNIV.
2011 - 2013	**Preparatory classes**, Physics and Chemistry, LYCÉE SAINT-LOUIS, PARIS Ranked 79th out of 3489 (National "Grandes Ecoles" admission competitive exam)

STUDENT RESEARCH EXPERIENCE

2017 (Mar-Jun)	**Observatoire de Paris, LUTh** *Numerical modeling of the dynamics of stratified AGN jets* Supervisor: Dr. Zakaria Meliani
2016 (May-Aug)	**Observatoire de Genève, Exoplanets Team** *Characterisation of the density and internal structure of low-mass exoplanets* Supervisor: Prof. François Bouchy
2015 (Jun-Sept)	**NASA Jet Propulsion Laboratory** *Study of high-redshift galaxy clusters in preparation of the Euclid Mission* Supervisors: Prof. Simona Mei and Prof. James Bartlett
2014 (Sept-Feb)	**Observatoire de Paris, GEPI** *Automatic estimation of galaxy morphology using neural networks* Supervisor: Dr. Marc Huertas-Company

PROFESSIONAL GRANTS

2018	Travel award (DIAS school in high-energy astro), ROYAL ASTRONOMICAL SOCIETY	£450
2017	Fully funded 3.5 years Ph.D. studentship, UNIVERSITY OF BATH	£50,000

- Computer time

2020	GW4-Isambard Tier-2 HPC Center, UK	40,000 node-hrs
2022	SNIC Medium allocation (Dardel) – **Acting PI**	252,000 core-hrs

AWARDS

2020	Poster Prize 3rd place, London Mathematical Society - Bath ML symposium 2020

SELECTED CONTRIBUTED TALKS AND WORKSHOPS

2021	**EAS annual meeting** Workshop: *"Introduction to Machine Learning for Astrophysics"* Workshop: *"Machine Learning Methods for Astrophysics"*	Online
2020	**RAS National Astronomy Meeting** (Canceled, re-selected and delivered 2021) Same workshops as above	Online
2020	**RAS specialist meeting:** Radiation Hydrodynamics *"From Dynamics to radiation: Simulating GRB afterglow flares on a moving mesh"*	London, UK
2019	**Yamada conference LXXI:** GRBs in the gravitational wave era *"Moving-mesh simulations of GRB afterglow flares"*	Yokohama, Japan
2018	**Bath, Bristol, Exeter and Cardiff astrophysics student seminar** *"The dynamics of relativistic stratified AGN jets"*	Bath, UK

- Local talks

2021 Stockholm university Astrophysics departmental seminar.
2020 Workshop on Monte-Carlo simulations in Astrophysics (Online)
2020 Bath department of Physics Theory group meeting

SELECTED POSTERS

2021	IAU symposium 363 – Neutron star astrophysics at the Crossroads	Online
2020	RAS Early-Career Poster Exhibition (2 posters)	Online
2020	LMS-Bath symposium 2020: Mathematics of Machine Learning	Online
2019	SKA Meeting: A Centenary of Astrophysical Jets	Jodrell Bank Obs, UK

OUTREACH

2019	**Pint of Science Talk:** *"Badly Behaved Gamma-Ray Bursts"*	Bath, UK
2019	**European Researcher's Night: walking with scientists**	Bath, UK

SUPERVISION

2020 – 2021 **Rupert Eardley,** M.Sc. project student (advisor), UNIVERSITY OF BATH
2019 – 2020 **Claire Anderson,** B.Sc. project student (primary advisor), UNIVERSITY OF BATH
2019 – 2020 **Tara Howard,** B.Sc. project student (primary advisor), UNIVERSITY OF BATH
2017 – 2018 **Marina Solomou,** B.Sc. project student (advisor), UNIVERSITY OF BATH

TEACHING

- Lecturing

2019 – 2020 2nd year Physics: C programming, UNIVERSITY OF BATH

- Demonstrating

2019 – 2020 3rd year Physics: Computational Astrophysics, UNIVERSITY OF BATH
2018 – 2019 3rd year Physics: Computational Physics B, UNIVERSITY OF BATH
2017 – 2020 2nd year Physics: C programming, UNIVERSITY OF BATH

PROFESSIONAL MEMBERSHIP

2017 – 2021 Fellow of the Royal Astronomical Society

OBSERVING EXPERIENCE

Radial velocity measurements: HARPS, la Silla ESO, Chile
SOPHIE, Observatoire de Haute-Provence, France
Co-Investigator of radio observing proposals for GRB follow-up, UNIVERSITY OF BATH

COMPUTING, PROGRAMMING AND DATA ANALYSIS

Languages: C/C++, Fortran, Python, Bash, Java, HTML5/CSS
Packages: OpenMP, MPI, HDF5, Scikit-Learn, Tensorflow
Software: Git, SAOImage DS9, Topcat, ParaView
Technical experience: Numerical modeling (PDEs, finite-volumes, Monte-Carlo methods), Bayesians statistics (MCMC), neural networks, high-performance computing, Gaussian processes

LANGUAGES

French: Mother tongue English: Fluent (TOEFL iBT 112/120) Spanish: Intermediate

PUBLICATIONS

2 refered, incl 2 first author
2 non-refered (Proceedings), 2 in prep.

1. **Ayache, E. H**., Van Eerten, H. J., Daigne, F. (2020), MNRAS, 495, 2979-2993
   Late X-ray flares from the interaction of a reverse shock with a stratified ejecta in GRB afterglows: simulations on a moving mesh.
2. **Ayache, E. H.**, Van Eerten, H. J., Eardley, R. W. (2022), MNRAS, 510, 1315-1330
   GAMMA: a new method for modelling relativistic hydrodynamics and non-thermal emission on a moving mesh.