Christoph Becker

PHYSICS PHD CANDIDATE

Institute for Data Science & Computational Cosmology, Department of Physics, Durham, DH1 3LE

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Work Experience

DATACTIVE
Developer
JAN 2021 - PRESENT

- Improving and enhancing `BigBang`, a software for scientific analysis of internet standards development and internet governance communities.
- Study of social-technical practices relating to humanitarian aid data in the Covid-19 pandemic and their effect on the Global North/South divide.
- Study of social topologies created by digital platforms for political participation through mixed methods based on participatory observation, interviews and data analysis.

INSTITUTE FOR DATA SCIENCE
Lead Developer
MARCH - MAY 2020

- As part of the Royal Society's Rapid Assistance in Modelling the Pandemic initiative, I oversaw and contributed to efforts to understand the spread of SARS-CoV-2 in the UK using individual-based models.
- Supported local and national hospitals and authorities together with a interdisciplinary research group.

PERVASIVE TECHNOLOGIES
Data Scientist & Machine Learning Engineer
JULY - NOVEMBER 2019

- Satellite Asset Monitoring: Co-developed a platform for real-time monitoring and failure prediction of renewable energy assets.
- AI powered planograms: Co-developed a computer vision software to support retail management.

Education

DURHAM UNIVERSITY
PhD in Physics
OCTOBER 2017 - 2021

- Developer of a new research software to analysis structure growth in cosmological simulations.
- Developer of a new cosmological N-body code to test new theories to explain the late-time accelerated expansion.
- Co-creator of a novel ray-tracing algorithm for cosmological simulations.
- Lead developer of a individual-based model framework used by policymakers during the ongoing pandemic in the UK.
- Member of an interdisciplinary group of experts at Durham, working on policy recommendations regarding 'Data for the Public Good'.

LUDWIG MAXIMILIAN UNIVERSITY OF MUNICH
MSc in Physics
OCTOBER 2015 - OCTOBER 2017

- Fully funded research project on hydrodynamic simulations of galaxies at INAF (Italy).

DELFT UNIVERSITY OF TECHNOLOGY & LEIDEN UNIVERSITY
BSc in Physics & Mechanical Engineer
OCTOBER 2011 - OCTOBER 2015

- Co-authored four published works on hybrid rocket engines and space debris removal.
- Fully funded travel and accommodation costs to presented at international conferences.

Honors & Awards

2018 **Greenhouse Gas and Dietary choices Open source Toolkit (GGDOT) October Hacknight**
For most insight-full data-analysis of the national diet and nutrition survey (NDNS) data-set.

2017 **Science and Technology Facilities Councils Centres for Doctoral Training in Data Intensive Science (STFC-CDT) Studentships**
To fully fund my education and PhD research.

2017 **Erasmus Mundus Scholarship**
To support my research visit to the National Institute for Astrophysics (INAF) in Italy/Trieste.

2016 **MLP Excellence Cluster**
For outstanding academic achievements.

2013 **Royal Industriële Handels Combinatie (IHC) Teamwork Award**
In recognition of the development of a new hybrid rocket engine.

2013 **2nd Years Science Project Award**
For team project on the design and production of human powered elevation system.

2013 **European Space Agency (ESA) Education Sponsorship**
To fully fund travel and accommodation for the presentation of my work on mitigating the space debris hazard at the 6th ECSD.

Publications

Journal Articles

In Prep.	A Vision of the Rees-Sciama Effect in the CMB Mirage	
In Prep.	A tree grows in Illustris TNG: the galaxy-halo connection learned by decision trees	
Submitted	The impact of line-of-sight structures on measuring H_0 with strong lensing time-delays	**arxiv: 2006.08540**
Submitted	Proca-stinated cosmology II: Matter, Halo, and Lensing Statistics in the vector Galileon	**arxiv: 2011.01719**
2020	Proca-stinated cosmology I: A N-body code for the vector Galileon	**JCAP: 10(2020)05**

Conference Articles

2014	Test Campaign on a 10 kN Class Sorbitol-Based Hybrid Rocket Motor for the Stratos II Sounding Rocket	**SP2014-2969362**
2013	Sorbitol-Based Hybrid Fuel Studies with Nitrous Oxide for the Stratos II Sounding Rocket	**AIAA 2013-4049**
2013	The Infinite Staging Rocket — First Step to Realization	**IAC-13,D2,7,x17847**
2013	Priority Targets for an Autonomous Debris Removal Mission	**IAC-13,A6,2,x17952**

Reports

In Prep.	Durham Policy Insights Series — Data for Public Good

Presentations

Conferences

Jan. 2021	Moderator	Painting Luminous Matter onto the Universe with Decision Trees	**Virgo**
Jan. 2020	Talk	Dark Energy as a Vector Field	**DEX-XVI**
Aug. 2019	Poster	The Impact of Line-of-Sight Structure on Time Delay Cosmography	**Cosmo'19**
Jan. 2019	Talk	Testing Gravity with Strong Lensing	**DEX-XV**
Jul. 2018	Poster	A Machine Learning Approach to the P5 Flavour Anomaly	**STFC-UCL**
Jun. 2017	Talk	Connecting Cosmological Simulations and Machine Learning	**4th HBP School**

Seminars

March 2021	Talk	Julia for the curious Pythonista	ICC
March 2021	Moderator	Beyond Metric Auditing of Sociotechnical Systems	DRMC
Jan. 2021	Moderator	Decolonizing Artificial Intelligence	DRMC
Nov. 2020	Moderator	Machine Learning	DRMC
Apr. 2020	Talk	Understanding Epidemics with Flute	IDAS
Jul. 2019	Talk	Measuring H0 using strong lenses	IPMU
Mar. 2019	Talk	Vector-Tensor Gravity	ICC
Dec. 2018	Talk	State of the Art in Fair ML	IDAS
May 2018	Talk	Gravitational Strong Lensing in Modified Gravity	ICC
Jul. 2017	Talk	Effects of Thermal Feedback Coupling to BCG Environment	LMU-USM
Mar. 2017	Talk	Hydrodynamic Simulation of Active Galactic Nulcei Feedback in Galaxy Cluster	INAF

Skills

Programming	Python (7 yrs), Fortan (4 yrs), Bash (4 yrs), Matlab (4 yrs),C/C++ (1 yr), Julia(1 yr), Scala (1 yr)
Computing	Five years experience using Tier-1 HPC facilities
Operating systems	Various Linux distributions and Microsoft Windows
Documenting	LaTeX, Microsoft Word, LibreOffice Writer, Google Docs, MarkDown
Web	Git, Google Cloud Platform and Colaboratory, Comet.ml, HTML(5)
Languages	German (native), English (fluent), Dutch (proficient)
Music	Played the third clarinet in the symphonic orchestra of the AGV in Munich and the Durham Concert Band

Reviewing

Dec. 2020-	Reviewer of open-source research software.	**Journal of Open Source Software (JOSS)**

Community involvement

Nov. 2020- **Durham Research Methods Centre**
Organise, moderate, and publish essays of conversations on data analytics for social sciences.

Apr. 2019 **Schools' Science Festival**
Demonstrator for 'Cosmic Cookery: Growing Galaxies in a Computer'.

Jun. 2018 **Open day for schools**
Demonstrator for 'Modelling the invisible'.

2017/18 **Staff-Student Consultative Committee**
Represented postgraduate needs and interests at the board of studies meetings, organised social and career events, and surveyed and consequently arranged for new electronic equipment for the staff of my institute.

Teaching Experience

2019/21	Workshop demonstrator for Level 3 Mathematics Workshop	**Durham University**
2018/19	Workshop demonstrator for Level 2 Computational Physics	**Durham University**

Workshops & Schools & Courses

2021	Philosophy of Technology	**FernUniversität in Hagen**
2019	The Paris-Saclay AstroParticle Workshop 2019	**Pascal Institute**
2018	ICIC Data Analysis Workshops	**Imperial College London**
2018	International School of Space Science	**Università degli Studi dell'Aquila**
2018	STFC's Summer School in Artificial Intelligence and Machine Learning	**University College London**
2017	STFC Centre for Doctoral Training - National Kickoff Event	**Cardiff University**
2017	4th HBP School - Future Computing: Brain Science and AI	**Obergurgl, Austria**
2016	Debugging and Optimization of Scientific Applications	**CINECA, Bologna**