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**Address**
2 Foxley Square
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UK

# Jonathan Holdship

Astrophysicist and healthcare researcher specializing in numerical modelling, statistical inference and machine learning.

## Education

### 2014 - 2017, PhD, Astrophysics, University College London

STFC funded studentship for a thesis titled "Shock chemistry in star forming environments", a study combining numerical modelling of chemistry and analysis of observational data, supervised by Prof. Serena Viti. For this thesis, I was awarded the Jon Darius Memorial Prize for outstanding postgraduate physics research in Astrophysics.

### 2010 - 2014, MSci, Physics, First class, Imperial College London

Dissertation Project: Reduction and analysis of photometric data, identifying high redshift galaxies from their emission in different wavelength bands.

## Industry Experience

### Health Improvement Researcher, NHS

- Working with large datasets to provide operational insights
- Training machine learning models to predict risk of negative patient events
- Working with clinical leads to support direct care through AI

### Data Scientist, Meganexus

- Created course recommender systems for education software in UK prisons
- Developed python web apps to deliver recommendations and a reporting dashboard
- Trained neural networks to learn user preferences and then suggest relevant courses

## Research Experience

### Post Doctoral Researcher, UCL

- Created simplified chemical model for Bayesian parameter inference and adapted for HPC use
- Worked with laboratory chemists to produce improved astrochemical model
- Created a pipeline to reduce a large observational dataset and infer key physical parameters of observed objects

### PhD Student, UCL

- Developed UCLCHEM, a chemical model, for public release
- Analysed spectral data from IRAM-30m telescope
- Applied for and was awarded 14 hours observation time with the IRAM-30m Telescope
- Produced published work for many projects, publication list: orcid.org/0000-0003-4025-1552

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# Teaching Experience

### ORBYTS Project Co-ordinator, Blue Skies Space

- Managed a programme in which 17 secondary schools took part in ongoing astronomical research
- Responsible for hiring and managing 20 tutors, each delivering their own original research projects
- Taught my own research project which resulted in a publication for the students

### Project Consultant, Mayor's Fund for London

- Worked with Russian astronomers to produce an after-school astronomy course suitable for children starting UK secondary school
- Delivered the course both as an after-school club and full day project
- Trained science teachers at multiple schools to deliver the course with minimal support

# Technical Skills

### Programming

- Proficient in Python and Fortran, using it regularly for research projects.
- Completed projects in other languages such as C++ and Java.
- Current projects on `https://github.com/jonholdship`

### Other Computing

- Confident in use of a wide range of software such as git and LaTeX
- Experience in cloud computing serives such as AWS and use of high performance computing (HPC) facilities
- Routine user of UNIX/LINUX environments

# Publications

Selected works are included below. A full list of publications can be found at `https://orcid.org/0000-0003-4025-1552`.

### Bayesian Inference of the Rates of Surface Reactions in Icy Mantles, ApJ

- Bayesian inference of unknown reaction rates in a chemical network. The first such work in Astrochemistry.
- DOI: 10.3847/1538-4357/aacdf2.

### UCLCHEM: A Gas-grain Chemical Code for Clouds, Cores, and C-Shocks, MNRAS

- Publication for an open source numerical model of chemistry in astrophysical environments.
- DOI: 10.3847/1538-3881/aa773f

# Conferences and Courses

### 2019, *Invited Speaker*, EWASS Lyon

Invited to present work on parameter inference in astrochemistry for a session on machine learning at an international conference.

### 2018, *Oral Presentation*, EWASS Liverpool

Presented recent chemical modelling work on behalf of my research group.