Micah **Bowles**

Manchester, UK

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Education

PhD Astronomy and Astrophysics
Manchester, UK

THE UNIVERSITY OF MANCHESTER
2020 - 2024

- Semantic information retrieval for scientific applications.
- Equivariant CNNs for physically informed robustness in computer vision.
- Data augmentations as domain specific inductive biases in deep learning.
- Management, calibration, and imaging data pipelines of TB scale data sets (over 200 TB total).

MScR Astronomy and Astrophysics, Distinction
Manchester, UK

THE UNIVERSITY OF MANCHESTER
2019 - 2020

- Explainable AI through self-attention.
- First in my class.

B.Sc. Physics
Cologne

THE UNIVERSITY OF COLOGNE
2012 - 2018

- Simulating galaxy mergers.

Skills

Programming	Python, git, Bash, SLURM, LaTeX, Cython, FORTRAN
ML Stack	PyTorch, Scikit-learn, PyTorch-lightning, Weights and Biases
Languages	English, German

Talks

Speaking of Undeclared Priors: Language in Astronomical Classifications
University of Montréal

ASTROMERIQUE SPEAKER SERIES, POLARIS INSTITUTE
Invited, 2022

Paying Attention to Radio Galaxy Morphologies
Open University

PHYSICAL SCIENCES SEMINAR
Invited, 2022

Challenging Language in Astronomical Classifications
EAS

EUROPEAN ASTRONOMICAL SOCIETY ANNUAL MEETING MEETING
2022

Open-Source Domain Specific Astronomy Augmentations for your Data Set
EAS

EUROPEAN ASTRONOMICAL SOCIETY ANNUAL MEETING
2022

Astrophysically Informed Priors for Self-Attention Classification in Radio Astronomy
URSI

INTERNATIONAL UNION OF RADIO SCIENCE (AT-AP-URSI)
2022

Paying Attention to Astronomy Data
NAM

NATIONAL ASTRONOMY MEETING
2021

Publications

[1] Radio Galaxy Zoo: Towards Semantically Meaningful Radio Morphology Taxonomy

MICAH BOWLES, RGZ EMU COLLABORATION, ET AL.
In Prep.

[2] Towards Galaxy Foundation Models with Hybrid Contrastive Learning
ICML

MIKE WALMSLEY, INIGO V SLIJEPCEVIC, MICAH BOWLES, ANNA M M SCAIFE
2022

Machine Learning for Astrophysics: https://arxiv.org/abs/2206.11927

[3] **Learning Useful Representations for Radio Astronomy 'in the wild' with Contrastive Learning**

ICML

Inigo V Slijepcevic, Anna M M Scaife, Mike Walmsley, <u>Micah Bowles</u>

2022

Machine Learning for Astrophysics: https://arxiv.org/abs/2207.08666

[4] **A Compressed Sensing Faraday Depth Reconstruction Framework for the MeerKAT MIGHTEE-POL Survey**

URSI

Miguel Carcamo, Anna M M Scaife, Russ Taylor, Matt Jarvis, <u>Micah Bowles</u>, et al.

2022

https://doi.org/10.23919/AT-AP-RASC54737.2022.9814329

[5] **Radio Galaxy Zoo: Using semi-supervised learning to leverage large unlabelled data-sets for radio galaxy classification under data-set shift**

MNRAS

Inigo V Slijepcevic, Anna M M Scaife, Mike Walmsley, <u>Micah Bowles</u>, et al.

2022

https://doi.org/10.1093/mnras/stac1135

[6] **Quantifying Uncertainty in Deep Learning Approaches to Radio Galaxy Classification**

MNRAS

Devina Mohan, Anna M M Scaife, Fiona Porter, Mike Walmsley, <u>Micah Bowles</u>

2022

https://doi.org/10.1093/mnras/stac223

[7] **E(2) Equivariant Self-Attention for Radio Astronomy**

NeurIPS

<u>Micah Bowles</u>, Matthew Bromley, Max Allen, Anna M M Scaife

2021

ML and the Physical Sciences: http://arxiv.org/abs/2111.04742v1

[8] **Attention-gating for improved radio galaxy classification**

MNRAS

<u>Micah Bowles</u>, Anna M M Scaife, Fiona Porter, Hongming Tang, David J Bastien

2021

https://doi.org/10.1093/mnras/staa3946

[9] **Structured variational inference for simulating populations of radio galaxies**

MNRAS

David J Bastien, Anna M M Scaife, Hongming Tang, <u>Micah Bowles</u>, Fiona Porter

2021

https://doi.org/10.1093/mnras/stab588

[10] **Interactions among intermediate redshift galaxies-The case of SDSS J134420. 86+ 663717.8**

A&A

Persis Misquitta, <u>Micah Bowles</u>, Andreas Eckart, et al.

2020

https://doi.org/10.1051/0004-6361/201937009

Experience

Recruitment Consultant

Manchester, UK

NES Global Talent

2019

- Recruiter for renewable energy private equity investment.

Technical Translator

Cologne, Germany

Omikron Systemhaus GmbH

2015 - 2018

- German to English translation of corporate banking software, manuals and white papers.

Translator

Cologne, Germnay

Deutsche Welle

2014

- German to English translation of training handbook on international journalism.

Professional Activities

ML and Data Club

2020 - Present

Organiser and Host

Manchester, UK and Virtual

- Collaboration with intergovernmental organisation (SKAO).
- Up to 25 participants.
- Hosted ML teaching sessions for newcomers.
- Disseminating novel AI research relevant to astronomy and astrophysics.

Other

Various Positions

- **Reviewer** for the Monthly Notices of the Royal Astronomical Society (top astronomy journal).
- Market making quantitative trading hackathon.
- Climate hackathon - cloud coverage forecasting with geospatial time series data.