Tarek Allam Jr.

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EDUCATION

Ph.D Applied Machine Learning [Astrophysics]   **09.2017 - present**
UCL, Centre for Doctoral Training in Data Intensive Science
Supervised by: Prof. Jason McEwen (Primary Advisor), Prof. Ofer Lahav, Prof. Denise Gorse
Thesis: **Multivariate Time-Series Classification of Astrophysical Transients with Deep Learning**

MSc Computer Science (72%)   **09.2014 - 09.2016**
UCL, Department of Computer Science, Engineering
Supervised by: Prof. Jason McEwen, Prof. Denise Gorse
Project: **Radio Interferometric Image Reconstruction for the SKA: A Deep Learning Approach**

MSci Astrophysics Upper Second Class Honours Masters Degree (2:1)   **09.2007 - 07.2011**
Royal Holloway, University of London, Department of Physics
Supervised by: Prof. Stuart Boogert
Project: **Analytical Methods of Stellar Spectra: Stellar Spectroscopy**

SELECTED TECHNICAL EMPLOYMENT & EXPERIENCE

Machine Learning Researcher [TIN Internship]   **05.2021 - present**
The Alan Turing Institute, London.
Conduct research into unsupervised probabilistic machine learning and scalable non-parametric inference techniques for sequential latent factor modelling. Work collaboratively to investigate model and data compression techniques for on-device deployment of deep neural networks.
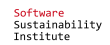
Research Software Engineering Fellow   **01.2020 - present**
Software Sustainability Institute (SSI), London
Advocating for software engineering best practises in the research community by providing version control and testing training to academics. My SSI mission is prepare and up-skill academics for working with large scientific research code-bases, that can scale to many contributors.

Graduate Teaching Assistant   **09.2020 - 09.2021**
UCL, London. *University of Jordan*, Amman
Assisting with grading and lesson planning for SPCE038: Machine Learning with Big Data. Lead the migration of `TensorFlow 1.x` to `TensorFlow 2.x` API. Coordinated infrastructure setup for delivery of course through Jupyter Book

Graduate Teaching Assistant   **03.2020 - 06.2020**
London Business School, London.
Assisting with grading and support for: E517: Python for Finance, QDE-APP: Applied Python Programming and CA22: Basic Python.

Research Software Engineer [Ph.D Internship]   **08.2019 - 03.2020**
The Alan Turing Institute, London.
Working in collaboration with the National Air Traffic Service (NATS), reinforcement learning (RL) was used to investigate machine learning methods to support air traffic controllers. Development of a RESTful API using `flask` was completed to allow for integration of both open-source and proprietary simulators. This has been followed by development of RL agents using `OpenAI gym`.

Data Scientist [Ph.D Internship]   **01.2018 - 04.2018**
Transport for London (TfL), London.
Working in a team of 4 fellow PhD students, we investigated a variety of machine learning methods for train failure predication, that would be robust to highly imbalanced time-series data. With high cost implications for false-positives, we looked at algorithmic trade-offs that optimised accuracy at a low false positive rate. This work was co-supervised by academics at UCL and data scientists at TfL.

**Further experience available on request

TOOLS PROFICIENCY

Languages In order of most recently used: PYTHON, RUST, C++, SCALA, JAVA

Software Libraries TENSORFLOW 2.x, PYTORCH 1.x, PANDAS, NUMPY, MATPLOTLIB, SPARK 2.3+, PLOTLY, NUMPYRO/JAX

CONFERENCES

- Statistical Challenges in Modern Astronomy VII, 2021
  Poster: *"Paying Attention to Astronomical Transients: Photometric Classification with the Time-Series Transformer"*

- International Biomedical and Astronomical Signal Processing (BASP) Frontiers, 2019
  Poster: *"Optimising the LSST Observing Strategy for Supernova Light Curve Classification with Machine Learning"*

AWARDS

- Software Sustainability Institute Fellowship, 2020: £3,000
- Won Honorarium, LSST Cadence Hackathon, 2018: $1,500
- STFC Studentship Centre for Doctoral Training in Data Intensive Science, UCL, 2017
- Young Graduate Trainee, Scientific Data Processing, European Space Agency, 2017 (declined)
- 3rd Place in ATOS International IT Challenge, 2015
- UCL Graduate Scholarship, MSc Computer Science 2014: £20,000

PUBLICATIONS

[1] **Allam Jr, Tarek** and J. D. McEwen, "Paying attention to astronomical transients: Photometric classification with the time-series transformer," *arXiv preprint arXiv:2105.06178*, 2021.

[2] C. S. Alves, H. V. Peiris, M. Lochner, J. D. McEwen, **Allam Jr, Tarek**, and R. Biswas, "Considerations for optimizing photometric classification of supernovae from the rubin observatory," *arXiv preprint arXiv:2107.07531*, 2021.

[3] A. Möller, J. Peloton, E. E. Ishida, C. Arnault, E. Bachelet, T. Blaineau, D. Boutigny, A. Chauhan, E. Gangler, F. Hernandez, *et al.*, "Fink, a new generation of broker for the lsst community," *arXiv preprint arXiv:2009.10185*, 2020.

[4] K. Ponder, R. Hlozek, A. **Allam, T** Bahmanyar, R. Biswas, K. Boone, M. Dai, L. Galbany, E. Ishida, S. Jha, *et al.*, "The photometric lsst astronomical time series classification challenge (plasticc): Final results," *AAS*, pp. 203–15, 2020.

[5] **Allam Jr, Tarek**, R. Biswas, R. Hlozek, M. Lochner, J. D. McEwen, H. Peiris, and C. Setzer, "Optimising the lsst observing strategy for supernova light curve classification with machine learning," 2019.

[6] R. Hlozek, R. Kessler, **Allam, Tarek**, A. Bahmanyar, R. Biswas, M. Dai, L. Galbany, E. Ishida, S. Jha, D. Jones, *et al.*, "The photometric lsst astronomical time series classification challenge (plasticc)," *AAS*, vol. 233, pp. 212–01, 2019.

[7] A. Malz, R. Hložek, **Allam Jr, Tarek**, A. Bahmanyar, R. Biswas, M. Dai, L. Galbany, E. Ishida, S. Jha, D. Jones, *et al.*, "The photometric lsst astronomical time-series classification challenge plasticc: Selection of a performance metric for classification probabilities balancing diverse science goals," *The Astronomical Journal*, vol. 158, no. 5, p. 171, 2019.

[8] **Allam Jr, Tarek**, A. Bahmanyar, R. Biswas, M. Dai, L. Galbany, R. Hložek, E. E. Ishida, S. W. Jha, D. O. Jones, R. Kessler, *et al.*, "The photometric lsst astronomical time-series classification challenge (plasticc): Data set," *arXiv preprint arXiv:1810.00001*, 2018.

[9] M. Lochner, D. M. Scolnic, H. Awan, N. Regnault, P. Gris, R. Mandelbaum, E. Gawiser, H. Almoubayyed, C. N. Setzer, S. Huber, *et al.*, "Optimizing the lsst observing strategy for dark energy science: Desc recommendations for the wide-fast-deep survey," *arXiv preprint arXiv:1812.00515*, 2018.

[10] D. M. Scolnic, M. Lochner, P. Gris, N. Regnault, R. Hložek, G. Aldering, **Allam Jr, Tarek**, H. Awan, R. Biswas, J. Blazek, *et al.*, "Optimizing the lsst observing strategy for dark energy science: Desc recommendations for the deep drilling fields and other special programs," *arXiv preprint arXiv:1812.00516*, 2018.