

JACK MUMFORD

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RESEARCH INTERESTS

My research focuses on the challenge of advancing XAI systems that can provide rationales for their outputs. I am interested in building machine learning that is logically coherent and investigating the extent to which such learning can accommodate effective human-computer interaction in order to engender greater trust in the output. In particular I examine the intersection of neural networks (subsymbolic) and argumentation semantics (symbolic), resulting in neural argumentation networks (NANs) that learn in a logically coherent manner according to argumentation principles.

EDUCATION

- 📅 2016 - 2017 MSc in Intelligent Systems
King's College London, Department of Informatics, UK
Distinction
- 📅 2012 - 2016 BSc in Mathematics
The Open University, School of Mathematics and Statistics, UK
1st Class (Honours)

RESEARCH

- 📅 2017 - PhD candidate in Computer Science
King's College London, Department of Informatics, UK
Thesis: Exploring the connections between argumentation and neural networks in producing data-driven decision making.
Supervisors: Professor Simon Parsons (School of Computer Science, University of Lincoln), Dr Elizabeth Black (Department of Informatics, King's College London) and Dr Isabel Sassoon (Department of Computer Science, Brunel University London).

TEACHING EXPERIENCE

- 📅 2017 - 2020 Graduate Teaching Assistant
King's College London, Department of Informatics, UK
Taught tutorial groups, managed computer practical sessions, first marked coursework, and second marked examinations; for undergraduate and masters level modules:
• Machine Learning • Data Mining • Software Measurement & Testing • Introduction to Robotics • Simulation & Data Visualisation.
- 📅 2014 - 2016 GCSE and A-Level Mathematics Tutor
West Midlands, UK
Self-employed in providing private one-one tuition for secondary school students studying for examination at GCSE and A-Level mathematics. Developed tailored lesson plans, marked homework, provided learning goals and provided relevant feedback.

PROFESSIONAL EXPERIENCE

- 📅 2012 - 2014 Programme Co-ordinator/Operations Co-ordinator
University of Warwick, Warwick Business School, UK
Administrative delivery of undergraduate modules and distance learning masters-level content. My duties included: • Responding to student enquiries by email, telephone and face-to-face • Supporting preparation and running of departmental open days • Analysing and producing reports based upon departmental performance data • Production of invoices for necessary materials • Meeting with prospective students and their parents to explain and advocate the courses offered by the department.
- 📅 2010 - 2012 Customer Services Officer
HSBC Bank, Stratford-upon-Avon, UK
Driving the quantity of sales and the quality of service within a target assessed team environment. Accepted onto the internal fast track Promotion Scheme. My duties included: • Facilitating a range of financial transactions and products • Auditing work and procedures as an authorised Signatory of the bank • Supporting smaller branches of the bank in a supervisory role.

AWARDS & GRANTS

- 📅 2020 Recipient of *King's Education Award* (King's College London)
- 📅 2019 Nominated for *King's Education Award* (King's College London)
- 📅 2019 *Outstanding Teaching Assistant Award* (Dept. of Informatics, King's College London)
- 📅 2017 - 2020 *PhD studentship* (EPSRC)
- 📅 2017 *Prize for the best overall performance on the MSc in Intelligent Systems* (Dept. of Informatics, King's College London)

ACADEMIC SERVICE

- 📅 2020 **Additional reviewer** 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2021)
- 📅 2020 **TA Representative** Department of Informatics TA Liaison Committee (King's College London)
- 📅 2019 - **Co-Founder & Editor** Online Handbook for Argumentation in Artificial Intelligence (OHAAI)
- 📅 2019 - **Co-Founder & Member** Argumentation Reading Group (King's College London)
- 📅 2016 - 2017 **Student Representative & Co-chair (from 2017)** Department of Informatics Postgraduate Staff Student Liaison Committee (King's College London)

OTHER SKILLS

Programming knowledge Python, MATLAB, Java, HTML, LaTeX.
Languages English (fluent), French (intermediate), Spanish (intermediate).

SCIENTIFIC TALKS

- 📅 2021 • *Complement-based argumentation*. Seminar for the UK India Education & Research Initiative (UKIERI).
- 📅 2020 • *Learning attack relations from data - the abstract argumentation way*. Seminar for the UK India Education & Research Initiative (UKIERI).
 - *Building Neural Argumentation Networks (NANs) - automating the learning of attack relationships from data*. Seminar for the Reasoning and Planning Group, Department of Informatics, King's College London, UK.
- 📅 2019 • *Building Neural Argumentation Networks (NANs) - automating the learning of attack relationships from data*. Presentation at the Argumentation Workshop, Imperial College London, UK.
 - *Argumentation Machine Learning*. Seminar for the Argumentation Reading Group, King's College London, UK.
 - *Attack learning using a feed-forward neural network*. Seminar for the Argumentation Reading Group, King's College London, UK.
 - *Calculating Dung semantics attack-relations using a feed-forward neural network*. Presentation at the London Argumentation Forum, Imperial College London, UK.

PUBLICATIONS

Published papers:

1. Jack Mumford. "Crafting neural argumentation networks". *Online Handbook of Argumentation for AI: Volume 1*, pages 22-26. arXiv:2006.12020 [cs.AI], 2020.

Papers under review:

2. Jack Mumford, Isabel Sassoon, Elizabeth Black and Simon Parsons. "On the complexity of finding sigma consistent solution attack relations for complete argumentation semantics". Submitted to the *30th International Joint Conference on Artificial Intelligence (IJCAI-21)*, 2021.
3. Jack Mumford. "Learning attack relations from data using Neural Argumentation Networks (NANs)". Submitted to *Online Handbook of Argumentation for AI: Volume 2*, 2021.

Papers being prepared for submission:

4. Jack Mumford, Isabel Sassoon, Elizabeth Black and Simon Parsons. "Deriving abstract argumentation attack relations from data using a feed-forward neural network". Being prepared for submission to *Artificial Intelligence*, expected submission date April 2021.
5. Jack Mumford and Stefan Sarkadi. "What you don't know can hurt you: on unknown knowns and unknown unknowns in abstract argumentation". Being prepared for submission to the *18th International Conference on Principles of Knowledge Representation and Reasoning*, expected submission date March 2021.

Edited books:

6. Federico Castagna, Francesca Mosca, Jack Mumford, Stefan Sarkadi and Andreas Xydias (editors). *Online Handbook of Argumentation for AI: Volume 1*. arXiv:2006.12020 [cs.AI], 2020.