

Alexander F. Spies

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Profession

JSPS Doctoral Fellowship Aug 2023 - Present
National Institute of Informatics, Tokyo *Tokyo, Japan*
Advisor: Prof. Katsumi Inoue

Ph.D. Computer Science (Artificial Intelligence) Oct 2020 - Present
Imperial College London *London, UK*
Thesis: *Symbolic Reasoning in Artificial Neural Networks*
Advisors: Prof. A. Russo, Prof. M. Shanahan

Education

Imperial College London Sep 2019 - Sep 2020
MSc in Computing (AI and ML) - *Classification: Merit, Courses: 77%* *London, UK*
Thesis: *Unsupervised Learning of World Models in the Animal AI Environment*
Independent Research Project: *Neurosymbolic Learning and Neurally Weighted dSILP*

University of California, Berkeley Aug 2017 - May 2018
Study Abroad Year, Physics - *GPA: 3.87/4.00* *Berkeley, CA, USA*
Performed undergraduate research whilst undertaking graduate level courses

University of Manchester Sep 2015 - Jun 2019
MPhys in Physics (Theoretical) - *Classification: First Class, Courses: 79.8%* *Manchester, UK*
Thesis: *Artificial Intelligence for the Automated Diagnosis of Atrial Fibrillation*

Professional Experience

German Electron-Synchrotron (DESY) Jul 2018 - Sep 2018
Research Intern / Student Researcher *Hamburg, Germany*

- Performed an Exclusion analysis of Higgs Boson decay channels in the MSSM

 Advisors: Prof. G. Weiglein, Dr. E. Bagnaschi, Dr. T. Stefaniak

Lawrence Berkeley National Laboratory (LBNL) Feb 2018 - Jul 2018
Undergraduate Researcher *Berkeley, CA, USA*

- Investigated Nonlocal Thresholds in Particle Physics pixel detectors [1]

 Advisors: Dr. B. Nachman

Publications

(*indicates equal contributions)

Journal Articles

- [1] *Nonlocal Thresholds for Improving the Spatial Resolution of Pixel Detectors*
Nachman, B. and Spies, A.F.
Journal of Instrumentation (JINST), Sep 2019.

Workshop Articles

- [2] *Sparse Relational Reasoning with Object-Centric Representations*
Spies, A.F., Russo, A. and Shanahan, M.
Dynamic Neural Networks Workshop (ICML), July 2022. (**spotlight**)
- [3] *Structured World Representations in Maze-Solving Transformers*
 Ivanitskiy, M.I.*, **Spies, A.F.***, Räuker, T.* et al.
Unifying Representations in Neural Models Workshop (NeurIPS), Dec 2023.

Preprints

- [4] *A Configurable Library for Generating and Manipulating Maze Datasets*
 Ivanitskiy, M.I., Shah, R., Spies, A.F. et al. | arXiv:2309.10498, Sep 2023.

Awards

JSPS Postdoctoral Fellowships for Research in Japan	May 2023
Google Cloud Research Grant	Aug 2022
1st Place in AIHack 2022 (Generative Hamiltonian Networks to model Microfluidics)	Mar 2022
Full Ph.D. Scholarship from UKRI	2020 - 2025
1st Place in StudentHack VII (TamaGotcha - Scan friends and look after their avatars)	Mar 2019

Leadership Experience

UnSearch Team, *Research Team Lead*, AI Safety Camp March 2023 - Present

- Led a team of independent researchers to develop tools and carry out research
- Constructed a detailed research agenda around multiple key research questions

Teaching Experience

Deep Learning, *Course Support Leader*, Imperial College, Computing Spring 2021&22

- Developed an autograding framework combining departmental tools with **Otter Grader**
- Aided with course organisation and spearheaded partnership with **Paperspace** for GPUs
- Co-created coursework on Generative Modelling. Created tutorial on **Attention Mechanisms**

Maths for Machine Learning, *Teaching Assistant*, Imperial College, Computing Fall 2021&2022

- Revamped Courseworks on Vector Calculus, Automatic Differentiation and Optimization
- Aided in Lab sessions and managed marking

Data Structures & Algorithms *Teaching Assistant*, Imperial College Business School Fall 2021&2022

Aided in Lab sessions and co-created and ran weekly workshops designed to consolidate material

Computer Architecture, *Teaching Assistant*, Imperial College, Computing Fall 2021

Aided in Lab sessions and marked Coursework

Python for Non-CS Majors, *Course Leader*, UniCS Society Spring 2019

- Created **lecture materials and exercises** which were used in Python coding workshops
- Led weekly sessions, briefed TAs on the lesson plans, and lectured

Academic Service

- Reviewer *Journ.:* Artificial Intelligence | *Conf:* NeurIPS, ICLR, AAAI, UAI, ICLP

Organization

- Organizing committee **ICLP 2023** 2023
- Co-founder of **ICARL Seminar Series** and Reading Group 2021 - 2023
- Co-organizer of **Imperial Computing Conference** 2020 - 2023

Language Skills

English (Native)

German (Native)

Japanese (Beginner)