



The NSF AI Institute for

Artificial Intelligence and Fundamental Interactions



IAIFI-AIMLAC Workshop Day 1

10:30-11:00 am (Kolker Room, 26-414)

Welcome from Jesse Thaler (IAIFI Director), Mike Williams (IAIFI Deputy Director), and Phiala Shanahan (IAIFI Senior Investigator)

1:00-4:30 pm (Kolker Room, 26-414)

Short Talks (30 minutes) – IAIFI introduced by Phiala Shanahan; AIMLAC introduced by Gert Aarts

- Ge Yang (IAIFI Fellow) – Correcting the Spectral-bias of Neural Value Approximation
- Siddharth Mishra-Sharma (IAIFI Fellow) - Simulation-based inference for astrophysical dark matter searches
- Di Luo (IAIFI Fellow) – Machine Learning for Quantum Science
- Biagio Lucini (Swansea) – The Quantum Field-Theoretic Learning Machine
- Maciej Glowacki (Bristol) – Deep learning aided New Physics Searches
- Sophie Sadler (Swansea) – Explainability in Graph-based Machine Learning and Social Network Analysis

4:30-5:30 pm (IAIFI Penthouse, 26-648)

Reception with refreshments



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IAIFI-AIMLAC Workshop Day 2

9:00-10:30 am (Kolker Room, 26-414)

Flash Talks (3-5 minutes)

- Tonicha Crook (Swansea) – A computability perspective on (verified) Machine Learning
- Yin Lin (MIT) - Neural-network preconditioners for solving lattice Dirac equations
- Tom Spriggs (Swansea) – Spectral reconstruction in lattice QCD at nonzero temperature
- Natalia Sikora (Swansea) – Shining the light on cancer diagnosis in asymptomatic patients. Applications of Raman spectroscopy and machine learning algorithms in blood-based liquid biopsies
- Anindita Maiti (Northeastern) - Symmetries, Non-Gaussianities, and Dualities in Neural Networks / Theoretical Particle Physics Correspondence
- Tabitha Lewis (Swansea) – Data visualisation of Sepsis mice data
- Luke Golby (Swansea) - Linking Cancer Prognosis to Immune Cell Composition and Contents by Artificial Intelligence (AI)
- Tri Nguyen (MIT) - Understanding the dark matter density profiles in dwarf galaxies with neural networks

1:00-2:00 pm (IAIFI Penthouse, 26-648)

Reception with refreshments

2:00-4:00 pm (LNS Conference Room, 26-528)

Education Discussion

- Gert Aarts (Swansea) – AIMLAC: Training the next generation of data/ML scientists
- Tom Spriggs (Swansea) – Student placement at Amplyfi
- Mike Williams (IAIFI Deputy Director) – IAIFI and Fellowship Program, Summer School, and Interdisciplinary PhD program ([slides](#))
- Phil Harris (IAIFI Senior Investigator) – MITx course and Micromasters ([slides](#))



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IAIFI-AIMLAC Workshop Day 3

10:00-11:30 am (Kolker Room, 26-414)

Flash Talks (3-5 minutes)

- Ben Winter (Bangor) – Using Grammatical Evolution to create loss functions
- Iwan Mitchell (Bangor) – Optimising CT scanners with Virtual Simulations and Neural Networks
- Peter Lu (MIT) - Discovering Conservation Laws via Manifold Learning
- Matt Selwood (Bristol) – Consistent Analysis of Type 2 AGN Optical Spectra
- Jack Furby (Cardiff) – Explainable Concept Bottleneck Models using LRP
- Sam Kim (MIT) - Deep Learning for Bayesian Optimization of High-Dimensional Problems in Science
- Sam Wincott (Cardiff) – Communication for exploration in deep reinforcement learning
- Rumen Dangovski (MIT) - Equivariant Contrastive Learning

2:00-3:00 pm (Kolker Room, 26-414)

IAIFI Colloquium: Giuseppe Carleo, Assistant Professor, Computational Quantum Science Laboratory, École Polytechnique

Neural-Network Quantum States: new computational possibilities at the boundaries of the many-body problem

3:00-4:00 pm (IAIFI Penthouse, 26-648)

Reception with refreshments