Abel Lawrence Peirson

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Education

Stanford University — Stanford, CA *September 2017 - Present*
Ph.D in Physics (Theoretical Astrophysics). GPA: 4.0 (in required coursework).

University of Oxford (Christ Church) — Oxford, UK *2013 - June 2017*
MPhys in Physics. First Class Honours with Distinction - top 10% of graduating class.

Honors, Awards and Grants

Future Investigator in NASA Earth and Space Science and Technology (FINESST) — Stanford, USA *June 2019*
Hooke Prize for the most outstanding member of Christ Church — Oxford, UK *September 2017*
Roach Prize for the most outstanding undergraduate across the sciences — Oxford, UK *September 2017*
Oxford International Strategy Scholarship — Oxford, UK *June 2016*
Christ Church Travel Award — Oxford, UK *June 2016, 2015*
Christ Church Academic Scholarship — Oxford, UK *2014-2017*
Christ Church Collections Prize — Oxford, UK *2015,2014,2013*
Gold, British Physics Olympiad — London, UK *2013*
Kingston Grammar School Academic Scholarship — Kingston, UK *2008-2013*

Research Experience

Stanford University, KIPAC — Stanford, CA *October 2017 - Present*
Graduate Student Researcher (Theoretical Astrophysics), ***Prof. Roger Romani***
Establishing relativistic models to explain observed polarization phenomena in high energy sources including astrophysical jets and pulsar wind nebulae. Using Bayesian neural networks to improve IXPE polarization sensitivity across all energies. Member of the IXPE collaboration: theory, simulation and AGN teams.

Stanford University, Neurosciences Institute — Stanford, CA *March 2018 - June 2018*
Graduate Student Researcher (Theoretical Neuroscience), ***Prof. Shaul Druckmann***
Developing a ring attractor dynamical system neural network to reproduce 2D path integration and pointing vector persistence in the drosophilia fly brain. Results were understood using topological data analysis.

Stanford University, NeuroAILab — Stanford, CA *December 2017 - March 2018*
Graduate Student Researcher (Artificial Intelligence), ***Prof. Dan Yamins***
Investigating unsupervised visual learning models, namely whether learning affine transformations can be transferred to improved accuracies in object classification, using RotNet and ImageNet datasets.

University of Oxford, Department of Physics — Oxford, UK *September 2016 - May 2017*
Research Assistant (Astrophysics & Cosmology Theory and Computation), ***Prof. Garret Cotter***
Modelling the spectra of BL-Lac type blazars, developing simulations to investigate how these spectra change travelling across different intergalactic media and placing limits on whether the Cherenkov Telescope Array will be able to constrain the existence of axion-like particles.

CERN, CLIC Test Facility — Geneva, Switzerland *June - August 2016*
Research Assistant (Accelerator Physics), ***Prof. Philip Burrows***
Leveraged beam dispersion to improve CTF3's Quadrupole scan, which measures the emittance and Twiss parameters, and reduce the uncertainty in the beam energy spread. Designed a new Gaussian fitting program to Enhance beam analysis pipeline. Quantified first order chromatic aberration effects. Results were used to sharpen beam injection.

University of Science and Technology of China, Plasma and Fusion Laboratory — Hefei, China *June - July 2015*
Research Assistant (Plasma Experiment), ***Prof. Xuan Sun***

Investigated Alfven wave phenomena in low temperature plasmas under a bias voltage, confirming their Doppler shift and amplification. Improved plasma confinement in the KMAX axisymmetric tandem mirror machine by applying a bias voltage. Constructed and inserted a Langmuir probe.

WHOI, Geology and Geophysics Laboratory — Woods Hole, MA *June - August 2011*
*Research and Engineering Assistant (Geophysics), **Jim Broda***

Repairing and upgrading the large diameter deep sea coring system on the R/V Knorr, including the electronics of the winch assembly. Analysing sea-bed specimens collected by this system and cataloguing them in the Core Laboratory.

Peer-Reviewed Publications and Presentations

A.L.Peirson, H.L.Marshall, R.W.Romani, J.F.Steiner, L.Baldini ***Deep Learning for X-ray Polarimetry***, *Nuclear Instruments and Methods in Physics Research*, 2020 (in prep.)

A.L.Peirson, R.W.Romani ***The Polarization Behavior of Relativistic Synchrotron Self-Compton Jets***, *235th Meeting of the American Astronomical Society*, January 2020 (Poster)

A.L.Peirson ***The Polarization Behavior Synchrotron Self-Compton Emission in Blazars***, *Understanding the Multiwavelength Blazar Variability - Workshop, Stanford*, August 2019 (Invited Talk)

A.L.Peirson, R.W.Romani ***The Polarization Behavior of Relativistic Synchrotron Self-Compton Jets***, *The Astrophysical Journal*, August 2019

Keith Jahoda et al. ***The X-ray Polarization Probe Mission Concept***, *Decadal Survey on Astronomy and Astrophysics 2020*, July 2019 (submitted)

I.Liodakis, **A.L.Peirson**, R.W.Romani ***Prospects for Detecting X-ray Polarization in Blazar Jets***, *The Astrophysical Journal*, June 2019

A.L.Peirson, R.W.Romani ***The Polarization Behaviour Of Blazars***, *AAS High Energy Astrophysics Division Conference*, March 2019 (Poster)

A.L.Peirson, ***AI in Design*****, Used Future: Symposium by Current Obsession**, Pratt Institute NY, November 2018

A.L.Peirson, ***Episode 68*****, The NVIDIA AI Podcast**, August 2018

A.L.Peirson, R.W.Romani ***The Polarization Behavior of Relativistic Synchrotron Jets***, *The Astrophysical Journal*, July 2018

A.L.Peirson, E.M.Tolunay ***Dank Learning: Generating Memes Using Deep Neural Networks***, Accepted for publication in *Advances in Intelligent Systems and Computing*, June 2018

D.Gamba, L.Malina, **A.L.Peirson Serratosa**, F.Tecker, S.Döbert, R.Corsini, P.Skowroński, A.Rollings, L.Martin, B.Constance, T.Persson, J.Roberts ***Transverse Beam Phase-Space Measurement Experience at CTF3***, *8th International Particle Accelerator Conference IPAC2017*, May 2017

A.L.Peirson ***Limiting Beam Energy Spread using Dispersion Measurements in CTF3***, *CERN - CLIC Test Facility*, August 2016 (Oral Presentation)

A.L.Peirson ***Plasma Confinement in the KMAX axisymmetric tandem mirror machine***, *Hefei International Physics School*, July 2015 (Oral Presentation)

Telescope Allocations

XMM-Newton: ***57ks*** — *Exploring the Synchro-Compton transition in CGRaBS J0211+1051* *2019 - 2020*

Selected Experience and Outreach

Wonderfest — Bay Area, CA *June 2019 - Present*
Science Envoy

Communicating science to public audiences as part of the Bay Area-wide Wonderfest program, taking place concurrently with a training program in public speaking and science communication for 10 graduate students selected from Stanford and Berkeley.

Stanford Judo Club — Stanford, CA *June 2018 - Present*
President 2019, Vice-President & Financial Officer 2018

Running all financial matters for both the adults' and children's club including setting the annual budget, communicating with Stanford's capital group, handling reimbursements and organising tournaments.

Stanford Diversity and First Generation Office — Stanford, CA *October 2018 - Present*
First Generation and Low Income Student Mentor

Mentoring undergraduates from underprivileged backgrounds in all matters of student life, from career and course decisions to sporting activities and extracurriculars.

SLAC Accelerating Girls' Engagement in STEM (SAGE-S) — Stanford, CA *Summer 2019*
Volunteer

Teaching girls from local public high schools about astronomy and astrophysics at the Stanford student observatory.

Stanford Astronomical Society — Stanford, CA *September 2018 - 2019*
Leading Committee Member

Organising and participating in telescope outreach events with the local Palo Alto elementary/high school students and the public. Teaching Stanford students how to operate optical telescopes.

Stanford Office of Science Outreach — Stanford, CA *September 2018 - 2019*
Stanford Science Penpal

Corresponding with high school students about science at Colegi Sant Pau Apostol in Tarragona, Spain.

Peirson & Freedman — Stanford, CA *August 2018 - Present*
App Designer

Conceived and designed iOS app ***Dank Learning*** that uses AI to generate memes in partnership with Dylan Freedman.

Leukaemia and Lymphoma Research — London, UK *October 2012*
Rower

Rowed 80+ miles in a double over 2 days to help beat Leukaemia and Lymphoma, collectively raising over £30,000.

Teaching

Physics 100: Observational Astrophysics — Stanford, CA *Spring 2019*

Additional Skills

Spanish (Native)
Primary Languages: **C, C++, Python, MATLAB, LaTeX.**
Secondary Languages: **Mathematica, Julia, Bash, HTML, Swift, LABVIEW, Adobe Illustrator**
Substantial tutoring experience (100+ hours) teaching Physics and Mathematics at high school level.
Ham Radio Technician License

Athletic Achievements

Stanford Judo Club Men's Team (President/Captain) — Stanford, CA *October 2017 - Present*
San Jose Buddhist Tournament, Team Champions 2018, 2019

Christ Church Boat Club Men's 1st VIII — Oxford, UK *May 2014 - June 2017*
Summer VIIIs Head of the River 2017.

Oxford-Cambridge Boat Race Triallist — Oxford, UK *2015*

Kingston Grammar School Boat Club Men's 1st Pair — Kingston, UK *2012-2013*
Hampton, Kingston, Teddington and Upper Thames Head of the River.

Kingston Grammar School Boat Club Men's 1st VIII — Kingston, UK *2010-2013*
Raced for Princess Elizabeth Challenge Cup, Henley 2012,2013. 1st IV holders of Percy England Challenge Cup, Thames Ditton.

Great Britain Men's Junior Rowing Team Triallist — Kingston, UK *2011*