

JAMES MOTT

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EDUCATION

- 2009 - 2013 **Ph.D. High Energy Physics, University College London**
Search for double beta decay of ^{82}Se with the NEMO-3 detector and development of apparatus for low-level radon measurements for the SuperNEMO experiment (Supervisor: Ruben Saakyan)
- 2005 - 2009 **MA and MSci Natural Sciences (Physical), Robinson College, University of Cambridge**
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EMPLOYMENT

- 2020 - **Fermilab**
Associate Scientist: Wilson Fellow, Muon $g-2$ experiment.
- 2018 - **Boston University**
Research Asst. Prof. (2018-20) & Adjunct Asst. Prof. (2020-): Muon $g-2$ experiment, Fermilab.
- 2014 - 2018 **Boston University**
Postdoctoral Associate: Muon $g-2$ and Mu2e experiments, Boston (2014-16) & Fermilab (2016-18).
- 2013 - 2014 **University College London**
Postdoctoral Research Associate: NEMO-3 and SuperNEMO experiments.
- 2009 - 2013 **Mount Vernon Hospital Radiopharmacy**
Software Designer: Generated paperwork for preparing radioactive medicine.
- 2007 - 2008 **Elekta Oncology Systems**
Software Tester: Validated & verified accelerator software for radiotherapy treatment.
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RESEARCH EXPERIENCE & SKILLS

– Hardware & Laboratory Skills

- Designed, prototyped and produced new detector designs on small and large scales.
- Utilised gaseous trackers, photodiodes, scintillator-coupled PMTs and SiPMs.
- Designed, produced and tested electronics systems (ASIC/FPGA and NIM based).
- Performed small-scale experiments, including basic DAQ systems and collection and analysis of data.
- Constructed, tested and commissioned large-scale tracking detector systems.
- Monitored and maintained detectors over long timescales.
- Designed, constructed and operated gas, vacuum and cryogenic systems
- Used clean room environments
- Handled radioactive sources and explosives
- Mitigated natural radioactivity for low-background experiments

– Software, Computing and Analysis

- Programming and scripting languages: C++, Python, Bash, PostgreSQL/MySQL & Fortran.
- Operating systems: Linux, macOS and Windows.
- Developed Geant4 simulations and debugged Geant4 source code.
- Designed user interfaces with Node.js, Plotly & Javascript.
- Performed large scale simulations and analysis with high data volumes using grid computing.
- Developed analysis and reconstruction algorithms in existing and new software frameworks.
- Built and refined models using experimental data.
- Developed automation for background discrimination and calibration systems.
- Analysed extremely large datasets to produce world-leading measurements.

LEADERSHIP

- 2021 - **g-2 Analysis Coordinator**
Manage and coordinate all analysis efforts from 200+ scientist collaboration.
- 2017 - 2020 **g-2 Tracking Analysis Coordinator**
Led a team of 14 scientists analysing the tracker data and its beam-dynamics interpretation.
- 2017 - 2018 **g-2 Detector Operations Coordinator**
Coordinated detector system upgrades and ensured eight detector systems were fully functional for first physics run.
- 2015 - 2017 **g-2 Tracker Group Co-convener**
Oversaw production, installation and commissioning of the tracker system.
- 2014 - 2016 **g-2 Tracker Frontend Electronics Manager**
Designed, produced, tested and delivered the frontend electronics for the $g-2$ tracker, managing a \$250k budget.
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MENTORING AND SUPERVISING

- 2019 - Co-advisor to Ph.D. student, *Sean Foster, Boston University.*
- 2016 - 2019 Primary advisor to Ph.D. student, *Nick Kinnaird, Boston University.*
- 2016 - Mentored 4 postdoctoral researchers from BU and Fermilab.
- 2014 - Advised 13 Ph.D. students from six different universities.
- 2014 - 2017 Supervised undergraduate projects for 3 BU masters students.
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TALKS & PRESENTATIONS

Invited Talks

- 04/2021 University of California Santa Cruz: Colloquium
- 04/2021 Boston University: Colloquium
- 06/2018 Symposium on Symmetries in Subatomic Physics 2018: *The Muon $g-2$ experiment at Fermilab*, Hyperfine Interact. 239 (2018) 55.
- 05/2018 Argonne National Laboratory: Seminar
- 01/2018 Northwestern University: Seminar
- 09/2016 Tau 2016: *The Muon $g-2$ experiment at Fermilab*, Nucl. Part. Phys. Proc. 287-288 (2017) 65-69.

Selected Contributed Talks & Posters

- 08/2016 International Conference on High Energy Physics 2016 (posters presented): *The readout system for the Fermilab Muon $g-2$ straw tracking detectors*, PoS (ICHEP 2016) 1136.
- 08/2015 APS Division of Particles and Fields 2015 (talk presented)
- 04/2013 Low Radioactivity Techniques 2013 (talk presented): *Low-background tracker development for SuperNEMO*, AIP Conf. Proc. 1549 (2013) 152-155.
- 06/2012 Neutrino 2012 (poster presented)
- 04/2012 IoP Joint HEPP and APP Meeting (talk presented)

PUBLICATIONS

Refereed Publications

- 2021 B. Abi et al., *Measurement of the Positive Muon Anomalous Magnetic Moment to 0.46 ppm*, Phys. Rev. Lett. **126**, 141081 (2021).
- 2021 T. Albahri et al., *Measurement of the anomalous precession frequency of the muon in the Fermilab Muon $g - 2$ Experiment*, Phys. Rev. D **103**, 072002 (2021).
- 2021 T. Albahri et al., *Beam dynamics corrections to the Run-1 measurement of the muon anomalous magnetic moment at Fermilab*, Phys. Rev. Accel. Beams **24** 044002 (2021).
- 2021 T. Albahri et al., *Magnetic-field measurement and analysis for the Muon $g - 2$ Experiment at Fermilab*, Phys. Rev. A **103**, 042208 (2021).
- 2021 R. Arnold et al., *Measurement of the distribution of ^{207}Bi depositions on calibration sources for SuperNEMO*, arXiv:2103.14429.
- 2020 A. Rakhimov et al., *Development of methods for the preparation of radiopure ^{82}Se sources for the SuperNEMO neutrinoless double-beta decay experiment*, Radiochim. Acta **108**, 87 (2020).
- 2020 R. Arnold et al., *Search for Periodic Modulations of the Rate of Double-Beta Decay of ^{100}Mo in the NEMO-3 Detector*, arXiv:2011.07657.
- 2020 R. Arnold et al., *Search for the double-beta decay of ^{82}Se to the excited states of ^{82}Kr with NEMO-3*, Nucl. Phys. A **996**, 121701 (2020).
- 2019 R. Arnold et al., *Detailed studies of ^{100}Mo two-neutrino double beta decay in NEMO-3*, Eur. Phys. J. C **79**, 440 (2019).
- 2018 R. Arnold et al., *Final results on ^{82}Se double beta decay to the ground state of ^{82}Kr from the NEMO-3 experiment*, Eur. Phys. J. C **78**, 821 (2018).
- 2017 R. Arnold et al., *Search for neutrinoless quadruple- β decay of ^{150}Nd with the NEMO-3 detector*, Phys. Rev. Lett. **119**, 041801 (2017).
- 2017 A. S. Barabash et al., *Calorimeter development for the SuperNEMO double beta decay experiment*, Nucl. Instrum. Meth. A **868**, 98 (2017).
- 2017 R. Arnold et al., *Measurement of the $2\nu\beta\beta$ Decay Half-life and Search for the $0\nu\beta\beta$ Decay of ^{116}Cd with the NEMO-3 Detector*, Phys. Rev. D **95**, 012007 (2017).
- 2017 A. S. Barabash et al., *The BiPo-3 detector for the measurement of ultra low natural radioactivities of thin materials*, J. Instrum. **12**, 06002 (2017).
- 2017 P. Loaiza et al., *The BiPo-3 detector*, Appl.Radiat.Isot. **123** (2017) 54-59.
- 2016 P. P. Povinec et al., *Reference material for natural radionuclides in glass designed for underground experiments*, J. Radioanal. Nucl. Chem. **307**, 619 (2016).
- 2016 R. Arnold et al., *Measurement of the double-beta decay half-life and search for the neutrinoless double-beta decay of ^{48}Ca with the NEMO-3 detector*, Phys. Rev. D **93**, 112008 (2016).
- 2016 R. Arnold et al., *Measurement of the $2\nu\beta\beta$ decay half-life of ^{150}Nd and a search for $0\nu\beta\beta$ processes with the full exposure from the NEMO-3 detector*, Phys. Rev. D **94**, 072003 (2016).
- 2015 R. Arnold et al., *Results of the search for neutrinoless double- β decay in ^{100}Mo with the NEMO-3 experiment*, Phys. Rev. D **92**, 072001 (2015).
- 2014 R. Arnold et al., *Search for neutrinoless double-beta decay of ^{100}Mo with the NEMO-3 detector*, Phys. Rev. D **89**, 111101 (2014).
- 2014 R. Arnold et al., *Investigation of double beta decay of ^{100}Mo to excited states of ^{100}Ru* , Nucl. Phys. A **925**, 25 (2014).
- 2011 R. Arnold et al., *Measurement of the Double Beta Decay Half-life of ^{130}Te* , Phys. Rev. Lett. **107**, 062504 (2011).

Additional Reports

- 2015 J. Grange et al., *Muon ($g-2$) Technical Design Report*, FERMILAB-FN-0992-E (2015) 583–627.
- 2015 L. Bartoszek et al., *Mu2e Technical Design Report*, FERMILAB-TM-2594, (2015).