DEREK FUJIMOTO

CURRICULUM VITAE

TRIUMF
4004 Wesbrook Mall, Vancouver, BC, V6T 2A3
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dfujimoto@triumf.ca

EDUCATION

2021	University of British Columbia	Ph.D. (Physics)
2015	University of British Columbia	M.Sc. (Physics)
2013	McGill University	B.Sc. (Physics)

PROFESSIONAL EMPLOYMENT

2021–	Postdoctoral Researcher	TRIUMF

AWARDS

2017 Killam Graduate Teaching Assistant Award.

2015 Stuart Blussom Quantum Matter Institute QuEST Fellowship.

REFEREED PUBLICATIONS

2025 W. A. MacFarlane, R. M. L. McFadden, S. L. Spencer, A. Chatzichristos, J. O. Ticknor, D. L. Cortie, M. H. Dehn, S. R. Dunsiger, D. Fujimoto, *et al*, "Lithium ion dynamics in synthetic quartz studied via the NMR of implanted $^{8}Li^{+}$", *Phys Rev B.* (2025).

2024 M. Zhao, R. Mammei, D. Fujimoto, "QuSpin Zero-Field Magnetometer Characterization for the TUCAN Experiment", *Meas. Sci. Technol.*, 36, 015113 (2024).

2024 T. Higuchi, H. Akatsuka, A. Brossard, D. Fujimoto, *et al*, "Polarized Cold-neutron Reflectometry at JRR-3/MINE2 for the Development of Ultracold-neutron Spin Analyzers for a Neutron EDM Experiment at TRIUMF", *J. Phys. Soc. Jpn.*, **93**, 091009 (2024).

2024 E. Thoeng, M. Asaduzzaman, P. Kolb, R. M. L. McFadden, G. D. Morris, J. O. Ticknor, S. R. Dunsiger, V. L. Karner, D. Fujimoto, *et al*, "Depth-resolved characterization of Meissner screening breakdown in surface treated niobium", *Sci. Rep.*, **14**, 21487 (2024).

2023 D. Fujimoto, V. L. Karner, M. H. Dehn, *et al*, "Near-surface dynamics of the ionic liquid EMIM-Ac above and below the glass transition", *J. Phys. Conf. Ser.*, **2462**, 1, 012051 (2023).

2023 D. Fujimoto, O. Brazil, W. C. Oliver, *et al*, "^{8}Li Spin Relaxation as a Probe of the Modification of Molecular Dynamics by Inelastic Deformation of Glassy Polystyrene", *J. Phys. Conf. Ser.*, **2462**, 1, 012053 (2023).

2023 J. O. Ticknor, J. Adelman, A. Chatzichristos, M. H. Dehn, L. Egoriti, D. Fujimoto, *et al*, "Ion-Implanted ^{8}Li Nuclear Magnetic Resonance in Highly Oriented Pyrolytic Graphite", *Phys. Rev. B*, **108**, 195437 (2023).

2023 W. A. MacFarlane, D. Fujimoto, R. M. L. McFadden, "Inverse Laplace Transform Approaches to βNMR Relaxation", *J. Phys. Conf. Ser.*, **2462**, 1, 012015 (2023).

2023 V. L. Karner, A. Chatzichristos, D. Fujimoto, *et al*, "Effects of the rhombohedral distortion in $LaAlO_3$ on the quadrupolar splitting of the implanted $^{8}Li^{+}$ NMR", *J. Phys. Conf. Ser.*, **2462**, 1, 012058 (2023).

2023 W. A. MacFarlane, M. Oudah, R. M. L. McFadden, D. Huang, A. C. Chatzichristos, D. Fujimoto, *et al*, "^{8}Li βNMR studies of Epitaxial Thin Films of the 3D topological Dirac semimetal Sr_3SnO", *J. Phys. Conf. Ser.*, **2462**, 1, 012057 (2023).

2023 W. A. MacFarlane, J. K. Shenton, Z. Salman, A. Chatzichristos, D. L. Cortie, M. Dehn, D. Fujimoto, *et al*, "The Site and High Field βNMR Properties of $^{8}Li^{+}$ Implanted in α-Al_2O_3", *J. Phys. Conf. Ser.*, **2462**, 1, 012009 (2023).

2023 E. Thoeng, R. M. L. McFadden, S. Saminathan, G. D. Morris, P. Kolb, B. Matheson, M. Asaduzzaman, R. Baartman, S. Dunsiger, D. Fujimoto, *et al*, "A New High Parallel-Field Spectrometer at TRIUMF's β-NMR Facility", *Rev. Sci. Instrum.*, **94**, 023305 (2023).

2023 R. Matsumiya, H. Akatsuka, C. P. Bidinosti, C. A. Davis, B. Franke, D. Fujimoto, (et al), "The Precision nEDM Measurement with UltraCold Neutrons at TRIUMF", *JPS Conf. Proc.*, **37**, 020701 (2023).

2022 R. M. L. McFadden, D. Szunyogh, N. Bravo-Frank, A. Chatzichristos, M. H. Dehn, D. Fujimoto, *et al*, "Magnesium(II)-ATP Complexes in 1-Ethyl-3-Methylimidazolium Acetate Solutions Characterized by ^{31}Mg β-Radiation-Detected NMR Spectroscopy", *Angew. Chem. Int. Ed.*, **61**, 35, e202207137 (2022).

2022 J. R. Adelman, D. Fujimoto, *et al*, "Nuclear magnetic resonance of ^{8}Li ions implanted in ZnO", *Phys. Rev. B*, 106, 035205 (2022).

2022 Y. Komatsu, R. Shimizu, R. Sato, M. Wilde, K. Nishio, T. Katase, D. Matsumura, H. Saitoh, M. Miyauchi, J. R. Adelman, R. M. L. McFadden, D. Fujimoto, *et al*, "Repeatable Photoinduced Insulator-to-Metal Transition in Yttrium Oxyhydride Epitaxial Thin Films", *Chem. Mat.*, **34**, 8, 3616–3623 (2022).

2022 I. McKenzie, D. Fujimoto, *et al*, "A β-NMR study of the depth, temperature, and molecular-weight dependence of secondary dynamics in polystyrene: Entropy–enthalpy compensation and dynamic gradients near the free surface", *J. Chem. Phys.*, **156**, 8, 084903 (2022).

2021 D. Fujimoto, "bfit: A Python Application For Beta-Detected NMR", *J. Open Source Softw.*, **6**, 65 (2021).

2021 V. L. Karner, A. Chatzichristos, D. L. Cortie, D. Fujimoto, *et al*, "Evolution of the metallic state in $LaNiO_3/LaAlO_3$ superlattices measured by ^{8}Li β-detected NMR", *Phys. Rev. B*, **104**, 20, 205114 (2021).

2020 D. Fujimoto, W. A. MacFarlane, J. Rottler, "Energy barriers and cooperative motion at the surface of freestanding glassy polystyrene films", *J. Chem. Phys.*, **153**, 15, 154901 (2020).

2020 R. M. L. McFadden, A. Chatzichristos, D. L. Cortie, D. Fujimoto, *et al*, "Local electronic and magnetic properties of the doped topological insulators Bi_2Se_3:Ca and Bi_2Te_3:Mn investigated using ion-implanted ^{8}Li β-NMR", *Phys. Rev. B*, **102**, 235206 (2020).

2020 J. O. Ticknor, I. Umegaki, R. M. L. McFadden, V. L. Karner, A. Chatzichristos, D. Fujimoto, *et al*, "Investigation of Ionic and Anomalous Magnetic Behavior in $CrSe_2$ Using ^{8}Li β-NMR", *RSC Adv.*, **10**, 8190–8197 (2020).

2019 D. Fujimoto, R. M. L. McFadden, *et al*, "The dynamics of liquid 1-ethyl-3-methylimidazolium acetate measured with implanted-ion ^{8}Li β-NMR", *Chem. Mat.*, **31**, 22, 9346–9353 (2019).
(16 authors)

2019 R. M. L. McFadden, A. Chatzichristos, K. H. Chow, D. L. Cortie, M. H. Dehn, D. Fujimoto, *et al*, "Ionic and electronic properties of the topological insulator Bi_2Te_2Se investigated via β-detected nuclear magnetic relaxation and resonance of ^{8}Li", *Phys. Rev. B*, **99**, 125201 (2019).

2019 V. L. Karner, A. Chatzichristos, D. L. Cortie, M. H. Dehn, O. Foyevtsov, K. Foyevtsova, D. Fujimoto, *et al*, "Local Metallic and Structural Properties of the Strongly Correlated Metal $LaNiO_3$ using ^{8}Li β-NMR", *Phys. Rev. B*, **100**, 16, 165109 (2019).

2019 A. Chatzichristos, R. M. L. McFadden, M. H. Dehn, S. R. Dunsiger, D. Fujimoto, *et al*, "Bi-Arrhenius diffusion and surface trapping of $^8Li^+$ in rutile TiO_2", *Phys. Rev. Lett.*, **123**, 9, 095901 (2019).

2018 D. M. Szunyogh, R. M. L. McFadden, V. L. Karner, A. Chatzichristos, T. D. Goodacre, M. H. Dehn, L. Formenti, D. Fujimoto, *et al*, "Direct observation of Mg^{2+} complexes in ionic liquid solutions by ^{31}Mg β-NMR spectroscopy", *Dalt. Trans.*, **47**, 41, 14431–14435 (2018).

2018 I. McKenzie, Y. Chai, D. L. Cortie, J. A. Forrest, D. Fujimoto, *et al*, "Direct measurements of the temperature, depth and processing dependence of phenyl ring dynamics in polystyrene thin films by β-detected NMR", *Soft Matter*, **14**, 36, 7291–7544 (2018).

2018 R. M. L. McFadden, A. Chatzichristos, M. H. Dehn, D. Fujimoto, *et al*, "On the Use of ^{31}Mg for β-Detected NMR Studies of Solids", *JPS Conf. Proc.*, **21**, 011047 (2018).

2018 V. L. Karner, R. M. L. McFadden, M. H. Dehn, D. Fujimoto, *et al*, "Beta-Detected NMR of LSAT and YSZ", *JPS Conf. Proc.*, **21**, 011024 (2018).

2016 D. Fujimoto, C. Hearty, "Characterization of the aging and excess noise of a Hamamatsu fine mesh photopentode.", *Nucl. Instrum. Methods Phys. Res. Sect. A*, **823**, 149–155 (2016).

MANUSCRIPTS IN PREPARATION

2025 T. Hepworth, A. Zahra, B. Algohi, R. de Vries, S. Pankratz, P. Switzer, T. Reimer, M. McCrea, J. Martin, R. Mammei, D. Anthony, L. Barron Palos, M. Bosse, M. Bradley, A. Brossard, T. Bui, J. Chak, R. Chiba, C. Davis, K. Drury, D. Fujimoto, *et al*, "Ultracold Neutron Guide-Coating Facility at U.Winnipeg", *Nucl. Instrum. Methods Phys. Res. Sect. A* (2025).
(73 authors)

2025 B. Algohi, D. Anthony, L. Barrón-Palos, M. Bossé, M.P. Bradley, A. Brossard, T. Bui, J. Chak, R. Chiba, C. Davis, R. de Vries K. Drury, B. Franke, D. Fujimoto, *et al*, "Initial results of the TRIUMF ultracold advanced neutron source", *Phys. Rev. C Lett.* (2025).
(78 authors)

CONFERENCE PRESENTATIONS

2023 nEDM2023 - The 5th Workshop on Searches for a Neutron Electric Dipole Moment
"Overview and Status of the TUCAN EDM Experiment" (Oral)

2023 New physics searches at the precision frontier (INT-23-1b)
"Progress and Goals of the TRIUMF nEDM Measurement" (Oral)

2023 Winter Nuclear & Particle Physics Conference 2023
"An Introduction to the TUCAN EDM Measurement" (Oral)

2022 15th International Conference on Muon Spin Rotation Relaxation and Resonance
"First depth-resolved beta-NMR measurements of 1-ethyl-3-methylimidazolium acetate" (Oral)

2022 15th International Conference on Muon Spin Rotation Relaxation and Resonance
"Near-surface dynamics of 1-ethyl-3-methylimidazolium acetate above and below the glass transition" (Poster)

2022 15th International Conference on Muon Spin Rotation Relaxation and Resonance
"^{8}Li spin relaxation as a probe of the modification of molecular dynamics by inelastic deformation of glassy polystyrene" (Poster)

2022 15th International Conference on Muon Spin Rotation Relaxation and Resonance
"Inverse Laplace transform approaches to βNMR relaxation" (Poster)

2020 American Physical Society March Meeting (virtual session)
"Ionic liquid dynamics measured with implanted-ion β-NMR" (Oral)

2020 American Physical Society March Meeting (COVID cancelled)
"Surface and bulk dynamics of compressed polystyrene films: A β-NMR study" (Poster)

2018 American Physical Society March Meeting
"Molecular Dynamics of Polystyrene Films: Comparison Between Atomistic Simulations and beta-NMR Measurements" (Oral)

2017 The 14th International Conference on Muon Spin Rotation, Relaxation and Resonance
"βNMR studies of Enhanced Dynamics in Polymer Thin Films" (Oral)

2017 The 14th International Conference on Muon Spin Rotation, Relaxation and Resonance
"Spin-lattice relaxation in βNMR through molecular dynamics" (Poster)

2015 The 21st Belle II General Meeting
"Hamamatsu Photopentode Excess Noise Factor" (Oral)

2015 16th Annual Meeting of the APS Northwest Section
"A Belle II Custom Photomultiplier Tube" (Oral)

TEACHING

2019	Instructor	Enriched Experimental Physics
2016–18	Instructor	Enriched Physics I Laboratory
2016–17	Instructor	Experimental Physics Lab
2016–18	Head Teaching Assistant	Experimental Physics Lab
2015, 19	Head Teaching Assistant	Enriched Experimental Physics
2014–18	Head Teaching Assistant	Enriched Physics I Laboratory
2016–17	Teaching Assistant	Experimental Physics Lab
2014–15, 19	Teaching Assistant	Enriched Experimental Physics
2013–18	Teaching Assistant	Enriched Physics I Laboratory

SUPERVISED STUDENTS

2025 R. Stutters, Undergraduate Coop.
UBC Engineering Physics

2024 N. Lo, Undergraduate Coop.
U. Victoria Department of Mechanical Engineering

2024 M. Zhao, Undergraduate Coop.
UBC Department of Physics and Astronomy

2023 A. Sankaran, Undergraduate Coop.
UBC Department of Mechanical Engineering

2023 P. Luers, Undergraduate Coop.
UBC Department of Physics and Astronomy

2023 T. Peterson, Undergraduate Coop.
UNBC Department of Physics

2023 P. Berard, Undergraduate Coop.
UBC Department of Mechanical Engineering

2022 R. Curtis, Undergraduate Coop.
UBC Department of Physics and Astronomy

2022, 24 L. Smith, Undergraduate Coop.
UBC Department of Mechanical Engineering

COMPLEMENTARY EDUCATION

2023 Crane Operator Training.
TRIUMF

2022 Advanced Radiation Protection Training (Nuclear Energy Worker).
TRIUMF

2018 Instructional Skills Workshop.
UBC Centre for Teaching, Learning, and Technology

2014, 17–18 Creating Inclusive Classrooms.
UBC Centre for Teaching, Learning, and Technology

2013 TA Professional Development Workshop.
UBC Department of Physics and Astronomy

UNIVERSITY SERVICE

2023 WNPPC Student Poster Judge.

2022 WNPPC Student Presentation Judge.

2018 Graduate Course Load Review Committee.

RELATED WORK

Software API for interfacing with various Siglent devices using SCPI commands.
`https://github.com/ucn-triumf/SiglentDevices`

Software Unofficial QuSpin Zero Field Magnetometer DAQ and control API.
`https://pypi.org/project/QZFM/`

Software β-NMR and β-NQR data fitting and visualization GUI and API.
`https://pypi.org/project/bfit/`

Software Muon data (MUD) file reader and asymmetry calculator for β-NMR and β-NQR at TRIUMF.
`https://pypi.org/project/bdata/`

Software Muon data (MUD) file reader for μSR at TRIUMF.
`https://pypi.org/project/mud-py/`

Software GUI for the viewing and comparison of CCD images taken for the β-NMR and β-NQR experiments at TRIUMF.
`https://pypi.org/project/bccd/`

Hardware β-NMR spectrometer high-temperature upgrade.

SKILLS

Languages English (native), French (good).
Python, LaTeX, Julia, Cython, MATLAB, ROOT, C++, BASH.

Experimental Magnetic shielding, β-NMR, β-NQR, logic circuits, photomultiplier tubes, calorimetry, UHV systems, experiment & equipment design, clean room, cryogenics, ion beams.

Computational	Molecular dynamics, LAMMPS, Monte-Carlo, Gaussian DFT, curve fitting, data processing, Tkinter.
Engineering	Solidworks, 3D printing.
Teaching	Learner-centered, inquiry-based, evidence-based, Socratic questioning, course and rubric design, learning goals, creating inclusive classrooms.
Soft Skills	Leadership, organization, communication, presentations, safety.