

Simon Viel

Associate Professor, Department of Physics, Carleton University

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Bilingual: French, English

Basic knowledge of Spanish, German, Mandarin Chinese

ACADEMIC EXPERIENCE

2022 – present: **Associate Professor in Physics**

2017 – 2022: Assistant Professor in Physics
Carleton University

2014 – 2017: Chamberlain Fellow and NSERC Postdoctoral Fellow
Lawrence Berkeley National Laboratory

2008 – 2014: Ph.D. Physics
The University of British Columbia
Supervisors: Prof. Colin Gay and Prof. Oliver Stelzer-Chilton
Dissertation: Search for new neutral high-mass resonances decaying into muon pairs
with the ATLAS detector

2005 – 2008: B.Sc. Physics
Université Laval

RESEARCHER PROFILE

Dr. Simon Viel has many years of experience in experimental particle physics. His main area of expertise is data analysis. With the ATLAS collaboration from 2008 to 2018, he led multiple searches for physics beyond the Standard Model, participated in a machine-learning analysis contributing to the Higgs boson discovery, and searched for dark matter produced in association with Higgs bosons. He made key contributions to ATLAS Inner Tracker layout design. He served as convener of the Inner Tracker simulation and performance group, and as release coordinator for ATLAS Upgrade software.

Upon joining Carleton University as faculty member in 2017, Dr. Viel moved from collider physics into astroparticle physics. He has so far directly supervised 5 postdocs, 3 PhD students, 2 MSc students, and 14 undergraduate research assistants. His main research effort is with the DEAP-3600 experiment looking for dark matter at SNOLAB, where as Analysis Coordinator in 2019-2023 he led all aspects of data analysis, including data processing, simulations, event reconstruction, searches and measurements. In addition, as a member of the DarkSide-20k, ARGO and nEXO collaborations, he participates in design and planning efforts, as well as silicon photomultiplier R&D for these future experiments. Dr. Viel also led data analysis for MVM, a ventilator designed in response to COVID-19.

RESEARCH GRANTS

As principal investigator:

- 2020 – 2021: Cross-Disciplinary Internship Fund:
Arthur B. McDonald Canadian Astroparticle Physics Research Institute
Canada First Research Excellence Fund, CA \$22,000
- 2020: “Mechanical Ventilator Milano”
COVID-19 Rapid Research Response Fund
Carleton University, CA \$10,000
- 2019 – 2024: Highly Qualified Personnel Pooled Resource Fund:
Arthur B. McDonald Canadian Astroparticle Physics Research Institute
Canada First Research Excellence Fund, CA \$328,000
- 2017 – 2024: New Faculty Research Fund:
Arthur B. McDonald Canadian Astroparticle Physics Research Institute
Canada First Research Excellence Fund, CA \$672,000
- 2017 – 2022: General Research Fund (Startup)
Natural Sciences and Engineering Research Council of Canada, CA \$10,000
- 2017: Internal Research Fund (Startup)
Carleton University, CA \$110,000

As co-principal investigator (team member):

- 2024: “Searching for Neutrinoless Double Beta Decay with nEXO at SNOLAB”
Team Leaders: T. Brunner and B. Franke
Innovation Fund 2023
Canada Foundation for Innovation, CA \$9,775,000
(conditional on US DOE funding and site selection at SNOLAB)
- 2023 – 2025: “The Global Argon Dark Matter Program – DEAP-3600, DarkSide-20k and ARGO”
Principal Investigator: M. G. Boulay
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$2,400,000
- 2022 – 2025: “The nEXO Search for Neutrinoless Double Beta Decay”
Principal Investigator: T. Brunner
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$2,790,000
- 2021: “Development of Next Generation Liquid Argon Dark Matter Detectors and of an
Underground Argon Storage Facility at SNOLAB”
Team Leaders: A. L. Hallin and M. G. Boulay
Innovation Fund 2020
Canada Foundation for Innovation, CA \$7,247,719
Fully matched by the Alberta Research Capacity Program and the Ontario Research Fund

2021: “Enabling the Search for Neutrinoless Double-Beta Decays in Xe-136 with nEXO”
Team Leaders: R. Kruecken and T. Brunner
Innovation Fund 2020
Canada Foundation for Innovation, CA \$6,849,313
With matching funds by the British Columbia Knowledge Development Fund and the
Ministère de l'Économie, Science et Innovation du Québec

Participant in the following grants (CFREF faculty member not eligible as co-applicant to NSERC until 2022):

- 2021 – 2023: “ARGO – Development of Next-Generation Argon Dark Matter Search”
Principal Investigator: M. G. Boulay
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$420,000
- 2021 – 2023: “The Darkside-20k Dark Matter Detector”
Principal Investigator: A. L. Hallin
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$780,000
- 2020 – 2023: “DEAP-3600 Data Collection and Analysis”
Principal Investigator: M. G. Boulay
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$1,200,000
- 2020 – 2022: “The nEXO Search for Neutrino-less Double Beta Decay”
Principal Investigator: J. Farine
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$1,432,000
- 2020 – 2021: “The Darkside Dark Matter Detector”
Principal Investigator: A. L. Hallin
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$188,000
- 2019 – 2020: “DEAP-3600 Analysis and Operations”
Principal Investigator: M. G. Boulay
Subatomic Physics Project
Natural Sciences and Engineering Research Council of Canada, CA \$800,000

RESEARCH – ASTROPARTICLE PHYSICS

2017 – present: **Associate Professor, Carleton University (2022 – present)**

Assistant Professor, Carleton University (2017 – 2022)

Adjunct Professor, University of Alberta (2017 – 2020)

Faculty Member, Arthur B. McDonald Canadian Astroparticle Physics Research Institute

DEAP, DarkSide-20k, ARGO and nEXO Collaborations, SNOLAB

- Research plan:
 - Develop software for detector simulation, event reconstruction and data analysis for DEAP-3600 and next-generation liquid argon experiments looking for **dark matter**, and for nEXO looking for **neutrinoless double beta decay** in liquid xenon
 - Evaluate the suitability of **silicon photomultiplier** detectors to detect scintillation light from liquid argon and xenon for future large-scale low-background experiments
 - Contribute to the design, planning, construction and operation of these experiments
- **Analysis coordinator** for DEAP-3600 (2019 – 2023)
 - Coordinate a team of over 50 researchers on all aspects of DEAP-3600 data analysis, including physical measurements and searches for new physics including dark matter
 - Oversee improvements to detector simulation, event reconstruction software, background discrimination, and the overall signal and background models
 - Contribute to the redaction and internal review of technical reports and publications
- **Position reconstruction convener** for DEAP-3600 (2017 – 2019)
 - Improve the position reconstruction algorithms used to reject surface background events
 - Evaluate algorithms' performance and systematic uncertainties
 - Coordinate improvements to the detector model for event simulation and reconstruction
- Other collaboration leadership roles:
 - Chair, DarkSide Membership Committee (2023 – 2025)
 - Software coordinator for DEAP-3600 (2021 – 2024)
 - Co-organizer, DEAP Collaboration meetings (2018 – 2024)

RESEARCH – MEDICAL PHYSICS

2020: Mechanical Ventilator Milano Collaboration:

Novel ventilator designed for mass scale production in response to the COVID-19 pandemic

- **Analysis leader** for MVM Canada
 - Coordinate a team of 7 scientists analyzing ventilator and lung simulator data, in close collaboration with international collaborators, management and industrial partners
 - Evaluate and document ventilator performance metrics in validation tests at multiple sites to ensure safe and reliable operation, and to achieve certification based on ISO, FDA and Health Canada requirements

FELLOWSHIPS, HONOURS AND AWARDS

- 2014 – 2017: **Chamberlain Fellowship**
Lawrence Berkeley National Laboratory, US \$195,720
- 2014 – 2016: Postdoctoral Fellowship
Natural Sciences and Engineering Research Council of Canada, CA \$80,000
- 2011 – 2014: **Vanier Canada Graduate Scholarship**
Natural Sciences and Engineering Research Council of Canada, CA \$150,000
- 2011 – 2014: Four Year Fellowship for Ph.D. Students
The University of British Columbia (accepted in title only)
- 2011: Best Presentation, Particle Physics Division
Canadian Association of Physicists Congress, CA \$100
- 2010: William Gibson Citation
Green College, The University of British Columbia
- 2008 – 2014: Faculty of Science Graduate Award
The University of British Columbia, CA \$16,747
- 2008 – 2010: Postgraduate Scholarship Master's
Natural Sciences and Engineering Research Council of Canada, CA \$38,300
- 2008 – 2010: Master's Scholarship
Fonds de recherche du Québec – Nature et technologies, CA \$15,000 (declined)
- 2007: Research Internship
German Academic Exchange Service (DAAD), CA \$800
- 2006: Undergraduate Student Research Award
Natural Sciences and Engineering Research Council of Canada, CA \$5,625
- 2006: Bourse d'excellence et de persévérance
Département de physique, génie physique et optique, Université Laval, CA \$250
- 2005: Bourse Adrien-Pouliot
Université Laval, CA \$1,500
- 2005: Honourable Mention
International Physics Olympiad, Salamanca, Spain
- 2005: Jeune boursier des Grands Québécois
Chambre de commerce de Québec, CA \$1,000
- 2005: Canada Millennium Excellence Award
Government of Canada, CA \$4,000

PUBLICATIONS

Astroparticle Physics Data Analysis:

DEAP Collaboration (2023) Precision measurement of the specific activity of ^{39}Ar in atmospheric argon with the DEAP-3600 detector. *European Physical Journal C*, 83, 642, *arXiv:2302.14639*

DEAP Collaboration (2022) First direct detection constraints on Planck-scale mass dark matter with multiple-scatter signatures using the DEAP-3600 detector. *Physical Review Letters*, 128, 011801, *arXiv:2108.09405*

DEAP Collaboration (2021) Pulseshape discrimination against low-energy Ar-39 beta decays in liquid argon with 4.5 tonne-years of DEAP-3600 data. *European Physical Journal C*, 81, 823, *arXiv:2103.12202*

DEAP Collaboration (2020) Constraints on dark matter-nucleon effective couplings in the presence of kinematically distinct halo substructures using the DEAP-3600 detector. *Physical Review D*, 102, 082001, *Erratum: Physical Review D*, 105, 029901 (2022), *arXiv:2005.14667*

DEAP Collaboration (2020) The liquid-argon scintillation pulseshape in DEAP-3600. *European Physical Journal C*, 80, 303, *arXiv:2001.09855*

DEAP Collaboration (2019) Electromagnetic backgrounds and potassium-42 activity in the DEAP-3600 dark matter detector. *Physical Review D*, 100, 072009, *arXiv:1905.05811*

DEAP Collaboration (2019) Search for dark matter with a 231-day exposure of liquid argon using DEAP-3600 at SNOLAB. *Physical Review D*, 100, 022004, *arXiv:1902.04048*

Astroparticle Physics Community Planning:

C. Adams et al. (2022) Neutrinoless double beta decay. *United States Nuclear Physics Long Range Plan 2023*. *arXiv:2212.11099*

J.-F. Pratte, S. Charlebois, T. Brunner, R. Kruecken, F. Retière, S. Viel (2020) The Particle/Photon to Digital Converters. *SnowMass2021 IF2: Photon Detectors*. <https://www.snowmass21.org>

D. E. Morrissey, S. Viel et al. (2020) Astroparticle Physics Community Planning 2020: Dark Matter Green Paper. *Astroparticle Physics Community Planning*. <https://cparc.ca/acp/>

M. Boulay, B. Cai, P. Di Stefano, P. Gorel, A. Hallin, C. Jillings, S. Manecki, A. McDonald, M.-C. Piro, F. Retière, P. Skensved, S. Viel (2020) Direct dark matter search with liquid argon: To the neutrino floor (and beyond?). *Astroparticle Physics Community Planning*. <https://cparc.ca/acp/>

Technology Design, Research and Development:

With direct participation:

N. V. H. Viet et al. (2023) Simulation study of photon-to-digital converter timing specifications for the LoLX experiment. *Submitted to IEEE Transactions on Nuclear Science*. *arXiv:2310.18607*

Global Argon Dark Matter Collaboration (2023) Sensitivity projections for a dual-phase argon TPC optimized for light dark matter searches through the ionization channel. *Physical Review D*, 107, 112006, *arXiv:2209.01177*

- B. Chana, M. Mahtab, F. Retière, S. Viel (2023) Rapid characterization of silicon photomultipliers for noble liquid experiments. *Journal of Instrumentation* 18, C03004
- L. Galli et al. (2023) Looking for Cherenkov light in liquid xenon with LoLX. *Nuclear Instruments & Methods in Physics Research A*, 1047, 167876
- MVM Collaboration (2021) The novel Mechanical Ventilator Milano for the COVID-19 pandemic. *Physics of Fluids*, 33, 037122
- ATLAS Collaboration (2018) Technical Design Report for the ATLAS Inner Tracker Pixel Detector. *CERN-LHCC-2017-021; ATLAS-TDR-030*
- ATLAS Collaboration (2017) Technical Design Report for the ATLAS Inner Tracker Strip Detector. *CERN-LHCC-2017-005; ATLAS-TDR-025*
- ATLAS Collaboration (2016) Expected performance of the ATLAS Inner Tracker at the High-Luminosity LHC. *Public Conference Note: ATL-PHYS-PUB-2016-025*
- S. Viel et al. (2016) Performance of silicon pixel detectors at small track incidence angles for the ATLAS Inner Tracker upgrade. *Nuclear Instruments & Methods in Physics Research A*, 831, 254-259
- A. Abusleme et al. (2016) Performance of a full-size small-strip thin gap chamber prototype for the ATLAS New Small Wheel muon upgrade. *Nuclear Instruments & Methods in Physics Research A*, 817, 85-92
- ATLAS Collaboration (2015) ATLAS Phase-II Upgrade Scoping Document. *CERN-LHCC-2015-020*
- Additional publications as DarkSide-20k collaboration author:*
- DarkSide-20k Collaboration (2024) Constraints on directionality of nuclear recoils in a liquid argon time projection chamber. *European Physical Journal C*, 84, 24, *arXiv:2307.15454*
- DarkSide-20k Collaboration (2023) Study on cosmogenic activation above ground for the DarkSide-20k project. *Astroparticle Physics* 152, 102878, *arXiv:2301.12970*
- DarkSide-20k Collaboration (2023) Measurement of isotopic separation of argon with the prototype of the cryogenic distillation plant Aria for dark matter searches. *European Physical Journal C*, 83, 453, *arXiv:2301.09639*
- DarkSide-20k Collaboration (2021) DarkSide-20k Technical Design Report. *DARKSIDE-CSN2-TDR-2112*
- DarkSide-20k Collaboration (2021) Separating ^{39}Ar from ^{40}Ar by cryogenic distillation with Aria for dark matter searches. *European Physical Journal C*, 81, 359, *arXiv:2101.08686*
- DarkSide-20k Collaboration (2021) Sensitivity of future liquid argon dark matter search experiments to core-collapse supernova neutrinos. *Journal of Cosmology and Astroparticle Physics*, 2021, 03, 043, *arXiv:2011.07819*
- DarkSide-20k Collaboration (2021) SiPM-matrix readout of two-phase argon detectors using electroluminescence in the visible and near infrared range. *European Physical Journal C*, 81, 153, *arXiv:2004.02024*

DarkSide-20k Collaboration (2020) Design and construction of a new detector to measure ultra-low radioactive-isotope contamination of argon. *Journal of Instrumentation*, 15, 02, P02024, arXiv:2001.08106

Additional publications as nEXO collaboration author:

nEXO Collaboration (2023) An integrated online radioassay data storage and analytics tool for nEXO. *Nuclear Instruments & Methods in Physics Research A*, 1055, 168477, arXiv:2304.06180

nEXO Collaboration (2022) Performance of novel VUV-sensitive silicon photo-multipliers for nEXO. *European Physical Journal C*, 82, 1125, arXiv:2209.07765

nEXO Collaboration (2022) Development of a ^{127}Xe calibration source for nEXO. *Journal of Instrumentation*, 17, P07028, arXiv:2201.04681

nEXO Collaboration (2022) nEXO: Neutrinoless double beta decay search beyond 10^{28} year half-life sensitivity. *Journal of Physics G: Nuclear and Particle Physics* 49, 015104, arXiv:2106.16243

nEXO Collaboration (2021) Reflectivity of VUV-sensitive silicon photomultipliers in liquid xenon. *Journal of Instrumentation*, 16, P08002, arXiv:2104.07997

nEXO Collaboration (2021) Event reconstruction in a liquid xenon time projection chamber with an optically-open field cage. *Nuclear Instruments & Methods in Physics Research A*, 1000, 165239, arXiv:2009.10231

nEXO Collaboration (2020) Measurements of electron transport in liquid and gas xenon using a laser-driven photocathode. *Nuclear Instruments & Methods in Physics Research A*, 972, 163965, arXiv:1911.11580

nEXO Collaboration (2020) Reflectivity and PDE of VUV4 Hamamatsu SiPMs in liquid xenon. *Journal of Instrumentation*, 15, 01, P01019, arXiv:1910.06438

nEXO Collaboration (2019) Reflectance of silicon photomultipliers at vacuum ultraviolet wavelengths. *IEEE Transactions on Nuclear Science*, 67, 12, 2501-2510, arXiv:1912.01841

nEXO Collaboration (2019) Simulation of charge readout with segmented tiles in nEXO. *Journal of Instrumentation*, 14, 09, P09020, arXiv:1907.07512

High-Energy Physics Data Analysis:

Over 600 publications as author on the ATLAS collaboration: July 2010 – July 2018.

Listed below are the ones for which a significant contribution to data analysis and/or writing was made.

Full 2015 and 2016 datasets:

ATLAS Collaboration (2017) Search for dark matter produced in association with a Higgs boson decaying to $b\bar{b}$ using 36 fb^{-1} of pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector. *Physical Review Letters*, 119, 181804

Full 2015 dataset:

ATLAS Collaboration (2016) Boosted Higgs ($\rightarrow b\bar{b}$) boson identification with the ATLAS detector at $\sqrt{s} = 13 \text{ TeV}$. *Public Conference Note: ATLAS-CONF-2016-039*

Full 2012 dataset:

ATLAS Collaboration (2015) Observation and measurement of Higgs boson decays to WW^* with the ATLAS detector. *Physical Review D*, 92, 012006

ATLAS Collaboration (2014) Observation and measurement of Higgs boson decays to WW^* with ATLAS at the LHC. *Public Conference Note: ATLAS-CONF-2014-060*

ATLAS Collaboration (2014) Search for contact interactions and large extra dimensions in the dilepton channel using proton-proton collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector. *European Physical Journal C*, 74, 3134

ATLAS Collaboration (2014) Search for high-mass dilepton resonances in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector. *Physical Review D*, 90, 052005

ATLAS Collaboration (2013) Search for high-mass dilepton resonances in 20/fb of pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS experiment. *Public Conference Note: ATLAS-CONF-2013-017*

Partial 2012 dataset:

ATLAS Collaboration (2012) Search for high-mass dilepton resonances in 6.1/fb of pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS experiment. *Public Conference Note: ATLAS-CONF-2012-129*

Full 2011 dataset:

ATLAS Collaboration (2013) Search for contact interactions and large extra dimensions in dilepton events from pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector. *Physical Review D*, 87, 015010

ATLAS Collaboration (2012) Search for high-mass resonances decaying to dilepton final states in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector. *Journal of High Energy Physics*, 1211, 138

ATLAS Collaboration (2012) Search for high-mass dilepton resonances with 5/fb of pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS experiment. *Public Conference Note: ATLAS-CONF-2012-007*

Partial 2011 dataset:

ATLAS Collaboration (2012) Search for contact interactions in dilepton events from pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector. *Physics Letters B*, 712, 1-2, 40-58

ATLAS Collaboration (2011) Search for dilepton resonances in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector. *Physical Review Letters*, 107, 272002

ATLAS Collaboration (2011) Search for technihadrons in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector. *Public Conference Note: ATLAS-CONF-2011-125*

ATLAS Collaboration (2011) Search for high mass dilepton resonances in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS experiment. *Public Conference Note: ATLAS-CONF-2011-083*

Full 2010 dataset:

ATLAS Collaboration (2011) Search for contact interactions in dimuon events from pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector. *Physical Review D*, 84, 011101

ATLAS Collaboration (2011) Search for high-mass states with one lepton plus missing transverse momentum in proton-proton collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector. *Physics Letters B*, 701, 1, 50-69

ATLAS Collaboration (2011) Search for high mass dilepton resonances in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS experiment. *Physics Letters B*, 700, 3-4, 163-180

Conference Proceedings:

S. Viel (2024) Latest results from the DEAP-3600 experiment at SNOLAB. *Proceedings of Science TAUP2023*, 075

S. Viel (2020) Dark matter search results from DEAP-3600 at SNOLAB. *Proceedings of Science ICHEP2020*, 655

S. Viel (2016) Expected performance of the ATLAS Inner Tracker upgrade. *Proceedings of Science ICHEP2016*, 1179

S. Viel (2016) Searches for leptoquarks and excited leptons with the ATLAS detector. *Proceedings of Science ICHEP2016*, 163

S. Viel (2013) Searches for Exotics: Heavy resonances with the ATLAS detector. *Journal of Physics: Conference Series*, 455, 012021

S. Viel (2011) Search for high-mass dilepton resonances with the ATLAS experiment at $\sqrt{s} = 7$ TeV. *Proceedings of the XXXI International Conference on Physics in Collision, SLAC eConf C1108282*

S. Viel (2011) Search for high-mass dimuon resonances with the ATLAS experiment at $\sqrt{s} = 7$ TeV. *Proceedings of Science EPS-HEP2011*, 419

PRESENTATIONS

* indicates poster presentations

International Conferences:

- S. Viel* (2023) Silicon photomultipliers for the nEXO light detection system. *13th International "Hiroshima" Symposium on the Development and Application of Semiconductor Tracking Detectors (HSTD13)*, Vancouver, BC, December 4.
- S. Viel (2023) Latest results from the DEAP-3600 experiment at SNOLAB. *XVIII International Conference on Topics in Astroparticle and Underground Physics (TAUP 2023)*, Vienna, Austria, August 30.
- S. Viel (2022) Latest results from DEAP-3600. *TeV Particle Astrophysics 2022*, Kingston, ON, August 10.
- S. Viel (2021) Latest results from DEAP-3600 at SNOLAB. *Weak Interactions and Neutrinos 2021*, Virtual conference, June 12.
- S. Viel (2020) Dark matter search results from DEAP-3600 at SNOLAB. *40th International Conference on High Energy Physics*, Virtual conference, July 29.
- S. Viel (2018) Dark matter search with DEAP-3600. *Lake Louise Winter Institute 2018*, Lake Louise, AB, February 19.
- S. Viel* (2016) Expected performance of the ATLAS Inner Tracker upgrade. *38th International Conference on High Energy Physics*, Chicago, IL, August 8.
- S. Viel (2016) Searches for leptoquarks and excited leptons with the ATLAS detector. *38th International Conference on High Energy Physics*, Chicago, IL, August 6.
- S. Viel (2016) Expected performance of the ATLAS Inner Tracker. *Connecting the Dots*, Vienna, Austria, February 23.
- S. Viel (2015) Performance of silicon pixel detectors at small track incidence angles for the ATLAS Inner Tracker upgrade. *10th International "Hiroshima" Symposium on the Development and Application of Semiconductor Tracking Detectors (HSTD10)*, Xi'an, China, September 28.
- S. Viel (2012) Searches for Exotics: Heavy resonances with the ATLAS detector. *International Workshop on Discovery Physics at the LHC*, Kruger National Park, South Africa, December 4.
- S. Viel (2012) Search for high-mass dilepton resonances with the ATLAS experiment. *Lindau Nobel Laureate Meeting Masterclass with Prof. David Gross*, Lindau, Germany, July 5.
- S. Viel (2011) Search for high-mass dilepton resonances with the ATLAS experiment at $\sqrt{s} = 7$ TeV. *XXXI International Conference on Physics in Collision*, Vancouver, BC, August 30.
- S. Viel* (2011) Search for high-mass dimuon resonances in the ATLAS experiment at $\sqrt{s} = 7$ TeV. *International Europhysics Conference on High-Energy Physics*, Grenoble, France, July 21-28.
- S. Viel (2011) Search for W' and Z' resonances at ATLAS. *GDR Terascale Plenary Meeting*, Lyon, France, April 20.

National and Regional Conferences, Reviews and Seminars:

- S. Viel (2023) New searches in astroparticle physics with noble element detectors enabled by developments in silicon photomultiplier technology. *Invited talk, Canadian Association of Physicists Congress, Fredericton, NB, June 20.*
- S. Viel (2023) Distributed computing platforms and projects in Canada: DEAP update. *Subatomic Physics National Team Meeting at TRIUMF, Vancouver, BC, May 29.*
- S. Viel (2023) Searches for new physics with noble liquids at SNOLAB. *Department of Physics & Astronomy Colloquium, The University of British Columbia, Vancouver, BC, April 20.*
- S. Viel (2023) DEAP-3600 analysis. *SNOLAB Experiment Advisory Committee Review, Toronto, ON, March 28.*
- B. Chana and S. Viel (2023) Rapid characterization of SiPMs for nEXO and future noble liquid experiments. *60th Winter Nuclear and Particle Physics Conference, Banff, February 18.*
- S. Viel (2022) Simulations and data analysis. *NSERC Review of the Global Argon Dark Matter Collaboration, Online, December 7.*
- S. Viel (2022) DEAP-3600 analysis status. *SNOLAB Experiment Advisory Committee Review, Toronto, ON, August 30.*
- B. Chana, S. Viel et al. (2022) Characterization of VUV sensitive silicon photomultipliers. *Canadian Association of Physicists Congress, Hamilton, ON, June 8.*
- S. Viel (2022) DEAP-3600, DarkSide-20k and ARGO. *Institute of Particle Physics 50th Anniversary Symposium, Ottawa, ON, May 29.*
- S. Viel (2022) New results in the search for dark matter with DEAP-3600 at SNOLAB. *Carleton University Physics Society: Pizza and a Prof, Ottawa, ON, February 17.*
- S. Viel (2021) Latest results from DEAP-3600 at SNOLAB. *University of Birmingham Particle Physics Group Seminar, Online, June 16.*
- S. Viel (2021) DEAP-3600 analysis status. *SNOLAB Experiment Advisory Committee Review, Online, March 4.*
- S. Viel (2021) DEAP-3600 and the Global Argon Dark Matter Collaboration. *McDonald Institute Midterm Review, Online, February 23.*
- B. Chana, S. Viel et al. (2021) Light-only Liquid Xenon experiment. *58th Winter Nuclear and Particle Physics Conference, Online, February 11.*
- S. Viel (2020) DEAP-3600 analysis status and plans. *SNOLAB Experiment Advisory Committee Review, Online, August 12.*
- S. Viel (2020) Silicon photomultipliers for nEXO. *Canadian Association of Physicists Congress, Online, June 9*
- S. Viel (2020) Dark matter searches in Canada: current activities and future directions. *Astroparticle Physics Community Planning Town Hall, Online, May 6.*

- S. Viel (2020) Experimental physics at Carleton University. *Carleton University Physics Society: Pizza and a Prof, Ottawa, ON, March 6.*
- S. Viel (2020) DEAP-3600 analysis status and plans. *SNOLAB Experiment Advisory Committee Review, Toronto, ON, March 4.*
- S. Viel (2019) Searching for dark matter with DEAP-3600 at SNOLAB. *Ottawa-Carleton Institute for Physics Symposium, Ottawa, ON, December 9.*
- S. Viel (2019) Light detection in nEXO. *NSERC review of nEXO, Ottawa, ON, December 7.*
- S. Viel (2019) DEAP-3600: Data analysis overview. *NSERC review of DEAP-3600, Ottawa, ON, November 22.*
- A. Smith-Orlik and S. Viel (2019) Narrowing in on dark matter. *Canadian Undergraduate Physics Conference, McGill University, Montréal, QC, November 8.*
- S. Viel (2019) Ten-year horizon for Canadian astroparticle physics: Dark matter searches. *Annual National Meeting of the Canadian Astroparticle Physics Community, Toronto, ON, August 29.*
- S. Viel (2019) Status of dark matter searches with liquid argon. *Annual National Meeting of the Canadian Astroparticle Physics Community, Toronto, ON, August 29.*
- S. Viel (2019) DEAP-3600 status and plans. *SNOLAB Experiment Advisory Committee Review, Sudbury, ON, August 24.*
- S. Viel (2019) Status of DEAP. *Institute of Particle Physics Annual General Meeting, Burnaby, BC, June 7.*
- S. Viel (2019) Dark matter search results from DEAP-3600 at SNOLAB. *Canadian Association of Physicists Congress, Burnaby, BC, June 4.*
- S. Viel (2019) Dark matter search with DEAP-3600 at SNOLAB. *56th Winter Nuclear and Particle Physics Conference, Banff, AB, February 17.*
- S. Viel (2018) DEAP-3600 position reconstruction. *NSERC Review of DEAP-3600, Ottawa, ON, December 3.*
- S. Viel (2018) ATLAS, DEAP, the search for dark matter and being a physicist. *Carleton University Physics Society: Pizza and a Prof, Ottawa, ON, October 11.*
- M. Waqar and S. Viel (2018) Where is the dark matter? *Canadian Undergraduate Physics Conference, University of Alberta, Edmonton, AB, August 17.*
- S. Viel (2018) De nouveaux détecteurs au silicium à la recherche de la matière sombre. *3Ithématique – Institut interdisciplinaire d'innovation technologique, Université de Sherbrooke, Sherbrooke, QC, January 18.*
- S. Viel (2017) Status of the DEAP-3600 position reconstruction algorithms. *SNOLAB Review of DEAP-3600 Analysis, Sudbury, ON, November 30.*
- S. Viel (2017) Dark matter particles and where to find them. *McGill University Physics Department Seminar, Montreal, QC, September 27.*
- S. Viel (2017) Dark matter particles and where to find them. *University of Alberta Physics Department Colloquium, Edmonton, AB, September 22.*

- S. Viel (2017) Status of the ATLAS Inner Tracker upgrade. *Tracking Progress Meeting, Lawrence Berkeley National Laboratory, Berkeley, CA, May 30 and June 13.*
- S. Viel (2017) Overview of the ATLAS upgrade program. *ATLAS-Theory Lunch, Lawrence Berkeley National Laboratory, Berkeley, CA, June 8.*
- S. Viel (2017) À la recherche de la matière sombre. *Séminaire du département de physique de l'Université de Montréal, Montréal, QC, May 18.*
- S. Viel (2017) Dark matter particles and where to find them. *Carleton University Physics Department Seminar, Ottawa, ON, May 11.*
- S. Viel (2017) The ATLAS Inner Tracker upgrade for the High-Luminosity LHC. *TRIUMF Particle Physics Seminar, Vancouver, BC, April 12.*
- S. Viel (2016) Searches for Exotics and Higgs with ATLAS at the LHC and towards the HL-LHC. *Carleton University Physics Department Seminar, Ottawa, ON, August 16.*
- S. Viel (2016) The ATLAS Inner Tracker Phase-II Upgrade. *Santa Cruz Institute for Particle Physics Seminar, Santa Cruz, CA, March 8.*
- S. Viel (2015) Secondary vertex clustering in boosted H to bb decays using k-means. *US ATLAS Hadronic Final State Forum, Seattle, WA, December 18.*
- S. Viel (2015) ATLAS Inner Tracker layout simulation. *US ATLAS Inner Tracker Meeting, SLAC National Accelerator Laboratory, Menlo Park, CA, July 7.*
- S. Viel (2015) Pixel clustering studies with cosmic data. *LHC Run-2 Performance Kick-Start Meeting, Lawrence Berkeley National Laboratory, Berkeley, CA, March 27.*
- S. Viel (2014) Beam test of new ATLAS muon detectors at Fermilab. *Canadian Association of Physicists Congress, Sudbury, ON, June 18.*
- S. Viel (2014) Beam test of new ATLAS muon detectors at Fermilab. *TRIUMF Society of Graduate Students and Postdocs Symposium, Vancouver, BC, June 13.*
- S. Viel (2013) Looking for a new force of nature with ATLAS: Searches for Exotics and Higgs in final states with two muons or electrons. *Research Progress Meeting, Lawrence Berkeley National Laboratory, Berkeley, CA, December 10.*
- S. Viel (2013) Insertable B-Layer test beam at SLAC End Station A. *US ATLAS Tracking Workshop, Lawrence Berkeley National Laboratory, Berkeley, CA, November 15.*
- K. McLean*, D. Schouten, B. Stelzer, O. Stelzer-Chilton, K. Van Nieuwkoop, S. Viel (2013) Analysis of $H \rightarrow WW \rightarrow l\nu l\nu$ decays in the vector boson fusion production channel: Characterizing the top control region. *Women in Physics Conference, Vancouver, BC, July 25.*
- S. Viel (2012) Search for high-mass resonances decaying to lepton pairs with the ATLAS detector. *American Physical Society – Northwestern Section Meeting, Vancouver, BC, October 20.*
- S. Viel* (2012) Search for high-mass dilepton resonances with the ATLAS experiment at $\sqrt{s} = 7$ TeV. *Advisory Committee on TRIUMF, Vancouver, BC, May 7.*

- S. Viel (2011) Search for Z' resonances at ATLAS. *NSERC Review of ATLAS Canada, TRIUMF, Vancouver, BC, November 5.*
- S. Viel (2011) Search for high-mass dilepton resonances in the ATLAS experiment at $\sqrt{s} = 7$ TeV at the LHC. *Canadian Association of Physicists Congress, St John's, NL, June 14.*
- S. Viel (2011) Prime time at the LHC: Search for Z' resonances at ATLAS. *Advisory Committee on TRIUMF, Vancouver, BC, May 13.*
- S. Viel (2010) Hunting for a new force of nature at the Large Hadron Collider. *UBC Physics and Astronomy Graduate Student Seminar Series, Vancouver, BC, October 29.*
- S. Viel and O. Stelzer-Chilton (2010) ATLAS Global Monitoring: Assessing data quality from the ATLAS detector at the LHC. *47th Winter Nuclear and Particle Physics Conference, Banff, AB, February 13.*
- J. Adelman, S. Ali, M. Baak, A. Canepa, B. Stelzer, O. Stelzer-Chilton, S. Viel* (2009) ATLAS Global Monitoring: Assessing data quality from the ATLAS detector at the LHC. *NSERC Site Review of TRIUMF, Vancouver, BC, October 28.*

Presentations at International Collaboration Meetings:

- DEAP Collaboration Meeting (January 23-26, 2024), TRIUMF
- Software coordination
- DEAP Collaboration Meeting (July 18-21, 2023), SNOLAB
- Software coordination
- DEAP Collaboration Meeting (February 7-10, 2023), National Autonomous University of Mexico
- Analysis overview, status and next steps
 - Software coordination
- DEAP Collaboration Meeting (August 22-25, 2022), Canadian Nuclear Laboratories, Chalk River
- Analysis overview, status and next steps
- DEAP Collaboration Meeting (February 22-25, 2022), Online
- Analysis overview, status and next steps
 - Software coordination
- DEAP Collaboration Meeting (September 20-23, 2021), Laurentian University and AstroCeNT Warsaw
- Analysis overview, status and next steps
 - Software coordination
- DarkSide Collaboration Meeting (June 7-11, 2021), Online
- DEAP-3600 analysis status
- DEAP Collaboration Meeting (February 16-26, 2021), Online
- Analysis overview, status and next steps
- DEAP Collaboration Meeting (July 27-30 and August 17-20, 2020), Online
- Analysis overview, status and next steps
- DEAP Collaboration Meeting (February 25-28, 2020), Technical University of Munich, Germany
- Analysis overview, status and next steps
 - Background reduction methods, and systematic uncertainties

nEXO Collaboration Meeting (December 15-18, 2019), Stanford University, USA

- Silicon photomultiplier characterization from IV curves and fits

DEAP Collaboration Meeting (August 20-23, 2019), SNOLAB

- Analysis overview, status and next steps
- Data formats and skimming, high-level processors and processing macro

nEXO Collaboration Meeting (June 23-25, 2019), Stony Brook University, USA

- Silicon photomultiplier tile characterization plans

DarkSide Collaboration Meeting (June 17-21, 2019), Pula, Sardinia, Italy

- DEAP-3600 introduction and analysis status

DEAP Collaboration Meeting (February 19-23, 2019), Technical University of Munich, Germany

- Position reconstruction overview

DarkSide Collaboration Meeting (November 17-20, 2018), CIEMAT, Madrid, Spain

- DEAP-3600 position reconstruction

DEAP Collaboration Meeting (July 10-13, 2018), University of Alberta

- Position reconstruction and optical model overview
- Systematics and essentials for position reconstruction

DarkSide Collaboration Meeting (June 11-15, 2018), Pula, Sardinia, Italy

- DEAP-3600 position reconstruction

DEAP Collaboration Meeting (February 3-5, 2018), National Autonomous University of Mexico

- Position reconstruction overview
- 3D digital silicon photomultipliers for liquid argon

Large number of presentations at ATLAS collaboration meetings (2009 – 2017).

Presentations to the General Public:

S. Viel and J. Thoms (2022) How physicists and artists look for dark matter. *Carleton University Science Café, Ottawa, ON, February 10.*

S. Viel (2019) Deep underground, looking for dark matter. *Carleton University Science Café, Ottawa, ON, February 13.*

S. Viel (2012) Observation of a new particle at the Large Hadron Collider. *Green College Members' Series, Vancouver, BC, September 17.*

S. Viel (2010) Hunting for a new force of nature at the Large Hadron Collider. *Green College Members' Series, Vancouver, BC, October 18.*

S. Viel (2009) Particle physics in a nutshell. *Green College Members' Series, Vancouver, BC, February 23.*

TEACHING AND MENTORSHIP EXPERIENCE

2017 – present: **Associate Professor (2022 – present)**

Assistant Professor (2017 – 2022)

Department of Physics, Carleton University

- **Courses:**

- PHYS 4807/5002, Statistical Data Analysis Techniques for Physics (F2021, F2022)
- PHYS 4602/5602, Particle Physics (W2019, W2020, W2021)
- PHYS 2203, Astronomy (F2018, F2019, F2020, F2021, F2022)
- Shad Canada Program, single lecture on dark matter (S2022)
- Lifelong Learning Program, single lecture on dark matter (F2019)

- **Teaching assistant supervision:**

- Ezekiel Staats (PHYS 4807/5002 F2021, F2022)
- Jérôme Claude (PHYS 4807/5002 F2021, F2022)
- Jérémie LePage-Bourbonnais (PHYS 2203 F2021, F2022)
- Hassan Easa (PHYS 4602/5602 W2020, W2021)
- Callan Jessiman (PHYS 4602/5602 W2019; PHYS 2203 F2020)
- Dylan Linthorne (PHYS 2203 F2018, F2019)

- **Postdoctoral fellow supervision:**

- Roxanne Turcotte-Tardif (2023):
 - Run coordinator for DEAP-3600
 - DEAP-3600 hardware upgrade work on site at SNOLAB
 - Measurement of the muon flux at SNOLAB with DEAP-3600 data
- Matthew Dunford (2022 – present):
 - Run coordinator for DEAP-3600
 - DEAP-3600 measurements of ^{39}Ar beta decay specific activity, half-life, spectrum
 - Search for neutrinoless double electron capture in ^{36}Ar with DEAP-3600
 - Leadership of data processing and PMT calibration working group of DEAP-3600
- Sean Daugherty (2021 – 2022, co-supervision SNOLAB/Laurentian U.):
 - DEAP-3600 hardware upgrade work on site at SNOLAB
 - DEAP-3600 measurements of ^{39}Ar beta decay specific activity, half-life, spectrum
- Guillaume Oliviéro (2019 – 2021):
 - DEAP-3600 data analysis, including major updates to core data processing software, and background rate estimates
 - DEAP-3600 krypton calibration source
 - Design studies for next-generation liquid argon experiments looking for dark matter
- Damian Goeldi (2018 – 2020):
 - DEAP-3600 data analysis, including background rates and Monte Carlo simulations
 - Research and development with EXO-100 and the Light-only Liquid Xenon detector towards a search for neutrinoless double beta decay with nEXO
 - Mechanical Ventilator Milano data analysis, to ensure safe and reliable operation

- **Doctoral student supervision:**
 - Akhil Maru (2022 – present):
 - Measurement of the muon flux at SNOLAB with DEAP-3600 data
 - Spencer Haskins (2021 – present):
 - Search for dark matter with DEAP-3600
 - Bindiya Chana (2018 – 2023):
 - Characterization and operation of vacuum ultraviolet-sensitive silicon photomultipliers toward the nEXO experiment [and EXO-100 recommissioning]
 - Jasbir Singh Sidhu Memorial Award 2021
- **Master's student supervision:**
 - Phillip DelGobbo (2019 – 2021):
 - Attenuated alpha backgrounds in the DEAP-3600 dark matter search experiment
 - Thesis accepted without revision, nominated for a Senate Medal
 - Timothée Cabos (2021, U. Montpellier MSc Internship):
 - Machine-learning algorithm for position reconstruction in DEAP-3600
- **Undergraduate research assistant supervision:**
 - Trevor Hoyte (2023 – 2024):
 - Improvements in neutron capture simulations and data analysis with DEAP-3600
 - Andrés Bigentini (2023 – 2024, Honours Thesis):
 - Neural network algorithm optimization for position reconstruction in DEAP-3600
 - Jacqueline Hollstedt (2022 – 2023, Honours Thesis)
 - Neural network position reconstruction algorithm for ARGO in single-phase designs
 - May Wittenberg (2022)
 - Improvement of alpha background rejection methods for DEAP-3600
 - Raveen Sidhu (2021, Cross-Disciplinary Internship):
 - Machine-learning for event reconstruction in the upgraded DEAP-3600
 - Trevor Hoyte (2020 – 2021, Honours Thesis):
 - Search for ${}^8\text{B}$ solar neutrino absorption by inverse beta decay in DEAP-3600
 - Owen Darragh (2020 – 2021):
 - Validation of machine-learning algorithms for background rejection in DEAP-3600
 - Jiapeng Zhang (2020 – 2021):
 - Simulation of alpha backgrounds from dust particulates in DEAP-3600
 - Kevin Gracequist (2020 – 2021):
 - Simulation and expected performance of ARGO in single-phase designs
 - Emily Darling (2020, Cross-Disciplinary Internship):
 - Muon flux characterization at SNOLAB using DEAP-3600 data
 - James Hughes (2019):
 - Design of electronic printed circuit boards for analog silicon photomultiplier readout

- Jérémie LePage-Bourbonnais (2019):
 - Position reconstruction studies for DEAP-3600
- Michael Sloan (2019, NSERC USRA):
 - Simulation of alpha backgrounds from dust particulates in DEAP-3600
- Adam Smith-Orlik (2019):
 - Improvement of ^{39}Ar beta decay simulations in DEAP-3600
- Kevin Gracequist (2018):
 - Simulated geometry studies of the tetraphenyl butadiene layer in DEAP-3600
- Muhammad Waqar (2018 – 2019):
 - Performance evaluation of position reconstruction algorithms for DEAP-3600
 - Analysis of ^{22}Na source calibration data for DEAP-3600
 - Validation of machine-learning algorithms for background rejection in DEAP-3600
- **DEAP HQP informally co-supervised**, in the context of collaboration leadership roles (and as Adjunct Professor, University of Alberta, 2017 – 2020):
 - Postdoctoral fellows:
 - Pushparaj Adhikari (Carleton U.)
 - Susnata Seth (Carleton U.)
 - Robert Stainforth (Carleton U.)
 - Shawn Westerdale (Carleton U.)
 - Yu Chen (U. Alberta)
 - Ashley Joy (U. Alberta)
 - Sumanta Pal (U. Alberta)
 - Frederick Schuckman (Queen's U.)
 - Mark Stringer (Queen's U.)
 - Ashlea Kemp (RHUL / Queen's U.)
 - Badamsambuu Jigmeddorj (SNOLAB)
 - Michela Lai (INFN Cagliari)
 - Doctoral students:
 - Andrew Erlandson (Carleton U.)
 - Shivam Garg (Carleton U.)
 - Gurpreet Kaur (Carleton U.)
 - Carl Rethmeier (Carleton U.)
 - Catherine Bina (U. Alberta)
 - Courtney Mielnichuk (U. Alberta)
 - Sina Safarabadi Farahani (U. Alberta)
 - Emma Ellingwood (Queen's U.)
 - Joseph McLaughlin (RHUL / TRIUMF)
 - Master's students:
 - David Gallacher (Carleton U.)
 - Kazmir Sobotkiewich (Carleton U.)
 - Joseph Willis (U. Alberta)
 - Lorenzo Mirasola (INFN Cagliari)

- PhD student advisory committees at Carleton U. [includes thesis evaluation]
 - Yu-Ming Chen (2022 – present)
 - Callan Jessiman (2020 – present)
 - Ben Davis-Purcell (2020 – 2022)
 - Hassan Easa (2019 – 2022)
- PhD student advisory committee at U. de Sherbrooke [includes thesis evaluation]
 - Sajedah Esmaeilzadeh (2023 – present)
- Additional thesis evaluation committees:
 - Jake Staples (MAsc 2023, Carleton U.)
 - John McGowan (PhD 2023, McGill U.)
 - Bakr Emara (MSc 2023, Carleton U.)
 - Yasser Saleem (PhD 2023, U. Ottawa)
 - Yi Fei Han (PhD 2023, U. Toronto)
 - Shengzhao Yu (MSc 2023, Laurentian U.)
 - Justin Boddison-Chouinard (PhD 2022, U. Ottawa)
 - Ian Ramirez-Berend (MSc 2022, Carleton U.)
 - Arthur Sadrack Powanwe (PhD 2021, U. Ottawa)
 - Ezekiel Staats (MSc 2021, Carleton U.)
 - Mohammad Zahirul Alam (PhD 2020, U. Ottawa)
 - Amal Alamre (MSc 2020, Carleton U.)
 - Alexander Bachiu (MSc 2019, Carleton U.)
 - Benjamin Freund (PhD 2018, U. de Montréal)
 - Justin Boddison-Chouinard (MSc 2018, U. Ottawa)
- PhD thesis defence chair at Carleton U.
 - Maude Marquis-Bissonnette (2022)
- PhD comprehensive examination committees at Carleton U.
 - Akhil Maru (2023)
 - Spencer Haskins (2023)
 - Cem Ayber (2022)
 - Ezekiel Staats (2021)
 - Dylan Pizzi (2020)
 - Laura Miller (2020)
 - Bindiya Chana (2019)
 - Susan Al-Abboodi (2018)

2016: Lecturer, ATLAS Undergraduate Lectures
Physics Division, Lawrence Berkeley National Laboratory

- Taught lectures on the Standard Model of particle physics, and tracking detectors

2015 – 2016: Mentor, ATLAS Group
Physics Division, Lawrence Berkeley National Laboratory

- Undergraduate research assistants supervised:
 - Olivia Piazza (2015 – 2016):
 - Evaluation of new designs and algorithms for the ATLAS pixel detector upgrade
 - Algorithm performance to identify boosted Higgs bosons decaying to b-quark pairs
 - Julian Wolf (2015):
 - Test beam data analysis for pixel modules at small track incidence angles

- 2012 – 2013: Mentor, ATLAS Group
Department of Physics and Astronomy, The University of British Columbia
- Undergraduate research assistants supervised:
 - Kayla McLean (2013):
 - Characterization of the top control region for the analysis of Higgs boson decays to W boson pairs in the vector boson fusion production channel
 - Kelsey Allen (2012 – 2013):
 - Searches for high-mass neutral resonances decaying into lepton pairs with ATLAS
- 2011 – 2013: Teaching Assistant
Canadian Physics Olympiads
- Taught lectures on classical mechanics, special relativity, and quantum mechanics
- 2011 – 2013: Contributor and French Translator, High School Prize Exam
Canadian Association of Physicists
- 2010 – 2012: Head Mentor Teaching Assistant
Department of Physics and Astronomy, The University of British Columbia
- Organized the teaching assistant mentorship program
 - Recruited and trained mentor teaching assistants
- 2009 – 2012: Mentor Teaching Assistant
Department of Physics and Astronomy, The University of British Columbia
- Helped teaching assistants improve their teaching abilities, via observation and feedback
- 2008 – 2011: Teaching Assistant
Department of Physics and Astronomy, The University of British Columbia
- Courses:
 - PHYS 101, Energy and Waves (2009, 2010, 2011)
 - PHYS 100, Introductory Physics (2008, 2009)

RESEARCH – HIGH-ENERGY PHYSICS

2014 – 2017: **Chamberlain Fellow and NSERC Postdoctoral Fellow**

Lawrence Berkeley National Laboratory
ATLAS Collaboration, CERN

- **Release coordinator** for ATLAS Upgrade software (2016 – 2017)
 - Coordinated the ATLAS software integration for Run-3 and Run-4 upgrades
- **Convener**, ATLAS Inner Tracker simulation and performance group (2016 – 2017)
 - Coordinated a team of 55 researchers working on improvements to simulation, digitization and track reconstruction software for the Inner Tracker upgrade
 - Oversaw the production of simulated data samples for Inner Tracker studies
 - Contributed to the redaction and internal review of technical design reports, publications and public notes
- Improved algorithms to **identify boosted Higgs bosons** decaying to b-quark pairs (2015 – 2016)
 - Optimized the selection of candidate Higgs boson jets of particles
 - Contributed to the development of multivariate classification algorithms
- Research and development toward the ATLAS Inner Tracker Pixel upgrade (2014 – 2017)
 - Key contributor to the **Inner Tracker layout design**
 - Evaluated the expected performance of novel pixel clustering and track reconstruction techniques using simulated data
 - Evaluated the impact of high collision rates on detector occupancy and readout systems
 - Improved the description of passive material in the simulated detector
 - Collected and analyzed **test beam** data from modules at small track incidence angles
 - Tested a prototype stavelet with integrated serial powering for pixel modules
 - Built a cosmic ray test bench for pixel module prototypes
- **Editorial board member:**
 - Search for dark matter in association with a Higgs boson decaying to b-quarks (2016 – 2017)
 - Search for high-mass states decaying into one charged lepton plus missing transverse momentum using ATLAS Run-2 data (2015 – 2017)

2008 – 2014: Graduate Student Research Associate (**Vanier Canada Graduate Scholar 2011 – 2014**)

The University of British Columbia and TRIUMF
ATLAS Collaboration, CERN

- **Test beams** for the ATLAS Insertable B-Layer (2013) and New Small Wheels (2014)
- Multivariate analysis looking for **vector boson fusion production of Higgs bosons** decaying to two W bosons, in final states with two charged leptons (2012 – 2014)
 - Optimized the event selection and boosted decision tree input variables
 - Evaluated background and signal yields, and systematic uncertainties
- Contributed to the Analysis Harmonization Groups toward Run-2 of the LHC (2013 – 2014)
- Liaison between the Exotics and Muon Combined Performance Groups (2012 – 2014)
 - Provided support for analysts working on over 20 searches with muons in the final state
- Search for **high-mass neutral resonances** decaying into lepton pairs, including Z' bosons (2010 – 2014)

- **Co-leader** (2011 – 2012): team of 70 researchers from 27 institutes
- **Editor** (2011 – 2014): contributed to writing papers, addressed comments during review
- Characterized the performance of the ATLAS detector for muons at high momentum
- Implemented the analysis strategy: muon selection, background and signal predictions
- Developed techniques to evaluate theoretical and experimental systematic uncertainties
- Managed and developed the statistical framework
- Interpreted the search results in the context of a variety of theoretical models
- Search for high-mass states decaying into one muon plus missing transverse momentum, including W' bosons (2010 – 2011)
 - Implemented the analysis strategy, evaluated systematic uncertainties, interpreted results
- Participated in collision data taking with the ATLAS detector (2010 – 2012)
- Participated in commissioning the ATLAS Transition Radiation Tracker (2009)
- Developed and maintained the ATLAS global data quality monitoring system (2009 – 2013)

RESEARCH EXPERIENCE – SUMMER INTERNSHIPS

- 2007: DAAD Research Intern
Universität Siegen
- Designed parts necessary for a quantum computing experiment involving a linear ytterbium ion trap in ultra-high vacuum
 - Programmed data acquisition software for devices used in this experiment
- 2006: Undergraduate Student Research Associate
Université Laval
- Searched for a viscous liquid suitable for a tilting liquid mirror, for astronomical applications
 - Designed a reflectometer working in real time during a thin metallic film deposition on an ionic liquid in ultra-high vacuum

RELEVANT PROFESSIONAL ACTIVITIES AND OUTREACH

- 2022 – 2023: Chair, Recruitment Retention and Outreach Committee
 2022 – 2023: Member, Tenure and Promotion Committee
 2021 – 2023: Undergraduate Student Research Assistant Coordinator
 2021 – 2022: Member, Departmental Equity Diversity and Inclusion Committee
 2020 – 2021: Member, Faculty of Science Equity Diversity and Inclusion Committee
 2020 – 2021: Member, Recruitment Retention and Outreach Committee
 2019 – 2023: Departmental Representative to the School of Computer Science Board
 2019 – 2021: Departmental Board Secretary
 2019 – 2021: Member, Tenure and Promotion Committee
 2018 – 2020: Member, Particle Physics Seminar Committee
 2018 – 2019: Member, Recruitment Retention and Outreach Committee
 2018 – 2019: Chair, Physics Department Seminar Committee
 Department of Physics, Carleton University
- 2021 – 2024: IPP Scientific Council Member
 2022: Member, Local Organizing Committee, IPP 50th Anniversary Symposium
 2018 – present: Member
 Institute of Particle Physics
- 2023: Session chair: Silicon strip sensors
 13th International "Hiroshima" Symposium on the Development and Application of
 Semiconductor Tracking Detectors (HSTD13)
- 2023: Session chair: Dark matter and its detection
 XVIII International Conference on Topics in Astroparticle and Underground Physics (TAUP)
- 2023: Session chair: Neutrinos and dark matter
 Canadian Association of Physicists Congress 2023
- 2021: Session chair: Dark matter experiments
 Canadian Association of Physicists Congress 2021
- 2021: Member, Local Organizing Committee
 Session chair: Noble liquid detectors
 International Conference on Technology and Instrumentation in Particle Physics (TIPP)
- 2020: Member, Particle Physics Division Thesis Award Committee
 Canadian Association of Physicists
- 2019 – 2020: Co-Chair, Dark Matter Working Group
 Canadian Astroparticle Physics Community Long-Term Planning
- 2018 – 2019: Carleton University Faculty Representative, Graduate Studies Fair
 Canadian Undergraduate Physics Conference at U. Alberta (2018) and McGill U. (2019)
- 2016 – 2024: Reviewer
 Nuclear Instrumentation & Methods in Physics Research A (2016, 2018, 2020, 2024)
 Journal of Instrumentation (2020)

- 2013 – 2014: Tour Guide
TRIUMF
- 2012: Speaker, ATLAS Virtual Visit
Science World of British Columbia
- 2011 – present: Member
Canadian Association of Physicists
- 2010 – 2011: Student member, Membership Committee
2009 – 2011: Steering committee member, Green College Dining Society
2009 – 2011: Chair, Collège Vert (French conversation group)
2009 – 2010: Convener, GreenNoir Cinémathèque
2008 – 2009: Chair, Social Committee
Green College, The University of British Columbia
- 2008: Tour Guide, Scientific Exposition
Université Laval
- 2007 – 2008: President
2006 – 2007: Director, Student Newspaper
Association des étudiants en physique de l'Université Laval
- 2007: Host, Scientific Radio Program
CHYZ 94,3 FM Québec
- 2004 – 2005: Participant, Forum Étudiant
Assemblée Nationale du Québec