

GABRIEL LEE

OBJECTIVE

I aim to apply the rigorous quantitative and systematic evaluation skills developed during my training as a theoretical physicist to impactful problems in data science.

EDUCATION

University of Chicago 09.2007 – 08.2014
M.S. (2008) and Ph.D. (2014), Physics.

University of Toronto 09.2003 – 05.2007
H.B.Sc. with High Distinction, Mathematics & Physics.

EMPLOYMENT

NextRoll, Inc. 03.2022 –
Data Scientist II Toronto, CA/San Francisco, US

- Data Scientist on the RollWorks Product Analytics team.

FlipGive, Inc. 06.2021 – 09.2021
Data Contractor Toronto, CA

- Assisted in the preparation for and drafting of the company's deck for a Series B funding round.
- Assessed the company's historic and future expected outcomes on a number of KPI's.
- Comprehensively reviewed available market research to perform a granular breakdown of TAM to optimize a new customer acquisition strategy.
- Developed a Tableau tool to visualize this breakdown for the new team.

Korea University/Cornell University 09.2017 – 05.2021/09.2017 – 09.2020
Research Professor, Institute of Basic Science/Postdoctoral Fellow, CLASSE Seoul, KR/Ithaca, US

- Repurposed the framework used to describe quarks inside nucleons to a number of theoretical problems including the unification of fundamental forces and dark matter.
- Applied previous work on electron-proton scattering data to improve searches relevant for experiments in precision physics: the multi-year billion-dollar US neutrino physics programme and novel table-top searches using atomic physics.

Technion – Israel Institute of Technology 09.2014 – 08.2017
Postdoctoral Fellow, Faculty of Physics Haifa, IL

- Investigated present and future constraints on a class of well-motivated models that attempt to explain the mass hierarchies of known elementary particles.
- Interfaced with experimental colleagues to understand details of the statistical and systematic uncertainties of their analyses and to suggest improvements to maximize sensitivity to new physics.
- Worked with a number of students in a supervisory role.

University of Chicago 09.2007 – 08.2014
Research Assistant, Enrico Fermi Institute and Teaching Assistant, Department of Physics Chicago, US

- Combined experimental results from the Large Hadron Collider with state-of-the-art theoretical calculations to place the most stringent bounds on supersymmetric models of new physics.
- Contributed to the development of the systematic framework to analyze electromagnetic interactions of nucleons. Performed a re-analysis of five decades of scattering data to attack the proton radius problem.
- Teaching assistant for undergraduate and graduate courses; nominated for a Physical Sciences Teaching Prize in 2009.

TRIUMF 05.2006 – 09.2006
Summer Research Scholarship Student, Nuclear Structure Group Vancouver, CA

ORCID: 0000-0002-7594-364X

- Involved in the commissioning of TIGRESS, performing final checks and calibration of the gamma-ray detector, and taking data for the first experiment measuring the nuclear structure of ^{21}Ne and ^{21}Na .

University of Toronto

Research Assistant and NSERC Summer Student, Department of Physics

2004 – 2006

Toronto, CA

- Designed and constructed low-noise electronics for measurements of properties of crystalline metals and oxides under high magnetic field in a dilution refrigerator.
- Investigated the localization of large-scale atmospheric patterns using a time-series analysis of decades of NOAA data.

PROFESSIONAL ACTIVITIES AND QUALIFICATIONS

Programming languages and environments

- Proficiency with TensorFlow.
- Proficiency with Python, pandas, Mathematica, MATLAB, SQL.
- Visualization in gnuplot, matplotlib, Tableau.

Code and package development

- MhEFT, Mathematica package that calculates experimentally-measurable quantities to constrain the input parameters of supersymmetric models of new physics.
- Python code for chi-square tests of models of the proton and neutron to world elastic electron–nucleon scattering data, included in Supplemental Material of Phys. Lett. B **777**, 8 (2018).

Academic Referee

- European Physical Journal C, 2016–20.
- Journal of High Energy Physics, 2018–21.

Academic Service

- Co-organizer, 4th New Physics in Korea Institute workshop: Searching for New Physics on the Horizon, May 2019.
- Co-organizer, Israel Joint Seminar in Particle Physics, 2015–16.
- Local coordinator for summer school of SUSY, a major international physics conference, Chicago, US, 2011.
- Student member of the 2010–2011 Graduate Student Admissions Committee, Dept. of Physics of U. Chicago.
- Instructor for English language program for incoming foreign students, 2008–2010.

Selected Talks

- 2020: U. Kentucky.
- 2019: Institute for High Energy Physics (Beijing).
- 2018: Carleton U.; U. of Toronto; Cornell U.; Korea Institute for Advanced Study; Korea Advanced Institute of Science and Technology; Seoul National U.; Galileo Galilei Institute; TRIUMF; U. Oregon.
- 2017: Weizmann Institute; U. of Sussex; U. of Manchester; King’s College London; Oxford; New York U.
- 2016: Johannes Gutenberg-Universität Mainz; Hebrew U. of Jerusalem; U. of Wisconsin, Madison; Argonne National Laboratory; U. of Cincinnati; U. of Pittsburgh.
- 2015: Technion; University of California, Santa Cruz; Perimeter Institute; York U.

Languages

- English (fluent), French (functional), Cantonese (basic conversational).

AWARDS AND HONOURS

- NSERC Postgraduate Scholarship D3, 2009–2012.
- Sachs Fellowship (Physics, U. Chicago), 2008.
- Ontario Graduate Scholarship, 2007 and NSERC Postgraduate Scholarship M, 2007–2011 (declined).
- University of Toronto Department of Physics Graduate Admission Award, 2007 (declined).
- St. Michael’s College Silver Medal in Mathematics, 2007.
- TRIUMF Summer Research Award, 2006.

- NSERC Undergraduate Summer Research Award, 2005.
- University of Toronto Scholar, 2005 and 2006.
- St. Michael's College Entrance Scholarship, 2003.

PUBLICATIONS

- [1] G. D. Kribs, G. Lee and A. Martin, “Effective Field Theory of Stückelberg Vector Bosons,” [arXiv:2204.01755 [hep-ph]].
- [2] K. Borah, R. J. Hill, G. Lee and O. Tomalak, “Parameterization and applications of the low- Q^2 nucleon vector form factors,” Phys. Rev. D **102**, 074012 (2020) [arXiv:2003.13640 [hep-ph]].
- [3] C. Csáki, G. Lee, S. J. Lee, S. Lombardo and O. Telem, “Continuum Naturalness,” JHEP **1903**, 142 (2019) [arXiv:1811.06019 [hep-ph]].
- [4] M. Geller, S. Iwamoto, G. Lee, Y. Shadmi and O. Telem, “Dark quarkonium formation in the early universe,” JHEP **1806**, 135 (2018) [arXiv:1802.07720 [hep-ph]].
- [5] Z. Ye, J. Arrington, R. J. Hill and G. Lee, “Proton and neutron electromagnetic form factors and uncertainties,” Phys. Lett. B **777**, 8 (2018) [arXiv:1707.09063 [nucl-ex]].
- [6] S. Iwamoto, G. Lee, Y. Shadmi and Y. Weiss, “Tagging new physics with charm,” JHEP **1709**, 114 (2017) [arXiv:1703.05748 [hep-ph]].
- [7] S. Iwamoto, G. Lee, Y. Shadmi and R. Ziegler, “Diphoton Signals from Colorless Hidden Quarkonia,” Phys. Rev. D **94**, no. 1, 015003 (2016) [arXiv:1604.07776 [hep-ph]].
- [8] N. Ierushalmi, S. Iwamoto, G. Lee, V. Nepomnyashy and Y. Shadmi, “LHC Benchmarks from Flavored Gauge Mediation,” JHEP **1607**, 058 (2016) [arXiv:1603.02637 [hep-ph]].
- [9] G. Lee and C. E. M. Wagner, “Higgs Bosons in Heavy Supersymmetry with an Intermediate m_A ,” Phys. Rev. D **92**, no. 7, 075032 (2015) [arXiv:1508.00576 [hep-ph]].
- [10] G. Lee, J. R. Arrington and R. J. Hill, “Extraction of the proton radius from electron-proton scattering data,” Phys. Rev. D **92**, no. 1, 013013 (2015) [arXiv:1505.01489 [hep-ph]].
- [11] P. Draper, G. Lee and C. E. M. Wagner, “Precise estimates of the Higgs mass in heavy supersymmetry,” Phys. Rev. D **89**, no. 5, 055023 (2014) [arXiv:1312.5743 [hep-ph]].
- [12] R. J. Hill, G. Lee, G. Paz and M. P. Solon, “The NRQED lagrangian at order $1/M^4$,” Phys. Rev. D **87**, 053017 (2013) [arXiv:1212.4508 [hep-ph]].
- [13] R. Huo, G. Lee, A. M. Thalappilil and C. E. M. Wagner, “ $SU(2) \otimes SU(2)$ Gauge Extensions of the MSSM Revisited,” Phys. Rev. D **87**, 055011 (2013) [arXiv:1212.0560 [hep-ph]].
- [14] M. A. Schumaker *et al.*, “Coulomb excitation of the proton-dripline nucleus Na-20,” Phys. Rev. C **80**, 044325 (2009) [Phys. Rev. C **82**, 069902 (2010)].
- [15] A. M. Hurst *et al.*, “Narrowing of the neutron sd-pf shell gap in Na-29,” Phys. Lett. B **674**, 168 (2009).
- [16] M. A. Schumaker *et al.*, “Coulomb excitation of radioactive Na-21 and its stable mirror Ne-21,” Phys. Rev. C **78**, 044321 (2008).
- [17] P. J. Kushner and G. Lee, “Resolving the Regional Signature of the Annular Modes”, J. Climate, **20**, 2840 (2007).

REVIEWS AND CONFERENCE PROCEEDINGS

- [1] J. M. Campbell *et al.*, “Event Generators for High-Energy Physics Experiments,” 2022 Snowmass Summer Study, [arXiv:2203.11110 [hep-ph]].
- [2] J. Arrington *et al.*, “Physics Opportunities for the Fermilab Booster Replacement,” 2022 Snowmass Summer Study, [arXiv:2203.03925 [hep-ph]].
- [3] P. Slavich *et al.*, “Higgs-mass predictions in the MSSM and beyond,” Eur. Phys. J. C **81**, no.5, 450 (2021) [arXiv:2012.15629 [hep-ph]].
- [4] D. de Florian *et al.* [LHC Higgs Cross Section Working Group Collaboration], “Handbook of LHC Higgs Cross Sections: 4. Deciphering the Nature of the Higgs Sector,” arXiv:1610.07922 [hep-ph].
- [5] E. Bagnaschi *et al.*, “Benchmark scenarios for low $\tan \beta$ in the MSSM”, LHCHSWG-2015-002, <https://cds.cern.ch/record/2039911>.