

# Matt LeBlanc, Ph.D.

## Curriculum vitae

Updated: 26 May 2026

### Contact Info

Matt LeBlanc  
Brown University Physics Dept.  
Barus & Holley 533  
184 Hope St., Providence, RI 02912

Phone: [+1 \(401\) 863-1467](tel:+14018631467)  
Email: [matt\\_leblanc@brown.edu](mailto:matt_leblanc@brown.edu)  
Web: [leblanc.physics.brown.edu](http://leblanc.physics.brown.edu)  
ORCID: [0000-0001-5977-6418](https://orcid.org/0000-0001-5977-6418)

## Research in Experimental High-Energy Physics

Member of the **CMS Collaboration** since 2024 (*signing author, 2025-present*).

Member of the **ATLAS Collaboration** from 2010-2023 (*signing author, 2015-2024*).

- Differential jet and jet substructure measurements.
- Hadronic object reconstruction & calibration; boosted object tagging.
- Searches for new particles, particularly in hadronic final states.
- (*prev.*) Characterization of prototype, radiation-hard CMOS pixel sensors.

## Positions

### Brown University

January 2024 — Present

Providence, Rhode Island, USA

**Assistant Professor of Physics (Research)**

- **Affiliate:** [The NSF AI Institute for Artificial Intelligence and Fundamental Interactions \(IAIFI\)](#)
- **Affiliate:** [Brown University Data Science Institute \(DSI\)](#)

### University of Manchester

April 2023 — December 2023\*

Manchester, Greater Manchester, England, UK

**Postdoctoral Research Associate**

- *Resigned to begin position at Brown University.*

### CERN

January 2021 — March 2023

Meyrin, Geneva, Switzerland

**Senior Research Fellow**

### University of Arizona

July 2017 — December 2020

Tucson, Arizona, USA

**Postdoctoral Research Associate**

## Education

### University of Victoria

Fall 2011 — Spring 2017

Victoria, British Columbia, Canada

**Ph.D.**, Experimental Particle Physics

**Advisor:** Rob McPherson (IPP / University of Victoria)

### Acadia University

Fall 2007 — Spring 2011

Wolfville, Nova Scotia, Canada

**B.Sc.(H.)**, Physics & Mathematics

# Grants and Awards

## Research Grants

- **US CMS HL-LHC Software and Computing R&D Award** (PI). 2026-2027, \$47k.
- **Brown University Data Science Institute Collaborative Grant** (Co-PI, w/ PI R. Gaitskell, G. Barone, I. Dell'Antonio, J. Pober and J. Roloff), *BEACON: Brown's Efficient AI Compression Network*, 2026-2027, \$30k.
- **US Department of Energy, Office of High Energy Physics Comparative Review Funding Award** (PI, w/ Co-PI J. Roloff), *Computational Advances to Enable Precision Physics at the HL-LHC*, 2025-2027, \$600k.
- **Brown University Data Science Institute Seed Grant** (PI, w/ J. Roloff), *Staying positive: eliminating negative sample weights using optimal transport*, 2024-2025, \$25k.

## Course Development Grants

- **Brown University Zern Fund for STEM**. *Fabry-Perot Interferometers for physics instructional lab experiments*. \$5k.

## Awards

- **2025 Breakthrough Prize in Fundamental Physics**
  - *I was among the 13,508 scientists who were awarded this prize for their contributions to the ATLAS, CMS, LHCb and ALICE Experiments during Run 2 of the LHC at CERN.*
- **Wu-Ki Tung Award for Early-Career Research in QCD**, CTEQ Collaboration 2022.
  - Citation: *"For important contributions to the measurements of QCD dynamics using jets and jet substructure, as well as for long standing contributions and leadership in jet reconstruction and calibration."*

NSERC	Postgraduate Scholarship - Doctoral, 2014-2017.
University of Victoria	President's Research Scholarship, 2012-2013, 2014-2017.
NSERC	Alexander Graham Bell Canada Graduate Scholarship, 2012-2013.
University of Victoria	Fellowship, 2011-2012.
Acadia University	'University Scholar' Designation, 2011.
AUPAC 2011	NSERC Representative's Honourable Mention (Presentation Prize).
TRIUMF	Summer Student Award - Atlantic Region, 2010.
NSERC	Undergraduate Summer Research Award, 2010, Declined.
Acadia University	Kenneth A. Killam Award, 2010.
Acadia University	Dr. Lalia B. Chase Scholarship, 2008, 2009, 2010.
Acadia University	Honours Research Summer Award, 2009.
Acadia University	Acadia Physics Departmental Scholarship, 2009.
Acadia University	Edgar Delap Bent Memorial Scholarship in Physics, 2008.
Acadia University	Alfred D. Arthurs Scholarship in Chemistry, 2007.
Acadia University	Acadia Excellence Scholarship, 2007.

# Leadership in Experimental Collaborations

## CMS Collaboration

*Member 2024 - Present*

- **L3 Convener**, MC Generators — Physics Modeling and Validation Subgroup, *2025-present*.
- **MC Contact Person**, Jets & Missing Energy Group, *2025-present*.

## ATLAS Collaboration

*Member 2010 - 2024, Signing Author 2015 - 2024*

- **Physics Coordination**, *ex officio* member (Jet/EtMiss Convener), *2022-2023*.
- **Jet/EtMiss Combined Performance Group Convener**, *2022-2023*.
  - **Coordination of work from ~200 contributing physicists**, across five subgroups on topics related to jet and missing transverse momentum reconstruction, calibration, software and R&D for new approaches.
  - **Oversight of ~30 'Authorship Qualification Projects'** (work typically performed by new graduate students, postdocs and faculty when joining the collaboration).
  - **Led the collaboration-internal review of public results**, including 6 peer-reviewed publications, 12 other preliminary results and ~25 presentations at international conferences that were prepared by members of the group.
- **Subgroup Convener**, Standard Model Jet & Photon Physics, *2020-2022*.
  - *Management and review of ~15 ongoing physics measurements and associated publications.*
- **Subgroup Convener**, Jet/EtMiss Definitions & MC Calibrations, *2019-2020*.
  - *Coordination of research activities for ~30 researchers working in the area of hadronic object reconstruction and calibration using simulation-based techniques.*
- **Subgroup Convener**, Jet/EtMiss Jet Energy Scale & Resolution, *2018-2019*.
  - *Coordination of research activities for ~80 scientists working in this the area of jet reconstruction and calibration using both in situ and simulation-based techniques.*
- Other roles
  - **Shift Leader**, ATLAS Control Room. *Run 2, 3 pp and Pb+Pb data-taking & pilot-beam operations between 2018-2022.*
  - **Coordinator**, core software ('Athena') code review shifts. *2017-2021.*
  - **Liaison**, between Jet/EtMiss and Supersymmetry Groups. *2017-2020.*
  - **Calo/Forward Detector Shifter**, ATLAS Control Room. *Run 2 pp data-taking in 2015.*

## Publications and preliminary results

- *I am an author of over 828 peer-reviewed results since 2015, as a contributing member of large high-energy physics collaborations. Listed below are selected results where I have made a significant, personal contribution.*
- *In experimental high-energy physics, a **Contact Editor** is a leadership role on an analysis team, acting as a point of contact to the larger experimental collaboration. They are responsible for coordinating analysis efforts, preparing the manuscript, and for ensuring that the physics results are produced in a timely and accurate manner.*
- *In both experimental and theoretical high-energy physics, authorship order is conventionally **strictly alphabetical**. In some cases, editors or working group conveners are listed before other contributors for e.g. community white-papers.*

## Peer-reviewed publications & proceedings

- 26 CMS Collaboration, *Evidence of the dead-cone effect in bottom quark initiated jets*. Preliminary Result, CMS-SMP-25-008. <https://cms-results.web.cern.ch/cms-results/public-results/preliminary-results/SMP-25-008/index.html>, <https://cds.cern.ch/record/2957860>
- 25 S. Höche, M. LeBlanc, J. Roloff & G. Whitman, *Massive tree-level splitting functions beyond kinematical limits*. Submitted to PRD. [arXiv:2512.07025](https://arxiv.org/abs/2512.07025) [hep-ph].
- 24 R. Gambhir, M. LeBlanc & Y. Zhou, *The Pareto frontier of resilient jet tagging*. Accepted by the NeurIPS 2025: Machine Learning & the Physical Sciences Workshop at the 39th annual conference on Neural Information Processing Systems (NeurIPS), San Diego, California, USA. 2-7 December 2025. [arXiv:2509.19431](https://arxiv.org/abs/2509.19431) [hep-ph].
- 23 ATLAS Collaboration, *Measurement of Jet Track Functions in ATLAS Run 2 Data*. Phys. Lett. B 868 (2025) 139680. [ATLAS-STDM-2022-05](https://arxiv.org/abs/2502.02062), [arXiv:2502.02062](https://arxiv.org/abs/2502.02062) [hep-ex].
  - Theory associate for analysis (STA): Ian Moutt (Yale)
  - *Main analyzer: I designed the analysis chain up to the statistical interpretation and directly mentored the student who ran it for the analysis (J. Pan, Yale), and contributed to the manuscript.*
- 22 C. Cesarotti & M. LeBlanc, *A Field Guide to Event-Shape Observables Using Optimal Transport*. Accepted by JHEP. [arXiv:2409.13150](https://arxiv.org/abs/2409.13150) [hep-ph].
  - *I produced the simulated Monte Carlo studies used for this study, performed the studies that used them, and wrote the manuscript.*
- 21 ATLAS Collaboration, *A precise measurement of the jet energy scale derived from single-particle measurements and in situ techniques in proton-proton collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector*. Submitted to Eur. Phys. J. C. [ATLAS-JETM-2022-06](https://arxiv.org/abs/2407.15627), [arXiv:2407.15627](https://arxiv.org/abs/2407.15627) [hep-ex].
  - *Technical Contribution: I made significant technical contributions to the ATLAS reconstruction software that enabled this study, and contributed to the design of this proof-of-concept calibration.*

- 20** ATLAS Collaboration, *Measurements of jet cross-section ratios in 13 TeV proton-proton collisions with ATLAS*. Phys. Rev. D 110 (2024) 7, 072019. [ATLAS-STDM-2020-04](#), [arXiv:2405.20206 \[hep-ex\]](#).
- *Contact editor & main analyzer: I designed & ran the data analysis chain up to the statistical interpretation, and wrote the manuscript.*
- 19** ATLAS Collaboration, *Measurements of Lund subjet multiplicities in 13 TeV proton-proton collisions with the ATLAS detector*. Phys. Lett. B 859 (2024) 139090. [ATLAS-STDM-2023-07](#), [arXiv:2402.13052 \[hep-ex\]](#).
- *Contact editor & main analyzer: I designed the analysis chain up to the statistical interpretation and directly mentored the student who ran it for the analysis (E. Smith, University of Chicago), and wrote the manuscript.*
- 18** ATLAS Collaboration, *Pursuit of paired dijet resonances in the Run 2 dataset with the ATLAS detector*. Phys. Rev. D 108 (2023) 112005. [ATLAS-EXOT-2022-18](#). [arXiv:2307.14944 \[hep-ex\]](#).
- *Contact editor & main analyzer: I ran the data analysis chain up to the statistical interpretation, and wrote the manuscript.*
- 17** M. LeBlanc, B. Nachman & C. Sauer, *Going off topics to demix quarks and gluons in extractions of  $\alpha_s$* . J. High Energ. Phys. 02 (2023) 150. [arXiv:2206.10642 \[hep-ph\]](#).
- 16** ATLAS Collaboration, *Measurements of multijet event isotropies using optimal transport with ATLAS*. J. High Energ. Phys. 10 (2023) 060. [doi:10.1007/JHEP10\(2023\)060](#). [arXiv:2305.16930 \[hep-ex\]](#).
- *Contact editor & main analyzer: I designed the analysis in consultation with C. Cesarotti, ran the data analysis chain and wrote the manuscript.*
  - Theory associate for analysis (STA): Cari Cesarotti (MIT)
  - ATLAS physics briefing: [Giving collisions a new shape: New ATLAS result measures isotropy of LHC events](#).
- 15** ATLAS Collaboration, *New techniques for jet calibration with the ATLAS detector*. Eur. Phys. J. C 83 (2023) 761. [ATLAS-JETM-2022-01](#), [arXiv:2303.17312 \[hep-ex\]](#).
- 14** B. Nachman, S. Rappoccio, N. Tran (editors) *et al. Jets and Jet Substructure at Future Colliders*. Front. Phys. 10, 22 June 2022. [arXiv:2203.07462 \[hep-ph\]](#).
- 13** ATLAS Collaboration, *Optimisation of large-radius jet reconstruction for the ATLAS detector in 13 TeV proton-proton collisions*. Eur. Phys. J. C 81 (2021) 4, 334. [ATLAS-JETM-2018-06](#), [arXiv:2009.04986 \[hep-ex\]](#).
- *Contact editor & main analyzer: I designed & ran the aspects of the analysis chain related to jet tagging, helped coordinate the analysis team's effort (~10 people), and wrote the manuscript.*
- 12** ATLAS Collaboration, *Jet energy scale and resolution measured in pp collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector*. Eur. Phys. J. C 81 (2021) 8, 689. [ATLAS-JETM-2018-05](#), [arXiv:2007.02645 \[hep-ex\]](#).

- 11 ATLAS Collaboration, *Measurement of the Lund Jet Plane with charged particles in 13 TeV pp collisions with the ATLAS detector*. Phys. Rev. Lett. 124 (2020) 222002. [ATLAS-STDM-2018-57](#), [arXiv:2004.03540 \[hep-ex\]](#).
  - Contact editor & main analyzer: *I designed the study, ran the data analysis chain, and wrote the manuscript.*
  - ATLAS physics briefing: *Novel probes of the strong force: precision jet substructure and the Lund jet plane*
- 10 ATLAS Collaboration, *A measurement of soft-drop jet observables in pp collisions with the ATLAS detector at sqrt(s)=13 TeV*. Phys. Rev. D 101, 052007 (2020). [ATLAS-STDM-2017-33](#), [arXiv:1912.09837 \[hep-ex\]](#).
  - Main analyzer: *I ran the data analysis chain up to the statistical interpretation.*
  - ATLAS physics briefing: *Novel probes of the strong force: precision jet substructure and the Lund jet plane*
- 9 ATLAS Collaboration, *Constraints on mediator-based dark matter models using sqrt(s) = 13 TeV pp collisions at the LHC with the ATLAS detector*. [ATLAS-EXOT-2017-32](#), J. High Energ. Phys. 05 (2019) 142. [arXiv:1903.01400 \[hep-ex\]](#).
- 8 ATLAS Collaboration, *Combination of the searches for pair-produced vector-like partners of the third-generation quarks at sqrt(s) = 13 TeV with the ATLAS detector*. Phys. Rev. Lett. 121 (2018) 211801. [ATLAS-EXOT-2017-17](#), [arXiv:1808.02343 \[hep-ex\]](#).
  - Physical Review Letters “Editor’s Suggestion”
  - CERN Press statement. *The incredible lightness of the Higgs (Français)*.
  - ATLAS Physics Briefing. *Could a new type of quark fix the “unnaturalness” of the Standard Model?*
- 7 ATLAS Collaboration, *Search for new phenomena in events with same-charge leptons and b-jets in pp collisions at sqrt(s) = 13 TeV with the ATLAS detector*. J. High Energ. Phys. 12 (2018) 039. [ATLAS-EXOT-2016-16](#), [arXiv:1807.11883 \[hep-ex\]](#).
- 6 ATLAS Collaboration, *In situ calibration of large-radius jet energy and mass in 13 TeV proton-proton collisions with the ATLAS detector*. Eur. Phys. J. C 79 (2019) 135. [ATLAS-JETM-2018-02](#), [arXiv:1807.09477 \[hep-ex\]](#).
  - Contact editor
  - CERN Courier Article. *A decade of advances in jet substructure*. 28 September, 2018.
- 5 ATLAS Collaboration, *Search for Supersymmetry in final states with missing transverse momentum and multiple b-jets in proton-proton collisions at sqrt(s) = 13 TeV with the ATLAS detector*. J. High Energ. Phys. 06 (2017) 107. [ATLAS-SUSY-2016-10](#), [arXiv:1711.01901 \[hep-ex\]](#).
- 4 ATLAS Collaboration, *Identification of high transverse momentum top quarks in pp collisions at sqrt(s) = 8 TeV with the ATLAS detector*. Journal of High Energy Physics, 06, 093 (2016). [ATLAS-PERF-2015-04](#), [arXiv:1603.03127 \[hep-ex\]](#).
  - ATLAS Physics Briefing: *ATLAS ready to “boost” Run 2 physics*.

- 3 ATLAS Collaboration, *Search for pair production of gluinos decaying via stop and sbottom in events with b-jets and large missing transverse momentum in pp collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector*. Physical Review D 94, 032003 (2016). [ATLAS-SUSY-2015-10](#), [arXiv:1605.09318 \[hep-ex\]](#).
- 2 R. P. Taylor *et al.* *The evolution of cloud computing in ATLAS*. [Journal of Physics: Conference Series, Volume 664, Clouds and Virtualization \(CHEP 2015, Okinawa, Japan\)](#).
- 1 ATLAS Collaboration, *Search for direct pair production of the top squark in all-hadronic final states in proton-proton collisions at  $\sqrt{s} = 8$  TeV with the ATLAS detector*. Journal of High Energy Physics, 09, 015 (2014). [ATLAS-SUSY-2013-16](#), [arXiv:1406.1122 \[hep-ex\]](#).

## Hardware-related results

- 12 D. V. Berlea *et al.* *Depletion depth studies with the MALTA2 sensor, a depleted monolithic active pixel sensor*. Nucl.Instrum.Meth.A 1063 (2024) 169262. Proceedings of the 13th international 'Hiroshima' Symposium on the Development and Application of Semiconductor Tracking Detectors ([HSTD13](#)).
- 11 D. Dobrijević *et al.*, *Future developments of radiation tolerant sensors based on the MALTA architecture*. JINST 18 (2023) 03, C03013. Proceedings of the 2022 Topical Workshop on Electronics for Particle Physics ([TWEPP-22](#)).
- 10 F. Dachs *et al.* *Development of a large-area, light-weight module using the MALTA monolithic pixel detector*. NIM A 1047 (2023) 167809. Proceedings of the 15<sup>th</sup> Pisa Meeting on Advanced Detectors ([PM2021](#)).
- 9 M. van Rijnbach *et al.* *Performance of the MALTA telescope*. Eur. Phys. J. C 83 (2023) 7, 581. [2304.01104 \[hep-ex\]](#).
- 8 H. Pernegger *et al.* *MALTA-Cz: A radiation hard full-size monolithic CMOS sensor with small electrodes on high-resistivity Czochralski substrate*. JINST 18 (2023) 09, P09018. [arXiv:2301.03912 \[physics.ins-det\]](#).
- 7 C. Solans Sánchez *et al.* *MALTA monolithic pixel sensors in TowerJazz 180 nm technology*. Nucl.Instrum.Meth.A 1057 (2023) 168787. Proceedings of the 30th International Workshop on Vertex Detectors ([VERTEX2021](#)).
- 6 D. V. Berlea *et al.* *Radiation Hardness of MALTA2, a Monolithic Active Pixel Sensor for Tracking Applications*. *IEEE Trans.Nucl.Sci.* 70 (2023) 10, 2303-2309.
- 5 M. LeBlanc *et al.* *Recent results with radiation-tolerant TowerJazz 180 nm MALTA Sensors*. Nucl.Instrum.Meth.A 1041 (2022) 167390. [arXiv:2209.04459 \[physics.ins-det\]](#). Proceedings of Vienna Conference on Instrumentation 2022 ([VCI2022](#)).
- 4 D. Dobrijević *et al.* *MALTA3: Concepts for a new radiation tolerant sensor in the TowerJazz 180 nm technology*. NIM A 1040 (2022) 167226. Proceedings of Vienna Conference on Instrumentation 2022 ([VCI2022](#)).
- 3 F. Piro *et al.* *A 1  $\mu$ W radiation-hard front-end in a 0.18  $\mu$ m CMOS process for the MALTA2 monolithic sensor*. *IEEE Trans. Nucl. Sci.* 69 6 1299-1309, June 2022.

- 2 G. Gustavino *et al.* *Timing performance of radiation-hard MALTA monolithic pixel sensors*, JINST 18 (2022) 03, C0301. [arXiv:2209.14676 \[physics.ins-det\]](https://arxiv.org/abs/2209.14676). Proceedings of the 23<sup>rd</sup> international workshop on Radiation Imaging Detectors (IWORID 2022).
- 1 M. van Rijnbach *et al.*, *Radiation hardness and timing performance in MALTA monolithic pixel sensors in TowerJazz 180 nm*. JINST 17 (2022) 04, C04034. Proceedings of TWEPP21.

## Other publications, proceedings & white papers (not peer-reviewed)

- 7 A. Ferguson, M. LaFleur, L. Ruthotto, J. Thaler, Y.-S. Ting, P. Tiwary, S. Villar (eds.) *et al.*, *The Future of Artificial Intelligence and the Mathematical and Physical Sciences*. [arXiv:2509.02661 \[cs.AI\]](https://arxiv.org/abs/2509.02661) Community Paper from the Future of NSF AI+MPS Workshop, Cambridge, Massachusetts, March 24-26, 2025.
- 6 M. Donegà, S. Jones, K. Köneke, R. Röntsch, P. Azure, A. Hinzmann, A. Huss, J. Huston, S. Marzani, M. Pellen, S. Höche, J. McFayden, V. Mikuni, S. Plätzer *et al.* *Les Houches 2023: Physics at TeV Colliders: Standard Model Working Group Report*. [arXiv:2406.00708 \[hep-ph\]](https://arxiv.org/abs/2406.00708). Proceedings of the 2023 Les Houches Workshop on Physics at TeV Colliders, Les Houches, France. 12-30 June 2023.
  - *I contributed to the Standard Model Phenomenology subgroup (Jet Substructure) and Monte Carlo Generators, Tools & Machine Learning subgroup (MC modeling uncertainties).*
- 5 M. LeBlanc, on behalf of the ATLAS and CMS Collaborations, *Jet and photon physics in ATLAS and CMS*. Proceedings of the 56th Rencontres de Moriond on QCD and High Energy Interactions, La Thuile, It, 19 - 26 Mar 2022. ATL-PHYS-PROC-2022-049.
- 4 M. LeBlanc, on behalf of the ATLAS Collaboration. Measurements of event shapes and jet substructure with ATLAS Run 2 data. Proceedings of the Eighth annual conference on Large Hadron Collider Physics (LHCP 2020) — PoS(LHCP2020)144. Online. ATL-PHYS-PROC-2020-047.
- 3 D. De Florian, M. Donegà, M. Dührssen-Debling, S. Jones, J. Bendavid, A. Huss, J. Huston, S. Kallweit, D. Maître, S. Marzani, B. Nachman, V. Ciulli, S. Prestel, E. Re, *et al.* *Les Houches 2019: Physics at TeV Colliders: Standard Model Working Group Report*. [arXiv:2003.01700 \[hep-ph\]](https://arxiv.org/abs/2003.01700). Proceedings of the 2019 Les Houches Workshop on Physics at TeV Colliders, Les Houches, France. 10-28 June 2019.
  - *I contributed to the jet working group studies.*
- 2 M. LeBlanc, on behalf of the ATLAS Collaboration. *Inclusive searches for squarks and gluinos with the ATLAS detector*. Proceedings of XXVI International Workshop on Deep-Inelastic Scattering and Related Subjects — PoS(DIS2018)078. 16-20 April 2018. Kobe, Hyogo, Japan. ATL-PHYS-PROC-2018-080.
- 1 M. LeBlanc & M. D. Robertson, *Imaging of Electron Trajectories in Crystals*. Bulletin Société de Microscopie du Canada, 37(2), 20 (2009).

## Public notes & figures

➔ *These documents were released publicly after an internal review process within an Experimental collaboration.*

- 16 ATLAS Collaboration, *Constituent-based W-boson tagging with the ATLAS Detector*. [ATL-PHYS-PUB-2023-020](#), public note. July 2023.
  - ATLAS Physics Briefing: [\[ML\] is revolutionising our understanding of particle "jets"](#)
- 15 ATLAS Collaboration, *Summary plots: anti-kt  $R=0.4$  precision jet energy scale uncertainty (Rel. 21)*. [JETM-2023-005](#), public plots (November 2023).
- 14 ATLAS Collaboration, *LAr Cells in Clusters with Timing*. [LARG-2023-05](#), public plots (July 2023).
- 13 ATLAS Collaboration, *Comparison of W tagging performance with different ML algorithms*. [JETM-2023-003](#), public plots (July 2023).
- 12 ATLAS Collaboration, *Towards a precise interpretation of the top quark mass parameter in ATLAS Monte Carlo samples*. [ATL-PHYS-PUB-2021-034](#), public Note. July 2021.
  - Contact editor
    - ➔ This work was a phenomenological study performed within ATLAS, involving several associated theoretical physicists : Andre Hoang (Vienna), Sonny Mantry (Georgia Tech), Adithya Pathak (Vienna), Iain Stewart (MIT)
- 11 ATLAS Collaboration, *Identification of hadronically-decaying top quarks using UFO jets with ATLAS in Run 2*. [ATL-PHYS-PUB-2021-028](#), public note (Preliminary result). July 2021.
- 10 ATLAS Collaboration, *E/p measurements and Geant4 physics list comparisons*. [JETM-2020-03](#), public plots (November 2020).
- 9 ATLAS Collaboration, *Impact of Alternative Inputs and Jet Grooming on Large-R Jet Performance*. [ATL-PHYS-PUB-2019-027](#), public note (Preliminary result). July 2019.
  - Contact editor
- 8 ATLAS Collaboration, *In situ large-R jet energy scale calibration and uncertainties in 2015-2017 data*, [JETM-2019-05](#), public plots (July 2019).
- 7 ATLAS Collaboration, *Particle flow jet energy scale in 2015-2017 data and simulation*. [JETM-2019-02](#), public plots (February 2019).
- 6 ATLAS Collaboration, *Particle flow jet energy resolution in 2017 data and simulation*. [JETM-2019-01](#), public plots (February 2019).
- 5 ATLAS Collaboration, *Impact of Pile-up on Jet Constituent Multiplicity in ATLAS*. [ATL-PHYS-PUB-2018-011](#), public note (Preliminary result). July 2018.
- 4 ATLAS Collaboration, *Jet energy scale and uncertainties in 2015-2017 data and simulation*. [JETM-2018-006](#), public plots (November 2018).

- 3 ATLAS Collaboration, *Jet energy resolution in 2017 data and simulation*. [JETM-2018-005](#), public plots (September 2018).
- 2 ATLAS Collaboration, *Jet reclustering and close-by effects in ATLAS Run 2*. [ATLAS-CONF-2017-062](#), preliminary conference result for [BOOST 2017](#), Buffalo, New York, USA. 17-21 July, 2017.
  - Contact editor
- 1 ATLAS Collaboration, *Stability of jet mass for top, W, and light jets as a function of pile-up*. [JETM-2016-014](#), public plots (December 2016).

## Open-Source Software and Public Datasets

- ➔ *I have listed both repositories I am the owner/maintainer of that are of interest to the wider community, and selected repositories and datasets where I have made significant personal contributions as a developer in the past.*
- **Maintainer**, R. Gambhir, M. LeBlanc & Y. Zhou, *Pythia8 and Herwig7 Boosted Top and QCD Datasets*. Zenodo; 2025. [10.5281/zenodo.16986897](https://zenodo.org/records/16986897) <https://zenodo.org/records/16986897>
  - **Developer**, *JetReconstruction.jl : Jet reconstruction (reclustering) with Julia*. (2025-present). <https://github.com/JuliaHEP/JetReconstruction.jl>
  - **Maintainer**, *JetTaggingFCC.jl : AI algorithms for jet tagging at the Future Circular Collider with Julia*. (2025-present). <https://github.com/JuliaHEP/JetTaggingFCC.jl>
  - **Owner**, *EnergyFlow.jl : Optimal transport for collider physics with Julia*. (2025-present). <https://github.com/leblanc-lab/EnergyFlow.jl>
  - **Developer**, *ATLAS Collaboration, Athena*. Zenodo, [10.5281/zenodo.2641997](https://zenodo.org/records/2641997) <https://gitlab.cern.ch/atlas/athena>
  - **Developer**, *xAOD AnaHelpers v1.0.0 : ATLAS Run II analysis framework for AnalysisTop and AnalysisBase for proton-proton physics*. (2015-2022). url: <https://github.com/UCATLAS/xAODAnaHelpers>. zenodo: <https://zenodo.org/record/7335128>

# Research Presentations

## Plenary and invited talks

- 23 **(Invited)** *Physics Innovation via Optimal Transport*. Workshop at the NSF Institute for Pure and Applied Mathematics at the University of California Los Angeles. March 1-5, 2027.
- 22 **(Invited)** *The Power of Positive Samples: Eliminating Negative Event Weights with Optimal Transport*. 2026 Meeting of the Department of Particles & Fields of the American Physical Society. Fermilab, Batavia, Illinois, USA. 20-24 July 2026. Parallel.
- 21 *Extractions of the strong coupling from ATLAS and CMS Run 2 data*. 15th Annual Workshop on QCD at the LHC (QCD@LHC 2025). Stony Brook University, New York, USA. 8-12 September 2025. Plenary, On behalf of the ATLAS and CMS Collaborations.
- 20 *Working Group 1 Summary: Minimum Bias, Underlying Event & Monte Carlo Generators*. 14th International Workshop on Multi-Parton Interactions at the LHC (MPI@LHC 2023). University of Manchester, Manchester, England. 20-24 November 2023. Plenary.
- 19 *Studies of hadronisation and the Underlying Event / Multi-Parton Interactions with ATLAS Run 2 Data*. 14th International Workshop on Multi-Parton Interactions at the LHC (MPI@LHC 2023). University of Manchester, Manchester, England. 20-24 November 2023. Plenary, on behalf of the ATLAS Collaboration.
- 18 *Giving events a new shape : measurements of multijet event isotropy at ATLAS using optimal transport*. ML4Jets 2023. DESY, Hamburg, Germany. 6-10 November 2023. Plenary, on behalf of the ATLAS Collaboration.
- 17 *Testing the Strong Force with Photons and Jets*. Standard Model at the LHC (SM@LHC 2023). Fermilab National Laboratory, Batavia, Illinois, USA. 10-14 July 2023. Plenary, on behalf of the ATLAS and CMS Collaborations.
- 16 *Breaking  $q/g$  degeneracies when extracting the strong coupling from jet substructure*. First Lund Jet Plane Institute, CERN Theory Department. 3-7 July 2023. Plenary.
- 16 *Going off topics to demix quarks and gluons when extracting  $\alpha_s$* . 14th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2022). Universität Hamburg, Hamburg, Germany. 15-19 August, 2022. Plenary.
- 15 *Overview (Experimental)*. 14th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2022). Universität Hamburg, Hamburg, Germany. 15-19 August, 2022. Plenary.
- 14 *Jet Reconstruction in ATLAS*. Semi-Visible Jets Workshop 2022, ETH Hönggerberg, Zürich, Switzerland. 5-7 July, 2022. Plenary, on behalf of the ATLAS Collaboration.
- 13 *Jet and photon physics in ATLAS and CMS*. 56th Rencontres de Moriond: QCD and High-Energy Interactions Session. La Thuile, Aosta, Italy. 19-26 March, 2022. Plenary, on behalf of the ATLAS and CMS Collaborations.

- 12 *Recent results with radiation-tolerant TowerJazz 180 nm MALTA Sensors. The 16th Vienna Conference on Instrumentation (VICI2022)*. Online. 21-25 February, 2022. Plenary.
- 11 *Jet substructure and event shapes with ATLAS. 8th annual Conference on Large Hadron Collider Physics (LHCP 2020)*. Online. 25-30 May, 2020. Parallel, on behalf of the ATLAS Collaboration.
- 10 *Precision jet substructure measurements with ATLAS Run 2 data. APS Virtual Meeting*, online, 18-21 April, 2020. Parallel, on behalf of the ATLAS Collaboration.
- 9 *Standard Model Highlights & Prospects. 2019 Brookhaven Forum: Particle Physics & Cosmology in the 2020's*. Brookhaven National Laboratory, Upton, New York, USA. 25-27 September, 2019. Plenary, On behalf of the ATLAS and CMS collaborations.
- 8 *Novel Probes of QCD: Jet Substructure Measurements at the LHC. 2019 Meeting of the Department of Particles & Fields of the American Physical Society*. Boston, Massachusetts, USA. 29 July - 2 August, 2019. Parallel, on behalf of the ATLAS, CMS, ALICE and LHCb collaborations.
- 7 *Hadronic final state reconstruction in ATLAS SUSY searches. 11th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2019)*. Cambridge, Massachusetts, USA. 21-27 July, 2019. Plenary, on behalf of the ATLAS Collaboration.
- 6 *Inclusive searches for squarks and gluinos with the ATLAS detector. 26th International Workshop on Deep-Inelastic Scattering and Related Topics (DIS 2018)*. Kobe, Hyogo, Japan. 16-20 April, 2018. Parallel, on behalf to the ATLAS Collaboration.
- 5 *Tagging boosted top quarks and Higgs bosons in ATLAS. 7th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2015)*, Chicago, IL, USA. 10-14 August, 2015. Plenary, on behalf of the ATLAS Collaboration.
- 4 *Direct stop production in boosted hadronic final states. 50th Winter Nuclear and Particle Physics Conference*. Banff, AB, Canada. February 16, 2013.
- 3 *Top-antitop cross section measurement with the ATLAS detector at the LHC. Atlantic Universities Physics and Astronomy Conference (AUPAC)*. St. Francis-Xavier University, Antigonish, NS, Canada. February 4-6, 2011.
- 2 *Top-antitop cross section measurement with the ATLAS detector at the LHC. 52nd Canadian Undergraduate Physics Conference (CUPC)*. Dalhousie University, Halifax, NS, Canada. October 13-16, 2010.
- 1 *Simulation and interpretation of HA-ADF images in scanning transmission electron microscopy. Atlantic Universities Physics and Astronomy Conference (AUPAC)*. Acadia University, Wolfville, NS, Canada. February 5-7, 2010.

## Poster presentations

- 4 *Comparative performance of ATLAS boosted  $W$  taggers using different AI/ML algorithms. 15th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2023)*. Lawrence Berkeley National Laboratory, Berkeley,

- 3 *Measurements and Applications of Jet Substructure with the ATLAS Detector.* 2019 Meeting of the Department of Particles & Fields of the American Physical Society. Boston, Massachusetts, USA. 29 July - 2 August, 2019. Poster, on behalf of the ATLAS Collaboration.
- 2 *Impact of Alternative Inputs and Grooming Methods on Large-R Jet Reconstruction in ATLAS.* 133rd LHCC Meeting Open Session. CERN, Geneva, Switzerland. 26 February - 2 March, 2018. Poster, on behalf of the ATLAS Collaboration.
- 1 *Jet reclustering and close-by effects in ATLAS Run 2.* 8th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2017). Buffalo, NY, USA. 16-21 July, 2017. Poster, on behalf of the ATLAS Collaboration.

## Invited seminars and colloquia

- 8 *Jet Propulsion: Advancing the performance and understanding of hadronic objects for Run 3.* November 17, 2023. **University of Manchester**, Bohr high-energy physics seminar.
- 7 *Jet Propulsion: Advancing the performance and understanding of hadronic objects for Run 3.* November 16, 2023. **University of Warwick**, high-energy physics seminar.
- 6 *Jet Propulsion: Advancing the performance and understanding of hadronic objects for Run 3.* November 14, 2023. **Cambridge University**, high-energy physics seminar.
- 5 *Perspectives on hadronic final states, from up close & far away.* May 24, 2023. **Università di Genova**, seminar on phenomenology of particle physics.
- 4 *Advances in Jet Physics: Insights into Hadronic Final States & the Strong Force.* March 27, 2023. **Brookhaven National Laboratory**, invited seminar.
- 3 *Advances in Jet Physics: Insights into Hadronic Final States & the Strong Force.* March 23, 2023. **Southern Methodist University**, invited seminar.
- 2 *MAPS to Discoveries.* October 21, 2021. **Argonne National Laboratory (online)**, invited seminar.
- 1 *Inside and Out: Precision Jet Physics in ATLAS Run 2.* July 5, 2019. **Georg-August-Universität Göttingen**, summer seminar series.

## Other presentations (local, collaboration-internal, etc.)

- 15 *Physics analysis with the Lund Jet Plane.* CMS Standard Model Physics Workshop. CERN, September 22-26, 2025.
- 14 *MC Generator Report from JME+BTV.* CMS Physics Days: Physics modelling and MC generators. CERN. April 15-16, 2025.
- 13 *Flavor corrections: status & plans.* CMS Jets & Missing Energy Workshop. Universität Hamburg, Hamburg, Germany. March 2025.

- 12 *Closing Summary. ATLAS Hadronic Calibration Workshop 2023*. Instituto de Física Corpuscular (IFIC). Valencia, Spain. September 8, 2023.
- 11 *Summary of BOOST 2021. Snowmass Energy Frontier Workshop — Restart*, online, 30 August - 3 September, 2021. Parallel.
- 10 *Highlights of LHCP 2020. ATLAS Weekly Meeting*. CERN (virtual). 9 June, 2020.
- 9 *Jets and missing transverse energy in Run 3. ATLAS Physics & Performance Week*. CERN. January 27-31, 2020.
- 8 *Post-mortem: hadronic object reconstruction in Run 2. ATLAS Run 2 Physics — Reaching New Heights Workshop*. CERN. December 9-13, 2019.
- 7 *ATLAS jet substructure measurements. ATLAS Standard Model Physics Workshop*. University of Belgrade, Belgrade, Serbia. September 17-20, 2019.
- 6 *Status and Challenges of Jet Reconstruction, Substructure and Missing Transverse Energy. US ATLAS Hadronic Final State Forum XIII*. Lawrence Berkeley National Laboratory, Berkeley, California, USA. December 10-14, 2018.
- 5 *Novel Probes of QCD. ATLAS End-of-Year Jamboree 2018*. CERN. December 7, 2018.
- 4 *Jet substructure — beyond tagging. ATLAS Hadronic Calibration Workshop XIII*. Toronto, Canada. 28 August - 1 September, 2017.
- 3 *Tagging boosted objects. ATLAS Hadronic Calibration Workshop XII*. Corfu Summer Institute, Corfu, Greece. September 22, 2016.
- 2 *Searching for stops with boosted tops. NSERC funding agency review of ATLAS Canada*. TRIUMF, Vancouver, BC, Canada. December 11, 2014.
- 1 *Direct stop production in boosted hadronic final states. ATLAS Canada Workshop*. Simon Fraser University, Vancouver, BC, Canada. May 8, 2013.

## Student & Mentee Presentations of Supervised Work

- 21 Regan Doherty, *Calibrating Electromagnetic and Hadronic Calorimeter Signals in the MAIA Detector Concept*. Poster at the 2026 International Muon Collider Collaboration (IMCC) and MuCol Annual Meeting. CERN. 22-25 June.
- 20 Rishabh Jain, *A Phase-Space Inclusive Figure of Merit based in Optimal Transport for Validating Monte Carlo Reweightings*. Parallel talk at the 28th Conference on Computing in High Energy and Nuclear Physics (CHEP 2026), Chulalongkorn University, Bangkok, Thailand. 25-29 May.
- 19 Lauren Hay, *Cell Reweighting Algorithms for Pathological Weight Mitigation in LHC Simulations using Optimal Transport*. Parallel talk at the 28th Conference on Computing in High Energy and Nuclear Physics (CHEP 2026), Chulalongkorn University, Bangkok, Thailand. 25-29 May.
- 18 Grant Whitman, *Massive  $1 \rightarrow 3$  Splitting Functions Beyond Kinematical Limits*. Parallel Talk at the 2026 Phenomenology Symposium (PHENO), University of Pittsburgh, Pittsburgh, Pennsylvania, USA. 11-13 May.

- 17 Camille Mauceri, *The Power of Positive Samples: Eliminating Negative Weights with Optimal Transport*. Lighting Round Talk at the 2025 US Large Hadron Collider Users' Association Annual Meeting, University of Washington, Seattle, Washington, USA. 16-19 December.
- 16 Yuanchen Zhou, *The Pareto frontier of resilient jet tagging*. Poster presentation at the NeurIPS 2025: Machine Learning & the Physical Sciences Workshop at the 39th annual conference on Neural Information Processing Systems (NeurIPS), San Diego, California, USA. 2-7 December 2025.
- 15 Haochen Wang, *High-Energy Physics Workflows in Native Julia*. APS New England Section, Brown University, Providence, Rhode Island, USA. 7-8 November 2025.
- 14 Sam Ferraro, *Suppressing backgrounds at a future Muon Collider with the SoftKiller algorithm*. APS New England Section, Brown University, Providence, Rhode Island, USA. 7-8 November 2025.
- 13 Grant Whitman, *Computing Massive 1→3 Splitting Kernels for Future Parton Shower Models*. APS New England Section, Brown University, Providence, Rhode Island, USA. 7-8 November 2025.
- 12 Yuanchen Zhou, *The Pareto Frontier of Resilient Jet Tagging*. APS New England Section, Brown University, Providence, Rhode Island, USA. 7-8 November 2025.
- 11 Rishabh Jain, *Learning the Space of Collider Events*. APS New England Section, Brown University, Providence, Rhode Island, USA. 7-8 November 2025.
- 10 Camille Mauceri, *Cell Reweighting Algorithms for Pathological Weight Mitigation in LHC Simulations using Optimal Transport*. APS New England Section, Brown University, Providence, Rhode Island, USA. 7-8 November 2025.
- 9 Rishabh Jain, *Cell Reweighting Algorithms for Pathological Weight Mitigation Using Optimal Transport*. Presentation at the 2025 IAIFI Summer Workshop. Harvard University, Cambridge, Massachusetts, USA. 11-15 August 2025.
- 8 Rishabh Jain, *Cell Reweighting Algorithms for Pathological Weight Mitigation Using Optimal Transport*. Poster at BOOST 2025 - 17th International Workshop on Boosted Object Phenomenology, Reconstruction, Measurements, and Searches at Colliders. Brown University, Providence, Rhode Island, USA. 28 July - 1 August 2025.
- 7 Sam Ferraro, *Applying SoftKiller at the Muon Collider*. Poster at BOOST 2025 - 17th International Workshop on Boosted Object Phenomenology, Reconstruction, Measurements, and Searches at Colliders. Brown University, Providence, Rhode Island, USA. 28 July - 1 August 2025.
- 6 Grant Whitman, *Computing Massive 1→3 Splitting Kernels for Future Parton Shower Models*. Poster at BOOST 2025 - 17th International Workshop on Boosted Object Phenomenology, Reconstruction, Measurements, and Searches at Colliders. Brown University, Providence, Rhode Island, USA. 28 July - 1 August 2025.
- 5 Ema Dimatrova, *Julia-based study of SoftKiller performance in high-pileup conditions*. Poster at BOOST 2025 - 17th International Workshop on Boosted Object Phenomenology, Reconstruction, Measurements, and Searches at Colliders. Brown University, Providence, Rhode Island, USA. 28 July - 1 August 2025.

- 4 Grant Whitman, *Computing Massive 1→3 Splitting Kernels for Future Parton Shower Models*. Poster at the 18th MCnet Summer School. Stirling, Scotland, UK. 8-13 June 2025.
- 3 Sam Ferraro, *ACTS tracking in Key4hep*. Presentation at the FCC-ee Workshop: Tracking Detectors and Software. Brookhaven National Laboratory, Upton, New York, USA. 7-9 May 2025.
- 2 Sam Ferraro, *Advancements in ACTS: Speed and Adaptability for the Muon Collider*. Poster at the Inaugural US Muon Collider Meeting. Fermilab, Illinois, USA. 7-9 August 2024.
- 1 Yuanchen Zhou, *Going beyond the jet tagging frontier using knowledge distillation*. Contributed parallel talk at 2024 IAIFI Workshop, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA. 12-16 August 2024.

# Teaching

## Brown University

- **Physics 0040, Basic Physics B**, instructor / lab manager / course manager.
  - Fall '26, expected enrollment: 42 students.
  - Fall '25, enrollment: 48 students.
  - Fall '24, enrollment: 39 students.
- **Physics 0560, Experiments in Modern Physics**, instructor.
  - Spring '27, expected enrollment: 40 students.
  - Spring '26, enrollment: 40 students.
  - Spring '25, enrollment: 44 students.

## Summer/Winter Schools, Pedagogical Lectures, etc.

- **Brown University Physics AI Winter Workshop, 5-9 January 2026.**  
*Applications of Optimal Transport in High-Energy Physics, instructor.*
  - Online: <https://indico.physics.brown.edu/event/192/>
  - Over 470 participants registered for this workshop.
- **BOOST 2024, "BOOST Camp" experimental instructor.**
  - Pedagogical module for 16th International Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP (BOOST 2024), Genova, Italy. 29 July.
- **Brown University Physics AI Winter Workshop, 16-19 January 2024.**  
*The evolution of boosted top tagging at the LHC, co-instructor.*
  - Online: <https://indico.physics.brown.edu/event/2/overview>
  - Over 470 participants registered for this workshop.

## University of Victoria

- **Physics 112, Introductory Physics II.** *Lab Instructor, Spring 2012.*
- **Physics 112, Introductory Physics I.** *Lab Instructor, Fall 2011.*

## Acadia University

- **Math 2723, Intro. Differential Equations.** *Teaching Assistant, Spring 2010.*
- **Physics 1063, Gen. Physics II.** *Lab Assistant: Spring 2010.*
- **Math 1023, Intro. Calculus II.** *Studio Assistant: Fall 2010.*
- **Physics 1053, Gen. Physics I.** *Lab Assistant: Fall 2009.*
- **Physics 1023, Intro. Physics II.** *Lab Assistant: Spring 2009.*
- **Physics Department Drop-In Help Centre.** *Tutor, Fall 2008.*

# Supervision and mentoring

## Postdoctoral Research Associates

- 1 **Dr. Lauren Hay**, PhD from SUNY Buffalo 2025 (*Supervisor: Prof. Salvatore Rappoccio*).
  - Contributing to studies of negative weight mitigation in collider physics simulations and the effect of lossy compression on collider physics datasets.
  - Contributing to precision QCD cross-section measurements with CMS Data.
  - CMS Experiment Particle Flow Validation Contact (202X-Present)
  - 🏆 US CMS Computing R&D Initiative Awardee (2026-2027)

## Doctoral students

- 3 **Yuanchen Zhou**, anticipated PhD: 2029
  - Studying the performance of AI-based jet calibrations for the CMS Experiment, particularly in the context of potential bias due to the use of flavor disaggregated data in training
  - CMS Data Quality Remote Shifter (Jets & Missing Energy), 2025.
- 2 **Camille Mauceri**, anticipated Ph.D. 2028
  - Contributing to studies of negative weight mitigation in collider physics simulations and to improvements for charged particle track reconstruction in dense environments for the CMS Experiment.
  - CMS Data Quality Remote Shifter (Jets & Missing Energy), 2025.
- 1 **Rishabh Jain**, anticipated Ph.D. 2027
  - Contributing to studies of negative weight mitigation in collider physics simulations and to in situ charged-hadron calibrations for the CMS Experiment.
  - CMS Data Quality Remote Shifter (Jets & Missing Energy), 2025.

## Master's students

- 5 **Shiyu Peng**, anticipated Sc.M. 2027.
  - **Thesis:** *Generative AI algorithms to simulate Beam-Induced Background at a Future Muon Collider. (working title).*
- 4 **Grant Whitman**, Sc.M. 2026.
  - **Thesis:** *Massive  $1 \rightarrow 3$  Splitting Functions Without Kinematical Limits.*
  - 🏆 *Master's Commencement Speaker for 2026 Physics Commencement Ceremony.*
- 3 **Haochen Wang**, Sc.M. 2026
  - **Thesis:** *A study of Higgs couplings at a future circular electron-positron collider in the Julia programming language.*

2 **Shutong Dong**, Sc.M. 2025

- **Thesis:** *Studies of the effects of lossy compression on hadronic jet reconstruction and classification.*
- **Afterward:** Project Manager, GE Healthcare, Yizhuang, China.

1 **Yuanchen Zhou**, Sc.M. 2025

- **Thesis:** *Applications of knowledge distillation in jet tagging at the LHC.*
- **Afterward:** PhD Student, Brown University.

## Undergraduate students

11 **Hanting Li**, anticipated graduation 2028 (Applied Mathematics)

- **Undergraduate Teaching and Research Award (UTRA):**  
*Developing an Open Source Julia-Based Optimal Transport Library for Particle Physics*

10 **Henry Greenhut**, anticipated graduation 2028 (Physics & Computer Science)

- **Undergraduate Teaching and Research Award (UTRA):**  
*Understanding the Statistical Properties of Beam-Induced Background Overlays at a future Muon Collider.*

9 **Cameron Peckham**, anticipated graduation 2027 (Physics)

- **Undergraduate Teaching and Research Award (UTRA):**  
*Studies of Event Shape Observables at a Future Muon Collider.*

8 **Nico DiLullo**, anticipated graduation 2027 (Physics & Computer Science)

Undergraduate Researcher, 2025 - present. *Supervisor*

- **Fall 2025 - Present:** *Optimizing LHC Data Storage via Floating-Point Quantization*

7 **Zhixing (Grace) Wang**, anticipated graduation 2028 (Mathematics)

- **Undergraduate Teaching and Research Award (UTRA):**  
*Improving searches for dark matter at the LHC with Optimal Transport.*

6 **Regan Doherty**, anticipated graduation 2027 (Physics & German Studies)

Undergraduate Researcher, 2025 - present. *Co-supervisor.*

- **Fall 2025 - Present:** *Hadronic object performance at a future Muon Collider.*
- **Summer 2025:** *Studies of negative weight density in simulated collider events with deep learning.*

5 **Ethan Lynn**, anticipated graduation 2027 (Physics)

- **Summer 2025 Undergraduate Teaching and Research Award (UTRA):**  
*Implementation of Valencia jet clustering algorithm in in JetReconstruction.jl*

4 **Kirill Vesialou**, anticipated graduation 2028 (Physics)

- **Summer 2025 Undergraduate Teaching and Research Award (UTRA):**  
*Implementation of ghost-based active area calculations in JetReconstruction.jl*

- 3 **Ema Dimatrova**, anticipated graduation 2027 (Computer Engineering)
  - **Undergraduate Teaching and Research Award (UTRA):**  
*Implementation of pile-up mitigation algorithms in in JetReconstruction.jl*
- 2 **Austine Zhang**, anticipated graduation 2026 (Applied Mathematics & Music)
  - **Fall 2024 Undergraduate Teaching and Research Award (UTRA):**  
*Visualizing jet algorithms at the Large Hadron Collider*
- 1 **Samuel Ferraro**, Sc.B. 2025 (Physics — Mathematical, *Magna cum laude, honours*)  
Undergraduate Researcher, 2024-25. *Co-supervisor.*
  - **Thesis:** *Investigations into Beam-Induced Background and Mitigation Strategies at a future Muon Collider*
  - 🏆 Mildred Widgoff Prize for Excellence in Thesis Preparation,  
Brown University Department of Physics.
  - 🏆 “Most Enthusiastic Presenter” Poster Prize at the Inaugural US Muon Collider Meeting (7-9 August 2024, Fermi National Accelerator Laboratory).
  - **IRIS-HEP Fellow**, Summer 2024  
Supervisor: Dr. Simone Pagan-Griso, Lawrence Berkeley National Laboratory
  - **Afterward:** PhD Student, Harvard University, Massachusetts, USA.

## Internal Service (Brown)

- **Physics Department Outreach & Publications Committee**, 2024-Present.
- **Comprehensive Exam Committees**
  - **Yuanchen Zhou**, Experimental High-Energy Physics. 2026, *chair*.
  - **Lazar Novakovic**, Experimental High-Energy Physics. 2026.
  - **Camille Mauceri**, Experimental High-Energy Physics. 2025, *chair*.
  - **Jessica Tang**, Experimental High-Energy Physics. 2025.
  - **Morgan Lee**, Experimental Astrophysics and Cosmology. 2024.
  - **Oliver Carey**, Experimental Astrophysics and Cosmology. 2024.
- **Summer/Semester Projects for Research, Internship, Teaching (SPRINT) LINK Awards Reviewer**, Spring 2024.
  - *These awards provide financial support for students who may not otherwise be able to engage in unpaid and low-paid summer research, teaching, and internship opportunities.*

## External Service

### Committees, Commitments & Memberships

- **US LHC Users' Association Executive Committee (USLUEC)** Member, 2024-2026.
  - Outreach/Communications Committee, 2024-2026.
  - Government Relations Committee, 2025-2026.
  - Representative of the US High-Energy Physics Community in annual advocacy trip to US Capitol. Washington, DC, USA. 21-24 April 2025.
- **NSF AI Institute for Artificial Intelligence and Fundamental Interactions (IAIFI)**
  - Industry Partnership Committee, 2024-Present.
- **Electron-Ion Collider (EIC) User Group**
  - Institutional Board Representative, Brown University, 2023-Present.
- **Snowmass 2021 US HEP Community Planning Exercise**
  - Liaison, Snowmass Early-Career and Energy Frontier, 2020-2021.
  - Contact, Snowmass Early-Career Inreach Group, Fall/Winter 2020
- **American Physical Society Member**, 2019-Present.

### Presentations about outreach, advocacy and policy

- 4 Moderator, *Global Science: Discoveries and Outlook of the US High Energy Physics Community*. Panel discussion with H. Newman, K. Kennedy and S. Bhattacharya at the 2026 AAAS Annual Meeting, Phoenix, Arizona, USA. 12-14 February 2026.
- 3 *Patterns, Probabilities & Particles: Studying the Quantum World*. International Year of Quantum Science and Technology. NSERC CISE Atlantic & IYQCan High School Talk. 18 November 2025.

- 2 *Global Science: Advocacy & Outreach for the US High Energy Physics Community*. APS New England Section 2025, Brown University, Providence, RI. 7 November 2025.
- 1 *US LHC Users' Association Overview*. Presentation at the I.ANN QCD Summit 2024: Empowering New Talents and Building Global Networks

## Workshop/Conference Organization

- **Convener**, “Reconstruction and Software” Session, International Muon Collider Collaboration Meeting 2026 (IMCC). CERN (June 2026).
- **Experimental Convener**, “Soft and Non-Perturbative QCD” Session, [QCD@LHC 2025](#). Stony Brook University, New York, USA (September 2025).
- **Local Organizing Committee**, BOOST 2025, Providence, RI, USA. (July 2025)
- **International Advisory Committee**, BOOST 2025, Providence, RI, USA. (July 2025)
- **International Advisory Committee**, BOOST 2024, Genoa, Italy. (July 2024)
- **Experimental Convener**, “Minimum Bias, Underlying Event & Monte Carlo Generators” Session, [MPI@LHC 2023](#). Manchester, United Kingdom (November 2023).
- **Organising Committee**, [ATLAS Hadronic Calibration Workshop 2023](#). Instituto de Física Corpuscular (IFIC). Valencia, Spain (September 2023).
- **International Advisory Committee**, [BOOST 2023](#). Lawrence Berkeley National Laboratory, Berkeley, California, USA (July 2023).
- **Organizing Committee**, [First Lund Jet Plane Institute](#). CERN Theory Department (July 2023).
- **International Advisory Committee**, [BOOST 2022](#). Universität Hamburg, Hamburg, Germany (July 2022).
- **Local Organizing Committee**, [BOOST 2021](#). CERN (Online, July 2021).
- **Local Organizing Committee**, [ATLAS Hadronic Calibration Workshop 2019](#). University of Arizona. Tucson, Arizona, USA (October 2019).
- **Organizing Committee**, [ATLAS Hadronic Calibration Workshop 2018](#), Kirchoff-Institut für Physik, Physikalisches Institute. Heidelberg, Germany (September 2018).

## External mentoring & supervision

---

### Doctoral students

- **Jingjing Pan**, Yale University, New Haven, Connecticut, USA. *Thesis analysis mentor*. Primary Supervisor: Keith Hamilton. PhD defended 7 August 2024.
  - \* **Thesis:** *Exploring the Standard Model and Beyond Through the Lens of Jet Substructure and Deep Learning with the ATLAS Experiment*
  - \* **Afterward:** Postdoctoral Associate, *Karlsruher Institut für Technologie*, Germany.
- **Emily Smith**, University of Chicago, Chicago, Illinois, USA. *Thesis analysis mentor*. Primary Supervisor: David Miller. PhD defended 30 October 2023.

- \* **Thesis:** *A Global View of Jets With the ATLAS Detector: From Hardware Triggers to Precision Measurements and Beyond* ([online](#))
  - 🏆 ATLAS Thesis Award Recipient
- \* **Afterward:** Lederman Fellow, Fermi National Accelerator Laboratory (Fermilab).
- **Christof Sauer**, Kirchoff-Institut für Physik, Physikalisches Institute, Heidelberg, Germany. *Thesis analysis mentor*. Primary Supervisor: Andre Schöning. PhD defended 24 October 2023.
  - \* **Thesis:** *Measurement of the Triple-Differential Cross-Section for the Production of Multijet Events using 139 fb<sup>-1</sup> of Proton-Proton Collision Data at  $\sqrt{s} = 13$  TeV with the ATLAS Detector to Disentangle Quarks and Gluons at the Large Hadron Collider* ([online](#))
  - \* **Afterward:** Postdoctoral Associate, Kirchoff-Institut für Physik, Physikalisches Institute, Heidelberg, Germany.

## Undergraduate students

- **Jonathan Barrett**, Memorial University of Newfoundland, Corner Brook, Newfoundland, Canada. [Institute of Particle Physics CERN Summer Student, 2022](#). *Co-supervisor*.
  - \* **Afterward:** MSc Student, Memorial University of Newfoundland.
- **Alejandro Reyes**, Cal State University, Fresno, California, USA. Cal State CERN Summer Student, 2019. *Co-supervisor*.
- **Hector Delgado**, Cal State University, Los Angeles, California, USA. Cal State CERN Summer Student, 2019. *Co-supervisor*.
  - \* **Afterward:** PhD Candidate (Astrobiology), University of Washington.

## External Ph.D. Examiner

- **Alberto Rescia**, *An exploration of heavy flavor jets: from phenomenology to precision measurements at the ATLAS Experiment*. Thesis supervisor: Federico Sforza. Università di Genova, Genova, Italy. 16 April, 2026.
- **Louis Ginabat**, *Étalonnage des jets et mesures précises de sections efficaces de production de jets avec les données de l'expérience ATLAS*. Directrice de thèse: Mélissa Ridet, co-encadrant de thèse: Bogdan Malescu. Laboratoire de Physique Nucléaire et de Hautes Energies (LPNHE), Paris, France. September 25, 2023.

## Funding Agency Review

- NSF Graduate Research Fellowships Program (GRFP), 2025.
- European Research Council (ERC), 2024.

## Peer Review & Editorial Duties

- Peer Referee, *Physical Review D* (PRD, since June 2024)
- Peer Referee, *Nuclear Science and Techniques* (NST, since September 2023)

- Associate Editor, *Frontiers in Big Data and AI in High Energy Physics* (since August 2023)
- Review Editor, *Frontiers in Physics: Radiation Detectors and Imaging* (since August 2023)
- Peer Referee, *European Journal of Physics C* (EPJC, since September 2022)
- Peer Referee, *Physical Review Letters* (PRL, since June 2022)
- Peer Referee, *Journal of High-Energy Physics* (JHEP, since March 2021)

## Collaboration-Internal Review

- ➔ *As a subgroup and group-level convener, I have reviewed numerous results that were prepared by experimental collaborations. The following lists only formal roles beyond those.*
- **Analysis Review Committee.** *Top pair production cross-section measurement in Pb+Pb collisions at 5.02 TeV.* CMS-HIN-24-021. (In-prep.)
- **Analysis Review Committee.** *Jet fragmentation function and groomed substructure of bottom quark jets in proton-proton collisions at 5.02 TeV with the CMS Detector.* CMS-HIN-24-005. (In-prep.)
- **Second reader.** *R=0.4 jets input comparison and Monte Carlo calibration with the ATLAS Detector.* [ATL-PHYS-PUB-2022-038](#). Public note (Preliminary result). August 2022.
- **Second reader.** *Transverse momentum response and reconstruction efficiency for jets from displaced decays in the ATLAS detector.* [ATL-PHYS-PUB-2019-025](#). Public note (Preliminary result). May 2019.
- **Editorial board chair.** *Measurement of the R=0.4 jet mass in Pb+Pb and pp collisions at  $\sqrt{s_{NN}}=5.02$  TeV with the ATLAS detector.* [ATLAS-CONF-2018-014](#). Preliminary conference result for [Quark Matter 2018](#), Venice, Italy. 14-19 May.

## Outreach

### Public events and interactions

- **Videoconference Moderator**, IPPOG / QuarkNet Physics Masterclasses, 2020-present.
- **US LHC Users' Association Booth**, American Association of Physics Teachers Summer Meeting, Boston, Massachusetts, USA. July 2024.
- **ATLAS Science Cafe & Walking Tour Guide**, CERN Open Days. 2019.
- **Guide**, TRIUMF + Emily Carr School of Art & Design Artists-In-Residence Visits, 2014-2015.
- **Volunteer Public Tour Guide**, TRIUMF, 2013-2015
- **Local Instructor**, TRIUMF IPPOG / QuarkNet Physics Masterclasses. 2014.
- **Photographer**, TRIUMF Open House, 2013
- **Local Instructor**, University of Victoria IPPOG / QuarkNet Physics Masterclasses. 2012.

## Magazine and online articles

- ATLAS Collaboration, *Machine learning is revolutionising our understanding of particle “jets”*. Online. 3 August 2023.
- ATLAS Collaboration, *Signal and noise: how timing measurements and AI are improving ATLAS event reconstruction*. Online. 1 August 2023.
- ATLAS Collaboration, *Giving collisions a new shape: New ATLAS result measures isotropy of LHC events*. Online. 14 July, 2023.
- ATLAS Collaboration, *A decade of advances in jet substructure*. CERN Courier. Volume 58, Number 8. October, 2018.
- ATLAS Collaboration, *ATLAS Physics Briefing: Novel probes of the strong force: precision jet substructure and the Lund jet plane*. Online. 19 April, 2020.