

# Jesse Diaz Thaler

## *Curriculum Vitae*

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### Contact Information

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Web: <http://www.jthaler.net/>

### Research in Theoretical Particle Physics

- Collider physics and quantum chromodynamics
- Theoretical frameworks beyond the standard model

### Degrees

*Fall 2002–Spring 2006*    **Harvard University**  
Ph.D., Physics, *June 2006*  
A.M., Physics, *June 2004*  
Thesis: “Symmetry Breaking at the Energy Frontier”  
Advisor: Nima Arkani-Hamed

*Fall 1998–Spring 2002*    **Brown University**  
Sc.B., Math/Physics, *May 2002*  
Advisor: Antal Jevicki

### Employment

*January 2010–Present*    **Massachusetts Institute of Technology**  
*MIT Center for Theoretical Physics*  
Associate Professor of Physics with Tenure, *2017–Present*  
Associate Professor of Physics, *2015–2017*  
Assistant Professor of Physics, *2010–2015*

*July 2009–December 2009*    **Lawrence Berkeley National Laboratory**  
*Theoretical Physics Group*  
Physicist Postdoctoral Fellow

*July 2006–June 2009*    **University of California, Berkeley**  
*Miller Institute for Basic Research in Science*  
Miller Research Fellow  
Advisor: Lawrence Hall

## Honors

- Fermilab Distinguished Scholar, *Fermi National Accelerator Laboratory*, 2018–2020
- Simons Fellowship in Theoretical Physics, *Simons Foundation*, 2018
- Frank E. Perkins Award for Excellence in Graduate Advising, *MIT*, 2017
- Harold E. Edgerton Faculty Achievement Award, *MIT*, 2016
- Buechner Faculty Teaching Award, *MIT Physics Department*, 2014
- Buechner Faculty Undergraduate Advising Award, *MIT Physics Department*, 2013
- Sloan Research Fellowship, *Alfred P. Sloan Foundation*, 2013
- Kavli Frontiers Fellow, *Kavli Foundation*, 2012
- Presidential Early Career Award for Scientists and Engineers, *White House*, 2012
- Class of 1943 Career Development Professorship, *MIT*, 2012–2015
- Early Career Research Award, *U.S. Department of Energy, Office of Science*, 2011–2016
- Miller Research Fellowship, *University of California, Berkeley*, 2006–2009
- Giorgio Gamberini Dissertation Prize, *Scuola Normale Superiore di Pisa*, 2007
- Merit Fellowship, *Harvard Faculty of Arts and Sciences*, 2006
- Goldhaber Prize, *Harvard Physics Department*, 2005
- Graduate Research Fellowship, *National Science Foundation*, 2002–2005

## UROP Students Supervised

*Undergraduate Research Opportunities Program, MIT*

- Zhou, Ziqi, '20: *Fall 2018*
- Klinger, Talya, '20: *Spring 2017*
- Mastandrea, Radha, '19: *Spring/Fall 2017, Spring/Summer 2018* (see below)
- Hall, Zachary, '18: *Spring/Summer/Fall 2017* (see below)
- Burns, Matthew, '18: *Fall 2014, Spring 2015*
- Zhou, Kevin, '17: *IAP/Spring/Summer/Fall 2016, Spring 2017*  
Orloff Award for Outstanding Research, *MIT Physics Department*, 2017  
After MIT: Marshall Scholarship, *U. Cambridge*
- Tripathee, Aashish, '17: *Spring/Summer/Fall 2015, IAP/Spring/Summer/Fall 2016* (see below)
- Phan, Trung, '15: *Spring/Summer 2014* (see below)
- Wilkason, Thomas, '15: *Fall 2013, Spring/Summer 2014* (see below)
- Williams, Mobolaji, '13: *Fall 2010, Spring 2011, Summer 2012* (see below)
- Katzin, Dustin, '12: *Fall 2011, IAP 2012* (see below)
- Chan, Tucker, '12: *Summer/Fall 2011, Spring 2012* (deceased)  
After MIT: Physics Ph.D. Candidate, *Stanford*
- Van Tilburg, Ken, '11: *Summer/Fall 2010* (see below)

## B.S. Student Theses Supervised

- Mastandrea, Radha, *B.S. 2019*  
Thesis: “Analyzing CMS Open Collider Data through Topic Modeling”  
Orloff Award for Outstanding Service, *MIT Physics Department, 2019*  
Physics Research Fellowship, *Heising-Simons Foundation, 2018*  
FUTURE of Physics Participant, *Caltech, 2018*  
After MIT: Marshall Scholarship, *U. Cambridge*
- Hall, Zachary, *B.S. 2018*  
Thesis: “Photon Isolation and Jet Substructure”  
Orloff Award for Outstanding Service, *MIT Physics Department, 2017*  
After MIT: Physics Ph.D. Candidate, *U.C. Berkeley*
- Tripathee, Aashish, *B.S. 2017*  
Thesis: “Jet Substructure at the Large Hadron Collider”  
After MIT: Physics Ph.D. Candidate, *U. Michigan*
- Phan, Trung, *B.S. 2015*  
Thesis: “Relativistic Quantum Fields in Theoretical Physics”  
After MIT: Physics Ph.D. Candidate, *Princeton*
- Wilkason, Thomas, *B.S. 2015*  
Thesis: “Exclusive Cone Jet Algorithms for High Energy Particle Colliders”  
Orloff Award for Outstanding Service, *MIT Physics Department, 2015*  
After MIT: Physics Ph.D. Candidate, *Stanford*
- Williams, Mobolaji, *B.S. 2013*  
Thesis: “Multiple Supersymmetry Breaking and Dark Matter”  
After MIT: Physics Ph.D. Candidate, *Harvard*
- Katzin, Dustin, *B.S. 2012*  
Thesis: “The DarkLight Experiment: Searching for the Dark Photon”  
Currently: Analyst, *American International Group*
- Fei, Lin, *B.S. 2011*  
Thesis: “Dark Matter Dynamics in the Early Universe”  
After MIT: Physics Ph.D. Candidate, *Princeton*
- Van Tilburg, Ken, *B.S. 2011*  
Thesis: “Identifying Boosted Objects with  $N$ -subjettiness and Linear  $k$ -means Clustering”  
Apker Award Finalist, *American Physical Society, 2011*  
Orloff Award for Outstanding Research in Physics, *MIT Physics Department, 2011*  
After MIT: Physics Ph.D., *Stanford*  
Currently: Postdoctoral Researcher, *KITP, Santa Barbara*

## M.Eng. Student Theses Supervised

- Naik, Preksha, *M.Eng. 2019*  
Thesis: “Exploring the Space of Jets with CMS Open Data”  
After MIT: Physics Ph.D. Candidate, *Caltech*

## Ph.D. Students Supervised

- Komiske, Patrick, *anticipated Ph.D. 2021*
- Metodiev, Eric, *anticipated Ph.D. 2021*
- Elder, Benjamin, *Ph.D. 2018*  
Thesis: “Jet Fragmentation at the LHC”  
After MIT: Cognitive Software Developer, *IBM*
- Necib, Lina, *Ph.D. 2017*  
Thesis: “Boosting Indirect Detection of Dark Matter”  
Vazquez Award for Outstanding Research, *MIT Physics Department, 2016*  
After MIT: Fairchild Postdoctoral Scholar, *Caltech*
- Kahn, Yonatan, *Ph.D. 2015*  
Thesis: “Forces and Gauge Groups Beyond the Standard Model”  
J.J. and Noriko Sakurai Dissertation Award, *American Physical Society, 2016*  
Andrew M. Lockett III Memorial Fund Award, *MIT Physics Department, 2014*  
After MIT: Postdoctoral Researcher, *Princeton*  
Currently: Assistant Professor, *U. Illinois, Urbana-Champaign*
- Bertolini, Daniele, *Ph.D. 2014*  
Thesis: “Electroweak Symmetry Breaking in the Era of the Higgs Boson Discovery”  
LHC-TI Graduate Fellowship, *LHC Theory Initiative, 2013*  
After MIT: Postdoctoral Researcher, *U.C. Berkeley*  
Currently: Data Scientist, *Quid*
- Thomas, Zachary, *Ph.D. 2014*  
Thesis: “Supersymmetry at the Dawn of the LHC Era”  
After MIT: Postdoctoral Researcher, *U. Minnesota*  
Currently: Applied Research Mathematician, *Department of Defense*
- D’Eramo, Francesco, *Ph.D. 2012*  
Thesis: “Hot and Dark Matter” (*jointly advised with Krishna Rajagopal and Hong Liu*)  
Vazquez Award for Outstanding Research, *MIT Physics Department, 2011*  
After MIT: Miller Research Fellowship, *U.C. Berkeley*  
Currently: Assistant Professor, *U. Padova*

## Postdoctoral Researchers Supervised

- Dreyer, Frédéric, Early Postdoc.Mobility Fellow, *Fall 2017–Spring 2018*  
After MIT: Postdoctoral Researcher, *Oxford*
- Soreq, Yotam, Rothschild Fellow, *Fall 2015–Spring 2018*  
After MIT: Postdoctoral Researcher, *CERN*  
Currently: Assistant Professor, *Technion*
- Safdi, Benjamin, Pappalardo Fellow in Physics, *Fall 2014–Spring 2017*  
After MIT: Assistant Professor, *U. Michigan*
- Xue, Wei, CTP Postdoctoral Researcher, *Fall 2014–Spring 2017*  
After MIT: Postdoctoral Fellow, *CERN*  
Currently: Assistant Professor, *U. Florida*

- Marzani, Simone, LHC Theory Initiative Postdoctoral Fellow, *Fall 2014–Spring 2015*  
After MIT: Assistant Professor, *U. Buffalo*  
Currently: Tenure-track Researcher, *U. Genova*
- Elor, Gilly, CTP Postdoctoral Researcher, *Fall 2013–Spring 2016*  
After MIT: Postdoctoral Researcher, *U. Oregon*  
Currently: Postdoctoral Researcher, *U. Washington, Seattle*
- Neill, Duff, Pappalardo Fellow in Physics, *Fall 2012–Spring 2015*  
CTP Postdoctoral Researcher, *Spring 2015–Spring 2016*  
After MIT: Director’s Fellow, *Los Alamos National Laboratory*  
Currently: Feynman Fellow, *Los Alamos National Laboratory*
- Larkoski, Andrew, CTP Postdoctoral Researcher, *Fall 2012–Fall 2015*  
After MIT: LHC Theory Initiative Postdoctoral Fellow, *Harvard*  
Currently: Visiting Assistant Professor, *Reed C.*  
Wu-Ki Tung Award for Early Career Research on QCD, *CTEQ Collaboration, 2017*
- McCullough, Matthew, Simons Postdoctoral Fellow, *Fall 2011–Fall 2014*  
After MIT: COFUND Fellowship, *CERN*  
Currently: Staff Scientist, *CERN*
- Rehermann, Keith, CTP Postdoctoral Researcher, *Fall 2010–Spring 2012*  
Currently: Consultant, *Ab Initio Software Corporation*

## Visitors Supervised

- Andrew Turner  
Tushar Shah and Sara Zion Physics Fellowship, *MIT Physics Department, 2018–2019*  
Ph.D. Advisor: Washington Taylor, *MIT*
- Maximilian Henderson  
International Research Opportunities Programme, *Summer 2018*  
Home Institution: *Imperial College London*
- Edward Hirst  
International Research Opportunities Programme, *Summer 2018*  
Home Institution: *Imperial College London*
- Leung, Rahim, International Research Opportunities Programme, *Summer 2017*  
Home Institution: *Imperial College London*
- Schulze, Markus, Visiting Postdoctoral Researcher, *Fall 2015*  
Home Institution: *CERN*
- Romero, Alexis, MIT Summer Research Program, *Summer 2015*  
MSRP Project: “Jet Physics Measurements on CMS Open Data”  
Home Institution: *San Diego State U.*
- Fonseca, Nayara, FAPESP Fellowship, *Spring 2014–Fall 2014*  
Ph.D. Advisor: Gustavo Burdman, *U. São Paulo, Brazil*

## Teaching Experience

- 8.831 — Supersymmetric Quantum Field Theories  
Lecture: *Spring 2017, Fall 2019*
- 8.051 — Quantum Mechanics II (MITx-based)  
Instructor: *Spring 2018*
- 8.033 — Relativity  
Lecture: *Fall 2017*  
Recitation: *Fall 2016*
- 8.02 — Physics II, Electricity & Magnetism (GIR)  
TEAL (studio class): *Spring 2014, Spring 2015, Spring 2016*
- 8.012 — Physics I, Classical Mechanics  
Recitation: *Fall 2014*
- 8.06 — Quantum Mechanics III  
Lecture: *Spring 2011, Spring 2012, Spring 2013*  
Recitation: *Spring 2010*
- 8.05 — Quantum Mechanics II  
Recitation: *Fall 2010, Fall 2012*

## Internal Service

- MIT Physics Ph.D. Thesis Committees:
  - Gherardo Vita (*Iain Stewart, in progress*)
  - Chih-Liang Wu (*Tracy Slatyer, in progress*)
  - J. Owen Andrews (*Ibrahim Cissé, in progress*)
  - Hongwan Liu (*Tracy Slatyer, May 2019*)
  - Charles Epstein (*Richard Milner, Aug. 2018*)
  - Nicholas Rodd (*Tracy Slatyer, Apr. 2018*)
  - David Hernandez (*Edmund Bertschinger, Apr. 2018*)
  - Aram Apyan (*Markus Klute, Nov. 2016*)
  - Daniel Roberts (*Allan Adams, Apr. 2016*)
  - Ian Moulton (*Iain Stewart, Apr. 2016*)
  - Daniel Kolodrubetz (*Iain Stewart, Apr. 2016*)
  - Mingming Yang (*Christoph Paus, Jan. 2015*)
  - Shawn Henderson (*Peter Fisher, Jul. 2013*)
  - Teng Ma (*Boleslaw Wyslouch, May 2013*)
  - Kevin Sung (*Steven Nahn, Mar. 2013*)
  - Christopher Jones (*Janet Conrad, Jun. 2012*)
  - Riccardo Abbate (*Iain Stewart, May 2012*)
  - Abolhassan Vaezi (*Xiao-Gang Wen, Jan. 2011*)
  - Georgia Karagiorgi (*Janet Conrad, Jul. 2010*)
- MIT Faculty Committee on Curricula, *Fall 2017–Spring 2018, Fall 2019–Present*
- MIT Physics Promotion Committee, *Fall 2019*
- MIT Physics Pappalardo Fellowships Executive Committee, *Fall 2016–Fall 2017*

- MIT Physics Colloquium Committee, *Spring 2010–Spring 2014*  
Chair: *Fall 2012–Spring 2014*
- MIT Physics Graduate Academic Advisor, *Fall 2017–Present*  
Anticipated Ph.D. 2022: Eric Anschuetz, Samuel Leutheusser, Gregory Ridgway,  
Annie Wei, Ryan Weller  
Anticipated Ph.D. 2020: Jasmine Brewer
- MIT Physics Academic Advisor, *Fall 2011–Present*  
Class of 2018/2019: Robert Arnott, Zachary Bogorad, Hannah Field, Rodmy Paredes Alfaro,  
Saranesh Prembabu, Joshua Rhodes, Kevin Tang, Michael Winer  
Class of 2014/2015: Allison Christian, Jay Lawhorn, Joseph Perricone, Jeffrey Prouty,  
Melih Ucer, Pranjal Vachaspati, Prashanth Venkataram
- MIT Physics Qualifying Exam, Part III Committee, *Spring 2015–Present*
- MIT Physics Qualifying Exam, Part II Committee, *Spring 2012–Spring 2014*  
Chair: *Fall 2013–Spring 2014*
- MIT Physics Qualifying Exam, Part II Grading Committee, *Sept. 2010*
- MIT LNS Colloquium Committee, *Fall 2015–Spring 2018*  
Chair: *Fall 2017–Spring 2018*
- MIT CTP Faculty Search Committee (Fall 2017, Fall 2019)  
Chair: *Fall 2019*
- MIT CTP Visitor Coordinator, *Fall 2016–Present*
- MIT CTP Nuclear/Particle Seminar Committee, *Fall 2010–Fall 2016*
- MIT CTP Postdoc Selection Committee, *Fall 2009–Present*
- MISTI Global Seed Funds Evaluation Committee, *Fall 2012–Fall 2014*

## External Service

- External Ph.D. Examiner:  
Thea Aarrestad (*U. Zurich, Mar. 2017*)  
Ignacio Garcia Garcia (*U. Valencia, Dec. 2016*)  
Brian Walsh (*Yale, Feb. 2013*)  
Travis Martin (*Carleton U., Aug. 2012*)
- External Mentoring:  
Ilias Cholis, PI Academy for Research and Engagement, *Oakland U., Fall 2018–Present*
- Science Advisory Board, *USQCD Collaboration, Spring 2013–Fall 2016*
- Sakurai Dissertation Award Selection Committee, *American Physical Society, Fall 2016*
- Fellowship Selection Committee, *LHC Theory Initiative, Fall 2013–Fall 2014*  
Chair: *Fall 2014*
- International Advisory Committee, Boost Workshops, *Jun. 2010, Jul. 2012, Aug. 2013, Aug. 2014, Aug. 2015, Jul. 2016, Jul. 2017, Jul. 2018, Jul. 2019, Jul. 2020*  
Ombuds Team: Boost 2020, *Hamburg, Jul. 2020*  
Local Organizing Committee: Boost 2019, *MIT, Jul. 2019*
- Jet Convenor, Les Houches Workshops, *Jun. 2015, Jun. 2017*

- Advisory Committee, Mainz Machine Learning Workshop, *May 2020*
- Advisory Committee, ML4Jets Workshop, *January 2020*
- Local Organizing Committee, Rising Stars in Physics, *Apr. 2018*
- Advisory Committee, BLV Workshop, *May 2017*
- Organizing Committee, Lattice for BSM Workshop, *Apr. 2017*
- Organizer, Aspen Center for Physics Workshops, *Feb. 2011, Jul. 2011, Aug. 2016*
- Organizer, Galileo Galilei Institute Workshop, *Sep. 2015*
- Organizer, Boston Jet Physics Workshop, *Jan. 2011, Jan. 2014*
- Program Committee, PANIC 2011, *Jul. 2011*
- Organizer, MIT/Berkeley Workshop, *Aug. 2010*
- Editorial Board, *Journal of High Energy Physics*, *Fall 2019–Present*
- Peer Review: *Physical Review Letters*, *Journal of High Energy Physics*, *Physical Review D*, *Journal of Cosmology and Astroparticle Physics*, *Physics of the Dark Universe*, *Nuclear Physics B*, *Physics Letters B*, *European Physical Journal C*, *Journal of Physics G*, *Physics Reports*, *Annals of Physics*, *Particle Data Group*
- Funding Agency Review: *U.S. Department of Energy*, *National Science Foundation*, *Heising-Simons Foundation*, *The Royal Society*, *Swiss National Science Foundation*, *Natural Sciences & Engineering Research Council of Canada*, *Israel Science Foundation*, *Netherlands Organisation for Scientific Research*, *German Academic Exchange Service*, *Hungarian National Research Office*
- High School Outreach: TheoryNet, *Northeastern University*, *Spring 2010–Spring 2018*  
Michael Wadness, *Medford High School*, *Fall 2012–Spring 2015*, *Spring 2018*  
Elaine Picard, *Concord-Carlisle High School*, *Fall 2015–Spring 2016*, *Spring 2017*  
Michael Hirsh, *Needham High School*, *Spring 2010–Spring 2012*
- Open Data Advocacy  
“Slow and Steady”, with Matthew Strassler, *Nature Physics* 15:725 (2019)  
“Particle Collisions”, in Felice Frankel, *Picturing Science and Engineering*, *MIT Press*, 2018  
“The Future of Particle Physics is ‘Open’”, Guest Blog Post, *CMS Experiment*, *Dec. 2017*

## Publications and Preprints

See <http://www.jthaler.net/research> for these publications organized by topic. Following the convention in particle physics, all authors are listed alphabetically, except for [83] and [93].

\* = Paper arising from a supervised Ph.D. thesis

† = Paper arising from a supervised B.S. thesis

[98] Cari Cesarotti, Yotam Soreq, Matthew J. Strassler, Jesse Thaler, and Wei Xue, *Searching in CMS Open Data for Dimuon Resonances with Substantial Transverse Momentum*, *Phys. Rev. D* **100**, 015021 (2019) [arXiv:1902.04222].

[97] \* Patrick T. Komiske, Eric M. Metodiev, and Jesse Thaler, *Metric Space of Collider Events*, *Phys. Rev. Lett.* **123**, 041801 (2019) [arXiv:1902.02346].



- [96] Jasmine Brewer, José Guilherme Milhano, and Jesse Thaler, *Sorting Out Quenched Jets*, Phys. Rev. Lett. **122**, 222301 (2019) [arXiv:1812.05111].
- [95] Timothy Cohen, Gilly Elor, Andrew J. Larkoski, and Jesse Thaler, *Navigating Collinear Superspace*, arXiv:1810.11032.
- [94] \* Patrick T. Komiske, Eric M. Metodiev, and Jesse Thaler, *Energy Flow Networks: Deep Sets for Particle Jets*, JHEP **1901**, 121 (2019) [arXiv:1810.05165].
- [93] Hongwan Liu, Brodi D. Elwood, Matthew Evans, and Jesse Thaler, *Searching for Axion Dark Matter with Birefringent Cavities*, Phys. Rev. D **100**, 023548 (2019) [arXiv:1809.01656].
- [92] \* Patrick T. Komiske, Eric M. Metodiev, and Jesse Thaler, *An Operational Definition of Quark and Gluon Jets*, JHEP **1811**, 059 (2018) [arXiv:1809.01140].
- [91] † Zachary Hall and Jesse Thaler, *Photon Isolation and Jet Substructure*, JHEP **1809**, 164 (2018) [arXiv:1805.11622].
- [90] \* Benjamin T. Elder and Jesse Thaler, *Aspects of Track-Assisted Mass*, JHEP **1903**, 104 (2019) [arXiv:1805.11109].
- [89] Frédéric A. Dreyer, Lina Necib, Gregory Soyez, and Jesse Thaler, *Recursive Soft Drop*, JHEP **1806**, 093 (2018) [arXiv:1804.03657].
- [88] \* Eric M. Metodiev and Jesse Thaler, *Jet Topics: Disentangling Quarks and Gluons at Colliders*, Phys. Rev. Lett. **120**, 241602 (2018) [arXiv:1802.00008].
- [87] \* Patrick T. Komiske, Eric M. Metodiev, and Jesse Thaler, *Energy Flow Polynomials: A Complete Linear Basis for Jet Substructure*, JHEP **1804**, 013 (2018) [arXiv:1712.07124].
- [86] Evan Coleman, Marat Freytsis, Andreas Hinzmann, Meenakshi Narain, Jesse Thaler, Nhan Tran, and Caterina Vernieri, *The Importance of Calorimetry for Highly-Boosted Jet Substructure*, JINST **13**, T01003 (2018) [arXiv:1709.08705].
- [85] \* Eric M. Metodiev, Benjamin Nachman, and Jesse Thaler, *Classification Without Labels: Learning from Mixed Samples in High Energy Physics*, JHEP **1710**, 174 (2017) [arXiv:1708.02949].
- [84] † Christopher Frye, Andrew J. Larkoski, Jesse Thaler, and Kevin Zhou, *Casimir Meets Poisson: Improved Quark/Gluon Discrimination with Counting Observables*, JHEP **1709**, 083 (2017) [arXiv:1704.06266].
- [83] † Aashish Tripathy, Wei Xue, Andrew Larkoski, Simone Marzani, and Jesse Thaler, *Jet Substructure Studies with CMS Open Data*, Phys. Rev. D **96**, 074003 (2017) [arXiv:1704.05842].
- [82] \*† Benjamin T. Elder, Massimiliano Procura, Jesse Thaler, Wouter J. Waalewijn, and Kevin Zhou, *Generalized Fragmentation Functions for Fractal Jet Observables*, JHEP **1706**, 085 (2017) [arXiv:1704.05456].
- [81] † Andrew Larkoski, Simone Marzani, Jesse Thaler, Aashish Tripathy, and Wei Xue, *Exposing the QCD Splitting Function with CMS Open Data*, Phys. Rev. Lett. **119**, 132003 (2017) [arXiv:1704.05066].

- [80] Philippe Gras, Stefan Hoeche, Deepak Kar, Andrew Larkoski, Leif Lönnblad, Simon Plätzer, Andrzej Siódmok, Peter Skands, Gregory Soyez, and Jesse Thaler, *Systematics of Quark/Gluon Tagging*, JHEP **1707**, 091 (2017) [arXiv:1704.03878].
- [79] Yevgeny Kats, Matthew McCullough, Gilad Perez, Yotam Soreq, and Jesse Thaler, *Colorful Twisted Top Partners and Partnerium at the LHC*, JHEP **1706**, 126 (2017) [arXiv:1704.03393].
- [78] Philip Ilten, Nicholas L. Rodd, Jesse Thaler, and Mike Williams, *Disentangling Heavy Flavor at Colliders*, Phys. Rev. D **96**, 054019 (2017) [arXiv:1702.02947].
- [77] \* Ian Moulton, Lina Necib, and Jesse Thaler, *New Angles on Energy Correlation Functions*, JHEP **1612**, 153 (2016) [arXiv:1609.07483].
- [76] Fabio Maltoni, Michele Selvaggi, and Jesse Thaler, *Exposing the Dead Cone Effect with Jet Substructure Techniques*, Phys. Rev. D **94**, 054015 (2016) [arXiv:1606.03449].
- [75] Philip Ilten, Yotam Soreq, Jesse Thaler, Mike Williams, and Wei Xue, *Proposed Inclusive Dark Photon Search at LHCb*, Phys. Rev. Lett. **116**, 251803 (2016) [arXiv:1603.08926].
- [74] Yonatan Kahn, Benjamin R. Safdi, and Jesse Thaler, *Broadband and Resonant Approaches to Axion Dark Matter Detection*, Phys. Rev. Lett. **117**, 141801 (2016) [arXiv:1602.01086].
- [73] Sergio Ferrara, Renata Kallosh, and Jesse Thaler, *Cosmology with Orthogonal Nilpotent Superfields*, Phys. Rev. D **93**, 043516 (2016) [arXiv:1512.00545].
- [72] Philip Ilten, Jesse Thaler, Mike Williams, and Wei Xue, *Dark Photons from Charm Mesons at LHCb*, Phys. Rev. D **92**, 115017 (2015) [arXiv:1509.06765].
- [71] † Jesse Thaler and Thomas F. Wilkason, *Resolving Boosted Jets with XCone*, JHEP **1512**, 051 (2015) [arXiv:1508.01518].
- [70] † Iain W. Stewart, Frank J. Tackmann, Jesse Thaler, Christopher K. Vermilion, and Thomas F. Wilkason, *XCone: N-jettiness as an Exclusive Cone Jet Algorithm*, JHEP **1511**, 072 (2015) [arXiv:1508.01516].
- [69] \* Nayara Fonseca, Lina Necib, and Jesse Thaler, *Dark Matter, Shared Asymmetries, and Galactic Gamma Ray Signals*, JCAP **1602**, 052 (2016) [arXiv:1507.08295].
- [68] Jesse Thaler, *Separated at Birth: Jet Maximization, Axis Minimization, and Stable Cone Finding*, Phys. Rev. D **92**, 074001 (2015) [arXiv:1506.07876].
- [67] \* Yonatan Kahn, Daniel A. Roberts, and Jesse Thaler, *The Goldstone and Goldstino of Supersymmetric Inflation*, JHEP **1510**, 001 (2015) [arXiv:1504.05958].
- [66] Andrew J. Larkoski, Simone Marzani, and Jesse Thaler, *Sudakov Safety in Perturbative QCD*, Phys. Rev. D **91**, 111501 (2015) [arXiv:1502.01719].
- [65] Daniele Bertolini, Jesse Thaler, and Jonathan R. Walsh, *The First Calculation of Fractional Jets*, JHEP **1505**, 008 (2015) [arXiv:1501.01965].
- [64] \* Yonatan Kahn, Gordan Krnjaic, Jesse Thaler, and Matthew Toups, *DAE $\delta$ ALUS and Dark Matter Detection*, Phys. Rev. D **91**, 055006 (2015) [arXiv:1411.1055].

- [63] Andrew J. Larkoski, Jesse Thaler, and Wouter J. Waalewijn, *Gaining (Mutual) Information about Quark/Gluon Discrimination*, JHEP **1411**, 129 (2014) [arXiv:1408.3122].
- [62] Andrew J. Larkoski and Jesse Thaler, *Aspects of Jets at 100 TeV*, Phys. Rev. D **90**, 034010 (2014) [arXiv:1406.7011].
- [61] \* Kaustubh Agashe, Yanou Cui, Lina Necib, and Jesse Thaler, *(In)direct Detection of Boosted Dark Matter*, JCAP **1410**, 062 (2014) [arXiv:1405.7370].
- [60] Andrew J. Larkoski, Simone Marzani, Gregory Soyez, and Jesse Thaler, *Soft Drop*, JHEP **1405**, 146 (2014) [arXiv:1402.2657].
- [59] Andrew J. Larkoski, Duff Neill, and Jesse Thaler, *Jet Shapes with the Broadening Axis*, JHEP **1404**, 017 (2014) [arXiv:1401.2158].
- [58] \* Daniele Bertolini, Tucker Chan, and Jesse Thaler, *Jet Observables Without Jet Algorithms*, JHEP **1404**, 013 (2014) [arXiv:1310.7584].
- [57] \* Yonatan Kahn, Matthew McCullough, and Jesse Thaler, *Auxiliary Gauge Mediation: A New Route to Mini-Split Supersymmetry*, JHEP **1311**, 161 (2013) [arXiv:1308.3490].
- [56] \* Francesco D’Eramo, Jesse Thaler, and Zachary Thomas, *Anomaly Mediation from Unbroken Supergravity*, JHEP **1309**, 125 (2013) [arXiv:1307.3251].
- [55] Andrew J. Larkoski and Jesse Thaler, *Unsafe but Calculable: Ratios of Angularities in Perturbative QCD*, JHEP **1309**, 137 (2013) [arXiv:1307.1699].
- [54] Hsi-Ming Chang, Massimiliano Procura, Jesse Thaler, and Wouter J. Waalewijn, *Calculating Track Thrust with Track Functions*, Phys. Rev. D **88**, 034030 (2013) [arXiv:1306.6630].
- [53] John Kearney, Aaron Pierce, and Jesse Thaler, *Exotic Top Partners and Little Higgs*, JHEP **1310**, 230 (2013) [arXiv:1306.4314].
- [52] Andrew J. Larkoski, Gavin P. Salam, and Jesse Thaler, *Energy Correlation Functions for Jet Substructure*, JHEP **1306**, 108 (2013) [arXiv:1305.0007].
- [51] Jack Kearney, Aaron Pierce, and Jesse Thaler, *Top Partner Probes of Extended Higgs Sectors*, JHEP **1308**, 130 (2013) [arXiv:1304.4233, arXiv:1304.4233].
- [50] Hsi-Ming Chang, Massimiliano Procura, Jesse Thaler, and Wouter J. Waalewijn, *Calculating Track-Based Observables for the LHC*, Phys. Rev. Lett. **111**, 102002 (2013) [arXiv:1303.6637].
- [49] \* Daniele Bertolini, Jesse Thaler, and Zachary Thomas, *TASI 2012: Super-Tricks for Superspace*, in “Searching for New Physics at Small and Large Scales” (World Scientific, Nov. 2013) [arXiv:1302.6229].
- [48] \* Francesco D’Eramo, Matthew McCullough, and Jesse Thaler, *Multiple Gamma Lines from Semi-Annihilation*, JCAP **1304**, 030 (2013) [arXiv:1210.7817].
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## Additional Publications and Preprints

For completeness, listed below are articles for which I was an incidental author.

- [A5] Anthony Badea, Austin Baty, Paoti Chang, Gian Michele Innocenti, Marcello Maggi, Christopher McGinn, Michael Peters, Tzu-An Sheng, Jesse Thaler, and Yen-Jie Lee. *Measurements of Two-Particle Correlations in  $e^+e^-$  Collisions at 91 GeV with ALEPH Archived Data*, arXiv:1906.00489.
- [A4] Jonathan L. Ouellet, Chiara P. Salemi, Joshua W. Foster, Reyco Henning, Zachary Bogorad, Janet M. Conrad, Joseph A. Formaggio, Yonatan Kahn, Joe Minervini, Alexey Radovinsky, Nicholas L. Rodd, Benjamin R. Safdi, Jesse Thaler, Daniel Winklehner, and Lindley Winslow, *Design and Implementation of the ABRACADABRA-10cm Axion Dark Matter Search*, Phys. Rev. D **99**, 052012 (2019) [arXiv:1901.10652].
- [A3] Jonathan L. Ouellet, Chiara P. Salemi, Joshua W. Foster, Reyco Henning, Zachary Bogorad, Janet M. Conrad, Joseph A. Formaggio, Yonatan Kahn, Joe Minervini, Alexey Radovinsky, Nicholas L. Rodd, Benjamin R. Safdi, Jesse Thaler, Daniel Winklehner, and Lindley Winslow, *First Results from ABRACADABRA-10 cm: A Search for Sub- $\mu$ eV Axion Dark Matter*, Phys. Rev. Lett. **122**, 121802 (2019) [arXiv:1810.12257].

- [A2] J. Owen Andrews, William Conway, Won-Ki Cho, Arjun Narayanan, Jan-Hendrik Spille, Namrata Jayanth, Takuma Inoue, Susan Mullen, Jesse Thaler, and Ibrahim I. Cissé, *qSR: a quantitative super-resolution analysis tool reveals the cell-cycle dependent organization of RNA Polymerase I in live human cells*, *Scientific Reports* **8**, 7424 (2018).
- [A1] J. Owen Andrews, Arjun Narayanan, Jan-Hendrik Spille, Won-Ki Cho, Jesse Thaler, and Ibrahim I. Cissé. *qSR: A software for quantitative analysis of single molecule and super-resolution data*, bioRxiv:146241.

## Invited Presentations

See <http://www.jthaler.net/cv> for a complete list of talks, including invited seminars and additional workshop and conference talks.

## Colloquia

- “Jet Substructure at the Frontiers of Particle Physics”  
Physics Colloquium, *U. Milan, Mar. 2018*  
Physics Colloquium, *U. Illinois, Oct. 2017*
- “New Physics Gets a Boost: Jet Substructure at the Large Hadron Collider”  
Colloquium, *Perimeter I., May 2017*  
Physics Colloquium, *U.C. Berkeley, Apr. 2017*  
Physics Colloquium, *U. Texas, Mar. 2017*  
Physics Colloquium, *MIT, Oct. 2016*  
Physics and Astronomy Colloquium, *U.C. Riverside, Oct. 2016*  
Physics Colloquium, *U. Buffalo, Sep. 2016*
- “Jet Substructure: Boosting the Search for New Physics at the LHC”  
Physics Colloquium, *U. Chicago, May 2016*  
Physics Colloquium, *Michigan State, Jan. 2016*
- “The Rise of Jet Substructure: Boosting the Search for New Physics at the LHC”  
Physics Colloquium, *U.C. Santa Cruz, Nov. 2015*  
Physics Colloquium, *Brandeis, Sep. 2015*
- “The Case for Jet Substructure”  
Physics Colloquium, *Caltech, Nov. 2014*  
Colloquium, *MIT Laboratory for Nuclear Science, Apr. 2014*
- “(Non)perturbative QCD and Jet Substructure”  
Triangle Nuclear Theory Colloquium, *Duke, Mar. 2014*  
Theory Colloquium, *U. Maryland, Oct. 2013*
- “The Shape of Jets to Come: Boosting the Search for New Physics at the LHC”  
Physics Colloquium, *U. Oregon, May 2013*  
Physics Colloquium, *Cornell, Feb. 2013*
- “The Higgs Boson: Triumph of the Standard Model”, *MIT Lecture Series Committee, Oct. 2012*
- “Anticipating New Data from the Energy Frontier”, Physics Colloquium, *Brown, Feb. 2011*
- “The Large Hadron Collider”, Physics Colloquium, *Wellesley, Oct. 2010*
- “The Shape of Jets to Come”, Colloquium, *MIT Laboratory for Nuclear Science, Feb. 2010*

## Public Lectures

- “Listening to the Invisible Universe”, with A Far Cry (chamber orchestra), *Apr. 2019*
- “Confronting the Invisible Universe”  
MIT Club of Great Britain Event, *London, May 2018*  
Public Talk, *Aspen Center for Physics, Mar. 2017*

## Lecture Series & Schools

- “Collider Physics”, Cargese Summer School, *Corsica, Jul. 2018*
- “Theoretical and Experimental Issues in Jet Substructure”, *Kavli IMPU and KEK, Jan. 2017*
- “Jet Physics”, MITP Summer School, *Mainz, Jul. 2016*
- “The Case for Jet Substructure”, Theorist of the Month, *DESY, Jun. 2014*
- “Jet Substructure”, PiTP Summer School, *Princeton, Jul. 2013*
- “Super-tricks for Superspace”, TASI 2012 Summer School, *C.U. Boulder, Jun. 2012*
- “Little Lessons for a Little Higgs”, ICTP Winter School, *Trieste, Jan. 2012*
- “Goldstini”, “The Shape of Jets to Come”, “Event Topologies for Early LHC”, Topic of the Week Lecture Series, *Fermilab, Nov. 2010*
- “Entering the LHC Era”, MIT-CTP Felix Villars Theoretical Physics Retreat, *Jan. 2010*

## Plenary Talks

- “Deep Learning (and Deep Thinking) for QCD”, QCD@LHC 2019, *Buffalo, Jul. 2019*
- “Deep Learning (and Deep Thinking) in Collider Physics”, Pheno 2019, *Pittsburg, May 2019*
- “The High Energy Physics Landscape in 2019”, High Energy Physics Advisory Panel, *Washington D.C., May 2019*
- “Collision Course: Particle Physics as a Machine-Learning Testbed”, Deep Learning in the Natural Sciences, *U. Hamburg, Feb. 2019*
- “Collision Course: Particle Physics as a Machine-Learning Testbed”, Theoretical Physics for Machine Learning, *Aspen Center for Physics, Jan. 2019*
- “A Theorist’s Perspective on Machine Learning for Jets” (Opening Talk), Machine Learning for Jet Physics, *Fermilab, Nov. 2018*
- “New Improvements in Jet Physics”, SUSY 2018, *Barcelona, Jul. 2018*
- “Theory Summary” (Closing Talk), Boost 2018, *Paris, Jul. 2018*
- “The Future is Open: Jet Substructure with CMS Public Data”, CMS Week, *CERN, Jun. 2018*
- “Recent Progress in Jet Physics”, From the LHC to Dark Matter and Beyond, *Aspen Center for Physics, Mar. 2017*
- “New Frontiers in Dark Matter Detection”, APS April Meeting, *Washington, DC, Jan. 2017*
- “Prospects for Cosmic Axion Detection with ABRACADABRA”, GPMFC Workshop on Ultra-light Dark Matter, *Washington, DC, Jan. 2017*
- “Using Jets and QCD to Boost the Search for New Physics”, Physics in LHC and Early Universe, *U. Tokyo, Jan. 2017*
- “The Shape of Jets to Come”, Boost 2016, *Zurich, Jul. 2016*



- “Probing the Core of QCD with Jet Substructure”, Stress-testing the Standard Model at the LHC, *KITP, Santa Barbara, May 2016*
- “Jet Substructure: Boosting the Search for New Physics at the LHC”, APS April Meeting, *Salt Lake City, Apr. 2016*
- “Theoretical Advances in Jet Substructure”, Rencontres de Moriond QCD, *La Thuile, Mar. 2016*
- “Theoretical Advances in Jet Substructure”, Particle Physics on the Verge of Another Discovery, *Aspen Center for Physics, Jan. 2016*
- “Probing the Core of QCD”, Boost 2015, *Chicago, Aug. 2015*
- “Unsafe but Calculable: Jets at the Frontier of Perturbative QCD”, PASCOS 2015, *ICTP, Trieste, Jul. 2015*
- “Pushing the Frontiers of Perturbative QCD”, Pheno 2015, *Pittsburg, May 2015*
- “Hidden Sectors and Dark Forces”, BLV 2015, *UMass Amherst, Apr. 2015*
- “Physics Opportunities for Future Circular Colliders”, FCC Week, *Washington, DC, Mar. 2015*
- “Jets in QCD: The Case for Jet Substructure”, Quark Confinement and the Hadron Spectrum XI, *St. Petersburg, Sep. 2014*
- “New Observables for Jet Substructure”, 43rd International Symposium on Multiparticle Dynamics (ISMD13), *Chicago, Sep. 2013*
- “The Case for Jet Substructure”, SEARCH 2013, *Stonybrook, Aug. 2013*
- “Theoretical Progress in Dissecting Jets”, Boost 2013, *Flagstaff, Aug. 2013*
- “Supersymmetry at the Frontiers” (Rapporteur Talk), Snowmass on the Pacific, *KITP, Santa Barbara, May 2013*
- “The Higgs Boson: Triumph of the Standard Model”, 24th Annual Kavli Frontiers of Science, National Academy of Sciences, *U.C. Irvine, Nov. 2012*
- “Jet Substructure and N-subjettiness”, Monte Carlo for Beyond the Standard Model 2012, *Cornell University, Mar. 2012*
- “Big Questions in Particle Physics” (Pedagogical Lecture), PANIC11, *MIT, Jul. 2011*
- “Two Views of the Universe” (Closing Talk), Hadron Collider Physics Symposium, *Toronto, Aug. 2010*
- “Supersymmetry Breaks (Again)”, in honor of Gerry Guralnik’s 2010 Sakurai Prize, *Brown U., May 2010*
- “Goldstini”, Emerging Problems in Particle Phenomenology, *ITS/CUNY, Apr. 2010*
- “The Window to the Terascale” (Opening Talk), Physics in the LHC Era, *Aspen Center for Physics, Feb. 2009*

## Research Contracts and Grants

- U.S. Department of Energy, Office of High Energy Physics, “Quantum Algorithms for Collider Physics” (QuantISED Award), *2018–2020* (\$264,000)
- Simons Foundation, “Theoretical Investigations In and Beyond the Standard Model” (Simons Fellowship), *2018–2019* (\$142,783)

- U.S. Department of Energy, Office of High Energy Physics, “Boosting the Search for New Physics at the Frontiers”, *2016–2017* (\$120,000)
- MIT Research Support Committee, “Boosting Jet Physics with Archival Collider Data” (The Charles E. Reed Faculty Initiatives Fund), *2015–2017* (\$75,000)
- MIT International Science and Technology Initiative, “Beyond the Standard Model at the LHC” (MIT–Belgium Seed Fund Award with Fabio Maltoni), *2013–2014* (\$23,100)
- Alfred P. Sloan Foundation, “Sloan Research Fellowship”, *2013–2016* (\$50,000)
- MIT International Science and Technology Initiative, “Probing a New Energy Frontier with Jets at the Large Hadron Collider” (Global Seed Fund Award with Iain Stewart, Andre Hoang, and Gavin Salam), *2012–2013* (\$15,000)
- U.S. Department of Energy, Office of Science, “Interpreting New Data from the Energy Frontier” (Early Career Research Award), *2011–2016* (\$750,000)
- Affiliated postdocs and students supported by cooperative research agreement: U.S. Department of Energy, Office of Science, “Laboratory for Nuclear Science, High Energy Physics Program: Task C, Center for Theoretical Physics”

### **MIT Educational Commons**

- UROP Supervision: 13 students (see above)
- Teaching General Institute Requirements (GIR): 8.02 (*Spring 2014, Spring 2015, Spring 2016*)
- MIT Graduate Student Council, “The Nuts and Bolts of Academic Job Search”, *Jul. 2018*
- MIT PhysPOP Orientation Lecture, “Implications of the Higgs Boson”, *Aug. 2013*
- MIT MISTI Presentation, “The Higgs Boson: Keystone of the Standard Model”, *Apr. 2013*
- MIT Physics Astronomical Event, “Dark Matter Beyond the Standard Model”, *Oct. 2012*
- MIT Physics Alumni Breakfast, “Hints of New Physics at the Energy Frontier”, *May 2012*
- MIT PhysPOP Orientation Lecture, “Beyond the Standard Model at the Frontiers”, *Aug. 2011*
- MIT Physics Visiting Committee Presentation, “Goldstini at the LHC”, *Oct. 2010*
- MIT Physics IAP Lecture, “The LHC Won’t Destroy the Planet (But Will Spark a Revolution)”, *Jan. 2010*