

Jesse Diaz Thaler

Curriculum Vitae

(Updated November 25, 2024)

Contact Information

Jesse Thaler
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Research in Theoretical Particle Physics

- Data Science and AI/ML
- Collider Physics and QCD
- Beyond the Standard Model

Employment

January 2010–Present **Massachusetts Institute of Technology**
MIT Center for Theoretical Physics
Professor of Physics, *2021–Present*
Associate Professor of Physics with Tenure, *2017–2021*
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

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

Leadership

- Director, NSF Institute for Artificial Intelligence and Fundamental Interactions (IAIFI), *August 2020–Present*

Affiliations

- MIT Center for Theoretical Physics (CTP), *January 2010–Present*
- MIT Laboratory for Nuclear Science (LNS), *January 2010–Present*
- MIT Statistics & Data Science Center (SDSC), *January 2020–Present*
- MIT Institute for Data, Systems & Society (IDSS), *January 2020–Present*
- Harvard Center for the Fundamental Laws of Nature, *September 2018–August 2019 sabbatical*

Honors

- APS Fellow, *American Physical Society, 2022*
- Simons Investigator in Physics, *Simons Foundation, 2022–2027*
- 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 Award for Teaching, *MIT Physics Department, 2014*
- Buechner Faculty Award for Undergraduate Advising, *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

- Nipun Dour '27: *Fall 2024*
- Max Tan '25: *Spring 2023, Summer 2023*
- Ammar Fayad '24: *Summer 2023, Summer 2024, Fall 2024*

- Mohit Dighamber '23: *Fall 2022, Spring 2023*
After MIT: EECS M.Eng Candidate, *MIT*
- Octavio Vega '22: *Spring 2021, Summer 2021, Fall 2021*
After MIT: Research Assistant, *University of Hamburg*
Currently: Physics Ph.D. Candidate, *University of Illinois, Urbana-Champaign*
- Nishat Prottyasha '23: *Summer 2020, Fall 2020, Spring 2021, Summer 2021*
After MIT: EECS M.Eng Candidate, *MIT*
FUTURE of Physics Participant, *Caltech, 2020*
- Serhii Kryhin '22: *Spring 2020, Summer 2020, Spring 2021, Summer 2021* (see below)
- Christopher Miller '21: *Fall 2020*
After MIT: Technical Instructor, *MIT*
- Debaditya Pramanik '21: *Spring 2020, Summer 2020, Fall 2020* (see below)
- Ziqi Zhou '20: *Fall 2018*
After MIT: Physics Ph.D. Candidate, *Stony Brook*
- Talya Klinger '20: *Spring 2017*
After MIT: Marshall Scholar, *University of Cambridge and Cardiff University*
Currently: Physics Ph.D. Candidate, *Caltech*
- Radha Mastandrea '19: *Spring 2017, Fall 2017, Spring 2018, Summer 2018* (see below)
- Eleanor Hall '18: *Spring 2017, Summer 2017, Fall 2017* (see below)
- Matthew Burns '18: *Fall 2014, Spring 2015*
- Kevin Zhou '17: *IAP 2016, Spring 2016, Summer 2016, Fall 2016, Spring 2017*
After MIT: Marshall Scholarship, *U. Cambridge and U. Oxford*
Currently: Postdoctoral Researcher, *UC Berkeley*
Joel Matthew Orloff Award for Outstanding Research, *MIT Physics Department, 2017*
- Aashish Tripathy '17: *Spring 2015, Summer 2015, Fall 2015, IAP 2016, Spring 2016, Summer 2016, Fall 2016* (see below)
- Trung Phan '15: *Spring 2014, Summer 2014* (see below)
- T.J. Wilkason '15: *Fall 2013, Spring 2014, Summer 2014* (see below)
- Mobolaji Williams '13: *Fall 2010, Spring 2011, Summer 2012* (see below)
- Dustin Katzin '12: *Fall 2011, IAP 2012* (see below)
- Tucker Chan '12: *Summer 2011, Fall 2011, Spring 2012* (deceased)
After MIT: Physics Ph.D. Candidate, *Stanford*
- Ken Van Tilburg '11: *Summer 2010, Fall 2010* (see below)

B.S. Student Theses Supervised

- Serhii Kryhin, *B.S. 2022*
Thesis: “Application of Unsupervised Machine Learning for Event Classification”
After MIT: Physics Ph.D. Candidate, *Harvard*
Morse/Orloff Research Award, *MIT Physics Department, 2022*
- Debaditya Pramanik, *B.S. 2021*
Thesis: “Collinear Supergravity at Linear Order”
After MIT: Physics Ph.D. Candidate, *Princeton*

- Radha Mastandrea, *B.S. 2019*
Thesis: “Analyzing CMS Open Collider Data through Topic Modeling”
After MIT: Marshall Scholarship, *U. Cambridge*
Currently: Physics Ph.D Candidate, *U.C. Berkeley*
Joel Matthew Orloff Award for Outstanding Service, *MIT Physics Department, 2019*
Physics Research Fellowship, *Heising-Simons Foundation, 2018*
FUTURE of Physics Participant, *Caltech, 2018*
- Eleanor Hall, *B.S. 2018*
Thesis: “Photon Isolation and Jet Substructure”
After MIT: Physics Ph.D. Candidate, *U.C. Berkeley*
Joel Matthew Orloff Award for Outstanding Service, *MIT Physics Department, 2017*
- Aashish Tripathy, *B.S. 2017*
Thesis: “Jet Substructure at the Large Hadron Collider”
After MIT: Physics Ph.D., *U. Michigan*
Currently: Postdoctoral Researcher, *U. Michigan*
Philip Morse Memorial Award, *MIT Physics Department, 2017*
- Trung Phan, *B.S. 2015*
Thesis: “Relativistic Quantum Fields in Theoretical Physics”
After MIT: Physics Ph.D., *Princeton*
Currently: Postdoctoral Researcher, *Johns Hopkins*
- T.J. Wilkason, *B.S. 2015*
Thesis: “Exclusive Cone Jet Algorithms for High Energy Particle Colliders”
After MIT: Physics Ph.D., *Stanford*
Currently: Senior Quantum Engineer, *Atom Computing*
Joel Matthew Orloff Award for Outstanding Service, *MIT Physics Department, 2015*
- Mobolaji Williams, *B.S. 2013*
Thesis: “Pseudo-Goldstino to Gravitino Decay: An Implication of Multiple Supersymmetry Breaking”
After MIT: Physics Ph.D., *Harvard*
Currently: Data Scientist, *Jellyfish*
- Dustin Katzin, *B.S. 2012*
Thesis: “The DarkLight Experiment: Searching for the Dark Photon”
After MIT: Part III, *University of Cambridge*
Currently: Software Engineering Team Lead, *Bloomberg*
- Lin Fei, *B.S. 2011*
Thesis: “Dark Matter Dynamics in the Early Universe”
After MIT: Physics Ph.D. Candidate, *Princeton*
- Ken Van Tilburg, *B.S. 2011*
Thesis: “Identifying Boosted Objects with N-subjettiness and Linear k-means Clustering”
After MIT: Physics Ph.D, *Stanford*
Currently: Assistant Professor, *NYU*
Apker Award Finalist, *American Physical Society, 2011*
Joel Matthew Orloff Award for Outstanding Research in Physics, *MIT Physics Department, 2011*

M.Eng. Student Theses Supervised

- Raymond Wynne, *M.Eng. 2023*
Thesis: “Anomaly Detection in Collider Physics via Factorized Observables”
After MIT: Physics Ph.D. Candidate, *Caltech*
- Nilai Sarda, *M.Eng. 2020*
Thesis: “On Anomaly Detection in Particle Accelerators” (*jointly advised with Justin Solomon*)
After MIT: Researcher, *D.E. Shaw Group*
Currently: Researcher, *Quantitative Finance*
Johnson Artificial Intelligence and Decision Making Thesis Award, *MIT EECS Department, 2020*
- Preksha Naik, *M.Eng. 2019*
Thesis: “Exploring the Space of Jets with CMS Open Data”
After MIT: Physics Ph.D. Candidate, *Caltech*

Ph.D. Students Supervised

- Pamela Pajarillo, *anticipated Ph.D. 2027*
- Sean Benevedes, *anticipated Ph.D. 2026*
- Rikab Gambhir, *anticipated Ph.D. 2025*
MIT Prize for Open Data (Honorable Mention), *MIT Libraries and School of Science, 2022*
- Samuel Alipour-fard, *anticipated Ph.D. 2025*
- Patrick Komiske, *Ph.D. 2021*
Thesis: “Machine Learning for High-Energy Collider Physics”
After MIT: Researcher, *PDT Partners*
Currently: Research Scientist, *River Run Trading*
- Eric Metodiev, *Ph.D. 2020*
Thesis: “Energy Flow in Particle Collisions”
After MIT: Research Scientist, *Renaissance Technologies*
- Benjamin Elder, *Ph.D. 2018*
Thesis: “Jet Fragmentation at the LHC”
After MIT: Cognitive Software Developer, *IBM*
Currently: Research Scientist, *IBM*
- Lina Necib, *Ph.D. 2017*
Thesis: “Boosting (In)direct Detection of Dark Matter”
After MIT: Fairchild Postdoctoral Scholar, *Caltech*
Currently: Assistant Professor, *MIT*
Vazquez Award for Outstanding Research, *MIT Physics Department, 2016*
- Yonatan Kahn, *Ph.D. 2015*
Thesis: “Forces and Gauge Groups Beyond the Standard Model”
After MIT: Postdoctoral Researcher, *Princeton*
Currently: Assistant Professor, *U. Illinois, Urbana-Champaign*
Andrew M. Lockett III Memorial Fund Award, *MIT Physics Department, 2014*
J.J. and Noriko Sakurai Dissertation Award, *American Physical Society, 2016*
- Daniele Bertolini, *Ph.D. 2014*
Thesis: “Electroweak Symmetry Breaking in the Era of the Higgs Boson Discovery”

After MIT: Postdoctoral Researcher, *U.C. Berkeley*
Currently: Machine Learning Scientist, *Unlearn*
LHC-TI Graduate Fellowship, *LHC Theory Initiative, 2013*

- Zoe Thomas, *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*
- Francesco D’Eramo, *Ph.D. 2012*
Thesis: “Hot and Dark Matter” (*jointly advised with Krishna Rajagopal and Hong Liu*)
After MIT: Miller Research Fellow, *U.C. Berkeley*
Currently: Associate Professor, *U. Padova*
Vazquez Award for Outstanding Research, *MIT Physics Department, 2011*

Postdoctoral Researchers Supervised

- So Chigusa, CTP Postdoctoral Researcher, *Fall 2024–Spring 2027*
- Kyle Lee, CTP Postdoctoral Researcher, *Fall 2022–Spring 2025*
- Cari Cesarotti, CTP Postdoctoral Researcher, *Fall 2022–Spring 2025*
J.J. and Noriko Sakurai Dissertation Award, *American Physical Society, 2023*
Science 30 Under 30, *Forbes, 2024*
Leona Woods Distinguished Postdoctoral Lectureship, *Brookhaven National Laboratory, 2024*
- Sokratis Trifinopoulos, Postdoc.Mobility Fellow, *Fall 2022–Spring 2024*
CTP Postdoctoral Researcher, *Spring 2024–Spring 2025*
- Siddharth Mishra-Sharma, IAIFI Fellow, *Fall 2021–Spring 2024*
After MIT: Assistant Professor, *Boston U.*
- Lena Funcke, CTP Postdoctoral Researcher, *Fall 2021–Fall 2022*
After MIT: Assistant Professor, *U. Bonn*
- Katelin Schutz, Pappalardo Fellow, *Fall 2019–Fall 2020*
NASA Einstein Fellow, *Spring 2021*
After MIT: Assistant Professor, Canada Research Chair, *McGill*
- Pouya Asadi, CTP Postdoctoral Researcher, *Fall 2019–Spring 2022*
After MIT: Postdoctoral Researcher, *U. Oregon*
- Bernhard Mistlberger, Pappalardo Fellow, *Fall 2018–Spring 2020*
After MIT: Associate Staff Scientist, *SLAC*
Currently: Staff Scientist, *SLAC*
- Frédéric Dreyer, Early Postdoc.Mobility Fellow, *Fall 2016–Spring 2018*
After MIT: Postdoctoral Researcher, *Oxford*
Currently: University Research Fellow, *Oxford*
- Yotam Soreq, Rothschild Fellow, *Fall 2015–Spring 2018*
After MIT: Postdoctoral Researcher, *CERN*
Currently: Assistant Professor, *Technion*
- Benjamin Safdi, Pappalardo Fellow, *Fall 2014–Spring 2017*
After MIT: Assistant Professor, *U. Michigan*
Currently: Assistant Professor, *U.C. Berkeley*

- Wei Xue, CTP Postdoctoral Researcher, *Fall 2014–Spring 2017*
After MIT: Postdoctoral Fellow, *CERN*
Currently: Assistant Professor, *U. Florida*
- Simone Marzani, LHC Theory Initiative Postdoctoral Fellow, *Fall 2014–Spring 2015*
After MIT: Assistant Professor, *U. Buffalo*
Currently: Associate Professor, *U. Genova*
- Gilly Elor, CTP Postdoctoral Researcher, *Fall 2013–Spring 2016*
After MIT: Postdoctoral Researcher, *U. Oregon*
Currently: Research Fellow, *UT Austin*
- Duff Neill, Pappalardo Fellow, *Fall 2012–Spring 2015*
CTP Postdoctoral Researcher, *Spring 2015–Spring 2016*
After MIT: Director’s Fellow, *Los Alamos National Laboratory*
Currently: Staff Scientist, *Los Alamos National Laboratory*
- Andrew Larkoski, CTP Postdoctoral Researcher, *Fall 2012–Spring 2015*
After MIT: LHC Theoretical Initiative Postdoctoral Fellow, *Harvard*
Currently: Assistant Project Scientist, *UCLA*
Wu-Ki Tung Award for Early Career Research on QCD, *CTEQ Collaboration*, 2017
- Matthew McCullough, Simons Postdoctoral Fellow, *Fall 2011–Spring 2014*
After MIT: COFUND Fellowship, *CERN*
Currently: Staff Scientist, *CERN*
- Keith Rehermann, CTP Postdoctoral Researcher, *Fall 2010–Spring 2012*
After MIT: Consultant, *Ab Initio Software Corporation*
Currently: Software Engineer, *Chainlink Labs*

Visitors Hosted

- Nathaniel Santiago, MIT Summer Research Program, *Summer 2024*
Project: “Graph Neural Network Particle Reconstruction for DUNE’s Prototype Near Detector”
Home Institution: *Northeastern Illinois University*
- Yiding Song, Research Science Institute, *Summer 2023*
Project: “Towards an Understanding of Scientific Data with Multimodal Language Models”
Home Institution: *Harrow School*
- Edward Gu, Research Internship, *Summer 2023*
Home Institution: *Cornell*
- Xinyue (Stella) Wu, MIT Summer Research Program, *Summer 2023*
Project: “Measuring the Size of Quark and Gluon Jets in CMS Open Data”
Home Institution: *U. Rochester*
- Brian Nord, MIT MLK Visiting Professor, *Fall 2022–Spring 2023*
Home Institution: *Fermilab and U. Chicago*
- Kaća Bradonjić, Visiting Artist, *Fall 2022*
Home Institution: *Hampshire College*
- Sergio Diaz, MIT Summer Research Program, *Summer 2022*
Project: “Determination of the W Mass Parameter using Machine Learning”
Home Institution: *U. Maryland, Baltimore County*

- Pedro Rivera-Cardona, MIT Summer Research Program, *Summer 2021*
Project: “Implementation of U(1) Group Symmetry on Energy Flow Networks”
Home Institution: *U. Puerto Rico, Mayaguez*
- Athis Osathapan, Research Internship, *Spring 2021, Summer 2021, Summer 2022*
Home Institution: *Bowdoin College*
- Shira Jackson, MIT Summer Research Program, *Summer 2020*
Project: “Estimating the Energy Mover’s Distance with Exclusive Jet Clustering”
Home Institution: *U. Cincinnati*
- Andrew Turner, Tushar Shah and Sara Zion Physics Fellowship, *2018–2019*
Home Institution: *MIT (Washington Taylor)*
- 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*
- Rahim Leung, International Research Opportunities Programme, *Summer 2017*
Home Institution: *Imperial College London*
- Markus Schulze, Visiting Postdoc, *Fall 2015*
Home Institution: *CERN*
- Alexis Romero, MIT Summer Research Program, *Summer 2015*
Project: “Jet Physics Measurements on CMS Open Data”
Home Institution: *San Diego State University*
- Nayara Fonseca, FAPESP Fellowship, *Spring 2014–Fall 2014*
Home Institution: *U. Sao Paulo, Brazil (Gustavo Burdman)*

Teaching Experience

- 8.831 — Supersymmetric Quantum Field Theories
Lecture: *Spring 2017, Fall 2019, Fall 2024*
- 8.398 — Selected Topics in Graduate Physics
Instructor: *Spring 2021, Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 2023, Spring 2024*
- 8.03 — Physics III, Waves and Vibrations
Recitation: *Fall 2020*
- 8.044 — Statistical Physics I
Recitation: *Spring 2020*
- 8.05 — Quantum Mechanics II
Instructor (MITx-based 8.051): *Spring 2018*
Recitation: *Fall 2010, Fall 2012*
- 8.033 — Relativity
Lecture: *Fall 2017*
Recitation: *Fall 2016*
- 8.02 — Physics II, Electricity and Magnetism
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*

Advising

- MIT Physics Ph.D. Thesis Committees:
 - Enrique Toloza (*Mark Harnett & Mehran Kardar, in progress*)
 - Ouail Kitouni (*Mike Williams, August 2024*)
 - Stella Schindler (*Iain Stewart, August 2024*)
 - Evgenii Kniazev (*Vladan Vuletic, June 2024*)
 - Yitian Sun (*Tracy Slatyer, April 2024*)
 - Cristian Zanoci (*Mikhail Lukin & Aram W. Harrow, May 2023*)
 - Eva Huang (*Salvatore Vitale, January 2023*)
 - Gregory Ridgway (*Tracy Slatyer, June 2022*)
 - Patrick Fitzpatrick (*Tracy Slatyer & David Kaiser, July 2021*)
 - Joseph Johnston (*Lindley Winslow & Joseph Formaggio, May 2021*)
 - Chih-Liang Wu (*Tracy Slatyer, April 2021*)
 - Constantin Weisser (*Mike Williams, March 2021*)
 - J. Owen Andrews (*Ibrahim Cisse, November 2020*)
 - Gherardo Vita (*Iain Stewart, August 2020*)
 - Jasmine Brewer (*Krishna Rajagopal, July 2020*)
 - Hongwan Liu (*Tracy Slatyer, May 2019*)
 - Charles Epstein (*Richard Milner, August 2018*)
 - Nicholas Rodd (*Tracy Slatyer, April 2018*)
 - David Hernandez (*Edmund Bertschinger, April 2018*)
 - Aram Apyan (*Markus Klute, November 2016*)
 - Daniel Roberts (*Allan Adams, April 2016*)
 - Ian Moulton (*Iain Stewart, April 2016*)
 - Daniel Kolodrubetz (*Iain Stewart, April 2016*)
 - Mingming Yang (*Christoph Paus, January 2015*)
 - Shawn Henderson (*Peter Fisher, July 2013*)
 - Teng Ma (*Boleslaw Wyslouch, May 2013*)
 - Kevin Sung (*Steven Nahn, March 2013*)
 - Christopher Jones (*Janet Conrad, June 2012*)
 - Riccardo Abbate (*Iain Stewart, May 2012*)
 - Abolhassan Vaezi (*Xiao-Gang Wen, January 2011*)
 - Georgia Karagiorgi (*Janet Conrad, July 2010*)
- MIT Physics Graduate Academic Advisor, *Fall 2017–Present*
 - Anticipated Ph.D. 2029: Aneca Sun, Adam Wills
 - Anticipated Ph.D. 2027: Manu Srivastava, Rachel Steinhorst
 - Anticipated Ph.D. 2025: Ryan Abbott
 - Ph.D. 2024: Bruno Scheihing Hitschfeld, Stella Schindler, Annie Wei
 - Ph.D. 2023: Eric Anschuetz
 - Ph.D. 2022: Gregory Ridgway, Samuel Leutheusser
 - Ph.D. 2020: Jasmine Brewer

- MIT Physics Undergraduate Academic Advisor, *Fall 2011–Present*
Class of 2024/2025: Omar Abdelghani, Nishant Dhankar, Chirag Falor, Gosha Geogdzhayeva, Lily Moseni, Dylan Raphael, David Suarez, Chris Viets
Class of 2018/2019/2020: 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, Pranjali Vachaspati, Prashanth Venkataram
- MIT First-Year Advisor, *Fall 2019–Spring 2020*
Class of 2023: Richter Brzeski, Megha Maran, Catalina Monsalve Rodriguez, Dylan Weber
- External Ph.D. Examiner:
Pim de Haan (*Max Welling, U. Amsterdam, TBA*)
Pedro Cal (*Wouter Waalewijn, U. Amsterdam, September 2021*)
Thea Aarrestad (*Ben Kilminster, U. Zurich, March 2019*)
Ignacio Garcia Garcia (*Eduardo Ros & Marcel Vos, U. Valencia, December 2016*)
Brian Walsh (*Tobias Golling, Yale, February 2013*)
Travis Martin (*Thomas Gregoire & Stephen Godfrey, Carleton U., August 2012*)
- External Mentoring:
Ilias Cholis, PI Academy for Research and Engagement, *Fall 2018–Fall 2019*

Internal Service

- MIT Rapid Response Task Force on Large Scale Proposal Development, *Summer 2024*
- MIT Faculty Committee on Curricula, *Fall 2017–Spring 2020*
- MIT Physics Council, Member at Large, *Fall 2024–Spring 2025*
- MIT Physics Ad Hoc Committee on Graduate Student Professional Development, *Spring 2023*
- MIT Physics Graduate Admissions Committee, *Spring 2021, Spring 2024, Spring 2025*
- MIT Physics Communic.8 Faculty Liaison, *Fall 2020–Fall 2023*
- MIT Physics Promotion Committee, *Fall 2019; Chair: Fall 2020, Fall 2021, Fall 2022*
- MIT Physics Pappalardo Fellowships Executive Committee, *Fall 2016, Fall 2017*
- MIT Physics Colloquium Committee, *Spring 2010–Spring 2012; Chair: Fall 2012–Spring 2014*
- MIT Physics Part II Qualifying Written Exam Committee, *Spring 2012–Spring 2013; Chair: Fall 2013–Spring 2014*
- MIT Physics Part II Qualifying Written Exam Grading Committee, *September 2010, January 2020*
- MIT LNS Advisory Group, *Fall 2017, Spring 2020–Present*
- MIT LNS Colloquium Committee, *Fall 2015–Spring 2017; Chair: Fall 2017–Spring 2018*
- MIT CTP Part III Oral Qualifying Exam Committee, *Spring 2015–Spring 2017, Fall 2022–Spring 2023*
- MIT CTP Faculty Mentor, *Spring 2021–Present*
- MIT CTP Faculty Search Committee, *Fall 2017, Fall 2021, Fall 2023; Chair: Fall 2019*
- MIT CTP Deputy Group Leader in High-Energy Physics, *Spring 2020–Present*
- MIT CTP Visitor Coordinator, *Fall 2016–Present*
- MIT CTP Nuclear/Particle Seminar Committee, *Fall 2010–Fall 2016, Fall 2020–Spring 2021, Fall 2022–Present*

- MIT CTP Postdoc Selection Committee, *Fall 2009–Present*
- MIT Physics, Statistics, and Data Science (PhysSDS) Committee, *Co–Chair: Fall 2020–Present*
- MIT SERC Seed Grant Selection Committee, *Spring 2024*
- MIT EECS Junior Faculty Mentoring Committee, *Spring 2024–Present*
- MISTI Global Seed Funds Evaluation Committee, *Fall 2012, Fall 2013, Fall 2014*

External Service

- Aspen Center for Physics (ACP)
 - General Member, *Summer 2020–Summer 2025*
 - Admissions Committee, *Summer 2024*
 - Nominations Committee, *Summer 2021; Chair: Summer 2022; Ex officio: Summer 2023*
 - Summer Program Committee, *Summer 2020*
 - Conference Liaison, “Theoretical Physics for Machine Learning”, *Winter 2023*
 - Workshop Organizer, “Interplay of Fundamental Physics and Machine Learning”, *Summer 2022*
 - Workshop Organizer, “The LHC Awakens: A New Energy Frontier”, *Summer 2016*
 - Workshop Organizer, “Year One of the LHC”, *Summer 2011*
 - Conference Organizer, “New Data from the Energy Frontier”, *Winter 2011*
- American Physical Society (APS)
 - Fellow, *2022–Present*
 - Sakurai Dissertation Award Selection Committee, *Fall 2016; Vice Chair: Fall 2022; Chair: Fall 2023*
 - Member, *2002–Present*
- High Energy Physics Advisory Panel (HEPAP)
 - Particle Physics Project Prioritization Panel (P5), *December 2022–December 2023*
 - HEPAP Member (Second Term), *April 2024–March 2027*
 - HEPAP Member, *August 2021–March 2024*
 - HEPAP Presentation, “The NSF AI Institute for Artificial Intelligence and Fundamental Interactions”, *December 2020*
 - HEPAP Presentation, “The High Energy Physics Landscape in 2019”, *May 2019*
- Machine Learning for Jet Physics (ML4Jets)
 - Advisory Committee, “ML4Jets”, *DESY, November 2023*
 - Advisory Committee, “ML4Jets”, *Rutgers, November 2022*
 - Advisory Committee, “ML4Jets”, *Heidelberg, July 2021*
 - Advisory Committee, “ML4Jets”, *New York, January 2020*
- International Workshop on Boosted Object Phenomenology (BOOST)
 - Advisory Committee and Ombuds Team (with Ayana Arce), “Boost 2022”, *Hamburg, August 2022*
 - Advisory Committee and Ombuds Team (with Ayana Arce), “Boost 2021”, *Online, August 2021*
 - Advisory Committee and Ombuds Team (with Ayana Arce), “Boost 2020”, *Hamburg, July 2020*
 - Local Organizing Committee, “Boost 2019”, *MIT, July 2019*
 - Advisory Committee, “Boost 2018”, *Paris, July 2018*
 - Advisory Committee, “Boost 2017”, *Buffalo, July 2017*
 - Advisory Committee, “Boost 2016”, *Zurich, July 2016*
 - Advisory Committee, “Boost 2015”, *Chicago, August 2015*
 - Advisory Committee, “Boost 2014”, *London, August 2014*
 - Advisory Committee, “Boost 2013”, *Flagstaff, August 2013*

- Advisory Committee, “Boost 2012”, *Valencia, July 2012*
Advisory Committee, “Boost 2010”, *Oxford U., June 2010*
- Scientific Committee, “PHYSTAT: Statistics Meets Machine Learning”, *Imperial College London, September 2024*
 - Organizer, “TASI 2024: The Frontiers of Particle Theory”, *CU Boulder, June 2024*
 - Topical Convener, “Collider Phenomenology”, *Snowmass Theory Frontier, July 2021, July 2022*
 - Organizer, “Machine Learning at GGI”, *Galileo Galilei Institute, August/September 2022*
 - Organizer, “CMS Open Data for Theorists”, *Fermilab/Virtual, September 2020*
 - Advisory Committee, “Machine Learning for Particle Physics”, *Mainz, May 2020 → June 2021*
 - Local Organizing Committee, “Rising Stars in Physics”, *MIT, April 2018*
 - Jet Convener, “Physics at TeV Colliders”, *Les Houches, June 2017*
 - Advisory Committee, “BLV 2017”, *Cleveland, May 2017*
 - Scientific Organizing Committee, “Lattice for BSM Physics 2017”, *Boston, April 2017*
 - Organizer, “Gearing up for LHC13”, *Galileo Galilei Institute, Fall 2015*
 - Jet Convener, “Physics at TeV Colliders”, *Les Houches, June 2015*
 - Organizer, “Boston Jet Physics”, *Harvard/MIT, January 2014*
 - Conference Program Committee, “PANIC 2011: Particle and Nuclei International Conference”, *Boston, July 2011*
 - Organizer, “Boston Jet Physics”, *Harvard/MIT, January 2011*
 - Organizer, “Implications of First LHC Data”, *MIT/Berkeley, August 2010*
 - Selection Committee, Margot and Tom Pritzker Prize for AI in Science Research Excellence, *Pritzker Foundation, 2024*
 - International Scientific Advisory Board, AI for Science and Science for AI (AISSAI) Center, *French CNRS, 2022–Present*
 - International Advisory Committee, Machine Learning Physics, *JSPS/MEXT Grant-in-Aid for Transformative Research Areas, 2022–2026*
 - Science Advisory Board, USQCD Collaboration, *Spring 2013–Fall 2016*
 - Fellowship Selection Committee, LHC Theory Initiative, *Fall 2013–Fall 2014; Chair: Fall 2014*
 - Editorial Board, *Journal of High Energy Physics, Fall 2019–Present*
 - Editorial College, *SciPost Physics, Fall 2019–Present*
 - Co-Topic Editor, “Efficient AI in Particle Physics and Astrophysics”, *Frontiers in Artificial Intelligence, Spring 2022*
 - Peer Review:
Physical Review Letters; Journal of High Energy Physics; Physical Review D; SciPost Physics; 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 (DOE); National Science Foundation (NSF); European Research Council (ERC); Heising-Simons Foundation; Research Corporation for Science Advancement (Cottrell); 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 (DAAD); French National Research Agency;
Hungarian National Research, Development & Innovation Office

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See <http://www.jthaler.net/research> for these publications organized by topic. Following the convention in particle physics, all authors are listed alphabetically, except those indicated by §.

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

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- [2] Nima Arkani-Hamed, Hsin-Chia Cheng, Markus A. Luty, and Jesse Thaler, *Universal Dynamics of Spontaneous Lorentz Violation and a New Spin-Dependent Inverse-Square Law Force*, JHEP 0507:029 (2005) [arXiv:hep-ph/0407034].
- [1] Antal Jevicki and Jesse Thaler, *Dynamics of black hole formation in an exactly solvable model*, Phys. Rev. D66 024041 (2002) [arXiv:hep-th/0203172].

Invited Presentations

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

Colloquia

- “Centaur Science: Particle Physics meets Machine Learning”
Presidential Lecture, *Simons Foundation, December 2024*
Physics Colloquium, *U. New Hampshire, November 2024*
Physics and Astronomy Colloquium, *U. Minnesota, November 2024*
- “The Hidden Geometry of Particle Collisions”
Physics Colloquium, *UMass Amherst, May 2024*
Computer Science Colloquium, *Tufts, November 2023*
Particle Physics Colloquium, *KIT Karlsruhe, November 2020* (virtual)
Theory Colloquium, *CERN, May 2020* (virtual)
- “Particle Physics through the Lens of Machine Learning”
Physics and Astronomy Colloquium, *Northwestern, March 2023*
Physics Colloquium, *Technion, January 2023*
Physics Colloquium, *Tel Aviv, January 2023*
Physics Colloquium, *Brown, November 2022*
- “The Geometry of Particle Collisions: Hidden in Plain Sight”, Physics Colloquium, *Brandeis, February 2022*
- “Collision Course: Particle Physics meets Machine Learning”
Physics Colloquium, *U.C. San Diego, May 2021* (virtual)
Physics and Astronomy Colloquium, *U. New Mexico, April 2021* (virtual)
Physics Colloquium, *U.C. Santa Barbara, April 2021* (virtual)
Physics Colloquium, *Northern Illinois University, February 2021* (virtual)

- Nordita Colloquium, *Stockholm University, February 2021* (virtual)
Physics Colloquium, *University of Chicago, February 2021* (virtual)
Physics Colloquium, *All Israel, November 2020* (virtual)
Physics Colloquium, *Harvard, November 2020* (virtual)
Physics Colloquium, *University of Maryland, October 2020* (virtual)
Physics Colloquium, *Case Western Reserve University, November 2019*
Physics and Astronomy Colloquium, *Rice University, October 2019*
Physics Colloquium, *Oakland University, October 2019*
Physics Colloquium, *Tufts University, September 2019*
- “The Future is Open: Adventures with Public Collider Data”, Colloquium, *Fermilab, September 2020* (virtual)
 - “Jet Substructure at the Frontiers of Particle Physics”
Physics Colloquium, *University of Milan, March 2018*
Physics Colloquium, *University of Illinois, Urbana-Champaign, October 2017*
 - “New Physics Gets a Boost: Jet Substructure at the Large Hadron Collider”
Colloquium, *Perimeter Institute, May 2017*
Physics Colloquium, *U.C. Berkeley, April 2017*
Physics Colloquium, *University of Texas, Austin, March 2017*
Physics Colloquium, *MIT, October 2016*
Physics and Astronomy Colloquium, *University of California, Riverside, October 2016*
Physics Colloquium, *University at Buffalo, September 2016*
 - “Jet Substructure: Boosting the Search for New Physics at the LHC”
Physics Colloquium, *University of Chicago, May 2016*
Physics Colloquium, *Michigan State University, January 2016*
 - “The Rise of Jet Substructure: Boosting the Search for New Physics at the LHC”
Physics Colloquium, *U.C. Santa Cruz, November 2015*
Physics Colloquium, *Brandeis, September 2015*
 - “The Case for Jet Substructure”
Physics Colloquium, *Caltech, November 2014*
Colloquium, *MIT Laboratory for Nuclear Science, April 2014*
 - “(Non)perturbative QCD and Jet Substructure”
Triangle Nuclear Theory Colloquium, *Duke University, March 2014*
Theory Colloquium, *University of Maryland, October 2013*
 - “The Shape of Jets to Come: Boosting the Search for New Physics at the LHC”
Physics Colloquium, *University of Oregon, May 2013*
Physics Colloquium, *Cornell University, February 2013*
 - “Anticipating New Data from the Energy Frontier”, Physics Colloquium, *Brown University, February 2011*
 - “The Large Hadron Collider”, Physics Colloquium, *Wellesley College, October 2010*
 - “The Shape of Jets to Come”, Colloquium, *MIT Laboratory for Nuclear Science, February 2010*

Public Lectures

- “Opening Keynote (with Eric Mazur)”, Education in the Age of Generative AI, *Perusall Exchange, June 2024* (virtual)

- “Predictably Uncertain: A Physicist’s Perspective on AI Policy”, Off the Record Foreign Policy Association Lecture, *New York City Bar Association*, March 2024
- “Collision Course: Artificial Intelligence meets Fundamental Physics”
Distinguished Lecture, *National Science Foundation*, January 2023 (virtual)
Keynote Presentation, *Tommy Flowers Network Conference*, October 2020 (virtual)
- “Artificial Intelligence Meets Fundamental Physics”, MIT Inside Track Master Class, *EmTech Digital*, March 2021 (virtual)
- “Listening to the Invisible Universe”, Program with A Far Cry: Open Rehearsal of Gravity, *Harvard Education Portal*, April 2019
- “Confronting the Invisible Universe”
MIT Club of Great Britain Event, *London*, May 2018
Public Talk, *Aspen Center for Physics*, March 2017
- “The Higgs Boson: Triumph of the Standard Model”
24th Annual Kavli Frontiers of Science, *National Academy of Sciences, U.C. Irvine*, November 2012
Lecture Series Committee, *MIT*, October 2012

Lecture Series & Schools

- “The (Hidden) Geometry of Particle Collisions”, Summer School on Neurosymbolic Programming, *Salem, MA*, June 2024
- “The Coming Decade(s) of Particle Physics”, TASI 2024, *CU Boulder*, June 2024
- “The Standard Model”, School on Table-Top Experiments for Fundamental Physics, *Perimeter Institute*, September 2022
- “Confronting the Invisible Universe”, Intro to Modern Physics, *MIT Lincoln Labs*, March 2022
- “QCD and Collider Physics”, Lectures on the Theory of Fundamental Interactions, *GGI, Florence*, January 2020
- “Collider Physics”, Cargese 2018 International Summer School, *Corsica*, July 2018
- “Jet Substructure”
Theoretical and Experimental Issues on Jet Structure at Hadron Colliders, *Kavli IMPU and KEK*, January 2017
PiTP Summer School, *Princeton*, July 2013
- “Jet Physics”, MITP Summer School, *Mainz*, July 2016
- “The Case for Jet Substructure”, Theorist of the Month, *DESY*, June 2014
- “Super-tricks for Superspace”, TASI Summer School, *C.U. Boulder*, June 2012
- “Little Lessons for a Little Higgs”, ICTP Winter School, *Trieste*, January 2012
- “Anticipating New Data from the Energy Frontier”, Topic of the Week Lecture Series, *Fermilab*, November 2010
- “Entering the LHC Era”, Felix Villars Theoretical Physics Retreat, *MIT CTP*, January 2010

Research Contracts, Grants, and Gifts

- Unrestricted Gift, “Interpretation of Multimodal Images from Astronomy”, *Google*, 2023 (\$50k)
- Simons Investigator in Physics, *Simons Foundation*, 2023–2028 (\$960k)

- AI Research Institute, “Institute for Artificial Intelligence and Fundamental Interactions (IAIFI)”, *National Science Foundation*, 2020–2025 (\$20M)
- MIT-Israel Zuckerman STEM Fund Award (with Tracy Slatyer, Tomer Volansky, Yotam Soreq), “The Quest for Dark Matter Interactions”, *MIT International Science and Technology Initiative (MISTI)*, 2020–2023 (\$25.5k)
- PIER Hamburg-MIT Seed Project (with Gregor Kasieczka, Phil Harris, Andreas Hinzmann, Roman Kogler, Iain Stewart), “Probing the Standard Model with Jet Substructure”, *Partnership for Innovation, Education and Research (PIER)*, 2019–2020 (€17k)
- Quantum Information Science (QuantISED) Award (with Aram Harrow), “Quantum Algorithms for Collider Physics”, *U.S. Department of Energy, Office of High Energy Physics*, 2018–2020 (\$264k)
- Simons Fellowship, “Theoretical Investigations In and Beyond the Standard Model”, *Simons Foundation*, 2018–2019 (\$142.8k)
- Comparative Review Funding Award, “Boosting the Search for New Physics at the Frontiers”, *U.S. Department of Energy, Office of High Energy Physics*, 2016–2017 (\$120k)
- The Charles E. Reed Faculty Initiatives Fund, “Boosting Jet Physics with Archival Collider Data”, *MIT Research Support Committee*, 2015–2017 (\$75k)
- MIT-Belgium Seed Fund Award (with Fabio Maltoni), “Beyond the Standard Model at the LHC”, *MIT International Science and Technology Initiative*, 2013–2014 (\$23.1k)
- Sloan Research Fellowship, *Alfred P. Sloan Foundation*, 2013–2016 (\$50k)
- Global Seed Fund Award (with Iain Stewart, Andre Hoang, Gavin Salam), “Probing a New Energy Frontier with Jets at the Large Hadron Collider”, *MIT International Science and Technology Initiative*, 2012–2013 (\$15k)
- Early Career Research Award, “Interpreting New Data from the Energy Frontier”, *U.S. Department of Energy, Office of Science*, 2011–2016 (\$750k)
- Cooperative Research Agreement, “Laboratory for Nuclear Science, High Energy Physics Program: Task C, Center for Theoretical Physics”, *U.S. Department of Energy, Office of Science*, 2010–present

MIT Educational Commons

- Originator of “Flexible P/NR” grading option (*Approved by MIT Faculty, May 2020*)
- Faculty Committees: Large Scale Proposal Task Force; Committee on Curricula (see above)
- UROP Supervision: 22 students (see above)
- First-Year Advising: 4 students (see above)
- Teaching General Institute Requirements (GIR): 8.02 (*Spring 2014, Spring 2015, Spring 2016*)
- MIT School of Science Breakfast Talk, “Deep Learning + Deep Thinking = Deeper Understanding”, *October 2024*
- MIT School of Science IET London Event, “Deep Learning + Deep Thinking = Deeper Understanding”, *May 2024*
- MIT Visit from Permanent Secretary of Singapore for National Research and Development, “Deep Learning + Deep Thinking = Deeper Understanding”, *April 2024*
- MIT Physics Breakfast in Palo Alto, “Deep Learning + Deep Thinking = Deeper Understanding”, *March 2024*

- MIT Physics Career Panel, “SPS/PGSC Career Panel”, *November 2021*
- MIT Postdoctoral Association Panel Discussion, “Making the Cut - Job Searching During a COVID-19 Economy”, *June 2020*
- MIT Graduate Student Council Panel Discussion, “The Nuts and Bolts of Academic Job Search”, *July 2018*
- MIT PhysPOP Orientation Lecture, “Implications of the Higgs Boson”, *August 2013*
- MIT MISTI Presentation, “The Higgs Boson: Keystone of the Standard Model”, *April 2013*
- MIT Astronomical Event Presentation, “Dark Matter Beyond the Standard Model”, *October 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”, *August 2011*
- MIT Physics IAP Lecture, “The LHC Won’t Destroy the Planet (But Will Spark a Revolution)”, *January 2010*
- Physics@MIT Journal, “Listening for Dark Matter from the Basement of Building 24” (with Lindley Winslow), *Fall 2019*
- MIT Lecture Series Committee, Q&A for “Particle Fever”, *September 2014*