

Sam Bright-Thonney

IAIFI Fellow, Massachusetts Institute of Technology

sambt@mit.edu

APPOINTMENTS

Massachusetts Institute of Technology

2024 - Present

- Postdoctoral Fellow, NSF AI Institute for Artificial Intelligence and Fundamental Interactions ([IAIFI](#))

EDUCATION

Cornell University

2018 - 2024

- Ph.D. in Experimental Particle Physics. Defended June 26th, 2024.
- Committee: Julia Thom-Levy (Advisor), Jim Alexander, Maxim Perelstein

University of California, Berkeley

2014 - 2018

- B.A., Physics. B.A., Applied Mathematics
- *Magna Cum Laude*, Phi Beta Kappa

PUBLICATIONS & PREPRINTS

1. **CMS Collaboration**, *Model-agnostic search for dijet resonances with anomalous jet substructure in proton-proton collisions at $\sqrt{s} = 13$ TeV*, *Reports on Progress in Physics* **88** (June, 2025) 067802
2. S. Bright-Thonney, B. Nachman, and J. Thaler, *Infrared-safe energy weighting does not guarantee small nonperturbative effects*, *Phys. Rev. D* **110** (2024), no. 1 014029, [[arXiv:2311.07652](#)] **Editor's Selection**
3. S. Bright-Thonney, P. Harris, P. McCormack, and S. Rothman, *Chained quantile morphing with normalizing flows*, [arXiv:2309.15912](#)
4. **CMS Collaboration** Collaboration, *Search for inelastic dark matter in events with two displaced muons and missing transverse momentum in proton-proton collisions at $\sqrt{s} = 13$ TeV*, *Phys. Rev. Lett.* **132** (Jan, 2024) 041802
5. S. Bright-Thonney, I. Moutl, B. Nachman, and S. Prestel, *Systematic quark/gluon identification with ratios of likelihoods*, *JHEP* **12** (2022) 021, [[arXiv:2207.12411](#)]
6. S. Bright-Thonney and B. Nachman, *Investigating the Topology Dependence of Quark and Gluon Jets*, *JHEP* **03** (2019) 098, [[arXiv:1810.05653](#)]
7. **ATLAS Collaboration**, M. Aaboud et al., *Search for R-parity-violating supersymmetric particles in multi-jet final states produced in p-p collisions at $\sqrt{s} = 13$ TeV using the ATLAS detector at the LHC*, *Phys. Lett. B* **785** (2018) 136–158, [[arXiv:1804.03568](#)]

CONFERENCES, POSTERS, & INVITED TALKS

■ = Talk, □ = Poster

- “[Towards Robust AI in HEP](#)”. *Physics in the AI Era Workshop*. Pisa, Italy. September 2024.
- “[Adventures in the LHC's ‘Wild West’ Era](#)”. *Dicke Fellowship Finalist Seminar*. Princeton, November 2023.
- “[Adventures in the LHC's ‘Wild West’ Era](#)”. *Lederman Fellowship Finalist Seminar*. Fermilab, November 2023.
- “[Wrangling the Black Box](#)”. *UC Irvine Particle Physics/ML Seminar*. Virtual, August 2023.

- “Chained Quantile Morphing with Normalizing Flows”. *BOOST 2023*. Berkeley, CA, August 2023.
- “Search for inelastic dark matter with the CMS detector”. *Phenomenology 2023 Symposium*. Pittsburgh, PA, May 2023.
- “Design and Construction of Radiation-Hard, Thermally Conductive Dees for the HL-LHC Upgrade to the CMS Inner Tracker”. *APS April Meeting*. New York, NY, April 2022. [Slides](#)
- “Efficiently Cooling Radiation-Damaged Silicon Pixel Sensors in the CMS HL-LHC Inner Tracker”. *54th Annual Fermilab Users Meeting*. Virtual, August 2021

HONORS & AWARDS

2023	Finalist, IAIFI Fellowship (Awarded)	<i>IAIFI (MIT)</i>
2023	Finalist, Pappalardo Fellowship	<i>MIT, Physics Department</i>
2023	Finalist, Dicke Fellowship	<i>Princeton, Physics Department</i>
2023	Finalist, Lederman Fellowship	<i>Fermilab</i>
2022, 2023	Albert Silverman Memorial Travel Award	<i>Cornell University, Physics Dept.</i>
2022	FGSA Travel Award, April Meeting	<i>APS</i>
2021	Fermilab Guests & Visitors Program	<i>Fermilab</i>
2018	Hartman Fund Teaching Scholarship	<i>Cornell University, Physics Dept</i>
2017-18	Berkeley Physics Undergraduate Research Scholars	<i>UC Berkeley, Physics Dept</i>
2017	URAP Chandra Research Fellow	<i>UC Berkeley</i>

TECHNICAL SKILLS

Programming Languages	C/C++, Python, MATLAB
Software Packages	ROOT, Scientific Python Libraries, PyTorch, TensorFlow
Physics Tools	PYTHIA 8, DIRE, MadGraph5, Herwig, CMSSW
Tools	Git, Jupyter

TEACHING EXPERIENCE

Spring 2020	ENGRD 2700 (Intro Statistics)	<i>Cornell University</i>
Fall 2019	Physics 2213 (Intro E&M)	<i>Cornell University</i>
Fall 2018, Spring 2019	Physics 1112 (Intro Mechanics)	<i>Cornell University</i>

OUTREACH, LEADERSHIP & SERVICE

REACT Workshop	July 2022, August 2023
<ul style="list-style-type: none"> ► Participated in Cornell’s Research Education and Activities for Community Teachers workshop. In 2022, I presented an introduction to pixel detectors. In 2023, I developed an interactive web-hosted Jupyter demo introducing the physics/mathematics of sound, and concepts in digital audio (sample rate, bit depth, distortion etc.). 	
Particle Bites	2022 - Present
<ul style="list-style-type: none"> ► Writer for ParticleBites, an website publishing short articles for a lay audience on recent particle physics news & results. Wrote coverage of the CMS Higgs width measurement and the CDF W mass measurement. 	
Cornell Prison Education Program	January - August 2022
<ul style="list-style-type: none"> ► Volunteered one night per week at Auburn Correctional Facility tutoring incarcerated students in math and writing. I hope to teach a full math or physics course in Spring 2024. 	
Graduate Student Representative, CEDI Committee	August 2021 - July 2022
<ul style="list-style-type: none"> ► Cornell Physics department’s Committee on Equity, Diversity, and Inclusion (CEDI) 	

Cornell Physics Admissions Committee

January - February 2022

- Served as one of two graduate student members on the Cornell Physics PhD admissions committee for Fall 2022 (the first year that graduate students were invited to be involved in the process)

Physics Application Workshop

November 2020, 2021

- Lead organizer of two virtual PhD application workshops for the fall 2020 and 2021 application seasons. Presented advice on preparing a strong PhD application for physics programs, ran Q&A, and organized grad student mentors to review attendees' applications after the workshop.

Physics Department Climate Survey

November 2020 - May 2021

- Designed a survey to solicit input on community values collected, responses in March-April 2021, and presented results to the department in May 2021.

Graduate & Professional Student Association

September 2020 - May 2023

- Served as a physics field representative in GPSA for the 2020-21 academic year. Elected as a Physical Sciences Voting Member for the 2021-22, 2022-23 academic years

Physics Graduate Society

May 2019 - August 2020

- Communications Officer for PGS; organized and advertised department social events