

# Radha Mastandrea

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## Education

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### PhD in Physics

University of California, Berkeley  
Designated Emphasis in Computational and Data Science and Engineering  
*Thesis Advisor:* Ben Nachman

Berkeley, CA  
Aug. 2021 - Present

### MPhil in Physics

University of Cambridge  
*Thesis:* Investigating non-standard sources of parity violation at the LHC  
*Thesis Advisor:* Christopher Lester

Cambridge, UK  
Oct. 2020 - Sep. 2021

### MASt in Physics

University of Cambridge  
*Thesis:* Search for new physics in  $B_{(s)}^0 \rightarrow \mu^+ \mu^- \mu^+ \mu^-$  decays  
*Thesis Advisor:* Valerie Gibson

Cambridge, UK  
Oct. 2019 - Jun. 2020

### B.S. in Physics

MIT  
*Thesis:* Analyzing CMS Open Collider Data through Topic Modeling  
*Thesis Advisor:* Jesse Thaler

Cambridge, MA  
Aug. 2015 - Jun. 2019

## Publications and Preprints

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Kehang Bai, Radha Mastandrea, and Benjamin Nachman. “Non-resonant Anomaly Detection with Background Extrapolation”. In: (Nov. 2023). arXiv: [2311.12924](https://arxiv.org/abs/2311.12924) [[hep-ph](#)]

Tobias Golling, Samuel Klein, Radha Mastandrea, Benjamin Nachman, and John Andrew Raine. “Morphing one dataset into another with maximum likelihood estimation”. In: *Phys. Rev. D* 108 (9 Nov. 2023), p. 096018. DOI: [10.1103/PhysRevD.108.096018](https://doi.org/10.1103/PhysRevD.108.096018). URL: <https://link.aps.org/doi/10.1103/PhysRevD.108.096018>

Tobias Golling et al. “The Interplay of Machine Learning–based Resonant Anomaly Detection Methods”. In: (July 2023). arXiv: [2307.11157](https://arxiv.org/abs/2307.11157) [[hep-ph](#)]

Tobias Golling, Samuel Klein, Radha Mastandrea, and Benjamin Nachman. “Flow-enhanced transportation for anomaly detection”. In: *Phys. Rev. D* 107.9 (2023), p. 096025. DOI: [10.1103/PhysRevD.107.096025](https://doi.org/10.1103/PhysRevD.107.096025). arXiv: [2212.11285](https://arxiv.org/abs/2212.11285) [[hep-ph](#)]

Gregor Kasieczka, Radha Mastandrea, Vinicius Mikuni, Benjamin Nachman, Mariel Pettee, and David Shih. “Anomaly detection under coordinate transformations”. In: *Phys. Rev. D* 107.1 (2023), p. 015009. DOI: [10.1103/PhysRevD.107.015009](https://doi.org/10.1103/PhysRevD.107.015009). arXiv: [2209.06225](https://arxiv.org/abs/2209.06225) [[hep-ph](#)]

Barry M. Dillon, Radha Mastandrea, and Benjamin Nachman. “Self-supervised anomaly detection for new physics”. In: *Phys. Rev. D* 106.5 (2022), p. 056005. DOI: [10.1103/PhysRevD.106.056005](https://doi.org/10.1103/PhysRevD.106.056005). arXiv: [2205.10380](https://arxiv.org/abs/2205.10380) [[hep-ph](#)]

Christopher G. Lester, Radha Mastandrea, Daniel Noel, and Rupert Tombs. “Hunting for vampires and other unlikely forms of parity violation at the Large Hadron Collider”. In: *JHEP* 08 (2022), p. 231. DOI: [10.1007/JHEP08\(2022\)231](https://doi.org/10.1007/JHEP08(2022)231). arXiv: [2205.09876](https://arxiv.org/abs/2205.09876) [[hep-ph](#)]

Brian T Cook et al. “Tracing Milky Way substructure with an RR Lyrae hierarchical clustering forest”. In: *Monthly Notices of the Royal Astronomical Society* (Apr. 2022). stac1007. ISSN: 0035-8711. DOI: [10.1093/mnras/stac1007](https://doi.org/10.1093/mnras/stac1007). eprint:

<https://academic.oup.com/mnras/advance-article-pdf/doi/10.1093/mnras/stac1007/43400845/stac1007.pdf>. URL: <https://doi.org/10.1093/mnras/stac1007>

Patrick T. Komiske, Radha Mastandrea, Eric M. Metodiev, Preksha Naik, and Jesse Thaler. “Exploring the Space of Jets with CMS Open Data”. In: *Phys. Rev. D* 101.3 (2020), p. 034009. DOI: [10.1103/PhysRevD.101.034009](https://doi.org/10.1103/PhysRevD.101.034009). arXiv: [1908.08542](https://arxiv.org/abs/1908.08542) [hep-ph]

Radha Mastandrea. “Testing Parametrized Theories of General Relativity Using Gravitational Waves”. In: *MIT Undergraduate Research Journal* 34 (Fall 2017)

## Conference Talks

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### **The Interplay of Machine Learning–based Resonant Anomaly Detection Methods**

Hammers & Nails, *Ascona, Switzerland*

Oct. 2023

ML4Jets, *DESY*

Nov. 2023

### **FETA: Flow-Enhanced Transport for Anomaly Detection**

APS April Meeting

*Minneapolis*

Apr. 2023

### **HEPSim2Real: Creating background templates with normalizing flows**

ML4Jets

*Rutgers University*

Nov. 2023

### **Using symmetries to build better latent spaces for dijet representation learning**

APS April Meeting

*New York*

Apr. 2022

### **Exploring the Parity of the Quark-Sector SME with Madgraph**

Fourth Summer School on the Lorentz- and CPT-violating Standard-Model Extension

*ICUSS*

May 2021

### **Analyzing CMS Open Collider Data through Topic Modeling**

BOOST Physics Workshop

*MIT*

Jul. 2019

### **Jet Analysis with the CMS Open Data**

Greater Boston Undergraduate Research Conference

*MIT*

Nov 2019

### **Testing Parameterized Theories of General Relativity using Gravitational Waves**

APS New England Section Meeting

*University of Rhode Island*

Dec. 2017

## Seminars

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### **The Interplay of Machine Learning-based Anomaly Detection Methods**

SLAC AI Seminar

December 2023

### **FETA: Flow-Enhanced Transportation for Anomaly Detection**

Fermilab AI Meetings

July 2023

University College London HEP Seminars

December 2022

Imperial College London HEP Seminars

December 2022

UC Berkeley 4D Seminars

October 2022

## Technical Skills

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**Programming** Python, C++, Mathematica, Matlab

**HEP Softwares** ROOT

## Honors and Awards

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Aug. 2023 - Present	Templeton TEX Fellowship
Apr. 2023	Citadel PhD Summit Attendee
Mar. 2023	APS GDS Impact Award
Mar. 2022 - Mar. 2023	APS DSECOP Fellow
Aug. 2021 - Present	NSF Graduate Research Fellowship
Oct. 2019 - Jul. 2021	Marshall Scholarship
Jun. 2019	Joel Matthew Orloff Award for Outstanding Service
Jun. 2019	Phi Beta Kappa
Jun. 2019	Sigma Pi Sigma
Oct. 2019	FUTURE of Physics @ Caltech participant
May. 2018 - Sep. 2018	Heising-Simons @ MIT Physics Research Fellow