

Mariel Pettee

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Particle physicist, AI researcher, and artist

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Education

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| 2021 | YALE UNIVERSITY PhD in Physics | New Haven, CT |
| 2015 | UNIVERSITY OF CAMBRIDGE • Trinity College MASt in Physics, Commendable Performance Lt. Charles H. Fiske III Harvard-Cambridge Scholar | Cambridge, UK |
| 2014 | HARVARD UNIVERSITY AB in Physics and Mathematics (Cum Laude, High Honors in Field) Dramatic Arts Secondary | Cambridge, MA |

Research

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| 2021 - | MACHINE LEARNING FOR FUNDAMENTAL PHYSICS Chamberlain Postdoctoral Fellow. Developing generic ML techniques in likelihood-free and label-free learning for applications across particle physics, astrophysics, and more. Dr. Ben Nachman | Lawrence Berkeley National Lab |
| 2020 | LEARNING LATENT GRAPH REPRESENTATIONS OF THE DANCING BODY Internship developing Graph Neural Networks to analyze choreography | Intel AI Lab |
| 2017 - 2021 | GENERATIVE CHOREOGRAPHY WITH MACHINE LEARNING I led an independent research group of 5 artists and scientists in generating and performing novel choreography based on 3D motion capture of my own movements. Sponsor: Yale Center for Collaborative Arts & Media | Yale |
| 2016 - 2021 | ATLAS EXPERIMENT Search for $V \rightarrow \text{leptons}$, $H \rightarrow \tau\tau$ in Run 2 with the ATLAS Experiment Prof. Sarah Demers | CERN |
| 2016 - 2018 | ATLAS EXPERIMENT Tau Identification with Recurrent Neural Networks in the ATLAS Trigger Prof. Sarah Demers | CERN |
| 2015 - 2016 | MU2E EXPERIMENT Trigger & Data Acquisition Studies for the Muze Experiment Prof. Sarah Demers | Fermilab |
| 2015 | TOWARDS NANOSCALE BATTERIES WITH COLLOIDAL GOLD Making Conducting Cells with DNA-Functionalized Gold Nanocolloids Prof. Erika Eiser | University of Cambridge |
| 2012 | ATLAS EXPERIMENT Improving k-factor Estimations for NNLO $H \rightarrow b\bar{b}$ Interactions Prof. John Huth, Dr. David Lopez Mateos | CERN |
| 2011 | HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS Reconstructing the Baryon Acoustic Oscillatory Peak Dr. Daniel Eisenstein | Cambridge, MA |

Publications

[Full list](#) of papers with the ATLAS collaboration.¹

- 2020 **M. Pettee**, S. Miret, S. Majumdar, and M. Nassar. [Choreo-Graph: Learning Latent Graph Representations of the Dancing Body](#). *NeurIPS 2020 Workshop on Machine Learning for Creativity and Design*.
- 2019 **M. Pettee**, C. Shimmin, D. Duhaime, and I. Vidrin. Beyond Imitation: Generative and Variational Choreography via Machine Learning. *Proceedings of the 10th International Conference on Computational Creativity*. [arXiv:1907.05297](#).
- The ATLAS Collaboration (Co-writer & editor). Expected Performance of the ATLAS Detector at the High-Luminosity LHC. [ATL-PHYS-PUB-2019-005](#).

Awards

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| 2021 | Owen Chamberlain Postdoctoral Fellowship | <i>Lawrence Berkeley National Laboratory</i> |
| 2018 | Lightning Round Talk Winner | <i>US LHC Users Association</i> |
| | Women's Faculty Forum Seed Grant | <i>Yale University</i> |
| 2016 | Winner, Windy City Physics Slam | <i>ICHEP</i> |
| | • PBS Chicago Interview Clip | |
| | Poster Award for <i>Trigger Studies for the Muze Experiment</i> | <i>ICHEP</i> |
| 2015 | Leigh Page Prize | <i>Yale University</i> |
| | • For potential contributions to the field of physics | |
| | Honorable Mention | <i>NSF Graduate Research Fellowship Program</i> |
| 2014 | Harvard-Cambridge Scholarship | <i>Harvard University</i> |
| | • Full tuition for a master's program at University of Cambridge | |
| | Julia Shaffner Memorial Prize | <i>Harvard University</i> |
| | • Honoring an outstanding woman in science | |
| 2013 | President's Challenge Finalist | <i>The Harvard Innovation Lab</i> |
| | 15 Most Interesting Seniors | <i>The Harvard Crimson</i> |
| 2012 | Judges' Award for Acting | <i>The International Student Drama Festival</i> |
| | Certificate of Distinction in Teaching | <i>Harvard University</i> |
| | The Caroline Isenberg and Elizabeth Cary Agassiz Fellowships | <i>Harvard University</i> |
| 2011 | Best Lead Actress in a Play | <i>Harvard Theater Award</i> |

Talks

Invited Talks

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|------|---|---------------|
| 2021 | AI METHODS FOR PARTICLE PHYSICS AND CHOREOGRAPHY HEP Seminar Speaker at University of Tennessee, Knoxville | <i>Online</i> |
| 2020 | CHOREO-GRAPH: LEARNING LATENT GRAPH REPRESENTATIONS OF THE DANCING BODY Kinetch Arts (San Francisco, CA) | <i>Online</i> |

Contributed Talks

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| 2020 | CHOREO-GRAPH: LEARNING LATENT GRAPH REPRESENTATIONS OF THE DANCING BODY NeurIPS Workshop on ML for Creativity and Design | Online |
| | RUN 3 TRIGGERS FOR HLEPTONS ANALYSES ATLAS Tau & HLeptons Workshop | Online |
| 2019 | EXPECTED ATLAS PERFORMANCE AT THE HL-LHC US ATLAS Workshop | UMass Amherst |
| | OVERVIEW OF TAU VS. JET IDENTIFICATION ATLAS Tau & HLeptons Workshop | Prague, Czech Republic |
| | BEYOND IMITATION: GENERATIVE CHOREOGRAPHY VIA MACHINE LEARNING International Conference on Computational Creativity (ICCC) | Charlotte, NC |
| 2018 | RNN TAU IDENTIFICATION WITHIN THE ATLAS HLT US LHC Users Association Meeting | Fermilab |
| | RNN TAU IDENTIFICATION IN THE ATLAS HLT ATLAS Machine Learning Workshop | CERN |
| | THE 2018 ATLAS TAU TRIGGER & COMBINED PERFORMANCE US ATLAS Workshop | Pittsburgh, PA |
| | TAU TRIGGER & CP PERFORMANCE AT HIGH μ ATLAS P&P Physics Plenary | CERN |
| | FTK & THE TAU TRIGGER ATLAS TDAQ Week | CERN |

Posters

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| 2020 | CHOREO-GRAPH: LEARNING LATENT GRAPH REPRESENTATIONS OF THE DANCING BODY Women in Machine Learning (WiML) at NeurIPS 2020 | Online |
| | RNN TAU IDENTIFICATION IN THE ATLAS HIGH-LEVEL TRIGGER ATLAS Trigger & Data Acquisition Week 2020 | CERN |
| 2019 | GENERATIVE & VARIATIONAL CHOREOGRAPHY VIA MACHINE LEARNING Women in Machine Learning (WiML) at NeurIPS 2019 | Vancouver, Canada |
| | MACHINE WOMAN: PRESERVATION, MEMORY, FORGETTING, AND AI Women's Faculty Forum at Yale | New Haven, CT |
| 2017 | PERFORMANCE OF THE ATLAS TAU TRIGGER IN RUN 2 Advanced Computing & Analysis Techniques in Physics Research (ACAT) | Seattle, WA |
| 2016 | TRIGGER STUDIES FOR THE MU2E EXPERIMENT International Conference on High Energy Physics (ICHEP) | Chicago, IL |

Leadership & Service

- 2017 - 2021 HLeptons Trigger Liaison: Trigger Studies for the ATLAS $H \rightarrow \tau\tau$ Analysis Group
- 2019 - 2020 Reviewer for NeurIPS Physical Sciences Workshop
- 2020 Session Co-Convener, PyHEP 2020 (Conference for Python in High-Energy Physics)
- 2019 Reviewer for Women in Machine Learning (WiML) Workshop

Teaching

Training

- 2016 PHYSICS 530: Theory and Practice of Scientific Teaching for Physical Scientists *Yale University*
- 2014 ASTRO 302: Scientists Teaching Science *Harvard University*

Yale University

- 2018 Physics 115: The Physics of Dance
American Studies 349: Technologies for Movement Research
- 2017 Physics 171: University Physics for the Life Sciences
Physics 115: The Physics of Dance
- 2016 Physics 205L: Modern Physical Measurement
Physics 115: The Physics of Dance
- 2015 Physics 165L: General Physics Laboratory

Harvard University

- 2013 Math 110: Vector Space Methods for Differential Equations
- 2012 - 2013 Math 121: Linear Algebra and Applications

Inclusion & Outreach Efforts

- 2020 Member of the American Physical Society's Inclusion, Diversity, and Equity Alliance (APS-IDEA)
- 2019 - 2021 Member of the Yale Physics Climate & Diversity Committee
- Advocated for a department-wide discussion of discrimination in our community
 - Contributed to the design of our department's Code of Conduct
- 2018 - 2020 US LHC Users Association advocacy trip to Capitol Hill
- Met with the offices of around 15 representatives from Congress each year to ask for their support for high-energy physics research and STEM funding in general
- 2017 - 2018 Speaker, *Science in the News*, delivering scientific talks to the New Haven public
Girls' Science Investigations at Yale
- 2016 Winner, Windy City Physics Slam at ICHEP
Choreographer: *Form Factors*, a dance intervention with physicists at ICHEP

2015 - 2020 Yale Women in Physics Mentor

Arts

Exhibitions

- 2020 [Mirror Exercise](#): an AI-generated duet with myself
- Highlighted in the NeurIPS Workshop on ML for Creativity and Design's [AI Art Gallery](#)
 - Digital exhibition at [Level Up: The Dramaturgy of Digital Performance & Design](#)
 - Selected by the AI Transparency Institute & featured at the 2020 AI Governance Forum
 - Boston Cyberarts Gallery exhibition *Perceptions / Distortions* (cancelled due to COVID-19)
- 2019 [SIGMA](#): a short film of AI-generated choreography
- Featured in the NeurIPS 2019 Workshop on ML for Creativity & Design's [AI Art Gallery](#)

Yale University

- 2020 Studio fellow, *Yale Center for Collaborative Arts & Media*
- Year-long paid fellowship to develop collaborative work across art & technology
- Dancer & Coordinator, *Transpositions*
- Dancer in virtual performances by Brian Seibert and Elm City Dance Collective
- [Women+ Art AI](#): Part of a global collective of women working at the intersection of art & AI
- Choreographer, *Elon Musk and the plan to Blow Up Mars the musical*
- Yale Cabaret, dir. Liam Bellman-Sharpe
- Dancer, Coordinator, & Rehearsal Director, *Yale Dance Lab*
- New work by choreographer Vicky Shick: "everywhere"
- 2019 Featured performer, *Learning Film (working title)*
- Interviewed for a documentary by the Derek Jarman Lab, co-produced by Tilda Swinton
- Bill T. Jones/Arnie Zane Dance Company Intensive, *Yale Dance Theater*
- Dancer in a restaging of *D-Man in the Waters*
- 2018 Dancer, *Dance Drawings (For Jock)*
- Choreography by Emily Coates located at the Yale Art Gallery's Sol LeWitt exhibit
- Paul Taylor Dance Company Intensive, *Yale Dance Theater*
- Leading role as "The Hostess" in the first restaging of Taylor's *Party Mix* in four decades
- Featured performer, *Machine Woman*
- An experiential short film documenting my AI-generated choreography research
- 2017 Choreographer: "La Mort du Chorégraphe", *A Different Drum Dance Company*
- Urban Bush Women Intensive, *Yale Dance Theater*
- 2016 Gaga Intensive with Saar Harari & Lee Sher, *Yale Dance Theater*
- Choreographer: "Rang Cherries", *A Different Drum Dance Company*

University of Cambridge

- 2015 Actor, *Attempts on Her Life*, dir. Tania Clarke, Corpus Playroom
- Dancer, *Evolution*, ADC Theatre

Harvard University

- 2014 Director/Writer/Choreographer: [Symmetry Breaking](#)
- My creative physics thesis: an immersive multimedia performance about the Higgs boson
- President, *The Signet Society of Arts & Letters*
- Choreographer-in-Residence, *Harvard Dance Center*
- Dancer, *Paper Wing*, chor. Jill Johnson, Farkas Hall
- 2013 Arts@CERN Internship
- Eurydice, *Antigonick*, dir. Ianthe Demos, American Repertory Theater Mainstage
- Isabelle & Executive Producer, *The Edge of the Map*, dir. Calla Videt (Sightline Theater Company)
- Dancer, *At Last*, Loeb Experimental Theater
- Dancer, *On The Run*, Harvard Dance Center
- 2012 Vice-President & Mainstage Coordinator, *The Harvard-Radcliffe Dramatic Club*
- 35+ productions as a performer, director, producer, designer, & choreographer
- Lucy, *CryHurtFood*, Loeb Experimental Theater & Crucible Mainstage (Sheffield, UK)
- Director: *for the purpose of catching ourselves in the act of being the most*
- Set the Guinness World Record for the longest telephone conversation between two people
- 2011 Co-founder and collaborator, *The Harvard Generalist* artistic collective
- Drama & Dance Proctor, *Freshman Arts Program* (2011-2014)

Writing

- 2018 [Theories of Everything](#), *Sightline Arts*
- [Now or Never: The Case for a Larger Hadron Collider](#), *Yale Distilled Magazine*