Mariel Pettee

Particle physicist, AI researcher, and artist

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Education

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

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 $V \to$ leptons, $H \to \tau\tau$ 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 Mu2e 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 $H \to b\bar{b}$ 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

2021	Owen Chamberlain Postdoctoral Fellowship	*Lawrence Berkeley National Laboratory*
2018	Lightning Round Talk Winner	*US LHC Users Association*
	Women's Faculty Forum Seed Grant	*Yale University*
2016	Winner, Windy City Physics Slam	*ICHEP*
	• PBS Chicago Interview Clip	
	Poster Award for *Trigger Studies for the Mu2e Experiment*	*ICHEP*
2015	Leigh Page Prize	*Yale University*
	• For potential contributions to the field of physics	
	Honorable Mention	*NSF Graduate Research Fellowship Program*
2014	Harvard-Cambridge Scholarship	*Harvard University*
	• Full tuition for a master's program at University of Cambridge	
	Julia Shaffner Memorial Prize	*Harvard University*
	• Honoring an outstanding woman in science	
2013	President's Challenge Finalist	*The Harvard Innovation Lab*
	15 Most Interesting Seniors	*The Harvard Crimson*
2012	Judges' Award for Acting	*The International Student Drama Festival*
	Certificate of Distinction in Teaching	*Harvard University*
	The Caroline Isenberg and Elizabeth Cary Agassiz Fellowships	*Harvard University*
2011	Best Lead Actress in a Play	*Harvard Theater Award*

Talks

Invited Talks

2021 - 2022	Interdisciplinary Machine Learning for Particle Physics	*Online*

- Cornell Laboratory for Elementary Particle Physics Journal Club
- Berkeley Institute for Data Science (BIDS) ML + Science Forum
- Physics Dept. Colloquium at Seattle University
- HEP Seminar Speaker at University of Tennessee, Knoxville

2020 CHOREO-GRAPH: LEARNING LATENT GRAPH REPRESENTATIONS OF THE DANCING BODY *Online*
  Kinetech Arts (San Francisco, CA)

  BEYOND IMITATION: GENERATIVE CHOREOGRAPHY WITH AI *Brown University*
  Conference for Research on Choreographic Interfaces (CRCI)

Contributed Talks

2021 DANCING WITH MYSELF *St. Louis, MO*
  Strange Loop

2020 CHOREO-GRAPH: LEARNING LATENT GRAPH REPRESENTATIONS OF THE DANCING BODY *Online*
  NeurIPS Workshop on ML for Creativity and Design

  RUN 3 TRIGGERS FOR HLEPTONS ANALYSES *Online*
  ATLAS Tau & HLeptons Workshop

2019 EXPECTED ATLAS PERFORMANCE AT THE HL-LHC *UMass Amherst*
  US ATLAS Workshop

  OVERVIEW OF TAU VS. JET IDENTIFICATION *Prague, Czech Republic*
  ATLAS Tau & HLeptons Workshop

  BEYOND IMITATION: GENERATIVE CHOREOGRAPHY VIA MACHINE LEARNING *Charlotte, NC*
  International Conference on Computational Creativity (ICCC)

2018 RNN TAU IDENTIFICATION WITHIN THE ATLAS HLT *Fermilab*
  US LHC Users Association Meeting

  RNN TAU IDENTIFICATION IN THE ATLAS HLT *CERN*
  ATLAS Machine Learning Workshop

  THE 2018 ATLAS TAU TRIGGER & COMBINED PERFORMANCE *Pittsburgh, PA*
  US ATLAS Workshop

  TAU TRIGGER & CP PERFORMANCE AT HIGH μ *CERN*
  ATLAS P&P Physics Plenary

  FTK & THE TAU TRIGGER *CERN*
  ATLAS TDAQ Week

Press

2022 Interviewee on the Cognicast podcast
  - A wide-ranging discussion of my research trajectory across AI, physics, and art
  - Episode webpage
  - Listen on Apple Podcasts

2021 Mariel Pettee successfully defends PhD thesis, *Yale Physics*

2020 Advice to Women in STEM: Mariel Pettee, *Yale Scientific Magazine*

2019 Feature on Yale's Instagram page

2016 Scientists Battle for Physics Slam Crown, *PBS Chicago*

2013 15 Most Interesting Seniors: Mariel N. Pettee, *The Harvard Crimson*

Posters

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 $H \to \tau\tau$ 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

2021 Untitled Bird Project: a 1 hour pop-up exhibit featuring AI-generated bird calls situated in nature

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

Bay Area

2022 Dancer, *Kinetech Arts*
- A new piece by Kinetech Arts commissioned by the Berkeley Dance Project

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*