Curriculum Vitae

Kevin J. Pedro
kpedro88@gmail.com
www.kjplanet.com/kjp

2320 W Adams St., Unit 3, Chicago, IL 60612 USA, Cell:+1 (207) 233 0209

Education

Rensselaer Polytechnic Institute, Troy, NY: B.S. Physics, *summa cum laude* (May 2011), GPA: 3.97/4.0
University of Maryland, College Park, MD: Ph.D. Physics (December 2014), GPA: 4.0/4.0

Positions

Associate Scientist   September 2019 - Present
    CMS Experiment; Scientific Computing Division, Fermi National Accelerator Laboratory
    Supervisors: Robert Harris, Nhan Tran, Daniel Elvira
Postdoctoral Research Associate   February 2015 - August 2019
    CMS Experiment; Particle Physics Division, Fermi National Accelerator Laboratory
    Supervisors: Frank Chlebana, Daniel Elvira
Graduate Research Assistant   August 2011 - January 2015
    CMS Experiment; Physics Department, University of Maryland
    Supervisor: Sarah Eno

Research

- Leading comprehensive program to search for evidence of dark matter from strongly-coupled hidden sectors in the forms of semivisible jets, emerging jets, and soft unclustered energy patterns.
- Maintainer and primary developer for TreeMaker ntuple production software, used for numerous searches (including above).
- Lead developer of SONIC (Services for Optimized Network Inference on Coprocessors) in the CMS software to accelerate ML inference using coprocessors; consultant for same approach in LArSoft for DUNE.
- Investigating AI diffusion to accelerate detector simulation and graph neural networks for accurate, scalable calorimeter clustering.

Leadership

CMS L3 Machine Learning for Simulation (ML4Sim) Convener	2020 - Present
Snowmass Computational Frontier Theoretical Calculations and Simulation Co-convener	2021 - 2022
HEP Software Foundation (HSF) Detector Simulation Working Group Co-convener	2021 - 2022
CMS L2 Upgrade Software Coordinator	2017 - 2020
CMS L2 Deputy Release Manager for CMSSW	2018 - 2019
CMS L3 HCAL CMSSW Co-convener	2016 - 2017
CMS L3 Upgrade Simulation and Reconstruction Coordinator	2016

Journal Publications

CMS Collaboration, "Search for soft unclustered energy patterns in proton-proton collisions at 13 TeV", arXiv:2403.05311, March 2024, submitted to *Phys. Rev. Lett.*

CMS Collaboration, "Search for new physics with emerging jets in proton-proton collisions at $\sqrt{s} = 13$ TeV", arXiv:2403.01556, March 2024, submitted to *JHEP*.

CMS Collaboration, "Portable acceleration of CMS computing workflows with coprocessors as a service", arXiv:2402.15366, February 2024, submitted to *Comp. Soft. Big Sci.*

C. Savard et al., "Optimizing High Throughput Inference on Graph Neural Networks at Shared Computing Facilities with the NVIDIA Triton Inference Server", arXiv:2312.06838, December 2023, submitted to *Comp. Soft. Big Sci.*

O. Amram and K. Pedro, "Denoising diffusion models with geometry adaptation for high fidelity calorimeter simulation", *Phys. Rev. D* 108 (2023) 072014, arXiv:2308.03876.

T. Cai et al., "Accelerating Machine Learning Inference with GPUs in ProtoDUNE Data Processing", *Comp. Soft. Big Sci.* 7 (2023) 11, arXiv:2301.04633.

K. Pedro and P. Shyamsundar, "Optimal Mass Variables for Semivisible Jets", *SciPost Phys. Core* 6 (2023) 067, arXiv:2303.16253.

CMS Collaboration, "Search for new physics in multijet events with at least one photon and large missing transverse momentum in proton-proton collisions at 13 TeV", *JHEP* 10 (2023) 046, arXiv:2307.16216.

S. Bein et al., "Refining fast simulation using machine learning", arXiv:2309.12919, September 2023, submitted to *Eur. Phys. J. Web Conf.*

A. Ćiprijanović et al., "DeepAstroUDA: Semi-Supervised Universal Domain Adaptation for Cross-Survey Galaxy Morphology Classification and Anomaly Detection", *Mach. Learn. Sci. Tech.* 4 (2023) 025013, arXiv:2302.02005.

S. Bhattacharya et al., "GNN-based end-to-end reconstruction in the CMS Phase 2 High-Granularity Calorimeter", *J. Phys. Conf. Ser.* 2438 (2023) 012090, arXiv:2203.01189.

S. Banerjee et al., "Denoising Convolutional Networks to Accelerate Detector Simulation", *J. Phys. Conf. Ser.* 2438 (2023)

012079, arXiv:2202.05320.

G. Albouy et al., "Theory, phenomenology, and experimental avenues for dark showers: a Snowmass 2021 report", *Eur. Phys. J. C* 82 (2022) 1132, arXiv:2203.09503.

A. Ćiprijanović et al., "DeepAdversaries: Examining the Robustness of Deep Learning Models for Galaxy Morphology Classification", *Mach. Learn. Sci. Tech.* 3 (2022) 035007, arXiv:2112.14299.

CMS Collaboration, "Search for resonant production of strongly coupled dark matter in proton-proton collisions at 13 TeV", *JHEP* 06 (2022) 156, arXiv:2112.11125.

J. Apostolakis et al., "Detector Simulation Challenges for Future Accelerator Experiments", *Front. Phys.* 10 (2022) 913510.

F. Canelli et al., "Autoencoders for Semivisible Jet Detection", *JHEP* 02 (2022) 74, arXiv:2112.02864.

J. Krupa, K. Lin, et al., "GPU coprocessors as a service for deep learning inference in high energy physics", *Mach. Learn. Sci. Tech.* 2 (2021) 035005, arXiv:2007.10359.

M. Wang, T. Yang, et al., "GPU-accelerated machine learning inference as a service for computing in neutrino experiments", *Front. Big Data* 3 (2021) 604083, arXiv:2009.04509.

G. Amadio et al., "GeantV: Results from the prototype of concurrent vector particle transport simulation in HEP", *Comp. Soft. Big Sci.* 5 (2021) 3, arXiv:2005.00949.

D. Rankin et al., "FPGAs-as-a-Service Toolkit (FaaST)", *Proc. H2RC* (2020) 38, arXiv:2010.08556.

N. Smith et al., "Coffea: Columnar Object Framework For Effective Analysis", *Eur. Phys. J. Web Conf.* 245 (2020) 06012, arXiv:2008.12712.

K. Pedro, "Integration and Performance of New Technologies in the CMS Simulation", *Eur. Phys. J. Web Conf.* 245 (2020) 02020, arXiv:2004.02327.

X. Ju et al., "Graph Neural Networks for Particle Reconstruction in High Energy Physics detectors", *Proc. Mach. Learn. Phys. Sci.* (NeurIPS 2019), arXiv:2003.11603.

K. Pedro, "Searches for new physics with unconventional signatures at ATLAS and CMS", *Proc. Moriond QCD* (2019), arXiv:1912.04180.

CMS Collaboration, "Search for supersymmetry in proton-proton collisions at 13 TeV in final states with jets and missing transverse momentum", *JHEP* 10 (2019) 244, arXiv:1908.04722.

K. Pedro, "Current and Future Performance of the CMS Simulation", *Eur. Phys. J. Web Conf.* 214 (2019) 02036.

J. Duarte et al., "FPGA-accelerated machine learning inference as a service for particle physics computing", *Comp. Soft. Big Sci.* 3 (2019) 13, arXiv:1904.08986.

CMS Collaboration, "Search for supersymmetry in events with a photon, jets, b-jets, and missing transverse momentum in proton-proton collisions at 13 TeV", *Eur. Phys. J. C* 79 (2019) 444, arXiv:1901.06726.

HEP Software Foundation, "A Roadmap for HEP Software and Computing R&D for the 2020s", *Comp. Soft. Big Sci.* 3 (2019) 7, arXiv:1712.06982.

CMS Collaboration, "Search for supersymmetry in multijet events with missing transverse momentum in proton-proton collisions at 13 TeV", *Phys. Rev. D* 96 (2017) 032003, arXiv:1704.07781.

M. Amouzegar et al., "Liquid scintillator tiles for calorimetry", *JINST* 11 (2016) P11018.

CMS-HCAL Collaboration, "Dose rate effects in the radiation damage of the plastic scintillators of the CMS Hadron Endcap Calorimeter", *JINST* 11 (2016) T10004, arXiv:1608.07267.

CMS Collaboration, "Search for supersymmetry in the multijet and missing transverse momentum final state in pp collisions at 13 TeV", *Phys. Lett. B* 758 (2016) 152, arXiv:1602.06581.

K. Pedro, "Search for Pair Production of Third-Generation Scalar Leptoquarks and R-Parity Violating Top Squarks in Proton-Proton Collisions at $\sqrt{s} = 8$ TeV" (doctoral dissertation), November 2014, doi:10.13016/M26C9Q.

CMS Collaboration, "Search for pair production of third-generation scalar leptoquarks and top squarks in proton-proton collisions at $\sqrt{s} = 8$ TeV", *Phys. Lett. B* 739 (2014) 229, arXiv:1408.0806.

CMS Collaboration, "Determination of Jet Energy Calibration and Transverse Momentum Resolution in CMS", *JINST* 06 (2011) P11002, arXiv:1107.4277.

Public Documents

D. Ciangottini et al., "Analysis Facilities White Paper", arXiv:2404.02100, April 2024.

M. Agarwal et al., "Applications of Deep Learning to physics workflows", arXiv:2306.08106, June 2023.

D. Elvira, S. Gottlieb, O. Gutsche, B. Nachman, et al., "The Future of High Energy Physics Software and Computing", Snowmass 2021, arXiv:2210.05822, October 2022.

P. Boyle, K. Pedro, and J. Qiang, "CompF2: Theoretical Calculations and Simulation Topical Group Report", Snowmass 2021, arXiv:2209.08177, September 2022.

R. Diurba et al., "Snowmass 2021 Community Engagement Frontier 6: Public Policy and Government Engagement: Non-Congressional Government Engagement", Snowmass 2021, arXiv:2207.00125, July 2022.

R. Diurba et al., "Snowmass 2021 Community Engagement Frontier 6: Public Policy and Government Engagement: Congressional Advocacy for Areas Beyond HEP Funding", Snowmass 2021, arXiv:2207.00124, July 2022.

M. Carneiro et al., "Snowmass '21 Community Engagement Frontier 6: Public Policy and Government Engagement: Congressional Advocacy for HEP Funding (The "DC Trip")", Snowmass 2021, arXiv:2207.00122, July 2022.

P. Harris et al., "Physics Community Needs, Tools, and Resources for Machine Learning", Snowmass 2021, arXiv:2203.16255, March 2022.

A. Adelmann et al., "New directions for surrogate models and differentiable programming for High Energy Physics detector simulation", Snowmass 2021, arXiv:2203.08806, March 2022.

S. Banerjee et al., "Detector and Beamline Simulation for Next-Generation High Energy Physics Experiments", Snowmass 2021, arXiv:2203.07614, March 2022.

J. Pivarski et al., "HL-LHC Computing Review Stage 2, Common Software Projects: Data Science Tools for Analysis", arXiv:2202.02194, February 2022.

HEP Software Foundation, "HL-LHC Computing Review: Common Tools and Community Software", HSF-DOC-2020-01, arXiv:2008.13636, August 2020.

ATLAS and CMS Collaborations, "Report on the Physics at the HL-LHC and Perspectives for the HE-LHC", arXiv:1902.10229, CMS-FTR-19-001, February 2019.

HEP Software Foundation, "Detector Simulation White Paper", HSF-CWP-2017-07, arXiv:1803.04165, October 2017.

CMS Collaboration, "The Phase-2 Upgrade of the CMS Barrel Calorimeters", CMS-TDR-015, September 2017.

D. Elvira et al., "CMS Simulation in the HL-LHC Era", HSF-CWP-011, January 2017.

CMS Collaboration, "Further SUSY Simplified Model interpretations for Moriond 2016", CMS PAS SUS-16-004, March 2016.

CMS Collaboration, "CMS Phase II Upgrade Scope Document", LHCC-G-165, September 2015.

CMS Collaboration, "Technical Proposal for the Phase-II Upgrade of the CMS Detector", LHCC-P-008, June 2015.

CMS Collaboration, "Jet Performance in pp Collisions at $\sqrt{s} = 7$ TeV". CMS PAS JME-10-003, July 2010.

Popular Articles

Symmetry Magazine, "This is our Muon Shot", April 2024.

Symmetry Magazine, "Will AI make MC the MVP of particle physics?", July 2023.

Nvidia Developer Blog, "Scaling Inference in High Energy Particle Physics at Fermilab Using NVIDIA Triton Inference Server", April 2021.

Fermi News, "The next big thing: the use of graph neural networks to discover particles", September 2020.

CMS Physics Briefing, "Enhancing the Missing Momentum Microscope", July 2019.

Conference Presentations

"Evolution of Generation and Simulation Techniques in the AI/ML Era". APS April Meeting, Sacramento, April 2024.

"A Call to Action: Advocating for The Future of US High Energy Physics". The Future of High Energy Physics: A New Generation, A New Vision, Aspen, March 2024.

"CaloDiffusion with GLaM for High Fidelity Calorimeter Simulation". ML4Jets, DESY, November 2023.

"Machine Learning for Particle Physics Experiments". ML4Jets, DESY, November 2023.

"AI and Beyond: New Techniques for Simulation and Design in HEP". 26th International Conference on Computing in High Energy and Nuclear Physics, Norfolk, May 2023.

"Inference as a Service in High Energy Physics". Accelerating Physics with ML, MIT, January 2023.

"Optimal Mass Variables for Semivisible Jets". ML4Jets, Rutgers, November 2022.

"Semivisible Jets at CMS". Semivisible Jets Workshop, Zurich, July 2022. LHC Dark Matter Working Group, CERN, January 2023.

"Dark Showers for Snowmass". Snowmass Energy Frontier Workshop, Providence, April 2022.

"Denoising Convolutional Networks to Accelerate Detector Simulation". 20th International Workshop on Advanced Computing and Analysis Techniques in Physics Research, South Korea, November 2021.

"AI at Fermilab". 54th Annual Users Meeting, Fermilab, August 2021.

"Machine learning for detector simulation". HSF WLCG Virtual Workshop, November 2020.

"CMS perspective on dark showers". Searching for long-lived particles at the LHC and beyond, November 2020.

"FPGA-accelerated machine learning inference as a service for particle physics computing". 24th International Conference on Computing in High Energy and Nuclear Physics, Adelaide, November 2019.

"Integration and Performance of New Technologies in the CMS Simulation". 24th International Conference on Computing in High Energy and Nuclear Physics, Adelaide, November 2019.

"Searches for new physics with unconventional signatures at ATLAS and CMS". 54th Rencontres de Moriond on QCD and High Energy Interactions, La Thuile, March 2019.

"FPGAs as a service to accelerate machine learning inference". Joint HSF/OSG/WLCG Workshop, JLab, March 2019.

"Integration of new simulation technologies in the experiments". Joint HSF/OSG/WLCG Workshop, JLab, March 2019.

"Search for emerging jets". Searching for long-lived particles at the LHC, Amsterdam, October 2018.

"Current and Future Performance of the CMS Simulation". 23rd International Conference on Computing in High Energy and Nuclear Physics, Sofia, July 2018.

"Tests of GeantV in CMS Software Framework". Joint WLCG & HSF Workshop, Napoli, March 2018.

"Search for supersymmetry in multijet events with missing transverse momentum in proton-proton collisions at 13 TeV". 2017 Meeting of the APS Division of Particles and Fields, Fermilab, August 2017.

"Search for supersymmetry in the multijet and missing transverse momentum final state at 13 TeV". 24th International

Conference on Supersymmetry and Unification of Fundamental Interactions, Melbourne, July 2016.

"Advanced Reconstruction Algorithms for the CMS High Granularity Calorimeter". US LHC Users Association Meeting Lightning Round, Fermilab, November 2015.

"Search for 3rd generation LQs and RPV stops". Phenomenology 2014 Symposium, Pittsburgh, May 2014.

"CMS HCAL Endcap Simulations for the High Luminosity LHC". APS April Meeting, Denver, April 2013.

"Fast Simulation of Calorimeters for the CMS Experiment". Fast Detector Simulation in High Energy Physics, DESY-Zeuthen, January 2013.

Seminars

"Searching Where the Light Isn't: Discovery Potential in LHC Anomalies", Fermilab Wine and Cheese Seminar, January 2023. Northwestern, February 2023.

"Software, Computing, and Analysis Tools at CMS". CMS Data Analysis School, Fermilab, January 2022. CMS Data Analysis School, Fermilab, January 2023.

"Overview of White Paper 1: Congressional advocacy for HEP funding (DC Trip)". Community Engagement Frontier 06 Snowmass White Paper Town Hall, February 2022. (w/ K. Kaadze)

"ML Inference Integration in CMS". Fast Detector Simulation Workshop, LPCC, CERN, November 2021.

"Simulation of Semi-visible Jets in CMS". Snowmass Dark Showers Working Group, September 2021.

"Is the dark force strong? New directions for LHC dark matter searches". MIT, September 2021.

"Coprocessors as a service to accelerate machine learning inference for particle physics". Wayne State University, November 2020. University of Minnesota, November 2020. University of Maryland, April 2021.

"AI for Particle Physics: Better, Smarter, Faster". Fermilab Colloquium, May 2020.

"FPGAs as a service to accelerate machine learning inference". LPC Topic of the Week, Fermilab, April 2019.

"Search for supersymmetry in multijet events with missing transverse momentum in proton-proton collisions at 13 TeV". University of Notre Dame, September 2017. Saha Institute of Nuclear Physics, January 2018.

"CMS Upgrade Simulation". LHC Detector Simulations Workshop, LPCC, CERN, June 2017.

"Search for supersymmetry in the multijet and missing transverse momentum final state at 13 TeV". Rutgers, March 2016.

"Reconstruction for the CMS High Granularity Calorimeter". Northwestern University, July 2015. University of Chicago, February 2016.

"Search for Pair Production of Third-Generation Scalar Leptoquarks and R-Parity Violating Top Squarks in Proton-Proton Collisions at $\sqrt{s} = 8$ TeV". Thesis Defense, University of Maryland, November 2014.

"Search for Third-Generation Scalar Leptoquarks and R-Parity Violating Top Squarks". Fermilab, September 2014. Cornell, October 2014. University of Virginia, November 2014.

"What is a Higgs and how do you discover one?". Physics Summer Outreach Program, University of Maryland, August 2014. (w/ M. Amouzegar, S. Eno)

"Fast Simulation of Calorimeters for the CMS Experiment". University of Maryland, February 2013.

Awards & Honors

URA Early Career Award	July 2024
FNAL Reward & Recognition Award (AI/ML Research)	March 2022
FNAL Reward & Recognition Award (Early Career Proposal Coordination)	February 2022
LPC Distinguished Researcher	January 2019
FNAL Exceptional Performance Recognition Award	September 2018
CMS Achievement Award - Offline & Computing	February 2018
LPC Distinguished Researcher	January 2018
CMS Detector Award - HCAL	April 2017
US LHC Users Association Lightning Round Winner	November 2015
CMS Fundamental Physics Special Recognition Award	December 2013
CMS Achievement Award - Upgrade	December 2012
University of Maryland Dean's Fellowship	August 2011
G. Howard Carragan Award	May 2011
Rensselaer Dean's List	Fall 2007 - Spring 2011
Sigma Pi Sigma Physics Honors Society	April 2010
Meritorious Winner in the Mathematical Contest in Modeling	April 2010
Rensselaer Presidential Scholar	July 2007
Rensselaer Mathematics and Science Medal	April 2006

Grants

Denoising Diffusion to Accelerate Detector Simulation (**principal investigator**)	July 2023
USCMS HL-LHC S&C Operations Program, $53,500	
Accelerating offline computing with the Fast Machine Learning Lab (renewal) (co-investigator)	June 2022
USCMS HL-LHC S&C Operations Program, $46,000	

High Velocity AI: Generative Models (**principal investigator**)	August 2021
DOE High Energy Physics Computational HEP Sessions Program, $328,000	
AI Denoising to Accelerate Detector Simulation (**principal investigator**)	May 2021
USCMS HL-LHC S&C Operations Program, $43,000	
Investigating Heterogeneous Computing at the Large Hadron Collider (contributor)	July 2020
Internet2: Exploring Clouds for Acceleration of Science (Phase 2), $500,000	
Accelerating offline computing with the Fast Machine Learning Lab (co-investigator)	June 2020
USCMS HL-LHC S&C Operations Program, $43,000	
High Velocity AI (contributor)	September 2019
DOE High Energy Physics Computational HEP Sessions Program, $400,000	
Graph Neural Networks for Accelerating Calorimetry and Event Reconstruction (co-investigator)	March 2019
FNAL Laboratory Directed Research and Development, L2019.017, $480,000	
Investigating Heterogeneous Computing at the Large Hadron Collider (contributor)	November 2018
Internet2: Exploring Clouds for Acceleration of Science (Phase 1), $156,000	
Implement open source HEP NoSQL database (contributor, 2018)	January 2016
FNAL Laboratory Directed Research and Development, L2016.032, $395,000	

Reviews

Journal referee:

Phys. Lett. B (2023 - present), *JHEP* (2021 - present), *Comput. Softw. Big Sci.* (2021 - present), *Sci. Rep.* (2021 - present), *Front. Big Data* (2020 - present), *CHEP2018* proceedings (*Eur. Phys. J. Web. Conf.* 214 (2019))

Analysis Review Committee (ARC) member: (CMS Collaboration)

"Search for long-lived particles using displaced vertices and missing transverse momentum in proton-proton collisions at $\sqrt{s} = 13$ TeV", arXiv:2402.15804, February 2023, submitted to *Phys. Rev. D.*

"Search for fractionally charged particles in proton-proton collisions at $\sqrt{s} = 13$ TeV", arXiv:2402.09932, February 2024, submitted to *Phys. Rev. Lett.*

"Development of the CMS detector for the CERN LHC Run 3", arXiv:2309.05466, September 2023, submitted to *JINST.*

"A deep neural network to search for new long-lived particles decaying to jets", *Mach. Learn. Sci. Tech.* 1 (2020) 035012, arXiv:1912.12238.

"A search for pair production of new light bosons decaying into muons in proton-proton collisions at 13 TeV", *Phys. Lett. B* 796 (2019) 131, arXiv:1812.00380.

"Measurement of the production cross section for pp $\to$ Z$\gamma \to \nu\nu\gamma$ at 13 TeV", CMS PAS SMP-16-004, June 2018.

CMS Certified Language Editor (CCLE): (CMS Collaboration)

"Search for low-mass long-lived particles decaying to displaced jets in proton-proton collisions at $\sqrt{s} = 13.6$ TeV", CMS PAS EXO-23-013.

"Measurement of the $t\bar{t}$ charge asymmetry in events with highly Lorentz-boosted top quarks in pp collisions at $\sqrt{s} = 13$ TeV", *Phys. Lett. B* 846 (2023) 137703, arXiv:2208.02751.

"HL-LHC searches for new physics in hadronic final states with boosted W bosons or top quarks using razor variables", CMS PAS FTR-18-037.

"Search for $t\bar{t}$ resonances at the HL-LHC and HE-LHC with the Phase-2 CMS detector", CMS PAS FTR-18-009.

"Searches for light higgsino-like charginos and neutralinos at the HL-LHC with the Phase-2 CMS detector", CMS PAS FTR-18-001.

"First Level Track Jet Trigger for Displaced Jets at High Luminosity LHC", CMS PAS FTR-18-018.

FNAL institutional review leader: (CMS Collaboration)

"Search for decays of the 125 GeV Higgs boson into a Z boson and a ρ or ϕ meson", *JHEP* 11 (2020) 039, arXiv:2007.05122.

"Azimuthal correlations for inclusive 2-jet, 3-jet, and 4-jet events in pp collisions at $\sqrt{s} = 13$ TeV", *Eur. Phys. J. C* 78 (2018) 566, arXiv:1712.05471.

"Search for lepton flavour violating decays of the Higgs boson to eτ and eμ in proton-proton collisions at $\sqrt{s} = 8$ TeV", *Phys. Lett. B* 763 (2016) 472, arXiv:1607.03561.

Committees

Fermilab CMS Postdoc Hiring Committee	Fall 2023
Fermilab Users Executive Committee	October 2022 - Present
Chair, Government Relations Subcommittee	(October 2023 - Present)
Deputy Chair, Government Relations Subcommittee	(October 2022 - September 2023)
Fermilab Institutional Cluster Acquisition Planning Committee	January 2022 - April 2022
Fermilab AI Associate Hiring Committee	September 2021 - February 2022
LPC Events Committee Co-chair	January 2019 - December 2020
Fermilab Computing Division Focus Group	October 2019 - June 2020
Fermilab High Velocity AI Hiring Committee	Winter 2019 - 2020
Fermilab Computational Physics Developer Hiring Committee	Spring 2018

Fermilab TARGET Program Committee	Spring 2017
LPC Computing Support Hiring Committee	Fall 2016
Fermilab EOS Task Force	Fall 2016

Workshops

ML4Jets 2023 (Session Chair: Super Resolution, Reweighting, and Refinement)	November 2023
Fast Machine Learning for Science Workshop (Session Chair: SONIC Developers Meeting)	September 2023
CMS Deep Dive: Fast and accurate simulation techniques (Co-chair)	July 2023
KITP Muon Collider Workshop (Early Career Panelist: The Path Forward)	March 2023
CMS ML Hackathon: FastSim (Co-chair)	February 2023
ML4Jets 2022 (Session Chair: Generative Models – Detector Level)	November 2022
FastSim Days 2022 (Co-chair)	October 2022
3rd Rucio Community Workshop (Local Organizer)	March 2020
Fall19 CMS Offline Software and Computing Week at the LPC (Local Organizer)	October 2019
Fast Machine Learning (Local Organizer)	September 2019
FastSim Days 2017 (Co-chair)	February 2017
Phase 2 Readiness for Physics with Full Simulation Event @ LPC (Local Organizer)	October 2016
HCAL DPG Event at the LPC (Local Organizer)	September 2016

Teaching

Project Advisor   October 2023 - Present
   University of Chicago Data Science Clinic
   Latent diffusion for particle showers

Co-director   December 2023
   2nd COFI Advanced Instrumentation and Analysis Techniques School (Puerto Rico)
   Curriculum design (physics, computing, AI/ML), lecturer recruitment, logistics/organization

Facilitator   June 2016 - September 2023
   LPC Hands-On Advanced Tutorials (Fermilab)
   Git/GitHub/CMSSW; Docker/Apptainer; Government Outreach; Generators; Data and MC Processing; Jets

Teaching Assistant   August 2020 - August 2021
   OOPL C++/STL (Fermilab)

Facilitator   January 2016 - January 2019
   CMS Data Analysis School (Fermilab)
   Git/GitHub; Generators; B-tagging; Jets; Hadronic Supersymmetry; SUSY with Top Tagging

Graduate Teaching Assistant   August 2011 - May 2012
   University of Maryland
   General Physics: Mechanics and Particle Dynamics; Fundamentals of Physics II

Undergraduate Teaching Assistant   August 2008 - May 2011
   Rensselaer Polytechnic Institute
   Honors Physics I; Honors Physics II; Using Matlab, Maple, and Mathematica for Physics

Past Positions

Undergraduate Research Assistant   January 2008 - August 2011
   Daya Bay Experiment; Physics Department, Rensselaer Polytechnic Institute
   Supervisors: Jim Napolitano, John Cummings

Undergraduate Research Assistant   January 2011 - May 2011
   ATLAS Experiment; Physics Department, University at Albany
   Supervisor: Jesse Ernst

REU Student   June 2010 - August 2010
   CMS Experiment; Physics Department, University of Rochester
   Supervisors: Aran Garcia-Bellido, Marek Zielinski

CERN Summer Student   June 2009 - August 2009
   CMS Experiment, CLIC Test Facility 3; Physics Department, Northwestern University
   Supervisors: Mayda Velasco, Anne Dabrowski

Past Research

- Searching for supersymmetry in the multijets plus missing energy final state.
- Supervised and consulted on HCAL radiation damage studies in simulation and collision data.
- Leading developer for HCAL Phase 1 software upgrades and electronics simulation.
- Co-developed HGCal reconstruction, with improved computing performance, using Pandora particle flow algorithm.
- Searched for third-generation scalar leptoquarks and R-parity violating top squarks in 8 TeV data.
- Retuned and improved CMS hadronic fast simulation.

- Developed standalone simulation for Phase 2 calorimeter upgrade designs.
- Studied radiation hardness and light yield of organic scintillators.
- Commissioned transmissometer to measure attenuation length of ultra-pure water for Daya Bay muon veto system.
- Documented and developed TriggerFish software for fast estimates of ATLAS trigger rates.
- Studied jet response and resolution in first CMS data.