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Education

Ph.D. Physics, California Institute of Technology 2016
Thesis: [Naturalness confronts nature: Searches for supersymmetry with the CMS detector in pp collisions at \$\sqrt{s} = 8\$ and 13 TeV](#)
Advisor: Maria Spiropulu
M.S. Physics, California Institute of Technology 2015
S.B. Physics and Mathematics, Massachusetts Institute of Technology 2010
Thesis: [Exotic antineutrino oscillations \(\$\bar{\nu}_e \rightarrow \bar{\nu}_\mu\$ \) in Double Chooz](#)
Advisor: Janet Conrad

Professional Experience

Associate Professor of Physics at UC San Diego, La Jolla, CA 2023–Present
Assistant Professor of Physics at UC San Diego, La Jolla, CA 2019–2023
[Lederman Fellow](#) at Fermilab, Batavia, IL 2016–2019
Technical Instructor in [Junior Lab](#) at MIT, Cambridge, MA 2010–2011

Fellowships and Awards

- American Physical Society [Henry Primakoff Award for Early-Career Particle Physics](#) (2024)
- UCSD [Inclusive Excellence Award](#) (2023)
- [Sloan Research Fellowship](#) (2023)
- Research Corporation For Science Advancement [Cottrell Scholar Award](#) (2023)
- UCSD Undergraduate Research Hub [Outstanding Mentor Award](#) (2021)
- [DOE Early Career Award](#) (2020)
- [William A. Lee Chancellor's Endowed Junior Faculty Fellowship II](#) (2019–Present)
- [LHC Physics Center Distinguished Researcher](#) (2019)
- [Fermilab Lederman Fellowship](#) (2016–2019)
- [NSF Graduate Research Fellowship](#) (2011–2014)
- [Gates Millenium Scholar](#) sponsored by Hispanic Scholarship Fund (2006–2014)

Grants and External Funding

- Key Personnel for DOE Award [UCSD Experimental and Theoretical Particle Physics](#) (2024–2028).
- Co-PI of [PREP: Advancing Research and Education in AI/ML for Science \(AREAS\)](#) (2024–2027).
- Lead PI of RCSA Cottrell Scholars Collaborative [Hidden Figures in Physics and Astronomy](#) (2023–2025).
- PI of Sloan Research Fellowship (2023–2025).
- PI of RCSA Cottrell Scholar Award [Building a Better Foundation: Teaching Physicists and Machines How to Learn from Data](#) (2023–2026).

- Key Personnel for DOE Award [U.S. CMS SPRINT—A Scholar Program for Research Internship](#) (2023–2026).
- Key Personnel for DOE Award [Western Advanced Training for Computational High-Energy Physics \(WATCHEP\)](#) (2022–2027).
- Key Personnel and Institute PI for [NSF HDR Institute for Accelerated AI Algorithms for Data Driven Discovery \(A3D3\)](#) (2021–2026).
- Key Personnel for DOE Award for [HEP Consortium for Advanced Training \(HEPCAT\)](#) (2021–2024).
- Co-PI for DOE Award for [Real-time Data Reduction Codesign at the Extreme Edge for Science](#) (2021–2024).
- PI of DOE Early Career Award for [Real-Time Artificial Intelligence for Particle Reconstruction and Higgs Physics](#) (2020–2025).
- Co-PI of DOE Award for [FAIR Framework for Physics-Inspired Artificial Intelligence in High Energy Physics](#) (2020–2023).
- Co-PI of NSF Award for [Exploring Neural Network Processors for AI in Science and Engineering](#) (2020–2021).
- Key Personnel for [Investigating Heterogeneous Computing at the Large Hadron Collider Phase-II](#) sub-award of Internet2 NSF Grant [Exploring Clouds for Acceleration of Science \(E-CAS\)](#) (2020–2021).
- DOE QuantISED Award [Quantum Machine Learning and Quantum Computation Frameworks for HEP \(QMLQCF\)](#) (2018–2020).
- Fermilab LDRD Award for [Graph Neural Networks for Accelerating Calorimetry and Event Reconstruction](#) (2019–2021).
- Fermilab LDRD Award for [Accelerator Control with Artificial Intelligence](#) (2019–2021).

Selected Research Experience

Higgs Boson Measurements & Combinations

- Author of CMS search for boosted Higgs bosons decaying to two W bosons merged in a single jet [1].
- Author of CMS search for boosted double Higgs boson production in the four bottom quark final state [54] and CMS statistical combination of Higgs boson pair searches [10, 48] using full Run 2 data (2020–Present).
- Lead author of search for a highly boosted Higgs boson decaying to a bottom quark-antiquark pair using full Run 2 data [87] and contributions to the charm quark-antiquark search [33] and dedicated vector boson fusion search [8] (2017–Present).
- Co-author of first search for a highly boosted Higgs boson decaying to a bottom quark-antiquark pair using 2016 data, published in *Phys. Rev. Lett.* [111]; Adapted analysis for interpretation for differential gluon fusion Higgs boson p_T measurement [103]; Combination of this result with other channels led to an observation of $H(b\bar{b})$ decay [105] and other measurements [102] (2016–2018).
- Level-1 and high-level (software) trigger development for Higgs decaying to bottom quark-antiquark pairs produced in association with a Z boson decaying to neutrinos [105] (2016–2017).

Exotic Long-lived Particle and Dijet Searches

- Supervision of students and postdoctoral researchers performing searches for long-lived particles [15, 24, 34, 62, 71] (2019–Present).

- Co-convenor of CMS Exotica Jets+X subgroup (2018–2020).
- Co-leader of analysis group searching for exotic, light spin-1 and spin-0 particles decaying to quarks [99, 100, 104, 112] (2017–2019).
- Co-leader of dijet resonance search group, including data scouting, wide resonance, and b-tagged resonance searches [3, 91, 93, 106–108, 113] (2016–2018).

Novel Machine Learning Algorithms for Physics

- Particle Data Group author responsible for review on machine learning (2024–Present).
- Symmetry-preserving attention networks for boosted and resolved multi-Higgs-boson event reconstruction [9] (2022–Present).
- Co-author of reviews and book chapters on machine learning for high energy physics [7, 11, 13, 45, 55, 58] (2020–Present).
- Symbolic regression to find parametric functions to model binned distributions in high energy physics [2] (2024–Present).
- Co-convenor of CMS Machine Learning Group (2023–Present).
- Self-supervised learning strategies for foundation models in high energy physics [6, 12, 18] (2023–Present).
- Development of frameworks for sharing findable, accessible, interoperable, and reusable (FAIR) data and models in high energy physics [27, 30, 32, 63] (2020–Present).
- Development of anomaly detection algorithms for new physics searches [29, 35, 64–66, 70, 72, 89] (2019–Present).
- Development of graph neural networks [13, 58] for particle-flow reconstruction [21, 39, 44, 60, 75, 80], including explainable AI techniques [42, 67], and charged particle tracking [31, 57, 73, 84] (2019–Present).
- Supervision of students developing generative adversarial networks and autoencoders for fast sparse data generation in high energy physics [28, 37, 51, 69, 79, 86] (2019–Present).
- Contributor to the Snowmass 2022 Community Planning Exercise, including white papers on machine learning for Higgs boson pair production [56], graph neural networks [59], fast machine learning [61], and data science and machine learning in physics education [49]; Co-convenor of the CompF04 subgroup on AI Hardware [38] and contributor to EF01/EF02 Higgs Boson [46], CompF03 Machine Learning [47], and Muon Collider reports [22].
- Studies of quantum machine learning and quantum computation frameworks for high energy physics, including charged particle tracking [74] (2018–Present).
- Development of deep neural networks for identifying boosted Higgs bosons decaying to $b\bar{b}$ and $c\bar{c}$ for the CMS experiment and beyond [43, 90, 95, 97, 110] (2017–Present).

Fast Machine Learning Inference for Physics

- Supervision of students developing tools for fault-tolerant edge neural networks [14, 20] (2023–Present).
- Neural architecture codesign [40] (2023–Present).
- Efficient and interpretable transformers for charged particle tracking [19] and jet tagging [5] (2023–Present).
- Set- and graph-based neural networks for jet tagging on FPGAs in the level-1 trigger [16] (2022–Present).
- Supervision of postdoctoral researchers and students developing an ASIC-based encoder for data compression in the CMS HGCal [77] and improving its training via a differentiable Earth mover’s distance [26] (2020–Present).

- Fast machine learning scientific benchmarks [50] (2022–Present).
- Development of Quantized ONNX (QONNX) framework for representing arbitrary-precision neural networks [53] (2022–Present).
- Real-time AI on FPGAs for accelerator control [76] (2018–2021).
- Development of `hls4ml` for scientific low-power machine learning devices [17, 25, 41, 52, 68, 77, 78, 82] (2020–Present).
- Development of *Services for Optimal Network Inference on Coprocessors* (SONIC) [4, 23, 36, 81, 88, 96, 101] (2018–Present).
- Creation of `hls4ml` tool for creating low-latency FPGA-based firmware implementations of machine learning algorithms [55, 57, 64, 83–85, 92, 98, 109] (2017–Present).
- R&D, including firmware development and hardware demonstration, for the CMS Global Correlator Trigger for the Phase-2 upgrade of the Level-1 trigger [94] (2017–Present).

Selected Publications, Reviews, Reports, Book Chapters, and Conference Proceedings

Selected publications, reviews, reports, book chapters, and conference proceedings to which I made a substantial contribution are listed here.

- [1] CMS Collaboration, *Search for Higgs boson production at high transverse momentum in the WW^* decay channel in proton-proton collisions at $\sqrt{s} = 13$ TeV*, CMS Physics Analysis Summary CMS-PAS-HIG-24-008 (May 2025), <https://cds.cern.ch/record/2932358>.
- [2] H. F. Tsoi et al., “SymbolFit: Automatic Parametric Modeling with Symbolic Regression”, (2025), [arXiv:2411.09851](https://arxiv.org/abs/2411.09851), Accepted by *Comput. Softw. Big Sci.*
- [3] CMS Collaboration, “Enriching the Physics Program of the CMS Experiment via Data Scouting and Data Parking”, *Phys. Rept.* **1115**, 678 (2025), [doi:10.1016/j.physrep.2024.09.006](https://doi.org/10.1016/j.physrep.2024.09.006), [arXiv:2403.16134](https://arxiv.org/abs/2403.16134).
- [4] H. Zhao et al., “Track reconstruction as a service for collider physics”, (2025), [arXiv:2501.05520](https://arxiv.org/abs/2501.05520), Accepted by *J. Instrum.*
- [5] A. Wang et al., “Interpreting and Accelerating Transformers for Jet Tagging”, in *7th Machine Learning and the Physical Sciences Workshop at the 38th Conference on Neural Information Processing Systems* (Dec. 2024), [arXiv:2412.03673](https://arxiv.org/abs/2412.03673), https://ml4physicalsciences.github.io/2024/files/NeurIPS_ML4PS_2024_189.pdf.
- [6] S. Katel et al., “Learning Symmetry-Independent Jet Representations via Jet-Based Joint Embedding Predictive Architecture”, in *7th Machine Learning and the Physical Sciences Workshop at the 38th Conference on Neural Information Processing Systems* (Dec. 2024), [arXiv:2412.05333](https://arxiv.org/abs/2412.05333), https://ml4physicalsciences.github.io/2024/files/NeurIPS_ML4PS_2024_222.pdf.
- [7] J. Duarte et al., “Machine learning for analysis and instrumentation in high energy physics”, in *Instrumentation and Techniques in High Energy Physics*, edited by D. Lincoln (World Scientific, Dec. 2024), p. 125, [doi:10.1142/9789819801107_0005](https://doi.org/10.1142/9789819801107_0005).
- [8] CMS Collaboration, “Measurement of boosted Higgs bosons produced via vector boson fusion or gluon fusion in the $H \rightarrow b\bar{b}$ decay mode using LHC proton-proton collision data at $\sqrt{s} = 13$ TeV”, *JHEP* **12**, 035 (2024), [doi:10.1007/JHEP12\(2024\)035](https://doi.org/10.1007/JHEP12(2024)035), [arXiv:2407.08012](https://arxiv.org/abs/2407.08012).
- [9] H. Li et al., “Reconstruction of boosted and resolved multi-Higgs-boson events with symmetry-preserving attention networks”, (2024), [arXiv:2412.03819](https://arxiv.org/abs/2412.03819), Submitted to *J. High Energy Phys.*

- [10] CMS Collaboration, *Combination of searches for nonresonant Higgs boson pair production in proton-proton collisions at $\sqrt{s} = 13$ TeV*, CMS Physics Analysis Summary CMS-PAS-HIG-20-011 (Nov. 2024), <https://cds.cern.ch/record/2917252>.
- [11] J. M. Duarte, “Novel machine learning applications at the LHC”, in 42nd International Conference on High Energy Physics (Sept. 2024), [arXiv:2409.20413](https://arxiv.org/abs/2409.20413).
- [12] Z. Zhao et al., “Large-Scale Pretraining and Finetuning for Efficient Jet Classification in Particle Physics”, in 22nd International Workshop on Advanced Computing and Analysis Techniques in Physics Research (Aug. 2024), [arXiv:2408.09343](https://arxiv.org/abs/2408.09343).
- [13] E. Chien et al., “Opportunities and challenges of graph neural networks in electrical engineering”, *Nat. Rev. Electr. Eng.* **1**, 529 (2024), doi:10.1038/s44287-024-00076-z.
- [14] O. Weng et al., “FKeras: a sensitivity analysis tool for edge neural networks”, *ACM J. Auton. Transport. Syst.* **1** (2024), doi:10.1145/3665334.
- [15] CMS Collaboration, “Search for long-lived heavy neutral leptons decaying in the CMS muon detectors in proton-proton collisions at $\sqrt{s} = 13$ TeV”, *Phys. Rev. D* **110**, 012004 (2024), doi:10.1103/PhysRevD.110.012004, [arXiv:2402.18658](https://arxiv.org/abs/2402.18658).
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- [17] J. Campos et al., “End-to-end codesign of Hessian-aware quantized neural networks for FPGAs”, *ACM Trans. Reconfigurable Technol. Syst.* **17** (2024), doi:10.1145/3662000, [arXiv:2304.06745](https://arxiv.org/abs/2304.06745).
- [18] C. Li et al., “Accelerating Resonance Searches via Signature-Oriented Pre-training”, (2024), [arXiv:2405.12972](https://arxiv.org/abs/2405.12972).
- [19] S. Miao et al., “Locality-Sensitive Hashing-Based Efficient Point Transformer with Applications in High-Energy Physics”, in 41st International Conference on Machine Learning, Vol. 235 (May 2024), p. 35546, [arXiv:2402.12535](https://arxiv.org/abs/2402.12535), <https://proceedings.mlr.press/v235/miao24b.html>.
- [20] T. Baldi et al., “Reliable edge machine learning hardware for scientific applications”, in 2024 IEEE 42nd VLSI Test Symposium (VTS) (May 2024), p. 1, doi:10.1109/VTS60656.2024.10538639, [arXiv:2406.19522](https://arxiv.org/abs/2406.19522).
- [21] J. Pata et al., “Improved particle-flow event reconstruction with scalable neural networks for current and future particle detectors”, *Commun. Phys.* **7**, 124 (2024), doi:10.1038/s42005-024-01599-5, [arXiv:2309.06782](https://arxiv.org/abs/2309.06782).
- [22] K. M. Black et al., “Muon Collider Forum Report”, *J. Instrum.* **19**, T02015 (2024), doi:10.1088/1748-0221/19/02/T02015, [arXiv:2209.01318](https://arxiv.org/abs/2209.01318).
- [23] CMS Collaboration, “Portable acceleration of CMS computing workflows with coprocessors as a service”, *Comput. Softw. Big Sci.* **8**, 17 (2024), doi:10.1007/s41781-024-00124-1, [arXiv:2402.15366](https://arxiv.org/abs/2402.15366).
- [24] CMS Collaboration, “Search for long-lived particles decaying in the CMS muon detectors in proton-proton collisions at $\sqrt{s} = 13$ TeV”, *Phys. Rev. D* **110**, 032007 (2024), doi:10.1103/PhysRevD.110.032007, [arXiv:2402.01898](https://arxiv.org/abs/2402.01898).
- [25] O. Weng et al., “Tailor: Altering skip connections for resource-efficient inference”, *ACM Trans. Reconfigurable Technol. Syst.* (2024), doi:10.1145/3624990, [arXiv:2301.07247](https://arxiv.org/abs/2301.07247).

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- [27] J. Duarte et al., “FAIR AI Models in High Energy Physics”, *Mach. Learn.: Sci. Technol.* **4**, 045062 (2023), doi:10.1088/2632-2153/ad12e3, arXiv:2212.05081.
- [28] A. Li et al., “Induced Generative Adversarial Particle Transformers”, in *6th Machine Learning and the Physical Sciences Workshop at the 37th Conference on Neural Information Processing Systems* (Dec. 2023), arXiv:2312.04757, https://ml4physicalsciences.github.io/2023/files/NeurIPS_ML4PS_2023_213.pdf.
- [29] CMS Collaboration, *Anomaly Detection in the CMS Global Trigger Test Crate for Run 3*, CMS Detector Performance Note CMS-DP-2023-079 (Oct. 2023), <https://cds.cern.ch/record/2876546>.
- [30] R. Kansal et al., “JetNet: A Python package for accessing open datasets and benchmarking machine learning methods in high energy physics”, *J. Open Source Softw.* **8**, 5789 (2023), doi:10.21105/joss.05789.
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- [32] E. A. Huerta et al., “FAIR for AI: an interdisciplinary and international community building perspective”, *Sci. Data* **10**, 487 (2023), doi : 10 . 1038 / s41597 – 023 – 02298 – 6, arXiv: 2210.08973.
- [33] CMS Collaboration, “Search for higgs boson and observation of Z boson through their decay into a charm quark-antiquark pair in boosted topologies in proton-proton collisions at $\sqrt{s} = 13$ TeV”, *Phys. Rev. Lett.* **131**, 041801 (2023), doi:10.1103/PhysRevLett.131.041801, arXiv:2211.14181.
- [34] CMS Collaboration, “Search for long-lived particles using out-of-time trackless jets in proton-proton collisions at $\sqrt{s} = 13$ TeV”, *J. High Energy Phys.* **07**, 210 (2023), doi : 10 . 1007 / JHEP07 (2023) 210, arXiv:2212.06695.
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- [37] R. Kansal et al., “Evaluating generative models in high energy physics”, *Phys. Rev. D* **107**, 076017 (2023), doi:10.1103/PhysRevD.107.076017, arXiv:2211.10295.
- [38] W. Bhimij et al., “Snowmass 2021 Computational Frontier CompF4 Topical Group Report Storage and Processing Resource Access”, *Comput. Softw. Big Sci.* **7**, 5 (2023), doi : 10 . 1007 / s41781 – 023 – 00097 – 7, arXiv:2209.08868.
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- [40] L. McDermott et al., “Neural architecture codesign for fast Bragg peak analysis”, in *3rd AAAI Workshop on AI to Accelerate Science and Engineering (AI2ASE)* (2023), arXiv: 2312.05978, https://ai-2-ase.github.io/papers/18%5cCameraReady%5cAAAI_Accelerating_Science_2.pdf.

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- [42] F. Mokhtar et al., “Do graph neural networks learn traditional jet substructure?”, in *5th Machine Learning and the Physical Sciences Workshop at the 36th Conference on Neural Information Processing Systems* (Nov. 2022), arXiv:2211.09912, https://ml4physicalsciences.github.io/2022/files/NeurIPS_ML4PS_2022_57.pdf.
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- [44] CMS Collaboration, *Progress towards an improved particle flow algorithm at CMS with machine learning*, CMS Detector Performance Note CMS-DP-2022-061 (Nov. 2022), <https://cds.cern.ch/record/2842375>.
- [45] J. Duarte et al., “Editorial: Efficient AI in particle physics and astrophysics”, *Front. AI* **5**, 999173 (2022), doi:10.3389/frai.2022.999173.
- [46] S. Dawson et al., “Report of the Topical Group on Higgs Physics for Snowmass 2021: The Case for Precision Higgs Physics”, in 2022 Snowmass Summer Study (Sept. 2022), arXiv:2209.07510.
- [47] P. Shanahan et al., “Snowmass 2021 Computational Frontier CompF03 Topical Group Report: Machine Learning”, in 2022 Snowmass Summer Study (Sept. 2022), arXiv:2209.07559.
- [48] CMS Collaboration, “A portrait of the Higgs boson by the CMS experiment ten years after the discovery”, *Nature* **607**, 60 (2022), doi:10.1038/s41586-022-04892-x, arXiv:2207.00043, [Erratum: *Nature* 623, E4 (2023)].
- [49] G. Benelli et al., “Data Science and Machine Learning in Education”, in 2022 Snowmass Summer Study (July 2022), arXiv:2207.09060.
- [50] J. Duarte et al., “FastML Science Benchmarks: Accelerating Real-Time Scientific Edge Machine Learning”, in 3rd Workshop on Benchmarking Machine Learning Workloads on Emerging Hardware (MLBench) at 5th Conference on Machine Learning and Systems (MLSys) (July 2022), arXiv:2207.07958.
- [51] M. Touranakou et al., “Particle-based fast jet simulation at the LHC with variational autoencoders”, *Mach. Learn.: Sci. Technol.* **3**, 035003 (2022), doi:10.1088/2632-2153/ac7c56, arXiv:2203.00520.
- [52] H. Borrás et al., “Open-source FPGA-ML codesign for the MLPerf Tiny Benchmark”, in 3rd Workshop on Benchmarking Machine Learning Workloads on Emerging Hardware (MLBench) at 5th Conference on Machine Learning and Systems (MLSys) (June 2022), arXiv:2206.11791.
- [53] A. Pappalardo et al., “QONNX: Representing arbitrary-precision quantized neural networks”, in *4th Workshop on Accelerated Machine Learning at the High-performance Embedded Architecture and Compilation 2022 Conference* (June 2022), arXiv:2206.07527, [https://accml.dcs.gla.ac.uk/papers/2022/4thAccML_paper_1\(12\).pdf](https://accml.dcs.gla.ac.uk/papers/2022/4thAccML_paper_1(12).pdf).
- [54] CMS Collaboration, “Search for nonresonant pair production of highly energetic Higgs bosons decaying to bottom quarks”, *Phys. Rev. Lett.* **131**, 041803 (2023), doi:10.1103/PhysRevLett.131.041803, arXiv:2205.06667.

- [55] A. M. Deiana et al., “Applications and techniques for fast machine learning in science”, *Front. Big Data* **5**, 787421 (2022), doi:10.3389/fdata.2022.787421, arXiv:2110.13041.
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- [57] A. Elabd et al., “Graph neural networks for charged particle tracking on FPGAs”, *Front. Big Data* **5** (2022), doi:10.3389/fdata.2022.828666, arXiv:2112.02048.
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- [60] J. Pata et al., “Machine Learning for Particle Flow Reconstruction at CMS”, in 20th International Workshop on Advanced Computing and Analysis Techniques in Physics Research (Mar. 2022), arXiv:2203.00330.
- [61] P. Harris et al., “Physics Community Needs, Tools, and Resources for Machine Learning”, in 2022 Snowmass Summer Study (Mar. 2022), arXiv:2203.16255.
- [62] CMS Collaboration, “Search for long-lived particles produced in association with a Z boson in proton-proton collisions at $\sqrt{s} = 13$ TeV”, *J. High Energy Phys.* **03**, 160 (2022), doi:10.1007/JHEP03(2022)160, arXiv:2110.13218.
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Teaching

Computational Physics

- Instructor for Physics 141/241: Computational Physics I: Probabilistic Models and Simulations (Spring 2023, Winter 2022).
- Instructor for Physics 142/242: Computational Physics II: PDE and Matrix Models (Winter 2025, Winter 2024, Spring 2022).

Machine Learning & Data Science

- Creator of and instructor for [Physics 139/239: Machine Learning in Physics](#) (Spring 2024, Winter 2023).
- Lecturer at [SLAC Summer Institute](#) (Summer 2023).
- Lecturer at [US ATLAS Machine Learning Training](#) (Summer 2023).
- [NSF IAIFI Ph.D. Summer School](#) Lecturer on “Representations, networks, and symmetries for learning from particle physics data” and “Model compression and fast machine learning in particle physics” (Summer 2022).
- Particle physics domain mentor for data science capstone [DSC 180AB](#) (Fall 2020, Winter 2021, Fall 2021, Winter 2022).
- Guest speaker for Purdue Physics 324: Big Data Science II (Spring 2021)
- Guest speaker for [MIT 8.S50: Computational Data Science in Physics](#) (Winter 2021).
- Creator of the [LHC Physics Center Machine Learning Tutorial](#) (2017–2020).

Computer Science & Engineering

- Guest speaker for [CSE 237C: Validation and Testing of Embedded Systems](#) (Fall 2020, Fall 2021, Fall 2022, Fall 2023).

Particle Physics

- Creator of a [HEPCAT Lab Module on ML/AI on FPGAs](#) (Summer 2023).
- Co-instructor for Physics 239: Modern Collider Physics (Spring 2023).
- UCSD instructor of record for [Physics 239: Statistics in Particle Physics at the LPC](#) [Primary instructor: Harrison Prosper, Florida State University] (Fall 2021).

Introductory Physics

- Lead instructor for [Physics 2C: Fluids, Waves, Thermodynamics, and Optics](#) for 300+ undergraduate students (Winter 2020, Winter 2021, Spring 2021).
- Teaching assistant in statistical and quantum mechanics at Caltech (2011–2012).

Seminar Courses

- Organizer of [Physics 191](#): Undergraduate Seminar on Physics (Fall 2020) and guest speaker (Fall 2019).
- Guest speaker for Physics 261: Seminar on Physics Research at UC San Diego (Winter 2020, Winter 2021).
- Guest speaker for Thurgood Marshall College 2: Transfer Year Experience. (Fall 2021).
- Facilitator for [Taking Research into Your Classroom](#) Workshop at Waubensee Community College (2017).

Physics Lab

- Technical Instructor in [MIT Junior Lab](#), teaching third-year undergraduate physics students and maintaining the experiments (2010–2011).

Outreach

Community Outreach

- Exhibitor for UC San Diego Physics and Duarte Lab at the [Barrio Logan Science & Art Expo](#) and [Southeast Science & Art Expo](#) (2022–2024).
- Presenter at “Career Exploration Event” at [SAY San Diego](#) Teen Leadership Connections Camp at Lincoln High School on Tuesday, July 18 (2023).
- Speaker at “[Meet a US CMS Professor](#)” for US CMS Internship Program on Wednesday, August 10 (2022).
- Panelist on “Careers in STEM Teaching and Research in Higher Education Panel” for UC San Diego Physical Sciences Division Student Success Center on Monday, November 15 (2021).
- Invited faculty speaker at UC San Diego Physics Graduate Student Diversity Initiative Grad Recruitment Fair on Saturday, October 23 (2021).
- Speaker on “Undergraduate and graduate research opportunities” at UC San Diego SACNAS Chapter’s Community College Workshop on Saturday, November 21 (2020).
- Invited faculty speaker for [Young Physicists Program](#) at UC San Diego (2020, 2022).
- Co-director of [Saturday Morning Physics](#) and lecturer on [Symmetry, Antimatter, and Supersymmetry](#) at Fermilab (2018–2019).
- On-site coordinator for [Saturday Morning Physics](#) at Fermilab (2016–2018).

Mentoring

- Mentor for [STEMULATE Community College Research Program](#) (2024).
- Mentor for [Cal-Bridge program](#) (2021–Present).
- Mentor for [APS National Mentoring Community](#) (2021–Present).
- Mentor for [ENLACE binational summer research program](#) (2021–2023).
- Mentor for [U.S. CMS Mentorship Program](#) (2020–2022).

Advocacy

- U.S. LHC Users Association Annual Trip to U.S. Congress (2017, 2021).

Diversity Programs

- Co-chair of local organizing committee for APS Conference on Undergraduate Women and Gender Minorities in Physics (CU*IP) at UC San Diego (2023–2025).
- UC San Diego Physics representative for the Mentoring Project (2024–Present).
- [PATHS Scholar Program](#) Faculty Advocate (2022–Present).

- Creator and coordinator of A3D3 Postbaccalaureate Fellowship Program (2021–Present).
- UC San Diego Physics Department Equity, Diversity, and Inclusion Committee member (2020–2023).
- Faculty advisor for UC San Diego SACNAS Chapter (2022–Present).
- Coordinator of A3D3 NSF Institute Equity & Career Committee (2022–Present).
- US CMS Collaboration Diversity, Equity, and Inclusion Committee (2022–2024).
- Faculty advisor for UC San Diego Physics Department Graduate Student Diversity Initiative (2021).
- Mentor in the [SIST](#) internship program at Fermilab (2018)
- Graduate student ambassador for the [Fermilab SHPE chapter](#) (2018).
- Member of the [TARGET](#) program committee at Fermilab (2017–2019).
- Residential Facilitator for [MIT Interphase EDGE program](#) (2010).

Selected Conference, Workshop, and Seminar Presentations

- [hls4ml and friends: Tools for ML in trigger and DAQ](#). ML4FE Workshop. May 19, 2025. University of Hawaii, Honolulu, HI, USA.
- [From collisions to discoveries with machine learning at the energy frontier](#). Physics Colloquium. January 30, 2025. Caltech, Pasadena, CA, USA.
- [Machine learning opportunities for the next generation of particle physics](#). 41st International Conference on Machine Learning. July 24, 2024. Vienna, Austria.
- [Novel ML technique applications](#). 42nd International Conference on High Energy Physics. July 23, 2024. Prague, Czech Republic.
- [Exploring Higgs bosons at high energies: From jets as graphs to fast machine learning on FPGAs](#). Fundamental Physics Directorate Seminar. May 21, 2024. SLAC, Menlo Park, CA, USA.
- [Exploring Higgs bosons at high energies: From jets as graphs to fast machine learning on FPGAs](#). APS April Meeting. Session F10: Narain, Primakoff and Sakurai Prize Session. April 4, 2024. Sacramento, CA, USA.
- [Exploring Higgs bosons at high energies: From jets as graphs to fast machine learning on FPGAs](#). Frederica Darema Lecture Series. April 1, 2024. UC Davis, Davis, CA, USA.
- [Machine learning at the edge of particle physics](#). IAIFI Summer Workshop. August 14, 2023. Northeastern University, Boston, MA, USA.
- [Machine learning summary: From concept to practice](#). 15th International Workshop on Boosted Object Phenomenology, Reconstruction, Measurements, and Searches at Colliders. August 4, 2023. Lawrence Berkeley National Laboratory, Berkeley, CA, USA.
- [Building a better foundation: Teaching physicists and machines how to learn from data](#). Cottrell Scholar Conference. July 19, 2023. Tucson, AZ, USA.
- [Machine learning for triggering](#). Aspen Winter Conference: Prospecting for New Physics through Flavor, Dark Matter, and Machine Learning. March 28, 2023. Aspen Center for Physics, Aspen, CO, USA.
- [Recent advances in machine learning for high energy physics](#). Dark Interactions: New Perspectives from Theory and Experiment. November 16, 2022.
- [Measuring Higgs bosons using artificial intelligence](#). Physics Department Colloquium. November 3, 2022. University of California San Diego, La Jolla, CA, USA.
- [Measuring Higgs bosons using artificial intelligence](#). The Human Side of Science Lecture Series. November 1, 2022. University of San Diego, San Diego, CA, USA.

- [Model compression and fast machine learning in particle physics](#). IAIFI Summer School. August 2, 2022. Tufts University, MA, USA.
- [Representations, networks, and symmetries for learning from particle physics data](#). IAIFI Summer School. August 1, 2022. Tufts University, Medford, MA, USA.
- [CompF3: ML for Data Analysis Summary](#). Community Summer Study Snowmass 2022. July 19, 2022. University of Washington, Seattle, WA, USA.
- [CompF4: AI-Hardware Summary](#). Community Summer Study Snowmass 2022. July 19, 2022. University of Washington, Seattle, WA, USA.
- [A3D3 Postbaccalaureate Fellowship Program](#). Community Summer Study Snowmass 2022. July 18, 2022. University of Washington, Seattle, WA, USA.
- [Enabling the Higgs self-coupling measurement with highly energetic Higgs pairs in CMS](#). Joint Experimental-Theoretical Physics Seminar (Wine & Cheese). June 3, 2022. Fermilab, Batavia, IL, USA.
- [Accelerated Graph Neural Network Inference](#). Mini-workshop on Graph Neural Networks for Tracking Colocated with Connecting the Dots 2022. June 3, 2022.
- [Fast Machine Learning for Science](#). ML Performance: Benchmarking Deep Learning Systems (MLPerf-Bench) Tutorial at the 28th IEEE International Symposium on High-Performance Computer Architectures (HPCA 2022). April 3, 2022.
- [AI at the Edge of Particle Physics](#). HEP Seminar. November 17, 2021. Columbia University, New York, NY, USA.
- [AI at the Edge of Particle Physics](#). AI Distinguished Lecture Series. August 12, 2021. Argonne National Laboratory.
- [AI-Hardware Codesign for Real-Time Science](#). Harnessing Data Science for Autonomous Computing Materials Symposium. May 27, 2021. Ohio State University.
- [The Edge of Particle Physics](#). Department of Physics and Astronomy Colloquium. May 6, 2021. Cal State LA.
- [Graph Neural Networks for High Energy Physics](#). Elementary Particle Physics Seminar. April 28, 2021. University of Minnesota.
- [hls4ml: An open-source codesign workflow to empower scientific low-power machine learning devices](#). tinyML Research Symposium. March 26, 2021.
- [Graph neural network tracking on FPGAs](#). IRIS-HEP Topical Meeting. October 21, 2020.
- [Real-time AI in particle physics](#). ECE Graduate Seminar. October 16, 2020. Carnegie Mellon University, Pittsburgh, PA, USA.
- [Recent highlights from CMS](#). 53rd Annual Fermilab Users Meeting. August 12, 2020. Fermilab, Batavia, IL, USA.
- [Deep learning for Higgs and new physics at the LHC](#). High Energy Physics Division Seminar. April 8, 2020. Argonne National Laboratory, Lemont, IL, USA.
- [Low-latency machine learning inference on FPGAs](#). 2nd Machine Learning and the Physical Sciences Workshop at NeurIPS 2019. December 14, 2019. Vancouver, Canada.
- [Deep learning for Higgs and new physics at the LHC](#). Department of Physics and Astronomy Colloquium. November 11, 2019. University of Kansas, Lawrence, KS, USA.
- [Deep learning for Higgs and new physics at the LHC](#). High Energy Experiment Seminar. October 10, 2019. Boston University, Boston, MA, USA.
- [Machine learning on FPGAs for low-latency and high-throughput inference](#). eScience 2019. September 24-27, 2019. San Diego, CA, USA.
- [Deep learning on FPGAs tutorial](#). 1st Real Time Analysis Workshop. July 15-26, 2019. Institute Pascal, Université Paris-Saclay, Saint Aubin, France.

- [Machine learning using CERN open data](#). LHCP 2019. May 20-25, 2019. Benemérita Universidad Autónoma de Puebla, Puebla, Mexico.
- [Dark sector searches in CMS](#). LHCP 2019. May 20-25, 2019. Benemérita Universidad Autónoma de Puebla, Puebla, Mexico.
- [FPGA-accelerated machine learning inference for particle physics](#). Connecting the Dots 2019. April 2, 2019. Valencia, Spain.
- [Unlocking the potential of LHC data: boosted Higgs and deep learning](#). Particle Physics Special Seminar. February 20, 2019. University of Chicago, Chicago, IL, USA.
- [Boosted Higgs couplings and dark mediators with deep learning in CMS](#). Joint Experimental-Theoretical Physics Seminar (Wine & Cheese). December 14, 2018. Fermilab, Batavia, IL, USA.
- [Heavy flavour identification for boosted resonances and large cone jets in CMS](#). Machine Learning for Jet Physics (ML4Jets) 2018. November 14-16, 2018. Fermilab, Batavia, IL, USA.
- [Boosted Higgs, dark matter, and deep learning](#). High Energy Physics Seminar. October 3, 2018. University of Pittsburgh, Pittsburgh, PA, USA.
- [hls4ml: Deploying Deep Learning on FPGAs for L1 trigger and Data Acquisition](#). Topical Workshop on Electronics for Particle Physics (TWEPP) 2018. September 17-21, 2018. KU Leuven Campus Carolus, Antwerp, Belgium.
- [Searches for Dark Matter Mediators with the CMS Detector](#). Conference on the Intersections of Particle and Nuclear Physics (CIPANP) 2018. May 29 - June 3, 2018. Hyatt Regency Indian Wells Conference Center, Indian Wells, CA, USA.
- [Fast inference of deep neural networks in FPGAs for particle physics](#). Research Techniques Seminar. April 24, 2018. Fermilab, Batavia, IL, USA.
- [Fast reconstruction and data scouting](#). Connecting the Dots 2018. March 20-22, 2018. University of Washington, Seattle, WA, USA.
- [Boosted Higgs in CMS](#). Higgs Couplings 2017. November 6-10, 2017. Heidelberg University, Heidelberg, Germany.
- [Unlocking the potential of CMS data: boosted Higgs, low-mass dijet resonances, and data scouting](#). High Energy Physics Seminar. October 30, 2017. Caltech, Pasadena, CA, USA.
- [Search for low-mass dijet resonances](#). TeVPA 2017. August 7-11, 2017. Columbus, OH, USA.
- [Inclusive search for boosted SM Higgs bosons using H to bb decays with the CMS detector at 13 TeV](#). APS DPF 2017. July 31 - August 4, 2017. Fermilab, Batavia, IL, USA.
- [Inclusive Higgs boson search using \$H \rightarrow b\bar{b}\$ decays](#). Collider Cross Talk. July 20, 2017. CERN, Geneva, Switzerland.
- [Introduction to CMS open data for boosted object tagging with machine learning applications](#). Data Science at High Energy Physics (DS@HEP) 2017. May 8-12, 2017. Fermilab, Batavia, IL, USA.

Service and Committee Work

Thesis Committees

- Ph.D. Thesis Committee (Chair) for Zihan Zhao (UC San Diego) (2024–Present).
- Ph.D. Thesis Committee for Wyatt Joyce (UC San Diego) (2024–Present).
- Ph.D. Thesis Committee (Co-Chair) for Luke Fairbanks (UC San Diego) (2024–Present).
- Ph.D. Thesis Committee (Chair) for Daniel Primosch (UC San Diego) (2024–Present).
- Ph.D. Thesis Committee for Michael Pokornik (UC San Diego) (2024–Present).

- Ph.D. Thesis Committee for Olivia Weng (UC San Diego) (2024–Present).
- Ph.D. Thesis Committee for Qingyuan Chen (UC San Diego) (2023–Present).
- M.S. Thesis Committee (Chair) for Steven Tsan (UC San Diego) (2023–2024).
- Ph.D. Thesis Committee for Robert Lee (UC San Diego) (2023–Present).
- Ph.D. Thesis Committee (Chair) for Anthony Aportela (UC San Diego) (2023–Present).
- Ph.D. Thesis Committee (Chair) for Farouk Mokhtar (UC San Diego) (2023–Present).
- Ph.D. Thesis Committee for Yifan Xiang (UC San Diego) (2023–2024).
- M.S. Thesis Committee for Kyle Yang (UC San Diego) (2022).
- Ph.D. Thesis Committee for Yueqi Zhao (UC San Diego) (2023–Present).
- Ph.D. Thesis Committee (Chair) for Raghav Kansal (UC San Diego) (2022–2024).
- M.S. Thesis Committee for Paul Wang (UC San Diego) (2021).
- Ph.D. Thesis Committee for Christian Aganze (UC San Diego) (2021–2023).

Other Service

- APS Henry Primakoff Award for Early-Career Particle Physics Selection Committee (2024–2025).
- Scientific program committee (Track 2: Data Analysis - Algorithms and Tools) for the 22nd International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT) (2024).
- Scientific organizing committee for [2nd](#), [3rd](#), [4th](#), and [5th](#) Fast Machine Learning for Science Workshops and [Accelerated Artificial Intelligence for Big-Data Experiments Conference](#)(2020–2023).
- Program committee for [Fast Machine Learning for Science Workshop at ICCAD](#) (2023).
- Reviewer for the Neural Information Processing Systems (NeurIPS) Conference (2023).
- Local organizing committee for [Multi-Boson Interactions Conference](#) at UC San Diego (2023).
- Organizer of [NSF HDR Postbaccalaureate Workshop](#) at UC San Diego (2023).
- Referee for *Physical Review Letters*, *Physical Review D*, *Physical Review Research*, *Journal of High Energy Physics*, *Physics Letters B*, *European Physics Journal C*, *Machine Learning: Science and Technology*, *Computing and Software for Big Science*, *Applied Optics*, *Nuclear Instruments and Methods in Physics Research Section A*, and *Science Bulletin* (2019–Present).
- US CMS Advisory Board (2022–2024).
- US CMS Collaboration Annual Meeting Planning Committee (2021–2023).
- US CMS Collaboration Diversity, Equity, and Inclusion Committee (2022–2023).
- Reviewer for the 2022 Datasets and Benchmarks Track, and [3rd](#) and [4th](#) Machine Learning for the Physical Sciences Workshops at the Neural Information Processing Systems (NeurIPS) Conference (2020–2022).
- External reviewer for Swiss Data Science Center (SDSC), French National Research Agency (ANR), US Department of Energy (DOE) Early Career Research Program, and European Science Foundation (ESF) (2019–2022).
- Faculty advisor for UC San Diego Physics Department Graduate Student Diversity Initiative (2021).
- Guest Associate Editor for [Efficient AI in Particle Physics and Astrophysics](#) Research Topic in Frontiers in Big Data and AI (2021–2022).

- UC San Diego Physics Department Equity, Diversity, and Inclusion Committee member (2020–2022).
- UC San Diego Physics Department Graduate Admissions Committee member (2019–2022).

Supervision and Mentorship

Postdoctoral Researchers

- Melissa Quinnan (UC San Diego). Schmidt AI in Science Postdoctoral Fellow. CMS level-1 trigger, Higgs boson searches (2022–Present).
- Daniel Diaz (UC San Diego). LPC Distinguished Researcher. CMS level-1 trigger, long-lived particle searches (2021–Present).

Doctoral Students

- Daniel Primosch (UC San Diego). Higgs boson pair production searches in CMS (2023–Present).
- Hyeon Seo Yun (Purdue University). A3D3 Mentorship Program (2023–Present).
- Zihan Zhao (UC San Diego). Self-supervised learning for jet tagging (2022–Present).
- Russell Marroquin Solares (UC San Diego). CMS level-1 trigger long-lived particle tagger (2022–Present).
- Haoyang (Billy) Li (UC San Diego). Higgs boson jet assignment, FAIR AI models (2022–Present).
- Olivia Weng (UC San Diego). Optimization of AI algorithms for FPGAs (2021–Present).
- Jieun Yoo (UIC). U.S. CMS Mentorship Program (2021–2022).
- Anthony Aportela (UC San Diego). Sloan fellow, HEPCAT fellow. Graph-based autoencoders for anomaly detection; Search for long-lived particles (2021–Present).
- Daniel Guerrero (University of Florida). U.S. CMS Mentorship Program (2020–2021).
- Farouk Mokhtar (UC San Diego). HDSI fellow, IRIS-HEP fellow. Machine learned particle-flow reconstruction; Search for boosted $H \rightarrow WW$ (2020–Present).
- Raghav Kansal (UC San Diego). IRIS-HEP fellow, LPC AI fellow, LPC graduate scholar. Graph-based generative adversarial networks for particle physics simulation; Search for boosted $HH \rightarrow b\bar{b}WW$ (2019–Present).
- Martin Kwok (Brown). Boosted Higgs boson search (2018–2020).
- Michael Krohn (CU Boulder). Boosted Higgs boson search, coupling measurement, and trigger development (2017–2018).
- Sean-Jiun Wang (University of Florida). Development and monitoring of triggers for the Higgs boson produced in association with a Z boson decaying to neutrinos (2017–2018).
- Andrzej Novak (RWTH Aachen University). Development of deep neural networks for boosted Higgs identification in CMS (2017–2019).
- Jiajing Mao (Caltech). Data scouting trigger stream development (2016–2018).
- Giulia D’Imperio and Federico Preiato (Sapienza University of Rome). Dijet searches (2016).

Masters Students

- Vivekanand Sahu (UC San Diego). Efficient particle transformer (2023–Present).
- Priyansh Bhatnagar (UC San Diego). Efficient transformers for particle physics (2023–2024).
- Rounak Sen (UC San Diego). Discretized GANs for particle physics (2023–2024).
- Prashant Krishnan Vaidyanathan (UC San Diego). Self-supervised learning for particle physics (2023–2024).
- Steven Tsan (UC San Diego). Diffusion models for particle physics (2022–2024).

- Venkat Krishnamohan (UC San Diego). Graph GANs for particle physics (2022–2023).
- Selwyn Reis Gomes (UC San Diego). Xilinx Alveo coprocessor support in `hls4ml` (2022–2023).
- Nirmal Thomas (UC San Diego). Ragged batching for graph neural network inference as a service (2022–2023).

Postbaccalaureate Students

- Luke McDermott (UC San Diego). Neural architecture codesign (2023–2024).
- Michael Miranda. US CMS Intern. CMS level-1 long-lived particle triggers (2023).
- Andrew Skivington (UC San Diego). A3D3 Postbaccalaureate Fellow. Anomaly detection for CMS level-1 trigger (2022–2023).

Undergraduate Students

- Samantha Rodriguez (San Diego City College). STEMULATE Program. Boosted decision trees for Higgs boson pair searches (2024).
- Juan D. Guadalupe-Rosado (University of Puerto Rico). US CMS Intern. Large-radius jet tagging level-1 trigger in CMS (2024).
- Lauren Cadle (UC San Diego). Symmetry-preserving attention networks for semi-merged top quarks (2024–Present).
- Peera Serumaga (UC San Diego). Symmetry-preserving attention networks for semi-merged top quarks (2024–Present).
- Adolfo Partida (UC San Diego). Symmetry-preserving attention networks for semi-merged top quarks (2024–Present).
- Julian Jackson (UC San Diego). Symmetry-preserving attention networks for semi-merged top quarks (2024–Present).
- Chang Liu (UC San Diego). Long-lived particle searches in CMS (2024–Present).
- Shuyang Zhang (UC San Diego). Long-lived particle searches in CMS (2023–Present).
- Jason Weitz (UC San Diego). Neural architecture codesign (2023–Present).
- Dmitri Demler (UC San Diego). Neural architecture codesign (2023–Present).
- Emily Pan (UC San Diego). GNNS for identifying long-lived particles (2023–Present).
- Aditya Sriram (UC San Diego). GNNS for identifying long-lived particles (2023–Present).
- Kaitlyn White (UC San Diego). Symmetry-preserving attention networks for multi-Higgs-boson reconstruction (2023–Present).
- Darius Chao (UC San Diego). Symmetry-preserving attention networks for multi-Higgs-boson reconstruction (2023–Present).
- Rohan Sachdeva (UC San Diego). Anomaly detection for CMS level-1 trigger (2023–Present).
- Jet Yue (UC San Diego). ABCD neural network for background estimation in CMS. (2023–Present).
- Evelyn Lorenzo (UC San Diego). PATHS Program Scholar (2022–2023).
- Zhaoyu Zhang (UC San Diego). Graphs GANs for particle physics (2022–2024).
- Mengke Zhang (UC San Diego). Undergraduate Research Award. Machine-learned particle-flow for the Compact Linear Collider (2022–Present).
- Anni Li (UC San Diego). IRIS-HEP fellow. Conditional generation with graph networks (2022–2023).
- Ricardo Efraín Parra Payano (Universidad Nacional de Ingeniería, Peru). APS National Mentoring Community (2022).

- Parvat Sapkota (University of Texas at Arlington). APS National Mentoring Community (2021).
- Saloni Agrawal (UC San Diego). EXPAND program. JetNet (2022).
- Carlos Pareja (UC San Diego). EXPAND program. JetNet (2022–2024).
- Thomas Sievert (UC San Diego). FMP program. Quantum machine learning for high energy physics (2021–2023).
- Brian Sheldon (UC San Diego). FMP program. Boosted Higgs boson searches at the Future Circular Collider (hadron mode) (2021–Present).
- John Choi (UC San Diego). FMP program. Long-lived particle identification for CMS level-1 trigger (2021–2023).
- Ishaan Kavoori (UC San Diego). FMP program. FAIR4HEP cookiecutter FAIR AI template (2021–2023).
- Simon Poon (UC San Diego). FMP program. Machine-learned missing transverse momentum for CMS level-1 trigger (2021–Present).
- Sukanya Krishna (UC San Diego). IRIS-HEP fellow. Real-time anomaly detection for jets (2021–Present).
- Jason Liang (UC San Diego). tinyML with Brevitas and FINN. (2021–2023).
- Tai Nguyen (UC San Diego). Undergraduate Research Scholarship. tinyML with Brevitas and FINN. (2021).
- Han Hiller (University of Washington). UM-CERN-REU program. Machine-learned missing transverse momentum for CMS level-1 trigger (2021).
- Rohan Shenoy (UC San Diego). Undergraduate Research Award. Improved autoencoder training for HGCal ASIC for data compression (2021–2023).
- John Chen (UC San Diego). AEP program. Variable-sized-input generative graph networks (2021).
- Jevon Suharnoko (UC San Diego). Dream fellow. Transpilation of PYTORCH-based neural networks to FPGA firmware with hls4ml (2021–2022).
- Rushil Roy (UC San Diego). FMP program. tinyML with hls4ml (2021–Present).
- Zichun Hao (UC San Diego). FMP program, Undergraduate Research Award. Lorentz-equivariant generative neural networks and $H \rightarrow WW$ tagging (2021–2023).
- Abdelrahman Elabd (University of Pennsylvania). IRIS-HEP fellow. Implementation of graph neural networks on FPGAs and integration into hls4ml. (2021–2022).
- Haifeng Ding (UC San Diego). FMP program. Higgs pair production sensitivity at future colliders (Snowmass study). (2021).
- Steven Tsan (UC San Diego). TRELS program. Unsupervised or semi-supervised anomaly detection algorithms for high energy physics. (2020–2022).
- Vesal Razavimaleki (UC San Diego). IRIS-HEP fellow. Implementation of graph neural networks on FPGAs. (2019–2021).
- Eric Moreno (Caltech). SURF program. Development of interaction and graph neural networks for boosted jet tagging with CMS open data. (2018–2020).
- Sydney Jenknins (University of Chicago). Compression and firmware implementation of interaction and graph neural networks for charged particle tracking at the LHC (2018).
- Eric Scotti (Brown University). Development of deep neural networks for boosted Higgs identification in CMS (2017–2018).

Press

- [“Physics vocabulary: AI edition”](#) By Emily Ayshford, Kim Hickok, and Chris Patrick, Symmetry Magazine, April 18, 2024
- [“Inside the hunt for new physics at the world’s largest particle collider”](#) by Dan Garisto, MIT Technology Review, February 20, 2024
- [“From life experience to research experience”](#) by Sarah Charley, Symmetry Magazine, February 6, 2024
- [“LHC Physicists can’t save them all”](#) by Laura Dattaro, Symmetry Magazine, November 14, 2023
- [“SDSC, UC San Diego Physicist Receives 2024 Henry Primakoff Award”](#) by Cynthia Dillon, SDSC News, October 26, 2023
- [“Javier Duarte Recognized for Inclusive Excellence”](#) by Michelle Franklin, UC San Diego School of Physical Sciences News, August 8, 2023
- [“Will AI make MC the MVP of particle physics?”](#) by R. M. Davis, Symmetry Magazine, July 18, 2023
- [“Four Early Career Professors at UC San Diego Awarded Sloan Research Fellowships”](#) by Michelle Franklin, Daniel Kane, Katherine Connor, UC San Diego Today, March 1, 2023
- [“Two UC San Diego Faculty Named 2023 Cottrell Scholars”](#) by Michelle Franklin, UC San Diego Today, February 9, 2023
- [“San Diego Supercomputer Center, UC San Diego Join Federal Effort to Train Next-Gen Physics Workforce”](#) by Cynthia Dillon, UC San Diego Today, February 7, 2023
- [“Machine Learning Shaking Up Hard Sciences, Too”](#) by Dan Garisto, IEEE Spectrum, October 7, 2022
- [“How physicists are probing the Higgs boson 10 years after its discovery”](#) by Emily Conover, Science News Magazine, June 29, 2022
- [“Probing Higgs self-coupling with boosted Higgs pairs”](#) by Artur Apresyan and Si Xie, Fermilab News, June 9, 2022
- [“MLPerf Results Show Advances in Machine Learning Inference Performance and Efficiency”](#), MLCommons, June 4, 2022
- [“MLPerf Results Highlight Advances in Machine Learning Inference Performance and Efficiency”](#), Inside HPC, April 6, 2022
- [“Double trouble Higgs”](#) by Sarah Charley, Symmetry Magazine, April 26, 2022
- [“Graph neural networks boost di-Higgs search”](#), CERN Courier, March 11, 2022
- [“Physicists Apply FAIRness to Data Studies”](#) by Kimberly Mann Bruch, UC San Diego News, February 15, 2022
- [“SDSC Builds AI-Focused ‘Voyager’ Supercomputer”](#), Intel, November 9, 2021
- [“Muon detector probes long-lived particles”](#), CERN Courier, November 5, 2021
- [“Hunting anomalies with an AI trigger”](#), CERN Courier, August 31, 2021
- [“A new window into the shadow world: Exotic particle decays in the muon detectors”](#), CMS Physics Briefing, August 30, 2021
- [“Physics, Computation Experts Help Earn \\$15M to Advance AI, Data Analysis”](#) by Cynthia Dillon, UC San Diego News, September 28, 2021
- [“San Diego Supercomputer Center Teams Up with Habana to Power Voyager”](#) by Cynthia Dillon, UC San Diego News, April 9, 2021
- [“Live long and prosper: Searching for the long-lived relatives of the Higgs boson”](#), CMS Physics Briefing, August 16, 2021
- [“Long-lived particles gather interest”](#) by James Beacham and Albert De Roeck, CERN Courier, July 21, 2021

- [“National Science Foundation Awards SDSC \\$5 Million to Develop Innovative AI Resource”](#) by Jan Zverina, UC San Diego News, July 1, 2020
- [“Boosting into the unknown: The highest energy Higgs bosons”](#), CMS Physics Briefing, May 20, 2020
- [“UC San Diego Physicist Making a Mark”](#) by Cynthia Dillon, UC San Diego Division of Physical Sciences News, July 1, 2020
- [“Fermilab scientists help push AI to unprecedented speeds”](#) by Javier Duarte, Sergo Jindariani, Ben Kreis and Nhan Tran, Fermilab News, January 29, 2019

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