As a member of the CMS Collaboration, I am an author of hundreds of peer-reviewed articles. Selected publications, reports, book chapters, and conference proceedings to which I made a substantial contribution are listed in teal.

A. PRIMARY PUBLISHED OR CREATIVE WORK

I. Original Peer-Reviewed Work or Listing of Creative Endeavors

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[1046] * 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, **Contribution:** I acquired funding, supervised the students performing the studies, and revised and edited the manuscript.

[1047] * 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, **Contribution:** I co-wrote the section on AI Hardware.

[1048] * CMS Collaboration, "Search for heavy resonances and quantum black holes in $e\mu$, $e\tau$, and $\mu\tau$ final states in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **05**, 227 (2023), doi:10.1007/JHEP05(2023)227, arXiv:2205.06709, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1049] * CMS Collaboration, "Search for Higgs boson decays to a Z boson and a photon in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **05**, 233 (2023), doi:10.1007/JHEP05(2023)233, arXiv:2204.12945, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1050] * CMS Collaboration, "Search for long-lived particles decaying to a pair of muons in proton-proton collisions at $\sqrt{s} = 13$ TeV", J. High Energy Phys. **05**, 228 (2023), doi:10.1007/JHEP05(2023)228, arXiv:2205.08582, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1051] * CMS Collaboration, "Strange hadron collectivity in pPb and PbPb collisions", J. High Energy Phys. **05**, 007 (2023), doi:10.1007/JHEP05(2023)007, arXiv:2205.00080, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1052] * Z. Hao et al., "Lorentz group equivariant autoencoders", Eur. Phys. J. C **83**, 485 (2023), doi:10.1140/epjc/s10052-023-11633-5, arXiv:2212.07347, **Contribution:** I conceptualized the original idea, supervised the students designing the algorithm, and revised and edited the manuscript.

[1053] * CMS Collaboration, "Observation of electroweak W^+W^- pair production in association with two jets in proton-proton collisions at $\sqrt{s} = 13$ TeV", Phys. Lett. B **841**, 137495 (2023), doi:10.1016/j.physletb.2022.137495, arXiv:2205.05711, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1054] * CMS Collaboration, "Search for nonresonant Higgs boson pair production in the four leptons plus twob jets final state in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **06**, 130 (2023), doi:10.1007/JHEP06(2023)130, arXiv:2206.10657, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1055] * CMS Collaboration, "Search for top squarks in the four-body decay mode with single lepton final states in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **06**, 060 (2023), doi:10.1007/JHEP06(2023)060, arXiv:2301.08096, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1056] * CMS Collaboration, "CMS pythia 8 colour reconnection tunes based on underlying-event data", Eur. Phys. J. C **83**, 587 (2023), doi:10.1140/epjc/s10052-023-11630-8, arXiv:2205.02905, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1057] * 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, **Contribution:** I participated in the workshop and contributed to writing the report.

[1058] * CMS Collaboration, "Measurement of inclusive and differential cross sections for single top quark production in association with a W boson in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **07**, 046 (2023), doi:10.1007/JHEP07(2023)046, arXiv:2208.00924, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1059] * CMS Collaboration, "Measurement of the cross section of top quark-antiquark pair production in association with a W boson in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 219 (2023), doi:10.1007/JHEP07(2023)219, arXiv:2208.06485, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1060] * CMS Collaboration, "Measurement of the differential $\mathrm{t\bar{t}}$ production cross section as a function of the jet mass and extraction of the top quark mass in hadronic decays of boosted top quarks", Eur. Phys. J. C **83**, 560 (2023), doi:10.1140/epjc/s10052-023-11587-8, arXiv:2211.01456, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1061] * CMS Collaboration, "Measurement of the Higgs boson inclusive and differential fiducial production cross sections in the diphoton decay channel with pp collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 091 (2023), doi:10.1007/JHEP07(2023)091, arXiv:2208.12279, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1062] * CMS Collaboration, "Measurement of the mass dependence of the transverse momentum of lepton pairs in Drell-Yan production in proton-proton collisions at $\sqrt{s}$ = 13 TeV", Eur. Phys. J. C **83**, 628 (2023), doi:10.1140/epjc/s10052-023-11631-7, arXiv:2205.04897, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1063] * CMS Collaboration, "Measurement of the top quark pole mass using $\mathrm{t\bar{t}}$+jet events in the dilepton final state in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 077 (2023), doi:10.1007/JHEP07(2023)077, arXiv:2207.02270, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1064] * CMS Collaboration, "Measurements of Higgs boson production in the decay channel with a pair of τ leptons in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Eur. Phys. J. C **83**, 562 (2023), doi:10.1140/epjc/s10052-023-11452-8, arXiv:2204.12957, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1065] * CMS Collaboration, "Measurements of the Higgs boson production cross section and couplings in the W boson pair decay channel in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Eur. Phys. J. C **83**, 667 (2023), doi:10.1140/epjc/s10052-023-11632-6, arXiv:2206.09466, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1066] * CMS Collaboration, "Precision measurement of the Z boson invisible width in pp collisions at $\sqrt{s} =$ 13 TeV", Phys. Lett. B **842**, 137563 (2023), doi:10.1016/j.physletb.2022.137563, arXiv:2206.07110, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1067] * CMS Collaboration, "Probing Heavy Majorana Neutrinos and the Weinberg Operator through Vector Boson Fusion Processes in Proton-Proton Collisions at $\sqrt{s} = 13$ TeV", Phys. Rev. Lett. **131**, 011803 (2023), doi:10.1103/PhysRevLett.131.011803, arXiv:2206.08956, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1068] * CMS Collaboration, "Search for *CP* violation in ttH and tH production in multilepton channels in proton-proton collisions at $\sqrt{s} = 13$ TeV", J. High Energy Phys. **07**, 092 (2023), doi:10.1007/JHEP07(2023)092, arXiv:2208.02686, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1069] * CMS Collaboration, "Search for a massive scalar resonance decaying to a light scalar and a Higgs boson in the four b quarks final state with boosted topology", Phys. Lett. B **842**, 137392 (2023), doi:10.1016/j.physletb.2022.137392, arXiv:2204.12413, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1070] * CMS Collaboration, "Search for CP violating top quark couplings in pp collisions at $\sqrt{s} = 13$ TeV", J. High Energy Phys. **07**, 023 (2023), doi:10.1007/JHEP07(2023)023, arXiv:2205.07434, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1071] * CMS Collaboration, "Search for direct pair production of supersymmetric partners of τ leptons in the final state with two hadronically decaying τ leptons and missing transverse momentum in proton-proton collisions at $\sqrt{s} = 13$ TeV", Phys. Rev. D **108**, 012011 (2023), doi:10.1103/PhysRevD.108.012011, arXiv:2207.02254, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1072] * CMS Collaboration, "Search for electroweak production of charginos and neutralinos at $\sqrt{s} =$ 13 TeV in final states containing hadronic decays of WW, WZ, or WH and missing transverse momentum", Phys. Lett. B **842**, 137460 (2023), doi:10.1016/j.physletb.2022.137460, arXiv:2205.09597, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1073] * 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, **Contribution:** I co-developed one the Higgs boson identification algorithm and supervised the student leading the project.

[1074] * CMS Collaboration, "Search for Higgs boson decays into Z and J/ψ and for Higgs and Z boson decays into J/ψ or Y pairs in pp collisions at $\sqrt{s} = 13$ TeV", Phys. Lett. B **842**, 137534 (2023), doi:10.1016/j.physletb.2022.137534, arXiv:2206.03525, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing

common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1075] * CMS Collaboration, "Search for Higgs boson pairs decaying to WW^*WW^*, $WW^*\tau\tau$, and $\tau\tau\tau\tau$ in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 095 (2023), doi:10.1007/JHEP07(2023)095, arXiv:2206.10268, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1076] * CMS, TOTEM Collaboration, "Search for high-mass exclusive $\gamma\gamma \to WW$ and $\gamma\gamma \to ZZ$ production in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 229 (2023), doi:10.1007/JHEP07(2023)229, arXiv:2211.16320, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1077] * CMS Collaboration, "Search for light Higgs bosons from supersymmetric cascade decays in pp collisions at $\sqrt{s} = 13\,\text{TeV}$", Eur. Phys. J. C **83**, 571 (2023), doi:10.1140/epjc/s10052-023-11581-0, arXiv:2204.13532, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1078] * CMS Collaboration, "Search for long-lived particles using out-of-time trackless jets in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 210 (2023), doi:10.1007/JHEP07(2023)210, arXiv:2212.06695, **Contribution:** I supervised the project and edited and revised the manuscript.

[1079] * CMS Collaboration, "Search for narrow resonances in the b-tagged dijet mass spectrum in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **108**, 012009 (2023), doi:10.1103/PhysRevD.108.012009, arXiv:2205.01835, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1080] * CMS Collaboration, "Search for nonresonant Higgs boson pair production in final state with two bottom quarks and two tau leptons in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Lett. B **842**, 137531 (2023), doi:10.1016/j.physletb.2022.137531, arXiv:2206.09401, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1081] * CMS Collaboration, "Search for pair production of vector-like quarks in leptonic final states in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 020 (2023), doi:10.1007/JHEP07(2023)020, arXiv:2209.07327, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1082] * CMS Collaboration, "Search for resonant and nonresonant production of pairs of dijet resonances in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 161 (2023), doi:10.1007/JHEP07(2023)161, arXiv:2206.09997, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1083] * CMS Collaboration, "Search for the exotic decay of the Higgs boson into two light pseudoscalars with four photons in the final state in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 148 (2023), doi:10.1007/JHEP07(2023)148, arXiv:2208.01469, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1084] * CMS Collaboration, "Search for top squark pair production in a final state with at least one hadronically decaying tau lepton in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 110 (2023), doi:10.1007/JHEP07(2023)110, arXiv:2304.07174, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1085] * CMS Collaboration, "Searches for additional Higgs bosons and for vector leptoquarks in $\tau\tau$ final states in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **07**, 073 (2023), doi:10.1007/JHEP07(2023)073, arXiv:2208.02717, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1086] * CMS Collaboration, "Azimuthal correlations in Z+jets events in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Eur. Phys. J. C **83**, 722 (2023), doi:10.1140/epjc/s10052-023-11833-z, arXiv:2210.16139, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1087] * CMS Collaboration, "Azimuthal Correlations within Exclusive Dijets with Large Momentum Transfer in Photon-Lead Collisions", Phys. Rev. Lett. **131**, 051901 (2023), doi:10.1103/PhysRevLett.131.051901, arXiv:2205.00045, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1088] * CMS Collaboration, "Constraints on anomalous Higgs boson couplings to vector bosons and fermions from the production of Higgs bosons using the $\tau\tau$ final state", Phys. Rev. D **108**, 032013 (2023), doi:10.1103/PhysRevD.108.032013, arXiv:2205.05120, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1089] * CMS Collaboration, "First measurement of the top quark pair production cross section in proton-proton collisions at $\sqrt{s}$ = 13.6 TeV", J. High Energy Phys. **08**, 204 (2023), doi:10.1007/JHEP08(2023)204, arXiv:2303.10680, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1090] * CMS Collaboration, "Measurement of the electroweak production of Wγ in association with two jets in proton-proton collisions at $\sqrt{s}$ = 13 TeV", Phys. Rev. D **108**, 032017 (2023), doi:10.1103/PhysRevD.108.032017, arXiv:2212.12592, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1091] * CMS Collaboration, "Measurements of inclusive and differential cross sections for the Higgs boson production and decay to four-leptons in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **08**, 040 (2023), doi:10.1007/JHEP08(2023)040, arXiv:2305.07532, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1092] * CMS Collaboration, "Measurements of jet multiplicity and jet transverse momentum in multijet events in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Eur. Phys. J. C **83**, 742 (2023), doi:10.1140/epjc/s10052-023-11753-y, arXiv:2210.13557, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common soft-

ware, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1093] * CMS Collaboration, "Search for a heavy composite Majorana neutrino in events with dilepton signatures from proton-proton collisions at s=13 TeV", Phys. Lett. B **843**, 137803 (2023), doi:10.1016/j.physletb.2023.137803, arXiv:2210.03082, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1094] * CMS Collaboration, "Search for Higgs Boson Decay to a Charm Quark-Antiquark Pair in Proton-Proton Collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. Lett. **131**, 061801 (2023), doi:10.1103/PhysRevLett.131.061801, arXiv:2205.05550, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1095] * CMS Collaboration, "Search for new physics using effective field theory in 13 TeV pp collision events that contain a top quark pair and a boosted Z or Higgs boson", Phys. Rev. D **108**, 032008 (2023), doi:10.1103/PhysRevD.108.032008, arXiv:2208.12837, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1096] * CMS, TOTEM Collaboration, "A search for new physics in central exclusive production using the missing mass technique with the CMS detector and the CMS-TOTEM precision proton spectrometer", Eur. Phys. J. C **83**, 827 (2023), doi:10.1140/epjc/s10052-023-11687-5, arXiv:2303.04596, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1097] * CMS Collaboration, "Evidence for Four-Top Quark Production in Proton-Proton Collisions at $\sqrt{s} =$ 13 TeV", Phys. Lett. B **844**, 138076 (2023), doi:10.1016/j.physletb.2023.138076, arXiv:2303.03864, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1098] * CMS Collaboration, "Measurement of differential cross sections for the production of a Z boson in association with jets in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **108**, 052004 (2023), doi:10.1103/PhysRevD.108.052004, arXiv:2205.02872, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1099] * CMS Collaboration, "Measurement of the dependence of the hadron production fraction ratio f_s/f_u and f_d/f_u on B meson kinematic variables in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. Lett. **131**, 121901 (2023), doi:10.1103/PhysRevLett.131.121901, arXiv:2212.02309, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1100] * CMS Collaboration, "Observation of same-sign WW production from double parton scattering in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. Lett. **131**, 091803 (2023), doi:10.1103/PhysRevLett.131.091803, arXiv:2206.02681, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1101] * CMS Collaboration, "Observation of the rare decay of the η meson to four muons", Phys. Rev. Lett. **131**, 091903 (2023), doi:10.1103/PhysRevLett.131.091903, arXiv:2305.04904, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1102] * CMS, TOTEM Collaboration, "Proton reconstruction with the CMS-TOTEM Precision Proton Spectrometer", J. Instrum. **18**, P09009 (2023), doi:10.1088/1748-0221/18/09/P09009, arXiv:2210.05854, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1103] * CMS Collaboration, "Reconstruction of decays to merged photons using end-to-end deep learning with domain continuation in the CMS detector", Phys. Rev. D **108**, 052002 (2023), doi:10.1103/PhysRevD.108.052002, arXiv:2204.12313, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1104] * CMS Collaboration, "Search for a charged Higgs boson decaying into a heavy neutral Higgs boson and a W boson in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **09**, 032 (2023), doi:10.1007/JHEP09(2023)032, arXiv:2207.01046, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1105] * CMS Collaboration, "Search for a vector-like quark $\text{T}' \to \text{tH}$ via the diphoton decay mode of the Higgs boson in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **09**, 057 (2023), doi:10.1007/JHEP09(2023)057, arXiv:2302.12802, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1106] * CMS Collaboration, "Search for exotic Higgs boson decays $\text{H} \to \mathcal{A}\mathcal{A} \to 4\gamma$ with events containing two merged diphotons in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. Lett. **131**, 101801 (2023), doi:10.1103/PhysRevLett.131.101801, arXiv:2209.06197, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1107] * CMS Collaboration, "Search for medium effects using jets from bottom quarks in PbPb collisions at $\sqrt{s_{\text{NN}}} = 5.02\,\text{TeV}$", Phys. Lett. B **844**, 137849 (2023), doi:10.1016/j.physletb.2023.137849, arXiv:2210.08547, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1108] * CMS Collaboration, "Search for new heavy resonances decaying to WW, WZ, ZZ, WH, or ZH boson pairs in the all-jets final state in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Lett. B **844**, 137813 (2023), doi:10.1016/j.physletb.2023.137813, arXiv:2210.00043, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1109] * CMS Collaboration, "Search for supersymmetry in final states with a single electron or muon using angular correlations and heavy-object identification in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **09**, 149 (2023), doi:10.1007/JHEP09(2023)149, arXiv:2211.08476, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration

publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1110] * CMS Collaboration, "Two-particle azimuthal correlations in γp interactions using pPb collisions at $\sqrt{s_{\mathrm{NN}}} = 8.16\,\mathrm{TeV}$", Phys. Lett. B **844**, 137905 (2023), doi:10.1016/j.physletb.2023.137905, arXiv:2204.13486, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1111] * CMS Collaboration, "A search for decays of the Higgs boson to invisible particles in events with a top-antitop quark pair or a vector boson in proton-proton collisions at $\sqrt{s} = 13\,\mathrm{TeV}$", Eur. Phys. J. C **83**, 933 (2023), doi:10.1140/epjc/s10052-023-11952-7, arXiv:2303.01214, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1112] * 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, **Contribution:** I acquired funding, contributed to developing the software, supervised the students, and revised and edited the manuscript.

[1113] * B. Orzari et al., "LHC hadronic jet generation using convolutional variational autoencoders with normalizing flows", Mach. Learn.: Sci. Technol. **4**, 045023 (2023), doi:10.1088/2632-2153/ad04ea, arXiv:2310.13138, **Contribution:** I supervised the students and revised and edited the manuscript.

[1114] * CMS Collaboration, "Measurement of the top quark mass using a profile likelihood approach with the lepton + jets final states in proton-proton collisions at $\sqrt{s} = 13\,\mathrm{TeV}$", Eur. Phys. J. C **83**, 963 (2023), doi:10.1140/epjc/s10052-023-12050-4, arXiv:2302.01967, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1115] * CMS Collaboration, "Measurements of the azimuthal anisotropy of prompt and nonprompt charmonia in PbPb collisions at $\sqrt{s_{\mathrm{NN}}}$ = 5.02 TeV", J. High Energy Phys. **10**, 115 (2023), doi:10.1007/JHEP10(2023)115, arXiv:2305.16928, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1116] * CMS Collaboration, "Observation of τ lepton pair production in ultraperipheral lead-lead collisions at $\sqrt{s_{\mathrm{NN}}}$ = 5.02 TeV", Phys. Rev. Lett. **131**, 151803 (2023), doi:10.1103/PhysRevLett.131.151803, arXiv:2206.05192, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1117] * CMS Collaboration, "Search for a high-mass dimuon resonance produced in association with b quark jets at $\sqrt{s} = 13 TeV$", J. High Energy Phys. **10**, 043 (2023), doi:10.1007/JHEP10(2023)043, arXiv:2307.08708, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1118] * 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", J. High Energy Phys. **10**, 046 (2023), doi:10.1007/JHEP10(2023)046, arXiv:2307.16216, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1119] * CMS Collaboration, "Search for the lepton-flavor violating decay of the Higgs boson and additional Higgs bosons in the eμ final state in proton-proton collisions at $\sqrt{s}$ = 13 TeV", Phys. Rev. D **108**, 072004 (2023), doi:10.1103/PhysRevD.108.072004, arXiv:2305.18106, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1120] * CMS Collaboration, "First Measurement of the Forward Rapidity Gap Distribution in pPb Collisions at $\sqrt{s_{\mathrm{NN}}} = 8.16\,\mathrm{TeV}$", Phys. Rev. D **108**, 092004 (2023), doi:10.1103/PhysRevD.108.092004, arXiv:2301.07630, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1121] * CMS Collaboration, "Measurement of the $\mathrm{t\bar{t}}$ charge asymmetry in events with highly Lorentz-boosted top quarks in pp collisions at $\sqrt{s} = 13\,\mathrm{TeV}$", Phys. Lett. B **846**, 137703 (2023), doi:10.1016/j.physletb.2023.137703, arXiv:2208.02751, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1122] * CMS Collaboration, "Performance of the local reconstruction algorithms for the CMS hadron calorimeter with Run 2 data", J. Instrum. **18**, P11017 (2023), doi:10.1088/1748-0221/18/11/P11017, arXiv:2306.10355, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1123] * CMS Collaboration, "Search for pair-produced vector-like leptons in final states with third-generation leptons and at least three b quark jets in proton-proton collisions at s=13TeV", Phys. Lett. B **846**, 137713 (2023), doi:10.1016/j.physletb.2023.137713, arXiv:2208.09700, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1124] * CMS Collaboration, "Search for the Higgs boson decay to a pair of electrons in proton-proton collisions at $\sqrt{s} = 13\,\mathrm{TeV}$", Phys. Lett. B **846**, 137783 (2023), doi:10.1016/j.physletb.2023.137783, arXiv:2208.00265, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1125] * CMS Collaboration, "Search for Z' bosons decaying to pairs of heavy Majorana neutrinos in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **11**, 181 (2023), doi:10.1007/JHEP11(2023)181, arXiv:2307.06959, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1126] * R. Shenoy et al., "Differentiable Earth Mover's Distance for Data Compression at the High-Luminosity LHC", Mach. Learn.: Sci. Technol. **4**, 045058 (2023), doi:10.1088/2632-2153/ad1139, arXiv:2306.04712, **Contribution:** I developed software to implement the idea, supervised the student conducting the studies, acquired funding, and co-wrote the manuscript.

[1127] * 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, **Contribution:** I conceptualized and coordinated the overall project, supervised the students and postdoctoral researchers performing the studies, co-wrote the manuscript, and corresponded with the journal.

[1128] * CMS Collaboration, "Observation of four top quark production in proton-proton collisions at $\sqrt{s} =$ 13 TeV", Phys. Lett. B **847**, 138290 (2023), doi:10.1016/j.physletb.2023.138290, arXiv:2305.13439, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1129] * CMS Collaboration, "Probing Small Bjorken-x Nuclear Gluonic Structure via Coherent J/ψ Photoproduction in Ultraperipheral Pb-Pb Collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV", Phys. Rev. Lett. **131**, 262301 (2023), doi:10.1103/PhysRevLett.131.262301, arXiv:2303.16984, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1130] * CMS Collaboration, "Search for direct production of GeV-scale resonances decaying to a pair of muons in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **12**, 070 (2023), doi:10.1007/JHEP12(2023)070, arXiv:2309.16003, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1131] * CMS Collaboration, "Search for physics beyond the standard model in top quark production with additional leptons in the context of effective field theory", J. High Energy Phys. **12**, 068 (2023), doi:10.1007/JHEP12(2023)068, arXiv:2307.15761, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1132] * CMS Collaboration, "Search for resonances in events with photon and jet final states in proton-proton collisions at $\sqrt{s} = 13$ TeV", J. High Energy Phys. **12**, 189 (2023), doi:10.1007/JHEP12(2023)189, arXiv:2305.07998, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1133] * ATLAS, CMS Collaboration, "Evidence for the Higgs Boson Decay to a Z Boson and a Photon at the LHC", Phys. Rev. Lett. **132**, 021803 (2024), doi:10.1103/PhysRevLett.132.021803, arXiv:2309.03501, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1134] * CMS Collaboration, "Luminosity determination using Z boson production at the CMS experiment", Eur. Phys. J. C **84**, 26 (2024), doi:10.1140/epjc/s10052-023-12268-2, arXiv:2309.01008, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1135] * CMS Collaboration, "Measurement of the Higgs boson production via vector boson fusion and its decay into bottom quarks in proton-proton collisions at $\sqrt{s} = 13$ TeV", J. High Energy Phys. **01**, 173 (2024), doi:10.1007/JHEP01(2024)173, arXiv:2308.01253, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1136] * CMS Collaboration, "Measurement of the τ lepton polarization in Z boson decays in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **01**, 101 (2024), doi:10.1007/JHEP01(2024)101, arXiv:2309.12408, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1137] * CMS Collaboration, "Measurement of the production cross section for a W boson in association with a charm quark in proton–proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Eur. Phys. J. C **84**, 27 (2024), doi:10.1140/epjc/s10052-023-12258-4, arXiv:2308.02285, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1138] * CMS Collaboration, "Search for Inelastic Dark Matter in Events with Two Displaced Muons and Missing Transverse Momentum in Proton-Proton Collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. Lett. **132**, 041802 (2024), doi:10.1103/PhysRevLett.132.041802, arXiv:2305.11649, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1139] * CMS Collaboration, "Study of charm hadronization with prompt Λ_c^+ baryons in proton-proton and lead-lead collisions at $\sqrt{s_{NN}}$ = 5.02 TeV", J. High Energy Phys. **01**, 128 (2024), doi:10.1007/JHEP01(2024)128, arXiv:2307.11186, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1140] * 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, **Contribution:** I supervised the student, acquired funding, and revised and edited the manuscript.

[1141] * CMS Collaboration, "Higher-order moments of the elliptic flow distribution in PbPb collisions at $\sqrt{s_{\text{NN}}} = 5.02\,\text{TeV}$", J. High Energy Phys. **2024**, 106 (2024), doi:10.1007/JHEP02(2024)106, arXiv:2311.11370, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1142] * 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, **Contribution:** I attended and participated in Muon Collider Forum meetings and gave feedback on the manuscript.

[1143] * CMS Collaboration, "Muon identification using multivariate techniques in the CMS experiment in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. Instrum. **19**, P02031 (2024), doi:10.1088/1748-0221/19/02/P02031, arXiv:2310.03844, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1144] * 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, **Contribution:** I co-conceptualized the original method, supervised the students and postdoctoral researchers performing the studies, and revised and edited the manuscript.

[1145] * CMS Collaboration, "Search for long-lived particles decaying in the CMS muon detectors in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **110**, 032007 (2024), doi:10.1103/PhysRevD.110.032007, arXiv:2402.01898, **Contribution:** I supervised the students and postdoctoral researchers performing the search, and revised and edited the manuscript.

[1146] * CMS Collaboration, "Search for Scalar Leptoquarks Produced via τ-Lepton–Quark Scattering in pp Collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. Lett. **132**, 061801 (2024), doi:10.1103/PhysRevLett.132.061801, arXiv:2308.06143, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1147] * CMS Collaboration, "Two-particle Bose-Einstein correlations and their Lévy parameters in PbPb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02\,\mathrm{TeV}$", Phys. Rev. C **109**, 024914 (2024), doi:10.1103/PhysRevC.109.024914, arXiv:2306.11574, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1148] * CMS Collaboration, "Measurements of azimuthal anisotropy of nonprompt D0 mesons in PbPb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02\,\mathrm{TeV}$", Phys. Lett. B **850**, 138389 (2024), doi:10.1016/j.physletb.2023.138389, arXiv:2212.01636, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1149] * CMS Collaboration, "New Structures in the $\mathrm{J}/\psi\mathrm{J}/\psi$ Mass Spectrum in Proton-Proton Collisions at $\sqrt{s} = 13\,\mathrm{TeV}$", Phys. Rev. Lett. **132**, 111901 (2024), doi:10.1103/PhysRevLett.132.111901, arXiv:2306.07164, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1150] * CMS Collaboration, "Observation of $\mathrm{WW}\gamma$ production and search for $\mathrm{H}\gamma$ production in proton-proton collisions at $\sqrt{s}$ = 13 TeV", Phys. Rev. Lett. **132**, 121901 (2024), doi:10.1103/PhysRevLett.132.121901, arXiv:2310.05164, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1151] * CMS Collaboration, "Search for dark matter particles in $\mathrm{W}^{+}\mathrm{W}^{-}$ events with transverse momentum imbalance in proton-proton collisions at $\sqrt{s} = 13\,\mathrm{TeV}$", J. High Energy Phys. **03**, 134 (2024), doi:10.1007/JHEP03(2024)134, arXiv:2310.12229, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1152] * CMS Collaboration, "Search for Long-Lived Heavy Neutral Leptons with Lepton Flavour Conserving or Violating Decays to a Jet and a Charged Lepton", J. High Energy Phys. **03**, 105 (2024), doi:10.1007/JHEP03(2024)105, arXiv:2312.07484, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1153] * CMS Collaboration, "Search for new Higgs bosons via same-sign top quark pair production in association with a jet in proton-proton collisions at $\sqrt{s} = 13\,\mathrm{TeV}$", Phys. Lett. B **850**, 138478 (2024), doi:10.1016/j.physletb.2024.138478, arXiv:2311.03261, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1154] * CMS Collaboration, "Study of azimuthal anisotropy of Υ(1S) mesons in pPb collisions at $\sqrt{s_{\mathrm{NN}}} = 8.16\,\mathrm{TeV}$", Phys. Lett. B **850**, 138518 (2024), doi:10.1016/j.physletb.2024.138518, arXiv:2310.03233, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1155] * 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, **Contribution:** I performed studies comparing model inference on different AI hardware, supervised the students, acquired funding, and revised and edited the manuscript.

[1156] * CMS Collaboration, "Search for flavor changing neutral current interactions of the top quark in final states with a photon and additional jets in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **109**, 072004 (2024), doi:10.1103/PhysRevD.109.072004, arXiv:2312.08229, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1157] * CMS Collaboration, "Search for supersymmetry in final states with disappearing tracks in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **109**, 072007 (2024), doi:10.1103/PhysRevD.109.072007, arXiv:2309.16823, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1158] * CMS Collaboration, "Development of the CMS detector for the CERN LHC Run 3", J. Instrum. **19**, P05064 (2024), doi:10.1088/1748-0221/19/05/P05064, arXiv:2309.05466, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1159] * CMS Collaboration, "Inclusive and differential cross section measurements of $\text{t}\bar{\text{t}}\text{b}\bar{\text{b}}$ production in the lepton+jets channel at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **05**, 042 (2024), doi:10.1007/JHEP05(2024)042, arXiv:2309.14442, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1160] * CMS Collaboration, "Measurement of simplified template cross sections of the Higgs boson produced in association with W or Z bosons in the $\text{H} \to \text{b}\bar{\text{b}}$ decay channel in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **109**, 092011 (2024), doi:10.1103/PhysRevD.109.092011, arXiv:2312.07562, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1161] * CMS Collaboration, "Measurement of the primary Lund jet plane density in proton-proton collisions at $\sqrt{\text{s}}$ = 13 TeV", J. High Energy Phys. **05**, 116 (2024), doi:10.1007/JHEP05(2024)116, arXiv:2312.16343, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1162] * CMS Collaboration, "Search for an exotic decay of the Higgs boson into a Z boson and a pseudoscalar particle in proton-proton collisions at s=13TeV", Phys. Lett. B **852**, 138582 (2024), doi:10.1016/j.physletb.2024.138582, arXiv:2311.00130, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1163] * CMS Collaboration, "Search for exotic decays of the Higgs boson to a pair of pseudoscalars in the $\mu\mu$bb and $\tau\tau$bb final states", Eur. Phys. J. C **84**, 493 (2024), doi:10.1140/epjc/s10052-024-12727-4, arXiv:2402.13358, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1164] * CMS Collaboration, "Search for long-lived particles decaying to final states with a pair of muons in proton-proton collisions at $\sqrt{s} = 13.6\,\text{TeV}$", J. High Energy Phys. **05**, 047 (2024), doi:10.1007/JHEP05(2024)047, arXiv:2402.14491, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1165] * CMS Collaboration, "Search for W' bosons decaying to a top and a bottom quark in leptonic final states in proton-proton collisions at $\sqrt{s}$ = 13 TeV", J. High Energy Phys. **05**, 046 (2024), doi:10.1007/JHEP05(2024)046, arXiv:2310.19893, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1166] * ATLAS, CMS Collaboration, "Combination of Measurements of the Top Quark Mass from Data Collected by the ATLAS and CMS Experiments at $\sqrt{s} = 7$ and 8 TeV", Phys. Rev. Lett. **132**, 261902 (2024), doi:10.1103/PhysRevLett.132.261902, arXiv:2402.08713, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1167] * CMS Collaboration, "Combined search for electroweak production of winos, binos, higgsinos, and sleptons in proton-proton collisions at $\sqrt{s} = 13$ TeV", Phys. Rev. D **109**, 112001 (2024), doi:10.1103/PhysRevD.109.112001, arXiv:2402.01888, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1168] * 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, **Contribution:** I supervised the project, gave feedback on studies, and contributed to writing the manuscript.

[1169] * CMS Collaboration, "Extracting the speed of sound in quark–gluon plasma with ultrarelativistic lead–lead collisions at the LHC", Rep. Prog. Phys. **87**, 077801 (2024), doi:10.1088/1361-6633/ad4b9b, arXiv:2401.06896, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1170] * TOTEM, CMS Collaboration, "Nonresonant central exclusive production of charged-hadron pairs in proton-proton collisions at s=13 TeV", Phys. Rev. D **109**, 112013 (2024), doi:10.1103/PhysRevD.109.112013, arXiv:2401.14494, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1171] * CMS Collaboration, "Observation of the J/$\psi\to\mu$+μ-μ+μ- decay in proton-proton collisions at s=13 TeV", Phys. Rev. D **109**, L111101 (2024), doi:10.1103/PhysRevD.109.L111101, arXiv:2403.11352, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1172] * CMS Collaboration, "Search for heavy neutral leptons in final states with electrons, muons, and hadronically decaying tau leptons in proton-proton collisions at $\sqrt{s} = 13$ TeV", J. High Energy Phys. **06**, 123 (2024), doi:10.1007/JHEP06(2024)123, arXiv:2403.00100, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1173] * CMS Collaboration, "Search for long-lived heavy neutrinos in the decays of B mesons produced in proton-proton collisions at $\sqrt{s} = 13$ TeV", J. High Energy Phys. **06**, 183 (2024), doi:10.1007/JHEP06(2024)183, arXiv:2403.04584, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1174] * CMS Collaboration, "Search for long-lived particles using displaced vertices and missing transverse momentum in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **109**, 112005 (2024), doi:10.1103/PhysRevD.109.112005, arXiv:2402.15804, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1175] * CMS Collaboration, "Search for pair production of scalar and vector leptoquarks decaying to muons and bottom quarks in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **109**, 112003 (2024), doi:10.1103/PhysRevD.109.112003, arXiv:2402.08668, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1176] * CMS Collaboration, "Search for the decay of the Higgs boson to a pair of light pseudoscalar bosons in the final state with four bottom quarks in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", J. High Energy Phys. **06**, 097 (2024), doi:10.1007/JHEP06(2024)097, arXiv:2403.10341, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1177] * CMS Collaboration, "Search for the lepton flavor violating $\tau \to 3\mu$ decay in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Lett. B **853**, 138633 (2024), doi:10.1016/j.physletb.2024.138633, arXiv:2312.02371, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1178] * O. Weng et al., "FKeras: a sensitivity analysis tool for edge neural networks", ACM J. Auton. Transport. Syst. **1** (2024), doi:10.1145/3665334, **Contribution:** I supervised the student, acquired funding, and revised and edited the manuscript.

[1179] * CMS Collaboration, "Observation of the $\Xi_b^- \to \psi(2S)\Xi^-$ decay and studies of the Ξ_b^{*0} baryon in proton-proton collisions at $\sqrt{s} = 13$ TeV", Phys. Rev. D **110**, 012002 (2024), doi:10.1103/PhysRevD.110.012002, arXiv:2402.17738, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1180] * CMS Collaboration, "Search for ZZ and ZH production in the $b\bar{b}b\bar{b}$ final state using proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Eur. Phys. J. C **84**, 712 (2024), doi:10.1140/epjc/s10052-024-13021-z, arXiv:2403.20241, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1181] * CMS Collaboration, "Search for long-lived heavy neutral leptons decaying in the CMS muon detectors in proton-proton collisions at $\sqrt{s} = 13\,\text{TeV}$", Phys. Rev. D **110**, 012004 (2024), doi:10.1103/PhysRevD.110.012004, arXiv:2402.18658, **Contribution:** I supervised the students and postdoctoral researchers performing the search, and revised and edited the manuscript.

[1182] * CMS Collaboration, "Test of lepton flavor universality in $B^\pm \to K^\pm \mu^+ \mu^-$ and $B^\pm \to K^\pm e^+ e^-$ decays in proton-proton collisions at $\sqrt{s} = 13$ TeV", Rep. Prog. Phys. **87**, 077802 (2024), doi:10.1088/1361-6633/ad4e65, arXiv:2401.07090, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1183] * P. Odagiu et al., "Ultrafast jet classification on FPGAs for HL-LHC", Mach. Learn.: Sci. Technol. **5**, 035017 (2024), doi:10.1088/2632-2153/ad5f10, arXiv:2402.01876, **Contribution:** I coordinated the overall project, developed the firmware implementation, supervised the students, acquired funding, and co-wrote the manuscript.

[1184] * CMS Collaboration, "Evidence for tWZ production in proton-proton collisions at s=13 TeV in multilepton final states", Phys. Lett. B **855**, 138815 (2024), doi:10.1016/j.physletb.2024.138815, arXiv:2312.11668, **Contribution:** As a member of the CMS Collaboration, I contribute indirectly to all collaboration publications by developing common software, acquiring funding, reviewing drafts, participating in meetings, and taking on coordination roles.

[1185] * H. Abouabid et al., "HHH whitepaper", Eur. Phys. J. C **84**, 1183 (2024), doi:10.1140/epjc/s10052-024-13376-3, arXiv:2407.03015.

[1186] * CMS Collaboration, "Measurement of boosted Higgs bosons produced via vector boson fusion or gluon fusion in the H $\to b\bar{b}$ decay mode using LHC proton-proton collision data at $\sqrt{s} = 13$ TeV", JHEP **12**, 035 (2024), doi:10.1007/JHEP12(2024)035, arXiv:2407.08012, **Contribution:** I supervised the students and postdoctoral researchers who performed the search.

[1187] * CMS Collaboration, "Dark sector searches with the CMS experiment", Phys. Rept. **1115**, 448 (2025), doi:10.1016/j.physrep.2024.09.013, arXiv:2405.13778, **Contribution:** I supervised the postdoctoral researcher who was one of the editing authors and contributed to several of the searches described in the review.

[1188] * 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, arXiv:2403.16134, **Contribution:** I maintained the data scouting stream in Run 2, and contributed to several of the searches described in the review.

[1189] * H. F. Tsoi et al., "SymbolFit: Automatic Parametric Modeling with Symbolic Regression", (2025), arXiv:2411.09851, Accepted by *Comput. Softw. Big Sci.*, **Contribution:** I supervised the student who developed the software, and contributed to the manuscript.

II. Review and Invited Articles

[1] 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, **Author Contribution Code(s):** 1, 4, 13, 14.

[2] * J. Duarte et al., "Editorial: Efficient AI in particle physics and astrophysics", Front. AI **5**, 999173 (2022), doi:10.3389/frai.2022.999173, **Contribution:** I was a journal guest editor of the special research topic and I co-wrote the editorial.

[3] * 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, **Contribution:** I co-wrote the section on applications in high energy physics.

III. Books and Book Chapters

[1] J. Duarte et al., "Graph neural networks for particle tracking and reconstruction", in *Artificial Intelligence for High Energy Physics*, edited by P. Calafiura et al. (World Scientific, Mar. 2022), p. 387, doi:10.1142/9789811234033_0012, arXiv:2012.01249.

[2] * 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.

IV. Refereed Conference Proceedings

[1] J. Duarte et al., "Accelerated machine learning as a service for particle physics computing", in 2nd Machine Learning and the Physical Sciences Workshop at the 33rd Conference on Neural Information Processing Systems (Dec. 2019), doi:10.5281/zenodo.3895029, https://ml4physicalsciences.github.io/2019/files/NeurIPS_ML4PS_2019_64.pdf, **Author Contribution Code(s):** 1, 2, 9, 12, 13.

[2] E. A. Moreno et al., "Interaction networks for the identification of Higgs boson decays to bottom quark-antiquark pairs", in 2nd Machine Learning and the Physical Sciences Workshop at the 33rd Conference on Neural Information Processing Systems (Dec. 2019), doi:10.5281/zenodo.3895048, https://ml4physicalsciences.github.io/2019/files/NeurIPS_ML4PS_2019_71.pdf, **Author Contribution Code(s):** 1, 2, 6, 9, 10, 12, 13.

[3] J. Duarte et al., "Low-latency machine learning inference on FPGAs", in 2nd Machine Learning and the Physical Sciences Workshop at the 33rd Conference on Neural Information Processing Systems (Dec. 2019), doi:10.5281/zenodo.3895081, https://ml4physicalsciences.github.io/2019/files/NeurIPS_ML4PS_2019_74.pdf, **Author Contribution Code(s):** 1, 2, 6, 9, 12, 13.

[4] D. S. Rankin et al., "FPGAs-as-a-service toolkit (FaaST)", in 2020 IEEE/ACM International Workshop on Heterogeneous High-performance Reconfigurable Computing (H2RC) (Nov. 2020), p. 38, doi:10.1109/H2RC51942.2020.00010, arXiv:2010.08556, **Author Contribution Code(s):** 1, 4, 6, 8, 9, 13.

[5] A. Heintz et al., "Accelerated charged particle tracking with graph neural networks on FPGAs", in 3rd Machine Learning and the Physical Sciences Workshop at the 34th Conference on Neural Information Processing Systems (Dec. 2020), arXiv:2012.01563, https://ml4physicalsciences.github.io/2020/files/NeurIPS_ML4PS_2020_137.pdf, **Author Contribution Code(s):** 1, 4, 6, 8, 9, 13.

[6] R. Kansal et al., "Graph generative adversarial networks for sparse data generation in high energy physics", in 3rd Machine Learning and the Physical Sciences Workshop at the 34th Conference on Neural Information Processing Systems (Dec. 2020), arXiv:2012.00173, https://ml4physicalsciences.github.io/2020/files/NeurIPS_ML4PS_2020_104.pdf, **Author Contribution Code(s):** 1, 4, 6, 8, 9, 13.

[7] F. Fahim et al., "Hls4ml: an open-source codesign workflow to empower scientific low-power machine learning devices", in 1st tinyML Research Symposium (Mar. 2021), arXiv:2103.05579, **Author Contribution Code(s):** 1, 4, 6, 8, 9, 13.

[8] B. Orzari et al., "Sparse data generation for particle-based simulation of hadronic jets in the LHC", in LatinX in AI (LXAI) Research Workshop at the 38th International Conference on Machine Learning (July 2021), arXiv:2109.15197, https://research.latinxinai.org/papers/icml/2021/pdf/paper_15.pdf, **Author Contribution Code(s):** 1, 2, 4, 6, 10, 14.

[9] F. Mokhtar et al., "Explaining machine-learned particle-flow reconstruction", in 4th Machine Learning and the Physical Sciences Workshop at the 35th Conference on Neural Information Processing Systems (Dec. 2021), arXiv:2111.12840, https://ml4physicalsciences.github.io/2021/files/NeurIPS_ML4PS_2021_120.pdf, **Author Contribution Code(s):** 1, 2, 4, 6, 10, 13, 14.

[10] C. Banbury et al., "MLPerf Tiny benchmark", in Proceedings of the Neural Information Processing Systems Track on Datasets and Benchmarks, Vol. 1 (Dec. 2021), arXiv:2106.07597, https://datasets-benchmarks-proceedings.neurips.cc/paper/2021/hash/da4fb5c6e93e74d3df8527599fa62642-Abstract-round1.html, **Author Contribution Code(s):** 9, 10.

[11] R. Kansal et al., "Particle cloud generation with message passing generative adversarial networks", in Advances in Neural Information Processing Systems, Vol. 34 (Dec. 2021), arXiv:2106.11535, https://papers.nips.cc/paper/2021/hash/c8512d142a2d849725f31a9a7a361ab9-Abstract.html, **Author Contribution Code(s):** 1, 2, 4, 6, 10, 13, 14.

[12] S. Tsan et al., "Particle Graph Autoencoders and Differentiable, Learned Energy Mover's Distance", in 4th Machine Learning and the Physical Sciences Workshop at the 35th Conference on Neural Information Processing Systems (Dec. 2021), arXiv:2111.12849, https://ml4physicalsciences.github.io/2021/files/NeurIPS_ML4PS_2021_98.pdf, **Author Contribution Code(s):** 1, 2, 4, 6, 9, 10, 13, 14.

[13] 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, **Author Contribution Code(s):** 1, 2, 4, 6, 10, 13, 14.

[14] H. Borras 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, **Author Contribution Code(s):** 1, 4, 6, 9, 10, 13, 14.

[15] 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, **Author Contribution Code(s):** 1, 4, 6, 9, 10, 13, 14.

[16] 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, **Author Contribution Code(s):** 1, 2, 4, 6, 9, 10, 13, 14.

[17] * 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, **Contribution:** I supervised the student performing the studies, acquired funding, and co-wrote the manuscript.

[18] * S. Hussain et al., "FastStamp: accelerating neural steganography and digital watermarking of images on FPGAs", in Proceedings of the 41st IEEE/ACM International Conference on Computer-Aided Design (Dec. 2022), p. 1, doi:10.1145/3508352.3549357, arXiv:2209.12391, **Contribution:** I assisted in the development of the FPGA algorithm and contributed to writing the manuscript.

[19] * 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, **Contribution:** I supervised the students performing the studies, acquired funding, and co-wrote the manuscript.

[20] * F. Mokhtar et al., "Progress towards an improved particle flow algorithm at CMS with machine learning", in 21st International Workshop on Advanced Computing and Analysis Techniques in Physics Research (Mar. 2023), arXiv:2303.17657, **Contribution:** I supervised the student performing the studies, acquired funding, and revised and edited the manuscript.

[21] * S.-Y. Huang et al., "Low Latency Edge Classification GNN for Particle Trajectory Tracking on FPGAs", in 33rd International Conference on Field-Programmable Logic and Applications (Sept. 2023), p. 294, doi:10.1109/FPL60245.2023.00050, arXiv:2306.11330, **Contribution:** I supervised the students conducting the studies.

[22] * R. E. Amaro et al., "Voyager - An Innovative Computational Resource for Artificial Intelligence & Machine Learning Applications in Science and Engineering", in Practice and Experience in Advanced Research Computing (Sept. 2023), p. 278, doi:10.1145/3569951.3597597, **Contribution:** I acquired funding for the supercomputer and was one of the first users.

[23] * 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, **Contribution:** I supervised the students performing the studies, acquired funding, and co-wrote the manuscript.

[24] * 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://proceedings.mlr.press/v235/miao24b.html, **Contribution:** I supervised the student performing the studies, acquired funding, and edited and revised the manuscript.

[25] * 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, **Contribution:** I contributed to writing the manuscript.

[26] * 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, **Contribution:** I conceptualized the study, supervised the students, and co-wrote the proceeding.

[27] * 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://ml4physicalsciences.github.io/2024/files/NeurIPS_ML4PS_2024_189.pdf.

[28] * 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://ml4physicalsciences.github.io/2024/files/NeurIPS_ML4PS_2024_222.pdf, **Contribution:** I conceptualized the original idea, supervised the students performing the studies, acquired funding, and co-wrote the manuscript.

B. OTHER WORK

I. Other Conference Proceedings

[1] J. Duarte, "Search for natural supersymmetry in events with 1 b-tagged jet using razor variables at 8 TeV", in 2nd Large Hadron Collider Physics Conference (Sept. 2014), arXiv:1409.4466.

[2] A. Bornheim et al., "Calorimeters for precision timing measurements in high energy physics", in 16th International Conference on Calorimetry in Particle Physics (Feb. 2015), doi:10.1088/1742-6596/587/1/012057.

[3] D. Anderson et al., "Studies towards a precision timing calorimeter for high energy physics collider experiments", in 2015 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) (Oct. 2015), p. 1, doi:10.1109/NSSMIC.2015.7581887.

[4] J. Duarte, "Inclusive Searches for Supersymmetry with the CMS detector at $\sqrt{s} = 8$ TeV", in 37th International Conference on High Energy Physics (May 2016), doi:10.1016/j.nuclphysbps.2015.09.071.

[5] A. Bornheim et al., "Comparative test beam studies of precision timing calorimeter technologies", in 2016 IEEE Nuclear Science Symposium and Medical Imaging Conference (Oct. 2016), doi:10.1109/NSSMIC.2016.8069874.

[6] A. Bornheim et al., "LYSO based precision timing calorimeters", in 17th International Conference on Calorimetry in Particle Physics, Vol. 928 (Nov. 2017), p. 012023, doi:10.1088/1742-6596/928/1/012023.

[7] J. Duarte, "Fast reconstruction and data scouting", in 4th International Workshop Connecting The Dots (Aug. 2018), arXiv:1808.00902.

[8] K. Albertsson et al., "Machine learning in high energy physics community white paper", in 18th International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT 2017), Vol. 1085 (Sept. 2018), p. 022008, doi:10.1088/1742-6596/1085/2/022008, arXiv:1807.02876.

[9] HEP Software Foundation Collaboration, "HL-LHC Computing Review: Common Tools and Community Software", in 2022 Snowmass Summer Study, edited by P. Canal et al. (Aug. 2020), doi:10.5281/zenodo.4009114, arXiv:2008.13636.

[10] K. A. Woźniak et al., "New physics agnostic selections for new physics searches", in 24th International Conference on Computing in High Energy and Nuclear Physics (CHEP 2019), Vol. 245 (Nov. 2020), p. 06039, doi:10.1051/epjconf/202024506039, **Author Contribution Code(s):** 10, 14.

[11] S. Thais et al., "Graph Neural Networks in Particle Physics: Implementations, Innovations, and Challenges", in 2022 Snowmass Summer Study (Mar. 2022), arXiv:2203.12852, **Author Contribution Code(s):** 13.

[12] P. Harris et al., "Physics Community Needs, Tools, and Resources for Machine Learning", in 2022 Snowmass Summer Study (Mar. 2022), arXiv:2203.16255, **Author Contribution Code(s):** 13.

[13] A. Apresyan et al., "Improving Di-Higgs Sensitivity at Future Colliders in Hadronic Final States with Machine Learning", in 2022 Snowmass Summer Study (Apr. 2022), arXiv:2203.07353, **Author Contribution Code(s):** 1, 6, 8, 9, 10, 13.

[14] G. Benelli et al., "Data Science and Machine Learning in Education", in 2022 Snowmass Summer Study (July 2022), arXiv:2207.09060, **Author Contribution Code(s):** 13.

[15] 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, **Contribution:** I participated in the topical group meetings and contributed a whitepaper to the proceedings.

[16] P. Shanahan et al., "Snowmass 2021 Computational Frontier CompF03 Topical Group Report: Machine Learning", in 2022 Snowmass Summer Study (Sept. 2022), arXiv:2209.07559, **Contribution:** I participated in the topical group meetings and contributed whitepapers to the proceedings.

[17] M. Agarwal et al., "Applications of Deep Learning to physics workflows", in Accelerating Physics with ML@MIT Workshop (June 2023), arXiv:2306.08106, **Contribution:** I participated remotely in the workshop, assisted with the figures, and edited the whitepaper.

[18] H. Li et al., "FAIR AI Models in High Energy Physics", in 26th International Conference on Computing in High Energy and Nuclear Physics, Vol. 295 (2024), p. 09017, doi:10.1051/epjconf/202429509017, **Contribution:** I conceptualized and coordinated the overall project, supervised the students and postdoctoral researchers performing the studies, and co-wrote the manuscript.

[19] J. M. Duarte, "Novel machine learning applications at the LHC", in 42nd International Conference on High Energy Physics (Sept. 2024), arXiv:2409.20413, **Contribution:** I presented the results at the conference and wrote the corresponding proceeding.

II. Abstracts

III. Popular Works

IV. Additional Products of Major Research

[1] J. Duarte et al., *Squark-mediated Higgs+jets production at the LHC*, Mar. 2017, arXiv:1703.06544.

[2] CMS Collaboration, *Performance of deep tagging algorithms for boosted double quark jet topology in proton-proton collisions at 13 TeV with the Phase-0 CMS detector*, CMS Detector Performance Note CMS-DP-2018-046 (July 2018), https://cds.cern.ch/record/2630438.

[3] CMS Collaboration, *Searches for dijet resonances in pp collisions at $\sqrt{s} = 13$ TeV using the 2016 and 2017 datasets*, CMS Physics Analysis Summary CMS-PAS-EXO-17-026 (Sept. 2018), https://cds.cern.ch/record/2637847.

[4] CMS Collaboration, *The Phase-2 upgrade of the CMS Level-1 trigger*, CMS Technical Design Report CERN-LHCC-2020-004. CMS-TDR-021, **Author Contribution Code(s):** 6, 9, 12, 13 (Apr. 2020), https://cds.cern.ch/record/2714892.

[5] V. Lončar et al., *fastmachinelearning/hls4ml*, version v0.6.0, **Author Contribution Code(s):** 1, 9, Nov. 2021, doi:10.5281/zenodo.1201549, https://github.com/fastmachinelearning/hls4ml.

[6] CMS Collaboration, *Machine Learning for Particle Flow Reconstruction at CMS*, CMS Detector Performance Note CMS-DP-2021-030, **Author Contribution Code(s):** 1, 9, 13, 14 (Nov. 2021), https://cds.cern.ch/record/2792320.

[7] CMS Collaboration, *Inclusive search for a boosted Higgs boson decaying to a charm quark pairs in proton-proton collisions at $\sqrt{s} = 13$ TeV*, CMS Physics Analysis Summary CMS-PAS-HIG-21-012, **Author Contribution Code(s):** 8, 9, 10, 14 (May 2022), https://cds.cern.ch/record/2809929.

[8] CMS Collaboration, *Performance of the mass-decorrelated DeepDoubleX classifier for double-b and double-c large-radius jets with the CMS detector*, CMS Detector Performance Note CMS-DP-2022-041, **Contribution:** I developed the original algorithm and supervised the students who improved it. (Nov. 2022), https://cds.cern.ch/record/2839736.

[9] CMS Collaboration, *Progress towards an improved particle flow algorithm at CMS with machine learning*, CMS Detector Performance Note CMS-DP-2022-061, **Contribution:** I supervised the student performing the studies and acquired funding. (Nov. 2022), https://cds.cern.ch/record/2842375.

[10] CMS Collaboration, *Portable Acceleration of CMS Mini-AOD Production with Coprocessors as a Service*, CMS Detector Performance Note CMS-DP-2023-037, **Contribution:** I co-conceptualized the original method and supervised the students and postdoctoral researchers performing the studies. (June 2023), https://cds.cern.ch/record/2863316.

[11] CMS Collaboration, *Search for boosted Higgs bosons produced via vector boson fusion in the $H \to b\bar{b}$ decay mode using LHC proton-proton collision data at $\sqrt{s} = 13$ TeV*, CMS Physics Analysis Summary CMS-PAS-HIG-21-020, **Contribution:** I supervised the students and postdoctoral researchers who performed the search. (Aug. 2023), https://cds.cern.ch/record/2866501.

[12] CMS Collaboration, *Anomaly Detection in the CMS Global Trigger Test Crate for Run 3*, CMS Detector Performance Note CMS-DP-2023-079, **Contribution:** I supervised the students and postdoctoral researchers who developed the firmware algorithm and its software emulation. (Oct. 2023), https://cds.cern.ch/record/2876546.

[13] O. Weng et al., *Architectural implications of neural network inference for high data-rate, low-latency scientific applications*, **Contribution:** I contributed to writing the manuscript. Mar. 2024, arXiv:2403.08980.

[14] CMS Collaboration, *Search for highly energetic double Higgs boson production in the two bottom quark and two vector boson all-hadronic final state*, CMS Physics Analysis Summary CMS-PAS-HIG-23-012, **Contribution:** I developed several of the analysis techniques and supervised the student who performed the search. (July 2024), https://cds.cern.ch/record/2904879.

[15] CMS Collaboration, *Search for low mass vector and scalar resonances decaying into quark-antiquark pairs*, CMS Physics Analysis Summary CMS-PAS-EXO-24-007, **Contribution:** I supervised the students who performed the search. (July 2024), https://cds.cern.ch/record/2904945.

[16] 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.

[17] 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, **Contribution:** I supervised the graduate student who performed one of the searches and edited the manuscript. (May 2025), https://cds.cern.ch/record/2932358.

C. WORK IN PROGRESS