Darin E. Acosta

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Education:

- University of California, San Diego, High-Energy Physics, Ph.D., 1993
  Thesis: "Investigations into Scintillating Fiber Calorimetry and a Measurement of the Two-Photon Production of Charged Meson Pairs
- University of California, San Diego, Physics, M.S., 1989
- California Institute of Technology, Pasadena, Physics, B.S., 1987

Appointments:

- 2021–present: Professor, Department of Physics & Astronomy, Rice University
  - Member of the Ken Kennedy Institute
- 2007–2021: Professor, Department of Physics, University of Florida
  - 2014–2021: affiliate appointment in Department of Electrical and Computer Engineering, University of Florida
- 2003–2007: Associate Professor, Department of Physics, University of Florida
- 1997–2003: Assistant Professor, Department of Physics, University of Florida
- 1993–1997: Research Associate, Department of Physics, The Ohio State University, Columbus. *Postdoctoral advisors:* T.Y. Ling, L.S. Durkin
- 1988–1993: Research Assistant, Department of Physics, University of California, San Diego. *Graduate advisor*: H.P.Paar

Awards:

- 2016-2019, University of Florida Term Professorship (for academic excellence)
- 2013, Fellow of the American Physical Society for the Division of Particles and Fields.
  - Citation: For searches for new lepton-quark couplings and compositeness at hadron colliders, and for contributions to the success of the CMS experiment at the LHC through leadership in the areas of detector commissioning, trigger, and coordination of the physics program.
- 2008-10, University of Florida Research Foundation Professorship
- 2001, Outstanding Junior Investigator, Department of Energy

Research Accomplishments:

- Critical contributions to the search for the Higgs boson decay into dimuons, leading to first evidence reported in 2020
- USCMS L2 Project Manager for Trigger Operations (2018–). Responsible for managing the U.S. operations of the CMS Level-1 and High Level Triggers.

- USCMS L3 Project Manager for HL LHC Upgrade of Level-1 Muon Trigger (2016-2020). Responsible for conceptual design, R&D plans, project management, and participation in funding agency reviews of the project.
- Co-Coordinator of CMS Trigger system (2020–2022). Responsible for the online selection of data for all physics analyses, and the operations and upgrade of a large software-based real-time data acquisition and filtering system.
- Co-Chair of CMS Supersymmetry Publications Committee (2018-2020). Responsible for the final editorial review of CMS scientific articles in the area of Supersymmetry before submission to journals.
- Manager of the Level-1 Trigger project, CMS Collaboration (Project Manager: 2012–2013, Co-Project-Manager: 2014–2016). Responsible for the operations and upgrade of this electronic filtering system. Technical Design Report published in 2013. Member of the CMS management board and executive steering committee.
- Deputy Physics Coordinator, CMS Collaboration (2010–2011). Responsible for coordinating the physics program of the CMS collaboration. Co-chair meetings for the approval of physics results for first LHC collisions. Nearly 100 physics papers submitted to journals for publication by end of term. Member of the CMS management board and executive steering committee.
- Deputy Coordinator of Commissioning and Run Coordination, CMS Collaboration (2007–2010). Objectives include setting up the organization and detailed planning to bring the CMS experiment into operation for the first LHC physics operations. Responsibilities also include coordination of the Detector Performance Groups of CMS, which are responsible for the procedures and software to deliver the design performance of the detectors. Member of the CMS management board.
- Principal investigator for the development and operation of the “Endcap Muon Track-Finder” for the Level-1 Trigger of the Muon system of the CMS experiment, including its upgrade for the High Luminosity LHC (1998–present)
- Co-coordinator of the Physics Reconstruction and Selection groups of CMS and member of the management board of the CMS Software, Computing, and Physics projects (2005–2006). Coordinate detector performance and physics studies, conduct approvals of CMS physics studies for publication. Co-editor of Volumes 1 and 2 of the CMS Physics Technical Design Report. Coordinator of the CMS combined Computing, Software, and Analysis challenge of 2006.

Publications:

I am a co-author on over 1000 articles published by the CMS Collaboration, the CDF Collaboration, the ZEUS Collaboration, and the CLEO Collaboration in high-energy particle physics. Below is a list of those articles of which I had significant involvement.

Selected Publications:

1. D. Acosta, “At the Frontier of High Energy Physics”, Scientia, https://doi.org/10.33548/SCIENTIA1117 (2024)
2. A. Hayrapetyan et al. (CMS Collaboration), "Performance of the CMS high-level trigger during LHC Run 2", Journal of Instrumentation, 19, P11021 (2024)

3. A. Hayrapetyan et al. (CMS Collaboration), “Development of the CMS detector for the CERN LHC Run 3”, Journal of Instrumentation, 19, P05064 (2024)
4. D. Acosta, E. Barberis, N. Hurley, W. Li, O. Miguel Colin, D. Wood, X. Zuo, “The Potential of a TeV-Scale Muon-Ion Collider”, Journal of Instrumentation, 18, P09025 (2023)
5. D. Acosta, A. Deiana, W. Ketchum, “Snowmass Topical Group Summary Report: IF04 -- Trigger and Data Acquisition Systems”, arXiv:2209.03794 (2022)
6. D. Acosta and W. Li, “A Muon-Ion Collider at BNL: the future QCD frontier and path to a new energy frontier of muon-antimuon colliders”, Nuclear Inst. and Methods in Physics Research A 1027 (2022) 166334
7. J. Alimena et al., “Review of opportunities for new long-lived particle triggers in Run 3 of the Large Hadron Collider”, CERN-LPCC-2021-01, arXiv:2110.14675 [hep-ex] (2021)
8. A.M. Sirunyan et al. (CMS Collaboration), “The Phase-2 Upgrade of the CMS Data Acquisition and High Level Trigger”, CERN-LHCC-2021-007; CMS-TDR-022
9. A.M. Sirunyan et al. (CMS Collaboration), “Evidence for Higgs boson decay to a pair of muons”, J. High Energy Phys. **01** (2021) 148
10. A.M. Sirunyan et al. (CMS Collaboration), “Performance of the CMS Level-1 trigger in proton-proton collisions at √s = 13 TeV”, Journal of Instrumentation, 15, P10017 (2020)
11. A.M. Sirunyan et al. (CMS Collaboration), “The Phase-2 Upgrade of the CMS Level-1 Trigger”, CERN-LHCC-2020-004; CMS-TDR-021
12. A.M. Sirunyan et al. (CMS Collaboration), “Search for the Higgs Boson Decaying to Two Muons in Proton-Proton Collisions at √s=13 TeV”, Physical Review Letters 122 (2019) 021801
13. N.P. Ghanathe, A. Madorsky, H. Lam, D.E. Acosta, A.D. George, M.R. Carver, Y. Xia, A. Jyothishwaraa, and M. Hansen, “Software and firmware co-development using high-level synthesis”, Journal of Instrumentation 12 (2017) C01083.
14. D. Acosta, A. Brinkerhoff, A. Carnes, I. Furic, S. Gleyzer, K. Kotov, J.F. Low, A. Madorsky and B. Scurlock, “Boosted Decision Trees in the CMS Level-1 Endcap Muon Trigger”, Proceedings of Science, TWEPP-17 (2017) 143
15. A.M. Sirunyan et al. (CMS Collaboration), “The Phase-2 Upgrade of the CMS L1 Trigger Interim Technical Design Report”, CERN-LHCC-2017-013; CMS-TDR-017
16. V. Khachatryan et al. (CMS Collaboration), “The CMS trigger system”, Journal of Instrumentation 12 (2017) no.01, P01020
17. V. Khachatryan et al. (CMS Collaboration), “Search for new physics in same-sign dilepton events in proton–proton collisions at √s=13TeV”, Eur. Phys. J. C76 (2016) no.8, 439
18. S. Chatrchyan et al. (CMS Collaboration), “Search for a standard model-like Higgs boson in the mu+ mu- and e+ e- decay channels at the LHC”, Physics Letters B744 (2015) 184, 24pp.

19. S. Chatrchyan et al. (CMS Collaboration), "CMS Technical Design Report for the Level-1 Trigger Upgrade", CERN-LHCC-2013-011, CMS-TDR-012 (2013), 171pp.
20. D. Acosta et al., "The CMS Modular Track Finder boards, MTF6 and MTF7", Journal of Instrumentation 8 (2013) C12034.
21. S. Chatrchyan et al. (CMS Collaboration), "Search for anomalous production of highly boosted Z bosons decaying to dimuon final state in pp collisions at √s = 7 TeV'", Physics Letters B722 (2013) 28, 20pp.
22. S. Chatrchyan et al. (CMS Collaboration), "Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC", Physics Letters B716 (2012) 30-61, arXiv:1207.7235
23. S. Chatrchyan et al. (CMS Collaboration), "Measurement of the Rapidity and Transverse Momentum Distributions of Z Bosons in pp Collisions at √s = 7 TeV", Physical Review D85 (2012) 032002, 37pp.
24. V. Khachatryan et al. (CMS Collaboration), "Transverse momentum and pseudorapidity distributions of charged hadrons in pp collisions at √s = 0.9 and 2.36 TeV"**,** J. High Energy Phys. 02 (2010) 041, 33pp.
25. S. Chatrchyan et al. (CMS Collaboration), "Performance of the CMS Level-1 Trigger during Commissioning with Cosmic Ray Muons", Journal of Instrumentation **5** T03002 (2010), 49pp.
26. S. Chatrchyan et al. (CMS Collaboration), "Commissioning of the CMS Experiment and the Cosmic Run at Four Tesla", Journal of Instrumentation 5 T03001 (2010), 37pp.
27. G.L. Bayatian et al. (CMS Collaboration), "CMS Physics Technical Design Report, Volume 1: Detector Performance and Software," CERN/LHCC 2006-001 (2006)
28. W. Adam et al. (CMS Collaboration), "The CMS High Level Trigger," European Physics Journal C46 (2006) 605, 107pp.
29. A. Abulencia et al. (CDF Collaboration), "Direct Search for Dirac Magnetic Monopoles in pp Collisions at √s = 1.96 TeV," Physical Review Letters 96 (2006) 201801, 7pp.
30. D. Acosta et al. (CDF Collaboration), "Search for Scalar Leptoquark Pairs Decaying to ννqq in *pp* Collisions at √s =1.96 TeV," *Physical Review* **D71** (2005) 112001.
31. D. Acosta, N. Adams, A. Atamanchouk, R.D. Cousins, M.I. Ferguson, V. Golovtsov, J. Hauser, A. Madorsky, M. Matveev, J. Mumford(*), T. Nussbaum, P. Padley, B. Razmyslovich, V. Sedov, W. Smith, B. Tannenbaum(**), "Development and Test of a Prototype Regional Track-Finder for the Level-1 Trigger of the Cathode Strip Chamber Muon System of CMS," Nuclear Instruments and Methods A496 (2003) 64-82.
32. D. Acosta et al. (CMS Endcap Muon Collaboration), "Design Features and Test Results of the CMS Endcap Muon Chambers," Nuclear Instruments and Methods A494 (2002) 504-508.
33. D. Acosta, S.Klimenko, J.Konigsberg, A.Korytov, G.Mitselmakher, V.Necula, A.Nomerotsky(**), A.Pronko(*), A.Sukhanov(**), A.Safonov(*),

D.Tsybychev(*), S.M.Wang(**), M.Wong, "The Performance of the CDF Luminosity Monitor," Nuclear Instruments and Methods A494 (2002) 57-62.

34. D. Acosta, S. Klimenko, J. Konigsberg, A. Korytov, G. Mitselmakher, A. Nguyele(*), A. Nomerotski(**), A. Safonov(*), R.Stanek, D.Tsybychev(*), R.Vidal, S.M.Wang(**), M.Wong, "The CDF Cherenkov Luminosity Monitor," Nuclear Instruments and Methods A461 (2001) 540–544.
35. D.Acosta, G.Apollinari, J.Blomquist, R.Breedon, N.Bondar, Yu. Bonushkin, E.Borisov, A.Bujak, B.Bylsma, N.Chester, D.Chrisman, D.Cline, S.Dolinsky, S.Durkin, D.Eartly, T.Ferguson, F.Feyzi, J.Gilmore(**), L.Gorn, W.Gorn, J.Gu, L.Gutay, J.Hauser, S.Hershman(*), J.Hoftiezer, O.Kiselev, W.Ko, J.Korienek, A.Korytov, J.Kubic, J.Layter, T.Y.Ling, R.Loveless, S.Lusin, C.Matthey, M.Matveev, S.Medved, G.Mitselmakher, S.Otwinowski, P.Padley, F.Petriello(*), Yu. Pishchalnikov, O.Prokofev, V.Razmyslovich, D.Reeder, J.Roberts, P.Robl, C.Rush, J.C.Santiard, S.Sedov, B.Smith(**), S.Sobolev, V.Soulimov, B.Tannenbaum(**), N.Terentev, A.Vorobyov, V.Yarba, "Large CMS Cathode Strip Chambers: Design and Performance," Nuclear Instruments and Methods A453 (2000) 182–187.
36. J. Breitweg et al., (ZEUS Collaboration), "A Search for Resonances Decaying to e+-jet in e+ p Interactions at HERA," The European Physical Journal C16 (2000) 253–267.
37. J. Breitweg et al., (ZEUS Collaboration), "Measurement of High Q2 Charged-Current e+ p Deep Inelastic Scattering Cross Sections at HERA," The European Physical Journal C12 (2000) 411–428.
38. J. Breitweg et al., (ZEUS Collaboration), "Measurement of High Q2 Neutral Current e+ p Deep Inelastic Scattering Cross Sections at HERA," The European Physical Journal C11 (1999) 427–445.
39. D.Acosta, J.Blomquist, N.Bondar, Yu. Bonushkin, A.Bujak, B.Bylsma, D.Chrisman, S.Durkin, D.Eartly, T.Ferguson, F.Feyzi, Yu. Fisyak, L.Gorn, W.Gorn, L. Gutay, J.Hauser, S.Hershman(*), J.Hoftiezer, H.Hoorani, O.Kiselev, J.Korienek, A.Korytov, J.Layter, P.Lennous, T.Y.Ling, R.Loveless, S.Medved, G.Mitselmakher, O.Prokofev, V.Razmyslovich, C.Rush, S.Sedov, S.Sobolev, V.Soulimov, A.Vorobyov, "Large Cathode Strip Chambers for the CMS Endcap Muon System," Nuclear Instruments and Methods A419 (1998) 469–474.
40. J. Breitweg et al. (ZEUS Collaboration), "Comparison of ZEUS Data with Standard Model Predictions for $e^+ p \rightarrow e^+ X$ Scattering at High x and Q^2," *Zeitschrift fur Physik* **C74** (1997) 207.
41. J. Breitweg et al. (ZEUS Collaboration), "A Search for Excited Fermions in e+p Collisions at HERA," Zeitschrift fur Physik C76 (1997) 631–646.
42. J. Breitweg et al. (ZEUS Collaboration), "Comparison of ZEUS Data with Standard Model Predictions for e+ p→ e+ X Scattering at High x and Q2" Zeitschrift fur Physik C74 (1997) 207–220.
43. M. Derrick et al, (ZEUS Collaboration), "Measurement of αS from Jet Rates in Deep Inelastic Scattering," Physics Letters B363 (1995) 201–216.
44. D. Acosta, B. Bylsma, L.S. Durkin, J. Gilmore(*), K. Honscheid, C.G. Li(*), T.Y. Ling, K. McLean(**), W.N. Murray(**), I.H. Park(**), R. Seidlein(*), "A

Scintillating Fiber Design for a ZEUS Barrel Calorimeter Shower Maximum Detector," Nuclear Instruments and Methods A354 (1995) 296–308.
45. M. Artuso et al. (CLEO Collaboration), "Measurement of the Cross-Section for γγ →p p," Physical Review D50 (1994) 5484–5490.
46. J. Dominick et al., (CLEO Collaboration), "Two-Photon Production of Charged Pion and Kaon Pairs," Physical Review D50 (1994) 3027–3037.
47. D. Acosta et al. (SPACAL collaboration), "Lateral Shower Profiles in a Lead/Scintillating Fiber Calorimeter," Nuclear Instruments and Methods A316 (1992) 184–201.
48. D. Acosta et al. (SPACAL collaboration), "Detection of Muons with a Lead/Scintillating Fiber Calorimeter," Nuclear Instruments and Methods A320 (1992) 128–143.
49. D. Acosta et al. (SPACAL collaboration), "The Performance of a Lead/Scintillating Fiber Calorimeter at LHC/SSC Compatible Gate Widths," Nuclear Instruments and Methods A314 (1992) 431–449.
50. D. Acosta et al. (SPACAL collaboration), "Effects of Radiation Damage on Scintillating Fiber Calorimetry," Nuclear Instruments and Methods B62 (1991) 116–132.
51. D. Acosta et al. (SPACAL collaboration), "On Muon Production and Other Leakage Aspects of Pion Absorption in a Lead/Scintillating Fiber Calorimeter," Nuclear Instruments and Methods A309 (1991) 143–159.
52. D. Acosta et al. (SPACAL collaboration), "Electron, Pion and Multiparticle Detection with a Lead/Scintillating Fiber Calorimeter," Nuclear Instruments and Methods A308 (1991) 481–508.
53. D. Acosta et al. (SPACAL collaboration), "Localizing Particles Showering in a Spaghetti Calorimeter," Nuclear Instruments and Methods A305 (1991) 55–70.
54. D. Acosta et al. (SPACAL collaboration), "Electron-Pion Discrimination with a Scintillating Fiber Calorimeter," Nuclear Instruments and Methods A302 (1991) 36–46.
55. D. Acosta et al. (SPACAL collaboration), "Results of Prototype Studies for a Spaghetti Calorimeter," Nuclear Instruments and Methods A294 (1990) 193–210.

Reviews

- D.E. Acosta and S.K. Blessing, “Leptoquark Searches at HERA and the Tevatron,” Annual Reviews of Nuclear and Particle Science 49 (1999) 389–434.

Invited Papers, Lectures, and Seminars Presented:

1. “Physics Potential, Accelerator Options, and Experimental Challenges of a TeV-Scale Muon-Ion Collider”, 42nd International Conference on High Energy Physics (ICHEP2024), Prague, Czech Republic, July 19, 2024
2. “Physics Potential of a TeV-Scale Muon-Ion Collider”, LoopFest XXII, Dallas, TX, USA, May 22, 2024
3. “Physics Potential, Accelerator Options, and Experimental Challenges of a TeV-Scale Muon-Ion Collider”, Center for Frontiers in Nuclear Science, virtual (Zoom), March 26, 2024

4. “Concept and Physics Potential of a Muon-Ion Collider”, The First Workshop on the Muon-Ion Collider, Rice University, December 13, 2023
5. “Muon-Ion Collider Physics Perspectives”, CFNS Workshop on Using muons from backscattered photons on targets for various studies at the EIC (Virtual), April 5, 2023
6. “Physics Potential of a TeV Muon-Ion Collider”, DIS 2022: XXIX International Workshop on Deep-Inelastic Scattering and Related Subjects, Santiago de Compostela, Spain, May 3, 2022
7. “Ordering Muons off the Collider Menu for Measurement & Discovery”, colloquium, Baylor University, April 20, 2022
8. “A Muon-Ion Collider at BNL”, seminar, Southern Methodist University, Dallas, TX, November 15, 2021
9. “A Muon-Ion Collider at BNL”, seminar, Peking University (Virtual), October 19, 2021
10. “The CMS Trigger System”, Pitt PACC Workshop: LHC physics for Run 3 (Virtual), April 7, 2021
11. “Ordering Muons off the Collider Menu - a taste of the physics at the Large Hadron Collider”, colloquium, Dept. of Physics and Astronomy, Rice University (virtual), February 25, 2021
12. “Evidence for the Higgs Boson Decay to Dimuons”, seminar, Bartol Research Institute, University of Delaware (Virtual), November 5, 2020
13. “Introduction to Trigger and DAQ Systems”, 2 (virtual) lectures given at the 15th annual Hadron Collider Physics Summer School, Fermilab, August 17,18, 2020
14. “Conveying the Science of the Large Hadron Collider”, American Association of Physics Teachers Winter 2020 conference, Orlando, FL, Jan.19, 2020.
15. “Triggers for Hadron Collider Physics”, Symposium on Triggering Particle Physics Discoveries, Madison, WI, Aug.30, 2019
16. "Trigger electronics technologies for current and future particle physics collider experiments", ASET colloquium, Tata Institute of Fundamental Research, Mumbai, India, Jan.18, 2019
17. "Results from the CMS Experiment at 13 TeV", Physics colloquium, Tata Institute of Fundamental Research, Mumbai, India, Jan.17, 2019
18. "Electronics, Trigger, and DAQ for High-Energy Physics Experiments" 4 lectures given at the XII SERB School on Experimental High Energy Physics, Tata Institute of Fundamental Research, Mumbai, India, Jan. 16-18, 2019
19. "Results from the CMS Experiment at 13 TeV", MIAMI conference, Ft. Lauderdale, FL, Dec.15, 2018
20. “Good Memory and Neural Nets Machine Learning in the (L1) Trigger”, Workshop on Triggering on New Physics at the HL-LHC, Princeton Center for Theoretical Physics, Princeton, NJ, 15-17 January, 2018.
21. “Searches for Supersymmetry with the CMS Detector”, seminar, Rice University, Houston, TX, October 14, 2016.
22. “CMS Phase-2 Trigger Upgrade Plans and R&D,” New Technologies for Discovery, Meeting of the Coordinating Panel for Advanced Detectors of the APS Division of Particles and Fields, Arlington, Texas, October 5-7, 2015.

23. **"**Using FPGAs to find the Higgs Boson and Other Interesting Particles", seminar, ECE Department, UF, October 23, 2014.
24. "CMS Trigger Improvements Towards Run II", 37th International Conference on High Energy Physics, Valencia, Spain, July 5, 2014
25. "Recent Results from the CMS Experiment", Southeast Section of the American Physical Society (SESAPS), Bowling Green, KY, November 22, 2013
26. "CMS Results from the First Two Years of Operation of the LHC", 11th Conference on the Intersections of Particle and Nuclear Physics (CIPANP), St. Petersburg, Florida, May 29, 2012
27. "Results from the CMS Experiment after the First Year of LHC Operation", seminar, SUNY Stony Brook, November 8, 2010.
28. "Status and Plans of the CMS Experiment", Miami 2009 conference, Ft. Lauderdale, FL, December 17, 2009
29. "First Glimpse of LHC Data with the CMS Experiment", colloquium, Brown University, Providence, RI, November 3, 2008
30. "Status and Prospects of the CMS Experiment at the LHC", invited talk at the Meeting of the Southeast Section of the American Physical Society, Raleigh, North Carolina, October 30, 2008
31. "LHC First Beams and the Achievements and Prospects of the CMS Experiment", colloquium, University of Florida, October 2, 2008
32. "Status of CMS Commissioning", International Workshop on Top Quark Physics (TOP2008), Isola d'Elba, Italy, May 19, 2008
33. "CMS Commissioning", seminar, University of Florida, January 10, 2007
34. "Preparing CMS for First Physics at the Large Hadron Collider", seminar, University of California, Los Angeles, October 17, 2007
35. "CMS Commissioning", Fermilab Wine & Cheese seminar, October 12, 2007
36. "Preparing for the LHC: Physics Commissioning", (4 lectures), Second CERN-Fermilab Hadron Collider Physics Summer School, CERN, Geneva, Switzerland, June 6-15, 2007
37. "SUSY Physics at the LHC," Hadron Collider Physics Symposium 2006, Durham, North Carolina, May, 2006
38. "The Promise of the LHC", Southeast APS Conference, Gainesville, Florida, November, 2005
39. "Preparations for Physics at the Large Hadron Collider using the CMS Detector," Colloquium, Illinois Institute of Technology, October 2004.
40. "The Hunt for Fundamental Scalar Particles at Proton Colliders," Colloquium, University of California, Davis, March 2004
41. "The Challenge of Extracting New Physics from the Data-Rich Environment of the LHC," University of California, Davis, March, 2004
42. "The Hunt for Fundamental Scalar Particles at Proton Colliders," University of Wisconsin, February, 2004
43. "Detecting Massive Scalar Particles with Massive Detectors," Florida Institute of Technology, Sigma Pi Sigma, April 2003
44. "What the LHC Can Teach Us About Low Energy Supersymmetry," Aspen Winter Conference on Particle Physics, Aspen, Colorado, January 2003

45. "Supersymmetry at the LHC: Searches, Discovery Windows, and Expected Signatures," Hadron Collider Physics Conference 2002, Karlsruhe, Germany, October 2002

Recent Contributed Papers and Presentations at Meetings

1. P. Kelling, D. Acosta, O. Miguel Colin, S. Jindariani, J. Konigsberg, J. Fu Low, A. Madorsky, E. Yiğitbaşı, "Design and deployment of a fast neural network for measuring the properties of muons originating from displaced vertices in the CMS Endcap Muon Track Finder", Topical Workshop on Electronics for Particle Physics (TWEPP2024), Glasgow, United Kingdom, Oct. 1, 2024
2. Darin Acosta, Andrew Brinkerhoff, Elena Busch, Andrew Carnes, Ivan Furic, Sergei Gleyzer, Khristian Kotov, Jia Fu Low, Alexander Madorsky, Jamal Rorie, Bobby Scurlock, and Wei Shi, "Boosted Decision Trees in the Level-1 Muon Endcap Trigger at CMS", 18th International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT), Seattle, WA, 21-25 August 2017.
3. A. Madorsky, …, D. Acosta, …, "Electronics for CMS Endcap Muon Level-1 Trigger System Phase-1 and HL LHC Upgrades Summary", Instrumentation for Colliding Beam Physics (Instr17), 27 Feb-3 Mar 2017, Budker Institute of Nuclear Physics, and Novosibirsk State University, Novosibirsk (Russian Federation)
4. N.P. Ghanathe, A. Madorsky, H. Lam, D.E. Acosta, A.D. George, M.R. Carver, Y. Xia, A. Jyothishwara and M. Hansen, "Software and firmware co-development using high-level synthesis**",** Topical Workshop on Electronics for Particle Physics (TWEPP2016), Karlsruhe, Germany, September 26-30, 2016.
5. B. Regnery, D. Acosta, J. Hugon, "A Study to Enhance the Sensitivity for the Discovery of the Higgs Boson Coupling", Meeting of the American Physical Society, Division of Particles and Fields (APS April Meeting), Baltimore, MD, April 11-14, 2015.
6. D. Acosta,[a] G. Brown[a,] A. Carnes[a,] M. Carvera, D. Currya, G. P. Di Giovannia, I. Furic[a], A. Kropivnitskaya[a], A. Madorsky[a*], M. Matveev[b], P. Padley[b], D. Rank[a], C. Reeves[a], B. Scurlock[a], S. Wang[a], "The CMS Modular Track Finder Boards, MTF6 and MTF7", Topical Workshop on Electronics for Particle Physics (TWEPP2013), Perugia, Italy, 23-27 September 2013

Conference and Workshop Organization

- Co-organizer of The First Workshop on the Muon-Ion Collider, Rice University, December 13-15, 2023
- Co-convener of Trigger/DAQ subgroup of the Snowmass Instrumentation Frontier community working group (2020-2022)
- Co-convener of Trigger/DAQ subgroup of DOE Basic Research Needs Instrumentation R&D panel (Workshop and report, Dec.2019, Washington, D.C.)
- Co-organizer of Trigger/DAQ session of the Coordinating Panel for Advanced Detectors (CPAD) workshop for the APS DPF (Oct.2017, Albuquerque, NM)

- Co-organizer and chair of the Phenomenology session for the 15th International Conference on Supersymmetry and the Unification of Fundamental Interactions (SUSY07), Karlsruhe, Germany, July 26 - August 1, 2007

Service Activities

Professional:

- Mentor: US CMS PURSUE summer research students (2022, 2023, 2024)
- LHC Physics Center Management Board member (2023–)
- CMS Supersymmetry Publications Committee member (2016–)
- CMS TriDAS Institution Board Chair (2018-2021)
- U.S. ATLAS HL-LHC Upgrade Project DOE OPA IPR Review (2024)
- DOE/NSF US ATLAS Operations Review panelist (2017, 2024)
- BNL ATLAS Directors Review (2023)
- DOE Energy Frontier Panel reviewer, university program (2017, 2019, 2024)
- DOE FAIR review (2024)
- DOE SBIR review (2023)
- DOE Panel reviewer, National Laboratories (2022)
- Swiss National Science Foundation proposal review (2022, 2023, 2024)
- Journal referee for Nuclear Instruments & Methods A (2024)
- Journal referee for Nature Communications (2023)
- DOE/SC CD-2/3 Panel Review of the HL-ATLAS Project (2022)
- DOE Instrumentation multi-institution R&D proposal review (2021)
- NSF panel reviewer (2018, 2022)
- Reviewer for NSF ECAS Internet2 proposal (2020)
- Journal referee for IEEE Transactions on Nuclear Science (2021)
- US LHC Users Association Executive Committee (2013-2020)
- DOE Panel reviewer for CD-2/3a (Jan.24-25, 2012)
- Chair, Resource Allocation Advisory Board for U.S. CMS Operations (2016)
- Department of Energy CD-2/CD-3 Review of US ATLAS (3 days @ Brookhaven National Lab in October 2014)
- Advisory Committee of CERN Users, non-member states representative (2006–2013)
- Member of the Management Board of the LHC Physics Center (LPC) at Fermilab (2010-12)
- Member of the LPC Guest Programme Committee at Fermilab (2010-12)
- Journal referee for Journal of Instrumentation, Physical Review Letters, Physics Letters B, Journal of Physics G, Physica Scripta, IEEE Transactions on Nuclear Science
- Reviewer for NSF (CAREER, Cooperative Agreements, Mid-scale Research Infrastructure, institutional proposals)
- Reviewer for DOE (Comparative reviews)
- Reviewer for Danish Council for Independent Research
- Reviewer for Swiss National Science Foundation

- Reviewer for Netherlands NOW proposal (2018)
- Member of the 2013 Panofsky Prize Selection Committee for the APS Division of Particles and Fields
- Evaluation letters for junior scientists and faculty promotions

Rice University:
- Rice SURF mentor (2022, 2023, 2024)
- Triad mentor, Office of Faculty Development (2024)
- Faculty Initiative Fund (FIF), reviewer (2022)

Rice University, School of Natural Sciences:
- Natural Sciences Award committee (2023–, chair 2024–)

Rice University, Department of Physics & Astronomy:
- Gulf Coast Undergraduate Research Symposium faculty mentor (2023, 2024)
- Research mentor of 3 (non-SURF) Rice undergraduate students (2023–)
- Department award committee (chair, 2023–)
- Wilson thesis award committee (2023, 2024)
- PAGSA and APS Chapter faculty advisor (2023–)
- Undergraduate program committee (2021–)
- DEI Committee member (2022–)
- Graduate admissions (2022–)
- Instructor Search Committee (2022-23)

Texas Secondary Schools:
- Mentor for Independence High School student on science project (2023)
- Mentor for Vanguard High School student AP Capstone project (2022)
- Research mentor for St. John's School High School student (summer 2022)

University of Florida, Liberal Arts & Sciences:
- McNair Scholar mentor (2020)
- University Scholars undergraduate mentor (2000, 2002, 2015-16, 2019-20)
- SSTP research advisor for two high school students (summers 2011, 2017)
- Mentor for the NSF Research Experience for Undergraduates program at the University of Florida, 9 students, (1999-2004)
- UMMP Minority mentor program (2013-14, 2014-15, 2015-16, 2016-17)
- Faculty Advisory Committee to UF Online (2015-2018)
- CLAS Committee to Review UF Quest impact
- Marshall for Commencement

University of Florida, Department of Physics:
- Department Graduate Recruitment and Admissions Committee (2000-03, 2018–2021)
- Department Advisory Committee (2004–06, 2007–09, 2011–13, 2014-15, 2015-16, 2018-19, 2021)

- Department Salary Review Committee (2003-06, 2016-17, 2019-20)
- Department High Energy Theory faculty search committee (2017-18)
- Department staff search committee (2018)
- Undergraduate physics majors advisor (2000–present)
- Advisor to the Society of Physics Students (2000–2003)
- Peer Review of Teaching committee
- Large course teaching committee
- Board member of IHEPA Center
- PHY2053 Textbook committee
- Preliminary Exam committee
- Research mentor for undergraduate physics students
- Recommendation letters for undergraduate and graduate students

Outreach:

- QuarkNet lecture, "QuarkNet lecture, "Standard Model and the LHC", Houston center, June 2024
- QuarkNet Masterclass lecture, "Particle Physics", Rice University, March 2024
- QuarkNet lecture, "Standard Model and the LHC", June 2023, Houston center
- QuarkNet Masterclass lecture, "Atoms to Quarks", Rice University, March 2023
- QuarkNet lecture on the 10th anniversary of the Higgs boson discovery, summer 2022, Houston center
- QuarkNet workshops for local high school and middle school teachers in Gainesville, FL, summers 2017, 2018, and 2020 (virtual), and earlier in 2000 and 2001.
- Presentation on "Robots at CERN" to Swampbot high school robotics team, Gainesville, FL, April 2019
- Presentation to Gainesville Sunshine Rotary Club talk on the CERN LHC, Sept.2017
- CODER workshop for high school teachers, University of Florida, with A.LaMee (UCF) and S.Gleyer (UF postdoc), Aug.1-3, 2016

Courses Taught, Rice University

- Mechanics Discussion (PHYS 103), Fall 2021. Discussions for first semester course covering mechanics.
- Waves, Light, and Heat (PHYS201), Fall 2022, 2023, 2024. A second-year course covering thermodynamics, oscillations, mechanical waves, sound, EM waves, light, optics, and interference and diffraction. Instructor effectiveness score average: 2.0 (best=1), Rice mean: 1.6
- General Physics II (PHYS126), Spring 2023, 2024. A second semester course covering waves, interference, electricity, circuits, magnetism, and some modern physics for life science majors. Primary lecturer. Instructor effectiveness score average: 2.47 (best=1), Rice mean: 1.62

Courses Taught, University of Florida

- Introduction to Modern Physics (PHY3101), 2020-2021, 1998-2001. A third semester course in physics covering relativity, quantum mechanics, and selected topics. Student evaluation average (best=5): 4.6 (Dept. mean 3.8, College mean 4.2)
- Introduction to Elementary Particle Physics (PHZ4390), 2017-2019. Upper division elective course. Student evaluation average (best=5): 4.9 (Dept. mean 4.0, College mean 4.3)
- Physics 1 with Calculus (PHY2048), 2014-2020. First semester course on mechanics for scientists and engineers. Student evaluation average (best=5): 4.5 (Dept. mean 4.1, College mean 4.3)
- Physics 2 with Calculus (PHY2049), 2004-2015. Second semester course on electromagnetism for scientists and engineers. Student evaluation average (best=5): 4.2 (Dept. mean 3.9, College mean 4.2)
- Enriched Physics 2 (PHY2061), 2004-2006. Honors second semester course on electromagnetism, including relativity and vector calculus. Student evaluation average (best=5): 4.6 (Dept. mean 3.8, College mean 4.2)
- Advanced Physics Lab 2 (PHY4803L), 2001-2003. A junior/senior-level lab course that covers the major topics in modern physics. Student evaluation average (best=5): 4.5 (Dept. mean 3.9, College mean 4.2)

Teaching Achievements and Innovation, University of Florida

For the Fall 2014, Spring 2015, and Fall 2016 semesters I was assigned to co-develop the online courses PHY2048 and PHY2049 (Physics 1 and 2 with Calculus) and PHY2053 (Physics 1 with Algebra) for UF Online, the online degree program at the University of Florida. I specifically recorded the lecture videos for these courses using a new "lightboard" recording studio the Department developed in 2014. The lightboard features a large 8 foot piece of glass that glows when you write on it, allowing you to face the camera while speaking. Approximately 100 videos were recorded for each of these courses. I have innovated with some special effects for the many demonstrations incorporated, such as stop-action video and the overlay of writing and images/videos with the camera. These have been very successful for our online courses, adapted also to lower level physics courses by other instructors. One such course won an internal university excellence award.

This repository of videos now accompanies our large face-to-face lecture courses, and in Fall 2015 we also experimented with a "flipped classroom" for PHY2049. During the COVID pandemic in 2020, these lecture videos were heavily relied on by the University of Florida Physics Department for the Spring, Summer, and Fall semesters as a primary source of content.

In teaching PHY3101 (Modern Physics) for Fall 2020 at the University of Florida, I similarly prerecorded all lectures and ran a flipped classroom online. This upfront development allowed for more in-class discussion time, and most days students spent 15-20 minutes in Zoom breakout rooms working on assigned problems.