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Education

Ph.D. Physics University of Illinois, Urbana-Champaign, 2003

B.A. Physics, Math, and English St. Norbert College, DePere, WI, May 1997.

Experience

Professor, University of Notre Dame, 2020–present.

Associate Professor, University of Notre Dame, 2014–2020.

Assistant Professor, University of Notre Dame, 2008–2014.

Postdoctoral Researcher, The Ohio State University, 2003–2008.

Research Assistant, University of Illinois at Urbana-Champaign, 1998–2003.

Summer Research Participant, Argonne National Laboratory, Summers 1994–1997.

Awards

CAREER Award, National Science Foundation, 2010

Giulio Ascoli Award for Demonstrating Excellence and Originality in the Study of High Energy Physics, 2001

Excellence in Teaching Award, University of Illinois, Fall 1997 and Spring 1998

Rev. Patrick N. Butler Award for Excellence in English Studies, 1997

William J. O’Callahan Award in the Arts and Sciences, 1997

Physics Award St. Norbert College, 1997

St. Norbert College Alumni Association Award for Highest Academic Achievement, 1997

GTE Academic All-American Second Team, Cross Country and Track, 1996–1997

English Faculty Endowed Scholarship, St. Norbert College, 1996

Midwest Conference Academic All-Conference, Cross Country, Indoor Track, and Outdoor Track (12 seasons total), 1994–1997

Distinguished Trustees Scholarship, St. Norbert College, 1993

Affiliations

Sigma Pi Sigma, American Physical Society, Division of Particles and Fields, Society of Catholic Scientists

Service to the Department

Graduate Recruitment Committee, 2008–2013, 2017–present

High Energy Physics Seminar Organizer, 2008–2013

Computer Committee, 2008–2009, 2010–2011, 2016–present

Undergraduate Curriculum, 2011–2012, 2018–present

Graduate Preliminary Exam Committee, 2012–2014

Graduate Admissions Committee, 2013–present

Graduate Curriculum Committee, 2016–2017

Service to the College of Science

Computing Committee, 2011–2013

College Council, 2016–present

Organizer for the 2nd Annual Notre Dame Gold Mass, 2018

Honesty Committee, 2018–present

Service to the University

University Committee on First Year Studies, 2013–2016

Center for Research Computing Faculty Advisory Committee, 2016–present

Faculty Affairs, Research, and Scholarship Committee of the Board of Trustees, 2017–present

Service to the Field

Organizing Committee for the U.S. CMS Collaboration Meeting, 2011

Reviewed NSF proposals including CAREER grants, 2011–present

U.S. CMS Collaboration Board Computing Liaison, 2013–2015

Chaired the U.S. CMS Committee to Review Analysis Computing, 2013–2014

U.S. CMS University Computing Facilities Co-Leader, 2015–2019

Co-Chaired the U.S. CMS Tier 2 Budget Reduction Committee, 2015–2016

Organizer for the U.S. CMS Facilities Workshop at the Open Science Grid All-Hands Meeting, 2015–2019

Chaired the CMS Workflow Management Review Committee, 2018–2019

CMS Tracker Upgrade Data Processing Systems Software Coordinator, 2018–present

U.S. CMS Software Co-Leader, 2019–present

Organizing Committee for the 2021 Top Quark International Workshop, 2019–present

CMS Workflow and Data Management (WMDM) Co-Leader, 2020–present

Faculty Mentoring

Second-Year Faculty Panel, New Faculty Orientation, 2009

NSF CAREER Panel Discussion, Office of Research, 2011

Junior Faculty Mentoring Committee, Prof. Manoel Couder, 2015–2019

Postdoctoral Researchers

2009–2013 Jason Slaunwhite Senior Systems Software Engineer at Microfocus Vertica

2014–2019 Geoffrey Smith Seeking data science position

2015–2019 Kenyi Hurtado HPC Engineer at Notre Dame's Center for Research Computing

Graduate Students

2008–2013	Tessa Pearson*	Lead ML/AI Engineer in Research at HERE Technologies
2008–2014	Wuming Luo	Faculty at the Institute of High Energy Physics (IHEP) in Beijing
2009–2015	Andrew Brinkerhoff	Assistant Professor at Baylor University
2011–2017	Charles Mueller	Data Scientist at GoGo Inflight Internet
2010–2018	Anna Woodard	Postdoc in Computer Science at the University of Chicago
2014–present	Andrew Wightman	
2016–present	Ian McAlister**	
2017–present	Kelci Mohrman	
2018–present	John Lawrence	
2019–present	Connor Moore	

* Co-advised with Prof. Randal Ruchti

** Co-advised with Prof. Mitchell Wayne

Undergraduate Students

2010	Kathryn Gerbich	2015–2016	Gregory Greif*
2010	Shannon Hughes*	2015–2016	Colin Dablain
2011–2012	Patrick Marino*	2015–2017	Ben Cote*
2010–2013	Kevin McDermott*	2016–2017	Tanner Leighton*
2011–2013	Timothy O’Brien	2016–2017	Ryan Kim*
2012–2013	Chris Henneman*	2017	Patrick McGuire
2013	Hanyi Yi*	2014–2018	Kaitlin Salyer*
2011–2014	Rachael Creager*	2015–2018	Patrick Shields*
2012–2014	Anthony Lefeld	2015–2019	Matthew Drnevich
2012–2014	Christopher Barnes*	2019	Connor Sabers
2013–2014	Dillon Bak*	2019	Jacob Mozdzen
2014	Bobby Flores*	2019	Rachel Rigsby
2015	Max Kempf*	2018–2020	Justin Dragoo*
2015	Callaghan Commers*	2018–2020	Kevin Greif*
2015	Eoghan Flannagan*	2018–2020	Arianna Garcia*
2013–2015	William McCormack	2019–present	Tianyi Wang*
2015–2016	John Charters*	2019–present	Jamie Harkin*
		2019–present	Robert Stiller*

*Co-advised with Prof. Michael Hildreth

REU Students

In addition to regularly mentoring students as part of the physics department REU program, I was co-PI of the Data Intensive Scientific Computing (DISC) REU from 2016-2018 and advised several students through that REU program.

2010	Angela Galvez*, Kathryn Gerbich (ND)
2011	Joshua Hardin*, Kevin McDermott* (ND)
2012	Michael Swift*, Rachael Creager* (ND)
2013	Edward Varty*, Hanyi Yi* (ND)
2014	Samantha Koutsares*, Patrick Moran*
2015	Carlos Buxo*, John Charters* (ND), Kaitlin Salyer* (ND)
2016	Marybeth Beydler, Matthew Link**, Anna Yannakopoulos**, John Charters* (ND), Ben Cote* (ND), Colin Dablain** (ND), Matthew Drnevich** (ND), Patrick Shields* (ND)
2017	Ariella Atencio*, Bryan Harris**, Jessica Stietzel**
2018	Brooke Emison*, Diego Fernandez**, Khaya Klanot**, Christopher McGrady*, Kevin Greif* (ND)
2019	Mary-Ellen Phillips*, Arianna Garcia* (ND), Tianyi Wang* (ND)
2020	Amanda Ehnis*

*Co-advised with Prof. Michael Hildreth

**DISC REU

Grants

- Research in Collider Physics (NSF PHY-0701621), Jan. 2009–May 2011
- Research in Collider Physics (NSF PHY-0969524), Aug. 2010–July 2013
- CAREER: Understanding Particle Masses through Studying Higgs Produced in Association with Top Quarks at CMS (NSF PHY-0955765), July 2010–Jun. 2015
- Research in Collider Physics (NSF PHY-1312842), Aug. 2013–July 2016
- CC-NIE Networking Infrastructure: Accelerating Research Data Transit Between the Scientist’s Desktop, Campus, and National Cyberinfrastructure (NSF ACI-1340990), Jan. 2014–Dec. 2015
- REU Site: Data Intensive Scientific Computing (DISC) (NSF IIS-1560363), Feb. 2016–Jan. 2019
- Virtual Clusters for Community Computation (VC3) (DOE DE-SC0015711.0002), Mar. 2016–Feb. 2019
- Fermi National Laboratory Support for Postdoctoral Researcher, Mar. 2015–Mar. 2017
- Research in Collider Physics (NSF PHY-1607578), Sep. 2016–Aug. 2019
- U.S. CMS Operations at the Large Hadron Collider, NSF subaward from Princeton, Jan. 2017–Dec. 2022
- CC* Compute: CAML - Accelerating Machine Learning via Campus and Grid (NSF OAC-1925645), July 2019–Jun. 2021
- Research in Collider Physics (NSF PHY-1914059), Sep. 2019–Aug. 2022
- Upgrades of the Barrel Calorimeter and Track Trigger for the CMS experiment at the High-Luminosity Large Hadron Collider (NSF PHY-1946735), Apr. 2020–Dec. 2026

Invited Talks and Seminars

Outside Notre Dame

1. “Reaching Beyond the LHC Energy with Top Quarks,” Kansas State University, Oct. 14, 2019
2. “Top Quark Multilepton Signatures as a Window into New Physics,” Michigan State University, Oct. 2, 2018
3. “Higgs Physics from the Bottom Down (Higgs physics beyond $t\bar{t}H$),” 11th International Workshop on Top Quark Physics (TOP 2018), Bad Neuenahr, Germany, Sep. 20, 2018
4. “Recent Top Physics Results from CMS,” Lake Louise Winter Institute, Canada, Feb. 19, 2018
5. “Big Data Leads to Big Discoveries at the LHC,” Colloquium for the Physics and Computer Science Departments at College of the Holy Cross, Worcester, MA, Nov. 2, 2017
6. “Associated Production of Bosons and Top Quark Pairs as a Window on New Physics,” Cornell University, Oct. 28, 2016
7. “VC3 - R&D for Virtual Clusters,” Open Science Grid All Hands Meeting, Clemson University, Mar. 15, 2016
8. “Top Quark Physics,” Meeting of the Division of Particles and Fields of the American Physical Society, Ann Arbor, MI, Aug. 5, 2015
9. “Search for Higgs Produced in Association with Top Quark Pairs,” Argonne National Laboratory, Nov. 26, 2013
10. “Search for Higgs Produced in Association with Top Quark Pairs,” Karlsruhe Institute of Technology, Karlsruhe, Germany, Oct. 24, 2013
11. “Search for Higgs Produced in Association with Top Quark Pairs,” Deutsches Elektronen-Synchrotron (DESY) Laboratory, Hamburg, Germany, Oct. 23, 2013
12. “Search for Higgs Produced in Association with Top Quark Pairs,” University of Illinois at Urbana-Champaign, Oct. 7, 2013
13. “Backgrounds to Top Pair Associated Higgs Production and MC Tools,” 6th International Workshop on Top Quark Physics, Durbach, Germany, Sep. 18, 2013
14. “Recent Results from CMS,” SLAC Summer Institute, Jul. 9, 2013
15. “Higgs Decaying into Bottom Quarks,” Higgs Coupling Conference, Tokyo, Japan, Nov. 18, 2012
16. “Search for Higgs Produced in Association with Top Quark Pairs,” Purdue University, Nov. 6, 2012
17. “Search for Higgs Produced in Association with Top Quark Pairs,” University of Wisconsin, Oct. 30, 2012
18. “ $t\bar{t}H$ at CMS and ATLAS,” CERN Collider Cross Talk series, Geneva, Switzerland, Oct. 18, 2012
19. “Search for Higgs Produced in Association with Top Quark Pairs,” Indiana University, Oct. 22, 2012
20. “Search for Higgs Produced in Association with Top Quark Pairs,” Michigan State University, Sep. 25, 2012
21. “Search for Higgs Produced in Association with Top Quark Pairs,” University of Michigan, Sep. 24, 2012
22. “CMS Status,” 4th International Workshop on Top Quark Physics, Sant Feliu de Guixols, Spain, Sep. 26, 2011

23. “Top Physics with CMS,” Conference on First LHC Data, University of Michigan, Dec. 13, 2010
24. “Observation of Single Top at CDF,” CERN Joint EP/PP Seminar, Geneva, Switzerland, Mar. 31, 2009
25. “Measurement of Single Top Quark Production at CDF,” University of Wisconsin-Madison, Apr. 14, 2008
26. “Digging Up Top and Higgs at CDF,” Colloquium, University of Nebraska-Lincoln, Mar. 31, 2008
27. “Digging Up Top and Higgs at CDF,” Colloquium, Iowa State University, Mar. 10, 2008
28. “Pushing the Limits: From Top to Higgs at CDF,” University of California-Davis, Feb. 26, 2008
29. “Pushing the Limits: From Top to Higgs at CDF,” University of Massachusetts-Amherst, Feb. 22, 2008
30. “Pushing the Limits: From Top to Higgs at CDF,” Fermi National Accelerator Laboratory, Feb. 15, 2008
31. “Digging Up Top and Higgs at CDF,” Colloquium, University of Illinois-Chicago, Feb. 13, 2008
32. “Top Quark Physics at the Tevatron,” Fermilab Users’ Meeting, Jun. 6, 2007
33. “Recent Measurements of the Top Quark from Fermilab,” April APS Meeting, Apr. 15, 2007
34. “Search for New Phenomena in the CDF Top Quark Sample,” Southern Methodist University, Feb. 5, 2007
35. “Search for New Phenomena in the CDF Top Quark Sample,” University of Illinois at Urbana-Champaign HETEP, Jan. 29, 2007
36. “Search for New Phenomena in the CDF Top Quark Sample,” Argonne National Laboratory HEP Division, Oct. 11, 2006
37. “Search for New Phenomena in the CDF Top Quark Sample,” SUSY 06, 14th International Conference on Supersymmetry, and the Unification of Fundamental Interactions, Jun. 12, 2006
38. “Search for Single-Top Production at CDF,” PHENO 06 Symposium, May 16, 2006
39. “Measuring B Hadron Correlations at CDF,” The Ohio State University, Jun. 18, 2003

Within Notre Dame Community, Including Public Lectures

1. “Big Data Leads to Big Discoveries at the LHC,” Quarknet Summer Lunchtime Talks, July 16, 2019
2. “Big Data Leads to Big Discoveries at the LHC,” CRC Summer Scholars program, July 2, 2019
3. “Discovering the Other 95% of the Universe: What’s Next at the LHC?” Junior Parents’ Weekend, February 16, 2019
4. “Big Data Leads to Big Discoveries at the LHC,” Quarknet Summer Lunchtime Talks, July 6, 2018
5. “Big Data Leads to Big Discoveries at the LHC,” CRC Summer Scholars program, July 2, 2018
6. “Deep Learning,” Machine Learning Workshop, Center for Research Computing, June 22, 2018.
7. “The Martian,” Warrior Scholars Program, June 15, 2018.

8. "Big Data Leads to Big Discoveries at the LHC," DISC REU Lunch Seminar, May 31, 2018
9. "Discovering the Other 95% of the Universe: What's Next at the LHC," Junior Parents' Weekend, February 17, 2018
10. "Deep Learning," DISC REU Training Seminar, July 19, 2017.
11. "Big Data Leads to Big Discoveries at the LHC," CRC Summer Scholars program, June 30 2017
12. "Big Data Leads to Big Discoveries at the LHC," DISC REU Lunch Seminar, June 8, 2017
13. "Discovering the Other 95% of the Universe: What's Next at the LHC," Junior Parents' Weekend, February 18, 2017
14. "Big Data Leads to Big Discoveries at the LHC," CRC Summer Scholars program, July 5, 2016
15. "Deep Learning," DISC REU Training Seminar, June 15, 2016.
16. "Big Data Leads to Big Discoveries at the LHC," DISC REU Lunch Seminar, May 26, 2016
17. "CMS Data Analysis with Lobster and Workqueue," Cooperative Computing Laboratory Workshop, Oct. 19, 2016
18. "Discovering the Other 95% of the Universe: What's Next for the LHC," Our Universe Revealed Public Lecture Series, Oct. 6, 2016
19. "Discovering the Other 95% of the Universe: What's Next at the LHC," Junior Parents' Weekend, February 20, 2016
20. "After the Higgs: Discovering the Other 95% of the Universe," Notre Dame Physics REU Seminar, July 8, 2015
21. "Discovering the Other 95% of the Universe: True Stories From the Energy Frontier," Junior Parents' Weekend, February 21, 2015
22. "Big Data Leads to Big Discovery: A New Particle Discovered at the LHC," CRC Summer Scholars program, July 7, 2014
23. "After the Higgs: Discovering the Other 95% of the Universe," Notre Dame Physics REU Seminar, May 28, 2014
24. "Searching for the Other 95% of the Universe: True Stories From the Energy Frontier", TEDx-UND, Feb. 27, 2014
25. "Big Data Leads to Big Discovery: A New Particle Discovered at the LHC," CRC Summer Scholars program, July 8, 2013
26. "Scaling Up CMS Tier-3 Data Processing," Cooperative Computing Laboratory Workshop, Oct. 11, 2012
27. "The Higgs Boson: Beyond the Headlines," Nieuwland Lecture Series, Sep. 6, 2012
28. "Notre Dame Science and the Higgs Boson," Notre Dame Leadership Seminar, Jul. 26, 2012
29. "The Big Higgs Announcement: What Does it Mean?", Notre Dame Physics REU Seminar, Jul. 19, 2012
30. "How Grid Computing Helped to Discover the Higgs Boson," Notre Dame Center for Research Computing Summer Scholars Program, Jul. 16, 2012
31. "LHC: Searching for the Other 96% of the Universe," *Scientia* Presentation, Sep. 15, 2011
32. "Particle Physics on the Grid: The CERN CMS Experiment at Notre Dame," Notre Dame Center for Research Computing Summer Scholars Program, Jun. 20, 2011
33. "What's the Big Deal About the Higgs," Notre Dame Physics REU Seminar, Jul. 28, 2010
34. "Last Lecture," Last Lecture Series, Dec. 2, 2010

Publications

In the field of particle physics, it is customary to list all members of an experimental collaboration in alphabetical order (in some cases first sorted by institution). Below is a list of selected publications in which I played a significant role, either as a primary author or as an important contributor. After this, I give my full list of publications.

Selected Publications

Refereed Journals

1. A. M. Sirunyan *et al.* [CMS Collaboration], “Observation of $t\bar{t}H$ production,” *Phys. Rev. Lett.* **120**, no. 23, 231801 (2018)
doi:[10.1103/PhysRevLett.120.231801](https://doi.org/10.1103/PhysRevLett.120.231801),[10.1130/PhysRevLett.120.231801](https://doi.org/10.1130/PhysRevLett.120.231801) [[arXiv:1804.02610](https://arxiv.org/abs/1804.02610)] [[hep-ex](#)]
2. A. M. Sirunyan *et al.* [CMS Collaboration], “Evidence for associated production of a Higgs boson with a top quark pair in final states with electrons, muons, and hadronically decaying τ leptons at $\sqrt{s} = 13$ TeV,” *JHEP* **1808**, 066 (2018)
doi:[10.1007/JHEP08\(2018\)066](https://doi.org/10.1007/JHEP08(2018)066) [[arXiv:1803.05485](https://arxiv.org/abs/1803.05485)] [[hep-ex](#)]
3. A. M. Sirunyan *et al.* [CMS Collaboration], “Measurement of the cross section for top quark pair production in association with a W or Z boson in proton-proton collisions at $\sqrt{s} = 13$ TeV,” *JHEP* **1808**, 011 (2018)
doi:[10.1007/JHEP08\(2018\)011](https://doi.org/10.1007/JHEP08(2018)011) [[arXiv:1711.02547](https://arxiv.org/abs/1711.02547)] [[hep-ex](#)]
4. V. Khachatryan *et al.* [CMS Collaboration], “Observation of top quark pairs produced in association with a vector boson in pp collisions at $\sqrt{s} = 8$ TeV,” *JHEP* **1601**, 096 (2016)
doi:[10.1007/JHEP01\(2016\)096](https://doi.org/10.1007/JHEP01(2016)096) [[arXiv:1510.01131](https://arxiv.org/abs/1510.01131)] [[hep-ex](#)]
5. V. Khachatryan *et al.* [CMS Collaboration], “Search for the associated production of the Higgs boson with a top-quark pair,” *JHEP* **1409**, 087 (2014) [Erratum-ibid. **1410**, 106 (2014)]
[[arXiv:1408.1682](https://arxiv.org/abs/1408.1682)] [[hep-ex](#)]
6. S. Chatrchyan *et al.* [CMS Collaboration], “Search for a standard-model-like Higgs boson with a mass in the range 145 to 1000 GeV at the LHC,” *Eur. Phys. J. C* **73**, 2469 (2013)
[[arXiv:1304.0213](https://arxiv.org/abs/1304.0213)] [[hep-ex](#)]
7. S. Chatrchyan *et al.* [CMS Collaboration], “Observation of a new boson with mass near 125 GeV in pp collisions at $\sqrt{s} = 7$ and 8 TeV,” *JHEP* **1306**, 081 (2013)
[[arXiv:1303.4571](https://arxiv.org/abs/1303.4571)] [[hep-ex](#)].
8. S. Chatrchyan *et al.* [CMS Collaboration], “Search for the standard model Higgs boson produced in association with a top-quark pair in pp collisions at the LHC,” *JHEP* **1305**, 145 (2013)
[[arXiv:1303.0763](https://arxiv.org/abs/1303.0763)] [[hep-ex](#)]
9. K. Lannon, F. Margaroli and C. Neu, “Measurements of the Production, Decay and Properties of the Top Quark: A Review,” *Eur. Phys. J. C* **72**, 2120 (2012)
[[arXiv:1201.5873](https://arxiv.org/abs/1201.5873)] [[hep-ex](#)]
10. S. Chatrchyan *et al.* [CMS Collaboration], “A New Boson with a Mass of 125 GeV Observed with the CMS Experiment at the Large Hadron Collider,” *Science* **338**, 1569 (2012).
doi:[10.1126/science.1230816](https://doi.org/10.1126/science.1230816)
11. S. Chatrchyan *et al.* [CMS Collaboration], “Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC,” *Phys. Lett. B* **716**, 30 (2012)
[[arXiv:1207.7235](https://arxiv.org/abs/1207.7235)] [[hep-ex](#)]

12. T. Aaltonen *et al.* [CDF Collaboration], “Search for Standard Model Higgs Boson Production in Association with a W Boson at CDF,” *Phys. Rev. D* **85**, 052002 (2012) [[arXiv:1112.1930](#)] [hep-ex]
13. S. Chatrchyan *et al.* [CMS Collaboration], “Measurement of the $t\bar{t}$ Production Cross Section in pp Collisions at $\sqrt{s} = 7$ TeV using the Kinematic Properties of Events with Leptons and Jets,” *Eur. Phys. J. C* **71**, 1721 (2011) [[arXiv:1106.0902](#)] [hep-ex]
14. T. Aaltonen *et al.* [CDF Collaboration], “Observation of Single Top Quark Production and Measurement of $|V_{tb}|$ with CDF,” *Phys. Rev.* **D82**, 112005 (2010). [[arXiv:1004.1181](#)] [hep-ex]
15. T. Aaltonen *et al.* [CDF Collaboration], “First Measurement of the Ratio $\sigma_{t\bar{t}}/\sigma_{Z/\gamma^* \rightarrow \ell\ell}$ and Precise Extraction of the $t\bar{t}$ Cross Section,” *Phys. Rev. Lett.* **105**, 012001 (2010). [[arXiv:1004.3224](#)] [hep-ex]
16. T. Aaltonen *et al.* [CDF Collaboration], “Search for a Higgs Boson produced in association a W Boson in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV,” *Phys. Rev. Lett.* **103**, 101802 (2009). [7 pages] [Impact Factor: 9.227] [[arXiv:0906.5613](#)] [hep-ex]
17. T. Aaltonen *et al.* [CDF Collaboration], “Observation of Electroweak Single Top Quark Production,” *Phys. Rev. Lett.* **103**, 092002 (2009). [[arXiv:0903.0885](#)] [hep-ex]
18. T. Aaltonen *et al.* [CDF Collaboration], “Search for Standard Model Higgs Boson Production in Association with a W Boson using a Neural Network Discriminant at CDF,” *Phys. Rev.* **D80**, 012002 (2009). [[arXiv:0905.3155](#)] [hep-ex]
19. T. Aaltonen *et al.* [CDF Collaboration], “Search for the Production of Narrow t anti- b Resonances in 1.9 fb^{-1} of $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV,” *Phys. Rev. Lett.* **103**, 041801 (2009). [[arXiv:0902.3276](#)] [hep-ex]
20. T. Aaltonen *et al.* [CDF Collaboration], “Search for Heavy Top-like Quarks Using Lepton Plus Jets Events in 1.96-TeV $p\bar{p}$ Collisions,” *Phys. Rev. Lett.* **100**, 161803 (2008). [[arXiv:0801.3877](#)] [hep-ex]
21. D. E. Acosta *et al.* [CDF Collaboration], “Measurement of the cross section for $t\bar{t}$ production in $p\bar{p}$ collisions using the kinematics of lepton + jets events,” *Phys. Rev.* **D72**, 052003 (2005). [[hep-ex/0504053](#)]
22. D. E. Acosta *et al.* [CDF Collaboration], “Measurements of $b\bar{b}$ azimuthal production correlations in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ TeV,” *Phys. Rev.* **D71**, 092001 (2005). [[hep-ex/0412006](#)]

Conference Proceedings

23. J. Stietzel and K. Lannon, “Study of Neural Network Size Requirements for Approximating Functions Relevant to HEP,” *EPJ Web Conf.*, 214 (2019) 06019 doi: [10.1051/epjconf/201921406019](#). [8 pages]
24. K. Albertsson *et al.*, “Machine Learning in High Energy Physics Community White Paper,” *J. Phys. Conf. Ser.* **1085**, no. 2, 022008 (2018) doi:[10.1088/1742-6596/1085/2/022008](#) [[arXiv:1807.02876](#)] [physics.comp-ph]. [27 pages]
25. P. Ivie, C. Zheng, K. Lannon and D. Thain, “An analysis of reproducibility and non-determinism in HEP software and ROOT data,” *J. Phys. Conf. Ser.* **898**, no. 10, 102007 (2017). doi:[10.1088/1742-6596/898/10/102007](#) [8 pages]

26. M. Wolf *et al.*, “Scaling up a CMS tier-3 site with campus resources and a 100 Gb/s network connection: what could go wrong?,” J. Phys. Conf. Ser. **898**, no. 8, 082041 (2017). doi:[10.1088/1742-6596/898/8/082041](https://doi.org/10.1088/1742-6596/898/8/082041) [8 pages]
27. M. Wolf *et al.*, “Opportunistic Computing with Lobster: Lessons Learned from Scaling up to 25k Non-Dedicated Cores,” J. Phys. Conf. Ser. **898**, no. 5, 052036 (2017). doi:[10.1088/1742-6596/898/5/052036](https://doi.org/10.1088/1742-6596/898/5/052036) [8 pages]
28. J. Balcas *et al.*, “CMS Connect,” J. Phys. Conf. Ser. **898**, no. 8, 082032 (2017). doi:[10.1088/1742-6596/898/8/082032](https://doi.org/10.1088/1742-6596/898/8/082032) [7 pages]
29. E. Bartz *et al.*, “FPGA-Based Tracklet Approach to Level-1 Track Finding at CMS for the HL-LHC,” EPJ Web Conf. **150**, 00016 (2017) doi:[10.1051/epjconf/201715000016](https://doi.org/10.1051/epjconf/201715000016) [[arXiv:1706.09225](https://arxiv.org/abs/1706.09225) [physics.ins-det]]. [11 pages]
30. E. Bartz *et al.*, “FPGA-Based Real-Time Charged Particle Trajectory Reconstruction at the Large Hadron Collider,” doi:[10.1109/FCCM.2017.27](https://doi.org/10.1109/FCCM.2017.27) [8 pages]
31. A. Woodard *et al.*, “Exploiting volatile opportunistic computing resources with Lobster,” J. Phys. Conf. Ser. **664**, no. 3, 032035 (2015). doi:[10.1088/1742-6596/664/3/032035](https://doi.org/10.1088/1742-6596/664/3/032035) [7 pages]
32. A. Woodard *et al.*, “Scaling Data Intensive Physics Applications to 10k Cores on Non-dedicated Clusters with Lobster,” doi:[10.1109/CLUSTER.2015.53](https://doi.org/10.1109/CLUSTER.2015.53) [10 pages]
33. T. Aaltonen *et al.* [CDF and D0 Collaborations], “Combined CDF and D0 Upper Limits on Standard Model Higgs Boson Production with up to 8.2 fb⁻¹ of Data,” [[arXiv:1103.3233](https://arxiv.org/abs/1103.3233) [hep-ex]]. [34 pages]
34. A. Abulencia *et al.* [CDF Collaboration], “eXtremely Fast Tracker Trigger Upgrade at CDF,” Nucl. Instrum. Meth. A **598**, 328 (2009). doi:[10.1016/j.nima.2008.08.034](https://doi.org/10.1016/j.nima.2008.08.034) [3 pages]
35. R. C. Group *et al.* [CDF Collaboration], “Combination of Single Top Quark Production Results from CDF,” [[arXiv:0809.4670](https://arxiv.org/abs/0809.4670) [hep-ex]]. [3 pages]
36. I. Fedorko *et al.* [CDF Collaboration], “The CDF II eXtremely Fast Tracker Upgrade,” doi:[10.1142/9789812819093_0159](https://doi.org/10.1142/9789812819093_0159) [6 pages]
37. A. Abulencia *et al.*, “The CDF II 3D-Track Level 2 Trigger Upgrade,” doi:[10.1109/RTC.2007.4382819](https://doi.org/10.1109/RTC.2007.4382819) [8 pages]
38. A. Abulencia *et al.*, “The CDF II eXtremely Fast Tracker Upgrade,” Nucl. Instrum. Meth. A **581**, no. 1-2, 482 (2007). doi:[10.1016/j.nima.2007.08.032](https://doi.org/10.1016/j.nima.2007.08.032) [3 pages]
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