Thomas Mastrianni Perry

Personal Data

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Education

2016 **Ph.D. in Physics** (particle physics minor) University of Wisconsin–Madison, Madison, WI, USA
A measurement of $Wb\bar{b}$ production and a search for monophoton signals of dark matter using the CMS detector at the CERN LHC

2009 **B.S. in Physics** (astrophysics minor) Union College, Schenectady, NY, USA
Magna Cum Laude with departmental honors
Multi-frequency VLBI imaging of two compact symmetric objects

Work Experience

June 2020 - present Math Tutor / Author

Aug 2019 - May 2020 Math Teacher (Calculus/Algebra II), Supervisor: James Leonard, 505-795-7514, jleonard@sfprep.org
Santa Fe Preparatory School, 1101 Camino Cruz Blanca, Santa Fe, NM, 87505

Jan 2019 - May 2019 Carpenter, Supervisor: Bob Fuller, 781-248-6446, info@southshoreboatworks.com
South Shore Boatworks, 22 Industrial Blvd., Hanson, MA, 02341

May 2017 - Aug 2018 Operations Manager for the CMS Hadronic Calorimeter, Supervisor: Paolo Rumerio, 205-348-2565, rumerio@cern.ch CERN, Route de Meyrin 385, Meyrin, CH, 1204

Nov 2016 - Oct 2018 Postdoctoral Fellow, Supervisor: Ted Kolberg, 850-445-6866, tkolberg@hep.fsu.edu
Florida State University, Department of Physics, 77 Chieftain Way, Tallahassee, FL, 32306

Sept 2016 - Oct 2016 Postdoctoral Fellow, Supervisor: Wesley Smith, 608-251-9610, wsmith@hep.wisc.edu
CERN, Route de Meyrin 385, Meyrin, CH, 1204

Jun 2013 - Aug 2016 Research Assistant, Supervisor: Wesley Smith, 608-251-9610, wsmith@hep.wisc.edu
CERN, Route de Meyrin 385, Meyrin, CH, 1204

Sep 2013 - May 2014 Teaching Assistant (Physics 103/104), Supervisor: Wesley Smith, 608-251-9610, wsmith@hep.wisc.edu
University of Wisconsin–Madison, Department of Physics, 1150 University Ave., Madison, WI, 53706

Jun 2012 - Aug 2013 Research Assistant, Supervisor: Wesley Smith, 608-251-9610, wsmith@hep.wisc.edu
CERN, Route de Meyrin 385, Meyrin, CH, 1204

Sep 2011 - May 2012 Teaching Assistant (Physics 103/104), Supervisor: Wesley Smith, 608-251-9610, wsmith@hep.wisc.edu
University of Wisconsin–Madison, Department of Physics, 1150 University Ave., Madison, WI, 53706

Jun 2011 - Aug 2011 Research Assistant, Supervisor: Albrecht Karle, 608-262-3945, albrecht.karle@icecube.wisc.edu
IceCube Collaboration, 222 West Washington Ave #500, Madison, WI, 53703

Nov 2010 - May 2011 Chemical Engineering Technician, Supervisor: Sarah Genovese, genovese@ge.com
General Electric Global Research Center, 1 Research Circle, Niskayuna, NY, 12309

Jul 2009 - Apr 2010 A-level Physics Teacher
St. Bernard's Secondary School, Kiswera, Uganda (Masaka District)
As part of the Minerva Fellowship I volunteered as a full-time physics teacher to high school seniors

Nov 2007 - Jun 2009 Planetarium Educator, Supervisor: Steve Russo, 518-382-7890
Suits-Bueche Planetarium, 15 Nott Terrace Heights, Schenectady, NY, 12308

Selected Publications [712 total, h index = 105]

- CMS Collaboration, "Search for new physics in the monophoton final state in proton-proton collisions at $\sqrt{s} = 13$ TeV", *JHEP* (2017) 10 doi: 10.1007/JHEP10(2017)073, arXiv:1706.03794.
- CMS Collaboration, "Measurement of the production cross section of a W boson in association with two b jets in pp collisions at $\sqrt{s} = 8$ TeV", *Eur. Phys. J. C* **77** (2017) 2, doi: 10.1140/epjc/s10052-016-4573-z, arXiv:1608.07561.
- CMS Collaboration, "Search for dark matter and graviton produced in association with a photon in pp collisions at $\sqrt{s} =$ 13 TeV with an integrated luminosity of 12.9fb^{-1}", 2016, CMS-PAS-EXO-16-039, http://cds.cern.ch/record/2205148.
- CMS Collaboration, "Search for Dark Matter and Large Extra Dimensions in the gamma + MET final state in pp Collisions at $\sqrt{s} = 13$ TeV", 2016, CMS-PAS-EXO-16-014, http://cds.cern.ch/record/2160229.
- CMS Collaboration, "Measurement of the production cross section for pp to Z(nu nu) gamma at $\sqrt{s} = 13$ TeV at CMS", 2016, CMS-PAS-SMP-16-004, http://cds.cern.ch/record/2204922.
- CMS Collaboration, "Measurement of the production cross section for a W boson and two b jets in pp collisions at $\sqrt{s} = 7$ TeV", *Phys. Lett. B* **735** (2014) 204, doi: 10.1016/j.physletb.2014.06.041, arXiv:1312.6608.
- J.M. Marr, T.M. Perry, J. Read, G.B. Taylor, A.O. Morris, "Multi-frequency Optical-depth Maps and the Case for Free-Free Absorption in Two Compact Symmetric Radio Sources: The CSO Candidate J1324 + 4048 and the CSO J0029 + 3457", *Astrophys. J.* **780** (2014) 178, doi: 10.1088/0004-637X/780/2/178, arXiv:1311.5762.
- CMS Collaboration, "CMS Technical Design Report for the Level-1 Trigger Upgrade", 2013, CERN-LHCC-2013-011, CMS-TDR-012, https://cds.cern.ch/record/1556311.

Notable Presentations

2018 CMS Exotica Workshop, Athens, Greece, *Search for Higgs boson decays to long-lived scalar particles in associated Higgs boson production*

2018 February CMS Week Run Coordination session, CERN, Meyrin, Switzerland, *HCAL endcap upgrade status*

2017 December CMS Week Run Coordination session, CERN, Meyrin, Switzerland, *HCAL end of year summary*

2017 June CMS Week Run Coordination session, CERN, Meyrin, Switzerland, *Status of the HCAL*

2017 June CMS Week HCAL session, CERN, Meyrin, Switzerland, *The Hadronic Calorimeter in the first half of 2017*, chair of session

2016 CMS Exotica Workshop, Zurich, Switzerland, *Monophotons post ICHEP - a summary of 2016*

2016 CERN Internal Preapproval Talk for SMP-16-004, CERN, Meyrin, Switzerland, *Measurement of the $Z(\nu\nu)\gamma$ production cross section at $\sqrt{s}$ =13 TeV*

2016 Posters@LHCC (poster), CERN, Meyrin, Switzerland, *Measurement of the W boson production cross section in association with two b jets in pp collisions at $\sqrt{s}$ =8 TeV*

2015 CERN Internal Approval Talk for SMP-14-020, CERN, Meyrin, Switzerland, *Measurement of the W boson production cross section in association with two b jets in pp collisions at $\sqrt{s}$ =8 TeV*

2015 XXIII International Workshop on Deep-inelastic scattering and related subjects, Southern Methodist University, Dallas, TX, USA, *Vector boson production in association with jets and heavy flavor quarks at CMS*

2015 Physics Department Colloquium, Union College, Schenectady, NY, USA, *Experimental high-energy particle physics at CMS*

2015 American Physical Society April Meeting, Baltimore, MD, USA, *Measurement of the $W + b\bar{b}$ cross section at CMS*

2014 Posters@LHCC (poster), CERN, Meyrin, Switzerland, *Study of charm and bottom production in association with a W boson at CMS*

2011 American Astronomical Society (poster), University of Washington, Seattle, WA, USA, *Multi-frequency optical-depth maps and the case for free-free absorption in two candidate compact symmetric objects: 1321+410 and 0026+346*

2010 Astronomical Society of New York, Rensselaer Polytechnic Institute, Troy, NY, USA, *VLBI imaging of two compact symmetric objects*

Fellowships/Prizes/Awards

2017 Finalist - Famelab Switzerland
The Swiss national finals for an international science communication competition
2015 CMS Create First Prize - CMS Collaboration
A competition to create a new public exhibit located at CMS
2009 Minerva Fellowship - Thomas McEvoy and Harold Fried
An eleven-month, $10,000 fellowship to live and volunteer in rural Uganda
2009 Undergraduate Student Prize - Astronomical Society of New York
Annual award for the best astronomy-related undergraduate research paper
2009 Josephine Daggett Award - Presidential Award - Union College
In recognition of the student voted by the faculty to be "of the best character and conduct"
2008 Booth-Ferris Fellowship - Edward Jones
A private $3000 fellowship to perform undergraduate research
2007 James Henry Turnbill Award - Union College
In recognition of the "best sophomore physics student"

Honor Societies 2009 Phi Beta Kappa - National Honor Society ; 2009 Sigma Xi - National Research Honor Society ; 2007 Sigma Pi Sigma - National Physics Honor Society ; 2006, 2007, 2008, 2009 Union College Dean's List

Academic/Employment History

I am currently in the second half of writing a book relating to particle physics and the discovery of the Higgs boson with over 400 pages completed in draft form. Previously, I was at the Santa Fe Preparatory School, teaching and developing a curriculum for Calculus and Algebra II. Prior to that, I was a carpenter at South Shore Boatworks under the supervision of my uncle Bob Fuller, a third generation master craftsman and owner of the last shop in the USA still producing all-wood traditional ship wheels. In addition to wheels, I worked on custom marine joinery from the finishing of interiors for larger ships to complete builds of smaller craft under power or sail as well as developing a system for incorporating modern CNC routers into the traditional hand system.

Before coming to South Shore Boatworks, I was based at the European Organization for Nuclear Research (CERN) for nearly six years, where I earned my PhD in particle physics and worked as a postdoctoral research fellow for two years. During the first year of my postdoc I was selected to skip the first tier of management and became directly the Operations Manager for the Hadronic Calorimeter (HCAL), one of four subsystems comprising the Compact Muon Solenoid (CMS) experiment. In this role, I was responsible for overseeing the testing, installation, and commissioning of new readout electronics on both endcaps of CMS, chairing weekly meetings discussing the status and plans for the HCAL, leading training sessions on operations/data taking/technical debugging, reporting to upper management on behalf of the HCAL, and carrying a CERN phone at all times so as to be able to respond to interruptions in data taking at any time.

As a postdoc I also supervised graduate students on a new physics analysis searching for long-lived scalar particles arising as the product of Higgs boson decays using the associated production of a vector boson to identify candidate events. We used central CMS software based in `c++/ROOT/python` for initial object reconstruction and I wrote a framework from scratch using these languages to do the selections/analysis/plotting which was later more generally adopted by others and is still in use today.

I came to the University of Wisconsin - Madison as a graduate student in the summer of 2011 after graduating in 2009 from Union College and spending a year in rural Uganda on a social entrepreneurship fellowship and another working as a technician for a chemical engineer at the USA site of General Electric's Global Research Center. Before starting my graduate school course work, I was with IceCube for a summer and began research with the CMS collaboration under Wesley Smith in the beginning of 2012, coming out to CERN for the first time that summer and taking shifts monitoring the data taking for the end of Run 1. After finishing my second year back in Madison, I moved to CERN full-time in May 2013 and contributed studies which were used in the Technical Design Report for a new trigger system as well as working on the 7 TeV W+bb physics analysis.

During my time as a graduate student, I continued on to become the editor for the 8 TeV W+bb analysis and was selected as the point of contact between the Standard Model Physics analysis groups and the b-tagging group. As the LHC was preparing to turn back on in 2015, I regularly took shifts in the CMS control room, and often worked underground and in the lab testing/preparing/installing hardware for the upgraded trigger system. As the 8 TeV W+bb paper began nearing completion, I joined and the monophoton analysis and contributed studies for a year before the paper went public. Unfortunately, we did not find dark matter.