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PROFESSIONAL EXPERIENCE

- 2013-present Wilson Fellow (Associate Scientist), Fermi National Accelerator Laboratory, Batavia, IL;
CMS Collaboration, CERN.
- 2009-2013 Research Associate, Fermi National Accelerator Laboratory, Batavia, IL;
CMS Collaboration, CERN.
- 2003-2009 Research Assistant, University of Colorado, Boulder;
Babar Collaboration, SLAC.
- 1999-2003 Ski Instructor, Steamboat Ski Area, Steamboat Springs, Colorado.
- 1995-1999 Undergraduate Research Assistant, Xavier University, Cincinnati, OH.

EDUCATION

- 2009 Ph.D., University of Colorado, Boulder;
Thesis topic: *CP* violation in hadronic penguin decays at *BABAR*.
Advisor: Prof. William T. Ford
- 1999 B.S. Physics, Xavier University, Cincinnati, OH.

AWARDS

- 2014-present Department of Energy Early Career Award (\$2.5M, five years)
- 2013 CMS LHC Physics Center (LPC) Junior Fellow (\$20k travel grant)
- 2011 CMS Students & Postdocs Achievement Award
For contributions to the operation of the CMS hadron calorimeter.
- 2008 ICHEP08 Student Award
- 2008 United Government of Graduate Students Travel Grant
- 2008 Beverly Sears Graduate Student Grant (University of Colorado)
- 1998-99 Frederick A. Hauck Physics Research Award (Xavier U.)
- 1996 Kent Award (for most outstanding freshman in study of physics, Xavier U.)
- 1995-99 Francis Xavier Full-Tuition Scholarship (Xavier U.)
- 1995 Classical Languages Scholarship (Xavier U.)

PROFESSIONAL SERVICE & COMMITTEES

- 2015-present Chair, Fermilab strategic planning LHC group
- 2014-present Member, Fermilab Scientist Advisory Council
- 2014-present NSF grant reviewer
- 2014 Member, CMS Research Associate Hiring Committee
- 2014 Member, Intensity Frontier Research Associate hiring committee.
- 2013-present Co-chair, LPC Topic of Week Speakers Committee.
- 2011-present Member of 12 CMS Analysis Review Committees.
- Mar 2013 Member, Fermilab Scientific Appointments Policy Working Group.
- Oct 2013 Member, Local Organizing Committee, SUSY at the Near Energy Frontier Workshop, Fermilab.
- Oct 2013 Member, Fermilab Science Priorities Working Group.
- Jan 2013 Long exercise leader for CMS Data Analysis School, January 2013.
- 2012-13 Speaker Committee for US CMS Weekly Meeting.
- Jun 2011 HCAL representative during CERN visit of NASA director, Charles F. Bolden, Jr.

2007-09 Member of 4 Babar analysis Review Committees.

OUTREACH

Jan 2015 Discussed LHC science on “Chicago Tonight” (WTTW PBS).
Jun 2014 Panelist for public discussion on “Particle Fever” film at Fermilab Arts & Lecture series.
Mar 2014 Panelist for public discussion on “Particle Fever” film at Naperville AMC16 Theater.
2013-14 Research mentor for two students from Illinois Math and Science Academy.
Jul 2013 Host and research mentor for embedded journalist at CERN (Jul 2013).
Jun 2013 Presentation to 9th grade science class at Brookside High School, Sheffield, OH.
Mar 2013 Presentation to 7th grade science class at Hawken School, Cleveland, OH.
Jul 2012 Twitter live-reporter from ICHEP 2012 for CMS Communications.
Dec 2010 Published article on “CMS Search for Quark Compositeness” for *CMS Times*.
2010 US LHC Blogger
2009-2010 FNAL Saturday Morning Physics: Led tours of pre-accelerator for high school students.
2007-2009 SLAC tour guide: 20 minute presentation followed by tour of SLD experimental hall and klystron gallery.

RECENT RESEARCH HIGHLIGHTS

Search for supersymmetry in events with jets and missing transverse energy in 13 TeV CMS data, 2014-present: Preparing a search for supersymmetry in all-hadronic final states of jets and missing transverse energy in the first 13 TeV CMS data. The search method is based on novel jet-mass variables inspired by techniques for reconstructing boosted topologies. Planning publication with the first 4/fb of 13 TeV data.

Phase II upgrade of the CMS endcap calorimeters, 2014-present: Collaborating with Fermilab scientists, Jim Freeman and Anna Pla-Dalmau, on studies of innovative radiation-tolerant scintillator materials for the upgrade of the CMS hadron endcap calorimeter in the mid-2020s. Collaborating with Fermilab engineer, Tom Zimmerman, on the design of the front-end ADC to be used in a unified readout system for the calorimeter barrel and endcap detectors.

Phase I upgrade of the front end electronics for the CMS barrel/endcap hadron calorimeter (HCAL), 2013-present: Co-leading the upgrade of the readout electronics of the HCAL barrel/endcap for the CMS collaboration. In addition to overall project leadership, I am also leading the technical development and production of the primary front-end QIE ASIC at Fermilab.

Search for new phenomena in events with leptons, photons, and jets in 8 TeV CMS data, 2013-present: Designed a model-independent search for decays of new heavy particles into leptons and jets in 8 TeV LHC data with no requirement on missing transverse energy (\cancel{E}_T). Also making major contributions to the update of the search in events with photons+jets. Low- \cancel{E}_T signatures have recently garnered much interest as SUSY searches based on high \cancel{E}_T have so far revealed no new phenomena. One paper has been published, and a second is in preparation.

Snowmass Community Summer Study, 2013: Snowmass is the long-term planning activity of the American Physical Society’s Division of Particles and Field. I was a leading contributor to the simulation of background samples for general use in “New Particle” studies. In addition, I published a whitepaper describing my study of R-parity violating decays of the top squark to a top quark plus jets, which will be one of the most challenging avenues for long term discovery at the high luminosity LHC.

Search for new phenomena in events with photons and jets in 7 TeV CMS data, 2012-13:

Designed and published novel search for decays of new heavy particles into photons+jets with no requirement on \cancel{E}_T including first constraints on the “stealth SUSY” model and model-independent limits on diphoton+jets production.

Co-convenor of the CMS Exotica leptons+jets working group, 2012-14: Actively guided 20 analyses searching for new phenomena in final states with leptons and jets resulting in 8 papers and 1 public document with 7 TeV LHC data and 1 paper, 3 public documents, and 7 papers in progress with 8 TeV LHC data.

CMS HCAL Operations Coordinator, 2011-12: Responsible for all aspects of HCAL operations. Led the diagnosis and treatment of anomalies related to operating the detector in a high luminosity environment for the first time.

Search for dijet resonances with dijet angular variables in early 7 TeV CMS data, 2011: Made significant contributions to a novel search for dijet resonances based on angular distributions, looking for deviations from the forward dijet production of t -channel-dominated QCD induced by central dijet contribution from s -channel-dominated new phenomena. Resulted in one public document in 2012.

Search for quark compositeness with dijet angular variables in the first CMS data, 2010: Co-led search for quark compositeness in the form of contact interactions in dijet angular variables resulting in second CMS publication of a new phenomena search. HCAL expertise was critical for early analysis during detector commissioning.

CMS HCAL commissioning, 2009-10: Significant contributions to the determination of the single particle response of the HCAL, the calibration of HCAL, improvements of HCAL simulation, the identification and filtering of anomalous noise in HCAL, and the optimization of calorimeter tower energy thresholds for jet reconstruction.

MENTORSHIP

Dr. Caterina Vernieri, 2014-present: Fermilab research associate working on search for supersymmetry in hadronic final states.

Dr. Andrew Whitbeck, 2013-present: Fermilab research associate working on search for supersymmetry in hadronic final states, integration test for CMS HCAL upgrade, and installation and commissioning of CMS forward calorimeter.

Mr. Ben Carlson, 2013-present: Carnegie-Mellon University graduate student working on search for supersymmetry in events with leptons, jets, and low missing transverse energy.

Dr. Daryl Hare, 2014-present: Fermilab research associate working on search for supersymmetry in hadronic final states and HCAL front end electronics upgrade.

Ms. Titas Roy, 2013-present: Florida Institute of Technology graduate student working on HCAL front end electronics upgrade at Fermilab.

Mr. Elliot Hughes, 2013-14: Rutgers graduate student working on HCAL front end electronics upgrade at Fermilab. Mr. Hughes is now working on his thesis.

CONFERENCE, SEMINAR, & WORKSHOP PRESENTATIONS

25/Mar/2015 [invited special colloquium] **Search for dark matter at the LHC**,
50th Rencontres de Moriond QCD; La Thuile, Italy.

- 05/Dec/2014 **Search for supersymmetry in events with low missing transverse energy at CMS**,
Seminar at Stony Brook University; Stony Brook, NY.
- 26/Sep/2014 **HCAL-based front end electronics architecture for the Shashlik ECAL**,
Shashlik Front End Electronics Workshop; Fermilab.
- 11/Jun/2014 [invited plenary] **LHC and CMS Upgrades**, 47th Annual Fermilab Users Meeting; Fermilab.
- 23/Apr/2014 [invited plenary] **Standard model backgrounds at 100 TeV**,
Physics at a 100 TeV pp Collider Workshop;
SLAC National Accelerator Laboratory, Menlo Park, CA.
- 23/Jan/2014 [plenary] **Searches for exotics and supersymmetry at CMS**,
Aspen 2014 : From Dark Matter to the LHC and Beyond; Aspen, CO.
- 15/Nov/2013 **The phase I upgrade of the HCAL front end electronics**,
Combined Forward Calorimeter Workshop; Fermilab.
- 27/Sep/2013 **Searches for R-parity violating top squark decays at CMS**,
Exotic Top Partner Workshop; Fermilab.
- Search for supersymmetry in events with low missing transverse energy**,
05/Feb/2013 Seminar at Iowa State University; Ames, Iowa.
15/Jan/2013 Seminar at University of California, San Diego.
16/Jan/2013 Seminar at University of California, Santa Barbara.
17/Jan/2013 Seminar at University of California, Riverside.
- 19/Oct/2012 [plenary] **Results from Exotica Searches at CMS**,
US LHC Users Organization Annual Meeting 2012; Fermilab.
- 16/Oct/2012 **Search for new phenomena in events with photons and low missing transverse energy in pp collisions at $\sqrt{s} = 7$ TeV**,
Seminar at University of Notre Dame, Southbend, IN.
- 07/Jul/2012 **Searches for New Physics in Events with Leptons and Jets at CMS**,
ICHEP 2012; Melbourne, Victoria, Australia.
- 29/Mar/2012 **Long-lived Particles and Other New Physics at CMS**,
Implications of LHC Results for TeV-scale Physics Workshop; CERN.
- 19/Oct/2011 **Searches for New Physics in Dijets and HCAL Operations at CMS**,
United States Department of Energy site visit; CERN.
- 03/Oct/2011 **Lessons learned for HCAL Operations in 2011**, CMS Run Coordination Workshop;
CIEMAT, Madrid, Spain.
- 20/May/2011 **Jet Cleaning and Jet Counting**, CMS Topology Workshop:
Hadronic Final States; CERN.
- 05/Nov/2010 **Model-independent limits on dijet signatures at CMS**,
Characterization of New Physics at the LHC; CERN.
- 14/Sep/2010 **Search for new physics with dijets**,
SUSY 2010; Bonn, Germany.
- 28/May/2009 **The experimental status of the CKM Angle β** ,
CIPANP09: 10th Conference on the Intersections of Particle and Nuclear Physics; San Diego, CA, USA.
- CP Violation in Hadronic Penguins at BABAR**,
13/Feb/2009 Seminar at Brookhaven National Laboratory; Upton, NY.

12/Feb/2009 Seminar at Massachusetts Institute of Technology; Cambridge, MA.
11/Feb/2009 Seminar at Boston University; Boston, MA.
27/Jan/2009 Seminar at Fermilab.
21/Jan/2009 Seminar at the Ohio State University; Columbus, OH.
31/Jul/2008 ***CP Violation in Hadronic Penguins at BABAR***,
ICHEP08; Philadelphia, PA, USA.

PUBLICATIONS WITH PRIMARY AUTHORSHIP

CMS experiment, 2009-present

- **Search for scalar top quarks in R-parity violating supersymmetry in events with leptons, jets, and low missing transverse momentum in pp collisions at $\sqrt{s} = 8$ TeV**, CMS Collaboration (expected Feb 2015).
- **Search for supersymmetry in events with jets, either photons or leptons, and low missing transverse momentum in pp collisions at $\sqrt{s} = 8$ TeV**, CMS Collaboration, accepted by Phys. Lett. B (2014); arXiv:1411.7255
- **Search for supersymmetry in events with photons and low missing transverse energy**, CMS Collaboration, Phys. Lett. B **719**, 42 (2013); arXiv:1210.2052.
- **Search for physics beyond the standard model in events with leptons and jets at CMS**, J. Hirschauer on behalf of the CMS Collaboration, Published in Proceedings of the 36th International Conference on High Energy Physics, PoS(ICHEP2012)177 (2012).
- **Search for new physics with the dijet angular ratio**, CMS Collaboration, CMS-PAS-EXO-11-026 (2012).
- **Search for quark compositeness with the dijet centrality ratio in pp collisions at $\sqrt{s} = 7$ TeV**, CMS Collaboration, Phys. Rev. Lett. **105**, 262001 (2010); arXiv:1010.4439
- **Single-particle response in the CMS calorimeters**, CMS Collaboration, CMS-PAS-JME-10-008 (2010).
- **Calorimetry Task Force Report**, CMS Calo Task Force Collaboration, CERN-CMS-NOTE-2010-007 (2010).

Snowmass whitepapers, 2013

Snowmass is the long-term planning exercise of the American Physical Society's Division of Particles and Fields, which is critical for the future of our field.

- **Sensitivity of an upgraded LHC to R-parity violating signatures of the MSSM**, D. Duggan et al., arXiv:1308.3903 (2013).
- **New particles working group report of the Snowmass 2013 Community Summer Study**, Y. Gershtein et al., arXiv:1311
- **Snowmass energy frontier simulations**, Jacob Anderson et al., arXiv:1309.1057 (2013).
- **Methods and results for standard model event generation at $\sqrt{s} = 14$ TeV, 33 TeV and 100 TeV proton colliders**, A. Avetisyan et al., arXiv:1308.1636 (2013).
- **Snowmass energy frontier simulations using the Open Science Grid**, A. Avetisyan et al., arXiv:1308.0843 (2013).

CMS publications to which I made significant contribution as working group convener:

- **Search for heavy Majorana neutrinos in $\mu^\pm\mu^\pm$ and $e^\pm e^\pm$ events in pp collisions at $\sqrt{s} = 7$ TeV**, CMS Collaboration, arXiv:1207.6079, Accepted by Phys. Lett. B (2012).
- **Search for pair production of first- and second-generation scalar leptoquarks in pp collisions at $\sqrt{s} = 7$ TeV**, CMS Collaboration, arXiv:1207.5406, Submitted to Phys. Rev. D (2012).

- Search for a narrow, spin-2 resonance decaying to a pair of Z bosons in the $q\bar{q}l^+l^-$ final state, CMS Collaboration, arXiv:1209.3807, Submitted to Phys. Lett. B (2012).
- Search for heavy neutrinos and W_R bosons with right-handed couplings in a left-right symmetric model in pp collisions at $\sqrt{s} = 7$ TeV, CMS Collaboration, arXiv:1210.2402, Submitted to Phys. Rev. Lett. (2012).
- Search for third-generation leptoquarks and scalar bottom quarks in pp collisions at $\sqrt{s} = 7$ TeV, CMS Collaboration, JHEP 12 (2012) 055; arXiv:1210.5627.
- Search for pair production of third-generation leptoquarks and top squarks, CMS Collaboration, Phys. Rev. Lett. 110 (2013) 081801; arXiv:1210.5629.

Babar experiment, 2005-2009

- Measurement of time dependent CP asymmetry parameters in B^0 meson decays to ωK_s^0 , $\eta' K^0$, and $\pi^0 K_s^0$, B. Aubert et al. [BABAR Collaboration], Phys. Rev. D **79**(2009) 052003; arXiv:0809.1174
- Observation of B meson decays to ωK^* and improved measurements for $\omega\rho$ and ωf_0 , B. Aubert et al. [BABAR Collaboration], Phys. Rev. D **79**, 052005 (2009); arXiv:0901.3703.
- Observation of $B^+ \rightarrow \eta\rho^+$ and search for B^0 decays to $\eta'\eta$, $\eta\pi^0$, $\eta'\pi^0$, and $\omega\pi^0$, B. Aubert et al. [BABAR Collaboration], Phys. Rev. D **78**, 011107 (2008); arXiv:0804.2422.
- Observation of $B^+ \rightarrow b_1^+ K^0$ and search for B meson decays to $b_1^0 K^0$ and $b_1\pi^0$, B. Aubert et al. [BABAR Collaboration], Phys. Rev. D **78**, 011104 (2008); arXiv:0805.1217.
- Branching fraction and CP -violation charge asymmetry measurements for B meson decays to ηK^+ , $\eta\pi^+$, $\eta'K$, $\eta'\pi^+$, ωK , and $\omega\pi^+$, B. Aubert et al. [BABAR Collaboration], Phys. Rev. D **76**, 031103 (2007); arXiv:0706.3893.
- Search for neutral B meson decays to $a_0\pi$, a_0K , $\eta\rho^0$, and ηf^0 , B. Aubert et al. [BABAR Collaboration], Phys. Rev. D **75**, 111102 (2007); arXiv:hep-ex/0703038.
- Observation of B meson decays to $b_1\pi$ and b_1K , B. Aubert et al. [BABAR Collaboration], Phys. Rev. Lett. **99**, 241803 (2007); arXiv:0707.4561.
- Measurement of branching fractions and charge asymmetries in B decays to an η meson and a K^* meson, B. Aubert et al. [BABAR Collaboration], Phys. Rev. Lett. **97**, 201802 (2006); arXiv:hep-ex/0608005.
- Measurement of branching fractions and charge asymmetries in B^+ decays to $\eta\pi^+$, ηK^+ , $\eta\rho^+$, $\eta'\pi^+$, and search for B^0 decays to ηK_s^0 and $\eta\omega$, B. Aubert et al. [BABAR Collaboration], Phys. Rev. Lett. **95**, 131803 (2005); arXiv:hep-ex/0503035.

REFERENCES

Prof. Yuri Gershtein, Rutgers University
 Dr. Boaz Klima, Fermilab
 Prof. Greg Landsberg, Brown University
 Prof. Jeremiah Mans, University of Minnesota
 Dr. Steve Nahn, Fermilab
 Prof. Manfred Paulini, Carnegie-Mellon University
 Dr. Jimmy Proudfoot, Argonne National Laboratory
 Prof. Randal Ruchti, University of Notre Dame
 Prof. Mitchell Wayne, University of Notre Dame
 Mr. Tom Zimmerman, Fermilab