

Frank J. Petriello
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Education

- Graduate: Stanford University, 1999-2003.
Ph.D. Physics, 2003; Advisor: JoAnne Hewett.
Specialization: Theoretical high energy physics.
- Undergraduate: University of Florida, 1995-1999.
B.S. in Physics; B.A. in Mathematics.

Professional Appointments

- Assistant professor, University of Wisconsin at Madison, 2005-present.
- Visiting scientist, Fermi National Accelerator Laboratory, Jan-May 2006.
- Postdoctoral researcher, Johns Hopkins University, 2003-2005.

Awards and Grants

- DOE Outstanding Junior Investigator award (2007-2010)
- Alfred P. Sloan Foundation research fellowship (2006-2008)
- Wisconsin Alumni Research Foundation awards (2006-2007, 2009)
- Co-principal investigator, DOE Institute for Elementary Particle Physics Research at UW-Madison (2006-present)

Professional Affiliations and Service

- Organizer, The Harmony of Scattering Amplitudes, 4 Apr-8 Jul 2011, KITP Santa Barbara.
- Organizer, LoopFest VIII: Radiative corrections for the LHC and the ILC, 7-9 May 2009, Madison, Wisconsin.
- Organizer, Workshop on Higgs Boson Phenomenology, 7-9 Jan 2009, ETH and University of Zurich, Switzerland.
- Convener of the Jet and Photon Energy Measurements working group at the 2007 American Linear Collider Physics Workshop, 22-26 October 2007, Fermilab.
- Organizer of the 2007 CTEQ Summer School on QCD Analysis and Phenomenology, 30 May-7 Jun 2007, Madison, Wisconsin.

- Convener of the QCD parallel session at the Joint Meeting Of Pacific Region Particle Physics Communities (DPF and JPS 2006), 29 Oct-3 Nov 2006, Honolulu, Hawaii.
- Program committee member, Vancouver Linear Collider Workshop (ALCPG 2006), 19-22 Jul 2006, Vancouver, British Columbia.
- Convener of the top/QCD physics working group at the Vancouver Linear Collider Workshop (ALCPG 2006), 19-22 Jul 2006, Vancouver, British Columbia.
- Convener of the top/QCD physics working group at the Linear Collider Workshop (LCWS06), 9-13 Mar 2006, Bangalore, India.
- Convener of the top/QCD physics working group at the 2005 International Linear Collider physics and detector workshop, 14-27 Aug 2005, Snowmass, Colorado.
- Member, American Physical Society.
- Proposal reviewer for NSF, NSERC.
- Referee for Physical Review Letters, Physical Review **D**, Physics Letters **B**, Journal of High Energy Physics, Computer Communications in Physics, Journal of Physics **G**, and International Journal of Modern Physics **A**.

Teaching

- University of Wisconsin, Madison:
 - Physics 311, Classical Mechanics: Fall 2006, Spring 2007, Fall 2008, Spring 2009.
 - Physics 711, Theoretical Physics-Dynamics: Fall 2007.
 - Physics 325, Wave Motion and Optics: Spring 2008.

Supervision of Students and Postdocs

- Graduate students:
 - Ye Li (2008-present).
 - Ryan Gavin (2006-present).
 - Seth Quackenbush (2006-present); Ph.D. expected in Spring 2009 \Rightarrow postdoctoral position at Argonne National Laboratory.
 - Melanie Ganz (2006-2007), co-supervised with Ulrich Nierste at Universität Karlsruhe \Rightarrow graduate school in medical physics.
- Postdoctoral researchers:
 - Thomas McElmurry (2006-2009) \Rightarrow postdoctoral position at Brookhaven National Laboratory.
 - Kathryn Zurek (2006-2008) \Rightarrow Fermilab David N. Schramm fellow, University of Michigan assistant professor.

Publications

1. W.-Y. Keung and F. Petriello, “Electroweak and finite quark-mass effects on the Higgs boson transverse momentum distribution,” arXiv:0905.2775.
2. C. Anastasiou, R. Boughezal and F. Petriello, “Mixed QCD-electroweak corrections to Higgs boson production in gluon fusion,” JHEP **0904**, 003 (2009).
3. D. Hooper, F. Petriello, K. M. Zurek and M. Kamionkowski, “The New DAMA Dark-Matter Window and Energetic-Neutrino Searches,” Phys. Rev. D **79**, 015010 (2009).
4. P. Fileviez Pérez, R. Gavin, T. McElmurry and F. Petriello, “Grand Unification and Light Color-Octet Scalars at the LHC,” Phys. Rev. D **78**, 115017 (2008).
5. Y. Gershtein, F. Petriello, S. Quackenbush and K. M. Zurek, “Discovering hidden sectors with mono-photon Z' searches,” Phys. Rev. D **78**, 095002 (2008).
6. F. Petriello and K. M. Zurek, “DAMA and WIMP dark matter,” JHEP **0809**, 047 (2008).
7. A. Lazopoulos, T. McElmurry, K. Melnikov and F. Petriello, “Next-to-leading order QCD corrections to $t\bar{t}Z$ production at the LHC,” Phys. Lett. B **666**, 62 (2008).
8. F. J. Petriello, S. Quackenbush and K. M. Zurek, “The Invisible Z' at the LHC,” Phys. Rev. D **77**, 115020 (2008).
9. F. Petriello and S. Quackenbush, “Measuring Z' couplings at the LHC,” Phys. Rev. D **77**, 115004 (2008).
10. A. Lazopoulos, K. Melnikov and F. J. Petriello, “NLO QCD corrections to the production of $t\bar{t}Z$ in gluon fusion,” Phys. Rev. D **77**, 034021 (2008).
11. A. Lazopoulos, K. Melnikov and F. Petriello, “QCD corrections to tri-boson production,” Phys. Rev. D **76**, 014001 (2007).
12. C. Anastasiou, K. Melnikov and F. Petriello, “The electron energy spectrum in muon decay through $\mathcal{O}(\alpha^2)$,” JHEP **0709**, 014 (2007).
13. K. Melnikov and F. Petriello, “Electroweak gauge boson production at hadron colliders through $\mathcal{O}(\alpha_s^2)$,” Phys. Rev. D **74**, 114017 (2006).
14. S. Alekhin, K. Melnikov and F. Petriello, “Fixed target Drell-Yan data and NNLO QCD fits of parton distribution functions,” Phys. Rev. D **74**, 054033 (2006).
15. K. Agashe, A. E. Blechman and F. Petriello, “Probing the Randall-Sundrum geometric origin of flavor with lepton flavor violation,” Phys. Rev. D **74**, 053011 (2006).
16. G. Davatz, F. Stockli, C. Anastasiou, G. Dissertori, M. Dittmar, K. Melnikov and F. Petriello, “Combining Monte Carlo generators with next-to-next-to-leading order calculations: Event reweighting for Higgs boson production at the LHC,” JHEP **0607**, 037 (2006).
17. K. Melnikov and F. Petriello, “The W boson production cross section at the LHC through $\mathcal{O}(\alpha_s^2)$,” Phys. Rev. Lett. **96**, 231803 (2006).

18. C. Anastasiou, K. Melnikov and F. Petriello, “The gluon-fusion uncertainty in Higgs coupling extractions,” *Phys. Rev. D* **72**, 097302 (2005).
19. C. Anastasiou, K. Melnikov and F. Petriello, “Fully differential Higgs boson production and the di-photon signal through next-to-next-to-leading order,” *Nucl. Phys. B* **724**, 197 (2005).
20. C. Anastasiou, K. Melnikov and F. Petriello, “Higgs boson production at hadron colliders: Differential cross sections through next-to-next-to-leading order,” *Phys. Rev. Lett.* **93**, 262002 (2004).
21. C. Anastasiou, K. Melnikov and F. Petriello, “Real radiation at NNLO: $e^+ e^- \rightarrow 2$ jets through $\mathcal{O}(\alpha_s^2)$,” *Phys. Rev. Lett.* **93**, 032002 (2004).
22. C. Anastasiou, L. Dixon, K. Melnikov and F. Petriello, “High-precision QCD at hadron colliders: Electroweak gauge boson rapidity distributions at NNLO,” *Phys. Rev. D* **69**, 094008 (2004).
23. C. Anastasiou, K. Melnikov and F. Petriello, “A new method for real radiation at NNLO,” *Phys. Rev. D* **69**, 076010 (2004).
24. C. Anastasiou, L. Dixon, K. Melnikov and F. Petriello, “Dilepton rapidity distribution in the Drell-Yan process at NNLO in QCD,” *Phys. Rev. Lett.* **91**, 182002 (2003).
25. J. L. Hewett, F. J. Petriello and T. G. Rizzo, “Constraining the Littlest Higgs,” *JHEP* **0310**, 062 (2003).
26. F. J. Petriello, “Radiative corrections to fixed target Moeller scattering including hard bremsstrahlung effects,” *Phys. Rev. D* **67**, 033006 (2003).
27. F. J. Petriello, “Kaluza-Klein effects on Higgs physics in universal extra dimensions,” *JHEP* **0205**, 003 (2002).
28. J. L. Hewett, F. J. Petriello and T. G. Rizzo, “Precision measurements and fermion geography in the Randall-Sundrum model revisited,” *JHEP* **0209**, 030 (2002).
29. J. L. Hewett, F. J. Petriello and T. G. Rizzo, “Non-commutativity and unitarity violation in gauge boson scattering,” *Phys. Rev. D* **66**, 036001 (2002).
30. J. L. Hewett and F. J. Petriello, “Indirect signatures of CP violation in the processes $\gamma\gamma \rightarrow \gamma\gamma$, γZ , and ZZ ,” *Phys. Rev. D* **64**, 095017 (2001).
31. F. J. Petriello, “The Higgs mechanism in non-commutative gauge theories,” *Nucl. Phys. B* **601**, 169 (2001).
32. J. L. Hewett, F. J. Petriello and T. G. Rizzo, “Signals for non-commutative interactions at linear colliders,” *Phys. Rev. D* **64**, 075012 (2001).
33. D. Acosta *et al.*, “Large CMS Cathode Strip Chambers: Design And Performance,” *Nucl. Instrum. Meth. A* **453**, 182 (2000).

Publications in Conference Proceedings

1. A. Juste *et al.*, “Report of the 2005 Snowmass Top/QCD Working Group,” in *Proc. of the 2005 International Linear Collider Physics And Detector Workshop*.
2. C. F. Berger, M. Perelstein and F. Petriello, “Top quark properties in little Higgs models,” in *Proc. of the 2005 International Linear Collider Physics And Detector Workshop*.
3. S. Heinemeyer *et al.*, “Toward high precision Higgs-boson measurements at the international linear e+ e- collider,” in *Proc. of the 2005 International Linear Collider Physics And Detector Workshop*.
4. J. L. Hewett and F. J. Petriello, “Indirect signatures of CP violation in the processes $\gamma\gamma \rightarrow \gamma\gamma$, γZ , and ZZ ,” in *Proc. of the APS / DPF / DPB Summer Study on the Future of Particle Physics (Snowmass 2001)*, Snowmass, Colorado, 30 Jun - 21 Jul 2001.
5. J. L. Hewett, F. J. Petriello and T. G. Rizzo, “Signals for noncommutative QED at high energy e+ e- colliders,” in *Proc. of the APS/DPF/DPB Summer Study on the Future of Particle Physics (Snowmass 2001)* ed. R. Davidson and C. Quigg.
6. M. M. Velasco *et al.*, “Photon photon and electron photon colliders with energies below a TeV,” in *Proc. of the APS/DPF/DPB Summer Study on the Future of Particle Physics (Snowmass 2001)* ed. R. Davidson and C. Quigg.

Plenary talks and Colloquia

1. “ Z' bosons from low to high energies,” invited talk, CIPANP 2009: Tenth Conference on the Intersections of Particle and Nuclear Physics, 29 May 2009, San Diego, California.
2. “Recent progress on QCD and electroweak corrections to Higgs production,” invited talk, Collider Physics 2009: Joint Argonne & IIT Theory Institute, 20 May 2009, Argonne National Laboratory.
3. “Precision Higgs physics,” invited talk, Workshop on Physics at the LHC: the 1st Year, 27 Apr 2009, TRIUMF, Canada.
4. “The Hunt for the Higgs Boson,” physics department colloquium, Florida State University, 9 Apr 2009.
5. “QCD predictions for LHC processes,” invited talk, LBNL Research Progress Meeting, 4 Dec 2008, Lawrence Berkeley National Laboratory.
6. “Getting ready for the LHC: a QCD status report” invited talk, Brookhaven Forum 2008, Terra Incognita: From LHC to Cosmology, 7 Nov 2008, Brookhaven National Laboratory.
7. “ Z' bosons from $Q^2 = 0$ to the LHC,” invited talk, Collider Physics Symposium: Preparing for the LHC, 30 Sep 2008, Institute for Nuclear Theory, Seattle.

8. “QCD at the LHC,” invited talk, Quark Confinement and the Hadron Spectrum, 2 Sep 2008, Mainz, Germany.
9. “QCD effects in Higgs physics at the Tevatron and the LHC,” invited talk, CDF collaboration meeting, 18 Jun 2008, Fermilab.
10. “Z’ bosons and light hidden sectors at the LHC,” invited talk, Anticipating Physics at the LHC, 5 Jun 2008, KITP, Santa Barbara.
11. “Electroweak gauge bosons through NNLO,” invited talk, LoopFest VI: Radiative Corrections for the LHC and ILC, 17 Apr 2007, Fermilab.
12. “Advances in perturbative QCD for LHC physics,” invited talk, American Physical Society April Meeting 2007, 14 Apr 2007, Jacksonville, Florida.
13. “Recent progress in QCD theory,” invited talk, 2007 Winter Conference On Particle Physics: New Physics At The Electroweak Scale And New Signals At Hadron Colliders, 11 Jan 2007, Aspen, Colorado.
14. “Theoretical perspectives in QCD,” invited talk, Symposium On Hadron Collider Physics 2006 (HCP 2006), 22-26 May 2006, Durham, North Carolina.
15. “Numerical methods for differential distributions at higher orders in QCD,” invited talk, 41st Rencontres De Moriond: QCD And Hadronic Interactions, 20 Mar 2006, La Thuile, Italy.
16. “Precision physics at the LHC,” colloquium, Carleton University, 28 Feb 2006, Ottawa, Canada.
17. “Fully differential Higgs boson production and the di-photon signal through NNLO,” invited talk, LoopFest IV: Radiative Corrections for the International Linear Collider, 18 Aug 2005.
18. “LHC physics and QCD beyond the leading order,” invited talk, EFI mini-symposium: Physics challenges at the LHC, University of Chicago, 14 Mar 2005.
19. “High precision QCD at hadron colliders: new techniques and results for perturbative calculations,” invited talk, 2005 Aspen Winter Conference: The Highest Energy Physics, 14 Feb 2005.
20. “High precision QCD at hadron colliders: new techniques and results for perturbative calculations,” invited talk, Argonne National Laboratory HEP division seminar, 26 May 2004.
21. “High precision QCD at hadron colliders: electroweak gauge boson rapidity distributions at NNLO,” invited talk, LoopFest III: Radiative Corrections for the Linear Collider: Multi-loops and Multi-legs, 1 Apr 2004, Kavli Institute for Theoretical Physics, Santa Barbara, California.
22. “Drell-Yan rapidity distribution at NNLO in QCD,” invited talk, LoopFest II: Precision Measurements and Radiative Corrections at a Future Linear Collider: SUSY, QCD, New Physics, 14 - 16 May 2003, Brookhaven National Laboratory.

Summer School Lectures

1. Lecture on “*QCD Calculations*,” 2009 SLAC Summer Institute: Revolutions on the Horizon, 7 August 2009.
2. Six lectures on “*Higgs Physics*,” IV Torino School in Physics at Colliders, Torino, Italy, 29 June - 3 July 2009.
3. Two lectures on “*Higgs and Electroweak Gauge Bosons*,” 2009 CTEQ Summer School, Madison, WI, 24-25 June 2009.

Seminars

1. “Electroweak effects in Higgs physics,” Florida State University high energy physics seminar, 10 Apr 2009.
2. “Electroweak effects in Higgs physics,” Fermilab high energy theory seminar, 19 Mar 2009.
3. “Electroweak effects in Higgs production,” Yale university particle theory seminar, 17 Feb 2009.
4. “Electroweak effects in Higgs production,” University of Minnesota particle theory seminar, 5 Feb 2009.
5. “Electroweak effects in Higgs production,” Argonne high energy theory seminar, 27 Jan 2009.
6. “DAMA and WIMP dark matter,” University of Zurich particle and astrophysics seminar, 29 Aug 2008.
7. “Probing Z' properties at the LHC,” Princeton high energy theory seminar, 20 Mar 2008.
8. “New techniques for NLO QCD and top quark physics at the LHC,” Florida State University HEP seminar, 6 Dec 2007.
9. “New techniques for NLO QCD and top quark physics at the LHC,” University of Illinois at Urbana-Champaign HETEP seminar, 29 Oct 2007.
10. “ $H \rightarrow \gamma\gamma$: mini-review,” parallel talk in the Jet and Photon Energy Measurements working group at the 2007 American Linear Collider Physics Workshop, 23 October 2007, Fermilab.
11. “New techniques for NLO QCD and top quark physics at the LHC,” Brookhaven HET/RIKEN seminar, 17 Oct 2007.
12. “Uncovering the New Standard Model at the LHC,” Johns Hopkins high energy theory seminar, 21 May 2007.
13. “QCD at the LHC,” University of Washington high energy theory seminar, 1 May 2007.

14. “Recent progress in perturbative QCD and LHC physics,” Rutgers high energy theory seminar, 3 Apr 2007.
15. “Electroweak gauge boson production at hadron colliders,” Northwestern University high energy physics seminar, 5 Feb 2007.
16. “Getting ready for the LHC: QCD at next-to-leading order and beyond,” Fermilab theory seminar, 11 May 2006.
17. “High precision QCD at hadron colliders,” Michigan State high energy physics seminar, 4 Apr 2006.
18. “LHC physics and QCD beyond the leading order,” Harvard phenomenology seminar, 21 Feb 2006.
19. “Numerical methods for perturbative calculations,” SLAC high energy theory seminar, 16 Feb 2006.
20. “LHC physics and QCD beyond the leading order,” University of California at Berkeley high energy theory, 13 Feb 2006.
21. “High precision QCD at hadron colliders,” University of California at Los Angeles high energy theory, 24 Jan 2006.
22. “High precision QCD at hadron colliders,” University of Florida high energy physics seminar, 22 Nov 2005.
23. “LHC physics and QCD beyond the leading order,” Carnegie Mellon University high energy physics seminar, 28 Sep 2005.
24. “High precision QCD at hadron colliders,” IAS phenomenology seminar, 19 Apr 2005.
25. “High precision QCD at hadron colliders: new techniques and results for perturbative calculations,” Brookhaven high energy theory seminar, 23 Mar 2005.
26. “High precision QCD at hadron colliders: new techniques and results for perturbative calculations,” University of California, Irvine joint particle physics seminar, 9 Mar 2005.
27. “High precision QCD at hadron colliders: new techniques and results for perturbative calculations,” University of Maryland elementary particle theory seminar, 4 Mar 2005.
28. “Challenges in precision collider physics,” Wisconsin phenomenology seminar, 24 Feb 2005.
29. “Differential distributions in QCD at next-to-next-to-leading order,” Argonne high energy theory seminar, 21 Feb 2005.
30. “High precision QCD at hadron colliders: new techniques and results for perturbative calculations,” MIT Center for Theoretical Physics seminar, 31 Jan 2005.
31. “High precision QCD at hadron colliders,” Wisconsin phenomenology seminar, 12 Nov 2004.

32. "High precision QCD at hadron colliders," Cornell high energy theory seminar, 6 Oct 2004.
33. "Differential distributions in QCD at next-to-next-to-leading order," Brookhaven high energy theory seminar, 9 June 2004.
34. "Real radiation at NNLO," Workshop on Collider Physics, 11 Mar 2004, Kavli Institute for Theoretical Physics, Santa Barbara, California.
35. "Challenges in precision collider physics," Johns Hopkins high energy theory seminar, 30 Jan 2004.
36. "Differential distributions at higher orders in QCD," Fermilab high energy theory seminar, 17 Jul 2003.
37. "Drell-Yan rapidity distribution at NNLO in QCD," SLAC high energy theory seminar, 13 Jun 2003.
38. "Constraining the Littlest Higgs", SLAC high energy theory seminar, 24 Jan 2003.
39. "Constraining the Littlest Higgs", University of Florida high energy theory seminar, 17 Dec 2002.
40. "Fermion geography in the Randall-Sundrum model, and implications for a linear collider," parallel talk at the Santa Cruz Linear Collider Retreat, 27-29 Jun 2002, Santa Cruz, California.
41. "Kaluza-Klein effects on Higgs physics in universal extra dimensions," parallel talk at the PHENO 2002 Symposium, 22-24 Apr 2002, Madison, Wisconsin.
42. "Introduction to non-commutative field theories," parallel talk at the APS / DPF / DPB Summer Study On The Future Of Particle Physics (Snowmass 2001), 30 Jun - 21 Jul 2001, Snowmass, Colorado.