August 22, 2002

David L. Rainwater

Fermi National Accelerator Laboratory	phone: (630) 840-3755
Theoretical Physics Dept., MS 106	fax: (630) 840-5435
P.O. Box 500	
Batavia, IL 60510	dlrain@fnal.gov

Positions Held:

1999–present: Research Associate, Theory Group, Fermilab

Education:

1999: Ph.D. Physics, University of Wisconsin - Madison
Advisor: Dieter Zeppenfeld

1993: B.S. Physics, with honors, minor in mathematics, Summa cum laude,
University of Missouri, Columbia, Missouri

Graduate Fellowships and Assistantships:

Summer 1998: NSF Summer Institute in Japan, KEK Theory Group

1996–1999: Research Assistant, Dept. of Physics, University of Wisconsin

1995: Teaching Assistant, Dept. of Physics, University of Wisconsin

1994–1995: Wisconsin Alumni Research Foundation Graduate Fellowship

Undergraduate Fellowships, Assistantships and Other Employment:

1993–1994: Research Engineer, Plasma Sterilization, AbTox, Inc.,
Mundelein, Illinois

Summer 1993: American Nuclear Society Foreign Exchange Student,
Tokyo Institute of Technology,
Research Laboratory for Nuclear Reactors, Tokyo, Japan

1992–1993: Research Assistant, Dept. of Physics, University of Missouri

1992: Teaching Assistant, Dept. of Physics, University of Missouri

Summer 1991: Undergraduate Summer Research Program,
Argonne National Laboratory

1990–1991: Research Assistant, Dept. of Physics, University of Missouri

Professional Activities:

- Higgs group co-convener for SUSY02, to be held at DESY, Hamburg, June 17-23, 2002.
- Organizing committee for Workshop on the Future of Higgs Physics, Fermilab, May 3-5, 2001.
- Subgroup convener for Top Thinkshop 2, Fermilab, November, 2000.
- Referee for Physical Review D.
- Public relations for Fermilab: regular respondent for public inquiries (including journalism) directed to physicsquestions@fnal.gov, including meeting with members of the public.
- Instructor for Fermilab's "Saturday Morning Physics" high school course, 2001-2002.

Publications in refereed journals:

18. **Measuring the Higgs Boson Self Coupling at the LHC and Finite Top Mass Matrix Elements**, (with U. Baur and T. Plehn), arXiv:hep-ph/0206024, accepted for publication in Phys. Rev. Lett.

17. **Measuring the top quark Yukawa coupling at hadron colliders via $t\bar{t}H, H \to W^+W^-$**, (with F. Maltoni and S. Willenbrock), arXiv:hep-ph/0202205, accepted for publication in Phys. Rev. **D**.

16. **Increased Yield of $t\bar{t}b\bar{b}$ at Hadron Colliders in Low-Energy Supersymmetry**, (with Adam K. Leibovich), Phys. Rev. Lett. 88, 221801 (2002)

15. **Top quark associated production of topcolor pions at hadron colliders**, (with A. Leibovich), Phys. Rev. **D65**, 055012 (2002).

14. **Higgs decays to muons in weak boson fusion**, (with T. Plehn), Phys. Lett. **B520**, 108.

13. **Determining the structure of Higgs couplings at the LHC**, (with T. Plehn and D. Zeppenfeld), Phys. Rev. Lett. 88, 051801 (2002)

12. **$H \to WW$ as the discovery mode for a light Higgs boson**, (with N. Kauer, T. Plehn and D. Zeppenfeld), Phys. Lett. **B503**, 113 (2001).

11. **Probing neutral gauge boson self-interactions in ZZ production at hadron colliders**, (with U. Baur), Phys. Rev. **D62**, 113011 (2000).

10. **$p\bar{p} \to t\bar{t}H$: A discovery mode for the Higgs boson at the Tevatron**, (with J. Goldstein, C.T. Hill, J. Incandela, S. Parke and D. Stuart), Phys. Rev. Lett. 86, 1694 (2001).

Publications in refereed journals (continued):

9. **New method for measuring the bottom quark Yukawa coupling at the CERN Large Hadron Collider**,
Phys. Lett. **B503**, 320 (2001).

8. **A Method for identifying $\boldsymbol{H \to \tau\tau \to e^{\pm}\mu^{\mp}\not{p}_T}$ at the CERN LHC**,
(with T. Plehn and D. Zeppenfeld), Phys. Rev. **D61**, 093005 (2000).

7. **Observing $\boldsymbol{H \to W^{(*)}W^{(*)} \to e^{\pm}\mu^{\mp}\not{p}_T}$ in weak boson fusion at the LHC**,
(with D. Zeppenfeld), Phys. Rev. **D60**, 113004 (1999).

6. **Drell-Yan plus missing energy as a signal for extra dimensions**,
(with T. Han and D. Zeppenfeld), Phys. Lett. **B463**, 93 (1999).

5. **Probing the MSSM Higgs sector via weak boson fusion at the LHC**,
(with T. Plehn and D. Zeppenfeld), Phys. Lett. **B454**, 297 (1999).

4. **Searching for $\boldsymbol{H \to \tau\tau}$ in weak boson fusion at the LHC**,
(with K. Hagiwara and D. Zeppenfeld), Phys. Rev. **D59**, 014037 (1999).

3. **Searching for $\boldsymbol{H \to \gamma\gamma}$ in weak boson fusion at the LHC**,
(with D. Zeppenfeld), JHEP **12** (1998) 004.

2. **Multijet structure of high $\boldsymbol{E_T}$ hadronic collisions**,
(with D. Zeppenfeld and D. Summers), Phys. Rev. **D55**, 5681 (1997).

1. **Probing color-singlet exchange in Z + 2-jet events at the CERN LHC**,
(with R. Szalapski and D. Zeppenfeld), Phys. Rev. **D54**, 6680 (1996).

Proceedings and other publications:

8. **Search for the Higgs boson**,
to appear in the 2002 edition of the Macmillan Encyclopedia of Physics.

7. **Higgs boson production at hadron colliders: signal and background processes**,
(with M. Spira and D. Zeppenfeld) in preparation, hep-ph/0203187, to appear in 2001 Proceedings of the Les Houches Workshop on Physics at TeV Colliders.

6. **Prospects For Observing T Anti-T H At Run Ii: A Discovery Mode For The Higgs Boson?**,
Int. J. Mod. Phys. A **16S1A**, 308 (2001).

5. **Linear collider resource book for Snowmass 2001**,
(with T. Abe et al.), FNAL-PUB-01-058-E, hep-ex/0106055-0106058.

4. **Precision Higgs physics at a future linear collider**,
Proceedings of the 5th International Symposium on Radiative Corrections, hep-ph/0105325.

3. **Linear Collider Physics**,
(with P. Derwent, B. Dobrescu, A. Kronfeld, H. Logan, K. Matchev, A. Para, S. Tkaczyk, W. Wester), FNAL-FN-701 (2000), hep-ex/0107044.

2. **Intermediate mass Higgs searches in weak boson fusion**,
(Ph.D. dissertation), hep-ph/9908378.

1. **Searching for $VV \to H \to \tau\tau$ at the CERN LHC**,
hep-ph/9903463, DPF99 proceedings.

Invited Conference Talks:

4. **Higgs Physics at Hadron Colliders**,
Pheno 2001 Symposium, Madison, Wisconsin, May 8, 2001.

3. **Higgs Physics Prospects at the LHC**,
KEK Theory Workshop on Linear Colliders, KEK, Japan, March 16, 2001.

2. **Precision Higgs Physics at a Future Linear Collider**,
Radcor 2000, Carmel, California, Sept. 15, 2000.

1. **The Higgs and the LHC**,
Berkeley 2000, LBNL, March 30, 2000.

Contributed Talks:

19. **Measurement of the Higgs potential and gauge coupling structure**,
SUSY 2002, DESY, Hamburg, Germany, June 20, 2002.

18. **QED corrections to $H \to ZZ \to 4\ell$ (status report)**,
LoopFest, Brookhaven National Lab, May 10, 2002.

17. **Measuring the top Yukawa coupling at the LHC**,
Pheno 2002, Madison, WI, April 23, 2002.

16. **Prospects for $pp \to t\bar{t}H, H \to W^+W^-$ at the LHC**,
Snowmass 2001, July 13, 2001.

15. **Weak boson fusion Higgs production at hadron colliders**,
Snowmass 2001, July 6, 2001.

14. **Precision Higgs physics at the LHC**,
Snowmass 2001, July 3, 2001.

13. **After Higgs discovery: the nature of the beast**,
Workshop on the Future of Higgs Physics, Fermilab, May 4, 2000.

12. **Issues in $t\bar{t} + jets$ production at hadron colliders**,
Top Thinkshop 2, Fermilab, Nov. 11, 2000.

11. **Prospects for observing $t\bar{t}H$ at Run II**,
DPF 2000, Columbus, OH, Aug. 11, 2000.

10. **A no-lose theorem for observation of the MSSM Higgs sector**,
SUSY 2000, CERN, July 1, 2000.

9. **MSSM $VV \to H \to \tau\tau$ at the LHC**,
Argonne National Lab Theoretical Institute on SUSY and Higgs, Chicago, May 11, 2000.

Contributed Talks (continued):

8. **A new method to measure the bottom quark Yukawa coupling at the LHC**,
Pheno 2000, Madison, Wisconsin, April 18, 2000.

7. **The MSSM and searching for $VV \to H \to \tau\tau$ at the CERN LHC**,
SUSY '99, Fermilab, June 18, 1999.

6. **Standard Model $VV \to H \to WW$ at the LHC**,
Pheno '99, Madison, Wisconsin, April 13, 1999.

5. **Drell-Yan plus real K-K emission at the Tevatron and LHC**,
Pheno '99, Madison, Wisconsin, April 13, 1999.

4. **SM process contributions to $VV \to \tau\tau + X$ at the LHC**,
LHC Workshop, CERN, January 22, 1999.

3. **Searching for $VV \to H \to \tau\tau$ at the LHC**,
DPF '99, UCLA, January 6, 1999.

2. **$H \to \gamma\gamma$ via weak boson scattering at the LHC**,
Pheno-CTEQ Symposium 1998, Madison, Wisconsin, March 25, 1998.

1. **$H \to \gamma\gamma$ via weak boson scattering at the LHC**,
Workshop on Physics at the First Muon Collider, Fermilab, Nov. 7, 1997.

Seminars and Colloquia:

30. **LHC Higgs physics: recent developments**,
Argonne HEP lunch seminar, April 9, 2002.

29. **QCD radiation in top quark pair production**,
University of Chicago HEP experimental lunch seminar, April 8, 2002.

28. **LHC Higgs physics: recent developments**,
Brookhaven High Energy Theoretical Physics Seminar, March 27, 2002.

27. $t\bar{t} + jets$ **at hadron colliders**,
Fermilab Theory lunch seminar, March 8, 2002.

26. **QCD radiation in $t\bar{t}$ events at hadron colliders**,
University of Texas - Arlington departmental colloquium, Feb. 26, 2002.

25. **QCD radiation in $t\bar{t}$ events at hadron colliders**,
Southern Methodist University departmental seminar, Feb. 25, 2002.

24. **Cross section for $H \to W^+W^-$ studies at the LHC**,
Fermilab CMS group meeting, Oct. 30, 2001.

23. **Top-pions in topcolor assisted technicolor at hadron colliders**,
University of Chicago HEP experimental lunch seminar, Oct. 22, 2001.

22. **In search of...the Higgs boson**,
Tevatron University seminar at Fermilab, Aug. 16, 2001.

21. **The potential for Higgs physics at future colliders**,
SLAC Experimental Seminar, May 30, 2001.

20. **$pp \to Hjj \to W^+W^-jj$ as discovery channel at the LHC**,
Fermilab CMS group meeting, March 22, 2001.

19. **ttH and $ttbb$ calculations for the LHC**,
Fermilab CMS group meeting, March 22, 2001.

18. **Prospects for Higgs physics at the LHC**,
High Energy Theory Seminar at Iowa State University, March 18, 2001.

17. **Higgs physics prospects at hadron colliders**,
High Energy Theory Seminar at Purdue Univ., Feb. 13, 2001.

16. **New prospects for Higgs physics at present and future colliders**,
High Energy Theoretical/Experimental Physics Seminar at the Univ. of Illinois - Urbana, Dec. 4, 2000.

15. **Higgs pair production at the LHC**,
Fermilab CMS group meeting, Aug. 28, 2000.

Seminars and Colloquia (continued):

14. **Prospects for observing $t\bar{t}H$ at Run II**,
BNL HEP lunch seminar, Aug. 4, 2000.

13. **Calculations of $ttH, ttbb, ttcc$, and $tt + jets$ at the LHC**,
Fermilab CMS group meeting, April 11, 2000.

12. **ttH at Tevatron and LHC**,
Fermilab CMS group meeting, March 7, 2000.

11. **Weak boson fusion Higgses at the LHC**,
High Energy Physics and Astrophysics Seminar, Indiana University, Bloomington, October 4, 1999.

10. **Weak boson fusion Higgses at the LHC**,
Fermilab Theory seminar, Sept. 16, 1999.

9. **Observing an intermediate-mass Higgs boson via weak boson fusion at the CERN LHC**,
Theoretical Particle Physics Seminar, Univ. of Toronto, March 22, 1999.

8. **Observing an intermediate-mass Higgs boson via weak boson fusion at the CERN LHC**,
Theoretical Elementary Particle Physics Seminar, Univ. of Rochester, March 16, 1999.

7. **Observing an intermediate-mass Higgs boson via weak boson fusion at the CERN LHC**,
High Energy Physics Seminar, SUNY - Buffalo, March 15, 1999.

6. **Intermediate mass $VV \to H \to \tau\tau$ at the LHC**,
High Energy Theory Seminar at Univ. of California - Riverside, January 11, 1999.

5. **$VV \to H \to \tau\tau$ at the LHC: how to see it with 30 fb^{-1}**,
High Energy Physics Theory Seminar at Argonne Labs, Nov. 30, 1998.

4. **Standard Model Higgs via Weak Boson Fusion at the LHC**,
Theory Seminar at KEK, July 14, 1998.

3. **Standard Model Higgs via Weak Boson Fusion at the LHC**,
High Energy Theoretical/Experimental Physics Seminar at the University of Illinois - Urbana, April 20, 1998.

2. **Intermediate-mass Higgs bosons via weak boson fusion at the LHC**,
Theoretical Physics Seminar at the Univ. of Kentucky - Lexington, Feb. 9, 1998.

1. **Searching for $H \to \gamma\gamma$ via weak boson scattering**,
High Energy Physics Seminar, Univ. of Wisconsin - Madison, Oct. 6, 1997.

Conferences and Workshops Attended:

LoopFest, Brookhaven National Lab, May 9-10, 2002

Pheno 2002 Symposium, madison, Wisconsin, April 22-24, 2002

Chicago Linear Collider Workshop, Chicago, Illinois, Jan. 7-9, 2002

Snowmass 2001, Snowmass, Colorado, June 30 - July 21, 2001

Pheno 2001 Symposium, Madison, Wisconsin, May 7-9, 2001

Workshop on the Future of Higgs Physics, Fermilab, May 3-5, 2001

Theory Workshop on Linear Colliders, KEK, Japan, March 15-17, 2001

Top Thinkshop 2, Fermilab, Nov. 10-12, 2000

Linear Collider Workshop 2000, Fermilab, Oct. 24-28, 2000

Radcor 2000: 5th International Symposium on Radiative Corrections, Carmel, California, Sept. 11-15, 2000

DPF 2000, Ohio State University, Aug. 9-12, 2000

SUSY 2000: 8th International Conference on Supersymmetries in Physics, CERN, June 26 - July 1, 2000

Pheno 2000 Symposium, Madison, Wisconsin, April 17-19, 2000

Berkeley 2000: Workshop on Future e^+e^- Colliders, LBNL, March 29-31, 2000

SUSY '99: 7th International Conference on Supersymmetries in Physics, Fermilab, June 14-19, 1999

Pheno '99 Symposium, Madison, Wisconsin, April 12-14, 1999

Physics at Run II - QCD and Weak Boson Workshop, Fermilab, March 4-6, 1999

DPF '99, UCLA, January 1999

Physics at Run II - Workshop on Supersymmetry/Higgs, Fermilab, Nov. 19-21, 1998

Pheno-CTEQ '98 Symposium, Madison, Wisconsin, March 1998

Physics at Run II Workshop - Higgs Bosons, Fermilab, March 21, 1998

Workshop on Physics at the First Muon Collider, Fermilab, Nov. 7, 1997

Conferences and Workshops Attended (continued):

Pheno '97 Symposium, Madison, Wisconsin, March 1997

VLHC Workshop: Physics at the high energy frontier beyond the LHC, Fermilab, March 1997

CTEQ '96 Symposium, Fermilab, November 1996

DPF '96, Univ. of Minnesota, August 1996

Pheno '96: Recent Developments in Phenomenology, Madison, Wisconsin, April 1996

Physics with High Energy e^+e^- Colliders, Fermilab, November 1995

Summer Schools Attended:

CTEQ: Summer School on QCD Analysis and Phenomenology, Lake Geneva, Wisconsin, May-June 1997

TASI: QCD and Beyond, Univ. of Colorado, Boulder, Colorado, June 1995

Persons sending letters of recommendation

Dr. Stephen Parke
Theoretical Physics Department
Fermi National Accelerator Laboratory
P.O. Box 500, Batavia, IL 60510

phone: (630) 840-4517
fax: (630) 840-5435
email: parke@fnal.gov

Professor Dieter Zeppenfeld
Department of Physics
University of Wisconsin – Madison
1150 University Avenue
Madison, WI 53706

phone: (608) 262-2483
fax: (608) 262-8628
email: dieter@pheno.physics.wisc.edu

Dr. Chris Quigg
Theoretical Physics Department
Fermi National Accelerator Laboratory
P.O. Box 500, Batavia, IL 60510

phone: (630) 840-3578
fax: (630) 840-5435
email: quigg@fnal.gov

Professor Ulrich Baur
Department of Physics
State University of New York – Buffalo
239 Fronczak hall
Buffalo, NY 14260-1500

phone: (716) 645-2535
fax: (716) 645-2507
email: baur@ubhep.physics.buffalo.edu

Additional persons with knowledge of my research

Dr. William Wester
Fermi National Accelerator Laboratory
Particle Physics Division, MS 222
P.O. Box 500
Batavia, IL 60510

phone: (630) 840-2113

email: wester@fnal.gov

Dr. Kaoru Hagiwara
KEK, Theory Group
Oho, Tsukuba
Ibaraki 305-0801 Japan

phone: 011-81-298-64-5391
fax: 81-298-64-5755
email: kaoru.hagiwara@kek.jp