

Ryan D. Reece

Curriculum Vitae

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Objective: An exciting post-doc position in experimental particle physics

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INSTITUTE

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University of Pennsylvania
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Personal

DATE OF BIRTH: January 17, 1985

BIRTHPLACE: Lubbock, TX, USA

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CITIZENSHIP: USA

SEX: male

Education

- **Expected Ph.D. Experimental High Energy Particle Physics** June 2006 - Present
The University of Pennsylvania
THESIS: "A search for new physics in high-mass ditau events in the ATLAS detector"
- **B.S. Physics with High Honors** August 2003 - May 2006
The University of Texas, Austin GPA: 3.91/4 PHYSICS GPA: 3.94/4
THESIS: "Late pulsing in the Hamamatsu R1408 PMT used in the Sudbury Neutrino Observatory"
- **Continuing Education**

Chicago 2012 Workshop on LHC Physics	Chicago, IL, USA	Nov 2012
Tau2012: 12th Int'l Workshop on Tau Lepton Physics	Nagoya, Japan	Sept 2012
ATLAS Tau and $H \rightarrow \tau\tau$ Workshop	Oxford, England	Mar 2012
Int'l Europhysics Conference on High Energy Physics (EPS)	Grenoble, France	July 2011
PhyStat2011: Statistics Workshop for LHC Physics	CERN	Jan 2011
ATLAS Tau Workshop	Freiburg, Germany	Oct 2010
ATLAS Tau Workshop	NBI, Copenhagen, Denmark	Apr 2009
USATLAS Analysis Jamboree	Brookhaven National Lab	Sep 2008
CERN-Fermilab Hadron Collider Physics Summer School	Fermilab	Aug 2008
Int'l Conference on High Energy Physics (ICHEP)	Philadelphia, PA, USA	Aug 2008
ATLAS Tau Workshop	TU, Dresden, Germany	May 2008
USATLAS Analysis Jamboree	Brookhaven National Lab	Mar 2008
USATLAS Analysis Jamboree	Brookhaven National Lab	Dec 2007
PhyStat07: Statistics Workshop for LHC Physics	CERN	Jun 2007
USATLAS Analysis Jamboree	Brookhaven National Lab	May 2007

Experience

- **Graduate Research** June 2006 - Present
THE UNIVERSITY OF PENNSYLVANIA Philadelphia, PA
THE EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH (CERN) Geneva, Switzerland

ATLAS is one of the multi-purpose experiments built to detect the products of 7-8 TeV proton-proton collisions at the Large Hadron Collider (LHC) at the European Organization for Nuclear Research (CERN) near Geneva, Switzerland. Penn helped design, assemble, and install the front end

electronics that read out, control, and power the Transition Radiation Tracker (TRT), the outermost sub-detector of the ATLAS tracker. Experiments at the LHC hope to discover the long-sought-after Higgs boson (evidence of which was announced on the 4th of July 2012) and observe possible signatures of Supersymmetry, among other goals on the frontier of particle physics.

Preparing for the arrival of, and analyzing the data collected by ATLAS since it first started-up in 2009, has been the focus of my graduate research. Between taking graduate courses at Penn, I spent the summers of 2006, 2007, and 2008 at CERN, participating in the commissioning of the TRT. I helped with connectivity tests of the TRT end-caps in the above ground cleanroom where the TRT was assembled (SR-1), and helped install and debug some of the TRT patch panels in the ATLAS cavern at Point 1. I designed and wrote software that calibrates the analog-to-digital thresholds for the TRT by tuning the thresholds channel-by-channel to reach a uniform noise occupancy, used as part of the regularly scheduled calibration. I moved to work at CERN full-time in January 2009, and helped support the TRT during the start-up of first collisions that fall. I wrote and supported applications used for scanning and archiving detailed TRT performance metrics to a database for tracking long term detector health. I continued to support the operations of the TRT as part of the team rotating the DAQ on-call responsibility through the summer of 2012. For the TRT offline community, I developed an algorithm for calculating the straw hit efficiency by counting straws that should have hits by using track extrapolation tools.

For the last few years, I have been working on tau identification performance and ditau physics at ATLAS. I developed the minimal cut-based tau identification used with the first ATLAS data in 2010. I contributed to several of the first ATLAS conference notes documenting the performance of tau reconstruction and reporting the first data-Monte Carlo comparisons. I was editor of the first ATLAS conference note documenting systematic uncertainties on the tau identification efficiency and energy scale. I developed further improvements to tau identification including p_T -parametrization and contributed to the vertex-dependent pile-up corrections. I was one of the lead developers in the team that documented the first observation of $Z \rightarrow \tau\tau$ with the first 8.5 pb^{-1} , and measured its cross section with the 30 pb^{-1} collected in 2010. More recently, I have been investigating the performance of high- p_T taus and searching for hypothetical high-mass ditau decays, like $Z' \rightarrow \tau\tau$, which are predicted in many Grand Unified Theories. For the last year, I have served as the Exotics Liaison to the tau performance group.

- **Teaching Assistant** September 2006 - May 2007
THE UNIVERSITY OF PENNSYLVANIA Philadelphia, PA

In the fall of 2006, I graded and lead tutoring for an intro level astronomy course and an intro level cosmology course. In the spring of 2007, I graded and lead a laboratory for an intro level course on electromagnetism.

- **Undergraduate Research Assistant** September 2005 - May 2006
THE UNIVERSITY OF TEXAS, AUSTIN

Working with Professor Joshua Klein, I demonstrated that the late pulsing of the Hamamatsu R1408 PMT model used in the Sudbury Neutrino Observatory (SNO) is intrinsic to the PMT by analyzing pulses in a dark box independent of SNO. This gave me much practice using ROOT and gave me the chance to learn the basics of neutrino oscillation. This study was compiled into my honors senior thesis.

GROUP'S SITE: <http://www.hep.utexas.edu/sno/>
MY THESIS: <http://www.hep.upenn.edu/~rreece/documents.html>

- **Physics Research Experience for Undergrads (REU)** June 2005 - August 2005
THE UNIVERSITY OF CALIFORNIA, LOS ANGELES

I worked in Professor K. Arisaka's group, part of the Pierre Auger cosmic ray observatory. As a cross-check to the callibration, I measured the fluorescence photon yield of air using PMTs, NIM electronics, an ADC, and a ^{90}Sr beta source to fluoresce air in a dark box.

MY REPORT: http://reu.physics.ucla.edu/common/papers/2005/ryan_reece.pdf

- Intern Software Developer** May 2004 - August 2004
 L3 - LINK SIMULATION AND TRAINING Arlington, TX
 As a summer internship in college, I designed and wrote a graphical user interface for modifying radar system data accessed by the company designed F-18 flight simulator. This task required proficiency with Microsoft Visual C++, QT GUI Designer, and Linux systems. I also was granted a US DOD SECRET level clearance required for my employment and for accessing sensitive data.
<http://www.link.com/>
- Software Tester** January 2003 - August 2003
 THURSBY SOFTWARE Arlington, TX
 As a high school student, I worked as a software tester at Thursby Software, a company that designs software that allows the integration of Macintosh computers into Microsoft Networks.
<http://www.thursby.com/>

Selected Talks

- Searching for new physics in high-mass ditau events at ATLAS**
 Yale University December 13, 2012
 New York University December 11, 2012
 University of Texas, Austin November 26, 2012
 Seminars I gave summarizing my efforts in tau lepton physics at ATLAS, including developing the cut-based tau identification used with the first data, the $Z \rightarrow \tau\tau$ cross section measurement, and the first search for $Z' \rightarrow \tau\tau$ at ATLAS.
- Searches for charged Higgs bosons, supersymmetry, and exotica with tau leptons with the ATLAS and CMS detectors at the LHC**
[Tau2012: International Workshop on Tau Lepton Physics](#) September 20, 2012
 A conference talk I gave reporting on ATLAS and CMS searches for new physics with tau leptons at Tau2012 in Nagoya, Japan.
- Measurement of the W and Z boson production cross sections in pp collisions at 7 TeV with the ATLAS detector**
[International Europhysics Conference on High Energy Physics \(EPS\)](#) July 22, 2011
 A conference talk I gave reporting the ATLAS measurements of the W and Z production cross sections at EPS 2011 in Grenoble, France.

Awards

ΦBK National Honors Society Member	Fall 2006 - Present
UT Physics Department Graduating Honors	Spring 2006
UT Walter E. Millet Physics Scholarship	Spring 2006
ΣΠΣ National Physics Honors Society member	Fall 2005 - Present
UT Undergraduate Research Fellowship	Fall 2005 - Spring 2006
Ira Lon Morgan Endowed Presidential Scholarship in Physics	Fall 2005 - Spring 2006
UT Melvin J. Reiger Physics Scholarship	Fall 2003 - Spring 2005
UT James Edmonds Scholarship	Fall 2003 - Spring 2004

Skills

- Software:** Python, C++, L^AT_EX, (X)HTML with CSS, XML, QT, SQL, Mathematica
- HEP Software:** ROOT, PyROOT, Athena, SFrame, RooFit, RooStats, EventView
- Hardware:** oscilloscopes, PMTs, ADCs, NIM electronics, soldering, high voltage, working with radioactive sources

- **General:** problem solving, programming, object-oriented design, data visualization, statistics, writing technical reports, working independently and in groups, presenting my ideas, graduate level physics and mathematics
- **Language:** Mother-tongue English, very basic French