

Douglas R. Bergman

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EDUCATION

Yale University, New Haven, CT, Ph.D. in physics, July 1997.

Yale University, New Haven, CT, M.Phil. in physics, May 1991.

Yale University, New Haven, CT, M.S. in physics, Dec. 1990.

University of Chicago, Chicago, IL, A.B. in physics, June 1989.

EMPLOYMENT

Associate Professor, Univ. of Utah Aug 2009 – pres.

Assistant Professor, Rutgers Univ. July 2005 – June 2009.

Research Assistant Professor, Rutgers Univ. July 2004 – June 2005.

Research Associate, Rutgers University July 2000 – June 2004

Postdoctoral Fellow, Rutgers University July 1997 – July 2000

Graduate Research Assistant, Yale University Feb. 1991 – July 1997

Math and Science Tutor, Pierson Coll., Yale Sept. 1991 – May 1995

Graduate Teaching Fellow, Yale University Sept. 1989 – May 1997

Undergraduate Research Assistant, Chicago Jan. 1988 – Aug. 1989

Teaching Assistant, University of Chicago Oct. 1986 – Mar. 1987

Summer Intern, General Electric, Cleveland June – Sept. 1986

RESEARCH

University of Utah, Salt Lake City, UT Aug. 2011 – pres.

Development of the Non-Imaging Cherenkov (NICHE) array as a low-energy extension of TA & TALE.

University of Utah, Salt Lake City, UT Aug. 2009 – pres.

Member of the Telescope Array (TA) and TA Low Energy Extension (TALE) Collaborations.

- Helped build and deploy the TALE Fluorescence Detector.
- Performed the first analysis of the UHECR spectrum using monocular fluorescence data in TA.

Rutgers University, Piscataway, NJ Sep. 2004 – Jun. 2009

Member of the Telescope Array (TA) and TA Low Energy Extension (TALE) Collaborations.

- TA Fluorescence Detector Analysis Coordinator.

- Built, deployed and tested a prototype TALE Tower Detector mirror.

Rutgers University, Piscataway, NJ Jun. 2002 – 2008
Member of the FLASH Collaboration (E-165 at SLAC), an experiment to measure to fluorescence yield of electrons in air.

Rutgers University, Piscataway, NJ Jan. 1999 – 2009
Member of the High Resolution Fly's Eye Experiment.

- Observed the GZK Cutoff in the UHECR flux spectrum.
- Measured the UHECR composition using the distribution of shower maxima in the atmosphere.
- Fit the measured HiRes UHECR spectra to a number of different source models.
- Developed phenomenological model of UHECR propagation to determine the expected shape of the UHECR spectrum from extragalactic sources.
- Measured the spectrum of UHECR's in a monocular analysis using time-binned FADC data.
- Developed analysis and visualization programs to work with FADC data.
- Surveyed PMT pointing directions using CCD camera to view star images on a screen at the PMT plane.
- Surveyed mirror positions using differential GPS unit.

Rutgers University, Piscataway, NJ July 1997 – Dec. 2001.
Member of the KTeV Experiment: Analyzed data from the 1997 run of KTeV (E832/E799) at the Fermilab Tevatron, measuring the branching ratio and photon spectrum for radiative K_{e3} decays.

Rutgers University, Piscataway, NJ July 1997 – June 1999.
Worked on the proposal for the CP/T experiment, an experiment to study K_L - K_S interference immediately downstream of a K^0 production target. Specifically worked on determining the systematic errors involved in measuring x , the $\Delta S = -\Delta Q$ amplitude in K_{e3} decays.

Yale University, New Haven, CT Aug. 1995 – July 1997
Analyzed data from the 1995 run of E865 at the AGS, looking for the decay, $K^+ \rightarrow \pi^+ \mu^+ e^-$. Wrote and defended Ph.D thesis, *A Search for the Decay $K^+ \rightarrow \pi^+ \mu^+ e^-$* , under the supervision of Professor Michael E. Zeller.

Yale University, New Haven, CT July 1990 – June 1995

Participated in all aspects of the design, construction and installation of the E865 detector apparatus at the AGS.

- Wrote a Monte Carlo simulation of the detector using the GEANT package from CERN.
- Over-saw the mapping of the two large spectrometer magnets used in the experiment. Checked this map for consistency against Maxwell's equations and corrected discrepancies therefrom.
- Installed and helped to design the fast trigger system.
- Participated in the design and prototyping of novel proportional wire chambers using graphite on mylar anode planes.
- Studied the feasibility of looking for CP violation in the decay $K \rightarrow \pi\pi\pi$.
- Ran simulations of the low halo beam-line design to determine background rates.

University of Chicago, Chicago, IL June 1988 – Sept. 1989

Assisted in the design of THISTLE, a balloon-borne experiment to measure the relative abundances of nuclear isotopes in cosmic rays. Worked to port Monte Carlo simulation code for these abundances to an IBM PC platform.

University of Chicago, Chicago, IL Jan. – June 1988

Assisted in the construction of modules for the Chicago Air Shower Array, a high-energy cosmic ray detector that was deployed at Dugway Proving Grounds, UT.

General Electric, Nela Park, Cleveland, OH June – Sept. 1986

Summer Intern: Studied the intensity of light from the UV lines of mercury vapor lamps under various conditions, including temperature and vapor pressure. Wrote this work up in an internal company memo.

PRESENTATIONS *Results from Telescope Array and TALE*, HAP Workshop Composition 2015, Karlsruhe, Sept. 2015.

Imaging and Non-Imaging Cherenkov Hybrid Reconstruction, 34th International Cosmic Ray Conference, The Hague, July 2015.

The NICHE Array: Status and Plans, 34th International Cosmic Ray Conference, The Hague, July 2015.

The distribution of shower longitudinal profiles widths as measured by Telescope Array in stereo mode, 34th International Cosmic Ray Conference, The Hague, July 2015.

Results from Telescope Array, IceCube Particle Astrophysics Symposium, Madison, May 2015.

The Non-Imaging Cherenkov Array (NICHE): A TA/TALE Extension to Measure the Flux and Composition of Very-High Energy Cosmic Rays, Conference on Ultrahigh Energy Cosmic Rays (UHECR2014), Springdale, UT, Oct. 2014.

Cosmic Ray Measurements at the Highest Energies: Results from Telescope Array, 40th Cospar Scientific Assembly, Moscow, Russia, Aug. 2014.

The Spectrum of UHECRs, Colloquium, University of Utah, Sept. 2013.

Telescope Array: Recent Results, Future Plans, Cosmic Ray Anisotropy Workshop, Madison, WI, Sept. 2013.

TA Spectrum Summary, 33rd International Cosmic Ray Conference, Rio de Janeiro, Brazil, July 2013.

An Efficient Technique for the Reconstruction of Extensive Air Showers using Non-Imaging Cherenkov Measurements (poster), 33rd International Cosmic Ray Conference, Rio de Janeiro, Brazil, July 2013.

The Non-Imaging Cherenkov Array (NICHE): A TA/TALE extension to measure the flux and composition of Very-High Energy Cosmic Rays, APS April Meeting, Denver, CO, April 2013.

Telescope Array: Recent Results, Future Plans, 4th Workshop on Air Shower Detection at High Altitudes, Naples, Italy, Jan. 2013.

HiRes and TA Spectrum Measurements, The International Symposium on Future Directions in UHECR Physics, Geneva, Switzerland, Feb. 2012.

Five Decades of Cosmic Rays, Colloquium, University of Utah, Sept. 2011.

The Energy Spectrum of UHECRs using the Telescope Array Fluorescence Detectors in Monocular Mode, 32nd International Cosmic Ray Conference, Beijing, China, Aug. 2011.

Detecting UHECRs using Cherenkov Light, APS April Meeting, Anaheim, CA, April 2011.

HiRes Results, the Final Word (almost), Workshop on Hadron-Hadron and Cosmic-Ray Interactions at multi-TeV Energies, ICT* Centre, Trento, Italy, Dec. 2010.

Non-Imaging Cherenkov Detection, Informal Seminar, University of California, Irvine, Irvine CA, Aug. 2010.

HiRes UHECR Spectrum Measurements, Bartol Mini-workshop, University of Delaware, Newark DE, Dec. 2009.

The HiRes Stereo Measurement of the UHECR Spectrum, Fall 2009 Meeting of the Four Corners Section of the APS, Colorado School of Mines, Golden CO, Oct. 2009.

UHECR's in the Northern Hemisphere: A Status Report: Recent Results from HiRes, CCAPP Inaugural Seminar, Ohio State University, Columbus OH, Oct. 2009.

Stereoscopic Measurement of the Flux of Ultra High Energy Cosmic Rays by the High Resolution Fly's Eye, 31st International Cosmic Ray Conference, Łódź, Poland, July 2009.

The Energy Spectrum of UHECR's using the TA Fluorescence Detectors in Monocular Mode, 31st International Cosmic Ray Conference, Łódź, Poland, July 2009.

Why HiRes was Able to Observe the GZK Cutoff, Colloquium, University of Utah, April 2009.

Recent Results from HiRes, 20th Recontres de Blois, Blois, France, May 2008.

Observation of the GZK Suppression by HiRes, International Astrophysics Symposium, Golden, CO, May 2008.

Observation of the GZK Cutoff Using by the HiRes Experiment, 30th International Cosmic Ray Conference, Merida, Mexico July 2007.

The TALE Tower Detector (poster), 30th International Cosmic Ray Conference, Merida, Mexico July 2007.

TA/TALE Usage, Aspen Workshop on Cosmic Ray Physics, Aspen CO, April 2007.

Observation of the GZK Cutoff Using the HiRes Detector, SUSY06, Irvine CA, June 2006.

Observation of the GZK Cutoff Using the HiRes Detector, CRIS 2006, Catania, Italy, May 2006.

Fitting the HiRes Spectra, 29th International Cosmic Ray Conference, Pune, India, Aug. 2005.

UHECR Composition Measurements Using the HiRes-II Detector (poster), 29th International Cosmic Ray Conference, Pune, India, Aug. 2005.

Monocular UHECR Spectrum Measurements from HiRes (poster), 29th International Cosmic Ray Conference, Pune, India, Aug. 2005.

Fitting the HiRes Spectra, Physics at the End of the Galactic Cosmic Ray Spectrum, Aspen, Apr. 2005.

From HiRes to the Telescope Array: A Tale of Hybrid Vigor, Colloquium, University of Delaware, Nov. 2004.

Fitting the HiRes Spectra and Monocular Composition, CRIS 2004, Catania, Italy, May 2004.

The Advent of Cosmic Ray Astronomy, Colloquium, University of Oklahoma, Feb. 2004.

Fits of the HiRes Spectra to Astrophysical Models, 28th International

Cosmic Ray Conference, Tsukuba, Japan, Aug. 2003.

Measurement of the Flux of UHE Cosmic Rays by the HiRes Detectors Observing in Monocular Mode, 28th International Cosmic Ray Conference, Tsukuba, Japan, Aug. 2003.

Fits of the HiRes Spectra to Astrophysical Models, 2003 APS April Meeting, Philadelphia, PA, April 2003.

The GZK with HiRes, Invited Seminar, The Pennsylvania State University, Oct. 2002.

The GZK with HiRes, Invited Seminar, Brookhaven National Laboratory, Sep 2002.

The UHECR Spectrum with HiRes, 31st International Conference on High Energy Physics, Amsterdam, July 2002.

The UHECR Spectrum with HiRes, 2002 APS April Meeting, Albuquerque, NM, April 2002.

Monocular UHECR Spectra with HiRes, 2002 Aspen Winter Conference on Ultra High Energy Particles from Space, Jan 2002.

A Monocular Spectrum Analysis Using FADC Timing at HiRes, 27th International Cosmic Ray Conference, Aug 2001.

Determining the Alignment of HiRes Optics Using a CCD Camera, 27th International Cosmic Ray Conference, Aug 2001.

Recent Results from the High Resolution Fly's Eye Experiment, 20th Texas Symposium on Relativistic Astrophysics, Dec. 2000.

A New Measurement of the Radiative K_{e3}^0 Branching Ratio and Photon Spectrum, Meson 2000, May 2000.

A Search for the Decay $K^+ \rightarrow \pi^+ \mu^+ e^-$, KTeV Lunch Talk, Aug. 1997

A Search for the Decay $K^+ \rightarrow \pi^+ \mu^+ e^-$, APS Washington Meeting, April 1997

E865: A Status Report, RHIC-AGS Users Meeting, May 1996

FUNDING

NSF PHY-1404502, \$2,311,356, Pierre Sokolsky *et al.*, University of Utah, *Telescope Array Operations and Data Analysis by the University of Utah Cosmic Ray Group*, Sep. 2014–Aug. 2017.

NSF PHY-1404495, \$1,846,443, Pierre Sokolsky *et al.*, University of Utah, *Baseline Support of the University of Utah Cosmic Ray Physics Group Including Analysis of the Telescope Array*, Sep. 2014–Aug. 2017.

NSF PHY-1069286, \$1,707,240, Pierre Sokolsky *et al.*, University of Utah, *Telescope Array Operations and Data Analysis by the University of Utah Cosmic Ray Group*, Sep. 2011–Aug. 2014.

NSF PHY-1069280, \$3,124,772, Pierre Sokolsky *et al.*, University of

Utah, *Baseline Support of the University of Utah Cosmic Ray Physics Group Including Analysis of the Telescope Array*, Sep. 2011–Aug. 2014.

NSF PHY-0968374, \$400,000, Gordon Thomson & Douglas Bergman, University of Utah, *Research in Ultrahigh Energy Cosmic Ray Physics*, May 2010–Apr. 2011.

NSF PHY-0649681, \$1,173,500, Gordon Thomson & Douglas Bergman, Rutgers University, *Experimental Research in Ultrahigh Energy Cosmic Ray Physics*, May 2007–Apr. 2010.

NSF PHY-0305516, \$3,474,000, Gordon Thomson, Thomas Devlin, Stephen Schnetzer, Sunil Somalwar, Amitabh Lath, Douglas Bergman and Eva Halkiadakis, Rutgers University, *Experimental Research In Elementary Particle Physics*, Jan 2004–Apr. 2007.

POSTDOCTORAL FELLOWS	Thomas Stroman, University of Utah	Jul. 2010 – Aug. 2015
	Lauren Scott, Rutgers University	Jul. 2005 – Jul. 2010

GRADUATE STUDENTS	Greg Furlich, University of Utah	Sep. 2015 – pres.
	Jian Lan, University of Utah	2012 – 2016
	Saskia Innemee, University of Utah	2010 – 2012
	Rhett Zollinger, University of Utah	2010 – 2011
	Sean Stratton, Rutgers University	2005 – 2012

UNDERGRAD STUDENTS	Matthew Dutson, University of Utah	Jan. 2016 – pres.
	Jeffrey Rodgers, University of Utah	Jan. 2016 – pres.
	Nathan Waugh, Weber State University (REU)	June–July 2014
	Bingran Wang, University of Utah	Dec. 2012 – Apr. 2015.
	Saskia Innemee, Rutgers University	Sep. 2008 – May 2010
	Oren Levi, Rutgers University	May 2008 – Aug. 2008
	Aneta Biesiedecka, Rutgers University	May 2007 – Aug. 2008

TEACHING	University of Utah	
	• Physics 3730: Computing in Physics	Fall 2016
	• Physics 3719/3729: Undergrad Lab	Spring 2016
	• Physics 3610/6610: Electronics I	Fall 2015
	• Physics 3740: Modern Physics	Spring 2015
	• Physics 3610/6610: Electronics I	Fall 2014
	• Physics 3740: Modern Physics	Spring 2014
	• Physics 3610/6610: Electronics I	Fall 2013
	• Physics 7910-013: Astroparticle Physics	Spring 2013

- **Physics 3610/6610: Electronics I** Fall 2012
- **Physics 3620/6620: Electronics II** Spring 2012
- **Physics 3610/6610: Electronics I** Fall 2011
- **Physics 3620/6620: Electronics II** Spring 2011
- **Physics 3610/6610: Electronics I** Fall 2010
- **Physics 3620/6620: Electronics II** Spring 2010

Rutgers University

- **Physics 272: Honors Physics II** Spring 2009
- **Physics 271: Honors Physics II** Fall 2008
- **Physics 272: Honors Physics II** Spring 2008
- **Physics 271: Honors Physics II** Fall 2007
- **Physics 272: Honors Physics II** Spring 2007
- **Physics 271: Honors Physics II** Fall 2006
- **Physics 124: Analytical Physics I-B** Spring 2006
Recitation Section Leader

SERVICE

Utah, Departmental Committees (Physics)

- **HEAP Seminar Committee, chair** 2015–pres.
- **Admissions Committee** 2015–pres.
- **Admissions Committee, chair** 2012–2015
- **Colloquium Committee** 2014–pres.
- **HEAP Seminar Committee** 2014–pres.
- **Advising Committee (Graduate)** 2012–2014
- **Public Education & Outreach** 2012–2013
- **College of Science Council** 2012–2013
- **Common Exam Committee** 2011–2012
- **HEAP Seminar Committee, chair** 2011–2012
- **Admissions Committee** 2011–2012
- **Space Committee** 2010–2012
- **Futures Committee** 2010–2011
- **HEAP Seminar Committee** 2009–2010

Rutgers, Departmental Committees (Physics)

- **Society of Physics Students Faculty Liaison** 2008–2009.
- **Undergraduate Studies** 2006–2009
- **Computer Services** 2005–2009
- **Graduate Recruitment Committee** 2005–2006
- **Written Qualifier Grading Committee** 2005–2006

Organizing

- International Organizing Committee, HAP Workshop Composition 2015, Karlsruhe, Germany, Sept. 2015.
- Local Organizing Committee & session chair, UHECR 2014, Springdale UT, Sept. 2014.

Reviewing

- Advances in Space Research (1)
- Astrophysical Journal (1)
- Astroparticle Physics (5)
- NASA APRA-SAT Review Panel
- Nazarbaev University
- Modern Physics Letters A (1)
- National Science Foundation (10)
- Textbook: Bauer & Westfall, *University Physics*.

Coaching

- Science Olympiad, Sounds of Music, Torrey Pines High School 2010–2011

Judging

- North Jersey Regional Science Fair 2005–2006