

# Asif Imran

Astrophysics – Statistics

Wisconsin IceCube Particle Astrophysics Center  
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**Research Interests:** Application of *cutting-edge* imaging techniques and statistical tools to analyze large quantities of data to study high-energy photon emissions from distant galaxies.

## Education

**Iowa State University**, Ames, IA  
Ph.D, Astrophysics

June 2010

**Grinnell College**, Grinnell, IA  
B.A., Physics *With Honors*

May 2003

## Skills

**Hardware:** [HAWC Observatory](#)

- Designed and built real-time, VMEbus-based data acquisition system capable of handling an unprecedented 500 MBytes/second. The novel design forgoes traditional hardware trigger in favor of purely software-based triggers.

### Software

- Currently developing a C++-based package with a tightly integrated SQLite-DB backend for the real-time monitoring of gamma-ray emission to be used by the HAWC collaboration.
- Developed C-based libraries for synchronized readout of an array of single board computers with a net throughput rate of 500 MBytes/sec.
- Developed Monte Carlo simulation package for the VERITAS collaboration. Developed software analysis tools for the HAWC collaboration to measure sensitivity of the detector.
- Languages: Python, C, C++, database query languages (SQLite and MySQL).
- Tools: ROOT, IPython, NumPy, SciPy, Matplotlib, Boost, Pandas, Pyfits, SQLAlchemy, L<sup>A</sup>T<sub>E</sub>X, SVN, Git, bash & regexp.

## Research Experience

**Wisconsin Icecube Particle Astrophysics Center** - Madison, WI

Postdoctoral Research Associate

2013 – present

*Supervisor: Stephan Westerhoff*

Develop tools for Fast, Real-Time Monitoring of Gamma Ray Emission with HAWC Observatory.

**Los Alamos National Laboratory** - Los Alamos, NM

Postdoctoral Research Associate

2010 – 2013

*Supervisor: Brenda Dingus*

Design and Develop VME-based Data Acquisition System for the HAWC Experiment.

Study of Extragalactic Gamma-Ray Sources with data from HAWC and the Fermi-Space Telescope.

**Iowa State University** - Ames, IA

Graduate Student Researcher

2005 – 2010

*Advisor: Frank Krennrich*

Analyzed Variable Gamma-Ray Emission from Active Galactic Nuclei.

Assembled & Tested camera electronics for the VERITAS telescopes.

**Grinnell College** - Grinnell, IA

Undergraduate Mentored Advanced Project

2002

*Advisor: Charlie Duke*

Simulation of Cherenkov Photons from Cosmic-Ray Cascade in the Earth's Atmosphere.

<b>Grants</b>	<b>Co-Investigator</b> , <i>A Search for Unique Signatures from Extragalactic Background Light (EBL) Absorption Effects in TeV Blazar Spectra</i> , Fermi Guest Investigator Cycle 2 Grant 2009-2010 (PI: F. Krennrich).	
<b>Awards and Honors</b>	<b>Iowa State University</b>	
	Graduate teaching excellence award	2005
	Teaching assistant of the year, Dept. of Physics and Astronomy	2004
	Hardware scholarship, Dept. of Physics and Astronomy	2003 - 2005
	<b>Grinnell College</b>	
	International Merit Scholarship	1999 – 2003
<b>Teaching Experience</b>	<b>Undergraduate Student Mentor</b>	
	Stephen Sturdevant (University of Wisconsin- Madison)	2013 – Present
	<b>Instructor</b>	
	WIPAC High School Internship Program	Fall 2013
	Co-taught high school students about basic electronic circuits and building data acquisition system with arduino boards.	
	<b>Graduate Student Mentor</b>	
	Peter Karn (UC Irvine)	2011 – 2013
	<b>Teaching Assistant</b>	
	Department of Physics and Astronomy	2003 – 2005
	Iowa State University, Ames, Iowa	
	Performed TA duties and conducted help sessions for Astronomy 120/150 (introductory astronomy courses), Astronomy 346 (intermediate astrophysics course) and Physics 221/222 (intermediate physics courses).	
	<b>Teaching Assistant/Tutor</b>	
	Department of Physics	2001 – 2003
	Grinnell College, Grinnell, Iowa	
	Teacher's support for introductory physics workshop. Helped students identify problem areas and provided timely feedbacks.	
	<b>Mathematics Lab Tutor</b>	
	Grinnell College, Grinnell, Iowa	2001 – 2003
	Provided structured mentoring to students. Conducted one-on-one help sessions aimed at supplementing class lecturers.	
<b>Conference and Workshop</b>	APS 4-Corners Section Meeting (2012), Socorro, NM. <i>(Invited)</i>	
	The 32 <sup>nd</sup> International Cosmic Ray Conference (2011), Beijing, China.	
	APS April Meeting (2011), Anaheim, CA.	
	INPAC Meeting (2011), Asilomar, CA. <i>(Invited)</i>	
	The 31 <sup>st</sup> International Cosmic Ray Conference (2009), Lodz, Poland.	

- Sensitivity of the high altitude water Cherenkov detector to sources of multi-TeV gamma rays*, Abeysekara, A. U., et al. for the HAWC Collaboration, Astroparticle Physics, **50** (2013), 26A
- Constraints on Cosmic Rays, Magnetic Fields, and Dark Matter from Gamma-Ray Observations of the Coma Cluster of Galaxies with VERITAS and Fermi*, Arlen, T., et al. for the VERITAS Collaboration, Astrophysical Journal, **757** (2012), 123.
- On the Sensitivity of the HAWC Observatory*, Abeysekara, A. U., for the HAWC Collaboration, Astroparticle Physics, **35** (2012), 641.
- Detection of Pulsed Gamma Rays Above 100 GeV from the Crab Pulsar*, Aliu, E., for the VERITAS Collaboration, Science, **334** (2011), 69.
- Discovery of Very High Energy  $\gamma$ -ray from the SNR G54.1+0.3*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal Letters, **719** (2010), 69.
- VERITAS discovery of variability in the very high energy  $\gamma$ -ray emission of 1ES 1218+304*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal Letters, **709L** (2010), 163.
- A connection between star formation activity and cosmic rays in the starburst galaxy M 82*, Acciari, V., et al. for the VERITAS Collaboration, Nature, **462** (2009), 770.
- VERITAS upper limit on the very high energy emission from the radio galaxy NGC 1275*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal Letters, **706L** (2009), 275.
- Radio imaging of the very-high-energy  $\gamma$ -ray emission region in the central engine of a radio galaxy*, Acciari, V., et al. for the VERITAS Collaboration, Science, **325** (2009), 444.
- Observation of extended very high energy emission from the supernova remnant IC 443 with VERITAS*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal, **698L** (2009), 133.
- Evidence for long-term gamma-ray and x-ray variability from the unidentified TeV source HESS J0632+057*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal Letters, **698L** (2009), 94.
- VERITAS observations of the BL Lac object 1ES 1218+304*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal, **695** (2009), 1370.
- VERITAS observations of a very high energy gamma-ray flare from the blazar 3C 66A*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal Letters, **693L** (2009), 104.
- The June 2008 flare of Markarian 421 from optical to TeV energies*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal Letters, **691L** (2009), 13.
- Discovery of very high energy gamma-ray radiation from the BL Lac 1ES 0806+524*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal, **690L** (2009), 126.
- Constraints on energy spectra of blazars based on recent EBL limits from galaxy counts*, Krennrich, F., Dwek, E., & Imran, A., Astrophysical Journal Letters, **689L** (2008), 93.
- Observation of gamma-ray emission from the galaxy M87 above 250 GeV with VERITAS*, Acciari, V., et al. for the VERITAS Collaboration, Astrophysical Journal, **679** (2008), 1427.