Asif Imran

Curriculum Vitae

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Education

June 2010 **Ph.D.**, *Iowa State University*, Ames, Iowa, Astrophysics.

May 2003 **B.A.**, *Grinnell College*, Grinnell, Iowa, Physics.
With Honors

Skills

Software Currently developing the main gamma-ray outburst monitoring system for **HAWC Observatory**. The C++-package with a tightly integrated SQLite backend employs Bayesian statistics to quickly scan the sky for increased gamma-ray emissions in real-time.

Developed C-based libraries for synchronized readout of an array of single board computers with a net throughput rate of 500 MBytes/sec and a $> 99\%$ up time.

Developed analysis tools for the HAWC collaboration to measure sensitivity of the detector.

Developed Monte Carlo simulation package for the VERITAS collaboration. The package was utilized for several primary analyses and featured in publications.

Hardware Built a data acquisition system for HAWC Observatory from ground-up and successfully deployed it. Currently in operation, the system is capable of handling an unprecedented 500 MBytes/second of raw readout.

Languages Python, C, C++, database query languages (SQLite & MySQL)

Tools ROOT, IPython, NumPy, SciPy, Matplotlib, Boost, Pandas, PyFits, SQLAlchemy, Git, LaTeX, SVN, bash & regexp

Research Experience

2013 – Present **Wisconsin IceCube Particle Astrophysics Center**, *Madison, Wisconsin.*

Postdoctoral Research Associate

Supervisor: Stefan Westerhoff

Develop analysis framework for fast, real-time monitoring of gamma ray emission with HAWC Observatory.

2010-2013 **Los Alamos National Laboratory**, *Los Alamos, New Mexico.*

Postdoctoral Research Associate

Supervisor: Brenda Dingus

Designed and built principal data acquisition system for the HAWC Observatory. The novel design forgoes traditional hardware trigger in favor of purely software-based triggers to allow us to detect photons with very low energies. Develop analysis tools to optimize and improve HAWC's overall sensitivity to gamma rays.

2004-2010 **Iowa State University**, *Ames, Iowa.*

Graduate Student Researcher

Supervisor: Frank Krennrich

Analyzed variable gamma-ray emissions from active galaxies. Developed analysis method to measure the density of diffuse extra-galactic radiation field resulting in new limits on emissions from distant galaxies. Assembled & tested camera electronics for the VERITAS telescope.

2002 **Grinnell College**, *Grinnell, Iowa.*

Undergraduate Mentored Advanced Project

Supervisor: Charlie Duke

Extended the functionality & speed of existing Monte Carlo simulation routines to trace the propagation of Cherenkov photons from cosmic-ray showers in the Earth's atmosphere.

Grants

2013-2014 **NASA *Swift* Guest Investigator Program**, *Cycle 10.*

Co-Investigator, *Swift Localization & Follow-up of HAWC Transients*, PI: T. Ukwatta

2009-2010 **NASA Fermi Guest Investigator Program**, *Cycle 2.*

Co-Investigator, *A Search for Unique Signatures from Extragalactic Background Light (EBL) Absorption Effects in TeV Blazar Spectra*, PI: F. Krennrich

Awards and Honors

Iowa State University

2005 Graduate teaching excellence award

2004 Teaching assistant of the year, Department of Physics & Astronomy

2003 – 2005 Hardware scholarship, Department of Physics & Astronomy

Grinnell College

1999 – 2003 International merit scholarship

Teaching Experience

2013 – Present **Undergraduate Student Mentor**, *Stephen Sturdevant.*
University of Wisconsin-Madison

Fall 2013 **Instructor**, *WIPAC High School Internship Program.*
Co-taught high school students about basic electronic circuits and building data acquisition system with arduino boards.

2010 – 2013 **Graduate Student Mentor**, *Peter Karn.*
University of California-Irvine

2003-2005 **Teaching Assistant**, *Iowa State University*, Department of Physics & Astronomy.
Performed TA duties and conducted help sessions for both undergraduate and graduate level physics/astrophysics courses.

2000 – 2003 **Teaching Assistant**, *Grinnell College*, Department of Math & Physics.
Provided structured mentoring and one-on-one help sessions to students enrolled in undergraduate physics and math courses.

Conferences and Workshops

2012 APS 4-Corners Section Meeting, Socorro, NM (*invited*)

2011 The 32^{nd} International Cosmic Ray Conference, Beijing, China

2011 APS April Meeting, Anaheim, CA

2011 INPAC Meeting, Asilomar, CA (*invited*)

2009 The 32^{nd} International Cosmic Ray Conference, Lodz, Poland

Selected Peer Reviewed Publications

For a complete list, see my ***NASA/ADS listings***

"The Study of TeV Variability and Duty Cycle of Mrk 421 from 3 Years of Observations with the Milagro Observatory",Abdo, A. A. et al. for the Milagro Collaboration, Astrophysical Journal, (*Accepted January 2014*)

"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.

"Dectection of Pulsed Gamma Rays Above 100 GeV from the Crab Pulsar", Aliu, E., for the VERITAS Collaboration, Science, **334** (2011), 69.

"VERITAS discovery of variability in the very high energy γ-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 γ-ray emission region in the central engine of a radio galaxy", Acciari, V., et al. for the VERITAS Collaboration, Science, **325** (2009), 444.