

# Catherine N. Bailey

## *Work Address*

Department of Physics  
Case Western Reserve University  
10900 Euclid Avenue  
Cleveland, OH 44106

## *Home Address*

PO Box 221075  
Beachwood, OH 44122  
(216) 650-5360  
cnb4@case.edu

## **Education:**

Ph.D. Candidate - Physics, expected graduation *Spring 2009*  
Case Western Reserve University, Cleveland, OH

Master's Degree - Physics, *May 2005*  
Case Western Reserve University, Cleveland, OH

Bachelor of Science - Physics (Honors), Astronomy, and Mathematics, *May 2003*  
University of Wisconsin - Madison, Madison, WI

## **Research Experience:**

Cryogenic Dark Matter Search (CDMS) Experiment *August 2003 - present*  
Department of Physics, Case Western Reserve University, Cleveland, OH  
Advisor: Professor Daniel Akerib

- Analyzed data that produced the world-leading result on properties of Weakly Interacting Massive Particles (WIMPs)
- Evaluated CDMS detectors prior to final installation
- Conducted experiments that influenced fabrication methods for future CDMS detectors
- Operated dilution refrigerators to study superconducting detectors
- Trained and supervised laboratory technicians and undergraduate assistants
- Developed analysis cuts and wrote real-time data monitoring code using MATLAB

Observational Cosmology Lab *January 2001 - May 2003*  
Department of Physics, University of Wisconsin - Madison, Madison, WI  
Advisor: Professor Peter Timbie

- Investigated thin film properties for the development of Cosmic Microwave Background (CMB) detectors
- Designed, built, and assembled parts for laboratory use
- Preparation of wiring for a cryogenic system, including soldering
- Maintained group webpage

Study of Star Formation in Dwarf Irregular Galaxies *May 2002 - August 2002*  
Department of Astronomy, University of Wisconsin - Madison, Madison, WI  
Advisor: Professor Jay Gallagher

- Analyzed astronomical images using IRAF software
- Observed galaxies using the WIYN telescope at Kitt Peak National Observatory

**Teaching Experience:**

Advanced Laboratory Course, Teaching Assistant Case Western Reserve University, Cleveland, OH	<i>Spring 2004</i>
Introductory Physics Laboratory Course, Teaching Assistant Case Western Reserve University, Cleveland, OH	<i>Fall 2003</i>
Introductory Physics Course, Tutor University of Wisconsin - Madison, Madison, WI	<i>Fall 2002 - Spring 2003</i>

**Selected Service and Outreach:**

Co-Leader, CDMS working group focused on detector performance:

- Organize and schedule working group meetings, implement plans of action (2008)

Cage Rider, Soudan Underground Laboratory:

- Accountable for the safety of people traveling underground (2007 - 2008)

Shift Leader, CDMS Experiment:

- Responsible for on-site experimental activities (2006 - 2008)

Soudan Underground Laboratory Science Open House:

- Presented public lectures for the CDMS experiment (May 2006)

University of Wisconsin - Madison "Wonders of Physics" department Open House:

- Led laboratory tours and demonstrations (Spring 2001, 2002, 2003)

**Conferences:**

Applied Superconductivity Conference 2008 / TES 4 (Chicago, IL)	<i>August 2008</i>
• Received student travel grant for \$325	
Great Lakes Cosmology Workshop IX (Pittsburgh, PA)	<i>June 2008</i>
APS April Meeting (St. Louis, MO)	<i>April 2008</i>
• Received DAP student travel grant for \$600	
12 <sup>th</sup> International Workshop on Low Temperature Detectors (Paris, FR)	<i>July 2007</i>
TES 3: International Workshop on Transition Edge Sensor Device Physics (Gainesville, FL)	<i>August 2006</i>
Kavli-CERCA Conference on the Future of Cosmology (Cleveland, OH)	<i>October 2003</i>
12 <sup>th</sup> Annual Wisconsin Space Conference (Madison, WI)	<i>August 2002</i>

**Selected Awards:**

GAANN Graduate Fellowship	<i>Fall 2004 - Spring 2007</i>
CWRU GSS Endowment Sponsored Mentorship Award	<i>August 2006</i>
University of Wisconsin Academic Excellence Scholarship	<i>Fall 1999 - Spring 2003</i>
NASA/Wisconsin Space Grant Consortium Scholarship	<i>Fall 2002 - Spring 2003</i>
Copernicus Award	<i>Fall 2002 - Spring 2003</i>
Fay Ajzenberg-Selove Award	<i>Fall 2001 - Spring 2002</i>

**Presentations:**

Posters

“First 5 Tower CDMS Analysis Results”  
APS April Meeting (St. Louis, MO), *April 2008*

“Detector Development for the Next Phases of the Cryogenic Dark Matter Search”  
Case Western Reserve University Research ShowCASE (Cleveland, OH), *April 2006*

Oral

“Development for an Anti-Coincidence Detector for the X-ray Microcalorimeter Spectrometer onboard the International X-ray Observatory”  
Case Western Reserve CERCA Seminar (Cleveland, OH), *November 2008*

“Cryogenic Dark Matter Search - Present Results and Future Detectors”  
Seminar at NASA Goddard Space Flight Center (Greenbelt, MD), *October 2008*

“Detector Development for the SuperCDMS Experiment”  
Applied Superconductivity Conference 2008 / TES 4 (Chicago, IL), *August 2008*

“First 5 Tower CDMS Analysis Results”  
Great Lakes Cosmology Workshop IX (Pittsburgh, PA), *June 2008*

“Detector Development for the Next Phases of the Cryogenic Dark Matter Search”  
Case Western Reserve CERCA Seminar (Cleveland, OH), *September 2007*

“Detector Development for the Next Phases of the Cryogenic Dark Matter Search”  
12<sup>th</sup> International Workshop on Low Temperature Detectors (Paris, FR), *July 2007*

“Detector Development for the Next Phases of the Cryogenic Dark Matter Search”  
Case Western Reserve CERCA Seminar (Cleveland, OH), *October 2006*

“Detector Development for the Next Phases of the Cryogenic Dark Matter Search”  
TES 3: International Workshop on Transition Edge Sensor Device Physics (Gainesville, FL),  
*August 2006*

“iZIP - A Next Generation CDMS Detector”  
Case Western Reserve CERCA Seminar (Cleveland, OH), *October 2005*

“An Overview of the CRESST Dark Matter Experiment”  
Case Western Reserve CERCA Seminar (Cleveland, OH), *October 2004*

“Modeling Properties of a Parallel Array of Transition Edge Sensors”  
Case Western Reserve CERCA Seminar (Cleveland, OH), *April 2004*

**Publications:**

Z. Ahmed et al., A Search for WIMPs with the First Five-Tower Data from CDMS II, preprint (astro-ph/0802.3530), accepted for publication in PRL (2008)

C.N. Bailey et al., Detector Development for the Next Phases of the Cryogenic Dark Matter Search: Results from 1 inch Ge and Si Detectors, J Low Temp Phys (2008) 151: 211-215

D.S. Akerib, et al., Present Status of the SuperCDMS program, J Low Temp Phys (2008) 151: 818-823

D.S. Akerib et al., Status of the Cryogenic Dark Matter Search experiment, J Low Temp Phys (2008) 151: 800-805

D.S. Akerib et al., Limits on spin-dependent WIMP-nucleon interactions from the Cryogenic Dark Matter Search, Phys. Rev. D **73**, 011102 (2006)

D.S. Akerib et al., Limits on spin-independent WIMP-nucleon interactions from the two-tower run of the Cryogenic Dark Matter Search, Phys. Rev. Lett. **96**, 011302 (2006)

D.S. Akerib et al, Limits on WIMP-nucleon interactions from the Cryogenic Dark Matter Search at the Soudan Underground Laboratory, NIMA 559 (2006) 390-392

D.S. Akerib et al., Characterization, performance, and future advanced analysis of detectors in the cryogenic dark matter search (CDMSII), NIMA 559 (2006) 387-389

N. Mirabolfathi et al., Detector commissioning for the CDMS-II final run at the Soudan Underground Laboratory, NIMA 559 (2006) 417-419

D.S. Akerib et al, The SuperCDMS proposal for dark matter detection, NIMA 559 (2006) 411-413

P.L. Brink et al, First test runs from a dark-matter detector with interleaved ionization electrodes and phonon sensors for surface-event rejection, NIMA 559 (2006) 414-416

D.S. Akerib et al., Exclusion Limits on the WIMP-Nucleon Cross-Section from the First Run of the Cryogenic Dark Matter Search in the Soudan Underground Lab, Phys. Rev. **D72**, 052009 (2005)

**Professional Memberships:**

American Physical Society (APS)

*2006 - present*

**Activities:**

Case Western Reserve University Physics Graduate Student Association

Member

*2005 - present*

Vice-President

*2006 - 2007*