

# CHRISTINE A. AIDALA

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High-energy experimental nuclear physics; nucleon structure; QCD dynamics in hadrons and hadronization.

## EDUCATION:

**Columbia University** Ph.D. program, Physics, 2002-05. M.A. 2004. M.Phil. 2005. Ph.D. 2005.  
**University of Chicago** Ph.D. program, Physics, 1999-2000. Medical leave starting March 2000.  
**Yale University** 1995-99. B.S. in Physics, B.S. in Music 1999.

## RESEARCH POSITIONS HELD:

September 2012-present. **Assistant Professor of Physics, University of Michigan.**

January-July 2012. **Scientist 2, Los Alamos National Laboratory.** PHENIX Experiment at the Relativistic Heavy Ion Collider (RHIC), Brookhaven National Laboratory, and E906, Fermi National Accelerator Laboratory.

January 2009-December 2011. **Frederick Reines Distinguished Postdoctoral Fellow, LANL, PHENIX and E906.**

January 2006-December 2008. **Postdoctoral Research Associate, UMass Amherst, PHENIX.**

September 2002-December 2005. **Graduate Research Assistant, Columbia University, PHENIX.** Thesis advisor: B.A. Cole.

September 2001-August 2002. **Physics Associate, BNL, PHENIX.**

June 1999-January 2000. **Graduate researcher, U. of Chicago, OPAL Experiment at CERN.** J. Pilcher.

1998-99. **Senior thesis, Yale U.,** polarized proton studies for the HERA e+p collider. V.W. Hughes.

Summer 1998. **CERN Summer Student Program,** data acquisition in a silicon lab. P. Weilhammer.

Summer 1997. **BNL Summer Student Program,** STAR Experiment at RHIC. T.J. Hallman.

Summer 1996. **Wright Nuclear Structure Laboratory, Yale U.,** low-energy nuclear structure. R.F. Casten.

## RESEARCH EXPERIENCE (since 2001):

### Data analysis:

- Transverse single-spin asymmetry in forward eta meson production in high-energy polarized proton-proton collisions, probing quark and gluon spin-momentum correlations within transversely polarized protons and in the hadronization of quarks to eta mesons.
- Transverse single-spin asymmetry in midrapidity neutral pion production in high-energy polarized proton-proton collisions, probing gluon spin-momentum correlations within transversely polarized protons.
- Double-helicity asymmetry in midrapidity charged hadron production in high-energy polarized proton collisions, sensitive to the gluon spin contribution to the spin of the proton.
- Cross section for midrapidity charged hadron production in moderate-energy proton-proton collisions, to test the energy range of the applicability of different techniques in perturbative QCD calculations.
- Spin transfer to antilambda baryons in high-energy polarized proton collisions, to study spin-momentum correlations in the hadronization into antilambda particles of quarks scattered from polarized protons.

### Phenomenology:

- Parameterization of transverse-momentum-dependent parton distribution functions from world Drell-Yan as well as Z and W boson data
- Parameterization of world data on the hadronization of quarks and gluons into eta mesons

### Simulations:

- GEANT 3 implementation of three upgrade/proposed detectors for PHENIX
- Extensive experience working with the PYTHIA event generator for proton-proton collisions

### Hardware, electronics, and experimental operations:

- Assembly and testing of PHENIX Forward Silicon Vertex Detector
- Preparation and testing of E906 Station 4 proportional tubes
- Maintenance and operations support for PHENIX Muon Trackers
- Studies for development of electronics-level trigger for high- $p_T$  charged pions in p+p collisions.
- Period Coordinator for operations, PHENIX 2007, 2008, and 2011 runs
- Deputy online data production manager, PHENIX 2006 run

## TEACHING AND MENTORSHIP EXPERIENCE:

### Teaching:

U. of Michigan, Physics 351: **Mathematical Methods of Theoretical Physics I**, Fall 2012, Winter 2013, Fall 2013.

Student advising and thesis committee membership:

- Thesis advisor, B.J. Ramson, U. of Michigan, May 2013-present
- Thesis co-advisor, M. Febraro, U. of Michigan, May 2013-present
- Prospectus committee member, G. Kaur, Wayne State U., July 2013
- Undergraduate research advisor for C.M. Culkin and A.S. White, U. of Michigan, summer 2013
- Faculty advisor for W. Qian as an associate editor for the Journal of Young Investigators, 2012-present
- Research advisor for graduate student J.D. Osborn, U. of Michigan, summer 2013
- Sponsor for R.J. Belmont, Vanderbilt U., as a Visiting Scholar at U. of Michigan to complete thesis, 2012
- Prospectus committee member, Z. Qu, U. of Michigan, September 2012
- Supervision of A. Datta, UMass Amherst, throughout thesis analyses, September 2007-February 2012
- Supervision of R. Han, Peking U., in completion of thesis analysis, May-December 2007
- Thesis committee, T. Engelmores, Columbia U., May 2011

**AWARDS AND RECOGNITION:**

**Essayist for *Blazing the Trail: Essays by Leading Women in Science*.** E. Ideal and R. Maharchand, eds. CreateSpace Independent Publishing, 2013.

**Distinguished Women Physicists Lecture Series colloquium speaker**, University of Connecticut, 2012.

**Invited Fellow, 50th anniversary celebration of the International School on Subnuclear Physics**, Erice, Italy, June–July 2011. Organized by G. t Hooft and A. Zichichi.

**Sambamurti Memorial Lectureship**, BNL, 2008. *For her contributions to the RHIC Spin Program, notably her leadership in the measurement of the transverse spin structure of the proton using pions.*

**Vernon Hughes Travel Fellowship**, 2004.

**Luise Meyer-Schutzmeister Award**, Association for Women in Science, 2004.

**GAANN Fellowship**, U.S. Department of Education, through University of Chicago, 1999.

**Scholarship Recipient**, Long Island Chapter of the **American Nuclear Society**, 1999.

**Nominee for Barry M. Goldwater Scholarship**, Yale University, 1998.

CONFERENCE, WORKSHOP, AND SCHOOL ORGANIZATION:

**Chair, Workshop on Opportunities for Polarized Physics at Fermilab**, May 20-22, 2013.

**Member, International Organizing Committee, 3rd Workshop on the QCD Structure of the Nucleon (QCD-N12)**, Bilbao, Spain, October 22-26, 2012.

**Member, Program Committee, 19th Particles and Nuclei International Conference (PANIC 2011)** and Co-organizer for session on Quarks and Gluons in Hadrons, MIT, July 24-29, 2011.

**Co-organizer, Wkshp on Transverse-Momentum-Dependent Distributions, ECT\***, Trento, Italy, June 21-25, 2010.

**Principal organizer, Symposium on Educational and Public Outreach**, sponsored by the RHIC-AGS Users Executive Comm. and the National User Facility Organization, BNL, June 9, 2010.

**Co-convenor, Spin Physics Working Group, 18th International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2010)**, Florence, Italy, April 17-23, 2010.

**Co-organizer, Workshop on Transverse Spin Physics**, RHIC-AGS Users Mtg, BNL, June 2009.

**Principal Organizer, 4th PHENIX Spinfest School on QCD Physics**, BNL, August 2008.

**Co-organizer, 2nd PHENIX Spinfest School on QCD Physics**, BNL, August 2006.

**Principal Organizer, Workshop on the Helicity Structure of the Nucleon**, RHIC-AGS Users Meeting, BNL, June 2006.

**Co-organizer, Workshop on Proton Spin Physics**, RHIC-AGS Users Meeting, BNL, June 2005.

OTHER SERVICE AND EXPERIENCE:

**Faculty advisor, U. of Michigan Society of Women in Physics (SWIP)**, Sept 2012-present.

**U. of Michigan HEP/Astro/Nuclear Seminar organizer**, Sept 2012-present. **Chair** 2013-14.

**Member, U. of Michigan Undergrad Curriculum and Concerns Comm.**, Sept 2012-present.

**Elected member, National User Facility Organization (NUFO) Steering Committee**, June 2011-present (term ends June 2014). <http://www.nufo.org>

**Elected member, PHENIX Executive Council**, March 2011-present (term ends March 2014). The EC is responsible for establishing scientific priorities for the experiment, with members selected for their scientific judgment, technical expertise, and commitment to the experiment.

**Member, BNL Work-Life Balance Committee**, April 2010-June 2012.

**Elected member, RHIC-AGS Users Executive Committee**, June 2009-June 2012.

**Moderator, Panel discussion: The Future of RHIC Upgrades**, RHIC Users Open Forum Meeting, Meeting of the APS Division of Nuclear Physics, October 2011.

**Member, RHIC Thesis Award Committee**, April–June 2011.

**Member, PHENIX Decadal Plan Writing Committee**, March–September 2010.

**Member, PHENIX Speakers Bureau**, April 2009–February 2010.

**Lecturer, European Graduate School on Complex Systems of Hadrons and Nuclei (HANUC)**, The Structure of the Nucleon. Turin, Italy, March 2009.

**Member, PHENIX Forward Calorimeter Upgrade Internal Review Comm.**, Jan–Feb 2009.

**Co-convenor, PHENIX Spin Physics Working Group**, January 2007–April 2009. Oversaw and coordinated all analysis activities within Working Group; approved scientific results for public release by the collaboration.

**Member, PHENIX Spokesperson Selection Task Force**, May–July 2006.

**Elected Student/Postdoc Representative, RHIC-AGS Users Executive Comm.**, 2004–05.

#### INVITED CONFERENCE AND WORKSHOP PRESENTATIONS:

Seminars and colloquia listed separately below.

For a complete listing of all presentations, please see <http://www.phenix.bnl.gov/~caidala>.

**APS Division of Nuclear Physics Fall Meeting**, Newport Beach, CA, October 2012. *Entering the Electronic Age at RHIC: eRHIC*.

**APS Division of Nuclear Physics Fall Meeting**, East Lansing, MI, October 2011. *The Electron-Ion Collider: Tackling QCD from the Inside (of Nucleons and Nuclei) Out*.

**Quarks, Hadrons, and LHC**, Mumbai, India, August 2011. *Transverse-Momentum-Dependent Distributions and Transverse Spin Phenomena at RHIC*.

**Gluons and the Quark Sea at High Energies: Workshop to develop the physics case of a high-energy Electron-Ion Collider**, INT, U. of Washington, September–November 2010. *Probing QCD in Hadrons Through Transverse-Momentum-Dependent Distributions at RHIC—Or—Why Use Messy  $p+p$  Collisions to Study What’s Happening Inside the Nucleon?*

**Electromagnetic Interactions with Nucleons and Nuclei (EINN 2009)** Workshop on Partonic Transverse Momentum Distributions, Milos, Greece, September–October 2009. *Single-Spin Asymmetries and Transverse-Momentum-Dependent Distributions at RHIC*.

**18th International Symposium on Spin Physics (SPIN2008)**, Charlottesville, VA, October 2008. *Spin in Hadron Reactions*. (Plenary)

**Gordon Conference on Photonuclear Reactions**, Tilton, NH, August 2008. *Transverse Spin Physics at RHIC*.

**2nd International Workshop on Transverse Polarization Phenomena in Hard Processes (Transversity 2008)**, Ferrara, Italy, May 2008. *Transversity and Transverse-Momentum-Dependent Distribution Measurements from PHENIX and BRAHMS*.

**24th Winter Workshop on Nuclear Dynamics**, South Padre Island, TX, April 2008. *Peering into Hadronic Matter: The Electron-Ion Collider*.

**International Workshop on Structure and Spectroscopy**, Freiburg, Germany, March 2007. *Recent Spin Physics Results from RHIC*.

**Spin Structure of the Nucleon Workshop**, Nashville, TN, October 2006. *Recent Spin Physics Results from PHENIX*.

**International Workshop on Transversity: New Developments in Nucleon Spin Structure**, ICT\*, Trento, Italy, June 2004. *Single Transverse Spin Asymmetries at RHIC*.

SEMINARS, COLLOQUIA, AND PUBLIC LECTURES:

**Colloquium: Notre Dame U.**, January 2014. *From Quarks and Gluons to the World Around Us: Advancing Quantum Chromodynamics by Probing Nucleon Structure*.

**Public lecture: U. of Michigan Saturday Morning Physics series**, March 2013. *Peering Into the Proton*. [https://www.youtube.com/watch?v=iLNches\\_G6M](https://www.youtube.com/watch?v=iLNches_G6M)

**Seminar: University of D0**, Fermilab, March 2013. *Investigating Proton Structure at the Relativistic Heavy Ion Collider*.

**Seminar: Wayne State U.**, January 2013. *Investigating Proton Structure at the Relativistic Heavy Ion Collider*.

**Colloquium: Triangle Nuclear Theory series, Duke U.**, February 2012. *The Electron-Ion Collider: Tackling QCD from the Inside (of Nucleons and Nuclei) Out*.

**Colloquium: UConn**, January 2012. *From Quarks and Gluons to the World Around Us: Understanding Quantum Chromodynamics by Exploring Nucleon Structure*.

**Seminars: LANL, Rutgers U.**, September - October 2011. *The PHENIX Decadal Plan: Crafting the Future of the Relativistic Heavy Ion Collider*.

**Seminar: Stony Brook U.**, February 2011. *From Quarks and Gluons to the World Around Us: Advancing into the Era of Quantitative QCD via Investigation of Nucleon Structure*.

**Seminars: DESY-Hamburg, DESY-Zeuthen**, October 2010. *Investigating the Spin Structure of the Proton at the Relativistic Heavy Ion Collider*.

**Seminar: INFN Ferrara**, June 2010. *Investigating the Spin Structure of the Proton at RHIC: Recent Results.*

**Colloquium, Catholic U. of America**, December 2009. *Getting Protons to Study Themselves: Investigating Proton Structure at the Relativistic Heavy Ion Collider.*

**Seminar: LANL**, October 2009. *The Electron-Ion Collider: Tackling QCD from the Inside (of Nucleons and Nuclei) Out.*

**Seminar: JLab**, May 2009. *Investigating the Spin Structure of the Proton at RHIC.*

**Seminars: LANL, Columbia U.**, 2009. *Frontiers in Nucleon Structure.*

**Seminars: Michigan State U., U. of Kentucky, Kent State U.**, 2008. *The Emerging QCD Frontier: The Electron-Ion Collider.*

**Seminar: INFN Torino**, June 2008. *Recent Spin Physics Results from RHIC.*

**Seminar: INFN Pavia**, June 2008. *Recent Results from the PHENIX Experiment at RHIC.*

**Colloquium: Old Dominion U.**, September 2007. *A Novel Shakedown of the Proton Spin Breakdown: How the Field Has Become Wider with a Polarized Proton Collider.*

**Seminars: UMass Amherst, INFN Cagliari**, 2006. *Recent Spin Physics Results from PHENIX.*

**Seminar: Mt. Holyoke College**, 2006. *The Whole Story Behind a Half: The Quest to Understand the Protons Spin.*

**Seminars: IUCF, LANL, LBL**, 2005. *Studying the Transverse Spin Structure of the Proton at PHENIX.*

**Seminars: CERN, Laboratori Nazionali di Frascati, INFN Torino, INFN Ferrara**, 2004. *Recent Spin Results from PHENIX.*

**Outreach seminars promoting physics graduate study: Bryn Mawr, Mt. Holyoke, Smith, Vassar, Barnard, Wellesley, and Amherst Colleges**, 2003-04. Sponsored by Columbia University.

**Colloquium: Vassar College**, December 2003. *Flying High with PHENIX: Surveying the Landscape for Quark-Gluon Plasma and the Secrets of the Protons Spin.*