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Chiara P. Salemi

Education

Massachusetts Institute of Technology — **Cambridge, MA**
Ph.D. Candidate, Department of Physics — *2017-present*

University of North Carolina — **Chapel Hill, NC**
B.S. Physics and Mathematics, Highest Honors, Highest Distinction — *2013–2017*

Awards and Honors

Dr. Pliny A. and Margaret H. Price Prize
Ph.D. student award from Ohio State University CCAPP — *2020*

NSF Graduate Research Fellow
2018–present

MIT Presidential Fellow
2017–2018

Paul E. Shearin Outstanding Senior Award in Physics
UNC Chancellor's Award — *2017*

Senior Thesis Highest Honors
Magnet Simulations for ABRACADABRA — *2017*

Phi Beta Kappa
2016

Daniel C. Johnson Award
Award for outstanding junior in the UNC Physics and Astronomy Department — *2016*

Goldwater Scholar
National scholarship for students pursuing research careers in STEM — *2016*

Honors Carolina
2013–2017

Research

ABRACADABRA and DM Radio, MIT — **Cambridge, MA**
Graduate Research Assistant with Lindley Winslow — *June 2017–present*

- Commissioned and ran ABRACADABRA-10cm first generation experiment
- Built and installed hardware including cryogenic systems and superconducting electronics
- Wrote analysis code and electromagnetic simulations

Experimental Nuclear and Astroparticle Physics, UNC — **Chapel Hill, NC**
Undergraduate Research Assistant with Reyco Henning — *Nov 2013–May 2017*

- Simulated detection setup and analyzed sources of noise for the proposed ABRACADABRA experiment
- Measured cosmogenic activation of tritium in germanium with data from the Majorana Demonstrator
- Wrote Monte Carlo simulations for CALIOPE, a search for lepton-sector CP violation with positronium
- Wrote and analyzed Monte Carlo simulation of cosmic ray shielding for gamma ray experiments

Axion Dark Matter eXperiment (ADMX), Fermilab — **Batavia, IL**
Undergraduate Research Assistant with Daniel Bowring and Andrew Sonnenschein — *Summer 2016*
DOE Science Undergraduate Laboratory Internship (SULI) at Fermi National Accelerator Laboratory (FNAL)

- Simulated and tested coplanar waveguide resonators to develop nonlinear dielectric tuning for next generation multi-cavity haloscope arrays
- Analyzed experimental sensitivity by simulating cavity tuning with tuning rods

ATLAS Experiment Higgs group, CERN **Geneva, Switzerland**
Undergraduate Research Assistant with Magda Chelstowska *Fall 2015*
University of Michigan Research Semester Abroad Program
- Analyzed Run 2 data with the Higgs diphoton decay channel for Higgs cross section measurements and for physics beyond the Standard Model

Observational Astronomy, UNC **Chapel Hill, NC**
Undergraduate Research Assistant with Dan Reichart *Aug 2014–Sep 2015*
- Analyzed maps and optimized algorithms for single-dish radio telescope mapping
- Optimized algorithms for robust Chauvenet rejection statistical methods

MAJORANA Experiment, LBNL **Berkeley, CA**
Undergraduate Research Assistant with Adam Bradley and Alan Poon *Summer 2015*
DOE Science Undergraduate Laboratory Internship (SULI) in Neutrino Astrophysics in the Nuclear Science Division at Lawrence Berkeley National Laboratory
- Modified and tested new designs for low background semiconductor detector front-end electronics

Educational Research in Radio Astronomy, NRAO **Green Bank, WV**
Participant *June 2014*
Hosted by the National Radio Astronomy Observatory and led by Dan Reichart of UNC
- Operated manual 40-foot and robotic 20-meter telescopes
- Used observations to analyze pulsars, the rotation of the Milky Way, and the North Polar Spur

Publications

[1] Ouellet, J. L., **Salemi, C. P.** et al. "First Results from ABRACADABRA-10 cm: A Search for Sub-μeV Axion Dark Matter". In: *Phys. Rev. Lett.* 122 (12 Mar. 2019), p. 121802. DOI: 10.1103/PhysRevLett.122.121802. URL: https://link.aps.org/doi/10.1103/PhysRevLett.122.121802.

[2] Ouellet, J. L., **Salemi, C. P.** et al. "Design and implementation of the ABRACADABRA-10 cm axion dark matter search". In: *Phys. Rev. D* 99 (5 Mar. 2019), p. 052012. DOI: 10.1103/PhysRevD.99.052012. URL: https://link.aps.org/doi/10.1103/PhysRevD.99.052012.

[3] J. R. Martin et al. "Skynet Algorithm for Single-dish Radio Mapping. I. Contaminant-cleaning, Mapping, and Photometering Small-scale Structures". In: *The Astrophysical Journal Supplement Series* 240.1 (Jan. 2019), p. 12. DOI: 10.3847/1538-4365/aad7c1. URL: https://doi.org/10.3847%2F1538-4365%2Faad7c1.

[4] M. P. Maples et al. "Robust Chauvenet Outlier Rejection". In: *The Astrophysical Journal Supplement Series* 238.1 (Aug. 2018), p. 2. DOI: 10.3847/1538-4365/aad23d. URL: https://doi.org/10.3847%2F1538-4365%2Faad23d.

[5] *Measurement of the Higgs boson production cross section at 7, 8 and 13 TeV center-of-mass energies in the $H \to \gamma\gamma$ channel with the ATLAS detector*. Tech. rep. ATLAS-CONF-2015-060. Geneva: CERN, Dec. 2015. URL: http://cds.cern.ch/record/2114826.

Talks

Center for Cosmology and AstroParticle Physics, OSU (invited seminar) **Columbus, OH**
The Search for Low-Mass Axion Dark Matter *Sep 2020*
Price Prize Seminar

Laboratory for Nuclear Science, MIT (seminar) **Cambridge, MA**
Axion Cosmology *Apr 2020*
Student Lunch Seminar

APS Division of Particles and Fields Meeting **Boston, MA**
The Search for Low-Mass Axions with ABRACADABRA-10 cm: Preparations for Run 2 *July 2019*

APS April Meeting **Denver, CO**
COMSOL Simulations for ABRACADABRA *Apr 2019*

Rencontres de Moriond (invited) **La Thuile, Italy**
First Results from ABRACADABRA-10 cm *Mar 2019*

Dept of Physics and Astronomy, Purdue University (invited seminar) **West Lafayette, IN**
First Results from ABRACADABRA-10 cm *Nov 2018*
Particle Physics Seminar

Wright Laboratory, Yale (invited seminar) **New Haven, CT**
ABRACADABRA: A Search for Low-Mass Axion Dark Matter *May 2018*
Weak Interactions Discussion Group Seminar

Laboratory for Nuclear Science, MIT (seminar) **Cambridge, MA**
ABRACADABRA: A Search for Low-Mass Axion Dark Matter *Apr 2018*
Student Lunch Seminar

Posters

Quantum Information and Systems for Fundamental Physics Conference **Aspen, CO**
ABRACADABRA: Searching for Low-Mass Axion Dark Matter *Feb 2020*

Dept of Physics, MIT **Cambridge, MA**
First Results from ABRACADABRA-10 cm, A Search for Low-Mass Axion Dark Matter *Apr 2018*
Won second prize at open house poster session

UCLA Dark Matter **Los Angeles, CA**
ABRACADABRA: A Search for Low-Mass Axion Dark Matter *Feb 2018*

Division of Nuclear Physics (DNP) Fall Meeting **Vancouver, Canada**
Microwave cavity tuning with nonlinear dielectric films for axion searches *Oct 2016*
Awarded funding by the Conference Experience for Undergraduates (CEU)

38th International Conference on High Energy Physics (ICHEP) **Chicago, IL**
Tuning microwave cavities with biased nonlinear dielectrics for axion searches *Aug 2016*

Division of Nuclear Physics (DNP) Annual Fall Meeting **Santa Fe, NM**
Testing new designs for the Majorana Demonstrator*'s low-mass front-end board* *Oct 2015*
Awarded maximum funding by the Conference Experience for Undergraduates (CEU) and additional funding from UNC for travel from CERN

Teaching

Teaching Assistant **Cambridge, MA**
MIT graduate particle physics, 8.811 *Fall 2019 and Fall 2020*

Physics and math tutor **Chapel Hill, NC**
UNC Physics Tutorial Center *Jan 2016–May 2016*

Service

MIT Physics Department **Cambridge, MA**
Mentor in Undergraduate Mentoring Program *Fall 2020*

MIT Physics Department — **Cambridge, MA**
Mentor in Graduate Student Buddy Program — *Fall 2018–present*

MIT Laboratory for Nuclear Science — **Cambridge, MA**
Founded and organized neutrinos and dark matter journal club — *Jan 2018–Aug 2020*

MIT Physics Department — **Cambridge, MA**
Mentor in Graduate/Undergraduate Women in Physics Buddy Program — *Fall 2019*

MIT Museum — **Cambridge, MA**
Girl's Day activity leader — *Nov 2017*

Morehead Observatory — **Chapel Hill, NC**
Tour co-leader for two elementary school programs — *Jan 2016–Feb 2016*

TEDxCERN — **Meyrin, Switzerland**
Greeter and crowd control — *Oct 2015*

Memberships

MIT Graduate Women in Physics — *Aug 2017–present*

American Physical Society (APS) — *Jan 2015–present*

UNC Society of Physics Students (SPS) — *Fall 2014–Spring 2017*

Carolina Women in Physics (WiP) — *Spring 2014–Spring 2017*
On-campus outreach director, Fall 2016–Spring 2017