Molly E. C. Swanson

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Education

Tufts University: Master of Arts in Teaching — M.A.T. Expected 2015
Massachusetts Institute of Technology: Physics — Ph.D. 2008
California Institute of Technology: Physics — B.S. with honor 2002

Licensure

Massachusetts Educator License # 431232

- Preliminary License for Physics 8-12
- Initial License for Physics 8-12 [pending, expected June 2015]
- Initial License for Math 8-12 [will apply summer 2015]
- Initial License for Moderate Disabilities 5-12 [will apply summer 2015]
- Sheltered English Immersion Endorsement [pending, expected June 2015]
- MTEL Results: passed Physics, Communication and Literacy Skills. Results pending for Mathematics, Foundations of Reading

Teaching

Student Teaching - Waldorf High School, Belmont, MA 2014-Present

- Designs curriculum for and teaches 12th grade optics class, 11th grade electricity and magnetism class, 11th grade science methods class, and 10th grade interdisciplinary class on the geometry of the earth and sky
- Tutors students with special needs in the Academic Support Center and supports these students within the mainstream classroom
- Uses phenomenological approach to engage students in rich scientific thinking
- Differentiates instruction and assessment using project-based learning

Resident Astrophysicist - Acera School, Melrose, MA 2010-2014

- Led astronomy, science, and math activities one day/week at Acera, a startup school for gifted K-8 students (growing to K-12 in coming years)
- Initiated, organized, and managed Acera's Destination Imagination program, an international team-based creative problem solving competition
- Member of Launch Team to open new school in Sept 2010

Teacher for Spark and Splash - MIT ESP 2010-2011

- Taught cosmology for high school students at one-day "Spark" and "Splash" events run by the MIT Educational Studies Program

University of London Observatory Tour Guide 2009

- Led telescope viewings and tours for the public and school groups

Student Supervision - University College London 2008-2009

- Mentored masters student on a year-long project on galaxy survey design
- Mentored undergraduate student on a summer project on modified gravity

Cambridge Rindge & Latin School Volunteer 2004-2007

- Worked in 9th grade physics and 12th grade astronomy classes
- Participated in summer teachers' workshops

Teaching Assistant for MIT Physics Courses 2003-2007

- Undergraduate astrophysics: Developed in-depth computational projects
- Graduate extragalactic astrophysics: Provided homework help and grading
- Sophomore wave physics: tutored, ran review sessions, graded exams

MasteringPhysics 2003-2005

- Wrote problems for a web-based free-response physics homework system

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RESEARCH

NSF Astronomy & Astrophysics Fellowship 2010-2013
- Advisor: Prof. Daniel Eisenstein, Harvard (Center for Astrophysics)
- Used Baryon Oscillation Spectroscopic Survey data to study galaxy properties
- Prepared Dark Energy Survey (DES) for first light in 2012
- Earned DES Builder status (co-authorship on papers using DES data)

NSF International Research Fellowship 2008-2010
- Advisor: Prof. Sarah Bridle, University College London
- Studied neutrino mass using galaxy surveys, developed software for DES

Cosmology with Sloan Digital Sky Survey 2004-2008
- Advisor: Prof. Max Tegmark, MIT
- Used clustering data to study composition and evolution of the universe
- Developed software to deal with angular masks of galaxy surveys

Astrophysics with Super-Kamiokande Neutrino Detector 2002-2004
- Advisor: Prof. Kate Scholberg, MIT (now at Duke)
- Studied ultra-high energy neutrinos from active galactic nuclei

CA High School Cosmic Ray Observatory (CHICOS) 2001-2002
- Advisor: Prof. Robert McKeown, Caltech
- Developed analysis software, installed observing stations in high schools

Summer Undergraduate Research Fellowship (SURF) 2000
- Advisor: Prof. Kenneth Libbrecht, Caltech
- Studied the effects of high voltage on iodine crystal growth

Research Experience for Undergraduates 1999
- Advisor: Prof. James Kakalios, University of MN
- Studied segregation of granular material and avalanche dynamics

SELECTED PUBLICATIONS

[1] C. Chang *et al.*, "Modeling the Transfer Function for the Dark Energy Survey," *Astrophysical Journal* **801**, 73 (2015).

[2] L. Anderson *et al.*, "The clustering of galaxies in the SDSS-III Baryon Oscillation Spectroscopic Survey: baryon acoustic oscillations in the Data Releases 10 and 11 Galaxy samples," *Monthly Notices of the Royal Astronomical Society* **441**, 24 (2014).

[3] M. E. C. Swanson, W. J. Percival, and O. Lahav, "Neutrino masses from clustering of red and blue galaxies: a test of astrophysical uncertainties," *Monthly Notices of the Royal Astronomical Society* **409**, 1100 (2010).

[4] M. E. C. Swanson, M. Tegmark, A. J. S. Hamilton, and J. C. Hill, "Methods for rapidly processing angular masks of next-generation galaxy surveys," *Monthly Notices of the Royal Astronomical Society* **387**, 1391 (2008).

[5] M. E. C. Swanson, M. Tegmark, M. Blanton, and I. Zehavi, "SDSS galaxy clustering: luminosity and colour dependence and stochasticity," *Monthly Notices of the Royal Astronomical Society* **385**, 1635 (2008).

[6] M. E. C. Swanson *et al.* (the Super-Kamiokande Collaboration), "Search for Diffuse Astrophysical Neutrino Flux Using Ultra-High-Energy Upward-going Muons in Super-Kamiokande I," *Astrophysical Journal* **652**, 206 (2006).