

Michael W. McElwain, Ph.D.

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RESEARCH INTERESTS	High contrast imaging and spectroscopy, low mass stars, extrasolar planets, infrared instrumentation, adaptive optics (AO), protoplanetary disks, dusty debris disks, space policy	
EDUCATION	Princeton University , Princeton, New Jersey USA Henry Norris Russell Postdoctoral Fellow, Astrophysical Sciences National Science Foundation Astronomy & Astrophysics Postdoctoral Fellow American Museum of Natural History , New York, New York USA Research Associate, Division of Physical Sciences, Astrophysics Department University of California, Los Angeles , Los Angeles, California USA Ph.D., Astronomy & Astrophysics, September 2007 <ul style="list-style-type: none">• Advisor: Prof. James Larkin• Dissertation Topic: “High Contrast Spectral Imaging of Sub-Stellar Companions Around Nearby Young Stars” M.S., Astronomy & Astrophysics, June 2003 <ul style="list-style-type: none">• Advisors: Prof. James Larkin & Postdoc. Adam Burgasser• Master’s Topic: “I. The Lick Wide-Field T Dwarf Search. II. High Contrast Imaging with OSIRIS.” University of Pennsylvania , Philadelphia, Pennsylvania USA B.A., Physics (Hons), May 2001 <ul style="list-style-type: none">• Advisor: Prof. David Koerner• Senior Thesis: “A Keck Survey for Binary L Dwarfs”	
RESEARCH AND TEACHING EXPERIENCE	Princeton University <i>Henry Norris Russell Postdoctoral Fellow</i> <i>National Science Foundation Postdoctoral Fellow</i> Science	October 2007 - September 2009 October 2009 - present
	<ul style="list-style-type: none">• Key participant in the Princeton-Subaru “N-PAC” collaboration on the Subaru SEEDS project. This project was awarded 120 nights of Subaru time to investigate the planet formation and evolutionary processes through direct detection techniques. The survey will use the new adaptive optics system with a 188 actuator deformable mirror (AO188) and a simultaneous differential imaging instrument called HiCIAO. I have helped commission the high contrast imaging instrumentation, including a lead role in introducing the angular differential imaging technique to HiCIAO. I helped define the science program for the SEEDS survey, and I will perform first-light science using this new system. I also helped with the design of next-generation instrumentation for Subaru high contrast imaging.• Co-organizer of the Princeton “Planets lunch” seminar series. Princeton Terrestrial Planet Finder Group	

- Preliminary optical design of an integral field spectrograph (IFS) for the Subaru Observatory high order AO system. Integral field spectroscopy will be used for speckle suppression of the host star and spectral analysis of planetary atmospheric features. Therefore, this instrument design will be critical for the NASA Terrestrial Planet Finder Coronagraph (TPF-C) science program. This work is being conducted in collaboration with the department of mechanical and aerospace engineering.
- Oversight of experimental projects in the Princeton TPF lab related to TPF technology development. This includes laboratory demonstrations of shaped pupil coronagraphs, occulters, and wavefront control using MEMs deformable mirrors. Several graduate students and undergraduates have on-going projects in the laboratory.

Program on Science and Global Security

- Investigating the long-term effects of kinetic-kill anti-satellite (ASAT) weapons on the near-Earth space debris environment. I am simulating several plausible scenarios in which one or more kinetic-kill ASAT weapons are used in a space conflict. The subsequent impact on the space debris environment will be used as the basis of policy recommendations regarding the stewardship of kinetic-kill ASAT weapons. This work is being conducted in collaboration with the Woodrow Wilson School of Public and International Affairs.

The National Academies

Christine Mirzayan Science and Technology Fellow
Science Policy

January 2009 - April 2009

- In this short-term fellowship, I participated in the DOE, NASA, and NSF sponsored Astro2010 decadal survey for astronomy and astrophysics. I lead teleconferences for the infrastructure study groups, helped receive and organize community input to the survey, and attended several of the science frontier panel meetings. In addition, I designed a Keck Observatory standing exhibit that is on display in the Keck Center building of The National Academies. This work was sponsored by the Board on Physics and Astronomy in the Division on Engineering and Physical Sciences.

University of California, Los Angeles

Graduate Student
Science

September 2001 - September 2007

- Wrote and employed digital filters and spatial rescaling routines to identify and subsequently suppress diffraction in the point spread function of the W. M. Keck Observatory (Keck) AO near-infrared IFS images. This procedure creates high contrast images to discover extrasolar planets and to study their atmospheres and formation mechanisms. These algorithms provide a baseline for the Gemini Planet Imager (GPI) and the TPF-C mission.
- Cross correlated the *IRAS* and *Hipparcos* databases to search for dusty debris disks around evolved stars. After screening many contaminant sources, non-photospheric infrared emission was fit by a blackbody using a χ^2 minimization method. This project produced the most complete sample of dusty debris disks to-date and analyzed the evolution of dusty debris disks across all spectral types of stars.

Infrared Laboratory

- Key involvement in building OSIRIS, an IFS for Keck. This experience included elements of optical design, thermal modeling, drafting of parts, finite element analysis, contracts with external supply vendors, instrument assembly, instrument shipping, integration with an AO system, software integration with an observatory, and extensive testing throughout the fabrication and commissioning processes.
- Lead developer of Quicklook v2.0, the primary 3-dimensional data visualization software for OSIRIS data cubes. Quicklook v2.0, written in IDL, is equipped with 2-dimensional image analysis tools such as data arithmetic, peak fitting (Gaussian, Lorentzian, or Moffat functions),

photometry, Strehl derivations, statistical calculations, data plotting, and normal rotations. The 3-dimensional functions include depth plotting, spectral line fitting, and digital filtering.

- Participant of the Gemini Planet Imager (GPI) design team, for which I helped design an IFS for the GPI instrument. Quantitative results were reached in accordance with the baseline science requirements.

Teaching Assistant Coordinator

September 2002 - August 2005

Taught the incoming physics and astronomy graduate students how to plan a discussion section or lab, proctor an exam, grade labs, grade exams, hold office hours, and deal with conflict in the classroom. Instructed the students on innovative teaching strategies and campus resources for student support services.

Instructor

March - June 2004

Designed and taught an undergraduate honors seminar about life in the cosmos. This course focused on astrobiology, a scientific discipline concerned with explaining life's origin, evolution, and distribution throughout the Universe. I had full responsibility for lectures, course materials, examinations, and grades.

Teaching Assistant

September 2001 - June 2004

Taught recitation sessions and led laboratory experiments to complement lecture material.

University of Pennsylvania

Undergraduate Research

Planetary Origins Research Group

May 1999 - August 2001

- Researched the probability distribution function for the occurrence of companions to low-luminosity dwarfs. This included the reduction of optical and infrared data and writing algorithms to search for common proper motion objects in multiple epoch data. Point spread function calibration and deconvolution were performed on each of the targets to identify unresolved binaries.

High Energy Physics Group

June 1998 - April 1999

- Research assistant for the AMANDA project. Designed a laboratory experiment to simulate photomultiplier tube signals and the signal attenuation over a coax cable. An electrical circuit was devised to sharpen and amplify the attenuated signal.

Teaching Assistant

Penn Summer Science Academy

June - July 2001

- Taught an intensive summer course for talented high school students interested in the sciences. Led nightly observing sessions for the students and assisted with lectures and laboratory experiments.

REFEREED
PUBLICATIONS

“Broadband Wavefront Control Using Two Deformable Mirrors,” Kasdin, N. J.; Pueyo, L.; Kay, J.; McElwain, M. W.; Groff, T.; Give'on, A. 2009, ApJ, in preparation

“A Binary-Star Coronagraph for the Subaru Telescope,” Cady, E.; McElwain, M. W.; Kasdin, N. J. 2009, submitted

“Search for Outer Massive Bodies around Transiting Planetary Systems: Candidates of Faint Stellar Companions around HAT-P-7,” Narita, N.; Kudo, T.; Bergfors, C.; Nagasawa, M.; Thalmann, C.; Sato, B.; Suzuki, R.; Kandori, R.; Janson, M.; Goto, M.; Brandner, W.; Ida, S.; Abe, L.; Carson, J.; Egner, S. E.; Feldt, M.; Golota, T.; Guyon, O.; Hashimoto, J.; Hayano, Y.; Hayashi, M.; Hayashi, S. S.; Henning, T.; Hodapp, K. W.; Ishii, M.; Knapp, G. R.; Kusakabe, N.; Kuzuhara, M.; Matsuo, T.; McElwain, M. W.; Miyama, S.; Morino, J.-I.; Moro-Martín, A.; Nishimura, T.;

- Pyo, T.-S.; Serabyn, E.; Suenaga, T.; Suto, H.; Takahashi, Y.; Takami, M.; Takato, N.; Terada, H.; Tomono, D.; Turner, E. L.; Watanabe, M.; Yamada, T.; Takami, H.; Usuda, T.; & Tamura, M. 2010, ApJ, accepted
- “Optimal Dark Hole Generation via Two Deformable Mirrors with Stroke Minimization,” Pueyo, L.; Kay, J.; Kasdin, N. J.; Groff, T.; McElwain, M.; Give’on, A.; Belikov, R. 2009, Applied Optics, 48, 32, 6296–6312
- “Discovery of the Coldest Imaged Companion of a Sun-Like Star,” Thalmann, C.; Carson, J.; Janson, M.; Goto, M.; McElwain, M.; Egner, S.; Feldt, M.; Hashimoto, J.; Hayano, Y.; Henning, T.; Hodapp, K. W.; Kandori, R.; Klahr, H.; Kudo, T.; Kusakabe, N.; Mordasini, C.; Morino, J.; Suto, H.; Suzuki, R.; Tamura, M. 2009, ApJL, arXiv:0911.1127
- “Characterization of Dusty Debris Disks for the IRAS Catalog,” Rhee, J. H.; Song, I.; Zuckerman, B.; McElwain, M. W. 2007, ApJ, 660, 1556
- “OSIRIS Integral Field Spectroscopy Laser Guide Star Adaptive Optics of a Star Forming Galaxy at $z\sim 1.5$,” Wright, S. A.; Larkin, J. E.; Barczys, M.; Erb, D.; Krabbe, A.; Iserlohe, C.; Law, D.; McElwain, M. W.; Quirrenbach, A.; Steidel, C.; Weiss, J. 2007, ApJ, 658, 78
- “A New Brown Dwarf Desert? A Scarcity of Wide Ultracool Binaries,” Allen, P. R.; Koerner, D. W.; McElwain, M. W.; Cruz, K. L.; Reid, I. N. 2007, AJ, 133, 971
- “First High-Contrast Science with an Integral Field Spectrograph: the Sub-Stellar Companion to GQ Lup,” McElwain, M. W.; Metchev, S. A.; Larkin, J. E.; Barczys, M.; Iserlohe, C.; Krabbe, A.; Quirrenbach, A.; Weiss, J.; Wright, S. A. 2007, ApJ, 656, 505
- “Diffraction Limited Imaging Spectroscopy of a Sgr A* Flare with OSIRIS,” Krabbe, A.; Iserlohe, C.; Larkin, J. E.; Barczys, M.; McElwain, M.; Weiss, J.; Wright, S. A.; Quirrenbach, A. 2006, JPhCS, 54, 406K
- “Resolved Spectroscopy of M Dwarf/L Dwarf Binaries. II. 2MASS J17072343-0558249AB,” McElwain, M. W.; & Burgasser, A. J. 2006, AJ, 131, 1007
- “OSIRIS: A diffraction limited integral field spectrograph for Keck,” Larkin, J. E.; Barczys, M.; Krabbe, A.; Adkins, S.; Aliado, T.; Amico, P.; Brims, G.; Campbell, R.; Canfield, J.; Gasaway, T.; Honey, A.; Iserlohe, C.; Johnson, C.; Kress, E.; Lafrenière, D.; Magnone, K.; Magnone, N.; McElwain, M. W.; Moon, J.; Quirrenbach, A.; Skulason, G.; Song, I.; Spencer, M.; Weiss, J.; Wright, S. A. 2006, New Astronomy Review, 50, 362
- “Diffraction Limited Imaging Spectroscopy of the SgrA* Region using OSIRIS, a new Keck Instrument,” Krabbe, A.; Iserlohe, C.; Larkin, J. E.; Barczys, M.; McElwain, M. W.; Weiss, J.; Wright, S. A.; Quirrenbach, A. 2006, ApJL, 642, L145
- “Resolved Spectroscopy of M Dwarf/L Dwarf Binaries. I. DENIS J220002.05-303832.9AB,” Burgasser, A. J.; & McElwain, M. W. 2006, AJ, 131, 1007
- “OSIRIS: AO-assisted integral-field spectroscopy at the Keck Observatory,” Quirrenbach, A.; Larkin, J.; Barczys, M.; Gasaway, T.; Iserlohe, C.; Krabbe, A.; McElwain, M.; Song, I.; Weiss, J.; Wright, S. 2006, New Astronomy Reviews, 49, 639
- “The 2MASS Wide-Field T Dwarf Search. V. Discovery of a T Dwarf via Methane Imaging,” Ellis, S. C.; Tinney, C. G.; Burgasser, A. J.; Kirkpatrick, J. D.; McElwain, M. W. 2005, AJ, 130, 2347

- “The 2MASS Wide-Field T Dwarf Search. IV. Hunting Out T Dwarfs with Methane Imaging,” Tinney, C. G.; Burgasser, A. J.; Kirkpatrick, J. D.; & McElwain, M. W. 2005, *AJ*, 130, 2326
- “The 2MASS Wide-Field T Dwarf Search. III. Seven New T Dwarfs and Other Cool Dwarf Discoveries,” Burgasser, A. J.; McElwain, M. W.; Kirkpatrick, J. D.; Cruz, K. L.; Tinney, C. G.; Reid, I. N. 2004, *AJ*, 127, 2856B
- “The 2MASS Wide-Field T Dwarf Search. II. Discovery of Three T Dwarfs in the Southern Hemisphere,” Burgasser, A. J.; McElwain, M. W.; Kirkpatrick, J. D. 2003, *AJ*, 126, 2487B
- “The 2MASS Wide-Field T Dwarf Search. I. Discovery of a Bright T Dwarf within 10 Parsecs of the Sun,” Burgasser, A. J.; Kirkpatrick, J. D.; McElwain, M. W.; Cutri, R. M.; Burgasser, A. J.; Skrutskie, M. F. 2003, *AJ*, 125, 850B
- “Keck Imaging of Binary L Dwarfs,” Koerner, D. W.; Kirkpatrick, J. D.; McElwain, M. W.; Bonaventura, N. R. 1999, *AJ*, 526L, 25K
- “The Evolution of Inquiry Activities in the Akamai Observatory Short Course, 2004-2009,” Rice, E. L.; McElwain, M.; Sonnett, S.; Rafelski, M., *ASP Conference Series*, Vol.
- “Performance characterization of the HiCIAO instrument for the Subaru Telescope”, Suzuki, R; Kudo, T.; Hashimoto, J.; Carson, J.; Egner, S.; Goto, M.; Hattori, M.; Hayano, Y.; Hodapp, K.; Ito, M.; Iye, M.; Jacobson, S.; Kandori, R.; Kusakabe, N.; Kuzuhara, M.; Matsuo, T.; McElwain, M.; Morino, J.-I.; Oya, S.; Saito, Y.; Shelton, R.; Stahlberger, V.; Suto, H.; Takami, H.; Thalmann, C.; Watanabe, M; Yamada, H.; & Tamura, M. *SPIE*, 2010
- “Progress on the occulter experiment at Princeton,” Cady, E.; Balasubramanian, K.; Carr, M.; Dickie, M.; Echternach, P.; Groff, T.; Kasdin, J.; Laftchiev, C.; McElwain, M.; Sirbu, D.; Vanderbei, R.; White, V., *SPIE*, 7440
- “Symmetric dark hole generation using enhanced high-contrast imaging techniques,” Kay, J.; Kasdin, N. J.; Groff, T.; McElwain, M.; Pueyo, L. 2009, *SPIE Newsroom*, DOI: 10.1117/2.1200905.1652
- “Decadal Survey of Astronomy and Astrophysics Begins,” McElwain, M. W.; & Moloney, M. 2009, *Issues in Physics and Astronomy*, Board on Physics and Astronomy Newsletter, The National Academies
- “Astro2010 Panels Begin Work,” McElwain, M. W.; & Moloney, M. 2009, *Issues in Physics and Astronomy*, Board on Physics and Astronomy Newsletter, The National Academies
- “Astro2010 Survey Committee Meets,” McElwain, M. W.; & Moloney, M. 2009, *Issues in Physics and Astronomy*, Board on Physics and Astronomy Newsletter, The National Academies
- “Astro2010 Begins Receiving Community Input,” McElwain, M. W.; & Moloney, M. 2009, *Issues in Physics and Astronomy*, Board on Physics and Astronomy Newsletter, The National Academies
- “High-contrast imaging with Keck adaptive optics and OSIRIS,” McElwain, M. W.; Larkin, J. E.; Metchev, S.; Zuckerman, B. 2009, *SPIE*, 7015, 70151A
- “OSIRIS: a diffraction limited integral field spectrograph for Keck,” Larkin, J.; Barczys, M.; Krabbe, A.; Adkins, S.; Aliado, T.; Amico, P.; Brims, G.; Campbell, R.; Canfield, J.; Gasaway, T.; Honey, A.; Iserlohe, C.; Johnson, C.; Kress, E.; Lafrenière, D.; Lyke, J.; Magnone, K.; Magnone, N.; McElwain, M.; Moon, J.; Quirrenbach, A.; Skulason, G.; Song, I.; Spencer, M.; Weiss, J.; & Wright, S. 2006, *SPIE*, 6269

OTHER
PUBLICATIONS

“Control software for OSIRIS: an infrared integral-field spectrograph for the Keck adaptive optics system,” Weiss, J. L.; Barczys, M.; Larkin, J. E.; Honey, A.; McElwain, M. W.; Gasaway, T. M.; & Krabbe, A. 2004, SPIE, 5496, 426

TALKS, POSTERS,
AND EXHIBITS

Talk: “Imaging Extrasolar Planets En Route to Finding an Exo-Earth,” McElwain, M. 2010, Princeton Astrophysics Undergraduate Student Research Project Pizza Lunch

Talk: “SEEDS of Exoplanetary Science at the Subaru Telescope,” McElwain, M. 2010, Princeton Peyton Hall Wunch

Talk: “Exoplanetary Science: Instrumentation, Observation, and Expectations,” McElwain, M. 2010, NASA Goddard Space Flight Center Extrasolar Planets Seminar

Talk: “Pupil Grid Mask and Integral Field Spectrograph Designs for HiCIAO,” McElwain, M.; Kasdin, N. J.; Turner, E.; Knapp, G.; Cady, E.; Vanderbei, R.; Kay, J.; Thalmann, C.; Egner, S. 2010, Mitaka, Japan

Poster: “Princeton QUEST Module Development, Our Place in Space: Our Solar System and Exoplanets,” McElwain, M.; Bartolone, L.; Dunkley, J.; Catena, A.; 2010, Center for Adaptive Optics Professional Development Program Community Interchange, Santa Cruz, CA

Talk: “High Contrast Imaging at the Subaru Telescope,” McElwain, M. 2010, NSF Astronomy & Astrophysics Postdoctoral Fellowship Symposium

Poster: “The Subaru SEEDS Exoplanet Survey,” McElwain, M.; Tamura, M.; Cady, E.; Carson, J.; Dressing, C.; Egner, S.; Grady, C.; Goto, M.; Guyon, O.; Hashimoto, J.; Hattori, Hayano, Y.; M.; Hodapp, K.; Iye, M.; Janson, M.; Kandori, R.; Knapp, G.; Kudo, T.; Kusakabe, N.; Kuzuhara, M.; Martinache, F.; Meguru, I.; Minowa, Y.; Morino, J.-I.; Moro-Martín, A.; Oya, S.; Saito, Y.; Serabyn, G.; Suto, H.; Suzuki, R.; Takami, H.; Thalmann, C.; Turner, E.; Watanabe, M.; Wisniewski, J. 2010, Bulletin of the American Astronomical Society, 41, 287

Poster: “Angular Differential Imaging at the Subaru Telescope,” Dressing, C.; McElwain, M.; Thalmann, C.; Goto, M.; Carson, J.; Janson, M.; Turner, E.; Knapp, G.; Tamura, M.; Suzuki, R.; Hodapp, K.; Suto, H.; Morino, J.-I.; Kandori, R.; Kusakabe, N.; Kudo, T.; Hashimoto, J.; Kuzuhara, M.; Hayano, Y.; Egner, S.; Hattori, M.; Oya, S.; Saito, Y.; Watanabe, M.; Minowa, Y.; Meguru, I.; Takami, H.; Iye, M. 2010, Bulletin of the American Astronomical Society, 41, 286

Talk: “Subaru SEEDS High Contrast Imaging and the First Discovery, GJ 758 B,” McElwain, M. W. 2009, Institute for Advanced Studies Bahcall Lunch

Talk: “Subaru SEEDS Status Update: the Survey, Commissioning Results, and Current Timeline,” McElwain, M. W. 2009, Princeton Planets Lunch

Exhibit: “W.M. Keck Observatory: An Exhibit at the Keck Center of The National Academies,” Shapero, D. & McElwain, M. W. 2009, produced by Moey Inc., <http://www.kecktelescopeexhibit.org/>

Talk: “Exoplanetary Science: Instrumentations, Observations, and Expectations,” McElwain, M. W. 2009, STScI Star and Planet Formation Seminar

Talk: “Space-based High Contrast Imaging Technology Development,” McElwain, M. W. 2009, ETH Zürich Exoplanet Lunch Seminar

- Talk: “Exoplanetary Science: Instrumentations, Observations, and Expectations,” McElwain, M. W. 2009, Max Planck Institute for Astronomy Heidelberg
- Talk: “Exoplanetary Science: Instrumentations, Observations, and Expectations,” McElwain, M. W. 2009, Leiden Observatory Colloquium
- Talk: “Exoplanetary Science: Instrumentation, Techniques, and Expectations,” McElwain, M. W. 2009, American Museum of Natural History Astro Seminar
- Poster: “Advances in Wavefront Correction and Estimation at the Princeton University High-Contrast Testbed,” Kay, J.; Pueyo, L.; Groff, T.; McElwain, M.; Kasdin, N. J. 2009, American Astronomical Society Meeting Abstracts, 213
- Poster: “The Subaru Coronagraphic Extreme AO Project,” Martinache, F.; Guyon, O.; Lozi, J.; Tamura, M.; Hodapp, K.; Suzuki, R.; Hayano, Y.; McElwain, M. W. 2009, American Astronomical Society Meeting Abstracts, 213
- Poster: “Subaru Strategic Exploration of Exoplanets and Disks with HiCIAO/AO188 (SEEDS): Targets and status report,” Tamura, M.; Usuda, T.; Takami, H.; Yamada, T.; Kandori, R.; Suzuki, R.; Morino, J.; Kudo, T.; Kusakabe, N.; Mayama, S.; Pyo, T.-S.; Saito, H.; Ishii, M.; Narita, N.; Kuzuhara, M.; Matsuo, T.; Takami, M.; Hashimoto, J.; Sato, B.; Hioki, T.; Okamoto, Y.; Momose, M.; Turner, E.; McElwain, M.; Knapp, J.; Moro-Martín, A.; Goto, M.; Carson, J.; Janson, M.; Enya, K.; Kataza, K. SEEDS team 2008, Japanese Astronomical Society Meeting
- Talk: “Adaptive Optics,” McElwain, M. W. 2008, Delaware Valley Amateur Astronomers Monthly Meeting
- Talk: “A Integral Field Spectrograph for Subaru High-Contrast Imaging,” McElwain, M. W. 2008, Subaru SEEDS Next Generation Instrumentation Workshop
- Talk: “Moving Group Targets for SEEDS,” McElwain, M. W.; Matsuo, T.; Turner, E.; Knapp, J.; & Moro-Martín, A. 2008, Subaru SEEDS All-Category Meeting
- Talk: “Princeton TPF Collaboration with the NAOJ,” McElwain, M. W. 2008, NASA HQ Visit to the Princeton TPF Group
- Talk: “High Contrast Imaging with Keck Adaptive Optics and OSIRIS,” McElwain, M. W.; Larkin, J. E.; Metchev, S. A.; & Zuckerman, B. 2008, SPIE Astronomical Instrumentation
- Poster: “Laboratory test of a hybrid occulter for exosolar planet imaging,” Kasdin, N. J.; Mellish, R.; Cady, E. J.; McElwain, M. W.; Vanderbei, R. J.; Spengel, D. N. 2008, SPIE Astronomical Instrumentation
- Poster: “An IFS for the Subaru Observatory HiCIAO system,” McElwain, M. W.; Kasdin, N. J.; Spengel, D. N.; Tamura, M.; Suzuki, R.; Hodapp, K.; Guyon, O.; Gunn, J. E.; Carr, M. A.; Turner, E. L.; Knapp, G.; Groff, T. 2008, SPIE Astronomical Instrumentation
- Poster: “First result of broadband wavefront control using two sequential deformable mirrors,” Pueyo, L. A.; Kay, J. D.; Belikov, R.; McElwain, M. W.; Kasdin, N. J. 2008, SPIE Astronomical Instrumentation
- Talk: “High Contrast Imaging with Adaptive Optics and Integral Field Spectroscopy,” McElwain, M. W. 2008, Subaru Seminar

- Talk: "An Integral Field Spectrograph for Subaru High-Contrast Imaging," McElwain, M. W.; Kasdin, N. J.; Turner, E. L.; Gunn, J. E.; Spergel, D. N.; Knapp, G. 2008, Subaru/HiCIAO Science Workshop
- Poster: "Speckle Suppression with the OSIRIS IFS," McElwain, M. W.; Larkin, J. E.; Metchev, S. A.; & Zuckerman, B. 2007 The Spirit of Bernard Lyot
- Talk: "Keck/OSIRIS NGS AO Observing for Users," McElwain, M. W.; Metchev, S. A.; Larkin, J. E.; Barczys, M.; Weiss, J. L.; Wright, S. A.; Krabbe, A. C.; Iserlohe, C.; & Quirrenbach, A. 2006, CfAO Fall Retreat
- Talk: "First High-Contrast Science with an IFS: the Sub-Stellar Companion to GQ Lup," McElwain, M. W.; Metchev, S. A.; Larkin, J. E.; Barczys, M.; Weiss, J. L.; Wright, S. A.; Krabbe, A. C.; Iserlohe, C.; & Quirrenbach, A. 2006, TPF/Darwin Workshop
- Poster: "OSIRIS Spectral Imaging of Closely Separated Binaries," McElwain, M. W.; Larkin, J. E.; Metchev, S. A.; Zuckerman, B.; Barczys, M.; Weiss, J. L.; Wright, S. A.; Krabbe, A. C.; Iserlohe, C.; & Quirrenbach, A. 2006, Cool Stars 14
- Talk: "A Systematic Search and Characterization of Dusty Debris Disks," McElwain, M. W. 2006, UCLA Journal Club
- Poster: "OSIRIS Spectral Imaging of Closely Separated Binaries," McElwain, M. W.; Larkin, J. E.; Metchev, S. A.; Zuckerman, B.; Barczys, M.; Weiss, J. L.; Wright, S. A.; Krabbe, A. C.; Iserlohe, C.; & Quirrenbach, A. 2006, Keck Science Meeting
- Talk: "Young Brown Dwarfs & Giant Planets: Recent Observations and Model Updates," McElwain, M. W. 2006, UCLA Journal Club
- Poster: "Keck II, LGSAO, OSIRIS observations of V723 Cas, Nova Cas 1995," Lyke, J. E.; Campbell, R. D.; Mader, J. A.; Chaffee, F. H.; Larkin, J. E.; Barczys, M.; Weiss, J. L.; Wright, S. A.; McElwain, M. W. 2005, American Astronomical Society Meeting Abstracts, 207
- Poster: "OSIRIS Laser Guide Star Adaptive Optics Observations at Keck Observatory," Wright, S. A.; Larkin, J. E.; Barczys, M.; Iserlohe, C.; Krabbe, A.; McElwain, M.; & Weiss, J. 2005, American Astronomical Society Meeting Abstracts, 207
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- Poster: "A Systematic Search and Characterization of Dusty Debris Disks," Rhee, J.; McElwain, M.; Song, I.; & Zuckerman, B. 2005, American Astronomical Society Meeting Abstracts, 207
- Poster: "First light of OSIRIS: A New, Innovative Keck Instrument," McElwain, M. W.; & Wright, S. A. 2005, CfAO Professional Development Program, Maui, HI
- Poster: "The ExAOC Science Instrument: An Integral Field Unit," McElwain, M. W.; Larkin, J. E.; McLean, I. S. 2004, CfAO Fall Retreat, Lake Arrowhead, CA
- Talk: "IFU Concepts," McElwain, M. W.; Larkin, J. E.; & McLean, I. S. 2004, ExAOC Project Meeting, Victoria, BC
- Poster: "Astronomical Science with Extreme Adaptive Optics," McElwain, M. W.; & Wright, S. A.

2004, CfAO Professional Development Program, Maui, HI

Talk: “An Astrometrically Measured Mass for Extrasolar Planet Gliese 876b,” McElwain, M. W. 2003, UCLA Journal Club

Talk: “Using the Sunyaev-Zeldovich Effect to Determine H_0 and the Baryon Fraction,” McElwain, M. W. 2002, UCLA Astronomy 278

Poster: “A Search for Companions to L Dwarfs,” Allen, P. R.; Koerner, D. W.; McElwain, M. W.; Murphy, G. R.; Reid, I. N.; Gizis, J. E.; & Kirkpatrick, J. D. 2003, IAU Symposium, 211, 303

Poster: “Searching for Brown Dwarf Companions to Nearby Stars,” McElwain, M. W.; Larkin, J. E.; Burgasser, A. J. 2003, CfAO Professional Development Program, Maui, HI

Talk: “Probing Active Galactic Nuclei with the Iron Line,” McElwain, M. W. 2002, UCLA Physics 269B

Poster: “First T Dwarf Discoveries from the 2MASS/Lick All-Sky T Dwarf Search,” McElwain, M. W.; Burgasser, A. J.; & Kirkpatrick, J. D. 2002, Bulletin of the American Astronomical Society, 34, 658

Poster: “A Search for Brown Dwarf Companions to Low-Luminosity Dwarfs,” McElwain, M. W.; Koerner, D. W.; Kirkpatrick, J. D.; Reid, I. N.; Allen, P. R.; & Murphy, G. R. 2001, Bulletin of the American Astronomical Society, 33, 1398

MENTORING

Undergraduate students

Courtney Dressing Senior Thesis at Princeton University Sept 2009 - May 2010

- “New Frontiers in Exoplanet Detection: High Contrast Imaging with Subaru”
- co-advised with Professor Edwin Turner

PERSONAL EXPERIENCE

Education & Public Outreach

Princeton University Public Observing Volunteer October 2007 - present

CfAO Summer Intern Mentor June - August 2005

CfAO Akamai Observatory Short Course, Big Island, HI June 2004, 2005, 2007

CfAO Professional Development Program March 2003, 2004, 2005, 2007

UCLA Planetarium Coordinator September, 2002 - June, 2004

Professional Service

National Science Foundation Astronomy and Astrophysics Research Grants Panelist Winter 2010

National Science Foundation Major Research Instrumentation Program Panelist Summer 2010

Publications of the Astronomical Society of the Pacific Referee Summer 2010

Professional Affiliations

Society of Photographic Instrumentation Engineers (SPIE) 2007-present

American Astronomical Society (AAS) 2001-present

Academic Enhancements

University of Science and Technology of China, Hefei, China – Public Policy Studies Summer 2006

Zemax Development Corporation – Zemax training course Fall 2005

GoEngineer – SolidWorks essentials training course Summer 2005

Indian Institute of Science, Bangalore, India – Public Policy Studies Winter 2004

Universidad de Cemanahuac, Cuernavaca, Mexico – Public Policy Studies	Winter 2003
NASA Jet Propulsion Laboratory – Planetary Science Summer School	Summer 2003
University of California, Santa Cruz – <i>CfAO</i> Adaptive Optics Summer School	Summer 2003
Harvard University – Michelson Interferometry Summer School	Summer 2002
Oxford University, Oxford, United Kingdom – Public Policy Studies	Summer 2002

Honors and Awards

National Science Foundation Postdoctoral Fellowship	2009-2012
Co-discovery of GJ 758 B – <i>TIME</i> Magazine Top 10 Science Discoveries of 2009	2009
Princeton University Henry Norris Russell Postdoctoral Fellowship	2007-2010
Peyton Hall Ping Pong Tournament Finalist (Xuening Bai def. Michael McElwain)	2010
Christine Mirzayan Science & Technology Policy Fellowship at The National Academies	2009
Phi Delta Theta Educational Foundation Graduate Fellowship	2006-2007
UCLA General Education Cluster Recognition for Excellence in Teaching	2003
UCLA Physics & Astronomy Department's Outstanding Teaching Assistant Award	2002
UPENN Chair of the Undergraduate Dean's Advisory Board	2000
UPENN College of Arts & Sciences Undergraduate Research Grant	2000
UPENN Men's Soccer Coaches' Award	2000
UPENN Men's Soccer Offensive Player of the Year	1999
UPENN Men's Soccer Arthur M. Binns Most Improved Player	1999
All-Ivy League Honorable Mention, Men's Soccer	1999
Phi Delta Theta National Leadership Conference, Miami of Ohio University, Oxford, OH	1999
Phi Delta Theta Fraternity, Pennsylvania Zeta Chapter	1998-2001
Indiana University of Pennsylvania Statewide High School Physics Test 1 st place	1997
Dallastown Area High School Men's Soccer Captain	1996-1997