Jason Melbourne, Ph.D.

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Bio Summary

I am a Postdoctoral Fellow at the California Institute of Technology where I conduct original research on galaxy formation and evolution across cosmic time. My research requires use of a revolutionary optical design called adaptive optics, a technique to return extremely high resolution imaging through a turbulent atmosphere. As outlined below, my skill set includes Leadership and Team Management, Grant and Proposal Writing, Event Organizing, Public Speaking, Teaching, and Science Writing. In addition through my research I have developed a wide range of technical skills, including imaging analysis – such as statistical morphologies, flux calibration, and 2D power-spectrum analysis; statistical techniques – such as Monte Carlo, Maximum Likelihood, Correlation Analysis, Principle Component Analysis, Chi-Squared Tests, Jackknifing, and Bootstrapping; computer programming – IDL, C++, PHP, and UNIX scripts; data management; and critical thinking. In short I am highly trained to undertake any set of technical challenges with relatively short lead-time.

Education

Doctor of Philosophy, Astrophysics, UC Santa Cruz (2006)
Thesis: *The Optical and Infrared Evolution of Galaxies*. (Advisors, C. Max, D.C. Koo)

Master of Arts, Astronomy, Wesleyan University (2001)
Thesis: *Metal Abundances in KISS Galaxies*. (Advisor, J.J. Salzer).

Bachelor of Arts, Physics and Astronomy double major, UC Berkeley (1995)

Appointments

Postdoctoral Fellow, California Institute of Technology (2007-present)

Postdoctoral Fellow, Center for Adaptive Optics, UC Santa Cruz (2006-2007)

Selected Leadership and Team Management

Manager, *NIRES Instrument Team*, Caltech (2010 -2011)
I was recently recruited to help manage the assembly and testing of a near-infrared spectrograph to be commissioned on the 10meter Keck Telescope in Hawaii. My role is to set a timeline organize a testing schedule, determine data quality, and run group meetings. When completed, NIRES will provide a vital capability to the largest optical telescope in the world.

Principal Investigator, *Local Group Infrared Cluster Survey (LoGICS)*, Caltech 2010
I am the lead investigator of LoGICS a project to image star clusters in nearby galaxies for studies of stellar evolution. The team I have assembled hails from 7 different institutions, and provides a wide range of expertise, from knowledge of the instrumentation, the clusters, and stellar evolution. I have written several successful proposals for LoGICS and we have recently obtained our first data sets.

Manager, *Bootes Research Team*, Caltech (2007-2011)
I am a member of a multi-institutional research team with the goal of understanding the most energetic galaxies in the universe. My role is provide regular communication among the institutions by organizing monthly group meetings. In this role, I also can
Director and Lead Instructor, *Think Like an Astronomer,*
Glendale Community College, Glendale, California (2010)
In an effort to promote science literacy, I have developed a 5-session astronomy short course for the general public. This course introduces major themes in astronomy through inquiry-based activities, and exquisite astronomical images.

Grant Writing

P.I. *Collaborative Research: Local Group Infrared Cluster Survey (LoGICS),*
NSF Astronomy Research Grant. $253,591 over 3 years (in review)

Co.I. and Caltech P.I. *Panchromatic Hubble Andromeda Treasury,*
HST Multi-Cycle Treasury Program, Caltech sub-award of $28,718 for the current fiscal year, with anticipated renewal for another 2 years (2010).

P.I. *The Sites and Triggers of Star Formation in Large Disk Galaxies Since z=1,*
HST Archival Grant, AR-10965. $53,000 over 1 year (2006)

Selected Successful Observing Proposals

P.I. *The Local Group Infrared Cluster Survey*, Keck adaptive optics imaging of clusters in M31 and M33 to constrain stellar evolution models. (2010)

P.I. *Rest-frame Optical Spectroscopy of z=2 Dust Obscured Galaxies,* Palomar Near-IR Spectroscopy with TripleSpec, (2009)

P.I. *Resolved Stellar Populations of Dwarf Galaxies with Keck Adaptive Optics,* Keck Laser Guide Star Adaptive Optics Imaging. (2008)

P.I. *A Calibration Database for Stellar Models of Asymptotic Giant Branch Stars,* HST Near-IR Imaging with WFC3, SNAP-11719 (2008)

P.I. *The Spatial Distribution of Warm Dust and PAH in Luminous Infrared Galaxies,*
Gemini Mid-IR Imaging with TReCS,(2008-09)

Event Organizing

Science Organizing Committee, *Massive Galaxies 3,* Tucson, Arizona (2010)
Designed the program for an international conference on massive galaxies. Member of a team that chose the conference topics and speakers and ran the science sessions.

Director and Lead Instructor, *The Keck Adaptive Optics Workshop,*
University of California Santa Cruz, Santa Cruz, California (2008)
I organized instructors and funding for a workshop on Keck adaptive optics instrumentation and observational techniques for the Caltech and UC Community.

Director, *Adaptive Optics Science Workshop,* University of California Santa Cruz (2006)
I organized an international adaptive optics workshop. Responsibilities included selecting the speakers, organizing the venue, and running the workshop.

Selected Recent Talks

The Contribution of Asymptotic Giant Branch Stars to the Infrared Luminosities of Galaxies: Implications for Measuring Stellar Masses of Galaxies
Conference, Vienna, Austria (September 2010)

Dust Obscured Galaxies at z=2
Colloquium, University of Hawaii (September 2010)

The Local Group Infrared Cluster Survey
Colloquium, UC Santa Cruz (April 2010)

Asymptotic Giant Branch Stars as Probes of Star Formation History
Conference, SAO, Russia (September 2009)

Rest-Frame Optical Spectral Diagnostics of z=2 Dust Obscured Galaxies
Conference, Charlottesville VA (September 2009)

Resolving Populations of Evolved Stars in Nearby Galaxies
AAS Meeting, Adaptive Optics Special Session, Pasadena CA (June 2009)

Morphologies of z=2 Dust Obscured Galaxies
Keck Science Meeting, University of California, Santa Cruz (September, 2008)

Probing the Decline of Star Formation Since z=1, with AO, Spitzer, and HST
Colloquium, University of Wisconsin, Madison (August 2008)

Exploring the Optical and Infrared Evolution of Galaxies
Colloquium, Institute for Astronomy, University of Hawaii, Manoa (October 2006)

The Center for Adaptive Optics Treasury Survey: Combining Adaptive Optics and Hubble Space Telescope Images to Study Distant Galaxies
Colloquium, Lawrence Berkeley National Laboratory (June 2006)

Teaching Experience

Adjunct Professor, *General Physics Laboratory,*
Pomona College, Claremont, California (2010)
Introductory undergraduate physics lab. In addition to instruction, I developed two of the labs, (1) RC Circuits and Vision Biophysics, and (2) Introduction to Ray Optics and Optical Design.

Adjunct Professor, *Introduction to Astronomy Lecture and Lab Courses,*
Mt San Antonio Community College, Pomona, California (2009)
I developed and taught the curriculum, for this lecture and lab course, including a semester long Sun tracking lab, and a galaxy morphology inquiry activity.

Science Advisor, *The California Math and Science Project,*
Watsonville, California (2005)

Lead Instructor, *The Center for Adaptive Optics (CfAO) Mainland Short Course*
University of California Santa Cruz, Santa Cruz, California (2005)
A one-week course on astronomy, light, and optics to prepare undergraduates for summer research positions in the CfAO.

Selected Students Advised

John Forbes, Caltech Summer Undergraduate Research Fellow (2009-2010)
Spatially Resolved Stellar Populations of z=1 Luminous Infrared Galaxies.

Steven Dabic, Caltech Summer Undergraduate Research Fellow (2008)
Inside-out Disk Growth in Intermediate Redshift Galaxies.

Abhiram Chivikula, Caltech Summer Undergraduate Research Fellow (2008)
Spectral Energy Distributions of High Redshift Dust-Obscured Galaxies.

Selected Professional Service

Referee, *The Astronomical Journal, The Astrophysical Journal, Publications of the Astronomical Society of the Pacific (2005-2010)*

NSF Panel Member, *Astronomy and Astrophysics Grants*, Arlington, Virginia (2007-2008)