Jason Melbourne, Ph.D.

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Profile

I am a research astronomer pursuing a new role in industry. As a Postdoctoral Fellow at Caltech, I coordinate multi-institutional research programs handling massive imaging datasets. I am an expert in adaptive optics techniques that return high-resolution images through a turbulent atmosphere. I have extensive coding experience, and have developed powerful applications in Objective-C, Python, and IDL. I am a productive scientist authoring 16 refereed publications, with over 350 citations, and co-authoring 31 additional publications with over 1000 citations. I am organized, efficient, and an experienced team leader.

Experience, Leadership, and Project Management

Principal Investigator, *Local Group Infrared Cluster Survey (LoGICS)***,** Caltech (2011—12)
- Assembled team from 7 institutions to track stellar evolution in star clusters
- Authored 2 successful proposals for Adaptive Optics imaging from Keck Observatory
- Organized and led teams of 3 observers to obtain the data
- Mentored a team of students to analyze the data
- Presented results at the 2012 Keck Science Meeting

Research Scientist, *Bootes Research Team*, Caltech (2007—2012)
- Led 4 papers on the morphologies of infrared luminous galaxies
- Organized monthly group telecons
- Authored 4 successful proposals for Adaptive Optics imaging/spectroscopy from Keck
- Organized and led teams of up to 5 observers to obtain the data
- Presented results at international conferences in Madrid, Vienna, the USA, and Russia

Instrument Scientist, *NIRES Instrument Team***,** Caltech (2010—2012)
- Led testing of a near-infrared detector for a new spectrograph for Keck Observatory
- Determined a detector upgrade was necessary to achieve the instrument specifications
- Developing the User Interface for controlling the instrument at the telescope
- Writing a data reduction pipeline

Postdoctoral Fellow, Physics, California Institute of Technology (2007—present)
- Organized funding and instructors, and led the Keck Adaptive Optics Workshop
- Initiated an effort to expand professional development of postdocs, exposing them to inquiry-based teaching techniques (see Grants bellow).
- Organized the poster presentations for the Keck Observatory's 20th Anniversary Gala

Special Projects

arXivNow, released at www.mybigscience.com/arxivnow.html (2011—Present)
- I built an Objective-C application to quickly display and filter the daily astronomy literature
- arXivNow also provides a database to store and comment on interesting articles
- Currently have over 30 users

Think Like an Astronomer (2010)
- I developed a five-session astronomy short-course for the general public based on hands-on activities and exquisite imaging from NASA's Planetary and Great Observatories programs
- Taught this course to a group of 15, including high-school and college students, school teachers, and local business leaders

Baby Tracker (2013)
- Developing an iPhone app to track the height/weight of a child and plot against averages

Skills

Image Analysis and Computer Vision: CCDs, Infrared Detectors, Imagers, Spectrographs, Flatfielding, Flux Calibration, Image Analysis, PSF Reconstruction, (De-) Convolution, Edge Detection, Fourier-Transforms

Statistics: Linear Regression, Maximum Likelihood, Model Fitting, KS-tests, Correlation

Coding: IDL (15 years), Objective-C & Cocoa (2 years), Python (1 year), and C++ (basic) LATEX (experienced), UNIX (experienced), HTML (intermediate), PHP (intermediate), JavaScript (basic), SQL (basic)

Selected Grants and Proposals

Collaborator *Transforming Undergraduate STEM Experiences Through the Next Generation of Scientist and Engineer Educators*, $600,000 (2013 – 2016)
P.I. *Panchromatic Hubble Andromeda Treasury,* Caltech sub-award of $93,000 (2010—12)
P.I. *The Sites and Triggers of Star Formation in Galaxies,* HST Grant, $53,000 (2006)
P.I. *Seven observing proposals (18 nights) to Keck, the world's largest telescope* (2007-12)

Selected Recent Talks

American Astronomical Society, Long Beach CA (2013)
The Infrared Luminosities of Asymptotic Giant Branch Stars

Keck Science Meeting, San Diego CA. (2012)
The Local Group Infrared Cluster Survey

Gemini-N Adaptive Optics Workshop, Victoria Canada. (2012)
High Spatial Resolution Studies of Resolved Stellar Populations

Conference: Through the Infrared Looking Glass, Pasadena CA (2011)
The Far-IR Spectral Energy Distributions of z = 2 Dust Obscured Galaxies

Conference: The Starbust-AGN Connection: Madrid, Spain (2011)
Black Hole Masses and Star Formation Rates of z = 2 Dust Obscured Galaxies Revealed with Keck OSIRIS Integral Field Spectroscopy

Colloquium: UC San Diego, UCLA, UC Irvine, Columbia, Harvard (2011)
Infrared Luminosities of AGB and RHeB Stars from HST WFC3: Implications for Measuring Stellar Masses of Galaxies

Conference: Why Do Galaxies Care About AGB Stars? Vienna, Austria (2010)
The Contribution of Asymptotic Giant Branch Stars to the Infrared Luminosities of Galaxies

Education Background

Doctor of Philosophy, Astrophysics, UC Santa Cruz (2006)
Master of Arts, Astronomy, Wesleyan University (2001)
Bachelor of Arts, Physics and Astronomy double major, UC Berkeley (1995)