

CONTACT INFORMATION

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RESEARCH INTERESTS

Characterization of extrasolar planet atmospheres through whatever means necessary – but with an emphasis on infrared spectroscopic and photometric techniques.

RESEARCH EXPERIENCE

University of California, Los Angeles

Exoplanetary characterization

09/2007 - present

- Ground-based characterization of extrasolar planet atmospheres via phase curves, secondary eclipses, and transits. Optical photometric refinements of the parameters of known transiting planets.

Jet Propulsion Laboratory

Exoplanet Transit Spectroscopy

01/2007 - 10/2007

- Reduced ground-based K and L band spectroscopic data of the secondary eclipse of HD 189733b. Part of a team ultimately obtaining the first published ground-based measurement of an exoplanet's spectrum.

Modeling and Design of High-Contrast Imagers

03/2005 - 06/2007

- Analyzed the high-contrast performance of the Planet Formation Instrument, an interferometric nulling coronagraph for the Thirty Meter Telescope. Derived an analytic relation between the segment optical specifications and the light leaking through the coronagraph.
- Designed a full wave-optics model of the Gemini Planet Imager for use in developing the backend wavefront calibration unit.

Interferometric Metrology Testbed

07/2004 - 06/2006

- Member of the KITE Testbed team, developing and characterizing a two-dimensional metrology truss as part of the SIM:Planetquest technology development program.

University of California, Irvine

Undergraduate Research

06/2003 - 06/2004

- Observed cataclysmic variable stars to photometrically determine their orbital periods.
- Upgraded climate monitoring equipment for the UCI Robotic Observatory.

EDUCATION

University of California, Los Angeles, Los Angeles, California USA

Ph.D. Track Graduate Student, Astrophysics, 09/2007 - 06/2012 (expected graduation date)

- Advisor: [Prof. Bradley Hansen](#)
- Topic: “Toward Characterization of Terrestrial Extrasolar Planets”

M.S., Astrophysics, 06/2009

- Advisor: [Prof. Bradley Hansen](#)
- Topic: “Thermal Emission of Non-Transiting Extrasolar Planets”

University of California, Irvine, Irvine, California USA

B.S., Physics (*magna cum laude*), 06/2004

- Advisor: [Prof. Tammy Smecker-Hane](#)
- Honors Thesis: “Confirmation of Variability in the SU Uma-type Dwarf Nova V1504 Cyg”

REFEREED PUBLICATIONS

Crossfield, I.J.M.; Hansen, B.M.S.; Barman, T.; *Ground-based, Near-infrared Exospectroscopy. II. A Tentative Detection of Emission From the Extremely Hot Jupiter WASP-12b*, 2011, ApJ, 746, 46

Crossfield, I.J.M.; Barman, T.; Hansen, B.M.S.; *High Resolution, Differential, Near-infrared Transmission Spectroscopy of GJ 1214b*, 2011, ApJ, 736, 132

Crossfield, I.J.M.; Hansen, B.M.S.; Harrington, J.; Cho, J.Y-K.; Deming, D.; Menou, K.; Seager, S.; *A New 24 micron Phase Curve for upsilon Andromedae b*, 2010, ApJ, 723, 1436

Crossfield, I.J. and Troy, M.; *Segment Aberration Effects on Contrast*, 2007, Applied Optics, 46, 4533

Johnson, J.A.; Gazak, J.Z.; Apps, K.; Muirhead, P.S.; Crepp, J.R.; **Crossfield, I.J.M.**; Boyagin, T.; von Braun, K.; Rojas-Ayala, B.; Howard, A.W.; Lloyd, J.P.; Covey, K.R.; Schlawin, E.; Hamren, K.; Marcy, G.; Morton, T.D.; *The Confirmation and Characterization of KOI-254b: A Transiting Hot Jupiter Orbiting an M Dwarf*, Submitted, Dec 2011.

Johnson, J.A.; Apps, K.; Gazak, J.Z.; Crepp, J.R.; **Crossfield, I.J.**; Holman, A.W.; Marcy, G.; Morton, T.D.; Chubak, C.; Isaacson, H.; *LHS6343C: A Transiting Field Brown Dwarf Discovered by the Kepler Mission*, ApJ, 730, 79.

Swain, M. R.; Deroo, P.; Griffith, C. A.; Tinetti, G.; Thatte, A.; Vasisht, G.; Chen, P.; Bouwman, J.; **Crossfield, I.J.**; Angerhausen, D.; *A ground-based near-infrared emission spectrum of the exoplanet HD189733b*, 2010, Nature, 463, 637

Winn, J.N.; Johnson, J.A.; Albrecht, S.; Howard, A.W.; Marcy, G.W.; **Crossfield, I.J.**; Holman, M.J.; *HAT-P-7: A Retrograde or Polar Orbit, and a Third Body*, 2009, ApJ, 703, 99

Winn, J.N.; Johnson, J.A.; Fabrycky, D.; Howard, A.W.; Marcy, G.W.; Narita, N.; **Crossfield, I.J.**; Suto, Y.; Turner, E.L.; Esquerdo, G.; Holman, M.J. *On the Spin-Orbit Misalignment of the XO-3 Exoplanetary System*, 2009, ApJ, 700, 302

CONFERENCE PROCEEDINGS

Levine, M.; Soummer, R.; et al; *Overview of Technologies for Direct Optical Imaging of Exoplanets*, 2010, [Astro2010 Decadal Survey white paper](#)

Morzinski, K.M.; Crockett, C.J.; **Crossfield, I.J.**; *Digital image exploration at Maui Community College*, 2010, [1009:3297](#)

Nissly, C.R.; Seo, B.-J.; Troy, M.; Angeli, G.Z.; **Crossfield, I.J.**; Ellerbroek, B.L.; Gilles, L.; Sigrist, N.; *High-resolution Optical Modeling of the Thirty Meter Telescope for Systematic Performance Trades*, 2008, Proceedings of the SPIE, 7017-30

Troy, M.; **Crossfield, I.J.**; Chanan, G.; Dumont, P.; Green, J.J.; Macintosh, B.; *Effects of Diffraction and Static Wavefront Errors on High-Contrast Imaging from the Thirty Meter Telescope*, 2006, Proceedings of the SPIE, 62722C

Vasisht, G.; **Crossfield, I.J.**; Dumont, P.; Levine, B.M.; Troy, M.; Shao, M.; Shelton, J.C.; Wallace, J.K.; *Post-Coronagraph Wavefront Sensing for the TMT Planet Formation Imager*, 2006, Proceedings of the SPIE, 627253

Chanan, G.; Troy, M.; **Crossfield, I.J.**; Nelson, J.; Mast, T.; *The Alignment and Phasing System for the Thirty Meter Telescope*, 2006, Proceedings of the SPIE, 62672V

Hemmati, H.; Chen, Y.; **Crossfield, I.J.**; *Telescope Wavefront Aberration Compensation with a Deformable Mirror in an Adaptive Optics System*, 2006, Proceedings of the SPIE, 61050O

TALKS

- Talk: *NIR Spectroscopy and Narrowband Photometry of WASP-12b*, ExoClimes 2012, 01/2012
- Talk: *NIR Spectroscopy and Narrowband Photometry of WASP-12b*, AAS 2012, 01/2012
- Talk: *Infrared Observations of Exoplanet Atmospheres*, U. Hawaii/IfA, 12/2011
- Talk: *Infrared Observations of Exoplanet Atmospheres*, California Institute of Technology, 12/2011
- Talk: *Infrared Observations of Exoplanet Atmospheres*, UC Santa Cruz Planet Lunch, 11/2011
- Talk: *Unraveling the Mystery of GJ1214b with NIRSPEC*, Keck Science Meeting, 09/2011
- Invited Talk: *Thermal Emission and Atmospheric Circulation in Extrasolar Planets*, UCLA Earth & Space Science Planetology Seminar, 02/2011
- Talk: *The unusual phase curve offset of upsilon Andromedae b*, AAS 2011, 01/2011
- Talk: *An updated 24 micron Phase Curve for upsilon Andromedae b*, DPS 2010, 09/2010
- Public Talks: *Extrasolar Planets* (and many other topics) at the UCLA Planetarium, 2008-2011
- Invited Talk: *The Planet Formation Instrument: Extreme Adaptive Optics on the Thirty Meter Telescope*, UC Berkeley Star Formation Seminar Series, 01/2007
- Talk: *High Contrast on Segmented Telescopes: Contrast Sensitivity and Prediction*, Center for Adaptive Optics Fall Retreat, 11/2006
- *Periodic Variability in Dwarf Nova V1504 Cyg*, UC Irvine Undergraduate Research Symposium, 05/2004

ACCEPTED OBSERVING PROPOSALS

- NASA IRTF: PI for four nights to perform transit spectroscopy of HD 97658b in 2012A.
- Subaru: Three nights of multi-object spectroscopy with MOIRCS in 2012A: HAT-P-12b and -18b during transit, and WASP-3b during eclipse.
- Large Binocular Telescope: Multi-object spectroscopy of WASP-12b with LUCIFER was scheduled for Jan 2012, but was subsequently scuttled due to instrument failure.
- Subaru: One night of multi-object spectroscopy of WASP-12b with MOIRCS. Observations were limited to narrowband photometry rather than multi-object spectroscopy due to instrumental issues; analysis underway.
- NASA IRTF: PI for four half-nights to perform transit spectroscopy of GJ 1214b. Data reduction in progress.
- NASA IRTF: PI for two half-nights to perform occultation spectroscopy of WASP-12b. Paper and referee response submitted to ApJ.
- Lick Observatory Shane 3 m: PI for a five-night run to detect the secondary eclipse of WASP-12b

in the H and K bands. All but one night clouded out; data quality was insufficient to detect the planet.

- Lick Observatory Nickel 1 m: PI for many nights in collaboration with the Transit Light Curve project to refine parameters of transiting planets, resulting in co-authorship on multiple papers.
- CTIO SMARTS 0.9 m: PI for Directors Discretionary Time for recently announced planet WASP-18b to observe followup transits and refine system parameters; observations clouded out.

HONORS AND AWARDS

- 2011-2012: UCLA Dissertation Year Fellow
- 2010: Recipient, AAS Chambliss Student Achievement Award
- 2009: Recipient, AAS Chambliss Student Achievement Award
- 2009: Honorable Mention, NSF Graduate Student Research Fellowship
- 2008: Honorable Mention, NSF Graduate Student Research Fellowship
- 2007-2009: UCLA Institute of Geophysics and Planetary Physics Graduate Fellowship
- 2008: UCLA Department of Astronomy First Year Graduate Student Summer Fellowship
- 2007: Jet Propulsion Laboratory: SIM: PlanetQuest Outstanding Performance Award (2)
- 2004: Outstanding Senior in Physics, UC Irvine Physics Department
- 2003: Herbet H. Chen Award (Outstanding Junior), UC Irvine Physics Department
- 2003: Phi Beta Kappa, UC Irvine chapter.

TEACHING EXPERIENCE

University of California, Los Angeles

Fourier Optics: Lab Redesign

Summer 2009

- Led a team in redesigning a hands-on Fourier Optics lab for graduate and professional-level students at the CfAO Adaptive Optics Summer School. The redesign responded to past student concerns by adding a more opportunities for student-directed investigations.

Digital Image Files: Inquiry Design

Fall 2008

- Part of a team designing an inquiry-based activity for engineering students at Maui Community College. The lesson teaches about digital images and engineering process skills and is now a regular part of the MCC Instrumentation course curriculum.

Teaching Assistant

Winter and Spring 2008

- Led weekly discussion sections for two courses: majors' Introduction to Astrophysics, and nonmajors' Cosmology. Moderated group discussions on issues of current interest and topical relevance.

SERVICE EXPERIENCE

Papers refereed: 1 (AJ).

University of California, Los Angeles

- 2010-2011 Graduate representative to UCLA faculty meetings
- 2011 Chambliss Student Award judge at Seattle AAS meeting
- 2009-2010 Journal Club coordinator
- 2008-2009 Planetarium coordinator
- 2008 Contributor to the "Direct Detection of Exoplanets" [white paper](#)

Jet Propulsion Laboratory, Pasadena

- 2006-2007 Led JPL “New Professionals’ Network”

LANGUAGES

English (native speaker)

German (conversational)