

BRYCE CROLL

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RESEARCH INTERESTS:

Observations of extrasolar planets, near-infrared observations, and stellar spot modelling.

EMPLOYMENT:

Sagan Postdoctoral Fellow, Massachusetts Institute of Technology, Cambridge, MA.
[September 2011 – present].

EDUCATION:

Ph.D. 2011, University of Toronto (UofT), Astronomy & Astrophysics. Toronto, ON.

Supervisors: Professors Dr. Norman Murray & Dr. Ray Jayawardhana

Thesis Title: *Near-infrared Characterization of the Atmospheres of Alien Worlds.*

B.Sc. 2006, University of British Columbia (UBC), Honours Physics. Vancouver, B.C.

SELECTED AWARDS:

NSERC PDF: 2010-2012: \$80,000

UTAA Graduate Scholar 2010: \$1000

Michael Fieldus Memorial Award: 2009: \$1000

NSERC Alexander Graham Bell CGS D 2008 – 2011: \$105,000

Chorafas Prize: 2008 – 2009: \$4000

NSERC PGS-M: 2007 – 2008: \$17,300

NSERC USRA (UBC) 2005

Undergraduate Scholar Program (UBC): 2001-2006

Norman MacKenzie Alumni (UBC): 2001-2002

W.H. Maclnnes Mathematics (UBC): 2001-2002

REFEREED PUBLICATIONS:

17. Cowan, N.B., Machalek, P., **Croll, B.** et al. (2012) "Thermal Phase Variations of WASP-12b: Defying Predictions." *Astrophysical Journal*, arXiv/astro-ph: 1112.0574
16. **Croll B.** et al. (2011) "Broadband Transmission Spectroscopy of the super-Earth GJ 1214b suggests a low mean molecular weight atmosphere." *Astrophysical Journal*, 736, 78
15. **Croll B.** et al. (2011) "Near-Infrared Thermal Emission from WASP-12b: detections of the secondary eclipse in Ks, H & J." *Astronomical Journal*, 141, 30
14. Steinbring, E., Carlberg, R., **Croll, B.** et al. (2010) "First Assessment of Mountains of Northwestern Ellesmere Island, Nunavut, as Potential Astronomical Observing Sites." *Publications of the Astronomical Society of the Pacific*, 122, 1092
13. **Croll B.** et al. (2010) "Near-Infrared Thermal Emission from TrES-3b: a Ks-band Detection and an H-band Upper Limit on the Depth of the Secondary Eclipse." *Astrophysical Journal*, 718, 920
12. **Croll B.** et al. (2010) "Near-Infrared Thermal Emission from the Hot Jupiter TrES-2b: Ground-Based Detection of the Secondary Eclipse." *Astrophysical Journal*, 717, 1084
11. Ahmic, M., **Croll, B.**, & Artymowicz, P. (2009) "Dust Distribution in the Beta Pictoris Circumstellar Disks." *Astrophysical Journal*, 705, 529
10. Huber, D., Matthews, J.M., **Croll, B.** et al. (2009) "A search for p-modes and other variability in the binary systems 85 Pegasi using MOST photometry." *Astronomy & Astrophysics*, 505, 715
9. Pribulla, T., Rucinski, S.M., DeBond, H., de Ridder, A., Karmo, T., Thomson, J.R., **Croll, B.** et al. (2009) "Radial Velocity Studies of Close Binary Stars. XIV." *Astronomical Journal*, 137, 3646

8. Boisse, I., Moutou, C., Vidal-Madjar, A., Bouchy, F., Pont, F., Hebrard, G., Bonfils, X., **Croll, B.** et al. (2009) "Stellar activity of planetary host star HD 189733." *Astronomy & Astrophysics*, 495, 959
7. Miller-Ricci, E., Rowe, J.F., Sasselov, D., Matthews, J.M., Kuschnig, R., **Croll, B.** et al. (2008). "MOST Spacebased Photometry of the Transiting Exoplanet System HD 189733: Precise Timing Measurements for Transits Across an Active Star." *Astrophysical Journal*, 682, 593
6. Walker, G.A.H., **Croll, B.** et al. (2008) "MOST Detects variability on tau Bootis possibly induced by its planetary companion." *Astronomy & Astrophysics*, 482, 691
5. **Croll B.** et al. (2007). "Looking for Super-Earths in the HD 189733 system: A search for transits in MOST space-based photometry." *Astrophysical Journal*, 671, 2129
4. Walker, G.A.H., **Croll, B.** et al. (2007) "The Differential Rotation of kappa1 Ceti as observed by MOST." *Astrophysical Journal*, 659, 1611
3. **Croll B.** et al. (2007) "Looking for giant Earths in the HD 209458 system: A search for transits in MOST space-based photometry." *Astrophysical Journal*, 658, 1328
2. **Croll, B.** (2006) "Markov Chain Monte Carlo Methods Applied to Photometric Spot Modeling." *Publications of the Astronomical Society of the Pacific*, 118, 1351
1. **Croll, B.** et al. (2006) "Differential Rotation of Epsilon Eridani Detected by MOST." *Astrophysical Journal*, 648, 607

CONFERENCE PRESENTATIONS:

- Croll, B.** et al. (2012). "Near-infrared Thermal Emission of hot Jupiters." American Astronomical Society Meeting #218. Austin, TX [Oral].
- Croll, B.** et al. (2011). "Near-infrared Thermal Emission of hot Jupiters and the Spectral Features of super-Earths." Extreme Solar Systems II. Jackson Hole, WY [Oral].
- Croll, B.** et al. (2011) "Near-infrared Thermal Emission of hot Jupiters and the Spectral Features of super-Earths." The Future of Astronomy: Fellows at the Frontiers of Science. Evanston, IL [Oral].
- Croll, B.** et al. (2011) "Near-infrared Thermal Emission of hot Jupiters and the Spectral Features of super-Earths." CASCA. London, Ontario [Oral].
- Croll, B.** et al. (2011) "Thermal Emission of hot Jupiters and the Spectral Features of super-Earths in the near-infrared." Exploring Strange New Worlds. Flagstaff, AZ [Oral].
- Croll, B.** et al. (2011) "Using Precise Ground-based Photometry in the Near-infrared to Characterize hot Jupiter's Thermal Emission and the Spectral Features of super-Earths." American Astronomical Society Meeting #217. Seattle, WA [Oral].
- Croll, B.** et al. (2010) "The Applications of Precise Near-infrared Photometry to brown dwarfs, hot Jupiters and super-Earths." CFHT Users Meeting. Taipei, Taiwan [Oral].
- Croll, B.** et al. (2010) "Ground-based Near-infrared Thermal Emission from the hottest of the hot Jupiters." IAU Symposium 276. Torino, Italy [Oral].
- Croll, B.** et al. (2010) "Near-infrared thermal emission from the hot Jupiters TrES-3b, TrES-2b, WASP-3b and WASP-12b." CASCA. Halifax, Nova Scotia [Oral].
- Croll, B.** et al. (2010) "Near-infrared Thermal Emission from the Hottest of the Hot Jupiters." KITP Exoplanets Rising. Santa Barbara, CA [Poster].
- Croll, B.** et al. (2010) "Near-infrared Thermal Emission From The Hottest Of The Hot Jupiters." American Astronomical Society Meeting #215. Washington, D.C. [Oral].
- Croll, B.** et al. (2009) "Discrete Observations of the Eccentric Transiting Planet HD 17156b." Spitzer's Growing Legacy. Pasadena, CA [Poster].
- Croll, B.** et al. (2009) "As the World Turns: Discrete Observations of the Eccentric Transiting Planet HD 17156b." CASCA. Toronto, Ontario [Poster].
- Croll, B.** et al. (2009) "A Ground-based Search for Thermal Emission from the Hottest of the Hot Jupiters." American Astronomical Society Meeting #213. Long Beach, CA [Poster].
- Croll, B.** et al. (2008) "Constraining the hot Jupiter Kozai Mechanism Connection." American Astronomical Society Meeting #211. Austin, TX [Oral].
- Croll, B.** et al. (2007) "Looking for transiting Super-Earths in the HD 209458 and HD 189733 systems with MOST." CASCA. Kingston, Ontario [Oral].
- Croll, B.** et al. (2007) "StarSpotz: A Sensitive Probe of the Differential Rotation Profile of Stars using MOST Photometry." American Astronomical Society Meeting #209. Seattle, WA [Oral].

- Croll, B.** et al. (2006) "StarSpotz - a versatile spot modeling program applied to MOST photometry of Epsilon Eridani." CASCA. Calgary, Alberta (Poster).
- Croll, B.** et al. (2005) "MOST space-based photometry of the transiting exoplanet system HD 209458: II. Search for transits at other periods." American Astronomical Society Meeting #207, Washington, D.C. (Poster).

COLLOQUIA & SEMINARS:

SSP Seminar, Harvard/CfA (Cambridge, Mass.), Dec. 6th 2010
Seminar, UC Berkeley (Berkeley, CA.), Nov. 12th 2010
Planetary Lunch, UC Santa Cruz (Santa Cruz, CA.), Nov. 9th 2010
Earth, Atmospheric and Planetary Sciences Seminar, MIT (Cambridge, Mass), Sept. 28th 2010
Astronomy Seminar, Laboratory of Astrophysics of Marseille (France), July 8th, 2010
Astronomy Seminar, Isaac Newton Group of Telescopes (La Palma, Spain), June 11th, 2009
Astronomy Seminar, Gemini-North Telescope (Hilo, HI, USA), Oct. 24th, 2008
Astronomy Seminar, Canada-France-Hawaii Telescope (Waimea, HI, USA) Oct. 14th, 2008

PUBLIC OUTREACH POSITIONS:

Public Tour Coordinator (Volunteer). University of Toronto Department of Astronomy & Astrophysics Free Public Tour: June 2007-September 2009.

- Oversaw a three-fold increase in our monthly public tour attendance to nearly 180 individuals per month, increased the number of telescopes from one to four at our monthly observing sessions, and wrote a grant to partially fund an inflatable planetarium that was eventually deployed in the basement of the Astronomy building.

Keynote Lecture Coordinator (Volunteer). University of Toronto.

- Initiated an annual keynote public lecture organized by graduate students, and led these organizational efforts for the September 2009 (Professor David Charbonneau; 200 attendees), and June 2011 lectures (Dr. Jill Tarter; 500 attendees).

PUBLIC OUTREACH TALKS:

Royal Society of Canada Annual Symposium: "Glimpses of Alien Worlds." (Ottawa, ON, Invited Talk) October 16th 2009

WIDEN Graduate Student Seminar: "Portraits of Planets in Other Solar Systems." April 14th 2009

UofT Astronomy Free Public Tour: "Oh, What a Wonderful Exo-World!" December 4th 2008

UofT Astronomy Day Tour: "Oh, What a Wonderful Exo-World!" May 10th 2008

UofT Astronomy Free Public Tour: "A Day in the life of an Astronomer." Nov 1st 2007

UofT Astronomy Day Tour: "Exoplanet Potpourri." April 21st 2007

GRANTS AWARDED:

Dean's Student Initiatives Fund (November 2010) "A Series to WIDEN Graduate-Student Experience: Workshops for Inter-Discipline Exchange and Novelty." Amount: \$300.

Astronomy Society of the Pacific SEED Grant (September 2009) "Portable Planetarium." Amount: \$2500.

Dean's Student Initiatives Fund (February 2009) "The Stars Belong to Everyone: UofT Astronomy Public Outreach during the 2009 International Year of Astronomy." Amount: \$1000.

Spitzer Space Telescope GO Program Grant (2008-2009) "As the World Turns: Discrete Observations of a Pseudo-Synchronized Eccentric Transiting Planet." Amount: \$50,000.

VOLUNTEER EXPERIENCE:

President, University of Toronto Triathlon Club: April 2008 - May 2010.

Social Coordinator, University of British Columbia Triathlon Club: Sept 2004 - August 2006.

TEACHING EXPERIENCE:

Teaching assistant, Department of Astronomy & Astrophysics, University of Toronto, 2006-2011. Courses include: AST 101, 201, 210, 251 and 325/326.

Teaching assistant, Science One Program, University of British Columbia, 2004-2006.

TELESCOPE TIME ALLOCATIONS:

- Croll, B.** Magellan Telescope (2011B): "Near-infrared Thermal Emission of the hottest of the Southern hot Jupiters." 6.5 hours.
- Jayawardhana, R., **Croll, B.** et al. Canada-France-Hawaii Telescope (2010B-2012B): "Thermal Emission of Transiting Exoplanets." 168 hours.
- Croll, B.** et al. Canada-France-Hawaii Telescope (2011A): "Refining the Broadband Spectrum of the Super-Earth GJ 1214b." 12 hours.
- Albert, L., **Croll, B.** et al. Canada-France-Hawaii Telescope (2011A): "A Direct Test of Brown Dwarf Models - Measuring the Secondary Eclipse of a Newly-Discovered Eclipsing Brown Dwarf." 13 hours.
- Machalek, P., Cowan, N., **Croll, B.** et al. Spitzer Space Telescope (Cycle 7): "Balancing the Budget: Simultaneous Near- and Mid-IR Phase Curves of WASP-12b." 72.5 hours.
- Croll, B.** et al. Canada-France-Hawaii Telescope (2010B): "The First Broadband Transmission Spectrum of a Super-Earth." 9 hours.
- Croll, B.** et al. Canada-France-Hawaii Telescope (2010A & 2010B): "Multi-wavelength near-infrared thermal emission from the hottest of the hot Jupiters." 25 & 20 hours.
- Croll, B.** et al. Canada-France-Hawaii Telescope (2009B): "Multi-wavelength near-infrared thermal emission of the extremely hot exoplanet WASP-12b." 16 hours.
- Croll, B.** et al. Gemini-North (2009B): "Searching for Atmospheric Absorption in the Transmission Spectra of HAT-P-1." 12 hours.
- Croll, B.** et al. Canada-France-Hawaii Telescope (2009A & 2008B): "Thermal Emission from the hottest of the hot Jupiters." 24 & 23.5 hours.
- Croll, B.** et al. Gemini-South (2008B & 2009A) & Gemini-North (2008B & 2009A): "Searching for Atmospheric Absorption in the Transmission Spectra of hot Jupiters." 27.0 & 27.0 hours, 8.5 & 16 hours.
- Croll, B.** et al. Spitzer Space Telescope (Cycle 5): "As the World Turns: Discrete Observations of an Eccentric Transiting Planet." 30 hours.
- Croll, B.** et al. Gemini-North (2008A & 2008B): "Imaging Long-Period RV companions to Exoplanet Host Stars." 15.5 & 8.2 hours.

PROFESSIONAL SERVICE:

Referee for *The Astrophysical Journal*, *The Astronomical Journal*, *Monthly Notices of the Royal Astronomical Society*, *Astronomy & Astrophysics*, and *Astronomische Nachrichten*.

PERSONAL INTERESTS:

- Bicycling: Cycled from Toronto to Halifax (in 10 days), and then Vancouver to Toronto (in 20 days) in Summer 2011.
- Triathlons: completed 8 Ironman Triathlons and competed in the 2008 Ironman World Championships in Kona, Hawaii and the 2009 Ironman 70.3 World Championships in Clearwater, Florida.