

DOUGLAS A. CALDWELL

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Education

- Ph.D., Physics:** Rensselaer Polytechnic Institute, Troy, NY, **6/1997**, Thesis title: *A Far-Infrared & Millimeter-Wave Study of Star Formation in the Magellanic Clouds*,
Advisors: D. C. B. Whittet, M. L. Kutner
- BS, Physics:** Carnegie-Mellon University, Pittsburgh, PA, **5/1986**

Professional Appointments

- 12/06–present** *Kepler Mission Instrument Scientist & Co-Investigator*, SETI Institute/NASA Ames Research Center, Moffett Field, CA
- 9/01–12/06** *Kepler Photometry Scientist*, SETI Institute/NASA Ames, Moffett Field, CA
- 9/02–2/06** *Principal Investigator*, SETI Institute, Mountain View, CA
- 9/98–9/01:** *NRC Research Fellow*, NASA Ames Research Center, Moffett Field, CA
- 8/00–12/00:** *Lecturer, Physics Dept.* San Jose State University, San Jose, CA

Teaching Experience

- International Conference on Physics Education: Invited Keynote lecture *The Kepler Mission: Finding and Understanding Exoplanets using Undergraduate Physics*, Aug 2013
- Gordon Research Conference: “Astronomy’s Discoveries and Physics Education”, Presented a follow-up of how Kepler can be used for teaching Physics. Continued work with faculty and educators to incorporate ideas into the undergraduate classroom, June 2012
- “Using Astronomy to Teach Physics” Conference, Presented an overview of Kepler and how it can be used as a starting point for teaching Physics. Worked with faculty and educators to develop ideas that will be incorporated into a new Lecture Tutorial and a Junior-level physics lab both based on Kepler, July 2011
- Kepler Outreach, As a member of the Kepler science team, I regularly give talks at Universities, conferences, and public outreach events. Some recent presentations were Mt Diablo Astronomical Society (10/2013), NASA Ames Director’s Colloquium (6/2013), SETI Institute public lecture series (7/2012), Int. Vacuum Electronics Society (IVEC-IVESC) conference (4/2012), SETI-con (6/2012, 8/2010), City College of San Jose (4/2009), Westchester Astronomy Club (10/2009), Astronomical Society of the Pacific (9/2009)
- Research Experience for Undergraduate (REU) Mentor, Jason Von Wilpert, project was to map electronic noise sources on the Kepler focal plane. Results of Jason’s work are in use on the Kepler Mission today. Jason has been successful in graduate school and is working in industry now. Summer 2009

REU Mentor, Jenny Carton, project was to analyze CCD images from the Vulcan-South transit search project. Jenny worked to register several month's worth of images and identify stars for subsequent measurements, Summer 2007

Lecturer, Physics 50 (Mechanics), Physics Dept. San Jose State University, San Jose, CA, Fall 2000

Teaching Assistant, Introductory Physics Recitation/Lab & Grader/Tutor, upper-level Astrophysics, Rensselaer Polytechnic Institute, Troy, NY, 9/1989 - 5/1996

Grants & Awards

- 03/13:** NASA Grant, Principal Investigator on the cooperative agreement *Science Analysis Support for NASA Discovery Program's Kepler Extended Mission*, \$4.8M, 3.5 years
- 01/13:** NASA Ames Science Innovation Fund award, Co-Investigator on the *Design Study on the use of 3D Detectors for Spectroscopy of Habitable Planets*, \$20K, 1 year
- 04/11:** NASA Grant, PI on the cooperative agreement *Science Analysis Support for NASA Discovery Program's Kepler Mission*, \$3.7M, 3 years, renewed 4/12
- 03/11:** NASA Tech Brief Initial Award for "contributing to the development of scientific or technical innovation, approved for publication as a NASA Tech Brief, entitled *Use of CCD Defects to Validate Phasing and Geometry of Large Focal Plane Arrays.*"
- 01/11:** NASA Software of the Year Award for work on the Kepler Science Operations Center analysis pipeline
- 07/10:** NASA Grant, PI on the cooperative agreement *Characterizing Exoplanet Frequencies from the Results of the Kepler Mission*, \$157K, 1 year
- 05/10:** NASA Group Achievement Award for Kepler Science Team for "outstanding critical science guidance, initial target selection, and planetary candidate follow-up and characterization activities."
- 05/10:** NASA Group Achievement Award for Kepler Science Office for "creativity and dedication in development of the tools for a highly successful commissioning phase leading to successful on-orbit operations."
- 05/10:** NASA Group Achievement Award for Kepler Launch and Commissioning Team for "exemplary creativity and dedication in advancing photometric detection of exoplanets from concept to spectacularly successful on-orbit operations."
- 10/09:** Popular Mechanics Breakthrough Innovator Award to *Kepler Mission* for "a multi-year survey of 100,000 stars, in search of planets where alien life may thrive."
- 10/09:** NASA-Ames Honor Award for Kepler Launch and Commissioning Team for "excellence in the category of Group/Team."
- 09/02:** National Science Foundation–Office of Polar Programs Grant, PI on the project *A Search for Extrasolar Planets from the South Pole*, \$255K, 3 years

Top Publications

Masses, Radii, and Orbits of Small Kepler Planets: The Transition from Gaseous to Rocky Planets, G. W. Marcy, et al., *Astrophysical Journal Supplement*, **210**: 20, Feb 2014

Planetary Candidates Observed by Kepler IV: Planet Sample From Q1-Q8 (22 Months), C. J. Burke, et al., *Astrophysical Journal Supplement*, **210**:19, Feb 2014

Identification of Background False Positives from Kepler Data, S. T. Bryson, J. M. Jenkins, R. L. Gilliland, J. D. Twicken, B. Clarke, J. Rowe, **D. Caldwell**, N. Batalha, F. Mullally, M. R. Haas, and P. Tenenbaum, *PASP*, **125**:889, Aug 2013

Kepler-62: A five-planet system with planets of 1.4 and 1.6 Earth radii in the Habitable Zone, W. J. Borucki, et al. *Science*, **340**:587, Apr 2013.

Candidates Observed by Kepler. III. Analysis of the First 16 Months of Data, N. M. Batalha, J. F. Rowe, S. T. Bryson, T. Barclay, C. J. Burke, **D. A. Caldwell**, and 70 other authors. *Astrophysical Journal Supplement*, **204**:24, Feb 2013

The Derivation, Properties, and Value of Kepler's Combined Differential Photometric Precision, J. L. Christiansen, J. M. Jenkins, **D. A. Caldwell**, C. J. Burke, P. Tenenbaum, S. Seader, S. E. Thompson, T. S. Barclay, B. D. Clarke, J. Li, J. C. Smith, M. C. Stumpe, J. D. Twicken, and J. Van Cleve. *PASP*, **124**:1279-1287, Dec 2012

Planet Occurrence within 0.25 AU of Solar-type Stars from Kepler, A. W. Howard, et al. *Astrophysical Journal Supplement*, **201**:15, Aug 2012

Kepler-22b: A 2.4 Earth-radius Planet in the Habitable Zone of a Sun-like Star W. J. Borucki, D. G. Koch, N. Batalha, S. T. Bryson, J. Rowe, F. Fressin, G. Torres, **D. A. Caldwell**, et al. *Astrophysical Journal*, **745**:120, Feb 2012

Kepler Mission Stellar and Instrument Noise Properties, R. L. Gilliland, W. J. Chaplin, E. W. Dunham, V. S. Argabright, W. J. Borucki, G. Basri, S. T. Bryson, D. L. Buzasi, **D. A. Caldwell**, et al. *Astrophysical Journal Supplement* **197**:6, Nov 2011

Architecture and Dynamics of Kepler's Candidate Multiple Transiting Planet Systems, J. J. Lissauer, D. Ragozzine, D. C. Fabrycky, J. H. Steffen, E. B. Ford, J. M. Jenkins, A. Shporer, M. J. Holman, J. F. Rowe, E. V. Quintana, N. M. Batalha, W. J. Borucki, S. T. Bryson, **D. A. Caldwell**, et al. *Astrophysical Journal Supplement* **197**:8, Nov 2011

Characteristics of Planetary Candidates Observed by Kepler. II. Analysis of the First Four Months of Data, W. J. Borucki, D. G. Koch, G. Basri, N. Batalha, T. M. Brown, S. T. Bryson, **D. Caldwell**, et al. *Astrophysical Journal*, **736**:19, Jul 2011

Kepler's First Rocky Planet: Kepler-10b, N. M. Batalha, W. J. Borucki, S. T. Bryson, L. A. Buchhave, **D. A. Caldwell**, et al. *Astrophysical Journal*, **729**:27, Mar 2011

Five Kepler Target Stars That Show Multiple Transiting Exoplanet Candidates, J. H. Steffen, N. M. Batalha, W. J. Borucki, L. A. Buchhave, **D. A. Caldwell**, et al. *Astrophysical Journal*, **725**:1226-1241, Dec 2010

Kepler instrument performance: an in-flight update, **D. A. Caldwell**, et al. In Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, volume 7731 of Presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) Conference, Jul 2010

Instrument Performance in Keplers First Months, **D. A. Caldwell**, et al. *Astrophysical Journal*, **713**:L92–L96, Apr 2010

Kepler Mission Design, Realized Photometric Performance, and Early Science, D. G. Koch, W. J. Borucki, G. Basri, N. M. Batalha, T. M. Brown, **D. Caldwell**, et al. *Astrophysical Journal*, **713**:L79–86, Apr 2010

Initial Characteristics of Kepler Short Cadence Data, R. L. Gilliland, J. M. Jenkins, W. J. Borucki, S. T. Bryson, **D. A. Caldwell**, et al. *Astrophysical Journal*, **713**:L160–L163, Apr 2010

Initial Characteristics of Kepler Long Cadence Data for Detecting Transiting Planets, J. M. Jenkins, **D. A. Caldwell**, et al. *Astrophysical Journal*, **713**:L120–L125, Apr 2010

Kepler's Optical Phase Curve of the Exoplanet HAT-P-7b, W. J. Borucki, D. Koch, J. Jenkins, D. Sasselov, R. Gilliland, N. Batalha, D. W. Latham, **D. A. Caldwell**, et al. *Science*, **325**:709, Aug 2009

Kepler Instrument Handbook, KSCI 19033-001, J. Van Cleve, **D. A. Caldwell**, Ames Research Center, Moffett Field, CA, archive.stsci.edu/kepler, Jul 2009

Detecting Extrasolar Planet Transits from the South Pole, **D. A. Caldwell**, W. J. Borucki, R. L. Showen, J. M. Jenkins, L. Doyle, Z. Ninkov, and M. Ashley. In R. Norris and F. Stootman, editors, *IAU Symposium*, p. 93+, Jun 2004

Some Tests to Establish Confidence in Planets Discovered by Transit Photometry, Jon M. Jenkins, **Douglas A. Caldwell**, & William J. Borucki, *Astrophysical Journal*, **564**, 611, January 2002

The Vulcan Photometer: A Dedicated Photometer For Extrasolar Planet Searches, William J. Borucki, **Douglas A. Caldwell**, David G. Koch, Larry D. Webster, Jon M. Jenkins, Zoran Ninkov, & Robert Showen, *PASP*, **113**, 439, April 2001