

## Curriculum Vitae Nicholas J. McConnell

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### Education

Ph.D. in Astrophysics, University of California, Berkeley 2012  
Thesis: “Black Hole Masses in Nearby Brightest Cluster Galaxies”  
Advisors: Chung-Pei Ma & James R. Graham  
M.A. in Astrophysics, University of California, Berkeley 2008  
B.A. in Astronomy and Physics, *summa cum laude*, Boston University 2006

### Research Experience

National Research Council Canada, Herzberg Astronomy and Astrophysics: 2015-present  
Plaskett Postdoctoral Fellow

I investigate the growth of the most massive galaxies and their supermassive black holes via spectroscopic measurements of stellar dynamics and populations in giant elliptical galaxies. I am a co-PI of the MASSIVE galaxy survey and lead independent projects to assess galaxies’ chemical enrichment and stellar initial mass function.

Institute for Astronomy, University of Hawaii, Manoa: 2012-2015  
Beatrice Watson Parrent Postdoctoral Fellow

I characterized and critically examined widely used scaling relations between galaxies and supermassive black holes and initiated a campaign to measure black hole masses in over 30 nearby galaxies. I helped initiate the MASSIVE galaxy survey and led the survey’s integral-field spectroscopic and near-infrared imaging campaigns.

University of California, Berkeley: graduate student researcher 2006-2012

I used integral-field spectroscopic data to measure stellar kinematics in brightest cluster galaxies. I ran orbit superposition models to determine the galaxies’ internal stellar dynamics, central black hole masses, and dark matter halo profiles.

Boston University Center for Space Physics: research assistant 2004-2006

I simulated performance of a fast steering mirror system and prepared electronic hardware for deployment on a sub-orbital rocket mission.

### Teaching Experience

Institute for Scientist and Engineer Educators (ISEE) Inquiry Institute – 2014-2015  
staff instructor

ISEE Design Institute – staff facilitator and design team consultant 2013-2015

Hawaii Student/Teacher Astronomy Research (HI STAR) – mentor and lecturer 2014

Community in the Classroom (Berkeley and Oakland elementary schools), 2011-2012  
Solar System activity – designer and visiting instructor

### **Teaching Experience, continued**

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|--|-----------|
| UC Santa Cruz, MARC/MBRS Summer Program,<br>Fluids inquiry activity – design team leader and co-instructor                                 | 2010      |
| Hartnell College, AST 1L: Introductory Astronomy Laboratory,<br>Transiting Planets inquiry activity – design team leader and co-instructor | 2009      |
| Maui Community College, ETRO 102: Instrumentation<br>Spectrometer Design activity – co-instructor  | 2008      |
| UC Berkeley, AY C10: Introduction to General Astronomy,<br>Head Graduate Student Instructor (GSI)  | 2007      |
| UC Berkeley, AY C12: The Planets, GSI  | 2007      |
| UC Berkeley, AY C10, GSI   | 2006      |
| The Princeton Review, MCAT Physics, instructor   | 2005-2006 |

### **Mentoring Experience**

I have worked closely with multiple graduate students at UC Berkeley, as part of the MASSIVE collaboration. Ryan Janish and Melanie Veale have led efforts to measure wide-field stellar kinematics in our survey of early-type galaxies. 2012-present

I worked with high-school student Stephen Chen to revise stellar orbit models of galaxies and determine whether a gradient in stellar mass-to-light ratio could bias black hole mass measurements. Stephen was second author on our publication in ApJ Letters. 2012-2013

I mentored an eighth-grade student, Gearld Canaday, for the Honolulu District science fair. The research project focused on classifying galaxies and calculating the fraction of galaxy collisions in different environments, using data from the Sloan Digital Sky Survey. 2014

I was a peer mentor for two astronomy graduate students at UC Berkeley, addressing concerns about academic requirements, initial research projects, and communication with faculty advisors. 2008-2012

I supervised high-school student Michael Reed in designing a web page to compile black hole mass measurements and host galaxy properties. 2012

### **Observing Experience**

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|---|------------------------------------|
| W. M. Keck Observatory<br>(OSIRIS, NIRC2, LRIS, DEIMOS, LGS-AO) | 18 nights (semesters 2008A-2015A)  |
| Gemini Observatory<br>(NIFS, GMOS-N, GMOS-S, LGS-AO)            | 131 hr (semesters 2010B-2015B)     |
| McDonald Observatory (Mitchell Spectrograph)                    | 29 nights (trimesters 2011B-2015B) |
| UKIRT (WFCAM)   | 58 hr (semesters 2014A-2015A)      |
| UH 2.2m (Tek, WFGS2)  | 4 nights (semesters 2014A-2015A)   |
| Lick Observatory (IRCAL, LGS-AO)                                | 18 nights (semesters 2007B-2009A)  |

In addition to telescope time secured through the University of California and the University of Hawaii, the observing time above includes 15 successful PI proposals to NOAO, CanTAC, and McDonald Observatory.

## **Refereed Publications**

*“Radial Trends in IMF-Sensitive Absorption Features in Two Early-Type Galaxies: Evidence for Abundance-Driven Gradients”*

**Nicholas J. McConnell**, Jessica R. Lu, & Andrew W. Mann. 2015, submitted to ApJ.

*“The Effect of Spatial Gradients in Stellar Mass-to-Light Ratio on Black Hole Mass Measurements”*

**Nicholas J. McConnell**, Shi-Fan Stephen Chen, Chung-Pei Ma, Jenny E. Greene, Tod R. Lauer & Karl Gebhardt. 2013, ApJ, 768, L21

*“Revisiting the Scaling Relations of Black Hole Masses and Host Galaxy Properties”*

**Nicholas J. McConnell** & Chung-Pei Ma. 2013, ApJ, 764, 184

*“Dynamical Measurements of Black Hole Masses in Four Brightest Cluster Galaxies at 100 Mpc”*

**Nicholas J. McConnell**, Chung-Pei Ma, Karl Gebhardt, Jeremy D. Murphy, Tod R. Lauer, James R. Graham, Shelley A. Wright & Douglas O. Richstone. 2012, ApJ, 756, 179

*“Two Ten-Billion-Solar-Mass Black Holes at the Centres of Giant Elliptical Galaxies”*

**Nicholas J. McConnell**, Chung-Pei Ma, Karl Gebhardt, Shelley A. Wright, Jeremy D. Murphy, Tod R. Lauer, James R. Graham, & Douglas O. Richstone. 2011, Nature, 480, 215.

*“The Black Hole Mass in the Brightest Cluster Galaxy NGC 6086”*

**Nicholas J. McConnell**, Chung-Pei Ma, James R. Graham, Karl Gebhardt, Tod R. Lauer, Shelley A. Wright, & Douglas O. Richstone. 2011, ApJ, 728, 100

*“A 17-Billion-Solar-Mass Black Hole in a Group Galaxy with a Very Diffuse Core”*

Jens Thomas, Chung-Pei Ma, **Nicholas J. McConnell**, Jenny E. Greene, John P. Blakeslee, and Ryan Janish. 2015, submitted to Nature.

*“The MASSIVE Survey – III. Molecular Gas and a Broken Tully-Fisher Relation in the Most Massive Early-Type Galaxies”*

Timothy A. Davis, Jenny E. Greene, Chung-Pei Ma, Viraj Pandya, John P. Blakeslee, **Nicholas J. McConnell**, and Jens Thomas. 2015, MNRAS in press.

*“The MASSIVE Survey – II. Stellar Population Trends out to Large Radius in Massive Early-Type Galaxies”*

Jenny E. Greene, Ryan Janish, Chung-Pei Ma, **Nicholas J. McConnell**, John P. Blakeslee, Jens Thomas, and Jeremy D. Murphy. 2015, ApJ, 807, 11

*“The MASSIVE Survey – I. A Volume-Limited Integral-Field Spectroscopic Study of the Most Massive Early-Type Galaxies within 108 Mpc”*

Chung-Pei Ma, Jenny E. Greene, **Nicholas McConnell**, Ryan Janish, John P. Blakeslee, Jens Thomas, and Jeremy D. Murphy. 2014, ApJ, 795, 158

*“The VAST Survey – II. Orbital Motion Monitoring of A-Type Star Multiples”*

Robert De Rosa, Jennifer Patience, Arthur Vigan, Paul Wilson, Adam Schneider, **Nicholas J. McConnell**, Sloane Wiktorowicz, Christian Marois, Inseok Song, Bruce Macintosh, James Graham, Mike Bessell, & Rene Doyon. 2012, MNRAS, 422, 2765

### **Refereed Publications, continued**

*“Long-term Evolution of the Aerosol Debris Cloud Produced by the 2009 Impact on Jupiter”*

Agustin Sánchez-Lavega, Glenn S. Orton, Ricardo Hueso, Santiago Pérez-Hoyos, Leigh N. Fletcher, Enrique García-Melendo, Josep M. Gomez-Forellad, Imke de Pater, Michael Wong, Heidi B. Hammel, Padma Yanamandra-Fisher, Amy Simon-Miller, Naiara Barrado-Izagirre, Franck Marchis, Olivier Mousis, Jose-Luis Ortiz, Jorge García-Rojas, Massimo Cecconi, John T. Clarke, Keith Noll, Santos Pedraz, Anthony Wesley, Paul Kalas, **Nicholas McConnell**, William Golisch, David Griep, Paul Sears, Eric Volquardsen, Vishnu Reddy, Mike Shara, Richard Binzel, Will Grundy, Joshua Emery, Andrew Rivkin, Cristina Thomas, David Trilling, Karen Bjorkman, Adam J. Burgasser, Humberto Campins, Takashi M. Sato, Yuichi Kasaba, Julie Ziffer, R. Mirzoyan, Michael Fitzgerald, & Hervé Bouy. 2011, *Icarus*, 214, 462

### **Other Publications**

*“Black Hole Safari: Tracking Populations and Hunting Big Game”*

**Nicholas J. McConnell**. 2013, Proceedings of the Frank N. Bash Symposium: New Horizons in Astronomy

*“A College-level Inquiry-based Activity on Transiting Planets”*

**Nicholas J. McConnell**, Anne M. Medling, Linda E. Strubbe, Pimol Moth, Ryan M. Montgomery, Lynne M. Raschke, Lisa Hunter, & Barbara K. Goza. 2010, *ASPC*, 436, 97

*“Training the Next Generation of Astronomers”*

Peter K. G. Williams, Eric Huff, Holly L. Maness, Maryam Modjaz, Kristen L. Shapiro, Jeffrey M. Silverman, Linda Strubbe, Betsey Adams, Katherine Alatalo, Kuenley Chiu, Mark Claire, Bethany Cobb, Kelle Cruz, Louis-Benoit Desroches, Melissa Enoch, Chat Hull, Hannah Jang-Condell, Casey Law, **Nicholas McConnell**, Rowin Meijerink, Stella Offner, John K. Parejko, Jonathan Pober, Klaus Pontoppidan, Dovi Poznanski, Anil Seth, Steven Stahler, Lucianne Walkowicz, Andrew A. West, Andrew Wetzel & David Whysong. 2009, *Astro2010*, Position Papers, no. 65, arXiv:0904.2571

### **Invited Talks**

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|--|--------------------|
| NRC Herzberg / Dominion Astrophysical Observatory, Colloquium          | November 26, 2015  |
| Seoul National University, astronomy seminar                           | May 21, 2015       |
| <i>Supermassive Black Holes</i> (workshop), Wadham College, Oxford, UK | March 17, 2015     |
| Adler Planetarium, Journal Club  | January 30, 2015   |
| University of Wisconsin – Madison, Astronomy Colloquium                | January 29, 2015   |
| Northwestern University, CIERA special seminar                         | January 28, 2015   |
| MPIA Heidelberg, Galaxy Coffee   | July 17, 2014      |
| ETH Zurich, galaxy seminar   | July 14, 2014      |
| Harvard/Smithsonian Center for Astrophysics, Optical/Infrared Seminar  | May 7, 2014        |
| Boston University, astronomy seminar                                   | May 5, 2014        |
| University of Hawaii, Institute for Astronomy Colloquium               | November 6, 2013   |
| <i>Bash Symposium: New Horizons in Astronomy</i> , Austin, TX          | October 6-8, 2013  |
| National Optical Astronomy Observatory, Friday Scientific Lunch Talk   | October 4, 2013    |
| Texas A&M University, Astrophysics Seminar                             | September 30, 2013 |
| Gemini Observatory, Astronomy Seminar                                  | January 18, 2013   |
| <i>Black Holes by the Black Sea</i> , Istanbul, Turkey                 | June 25-29, 2012   |

### **Invited Talks, continued**

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|--|--------------------|
| Lawrence Berkeley National Laboratory, INPA Journal Club   | May 4, 2012        |
| University of California, Irvine, Astrophysics Seminar   | January 17, 2012   |
| UCLA, extragalactic journal club   | November 21, 2011  |
| Princeton University, extragalactic journal club   | November 14, 2011  |
| University of Toronto, extragalactic journal club  | November 10, 2011  |
| Yale University, Galaxy Lunch  | November 9, 2011   |
| University of Texas at Austin, Cosmos Seminar  | September 28, 2011 |
| University of California, Berkeley, Theory Lunch   | April 20, 2011     |
| Keck Observatory, astronomy seminar  | May 6, 2010        |
| <i>Teaching Science &amp; Engineering Research Skills:<br/>Practices and Perspectives</i> , Santa Cruz, CA | April 3, 2009      |
| University of California, Berkeley, Adaptive Optics Seminar  | October 28, 2008   |

### **Contributed Talks**

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|---|----------------------|
| <i>The Stellar IMF at Low Masses</i> , Baltimore, MD              | June 29-July 1, 2015 |
| <i>Massive Galaxies and their Precursors</i> , Sydney, Australia  | February 9-12, 2015  |
| <i>American Astronomical Society Meeting 225</i> , Seattle, WA    | January 5-8, 2015    |
| <i>Keck Science Meeting</i> , Pasadena, CA                        | October 2-3, 2014    |
| <i>American Astronomical Society Meeting 223</i> , Washington, DC | January 5-9, 2014    |
| <i>American Astronomical Society Meeting 219</i> , Austin, TX     | January 9-12, 2012   |
| <i>Single and Double Black Holes in Galaxies</i> , Ann Arbor, MI  | August 22-25, 2011   |
| <i>American Astronomical Society Meeting 217</i> , Seattle, WA    | January 10-13, 2011  |

### **Poster Presentations**

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|---|-----------------------|
| <i>International Astronomical Union Symposium 309:<br/>Galaxies in 3D across the Universe</i> , Vienna, Austria                   | July 7-11, 2014       |
| <i>Unveiling the Formation of Massive Galaxies</i> , Aspen, CO  | February 2-7, 2014    |
| <i>Early Galaxy Formation in <math>\Lambda</math>CDM Cosmology</i> , Jerusalem, Israel  | January 1-10, 2013    |
| <i>Learning from Inquiry in Practice</i> , Santa Cruz, CA   | January 16-17, 2010   |
| <i>Keck Science Meeting</i> , Pasadena, CA  | September 16-17, 2009 |
| <i>International Astronomical Union Symposium 267: Evolution of<br/>Galaxies and Central Black Holes</i> , Rio de Janeiro, Brazil | August 10-14, 2009    |
| <i>American Astronomical Society Meeting 213</i> , Long Beach, CA   | January 5-8, 2009     |
| <i>Keck Science Meeting</i> , Santa Cruz, CA  | September 18, 2008    |

### **Formal Education Training**

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|---|-----------|
| Center for Astronomy Education Tier I workshop  | 2011      |
| Institute for Scientist and Engineer Educators (ISEE),<br>“Certificate in Teaching Innovative Laboratory Experiences” | 2010      |
| ISEE Professional Development Program, “Inquiry in Science and<br>Engineering Learning and Teaching” workshop         | 2008-2010 |
| ISEE Professional Development Program, “Re-thinking Science and<br>Engineering Learning and Teaching” workshop        | 2008      |

### **Fellowships, Scholarships, and Awards**

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|---|--------------|
| Plaskett Postdoctoral Fellowship, NRC Herzberg                        | 2015-present |
| Beatrice Watson Parrent Fellowship, Institute for Astronomy, UH Manoa | 2012-2015    |
| Mary Elizabeth Uhl Prize, UC Berkeley Astronomy Department            | 2012         |
| Outstanding Graduate Student Instructor Award, UC Berkeley            | 2007         |
| William V. Power Graduate Award, UC Berkeley                          | 2006         |
| Astronomy Prize, Boston University Astronomy Department               | 2006         |
| College Prize, Boston University Astronomy Department                 | 2006         |
| Inducted to Phi Beta Kappa honor society                              | 2005         |
| College of Arts and Science Scholarship, Boston University            | 2005-2006    |
| University Scholarship, Boston University                             | 2002-2006    |

### **Service**

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|--|--------------|
| Astronomy Ally   | 2015-present |
| Co-hosted a biweekly astro-ph coffee discussion at IfA   | 2013-2015    |
| Hosted a weekly extragalactic seminar at IfA   | 2012-2015    |
| Participated in two working groups for IfA long-term strategic planning  | 2014         |
| Served on Telescope Allocation Committee, University of Hawaii   | 2014A-2014B  |
| Served as the graduate student representative on the New Building Committee<br>(identified and addressed student concerns during the Astronomy<br>department's relocation on UC Berkeley's campus) | 2009-2011    |

### **Public Outreach**

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|---|--------------------|
| Speaker, Nanaimo Astronomy Society, "Monsters in the Dark"            | November 19, 2015  |
| Speaker, MacMillan Space Centre, "Monsters in the Dark"               | October 24, 2015   |
| Judge, Hawaii State Science Fair                                      | March 23, 2015     |
| Speaker, HawaiiCon, "Black Holes and their Messy Habits"              | September 13, 2014 |
| Speaker, IfA Frontiers Lecture, "Monsters in the Dark"                | October 29, 2013   |
| Presenter, Hokulani Elementary School Career Day                      | March 13, 2013     |
| Guest Scientist, KALX-FM Berkeley                                     | February 17, 2012  |
| Presenter, Oakland Unified School District Dinner with a Scientist    | May 2 & 30, 2012   |
|   | June 1, 2011       |
| Volunteer, Bay Area Science Festival                                  | November 6, 2011   |
| Speaker, Alameda County 4-H Science Engineering Technology Career Day | April 9, 2011      |
| Speaker, Eastbay Astronomical Society, "Dark Influences"              | August 28, 2010    |

### **Citizenship**

United States