

DANIEL TAMAYO

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CITIZENSHIP: U.S.A., SPAIN

PROFESSIONAL EXPERIENCE

2014-Present POSTDOCTORAL FELLOW University of Toronto	CENTRE FOR PLANETARY SCIENCES CANADIAN INSTITUTE FOR THEORETICAL ASTROPHYSICS
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2008-2014 CORNELL UNIVERSITY Ithaca, NY, USA	Ph.D.: ASTRONOMY & SPACE SCIENCE Minor Concentration: PHYSICS GPA: 4.0 Advisors: JOSEPH A. BURNS and PHILIP D. NICHOLSON
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2005 UNIVERSITY OF MICHIGAN Ann Arbor, MI, USA	B.S. PHYSICS B.S. MATHEMATICAL PHYSICS B.S. PHILOSOPHY
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FELLOWSHIPS AND AWARDS (RESEARCH)

JEFFREY L. BISHOP FELLOWSHIP (CANADIAN INSTITUTE FOR THEORETICAL ASTROPHYSICS) <i>Awarded every two years for excellence in research in astrophysical dynamics.</i>	2015
Z. CARTER PATTEN GRADUATE FELLOWSHIP IN ASTRONOMY	2013
NASA SPACE GRANT FELLOWSHIP	2013
AAS DIVISION OF DYNAMICAL ASTRONOMY STUDENT STIPEND AWARD	2010
CORNELL UNIVERSITY FIRST YEAR FELLOWSHIP	2008

FELLOWSHIPS AND AWARDS (TEACHING)

KNIGHT AWARD FOR WRITING EXERCISES, Cornell Knight Institute <i>Awarded to the best writing exercise across university's first-year writing seminars</i>	2014
BUTTRICK-CRIPPEN FELLOWSHIP, Cornell Knight Institute <i>One of two awarded across all Cornell depts to develop & teach a first-year writing seminar</i>	2013-2014
OUTSTANDING TEACHING ASSISTANT AWARD, Cornell University Dept of Astronomy	2010

RESEARCH GRANTS AWARDED

Collaborator: UNDERSTANDING FREE NORMAL MODES AND IRREGULAR STRUCTURES ON THE EDGES OF SATURN'S RINGS. (\$324,988)	2016
Science PI: GALACTIC BACKGROUND CALIBRATIONS FOR OT1_DDAN01_1 (\$20,300) <i>Herschel Space Observatory Open Time Proposals Rd 2 (Obs. not executed)</i>	2012
Science PI: DETECTING THE LARGEST RINGS IN THE SOLAR SYSTEM— DUST RINGS FROM THE IRREGULAR SATELLITES (\$54,000) <i>Herschel Space Observatory Open Time Proposals Rd 1</i>	2011

MENTORING

<i>Graduate Students</i>		
ARI SILBURT	A hybrid integrator for simulating close encounters.	2015-pres.
ALYSA OBERTAS	Stability of tightly packed planetary systems.	2015-2016.
RYAN CLOUTIER	Retention of satellites during close planetary encounters.	2014-2015.
<i>Undergraduate Students</i>		
NAIREEN HUSSAIN	MACHINE LEARNING TO PREDICT ORBITAL STABILITY	2017-pres
JAHNAVI SHAH	MODELING DEBRIS DISKS FROM COLLIDING SATELLITES	2016-2017
CHRISTOPHER SIMBULAN	EXPLAINING THE OBSERVED EXOPLANET DISTRIBUTION	2015-2016
MORGAN BENNETT	ORBITAL STABILITY OF MULTI-PLANET KEPLER SYSTEMS.	2015
ALICE CHEN	RESONANT STABILITY WITH PLANET-DISK INTERACTIONS	2015
CADEN ARMSTRONG	PHOTOMETRIC SIGNATURES OF EXOPLANETARY RINGS	2015
PENGSHUAI (SAM) SHI	GENERAL RELATIVITY CORRECTIONS TO N-BODY SIMULATIONS	2015-2016
SUNNY-SUM CHEN	CHAOS INDICATORS IN SIMULATIONS OF PLANETARY SYSTEMS	2014
STEPHEN MARKHAM	EXTRACTING THE PHOEBE RING'S RADIAL STRUCTURE USING OBSERVATIONS AT SATURN FROM THE CASSINI SPACECRAFT	2013-2015
HEMING GE	VISUALIZATION SOFTWARE FOR DYNAMICAL SIMULATIONS	2013

LEADERSHIP

PROPOSED AND CO-ORGANIZED CONFERENCE ON NUMERICAL DYNAMICS (\$6,000)	2017
AMERICAN ASTR. SOCIETY DIVISION ON DYNAMICAL ASTRONOMY COMMITTEE	2016-pres.
PLANETARY JUNIOR VISITOR COORDINATOR	2015-2016
PLANETARY LUNCH COORDINATOR	2014-pres.
NASA PROPOSAL REVIEW PANELIST	2014-pres.
MANUSCRIPT REFEREE, <i>Astrophysical Journal</i> , <i>Icarus</i> , <i>MNRAS</i>	2012-pres.
PRESIDENT, ASTRONOMY GRADS NETWORK, <i>Cornell University</i>	2010-2012

TEACHING TRAINING

WRITING 7100: TEACHING WRITING, <i>Cornell University</i>	2013
ALS 6015: TEACHING IN HIGHER EDUCATION, <i>Cornell University</i>	2012
CENTER FOR ASTRONOMY EDUCATION TEACHING EXCELLENCE WORKSHOP, <i>PSU, PA</i>	2011
WRITING 7101: WRITING IN THE MAJORS, <i>Cornell University</i>	2009

INVITED TALKS

EXOPLANETS AND PLANET FORMATION CONFERENCE, SHANGHAI	DEC 2017
HARVARD CENTER FOR ASTROPHYSICS STARS & PLANETS SEMINAR	NOV 2017
CALTECH PLANETARY SCIENCE SEMINAR	OCT 2017
BERKELEY CENTER FOR INTEGRATIVE PLANETARY SCIENCE SEMINAR	OCT 2017
UNIVERSITY OF ARIZONA THEORETICAL ASTROPHYSICS PROGRAM COLLOQUIUM	SEP 2017
HERZBERG INSTITUTE OF ASTROPHYSICS COLLOQUIUM	NOV 2016
UNIVERSITY OF BRITISH COLUMBIA COLLOQUIUM	NOV 2016
(30+ ADDITIONAL CONFERENCE TALKS AND SEMINARS)	

TEACHING

U. OF TORONTO Scarborough, ON	Co-Organized and Taught Monthly Machine Learning Workshop: <i>Attended by Undergraduates, Graduate Students, Postdocs and Faculty.</i>	2016
CORNELL Astronomy Dept. Ithaca, NY	Designed and Taught First-Year Writing Seminar: <i>Are We Alone in the Universe?</i> (Buttrick-Crippen Fellowship)	2014
	Teaching Assistant, ASTRO 1102, <i>Our Solar System</i>	2011
	Designed and Taught 5-week middle-school science course: <i>Figuring Out Our Place in the Universe!</i>	2011
	Head Teaching Assistant, ASTRO 1101, <i>Nature of the Universe</i>	2010
	Teaching Assistant, ASTRO 1102, <i>Our Solar System</i>	2010
	Designed and Taught 5-week middle-school science course: <i>Mind-Blowing Science—From Relativity to Alien Biology</i>	2009
	Teaching Assistant, ASTRO 2201, <i>The History of the Universe</i>	2009
PEACE CORPS Otjimbingwe Namibia	Mathematics Teacher (Grades 8-10) Physical Science Teacher (Grades 8-9) Founded Computer Lab & Chess Club Renovated School Library	2005-2007
PRINCETON REVIEW Ann Arbor, MI	Math, Science, Reading and English Teacher for ACT Test	2003-2005

SELECTED OUTREACH

Co-launched SYSTEM-SOUNDS.COM, A WEBSITE SONIFYING ASTROPHYSICAL PHENOMENA <i>Toronto, Canada</i>	2017
Interviewed ON CANADIAN BROADCASTING CORPORATION RADIO <i>Toronto, Canada</i>	2017
Co-organized CANADA 150 ANNIVERSARY PUBLIC ASTRONOMY EVENT (~ 600 people) <i>University of Toronto at Scarborough</i>	2017
Co-proposed AND BUILT KM-SCALE MODEL OF THE SOLAR SYSTEM (\$10,000) <i>University of Toronto at Scarborough</i>	2017
Co-Organized LUNAR ECLIPSE PUBLIC EVENT (~ 500 people) <i>University of Toronto at Scarborough</i>	2015
Reviewed NEAL STEPHENSON NOVEL SEVENEVES <i>Science Vol 348, 6241, pp. 1310-1311</i>	2015
Organized ASTRO CAREER DAY (2-day event for 80 local middle-school students) <i>Cornell Department of Astronomy, Ithaca NY</i>	2014
Organized MUSEUM IN THE DARK (Astronomy Halloween Event ~ 100 children) <i>Museum of the Earth, Ithaca, NY</i>	2011
Co-Started ASK AN ASTRONOMER AT CORNELL PODCAST <i>Cornell Department of Astronomy, Ithaca NY</i>	2011-2014
Organized a book drive to send astronomy materials to a planetarium in Ghana <i>Gathered and shipped over 100 textbooks</i>	2010
Co-Organized OBSERVE THE MOON NIGHT (> 300 children and families) <i>Fuertes Observatory, Ithaca, NY</i>	2009

REFEREED PUBLICATIONS

- 20 **Tamayo, D.**, Rein, H., Shi, P.* FAST OPERATOR-SPLITTING METHODS FOR PERTURBED N-BODY INTEGRATIONS INCLUDING DISSIPATION, *in prep*, 2017
- 19 Silburt, A.*, Rein, H., **Tamayo, D.**. HERMES: A HYBRID INTEGRATOR FOR SIMULATING CLOSE ENCOUNTERS AND PLANETESIMAL MIGRATION., *Submitted to Monthly Notices of the Royal Astronomical Society*. ([preprint](#)) 2017
- 18 Rein, H., **Tamayo, D.**. JANUS: A BIT-WISE REVERSIBLE INTEGRATOR FOR N-BODY DYNAMICS, *accepted Monthly Notices of the Royal Astronomical Society*. ([preprint](#)) 2017
- 17 **Tamayo, D.**, Rein, H., Petrovich, C., Murray, N. CONVERGENT MIGRATION RENDERS TRAPPIST-1 LONG-LIVED., *Astrophysical Journal Letters*, Vol. 840.2, L19. ([preprint](#)) 2017
- 16 Rein, H., **Tamayo, D.**. A NEW PARADIGM FOR REPRODUCING AND ANALYZING N-BODY SIMULATIONS, *Monthly Notices of the Royal Astronomical Society*, Vol. 467.2, p. 2377-2383. ([preprint](#)) 2017
- 15 Simbulan, C.*, **Tamayo, D.**, Petrovich, C., Rein, H., Murray, N. CONNECTING THE HL TAU SYSTEM TO THE OBSERVED EXOPLANET POPULATION, *Monthly Notices of the Royal Astronomical Society*, Vol. 469.3, p. 3337-3346. ([preprint](#)) 2017
- 14 Obertas, A.*, van Laerhoven, C., **Tamayo, D.**. THE STABILITY OF TIGHTLY-PACKED AND EVENLY-SPACED PLANETARY SYSTEMS, *Icarus*, Vol 293, p. 52-58. ([preprint](#)) 2017
- 13 **Tamayo, D.**, Silburt, A.*, et al. A MACHINE LEARNS TO PREDICT THE STABILITY OF TIGHTLY PACKED PLANETARY SYSTEMS, *Astrophysical Journal Letters*, Vol. 832.2. L22 ([preprint](#)) 2016
- 12 **Tamayo, D.**, Markham, S.R.*, Hedman, M.M, Burns, J.A., RADIAL PROFILES OF THE PHOEBE RING: A VAST DEBRIS DISK AROUND SATURN. *Icarus*, Vol. 275, p. 117-131. ([preprint](#)) 2016
- 11 Tiscareno, M. et al. (including **Tamayo, D.**). OBSERVING PLANETARY RINGS AND SMALL SATELLITES WITH THE JAMES WEBB SPACE TELESCOPE: SCIENCE JUSTIFICATION AND OBSERVATION REQUIREMENTS, *Publications of the Astronomical Society of the Pacific*, Vol. 128.959, pp. 018008. ([preprint](#)) 2016
- 10 Rein, H., **Tamayo, D.**. SECOND-ORDER VARIATIONAL EQUATIONS FOR N-BODY SIMULATIONS. *Monthly Notices of the Royal Astronomical Society*, Vol. 459.3 p. 2275-2285. ([preprint](#)) 2016
- 9 Kostov, V.B., Moore, K.*, **Tamayo, D.**, Jayawardhana, R., Rinehart, S.A. TATOOINE'S FUTURE: THE ECCENTRIC RESPONSE OF KEPLER'S CIRCUMBINARY PLANETS TO COMMON-ENVELOPE EVOLUTION OF THEIR HOST STARS, *Astrophysical Journal*, Vol 832.2. ([preprint](#)) 2016
- 8 **Tamayo, D.**, Triaud, A.H.M.J., Menou, K., Rein, H. DYNAMICAL STABILITY OF IMAGED PLANETARY SYSTEMS IN FORMATION: APPLICATION TO HL TAU. *Astrophysical Journal*, Vol. 805 (2), 100. ([preprint](#)) 2015
- 7 Cloutier, R*., **Tamayo, D.**, Valencia, D., COULD JUPITER OR SATURN HAVE EJECTED A FIFTH GIANT PLANET?. *Astrophysical Journal*, Vol. 813.1. ([preprint](#)) 2015
- 6 Rein, H., **Tamayo, D.** WHFAST: A FAST AND UNBIASED IMPLEMENTATION OF A SYMPLECTIC WISDOM-HOLMAN INTEGRATOR FOR LONG-TERM GRAVITATIONAL SIMULATIONS. *Monthly Notices of the Royal Astronomical Society*, Vol. 452.1 p. 376-388. ([preprint](#)) 2015
- 5 **Tamayo, D.**, Hedman, M.M., Burns, J.A. FIRST OBSERVATIONS OF THE PHOEBE RING IN OPTICAL LIGHT. *Icarus*, Vol. 233, p. 1-8. ([preprint](#)) 2014
- 4 **Tamayo, D.** CONSEQUENCES OF AN ECCENTRIC ORBIT FOR FOMALHAUT B. *Monthly Notices of the Royal Astronomical Society*, Vol. 438, Issue 4, p. 3577-3586. ([preprint](#)) 2014
- 3 **Tamayo, D.**, Burns, J.A., Hamilton, D.P. CHAOTIC DUST DYNAMICS AND IMPLICATIONS FOR THE HEMISPHERICAL COLOR ASYMMETRIES OF THE URANIAN SATELLITES. *Icarus*, Vol. 226, Issue 1, p. 655-662. ([preprint](#)) 2013
- 2 **Tamayo, D.**, Burns, J.A., Hamilton, D.P., Nicholson, P.D. DYNAMICAL INSTABILITIES IN HIGH-OBLIQUITY SYSTEMS. *Astronomical Journal*, Vol. 145, Issue 3, id. 54, 12 pp. ([preprint](#)) 2013
- 1 **Tamayo, D.**, Burns, J.A., Hamilton, D.P., Hedman, M.M. FINDING THE TRIGGER TO IAPETUS' ODD GLOBAL ALBEDO PATTERN: DYNAMICS OF DUST FROM SATURN'S IRREGULAR SATELLITES. *Icarus*, Volume 215, Issue 1, p. 260-278. ([preprint](#)) 2011

* Student