Daniel Tamayo

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Professional Experience

2018-pres Princeton University Princeton, NJ, USA	NASA Sagan Fellow
2014-2018 University of Toronto Toronto, CA	Postdoctoral Fellow Centre for Planetary Sciences Canadian Institute for Theoretical Astrophysics
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
2005 University of Michigan Ann Arbor, MI, USA	B.S. Physics B.S. Mathematical Physics B.S. Philosophy

Fellowships and Awards (Research)

Lyman Spitzer Jr. Fellowship (Princeton University)	2021-2023
NASA Sagan Fellowship (Space Telescope Science Institute)	2018-2021
Jeffrey L. Bishop Fellowship (Canadian Institute Theoretical Astrophysics)	2015
Centre for Planetary Sciences Fellowhsip)	2014-2018
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	2014
Awarded to the best writing exercise across university's first-year writing seminars	
Buttrick-Crippen Fellowship, Cornell Knight Institute	2014
One of two awarded across all Cornell depts to develop & teach a first-year writing seminar	
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) *Herschel Space Observatory* Open Time Proposals Rd 2 *(Obs. not executed)*	2012
Science PI: Detecting the Largest Rings in the Solar System— Dust Rings from the Irregular Satellites ($54,000) *Herschel Space Observatory* Open Time Proposals Rd 1	2011

Mentoring

Graduate Students		
Alysa Obertas	Stability of tightly packed planetary systems.	2015-pres.
Ari Silburt	A hybrid integrator for simulating close encounters.	2015-2017
Ryan Cloutier	Retention of satellites during close planetary encounters.	2014-2015
Undergraduate Students		
Loic Nassif-Lachapelle	Detectability of Exoplanet Debris Clouds	2018-pres
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	Gen. relativity corrections to N-body simulations	2015-2016
Sunny-Sum Chen	Chaos indicators in simulations of planetary systems	2014
Stephen Markham	Observing the Phoebe ring from 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	2016-2018
Planetary Junior Visitor Coordinator	2015-2016
Planetary Lunch Coordinator	2014-2018
NASA Proposal Review Panelist	2014-pres
Manuscript Referee, *Astrophysical Journal, Icarus, MNRAS*	2012-pres
President, Astronomy Grads Network, *Cornell University*	2010-2012

Teaching Training

Writing 7100: Teaching Writing, *Cornell University*	2013
ALS 6015: Teaching in Higher Education, *Cornell University*	2012
Center for Astronomy Education Teaching Excellence Workshop, *PSU, PA*	2011
Writing 7101: Writing in the Majors, *Cornell University*	2009

Selected Talks

Astrophysics Seminar, Rutgers University	Oct 2018
Machine Learning in Science & Engineering (Invited), Carnegie Mellon	Jun 2018
Vanderbilt University Data Science Colloquium	Apr 2018
Center for Exoplanets and Habitable Worlds Seminar, Penn State	Apr 2018
University of Pennsylvania Astronomy Seminar	Mar 2018
Exoplanets and Planet Formation Conference (Invited), Shanghai	Dec 2017
Joint EPS/CIERA Seminar, Northwestern University	Nov 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
(35+ additional colloquia, seminars and conference talks)	

Teaching

U. of Toronto Scarborough, ON	Co-Organized and Taught Monthly Machine Learning Workshop: *Attended by Undergraduates, Graduate Students, Postdocs and Faculty.*	2016
Cornell Astronomy Dept. Ithaca, NY	Designed and Taught First-Year Writing Seminar: *Are We Alone in the Universe?* (Buttrick-Crippen Fellowship)	2014
	Teaching Assistant, ASTRO 1102, *Our Solar System*	2011
	Designed and Taught 5-week middle-school science course: *Figuring Out Our Place in the Universe!*	2011
	Head Teaching Assistant, ASTRO 1101, *Nature of the Universe*	2010
	Teaching Assistant, ASTRO 1102, *Our Solar System*	2010
	Designed and Taught 5-week middle-school science course: *Mind-Blowing Science–From Relativity to Alien Biology*	2009
	Teaching Assistant, ASTRO 2201, *The History of the Universe*	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

Collaborator: One Sky: 12-hour sonification of the night sky ($45,000) 2018
Annual Nuit Blanche festival, Toronto, Canada
Co-I: SYSTEM Sounds:Bringing the Music of the Spheres Down to Earth (€7969.5) 2017
Co-launched system-sounds.com: Sonifications of astrophysical phenomena 2017
Interviewed on popular science radio show Quirks & Quarks 2017
Canadian Broadcasting Corporation, Toronto, Canada
Co-organized Canada 150 anniversary Public astronomy event ($\sim$ 600 people) 2017
University of Toronto at Scarborough
Co-proposed and helped build km-scale model of the Solar System ($10,000) 2017
University of Toronto at Scarborough
Co-Organized Lunar Eclipse Public Event ($\sim$ 500 people) 2015
University of Toronto at Scarborough
Reviewed Neal Stephenson novel Seveneves 2015
Science Vol 348, 6241, pp. 1310-1311
Organized Astro Career Day (2-day event for 80 local middle-school students) 2014
Cornell Department of Astronomy, Ithaca NY
Organized Museum in the Dark (Astronomy Halloween Event $\sim$ 100 children) 2011
Museum of the Earth, Ithaca, NY
Co-launched Ask An Astronomer At Cornell Podcast 2011
Cornell Department of Astronomy, Ithaca NY
Organized a book drive to send astronomy materials to a planetarium in Ghana 2010
Gathered and shipped over 100 textbooks
Co-Organized Observe the Moon Night ($>$ 300 children and families) 2009
Fuertes Observatory, Ithaca, NY

Refereed Publications

21	**Tamayo, D.**, Rein, H., Shi, P.* Fast Operator-Splitting Methods for Perturbed N-body Integrations Including Dissipation, *to be submitted*,	2018
20	Rein, H., **Tamayo, D.**, Vokrouhlický, D. The random walk of cars and their collision probabilities with planets, *Aerospace*, Vol 5.2 p.57. (preprint)	2018
19	Jackson, A., **Tamayo, D.**, Hammond, N., Ali-Dib, M., Rein, H. Ejection of rocky and icy material from binary star systems: Implications for the origin and composition of 1I/'Oumuamua, *Monthly Notices of the Royal Astronomical Society Letters*, Vol. 478.1, L49-53. (preprint)	2018
18	Rein, H., **Tamayo, D.**. JANUS: A bit-wise reversible integrator for N-body dynamics, *Monthly Notices of the Royal Astronomical Society*, Vol. 473.3, p. 3351-3357. (preprint)	2018
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

* Student

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

References

Prof. Norman Murray	Canadian Institute for Theoretical Astrophysics murray@cita.utoronto.ca +1 (416) 978-1778
Prof. Kristen Menou	University of Toronto menou@astro.utoronto.ca +1 (416) 208-5060
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Prof. Konstantin Batygin	California Institute of Technology kbatygin@gps.caltech.edu +1 (626) 395-2920