

Kathryne J. Daniel

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EDUCATION

Johns Hopkins University , Baltimore, MD	
<i>Ph.D.</i> in Physics & Astronomy	2015
Advisor: Rosemary F. G. Wyse	
Thesis: “The Importance of Radial Migration to the Evolution of Disk Galaxies”	
<i>M.A.</i> in Physics & Astronomy	2005
Advisor: Karl Glazebrook	
Bryn Mawr College , Bryn Mawr, PA	
<i>Post-baccalaureate Major</i> in Physics	2002
<i>A.B.</i> in Classical & Near Eastern Archaeology (Honors)	1999

APPOINTMENTS

Bryn Mawr College , Bryn Mawr, PA	
<i>Assistant Professor</i> , Department of Physics	2016-present
Johns Hopkins University , Baltimore, MD	
<i>Visiting Research Scientist</i> , Department of Physics & Astronomy	2015-2016
Swarthmore College , Swarthmore, PA	
<i>Visiting Assistant Professor</i> , Department of Physics & Astronomy	2015-2016
Towson University , Towson, MD	
<i>Lecturer</i> , Department of Physics, Astronomy & Geosciences	2008-2009
<i>Adjunct Faculty</i> , Department of Physics, Astronomy & Geosciences	2006-2008

HONORS & AWARDS

Scialog Fellow - Research Corporation & Heising-Simons Foundation	2019
FAMOUS Award	2016, 2018
AAUW American Dissertation Fellowship	2014-2015
E. J. Rhee Award	2014
Ford Foundation Dissertation Fellowship , Honorable Mention	2014-2015
NSF Graduate Research Fellow	2011-2014
Rowland Prize for Innovation and Excellence in Teaching	2003
Bryn Mawr College Scholarship	1996-1999

RESEARCH TOPICS

Galactic dynamics – Spiral galaxy evolution – Nature of spiral structure – Dynamical resonances in the disk – Radial migration/mixing of disk stars – Chaotic orbits – Outer disks – Thick disks – Origin of exponential disks – Globular cluster dynamics – Collisionless systems – Analytically derived modeling – Stellar populations – X-ray emission from young stars

PUBLICATION STATISTICS

ORCID ID: 0000-0003-2594-8052

12* publications, 7 first author, 9 lead author, 217 citations

54 presentations, 32 invited talks, 10 posters

PUBLICATIONS (*advisee)

Peer Reviewed Journal Articles:

- [1] Schaffner, D. & **Daniel, K. J.** (2021) "PESCy: A novel approach for characterizing orbital chaos, asymptotic stochasticity and periodicity" ApJ, under review
- [2] **Daniel, K. J.**, Schaffner, D., McCluskey, F.*, Fiedler Kawaguchi, C.*, Loebman, S. (2019) "When Cold Radial Migration is Hot: Constraints from Resonant Overlap" ApJ, 882, 111 (DOI: 10.3847/1538-4357/ab341a)
- [3] **Daniel, K. J.** & Wyse, Rosemary F. G. (2018) "Constraints on Radial Migration in Spiral Galaxies - II. Angular momentum distribution and preferential migration" MNRAS, 476, 1561 (DOI: 10.1093/mnras/sty199)
- [4] **Daniel, K. J.**, Heggie, D. C. & Varri, A. L. (2017) "An Approximate Analytic Model of a Star Cluster with Potential Escapers", MNRAS, 468, 1453 (DOI: 10.1093/mnras/stx571)
- [5] **Daniel, K. J.** & Wyse, Rosemary F. G. (2015) "Constraints on Radial Migration in Spiral Galaxies - I. Analytic Criterion for Capture at Corotation" MNRAS, 447, 3576 (DOI: 10.1093/mnras/stu2683)
- [6] Le Bourgne, D., Roberto, A., **Daniel, K. J.** et al. (2006) "Gemini Deep Deep Survey. VI. Massive H δ -strong Galaxies at z= 1" ApJ, 642, 48 (DOI: 10.1086/500005)
- [7] Gagné, M., **Daniel, K. J.**, & Skinner, S. L. (2004) "Simultaneous *Chandra* and Very Large Array Observation of Young Stars and Protostars in ρ -Ophiuchus Cloud Core A", ApJ, 613, 393 (DOI: 10.1086/422828)
- [8] **Daniel, K. J.**, Linsky, J. L., & Gagné, M. (2002) "*Chandra* Observations of the Pleiades Open Cluster: X-Ray Emission from Late B- to Early F-Type Binaries", ApJ, 578, 486 (DOI: 10.1086/340553)

Selected Other Publications:

- [1] Hanson, M.H., Ramirez-Ruiz, E., Besla, G., Boyd, P.T., **Daniel, K.J.**, Haynes, M.P., Isler, J., Ivie, R.L., Johnston, K.V., Miller, C.W., Pando, J., Posselt, J., Rigby, J.R., Rockward, W.S., Stassun, K.G (2021) *Decadal Survey on Astronomy & Astrophysics 2020: Panel on the State of the Profession and Societal Impacts*, Consensus Study Report of the National Academies of Sciences, Engineering & Medicine, under review
- [2] Kamai, B, Cid, X., Quichocho, X., Little, A., **Daniel, K.J.**, Gray, C., Neilson, H., & Blue Bird, J. (2020) "Indigenous Peoples Exist Within Physics" *APS Gazette* 39, 2

* includes submitted article

- [3] Gardner-Vandy, K., Scalice, D., Chavez, J.C., David-Chavez, D.M., **Daniel, K.J.**, Gonzales, E, Lee, A., Makoce, M.S., Waterhouse, J., Yracheta, J.M., Gorospe, G., Goordial, J., Hudson, M., Russo Carroll, S., Williams, J., McCoy, T.J., Cadue-Blackwood, C., Atencio, J., Seyler, L., Carron, A., Cabrol, N., Anderson, J., & Kirk, M, "Relationships First and Always: A Guide to Collaborations with Indigenous Communities" (2020) *NAS 2020 Planetary Science and Astrobiology Decadal Survey White Paper*

PROFESSIONAL ACTIVITIES

Professional Service

Cosmic Explorer Advisory Committee – <i>Referee (invited)</i>	2021
National Academy of Sciences (NAS) Decadal survey on Astronomy & Astrophysics (Astro2020): State of the Profession & Societal Impacts – <i>Panelist (nominated)</i>	2019-2021
AAS Division for Dynamical Astronomy (DDA) – <i>Committee (elected)</i>	2018-2020
Committee on Status of Minorities in Astronomy (CSMA) – <i>Committee (nominated & elected)</i>	2017-2020
NASA Hubble Fellowship Program (NHFP) – <i>Reviewer</i>	2020-2021
NASA Astrophysics Theory Program (ATP) – <i>Panel Reviewer</i>	2019
Gemini Observatory Fast Turnaround – <i>Reviewer</i>	2019-2020
Monthly Notices of the Royal Astronomical Society (MNRAS) – <i>Referee</i>	2017-
Alfred P. Sloan Foundation - Sloan Digital Sky Survey (SDSS) – <i>Reviewer</i>	2018
Honors in Astronomy at Swarthmore College on ISM – <i>Examiner</i>	2017
Chambliss Astronomy Achievement Student Award – <i>Judge</i>	2016-2018

Workshops

Galactic Archaeology with Fundamental Stellar Parameters: Synthesizing the power of accurate ages with distances, chemistry and kinematics, <i>Aspen Center for Physics (ACP)</i> . Cancelled in 2020 due to pandemic and re-accepted. – Lead Organizer	2021
Dynamics of the Milky Way in the Era of Gaia Summer Workshop, <i>ACP</i> . Discussion leader and organizer for two sessions. -Equilibrium versus non-equilibrium models for the MW -Radial mixing, radial heating & cold torquing in the disk	2018
Everyday Anti-Racism: Tools to Combat Racism in Astronomy, <i>231st AAS Meeting</i> . Co-host and -organizer.	2018 2018
Kavli International Summer Institute for Modeling in Astrophysics: Gravitational Dynamics, <i>CITA at University of Toronto</i> , Toronto, Canada	2014

Workshops (cont.)

Galactic Dynamics in the Times of Gaia, <i>UNAM</i> , Mexico City, Mexico	2013
GREAT ITN School: Galaxy Modeling, <i>Institut UTINAM</i> , Besançon, France	2012
Summer School for Astro-Computing: Galaxy Simulations, <i>High Performance Astro-Computing Center at UC-Santa Cruz</i> , Santa Cruz CA, USA	2010

Member

Society of Indigenous Physicists (SIP) - *Co-Founder*
American Astronomical Society (AAS)
American Physical Society (APS)
Society for Advancing Chicanos/Hispanics & Native Americans in Science (SACNAS)
500 Women Scientists - Philadelphia Pod

SELECTED PRESENTATIONS (44 talks, 32 invited; 10 posters, ;[†]invited, *advisee)

2021	Colloquium [†]	University of Wisconsin - Madison, Astronomy Dept, Madison WI
	Colloquium [†]	Steward Observatory & University of Arizona, Dept of Astronomy, Tucson AZ
2020	Colloquium [†]	Wesleyan University, Dept of Astronomy, Middletown CT
	Colloquium [†]	Michigan State University, Dept of Physics & Astronomy, East Lansing MI
	Colloquium [†]	Royal Observatory, Edinburgh University, Edinburgh, Scotland, UK
	Seminar [†]	University of Surrey, Dept of Physics, Surrey, Guildford, UK
	Seminar [†]	CfA - Harvard & Smithsonian, ITC, Cambridge MA
	Colloquium [†]	University of Michigan, Dept of Astronomy, Ann Arbor MI
	Colloquium [†]	Villanova University, Dept of Astrophysics & Planetary Science, Villanova PA
2019	Seminar [†]	Flatiron Institute, CCA, New York NY
	Lecture [†]	UC Davis, Dept of Physics, Davis CA
	Seminar [†]	UC Davis, Dept of Physics, Davis CA
	Poster*	Vassar College, <i>Keck Northeast Astronomy Consortium (KNAC)</i> , Poughkeepsie NY
2018	Seminar [†]	Columbia University, Dept of Astronomy, New York NY
	Seminar [†]	American Museum of Natural History, New York NY
	Workshop [†]	Bucks IU Challenging the Gifted Conference, Doylestown PA
	Colloquium [†]	<i>Authentic Iceland Faculty Lecturer</i> , Reykjavik, Iceland
	Colloquium [†]	Haverford College, Physics & Astronomy Dept, Haverford PA
	Poster*	AAS, 231 st Annual Meeting, Washington DC

- 2017 Seminar[†] Harvard-Smithsonian CfA, Cambridge MA
 Talk[†] *Thin, Thick and Dark Disks* by the Center for Theoretical Astrophysics & Cosmology, University of Zurich, Ascona, Switzerland
 Keynote[†] Banneker-Aztlán Institute, Harvard-Smithsonian CfA, Cambridge MA
 Talk[†] *WiP-PA*, Bucknell University, Lewisburg PA
 Poster* AAS, 229th Annual Meeting, Grapevine TX
- 2016 Seminar[†] University of Edinburgh, IfA, Edinburgh, Scotland, UK
- 2014 Talk *International Summer Institute for Modeling in Astrophysics*, CITA, Toronto, Canada
- 2013 Talk *International Gaia School*, UNAM, Mexico City, Mexico
 Talk *Structure and Dynamics of Disk Galaxies*, Winthrop Rockefeller Institute Petit Jean Mountain, AR
- 2012 Talk *International Gaia School*, Besançon, France
 Talk *Stars without Borders: Radial Migration in Spiral Galaxies*, Medana, Slovenia

STUDENT RESEARCH SUPERVISION & RECOGNITIONS

(2 PhD students; 5 Honors AB Theses, 13 undergraduate advisees)

PhD Thesis Advisor, Bryn Mawr College

Amy Smock – Spring ‘18-present

PhD Thesis: Transient Spiral Regeneration and Morphology

Olivia McAuley – Fall ‘16-present

PhD Thesis: Emergence of Structure in the Galactic Center: Stable Orbits and Resonant Trapping from the Bar

Awards: (1) Dean’s Fellowship 2020-2021; (2) Travel Fellowship (\$3,000) for the 2019 International School for Space Science in l’Aquila, Italy; (3) Fermilab & NSF Travel Award to attend the 2016 National Society of Black Physicists (NSBP) Conference

Other Graduate Mentorship

Moiya McTier, PhD in Astronomy from Columbia University ‘21

Project: *Chemical Analysis of Moving and Orbit Groups with Gaia EDR3*

with Keith Hawkins & Kathryn Johnston

Undergraduate Research & Theses, Bryn Mawr College

Morgan Fernandez ‘21 – Senior Thesis: *Decolonizing Physics*

Irene Lin ‘20 – Currently studying Financial Engineering, **Columbia University**

Senior Thesis: *Resonant Effects from Spiral Arms on Stellar Kinematics (Honors)*

Fiona McCluskey ‘19 – Currently studying Astronomy, **UC-Davis**

Senior Thesis: *Resonating with the Stars: Constraining Cold Migration in Spiral Galaxies (Honors)*; Nominated: Leroy Apker Award

Carrie Filion ‘18 – Currently studying Astronomy at **Johns Hopkins University**

Project: *Configuring GALAXY Simulation Package*; Senior Thesis: *Radial Migration & Manifold Theory as Observed in the GALAXY N-Body Simulation (Awarded Honors)*

Undergraduate Research & Theses (cont.), Bryn Mawr College

Chelsea Thangavelu '18 – At Aero Core Inc. MS Aerospace Eng., **CU-Boulder**
Senior Thesis: *Understanding the Disk's Response to Dark Matter Subhalo Bombardment (Honors)*

Codie Fiedler-Kawaguchi '18 – Currently doing research, **Los Alamos National Labs**
Senior Thesis: *Using Permutation Entropy and Statistical Complexity to Understand the Movement of Stars in Trapped Orbits*

Cheryl Liu '18 – Currently studying Physics, **University of Washington**
Project: *Classification of orbits in the Milky Way*;
Awards: Kathrine B Blodgett 1917 Summer Research Fellowship; (**Honors**)

Jessica Breet '18 – Project: *Monte Carlo Simulation of the Milky Way*

Dr. Bridgett Kohno '17 – PhD conferred '21, **UC-Irvine**
Project: *Galaxy Evolution using Python*

Han Wang '17
Senior Thesis: *The Birth Radius of the Sun from Disk Galaxy Chemical Evolution*

Sarah Brown '17
Senior Thesis: *Significance of Pitch Angle in Radial Migration*

Undergraduate Students, Swarthmore College

Noah Lifset '18 – Project: *Pitch Angle and Radial Mixing in the Milky Way*

Luke Barbano '18 – Project: *Optimizing Leapfrog Orbital Integrator in Python*

COURSES TAUGHT

Bryn Mawr College, Bryn Mawr, PA

PHYS 101 Lab - <i>Introductory Physics I - Mechanics</i> (remote design)	F'20
PHYS 102 - <i>Introductory Physics II - E&M</i>	S'18
PHYS 102-1 - <i>Introductory Physics II - E&M (postbac pre-med)</i>	S'19
PHYS 121 - <i>Modern Physics</i>	F'16, F'17, F'18
PHYS 122 - <i>Introduction to Classical Mechanics</i>	S'21
PHYS 214 - <i>Introductory Quantum Mechanics</i>	S'17, S'18, S'21
PHYS 214 Lab - <i>Introduction to Programming in Python</i>	S'17, S'21
PHYS 303 - <i>Statistical Mechanics & Thermodynamics</i>	F'16, F'20
PHYS 328 - <i>Galactic Dynamics</i>	F'18
PHYS 403 - <i>Undergraduate Supervised Research</i>	F'16-F'20
PHYS 505 - <i>Graduate Classical Mechanics</i>	F'18

Swarthmore College, Swarthmore, PA

ASTR 1 - <i>Introductory Astronomy</i>	F'15, S'16
ASTR 2 - <i>Tracing the Unseen Universe</i>	S'16
ASTR 16 Lab - <i>Modern Astrophysics: Observational</i>	F'15
PHYS 82 - <i>Advanced Lab II</i>	S'16
PHYS 94 - <i>Senior Comprehensive</i>	S'16

Towson University, Towson, MD

ASTR 161 - <i>Introductory Astronomy I</i>	F/S/Sm'06 - '09
ASTR 161 Lab - <i>Introductory Astronomy I: Lab</i>	F/S/Sm'06 - '09
ASTR 162 - <i>Introductory Astronomy II</i>	S'07, S'08
ASTR 162 Lab - <i>Introductory Astronomy II: Lab</i>	S'07, S'08, S'09
PHYS 100 - <i>Understanding Physics</i>	F'08
PHYS 211 - <i>General Physics I: Algebra/Trig Based</i>	F'08, S'09
PHYS 241 - <i>General Physics I: Calculus Based</i>	S'09
PHSC 101 - <i>Physical Science</i>	S'08

Johns Hopkins University, Baltimore, MD

PHYS 171.101 (Recitation & Lab) - <i>General Physics I (Sci Majors)</i>	F'02, F'04, F'09
PHYS 171.102 (Recitation & Lab) - <i>General Physics II (Sci Majors)</i>	S'03, S'05
PHYS 171.103 (Head TA) - <i>General Physics I (Bio Majors)</i>	F'09
PHYS 171.104 (Head TA) - <i>General Physics II (Bio Majors)</i>	S'10

COLLEGE SERVICE

Committees

Ad Hoc Committee for the formation of an Anti-Racism Committee (ARC)	2021
Honor Board	2017-2020
Hiring Committee for Physics Department	2019-2020
	2017-2018
HC Astronomy Department Hiring Committee – <i>Advisor</i>	2016

Other College Service

Director of Graduate Studies in Physics	2021-
Physics PhD Committee – Andy Clark, Olivia McAuley	2019-
Race Matters Institute Workshops – <i>Advisory Committee</i>	2018-2019
Alumnae Association Travel Program: Authentic Iceland – <i>Lecturer/Host</i>	2018
Physics Department Events – <i>Coordinator</i>	2017-2021
PhD Committee Chair – Bash Kokona (Chemistry) & Isaac Craig (Mathematics)	2017, 2018
Society of Physics Students (SPS-BMC) - <i>Faculty Advisor</i>	2017-
BMC Star ParTeas – <i>Organizer & Host</i>	2017-
Student Booth at Philadelphia Science Festival Carnival– <i>Organizer</i>	2017
SAndAWiCh – <i>Organizer & Host</i>	2015-2019
A quarterly Tri-college seminar for astrophysically oriented faculty.	