Adam S. Jermyn

Home: 18 Duxbury Lane, Longmeadow, MA 01106-2006, USA
University: Churchill College, Storey's Way, Cambridge CB3 0DS, Tel 011-44-(0)-749-0397012, UK
Online: adamjermyn@gmail.com, adamjermyn.com, github.com/adamjermyn

EDUCATION

PhD Student, Astronomy, University of Cambridge, Churchill College, Institute of Astronomy
Funded by UK Marshall Scholarship 2015-18
Supervisors: Professor Christopher Tout and Professor Gordon Ogilvie

BS, Physics, California Institute of Technology 2011-2015
Academic Advisors: Professors Tom Tombrello and Jason Alicea
Senior Thesis: The Atmospheric Dynamics of Pulsar Companions (Professor E. Sterl Phinney)
GPA: 4.2/4.3, Class Rank: 2/239, In-Major GPA: 4.3/4.3, In-Major Rank: 1/31
General GRE (2013): 168/170 (Verbal), 169/170 (Mathematics), 6/6 (Writing)
Physics GRE (2012): 990/990

Coursework, Westfield State University 2010-11

Longmeadow High School 2007-11

RESEARCH

Disk Populations around Binary Systems (Rob Izzard) 2015-

Turbulence Closure modelling (Chris Tout, Pierre Lesaffre, Shashikumar Chitre) 2015-
Visitor - Centre for Excellence in Basic Sciences - University of Mumbai January 2017
Visitor - École Normale Supérieure January 2016

Quasistar Structure (Anna Zytkow) 2015-

Tidal feedback (Gordon Ogilvie) 2015-

Lin Group, UC Berkeley and UT Southwestern, Aggregation in Biological Systems 2012-

Levitin Group, McGill, Spectral Laws in Non-Human Music 2015-16

Carroll Group, Caltech, Information Retrieval from Black Holes 2015

Atwater Group, Caltech, JCAP, Nanoplasmonics, Carrier Transport, and Photoabsorption 2012-16

Senior Thesis (E. Sterl Phinney), Caltech, Transient Effects in Pulsar Companions 2013-15

Alicea Group, IQIM, Condensed Matter Theory 2012-14

Zewail Group, Caltech, Theoretical Protein Folding 2012-13

Markovic Group, Johns Hopkins University, Quantum Transport Measurement 2010

Johns Hopkins Biostatistics Department High Performance Computing Center 2008

AWARDS

Institute of Astronomy Paul Murdin Prize (for best paper by a PhD student) 2017

APS LeRoy Apker Award 2015

Caltech George W. Housner Award for Original Research 2015

Caltech Frederic W. Hinrichs, Jr. Memorial Leadership Award 2015

Caltech Dr. D. S. Kothari Prize 2015

Caltech Library Senior Thesis Prize 2015

Caltech Haren Lee Fisher Memorial Award in Physics 2014

Caltech Jack E. Froehlich Memorial Award 2014

Caltech Perpall Scientific Speaking Competition 2nd Place 2014

US Physics Team (top 20 in US on semifinal exam), Member 2011

First Place Massachusetts State Science Fair, Flow properties of Coulomb gases 2010

CleanTech MSSEF Award 2010

Grants

Hertz Fellowship 2015

NSF Graduate Fellowship 2015

NDSEG Graduate Fellowship (declined) 2015

Marshall Scholarship 2014
Renewed 2017-18 2017

Barry M. Goldwater Fellowship 2014

Flintridge Foundation Summer Undergraduate Research Fellowship 2014

US Department of Energy NERSC Allocation m1824 (PI):
Renewal Allocation (PI, 50,000 core-hours) 2016
Renewal Allocation (PI, 50,000 core-hours) 2015
Renewal Allocation (PI, 15,000 core-hours) 2014
Startup Allocation (15,000 core-hours) 2013

Jean J. Dixon Summer Undergraduate Research Fellowship 2013

Ph11 Summer Research Fellowship 2012

Professional Memberships	Royal Astronomical Society	2016-17
	Association of Marshall Scholars	2015-17
	American Physical Society	2013-17
	Materials Research Society	2012-2015

PAPERS

Published:

1. Halabi, G. M., Izzard, R. G., Tout, C. A., **Jermyn, A. S.**, Cannon, R. 2DStars: A two-dimensional stellar evolution code. Mem. S.A.It. Vol. 75, 282.
2. **Jermyn, A. S.**, Tout, A. C., Ogilvie, I. G. Tidal heating and solar irradiation of Hot Jupiters. Monthly Notices of the Royal Astronomical Society (2017 469 (2): 1768-1782, arXiv:1704.01126).
3. Corts, E, Xie, W, Cambiasso, J, **Jermyn, A. S.**, Sundararaman, R, Narang, P, Schlücker, S, Maier, S. Hot Electron Transport Driven Surface-Chemistry with Nanoscale Spatial Resolution. Nature Communications (2017).
4. Narang, P*, Sundararaman, R*, **Jermyn, A. S.**, Atwater, H, Goddard, W. Cubic nonlinearity driven upconversion in high-field plasmonic hot carrier systems. The Journal of Physical Chemistry C (2016).
5. Chatwin-Davies, A, **Jermyn, A. S.**, Carroll, S. Retrieving Qubits from Black Holes. Physical Review Letters (2015, Phys.Rev.Lett.115,261302, arXiv:1507.03592). **Highlighted in Science News**.
6. Sundararaman, R*, Narang, P*, **Jermyn, A. S.***, Atwater, H, Goddard, W. Theoretical predictions for hot carrier generation from surface plasmon decay. Nature Communications 5, 5788 (2014).
7. **Jermyn, A. S.**, Mong, R, Alicea, J. Stability of zero-modes in parafermion chains. Physical Review B (2014, PhysRevB.90.165106, arXiv:1407.6376). **Editor's Suggestion (front webpage)**.

Submitted: (preprints upon request unless specified)

1. Tagliabue, G, **Jermyn, A. S.**, Sundararaman, R, Welch, A. J., DuChene, J. S., Davoyan, A. R., Narang, P, Atwater, H. Hot Carrier Dynamics in Photoexcited Gold Nanostructures: Role of Interband Excitations and Evidence for Ballistic Transport. arXiv:1708.02187. 2017.
2. **Jermyn, A. S.** Bounding the Radius of Convergence of Analytic Functions. arXiv:1708.00343. 2017.
3. **Jermyn, A. S.**, Lesaffre, P, Tout, C. A., Chitre, S. M. Turbulence Closure for Mixing Length Theories. 2017.
4. **Jermyn, A. S.**, Tagliabue, G, Atwater, H, Goddard, W, Sundararaman, R, Narang, P. Far-from-equilibrium transport of excited carriers in nanostructures. arXiv:1707.07060.
5. Rasmussen, A*, **Jermyn, A. S.*** Gapless Topological Order, Gravity, and Black Holes. arXiv:1703.04772. 2017.
6. Steinhardt, L., C., **Jermyn, A. S.** Nonparametric Methods in Astronomy: Think, Regress, Observe – Pick Any Three. 2016.
7. **Jermyn, A. S.**, Stevenson, D. J. Levitin, D. J. From Bach to Shamu: $1/f$ laws in non-human music. 2016.

In Preparation: (preprints upon request unless specified)

1. **Jermyn, A. S.**, Tout, C. A. The Role of Asymmetric Stress in Differential Rotation.
2. **Jermyn, A. S.**, Chitre, S. M. Lesaffre, P, Tout, C. A. The Magnitude of Differential Rotation.
3. Izzard, R. G., **Jermyn, A. S.** Circumbinary discs around post-AGB stars.
4. **Jermyn, A. S.**, Tout, C. A., Chitre, S. M. Enhanced Mixing in Massive Rotating Stars.
5. **Jermyn, A. S.**, Lin, M., De La Cruz, E. Equilibrium Self-Assembly in One Dimension.
6. **Jermyn, A. S.**, Lin, M. Statistical Mechanics Model of Aggregation with Tunable Branching.

TALKS

Invited:

1. **Jermyn, A. S.**, Tout, C. A., Chitre, S. M., Lesaffre, P. (2017), Meridional Flow and Mixing in Massive Stars. Seminar, Institute of Astronomy, University of Cambridge.
2. **Jermyn, A. S.**, Phinney, E.S. (2016). The Atmospheric Dynamics of Pulsar Companions. Invited Talk (Apker Prize), APS April.
3. **Jermyn, A. S.**, Mong, R, Alicea, J (2014), Stability of zero-modes in parafermion chains. Institute for Quantum Information and Matter.

Contributed:

1. **Jermyn, A. S.**, Tout, C. A., Chitre, S. M., Lesaffre, P. Tidal Heating and Solar Irradiation of Hot Jupiters. Churchill Conference on Everything (2017).
2. **Jermyn, A. S.** (2017). Automatic Renormalization of Local Tensor Networks. APS March.
3. **Jermyn, A. S.**, Phinney, E.S. (2015). Exterior Stellar Heating. APS Apker Finalist Seminar.
4. **Jermyn, A. S.**, Sundararaman, R, Narang, P, Goddard, W, Atwater, H (2015). Plasmonic Hot Carrier Transport and Collection in Nanostructures. APS March.
5. **Jermyn, A. S.**, Phinney, E.S. (2014). Exterior Stellar Heating. Caltech SURF Seminar.
6. **Jermyn, A. S.**, Mong, R, Alicea, J (2014), Robustness of zero-modes in parafermion chains. APS March.
7. **Jermyn, A. S.**, Alicea, J, Mong, R (2013), The Stability of Zero Energy Edge Modes in 1D Quantum Chains. Caltech SURF Seminar.
8. **Jermyn, A. S.** (2010). The Fluid Behavior of Electron Aggregates. Massachusetts Junior Academy of Sciences Symposium.

Collaborative:

1. Tagliabue, G, **Jermyn, A. S.**, Sundararaman, R, Narang, P, Welch, A, Du Chene, J, Davoyan, A, Atwater, H. Ballistic Transport of Plasmonic Hot Carriers at the Au-GaN Interface: A Coupled Experimental and Theoretical Study of Excited Carrier Transport. Nanophotonics and Micro/Nano Optics International Conference 2017.
2. Tagliabue, G, Sundararaman, R, Narang, P, **Jermyn, A. S.**, Atwater, H.Plasmonic hot-carriers in the UV-VIS regime: experimental study of the internal quantum efficiency of generation and injection into GaN. SPIE Nanoscience and Engineering 2017.
3. Rasmussen, A, **Jermyn, A. S.**, Refael, G, Gapless Topological Order, Gravity, and Black Holes. APS March 2017.
4. Corts, E*, Xie, W, Cambiasso, J, **Jermyn, A. S.**, Sundararaman, R, Narang, P, Schlücker, S, Maier, S), Mapping reactive-sites in plasmonic antennas with 15nm resolution. 8th International Conference on Surface Plasmon Polaritons 2017.
5. Corts, E*, Xie, W, Cambiasso, J, **Jermyn, A. S.**, Sundararaman, R, Narang, P, Schlücker, S, Maier, S, Spatial Mapping the Reactivity of Plasmons. MRS Spring 2017.
6. Corts, E, Xie, W, Cambiasso, J*, **Jermyn, A. S.**, Sundararaman, R, Narang, P, Schlücker, S, Maier, S, Site-specific surface chemistry driven by hot-electrons. NanoMeta 2017.
7. Steinhardt, C*, **Jermyn, A. S.**, Astronomical Methods for Nonparametric Regression, Astronomical Methods in Nonparametric Regression. AAS 229 2017.
8. Narang, P*, Sundararaman, R, **Jermyn, A. S.**, Goddard, W, Atwater, H, Generation, transport and relaxation dynamics of non-equilibrium carriers in plasmonic devices. MRS Fall 2016.
9. Izzard, R., **Jermyn, A. S.**. Post-AGB Binary Discs. Torino Workshop XII 2016.
10. Sundararaman, R, Narang, P, **Jermyn, A. S.**, Atwater, H, Goddard, W, Excited carrier dynamics and transport in plasmonic nanostructures. APS March 2016.
11. Narang, P*, Sundararaman, R, **Jermyn, A. S.**, Cortes, E., Maier, S., Goddard, W (2016), Non-equilibrium hot carrier dynamics in plasmonic nanostructures. APS March.
12. Sundararaman, R, **Jermyn, A. S.**, Narang, P, Generation, transport and relaxation of non-equilibrium carriers in plasmonic nanostructures. MRS Fall 2015.
13. Narang, P*, Sundararaman, R, Brown, Ana, **Jermyn, A. S.**, Goddard, W, Atwater, H (2015), Ultrafast processes in surface plasmon decays. MRS Fall.
14. Narang, P, Sundararaman, R, **Jermyn, A. S.**, Goddard, W, Atwater, H, Surface plasmon decay dynamics in nanostructured systems: A Feynman diagram approach. APS March 2015.

15. Narang, P, Sundararaman, R, **Jermyn, A. S.**, Bouma, L, Goddard, W, Atwater, H (2014), Surface Plasmon Decay Dynamics: A Feynman Diagram Approach. Gordon Research Conference Invited Talk.
16. Sundararaman, R, Narang, P, **Jermyn, A. S.**, Atwater, H, Goddard, W, First principles theory for surface plasmon generation and decay to hot carriers. APS March 2014.
17. Narang, P, **Jermyn, A. S.**, Sundararaman, R, Goddard, W, Galli, G, Atwater, H, Localized Surface Plasmon Decay Dynamics. MRS Fall 2014.
18. Narang, P*, **Jermyn, A. S.***, Lewis, N, Atwater, H, Quantum Plasmons: Strong Correlation of Surface Plasmon Polariton Polarization with Hot Carrier Momentum Distribution. MRS Fall 2013.
19. Narang, P*, **Jermyn, A. S.**, Leenheer, A, Lewis, N, Atwater, H, Plasmonic Hot Carrier Devices: Light Capture and Catalysis. JCAP DOE Site Review Spring 2013.
20. Narang, P*, **Jermyn, A. S.***, Leenheer, A, Lewis, N, Atwater, H, Plasmonic Hot Carrier Devices: Fully Quantized Model. MRS Spring 2013.
21. Leenheer, A, Narang, P, **Jermyn, A. S.**, Lewis, N, Atwater, H, Plasmonic Hot Carrier Emission Devices: Efficiency Considerations. MRS Fall 2012.

POSTERS

1. **Jermyn, A. S.**, Lesaffre, P, Tout, C, A 2D Magnetic Mixing Length Theory. Cambridge Fluids Network Meeting 2016.
2. Sundararaman, R, Narang, P, **Jermyn, A. S.**, Brown, A, Goddward, W, Atwater, H, Generation and transport of hot carriers in plasmonic nanostructures. Joint Center for Artificial Photosynthesis All-Hands 2015.
3. Narang, P, Sundararaman, R, **Jermyn, A. S.**, Bouma, L, Goddard, W, Atwater, H, Surface Plasmon Decay Dynamics: A Feynman Diagram Approach. Gordon Research Conference 2014.
4. Sundararaman, R, Narang, P, **Jermyn, A. S.**, Atwater, H, Goddard, W, First principles theory of plasmonic hot carrier generation in nano-structured systems. Gordon Research Conference 2014.
5. Narang, P, Sundararaman, R, **Jermyn, A. S.**, Localized Surface Plasmon Decay Dynamics. MRS Spring 2014.
6. Sundararaman, R, Narang, P, **Jermyn, A. S.**, Atwater, H, Goddard, W, First Principles Calculations for Surface Plasmon Decays and Solvation Models for Surfaces in Solution. Joint Center for Artificial Photosynthesis All-Hands 2014.
7. Narang, P, Sundararaman, R, **Jermyn, A. S.**, Creel, E, Atwater, H, Goddard, W, Plasmon-driven Solar Energy Conversion and Catalysis: A First Principles Study. Joint Center for Artificial Photosynthesis All-Hands 2014.
8. Markovic, N, Silverman, S, **Jermyn, A. S.**, Rivera, R. Optical Properties of Unfunctionalized Ultra-Short Carbon Nanotubes. Poster 135, MRSEC Summer Research Experience Poster Session 2010.

PATENTS

Jermyn, A. S., Silverman, J, Markovic, N, "System for Lightweight Image Processing," US Patent Number US 9,097,739 B2 (Filed 2011, Awarded 2015).

SOFTWARE

arrfunc - Python module for treating functions as lazily-evaluated arrays (MIT, github)	2017-
2D Stars - Cambridge 2D Stellar Evolution Code. Cofounding Developer	2015-17
QuantumScattr - Quantum carrier transport code. Cofounding Developer	2012-17
AstroMicroPhysics - Python astronomical microphysics package. Lead Developer.	2015
QuantumChains - Numerical Condensed Matter Package (GPLv3, github). Lead Developer.	2013-14
NanoImage - Atomic Force Microscopy Analysis (USPTO 13/534428). Lead Developer.	2010-11

TEACHING

Cambridge Supervisor:

Mathematics: Mathematical Biology (Part II)	2017
Mathematics: Binary Stars (Part III - Masters Course)	2017
Mathematics: Computational Projects (Part IB)	2016
Mathematics: Structure and Evolution of Stars (Part III - Masters Course)	2016
Natural Sciences: Mathematics (Part IA)	2016
Physics: Astrophysical Fluid Dynamics (Part II)	2015

Caltech Teaching Assistant:

Ph101 - Order of Magnitude Physics (Prof. E. S. Phinney)	2015

Ph11 - Freshman Research Tutorial (Profs. David Stevenson and Rob Phillips) 2014-15
Ph7 - Radiation Lab (Graduate TA/Section Leader for Dr. Frank Rice) 2014
Ph6 - Atomic Physics Lab (Graduate TA/Section Leader for Dr. Frank Rice) 2014
Ph5 - Analog Circuits Lab (Undergraduate TA for Dr. Frank Rice) 2013
Ph6 - Atomic Physics Lab (Undergraduate TA for Dr. Frank Rice) 2013

Caltech Tutor:

Ph205a - Relativistic Quantum Field Theory 2014-15
Ph106 - Graduate Classical Mechanics and Electromagnetism 2013-15
Ph127 - Graduate Statistical Physics 2013-15
Ph236a - General Relativity 2013-15
Ch1 - Freshmen Chemistry 2012-15
Ma1 - Freshmen Math (Analysis, Linear Algebra, Multivariable Calculus) 2012-15
Ma2 - Sophomore Math (Probability, Statistics, and Differential Equations) 2012-15
Ph2 - Sophomore Physics (Waves, Quantum Mechanics, and Thermodynamics) 2012-15
Ph12 - Advanced Sophomore Physics (Waves, Quantum Mechanics, and Thermodynamics) 2012-15
ACM95 - Graduate Methods of Applied and Computational Mathematics 2012-15
Ph125 - Graduate Quantum Mechanics 2012-15

Caltech Guest Lecturer:

Ph50 - Physics League (Seminar) 2017
Ph11 - Freshman Research Tutorial 2013, 2016, 2017

Unaffiliated Tutor:

High School Physics Olympiad Preparation 2016

Other:

Experimental Design (Thin Film Deposition) for Senior Lab 2014
Editor, Ph5 Laboratory Manual 2013

OUTREACH

1. Contributed text on the history of stellar dynamics to an upcoming biography of Sir Jeans. 2017.
2. Volunteer at Cambridge Science Festival. March 2017.
3. **Jermyn, A. S.**, Tout, C. A., Chitre, S. M., Lesaffre, P. Mixing in Massive Stars. Churchill MCR ChuTalk (Outreach Talk) (2017).
4. Co-Organized Institute of Astronomy Undergraduate Journal Club. 2016-17.
5. Volunteer at Cambridge Science Festival. March 2016.
6. **Jermyn, A.** Gravitational waves open new window to cosmos. Reach for the Stars Guest Column on MassLive. URL: `http://www.masslive.com/living/index.ssf/2016/03/reach_for_the_stars_gravitational_waves_open_new_window_to_cosmos.html`. March 2016.
7. Volunteer at Cambridge Institute of Astronomy Public Outreach events 2016.
8. Handmer, C. **Jermyn, A. S.**, Paragano, M., Lommen, P, Nosanov, J. The Martian: A Technical Commentary. URL: `http://caseyexaustralia.blogspot.co.uk/2015/10/the-martian-technical-commentary.html`. October 2015.
9. **Jermyn, A. S.**, Hung, P. Caltech Teaching Conference Opening Session. Caltech Center for Teaching, Learning, and Outreach Invited Talk. September 2014.
10. **Jermyn, A. S.** A Summer of Physics. Invited talk at the Skyscrapers Amateur Astronomical Society of Rhode Island. July 2011.
11. Guest speaker at the Springfield Telescope and Reflector Society and Amherst Area Amateur Astronomy Association. 6 times in 2006-2012.

EMPLOYMENT

Undergraduate IT Support 2011-14

SKILLS

Programming Languages:

Expert: Python (NumPy/SciPy), Java, Mathematica
Experienced: C++, Julia, Matlab
Familiar: C, Fortran, Bash
Passable: R, Scheme

Other:

Programming and using Finite Element codes
Density Matrix Renormalization Group methods
Markov Chain and Nested Sampling methods
Massively parallel programming

Finite Difference Time Domain EM Simulations (Meep)
Familiarity with Unix/Linux environments

SERVICE

Cambridge:

Representative to the Institute of Astronomy Athena SWAN/Juno committee	2016-17
Institute of Astronomy Computing Users' Committee	2017
Astronomy Graduate Student Forum Representative	2015-17
Representative to the School of Physical Sciences Graduate Education Committee Workshop	2016

Caltech:

Search Committee for the Vice President for Student Affairs	2014-15
Dean's Advisory Council	2014-15
Contributing Writer - The California Tech	2014-15
Academics and Research Committee	2012-15
Curriculum Committee	2012-15
Commencement Speaker Selection Committee	2014-15
Physics Student Faculty Conference Committee	2013-15
Physics Option Mentor	2013-15
Upperclassmen Counselor	2013-15
Council for Undergraduate Education	2013-15
Information Management Systems and Services Representative	2012-15
Title IX Committee	2014-15
Faculty Board Ad Hoc Honor Code Task Force	2013-14
Undergraduate Honor Code Committee	2013-14
Housing Stewardship Committee	2013-14
Dabney House Treasurer	2013-14
Computer Advisory Committee	2012-14
Dabney House Comptroller	2012-13