

# MICHAEL K. MCCOURT

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## EDUCATION AND ACADEMIC POSITIONS

UC Santa Barbara	2016–2018	KITP and Hubble Fellow
	2015–2016	Postdoc
Harvard	2014–2015	ITC Fellow
UC Berkeley	2008–2014	Graduate Student <ul style="list-style-type: none"><li>· 2014: <i>Ph.D. astrophysics</i></li><li>· 2010: <i>M.A. astrophysics</i></li><li>· advisor: <i>Eliot Quataert</i></li></ul>
Stanford University	2005–2008	Undergraduate Student <ul style="list-style-type: none"><li>· 2008: <i>B.S. physics</i></li><li>· concentration in <i>theoretical physics</i></li><li>· advisor: <i>Roger Blandford</i></li></ul>

## ACADEMIC AWARDS

UC Berkeley	April 2014	Mary Elizabeth Uhl Prize
	May 2012	Robert J. Trumpler Graduate Student Excellence Award
Stanford University	Fall 2007	Nomination for the Churchill Scholarship
	Summer 2006	VPUE Grant for Undergraduate Research
Rose Hills Foundation	Summer 2007	Rose Hills Award for Undergraduate Research

## PROFESSIONAL SERVICE

- Co-instituted and co-organized a new lunch talk series at UCSB
- Organizer (“Mentor Master”) for the UC Berkeley Astronomy Department peer-mentoring system.
- Referee for the *Astrophysical Journal* (and *ApJ Letters*), *MNRAS* (and *MNRAS Letters*), *Astrophysics and Space Science*, *Journal of Fluid Mechanics*, and *Nature Letters*.
- Author of several open-source emacs packages, including a popular [major mode](#) for editing gnuplot scripts and a [browser](#) for fetching BibTeX entries from ADS. Both are available in the [MELPA](#) package repository

## FUNDING PROPOSALS

\* denotes proposals  
where I was a Co-I

	grant	award (\$k)	year
5	HST THEORY GRANT	120	2018
4*	ATP THEORY GRANT	642	2017
3	ATP THEORY GRANT	410	2017
2	HUBBLE FELLOWSHIP	350	2015
1	CHANDRA THEORY GRANT	60	2011
	<i>total:</i>	1582	

## COMPUTING GRANTS

most of these  
proposals are  
collaborative; this  
list includes only  
grants where I was  
a primary author

	agency	award ( $\times 10^6$ hour)	value (\$k)	year
8	NSF	5.6	23	2017
7	NSF	1.6	55	2016
6	NSF	1.2	40	2016
5	NSF	0.6	20	2015
4	NSF	3.2	110	2015
3	NASA	4.7	100	2015
2	NSF	2.6	89	2014
1	NASA	2.4	75	2014
	<i>total:</i>	21.9	512	

## OBSERVING PROPOSALS

	facility	award (hours)	year
4	VLA	6.0	2017
3	GEMINI	1.0	2016
2	VLA	4.0	2015
1	VLA	6.0	2014

## TEACHING EXPERIENCE

UC Santa Barbara	2017	Organized and taught a fluid dynamics “bootcamp” for graduate students
	2016–present	Supervising undergraduate research · <i>will soon result in two student-led publications</i>
UC Berkeley	2008–2009	Graduate Student Instructor
Stanford University	2008	Undergraduate Instructor · <i>co-designed and taught a course on numerical methods (Physics 90SI) under the student-initiated course program.</i>

25. Madigan, Zderic, et al., *AJ* (2018)  
*"On the Dynamics of the Inclination Instability"*
24. Ji, Oh, & McCourt, *MNRAS* (2018)  
*"The impact of magnetic fields on thermal instability"*
23. Madigan, Halle, et al., *ApJ* (2018)  
*"Dynamical Properties of Eccentric Nuclear Disks: Stability, Longevity, and Implications for Tidal Disruption Rates in Post-merger Galaxies"*
22. McCourt, Oh, O'Leary, & Madigan, *MNRAS* (2018)  
*"A characteristic scale for cold gas"*
21. Gronke, Dijkstra, McCourt, & Oh, *A&A* (2017)  
*"Resonant line transfer in a fog: using Lyman-alpha to probe tiny structures in atomic gas"*
20. Fielding, Quataert, McCourt, & Thompson, *MNRAS* (2017)  
*"The impact of star formation feedback on the circumgalactic medium"*
19. Madigan, McCourt, & O'Leary, *MNRAS* (2017)  
*"Using gas clouds to probe the accretion flow around Sgr A\*: G2's delayed pericentre passage"*
18. Guillochon & McCourt, *ApJ* (2017)  
*"Simulations of Magnetic Fields in Tidally Disrupted Stars"*
17. Gronke, Dijkstra, McCourt, & Oh, *ApJ* (2016)  
*"From Mirrors to Windows: Lyman-alpha Radiative Transfer in a Very Clumpy Medium"*
16. Guillochon, McCourt, Chen, Johnson, et al., *ApJ* (2016)  
*"Unbound Debris Streams and Remnants Resulting from the Tidal Disruptions of Stars by Supermassive Black Holes"*
15. Madigan & McCourt, *MNRAS* (2016)  
*"A new inclination instability reshapes Keplerian discs into cones: application to the outer Solar system"*
14. Lecoanet, McCourt, Quataert, Burns, et al., *MNRAS* (2016)  
*"A validated non-linear Kelvin-Helmholtz benchmark for numerical hydrodynamics"*
13. McCourt & Madigan, *MNRAS* (2016)  
*"Going with the flow: using gas clouds to probe the accretion flow feeding Sgr A"*
12. McCourt, O'Leary, Madigan, & Quataert, *MNRAS* (2015)  
*"Magnetized gas clouds can survive acceleration by a hot wind"*
11. McBride & McCourt, *MNRAS* (2014)  
*"Bent radio jets reveal a stripped interstellar medium in NGC 1272"*
10. Wagh, Sharma, & McCourt, *MNRAS* (2014)  
*"Thermal conduction and multiphase gas in cluster cores"*
9. McCourt, Quataert, & Parrish, *MNRAS* (2013)  
*"What sets temperature gradients in galaxy clusters? Implications for non-thermal pressure support and mass-observable scaling relations"*
8. Sharma, McCourt, Parrish, & Quataert, *MNRAS* (2012)  
*"On the structure of hot gas in haloes: implications for the  $L_X$ - $T_X$  relation and missing baryons"*

7. Parrish, McCourt, Quataert, & Sharma, *MNRAS* (2012)  
*"The effects of anisotropic viscosity on turbulence and heat transport in the intracluster medium"*
6. Sharma, McCourt, Quataert, & Parrish, *MNRAS* (2012)  
*"Thermal instability and the feedback regulation of hot haloes in clusters, groups and galaxies"*
5. McCourt, Sharma, Quataert, & Parrish, *MNRAS* (2012)  
*"Thermal instability in gravitationally stratified plasmas: implications for multiphase structure in clusters and galaxy haloes"*
4. Parrish, McCourt, Quataert, & Sharma, *MNRAS* (2012)  
*"Turbulent pressure support in the outer parts of galaxy clusters"*
3. McCourt, Parrish, Sharma, & Quataert, *MNRAS* (2011)  
*"Can conduction induce convection? On the non-linear saturation of buoyancy instabilities in dilute plasmas"*
2. Bradač, Schrabback, Erben, McCourt, et al., *ApJ* (2008)  
*"Dark Matter and Baryons in the X-Ray Luminous Merging Galaxy Cluster RX J1347.5-1145"*
1. Samulon, Islam, Sebastian, Brooks, et al., *Phys. Rev. B* (2006)  
*"Low-temperature structural phase transition and incommensurate lattice modulation in the spin-gap compound BaCuSi<sub>2</sub>O<sub>6</sub>"*

#### SELECTED PRESENTATIONS

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| 29. <i>Invited Talk</i> , What matter(s) around galaxies         | June 2017      |
| 28. <i>Lunch Talk</i> , UC Santa Barbara                         | March 2017     |
| 27. <i>Contributed Talk</i> , Hubble Fellow Symposium            | March 2017     |
| 26. <i>Astronomy Colloquium</i> , University of Washington       | February 2017  |
| 25. <i>MPS Seminar</i> , UC Santa Cruz                           | October 2016   |
| 24. <i>Invited Talk</i> , Fellows at the Frontier Conference     | September 2016 |
| 23. <i>Invited Talk</i> , Theory & Computation in the ICM        | August 2016    |
| 22. <i>Seminar</i> , Cold Universe Workshop                      | June 2016      |
| 21. <i>Astronomy Seminar</i> , UCSB                              | April 2016     |
| 20. <i>Lunch Talk</i> , Harvard ITC                              | April 2015     |
| 19. <i>Pizza Lunch</i> , Harvard ITC                             | April 2015     |
| 18. <i>Lunch Talk</i> , UCSB                                     | April 2015     |
| 17. <i>Lunch Talk</i> , UC Berkeley                              | March 2015     |
| 16. <i>Contributed Talk</i> , Black Holes in Dense Star Clusters | January 2015   |
| 15. <i>Cosmology Seminar</i> , Yale                              | September 2014 |
| 14. <i>CIERA Astrophysics Seminar</i> , Northwestern             | September 2014 |
| 13. <i>Lunch Talk</i> , UC Berkeley                              | February 2014  |
| 12. <i>TAPIR Seminar</i> , Caltech                               | October 2013   |
| 11. <i>KIPAC "Tea-Talk" Seminar</i> , Stanford                   | October 2013   |
| 10. <i>ITC Seminar</i> , Harvard CfA                             | September 2013 |
| 9. <i>Geo- and Astro-physical Fluid Dynamics Seminar</i> , UCSC  | April 2013     |

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| 8. <i>Invited Talk</i> , SnowCluster conference              | March 2013   |
| 7. <i>Astrophysics Seminar</i> , UCSB                        | October 2012 |
| 6. <i>Theory Seminar</i> , CITA                              | October 2012 |
| 5. <i>Informal Astrophysics Seminar</i> , Princeton IAS      | October 2012 |
| 4. <i>Invited Talk</i> , Theory & Computation in the ICM     | August 2012  |
| 3. <i>KITP Theory Lunch talk</i> , UCSB                      | April 2011   |
| 2. <i>Contributed Talk</i> , Theory & Computation in the ICM | August 2010  |
| 1. <i>KIPAC "Tea-Talk" Seminar</i> , Stanford                | August 2006  |

#### PATENTS

9. McCourt, [US 12,230,253 B2](#) (Awarded: Feb 18, 2025)  
*"Automatic classification of phone calls using representation learning based on the hierarchical pitman-yor process"*
8. McCourt, Ghodoussi & Borda, [US 2024/0312451 A1](#) (Filed: Mar 17, 2023)  
*"Topic-based semantic search of electronic documents based on machine learning models from bayesian belief networks"*
7. McCourt & Borda, [US 11,429,901 B1](#) (Awarded: Aug 30, 2022)  
*"Pitman-Yor process topic modeling pre-seeded by keyword groupings"*
6. McCourt & Praturu, [US 11,804,216 B2](#) (Awarded: Oct 31, 2023)  
*"Generating training datasets for a supervised learning topic model from outputs of a discovery topic model"*
5. McCourt & Lawrence, [US 11,521,601 B2](#) (Awarded: Dec 6, 2022)  
*"Detecting extraneous topic information using artificial intelligence models"*
4. McCourt, Storlie, Borda, Lawrence, et al., [US 11,115,520 B2](#) (Awarded: Sep 7, 2021)  
*"Signal discovery using artificial intelligence models"*
3. McCourt, [US 10,719,783 B2](#) (Awarded: Jul 21, 2020)  
*"Binary signal classifiers that tolerate incorrect training data"*
2. McCourt, [US 11,423,330 B2](#) (Awarded: Aug 23, 2022)  
*"Performance score determiner for binary signal classifiers"*
1. Storlie, Borda, McCourt, Kirchhoff, et al., [US 10,332,546 B1](#) (Awarded: Jun 25, 2019)  
*"Desired signal spotting in noisy, flawed environments"*

#### USELESS AND UNUSUAL SKILLS

- building wooden boats and furniture
- restoring old railroad lanterns (hot- and cold-blast)
- restoring vintage cameras and fountain pens
- converting cinema film for use in still cameras
- designing and building lightweight camping gear
- onetime holder of a federal pyrotechnics permit

