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 · *2014: Ph.D. astrophysics* · *2010: M.A. astrophysics* · *advisor: Eliot Quataert*
Stanford University	*2005–2008*	Undergraduate Student · *2008: B.S. physics* · *concentration in theoretical physics* · *advisor: Roger Blandford*

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
	total:	1,582	

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
	total:	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 · *will soon result in two student-led publications*
UC Berkeley	*2008–2009*	Graduate Student Instructor
Stanford University	*2008*	Undergraduate Instructor · *co-designed and taught a course on numerical methods (Physics 90SI) under the student-initiated course program.*

PUBLICATIONS

25. Madigan, Zderic, er, McCourt, 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, rew, Moody, 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 $BaCuSi_2O_6$*"

SELECTED PRESENTATIONS

29. *Invited Talk*, What matter(s) around galaxies — June 2017

28. *Lunch Talk*, UC Santa Barbara — March 2017

27. *Contributed Talk*, Hubble Fellow Symposium — March 2017
26. *Astronomy Colloquium*, University of Washington — February 2017
25. *MPS Seminar*, UC Santa Cruz — October 2016
24. *Invited Talk*, Fellows at the Frontier Conference — September 2016
23. *Invited Talk*, Theory & Computation in the ICM — August 2016
22. *Seminar*, Cold Universe Workshop — June 2016
21. *Astronomy Seminar*, UCSB — April 2016
20. *Lunch Talk*, Harvard ITC — April 2015
19. *Pizza Lunch*, Harvard ITC — April 2015
18. *Lunch Talk*, UCSB — April 2015
17. *Lunch Talk*, UC Berkeley — March 2015
16. *Contributed Talk*, Black Holes in Dense Star Clusters — January 2015
15. *Cosmology Seminar*, Yale — September 2014
14. *CIERA Astrophysics Seminar*, Northwestern — September 2014
13. *Lunch Talk*, UC Berkeley — February 2014
12. *TAPIR Seminar*, Caltech — October 2013
11. *KIPAC "Tea-Talk" Seminar*, Stanford — October 2013
10. *ITC Seminar*, Harvard CfA — September 2013
9. *Geo- and Astro-physical Fluid Dynamics Seminar*, UCSC — April 2013
8. *Invited Talk*, SnowCluster conference — March 2013
7. *Astrophysics Seminar*, UCSB — October 2012
6. *Theory Seminar*, CITA — October 2012
5. *Informal Astrophysics Seminar*, Princeton IAS — October 2012
4. *Invited Talk*, Theory & Computation in the ICM — August 2012
3. *KITP Theory Lunch talk*, UCSB — April 2011
2. *Contributed Talk*, Theory & Computation in the ICM — August 2010
1. *KIPAC "Tea-Talk" Seminar*, 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*