

## JENNIFER E. HOFFMAN

Department of Physics  
Harvard University  
17 Oxford St.  
Cambridge, MA 02138

[jhoffman@physics.harvard.edu](mailto:jhoffman@physics.harvard.edu)  
<http://hoffman.physics.harvard.edu/>  
Office: Lyman 332, 617-495-3734  
Lab: LISE B38-45, 617-495-8513

---

*Hoffman's research program combines molecular beam epitaxy and scanning probe microscopy to image and manipulate the nanoscale electronic and magnetic properties of quantum materials.*

### EDUCATION

- Ph.D. in Physics, University of California, Berkeley, 2003  
*Thesis: "A Search for Alternative Electronic Order in the High Temperature Superconductor  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$  by Scanning Tunneling Microscopy"* ([link](#))
- M.A. in Physics, University of California, Berkeley, 5/2001
- B.A. *magna cum laude* with Highest Honors in Physics, Harvard University, 1999

### RESEARCH APPOINTMENTS

- Professor of Physics & Applied Physics, Harvard University, 2015-present
- Professor, University of British Columbia, Physics & Astronomy Department, 7/2015-6/2016
- Associate Professor of Physics, Harvard University, 7/2010-2/2015
- Assistant Professor of Physics, Harvard University, 1/2005-6/2010
- Postdoctoral Fellow, Stanford University, Applied Physics Department, 9/2003-12/2004

### ACADEMIC HONORS

- Clowes Professor of Science, Harvard University, 2019-present
- Canada Excellence Research Chair, 2015-2016
- Moore Foundation Experimental Investigator Award, 2014
- Radcliffe Fellowship, 2013
- Sloan Fellowship, 2010
- NSF CAREER Award, 2008
- Presidential Early Career Award for Scientists and Engineers, 2006
- Fannie & John Hertz Foundation Fellow, 2001-2003
- Berkeley Physics Department Fellow, 1999-2001
- Barry Goldwater Scholar, 1998-1999
- Robert Byrd Scholar, 1996-1999
- National Merit Scholar, 1996-1997

### SELECTED PUBLICATIONS

(See [Google Scholar](#) for citation count, over 6500.)

- "Simulating twistronics in acoustic metamaterials"  
**2D Materials** 8, 031002 (2021) [[10.1088/2053-1583/abf252](#)]  
*S. Minhal Gardezi, Harris Pirie, Stephen Carr, William Dorrell, Jennifer E. Hoffman*
- "van der Waals metamaterials"  
**Physical Review B** 101, 121103(R) (2020) [[10.1103/PhysRevB.101.121103](#)]  
*William Dorrell, Harris Pirie, S. Minhal Gardezi, Nathan C. Drucker, Jennifer E. Hoffman*
- "Consistency between ARPES and STM measurements on  $\text{SmB}_6$ "  
**Physical Review B** 101, 085142 (2020) [[10.1103/PhysRevB.101.085142](#)]  
*Christian E. Matt, Harris Pirie, Anjan Soumyanarayanan, Michael M. Yee, Yang He, Daniel T. Larson, Wendel S. Paz, J.J. Palacios, M.H. Hamidian, Jennifer E. Hoffman*

- “Probing Image Potential States on Topological Semimetal Antimony Surface”  
**Physical Review B** 101, 035152 (2020) [[10.1103/PhysRevB.101.035152](https://doi.org/10.1103/PhysRevB.101.035152)]  
*Jian-Feng Ge, Haimei Zhang, Yang He, Zhihuai Zhu, YouChuen Yam, Pengcheng Chen, Jennifer E. Hoffman*
- “Imaging emergent heavy Dirac fermions of a topological Kondo insulator”  
**Nature Physics** 16, 52-56 (2020) [[10.1038/s41567-019-0700-8](https://doi.org/10.1038/s41567-019-0700-8)]  
*Harris Pirie, Yu Liu, Anjan Soumyanarayanan, P. Chen, Yang He, M.M. Yee, P.F.S. Rosa, J.D. Thompson, Dae-Jeong Kim, Z. Fisk, Xiangfeng Wang, J.P. Paglione, Dirk K. Morr, M. H. Hamidian, Jennifer E. Hoffman*
- “Achieving low noise in scanning tunneling spectroscopy”  
**Review of Scientific Instruments** 90, 101401 (2019) [[10.1063/1.5111989](https://doi.org/10.1063/1.5111989)]  
*Jian-Feng Ge, Maoz Ovadia, Jennifer E. Hoffman*
- “Density wave probes cuprate quantum phase transition”  
**Physical Review X** 9, 021021 (2019) [[10.1103/PhysRevX.9.021021](https://doi.org/10.1103/PhysRevX.9.021021)]  
*Tatiana A. Webb, Michael C. Boyer, Y. Yin, Debanjan Chowdhury, Yang He, Takeshi Kondo, T. Takeuchi, Hiroshi Ikuta, Eric W. Hudson, Jennifer E. Hoffman, Mohammad H. Hamidian*
- “Optical Nanoscopy of High- $T_c$  Cuprate Nano-Constrictions Patterned by Helium Ion Beams”  
**Nano Letters** 17, 1582 (2017) ([link](#))  
*Adrian Gozar, Nicholas Litombe, Jennifer E. Hoffman, Ivan Bozovic*
- “Etching of Cr Tips for Scanning Tunneling Microscopy of Cleavable Oxides”  
**Review of Scientific Instruments** 88, 023705 (2017) ([link](#))  
*Dennis Huang, Stephen Liu, Ilija Zeljkovic, John F. Mitchell, Jennifer E. Hoffman*
- “Dumbbell Defects in FeSe Films: Scanning Tunneling Microscopy & First-Principles Investigation”  
**Nano Letters** 16, 4224 (2016)  
*Dennis Huang, Tatiana A. Webb, Can-Li Song, Cui-Zu Chang, J. S. Moodera, E. Kaxiras, Jennifer E. Hoffman*
- “Bounds on Nanoscale Nematicity in Single-Layer FeSe/SrTiO<sub>3</sub>”  
**Physical Review B** 93, 125129 (2016)  
*Dennis Huang, Tatiana A. Webb, Shiang Fang, Can-Li Song, Cui-Zu Chang, Jagadeesh S. Moodera, Efthimios Kaxiras, Jennifer E. Hoffman*
- “Single Vortex Pinning and Penetration Depth in Superconducting NdFeAsO<sub>1-x</sub>F<sub>x</sub>”  
**Physical Review B** 92, 134509 (2015)  
*Jessie T. Zhang, Jeehoon Kim, Magdalena Huefner, Cun Ye, Stella Kim, Paul C. Canfield, Ruslan Prozorov, Ophir M. Auslaender, Jennifer E. Hoffman*
- “Revealing the Empty-State Electronic Structure of Single-Unit-Cell FeSe/SrTiO<sub>3</sub>”  
**Physical Review Letters** 115, 017002 (2015) ([link](#))  
*D. Huang, C.-L. Song, T. A. Webb, Shiang Fang, Cui-Zu Chang, J. S. Moodera, E. Kaxiras, Jennifer E. Hoffman*
- “Spin-Polarized Quantum Well States on Bi<sub>2-x</sub>Fe<sub>x</sub>Se<sub>3</sub>”  
**Physical Review B** 91, 161306(R) (2015)  
*Michael M. Yee, Z.-H. Zhu, Anjan Soumyanarayanan, Yang He, Can-Li Song, Ekaterina Pomjakushina, Zaher Salman, Amit Kanigel, Kouji Segawa, Yoichi Ando, Jennifer E. Hoffman*
- “Momentum-Resolved STM Studies of Rashba-Split Surface States on Topological Semimetal Sb”  
**Journal of Electron Spectroscopy & Related Phenomena** 201, 66-73 (2015)  
*Anjan Soumyanarayanan, Jennifer E. Hoffman*
- “Nanoscale interplay of strain and doping in Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+x</sub>”  
**Nano Letters** 14, 6749 (2014)  
*Ilija Zeljkovic, Jouko Nieminen, Dennis Huang, Tay-Rong Chang, Yang He, Horng-Tay Jeng, Zhijun Xu, Jinsheng Wen, Genda Gu, Hsin Lin, Robert S. Markiewicz, Arun Bansil, Jennifer E. Hoffman*
- “Fermi Surface and Pseudogap Evolution in a High  $T_c$  Superconductor”  
**Science** 344, 608-611 (2014) ([link](#))  
*Y. He, Y. Yin, M. Zech, A. Soumyanarayanan, M.M. Yee, T.L. Williams, M.C. Boyer, K. Chatterjee, W.D. Wise, I. Zeljkovic, T. Kondo, T. Takeuchi, H. Ikuta, P. Mistark, R.S. Markiewicz, A. Bansil, E.W. Hudson, J.E. Hoffman*

- “Charge ordering driven by Fermi-arc instability in underdoped cuprates”  
**Science** 343, 390 (2014) ([link](#))  
*R. Comin, A. Frano, M. M. Yee, Y. Yoshida, H. Eisaki, E. Schierle, E. Weschke, R. Sutarto, F. He, A. Soumyanarayanan, Y. He, M. LeTacon, I. Elfimov, J.E. Hoffman, B. Keimer, G.A. Sawatzky, A. Damascelli*
- “Dopant clustering, electronic inhomogeneity, and vortex pinning in iron-based superconductors”  
**Physical Review B** 87, 214519 (2013)  
*C.L. Song, Y. Yin, M. Zech, T.L. Williams, M.M. Yee, G.F. Chen, J.L. Luo, N.L. Wang, E.W. Hudson, J.E. Hoffman*
- “A quantum phase transition from triangular to stripe charge order in NbSe<sub>2</sub>”  
**Proceedings of the National Academy of Sciences** 110, 1623 (2013). ([link](#))  
*A. Soumyanarayanan, M. Yee, Y. He, J. van Wezel, D. Rahn, K. Rossnagel, E. Hudson, M. Norman, J.E. Hoffman*
- “Imaging the impact of single oxygen atoms on superconducting Bi<sub>2+y</sub>Sr<sub>2-y</sub>CaCu<sub>2</sub>O<sub>8+x</sub>”  
**Science** 337, 320 (2012) ([link](#))  
*Ilija Zeljkovic, Zhijun Xu, Jinsheng Wen, Genda Gu, R. S. Markiewicz, Jennifer E. Hoffman*
- “STM imaging of inversion-symmetry-breaking structural distortion in Bi-based cuprates”  
**Nature Materials** 11, 585 (2012) ([link](#))  
*I. Zeljkovic, E.J. Main, T.L. Williams, M. C. Boyer, K. Chatterjee, W. D. Wise, Yi Yin, Martin Zech, Takeshi Kondo, T. Takeuchi, Hiroshi Ikuta, Jinsheng Wen, Zhijun Xu, G.D. Gu, E.W. Hudson, J.E. Hoffman*
- “Spectroscopic scanning tunneling microscopy insights into Fe-based superconductors”  
**Reports on Progress in Physics** 74, 124513 (2011) ([link](#))  
*Jennifer E. Hoffman*
- “Nanoscale Imaging and Control of Resistance Switching in VO<sub>2</sub> at Room Temperature”  
**Appl. Phys. Lett.** 96, 213106 (2010) ([link](#))  
*Jeehoon Kim, Changhyun Ko, Alex Frenzel, Shriram Ramanathan, Jennifer. E. Hoffman*
- “Scanning Tunneling Spectroscopy and Vortex Imaging in the Superconductor BaFe<sub>1.8</sub>Co<sub>0.2</sub>As<sub>2</sub>”  
**Phys. Rev. Lett.** 102, 097002 (2009) ([link](#))  
*Y. Yin, M. Zech, T. L. Williams, X. F. Wang, G. Wu, X. H. Chen, J. E. Hoffman*
- “Mechanics of Individual, Isolated Vortices in a Cuprate Superconductor”  
**Nature Physics** 5, 35 (2009) ([link](#))  
*O. M. Auslaender, L. Luan, E. W. J. Straver, J. E. Hoffman, N. C. Koshnick, E. Zeldov, D. A. Bonn, R. Liang, W. N. Hardy, K. A. Moler*
- “Controlled manipulation of individual vortices in a superconductor”  
**Appl. Phys. Lett.** 93, 172514 (2008) ([link](#))  
*E. W. J. Straver, J. E. Hoffman, O. M. Auslaender, D. Rugar, K. A. Moler*
- “Relating atomic scale electronic phenomena to wave-like quasi-particle states in superconducting Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+d</sub>”  
**Nature** 422, 592-596 (2003) ([link](#))  
*K. McElroy, R. W. Simmonds, J. E. Hoffman, D.-H. Lee, J. Orenstein, H. Eisaki, S. Uchida, J. C. Davis*
- “Imaging quasiparticle interference in Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+d</sub>”  
**Science** 297, 1148-1151 (2002) ([link](#))  
*J. E. Hoffman, K. McElroy, D.-H. Lee, K. M. Lang, H. Eisaki, S. Uchida, J.C. Davis*
- “A 4-Unit Cell Periodic Pattern of Quasi-Particle States Surrounding Vortex Cores in Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+d</sub>”  
**Science** 295, 466-469 (2002) ([link](#))  
*J. E. Hoffman, E. W. Hudson, K. M. Lang, V. Madhavan, H. Eisaki, S. Uchida, J. C. Davis*
- “Imaging the granular structure of high-T<sub>c</sub> superconductivity in underdoped Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+d</sub>”  
**Nature** 415, 412-416 (2002) ([link](#))  
*K. M. Lang, V. Madhavan, J. E. Hoffman, E. W. Hudson, H. Eisaki, S. Uchida, J. C. Davis*

## TEACHING

### Awards

- HGWISE Mentor of the Year Award, Harvard, 2018 ([link](#))
- Fannie Cox Award, given annually to two faculty members in recognition of “outstanding teaching in introductory science courses.” Harvard, 2012 ([link](#))
- Roslyn Abramson Award, given annually to two tenure track faculty members in recognition of “excellence and sensitivity in teaching undergraduates.” Harvard, 2012 ([link](#))
- Spark Award, “for inspiring the next generation of women in science”, Harvard, 2009

### Courses Taught

(See syllabi, websites, and Q details: <http://hoffman.physics.harvard.edu/courses.php>)

- Freshman Seminar 24k, “Building a Scanning Tunneling Microscope” (developed a new course)
- Physics 11a, Introductory mechanics (for pre-meds and engineers, 160 students)
- Physics 15a, Mechanics & Special Relativity (1<sup>st</sup> semester for physics majors)
- Physics 15b, Electricity & magnetism (2<sup>nd</sup> semester for physics majors)
- Physics 15c, Wave phenomena (3<sup>rd</sup> semester for physics majors)
- Physics 153, Electricity & magnetism (for senior physics majors)
- Physics 191, Advanced Lab (for senior physics majors)
- Physics 195, Solid State Physics (for senior physics majors)
- Engineering Sciences 297, Professional Writing for Scientists & Engineers (for grads & undergrads)

### Advising

- Research advisor: 9 postdocs, 11 PhD, 5 MSc, 50+ undergraduates, 12 high school completed; 4 postdocs, 9 PhD, 10 undergraduates, 1 high school in progress

### Outreach

- Organized monthly Women in Physics & Astronomy book group, 2019-2020
- Organized 3-day professional development retreat for Women in Physics & Astronomy, 2019
- CUWiP lecturer (Conference for Undergraduate Women in Physics), Harvard, 2017
- Albert Einstein Festival lecturer, Harvard, 2007-2009, 2014
- Taught cryogenics classes to K-5 students at Einstein’s Workshop, 2013-2014
- Research Science Institute Mentor, 2005, 2010, 2011, 2015, 2018-2021
- Public Lecture at Boston Museum of Science “Nanodays” celebration, 2010
- Annenberg Media “Physics for the 21<sup>st</sup> Century”, Unit 6: “Macroscopic Quantum Mechanics” ([http://www.learner.org/courses/physics/unit/unit\\_vid.html?unit=6](http://www.learner.org/courses/physics/unit/unit_vid.html?unit=6))

## PERSONAL

- 3 children, born in 2006, 2009, 2012
- Competitive long distance runner, highlights include:
  - Javelina 100 Miler, 1<sup>st</sup> woman (18:52)
  - Beast of Burden 100 Miler, 2014, 1<sup>st</sup> woman (18:47)
  - USA Track & Field 24-Hour Run, **National Champion**, 2014 (127 miles) ([link](#))
  - USA Track & Field 100-mile National Championship, 2015, 4<sup>th</sup> woman (16:48)
  - USA Track & Field 24-Hour Run, **National Champion**, 2015 (138.4 miles)
  - USA Track & Field 24-Hour Run, **National Champion**, 2016 (142 miles, [top 10 all-time](#))
  - USA Track & Field [Athlete of the Week](#), Sept 23, 2016
  - Lumberjack 100 Miler, April 2017, 1<sup>st</sup> place *overall* (male & female)
  - World Championship 24-Hour Run, **Team USA Gold Medal**, Belfast, 2017
  - Ran >2500 miles in 42 days from San Francisco, CA to Cleveland, OH in Sept-Oct 2019 ([link](#))