

Hugh O. H. Churchill

CURRICULUM VITAE

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Education

- 2012 Ph.D. in Physics, Harvard University
Dissertation title: “Quantum dots in gated nanowires and nanotubes”
- 2008 A.M. in Physics, Harvard University
- 2006 B.A. in Physics with highest honors and Mathematics, Oberlin College
B.M. in Tuba Performance, Oberlin Conservatory of Music

Employment

- 2015– Assistant Professor of Physics, University of Arkansas
Research interests: quantum materials and devices, quantum transport, optoelectronics
- 2012–2015 Pappalardo Fellow, Massachusetts Institute of Technology Department of Physics
Quantum transport and optoelectronics in dichalcogenides (advisor P. Jarillo-Herrero)
- 2012 Postdoctoral Fellow, Harvard University Department of Physics
Tunneling spectroscopy of superconducting InSb nanowire devices (advisor C. M. Marcus)
- 2006–2012 Research Assistant, Harvard University Department of Physics
Quantum dots in gated nanowires and nanotubes (advisor C. M. Marcus)

Honors

- 2018 NSF CAREER Award
- 2017 ORAU Powe Junior Faculty Award
- 2016 AFOSR Young Investigator
- 2016 Connor Faculty Fellowship, University of Arkansas
- 2012 Pappalardo Postdoctoral Fellowship, MIT
- 2011 White Prize for Excellence in Teaching, Harvard
- 2010 IBM Ph.D. Fellow
- 2006 APS Apker Award for Undergraduate Research

2006 NSF Graduate Research Fellow
 2005 Phi Beta Kappa, Sigma Xi, Pi Kappa Lambda

Total citations: > 3000 ([Google Scholar](#))
 h-index: 20

Research Articles

19. Josh P. Thompson, M. Hasan Doha, Peter Murphy, Jin Hu, and Hugh O. H. Churchill, “Exfoliation and Analysis of Large-area, Air-Sensitive Two-Dimensional Materials,” *J. Vis. Exp.* **143**, e58693 (2019).
18. D. T. Debu, S. J. Bauman, D. French, **H. O. H. Churchill**, and J. B. Herzog, “Tuning Infrared Plasmon Resonance of Black Phosphorene Nanoribbon with a Dielectric Interface,” *Scientific Reports* **8**, 3224 (2018).
17. E. Andharia, T. P. Kaloni, G. J. Salamo, S.-Q. Yu, **H. O. H. Churchill**, and S. Barraza-Lopez, “Exfoliation energy, quasi-particle bandgap, and excitonic properties of selenium and tellurium atomic chains,” *Physical Review B* **98**, 035420 (2018).
16. **H. O. H. Churchill**, S.-Q. Yu, G. J. Salamo, T. Hironaka, X. Hu, J. Stacy, and I. Shih, “Toward Single Atom Chains with Exfoliated Tellurium,” *Nanoscale Research Letters* **12**, 488 (2017).
15. M. Mehboudi, A. M. Dorio, W. Zhu, A. van der Zande, **H. O. H. Churchill**, A. A. Pacheco-Sanjuan, E. O. Harriss, P. Kumar, and S. Barraza-Lopez, “Two-dimensional disorder in black phosphorus and monochalcogenide monolayers,” *Nano Letters* **16**, 1704 (2016).
14. J. I.-J. Wang, Y. Yang, Y.-A. Chen, K. Watanabe, T. Taniguchi, **H. O. H. Churchill**, and P. Jarillo-Herrero, “Electronic Transport of Encapsulated Graphene and WSe₂ Devices Fabricated by Pick-up of Pre-patterned hBN,” *Nano Letters* **15** 1898 (2015).
13. Britton W. H. Baugher*, **Hugh O. H. Churchill***, Yafang Yang, and Pablo Jarillo-Herrero, “Optoelectronic devices based on electrically tunable p-n diodes in a monolayer dichalcogenide,” *Nature Nanotechnology* **9**, 262 (2014).
 *equal contribution
 → accompanying *Nature Nanotechnology* News and Views:
 R. Bratschitsch, “Optoelectronic devices: Monolayer diodes light up,” *Nature Nanotechnology* **9**, 247 (2014).
12. R. A. Lai, **H. O. H. Churchill**, and C. M. Marcus, “g-Tensor control in bent carbon nanotube quantum dots,” *Physical Review B* **89**, 121303, Rapid Communication (2014).
11. Britton W. H. Baugher, **Hugh O. H. Churchill**, Yafang Yang, and Pablo Jarillo-Herrero, “Intrinsic Transport Properties of High Quality Monolayer and Bilayer MoS₂,” *Nano Letters* **13**, 4212 (2013).

10. **H. O. H. Churchill**, V. Fatemi, K. Grove-Rasmussen, M. T. Deng, P. Caroffe, H. Q. Xu, and C. M. Marcus, “Superconductor-nanowire devices from tunneling to the multichannel regime: Zero-bias oscillations and magnetoconductance crossover,” *Physical Review B* **87**, 241401, Rapid Communication (2013).
→ Editors’ suggestion and PRB Kaleidoscope, June 2013.
9. G. Yamahata, T. Kodera, **H. O. H. Churchill**, K. Uchida, C. M. Marcus, and S. Oda, “Magnetic field dependence of Pauli spin blockade: a window into the sources of spin relaxation in silicon quantum dots,” *Physical Review B* **86**, 115322 (2012).
8. S. Weiss, E. I. Rashba, F. Kuemmeth, **H. O. H. Churchill**, and K. Flensberg, “Spin-orbit effects in carbon nanotube double quantum dots,” *Physical Review B* **82**, 165427 (2010).
7. **H. O. H. Churchill**, F. Kuemmeth, J. W. Harlow, A. J. Bestwick, E. I. Rashba, K. Flensberg, C. H. Stwertka, T. Taychatanapat, S. K. Watson, C. M. Marcus, “Relaxation and dephasing in a two-electron ^{13}C nanotube double quantum dot,” *Physical Review Letters* **102**, 166802 (2009).
6. **H. O. H. Churchill**, A. J. Bestwick, J. W. Harlow, F. Kuemmeth, D. Marcos, C. H. Stwertka, S. K. Watson, C. M. Marcus, “Electron-nuclear interaction in ^{13}C nanotube double quantum dots,” *Nature Physics* **5**, 321 (2009).
→ accompanying *Nature Physics* News and Views:
B. Trauzettel and D. Loss, “Carbon surprises again,” *Nature Physics* **5**, 317 (2009).
5. Yongjie Hu*, **Hugh O. H. Churchill***, David J. Reilly, Jie Xiang, Charles M. Lieber, and Charles M. Marcus, “A Ge/Si heterostructure nanowire-based double quantum dot with integrated charge sensor,” *Nature Nanotechnology* **2**, 622 (2007).
*equal contribution
→ accompanying *Nature Nanotechnology* News and Views:
M. A. Eriksson and M. Friesen, “Nanowires charge towards integration,” *Nature Nanotechnology* **2**, 595 (2007).
4. S. A. FitzGerald, **H. O. H. Churchill**, P. Korngut, and C. B. Simmons, “Cryogenic apparatus for diffuse reflectance infrared spectroscopy with high-pressure capabilities,” *Review of Scientific Instruments* **77**, 093110 (2006).
3. S. A. FitzGerald, **H. O. H. Churchill**, P. Korngut, C. B. Simmons, Y. E. Strangas, “Low-temperature rotational-vibrational spectroscopy of H_2 in crystalline C_{60} ,” *Physical Review B* **73**, 155409 (2006).
2. Wang Z. M., **H. Churchill**, C. E. George, and G. J. Salamo, “High anisotropy of lateral alignment in multilayered (In,Ga)As/GaAs(100) quantum dot structures,” *Journal of Applied Physics* **96**, 6908 (2004).
1. **Hugh Churchill**, Henry Teng, and Robert M. Hazen, “Correlation of pH-dependent surface interaction forces to amino acid adsorption: Implications for the origin of life,” *American Mineralogist* **89**, 1048 (2004).

Invited Publications

3. **H. Churchill**, “Growth and Exfoliation of Selenium and Tellurium for Quantum Chains of Atoms,” *Microscopy and Microanalysis* **24**, 1672 (2018).
2. **Hugh O. H. Churchill** and Pablo Jarillo-Herrero, “Two-dimensional crystals: Phosphorus joins the family,” *Nature Nanotechnology*, **9**, 330 (2014). (News and Views)
1. F. Kuemmeth, **H. O. H. Churchill**, P. K. Herring, C. M. Marcus, “Carbon nanotubes for coherent spintronic devices,” *Materials Today* **13**, 18 (2010).

Patent Application

1. Shui-Qing Yu, **Hugh Churchill**, and Gregory Salamo, “Growth of Single Atom Chains for Nano-Electronics and Quantum Circuits,” U.S. Patent Application Serial Number 15/910,789. Filed March 2, 2018.

Invited Presentations

22. Microscopy and Microanalysis, Baltimore, MD (July 2018)
21. Condensed Matter Physics Seminar, Texas A&M University (March 2017)
20. Physics Colloquium, University of Tulsa (December 2016)
19. Colloquium, Center for Nanophysics and Advanced Materials, University of Maryland (November 2016)
18. Physics Colloquium, Missouri State University (November 2016)
17. Condensed matter physics seminar, University of Oklahoma (October 2016)
16. Keynote speaker, Arkansas Junior Science and Humanities Symposium, Arkansas Tech University (March 2016).
15. Arkansas INBRE Conference, Fayetteville, AR (November 2015).
14. Quantum Innovators Workshop, Institute for Quantum Computing, Waterloo, Ontario, Canada (October 2014).
13. IEEE Summer Topicals Meeting Series, Montreal, Quebec, Canada (July 2014).
12. 1st Muju International Winter School Series, South Korea (February 2014).
11. Boston Area Carbon Nanoscience Plus (BACON+) meeting, Harvard University (October 2013).
10. Workshop on Interferometry and Interactions in Non-equilibrium Meso- and Nano-systems, International Center for Theoretical Physics, Trieste, Italy (April 2013).

9. Winter Conference on Topological States of Matter, Aspen Center for Physics, Aspen, CO (January 2013).
8. Majorana Fermion Zero Modes in Solid-State Systems, Kavli Institute for Theoretical Physics, Santa Barbara, CA (December 2012).
7. Boston Area Carbon Nanoscience (BACON) meeting, Massachusetts Institute of Technology (February 2011).
6. International Winterschool on Electronic Properties of Novel Materials, Kirchberg, Austria (March 2010).
5. Seminar at National Research Council of Canada, Ottawa (March 2009).
4. Boston Area Carbon Nanoscience (BACON) meeting, Harvard University (December 2008).
3. Workshop on Quantum Phenomena and Information, International Center for Theoretical Physics, Trieste, Italy (June 2008).
2. Nanoscale Science and Engineering Center Research Exchange Seminar, Harvard University (January 2008).
1. APS March Meeting (March 2007).