ANDREW J. STOLLENWERK

CONTACT INFORMATION

Department of Physics
University of Northern Iowa
Cedar Falls, Iowa 50614-0150

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ACADEMIC POSITIONS

Professor	University of Northern Iowa	2021 – present
Associate Professor	University of Northern Iowa	2015 – 2021
Assistant Professor	University of Northern Iowa	2009 – 2015
Adjunct Assistant Professor	Bentley University	Spring 2009
Postdoctoral Fellow	Harvard University	2007 – 2009
Graduate Research Assistant	University at Albany, SUNY	2002 – 2007

EDUCATION

Ph.D.	NanoScience	University at Albany, SUNY	2007
M.S.	Physics	University at Albany, SUNY	2004
B.S.	Physics	Miami University	2002
B.A.	Mathematics	Miami University	2002

TEACHING EXPERIENCE

University of Northern Iowa

- General Physics I: Mechanics
- General Physics II: Electromagnetism
- Physics III: Theory and Simulation
- Mathematical Methods for Physicists
- Conceptual Physics (survey)
- Physics in Everyday Life Lab
- Intermediate Nanotechnology
- Introduction to Quantum Mechanics
- Classical Dynamics
- Physics of Everyday Life (survey)
- First Year Projects in Physics

Bentley University

- Color and Light (survey)

HONORS AND AWARDS

Physical Review B publication featured in Kaleidoscope (2016)

Outstanding new faculty member at UNI (2015)

Dean's Award for Teaching in Departmental Programs (2015)

Nominated: Dean's Award for Teaching in Departmental Programs (2014, 2015)

Society of Physics Students: Outstanding SPS Chapter (2013, 2014)

Introduction into Sigma Xi (2010)

Nano 50 Award (2008)

Spins in Solids award (2006)

Dean's List (2001)

J. A. Culler Award in Physics (1999, 2000)

SERVICE

Nominations Committee (2021 – 2023)

University Senate (2018 – 2023)

University Council (2017 – 2023)

Technical Advisor for the Center for Business Growth and Innovation (2019 – 2020)

Faculty Senate Chair, College of Humanities, Arts and Sciences (2017 – 2018)

Faculty Senate, College of Humanities, Arts and Sciences (2015 – 2018)

University Faculty Budget Committee (2016-2017)

Referee: J. Appl. Phys., J. of Phys. Chem. C (2010 – present)

Supervisor of the Physics Machine Shop, University of Northern Iowa (2009 – present)

University Senate Alternate (2012 – 2018)

Reviewer for the Murdoc Charitable Trust (2017)

University Faculty Budget Committee (2016 – 2017)

NSF review panel (2016)

Annual classroom recruitment visits, Cedar Falls and Waterloo High Schools (2013 – 2016)

Board Member, Central States Universities, Incorporated (2011 – 2015)

Physics Club Advisor, University of Northern Iowa (2011 – 2015)

Faculty search committee (2011, 2014)

Student Chaperone, Argonne Symposium for Undergraduates in Science (2011 – 2014)

Organized STEM summer camp entitled *The Physics of Mario Kart* (2013)

Session Chair: Fall Meeting of the APS Prairie Section (2011)

CERTIFICATIONS AND TRAINING

Quality Matters: Teaching Online Essentials Workshop (2020)

NSF Condensed Matter Physics: Principal Investigators Workshop (2015)

American Physical Society: Building a Thriving Undergraduate Physics Program (2012)

Machine Shop User, Harvard University (2008)

Accelerator Operator, University at Albany, SUNY (2004)

PATENTS

A. J. Stollenwerk and T.E. Kidd "Thin Metal Films Having an Ultra-Flat Surface and Methods of Preparing the Same" **U.S. Patent Application** 63078712, filed September 2020. Patent Pending.

INVITED PUBLICATIONS

W. Yi, A. J. Stollenwerk, and V. Narayanamurti, "Ballistic Electron Microscopy and Spectroscopy of Metals and Semiconductors" *Surface Science Reports* **64**, 169 (2009).

REFEREED PUBLICATIONS (* indicates undergraduate student)

1. E. Wolter*, A. J. Stollenwerk, and T. E. Kidd "Effect of Growth Rate on Ultrathin Mn Films Grown by Thermal Evaporation" *Thin Solid Films* (under review) (2023)
2. T. E. Kidd, P. Kruckenberg, C. Gorgen, P. V. Lukashev, and A. J. Stollenwerk "Criteria for electronic growth of Au on layered semiconductors" *Journal of Applied Physics,* **132** 245301 (2022).
3. T. E. Kidd, M. Shand, A. J. Stollenwerk, C. Gorgen*, Y. Moua*, L. Stuelke*, P. V. Lukashev "Large-field magnetoresistance of nanometer scale nickel films grown on molybdenum disulfide" *AIP Advances* **12** 035233 (2022)
4. T. E. Kidd, P. V. Lukashev, L. Stuelke*, C. Gorgen*, S. Roberts*, G. Gu, and A. J. Stollenwerk "Diffusion and stability of nanometer scale Au films on Bi_2Se_3" *Physica Scripta,* **96** 125708 (2021)
5. A. J. Stollenwerk, L. Stuelke*, L. Margaryan*, T. E. Kidd, and P. V. Lukashev, "First principles study of nearly strain-free Ni/WSe_2 and Ni/MoS_2 interfaces" *Journal of Physics: Condensed Matter*, **33** 425001 (2021)
6. T. E. Kidd, J. Weber*, E. O'Leary*, and A. J. Stollenwerk, "Preparation of Gold Films with Subatomic Surface Roughness," *Langmuir,* **37** 9472 (2021).
7. T. E. Kidd, S. Scott*, S. Roberts*, R. Carlile*, P. V. Lukashev, and A. J. Stollenwerk "Electronic growth of Pd(111) nanostructures on MoS_2" *Journal of Applied Physics,* **129** 174303 (2021).
8. E. O'Leary*, A. Ramker,* D. VanBrogen*, B. Dahal, E. J. Montgomery, S. Poddar, P. Kharel, A. J. Stollenwerk, and P. V. Lukashev "Chemical substitution induced half-metallicity in $CrMnSb_{(1-x)}P_x$," *Journal of Applied Physics,* **128** 113906 (2020).
9. T. E. Kidd, E. O'Leary*, A. Anderson*, S. Scott*, and A. J. Stollenwerk "Self-assembled Ag(111) nanostructures induced by Fermi surface nesting," *Physical Review B* **100**, 235447 (2019).
10. J. Weber* and A. J. Stollenwerk, "Measuring the Mechanical Properties of Laminated Wood Structures Using a Homemade Bending Tester," *American Journal of Undergraduate Research* **15**, 35 (2018).
11. T. E. Kidd, J. Weber*, R. Holzapfel*, K. Doore*, and A. J. Stollenwerk, "Three-dimensional quantum size effects on the growth of Au islands on MoS_2," *Applied Physics Letters* **113**, 191603 (2018).
12. R. Holzapfel, J. Weber, P. V. Lukashev, and A. J. Stollenwerk, "Out-of-plane electron transport in finite layer MoS_2," *Journal of Applied Physics* **123**, 174303 (2018).
13. A. J. Stollenwerk, E. Clausen*, M. Cook*, K. Doore*, R. Holzapfel*, J. Weber*, R. He, and T. E. Kidd, "Room Temperature Formation of Carbon Onions via Ultrasonic Agitation of MoS_2 in Isopropanol," *Journal of Nanoscience and Nanotechnology* **18**, 3171 (2018).
14. K. Doore*, M. Cook*, E. Clausen*, P. V. Lukashev, T. E. Kidd, and A. J. Stollenwerk, "Electronic structure of multi-walled carbon fullerenes," *Journal of Physics: Condensed Matter* **29**, 075302 (2016).
15. M.W. Roth, B. Wandling*, T. E. Kidd, P. M. Shand, and A. J. Stollenwerk, "Simulated structural and magnetic behavior of Mn-Ti intercalated dichalcogenide crystals," *Journal of Physics: Condensed Matter* **28**, 184001 (2016).
16. M. Cook*, R. Palandech*, K. Doore*, Z. Ye*, G. Ye*, R. He, and A. J. Stollenwerk, "Influence of interface coupling on the electronic properties of the Au/MoS_2 junction," *Physical Review B* **92**, 125425R (2015).
17. A. J. Stollenwerk, N. Hurley*, B. Beck*, K. Spurgeon*, T. E. Kidd, and G. Gu, "Manipulation of subsurface carbon nanoparticles in $Bi_2Sr_2CaCu_2O_{8+\delta}$ using a scanning tunneling microscope," *Physical Review B* **91**, 125425 (2015).

18. T. E. Kidd, A. O'Shea*, B. Beck*, C. Delaney*, P. Shand, L. Strauss, A. J. Stollenwerk, N. Hurley*, R. He, and G. Gu "Universal Method for Creating 3D Photoluminescent Nanostructures on Layered Materials," *Langmuir* **30**, 5939 (2014).
19. M. W. Eckes*, B. E. Friend*, and A. J. Stollenwerk, "Effect of growth temperature on ballistic electron transport through the Au/Si(001) interface," *Journal of Applied Physics* **115**, 163710 (2014).
20. B. E. Friend*, E. Wolter*, T.E. Kidd, and A. J. Stollenwerk, "Ballistic electron transport properties across the Manganese/Silicon interface," *Applied Physics Letters* **102**, 091605 (2013).
21. A. J. Stollenwerk, A. O'Shea*, E. Wolter*, M. W. Roth, L. H. Strauss, and T. E. Kidd, "Emergence of Long Range One-Dimensional Nanostructures in a Disordered Two-Dimensional System: Mn Doped $Ti_{1+\delta}S_2$," *Journal of Physical Chemistry C* **116**, 764 (2012).
22. M. Olson Hummon, A. J. Stollenwerk V. Narayanamurti, M. Panzer, V. Wood, P. Anikeeva and V. Bulovic, "Measuring charge trap occupation and energy level in CdSe/ZnS quantum dots using a scanning tunneling microscope," *Physical Review B* **81**, 115439 (2010).
23. P. R. Stollenwerk*, M. Olson Hummon, A. J. Stollenwerk**,** M. Kemei*, and V. Narayanamurti, "Ballistic Electron Environmental Effects on the Local Density of States of CdSe Quantum Dots on an Au Substrate," *JUROS* **1**, 28 (2010).
24. A. J. Stollenwerk, E. J. Spadafora, J. J. Garramone, R. J. Mayti, R. L. Moore and V.P. LaBella, "Effect of interface band structure on hot-electron attenuation lengths in Au," *Physical Review B* **77**, 033416 (2008).
25. M. R. Krause, A. J. Stollenwerk, M. Licurse* and V.P. LaBella, "Measurement of the Clustering Energy of Manganese Silicide Islands on Si(001) by Ostwald Ripening," *Applied Physics Letters* **91**, 041903 (2007).
26. A. J. Stollenwerk, M. R. Krause, J. Garramone, E. Spadafora and V.P. LaBella, "Measuring Spin Dependant Hot Electron Transport using Spin-Polarized Ballistic Electron Emission Microscopy," *Physical Review B* **76**, 195311 (2007).
27. M. R. Krause, A. J. Stollenwerk, J. Reed*, V. P. LaBella, M. Hortamani, P. Kratzer, and M. Scheffler, "Observation of subsurface Mn on the Si(001)-(2x1) reconstructed surface," *Physical Review B* **75**, 205326 (2007).
28. A. J. Stollenwerk, M. Krause, D. H. Idell*, R. Moore and V. P. LaBella, "Ballistic electron transport properties of Fe-based films on Si(001)" *Journal of Vacuum Science and Technology B* **24**, 2009 (2006).
29. A. J. Stollenwerk, M. Krause, D. H. Idell*, R. Moore and V. P. LaBella, **"**Probing the Hot Electron Transport Properties and Interface Band Structure of Fe/Si(001) and FeC/Si(001) Schottky Diodes," *Physical Review B* **74**, 155328 (2006).
30. M. R. Krause, A. J. Stollenwerk, M. Licurse* and V. P. LaBella, "Ostwald Ripening of Manganese Silicide Islands on Si(001)," *Journal of Vacuum Science and Technology A* **24**, 1480 (2006).
31. A. J. Stollenwerk, M. Krause, R. Moore and V. P. LaBella, "Hot Electron Transport Across Manganese Silicide Layers on the Si(001)," *Journal of Vacuum Science and Technology A* **24**, 1610 (2006).
32. M. Bolduc, C. Awo-Affouda, A. Stollenwerk, M. B. Huang, F. Ramos and V. P. LaBella, "Investigation of the Structural Properties of Ferromagnetic Mn-implanted Si," *Nuclear Instrumentation and Methods* **242**, 367 (2005).

33. M. Krause, A. Stollenwerk, C. Awo-Affouda, B. Maclean*, and V. P. LaBella, "Combined molecular beam epitaxy low temperature scanning tunneling microscopy system: enabling atomic scale characterization of semiconductor surfaces and interfaces," *Journal of Vacuum Science and Technology B* **23**, 1684 (2005).
34. M. Bolduc, C. Awo-Affouda, A. Stollenwerk, M. B. Huang, F. G. Ramos, G. Agnello, and V. P. LaBella, "Above Room Temperature Ferromagnetism in Mn-ion implanted Si," *Physical Review B* **71**, 033302 (2005).
35. M. Bolduc, C. Awo-Affouda, A. Stollenwerk, M. B. Huang, F. Ramos, G. Agnello, and V. P. LaBella, "Magnetic and Structural Properties of Mn-implanted Si, Material Research Society Symposium," *Proceedings* **853E**, 4 (2004).
36. J. Castracane, B. Xu, O. Gutin, R. Lavrijsen, and A. Stollenwerk, "Diffractive Micro-Arrays for Active Spectroscopy and Interconnect Applications," *SPIE-Optoelectronics* (2002).

SUPERVISED UNDERGRADUATE RESEARCH

Haley Harms, *Phys.* (2023)
Colin Gorgin, *Phys.* (2021)
Adam Ramker, *Phys.* (2019, 2020)
Skylar Scott, *Phys.* (2018, 2019)
Evan O'Leary, *Phys.* (2018)
Enrique Tuvar, *Phys. Teach.* (2016, 2017)
Keith Doore, *Phys.* (2015, 2016)
Robert Palandech, *Phys. Teach.* (2014, 2015)
Alex Corker, *Appl. Phys./Comp. Sci.* (2013, 2015)
Gaihua Ye, *Phys.* (2014)
Brad Friend, *Appl. Phys.* (2011, 2013)
Matt Eckes, *Appl. Phys.* (2012)
Kody Waldstein, *Chem.* (2010)
Eric Wolter, *Phys.* (2010)
Preston Kruckenberg, *Phys.* (2021, 2022)
Sophie Roberts, *Phys.* (2019, 2021)
Dylan Blattner, *Phys.* (2019)
Aaron Anderson, *Phys.* (2018)
Jacob Weber, *Phys. Teach.* (2016, 2017)
Ryan Holzapfel, *Phys.* (2016)
Colten Lastine, *Appl. Phys.* (2015)
Matthew Cook, *Phys.* (2014, 2015)
Jessica Thatcher, *Phys./Comp. Sci.* (2014)
Noah Hurley, *Phys.* (2013)
Ellen Jarrett, *Phys.* (2013)
Ryan Krogmann, *Chem.* (2011)
Byron Tasseff, *Phys.* (2010)
Eddie Maldonado, *Phys.* (2009)

GRANTS AND FELLOWSHIPS (TOTAL: $1,900,615)

- Department of Energy (2023-2026)
  Influence of Dimensional Confinement at the Metal-Layered Crystal Interface
  Total: $375,888 (pending)
- National Science Foundation: Research in Undergraduate Institutions (2023-2026)
  Collaborative Research: RUI: Patterned Doping of Layered Materials
  Total: $520,877 (pending)
- National Science Foundation: Major Research Instrumentation Program (2023-2024)
  MRI: Track 1 Acquisition of Atomic Force Microscope for Interdisciplinary Research
  Total: $364,342 (pending)
- Department of Energy (2019-2023)
  Influence of Dimensional Confinement at the Metal-Layered Crystal Interface
  Total: $328,448
- Brookhaven National Labs: Basic Energy Science (2020-2023)
  Influence of Dimensional Confinement at the Metal-Layered Crystal Interface

Facility use

- Argonne National Labs: Center for Nanoscale Materials (2020-2022)
  Quantized growth of Metallic Nanostructures on Layered Crystals
  Facility use
- University of Northern Iowa summer fellowship (2019)
  Growing Atomically Flat Gold Surfaces Using Quantum Size Effects
  Total: $7200
- National Science Foundation: Research in Undergraduate Institutions (2014-2018)
  Electronic Properties of Finite Molecular Layer Transition Metal Dichalcogenides"
  Total: $247,303
- University of Northern Iowa summer fellowship (2015)
  Achieving Charge Injection into Single Layered Molybdenum Disulfide
  Total: $6571
- University of Northern Iowa pre-tenure summer fellowship (2014)
  Electron Injection into Transition Metal Dichalcogenide Semiconductors
  Total: $4500
- Regents' Capacity Grant (2014-2015)
  Developing Low Cost Robotics Kits with Modular Components
  Total: $15,134
- University of Northern Iowa summer fellowship (2013)
  Electron transport through discretely charged gold nano-crystals
  Total: $6442
- Iowa NSF EPSCoR: Funding for Summer Camps (2013)
  Integrating the physical world and your computer with Arduino
  Total: $13,500
- University of Northern Iowa pre-tenure summer fellowship (2011)
  Understanding Hydrogen absorption in Manganese Thin Films
  Total: $4500
- University of Northern Iowa summer fellowship (2010)
  Etching Nanocrystals Using a Scanning Tunneling Microscope
  Total: $5910

INVITED TALKS

1. Physics Colloquium, Texas Tech University, *Magic sized Islands on MoS_2* (2022)
2. Physics Colloquium, University of Iowa, *Self-assembled Nanostructures on MoS_2 Induced by Quantum Size Effects* (2019)
3. Nanoscience Seminar, SUNY Polytechnic Institute, *Magic Sized Au Islands on MoS_2* (2018)
4. Physics Seminar, Pennsylvania State, Behrend, *Exploring Properties of Finite Layered Materials* (2017)
5. Physics Seminar, Miami University, *Exploring the Electronic Properties of Layered Materials* (2014)
6. Physics Seminar, Western Illinois University, *Exploring the Electronic Properties of Layered Materials* (2014)
7. Career Speaker, Waterloo West High School, *Physics: Not as lame as you think* (2013)

8. Physics Seminar, Grinnell College, *Ballistic electron transport through multi-layered films* (2012)
9. ENCOMM Colloquium, The Ohio State University, *Spin transport and structural properties of transition-metal/semiconductor interfaces* (2007)

CONTRIBUTED TALKS

1. Iowa Academy of Science, *Self-assembled nanostructures on MoS_2 induced by quantum size effects* (2021)
2. Iowa Academy of Science, *Magic sized Au islands on MoS_2* (2019)
3. American Physical Society, *Quantum size effects observed in high coverage Au layers on MoS_2* (2016)
4. American Vacuum Society, *Electronic and optical properties of nanometer sized structures formed via local intercalated of carbon in layered materials* (2014)
5. American Vacuum Society, *Effect of hydrogen on ballistic electron transport through manganese thin films on silicon* (2011)
6. Physics and Chemistry of Semiconductor Interfaces, *Observation of discrete charging in CdSe/ZnS quantum dots* (2009)
7. Physics and Chemistry of Semiconductor Interfaces, *Measuring spin dependent hot electron transport and band structure of Fe/Si(001) Schottky diodes* (2007)
8. American Physical Society, *Measuring spin dependent hot electron transport and band structure of Fe/Si(001) Schottky diodes* (2007)
9. American Vacuum Society, *Measuring spin dependent hot electron transport and band structure of Fe/Si(001) Schottky diodes* (2006)
10. Physical Electronics Conference*, Measuring spin dependent hot electron transport using spin-polarized ballistic electron emission microscopy* (2006)
11. Physics and Chemistry of Semiconductor Interfaces, *Measuring spin dependent hot electron transport using spin-polarized ballistic electron emission microscopy* (2006)
12. IFC Annual Review, *Measuring spin-dependent hot electron transport using spin-polarized ballistic electron emission microscopy* (2006)
13. American Vacuum Society, *Hot electron transport across manganese silicide layers on the Si(001) surface* (2005)

CONTRIBUTED TALKS BY STUDENTS

1. Sophie Roberts, Research at the Capital (2020)
2. Sophie Roberts, Physcon (2019)
3. Adam Ramker, Physcon (2019)
4. Keith Doore, American Physical Society (2016)
5. Noah Hurely, Argonne National Labs Undergraduate Research Symposium (2013)
6. Erik Wolter, Research at the Capitol (2012)
7. Erik Wolter, NCUR conference (2012)
8. B. Friend, Argonne National Labs Undergraduate Research Symposium (2011)
9. Erik Wolter, American Physical Society: Prairie Section (2011)
10. Byron Tasseff, Argonne National Labs Undergraduate Research Symposium (2010)