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EDUCATION

- Ph.D. Physics, University of California, Berkeley, 1997
- M.A. Physics, University of California, Berkeley, 1993
- B.Sc. Physics, Massachusetts Institute of Technology, 1991

EXPERIENCE

- WSU, Department of Physics and Astronomy, Professor, 2009–
- Chief Technology Officer and co-founder, Klar Scientific, 2016–
- WSU, Materials Science Program, member, 2001–
- WSU, Institute for Shock Physics, member, 1998–
- WSU, Department of Physics and Astronomy, Chair, 2012–16
- WSU, Materials Science Program, Interim Chair, 2008–9
- WSU, Department of Physics and Astronomy, Acting Chair, 2006–7
- WSU, Department of Physics, Associate Professor with tenure, 2004–9
- WSU, Department of Physics, Assistant Professor, 1998–2004
- Xerox Palo Alto Research Center (PARC), Postdoctoral Research Associate, 1997–8
- Lawrence Berkeley National Laboratory (LBNL), Graduate Student Researcher, 1993–6

DISSERTATION

- **Title:** [Hydrogen Local Vibrational Modes in Semiconductors](#)
- **Committee:** Eugene Haller (chair), Peter Yu (co-chair), Steven Louie, and Daryl Czhran

RESEARCH INTERESTS

- Optical and electrical properties of semiconductors and oxides
- Infrared spectroscopy of defects in semiconductors
- Synthesis and characterization of oxide materials
- High-pressure and shock compression physics
- Optical microscopy

PROFESSIONAL SOCIETIES

- American Physical Society (APS)
- Materials Research Society (MRS)
- SPIE (the international society for optics and photonics)

AWARDS

- Westinghouse Distinguished Professorship in Materials Science and Engineering, 2013–
- WSU College of Sciences New Faculty Performance Award, one awarded, 2002

Student awards (past 10 years)

- Syeed Ahmed, MSEP Poster Presentation Winner (three awarded), 2021
- Leah Snyder, Ed & Virginia Donaldson Surface Science Fellowship, 2020
- Syeed Ahmed, AVSNW poster 2nd prize, 2019
- Anya Rasmussen, WSU Association of Faculty Women Rigas Award, 2015
- Anya Rasmussen, Advanced Light Source Doctoral Fellowship in Residence, 2014–5
- Anya Rasmussen, student scholarship, Shock Compression and Condensed Matter conference, 2013
- Samuel Teklemichael, Graduate and Professional Student Association RA award, 2012
- Marianne Tarun, Graduate and Professional Student Association RA award, 2011
- Jennifer Schei, WSU Association of Faculty Women Rigas Award, 2011

SERVICE AT WSU (past 10 years)

University

- Materials Science and Engineering Program Advisory Council, 2021–
- Commercialization Gap Fund Internal Review Committee, 2017–
- Provost Tenure and Promotion Committee, 2015–7
- Seed Grant Review Panel, 2010, 2014–6
- Academic Showcase Committee, 2011–2, 2014–7
- Keynote Speaker, Phi Beta Kappa Induction Ceremony, 2016
- Dean (College of Arts & Sciences) Review Committee, 2016
- Materials Science and Engineering Director Search Committee, 2014–5
- Materials Science and Engineering Advisory Committee, 2010–4, 2018–
- Faculty address, “Crimson Reads,” 2014
- Dean (College of Sciences) Search Committee, 2010

College of Arts & Sciences

- *Ad hoc* Tenure and Promotion Committees, 2015–8

Department of Physics & Astronomy

- Graduate Admissions Committee, 2021
- Promotion Guidelines Committee, 2019–2020
- Chair, Safety/Space/Building Committee, 2018–
- Department Chair, 2012–6
- Chair, Fiscal Analyst Search Committee, 2015
- Chair, Administrative Manager Search Committee, 2015

- Chair, Program Coordinator Search Committee, 2014
- Colloquium Coordinator, 2000, 2001, 2013
- Chair, Department Vision Committee, 2010–11
- Graduate Studies Committee, 2000–11 (Chair 2007–11)
- Research Experiences for Undergraduates (REU) Site, PI and Faculty Coordinator, 2007–10

SERVICE OUTSIDE WSU

- Steering Committee, International Conference on Defects in Semiconductors (ICDS), 2019–
- Co-organizer, Focus Topic on Dopants and Defects in Semiconductors, APS March Meeting, 2009, 2013, 2021
- APS March Meeting Abstract Sorters' Meeting, 2003, 2020
- Chair, ICDS–30, Seattle, 2019
- International Advisory Committee, ICDS, 2003–17
- Program Committee, ICDS, 2015, 2017, and 2021
- National Science Foundation (NSF) review panels, 2002, 2009, 2012, 2017
- Chair, APS Northwest (APSNW) Meeting, 2015
- Department of Energy (DOE) review panels, 2009, 2010, 2011, 2013, 2015
- Environmental Molecular Sciences Laboratory (EMSL) User Executive Committee, 2011–14
- Corbett Prize Committee, ICDS, 2013
- APSNW Program Committee, 2005–6 and 2011–12
- Program Committee, Gordon Research Conference (GRC) on Defects in Semiconductors, 2010 and 2012
- Chair, GRC on Defects in Semiconductors, 2007–8 (Vice Chair 2005–6)
- Advisory Committee, University of Idaho DOE-EPSCOR Grant, 2005–7
- International Conference on Hydrogen in Materials organizing committee, 2002–6
- APSNW Executive Committee, 2004–5
- Co-organizer, Focus Topic on Wide-band-gap Semiconductors, APS March Meeting, 2004
- Co-organizer, Symposium on Hydrogen in Semiconductors, MRS Spring Meeting, 2004
- Session chair for various conferences

REFEREEING

- **Journals:** ACS Photonics, Advanced Functional Materials, American Journal of Physics, Applied Materials and Interfaces, Applied Physics Letters, Applied Spectroscopy, Applied Surface Science, Canadian Journal of Physics, Central European Journal of Physics, Ceramics International, Chemical Physics Letters, IEEE Electron Device Letters, Japanese Journal of Applied Physics, Journal of Alloys and Compounds, Journal of Applied Physics, Journal of Chemical Physics, Journal of Crystal Growth, Journal of the Electrochemical Society, Journal of Luminescence, Journal of Nanomaterials, Journal of Physical Chemistry, Journal of Physics D, Journal of Vacuum Science and Technology (JVST) A, JVST B, Materials Letters, Materials Research Bulletin, Materials Science in Semiconductor Processing, Materials Today, Nanoscale, Nanotechnology, Nature, Nature Materials, New Journal of Physics, Optical Materials Express, Organic Electronics, Physical Review Applied, Physical Review B, Physica Status Solidi A, Physical Review Letters, Physical Review Materials, PLOS ONE, Reviews of Modern Physics, Semiconductor Science and Technology, Sensors and Actuators B, Thin Solid Films

- **Funding agencies:** DOE, NSF, Deutsche Forschungsgemeinschaft (DFG), Natural Sciences and Engineering Research Council of Canada, Petroleum Research Fund (PRF), United States – Israel Binational Science Foundation
- **Other:** Advanced Light Source (ALS), Environmental Molecular Sciences Laboratory / Pacific Northwest National Laboratory (EMSL/PNNL), Le Studium, Stanford Synchrotron Radiation Laboratory, book proposals, tenure applications, external examiner/reader for Ph.D. committees (University of Alberta and Simon Fraser University)

OUTREACH

- MIT Educational Counselor, 2014–18
- MIT Reunion Gift Committee, 2015–6
- Contributor to WSU's *Ask Dr. Universe* column
- Physics videos on YouTube
- Leader, Franklin Elementary Math Club, 2009–10
- Recruiting trip, 2009 Joint Annual Conference of the National Society of Black Physicists and the National Society of Hispanic Physicists
- Team Leader, “Kids Judge” neuroscience event, 2006
- Development of lab exercises for the Nespelem school, on the Colville Indian reservation in northeast Washington, for 8th grade class
- Organized visits by WSU Children’s Center (ages: 2-10)
- Mentor for Pullman High School senior science project
- Physics demonstrations for elementary students

PUBLICATIONS

Summary

- Authored or co-authored over 100 peer-reviewed publications and 2 textbooks. *H*-index = 35 ([Google Scholar](#), 6/24/2021).
- Top citations, work done at WSU:
 - 1,061: “Defects in ZnO,” *J. Appl. Phys.* (2009)
 - 221: “Infrared spectroscopy of hydrogen in ZnO,” *Appl. Phys. Lett.* (2002)
 - 207: “Tutorial: Defects in semiconductors—Combining experiment and theory,” *J. Appl. Phys.* (2016)
 - 149: “Nitrogen is a deep acceptor in ZnO,” *AIP Advances* (2011), *most cited AIP Advances article in 2012*
 - 147: “Local vibrational modes of impurities in semiconductors,” *J. Appl. Phys.* (2000)
 - 145: *Dopants and Defects in Semiconductors* (CRC Press, 2018)
 - 138: “Structure and stability of O-H donors in ZnO from high-pressure and infrared spectroscopy,” *Phys. Rev. B* (2005)
 - 135: “Persistent photoconductivity in strontium titanate,” *Phys. Rev. Lett.* (2013)
 - 125: “Ferromagnetism in Ga_{1-x}Mn_xP: Evidence for inter-Mn exchange mediated by localized holes within a detached impurity band,” *Phys. Rev. Lett.* (2005)
- Top citations, work done before WSU:
 - 257: “Large band gap bowing of In_xGa_{1-x}N alloys,” *Appl. Phys. Lett.* (1998)
 - 238: “Phase separation in InGaN/GaN multiple quantum wells,” *Appl. Phys. Lett.* (1998)
 - 220: “Local vibrational modes of the Mg-H acceptor complex in GaN,” *Appl. Phys. Lett.* (1996)
 - 198: “Fano interference of the Raman phonon in heavily boron-doped diamond films grown by chemical vapor deposition,” *Appl. Phys. Lett.* (1995)
 - 196: “Metastability of oxygen donors in AlGaIn,” *Phys. Rev. Lett.* (1998)
 - 179: “Optical properties of InGaIn alloys grown by metalorganic chemical vapor deposition,” *J. Appl. Phys.* (1998)

Journal Articles (peer-reviewed)

Work done at WSU (2020–)

135. Y. Yu and M.D. McCluskey, Classification of semiconductors by photoluminescence spectroscopy and machine learning, *Applied Spectroscopy* (in press).
134. S.E. Ahmed, V.M. Poole, J. Igo, Y. Gu, and M.D. McCluskey, Localized phase transition of TiO₂ thin films induced by sub-bandgap laser irradiation, *J. Vac. Sci. Tech. A* (submitted).
133. J. Jesenovec, M. Weber, C. Pansegrau, M.D. McCluskey, K.G. Lynn, and J.S. McCloy, [Gallium vacancy formation and configuration in unintentionally doped β-Ga₂O₃](#), *J. Appl. Phys.* **129**, 245701:1-9 (2021).
132. T.D. Gustafson, J. Jesenovec, C.A. Lenyk, N.C. Giles, J.S. McCloy, M.D. McCluskey, and L.E. Halliburton, [Zn acceptors in β-Ga₂O₃ crystals](#), *J. Appl. Phys.* **129**, 155701:1-10 (2021).
131. J. Huso, M.D. McCluskey, Y. Yu, Md. M. Islam, and F. Selim, [Localized UV emitters on the surface of Ga₂O₃](#), *Scientific Reports* **10**, 21022:1-7 (2020).

130. J.R. Ritter, M.J. Caldas, T.J. da Silva, A. Calzolari, and M.D. McCluskey, [Surface effects on pyrene luminescence excitation](#), *ACS Applied Electronic Materials* **2**, 2806-2812 (2020).
129. J. Lapp, D. Thapa, J. Huso, A.J. Canul, M.G. Norton, M.D. McCluskey, and L. Bergman, [Enhancement of the ultraviolet photoluminescence of ZnO films: Coatings, annealing, and environmental exposure studies](#), *AIP Advances* **10**, 085217:1-8 (2020).
128. M.D. McCluskey and A. Janotti, [Defects in semiconductors](#), *J. Appl. Phys.* **127**, 190401:1-3 (2020).
127. S.E. Ahmed, J. Huso, J.R. Ritter, J. Igo, Y. Gu, and M.D. McCluskey, [Insulating regions in a TiO₂ thin film defined by laser irradiation](#), *J. Vac. Sci. Tech. B* **38**, 032203:1-7 (2020).
126. Y. Yu, X. Ye, and M.D. McCluskey, [Confocal microscopy with a microlens array](#), *Applied Optics* **59**, 3058-3063 (2020).
125. M.D. McCluskey, [Point defects in Ga₂O₃](#), *J. Appl. Phys.* **127**, 101101:1-13 (2020). [Featured Article](#).

Work done at WSU (2010–2019)

124. J.R. Ritter, K.G. Lynn, and M.D. McCluskey, [Iridium-related complexes in Czochralski-grown \$\beta\$ -Ga₂O₃](#), *J. Appl. Phys.* **126**, 225705:1-6 (2019).
123. J. Huso, J.R. Ritter, L. Bergman, and M.D. McCluskey, [High order oxygen local vibrational modes in ZnS_{1-x}O_x](#), *Phys. Stat. Solidi B* **2019**, 1800607:1-9 (2019).
122. J. Huso, L. Bergman, and M.D. McCluskey, [Bandgap of cubic ZnS_{1-x}O_x from optical transmission spectroscopy](#), *J. Appl. Phys.* **125**, 075704:1-5 (2019).
121. D. Thapa, J. Huso, J. Lapp, N. Rajabi, J. Morrison, M.D. McCluskey, and L. Bergman, [Thermal stability of ultra-wide-bandgap MgZnO alloys with wurtzite structure](#), *Journal of Materials Science: Materials in Electronics* **29**, 16782-16790 (2018).
120. J.R. Ritter, J. Huso, P.T. Dickens, J.B. Varley, K.G. Lynn, and M.D. McCluskey, [Compensation and hydrogen passivation of magnesium acceptors in \$\beta\$ -Ga₂O₃](#), *Appl. Phys. Lett.* **113**, 052101:1-5 (2018).
119. J. Huso, J.R. Ritter, D. Thapa, K.M. Yu, L. Bergman, and M.D. McCluskey, [Oxygen vibrational modes in ZnS_{1-x}O_x alloys](#), *J. Appl. Phys.* **123**, 161537:1-5 (2018).
118. V.M. Poole, J. Huso, and M.D. McCluskey, [The role of hydrogen and oxygen in the persistent photoconductivity of strontium titanate](#), *J. Appl. Phys.* **123**, 161545:1-5 (2018).
117. N.S. Parmar, J.-W. Choi, L.A. Boatner, M.D. McCluskey, and K.G. Lynn, [Formation of high concentrations of isolated Zn vacancies and evidence for their acceptor levels in ZnO](#), *Journal of Alloys and Compounds* **729**, 1031-1037 (2017).
116. V.M. Poole, S.J. Jokela, and M.D. McCluskey, [Using persistent photoconductivity to write a low-resistance path in SrTiO₃](#), *Scientific Reports* **7**, 6659:1-6 (2017).
115. X. Ye and M.D. McCluskey, [Subtractive imaging using Gaussian fits and image moments in confocal microscopy](#), *Res. J. Opt. Photonics* **1**(1), 1000102:1-5 (2017).
114. Q. Wang, L. Yang, S. Zhou, X. Ye, Z. Wang, W. Zhu, M.D. McCluskey, and Y. Gu, [Phase-defined Van der Waals Schottky junctions with significantly enhanced thermoelectric properties](#), *J. Phys. Chem. Lett.* **8**, 2887-2894 (2017).
113. D. Thapa, J. Huso, K. Miklos, P.M. Wojcik, D.N. McIlroy, J.L. Morrison, C. Corolewski, M.D. McCluskey, T.J. Williams, M.G. Norton, and L. Bergman, [UV-luminescent MgZnO semiconductor alloys: Nanostructure and optical properties](#), *J. Mat. Sci.:Mater. Electron.* **28**, 2511-2520 (2017).
112. X. Ye and M.D. McCluskey, [Modular scanning confocal microscope with digital image processing](#), *PLoS ONE* **11**(11), e0166212:1-14 (2016).

111. A.M. Rasmussen, E. Mafi, W. Zhu, Y. Gu, and M.D. McCluskey, [High pressure \$\gamma\$ -to- \$\beta\$ phase transition in bulk and nanocrystalline \$\text{In}_2\text{Se}_3\$](#) , *High Pressure Res.* **36**, 549-56 (2016).
110. D. Thapa, J. Huso, J.L. Morrison, C.D. Corolewski, M.D. McCluskey, and Leah Bergman, [Achieving highly-enhanced UV photoluminescence and its origin in ZnO nanocrystalline films](#), *Optical Materials* **58**, 382–9 (2016).
109. C.D. Corolewski, N.S. Parmar, K.G. Lynn, and M.D. McCluskey, [Hydrogen-related complexes in Li-diffused ZnO single crystals](#), *J. Appl. Phys.* **120**, 035702:1-5 (2016).
108. A. Alkauskas, M.D. McCluskey, and C.G. Van de Walle, [Tutorial: Defects in semiconductors—Combining experiment and theory](#), *J. Appl. Phys.* **119**, 181101:1-11 (2016).
107. S.T. Hung, A. Bhuyan, K. Schademan, J. Steverlynck, M.D. McCluskey, G. Koeckelberghs, K. Clays, and M.G. Kuzyk, [Spectroscopic studies of the mechanism of reversible photodegradation of 1-substituted aminoanthraquinone-doped polymers](#), *J. Chem. Phys.* **144**, 114902:1-17 (2016).
106. K.W. Harrison, C.D. Corolewski, M.D. McCluskey, J. Lindemuth, S. Ha, and M.G. Norton, [Electronic transport in molybdenum dioxide thin films](#), *J. Mater. Sci.: Mater. Electron.* **26**, 9717-20 (2015).
105. V.M. Poole, C.D. Corolewski, and M.D. McCluskey, [P-type conductivity in annealed strontium titanate](#), *AIP Advances* **5**, 127217:1-4 (2015).
104. N.S. Parmar, C.D. Corolewski, M.D. McCluskey, and K.G. Lynn, [Potassium acceptor doping of ZnO crystals](#), *AIP Advances* **5**, 057107:1-7 (2015).
103. J. Huso, H. Che, D. Thapa, A. Canul, M.D. McCluskey, and L. Bergman, [Phonon dynamics and Urbach energy studies of MgZnO alloys](#), *J. Appl. Phys.* **117**, 125702:1-8 (2015).
102. M.D. McCluskey, C.D. Corolewski, J. Lv, M.C. Tarun, S.T. Teklemichael, E.D. Walter, M.G. Norton, K.W. Harrison, and S. Ha, [Acceptors in ZnO](#), *J. Appl. Phys.* **117**, 112802:1-6 (2015).
101. F.A. Selim, D. Winarski, C.R. Varney, M.C. Tarun, Jianfeng Ji, and M.D. McCluskey, [Generation and characterization of point defects in \$\text{SrTiO}_3\$ and \$\text{Y}_3\text{Al}_5\text{O}_{12}\$](#) , *Results in Physics* **5**, 28-31 (2015).
100. S.T. Teklemichael, M.D. McCluskey, G. Buchowicz, O.D. Dubon, and E.E. Haller, [Evidence for a shallow Cu acceptor in Si from infrared spectroscopy and photoconductivity](#), *Phys. Rev. B* **90**, 165204:1-4 (2014).
99. J.M. Philipps, J.E. Stehr, I. Buyanova, M.C. Tarun, M.D. McCluskey, B.K. Meyer, and D.M. Hofmann, [Recharging behavior of nitrogen-centers in ZnO](#), *J. Appl. Phys.* **116**, 063701:1-4 (2014).
98. J. Huso, J.L. Morrison, L. Bergman, and M.D. McCluskey, [Anharmonic resonant Raman modes in \$\text{Mg}_{0.2}\text{Zn}_{0.8}\text{O}\$](#) , *Phys. Rev. B* **87**, 125205:1-5 (2013).
97. E.H. Khan, M.H. Weber, and M.D. McCluskey, [Formation of isolated Zn vacancies in ZnO single crystals by absorption of ultraviolet radiation: A combined study using positron annihilation, photoluminescence, and mass spectroscopy](#), *Phys. Rev. Lett.* **111**, 017401:1-5 (2013).
96. F. Tuomisto, C. Rauch, M.R. Wagner, A. Hoffmann, S. Eisermann, B.K. Meyer, L. Kilanski, M.C. Tarun, and M.D. McCluskey, [Nitrogen and vacancy clusters in ZnO](#), *Journal of Materials Research* **28**, 1977-83 (2013).
95. M.C. Tarun, F.A. Selim, and M.D. McCluskey, [Persistent photoconductivity in strontium titanate](#), *Phys. Rev. Lett.* **111**, 187403:1-5 (2013).
94. F.A. Selim, C.R. Varney, M.C. Tarun, M.C. Rowe, G.S. Collins, and M.D. McCluskey, [Positron lifetime measurements of hydrogen passivation of cation vacancies in yttrium aluminum oxide garnets](#), *Phys. Rev. B* **88**, 174102:1-5 (2013).
93. A.M. Rasmussen, S.T. Teklemichael, E. Mafi, Y. Gu, and M.D. McCluskey, [Pressure-induced phase transformation of \$\text{In}_2\text{Se}_3\$](#) , *Appl. Phys. Lett.* **102**, 062105:1-4 (2013).

92. P. Grivickas, M.D. McCluskey, and Y.M. Gupta, [Use of dynamic compression to probe semiconductor response at large strains](#), *Physica Status Solidi B* **250**, 683-7 (2013).
91. N.S. Parmar, M.D. McCluskey, and K.G. Lynn, [Vibrational spectroscopy of Na-H complexes in ZnO](#), *Journal of Electronic Materials* **42**, 3426-8 (2013).
90. S.T. Teklemichael and M.D. McCluskey, [Compensation of acceptors in ZnO nanocrystals by adsorption of formic acid](#), *J. Phys. Chem. C* **116**, 17248-51 (2012).
89. F.A. Selim, M.C. Tarun, D.E. Wall, L.A. Boatner, and M.D. McCluskey, [Erratum: "Cu-Doping of ZnO by nuclear transmutation" \[Appl. Phys. Lett. 99, 202109 \(2011\)\]](#), *Appl. Phys. Lett.* **101**, 029901 (2012).
88. Z.A. Dreger, M.D. McCluskey, and Y.M. Gupta, [High pressure – high temperature decomposition of \$\gamma\$ -cyclotrimethylene trinitramine](#), *J. Phys. Chem. A* **116**, 9680-8 (2012).
87. M.D. McCluskey, M.C. Tarun, and S.T. Teklemichael, [Hydrogen in oxide semiconductors](#), *J. Mater. Res.* **27**, 2190-8 (2012).
86. H. Che, J. Huso, J.L. Morrison, D. Thapa, M. Huso, W. Jiang Yeh, M.C. Tarun, M.D. McCluskey, and L. Bergman, [Optical properties of ZnO-alloyed nanocrystalline films](#), *Journal of Nanomaterials* **2012**, 963485:1-7 (2012).
85. S.T. Teklemichael and M.D. McCluskey, [Acceptor and surface states of ZnO nanocrystals: A unified model](#), *Nanotechnology* **22**, 475703:1-4 (2011).
84. S.T. Teklemichael, W.M. Hlaing Oo, M.D. McCluskey, E.D. Walter, and D.W. Hoyt, [Acceptors in ZnO nanocrystals](#), *Appl. Phys. Lett.* **98**, 232112:1-3 (2011).
83. F.A. Selim, M.C. Tarun, D.E. Wall, L.A. Boatner, and M.D. McCluskey, [Cu-doping of ZnO by nuclear transmutation](#), *Appl. Phys. Lett.* **99**, 202109:1-3 (2011).
82. G.J. Hanna, S.T. Teklemichael, M.D. McCluskey, L. Bergman, and J. Huso, [Equations of state for ZnO and MgZnO by high pressure x-ray diffraction](#), *J. Appl. Phys.* **110**, 073511:1-5 (2011).
81. M.C. Tarun and M.D. McCluskey, [Infrared absorption of hydrogen-related defects in strontium titanate](#), *J. Appl. Phys.* **109**, 063706:1-4 (2011).
80. M.C. Tarun, M. Zafar Iqbal, and M.D. McCluskey, [Nitrogen is a deep acceptor in ZnO](#), *AIP Advances* **1**, 022105:1-7 (2011).
79. P. Grivickas, M.D. McCluskey, and Y.M. Gupta, [Order-of-magnitude reduction of carrier lifetimes in \[100\] *n*-type GaAs shock-compressed to 4 GPa](#), *Appl. Phys. Lett.* **98**, 092107:1-3 (2011).
78. G.J. Hanna and M.D. McCluskey, [Equation of state and refractive index of argon at high pressure by confocal microscopy](#), *Phys. Rev. B* **81**, 132104:1-4 (2010).
77. W.M. Hlaing Oo, S. Tabatabaei, M.D. McCluskey, J.B. Varley, A. Janotti, and C.G. Van de Walle, [Hydrogen donors in SnO₂ studied by infrared spectroscopy and first-principles calculations](#), *Phys. Rev. B* **82**, 193201:1-4 (2010).
76. W.M. Hlaing Oo, M.D. McCluskey, J. Huso, J.L. Morrison, L. Bergman, M.H. Engelhard, and L.V. Saraf, [Incorporation of Cu acceptors in ZnO nanocrystals](#), *J. Appl. Phys.* **108**, 064301:1-3 (2010).
75. S.J. Jokela and M.D. McCluskey, [Structure and stability of N-H complexes in single-crystal ZnO](#), *J. Appl. Phys.* **107**, 113536:1-5 (2010).

Work done at WSU (2000–2009)

74. P. Grivickas, M.D. McCluskey, Y. Zhang, J.F. Geisz, and Y.M. Gupta, [Bound exciton luminescence in shock compressed GaP:S and GaP:N](#), *J. Appl. Phys.* **106**, 023710:1-7 (2009).
73. M.D. McCluskey and S.J. Jokela, [Defects in ZnO](#), *J. Appl. Phys.* **106**, 071101:1-13 (2009).
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72. G.J. Hanna and M.D. McCluskey, [Measuring the volume of a fluid in a diamond anvil cell using a confocal microscope](#), *Applied Optics* **48**, 1758-63 (2009).
71. S.J. Jokela, M.C. Tarun, and M.D. McCluskey, [Nitrogen and hydrogen in bulk single-crystal ZnO](#), *Physica B* **404**, 4810-2 (2009).
70. J. Huso, J.L. Morrison, J. Mitchell, E. Casey, H. Hoeck, C. Walker, L. Bergman, W.M. Hlaing Oo, and M.D. McCluskey, [Optical transitions and multiphonon scattering of Cu-doped ZnO and MgZnO ceramics](#), *Appl. Phys. Lett.* **94**, 061919:1-3 (2009).
69. P. Grivickas, M.D. McCluskey, and Y.M. Gupta, [Real-time band structure changes of GaAs during continuous dynamic compression to 5 GPa](#), *Appl. Phys. Lett.* **95**, 152108:1-3 (2009).
68. M.D. McCluskey, [Resonant interaction between hydrogen vibrational modes in AlSb:Se](#), *Phys. Rev. Lett.* **102**, 135502:1-4 (2009).
67. W.M. Hlaing Oo, L.V. Saraf, M.H. Engelhard, V. Shutthanandan, L. Bergman, J. Huso, and M.D. McCluskey, [Suppression of conductivity in Mn-doped ZnO thin films](#), *J. Appl. Phys.* **105**, 013715:1-4 (2009).
66. P. Grivickas, M.D. McCluskey, and Y.M. Gupta, [Transformation of GaAs into an indirect \$L\$ band gap semiconductor under uniaxial strain](#), *Phys. Rev. B* **80**, 073201:1-4 (2009).
65. K.K. Zhuravlev, W.M. Hlaing Oo, M.D. McCluskey, J. Huso, J.L. Morrison, and L. Bergman, [X-ray diffraction of \$Mg_xZn_{1-x}O\$ and ZnO nanocrystals under high pressure](#), *J. Appl. Phys.* **106**, 013511:1-4 (2009).
64. J.L. Schei, M.D. McCluskey, A.J. Foust, X.-C. Yao, and D.M. Rector, [Action potential propagation imaged with high temporal resolution near-infrared video microscopy and polarized light](#), *NeuroImage* **40**, 1034-43 (2008).
63. P. Grivickas, M.D. McCluskey, and Y.M. Gupta, [Band-gap luminescence of GaP:S shock compressed to 5 GPa](#), *Appl. Phys. Lett.* **92**, 142104:1-3 (2008).
62. W.M. Hlaing Oo, M.D. McCluskey, Y.P. He and Y.P. Zhao, [Strong Fano resonance of oxygen-hydrogen bonds on oblique angle deposited Mg nanoblades](#), *Appl. Phys. Lett.* **92**, 183112:1-3 (2008).
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PATENTS

- M.D. McCluskey, [Digital confocal optical profile microscopy](#), No. US 9,891,422 B2
 - Filed 9/05/2013, granted 2/13/2018
 - Provisional application No. 61/700,198, filed 9/12/2012
- M.D. McCluskey, [Modular scanning confocal optical profile microscopy with digital image processing](#), No. US 10,989,903 B2
 - Filed 2/26/2019, granted 4/27/2021
 - Provisional application No. 62/635,134, filed 2/26/2018

PRESENTATIONS (past 10 years, oral contributions unless noted)

- “Defects in gallium oxide,” Physical Behavior of Materials DOE-BES PI Meeting, 2021 (invited poster)
- “Acceptors in gallium oxide,” Conference on Electronic Materials and Applications (EMA), APS March Meeting, 2021, and MRS Spring 2021 (all virtual)
- “Photoluminescence mapping of semiconductors with high spatial resolution,” OSA Optical Sensors and Sensing Congress, Applied Industrial Spectroscopy, 2020 (virtual)
- “Using light to change defects in titanate semiconductors,” GRC on Defects in Semiconductors, 2020 (invited, conference canceled due to COVID-19)
- “Defining insulating regions on TiO₂ thin films by laser heating,” Conference on the Physics and Chemistry of Surfaces and Interfaces (PCSI-47), 2020 (oral and poster)
- “Defects in oxide semiconductors and ternary alloys,” Physical Behavior of Materials DOE-BES PI Meeting, 2019 (invited)
- “Modifying the conductivity of strontium titanate by light exposure,” EMA, 2019 (invited)
- “Compensation and passivation of magnesium acceptors in β -Ga₂O₃,” GRC on Defects in Semiconductors, 2018 (poster)
- “Hydrogen is the prime suspect for persistent photoconductivity in SrTiO₃,” APS March Meeting, 2018
- “Acceptors in oxide semiconductors: The *p*-type quest continues,” ICDS-29, 2017 (invited plenary)
- “Zinc oxide and its alloys,” Physical Behavior of Materials DOE-BES PI Meeting, 2017 (invited poster)
- “Strange conductivity of strontium titanate,” APS March Meeting, 2017 (invited)
- “Evidence for a shallow Cu acceptor in Si,” 7th International Symposium on Advanced Science and Technology of Silicon Materials (JSPS Si Symposium), 2016 (invited)
- “Strange conductivity of strontium titanate,” GRC on Defects in Semiconductors, 2016 (poster)
- “Large persistent photoconductivity in SrTiO₃,” Photonics West, 2016
- “Acceptors in ZnO and SrTiO₃,” ICDS-28, 2015 (invited)
- “Acceptors in ZnO: Nitrogen will not work,” APSNW Meeting, 2015 (invited)
- “Acceptor defects in ZnO and related materials,” Physical Behavior of Materials DOE-BES Contractors Meeting, 2015 (invited poster)

- “Acceptor mysteries in ZnO,” International Conference on the Physics of Semiconductors (ICPS), 2014 (invited)
- “Characterization methods,” MRS Spring Meeting, 2014 (invited tutorial)
- “Persistent photoconductivity in bulk SrTiO₃,” MRS Spring Meeting, 2014
- “Persistent photoconductivity in SrTiO₃,” GRC on Defects in Semiconductors, 2014 (poster)
- “Defects and persistent conductivity in SrTiO₃,” ICDS-27, 2013
- “Confocal microscopy of fluids under static pressure,” APS SCCM Meeting, 2013
- “Acceptors in ZnO,” Physical Behavior of Materials DOE-BES Contractors Meeting, 2013 (invited)
- “Persistent photoconductivity in strontium titanate,” APS March Meeting, 2013
- “IR spectroscopy of impurities in silicon,” 6th International Symposium on Advanced Science and Technology of Silicon Materials (JSPS Si Symposium), 2012 (invited)
- “Acceptor dopants in bulk and nanoscale ZnO,” MRS Fall Meeting, 2012 (invited)
- “Acceptors in bulk and nanoscale ZnO,” APS March Meeting, 2012 (invited)
- “Experimental evidence for nitrogen as a deep acceptor in ZnO,” MRS Fall Meeting, 2011
- “Anisotropic direct-to-indirect band gap transition in shock- and ramp-wave compressed GaAs,” APS SCCM Meeting, 2011
- “Optical properties of doped ZnO nanocrystals and ceramics,” Physical Behavior of Materials DOE-BES Contractors Meeting, 2011 (invited poster)

Student/postdoc presentations (past 10 years)

- Syeed Ahmed, “Localized phase transition of TiO₂ thin films induced by sub-bandgap laser irradiation,” APS March Meeting, 2021 (virtual)
- Chris Pansegrau, “Persistent photoconductivity in barium titanate,” APS March Meeting, 2021 (virtual)
- Cassi Remple, “Fe³⁺ and Cr³⁺ photoluminescence of Fe doped β-Ga₂O₃,” APS March Meeting, 2021 (virtual)
- Jacob Ritter, “Hydrogen passivation of magnesium and calcium doped β-Ga₂O₃,” Photonics West, 2019
- Chris Pansegrau, “Effect of light on hydrogen in TiO₂,” GRC on Defects in Semiconductors, 2018 (poster)
- Jesse Huso, “Local vibrational modes and optical properties of ZnS_{1-x}O_x alloy films,” GRC on Defects in Semiconductors, 2016 (poster)
- Jacob Ritter, “Optical properties of thin film ZnSO,” GRC on Defects in Semiconductors, 2016 (poster)
- Anya Rasmussen, “In₂Se₃ phase transitions at high pressure and high temperature,” APSNW Meeting, 2015
- Xianjun Ye, “Scanning confocal microscopy using CCD and image processing,” APSNW Meeting, 2015
- Caleb Corolewski, “Lithium acceptors and hydrogen in zinc oxide,” APSNW Meeting, 2015
- Violet Poole, “On the role of point defects in the persistent photoconductivity of strontium titanate,” APSNW Meeting, 2015
- Anya Rasmussen, “Pressure-induced phase transitions in bulk and noncrystalline In₂Se₃,” ALS User Meeting, 2014 (poster and 5 min presentation)
- Anya Rasmussen, “Pressure-induced phase transformations of In₂Se₃,” APS SCCM Meeting, 2013

- Marianne Tarun, “Defects and room-temperature persistent photoconductivity in SrTiO₃,” Women in Physics Conference 2013, Simon Fraser University, Burnaby, B.C. Canada, 2013
- Marianne Tarun, “Experimental evidence of nitrogen deep acceptor in ZnO,” US Workshop on the Physics & Chemistry of II-VI Materials, 2012 (poster)
- Samuel Teklemichael, “Experimental investigation of acceptor and surface states of ZnO nanocrystals,” US Workshop on the Physics & Chemistry of II-VI Materials, 2012
- Samuel Teklemichael, “Acceptor and surface states of ZnO nanocrystals: a unified model,” GRC on Defects in Semiconductors, 2012 (poster)
- Marianne Tarun, “Nature of hydrogen-related defects in strontium titanate,” GRC on Defects in Semiconductors, 2012 (invited)
- Marianne Tarun, “Infrared spectroscopy of hydrogen-related defects in SrTiO₃,” Physical Electronics Conference, 2012
- Samuel Teklemichael, “Acceptor and surface states of ZnO nanocrystals: a unified model,” Physical Electronics Conference, 2012

SEMINARS (past 10 years)

- University of Idaho, Physics, 2010, 2014, 2018, 2021
- University of California Santa Barbara, Materials, 2018
- University of Washington, Physics, 2015
- Rensselaer Polytechnic Institute, Physics, 2006 and 2011
- WSU, Materials Science, 2011
- WSU, Voiland School of Chemical Engineering and Bioengineering, 2010

EXTERNAL FUNDING (past 10 years, sole PI unless noted)

- Persistent photoconductivity in titanate semiconductor crystals, NSF-DMR, 5/1/21–4/30/24, \$397k
- Fundamentals of doping and defects in Ga₂O₃ for high breakdown field electronics (PI: Scarpulla, University of Utah), DOD-Air Force, 8/1/21–9/30/24, McCluskey: \$300k
- Conference Grant – International Conference on Defects in Semiconductors, DOE-BES, 7/21/19–7/26/19, \$8k
- Conference Grant – International Conference on Defects in Semiconductors, International Union of Pure and Applied Physics (IUPAP), 7/21/19–7/26/19, €5k
- Defects in gallium oxide (PI: McCluskey, co-PI: Bergman), DOE-BES, 6/1/19–5/31/22, \$450k (WSU: \$263k)
- SBIR Phase II: Spectroscopy and imaging of irregular surfaces using confocal microscopy (PI: Lytel, Senior Personnel: McCluskey, Jokela), NSF, 8/1/18–7/31/20, \$881k
- SBIR Phase I: Spectroscopy and imaging of irregular surfaces using confocal microscopy (PI: Lytel, Senior Personnel: McCluskey, Jokela), NSF, 1/1/17–12/30/17, \$210k
- Acceptor defects in ZnO and related materials (PI: McCluskey, co-PI: Bergman), DOE-BES, 5/1/16–4/30/19, \$407k (WSU: \$263k)
- Persistent photoconductivity in strontium titanate and related oxides, NSF-DMR, 8/16/16–8/15/19, \$399k
- Acceptor defects in ZnO and related materials (PI: McCluskey, co-PI: Bergman), DOE-BES, 6/1/13–5/31/16, \$453k (WSU: \$273k)

- FRG: Structural phase transformations in polymorphic nanostructures (PI: Gu, co-PIs: McCluskey, Zhu), NSF-DMR, 7/1/12–6/30/16, \$610k (WSU: \$495k)
- Tailoring the functionality of ZnO via highly lattice mismatched and lattice matched alloying (PI: Bergman, co-PI: McCluskey), NSF-DMR, 7/1/12–6/30/15, \$432k (WSU: \$169k)
- Confocal microscopy of polymers under pressure, ACS-PRF, 9/1/11–8/31/13, \$100k
- Hydrogen in zinc oxide and related materials, NSF-DMR, 6/1/10–05/31/13, \$420k
- Optical properties of doped ZnO nanocrystals and ceramics (PI: McCluskey, co-PI: Bergman), DOE-BES, 6/1/10–5/31/13, \$453k (WSU: \$265k)

USER ALLOCATIONS

- *In₂Se₃ under pressure, from many layers to one*, high-pressure beamline 12.2.2, ALS, LBNL, 2019–20
- *Pressure induced phase transitions in crystalline and amorphous In₂Se₃*, high-pressure beamline 12.2.2, ALS, LBNL, 2014–16
- *Pressure-induced phase transitions in indium selenide, CHESS beamline B2*, 2012
- *Phase transformations of In₂Se₃ under pressure*, high-pressure beamline 12.2.2, ALS, LBNL, 2012–14
- *X-ray diffraction of ZnO, MgZnO, and CdZnO under pressure*, high-pressure beamline 12.2.2, ALS, LBNL, 2009–11
- *Local vibrational modes of hydrogen in III-V semiconductors*, National Center for Supercomputing Applications (NCSA), Startup Allocation 2008–9, Renewal 2009–10
- *Zinc oxide: A material for efficient light emission*, EMSL/PNNL, 2006–9

COURSES TAUGHT

- Physics 101 (General Physics, algebra-based), 6 semesters
- Physics 102 (General Physics, algebra-based), 2 semesters
- Physics 201 (Physics for Scientists and Engineers, calculus-based), 6 semesters
- Physics 303 (Modern Physics II), 4 semesters
- Physics 410 (Electronics), 4 semesters
- Physics 443 (Optics), 1 semester
- Physics 463 (Solid State), 5 semesters
- Physics 515 (Optoelectronics Lab), team taught, head instructor 2 semesters
- Physics 563 (Physics of the Solid State), 1 semester
- Physics 581 (Semiconductor Physics), 2 semesters
- Materials Science 571 (Surfaces), team taught, 6 semesters

INSTRUCTIONAL INNOVATIONS

- *The Physics of the Titanic*, a lecture that examines the sinking of the *RMS Titanic* from a physicist's point of view
- Peer-instruction exercises in upper-division and graduate solid state physics
- Thermal conductivity hands-on demonstration
- Development of new graduate course (Semiconductor Physics) and textbook
- Problem-solving textbook for algebra-based introductory physics

STUDENT EVALUATIONS

From 2010-2019, average instructor rating was 4.5 out of 5 ($\sigma = 0.3$). Comments from students:

- “Matthew McCluskey is by far one of the best professors I've had here. He is very clear in his teachings and extremely organized. Physics is a difficult topic, and he made it so easy to understand. Great enthusiasm as well.”
- “He was very knowledgeable about the material and was able to explain it clearly. He also did a lot of examples/practice problems during the lectures.”
- “I hated physics in HS. Detested it. This course showed me physics can be understood if it is taught well. Professor McCluskey did an outstanding job presenting the course and teaching effectively and in an enjoyable way.”
- “My favorite professor so far at WSU! Very clear and effective in lecture and was very enthusiastic about the subject!”
- “I love his sense of humor, which is something most profs lack.”
- “Course was hard, but also fun to learn about the material. He did a nice job in presenting the information in a way that was easily understandable.”

From 1999-2009, average instructor rating was 4.4 out of 5 ($\sigma = 0.2$). Comments from students:

- “He was great, the lectures were entertaining and very informative. I learned a lot during the lectures, and his homework assignments were long, but helpful in mastering the material.”
- “WSU has the right idea with instructors like McCluskey. I'm extremely disappointed he's not teaching 202.”
- “Class participation during class is GREAT! It keeps students awake and thinking. I encourage more of those kinds of activities.”
- “The most organized professor I've seen, bar none. The lecture notes provided were one of the most useful resources I've had for any class.”
- “This has been my favorite physics course yet. Everything was straightforward, lectures were well organized, and the homeworks were relevant to class material.”

UNDERGRADUATE RESEARCH SUPERVISION

Fiona McLary (2021), Leah Snyder (2018–21), Hannah Knaack (2015), Sonal Nanda (2014), Ben Whitfield (2013), Hillary Child (2010), Heather Ploeg (2008–10), Bobbie Riley (2006–8), Martha Roseberry (2007), Katie Epperson (2007), Andrew Ulrich (2005–6), Amy Perenchio (2005), Ben Horton (2004–5), Lance Culnane (2003), Daniel Grover (2001), Tyler Cumby (2001), Brooke Bafus (1999)

DISSERTATIONS (Ph.D. committee chair)

- Jacob Ritter, *Spectroscopy of defects in gallium oxide*, Physics Ph.D. 2019
- Violet Poole, *Persistent photoconductivity of strontium titanate*, Physics Ph.D. 2016
- Anya Rasmussen, *Pressure-induced phase transitions of indium selenide*, Physics Ph.D. 2016
- Samuel Teklemichael, *Defects in ZnO nanocrystals*, Physics Ph.D. 2012
- Marianne Tarun, *Hydrogen and related defects in oxide semiconductors*, Mat. Sci. Ph.D. 2012
- Jennifer Schei, *Optical imaging of neural and hemodynamic brain activity*, Physics Ph.D. 2011
- Gabriel Hanna, *Confocal microscopy of fluid argon under pressure*, Physics Ph.D. 2009

- Win Maw Hlaing Oo, *Infrared spectroscopy of zinc oxide and magnesium nanostructures*, Mat. Sci. Ph.D. 2007
- Slade Jokela, *Stability and structure of hydrogen defects in zinc oxide*, Mat. Sci. Ph.D. 2006
- Kirill Zhuravlev, *Infrared spectroscopy of conjugated organic molecules under high pressure*, Physics Ph.D. 2004

POSTDOCTORAL SUPERVISION

Jesse Huso (2016–19), Violet Poole (2016–18), Xianjun Ye (2013–17), Samuel Teklemichael (2012–13), Marianne Tarun (2012–13), Gabriel Hanna (2010), Slade Jokela (2008–9), Win Maw Hlaing Oo (2007–9), Hongying Peng (2001–3)

PRESS CITATIONS / QUOTATIONS (past 10 years)

- *WSU startup receives research grant*, WSU Insider, 9/18/2018
<https://news.wsu.edu/2018/09/18/wsu-startup-receives-research-grant/>
- *Writing with Light: An 'Etch A Sketch' Electrical Circuit*, Tech Briefs, 8/3/2017
<http://www.techbriefs.com/component/content/article/1198-ntb/news/news/27358-writing-with-light-an-etch-a-sketch-electric-circuit>
- *WSU physicists write with light, turn crystal into an electrical circuit*, WSU Today, 7/27/2017
<https://news.wsu.edu/2017/07/27/wsu-physicists-write-light-turn-crystal-electrical-circuit/>
- *Building a better microscope*, The Daily Evergreen, 1/17/2017
<https://dailyevergreen.com/6413/news/building-a-better-microscope/>
- *Seeing discoveries through clear eyes*, Moscow/Pullman Daily News, 1/14/2017
- *Need for a better microscope prompts launch of a startup*, WSU Today, 1/12/2017
<https://news.wsu.edu/2017/01/05/need-better-microscope-prompts-launch-startup/#more-153451>
- *Ask Dr. Universe*
<https://askdruniverse.wsu.edu/2016/10/31/how-do-cats-land-on-their-feet/>
<https://askdruniverse.wsu.edu/2015/09/28/why-is-space-so-cold/>
<https://askdruniverse.wsu.edu/2015/03/09/drifting-out-to-space/>
- *Can open access publishing be a smart career move?*, New Scientist issue 2983, 8/26/2014
<http://www.newscientist.com/article/dn26101-can-open-access-publishing-be-a-smart-career-move.html>
- *Scientist of the Week: Matthew McCluskey*, Laboratory Equipment, 12/5/2013
<http://www.laboratoryequipment.com/news/2013/12/scientist-week-matthew-mccluskey>
- *Accidental discovery dramatically improved conductivity*, WSU Today, 11/14/2013
<https://news.wsu.edu/2013/11/14/accidental-discovery-dramatically-improves-electrical-conductivity/#.VT-43iFVhBd>

VIDEOS

- *WSU Physics Dept. make accidental discovery that could help advance technology*, 2013
<http://www.klewtv.com/news/local/WSU-students-make-accidental-discovery-that-could-help-advance-technology-232665501.html>
- *Accidental discovery dramatically improves electrical conductivity*, 2013
<http://www.youtube.com/watch?v=WlcpzLbSsrY>
- *Ice in oil: A disappearing act*, 2011
<http://youtu.be/SKG46jJyL30>
- *Ice VI*, 2008
<http://www.youtube.com/watch?v=VLuQoNhVv3U>
- *Watermelon versus liquid nitrogen*, 2007
<http://www.youtube.com/watch?v=szBafBoN2nY>