

James M. Pientka, Ph.D.

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St. Bonaventure, NY 14778 USA

FIELDS OF EXPERTISE: Spintronics, Nanoscale Magnetism, Quantum Dots, Nanoplatelets, Quantum Many Body Theory, Computational Physics.

EDUCATION: 2007-2015, **University at Buffalo**, Buffalo, New York USA.
2003-2007, **Canisius College**, Buffalo, New York USA.

DEGREES: Ph.D., Physics, University at Buffalo.
B.S., Physics, Canisius College.
B.A., Adolescence Education, Canisius College.

ACADEMIC EXPERIENCE: 2023-Present, Professor of Physics & Chair, St. Bonaventure University.
2019-2023, Associate Professor of Physics & Chair, St. Bonaventure University.
2014-2019, Assistant Professor of Physics, St. Bonaventure University.
2014, Adjunct Professor of Physics, Erie Community College.
2011-2014, Adjunct Professor of Physics, Canisius College.
2009, Instructor of Physics, University at Buffalo.
2010-2014, Research Assistant, University at Buffalo.
2008-2010, Teaching Assistant, University at Buffalo.

PUBLICATIONS: **Articles (in refereed journals)**

L. Alwafi, A. Datta, J. M. Pientka, B. Barman, Excitation wavelength dependent photon emission and phase change probing in CsPbBr₃ quantum dots, *Solid State Communications* 366-367, 115136 (2023).

J. Volný, K. Charvátová, M. Veis, V. Holý, M. Vondráček, J. Honolka, E. Duverger-Nédellec, J. Schusser, S. W. D'Souza, J. Minár, J. M. Pientka, A. Marmodoro, K. Výborný, and K. Uhlířová, Single-crystal studies and electronic structure investigation of the room-temperature semiconductor NaMnAs, *Phys. Rev. B* 105, 125204 (2022).

A. Naja, M.Sharma, S. Delikanli, A. Bhattacharya, J R. Murphy, J. Pientka, A. Sharma, A. P. Quinn, O. Erdem, S. Kattel, Y. Kelestemur, M. V. Kovalenko, W. D. Rice, H. V. Demir, A. Petrou, Light-Induced Paramagnetism in Colloidal Ag⁺ Doped CdSe Nanoplatelets, *J. Phys. Chem. Lett.* 12 (11), 2892 (2021).

A. Naja, S. Tarasek, S. Delikanli, P. Zhang, T. Noden, S. Shendre, M. Sharma, A. Bhattacharya, N. Taghipour, J. Pientka, H. V. Demir, A. Petrou, T. Thomay, CdSe/CdMnS Nanoplatelets with Bilayer Core and Magnetically Doped Shell Exhibit Switchable Excitonic Circular Polarization: Implications for Lasers and Light-Emitting Diodes. *ACS Appl. Nano Mater.* 3 (4), 3151 (2020).

B. Barman, J.M. Pientka, J.R. Murphy, A.N. Cartwright, W.C. Chou, W.C. Fan, R. Oszwaldowki, A. Petrou, Circular Polarization Dynamics during Magnetic Polaron Formation in Type-II Magnetic Quantum Dots. *The Journal of Physical Chemistry C* 124, 12766-12773 (2020)

P. Zhang, T. Norden, J. M. Pientka, R. Oszwaldowski, A. Naja, B. Barman, Y. Tsai, W. C. Fan, W. C. Chou, J. E. Han, I. Zutic, B. D. McCombe, and A. Petrou, Optical control of carrier wavefunction in magnetic quantum dots. *The Journal of Physical Chemistry C* 123 (42), 25934 (2019).

D. Rederth, R. Oszwaldowski, A. Petukhov, and J. M. Pientka, Multiband Electronic Structure of Magnetic Quantum Dots: Numerical Studies, *Acta Physica Polonica A* 113 (3), 343 (2018).

B. Barman, R. Oszwaldowski, L. Schweidenback, A. H. Russ, J. M. Pientka, Y. Tsai, W. C. Chou, W. C. Fan, J. R. Murphy, A. N. Cartwright, I. R. Sellers, A. G. Petukhov, I. Žutić, B. D. McCombe, and A. Petrou, Time-resolved magnetophotoluminescence studies of magnetic polaron dynamics in type-II quantum dots, *Phys. Rev. B* 92 (3), 035430 (2015).

J. M. Pientka, R. Oszwaldowski, A. G. Petukhov, J. E. Han, and I. Žutić, Magnetic ordering in quantum dots: Open versus closed shells, *Phys. Rev. B* 92 (15), 155402 (2015).

B. Barman, Y. Tsai, T. Scrace, J. R. Murphy, A. N. Cartwright, J. M. Pientka, I. Žutić, B. D. McCombe, A. Petrou, I. R. Sellers, R. Oszwaldowski, A. G. Petukhov, W. C. Fan, W. C. Chou, and C. S. Yang, Conventional vs. Unconventional Magnetic Polarons: ZnMnTe/ZnSe and ZnTe/ZnMnSe Quantum Dots, *Proc. SPIE*, vol. 9167, 91670L (2014).

J. M. Pientka, R. Oszwaldowski, A. G. Petukhov, J. E. Han and I. Žutić, Reentrant Formation of Magnetic Polarons in Quantum Dots, *Phys. Rev. B* 86, 161403(R) (2012).

S. Fujita, J. M. Pientka and A. Suzuki, On van Hove Singularities in Pure Cubic Crystals. *Mod. Phys. Lett. B* 26, 1250091 (2012).

Other Publications

Co-author the solution manual to S. Fujita and S. Godoy, *Mathematical Physics. Wiley-VCH, 2010.*

PAPER PRESENTED **International Conferences**

& PARTICIPATION IN

PROFESSIONAL

MEETINGS

R. Oszwaldowski, D. Rederth, J. M. Pientka, and A. G. Petukhov, Magnetic Polarons in Semiconductor Quantum Dots, The European Conference PHYSICS OF MAGNETISM 2017, Poznań, Poland, June 26-30, 2017.

National Conferences

J. M. Pientka, A. Bhattacharya, P. Zhang, S. Delikanli, F. Isik, H. V. Demir, X. Zhang, A. Petrou, Experimental and Theoretical Studies of CdSe/CdMnS core/shell nanoplatelets in variable magnetic fields, APS March Meeting, Las Vegas, Nevada, March, 2023.

J. M. Pientka, A. Bhattacharya, P. Zhang, S. Delikanli, F. Isik, H. V. Demir, X. Zhang, A. Petrou, Magnetic field dependence of the recombination times in CdSe/CdMnS core/shell nanoplatelets, APS March Meeting, Chicago, Illinois, March, 2022.

J. M. Pientka, A. Naja, S. Tarasek, P. Zhang, T. Norden, S. Shendre, M. Sharma, A. Bhattacharya, N. Taghipour, H. V. Demir, A. Petrou, T. Thomay, Modeling of the Mn-Carrier Exchange Interaction in Colloidal CdSe/CdMnS Nanoplatelets with a Multilayer Core and Magnetically Doped Shell, APS March Meeting, Denver, Colorado, March, 2020.

T. De Campos, J. M. Pientka, Alex M. Abiague, J. E. Han, A. Bhattacharya, J. M. Pientka, I. Žutić, Correlated States and Frustration in Magnetic Quantum Dots with Multiple Occupancy, APS March Meeting, Denver, Colorado, March, 2020.

A. Naja, S. Tarasek, S. Delikanli, P. Zhang, T. Norden, S. Shendre, M. Sharma, A. Bhattacharya, N. Taghipour, J. Pientka, H. V. Demir, A. Petrou, T. Thomay, Switchable Excitonic Circular Polarization in CdSe/CdMnS Nanoplatelets with Bilayer Core and Magnetically Doped Shell, APS March Meeting, Denver, Colorado, March, 2020.

J. M. Pientka, P. Zhang, T. Norden, A. Naja, B. Barman, Y. Tsai, B. D. McCombe, J. E. Han, I. Žutić, A. Petrou, R. Oszwaldowski, W. C. Fan, W-C. Chou, Modification of the Heavy Hole Wave-function in Multiply Occupied Magnetic Quantum Dots, APS March Meeting, Boston, Massachusetts, March, 2019.

T. De Campos, J. M. Pientka, Alex M. Abiague, J. E. Han, A. Bhattacharya, J. M. Pientka, I. Žutić, Correlated states in magnetic quantum dots with multiple occupancy, APS March Meeting, Boston, Massachusetts, March, 2019.

A. Naja, P. Zhang, T. Norden, A. Bhattacharya, J. M. Pientka, S. Shendre, S. Delikanli, H. V. Demir, A. Petrou, Confined excitons in CdSe/CdMnS and CdSe/ZnMnS nanoplatelets, APS March Meeting, Boston, Massachusetts, March, 2019.

J. M. Pientka, P. Zhang, T. Norden, A. Naja, B. Barman, Y. Tsai, B. D. McCombe, J. E. Han, I. Žutić, A. Petrou, R. Oszwaldowski, W. C. Fan, and W-C. Chou, Modeling of ZnTe Quantum Dots (QDs) embedded in a ZnMnSe matrix, APS March Meeting, Los Angeles, California, March, 2018.

P. Zhang, T. Norden, A. Naja, B. Barman, Y. Tsai, B. D. McCombe, I. Žutić, A. Petrou, W. C. Fan, W. C. Chou, J. M. Pientka and R. Oszwaldowski, Dependence of the Magneto-optical Properties on Laser Excitation in ZnTe/ZnMnSe QDs. 116th Topical Symposium of the APS New York State Section (Poster Presentation), SUNY Buffalo, Buffalo, NY, Apr 21- 22, 2017.

J. M. Pientka, B. Barman, L. Schweidenback, A. H. Russ, Y. Tsai, J. R. Murphy, A. N. Cartwright I. Žutić, B. D. McCombe, A. Petrou, W-C. Chou, W. C. Fan, I. R. Sellers, A. G. Petukhov, and R. Oszwaldowski, Modeling of magnetic polaron properties in (Zn,Mn)Te quantum dots, APS March Meeting, Baltimore, Maryland, March, 2016.

A. Matos-Abiague , J. M. Pientka , J. E. Han and Igor Žutić, Driven magnetic patterns in quantum dots. APS March Meeting, San Antonino, Texas, March, 2015.

J. M. Pientka, I. Žutić and J. E. Han, Ground State Properties of Magnetic Quantum Dots with Multiple Occupancies. APS March Meeting, San Antonino, Texas, March, 2015.

J. M. Pientka, R. Oszwaldowski, A. G. Petukhov, J. E. Han and Igor Žutić, Spin Ordering and Fluctuations in Magnetic Quantum Dots. APS March Meeting , Denver, Colorado, March, 2014.

J. M. Pientka, R. Oszwaldowski, A. G. Petukhov, J. E. Han and Igor Žutić, The Optimization of Magnetic Ordering in Quantum Dots. APS March Meeting , Baltimore, Maryland, March, 2013.

J. M. Pientka, R. Oszwaldowski, A. G. Petukhov, J. E. Han and Igor Žutić, Reentrant Magnetic Polaron Formation in Quantum Dots. APS March Meeting , Boston, Massachusetts, March, 2012.

J. M. Pientka, R. Oszwaldowski, A. G. Petukhov, J. E. Han and Igor Žutić, Quasi-Equilibrium Ordering in Magnetic Quantum Dots. NewSpin2 (Poster Presentation), College Station, Texas, December, 2011.

J. M. Pientka, R. Oszwaldowski, A. G. Petukhov, J. E. Han and Igor Žutić, Non-equilibrium Magnetic Ordering in Quantum Dots. APS March Meeting , Dallas, Texas, March, 2011.

Invited Talks

J. M. Pientka, The Great American Eclipse 2023/2024: Understanding the Eclipse Phenomenon and the Unveiling of Stars, Ibague, Colombia

J. M. Pientka, R. Oszwałdowski, A. G. Petukhov, J. E. Han and Igor Žutić, Magnetic Ordering and Thermally Enhanced Magnetism in Quantum Dots. AMMCS-2013, Waterloo, Ontario, Canada, August, 2013.

J. M. Pientka, R. Oszwałdowski, A. G. Petukhov, J. E. Han and Igor Žutić, Non-equilibrium Magnetic Ordering in Quantum Dots. Canisius College, Buffalo, New York, March, 2011.

Supervised Talks Presented by Saint Bonaventure Students

A. Wilson and J.M.Pientka, Monte Carlo Simulations of Magnetic Quantum Dots, Arts and Science Exposition, St. Bonaventure, New York, April, 26 2018.

J.Bosworth, P.Zhang, T. Norden, B.Barman, J.M.Pientka, and A.Petrou, Magnetic Quantum Dots, Arts and Science Exposition, St. Bonaventure, New York, April, 26 2017.

TEACHING

St. Bonaventure University

Undergraduate Courses

Engineering (ENGR) 220	Introduction to MatLab, Spring(19,21,23).
Engineering (ENGR) 252	Engineering Mechanics, Fall(22).
Physical Science (PHSC) 101	Earth Science, Spring(23).
Physical Science (PHSL) 101	Earth Science Laboratory, Fall (23), Spring(23).
Physical Science (PHSC) 106	Stars and Stellar Systems, Fall(14-23), Spring(15-24), Summer(19-23),Winter(23-24).
Physical Science (PHSC) 113L	Astronomy Laboratory, Fall(17,19-21,23), Spring(17-22), Summer(19-23),Winter(23-24).
Physical Science (PHSC) 115	Alternative Energy Sources, Fall (20,21,22),Spring(24).
Physics (PHYS) 103	General Physics I, Fall(14-19), Spring(21), Summer(15,16).
Physics (PHYL) 103	General Physics Laboratory I, Fall(14,15,18), Summer(16).
Physics (PHYS) 104	General Physics II, Spring(15-20), Summer(15,16).
Physics (PHYL) 104	General Physics Laboratory II, Spring(15,16), Summer(15,16).
Physics (PHYS) 201	Theoretical Mechanics, Fall(16,19,22), Spring 23.
Physics (PHYS) 203	Modern Physics and Quantum Mechanics, Spring(17,24).
Physics (PHYS) 301	Electricity and Magnetism I, Fall (15,18,21,23).
Physics (PHYS) 302	Electricity and Magnetism II, Spring(16,18,22,24).
Physics (PHYS) 304	Thermodynamics, Spring(15,24), Fall(20).
Physics (PHYS) 309	Experimental Physics I, Fall 17, Spring(20,22).
Physics (PHYS) 312	Internship in Applied Physics, Spring(17,18,20).
Physics (PHYS) 406	Introductory Quantum Mechanics, Fall(16,21).
Physics (PHYS) 451	Applied Prob. Computational Physics, Spring(21).
Physics (PHYS) 490	Senior Comprehensives, Spring (20-22).

Independent Studies

Jacob Bosworth, Magnetic Quantum Dots.

Aidan Wilson, Monte Carlo Simulations of Magnetic Quantum Dots.

Benjamin D. MacConnell, Johnathan Ek, Richard Leisure, Thermodynamics of Magnetic Quantum Dots.

Other Teaching (Prior to Employment at St. Bonaventure University)

Undergraduate Courses at Erie Community College

Physics 109 General Physics, Spring 14.

Undergraduate Courses at Canisius College

Physics 201 General Physics I, Spring 13.
Physics 202 General Physics II, Spring(11,13,14).

Undergraduate Courses at the University at Buffalo

Physics 107 General Physics I, Summer 09.

PROFESSIONAL ORGANIZATIONS

American Physical Society

PROFESSIONAL DEVELOPMENT

Facilitating Learning in an Honors Course Workshop
SBU Dual Enrollment Course Development Workshop
2018 STEM Summer Teacher Workshop, Co-organizer.

COMMITTEES AND SERVICE

Committee Work

Environmental Studies Steering Committee, Fall 15-Current.
Health Professional Evaluations Committee, Spring 16-Current.
Faculty Welfare and Status Committee, Fall 16-Spring 19.
Fulbright Committee, Fall 16-Current.
Natural Science General Education Committee, Fall 16-Spring 17 .
Academic Standards Committee Fall 19-Spring 20, Chair(23,24).
President Search Committee May 21-March 22. Interim Dean of Arts & Sciences Search Committee Summer(23) Dean of Arts & Sciences Search Committee Fall(23)-Spring(24)

Service Work Faculty Senator Science Representative (22-25)

Participate in Admissions recruitment events (Met with visiting students, Open House, Welcome Days, Scholars Day)

Served as the Twin Tiers Regional Science Fair Director Fall 16-Fall 20

Club Advisement

ORION Astronomy Club-Academic Club, about 40 active club members.

Smash Bros. Club-Recreational Club, about 20 active club members, Spring 17-current

Academic Service Outside St Bonaventure University

Judged Science Fair Projects at Local Secondary Schools.

I am currently a referee for the following peer-reviewed physics journals: Physical Review B and Physica Status Solidi B: Basic Solid State Physics.

Presented talks for the Community for CALM's Science on Tap:

J. M. Pientka, Physics and Beer, New York, April, 2018.

J. M. Pientka, Taco Thursday With a Side of Black Holes, Olean, New York, April, 2019.

J. M. Pientka, Magnetism Does Size Matter? (from Macro to Nano), Olean, New York, November, 2021.

J. M. Pientka, A Quantum Mechanics Mystery, Olean, New York, April, 2023.

J. M. Pientka, Computational Modeling with Monte Carlo Simulations, Olean, New York, November, 2023.

University at Buffalo (North), Buffalo, New York USA: Organization of a summer workshop with the participation of high-school students and teachers for the Buffalo area as part of an outreach on “Introduction to Optics and Lasers”, July 2013.

HONORS AND
AWARDS

Frank B. Silverstro Fellowship, 2010-2014.

University at Buffalo (North) Outstanding Teaching Assistant Award, 2009.

V.A. Ruskiewicz Memorial Prize for High Distinction in Physics, 2007.

Canisius College Merit Scholarship, 2003-2007.

Delores Miller Science Teacher Scholarship, 2003.

COMPUTER SKILLS

- Languages: C++, C , Fortran 77, Unix shell scripts, MPI parallel processing library, OpenMp, Mathematica, MatLab
- Applications: Gnuplot, L^AT_EX, Microsoft Office .
- Algorithms: Monte Carlo Simulation, Exact Diagonalization .
- Operating Systems: Unix OS, Windows 7.