

# Curriculum Vita

## *Christopher S. Baird*

Associate Professor of Physics  
Department of Chemistry and Physics  
West Texas A&M University  
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## EDUCATION

**Ph.D. in Physics**, *University of Massachusetts Lowell (UMass Lowell)* 2007  
*Dissertation Title: "Design and Analysis of an Euler Transformation Algorithm Applied to Full-Polarimetric ISAR Imagery"*  
*Advisor: Robert H. Giles, Professor, Department of Physics*

**B.S. in Physics**, *Brigham Young University* 2001  
*Minor: Mathematics, Emphasis: Computer Science*

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## HONORS AND AWARDS

**Outstanding Professional Service Award, College Level** 2022  
*Paul Engler College of Agriculture and Natural Sciences*  
*West Texas A&M University*

**Physics Graduate Student of the Year Award** 2005  
*University of Massachusetts Lowell*

**First-Year Physics Graduate Student of the Year Award** 2003  
*University of Massachusetts Lowell*

**Dean's List** 1999-2001  
*Brigham Young University*

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**INSTRUCTIONAL RESPONSIBILITIES AT WEST TEXAS A&M UNIVERSITY**
***COURSES TAUGHT AT WEST TEXAS A&M UNIVERSITY***

<b>General Physics I</b> (PHYS 1401)	2016-2023
<b>General Physics II</b> (PHYS 1402)	2017-2023
<b>Calculus Physics I</b> (PHYS 2425)	2016-2023
<b>Calculus Physics II</b> (PHYS 2426)	2017-2023
<b>Electromagnetism</b> (PHYS 3340)	2016, 2018, 2020
<b>Optics</b> (PHYS 4330)	2017

***SUPERVISION OF STUDENT RESEARCH AT WEST TEXAS A&M UNIVERSITY***

<b>Marissa Lafferty</b> , B.S. in Physics	2017-2020
<b>Alec Baldwin</b> , B.S. in Physics	2018-2019

***OTHER INSTRUCTIONAL RESPONSIBILITIES AT WEST TEXAS A&M UNIVERSITY***

**Implementer of All Lower-Level Physics Lab Class Redesigns** 2019-2023

*Department of Chemistry and Physics*

Carried out extensive weekly surveys and discussions with teaching assistants to determine areas needing improvement, changes that should be made, and decisions that should be formalized. Implemented new physics lab class policies in response to these decisions. Wrote 16 physics lab class manuals, including the student and TA editions for every lower-level physics lab class, 1<sup>st</sup> and 2<sup>nd</sup> editions. Trained the TA's on all the changes during weekly meetings. Purchased new equipment to facilitate the updated experiments in the lab manuals, including tablet computers and wireless datalogger links.

**Supervisor of Physics Lab Classes** 2016-2023

Supervised the lab class components of General Physics I, General Physics II, Calculus Physics I, and Calculus Physics II. Supervised on average four lab classes per semester.

**Facilitator of Texas Physics Consortium (TPC) Classes** 2016-2023

Facilitated TPC classes taught remotely from other universities: administered tests, ensured the proper functioning of broadcast equipment, and helped students with homework problems. Facilitated on average two classes per semester.

**Trainer of Physics Teaching Assistants** 2019-2020

Trained all physics lab class teaching assistants on the use of equipment and the nature of effective teaching. These training sessions were typically held every Friday of the semester.

**INSTRUCTIONAL RESPONSIBILITIES AT UMASS LOWELL*****COURSES TAUGHT AT UMASS LOWELL***

**Graduate Electromagnetism I** 2008-2016

**Graduate Electromagnetism II** 2009-2016

***SUPERVISION OF STUDENT RESEARCH AT UMASS LOWELL***

**Robert Martin**, M.S. in Physics 2014-2016

**Duncan Pettengill**, B.S. in Physics 2012

**Christopher Emma**, B.S. in Physics 2012

**Karen Uttecht**, M.S. in Computer Science 2011-2012

**Adam Boudreau**, M.S. in Mathematics 2010-2012

**Philip Slingerland**, Ph.D. in Physics 2008-2011

**Thomas Socorelis**, B.S. in Mathematics 2010-2011

**Betty Makovoz**, B.S. in Mathematics 2010

**Bryan Crompton**, B.S. in Mathematics 2007-2010

**Alex Petrosillo**, B.S. in Mathematics 2009

**Sam O'Brien**, B.S. in Mathematics 2008

<b>Jareth Arnold</b> , B.S. in Physics	2007-2008
<b>Christopher Evans</b> , B.S. in Physics	2005-2007

***OTHER INSTRUCTIONAL RESPONSIBILITIES AT UMASS LOWELL***

<b>Teaching Assistant</b>	2002-2004
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Taught laboratory classes as a graduate student for General Physics 1, General Physics 2, and Exploring the Universe. Worked in the stock room setting up lab class equipment.

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**INTELLECTUAL CONTRIBUTIONS AT WEST TEXAS A&M UNIVERSITY**

***GRANTS AND AWARDS WHILE AT WEST TEXAS A&M UNIVERSITY***

<b>“Supporting Low-Income Students for Success in STEM Careers”</b>	2019-2024
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*National Science Foundation (NSF)*  
Co-Principal Investigator  
N. Flynn, C. Baird, D. Byers, G. McGovern  
Amount Awarded: \$999,545

***PEER REVIEWED PUBLICATIONS WHILE AT WEST TEXAS A&M UNIVERSITY***

C. Baird, “ <b>Lens (Optics)</b> ,” invited review article, <i>AccessScience</i> , McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum.	2022
C. Baird, “ <b>Line Spectrum</b> ,” invited review article, <i>AccessScience</i> , McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum.	2022
C. Baird, “ <b>Wave Motion</b> ,” invited review article, <i>AccessScience</i> , McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum.	2022
C. Baird, “ <b>Antenna (Electromagnetism)</b> ,” invited review article, <i>AccessScience</i> , McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum.	2022

- C. Baird, “**Electromagnetic Wave Transmission**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2021
- C. Baird, “**Interference of Waves**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2021
- C. Baird, “**Electromagnetic Field**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2021
- C. Baird, “**Electromagnetic Wave**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2021
- C. Baird, “**Radiation**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2019
- C. Baird, “**Magnetism**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2019
- C. Baird, “**Magnet**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2019
- C. Baird, “**Absorption of Electromagnetic Radiation**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2019
- C. Baird, “**Electromagnetic Radiation**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2019
- C. Baird, “**Electromagnetism**,” invited review article, *AccessScience*, McGraw-Hill, editors: Adam Hadhazy, Hilary Maybaum. 2019

C. Baird, M. Lafferty, “**Analysis of approximations used in terahertz quantum cascade laser doping calculations,**” *SPIE Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Application XII*, editors: Laurence P. Sadwick, Tianxin Yang, Vol. 9806. 2019

C. Baird, M. Lafferty, P. Slingerland, “**The effects of a common approximation used in the polarizability calculations of electron-electron subband screening in quantum well devices,**” *SPIE Low-Dimensional Materials and Devices*, editors: Nobuhiko P. Kobayashi, A. Alec Talin, M. Saif Islam, Albert V. Davydov, Vol. 10725. 2018

### ***CONFERENCE PRESENTATIONS WHILE AT WEST TEXAS A&M UNIVERSITY***

C. Baird, M. Lafferty, “**Minimizing the Lasing Frequency Fluctuations Arising from Temperature Variations in Terahertz Quantum Cascade Lasers,**” podium presentation, *American Physical Society Session of the Joint 2021 Texas Sections Meeting of the APS, AAPT, & SPS*, Corpus Christi, TX. 2021

M. Lafferty, C. Baird “**Terahertz Quantum Cascade Lasers: What is the Effect of Doping Locations on Lasing Frequency,**” poster presentation, *Texas Tech University Undergraduate Research Conference*, Lubbock, TX. 2020

C. Baird, M. Lafferty, “**Analysis of approximations used in terahertz quantum cascade laser doping calculations,**” podium presentation, *SPIE Photonics West Conference*, San Francisco, CA. 2019

M. Lafferty, C. Baird, “**Terahertz quantum cascade lasers: What are the typical values of the Fermi energy?**” poster presentation, *West Texas A&M University Student Research Conference*, Canyon, TX. 2019

M. Lafferty, C. Baird, “**Terahertz quantum cascade lasers: Determining the optimal waveguide for 1.5 THz,**” poster presentation, *Texas A&M System Pathways Student Research Symposium*, Canyon, TX. 2018

M. Lafferty, C. Baird, “**Computational investigation of waveguide effects in low-frequency terahertz quantum cascade lasers,**” invited podium presentation, *Conference for Undergraduate Women in Physical Sciences at the University of Nebraska-Lincoln*, Lincoln, NE. 2018

C. Baird, M. Lafferty, P. Slingerland, “**The effects of a common approximation used in polarizability calculations of electron-electron subband screening in quantum well devices,**” podium presentation, *SPIE Optics+Photonics Conference*, San Diego, CA. 2018

M. Lafferty, C. Baird, “**Terahertz quantum cascade lasers: Which electron population algorithm is the fastest?**” poster presentation, *West Texas A&M University Student Research Conference*, Canyon, TX. 2018

#### ***BOOKS/MANUALS WHILE AT WEST TEXAS A&M UNIVERSITY***

C. Baird, “**Calculus Physics 1 Lab Manual, 2<sup>nd</sup> Edition, TA Version,**” containing 12 lab class experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020

C. Baird, “**Calculus Physics 1 Lab Manual, 2<sup>nd</sup> Edition, Student Version,**” containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020

C. Baird, “**Calculus Physics 2 Lab Manual, 2<sup>nd</sup> Edition, TA Version,**” containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020

C. Baird, “**Calculus Physics 2 Lab Manual, 2<sup>nd</sup> Edition, Student Version,**” containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020

C. Baird, “**General Physics 1 Lab Manual, 2<sup>nd</sup> Edition, TA Version,**” containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020

C. Baird, “**General Physics 1 Lab Manual, 2<sup>nd</sup> Edition, Student Version,**” containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020

- C. Baird, "**General Physics 2 Lab Manual, 2<sup>nd</sup> Edition, TA Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020
- C. Baird, "**General Physics 2 Lab Manual, 2<sup>nd</sup> Edition, Student Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2020
- C. Baird, "**Calculus Physics 1 Lab Manual, 1<sup>st</sup> Edition, TA Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019
- C. Baird, "**Calculus Physics 1 Lab Manual, 1<sup>st</sup> Edition, Student Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019
- C. Baird, "**Calculus Physics 2 Lab Manual, 1<sup>st</sup> Edition, TA Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019
- C. Baird, "**Calculus Physics 2 Lab Manual, 1<sup>st</sup> Edition, Student Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019
- C. Baird, "**General Physics 1 Lab Manual, 1<sup>st</sup> Edition, TA Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019
- C. Baird, "**General Physics 1 Lab Manual, 1<sup>st</sup> Edition, Student Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019
- C. Baird, "**General Physics 2 Lab Manual, 1<sup>st</sup> Edition, TA Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019
- C. Baird, "**General Physics 2 Lab Manual, 1<sup>st</sup> Edition, Student Version,**" containing 12 experiments, approx. 70 pages, *Published by the WTAMU Print Shop* 2019



**REPORTS AS A PEER REVIEWER WHILE AT WEST TEXAS A&M UNIVERSITY**

- SPIE**, review of the proposed book, “Electromagnetic Theory and Applications for the Optical Engineer.” 2022
- McGraw-Hill**, review of the proposed book revision, “College Physics.” 2022
- Optics Letters**, review of the journal article, “Millimeter-level resolution through-the-wall radar imaging enabled by an optically injected semiconductor laser.” 2021
- Applied Optics**, review of the journal article, “Learned Linear Models for Detecting Watercraft in a Maritime Environment.” 2020
- Journal of Optics**, review of the journal article, “Polarimetric imaging method for target enhancement in haze based on polarimetric retrieval.” 2018
- Oak Ridge Associated Universities**, review of three research grant proposals as part of the Applied Sciences Panel. 2018
- Oak Ridge Associated Universities**, review of three research grant proposals as part of the Physical Sciences Panel. 2018
- Journal of Optics**, review of the journal article, “Underwater polarimetric imaging for visibility enhancement utilizing active unpolarized illumination.” 2018
- Applied Optics**, review of the journal article, “Canonical scattering coefficients upward recursion algorithm for multilayered sphere or long cylinder with large size parameters.” 2018
- AIP Advances**, review of the journal article, “Theoretical and experimental study of echo fluctuation suppression of cirrus cloud by millimeter wave MIMO radar.” 2017

**Optics Express**, review of the journal article, "Linearized inversion methods for three-dimensional electromagnetic imaging in the multiple scattering regime." 2017

**Applied Optics**, review of the journal article, "Laterally coupled distributed feedback type-I quantum well cascade diode lasers emitting near 3.22  $\mu\text{m}$ ." 2017

**Journal of Optics**, review of the journal article, "Object detection with a hyperspectral polarimetric imager based on double-filtering technology." 2017

**Journal of Applied Physics**, review of the journal article, "Terahertz quantum cascade laser with an X-valley-based injector." 2017

**Journal of Applied Physics**, review of the journal article, "Cross section equivalence between photons and non-relativistic massive particles for targets with complex geometries." 2016

***LOCAL SEMINAR PRESENTATIONS WHILE AT WEST TEXAS A&M UNIVERSITY***

C. Baird, M. Lafferty, "**Fermi Energy Effects in Terahertz Quantum Cascade Lasers**," podium presentation, Department of Chemistry and Physics, *West Texas A&M University*, Canyon, TX. 2019

C. Baird, M. Lafferty, A. Baldwin, "**Electron dynamics in terahertz quantum cascade lasers**," podium presentation, Department of Chemistry and Physics, *West Texas A&M University*, Canyon, TX. 2018

C. Baird, "**Terahertz quantum cascade laser computational research**," podium presentation, Dept. of Chem. and Phys., *West Texas A&M University*, Canyon, TX. 2017

C. Baird, "**Wind turbine defect detection using terahertz imaging**," invited podium presentation, *North American Wind Research and Training Center*, Tucumcari, NM. 2016

C. Baird, “**Terahertz imaging: From quantum cascade lasers to wind turbine defect detection,**” invited podium presentation, Department of Chemistry and Physics, *West Texas A&M University*, Canyon, TX. 2016

**RESEARCH POSITIONS WHILE AT WEST TEXAS A&M UNIVERSITY**

**Associate Professor of Physics** 2022-2023  
*Department of Chemistry and Physics, West Texas A&M University*  
Research Projects: Terahertz Quantum Cascade Lasers, Quantum Well Physics

**Assistant Professor of Physics** 2016-2022  
*Department of Chemistry and Physics, West Texas A&M University*  
Research Projects: Terahertz Quantum Cascade Lasers, Quantum Well Physics

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**INTELLECTUAL CONTRIBUTIONS AT UMASS LOWELL**

**GRANTS AND AWARDS WHILE AT UMASS LOWELL**

**“Large Area Turbine Blade Inspection,”** 2015  
*National Science Foundation (NSF)/WindSTAR*  
Co-Investigator  
C. Niezrecki, C. Baird  
Amount Awarded:  
\$81,511

**“Submillimeter-Wave Radar Signature Support”** 2011-2015  
*Department of Defense (DoD)*  
Co-Investigator  
R. Giles, A. Gatesman, C. Baird, T. Goyette  
Amount Awarded:  
\$21,656,780

**“Submillimeter-Wave Radar Signature Support”**

2006-2010

*Department of Defense (DoD)*

Co-Investigator

R. Giles, A. Gatesman, C. Baird, T. Goyette

Amount Awarded:

\$26,228,950***PEER REVIEWED PUBLICATIONS WHILE AT UMASS LOWELL***

R. Martin, C. Baird, R. Giles, C. Niezrecki, **“Terahertz ISAR and x-ray imaging of large area wind turbine blade structures,”** *SPIE Smart Materials and Nondestructive Evaluation for Energy Systems*, editor: Norbert G. Meyendorf, Vol. 9806. 2016

R. Martin, supervised by C. Baird, ***Analysis of polarimetric terahertz imaging for non-destructive detection of subsurface defects in wind turbine blades***, M.S. thesis, University of Massachusetts Lowell. 2016

P. Slingerland, C. Baird, R. Giles, **“Application of multi-subband self-consistent energy balance method to terahertz quantum cascade lasers,”** *Semiconductor Science and Technology*, editor: Koji Ishibashi, 27 (6). 2012

X. Qian, N. Chandrayan, S. Vangala, W. Goodhue, A. Danylov, J. Waldman, C. Baird, R. H. Giles, W. E. Nixon, **“One-half milliwatt 2.31 THz continuous-wave QCL operating at 77K,”** *SPIE Terahertz Technology and Applications V*, editors: Laurence P. Sadwick, Creidhe M. O'Sullivan, Vol. 8261. 2012

P. Slingerland, supervised by C. Baird, ***Temperature effects and transport phenomena in terahertz quantum cascade lasers***, Ph.D. dissertation, University of Massachusetts Lowell. 2011

P. Slingerland, C. Baird, R. Giles, **“The effects of various approximations on electron-electron scattering calculations in QCLs,”** *SPIE Terahertz Technology and Applications IV*, editor: Laurence P. Sadwick, Vol. 7938. 2011

- P. Slingerland, C. Baird, B. Crompton, R. Giles, W. E. Nixon, “**The effects of electron temperature in terahertz quantum cascade laser predictions,**” *SPIE Modeling and Simulation for Defense Systems and Applications V*, editor: Eric J. Kelmelis, Vol. 7705. 2010
- C. Baird, B. Crompton, P. Slingerland, R. Giles, W. E. Nixon, “**Optimization of semi-insulating surface-plasmon waveguides within terahertz QCL's using computational models,**” *SPIE Terahertz Physics, Devices, and Systems IV: Advanced Applications in Industry and Defense*, editors: Mehdi Anwar, Nibir K. Dhar, Thomas W. Crowe, Vol. 7671. 2010
- C. Baird, *Design and analysis of an Euler transformation algorithm applied to full-polarimetric ISAR imagery*, Ph.D. dissertation, University of Massachusetts Lowell. 2007
- C. Baird, R. Giles, W. E. Nixon, “**Development and assessment of a complete ATR algorithm based on ISAR Euler imagery,**” *SPIE Radar Sensor Technology XI*, editors: James L. Kurtz, Robert J. Tan, Vol. 6547. 2007
- C. Baird, W. T. Kersey, R. Giles, W. E. Nixon, “**Classification of targets using optimized ISAR Euler imagery,**” *SPIE Radar Sensor Technology X*, editors: Robert N. Trebits, James L. Kurtz, Vol. 6210. 2006
- C. Baird, *Classification of targets using optimized ISAR Euler imagery*, Advanced Projects thesis, University of Massachusetts Lowell. 2006
- C. Baird, W. T. Kersey, R. Giles, W. E. Nixon, “**Exploitation of ISAR imagery in Euler parameter space,**” *SPIE Radar Sensor Technology IX*, editors: Robert N. Trebits, James L. Kurtz, Vol. 5788. 2005
- CONFERENCE PRESENTATIONS WHILE AT UMASS LOWELL**
- R. Martin, C. Baird, R. Giles, C. Niezrecki, “**Terahertz ISAR and x-ray imaging of large area wind turbine blade structures,**” podium presentation, *SPIE Smart Structures NDE Conference*, Las Vegas, NV. 2016

- R. Martin, C. Niezrecki, R. Giles, C. Baird, “**Large area turbine blade inspection, June 2015,**” podium presentation, *WindSTAR IAB Conference*, Lowell, MA. 2015
- R. Martin, C. Niezrecki, R. Giles, C. Baird, “**Large area turbine blade inspection, Jan. 2015,**” podium presentation, *WindSTAR IAB Conference*, Dallas, TX. 2015
- X. Qian, N. Chandrayan, S. Vangala, W. Goodhue, A. Danylov, J. Waldman, C. Baird, R. H. Giles, W. E. Nixon, “**One-half milliwatt 2.31 THz continuous-wave QCL operating at 77K,**” podium presentation, *SPIE Photonics West Conference*, San Francisco, CA. 2012
- P. Slingerland, C. Baird, R. Giles, “**The effects of individual subband electron temperatures in terahertz quantum cascade laser predictions,**” podium presentation, *SPIE Defense, Security, and Sensing Conference*, Orlando, FL. 2011
- P. Slingerland, C. Baird, R. Giles, “**The effects of various approximations on electron-electron scattering calculations in QCLs,**” podium presentation, *SPIE Photonics West Conference*, San Francisco, CA. 2011
- C. Baird, B. Crompton, P. Slingerland, R. Giles, W. E. Nixon, “**Optimization of semi-insulating surface-plasmon waveguides within terahertz QCL's using computational models,**” podium presentation, *SPIE Defense, Security, and Sensing Conference*, Orlando, FL. 2010
- P. Slingerland, C. Baird, B. Crompton, R. Giles, W. E. Nixon, “**The effects of electron temperature in terahertz quantum cascade laser predictions,**” podium presentation, *SPIE Defense, Security, and Sensing Conference*, Orlando, FL. 2010
- C. Baird, R. Giles, W. E. Nixon, “**Development and assessment of a complete ATR algorithm based on ISAR Euler imagery,**” podium presentation, *SPIE Defense, Security, and Sensing Conference*, Orlando, FL. 2007

C. Baird, W. T. Kersey, R. Giles, W. E. Nixon, “**Classification of targets using optimized ISAR Euler imagery,**” podium presentation, *SPIE Defense, Security, and Sensing Conference*, Orlando, FL. 2006

C. Baird, W. T. Kersey, R. Giles, W. E. Nixon, “**Exploitation of ISAR Imagery in Euler Parameter Space,**” podium presentation, *SPIE Defense, Security, and Sensing Conference*, Orlando, FL. 2005

**REPORTS AS A PEER REVIEWER WHILE AT UMASS LOWELL**

**CRC Press**, review of the book, “Elastic scattering of electromagnetic radiation: analytic solutions in diverse backgrounds.” 2015

**NASA Postdoctoral Program**, review of a research grant proposal. 2015

**IEEE Transactions on Antennas and Propagation**, review of the journal article, “Global scattering center extraction for radar targets using a modified RANSAC Method.” 2015

**Applied Optics**, review of the journal article, “Electric field induced by a PEC strip placed in soil.” 2015

**Journal of Optics**, review of the journal article, “Adaptive polarimetric image representation for contrast optimization of a polarized beacon through fog.” 2015

**IEEE Transactions on Antennas and Propagation**, review of the journal article, “Classification of shell-shaped targets using RCS and fuzzy classifier.” 2015

**IEEE Transactions on Antennas and Propagation**, review of the journal article, “Hierarchical reconstruction and structural waveform analysis for target classification.” 2015

**NASA Postdoctoral Program**, review of a research grant proposal. 2014

- Optics Letters**, review of the journal article, “Enhancing the sensitivity of mid-IR QCL-based cavity-enhanced absorption spectroscopy using RF current perturbation.” 2014
- Applied Physics Letters**, review of the journal article, “Importance of the localization for inter-subband scattering rates in quasi two-dimensional structures.” 2013
- IEEE Transactions on Antennas and Propagation**, review of the journal article, “Wide-band imaging of canonical rotation-symmetric ballistic targets.” 2012
- Optics Express**, review of the journal article, “Indirectly pumped 3.7 THz InGaAs/InAlAs quantum-cascade lasers grown by metal-organic vapor-phase epitaxy.” 2012
- IEEE Transactions on Antennas and Propagation**, review of the journal article, “Kennaugh matrix phenomenology.” 2011

***LOCAL SEMINAR PRESENTATIONS WHILE AT UMASS LOWELL***

- R. Martin, supervised by C. Baird, “**Analysis of polarimetric terahertz imaging for non-destructive detection of subsurface defects in wind turbine blades**”, M.S. thesis defense presentation, *University of Massachusetts Lowell*, Lowell, MA. 2016
- C. Baird, “**CEM capabilities at STL**,” poster presentation, *University of Massachusetts Lowell*, Lowell, MA. 2015
- C. Baird, D. Pettengill, R. Giles, W. E. Nixon, “**Identification of the center of a rectangular vehicle in ISAR images using various methods**,” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2012
- C. Baird, C. Emma, R. Giles, W. E. Nixon, “**Use of the Xpatch scattering centers code**,” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2012



- C. Baird, D. Pettengill, R. Giles, W. E. Nixon, “**Automatic identification of the orientation of rectangular vehicles in ISAR images,**” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2012
- P. Slingerland, supervised by C. Baird, “**Temperature effects and transport phenomena in terahertz quantum cascade lasers,**” Ph.D. dissertation defense presentation, *University of Massachusetts Lowell*, Lowell, MA. 2011
- P. Slingerland, C. Baird, “**Study of electron temperature in quantum cascade lasers,**” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2010
- C. Baird, “**Electromagnetic scattering theory,**” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2009
- P. Slingerland, C. Baird, “**QCL fundamentals,**” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2009
- P. Slingerland, C. Baird, “**Rate equations and their implementation in QCLs,**” podium presentation, Dept. of Phys., *University of Massachusetts Lowell*, Lowell, MA. 2009
- P. Slingerland, C. Baird, “**QCL prediction code progress and rate equations,**” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2009
- C. Baird, “**Quantum cascade laser code prediction,**” podium presentation, Department of Physics, *University of Massachusetts Lowell*, Lowell, MA. 2009
- C. Baird, “**Terahertz quantum cascade lasers,**” poster presentation, *University of Massachusetts Lowell Research Symposium*, Lowell, MA. 2008

C. Baird, supervised by R. Giles, “**Design and analysis of an Euler transformation algorithm applied to full-polarimetric ISAR imagery,**” Ph.D. dissertation defense presentation, *University of Massachusetts Lowell*, Lowell, MA. 2007

C. Baird, R. Giles, “**Design and analysis of an automatic target recognition algorithm using optimized Euler ISAR imagery,**” podium presentation, *University of Massachusetts Lowell*, Lowell, MA. 2007

C. Baird, W. T. Kersey, R. Giles, W. E. Nixon, “**Classification of targets using optimized ISAR Euler imagery,**” Advanced Projects thesis defense presentation, *University of Massachusetts Lowell*, Lowell, MA. 2006

C. Baird, C. Evans, W. T. Kersey, R. Giles, “**Initial assessment of the STL Xpatch radar prediction system,**” podium presentation, *University of Massachusetts Lowell*, Lowell, MA. 2006

***NON-PEER REVIEWED PUBLICATIONS WHILE AT UMASS LOWELL***

C. Baird, “**Graduate Electromagnetics I and II Lecture Notes,**” 39 documents 2008-2016  
*Website:* [wtamu.edu/~cbaird/courses.html](http://wtamu.edu/~cbaird/courses.html)

C. Baird, “**Jackson Homework Solutions,**” 87 documents 2008-2016  
*Website:* [wtamu.edu/~cbaird/courses.html](http://wtamu.edu/~cbaird/courses.html)

C. Baird, “**Quantum Cascade Laser Theory Online Research Notes,**” 14 documents 2008-2011  
*Website:* [wtamu.edu/~cbaird/research\\_QCL\\_theory.html](http://wtamu.edu/~cbaird/research_QCL_theory.html)

***RESEARCH POSITIONS WHILE AT UMASS LOWELL AND BEFORE***

**Senior Scientist and Adjunct Research Faculty** 2007-2016  
*Submillimeter-Wave Technology Laboratory, University of Massachusetts Lowell*  
Research Projects: Terahertz Quantum Cascade Lasers, Wind Turbine Defect Detection, Radar Scattering Prediction and Analysis, ATR

- Research Assistant** 2004-2007  
*Submillimeter-Wave Technology Laboratory, University of Massachusetts Lowell*  
Research Projects: Radar Scattering Prediction and Analysis, Phenomenological Electromagnetic Scattering, Automatic Target Recognition
- Space Scholar** 2003  
*Air Force Research Laboratory, Hanscom Air Force Base*  
Research Project: Ionospheric Plume Dynamics Modeling
- Software Engineer in Research and Development** 2001-2002  
*ZServe Corporation, Provo, UT*  
Research Project: Social Media Analytics
- Research Assistant** 2000  
*Department of Biology, Brigham Young University*  
Research Project: Molecular Dynamics Modeling of Cell Membrane Ion Channels

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## **PROFESSIONAL SERVICE WHILE AT WEST TEXAS A&M UNIVERSITY**

### ***UNIVERSITY SERVICE WHILE AT WEST TEXAS A&M UNIVERSITY***

- Faculty Grievance Committee Pool** 2022-2023  
Served on Faculty Grievance Committee Pool, serving when selected from the pool.
- Promotion and Tenure Committee** 2022-2023  
*Paul Engler College of Agriculture and Natural Sciences*  
Served on the Promotion and Tenure Committee at the college level, reviewing all applications for promotion and tenure from within the college.
- Author of the Guide for New Texas Physics Consortium (TPC) Instructors** 2022-2023  
Wrote an 8-page Guide for New Texas Physics Consortium (TPC) Instructors, had it peer-reviewed, and then delivered it to the new TPC professors.

**WT 125 Generational and Strategic Planning Committee Member** 2017-2023

Served on the Undergraduate Academics theme group, attending and participating in all committee meetings. Gathered and analyzed data and helped write reports.

**Implementer of All Lower-Level Physics Lab Class Redesigns** 2019-2023

*Department of Chemistry and Physics*

Carried out extensive weekly surveys and discussions with teaching assistants to determine areas needing improvement, changes that should be made, and decisions that should be formalized. Implemented new physics lab class policies in response to these decisions. Wrote 16 physics lab class manuals, including the student and TA editions for every lower-level physics lab class, 1<sup>st</sup> and 2<sup>nd</sup> editions. Trained the TA's on all the changes during weekly meetings. Purchased new equipment to facilitate the updated experiments in the lab manuals, including tablet computers and wireless datalogger links.

**Society of Physics Students (SPS) Faculty Advisor** 2016-2023

Organized and participated in all SPS events and biweekly planning meetings. Trained and consulted with the SPS officers. Events included research presentations, public science lectures, fundraisers, service projects, field trips, and career workshops.

**S-STEM Scholars Faculty Mentor** 2019-2023

*Paul Engler College of Agriculture and Natural Sciences*

Regularly interviewed and mentored students about their academic performance and career progress as part of the NSF S-STEM grant.

**Physics Class Schedule Planner** 2019-2023

*Department of Chemistry and Physics*

Served as the department's class schedule planner for all physics classes.

**Supervisor of Physics Lab Classes** 2016-2023

Supervised the lab class components of General Physics I, General Physics II, Calculus Physics I, and Calculus Physics II. Supervised on average four lab classes per semester.

- Facilitator of Texas Physics Consortium (TPC) Classes** 2016-2023  
Facilitated TPC classes taught remotely from other universities: administered tests, ensured the proper functioning of broadcast equipment, and helped students with homework problems. Facilitated on average two classes per semester.
- Student Recommendation Letter Writer** 2016-2023  
Wrote more than 16 letters of recommendation for various students.
- Curriculum Committee Member** 2018-2021  
*Department of Chemistry and Physics*  
Attended all committee meetings and participated in communications as needed.
- New Student Orientation (NSO) and Transfer Student Orientation (TSO) Advisor** 2017-2021  
Served as an orientation advisor for most of the orientations held every year. Attended the orientation advisor training every year.
- Trainer of Physics Teaching Assistants** 2019-2021  
*Department of Chemistry and Physics*  
Trained all physics lab class teaching assistants on the use of equipment and the nature of effective teaching. These training sessions were typically held every Friday of the semester, except during the pandemic.
- Supervisor of Student Research** 2017-2021  
Supervised the original research of two students in the fields of quantum cascade lasers, quantum well physics, and computational physics. This research led to the successful completion of two capstone projects, four student research conference poster presentations, and one invited student research conference podium presentation.
- Physics Faculty Search Committee Member** 2019  
Reviewed and scored 21 applications, helped to phone interview 6 semi-finalists, and helped to on-site interview and host the 2 finalists.

**Student Research Conference Science Judge** 2017-2019

*West Texas A&M University Student Research Conference*

Served as poster judge, paper judge, and oral presentation judge.

**Host of the Visiting Fulbright Scholar Dr. Avashai Benyamini** 2017

Invited, organized, secured funding for, and facilitated the visit of this Fulbright scholar. This visit involved seven events, including research presentations, student discussions, and meals.

**Supporter of the Visiting Distinguished Lecturer Dr. Shane Larson** 2017

Advertised and helped facilitate the five events involved in this visit, which included research presentations, student discussions, and meals.

**Contributor to the Development of the Department Brochure** 2017

*Department of Chemistry and Physics*

### ***REGIONAL AND GLOBAL SERVICE WHILE AT WEST TEXAS A&M UNIVERSITY***

**Texas Physics Consortium (TPC) Registration and Access Coordinator** 2018-2023

*Texas A&M University System*

As the only Registration and Access Coordinator for all nine universities in the TPC, set up the academic accounts, course registration, network access, and course evaluations for all students, instructors, and facilitators in all TPC classes at all nine member universities. Created, updated, and organized all TPC enrollment files. This system-level position has demanded dedication of almost every waking hour to TPC duties during the entire two weeks preceding each regular semester.

**Author and Publisher of Science Articles for the General Public** 2016-2023

*"Science Questions with Surprising Answers," wtamu.edu/~cbaird/sq/*

Authored, designed, and self-published 9 science articles for the general public, in addition to the 340 articles written before coming to West Texas A&M University. Answered approximately 4100 science questions from readers of these articles via email, averaging 2.2 questions answered per day for 5 years. These articles have been quoted by Space.com, Weather.com, NASA, EarthSky, The HuffPost, UK Express

News, RealClearScience, the Library of Congress's Everyday Mysteries, and other media outlets.

**Author of the Guide for New Texas Physics Consortium (TPC) Instructors** 2022-2023

Wrote an 8-page Guide for New Texas Physics Consortium (TPC) Instructors, had it peer-reviewed, and then delivered it to the TPC professors teaching a TPC course for the first time.

**Science Consultant** 2022

*Newsweek*. As an invited consultant, provided information on the physics of auroras and the Russell-McPherron Effect.

**Reviewer of Book Proposal** 2022

*SPIE*. Served as a peer reviewer of a book proposal titled "Electromagnetic Theory and Applications for the Optical Engineer."

**Reviewer of Book Revision** 2022

*McGraw-Hill*. Served as a peer reviewer of a revision of a textbook titled "College Physics."

**Author of Short Article** 2021

*All About Space*. As an invited author, wrote a short article titled, "Can a Star Turn into a Planet?" July 2021 issue.

**Author of Short Article** 2021

*All About Space*. As an invited author, wrote a short article titled, "Where is the Edge of the Universe?" Jan. 2021 issue.

**Science Consultant** 2020

*Live Science*. As an invited contributor, provided extensive quotes and science consulting for an article titled, "What Color is the Sun?" published Dec. 2020.

- Author of Short Article** 2020  
*All About Space*. As an invited author, wrote a short article titled, “Why Don’t We See Galaxies Rotating?” Dec. 2020 issue.
- Peer Reviewer of a Research Article** 2020  
*Applied Optics*
- Student Research Conference Science Judge** 2018  
*Texas A&M University System Pathways Student Research Symposium*
- Peer Reviewer of a Research Article** 2018  
*Journal of Optics*
- Peer Reviewer of Three Grant Proposals** 2018  
*Oak Ridge Associated Universities, Physical Sciences Panel*
- Peer Reviewer of Three Grant Proposals** 2018  
*Oak Ridge Associated Universities, Applied Sciences Panel*
- Peer Reviewer of a Research Article** 2018  
*Journal of Optics*
- Peer Reviewer of a Research Article** 2018  
*Applied Optics*
- Member** 2017-2018  
*American Institute of Physics (AIP)*
- Member** 2017-2018  
*Institute of Electrical and Electronics Engineers (IEEE)*



<b>Member</b> <i>Optical Society of America (OSA)</i>	2017-2018
<b>Peer Reviewer of a Research Article</b> <i>AIP Advances</i>	2017
<b>Peer Reviewer of a Research Article</b> <i>Optics Express</i>	2017
<b>Peer Reviewer of a Research Article</b> <i>Applied Optics</i>	2017
<b>Peer Reviewer of a Research Article</b> <i>Journal of Optics</i>	2017
<b>Peer Reviewer of a Research Article</b> <i>Journal of Applied Physics</i>	2017
<b>Science Consultant</b> <i>Popular Mechanics Magazine</i>	2016
<b>Science Consultant</b> <i>Who Wants To Be a Millionaire Television Program</i>	2016
<b>Peer Reviewer of a Research Article</b> <i>Journal of Applied Physics</i>	2016

***LOCAL COMMUNITY SERVICE WHILE AT WEST TEXAS A&M UNIVERSITY***

<b>Assistant Scoutmaster &amp; Unit Commissioner</b> <i>Boys Scouts of America, Amarillo, TX</i> Organized and/or participated in troop-level and district-level boy scout events two to	2016-2020
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three times per week. Events included campouts, training meetings, merit badge workshops, robotics competitions, trips to museums, eagle projects, sports competitions, and service activities.

**Church Service Volunteer** 2016-2020  
*Church of Jesus Christ of Latter-day Saints, Amarillo, TX*  
Served in various local and regional church leadership positions.

**Student Research Conference Science Judge** 2018  
*Randall High School Science Research Conference, Amarillo, TX*

**Science Bowl Science Judge** 2017-2018  
*National Science Bowl Regional Competitions, Department of Energy*

**Solar Eclipse Science Demonstrator** 2017  
*2017 Solar Eclipse Viewing Event, Canyon Area Library, Canyon, TX*

**Science Demonstrator** 2016-2017  
*Canyon High School Family Science Night, Amarillo, TX*  
Organized and directed three different science demonstrations both years. Trained and directed the physics students from West Texas A&M University that helped run the demonstrations.

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## PROFESSIONAL SERVICE WHILE AT UMASS LOWELL

### *UNIVERSITY SERVICE WHILE AT UMASS LOWELL*

**Supervisor of Student Research** 2005-2016  
*University of Massachusetts Lowell*  
Supervised the original research of 13 students in the fields of quantum cascade lasers, wind turbine defect detection, and radar scattering. This research led to the successful completion of a student's Ph.D. dissertation on quantum cascade lasers and another

student's M.S. thesis on wind turbine defect detection, as well as numerous capstone projects and student presentations at research conferences.

**Physics Graduate Comprehensive Exam Committee Member** 2007-2016

*University of Massachusetts Lowell*

Wrote and corrected the written electromagnetism section of the exam every year.

Administered the oral electromagnetism section of the exam every year.

**Masters Thesis Defense Committee Chair for Robert Martin** 2016

*University of Massachusetts Lowell*

**Doctoral Dissertation Defense Committee Member for Brian Wells** 2015

*University of Massachusetts Lowell*

**Masters Thesis Defense Committee Member for Christopher Roberts** 2015

*University of Massachusetts Lowell*

**Doctoral Thesis Defense Committee Chair for Philip Slingerland** 2011

*University of Massachusetts Lowell*

**Masters Thesis Defense Committee Member for Robert Esposito** 2009

*University of Massachusetts Lowell*

***REGIONAL AND GLOBAL SERVICE WHILE AT UMASS LOWELL***

**Author and Publisher of Science Articles for the General Public** 2012-2016

*"Science Questions with Surprising Answers," wtamu.edu/~cbaird/sq/*

Authored, designed, and self-published 330 science articles for the general public.

Answered approximately 3100 science questions from readers of these articles via email, averaging 2.2 questions answered per day for 3.7 years. These articles have been quoted by Space.com, Weather.com, NASA, EarthSky, The HuffPost, UK Express News, RealClearScience, the Library of Congress's Everyday Mysteries, and other media outlets.

<b>Peer Reviewer of a Physics Textbook</b> <i>CRC Press</i>	2015
<b>Peer Reviewer of a Grant Proposal</b> <i>NASA Postdoctoral Program</i>	2015
<b>Peer Reviewer of a Research Article</b> <i>IEEE Transactions on Antennas and Propagation</i>	2015
<b>Peer Reviewer of a Research Article</b> <i>Applied Optics</i>	2015
<b>Peer Reviewer of a Research Article</b> <i>Journal of Optics</i>	2015
<b>Peer Reviewer of a Research Article</b> <i>IEEE Transactions on Antennas and Propagation</i>	2015
<b>Peer Reviewer of a Research Article</b> <i>IEEE Transactions on Antennas and Propagation</i>	2015
<b>Peer Reviewer of a Grant Proposal</b> <i>NASA Postdoctoral Program</i>	2014
<b>Peer Reviewer of a Research Article</b> <i>Optics Letters</i>	2014
<b>Peer Reviewer of a Research Article</b> <i>Applied Physics Letters</i>	2013
<b>Peer Reviewer of a Research Article</b> <i>IEEE Transactions on Antennas and Propagation</i>	2012

**Peer Reviewer of a Research Article** 2012  
*Optics Express*

**Peer Reviewer of a Research Article** 2011  
*IEEE Transactions on Antennas and Propagation*

***LOCAL COMMUNITY SERVICE WHILE AT UMASS LOWELL***

**Church Service Volunteer** 2007-2016  
*Church of Jesus Christ of Latter-day Saints, Nashua, NH*  
Served in various local and regional church leadership positions, attending meetings approximately two times per week.

**Art Teacher** 2014  
*Hudson Homeschooling Group, Hudson, NH*  
Taught pencil drawing and art technique once per week to children of all ages from different families.

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**PROFESSIONAL DEVELOPMENT**

**American Physical Society Session of the Joint 2021 Texas Sections Meeting** 2021  
*Research Conference, Corpus Christi, TX*

**SPIE Photonics West** 2019  
*Research Conference, San Francisco, CA*

**SPIE Optics+Photonics** 2018  
*Research Conference, San Diego, CA*

**Chip-Scale Terahertz Frequency Combs & Multiheterodyne Spectroscopy** 2017  
*Research Webinar, Optical Society of America*

- WindSTAR AIB** 2015  
*Research Conference, Lowell, MA*
- SPIE Defense, Security, and Sensing** 2010  
*Research Conference, Orlando, FL*
- Xpatch Electromagnetics Workshop** 2008  
*Professional Development Workshop, Urbana-Champaign, IL*
- SPIE Defense, Security, and Sensing** 2007  
*Research Conference, Orlando, FL*
- SPIE Defense, Security, and Sensing** 2006  
*Research Conference, Orlando, FL*
- SPIE Defense, Security, and Sensing** 2005  
*Research Conference, Orlando, FL*