***Curriulum Vitae* for Michael Courtney, PhD**

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Education

Ph.D. Massachusetts Institute of Technology, 1995
(Physics, GPA 4.7/5.0)

B.S. Louisiana State University – Baton Rouge, 1989
(Physics, GPA 3.95/4.0)

Further Education, Training, and Certifications:

United States Air Force *Supervisor's Course,* 2010, Maxwell AFB
United States Air Force *Civilian Personnel Management Course*, 2010, Maxwell AFB
USAFA Center for Excellence in Education *Course Administrators Workshop, 2010*
USAFA Department of Mathematical Sciences *Course Directors Training, 2010*
USAFA Department of Mathematical Sciences *New Instructor Training, 2009*
Western Carolina University *Adolescent Psychology*, 2007
Western Carolina University *Organic Chemistry*, 2006
Lorain County Community College *Music Theory I*, 2005
Lakeland Community College *Meteorology*, 2004
NRA Certified Instructor, *Basic Pistol, Personal Protection*, 2004 – 2008

Professional Background

July 2009 – Present
Assistant Professor of Mathematical Sciences and Director of Quantitative Reasoning Center – United States Air Force Academy, CO

January 2001 – Present
Principal Investigator – BTG Research

August 2008 – June 2009
Instructor of Mathematics and Physics – Hillsdale Academy, Hillsdale, MI

August 2006 – December 2006
Assistant Professor of Physics and Director of Forensic Science Program – Western Carolina University, Cullowhee, NC

August 2002 – June 2006
Assistant Professor of Physics – Lorain County Community College, Elyria, OH

March 2000 – June 2002
RF Test Engineer IV – Cisco Systems, Akron, OH

November 1995 – March 2000
Principal RF Test Engineer – Aironet Wireless Communications, Akron, OH

January 1995 – November 1995
Applications Engineer – IOTech, Cleveland, OH

August 1989 – December 1994
Doctoral Student, Research Assistant, also Teaching Assistant (August 1993 – December 1994)
Department of Physics, Massachusetts Institute of Technology, Cambridge, MA

August 1991 – May 1993
Calculus and Physics Tutor, Office of Minority Education – Massachusetts Institute of Technology, Cambridge, MA

June 1988 – August 1988, January 1989 – August 1989
Research Intern, Department of Chemistry – Brookhaven National Laboratory, Upton, NY

September 1986 – May 1988, September 1988 – December 1988
Research Assistant, Department of Physics and Astronomy – Louisiana State University, Baton Rouge, LA

August 1985 – September 1986
Laboratory Assistant, Center for Wetland Resources – Louisiana State University, Baton Rouge, LA

Professional Societies

International Ballistics Society (IBS), Lifetime Founding Member
Mathematical Association of America (MAA)
National Rifle Association, Life Member

Awards

Outstanding Academy Educator (OAE), DF Staff 2010-2011, USAF Academy, CO.
Finalist for American Physical Society Outstanding Doctoral Thesis Award in Atomic, Molecular, and Optical Physics, 1995.
Bachelor of Science degree awarded *summa cum laude.* August 1989. Louisiana State University, Baton Rouge.
University Medal (ranked first in class). August 1989. Louisiana State University, Baton Rouge.

Publications in External Ballistics

Michael Courtney and Amy Courtney, "Using Sound of Target Impact for Acoustic Reconstructions of Shooting Events," Medicine, Science, and the Law, 2012.

Michael Courtney, "Acoustic methods for measuring bullet velocity," Applied Acoustics, October 2008.

Michael Courtney and Don Miller, "A Stability Formula for Plastic-Tipped Bullets," Precision Shooting, January and February 2012.

Emily Bohnenkamp, Maurice Motley, and **Michael Courtney**, "Does Polishing a Rifle Bore Reduce Bullet Drag?" Precision Shooting, April 2011.

Emily Bohnenkamp, Bradford Hackert, Maurice Motley, and **Michael Courtney**, "Comparing Advertised Ballistic Coefficients with Independent Measurements," DTIC, 2012.

Alex Halloran, Colton Huntsman, Chad Demers, and **Michael Courtney**, "More Inaccurate Specifications of Ballistic Coefficients," DTIC, 2012.

Lionel Magee, Aaron Oats, and **Michael Courtney**, "Comparing Measured Bullet Weight with Manufacturer Specifications," DTIC, 2012.

Michael Courtney and Amy Courtney, "An Acoustic Method for Determining Ballistic Coefficients," Popular Physics, Cornell University Library, May 2007.

Michael Courtney and Amy Courtney, "The Truth about Ballistic Coefficients," Popular Physics, Cornell University Library, May 2007.

Michael Courtney and Brian Edwards, "Measuring Bullet Velocity with a PC Soundcard," Physics Education, Cornell University Library, January 2006.

Publications in Terminal Ballistics

Michael Courtney and Amy Courtney, "History and Evidence Regarding Hydrostatic Shock," Neurosurgery, February 2011.

Michael Courtney and Amy Courtney, "Comments on 'Ballistics: A Primer for the Surgeon'," Injury, March 2008.

Michael Courtney and Amy Courtney, "Apparent measurement errors in 'Development of biomechanical response corridors in the thorax to blunt ballistic impacts'," Journal of Biomechanics, February 2008.

Amy Courtney and **Michael Courtney**, "Links between traumatic brain injury and ballistic pressure waves originating in the thoracic cavity and extremities," Brain Injury, June 2007.

Amy Courtney and **Michael Courtney**, "Cerebrovascular injury caused by a high strain rate insult in the thorax," Medical Physics, Cornell University Library, May 2011.

Michael Courtney and Amy Courtney, "Misleading reference to unpublished wound ballistics data regarding distant injuries," Medical Physics, Cornell University Library, December 2008.

Michael Courtney and Amy Courtney, "The Ballistic Pressure Wave Theory of Handgun Bullet Incapacitation," Medical Physics, Cornell University Library, March 2008.

Michael Courtney and Amy Courtney, "Scientific Evidence for Hydrostatic Shock," Medical Physics, Cornell University Library, March 2008. Also DTIC 2010.

Michael Courtney and Amy Courtney, "A Method for Testing Handgun Bullets in Deer," Medical Physics, Cornell University Library, February 2007.

Michael Courtney and Amy Courtney, "Review of criticisms of ballistic pressure wave experiments, the Strasbourg goat tests, and the Marshall and Sanow data," Medical Physics, Cornell University Library, January 2007.

Michael Courtney and Amy Courtney, "Ballistic pressure wave contributions to rapid incapacitation in the Strasbourg goat tests," Medical Physics, Cornell University Library, January 2007.

Michael Courtney and Amy Courtney, "Relative incapacitation contributions of pressure wave and wound channel in the Marshall and Sanow data set," Medical Physics, Cornell University Library, January 2007.

Publications in Internal Ballistics

Patrick Boyle, Alexander Humphrey, Spencer Proctor, and **Michael Courtney**, "Measuring Barrel Friction in the 5.56mm NATO," DTIC, 2012.

Amy Courtney and **Michael Courtney**, "Comparing Blast Pressure Variations of Lead Styphnate Based and Diazodintrophenol Based Primers," Weapons Systems Technology Information Analysis Center Journal, October 2011.

Michael Courtney and Amy Courtney, "High Speed Measurements of Rifle Primer Blast Waves," Precision Shooting, February 2011.

Michael Courtney and Amy Courtney, "A Method for Testing Bullets at Reduced Velocity," Medical Physics, Cornell University Library, December 2008.

Publications in Blast Injury and Blast Physics

Michael Courtney and Amy Courtney, "Working toward exposure thresholds for blast-induced traumatic brain injury: thoracic and acceleration mechanisms," NeuroImage, January 2011.

Amy Courtney and **Michael Courtney**, "A thoracic mechanism of mild traumatic brain injury due to blast pressure waves," Medical Hypothesis, January 2009.

Michael A. Armacost, Ayesha Pladera, and **Michael Courtney**, "Measuring Deflagration Velocity in Oxy-Acetylene with High-Speed Video," The Chemical Educator, October 2011.

Michael Courtney and Amy Courtney, "A Table-top blast driven shock tube," Review of Scientific Instruments, December 2010.

Amy Courtney and **Michael Courtney**, "Attenuation of a Blast Wave Through Cranial Bone," Proceedings of the 26th International Ballistics Symposium, September 2011.

Amy Courtney, Alivia Berg, George Michalke, and **Michael Courtney**, "Development and Characterization of Laboratory Scale Shock Tubes for Studies of Blast Wave Effects," Second Research Symposium on Traumatic Brain Injury, May 2011.

Michael Courtney and Amy Courtney, "Oxy-acetylene Driven Laboratory Scale Shock Tubes for Studying Blast Wave Effects," Cornell University Library, May 2011.

Publications in Quantitative Fisheries Science

Joshua Courtney, Taylor Klinkmann, Amy Courtney, Joseph Toramñ o, and **Michael Courtney**, "Condition Indices of Fish as Bioindicators One Year After the Deepwater Horizon Oil Spill," (Under Review).

Jessica Abbott, Kerri Schmidt, and **Michael Courtney**, "Relative Weight of Brown Trout and Lake Trout in Blue Mesa Reservoir, CO," Ecology, Nature Precedings, February 2012.

Taylor Klinkmann, Joseph Toramñ o, and **Michael Courtney**, "Weight-Length Relationships in Gafftopsail Catfish (Bagre marinus) and Hardhead Catfish (Ariopsis felis) in Louisiana Waters," Ecology, Nature Precedings, February 2012.

David Parker, Thomas Avers, and **Michael Courtney**, "Weight, Length, and Growth in Cutbow Trout (Oncorhynchus mykiss x clarkii)," Ecology, Nature Precedings. September 2011.

Joshua Daviscourt, Joshua Huertas, and **Michael Courtney**, "An Assessment of Weight-Length Relationships for Muskellunge, Northern Pike, and Chain Pickerel In Carlander's Handbook of Freshwater Fishery Biology," Quantitative Biology, Cornell University Library, July 2011.

Mercedes Dexter, Kyle Van Alstine, **Michael Courtney**, and Ya'el Courtney, "Demonstrating an Improved Length-weight Model in Largemouth Bass, Chain Pickerel, Yellow Perch, Black Crappie, and Brown Bullhead in Stilwell Reservoir, West Point, New York," Quantitative Biology, Cornell University Library, July 2011.

Simeon Cole-Fletcher, Lucas Marin-Salcedo, Ajaya Rana, **Michael Courtney**, "Errors in Length-weight Parameters at FishBase.org," Ecology, Nature Precedings, April 2011.

Elizabeth Keenan, Sarah Warner, Ashley Crowe, and **Michael Courtney**, "Length, Weight, and Yield in Channel Catfish, Lake Diane, MI," Ecology, Nature Precedings, February 2011.

Publications in Education

Michael Courtney and Elya Courtney, "Acoustic Demonstration of Galileo's Law," Physics Education, March 2011.

Amy Courtney and **Michael Courtney**, "Comments regarding 'On the Nature of Science'," Physics in Canada, July 2008.

Michael Courtney and Amy Courtney, "Acoustic Measurement of Potato Cannon Velocity," The Physics Teacher, November 2007.

Michael Courtney, Norm Althausen, and Amy Courtney, "Five Frequently Fatal Freshmen Physics Fantasies," Physics Education, January 2007.

Garret Hedrick, Elliot Beski, Timothy Lopez, and **Michael Courtney**, "Testing Estes' Thrust Claims for the A10-PT Motor," Rockets, April 2011.

Alivia Berg and **Michael Courtney**, "Echo-based measurement of the speed of sound," Popular Physics, Cornell University Library, February 2011.

Scott Williams and **Michael Courtney**, "Why Cheating is Wrong," Physics Education, Cornell University Library, February 2011.

Michael Courtney and Amy Courtney, "Measuring Thrust and Predicting Trajectory in Model Rocketry," Popular Physics, Cornell University Library, March 2009.

Michael Courtney and Amy Courtney, "Epistemological Distinctions Between Science and History ," General Physics, Cornell University Library, March 2008.

Michael Courtney and Amy Courtney, "Sheep Collisions: the Good, the Bad, and the TBI," Physics Education, Cornell University Library, November 2007.

Michael Courtney and Amy Courtney, "Who is the customer in higher education?" Physics Education, Cornell University Library, December 2006.

Michael Courtney and Norm Althausen, "Teaching Fourier Analysis and Wave Physics with the Bass Guitar," Physics Education, Cornell University Library, May 2006.

Publications in Theoretical Atomic Physics

Michael Courtney and Daniel Kleppner, "Core-induced chaos in diamagnetic lithium," Physical Review A, January 1996.

Michael Courtney, "Initial conditions of closed classical orbits from quantum spectra," Chaos, January 1996.

Michael Courtney, "Scaled-energy spectra and closed classical orbits of the hydrogen atom in parallel electric and magnetic fields," Physical Review A, June 1995.

Michael Courtney, Neal Spellmeyer, Hong Jiao, and Danial Kleppner, "Classical, semiclassical, and quantum dynamics of lithium in an electric field," Physical Review A, May 1995.

John Shaw, John Delos, **Michael Courtney**, and Daniel Kleppner, "Recurrences associated with a classical orbit in the node of a quantum wave function," Physical Review A, November 1995.

Benjamin Simons, Aki Hashimoto, **Michael Courtney**, Daniel Kleppner, and Boris Altshuler, "New Class of Universal Correlations in the Spectra of Hydrogen in a Magnetic Field," Physical Review Letters, November 1993.

Publications in Experimental Atomic Physics

Michael Courtney, Hong Jiao, Neal Spellmeyer, Daniel Klepper, Jing Gao, and John Delos, "Closed Orbit Bifurcations in Continuum Stark Spectra," Physical Review Letters, February 1995.
Michael Courtney, Hong Jiao, Neal Spellmeyer, and Daniel Kleppner, "Long-period Orbits in the Stark Spectrum of Lithium," Physical Review Letters, September 1994.

Michael Courtney, Hong Jiao, Neal Spellmeyer, and Daniel Klepner, "Quantum Chaos and Rydberg Atoms in Strong Fields," Proceedings of the 4th Drexel Symposium on Quantum Nonintegrability, September 1994.

Louis DiMauro, Dalwoo Kim, **Michael Courtney**, Michael Anselment, "Nonresonant multiphoton ionization of calcium atoms in an intense laser field," Physical Review A, September 1988.

Publications in Theoretical Astrophysics

Ganesar Chanmugam, Paul Barrett, Kinwah Wu, and **Michael Courtney**, "Thermal Cyclotron Absorption Coefficients," Astrophysical Journal Supplement Series, October 1989.

Presentations

Michael Courtney, "The QRC Cadet Research Program," Invited talk at USAFA DFR Meeting, September, 2011.

Tom Mabry and **Michael Courtney,** "Program Assessment Strategies," Invited talk at Symposium for Military Academy Learning Centers, March, 2011.

Beth Schaubroeck and **Michael Courtney**, "Preparation for a technical core: Algebra & trigonometry at the Air Force Academy," Joint Mathematics Meetings, New Orleans, Louisiana, January 2011.

Michael Courtney and Amy Courtney, "A Table-Top Blast Driven Shock Tube," Invited talk at the Medical University of South Carolina, September 2010.

Michael Courtney, "Effective Extra Instruction," Invited talk at USAFA Department of Mathematical Sciences, August, 2010.

Amy Courtney and **Michael Courtney**, "Working Toward Mechanism-Based Blast-Induced TBI Thresholds," International State-of-the-Science Meeting on Non-Impact, Blast-Induced Mild Traumatic Brain Injury (DoD), Herndon, VA, May, 2009.

Amy Courtney and **Michael Courtney**, "Everything I really needed to know I learned in Physics 201 and 202," Invited Colloquium at the Department of Physics and Nuclear Engineering, United States Military Academy, November 2007.

Michael Courtney, "New Acoustic Methods in Shooting Analysis," Invited talk at Department of Chemistry and Physics, Western Carolina University, April 2006.

Michael Courtney, "Quantum Chaos, Periodic Orbit Spectroscopy, and Rydberg Atoms," Invited talk at Department of Physics, Case Western Reserve University, November 1995.

Michael Courtney, "Rydberg Atoms in Strong Fields: A Testing Ground for Quantum Chaos", American Physical Society, DAMOP Invited talk, Toronto, Canada, May 1995.

Other Scholarly Work

Consulting:

Amy Courtney and **Michael Courtney**, Review of MRAP Lower Limb Blast Injury Literature for DoD contractor. July 2011 – January 2012.

Michael Courtney, Testing of Explosively Formed Projectile Velocity Measurement System for DoD contractor, October 2011 – December 2011.

Amy Courtney and **Michael Courtney**, Reviewed blast test methodologies of for Mine Resistant Ambush Protected Vehicles for DoD contractor, including visits to factory and blast range. Assisted with implementation of NATO test standards and interpretation of blast test data. November 2009 – December 2011.

Michael Courtney and Amy Courtney, Review and Testing of Candidate Body Armor Materials for DoD contractor including measurement of AP core velocity after penetrating ceramic and V50 measurements. September 2011 – November 2011.

Reviews of Proposals and Papers:

Michael Courtney, Review two grant proposals in field of blast injury for United States Army Medical Research and Materiel Command. December 2011.

Michael Courtney, Review of grant proposal in field of blast injury for United States Army Medical Research and Materiel Command. April 2011.

Michael Courtney, Review of paper on experiments in field of blast injury for Annals of Biomedical Engineering. October 2011.

Michael Courtney, Review of grant proposal in field of wound ballistics for United States Army Medical Research and Materiel Command. July 2010.

Michael Courtney and Amy Courtney, Review of grant proposal in field of blast related traumatic brain injury at the request of the principal investigator, Tripler Army Medical Center. October 2010.

Michael Courtney and Amy Courtney, acknowledged contributions, advice, and review of the paper, "Non-impact, blast-induced mild TBI and PTSD: Concepts and caveats" (Yun Chen and Wei Huang, Brain Injury June 2011). July – December 2010.

Michael Courtney, Review of paper in field of internal ballistics for The Physics Teacher. February 2010.

Michael Courtney, Review of University of Washington Master's thesis in Applied Mathematics, "A Finite Volume Approach to Modeling Injury Mechanisms of Blast-Induced Traumatic Brain Injury" at the request of the author, Maj Randall W. Hoberect, now at USMA, October 2009.

Michael Courtney, Review of proposal regarding correlations of MRAP blast simulations with experiments at the request of DoD contractor. January 2010.

Michael Courtney, Review of SONICU sound level monitoring system for potential application in neonatal intensive care unit at the request of Mission Hospital, Asheville, NC. December 2009.

Michael Courtney, Review of three grant proposals in field of blast injury for United States Army Medical Research and Materiel Command. December 2008.

Michael Courtney and Amy Courtney, wound ballistic analysis of officer involved shooting, expert analysis in legal case. United States District Court, Middle District of Florida. November 2008.

Michael Courtney, Member of peer-review panel for nine grant proposals in, "Physics of Blast Injury," for Congressionally Directed Medical Research Programs. Landsdowne, VA. November 2007.

Michael Courtney, Member of peer-review panel for twelve grant proposals in, "Neuroprotection," for Congressionally Directed Medical Research Programs. Landsdowne, VA. November 2007.

Original Course Support:

Michael Courtney*,* USAFA Math 141 Course Project, Spring 2011, "Analyzing Rotational Motion using Difference Ratios," including high-speed video of model airplane propeller, written course assignment, and Excel-based solution. December 2010 – February 2011.

Michael Courtney, USAFA Math 141 Course Project, Spring 2012, "High Speed Video Analysis Finding Forces on Bullets Using Difference Ratio Definitions of Derivatives," including high-speed videos of bullets in ballistic gelatin, written assignment, and four Excel-based solutions. December 2011 – February 2012.

Software:

Michael Courtney, Brian Litz, Don Miller, algorithm implementing improved stability formula for plastic tipped bullets. June 2010 – January 2012.

Michael Courtney, Standard Fourier Transform, for cases where FFTs are sub-optimal. Handles arbitrary input arrays, variable input spacings, output ranges, output spacings, and variable input ranges and windowing functions. June 2010 – September 2010.

Michael Courtney, Rocket Trajectory, Student-friendly spreadsheet implementing numerical solution of differential equation governing rocket flight including thrust, drag, gravity, etc. June 2010 – May 2011.

Michael Courtney, Least Squares Fit, implementation of Levenberg-Marquardt algorithm for non-linear regression analysis in many adjustable parameters and arbitrary number of independent variables. 2002 – 2006.

Michael Courtney, ATE Test, software suite for design validation and factory testing and calibration of wireless networking devices. 1995 – 2002.

Michael Courtney, TD.exe, interrupt driven data acquisition, analysis, and control program for high-resolution laser spectroscopy of Rydberg atoms of lithium in strong electric and magnetic fields. 1990 – 1994.

Michael Courtney, Orbit, a suite of programs using varying numerical methods and coordinate systems to compute Poincare surfaces of section and search out classical periodic orbits of alkali metal atoms in strong electric and magnetic fields. 1990 – 1996.

Michael Courtney, Dominique Delande, George Welch, Michael Littman, Chun-Ho Iu, and Michael Kash, Diag, a suite of programs for computing quantum spectra of alkali-metal atoms in strong electric and magnetic fields. 1989 – 1996.