

TIMOTHY M. RITTER

Department of Chemistry and Physics
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EDUCATION

- Ph.D. in Physics, State University of New York at Buffalo, Buffalo, NY; Jan. 1997
Advisor: Dr. Bernard A. Weinstein
Thesis Title: "High Pressure Optical Studies of Deep Levels and Band Offsets in Wide Bandgap Optoelectronic Systems"
- M.A. in Physics, State University of New York at Buffalo, Buffalo, NY; Sept. 1996
Advisor: Dr. Bernard A. Weinstein
Project Title: "Emergence of Deep Levels in *n*-Type ZnSe under Hydrostatic Pressure"
- B.S. in Physics, State University of New York at Buffalo, Buffalo, NY; 1989
Graduated cum laude with a major in Physics and a minor in Mathematics

POSITIONS HELD

- Professor**, Department of Chemistry and Physics, UNC Pembroke, Pembroke, NC; 2007 - present
- Associate Professor**, Department of Chemistry and Physics, UNC Pembroke, Pembroke, NC; 2002 - 2007
- Assistant Professor**, Department of Chemistry and Physics, UNC Pembroke, Pembroke, NC; 1996 - 2002
- Visiting Associate Professor**, SUNY at Buffalo, Summer 2003
- NASA Summer Faculty Fellow**, Marshall Space Flight Center, 1997, 1998, 1999
- Lecturer**, SUNY at Buffalo; 1993, 1995
- Graduate Research Assistant**, High Pressure Physics Laboratory, SUNY at Buffalo; 1989-1996
- Teaching Assistant**, SUNY at Buffalo; 1989-1993, 1995-1996
- Laboratory Assistant**, High Energy Physics Laboratory, SUNY at Buffalo; 1987-1989

RESEARCH EXPERIENCE

Experimental Areas:

- Fluids in microgravity
- Growth and Characterization of GeSi crystals in a large magnetic field
- Photoluminescence characterization of CdZnTe material grown aboard the second United States Microgravity Laboratory
- Characterization of Band Alignment in AlGaInP quantum well laser structures
- Optical spectroscopy studies of deep impurity traps in ZnSe under pressure
- High pressure optical studies of mechanical interface defects in InAl(Ga)As heterostructures

Laboratory Techniques and Skills:

- Design and performance of microgravity experiments on parabolic flight aircraft
- Proficient in Photoluminescence, Raman scattering and other optical spectroscopies
- Design, development, and implementation of high pressure diamond anvil cells
- Extensive experience with cryogenic equipment and procedures
- Semiconductor crystal handling methods: cleaving, chemical polishing and etching

PROFESSIONAL ACTIVITIES

Courses Taught:

Advanced Physics Laboratory I, UNC Pembroke PHY 4200
Classical Mechanics, UNC Pembroke PPHY3000
College Physics I, SUNY at Buffalo PHY 101
College Physics I & II, UNC Pembroke PHY 1500 and 1510
College Physics Laboratory I & II, UNC Pembroke PHY 1560 and 1570
Comprehensive Physical Science, Fayetteville State University NSCI 110
Engineering Dynamics, UNC Pembroke EGR 2010
Electricity & Magnetism I & II, UNC Pembroke PHY 3200 and 3210
Freshman Seminar, UNC Pembroke FRS 1000
General Physics I, SUNY at Buffalo PHY 1070
Heat and Temperature, UNC Pembroke PHY3260
Historical Perspectives of Physics, UNC Pembroke PHY5480
Microgravity Research I, II, III, IV, UNC Pembroke BTES4200, 4210, 4211 & 4212
Modern Electronics, UNC Pembroke PHY 3560
Modern Physics, UNC Pembroke PHY 2560
Optics, UNC Pembroke PHY 2180
Research in Chemistry, UNC Pembroke CHM 3990
Physical Science I & II, UNC Pembroke PHS 1100 and 1110
University Physics I & II, UNC Pembroke PHY 2000 and 2010

Faculty Level Activities:

Advisory Group on Assessment of Student Learning Outcomes, 2003-2005
Departmental Student Awards Committee, Chair, 1998 - 2001
Departmental Student Worker Oversight Committee, 2008-2009
Faculty Advisor to Gamma Sigma Epsilon (Chem. Honor Society), 2003-present
Faculty Evaluation Review Committee, Secretary, 1999 - 2001
General Education Committee, 2000 - 2001
Interior Design Committee, 2006 - 2008
Internet Advisor for high school teachers as part of an Eisenhower Grant for Network Resources and Training Sites, 1997-1998
Member of committee to establish the Applied Physics major at UNCP, 1997-1999
Member of University Bookstore Committee, 1997-1998
NC Region 4 Science Fair, Co-director, 2004-present
Peer Evaluation Committees (total of thirteen PEC's to date, chair of seven)
Promotion and Tenure Committee, 2003-2006
Promotion and Tenure Ad Hoc Committee, 2007-2009

Quality Enhancement Plan – SACS Committee, 2007-present
Search Committee for Assistant Professor of Physics, Chair of committee, 2007
Search Committee for University Registrar, 2008
Teaching Fellow’s Mentor, 1999 - 2005
Traffic Appeals Board, Chair, 1997-1998
University Awards Committee, 2000 – 2001, 2007-2008
Veterans Affairs Task Force, 2009

Professional Development:

Annual UNC Pembroke Faculty Development Day, UNC Pembroke, 2002 – 2008
Army Science & Technology University Opportunities Conference, Raleigh, NC, 2008
Physics Teacher Education Workshop, UNC Chapel Hill, 2007
NSF workshop on “Science and the Public Interest” curriculum development,
UNC Pembroke, 1997
Workshop on the utilization of the Distance Learning facilities, UNC Pembroke, 1997
Workshop on “Syllabus and Course Construction”, UNC Pembroke, 1997
Workshop on “Effective College Teaching: A Workshop for Scientists, Engineers, and
Mathematicians Who Teach”, UNC Chapel Hill, 1996

Professional Affiliations:

American Physical Society (Condensed Matter Physics Div. and Southeastern Section)
American Association of Physics Teachers (National and N. Carolina Sections)
National Science Teachers Association
North Carolina Academy of Science
North Carolina Science Teachers Association

Conference and Workshop Coordination:

1. North Carolina Region 4 Science Fair workshop for teachers, held annually 2006-present.
2. Medical College Admissions Test (MCAT) preparation workshop for students, UNC Pembroke, 2003-2006. I conducted the four-day physics review portion of this workshop.
3. “Implementation of Improved Physical Science Demonstration Kits to Accompany the North Carolina Standard Course of Study for the Middle Grades 6-8”, A two week workshop for middle school teachers, UNC Pembroke, Summer 2002.
4. “Implementation of Physical Science Demonstration Kits to Accompany the North Carolina Standard Course of Study for the Middle Grades 6-8”, A two week workshop for middle school teachers, UNC Pembroke, Summer 2001.
5. Assisted in organizing the Sixth International Conference on High Pressure Semiconductor Physics, Vancouver, Canada, Aug. 1994

PUBLICATIONS

1. "Human Immune Complex Formation Rates in Microgravity", B. Bullard, L. Guyton, M. Godwin, T. Henderson, L. Walters, L. Willis, T.M. Ritter, NASA/TM-2009-214794, 2009.
2. "Gravitational Effects on Human Immune Complexes and Flame Dynamics", T.M. Ritter, C. Haywood, S. Schrock, T. Smith, L. Walters, NASA/TM-2008-214765, 2008.
3. "The Effects of Gravity on Enzymatic Reaction Rates", T.M. Ritter, C. Branch, M. Grimsley, B. Locklear, J. Sanford, NASA/TM-2007-214765, 2007.
4. "Pressure Measurements of TO-Phonon Anharmonicity in Isotopic ZnS", R. Tallman, T. M. Ritter, B. A. Weinstein, A. Cantarero, J.Serrano, R.Lauck and M. Cardona, *Phys. Stat. Sol.(b)* **241**, pp. 491-494, 2004.
5. "Pressure-Raman Study of Resonant TO(Γ)-Two-Phonon Decay Processes in ZnS: Comparison of Three Isotope Compositions", R. E. Tallman¹, J. Serrano, A. Cantarero, N. Garro, R. Lauck, T. M. Ritter, B. A. Weinstein, and M. Cardona, *Phys. Stat. Sol.(b)* **241**, pp. 3143-3148, 2004.
6. "Raman Scattering in β -ZnS", J. Serrano, A. Cantarero, M. Cardona, N. Garro, R. Lauck, R. E. Tallman, T. M. Ritter, and B. A. Weinstein, *Phys. Rev. B* **69**, 014301, 2004.
7. "Pressure Studies of Conduction-band N-pair state mixing in dilute GaAsN alloys", B.A. Weinstein, S.R. Stambach, and T.M. Ritter, J.O. MacLean and D.J. Wallis, *Physica E* **20**, pp. 317-320, 2004.
8. "Evidence for Selective De-Localization of N-pair States in Dilute GaAs_{1-x}N_x", B.A. Weinstein, S.R. Stambach, and T.M. Ritter, J.O. MacLean and D.J. Wallis, *Phys. Rev. B* **68**, 035336, 2003.
9. "Pressure-evolution of nitrogen-related resonant-levels and band-tail-states in GaAs_{1-x}N_x alloy quantum wells (x=0.0025, 0.004) near the band-formation regime", B.A. Weinstein, T.M. Ritter, S. Stambach, J.O. Maclean, and D.J. Wallis, in *Proceedings of the 26th International Conference on the Physics of Semiconductors*, Edinburgh 2002, edited by A. R. Long and I. J. H. Davies (IOP, Bristol, 2003).
10. "Pressure and temperature dependence of the Raman phonons in isotropic cuprous halides", J. Serrano, M. Cardona, T.M. Ritter, B.A. Weinstein, A. Rubio, and C.T. Lin, in *Proceedings of the 26th International Conference on the Physics of Semiconductors*, Edinburgh 2002, edited by A. R. Long and I. J. H. Davies (IOP, Bristol, 2003).

11. "Pressure and Temperature Dependence of the Raman Phonons in Isotropic γ -CuI", J. Serrano, M. Cardona, T.M. Ritter, B.A. Weinstein, A. Rubio, and C.T. Lin, *Phys. Rev. B* **66**, 245202, 2002.
12. "Growth and Characterization of Bulk GeSi Solid Solutions", T.M. Ritter and M.P. Volz, NASA/CR-2001-211303, 2001.
13. "Magnetic Field Effects on Crystalline Quality in Bridgman Grown GeSi Solid Solutions", T.M. Ritter and M. Volz, NASA/CR-2001-210796, 2001.
14. "Influence of applied thermal gradients and a static magnetic field on Bridgman-grown GeSi alloys", M.P. Volz, F.R. Szofran, S.D. Cobb, and T.M. Ritter, *Materials Research in Low Gravity II*, SPIE Vol. 3792, pp. 23-30, 1999.
15. "Energy level alignments in strained-layer GaInP/AlGaInP laser diodes: Model Solid Theory analysis of pressure-photoluminescence experiments", T.M. Ritter, B.A. Weinstein, R. E. Viturro, and D.P. Bour, *Phys. Stat. Sol.(b)* **211**, pp.869-883, 1999.
16. "Orbital Processing of High-Quality Zn-Alloyed CdTe Compound Semiconductors", D.J. Larson, Jr., M. Dudley, B. Raghathamachar, J.I.D. Alexander, F.M. Alexander, F.M. Carlson, D. Gillies, M. Volz, T.M. Ritter, and D. Dimarzio, *Proceedings of the NASA Microgravity Materials Science Conference - 1998*, NASA/CP-1999-209092, 1999.
17. "Low Temperature Photoluminescence Characterization of Orbitally Grown CdZnTe", T.M. Ritter, D. J. Larson, Jr., D. Gillies, and M. Volz, NASA/CR-1998-208803, 1998.
18. "Competition of Deep and Shallow Impurities in Wide Gap II-VI's Under Pressure", B.A. Weinstein, T.M. Ritter, D. Strachan, M. Li, H. Luo, M. Tamargo, and R. Park, *Phys. Stat. Sol.(b)* **198**, pp. 167-180, 1996.
19. "Emergence of Deep Levels in n-Type ZnSe Under Hydrostatic Pressure", T.M. Ritter, B.A. Weinstein, M. C. Tamargo and R. Park, *Phys. Rev. Lett.* **76**, pp. 964-967, 1996.
20. "Relation between Phase Stability and Mechanical Defects in InGa(Al)As/GaAs and ZnSe/GaAs Heterostructures under Pressure", T.M. Ritter, B.A. Weinstein, H.M. Kim, K. Stair, C. Choi-Feng and M. Funato, *J. Phys. Chem. Solids* **56**, pp. 607-613, 1995.
21. "Pressure Tuning of Deep P- and As-Impurity States in ZnSe", Ming Li, D.J. Strachan, T.M. Ritter, M. Tamargo and B.A. Weinstein, in: The Physics of Semiconductors (The Proc. of the 22nd Intl. Conf.), ed. by D.J. Lockwood, (World Scientific,1995), pp. 2475-2478.
22. "Luminescence of Deep Phosphorous and Arsenic Impurities in ZnSe at High Pressure", M. Ming Li, D.J. Strachan, T.M. Ritter, M. Tamargo and B.A. Weinstein, *Phys. Rev. B* **50**, pp. 4385-90, 1994.

23. “Strain Relaxation in Highly Mismatched Heterostructures under High-Pressure/Temperature Conditions”, B.A. Weinstein, T.M. Ritter, K. Stair, C. Choi-Feng, G. Devane, H.M. Kim and C.R. Wie, in High-Pressure Science and Technology (The Proc. of the AIRAPT-1993), ed. by S.C. Schmidt, J.W. Shaner, G.A. Samara and M. Ross, (American Inst. of Physics, 1994), pp. 581-4.
24. “Pressure-induced Resonant Raman Scattering in an $\text{In}_x\text{Ga}_{1-x}\text{As}/\text{GaAs}$ Strained-layer Superlattice”, V. Lemos, C.K. Inoko, F. Cerdeira, T. Ritter and B.A. Weinstein, *Solid State Commun.* **84**, pp. 1011-13, 1992.
25. “Anomalies in the Pressure Response of the Raman Modes in (211)-oriented $\text{In}_x\text{Ga}_{1-x}\text{As}/\text{GaAs}$ Strained-layer Superlattices”, V. Lemos, T. Ritter and B.A. Weinstein, *Appl Phys. Lett.* **61**, pp. 1417-19, 1992.
26. “Effects of High Pressure on the Internal Strain and Stability of InAlAs films and InAlAs/GaAs Multilayers on InP substrates”, T.M. Ritter, B.A. Weinstein, H.M. Kim, C.R. Wie, K. Stair and G. Devane, in: The Physics of Semiconductors (The Proc. of the 21st Intl. Conf.), ed. by P. Jiang and H-Z. Zheng, (World Scientific Co. Ltd., 1992), pp. 895-8.
27. “Mean Free Paths of He Fragments Produced in Collisions of ^{16}O at 60 GeV/n”, K.Sengupta, G. Singh, T. Ritter and P. L. Jain, *Europhysics Lett.* **8**, pp. 15-18, 1989.

PRESENTATIONS BY T. M. RITTER

1. “Activities for Measuring and Calculating Five Physical Quantities in Mechanics”, *North Carolina Science Teachers Association Annual Conference*, Greensboro, NC, 2011. (with: P. Wish, B. Postek, and R. McBroom).
2. “Graphing a Pathway Through Mechanics-An Inquiry Into Uniform Motion”, *North Carolina Science Teachers Association Annual Conference*, Greensboro, NC, 2011. (with: P. Wish, B. Postek, and R. McBroom).
3. “Science in Zero-g: Student Research on NASA’s Microgravity Research Aircraft”, Invited talk for the *Science Saturday* program at the *North Carolina Museum of Natural Sciences*, Raleigh, NC 2011.

4. “Hands-on Activities for Teaching the Basic Physical Quantities of Mechanics”, *National Science Teachers Association Southeastern Regional Conference*, Nashville, TN, 2010. (with: B. Postek).
5. “Hands-on Activities for Teaching the Basic Physical Quantities of Mechanics”, *National Science Teachers Association Annual Conference*, New Orleans, LA, 2009. (with: P. Wish and R. McBroom).
6. “Hands-on Activities for Teaching the Basic Physical Quantities of Mechanics”, *National Science Teachers Association Southeastern Regional Conference*, Charlotte, NC, 2008. (with: P. Wish and R. McBroom).
7. “The Complete Undergraduate Research Experience Inspired by NASA’s Microgravity University”, *22nd National Conferences on Undergraduate Research*, Salisbury, MD, 2008.
8. “The Complete Undergraduate Research Experience Inspired by NASA’s Microgravity University”, *2008 March Meeting of the American Physical Society*, New Orleans, LA, 2008.
9. “Hands-On Activities for Teaching the Basic Physical Quantities of Mechanics”, *North Carolina Science Teachers Association Annual Conference*, Greensboro, NC, 2007. (with: P. Wish and R. McBroom).
10. “NASA’s Reduced Gravity Student Flight Opportunities Program as an Effective Educational Outreach Platform for Native Americans”, *2007 March Meeting of the American Physical Society*, Denver, CO, 2007. (with: M. Grimsley)
11. “Understanding Basic Physical Quantities In Mechanics Using the Learning Cycle Approach”, *North Carolina Science Teachers Association Annual Conference*, Greensboro, NC, 2006. (with: P. Wish and M. Harris)
12. “NASA’s Reduced Gravity Student Flight Opportunities Program”, *North Carolina Section of the American Association of Physics Teachers*, Pembroke, NC, 2005.
13. “Effective Hands-On Activities for Measuring and Calculating Five Basic Physical Quantities in Mechanics”, *North Carolina Science Teachers Association Annual Conference*, Greensboro, NC, 2005. (with: P. Wish and B. Storms)
14. “Using NASA’s Reduced Gravity Student Flight Opportunities Program as an Effective Outreach Platform for Native Americans”, *56th International Astronautical Congress*, Fukuoka, Japan, 2005. (with: M. Grimsley)
15. “Demonstrations for Measuring and Calculating Five Basic Physical Quantities in Mechanics”, *National Science Teachers Association National Conference*, Atlanta, GA, 2004. (with: P. Wish, M. Welter, and J. Inman)

16. “Demonstrations for Measuring and Calculating Five Basic Physical Quantities in Mechanics”, *North Carolina Science Teachers Association Annual Conference*, Greensboro, NC, 2003. (with: P. Wish, M. Welter, G. Stefan, and K. Notestine)
17. “Gravitational Affects on Fluid Mixing Properties as Observed in NASA’s KC-135A Student Flight Opportunities Program”, *54th International Astronautical Congress*, Bremen, Germany, 2003.
18. “Physics”, *Native American Resource Center*, Pembroke, NC, 2003.
19. “Developing High School Physical Science Activities Using a Learning Cycle Approach”, *North Carolina Science Teachers Association Annual Conference*, Greensboro, NC, 2002. (with: P. Wish, J. Inman, R. McBroom, M. Guick, S. Burney, M. Henry, and A. Fann)
20. “From Semiconductors to the Center of the Earth: Working Under More Pressure than a Wall Street Analyst”, *Life of the Mind Lecture Series*, UNC Pembroke, NC, 2000.
21. “Growth and Characterization of Bulk GeSi Solid Solutions”, *NASA, Marshall Space Flight Center*, Huntsville, AL, 1999. (with: M. Volz)
22. “Macrosegregation of GeSi Alloys Grown in a Static Magnetic Field”, *March Meeting of the American Physical Society*, Atlanta, GA, 1999. (with: M. Volz, S. Cobb, and F. Szofran)
23. “Magnetic Field Effects on Crystalline Quality in Bridgman Grown GeSi Solid Solutions”, *NASA, Marshall Space Flight Center*, Huntsville, AL, 1998. (with: M. Volz)
24. “Low Temperature Photoluminescence Characterization of Orbitally Grown CdZnTe”, *1998 March Meeting of the American Physical Society*, Los Angeles, CA, 1998. (with: D. Larson, Jr.)
25. “Physics”, Invited speaker at the *North Carolina Alliance for Minority Participation (NCAMP)* series, UNC Pembroke, Pembroke, NC, 1997 and 1998.
26. “Low Temperature Photoluminescence Characterization of Orbitally Grown CdZnTe”, *NASA, Marshall Space Flight Center*, Huntsville, AL, 1997. (with: D. Larson, Jr., D Gillies, and M. Volz)
27. “Band Structure Characterization of AlGaInP Lasers by Model-Solid Analysis of Pressure-Photoluminescence Experiments”, *1997 March Meeting of the American Physical Society*, Kansas City, MO, 1997. (with: B. A. Weinstein, R. Enrique Viturro and D. P. Bour)
28. “High Pressure Determination of Energy Level Alignments in Strained-Layer AlGaInP/GaInP Heterostructures: Experiments and Calculations”, *The 24th Conference on the Physics and Chemistry of Semiconductor Interfaces*, Research Triangle Park, NC, 1997 (with: B. A. Weinstein, R. Enrique Viturro and D. P. Bour)

29. “Scientific Research, Is it for You?”, *UNC Pembroke Health Careers Opportunity Program*, Pembroke, NC, 1996.
30. “Characterization of Band Alignments in AlGaInP Heterostructure Lasers”, *SUNY at Buffalo Semiconductor Topical Assembly*, Buffalo, NY, 1996 (with: B. A. Weinstein, R. Enrique Viturro and D. P. Bour)
31. “High Pressure Photoluminescence of Deep Levels in n-Type ZnSe: Emergence of States in the Gap”, *1996 March Meeting of the American Physical Society, St. Louis, MO, 1996.* (with: V. Iota, B. A. Weinstein, R. M. Park and M. C. Tamargo)
32. “High Pressure Luminescence Studies of Band-Edge Tuning and Deep Level Traps in Optoelectronic Materials” *XEROX - Webster Center for Research and Technology*, Rochester, NY, 1996. (with: B. A. Weinstein, R. Enrique Viturro, D. P. Bour, R. M. Park and M. C. Tamargo)
33. “Study of Level Alignments in Strained-Layer GaInP Quantum Well Lasers by High Pressure”, *1995 Fall Meeting of the Materials Research Society*, Boston, MA, 1995. (with: B. A. Weinstein, R. Enrique Viturro and D. P. Bour)
34. “High Pressure Semiconductor Techniques”, *SUNY at Buffalo Semiconductor Topical Assembly*, Buffalo, NY, 1995.
35. “Band Line-Ups and Quenching in GaInP-based Visible Optoelectronic Structures by High Pressure Photoluminescence Spectroscopy”, *1995 March Meeting of the American Physical Society*, San Jose, CA, 1995. (with: B. A. Weinstein, R. Enrique Viturro and D. P. Bour)
36. “High Pressure Photoluminescence of Deep States in ZnSe Doped with several Donor and Acceptor Impurities”, *1995 March Meeting of the American Physical Society*, San Jose, CA, 1995. (with: V. Iota, B. A. Weinstein, M. Tamargo and R. Park)
37. “Relation between Phase Stability and Mechanical Defects in InGa(Al)As/GaAs and ZnSe/GaAs Heterostructures under Pressure”, *Sixth International Conference on High Pressure Semiconductor Physics*, Vancouver BC, Canada, 1994. (with: B. A. Weinstein, H. M. Kim, C. R. Wie, K. Stair, C. Choi-feng and M. Funato)
38. “High Pressure Phase Transitions in ZnSe films and Heterostructures”, *1994 March Meeting of the American Physical Society*, Pittsburgh, PA, 1994. (with: B. A. Weinstein and M. Funato)
39. “Strain Relaxation in InAlAs and InGaAs Heterostructures under High-Pressure/Temperature Conditions”, *1993 March Meeting of the American Physical Society*, Seattle, WA, 1993. (with: B. A. Weinstein, H. M. Kim, C. R. Wie, K. Stair, G. Devane and C. Choi-feng)

40. “Pressure Effects on the Raman Modes of InGaAs/GaAs Strained Layer Superlattices”, *Strained-Layer Semiconductor Material and Devices*, Buffalo, NY, 1991. (with: V. Lemos and B. A. Weinstein)

PRESENTATIONS BY STUDENTS OF T. M. RITTER

1. “Human Immune Complex Formation Rates in Reduced Gravity” presented by Branyun Bullard, Michelle Godwin, Lane Guyton, Tamra Henderson, Lisa Walters, and Lindsey Willis, *3rd Annual Pembroke Undergraduate Research and Creativity Symposium*, Pembroke, NC, 2009.
2. “Fun with Zero-g: A NASA Inspired Space Sciences Education Awareness Program”, presented by Branyun Bullard and Tamra Henderson, *4th Annual State of North Carolina Undergraduate Research Symposium*, Boone, NC, 2008.
3. “The Consequences of Space Flight on the Human Immune System”, presented by Lisa Walters and Lindsay Willis, *4th Annual State of North Carolina Undergraduate Research Symposium*, Boone, NC, 2008.
4. “Human Immune Complex Formation Rates in Reduced Gravity”, presented by Lane Guyton, *North Carolina Space Grant Annual Meeting*, Boone, NC, 2008.
5. “The Influence of Micro- and Hypergravity on Immune Complex Formation”, presented by Lisa Walters, *22nd National Conference on Undergraduate Research*, Salisbury, MD, 2008.
6. “Microgravity: A Down to Earth Approach to Science for Today’s Youth”, presented by Clinton Haywood and Samantha Schrock, *3rd Annual State of North Carolina Undergraduate Research Symposium*, Greensboro, NC, 2007.
7. “The Influence of Micro- and Hypergravity on Immune Complex Formation ”, presented by Tala P. Smith and Lisa Walters, *3rd Annual State of North Carolina Undergraduate Research Symposium*, Greensboro, NC, 2007.
8. “Microgravity: A Down to Earth Approach to Science for Native American Youth”, presented by Clinton Haywood, *AISES National Conference*, Phoenix, AZ, 2007.
9. “The Effects of Varying Gravitational Fields on Immune Complex Formation”, presented by Tala P. Smith, *AISES National Conference*, Phoenix, AZ, 2007, (awarded third place prize for all oral presentations).
10. “Flame Dynamics in Microgravity”, presented by Samantha Schrock, *Summer Undergraduate Research Symposium*, Pembroke, NC, 2007.
11. “The Effects of Gravity on Enzyme Reaction Rates”, presented by Megan Grimsley and Tala Smith, *Research in the Capital: An Undergraduate Research Symposium for the North Carolina General Assembly*, Raleigh, NC, 2007.

12. “Microgravity Research on NASA’s ‘Weightless Wonder’”, presented by Samantha Schrock, *First Annual Pembroke Undergraduate Research Center Forum*, Pembroke, NC, 2007.
13. “The Effects of Micro- and Hyper-Gravity on the Reaction Rates of Enzymes”, presented by Megan Grimsley and Tala Smith, *Fourth Annual Fayetteville State University Research Initiative for Scientific Enhancement Research Colloquium*, Fayetteville, NC, 2007.
14. “The Effects of Varying Gravitational Fields on Enzymatic Reaction Rates”, presented by Megan Grimsley, *2nd Annual State of North Carolina Undergraduate Research Symposium*, Raleigh, NC, 2006.
15. “A Study of Enzyme/Substrate Reactions in 0- and 2-g Environments”, presented by Brandon Locklear, *10th Annual North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) Undergraduate Research Conference*, Greensboro, NC, 2006.
16. “A Study of Enzyme/Substrate Reactions in 0- and 2-g Environments”, presented by Brandon Locklear and Janet Sanford, *American Indian Science and Engineering Society (AISES) National Conference*, Charlotte, NC, 2005.
17. “Enzymes in 0-g”, presented by April Locklear, *9th Annual North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) Undergraduate Research Conference*, Fayetteville, NC, 2005, (awarded first prize for best presentation in chemistry division).
18. “Enzymes in 0-g”, presented by April Locklear, *Research in the Capital: An Undergraduate Research Symposium for the North Carolina General Assembly*, Raleigh, NC, 2005.
19. “NASA KC-135 Reduced Gravity Undergraduate Program”, presented by Kiel Locklear, Greg Watkins, Robie Goins, and Chad Spivey, *2004 American Society of Engineering Education Annual Conference & Exposition*, Salt Lake City, UT, 2004.
20. “The Properties of Fluids in 0-g as Studied Aboard NASA’s KC-135A Aircraft”, presented by April Oxendine and Robie Goins, *8th Annual North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) Undergraduate Research Conference*, Charlotte, NC, 2004.
21. “NASA Zero-g Flight Opportunity: Students, Colleges, Communities”, presented by Robie Goins, Kiel Locklear and April Oxendine, *National Indian Education Association (NIEA) 34th Annual Convention*, Greensboro, NC, 2003.

22. “Fluid Mixing in a Reduced Gravity Environment as an Outreach Project aboard NASA’s KC-135A Aircraft”, presented by Robie Goins, *54th International Astronautical Congress*, Bremen, Germany, 2003.
23. “The NASA KC-135A Reduced Gravity Student Flight Opportunities Program”, presented by Toni Chagolla and April Oxendine, *7th Annual North Carolina Louis Stokes Alliance for Minority Participation (NC-LSAMP) Undergraduate Research Conference*, Pembroke, NC, 2003.

AWARDS/HONORS

Received UNC Pembroke Outstanding Teacher Award – 2004, 2009
 Nominated for UNC Board of Governors Award for Excellence in Teaching – 2008
 Nominated for UNC Pembroke Outstanding Teacher Award – 1999, 2000, 2003, 2004, 2009
 Nominated for UNC Pembroke Dial Award for Research/Creative work – 2003, 2007
 Nominated for UNC Pembroke Dial Award for Community Service – 2009
 Nominated for SUNY at Buffalo Outstanding Teaching Assistant Award – 1990, 1991
 Golden Key National Honor Society
 Inclusion in *Who’s Who Among Executives and Professionals* – 2004
 Inclusion in *Who’s Who in America* – 2001
 Inclusion in *Who’s Who in Science* – 2002

CONTRACT/GRANT ACTIVITIES

1. Title: “Using NASA’s “Weightless Wonder” to Inspire North Carolina’s American Indian Youth”
 Principle Investigator: Timothy M. Ritter
 Funding Source: North Carolina Space Grant
 Funding Amount: \$ 5,000.00 for 2011-2012
2. Title: “The Complete Undergraduate Research Experience (CURE) Inspired by NASA’s Microgravity University”
 Principle Investigator: Timothy M. Ritter
 Funding Source: North Carolina Space Grant
 Funding Amount: \$9,998.00 for 2011-2012
3. Title: “The Complete Undergraduate Research Experience (CURE) Inspired by NASA’s Microgravity University”
 Principle Investigator: Timothy M. Ritter
 Funding Source: North Carolina Space Grant
 Funded Amount: \$ 10,000.00 for 2009-2010 (Note: Even though the grant was awarded I had to decline due to being mobilized to Iraq with the U.S. Navy 30OCT09-15DEC10)

4. Title: "Engaging American Indian Youth with NASA's Microgravity Research Program"
Principle Investigator: Timothy M. Ritter
Funding Source: North Carolina Space Grant
Funded Amount: \$ 5,000.00 for 2009-2010 2010 (Note: This grant was transferred to Dr. Brian Postek, a collaborator in the department of Chemistry & Physics, due to my being mobilized to Iraq with the U.S. Navy 15OCT09-15DEC10)
5. Title: "Developing a Permanent Undergraduate Microgravity Research Program at The University of North Carolina at Pembroke"
Principle Investigator: Timothy M. Ritter
Funding Source: North Carolina Space Grant
Funded Amount: \$ 25,000.00 for 2008-2010 (not funded)
6. Title: "Fun with Zero-g: A Space Sciences Education Awareness Program for North Carolina's Native American Youth"
Principle Investigator: Timothy M. Ritter
Funding Source: North Carolina Space Grant
Funded Amount: \$ 5,000.00 for 2008-2009
7. Title: "Establishing a Microgravity Research Course at The University of North Carolina at Pembroke"
Principle Investigator: Timothy M. Ritter
Funding Source: North Carolina Space Grant
Funded Amount: \$ 10,000.00 for 2007-2008
8. Title: "Taking the Microgravity Message Across North Carolina"
Principle Investigator: Timothy M. Ritter
Funded Source: North Carolina Space Grant
Requested Amount: \$ 5000.00 for 2007-2008
9. Title: "Optical Characterization of PbSe"
Principle Investigator: Timothy M. Ritter
Funding Source: The UNC Pembroke Faculty Research and Development Fund
Funded Amount: \$1,000.00 for 2007-2008.
10. Title: "Using NASA's Reduced Gravity Student Flight Opportunities Program as an Effective Outreach Tool to Reach Native American Youth"
Principle Investigator: Timothy M. Ritter
Funding Source: North Carolina Space Grant
Funded Amount: \$ 4996.00 for 2006-2007
11. Title: "The Effects of Gravity on Enzyme Reaction Rates"
Faculty Advisor: Timothy M. Ritter
Program Office: National Aeronautics and Space Administration (NASA)
Funding Amount: Budget of \$11,320.00 from independent sources for 2005-2006

12. Title: "High Pressure Photoluminescence Study of Isotopic ZnS"
Principle Investigator: Timothy M. Ritter
Funding Source: The UNC Pembroke Faculty Research and Development Fund
Funded Amount: \$800.00 for 2004-2005.
13. Title: "Fluids in 0-g (F0G) A Study of the Mixing Properties of Fluids in a Reduced Gravity Environment"
Principal Investigator: Timothy M. Ritter
Funding Source: North Carolina Space Grant Consortium (NCSGC)
Funded Amount: \$1000.00 for 2004-2005
14. Title: "Fluids in Reduced and Increased Gravity"
Faculty Advisor: Timothy M. Ritter
Program Office: National Aeronautics and Space Administration (NASA)
Funding Amount: Budget of \$10,790.00 from independent sources for 2004-2005 (Not Accepted)
15. Title: "Fluids in 0-g (F0G): A Study of the Mixing Properties of Fluids and Enzyme Activity in Reduced Gravity"
Faculty Advisor: Timothy M. Ritter
Program Office: National Aeronautics and Space Administration (NASA)
Funding Amount: Budget of \$13,430.00 from independent sources for 2003-2004
16. Title: "Mixing Properties of Fluids in a Reduced Gravity Environment"
Principal Investigator: Timothy M. Ritter
Funding Source: North Carolina Space Grant Consortium (NCSGC)
Funded Amount: \$1000.00 for 2003-2004
17. Title: "Aqueous Diffusion Rates (ADR): The Effects of a Reduced Gravity Environment on the Rate of Diffusion in Liquids"
Faculty Advisor: Timothy M. Ritter
Program Office: National Aeronautics and Space Administration (NASA)
Funding Amount: Budget of \$20,000.00 from independent sources for 2002-2003
18. Title: "Going Aboard the KC135A as an Experiment (GATE): Children's Questions Answered on Liquids in a Weightless Environment"
Faculty Advisor: Timothy M. Ritter
Program Office: National Aeronautics and Space Administration (NASA)
Funding Amount: Budget of \$20,000.00 from independent sources for 2002-2003
19. Title: "Implementation of Improved Physical Science Demonstration Kits to Accompany the North Carolina Standard Course of Study for the Middle Grades 6-8"
Principal Investigator: Timothy M. Ritter
Funding Source: Dwight D. Eisenhower Professional Development Program
Funded Amount: \$30,000.00 for 2001-2002

20. Title: "Implementation of Physical Science Demonstration Kits to Accompany the North Carolina Standard Course of Study for the Middle Grades 6-8"
Principal Investigator: Timothy M. Ritter
Funding Source: Dwight D. Eisenhower Professional Development Program
Funded Amount: \$29,998.00 for 2000-2001
21. Title: "High Pressure Optical Studies of Novel Semiconductor Structures"
Principal Investigator: Timothy M. Ritter
Funding Source: The University of North Carolina at Pembroke Endowment Fund
Funding Amount: \$1000.00 for 2001
22. Title: "High Pressure Optical Studies of Semiconductors"
Principal Investigator: Timothy M. Ritter
Funding Source: The University of North Carolina at Pembroke Endowment Fund
Funded Amount: \$1300.00 for 2000
23. Title: "High Pressure Photoluminescence Study of Orbitally Processed CdZnTe"
Principal Investigator: Timothy M. Ritter
Funding Source: The UNC Pembroke Faculty Research and Development Fund
Funded Amount: \$637.50 for 1998
24. Title: "High Pressure Optical Characterization of Band Alignments in a AlGaInP Quantum Well Laser"
Principal Investigator: Timothy M. Ritter
Funding Source: The UNC Pembroke Faculty Research and Development Fund
Funded Amount: \$843.00 for 1997
25. Title: "A Pilot Curriculum in Bioprocessing: An Educational Partnership with Industry"
Principal Investigator: Leonard D. Holmes
Funding Source: U.S. Department of Education
Funding Amount Requested: \$150,725.00 (Not Funded)

RESEARCH SCHOLARSHIPS AWARDED TO STUDENTS OF T. M. RITTER

1. Title: "Antigen-Anti-body reactions in Microgravity"
Student: Lisa Walters (UNC Pembroke-class of 2009)
Funding Source: North Carolina Section of the American Chemical Society
Funding Amount: \$1900.00 for 2008-2009
2. Title: "The Affects of Reduced Gravitational Fields on the Molecular Reactions of Antigens and Anti-bodies"
Student: Tala Smith (UNC Pembroke-class of 2008)

- Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$2000.00 for academic year 2007-2008
3. Title: “The Affects of Varying Gravitational Fields on Enzymatic Reaction Rates”
Student: Megan Grimsley (UNC Pembroke-class of 2007)
Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$4000.00 for summer 2006
 4. Title: “Behavior of Objects in Viscous Fluids in Reduced and Increased Gravity”
Student: Charlotte Branch (UNC Pembroke-December class of 2006)
Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$4000.00 for summer 2006
 5. Title: “Enzymes in 0-g”
Student: April Oxendine (UNC Pembroke-class of 2005)
Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$2000.00 for summer 2005
 6. Title: “Weightless Lumbees Summer Outreach Program”
Student: Brandon Locklear (UNC Pembroke-class of 2006)
Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$1000.00 for summer 2005
 7. Title: “Fluids in 0-g (FOG) A Study of the Mixing Properties of Fluids in a Reduced Gravity Environment”
Student: Charlene Locklear (UNC Pembroke-class of 2004)
Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$5000.00 for summer 2004
 8. Title: “Aqueous Diffusion Rates (ADR): The Effects of a Reduced Gravity Environment on the Rate of Diffusion in Liquids”
Student: Toni Chagolla (UNC Pembroke-class of 2003)
Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$4000.00 for summer 2003
 9. Title: “Microgravity Research on NASA’s KC-135”
Student: Robie Goins (UNC Charlotte-class of 2003)
Funding Source: North Carolina Space Grant Consortium
Funding Amount: \$5000.00 for summer 2003

RESEARCH STUDENTS OF T. M. RITTER

Student	University	Degree/Date	Current Position
Branyun Bullard	UNC Pembroke	BS-Biology /2010	Undergraduate student, UNC Pembroke
Tamra Henderson	UNC Pembroke	BS-Nursing/2010	Undergraduate student, UNC Pembroke
Michelle Godwin	UNC Pembroke	BS-Biology/2010	Undergraduate student, UNC Pembroke
Lane Guyton	UNC Pembroke	BS-Biology & Chemistry/2009	Medical School, East Carolina Medical School, NC
Lindsay Willis (Burke)	UNC Pembroke	BS-Biology/2009	Attending Physicians Assistant Program, NY City
Lisa Walters	UNC Pembroke	BS-Biology & Chemistry/2009	Graduate Student, East Carolina Medical School, NC
Samantha Schrock	UNC Pembroke	BS-Chemistry/2010	Undergraduate student, Fayetteville State Univ.
Clinton Haywood	UNC Pembroke	BS-History Education/2009	Graduate Student, Business School, UNC Pembroke, NC
Tala Smith	UNC Pembroke	BS-Biology & Chemistry/2008	Graduate Student, East Carolina Medical School, NC
Megan Grimsley	UNC Pembroke	BS-Biology & Chemistry/2007	Pharmacy School, UNC Chapel Hill
Charlotte Branch	UNC Pembroke	BS-Biology & Chemistry/2008	Secondary science teacher, Lumberton, NC
Brandon Locklear	UNC Pembroke	BS-Chemistry/2006	Employed, Fort Collins, CO
Rekelle Oxendine	UNC Charlotte	BS-Accounting/Did not complete	Employed, Atlanta, GA.
Janet Sanford	UNC Pembroke	BS-Chemistry/2006	Graduate student, Chemistry Department, Colorado State University
Jenna C. Mills	Western Carolina University	BS-Public Relations/2005	Employed at NASA, Johnson Space Center, Public Affairs Office
April Oxendine	UNC Pembroke	BS-Chemistry/2005	Shift supervisor at Campbell Soups Co., Maxton, NC
Charlene Locklear	UNC Pembroke	BS-Biology & Chemisry/2004	Medical Residency, Florence, SC
Kiel Locklear	UNC Charlotte	BS-Mechanical Engineering Technology/2004	Project Engineer, CDX Industries, Jacksonville, FL
Robie Goins	UNC Charlotte	BS-Civil Engineering Technology/2004	Engineer with Shaw Group, Charlotte, NC
Ginger Moody	UNC Charlotte	BS-Accounting/2004	Accountant, West Virginia
Mary Beth Brayboy	UNC	BS-Mass Communications &	Marketing coordinator,

	Pembroke	Native American Studies/2003	Advantage Hospice and Home Care, Lumberton, NC
Toni Chagolla	UNC Pembroke	BS-Biology & Chemistry/2003	Graduate student, East Carolina Medical School, NC
Joseph Oxendine	UNC Pembroke	BS-Chemistry/2003	U.S. Navy Officer