
Curriculum Vitae of Tonya Coffey

Contact Information

Address: Room 231 CAP Bldg., 525 Rivers St., Physics and Astronomy Dept., Appalachian State University, Boone, NC 28608

Phone: 828-262-2437 (work)

Email: coffeyts@appstate.edu

Research Interests and Expertise

Nanotribology (the study of friction on the nanoscale), Tribology, Ultra High Vacuum Technology, X-ray microscopy, scanning electron microscopy (SEM), atomic force microscopy (AFM), and scanning tunneling microscopy (STM), STEM Outreach, and Microanalysis

Education

North Carolina State University	1996	B.S. Physics (minors in Mathematics and Spanish)
North Carolina State University	1999	M.S. Physics
North Carolina State University	2004	Ph.D., Physics

Academic and Related Professional Experience

6/94—8/94 Research Experience for Undergraduates; NCSU Astrophysics; Dr. S. Reynolds

1994-1996 Teaching Assistant to University Scholars Program at N.C. State

1996-1997 Teaching Assistant in Physics Department, N.C. State

1996-6/2004 Research Assistant, N.C. State Physics Department

8/99—5/00 Preparing the Professoriate Program, N.C. State

8/04-5/1/09 Assistant Professor, Physics Dept., Appalachian State University

Present Associate Professor, Physics Dept., Appalachian State University

M.S. Thesis Advisor: H. Ade. *Radiation Damage to Polymers with Soft X-rays*. 1999.

Ph.D. Thesis Advisor: J. Krim, *Nanomorphism*, 2004.

Honors and Awards

William Strickland Award for Outstanding Young Faculty in the College of Arts and Sciences for 2009 Academic Year; NSF DMR MRI Grant, 2008-2009; Appalachian Regional Microscopy Society's Young Investigator Award, 2007; Petroleum Research Fund Type G Grant, 2006-2008; NC Space Grant New Investigations Award, 2006-2008; University Research Council Mini-Grant, 2005; U.S. Department of Education Graduate Assistance in Areas of National Need Fellowship, Fall 1997-Spring 2000; Leadership Award for a Graduating Senior in the College of Physical and Mathematical Sciences, 1996; Graduated Summa Cum Laude, 1996; Phi Beta Kappa, 1995; Phi Kappa Phi, 1995; Order of Thirty and Three (an organization for outstanding rising juniors at N.C. State), 1994; Sigma Pi Sigma, 1995; Pi Mu Epsilon, 1995; Golden Key National Honor Society, 1995; MENSA, 1991; University Scholars Program, 1992-1996; Caldwell Scholarship, 1992-1996; National Merit Scholarship Finalist, 1992; J. Motley Morehead Scholarship Finalist, 1992

Professional Activities

American Chemical Society, 2007-2010; American Physical Society, 1998-Present; American Vacuum Society, 2002-present; Microscopy Society of America, 1997-Present; Sigma Xi, (2006-Present); Society of Physics Students, 1993-2004 (President, NCSU Chapter, 1995-1996); Graduate Physics Student Association, 1997-2004

Selected Publications

1. "Atomic force microscopy of microwear traces on Mousterian tools from Myshtylagty Lagat (Weasel Cave), Russia," N. R. Faulks, L. R. Kimball, N. Hidjrati, T. S. Coffey, *Scanning* **3**, 304-315, (2011).
2. "A New Atomic Force Microscopy Learning Module Using Diffraction Gratings," T. Coffey et al., *Microscopy Today* **18**, 42-48 (November, 2010).
3. "Soda Pop Fizz-ics" T. Coffey, *The Physics Teacher* **46**, 473 (2008).
4. "Using the quartz crystal microbalance to study macro- and nanoscale bubbles at solid-liquid interfaces" J. Jones and T. Coffey, proceedings of the IVC-17/ICSS-13 and ICN+T2007 Congress, *Journal of Physics: Conference Series* **100**, 072026 (2008).
5. "Diet Coke and Mentos: What is really behind this physical reaction?" T. Coffey, *American Journal of Physics* **76** (6) 551-557 (2008).
6. "Impact of Atomic Corrugation on Atomic Friction as Probed by QCM," T. Coffey and J. Krim, *Physical Review Letters*, **95**, 076101 (2005).
7. "QCM Studies of the Slippage of Solid and Liquid Krypton Monolayers on Metal(111) and C₆₀ Surfaces," T. Coffey and J. Krim, *Physical Review B*, **72**, 235414 (2005).
8. "C₆₀ Molecular Bearings and the Phenomenon of Nanomapping" T. Coffey and J. Krim, *Physical Review Letters*, **96**, 186104 (2006).
9. "Gas Adsorption on a C₆₀ Monolayer," R.A. Trasca, M.W. Cole, T. Coffey, and J. Krim, *Physical Review E*, **77**, 041603 (2008).
10. "Nanotribology." T. Coffey and J. Krim, in: *The Encyclopedia of Nanoscience and Nanotechnology*, American Scientific Publishers, Stevenson Ranch, California, 2004.
11. "A scanning probe and quartz crystal microbalance study of the impact of C₆₀ on friction at solid-liquid interfaces." T. Coffey, M. Abdelmaksoud, and J. Krim. *Journal of Physics: Condensed Matter* **13** (2001) 4991-4999.
12. "Characterization of the effects of soft x-ray irradiation on polymers." T. Coffey, S. Urquhart, H. Ade. *Journal of Electron Spectroscopy and Related Phenomena* **122** (2002) 65-78.

Selected STEM Outreach Experience

1. Currently organizing ASU Science Expo to take place on April 16, 2012. This event will host ~1000 students in 6th-12th grades from Western NC, and will feature the main Expo floor with at least three dozen booths addressing STEM research and education efforts at ASU. In addition, students can attend numerous science demo shows and activities throughout the day.
2. Organized ASU's participation in the 2010 NC Science Festival. During the festival, ASU hosted 12 outreach events over the two-week period, including a Science Expo, stargazing events, physics and chemistry demo shows, and many others.
3. Hosted ASU Science Expo in Fall of 2010. The event featured roughly two dozen booths educating and informing the general public about science research at ASU, including a booth discussing the science behind the Diet Coke and Mentos reaction, hosted by Dr. Coffey.
4. Joined the Science Teacher Professional Learning Community (PLC) sponsored by ASU's Math & Science Education Center in 2011. Currently attends monthly meetings to collaborate on outreach with public school teachers in Western NC.
5. Trained Discovery Place staff to operate tabletop SEM in spring 2011 and loaned tabletop SEM to museum for the month of August 2011. During that time, 500 guests of the museum had hands-on experiences with the SEM.
6. Visited ~30 separate public schools or other public locations for science outreach events (mostly nanoscience/microscopy outreach) over the past three years, including the "Making Stuff" weekend at Discovery Place (Feb. 25-27, 2011)