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EDUCATION

Ph.D. Chemical Physics	Virginia Commonwealth University (May 2007) *Dissertation:* "Localized electronic behavior of large band-gap semiconductor systems" *Advisor:* Dr. Alison Baski
M.S. Applied Physics	Virginia Commonwealth University (May 2002) *Thesis:* "Oxidation Studies of the Clean and Au:Si(5 5 12) Systems"
B.S. Physics	Virginia Commonwealth University (Dec. 2000), *Cum laude*

TEACHING

ASSISTANT PROFESSOR, Longwood University (Farmville, VA), Department of Chemistry & Physics (2007-present)
Course Taught: Algebra-Based Introductory Physics, Electric Circuit Theory, Microelectronics, Thermodynamics, Unifying Principles of Physics.

- *Director of the Engineering Dual-Degree Program*. Liaison for dual-degree program at partner institutions: Virginia Tech, the University of Virginia, Old Dominion University, Christopher Newport University, and the University of Tennessee.
- *Advisor* to undergraduate physics majors and dual-degree engineering students.
- *Leader* of student recruitment and retention efforts.

PHYSICS INSTRUCTOR, St. Catherine's School (Richmond, VA), Science Department (2003-2004)
Course Taught: AP Physics C (college level calculus-based introductory physics), Honors Physics, Physics.

- Taught high-school and college level introductory physics courses. (65 students, 4 classes)
- Developed online and in-class instructional materials adapted from *Tutorials in Physics*.
- Developed labs and purchased equipment
- Collaborated with lower school (elementary) science faculty in the implementation of a LEGO robotics competition team.
- Developed and taught a course about the history and engineering of medieval siege weapons, culminating in the design and construction of a 15' trebuchet.

FOUNDER/ADMINISTRATOR, ilovephysics.com (2003-Present)
Founded an online forum aimed towards students and teachers for discussion of physics topics. Includes forums, interactive tutorials, videos, and physics/science news. Site receives ~35,000 visitors per month.

- Assist and tutor physics students from around the globe through an online forum.
- Featured in *Science Magazine* "Best of the Web in Science" - *Science*, **315**, 733 (2006).
- Recently entered a partnership with Edmund Scientific to review physics-related products.
- Future plans include freely available video tutorials on concepts and problem solving techniques.

PHYSICS INSTRUCTOR, J.R. Tucker High School (Henrico, VA), Science Department (2002–2003)
Courses Taught: AP Physics B (college level algebra-based introductory physics), Honors Physics, Conceptual Physics

- Taught high-school and college level introductory physics courses. (95 students, 5 classes)
- Designed and implemented on-line content for physics classes utilizing text and video presentations.
- Coach for regional winning and nationally ranked FIRST Robotics Team (2002-2004). Solicited ~$50,000 per year in funding from local businesses and NASA.
- Helped develop a course in robotics with an emphasis on electronics and programming.

TEACHING ASSISTANT, Virginia Commonwealth University, Physics Department (2000-2002)
Courses Taught: algebra-based and conceptual introductory physics labs

- Helped develop lab activities and manuals.
- Taught conceptual and algebra-based introductory physics lab sections. (25 students per section)
- Responsible for grading 25 labs weekly and 100-125 quizzes and homework assignments bi-weekly.

RESEARCH

ASSISTANT PROFESSOR, Longwood University, Department of Physics and Chemistry (2007-Present)
Conduct research on chemical synthesis of nano-materials and local electrical characterization of large bandgap semiconductors. Specifically:

- Growth of semiconductor nanowires in AAO porous templates using electrodeposition and DC sputtering;
- Local electrical characterization of nano-scale semiconductor systems using CAFM and SKPM;
- Inventor of Electronic Pump-Probe Microscopy (EPPM) which combines CAFM and SKPM to produce time-resolved charge-transfer imaging; and
- Characterization of current conduction mechanisms for nano-defects on GaN surfaces.

RESEARCH ASSISTANT, Virginia Commonwealth University, Department of Physics (2003–Present)
Conducted research utilizing Atomic Force Microscopy (AFM) and related techniques (CAFM, SKPM) to study the nano-scale structural and electronic properties of various large bandgap semiconductor systems. Specifically:

- Determination of densities, conduction mechanisms, and charging behavior for defects in GaN films;
- *I-V* characterization of semiconductor nanowires (ZnO) grown via catalyzed vapor phase transport;
- Investigation of the ZnO polar surface's reaction with ambient; and
- Trained and supervised undergraduate and entering graduate students.

GRADUATE TEACHING ASSISTANT, Virginia Commonwealth University, Department of Physics (2000–2002)
Participation in a research program studying the structural and electronic properties of clean and metal (Au, Cu) induced faceting of Si(5 5 12), and the oxidation characteristics of these systems. Techniques used include:

- Scanning tunneling microscopy (STM),
- Low energy electron diffraction (LEED),

- Reflective high energy electron diffraction (RHEED), and
- Ultra high vacuum (UHV) systems.

PRINCIPLE INVESTIGATOR, Guilford College, Department of Physics (1998–1999)
Initiated a research program to study the mechanical response of various materials used in the construction of speaker enclosures.

- Performed experiments using pressure and force transducers interfaced with LabVIEW.
- Mathematically modeled systems using Maple and Matlab.
- Received funding from the Ellen and Winslow Womack Research Award (co-PI w/ B. Redman).

PUBLICATIONS

"Study of the electronic behavior of the Zn- and O-polar ZnO surfaces using conductive atomic force microscopy," J.C. Moore, S. Chevtchenko, H. Morkoç, A.A Baski, *Appl. Phys. Lett.* (in prep.).

"Investigation of charge trapping at the oxide/semiconductor interface for MBE-grown GaN films," J.C. Moore, M.A. Reshchikov, J.E. Ortiz, J. Xie, H. Morkoç, A.A. Baski, *Proc. of SPIE* (in press).

"Local electronic and optical behavior of *a*-plane GaN grown via epitaxial lateral overgrowth," J.C. Moore, V. Kasliwal, X. Ni, Ü. Özgür, H. Morkoç, A.A. Baski, *Appl. Phy. Lett.* **90**, 011913 (2007).

"Sublimation behavior of SiO2 from low- and high-index silicon surfaces," J.C. Moore, J.L Skrobiszewski, A.A. Baski. *J. Vac. Sci. Technol.* **25**, 4, 812-815 (2007).

"Carrier relaxation and stimulated emission in ZnO nanorods grown by catalyst-assisted vapor transport on various substrates," Zinc Oxide Materials and Devices II, (Ed. F.H. Teherani, C.W. Litton), *Proc. of SPIE* 64741M (2007).

"AFM and CAFM studies of ELO GaN films," V. Kasliwal, J.C. Moore, X. Ni, H. Morkoc, A.A. Baski, Gallium Nitride Materials and Devices II, (Ed. H. Morkoc, C.W. Litton), *Proc. of SPIE* 647308 (2007).

"Effect of temperature on the growth of InAs/GaAs quantum dots grown on a strained GaAs layer", I. Ahmad, J.C. Moore, V. Avrurtin, A.A. Baski, H. Morkoc, *J. Nanosci. Nanotechnol.* **7**, 8, 2889-2893(5) (2007).

"Study of leakage defects on GaN films by conductive atomic force microscopy," J.C. Moore, J.E. Ortiz, J. Xie, H. Morkoç, A.A. Baski. *J. Phy.* **61**, 1, 90-94 (2007).

"Morphology and optical properties of ZnO nanorods grown by catalyst-assisted vapor transport on various substrates," V. Avrutin, Ü. Özgür, N. Izyumskaya, S. Chevtchenko, J. Leach, J.C. Moore, A. A. Baski, H. O. Everitt, K. T. Tsen, P. Ruterana, H. Morkoç, *MRS Symp. Proc.*, **963E** (Fall 2006).

"Comparative study of surface properties for (0001) and (0001bar) bulk ZnO," S. Chevtchenko, J.C. Moore, Ü. Özgür, X. Gu, B. Nemeth, J.E. Nause, A.A. Baski, H. Morkoç, *Appl. Phy. Lett.*, **89**, 182111 (2006).

"Conductive atomic force microscopy study of MBE GaN films," J.C. Moore, K.A. Cooper, J. Xie, H. Morkoç, A.A. Baski, Gallium Nitride Materials and Device (Ed. C.W. Litton), *Proc. of SPIE 6121*, 61210J-1,6 (2006).

"Effects of hydrogen on the morphology and electrical properties of GaN grown by plasma-assisted molecular-beam epitaxy," Y. Dong, R.M. Feenstra, D.W. Greve, J.C. Moore, M.D. Sievert, A.A. Baski, *Appl. Phy. Lett*., **86**, 121914 (2005).

"Au-induced faceting of the Si (5 5 12) surface," J.D. Dickinson, J.C. Moore, A.A. Baski, *Surf. Sci.*, **561**, 193-199 (2004).

"Scanning tunneling microscopy studies of oxide growth and etching on Si(5 5 12)," J.L. Skrobiszewski, J.C. Moore, J.W. Dickinson, A.A. Baski, *J. Vac. Sci. Technol*. *A*, **22**, 1667-1670 (2004).

"Scanning Tunneling Microscopy Studies of the Cu:Si(5 5 12) System," P.H. Woodworth, J.C. Moore, A.A. Baski, *J. Vac. Sci. Technol*. *A*, **21**, 1332-1335 (2003).

"Oxygen Etching of Si(5 5 12) and Related Surfaces," J.C. Moore, P.H. Woodworth, J.L. Skrobiszewski, A.A. Baski, *Surf. Sci*., **532**, 711-715 (2003).

CONFERENCE ABSTRACTS, CONTRIBUTED TALKS AND POSTERS

"Investigation of charge trapping at the oxide/semiconductor interface for MBE-grown GaN films," Talk
SPIE International Conference (January 2008)

"Investigation of charge trapping in GaN films using electronic pump-probe microscopy," Talk
MRS Fall Meeting (November 2007)

"Investigation of charge trapping in GaN films using SKPM and CAFM," Talk
AVS 55th International Symposium (October 2007)

"AFM and CAFM studies of ELO GaN films," Talk
SPIE International Conference (January 2007)

"Two-step epitaxial lateral overgrowth of (112-0) a-plane GaN by MOCVD," Poster presentation
SPIE International Conference (January 2007)

"Morphology and optical properties of ZnO nanorods grown by catalyst-assisted vapor transport on various substrates," Talk
SPIE International Conference (January 2007)

"Morphology and optical properties of ZnO nanorods grown by catalyst-assisted vapor transport on various substrates," Poster presentation
MRS Fall Meeting (November 2006)

"Comparative study of surface properties for Zn- and O-face bulk ZnO," Talk
AVS 54th International Symposium (November 2006)

"Optical characterization of electrochemically self-assembled ZnO nanowires"
Electrochemical Society Meeting (October 2006)

"No blood for platinum: cheaper alternatives for fuel cell catalysts," Talk
Seminar, Department of Chemistry, Virginia Commonwealth University (October 2006)

"Localized electronic behavior of large bandgap semiconductor systems," Poster presentation

Graduate Poster Session, Department of Chemistry, Virginia Commonwealth University (October 2006)

"AFM and conductive AFM studies of MBE GaN films," Talk
14th International Conference on Scanning Tunneling Microscopy and Related Techniques (June 2006)

"Conductive atomic force microscopy study of forward and reverse current conduction in MBE GaN films," Talk
SPIE International Conference (January 2006)

"Sublimation Behavior of SiO_2 from low- and high-index silicon surfaces," Poster presentation
AVS 52nd International Symposium (November 2004)

"Oxygen reactivity of clean and Au/Cu-induced high-index Si surfaces," Poster presentation
AVS 50th International Symposium (November 2002)

"STM studies of oxygen etching on Si(5 5 12)," Poster presentation
VCU Graduate Student Association Poster Session (March 2002)

"Au induced faceting of Si(5 5 12)," Poster presentation
AVS 49th International Symposium (November 2001)

"Integrating Research in the Undergraduate Experience," Talk
AAPT Chesapeake Section Spring Meeting (April 2001)

"High Coverage Growth of Sn:Si(5 5 12)," Talk
Mid-Atlantic Regional Conference of Undergraduate Scholarship (October 2000)

"Mechanical response of wood speaker enclosures," Talk
National Conference on Undergraduate Research (April 1999)

AWARDS & HONORS

Friends of the School Scholarship (Guilford College 1997-1999)
Presidential Scholarship (Guilford College 1997-1999)
Ellen and Winslow Womack Research Award (1998)
John Wilson Memorial Award (Professional Construction Estimators Association 1999-2000)
Commonwealth Award (Virginia Commonwealth University 1999-2002)
Graduate Academic Award (Department of Physics, VCU 2002)

PROFESSIONAL MEMBERSHIPS

American Association of Physics Teachers
Greater Richmond Association of Physics Educators (co-founder)
AVS – Society for Science and Technology of Materials, Interfaces, and Processing
Material Research Society
Sigma Pi Sigma, Society of Physics Students (President, VCU Chapter 2000)