G. Neal Chesnut

University of West Georgia
Physics Department
1601 Maple St.
Carrollton, GA 30118
(678) 839-4094
nchesnut@westga.edu

CAREER OBJECTIVE

A faculty position with an emphasis on teaching physics courses, along with research opportunities in experimental physics.

EDUCATION

University of Alabama at Birmingham (UAB), Birmingham, AL, 1995 - 2001

Ph.D. in Physics, 2001, Dissertation Title: Ultra-High Pressure Phase Transformations in Light Rare Earth Metals

M.S. in Physics, 1999, Thesis Title: High Pressure Phase Transformations in Heavy Rare Earth Metals, Topics studied include classical mechanics, electricity, magnetism, quantum mechanics and solid state physics.

B.S. in Physics, 1997

Math minor/Physics concentration

EXPERIENCE

Chair of the Physics Department – University of West Georgia (UWG), 2019-present.

- Manage the daily operation of the department.
- Provide guidance and leadership with departmental mission and objectives.
- Represent faculty, staff, and students needs and issues.
- Meet regularly with the college dean and chairs.
- Provide communication between administrators, faculty, students and staff.

Associate Professor of Physics - University of West Georgia, 2014 – present.

- Teach Introductory and Advanced Physics courses.
- Teach and Supervise Introductory Physics Labs (primarily during the summer sessions).
- Mentor students in research activities at UWG.
- Establishing High-Pressure-Low-Temperature Research Lab with Dr. Ajith DeSilva for the purpose of studying material properties.
- Research projects including the study of semiconducting nanoparticles.

Assistant Professor of Physics – University of West Georgia, 2009 – 2014.

- Teach Introductory and Advanced Physics courses and Introductory Astronomy.
- Teach and Supervise Introductory Physics Labs (primarily during the summer sessions).
- Mentor students in research activities at UWG and at national user organizations such as the Spallation Neutron Source and the Advanced Photon Source.

- Research collaborations with the UAB Physics Program studying High Temperature Super Conductors.
- University support through various committees: Faculty Senate – University Relations Committee (2011-2012) and COSM Curriculum Committee (2012-2014).
- Department Representative at Preview Days. (These are opportunities for potential students and parents to meet faculty and ask questions about the department and school.)
- Participate in community outreach through activities such as physics demonstrations for local middle schools.
- Faculty Advisor to the Physics-Engineering Club (2010-2014).

Technical Staff Member - Los Alamos National Laboratory (LANL)**,** 2004 – 2009

- Research encompasses the study electronic and structural properties in transition metals, lanthanides, actinides, and polymers at high pressure using x-ray diffraction techniques for determining equation-of-state parameters and evaluating aging effects in special nuclear materials.
- Manage Diamond Anvil Cell (high pressure-high temperature) research on metals at LANL.
- Direct a small group of metallurgist (MST-16) to understand material properties of metals and alloys under extreme conditions.
- Supervisor and mentor to postdoctoral research associate and former post-baccalaureate student
- Representative of the LANL static research community to the Carnegie/DOE Alliance Center (CDAC).
- COMPRES (Consortium for Materials Properties Research in Earth Sciences) elector alternate for LANL.
- Currently implementing a heating system for generating temperatures up to 1000^{o}C and simultaneous high pressure for determining equation-of-state properties and mapping phase diagrams.
- Work package manager for Plutonium Diamond Anvil Cell Research in the Enhanced Surveillance program. Responsibilities include obtaining and managing funds, guiding the work and research direction, and carrying out experiments.
- Established the Diamond Anvil Cell Research Lab at LANL housing one of the most powerful rotating anode x-ray sources for micro-diffraction of powder samples.
- Developed radial x-ray diffraction technique at LANL for studying strain at extreme stresses and designed new compact diamond anvil cells capable of megabar pressures.
- Performed first static high-pressure x-ray diffraction experiments at LANL on special nuclear materials (2006).
- Lead and trained students, technicians, and technical staff members on static high-pressure experiments at the Advanced Photon Source, Argonne National Laboratory.
- 2005 and 2006 committee member of the LDRD/ER Chemistry and Material Synthesis Funding Review Committee.

Postdoctoral Research Associate - Los Alamos National Laboratory, 2002 – 2004

- Designed new diamond anvil cell for radial x-ray diffraction to produce highly accurate equation-of-state data and examine stress-strain conditions at high pressure.
- Performed static high-pressure x-ray diffraction experiments with synchrotron radiation on lanthanides.

- Performed dynamic high pressure-high temperature experiments with gas guns and explosive techniques.

Research Assistant - University of Alabama at Birmingham, 1997 – 2001

- Prepared and gave formal presentations to students and others in the scientific community.
- Utilized diamond anvil cells for high-pressure experiments.
- Experience with Raman spectroscopy with argon and krypton lasers.
- Performed energy dispersive x-ray diffraction experiments at synchrotron radiation facilities:
  - National Synchrotron Light Source, Brookhaven National Lab
  - Advanced Photon Source, Argonne National Lab.
  - Cornell High Energy Synchrotron Source, Cornell University.
- Mentored students in the Research Experience for Undergraduates (REU) program at UAB.

Research Intern - University of Alabama at Birmingham, 1996 – 1997

- Built polycrystalline diamond polishing system for repairing and shaping diamond anvils.
- Successfully polished diamond anvils used in high-pressure experiments and chemical vapor deposition experiments.

FUNDING/GRANTS

- COSM Faculty Research Grant entitled "Low Temperature High Pressure Platform to Study Quantum Dots". 2018-2019. Award $1950.
- Student Research Assistant Program (SRAP). 2016-2017. Funded $1475.
- COSM Faculty Research Grant (FRG) funded. "High Pressure Studies on Semiconductors." Fall 2016. Total Award: $1000.
- UWise Mingrant, Teaching grant awarded for "Workshops for PHYS 2211/2212." 2014-2015. Award $3540.
- Presidential Assistance Grant, for research equipment supporting Strategic Imperative 1: Student Success: Enhanced Learning, Access, Progression, & Development. 2014-2015. Award $4000.
- UWise Minigrant II, Teaching grant awarded for "Demonstrations and Projects Teaching Electricity and Magnetism." 2013-2014. Award $4995.
- COSM Research Grant Initiative, "High Temperature Superconductivity Research." 2012-2013. Award $2200.
- 2012: Beamtime allocation to the Spallation Neutron Source. (March)
- 2011: Beamtime allocation to the Spallation Neutron Source. (August)
- 2011 - 2012: Student Research Assistantship Proposal (SRAP).
- 2010 - 2011: Student Research Assistantship Proposal (SRAP).
- 2008 – 2009: DOE: Campaign 2 (Materials) and DPE Program
- 2006 – 2008: DOE: Campaign 8 (Enhanced Surveillance) and Campaign 2 (Materials)
- 2005 – 2006: DOE: Campaign 8 (Enhanced Surveillance)

PROFESSIONAL DEVELOPMENT/SERVICE

- Faculty Development Committee, 2017 – 2019.
- Vice-President of the Georgia Academy of Science, 2017-2019.
- Local Arrangements Chair of the Georgia Academy of Science Annual Meeting scheduled for April 13-14, 2018.
- Rules Committee, 2016-2017.
- Georgia Academy of Science, Councilor at Large, 2012-2016.
- Co-director of the West Georgia Regional Science and Engineering Fair, 2016 and 2017.
- COSM Promotion and Tenure Committee, Chair, 2015.
- COSM Vision Committee, 2015.
- Student Affairs Committee, 2014.
- COSM Curriculum Committee, 2013-2014.
- Steering Committee, Carnegie DOE Academic Alliance (CDAC) (2010 - 2014). Reviewer for graduate student research proposals. CDAC is an NSF supported project between Department of Energy (DOE) national laboratories and academic institutions. The project is headquartered at the Geophysical Laboratory of the Carnegie Institution of Washington.
- Faculty Advisor to the Physics-Engineering Club of the University of West Georgia, 2010-Present.
- 2014-2015 Recruitment Committee for REU-site renewal "Regional Initiative to Promote Undergraduate Participation in Experimental and Computational Material Research" by PI Yogesh K. Vohra, University of Alabama at Birmingham (UAB).

ACHIEVEMENTS

- Best of the West Award. 2018
- Award of Excellence to the Pit Lifetime Assessment team – team member. 2007
- Received first runner-up for the John C. Jamieson Award at the International Conference on High Pressure Science and Technology in Honolulu, HI. 1999
- Accepted to attend the United States National School on Neutron and X-ray Scattering at Argonne National Lab. 1999
- GSA Senator at the University of Alabama at Birmingham. 1999 – 2000
- President of the UAB chapter of the Society of Physics Students. 1995 – 1997

COMMUNITY INVOLVEMENT

Younglife (Wyldlife) Team Leader – Los Alamos Younglife, 2004 – 2008
Younglife Leader – Los Alamos Younglife, 2002 - 2004

PUBLICATIONS

Neutron Diffraction and Electrical Transport Studies on Magnetic Ordering in Terbium at High Pressures and Low Temperatures, S. A. Thomas, J. M. Montgomery, G. M. Tsoi, Y. K. Vohra, G. N. Chesnut, S. T. Weir, C. A. Tulk, and A. F. M. Dos Santos, J. High Pressure Physics **33** (3), 555 (2013)

Neutron Diffraction and Electrical Transport Studies on the Incommensurate Magnetic Phase Transition in Holmium at High Pressures, S. A. Thomas, W. O. Uhoya,

G. M. Tsoi, L. E. Wenger, Y. K. Vohra, G. N. Chesnut, S. T. Weir, C. A. Tulk, and A. M. dos Santos, J. Phys.: Condensed Matter **24** 216003 (2012)

Effects of Interstitial Impurities on the High Pressure Martensitic α to ω Structural Transformation and Grain Growth in Zirconium, N. Velisavljevic, G. N Chesnut, L. L. Stevens, and D. M. Dattelbaum, J. Phys.: Condensed Matter **23** 125402 (2011)

Structural Phase Stability in Group IV Metals Under Static High Pressure, N. Velisavljevic, G. N. Chesnut, D. M. Dattelbaum, Y. K. Vohra, and A. Stemshorn, *Shock Compression of Cond. Matt.*-2009, edited by M. L. Elert, W. T. Butler, M. D. Furnish, W. W. Anderson, and W. G. Proud, Conf. Proc. Of APS topical group on SCCM, (AIP, New York, 2009), p. 1213

Phase Stability in Nanocrystalline Titanium to 161 GPa, N. Velisavljevic, G. N. Chesnut, L. L. Stevens, and D. M. Dattelbaum, Los Alamos Report LA-UR-08-0402, (01/2008)

Static High Pressure DAC Results on Pu – April 2008 (U), G. N. Chesnut R. A. Pereyra, D. M. Lovato, and L. A. Morales, LANL Report, LA-CP-08-0617

Diamond Anvil Cell Experiments on Plutonium in 2007 (U), G. N. Chesnut and R. A. Pereyra, LANL Report, LA-CP-08-0079

Static High Pressure X-ray Diffraction of Ti-6Al-4V, G. N. Chesnut, N. Velisavljevic, and L. Sanchez, *Shock Compression of Cond. Matt.*-2007, edited by M. Elert, M. D. Furnish, R. Chau, N. C. Holmes, and J. Nguyen, Conf. Proc. Of APS topical group on SCCM, (AIP, New York, 2007), Pt. 1, p. 27

Direct Hcp → Bcc Structural Phase Transition Observed in Titanium Alloy at High Pressure, N. Velisavljevic and G. N. Chesnut, Appl. Phys. Lett. **91**, 101906 (2007)

Equation of State For Ti-Beta-21S, K. G. Honnell, N. Velisavljevic, C. D. Adams, P. A. Rigg, G. N. Chesnut, R. M. Aiken, Jr., and J. C. Boettger, *Shock Compression of Cond. Matt.*-2007, edited by M. Elert, M. D. Furnish, R. Chau, N. C. Holmes, and J. Nguyen, Conf. Proc. Of APS topical group on SCCM, (AIP, New York, 2007), Pt. 1, p. 55

Diamond Anvil Cells for Radial X-ray Diffraction, G. N. Chesnut, D. Schiferl, B. D. Streetman, and W. W. Anderson, J. Phy. Condensed Matt. **18**, S1083 (2006)

Diamond Anvil Cell Study of Ti-beta21S to 70 GPa, N. Velisavljevic, G. N. Chesnut and L. Sanchez, LANL Report, LA-UR # 06-5542.

Static X-ray Diffraction Study of Cerium to 330 Kilobars, G. N. Chesnut, W. W. Anderson, and J. Casson, *Shock Compression of Cond. Matt.*-2005, edited by M. D. Furnish, M. Elert, T. P. Russell, and C. T. White, Conf. Proc. Of APS topical group on SCCM, (AIP, New York, 2006), Pt. 1, p. 45

Static X-Ray Diffraction Study of Cerium: The Standard Approach & The Magic-Angle Approach, G. N. Chesnut, B. D. Streetman, D. Schiferl, W. W. Anderson, M. Nicol, and Y. Meng, *Shock Compression of Cond. Matt.*-2003, edited by M. D. Furnish, Y. M. Gupta, and J. W. Forbes, Conf. Proc. of APS topical group on SCCM, (AIP, New York, 2004), Pt. 1, p. 37

Structural and Electronic Properties of Beryllium Metal to 66 GPa Studied Using Designer Diamond Anvils, N. Velisavljevic, G. N. Chesnut, Y. K. Vohra, S. T. Weir, V. Malba and J. Akella, Phys. Rev. B 65, 172107 (2002)

Phase Transformations and Equation of State of Praseodymium Metal to 103 GPa, G. N. Chesnut and Y. K. Vohra, Phys. Rev. B 62, 2965 (2000)

α-Uranium Phase in Compressed Neodymium Metal, G. N. Chesnut and Y. K. Vohra, Phys. Rev. B 61, R3768 (2000)

Phase Transitions in Samarium Metal to 205 GPa, G. N. Chesnut and Y. K. Vohra, *High Pressure Science and Technology*-1999, edited by M. H. Manghnani, W. J. Nellis, M. F. Nicol, Conf. Proc. of AIRAPT-17, (Universities Press Limited, India, 2000), Pt. 1, p. 483

Structural and Electronic Transitions in Ytterbium Metal to 202 GPa, G. N. Chesnut and Y. K. Vohra, Phys. Rev. Lett. 82, 1712 (1999)

Phase Transformations in Lutetium Metal at 88 GPa, G. N. Chesnut and Y. K. Vohra, Phys. Rev. B 57, 10221 (1998)

High Pressure Phase Transformations in Neodymium Studied in a Diamond Anvil Cell Using Diamond-Coated Rhenium Gaskets, J. Akella, S. T. Weir, Y. K. Vohra, H. Prokop, S. A. Catledge and G. N. Chesnut, J. Phys.: Condens. Matter **11**, 6515 (1999)

Growth and Modification of Diamond Anvils by Chemical Vapor Deposition, S. A. Catledge, N. Chesnut and Y. K. Vohra, Rev. High Pressure Sci. Technol. 7, (1998)

Image Plate X-ray Diffraction Study of Distorted FCC Phase in Rare Earth Metals at High Pressures, S. Beaver, G. N. Chesnut and Y. K. Vohra, Mat. Res. Soc. Symp. Proc. 499, 435 (1998)

INVITED TALKS

Panel Discussion on "Approaches to Increase Student Learning in STEM Courses" by V. Geisler, N. Chesnut, and C. Thielemier, COSM Dean's Teaching and Learning Seminar Series 10/2014.

Neutron Diffraction Studies of Iron-Based Superconductors and Related Elements, Workshop on SNAP Science and New Tools for Data Analysis, Spallation Neutron Source, Oak Ridge National Laboratory, Oak Ridge, TN, 11/2011

Superconductivity: High Pressure Low Temperature Studies, COSM Dean's Seminar Series, University of West Georgia, Carrollton, GA, 11/2011

Diamond Anvil Cell Research on Cerium, JOWOG32, Atomic Weapons Establishment (AWE), Aldermaston, UK, 11/2004

The Role of High Pressure Diamond Anvil Cell Experiments, Physics Colloquium, Physics Dept., New Mexico State University, Las Cruces, NM, 09/2004

POSTER PRESENTATIONS/PRESENTATIONS/STUDENT PRESENTATIONS

Photoluminescence of InP/ZnS Nanocrystals Under Pressure, Tyler Young, Gary N. Chesnut, and L. Ajith DeSilva, *Georgia Academy of Science*, University of West Georgia, GA, April 13-14, 2018

Photoluminescence of CdSe/ZnS Quantum Dots under Various Pressures, Joshua Harwell,Neal Chesnut, and Ajith DeSilva *Georgia Academy of Science*, Young Harris College, GA, March 24-25, 2016

High Pressure Low Temperature Studies of the Iron-Based Superconductor SrFe2As2, G. N. Chesnut, Walter Uhoya, Jeffrey Montgomery, Antonio dos Santos, and Jamie Molaison, American Physical Society March Meeting, 03/2013.

Neutron Diffraction Experiments on Elemental Holmium, G. N. Chesnut, W. Uhoya, S. A. Thomas, and Y. K. Vohra, *Georgia Academy of Science*, Kennesaw State University, GA, March 23-24, 2012

Static High Pressure X-ray Diffraction of Ti-6Al-4V, APS Topical Conference on Shock Compression of Condensed Matter, Kohala Coast, HI, 06/2007

Diamond Anvil Cell EOS Studies at LANL, Enhanced Surveillance Review, Lawrence Livermore National Laboratory, Livermore, CA, 04/2006

Static X-ray Diffraction Study of Cerium to 330 Kilobars, APS Topical Conference on Shock Compression of Condensed Matter, Baltimore, MD, 06/2005