

ACADEMIC AND RESEARCH POSITIONS

- 2000 – **Paul Whitfield Horn Professor**, Texas Tech University
1996 – 2000 **Professor**, Physics Department, Texas Tech University
Fall 1995 **Visiting Professor**, Max-Planck Institute, Stuttgart
1991 – 1996 **Associate Professor**, Physics Department, Texas Tech University
1986 – 1991 **Assistant Professor**, Physics Department, Texas Tech University
1985 – 1986 **Assistant Professor** (non tenure-track), Physics and Elec. Engr., Rice University
1983 – 1985 **R.A. Welch Postdoctoral Fellow**, Physics Department, Rice University
1982 **PhD** in Physics, University of Zürich (Switzerland)
1978 **MS** in Physics, University of Geneva (Switzerland)

HONORS

- 2012 **Scientist of the Year, ARCS** (Achievement Rewards for College Scientists), Lubbock Chapter
2008 **President's Book Award** (*Wine: from Neolithic Times to the 21st Century*, Algora, NY 2006)
2006 **Fellow Institute of Physics** (UK)
2001 **Humboldt Research Award** (Friedrich Wilhelm Bessel Prize)
2010: travel grant from the Humboldt Foundation for a month trip to Germany
2017: travel grant from the Humboldt Foundation for a two-months trip to Germany
2000 **Paul Whitfield Horn Professor**, Texas Tech University
1997 **Fellow American Physical Society**

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- Alexander von Humboldt Association of America (lifetime member)
American Physical Society (fellow)
Institute of Physics, UK (fellow)
Materials Research Society
Sigma Pi Sigma Honor Society

SERVICE

- Chair, International Steering Committee, *Int. Conf. on Defects in Semiconductors (ICDS)*** (2011 -2015)
Secretary, International Steering Committee, *ICDS* (2009 -2011)
Member, International Advisory Committee, *ICDS* (2003 - 2015)
Associate Editor, *Journal of Applied Physics*

Proc. 32nd Int. Conf. on the Physics of Semiconductors, **Journal of Applied Physics** **117** (2015).

Proc. 26th ICDS, **Journal of Applied Physics** **115** (2014) and AIP Proceedings:

<http://scitation.aip.org/content/aip/proceeding/aipcp/1583>

co-Editor

Proc. 25th ICDS with N.T. Bagraev, V.V. Emtsev, *Physica B* **404** (Elsevier, Amsterdam, 2009)

Proc. 24th ICDS, with M.W. Holtz, C.H. Seager, A.F. Wright, *Physica B* **401-402** (Elsevier, Amsterdam, 2007)

Co-organizer

Symposium C, *Advanced Materials Research for Electronic and Photovoltaic Applications III* with G. Kissinger, S. Pizzini, H. Yamada-Kaneta, and J. Kang, E-MRS, June 2011, Strasbourg (France)

Focused session *Dopants and Defects in Semiconductors* with J. Ager III and T. Buonassisi, APS meeting March 2011, Dallas (TX)

Symposium C, *Materials, Devices, and Economics Issues for Tomorrow's Photovoltaics* with S. Takashi, K. Vitaly, and A. Cavallini, European MRS, September 2010, Warsaw (Poland)

Materials Physics Topical Group session *Hydrogen in Crystalline Semiconductors*, with E.E. Haller APS meeting, March 1991, Cincinnati (OH)

Chair

24th ICDS with Alan Wright (Albuquerque NM, 2007)

Gordon Research Conf. Point & Line Defects in Semiconductors (Colby-Sawyer, 2002)

Vice-chair, *Gordon Research Conf. Point & Line Defects in Semiconductors* (Colby-Sawyer, 2002)

Program Committee

Gordon Research Conference on Defects in Semiconductors (2004 – 2016)

ICDS (2003 – 2017)

Gettering and Defect Engineering in Semiconductor Technology (2011 – 2015)

Editor, *The Science Corner*, popular scientific articles in *Lubbock Magazine* (monthly), 1998-2001

Elected member (1997-2001), Executive Committee, Texas Section, American Physical Society

Member, International Advisory Committee, NATO advanced research workshop, *Early Stages of Oxygen Precipitation in Silicon*, 3/25-28, 1996, Exeter (UK)

Panel Member, *Fundamental Issues in Hydrogen-Defect Interactions*, sponsored by the Council Materials Science, US Department of Energy, 1/8-12, 1990, La Jolla (CA)

PhD EXAMINER

External examiner for Ronald STÜBNER, Technical University Dresden (Dresden, Germany, 2017)

External examiner for Michael STEGER, Simon Fraser University (Vancouver, Canada, 2011)

External examiner for Gianpietro MORAS, King's College London (UK, 2008)

External examiner for James KERMODE, Univ. of Cambridge (UK, 2008)

External examiner for Riccardo RURALI, Autonomous University of Barcelona (Spain, 2003)

Opponent of Juha LENTO, Helsinki Univ. of Technology (Finland, 2003)

INVITED TALKS: PHYSICS CONFERENCES (total: 57)

European Materials Research Society, Symposium I (Strasbourg, France, 6/18, **invited**):

No title yet

Workshop on thermal conductivity through layered nanostructures (Loeben, Austria, 11/17, **invited**):

Heat flow and defects in semiconductors and nanostructures

Gettering and Defect Engineering in Semiconductor Technology (Lopota Resort, Georgia, 10/17, **banquet**):

The beginning of wine and viticulture

Gordon Research Conference 'Defects in Semiconductors' (New London, NH, 9/16, **plenary**):

Theory and theorists at our GRC

Probing Potential Energy Surfaces PPES IV (Zermatt, Switzerland, 4/16, **invited**):

Phonon-phonon interactions

GADEST 2015 (Bad Staffelstein, Germany, 9/15, **invited**):

Heat flow and defects in Si

International Conference on the Physics of Semiconductors (Austin, TX, 8/14, **invited**):

Heat flow in semiconductor nanostructures containing defects: a first-principles study

EMRS 2014 Spring Meeting (Lille, France, 5/14, **invited**):
Defect dynamics and heat flow in Si and Si nanostructures

27th Int. Conf. on Defects in Semiconductors (Bologna, Italy, 7/13, **plenary**):
Phonon in semiconductors: localized modes, phonon trapping, phonon scattering, and heat flow at heterojunctions

27th Nordic Semiconductor Conference (Helsinki, Finland, 6/13, **invited**):
Phonon trapping in semiconductors

European Materials Research Society, Symposium A (Strasbourg, 5/12, **invited**):
Hydrogen in C-rich Si and the diffusion of vacancy–H complexes

14th DRIP (Defects-Recognition, Imaging & Physics in Semiconductors) (Myazaki, Japan, 9/11, **plenary**):
Theory of defects in semiconductors: phonon trapping and isotope effects

26th International Conference on Defects in Semiconductors (Nelson, New Zealand, 7/11, **tutorial**):
Theory of defects in semiconductors

PsiK 2010 (Berlin, Germany, 9/10, **invited**): *Preparing supercells for non-equilibrium MD simulations*

Materials Research Society, Symposium I (San Francisco, CA, 3/10, **invited**):
Electrically active and electrically inactive 3d transition metal centers in Si

25th International Conference on Defects in Semiconductors (St Petersburg, Russia, 7/09, **plenary**):
Non-equilibrium dynamics of impurities in semiconductors

European Materials Research Society, Symposium I (Strasbourg, 6/09, **invited**):
Theory of defects in Si and Ge: past, present and challenges

3rd South African Conference on Photonic Materials (Mabula, 3/09, **keynote**):
Fundamental Interactions Involving Transition Metals in Silicon: First-Principles Theory

18th NREL Workshop on c-Silicon Solar Cell Materials and Processes (Vail CO, 8/08, **invited**):
Transition metals, hydrogen and passivation in Si solar cells

European Materials Research Society (Strasbourg, 5/08, **invited**):
Fundamental Interactions Involving Transition Metals in Silicon: First-Principles Theory

Solar Focus Meeting (Ochsenfurt, Germany, 3/08, **plenary**): *Transition Metals in Silicon*

XII GADEST 2007 (Erice, Sicily, 10/07, **invited**): *The fundamental chemistry of iron in Si*

Symposium honoring Professor Sandy DasGupta (Dept. of Chemistry, Texas Tech U., **invited**):
Defects in Semiconductors: a First-Principles Theoretical Approach

16th NREL Workshop on c-Si Solar Cell Materials and Processes (Denver CO, 8/06, **invited**):
Fundamental interactions involving Fe in silicon

International workshop: ‘Hybrid Atomistic Methods for Materials and Biological Systems’ CECAM,
(Lyon, France, 7/06, **invited**): *Vibrational Dynamics for Impurities in Semiconductors*

10th International Conference on Muon Spin Rotation (Oxford UK, 8/05, **invited**):
Energetics of H and Mu in Semiconductors: theoretical predictions at finite temperatures

23rd International Conference on Defects in Semiconductors (Awaji Island, Japan, 7/05, **invited**):
Predicting the energetics of defects at $T > 0K$

3rd International Conference on Computational Modeling and Simulation of Materials
(Acireale, Sicily, 5/04, **invited**): *Vibrational dynamics of defects in semiconductors*

Fall Meeting of the Texas Section of the American Physics Society, (TX, 10/03, **plenary**):
The forgotten entropies of defects in semiconductors

22nd International Conference on Defects in Semiconductors (Aarhus, Denmark, 7/03, **tutorial**):

Theory of defects in semiconductors

1st Int. Workshop H in Materials & Vacuum Systems (Jefferson Lab, Newport News, VA, 10/02, **invited**):

Dynamics of hydrogen in semiconductors

12th Workshop on c-Si Solar Cell Materials and Processes (Breckenridge, CO, 8/02, **invited**):

Microscopic properties of copper in silicon: theoretical predictions

31st Int. School on the Physics of Semiconductor Compounds (Jaszowiec, Poland, 6/02, **invited**):

Hydrogen molecules in semiconductors: an angel in GaAs, a devil in Si

1st Workshop on defects in Si and SiGe (Manchester, UK, 10/01, **opening talk**): *Dynamics of copper in Si*

9th GADEST (Gettering And Defect Engineering in Semic. Technology) (Catania, Italy, 10/01, **invited**):

Cu-defect and Cu-impurity interactions in Si

21st International Conference on Defects in Semiconductors (Giessen, Germany, 7/01, **plenary**):

The fascinating dynamics of defects in silicon

Gordon Research Conf. 'Materials Processes Far From Equilibrium' (Meriden, NH, 7/01, **invited**):

Hydrogen-Defect Interactions in Silicon

March Meeting of the American Physical Society (Seattle, 3/01, **invited**):

Molecular-dynamics studies of hydrogen-defect interactions in Si

10th NREL Workshop on c-Silicon Solar Cell Materials and Processes (Copper Mountain, CO,

8/00, **invited**): *Hydrogen, passivation and related issues*

South African Institute of Physics (Annual Meeting, Port Elizabeth, South Africa, 7/99, **invited**):

The Rich Chemistry of Copper in Silicon

Winter School on Defects in Materials (Port Elizabeth, South Africa, 7/99, **invited**):

Ab-Initio Theory of Defects in Silicon

Workshop on Hydrogen Defects in Semiconductors (Exeter, UK, 4/99, **invited**):

Hydrogen Interactions with Intrinsic Defects in Silicon

8th NREL Workshop: c-Si Solar Cell Materials & Processes (Copper Mountain CO, 8/98, **invited**):

Recent Experimental and Theoretical Results for H₂ in Si (with M. Stavola).

European Materials Research Society (Strasbourg, 6/98, **invited**):

Hydrogen and Vacancy-Related Defects in Silicon

19th International Conference on Defects in Semiconductors (Aveiro, Portugal 7/97, **invited**):

Molecular-Dynamics Simulations of Fundamental Defects in Silicon

33rd Workshop Punktdefekte, Max-Planck Institute for Solid State Physics (Stuttgart, 6/97, **invited**):

Vacancy Aggregates in Silicon

6th NREL Workshop on the Role of Impurities and Defects in Silicon Device Processing

(Snowmass CO, 8/96, **invited**): *Passivation Processes in Silicon*

31st Workshop Punktdefekte, Max-Planck Institute for Solid State Physics (Stuttgart, 6/96, **invited**):

Hydrogen-Oxygen Interactions in Silicon

NATO Workshop Early Stages of Oxygen Precipitation in Silicon (Exeter, UK, 3/96, **invited**):

Hydrogen-Oxygen Interactions in Silicon

188th ElectroChemical Society, 'Wide Bandgap Semiconductors & Devices' (Chicago, 10/95, **invited**):

Hydrogen in Wide-Bandgap Semiconductors

Gordon Research Conf. 'Point and Line Defects in Semiconductors' (Plymouth NH, 7/94, **invited**):

States and Diffusion Properties of Hydrogen: A View from Theory

3rd NREL Workshop: Role of Impurities and Defects in Silicon Device Processing (Vail CO, 8/93, **invited**):
Hydrogen Diffusion and Passivation Mechanisms

6th International Conference on Muon Spin Rotation (Maui HI, 6/93, **invited**):
Hydrogen in Semiconductors: the Roles of μ SR and Theory

American Association for the Advancement of Science, SWARM div. (Albuquerque NM, 5/93, **invited**):
Theoretical Aspects of Hydrogen in Semiconductors

Austin Molecular Design Meeting (Austin TX, 12/92, **invited**):
Density Functional vs. Hartree-Fock: Comparison of Methods Applied to Defects in Semiconductors

2nd NREL Workshop: Role of Impurities & Defects in Si Device Processing (Breckenridge CO, 8/92, **invited**):
Fundamental Properties of Point Defects: the Role of Theory

MRS, Advanced III-V Compound Semiconductor Growth, Processing, and Devices' (Boston, MA 12/91, **invited**):
Theoretical Studies of Defects, Impurities, and Complexes in Compound Semiconductors

INVITED TALKS: SEMINARS AND COLLOQUIA (total: 105)

- 2017** University of Texas at Arlington, February
University Autonomos of Barcelona (Spain), May
University of Valladolid (Spain), May
University of Konstanz (Germany), September
- 2016** University of Milano-Bicocca (Italy), June
University of Munich-Garching (Germany), July
Technical University of Dresden (Germany), July
- 2015** Zhejiang University (Hangzhou, China), May
University of Bologna (Italy), June
University of Oslo (Norway), July
- 2014** PChem seminar, department of Chemistry, TTU (January)
University Autonomos of Barcelona (Spain), June
University of Valladolid (Spain), June
University of Muenster (Germany), July
Technical University of Dresden (Germany), July
- 2013** Ohio University (Athens, OH), October
- 2012** Lehigh University (Bethlehem, PA), April
King's College London (UK), June
Oxford University (UK), August
- 2011** Ecole Polytechnique Fédérale (Lausanne, Switzerland), May
Walter-Schottky Institute (Munich, Germany), May
University of Freiburg (Germany), May
Center for investigation in nanoscience and nanotechnology (Barcelona, Spain), June
University of Oviedo (Spain), June
University of Melbourne (Australia), July
Simon Fraser University (Vancouver, Canada), October
- 2010** Technical University of Dresden (Germany), September
University of Goettingen (Germany), September

University of Aarhus (Denmark), September
University of Aveiro (Portugal), November

- 2009** University of Cambridge (UK), June
- 2008** Ecole Polytechnique Fédérale, Lausanne (Switzerland), May
University of Dresden (Germany), department of Physics, June
Rossendorf Forschung Zentrum (Germany), June
King's College London (UK), July
MIT - Lab for Photovoltaics Research, August
- 2007** University of Zurich (Switzerland), department of Physics, May
Walter-Schottky Institute (TU Munich, Germany), May
Fraunhofer Inst. f. Solar Energy Systems, Freiburg (Germany), June
- 2006** University of Texas at Arlington, department of Physics, May
University Pierre et Marie Curie, Paris (France), May
Technical University Dresden (Germany), June
University of Aarhus (Denmark), June
King's College London (UK), June
- 2005** University of Exeter (UK), June
University of Yokohama (Japan), July
University of Texas at Arlington, department of Chemistry, September
- 2004** University of Rome La Sapienza (Italy), June
University of Bologna (Italy), June
University of Milano-Bicocca (Italy), June
Walter-Schottky Institute (TU Munich, Germany), June
Max-Planck Institute f. Mikrostrukturphysik – Halle (Germany), June
Technical University, Dresden (Germany), June
Technical University of Clausthal (Germany), June
University of Cambridge (UK), July
- 2003** Sandia Nat. Lab. (Albuquerque, NM), May
University of Bologna (Italy), June
Laboratorio MDM - INFN, Milano (Italy), June
Technical University, Dresden (Germany), June
Fraunhofer Inst. f. Solar Energy Systems, Freiburg (Germany), July
The Classical Society, Texas Tech University, September
University of Montreal (Canada), October
Ohio University (Athens, OH), October
- 2002** Texas Tech University, Physics Department, January
Texas Tech University, Department of Electrical Engineering, January
Lehigh University, Bethlehem, PA, March
University of California Berkeley, CA, April
University of Milano – Bicocca, May
Max-Planck Institute f. Mikrostrukturphysik, June
- 2001** University of Exeter (UK), June
Joint seminar: King's College and University College, London, June
University of Aarhus (Denmark), August

Fritz-Haber Institute, Berlin (Germany), October
Technical University, Berlin (Germany): lecture on deep levels in semiconductors, October
Max-Planck Institute for microstructure physics, Halle (Germany), November
Walter-Schottky Seminar, Technical University Munich (Germany), November
Centre National de Recherches Scientifiques, PHASE, Strasbourg (France), November
Forschungszentrum Rossendorf (Germany), November
University of Konstanz (Germany), December

2000 University of Texas at Arlington, February
University of Zürich (Switzerland), May
Max-Planck Institute for Microstructures, Halle (Germany), May
Technical University, Dresden (Germany), June,
UC Berkeley, (Departmental colloquium and two seminars), October

1999 Texas A&M University (College Station), October
University of Witwatersrand (Johannesburg, South Africa), Physics Department, June
University of Pretoria (South Africa), June
SEMATECH (Austin, TX), June

1998 University of Exeter (UK), June
King's College (London), June
University Aarhus (Denmark), June
University of Zürich (Switzerland), June

1997 MEMC (St. Louis, MO), March
Sandia Nat. Laboratories (Albuquerque, NM), May
Max-Planck Institute für Mikrostruktur, Halle (Germany), June
Physics Department, University of Göttingen, (Germany), June

1996 Edinburgh University (Scotland), March
University College (London), Physics Department, March
MEMC-Southwest (Sherman, TX), May

1995 Texas Instruments (Dallas TX), May
Max-Planck Institute for Solid State Physics, Stuttgart (Germany), June
University Aarhus (Denmark), September
Swiss Center for Scientific Computing (Manno, Switzerland), October
Fraunhofer Institute - Solar Energy, Freiburg (Germany), October
Centre National de Recherches Scientifiques, Strasbourg (France), October
Walter-Schottky Institute, Technical University München (Germany), November

INVITED TALKS: HISTORY OF WINE (total: 9)

GADEST 2017 (October 1-6, Georgia)
The origin of wine and viticulture

Zhejiang University (Hangzhou, China, May)
An overview of the history of (grape) wine

Osher Lifelong Learning Institute (Texas Tech University, Lubbock, TX, 2/5 and 2/7)
The story of wine (two 90-min lectures)

Texas Section meeting of the APS (Lubbock, TX, 10/12)
The story of wine

XII GADEST 2007 (Erice, Sicily, 10/07)

Wine: From Neolithic Times to the 21st Century

10th International Conference on Muon Spin Rotation (Oxford UK, 8/05)

Wine: the past 7,400 years

31st Electronic Materials Symposium (Santa Clara, CA, 4/03)

Materials in the history of wine

3rd South African Conference on Photonic Materials (Mabula, 3/09)

History of Wine: the past 7,400 years

Materials Research Society, Symposium X (San Francisco, CA, 3/02)

Materials in the history of wine