Hans M. Christen
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Past Professional Positions

2018–2023 **Director, Neutron Scattering Division (ORNL)**
The Neutron Scattering Division (NSD) operates the internal science program and the general user program at the Spallation Neutron Source (SNS) and the High Flux Isotope Reactor (HFIR), providing an international user community access to 30 neutron scattering instruments and 25 scientific laboratories with capabilities in diffraction, spectroscopy, small-angle scattering, reflectometry, and imaging.

2014–2018 **Director, Center for Nanophase Materials Sciences (ORNL)**
Responsible for operations and coordination of research activities within the Center for Nanophase Materials Sciences (CNMS), a Nanoscale Science Research Center (NSRC) established as part of the Department of Energy's (DOE) Office of Science contribution to the U.S. Government National Nanotechnology Initiative (NNI), providing users state-of-the-art nanoscience research capabilities and executing a cutting-edge nanoscience research program. Responsible for the CNMS Division, which include the CNMS user facility plus numerous additional research projects.

2013 **Associate Division Director, Novel Materials and Mechanisms, Materials Science and Technology Division, Oak Ridge National Laboratory (ORNL)**
Responsible for the coordination and line management of seven research groups within the Materials Science and Technology Division, with emphasis on materials synthesis, microscopy, structural and functional properties, and materials theory.
Research in the area of oxide heterostructures, ferroelectrics, and multiferroics.

2011–2013 **ORNL Manager, DOE Materials Sciences and Engineering Program**
Coordination of all research programs funded by DOE's Office of Basic Energy Sciences, Materials Sciences and Engineering Division, and performed at ORNL within the Materials Science and Technology Division, the Chemical Sciences Division, the Center for Nanophase Materials Sciences (CNMS), and at the Spallation Neutron Source.

2006–2013 **Distinguished Research Staff and Group Leader, Thin Films and Nanostructures, Materials Science and Technology Division, ORNL**
Research focusing on the effects of confinement, strain, and interfaces in perovskite structures and superlattices; ferroelectric, magnetic, and multiferroic oxides.
Responsible for operations and safety of the group's laboratories; program development, mentoring and training.
Contribution to CNMS research and user activities.

2000–2006 **Research Staff Member, Condensed Matter Sciences Division, ORNL**
Research focusing on thin films of complex metal-oxides and the development of pulsed-laser deposition techniques (incl. compositional-spread methods, applied superconductivity research). Involved in the planning of the CNMS laboratories.

1999–2000 **Program Manager, Microwave Microscopy, Neocera, Inc., Beltsville, MD**
Responsible for technology transfer from the University of Maryland, commercialization of a measurement tool, investor and customer interactions.

1997–1999 **Staff Scientist, Neocera, Inc., Beltsville, MD**
Development of oxide materials for superconducting device applications. Improvements to the pulsed-laser deposition process.

1994–1996 **Swiss National Science Foundation and Oak Ridge Associated Universities Postdoctoral Fellow, ORNL**
Research focused on epitaxial ferroelectric films and study of size and strain effects.

1991–1994 **Research Assistant, IBM Research - Zurich, Switzerland**
Dissertation research; dielectric spectroscopy on single-crystal and thin-film samples.

Education

Swiss Federal Institute of Technology (Ecole Polytechnique Fédérale de Lausanne [EPFL], Lausanne, Switzerland:

Ph.D. 1994 Thesis: "Dielectric Properties of Perovskites with Polar Disorder ($K_{1-x}Li_xTaO_3$ and $Pb[Mn_{1/3}Nb_{2/3}]O_3$) and of $SrTiO_3$ Films." Research performed at IBM Research - Zurich, Switzerland

M.S. 1991 Physics Engineering (diplôme d'ingénieur)

Research Programs

2014-2018 Director, *Center for Nanophase Materials Sciences*, U.S. Dept. of Energy (DOE) Scientific User Facility (ERKCZ01).

2006–2013 Principal Investigator, *Interfaces in Epitaxial Complex Oxides,* U.S. Dept. of Energy (DOE) Field Work Proposal ERKCS80.

2004–2009 Co-Leader, *Emergent Behavior in Nanoscale Systems* (2007-2009) and *Functional Nanomaterials* (2004-2007) Scientific Theme Areas, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory (ORNL).

2001–2006 Task Co-Leader, *The Emergence of Nanoscale Cooperative Phenomena,* U.S. Dept. of Energy, Nanoscale Science, Engineering, and Technology Initiative (NSET) Program.

Principal Investigator: *Highly-Polar Oxides for Photovoltaics Beyond p-n Junctions* (ORNL Laboratory Directed R&D, 2010-2012), *Deterministic Growth of Complex Oxide Nanorods Using Pulsed-Laser Deposition* (ORNL Seed Money, 2007-2008), *Interfacial solids* (ORNL Laboratory Directed R&D, 2005-2006), *Development of a Combinatorial Search Apparatus* (ORNL Seed Money, 2001-2002), *Improvement of Spatial Resolution in Microwave Microscopy* (U.S. National Science Foundation—Small Business Innovation Research, Phases I&II, 1998-2000), *Tunable Microwave Materials* (US Air Force—Small Business Innovation Research, Phase II, 1997-1999).

Professional Activities, Honors, Awards

Fellow, American Physical Society (2011)
Panel Co-lead, DOE Office of Science Roundtable on Pandemic Preparedness, March-May 2022
Panel Lead, DOE Office of Science Roundtable on Impact of COVID-19 on User Facilities, Dec. 2020
Co-chair, DOE BES Committee of Visitors for Energy Frontier Research Centers and Energy Innovation Hubs programs, Oct. 2020
Co-chair, 2018 International Materials Research Congress (joint Materials Research Society, Sociedad Mexicana de Materiales)
Co-chair, BES Roundtable on Opportunities for Basic Research for Next-Generation Quantum Systems (October 2017)
Member, Executive Board, Advanced Materials Interfaces, 2013 – present
International Organizing Committee of the Workshop on Oxide Electronics series, 2012 – 2015

Member, Organizing Committee, EMRS symposium on Multifunctional Oxide Films, 2014
Organizer, American Physical Society March Meeting Symposium on Bulk Magnetic Oxides, 2014 (Co-Organizer), on Dielectric, Ferroelectric, and Piezoelectric Oxides, 2012 (Lead), 2011, 2007 (Co-Organizer)
Co-organizer, 2010 European Materials Research Spring Meeting Symposium "Frontiers of Multifunctional Oxides"
Member, Alabama EPSCoR RII External Advisory Board, 2010-2012
Member, Program Advisory Committee (PAC), University of Tennessee/ORNL Joint Institute for Advanced Materials (JIAM), 2009–2011
Member, Proposal Review Panel (PRP), Center for Functional Nanomaterials (CFN) at Brookhaven National Laboratory, 2009–2011
Reviewer, NSF MRSEC Panel, 2008; NSF Career Panel, 2005
Co-Organizer, Georgia Tech – Imperial College – ORNL Nanoscience Workshop (2005)
Reviewer, DOE Peer Review: Superconductivity for Electric Systems/University Panel, 2003
Co-Organizer, Focus Session on Epitaxial Superlattices and Nanostructures, 15th American Conference on Crystal Growth, 2003
Panelist, International Workshop on Processing and Applications of Superconductors, 2003
ORNL Research Accomplishment Award, 1999
Swiss National Science Foundation Fellowship, 1994

Publications and Patents: Author or co-author of more than 180 articles in refereed journals and conference proceedings, over 7,700 citations; 4 book chapters; and 7 issued US patents (ISI h-index: 48) [2022]. ORCID: 0000-0001-8187-7469

Graduate and Postdoctoral Advisors:

Ph.D. Advisors: Andre Chatelain (EPFL, Lausanne), Jochen Mannhart (IBM, Zurich)
Postdoctoral Advisors: Lynn A. Boatner (ORNL), David P. Norton (ORNL)

Supervised Students and Postdocs:

Student:

Charlee J.C. Bennett, 2007-2009 (joint with D. P. Norton, U. Florida) (then postdoc at NRL)

Postdocs:

Hong Ying Zhai, 2001-2003 (then postdoc at Stanford)
Isao Ohkubo, 2002-2004 (then research faculty at U. Tokyo)
Ho Nyung Lee, 2002-2003 (then staff at ORNL)
Dae Ho Kim, 2005-2007 (then faculty at Tulane U.)
Michael D. Biegalski, 2006-2008 (then staff at ORNL)
Hyun Sik Kim, 2008-2010 (then research staff at U. Warwick)
Wolter Siemons, 2010-2013 (then staff at ASML)
Christianne Beekman, 2012-2014 (then faculty at Florida State)
Zhiqi Liu, 2014-2015 (then postdoc at UC Berkeley)

Research Interests: Research has focused on understanding the influence of epitaxial strain, spatial confinement (size effects), and interfacial mechanisms on the properties of thin films, superlattices, and nanostructures, formed of complex metal-oxides including ferroelectrics, magnetic and multiferroic perovskites, high-temperature superconductors, high-k dielectrics, and optical materials; interplay between electronic and ionic effects and surface catalytic activity; focus on applying and improving pulsed-laser deposition methods for the synthesis of precisely tailored superlattices, as well as novel deposition approaches, such as compositional-spread and temperature-gradient methods and rf sputtering; neutron reflectometry and diffraction; synchrotron x-ray diffraction.