Bryan Charles Chakoumakos

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ACADEMIC RECORD

Ph.D. Geological Sciences Virginia Tech 1984
"Systematics of the pyrochlore structure type, and theoretical molecular modeling of silanol - water interactions."

M.S. Geological Sciences Virginia Tech 1981
"A molecular orbital study of I. rings in silicates and siloxanes and II. order-disorder isomorphism in silicate anions."

B.S. Geology, *summa cum laude*, University of New Mexico 1978
with Departmental Honors
"Microlite, the Harding pegmatite, Taos County, New Mexico."

Scholastic Awards:	Cunningham Fellowship, Virginia Tech	1981-82
	State Tuition Scholarship, Virginia Tech	Fall 1980
	Albuquerque Gem & Mineral Club Scholarship, UNM	1975/1976
	Harry & Mabel Leonard Scholarship, UNM	1975/1976

PROFESSIONAL EXPERIENCE

Oak Ridge National Laboratory

Team Leader, *Single-Crystal Diffraction, Diffraction Group, NSD*	2018-present
Diffraction Group, Neutron Scattering Division	2017- 2018
Group Leader, *Structure of Matter, Quantum Condensed Matter Division*	2011-2017
Group Leader, *Single-Crystal Neutron Diffraction*	2006-2011
Neutron Scattering Sciences Division	2006-2011
Center for Neutron Scattering, Solid State Division	1993-2006
Synthesis & Properties of Novel Materials Group, Solid State Division	1988-1993

My active research program focuses on structure - property relationships in novel and technologically important materials. I have served as instrument scientist for the single-crystal four-circle diffractometer (2002-2011) and powder diffractometer (1994-2007) at the High Flux Isotope Reactor. Systematic crystal physics, chemistry and crystallography of inorganic materials are the broad themes of my research and collaborative contributions. Materials of interest include thermoelectric materials, gas hydrates, superconductors and related phases, intermetallics, phosphates, biomaterials (e.g., apatite, otoliths), silicates, metamict minerals, and granitic pegmatite. My "hands-on" experimental activities include X-ray (powder & single-crystal) and neutron (powder & single-crystal) diffraction, synthesis of ceramic materials, growth of large single-crystals (flux, floating zone, and Czochralski methods), thermal analysis, optical microscopy and analytical electron microscopy.

University of New Mexico, Department of Geology 1984-1988
Post-Doctoral Fellow: With Rodney C. Ewing, conducted experimental and theoretical investigations of the structural chemistry of α-decay damage in complex oxides. Departmental responsibilities included supervision and renovation of the x-ray diffraction and crystal synthesis laboratories, revision of the mineralogy curriculum, improvement of in-house computer hardware and software, and the design and instruction of a graduate level crystallography course.

Virginia Tech, Department of Geological Sciences 1978-1984
Graduate Teaching Assistant: Taught laboratory classes in Mineralogy (3 terms), Crystallography (2 terms), Optical Crystallography (3 terms), Igneous Petrography (1 term), and Introductory Geology (2 terms). Three summers and one year support as a Graduate Assistant were spent on maintenance, design and installation of computer software for a research group of 7 (Investigator, G. V. Gibbs) doing quantum chemical and crystallographic calculations.

University of New Mexico Department of Geology 1974-1978
Curator of Mineralogy: Organized and maintained teaching and research collections, designed educational museum exhibits, and conducted library research for grant-supported projects (Investigator, R.C. Ewing) on crystal chemistry of radioactive waste forms. Also taught Mineralogy Laboratory (2 terms).

ACTIVE INTERESTS

Research: crystal structure-property relationships
magnetic crystal structures
synthesis and characterization of novel materials
crystal structure, physics and chemistry of solids
metamictization and radiation damage of crystals and glasses
mineralogy and petrology of pegmatites and volatile-rich silicate melts

Teaching: crystallography, powder and single-crystal diffractometry mineralogy, crystal chemistry, optical crystallography,

PROFESSIONAL AFFILIATIONS

American Association for the Advancement of Science (since 1983, Fellow 2016)
American Crystallographic Association (since 1983, Fellow 2016)
American Geophysical Union (since 1984)
American Physical Society (since 2007)
Mineralogical Association of Canada (since 1975)
Mineralogical Society of America (since 1973, Fellow 2007)
Neutron Scattering Society of America (since 1993, Fellow 2020)

HONORS & AWARDS

Fellow, Neutron scattering Society of America, 2020

Bau Neutron Diffraction Award, American Crystallographic Association, 2019

Fellow, American Association for the Advancement of Science, elected 2016, Geosciences Section

Fellow, American Crystallographic Association, elected 2016

Fellow, Mineralogical Society of America, elected 2007.

PROFESSIONAL ACTIVITIES

Chair, Bau Neutron Diffraction Award Selection Committee, American Crystallographic Association 2021.

Chair, Nominating Committee, American Crystallographic Association, 2020.

Secretary, Mineralogical Society of America, 2015-2019.

Advisory Committee Member, National School on Neutron and X-ray Scattering, 2020 - present.

ORNL Science Director, National School on Neutron and X-ray Scattering, 2008-2018.

Letters Editor, *American Mineralogist*, 2005-2010.

Served as external reviewer for Sebastian Christensen's Ph.D. defense, Aarhus University, Aarhus, Denmark, Nov 2015.

Chair of the Powder Diffraction Special Interest Group of the American Crystallographic Association, 2005.

Expert for International Atomic Energy Agency educational mission to the Instituto Peruano Energía Nuclear, Lima, Peru, course instructor for Nuclear Techniques to Materials Applications, January 3-10, 2004.

Guest Editor, special issue on Clathrate Hydrates of the *American Mineralogist*, Vol 89, Aug-Sept 2004.

Executive Committee, Instrument Development Team for the Single Crystal Diffractometer, Spallation Neutron Source, Oak Ridge, Tennessee, June 2002-2011.

Session Organizer, "Clathrates, Ices and Planetary Materials" for the American Crystallographic Association Annual Meeting, Los Angeles, California, July 21-26, 2001.

Chair of the Neutron Scattering Special Interest Group of the American Crystallographic Association, 2001.

Associate Editor, *American Mineralogist*, 1999-2004.

Guest Editor, *Neutron News*, Volume 10, Issue 2, 1999, special issue on the neutron scattering facilities at the High Flux Isotope Reactor at Oak Ridge National Laboratory, 1998-1999.

Grand Awards Judge for Chemistry, International Science & Engineering Fair, Louisville, Kentucky, May 11-12, 1997.

Intense Pulsed Neutron Source Program Advisory Committee, 1996 – 2001.

Member of the Organizing Committee and Single-Crystal Diffraction Working Group Chair for the Workshop on Instrumentation Needs and Performance Metrics for the National Spallation Neutron Source, Oct. 31-Nov. 1, 1996, Oak Ridge, Tennessee, 1996.

Member of the Research Committee for the Japan Atomic Energy Agency - U.S. Department of Energy Cooperative Program on Neutron Scattering, 1995- Present.

Member of the Research Committee for the Institute for Solid State Physics (Univ. Tokyo) - U.S. Department of Energy Cooperative Program on Neutron Scattering, 1995 – 2005.

Correspondent for *Neutron News*, 1994 – 2004.

2nd Place in Optical Micrographs, The American Ceramic Society, Ceramographic Contest. "Dehydration of Newberyite" by L.A. Boatner, B.C. Sales, and B.C. Chakoumakos, 1992.

1st Place in the Unique/Unusual/New Techniques Class, International Metallographic Contest. "Ultramicroscopy of a Crystalline-To-Amorphous Phase Transition" by L.A. Boatner, B.C. Chakoumakos, B.C. Sales and A.G. Baldwin, 1992.

Technical Achievement Award, Martin Marietta Energy Systems, H.A. Mook, M. Mostoller, J.A. Harvey, N.W. Hill, B.C. Chakoumakos and B.C. Sales, Observation of phonon softening at the superconducting transition in $Bi_2Sr_2CaCu_2O_8$. *Physical Review Letters* 65, 2712-2715 (1990), 1992.

Participant, Rietveld Refinement Round-Robin sponsored by the Commission on Powder Diffraction of the International Union of Crystallography, 1991.

Young Scientist Award, International Union of Crystallography, Travel funds to attend the XIVth International Congress of Crystallography, Perth, Australia, 1987.

Photograph of microfracturing in zircon on cover of *Science* June 19, 1987, Volume 236, pp. 1493-1600.

Mentoring

Emil Klahn, Ph.D. student, Department of Chemistry, Aarhus University, Denmark for 4 months 2019.

R. Seth Wood, undergraduate, Department of Earth & Planetary Science, University of Tennessee 2017-2018.

Daniel Rutstrom, undergraduate & Ph.D. student, Materials Science and Engineering and Scintillation Materials Research Center, University of Tennessee 2017-present.

Jesse Johnson, undergraduate, Materials Science and Engineering and Scintillation Materials Research Center, University of Tennessee 2017.

Nikolaj Roth, Ph.D. student, Department of Chemistry, Aarhus University, Denmark for 2 months 2016.

John Salasin, graduate, Materials Science and Engineering, University of Tennessee, 2014.

Marybeth Parker, Materials Science and Engineering, University of Tennessee, undergraduate, 2010-2011.

Lauren Garten, undergraduate, Missouri University of Science and Technology, summer intern 2008.

Birgitte Pedersen, Ph.D. student, Department of Chemistry, Aarhus University, Denmark for 5 months 2006.

Cara Nygren, Department of Chemistry, University of Tennessee, Knoxville, 2003-2005, served on Ph.D. Thesis committee.

Sam Subramaniam, Miles College, visiting faculty, Summer, 2002.

Matt Farmer, Baylor University, graduate student, chemistry, Summer, 1999.

M. Jenee Mitchell, Physics, Summer Intern, 1998.

Ben Coster, Southwestern Oklahoma State University, undergraduate, ORNL/Science and Energy Research Semester Program, Spring, 1995.

PUBLICATIONS
Web of Science: 247 pubs, 10295 citations, h-factor = 52
Google Scholar: 13803 citations, h-factor 62

Book Chapters

Garlea V.O. and B. C. Chakoumakos, Magnetic Structures. In F. Fernandez-Alonso and D. L. Price, Eds., Neutron Scattering – Magnetic and Quantum Phenomena, Vol. 48, Experimental Methods in the Physical Sciences, Academic Press, p. 203-290, (2015).

Journal Articles (submitted & in press)

Wood, R.S., Allison M. Fortner, Kat Gillies-Rector, B. C. Chakoumakos, Matthias Frontzek, Ilia N. Ivanov, Linda C. Kah, Brian Kennedy, Brenda M. Pracheil, Quantifying fish otolith mineralogy for trace element chemistry studies. *Journal of Fish Biology*, submitted.

Long, J. M., Richard A. Snow, Brenda M. Pracheil, B. C. Chakoumakos, Morphology and composition of Goldeye (Hiodontidae; *Hiodon alosoides*) otoliths. *Journal of Fish Biology*, submitted.

Ding, L., Yan Wu, Minseong Lee, Eun Sang Choi, Haidong Zhou, Bryan C. Chakoumakos, Huibo Cao, Successive dielectric anomalies and magnetoelectric coupling in honeycomb $Fe_4Nb_2O_9$. *Physical Review Materials*, submitted.

Ding, L., Minseong Lee, Tao Hong, Zhiling Dun, Ryan Sinclair, Songxue Chi, Harish K. Agrawal, Eun Sang Choi, B. C. Chakoumakos, Haidong Zhou, Cao, H.B., Noncollinear magnetic structure and magnetoelectric coupling in buckled honeycomb $Co_4Nb_2O_9$: A single crystal neutron diffraction study. *Physical Review B*, submitted.

Dziaugys, A., Kyle Kelley, John Brehm, Alexander Puretzky, Tianli Feng, Sabine Neumayer, Marius Chyasnavichyus, Eugene Eliseev, Juras Banys, Yulian Vysochanskii, Feng Ye, Bryan C. Chakoumakos, Michael McGuire, Sergei Kalinin, Panchapakesan Ganesh, Sokrates Pantelides, Nina Balke, Anna Morozovska, Petro Maksymovych, Piezoelectric domain walls in van der Waals ferrielectric $CuInP_2Se_6$. *Nature Communications*, in press.

Journal Articles (in print) see separate list.