

CLARINA R. DE LA CRUZ, PHD

Professional Background

- Senior Scientist, Oak Ridge National Laboratory (January 2017-Present)
- Group Leader, Powder Diffraction Group, Neutron Scattering Division, Neutron Sciences Directorate, Oak Ridge National Laboratory (October 2020- present)
- Neutron Scientist, HB2a Neutron Powder Diffractometer, High Flux Isotope Reactor (2010-present) <https://neutrons.ornl.gov/powder>
- Science Initiatives Coordinator for Quantum Materials, Neutron Sciences Division (October 2017- March 2021)
- Vice Chairperson, American Physical Society, Topical Group on Magnetism and its Applications (GMAG), March 2021-present

Scientific Research Interests

Experimental condensed matter physics focused on studying correlated electron systems including unconventional superconductors, iron-based superconductors and multifunctional materials such as multiferroic systems. The use of various neutron scattering techniques in investigating the correlation between structure, magnetism and physical properties is a central theme, with further studies into tuning these properties at ultra-low temperatures as well as high magnetic fields and pressure.

Academic Background

- **Undergraduate Level: B.S. Physics (1996-2001)**
National Institute of Physics, University of the Philippines, Diliman, Quezon City, Philippines
Undergraduate Thesis Title: "Investigation of electrical dissipation properties of a $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_\delta$ Thin Film"
- **Graduate Level: M.S. Physics (2001-2003)**
National Institute of Physics, University of the Philippines, Diliman, Quezon City, Philippines
M.S. Thesis Title: "The Magnetoresistance Profile of a $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_\delta$ HTSC: On the dependence of the Potential Barrier in the flux creep process on the Applied Magnetic Field and temperature"
- **Graduate Level: Ph.D. Physics (2003-2006)**
Department of Physics, University of Houston, Texas, USA
Dissertation Title: "Spin Frustration, Ferroelectricity and Spin-Lattice Coupling in Multiferroic Rare Earth Manganites", defended Sept. 29, 2006
- **Postdoctoral Research Fellowship (2007-2009)**
Neutron Sciences Directorate, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA and Department of Physics and Astronomy,
 - Neutron scattering research in multiferroic materials and oxypnictide FeAs-based superconductors. Advisers: Pengcheng Dai, PhD and Herbert A. Mook, PhD

Awards and Honors

- Early Career Research Award, UT-Battelle Awards Night, November 7, 2014

- Outstanding Young Achiever of Aklan in the field of Physics, The Ben Hur Z. Mobo “Move Aklan Forward Foundation, Inc., April 21, 2014, Aklan, Philippines
- 2014 Young Scientist Prize, International Union of Physics and Applied Physics, Commission on the Structure and Dynamics of Condensed Matter (C10)
- 2010 Gordon Battelle Team Award, Team award for Studies on Iron-based Superconductors, ORNL January 31, 2011
- 2010 Early Career Scientists Program, Oak Ridge Associated Universities for ORNL
- Postdoctoral Research Fellowship, ORNL and University of Tennessee (2007)
- Outstanding Aklanon in Technology Research, Provincial Government of Aklan, Panay Island, Philippines (2007)
- Postdoctoral Research Fellowship, Texas Center for Superconductivity (2006)
- Sigma Xi Graduate Student Research Achievement Award Winner (2006)
- 1st Place, Graduate Student Competition, 50th Int’l. Conference in Magnetism and Magnetic Materials, November 2005
- Most Outstanding Graduate Student Presentation, APS-Texas Section Fall Meeting, October 2005
- 1st place Best Student Competition, Texas Center for Superconductivity Fall Student Symposium, December 2004.
- *Cum Laude*, BS Physics National Institute of Physics (2001)
- Most Outstanding Graduate, BS Physics, University of the Philippines (2001)
- Bank of the Philippine Islands National Science Awardee (2001)
- Philippine Department of Science and Technology Scholar (1996-2001)

Affiliations

- Member: American Crystallography Association (2009–present)
- Member: Materials Research Society (2008–present)
- Member: American Physical Society (APS) (2005–present)
- Member: APS Forum on Graduate Student Affairs and APS Topical Group on Magnetism and its Applications (2005–2010)
- Research Associate: High Pressure and Low Temperature Laboratory, Texas Center for Superconductivity, University of Houston (2003–2006)
- Teaching Associate: Department of Physics, University of Houston (2003)
- Member: Condensed Matter Physics Laboratory, National Institute of Physics, UP Diliman (1997–2003)

Invited Talks/ Participation

- Invited talk, Neutron Advisory Board NAB Virtual Meeting, “Science Highlights of the Quantum Materials Initiative”, Aug 28-Sept 1, 2020.
- Invited talk, HFIR Thermal Guide Hall Planning Meeting, “QMI Science at the Future HFIR Thermal Guide Hall”, September 11, 2020.

- Invited Participant, Meeting of the Minds Symposium: Legacy of Bernd T. Matthias, Texas Center for Superconductivity at the University of Houston, Houston TX, Nov 15-17, 2019.
- Invited Participant, Science and Technology for Society STS Forum, Kyoto, Japan, October 5-8, 2019.
- Invited talk, Neutron Advisory Board NAB, “Future of the High Flux Isotope Reactor”, Clinch River Cabin, ORNL, Sept 12, 2019.
- Invited talk, Inaugural SEEMS Workshop, “User Facilities at ORNL”, ORNL, June 12, 2019.
- Invited talk, QMI Young Investigator’s Workshop, Double Tree Hotel, Oak Ridge ,TN, June 6, 2019.
- Invited talk, American Chemistry Society ACS Spring Meeting, “Magnetism at all Length Scales”, Orlando, FL, April 3, 2019.
- Invited Speaker, 85th Annual Meeting of the APS Southeastern Section, “Neutrons at ORNL”, Holiday Inn at World’s Fair Park, Knoxville, TN, Nov 8-10, 2018
- Keynote Speaker, IUMRS-ICA, International Union of Materials Research Society-International Conference in Asia, Bali, Indonesia, Oct 31-Nov 2, 2018.
- Invited Speaker, Physical Sciences Division’s Science Advisory Committee Review, ORNL, Oct 23, 2018.
- Invited Talk, Young Investigator’s Workshop, Clinch River Cabin, ORNL, June 7, 2018
- Invited talk, “Opportunities for Quantum Materials Research with Neutrons”, Department of Physics Colloquium, Central Michigan University, Mount Pleasant, MI, September 13, 2018
- Invited Talk, “Opportunities for Quantum Materials Research with Neutrons”, Condensed Matter Colloquium, Department of Physics, University of Virginia, Charlottesville, VA, April 11, 2018
- Invited talk, “Opportunities for Quantum Materials Research with Neutrons”, NSF Molecular Magnets Workshop (MMW), St. Simons Island, GA, February 23-24, 2018
- Invited talk, Rietveld Session, Denver Xray Conference, Big Sky Resort, Montana, July 30-August 5, 2017.
- Invited participant, Department of Energy BIG Ideas Summit, Crystal Gateway Marriot, Crystal City, VA, April 21–22, 2016.
- Invited participant, La Jolla Workshop on Big Ideas in Quantum Materials, December 14–17, 2015. University of California, San Diego, CA, December 14–17, 2015.
- Invited talk, “Probing the world of correlated electron systems: Materials characterization and neutron scattering studies”, Department Colloquium, Department of Chemistry and Biochemistry, Ohio University, Athens, OH, USA, April 10, 2015.
- Invited talk, “Powder diffraction Science”, National Science Foundation sponsored IGERT (Integrative Graduate Education and Research Traineeship) workshop on neutron scattering, April 6–10, 2015, Oak Ridge National Laboratory, Oak Ridge, TN.
- Invited talk, “Magnetic structure determination from neutron diffraction”, 72nd Annual Pittsburgh Diffraction Conference October 26–28, 2014, Georgia Center for Continuing Education, Athens, GA.
- Invited talk, “Materials characterization and neutron scattering studies in high temperature superconductors and multiferroics”, Symposium: A celebration of crystallography in solid state and materials chemistry: Complex problems and new solutions in inorganic small molecule

crystallography, 247th American Chemical Society National Meeting, Dallas Convention Center, TX, March 2014.

- Invited talk, “Neutron scattering in magnetism”, Invited Session: Buckley / McGroddy / Adler / IUPAP YSP/ Nicholson Prize Session, APS Meeting, Denver, CO, USA, March 2014.
- Invited talk, “Tuning electronic and magnetic ground states in correlated electron systems,” Symposium MM: Neutron Scattering Studies of Advanced Materials, Materials Research Society Fall Meeting, Boston Convention Center, Boston, MA, December 2013.
- Invited participant, Quantum Condensed Matter Workshop, Lawrence Berkeley National Laboratory, Berkeley, CA, December 2013.
- Invited talk, “Field Effect on the magnetic structure of the multiferroic $\text{Ba}_2\text{CoGe}_2\text{O}_7$.” Workshop on Competing Interactions and Colossal Responses in Transition Metal Oxides, July 15–19, 2013, Telluride, CO, USA.
- Department Colloquium, “Probing into the world of strongly correlated electron systems: Materials characterization and neutron scattering studies in superconductors and multiferroics”, Department of Physics, National Sun Yat-Sen University, Kaohsiung and Center for Condensed Matter Science, National Taiwan University, March 20–24, 2013.
- Invited Speaker, “My adventures in condensed matter physics: An experimentalist’s story,” Third Annual Southeast Conference for Undergraduate Women in Physics, University of Tennessee, Knoxville, TN, Jan 12–15, 2012.
- Invited Speaker, “Lattice distortion and magnetic quantum phase transition in $\text{CeFeAs}_{1-x}\text{PxO}$ ”, Focus Session: Iron Based Superconductors -- Magnetic Properties & Phase Diagrams, APS March Meeting, Dallas Convention Center, Dallas, TX, USA, March 2011.
- Invited Talk, “Neutron diffraction in the study and development of new materials”, NSF-sponsored Materials by Design Workshop, University of California, Santa Barbara, CA, March 2011.
- Invited talk, “Effect of lattice distortion via phosphorus doping in Fe-based Oxypnictides”, American Crystallography Association Annual Meeting, Sheraton Chicago Hotel and Towers, Chicago, IL, July 2010.
- Invited talk, “Neutron scattering studies in the newly discovered Iron-based superconductors”, 27th National Philippine Physics Congress, Tagaytay City, Cavite Philippines, October 2009.
- Department Colloquium and Faculty Seminar, “Probing into the world of strongly correlated electron systems: Materials characterization and neutron scattering studies in superconductors and multiferroics” Department of Physics, The Chinese University of Hong Kong (CUHK), CUHK, Shatin, Hong Kong, November 2009.
- Department Colloquium, “Nuclear and magnetic structures in Fe-based superconductors”, Department of Physics and Astronomy, Rice University, Houston, TX, USA, October 2009.
- Invited Talk, “Magnetic order versus superconductivity in the Iron-based layered $\text{La}(\text{O}_{1-x}\text{F}_x)\text{FeAs}$ systems”, American Conference in Neutron Scattering, Santa Fe, NM, May 11–15, 2008.
- Invited Talk, “Spin frustration, ferroelectricity and spin-lattice coupling in multiferroic rare earth Manganites”, Neutron Scattering Science Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA, June 2007.

Participation in Outreach Activities

- QMI “Papers NOT to miss” Digest, a weekly digital newsletter about relevant articles from the Quantum Materials Initiative, May 2020-present
- Hosted GeorgiaTech REU participants at HFIR, ORNL June 19, 2018
- Participated as Volunteer and Speaker for Neutron Panel on ORNL Lab Day, June 9, 2018
- Volunteer Staff, ORNL Travelling Science Fair, Catawba Science Center, Hickory , North Carolina, April 12-13, 2019
- STEM Café Mentoring Session, Oak Ridge High School, Oak Ridge Tennessee, December 13, 2017.
- Mentor, ORPA’s Your Science in a Nutshell Workshop, ORNL, December 4, 2017.
- Member, Women In Neutron Sciences Group (WiNS), April 2016– present.
- Invited Panelist, 2016 Oak Ridge Women’s Career Workshop, Federal Women’s Program, US DOE Oak Ridge Office, March 9, 2016.
- Participant, ADVANCE Negotiating for the Ideal Faculty Position Workshop, Rice University, Houston, TX, USA, October 2009.

Participation in Scientific Conventions and Events

- Co-Organizer, QMI Virtual Workshop for Magnetic Structure Determination from Neutron Diffraction Data, September 28-Oct 2, 2020.
- Adviser, QMI Virtual Workshop for Neutrons and Complimentary Techniques for Quantum Materials, August 11-14, 2020.
- Participant, ACNS Virtual Conference, July 13-16, 2020
- Organizer, 2020 Molecular Magnetism in North America (MAGNA) Conference, St. Simons Island, GA, February 21-24, 2020
- Participant, STS Second Target Station Workshop, December 9-10, 2020, SNS, ORNL
- Organizer, Workshop on High Pressure for Quantum Materials, Shull Wollan Center, December 6, 2019. Co-organized with Bianca Haberl and Alan Tennant
- Member, ORNL Distinguished Staff Fellowship Committee, 2016- October 2019
- Hands-on experiment and tutorial on FullProf software at the National School on Neutron and X-ray Scattering, High Flux Isotope Reactor, Oak Ridge National Laboratory, 2009–2019.
- Organizer and Lecturer, Mini-Workshop on Magnetic structure determination, satellite workshop to the PDC, ORNL, Oct 21-23, 2019.
- Panelist, Protocol Visit-Oppenheimer Science and Energy Leadership Program, July 18, 2019.
- Invited Participant, Steering Committee Meeting, US-Japan Collaboration for Neutron Scattering, ORNL, July 15-16, 2019.
- Invited Participant, ORNL hosted Georgia Tech Collaboration Event, ORNL, Oct 9, 2018.
- Organizer and Lecturer, Workshop on Magnetic structure determination from Neutron Diffraction data, satellite workshop to the ACNS, Knoxville, TN, June 24-25, 2018.

- Organizer, Workshop on Quantum Material studies under High Pressure, AMES National Laboratory, Ames, Iowa, May 30, 2018.
- Participant, BESAC Subcommittee Community Workshop, Bethesda North Marriott Hotel and Conference Center, Rockville, MD, January 17, 2018
- Organizer, 7th School on Representational Analysis and Magnetic Structures (RAMS), June 20-23 2018, University of Maryland.
- Participant, Instrument Advisory Board Meeting, Neutron Sciences Directorate, ORNL, Jan 24-25, 2018
- Participant, Scientific meeting between NScD and Ames lab leadership teams to facilitate an MOU that enables stronger collaborations, AMES Laboratory, Ames IA, Dec 12, 2017
- Co-Chair, ORNL's Big Science Questions, Office of the Deputy for Science and Technology and Office of Institutional Planning, Oak Ridge National Laboratory, December 2015–2017.
- Organizer, Workshop on Magnetic structure determination from Neutron Diffraction data, Florida State University, Tallahassee, FL, May 23–26, 2016.
- Co-organizer, 5th School on Representational Analysis and Magnetic Structures, August 2–7, 2015, University of Maryland, College Park, MD.
- Organizer, ACA Satellite Workshop: Rietveld Refinement Analysis, July 25, 2015, Philadelphia, PA.
- Session Chairperson, APS March Meeting, San Antonio, TX, "Session Q5: Focus Session: Search for New Fe-based Superconductors II", March 1–6, 2015.
- Organizer, ACNS Satellite Workshop: "Magnetic Structure Determination from Neutron Diffraction Data", June 5–8, 2014, Hilton Knoxville, Knoxville, TN.
- Co-organizer, Workshop on "Magnetic structure determination from Neutron Diffraction data", Sept 17–20, 2013, Oak Ridge National Laboratory, Oak Ridge Tennessee, USA.
- Symposium Co-Chair, "Advancing Materials Characterization with Neutrons", International Materials Research Congress (IMRC), Aug 11–16, 2013.
- Publications Committee Member, Conference on Materials and Mechanisms of Superconductivity, "M2S 2012", Omni Shoreham Hotel in Washington, DC, July 29 – August 3, 2012.
- Chairperson, Neutron Special Interest Group (SIG), ACA Meeting 2012.
- Session Chairperson, Diffraction studies of Magnetic Materials, ACA Meeting, Sheraton New Orleans, New Orleans, LA, USA, June 2011.
- Session Chairperson, Focus Session: Iron Based Superconductors -- Orbital Order, APS March Meeting 2011.
- Participant, NCNR Representational Analysis of Complex Magnetic Structures, NIST Center for Neutron Research, Gaithersburg, MD, April 2007.
- Organizing Committee Support and Poster presentation, "The pressure effect on the magnetic structure commensurability and ferroelectricity in the multiferroic HoMn_2O_5 and TbMn_2O_5 ", International Conference on Strongly Correlated Electron Systems (SCES'07), Houston, USA, May 2007.

Oral / Poster presentations

- Participant, Fundamental Physics of Ferroelectrics and Related Materials Workshop, Carnegie Institute of Science, Washington DC. January 31–February 3, 2016.
- Participant, Fundamental Physics of Ferroelectrics and Related Materials Workshop, Crowne Plaza Hotel, Knoxville, TN, January 25–28, 2015.
- Poster presentation, “Designing for multifunctionality”, Gordon Research Conference for Multiferroic & Magnetoelectric Materials, August 10–15, 2014, University of New England Biddeford, ME
- “Lattice distortion and magnetic quantum phase transition in $\text{CeFeAs}_{1-x}\text{P}_x\text{O}$ ”, APS March Meeting, Portland Convention Center, Portland, OR, March 2010.
- “Neutron scattering studies on superconducting $\text{Na}_{1-\delta}\text{FeAs}$ ”, International Conference on Neutron Scattering (ICNS 2009), Knoxville Convention Center, Knoxville, TN, USA, May 2009.
- “Nuclear and Magnetic structures of $\text{CeFeAs}_{1-x}\text{P}_x\text{O}$ ”, APS March Meeting, Pittsburgh Convention Center, Pittsburgh, PA, USA, March 2009.
- “Nuclear and magnetic structures in the Fe-based superconductors and their parent compounds”, Poster and Oral presentation with Junior Scientist Travel award, *International Conference on Advanced Materials (ICAM) Workshop on Fe-Pnictide and Related Superconductors*, University of Maryland at College Park, MD, USA, November 2008.
- “Magnetic field effect on the magnetic structure of $\text{Ba}_2\text{CoGe}_2\text{O}_7$ ”, APS March Meeting, New Orleans, LA, USA, March 2008.
- “Pressure induced stabilization of the ferroelectricity and commensurate magnetic structure in RMn_2O_5 ($R=\text{Tb,Dy,Ho}$)”, APS March Meeting, Denver Convention Center, Denver, CO, USA, March 2007.
- “Magneto-elastic effects, spin frustration, and ferroelectricity in RMn_2O_5 ($R=\text{Ho, Tb, Dy}$)”, International Conference on Magnetism (ICM 2006), Kyoto International Convention Hall, Kyoto, Japan, August 21–25, 2006.
- “The pressure effect on the ferroelectricity in multiferroic RMn_2O_5 ($R=\text{Tb,Dy,Ho}$)”, APS March Meeting, Baltimore Convention Center, Baltimore, MD, USA, March 2006.
- “Evidence for strong spin-lattice coupling in multiferroic RMn_2O_5 ($R=\text{Tb,Dy,Ho}$) via thermal expansion anomalies”, 50th International Conference in Magnetism and Magnetic Materials, The Fairmont-San Jose, San Jose, CA, USA, November, 2005.
- “Thermal expansion measurements in multiferroic HoMn_2O_5 ”, APS March Meeting 2005, LA Convention Center, Los Angeles, USA, March 2005.
- “Anisotropic lattice anomalies and the pressure effect on the ferroelectricity in multiferroic HoMn_2O_5 ”, APS Texas Section Fall Meeting, The Hilton, Houston, TX, USA, October 2005.
- “Evidence of strong spin-lattice coupling in multiferroic HoMn_2O_5 via thermal expansion measurements”, TcSUH Fall Student Symposium, TcSUH, University of Houston, TX, USA, December 2004.

Reviewer

- ORNL Laboratory Directed Research Development and SEED Proposals
- Member, Editorial Board of The Scientific World Journal (Condensed Matter Physics).

- Ad hoc reviewer: Physical Review B, Physical Review Letters, Journal of Low Temperature Physics, Journal of Physics and Journal of Magnetism and Magnetic Materials