
LORI A. REBENITSCH

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Physicist turned consultant working in a variety of different computer science and physics related projects for small businesses and start-ups for three years. Analytical and results-driven professional with eight years of experience in creating and implementing data acquisition systems for different experimental systems. Flexible and technical with a keen eye for details; skilled at synthesizing and editing information to achieve overall objectives.

- Data Analysis & Interpretation
- Scientific Research
- System Development
- Experimental Analysis & Testing
- Reporting & Documentation
- Learning & Development
- Cross-team Collaboration
- Relationship Building
- Issues & Dispute Resolution

Education

Ph.D. Physics, University of Manitoba February 2019.

M.S. Physics, Indiana University, December 2012.

B.S. Physics, Minor Computer Science, South Dakota School of Mines and Technology, May 2010.

Work

Founder, The Study, LLC, Rapid City, SD 4/2021 to Present

Founded The Study, LLC, as a scientific consulting company offering expertise in physics and computer science. These services developed from working as a consultant to a STEM educational start-up and as a project reviewer to other small businesses.

Summary:

- VR textbook with the South Dakota School of Mines to bring cutting edge technology into the undergraduate classroom (A Practical Introduction to Virtual Reality). Submitted to Elsevier to be published under the Morgan Kauffman label.
- Consultant to Excellence in Computer Programming (nonprofit) with past emphasis on reviewing and developing computer science teaching tools for K-12 digital classrooms and current emphasis on scientific writing services and planning for future development projects.
- Consultant to Energy Engineering, Inc. as a physicist project reviewer.
- Grant and scientific writer to local clients.

Feb. 2019 – present

Consultant, Excellence in Computer Programming (ECP, nonprofit)

Develop, maintain, and apply knowledge and understanding of current trends in computer science programming skills to evaluate available computer science teaching tools for K-12 digital classrooms.

- Currently researching expansions options and venues, including developing cooperative relationships between ECP and various student groups across South Dakota.
- Engaged in quality and usability testing of product.

- Played a vital role in communicating the importance of learning computer coding skills to teachers, parents, and volunteers.
- Assessed the most relevant computer science education materials out of more than 150 potential programs.

Research

June 2013 – Dec. 2018

Research Assistant, Ultracold Neutron (UCN) group

Department of Physics, University of Winnipeg and University of Manitoba (UM)

- Lithium Doped UCN Detector.
 - High rate UCN detector (MHz scale)
 - Method of measurement utilizing $6\text{Li}+n \rightarrow \alpha+t$ interaction.
 - Duties include:
 - Data acquisition system development.
 - Detector assembly.
 - Baseline measurement and analysis at Paul Scherrer Institute (PSI)
- Thermal neutron flux measurement of UCN source
 - Measuring thermal and colder neutron flux around D₂O cryostat at TRIUMF.
 - Method of measurement with $^{197}\text{Au}(n,\gamma)^{198}\text{Au}$ activation.
 - Duties include:
 - Determine relevant positions of Au foils for measuring thermal neutron production around D₂O cryostat.
 - Develop method to retrieve and measure Au activation.
 - Analyze resulting thermal neutron flux
- Japan-Canada UCN collaboration
 - Participation in collaborative research between Canada and Japan.
 - Duties include:
 - Presenting at weekly and biweekly meetings
 - Coordinating work between engineers, technicians, and other scientists.

May 2011 – Dec. 2012

Research Assistant, Neutrino Group

Center for Exploration of Energy and Matter (CEEM)

Department of Physics, Indiana University (IU)

- Neutron/neutrino detector known as SciBath.
 - 3D grid of 768 wavelength-shifting fibers submerged in liquid scintillator.
 - Particles tracked regardless of direction of propagating particle.
- Duties include:
 - Monte Carlo simulation of detector using Geant4 for data analysis.
 - Monitoring and collecting data for SciBath at NuMI and MI-12 at FNAL.
 - Comparison analysis of collected data from SciBath and simulation.
 - Development of particle identification of data readout.

Undergraduate Research

Senior Research:

- Simulating cosmic rays at various energies and heights in the earth's atmosphere creating air showers using CORSIKA.
- Analyze the energy and lateral distribution of the resulting data set at the ground level of DUSEL (now SURF).

Independent Research – Blob Multitouch Designer:

- Open Toolset for Creating Educational Tools for Multi-Touch Surfaces.

- Duties primarily comprised of testing and researching educational applications for Designer software.

Selected Publications

Papers:

- S. Ahmed et al. "Fast-switching magnet serving a spallation-driven ultracold neutron source." *Phys. Rev. Accel. Beams* 22, 102401 – Published 11 October 2019
 <<https://journals.aps.org/prab/abstract/10.1103/PhysRevAccelBeams.22.102401>>
- Ahmed, S. et al. "A beamline for fundamental neutron physics at TRIUMF" *Nuclear Inst. and Methods in Physics Research, A*. 11 Feb. 2019
 <<https://www.sciencedirect.com/science/article/pii/S0168900219301184>>
- Ahmed, S. et al. "First ultracold neutrons produced at TRIUMF" Submitted to *Phys. Rev. C*. Sept. 2018
 <<https://arxiv.org/pdf/1809.04071.pdf>>
- Jamieson, B. et al. "Characterization of a scintillating lithium glass ultra-cold neutron Detector" *Eur. Phys. J. A* (2017) 53: 3
 <http://epja.epj.org/articles/epja/abs/2017/01/10050_2017_Article_744/10050_2017_Article_744.html>.
- Jamieson, B; Rebenitsch, L. "Determining the ⁶Li Doped Side of a Glass Scintillator for Ultra Cold Neutrons" *Nuclear Inst. and Methods in Physics Research, A*. 24 Apr 2015.
 <<http://arxiv.org/abs/1502.01392>>.
- Tayloe, R. et al. "T-1025 IU SciBath-768 tests in MI-12" FERMILAB-PROPOSAL-1025. Feb 2012.
- Cooper, R. et al. "SciBath: A Novel Tracking Detector for Measuring Neutral Particles Underground" Oct 2011. <[arXiv.1110.4432](https://arxiv.org/abs/1110.4432)[hep-ex]> .
- Soha, A. et al. "T-1014 IU SciBath-768 Detector" FERMILAB-PROPOSAL-1014. Aug 2011.

Talks:

- Rebenitsch, L. "Cold and thermal neutron flux measurements of the cold neutron source commissioning at TRIUMF" CAP Congress. 31 May 2017.
 <<http://indico.cern.ch/event/593812/contributions/2509077/>>.
- Rebenitsch, L. A. "Characterization of a scintillating lithium glass ultra-cold neutron detector" APS-DNP Meeting. 14 Oct 2016. <<http://meetings.aps.org/link/BAPS.2016.DNP.FJ.8>>.
- Rebenitsch, L. "A lithium doped glass detector to measure the electric dipole moment of ultra cold neutrons." 2015 WNPPC. 13 Feb 2015.
 <http://wnppc.triumf.ca/2015/WNPPC2015_SCHEDULE.pdf>.
- Rebenitsch, L. A. "Developing a Lithium Doped Glass Detector to Measure the Electric Dipole Moment of Ultra Cold Neutrons" 2014 CAP Congress. 17 June 2014.
 <indico.cern.ch/event/293589/session/23/contribution/221>.
- Rebenitsch, L. A. "A Framework for Developing Multitouch Applications for Enhance K-12 Education" Oct 2010. <gracehopper.org/2010>.
- Krage, R. et al. "A Framework for Developing Multitouch Applications for Enhance K-12 Education" Apr 2010 <<http://www.cs.uwec.edu/MICS/attending/MICS2010ProceedingsIndex.html>>
- Rebenitsch, L. A. "Air Shower Simulations of IceCube Data using CORSIKA" SDSM&T Undergraduate Research Symposium. 20 Apr 2010.

Awards, Grants, Societies

Grants:

- Group on Physics Education Research (GPER) Mini-grant, 2021
- International Graduate Student Scholarship (IGSS), 2014-2015, University of Manitoba.
- International Graduate Student Entrance Scholarship (IGSES), 2013-2014, University of Manitoba.
- Undergraduate Student Grant South, 2009-2010, South Dakota Space Consortium.
- Computing Research Experience for Undergraduates (CREU), 2009-2010, Computing Research Associates – Women (CRA-W).

Awards:

- Japan Society for the Promotion of Science (JSPS) Postdoctoral fellowship, 2015.
- Third place National Microsoft Imagine Cup, Team Blob 2010.
- Dean's List.

Societies:

- Canadian Institute of Nuclear Physics.
- American Physical Society.
- Canadian Association of Physicists.
- Eta Kappa Nu – IEEE.
- Electron Devices Society – IEEE.

Teaching and Outreach

Teaching:

- General Physics 1 (PHYS1020L) Winter 2018, UM.
- PHYS1020L Fall 2017, UM.
- PHYS1020L Winter 2017, UM.
- PHYS1020L Fall 2015, UM.
- General Physics 2 (PHYS1030L) Winter 2015, UM.
- PHYS1020L Fall 2014, UM.
- PHYS1030L Winter 2014, UM.
- PHYS1020L Fall 2013, UM.
- General Physics 2 Lab (P202L) Spring 2011, IU.
- Physics 1 Lab (P221L) Fall 2010, IU.
- PHYS 212R Fall 2008, SDSM&T.
- Tutoring 2006-2011, IU, SDSM&T, BSC.

Outreach:

- Connecting QuSTEAM to SD area tribal high schools 2022 – current.
- Volunteer Language Exchange Program, UM, 2013-2014.
- IU Alliance for Graduate Education and the Professoriate (AGEP) Emissary 2012.
- Women in Physics, IU representative, 2012.
- Indiana State Science Olympiad 2012.
- IU Physics Open House Committee 2011.