Grayson C. Rich

5640 S Ellis Ave, ERC Office 487
Chicago, IL 60637
USA
✉ *gcrich@uchicago.edu*

Education

2017 **Ph.D., Physics**, *University of North Carolina*, Chapel Hill, NC.
Thesis title: "Measurement of low-energy nuclear-recoil quenching factors in CsI[Na] and statistical analysis of the first observation of coherent, elastic neutrino-nucleus scattering".
Advisor: P.S. Barbeau (Duke University).
Recipient of American Physical Society Division of Nuclear Physics thesis prize in 2018.

2013 **M.S., Physics**, *University of North Carolina*, Chapel Hill, NC.

2010 **B.S., Physics**, *University of North Carolina*, Chapel Hill, NC, Minor: computer science.

Experience

Research

2017 – Present **Enrico Fermi Fellow and Kavli Institute for Cosmological Physics Fellow**, *University of Chicago*, Chicago, IL.
Member of the Dark Matter in CCDs (DAMIC) Collaboration and co-analysis coordinator of the COHERENT Collaboration.

2010 – 2017 **Graduate research assistant**, *University of North Carolina*, Chapel Hill, NC.

Summer 2012 **Glenn T. Seaborg Institute Graduate Intern**, *Lawrence Livermore National Laboratory*, Livermore, CA.

Teaching

Spring 2011 **Lead Teaching Assistant**, *University of North Carolina*, Chapel Hill, NC.
Lead TA for PHYS 352L, a continuation of PHYS 351L covering digital electronics, data acquisition, and interfacing of hardware and software. Organized efforts of 3 undergraduate assistant TAs and coordinated instruction plans and grading for a class of 60 students distributed across several lab sections.

Fall 2010 **Teaching Assistant**, *University of North Carolina*, Chapel Hill, NC.
Lab instructor and grader for PHYS 351L, an undergraduate course on analog electronics intended for juniors and seniors majoring in physics and biomedical engineering.

Collaboration building and grant writing

May 2018 **Searching for beyond the Standard Model physics with coherent neutrino-nucleus elastic scattering**.
Participated in an initiative bringing together phenomenologists and experimentalists from the neutrino community to develop software for robust and broad-reaching analyses of neutrino data, especially that associated with coherent elastic neutrino-nucleus scattering.

February 2013 **Radiation sensing in nanomaterials**.
Conceived of and prepared technical white papers for the Departments of Defense and Energy proposing research into the response of select nanomaterials to irradiation. Assembled a multidisciplinary team demonstrating a notably effective working relationship. Reviewers regarded the proposed research as “creative" and likely to advance basic understanding of nanomaterials and their potential for application in radiation sensing. Responsible for devising a complete project budget of $>$\$1M.

January 2012 **Composite neutron detector research**.
Prepared federal grant proposal submitted to the Department of Energy in an effort to establish at UNC a collaborative research effort with LLNL into novel neutron detector technologies intended for use in nuclear safeguards applications. Planned total project budget of $\sim$\$600k.

Energy and security policy

2013 – 2016 **Triangle Institute for Security Studies**.
Participated in seminars and active discussions involving both technical and non-technical parties on subjects related to energy and energy security. Assisted in scheduling future seminars by identifying technical experts, predominantly in the fields of nuclear safeguards and intelligence, able to effectively engage in policy discussions.

Invited talks

Sep. 2018 **Coherent elastic neutrino-nucleus scattering**, plenary.
Neutrino Oscillation Workshop (NOW) 2018. Ostuni, Italy.

Aug. 2018 **The world’s smallest neutrino detector and the first observation of coherent elastic neutrino-nucleus scattering**, physics department colloquium.
Georgia Tech. Atlanta, GA

Jul. 2018 **The COHERENT Collaboration and the First Observation of Coherent Elastic Neutrino-Nucleus Scattering**.
6^{th} Symposium of Neutrinos and Dark Matter in Nuclear Physics (NDM). Daejeon, Republic of Korea.

Jun. 2018 **The DAMIC Experiment at SNOLAB and beyond**.
6^{th} Symposium of Neutrinos and Dark Matter in Nuclear Physics (NDM). Daejeon, Republic of Korea.

Jun. 2018 **The COHERENT Collaboration and the First Observation of Coherent Elastic Neutrino-Nucleus Scattering**.
Neutrino 2018. Heidelberg, Germany.

May 2018 **First observation of coherent elastic neutrino-nucleus scattering and continued efforts of the COHERENT Collaboration**.
The Mitchell Conference on Collider, Dark Matter, and Neutrino Physics. College Station, TX.

Apr. 2018 **First observation of coherent elastic neutrino-nucleus scattering and continued efforts of the COHERENT Collaboration**, High Energy Physics group seminar.
Stony Brook University. Stony Brook, NY.

Mar. 2018 **First observation of coherent elastic neutrino-nucleus scattering and continued efforts of the COHERENT Collaboration**.
Recontres de Moriond, electroweak session. La Thuile, Aosta Valley, Italy.

Nov. 2017 **Observation of coherent, elastic neutrino-nucleus scattering**, seminar.
Laboratory for Particle Physics and Cosmology, Harvard University. Cambridge, MA.

Sep. 2017 **Observation of coherent, elastic neutrino-nucleus scattering**, colloquium.
Kavli Institute for Cosmological Physics, University of Chicago. Chicago, IL.

Dec. 2015 **Status and plans for the COHERENT CEνNS experiment**.
Applied Antineutrino Physics 2015. Arlington, VA.

Nov. 2015 **Status and plans for the COHERENT CEνNS experiment**.
Coherent Neutrino Scattering Experiment Workshop at the Mitchell Institute for Fundamental Physics and Astronomy at Texas A&M. College Station, TX.

Contributed talks

Jul. 2018 **Status and plans for the DAMIC Experiment at SNOLAB and Modane**, plenary.
12$^{\text{th}}$ International Conference on the Identification of Dark Matter (IDM). Providence, RI.

Jul. 2018 **First Observation of Coherent Elastic Neutrino-Nucleus Scattering and Continued Efforts of the COHERENT Collaboration**.
International Conference on High Energy Physics. Seoul, Republic of Korea.

Oct. 2014 **The COHERENT collaboration: an effort to observe coherent, elastic, neutral-current neutrino-nucleus scattering at the Spallation Neutron Source**.
American Physical Society Division of Nuclear Physics Meeting. Kona, HI.

Apr. 2014 **Precision measurement of quenching factors for low-energy nuclear recoils at TUNL**.
American Physical Society April Meeting. Savannah, GA.

Oct. 2012 **Evaluation of a lithium-glass based composite neutron detector for ^{3}He replacement**.
American Physical Society Division of Nuclear Physics Meeting. Newport Beach, CA.

Selected publications

Akimov, D. et al. (2017). "Observation of coherent elastic neutrino-nucleus scattering". *Science* 357.6356, pp. 1123–1126. DOI: 10.1126/science.aao0990. arXiv: 1708.01294 [nucl-ex].

Rich, G.C., K. Kazkaz, H.P. Martinez, and T. Gushue (2015). "Fabrication and characterization of a lithium-glass-based composite neutron detector". *Nuclear Instruments and Methods in Physics Research Section A* 794. DOI: 10.1016/j.nima.2015.05.004.

Csige, L. et al. (2013). "Exploring the multihumped fission barrier of ^{238}U via sub-barrier photofission". *Physical Review C* 87 (4), p. 044321. DOI: 10.1103/PhysRevC.87.044321.

Arnold, C.W., T.B. Clegg, C. Iliadis, H.J. Karwowski, G.C. Rich, J.R. Tompkins, and C.R. Howell (2012). "Cross-section measurement of ^{9}Be$(\gamma, n)\,^8$Be and implications for $\alpha + \alpha + n \rightarrow {}^9$Be in the r process". *Physical Review C* 85 (4), p. 044605. DOI: 10.1103/PhysRevC.85.044605.

Attayek, P.J., E.S. Meyer, L. Lin, G.C. Rich, T.B. Clegg, and O. Coronell (2012). "A remotely controlled, semi-automatic target system for Rutherford backscattering spectrometry and elastic recoil detection analyses of polymeric membrane samples". *Nuclear Instruments and Methods in Physics Research Section A*. DOI: 10.1016/j.nima.2012.02.005.

Tompkins, J.R., C.W. Arnold, H.J. Karwowski, G.C. Rich, L.G. Sobotka, and C.R. Howell (2011). "Measurements of the ^{48}Ca(γ, n) reaction". *Physical Review C* 84 (4), p. 044331. DOI: 10.1103/PhysRevC.84.044331.