Hunter Ratliff
Curriculum Vitae

PERSONAL DETAILS

Mail	`hratliff@vols.utk.edu`
Citizenship	United States

EDUCATION

Ph.D. Nuclear Engineering   **May 2015-December 2018**
University of Tennessee, Knoxville

M.S. Nuclear Engineering   **May 2015-December 2016**
University of Tennessee, Knoxville

B.S. Nuclear Engineering   **August 2011-May 2015**
University of Tennessee, Knoxville

WORK EXPERIENCE

Postdoctoral Fellow   **April 2019-present**
Japan Atomic Energy Agency

Graduate Research Assistant   **Summer 2015-February 2019**
University of Tennessee, Knoxville
   See the Graduate Projects section on the third page.

Graduate Teaching Assistant   **Fall 2015-Fall 2016**
University of Tennessee, Knoxville
   I worked as a GTA for the undergraduate nuclear engineering lab courses which had a primary
   focus on radiation detection and use of NIM equipment. I also worked as a GTA for the
   graduate course on radiation protection.

Intern at ORNL   **May 2014-August 2014**
Oak Ridge National Laboratory, Full-time Internship
   I worked on debugging a documenting a computational fluid dynamics code written in C++
   and FORTRAN. The job also involved working in a Unix environment using Open MPI to
   execute the code on a remote cluster.

PUBLICATIONS

[1] H. N. Ratliff, N. A. McGirl, L. A. Castellanos, H.-C. Wang, A. P. Srikrishna, and L. H. Heilbronn, "Secondary neutron yields from thick-target GCR accelerator experiments," in *Proceedings of Radiation Protection and Shielding Division 20th Topical Meeting of the American Nuclear Society*, 2018.

[2] H.-C. Wang, L. A. Castellanos, N. A. McGirl, H. N. Ratliff, A. P. Srikrishna, and L. H. Heilbronn, "Light charged ion measurements and Monte Carlo calculations from thick targets bombarded by protons and heavy ions," in *Proceedings of Radiation Protection and Shielding Division 20th Topical Meeting of the American Nuclear Society*, 2018.

[3] H. N. Ratliff, M. B. R. Smith, and L. H. Heilbronn, "Simulation of the GCR spectrum in the Mars curiosity rover's RAD detector using MCNP6," *Life Sciences in Space Research*, vol. 14, no. Supplement C, pp. 43 – 50, 2017. Radiation on the Martian Surface: Model Comparisons with Data from the Radiation Assessment Detector on the Mars Science Laboratory (MSL/RAD): Results from the 1st Mars Space Radiation Modeling Workshop.

[4] D. Matthiä, D. M. Hassler, W. de Wet, B. Ehresmann, A. Firan, J. Flores-McLaughlin, J. Guo, L. H. Heilbronn, K. Lee, H. Ratliff, R. R. Rios, T. C. Slaba, M. Smith, N. N. Stoffle, L. W. Townsend, T. Berger, G. Reitz, R. F. Wimmer-Schweingruber, and C. Zeitlin, "The radiation environment on the surface of Mars - Summary of model calculations and comparison to RAD data," *Life Sciences in Space Research*, vol. 14, no. Supplement C, pp. 18 – 28, 2017. Radiation on the Martian Surface: Model Comparisons with Data from the Radiation Assessment Detector on the Mars Science Laboratory (MSL/RAD): Results from the 1st Mars Space Radiation Modeling Workshop.

TALKS/PRESENTATIONS GIVEN

Atomic Energy Society of Japan 2019 Fall Meeting   **11 September 2019**

University of Toyama, Gofuku Campus   Toyama City, Toyama, Japan
Improvements to DCHAIN and its data libraries

Mars Space Radiation Modeling Workshop 2018   **17 October 2018**

Southwest Research Institute   Boulder, CO
Overview of model evaluation: "MCNP6" (2018)
    Co-presented with Michael B.R. Smith

20th Topical Meeting of the Radiation Protection and Shielding Division of the American Nuclear Society (Conference)   **29 August 2018**

American Nuclear Society   Santa Fe, NM
Secondary neutron yields from thick-target GCR accelerator experiments

James E. Turner Back to School Lecture Series   **24 February 2018**

Roane State Community College, Oak Ridge campus   Oak Ridge, TN
The radiation environment on the Martian surface: A modeling challenge and benchmarking opportunity

Mars Space Radiation Modeling Workshop 2016   **29 June 2016**

Southwest Research Institute   Boulder, CO
Overview of model evaluation: "MCNP6" (2016)
    Co-presented with Michael B.R. Smith

GRADUATE PROJECTS

Analysis of experimentally measured neutrons   **Summer 2015-December 2018**
Ph.D. project, Completed

I was involved in the data collection of 400 hours of accelerator experiments involving GCR-like beams incident on targets characteristic of spacecraft walls/shielding followed by a second target to emulate the back wall of a spacecraft. From these experiments, I analyzed all collected neutron data which is broken down into two categories. First, I worked on characterizing the neutrons produced in the primary target which traveled directly to detectors. This involved employing standard time-of-flight techniques, though I also improved some of the existing methodology in my work. Next, neutrons produced in the second downstream target and those scattered throughout the room were characterized using a pulse height deconvolution technique developed for this work. In addition to developing the deconvolution method, this also involved development of neutron response matrices using the SCINFUL-QMD code.

Mars surface radiation simulations in MCNP6   **2016-2018**
M.S. project (2016) and Side project (2018), Completed

For a series of collaborative workshops hosted by SWRI, the first in June 2016 and second in October 2018, I worked on modeling in MCNP6 the GCR environment in the RAD detector aboard the Curiosity rover on Mars. The project required advanced usage of MCNP6 and heavy scripting for preparing input files and processing results.

Modernization of CLSQ   **Summer 2015**
Side project, Completed

I rewrote the 1962 CLSQ Brookhaven Decay Curve Analysis Program, originally in FORTRAN IV, in Python 3. In the process, the input syntax was completely redone to be far more user-friendly. Comprehensive documentation, which did not exist with the original code, was written for this effort. The updated code can be found at: `https://github.com/Lindt8/CLSQ2`

SKILLS

Programming languages	Python 3, Matlab, Fortran
Transport codes	Mcnp, Phits
Software	LaTeX, Microsoft Office, Root
Other software	Command-line interfaces for Windows and Unix
Web design (limited exp.)	Html, Css, and Google Sites

REFERENCES

Available upon request