Hunter Ratliff

Nuclear Engineer,
Code Developer

27 years old

Tokai, Ibaraki, Japan

available upon request

hratliff.com

available upon request

United States citizenship

Skills

Languages

- English ●●●●●
- Japanese ●●○○○

Programming

- Python, Jupyter ●●●●●
- Fortran (IV/77/90/08) ●●●●○
- MATLAB ●●●●○
- C++ ●●●○○
- CMD/Bash scripting ●●●○○
- JavaScript, Brython ●○○○○

Nuclear / Scientific

- MCNP6/X/5, PHITS ●●●●●
- Git, GitHub ●●●●○
- ROOT ●●●○○
- SCALE/ORIGEN ●●○○○
- Geant4 ●○○○○

Other

- LaTeX, TikZ, MetaPost ●●●●●
- Microsoft Office Suite ●●●●●
- Windows local systems ●●●●●
- Unix remote systems ●●●●○
- HTML, CSS, Markdown ●●●○○

Summary

Hunter is a nuclear engineer whose experience is predominantly with radiation transport simulations using MCNP and PHITS, code development in Python and Fortran, hadron accelerator experiments, analysis and visualization of large datasets, activation and decay calculations, and space radiation modeling. He also has an interest in radiation protection and shielding, radioisotope production, and nuclear medicine.

Experience

Apr. 2019 – present
Postdoctoral Fellow — Japan Atomic Energy Agency (JAEA)
Member of the PHITS particle transport code development team, serving as the current lead developer of the DCHAIN-PHITS activation and decay code coupled to and distributed alongside PHITS. Implemented modern decay and cross section libraries, uncertainty propagation, reaction tracking, tetrahedral and 3-D grid mesh geometry support, performance improvements, and more into DCHAIN.

May 2015 – Feb. 2019
Graduate Research Assistant — The University of Tennessee, Knoxville
Conducted and analyzed data from accelerator experiments emulating radiation conditions within spacecraft, characterized neutron spectra, and modeled the experiment in MCNP. Other projects included modeling the Martian surface's radiation environment from galactic cosmic rays and solar particle events in MCNP and PHITS and modernizing the CLSQ Fortran IV decay analysis code in Python.

Aug. 2015 – Dec. 2016
Graduate Teaching Assistant — The University of Tennessee, Knoxville
Lead laboratory experience portions of courses within the Nuclear Engineering Department, further developing skills in troubleshooting radiation detectors and associated pulse chain equipment, teaching, communication, and providing constructive guidance to students.

May. 2014 – Aug. 2014
Engineering Student Intern — Oak Ridge National Laboratory
Ran, debugged, and composed documentation for an in-house computational fluid dynamics code written in C++ and Fortran.

Education

May 2015 – Dec. 2018
Ph.D. in Nuclear Engineering — The University of Tennessee, Knoxville
Organized, conducted, and analyzed data from 400 hours of beam experiments at the NASA Space Radiation Laboratory in Brookhaven National Laboratory, characterizing the neutron environment within (emulated) spacecraft bombarded by cosmic rays using established time-of-flight and newly developed deconvolution techniques, requiring careful time management and monitoring during the experiments to maximize data quality followed by substantial scripting to filter and process the raw data into spectra and to generate, run, and process MCNPX/6 models of the experiment.

May 2015 – Dec. 2018
M.S. in Nuclear Engineering — The University of Tennessee, Knoxville
Designed and conducted MCNP6 simulations of the galactic cosmic ray-induced radiation environment on the Martian surface, modeling the individual particle spectra and dosimetric data as seen by the Radiation Assessment Detector onboard the Mars Curiosity Rover.

Aug. 2011 – May 2015
B.S. in Nuclear Engineering — The University of Tennessee, Knoxville
Designed a reactor and modeled its criticality and shielding in MCNP for a proposed critical experiment facility as a final design project.

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Short Bio

Hunter studied nuclear engineering at the University of Tennessee from 2011 to 2015 at an undergraduate level and, when presented with very interesting space radiation research opportunities, continued on with his graduate studies at UTK, graduating at the end of 2018. Afterward, he moved to Japan in early 2019 to join the PHITS development team at the Japan Atomic Energy Agency.

Proficiencies

- Programing and scripting
- Monte Carlo methods/simulation
- Data analysis and visualization
- Documentation and presentation
- Nuclear data processing/formatting
- Web design/online tool development

Personal

After living his entire life in the US state of Tennessee, Hunter made his first trip abroad: moving to Japan. Since, he has thoroughly enjoyed exploring the local scenery, culture, and language. New experiences in travel, cuisine, and forces of nature (earthquakes) have truly opened his eyes to the staggering variety of experiences the world has to offer. He is enthusiastic about learning other languages and cultures on his now-international journey through life.

Other

American Nuclear Society member

Tennessee Class D driver's license

Degrees, certificates, and any other documents available upon request

Publications

2020 **Addition of new features and modern data libraries to the DCHAIN-PHITS activation code**
H.N. Ratliff, N. Matsuda, S. Abe, T. Miura, T. Furuta, and T. Sato
Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms *(in institutional review)*

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

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

2017 **Simulation of the GCR spectrum in the Mars Curiosity Rover's RAD detector using MCNP6**
H.N. Ratliff, M.B.R. Smith, and L.H. Heilbronn
Life Sciences in Space Research

2017 **The radiation environment on the surface of Mars - Summary of model calculations and comparison to RAD data**
D. Matthiä, D.M. Hassler, W. de Wet, B. Ehresmann, A. Firan, J. Flores-McLaughlin, J. Guo, L.H. Heilbronn, K. Lee, H.N. Ratliff, R.R. Rios, T. Slaba, M.B.R. Smith, L.W. Townsend, T. Berger, G. Reitz, R.F. Wimmer-Schweingruber, and C. Zeitlin
Life Sciences in Space Research

Honors and Awards

2015 – 2018	Chancellor's Distinguished Graduate Fellowship	Univ. of Tennessee
2011 – 2015	Chancellor's Honors Program	Univ. of Tennessee
2013 – 2014	Eastland Family Engineering Scholarship	
2013	US Nuclear Regulatory Commission Scholarship	
2012 – 2013	Energy*Solutions* Corporation Engineering Scholarship	
2011 – 2012	Tennessee Society of Professional Engineers Scholarship	

Hobbies

Coding	Leveraging the power of scripting to automate everyday tasks like resizing desktop wallpapers to a desired aspect ratio, managing file properties, backing up data, and more.
Web design	Constructing and tinkering with my personal website hratliff.com, my custom HTML browser new tab page, and online-viewable interactive Jupyter notebooks with scientific applications.
Mixology	Responsibly exploring the diverse world of cocktails and mixed drinks, learning about the history of the ingredients and many recipes.
Edutainment	Watching educational documentaries and videos on a wide variety of topics including geography, mountaineering, exploration, technology, architecture, engineering, linguistics, wood/metalworking, business, geopolitics, travel, chemistry, mathematics, and history.

References

available upon request