Hunter Ratliff

Nuclear Engineer and
Code Developer

- 28 years old
- Bergen, Norway
- available upon request
- hratliff.com
- contact@hratliff.com
- linkedin.com/in/hunter-ratliff
- United States citizenship

Skills

Languages

🇺🇸 English	●●●●●
🇯🇵 Japanese	●●○○○
🇳🇴 Norwegian	●○○○○

Programming

Python, Jupyter	●●●●●
Fortran (IV/77/90/08)	●●●●○
MATLAB	●●●○○
C++	●●○○○
CMD/Bash scripting	●●●○○
Git, GitHub	●●●●○

Nuclear / Scientific

MCNP6/X/5, PHITS	●●●●●
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, activation and decay calculations, scientific code development in Python and Fortran, space radiation modeling, cosmic-ray-like ion accelerator experiments, and analysis and visualization of large experimental and modeled datasets. He also has interests in radiation protection and shielding, radiotherapy, and radioisotope production.

Experience

Aug. 2021 – present

Postdoctoral Fellow   Western Norway University of Applied Sciences (HVL)
Development, modeling, analysis, and deployment of a prototype neutron/γ-ray detector that seeks to more precisely determine doses delivered in proton radiotherapy treatments to then allow for sparing of more healthy tissue surrounding the sites receiving treatment.

Apr. 2019 – Aug. 2021

Postdoctoral Fellow   Japan Atomic Energy Agency (JAEA)
Member of the PHITS particle transport code team as the lead developer of the DCHAIN-PHITS activation, buildup, burnup, and decay code coupled to PHITS. Implemented modern decay and cross section libraries, uncertainty propagation, reaction tracking, tetrahedral and 3-D grid mesh geometry support, performance improvements, new input/output features, and more into DCHAIN. Authored the user guide/manual and assisted with user support for DCHAIN-PHITS.

May 2015 – Feb. 2019

Graduate Research Assistant   The University of Tennessee, Knoxville
Conducted accelerator experiments emulating radiation conditions within spacecraft, characterized resulting neutron spectra, and modeled the experiments in MCNP. Also modeled the Martian surface's radiation environment from galactic cosmic rays in MCNP and PHITS and modernized 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.

Education

May 2015 – Dec. 2018
Grade: A (4.0/4.0)

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. This required substantial scripting to filter and process the raw data into spectra and to generate, run, and process MCNPX/6 models of the experiment. Further detailed dose analyses were explored to draw conclusions on optimal spacecraft shielding materials, thicknesses, and configurations to minimize risk to astronauts.

May 2015 – Dec. 2016
Grade: A (4.0/4.0)

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
Grade: A (3.94/4.0)

B.S. in Nuclear Engineering   The University of Tennessee, Knoxville
Designed a plate-fuel research reactor relevant to nuclear propulsion fuels testing and modeled its criticality and shielding in MCNP for a proposed critical experiment facility as a final design project.

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Specialties ——————

 Programming and scripting

 Monte Carlo methods/simulation

 Data analysis and visualization

 Documentation and presentation

 Nuclear data processing/formatting

</> Web design/online tool development

Professional Bio ——

Hunter studied for a BS in nuclear engineering at the University of Tennessee from 2011 to 2015 and, when presented with interesting space radiation research opportunities, continued with his graduate studies at UTK, earning a PhD in late 2018. Afterward, he moved to Japan in early 2019 to join the PHITS code development team at the Japan Atomic Energy Agency. In 2021 he then moved to Norway to work at Høgskulen på Vestlandet.

Personal Bio ——————

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 everywhere he has lived. New experiences in travel, cuisine, and forces of nature 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

 Eagle Scout, Boy Scouts of America

 Degrees, certificates, and any other documents available upon request

Publications

2022	**Development of scalable deconvolution methods for determining secondary target neutron yields from dual-thick-target cosmic-ray ion accelerator experiments** *H.N. Ratliff, N.A. McGirl, M.R. Beach, L.A. Castellanos, M.S. Clowdsley, L.H. Heilbronn, C. La Tessa, J.W. Norbury, A. Rusek, M. Sivertz, A.P. Srikrishna, H. Wang, and C. Zeitlin* Nucl. Instrum. Methods Phys. Res., B, *(in internal review)*
2022	**Double-differential primary target neutron yields from dual-thick-target proton and heavy ion accelerator experiments** *H.N. Ratliff, N.A. McGirl, M.R. Beach, L.A. Castellanos, M.S. Clowdsley, L.H. Heilbronn, C. La Tessa, J.W. Norbury, A. Rusek, M. Sivertz, A.P. Srikrishna, H. Wang, and C. Zeitlin* Nucl. Instrum. Methods Phys. Res., B, *(in internal review)*
2020	**Modernization of the DCHAIN-PHITS activation code with new features and updated data libraries** *H.N. Ratliff, N. Matsuda, S. Abe, T. Miura, T. Furuta, Y. Iwamoto, T. Sato* Nucl. Instrum. Methods Phys. Res., B, 484, 29–41, Dec. 2020.
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, 14, Suppl. C, 43–50, Jun. 2017.
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, 14, Suppl. C, 18–28, Jun. 2017.

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	

References

available upon request