Personal Information

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CASEY A. ANDERSON

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Work Information

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Professional Experience

Los Alamos National Laboratory

Los Alamos, New Mexico

Graduate Research Assistant
Graduate Research Assistant
Post Master's Research Assistant
Summer Intern

NEN-5, Systems Design & Analysis¹
ISR-1, Space Science & Applications²
W-13, Advanced Engineering Analysis³
XCP-3, Monte Carlo Codes⁴

2016 - Present
2017 - 2019

- Implemented new features in MCNP6 through writing code, developing benchmarks, publishing reports, and presenting the new features at various conferences [Pubs: 5,6,8,9,10]¹
- Gained significant knowledge and experience in the design, modeling, simulation, and analysis of a variety of radiation detectors for the **Nuclear Detection Figure of Merit (NDFOM)** project²
- Transitioned NDFOM from version 2.0 to 3.0 by modularizing and refactoring the backend Python code and through developing a cleaner, more intuitive user interface for the customer²
- Managed the deployed server of NDFOM, including SQL database²
- Assisted in the development, testing, validation, and verification of the combined radiation transport and finite-element analysis multi-physics capability for the **Engineering Campaign-7 Nuclear Survivability** project³
- Developed unstructured mesh human phantoms for health physics applications with MCNP6 [Pubs: 4,14]³
- *Acquired DOE Q-level security clearance and assisted on the analysis of the W-88 weapons system³
- Created a software visualization package for finite element geometries in MCNP simulations⁴
- Utilized the high performance computing (HPC) systems and utilities for advanced physics simulations and analysis¹⁻⁴

Medical College of Wisconsin

Milwaukee, Wisconsin

Graduate Research Assistant Department of Biophysics¹ 2012 - 2016 Biophysics Representative, IT Liason Graduate Student Council² 2014 - 2016

- Funded my graduate studies through conducting the background research, providing the preliminary results, and co-authoring a successful R21 National Institute of Health (NIH) grant¹
- Patented a segmented reconstruction technique for artifact reduction in Magnetic Resonance Imaging [Pat: i.]
- Collaborated with a diverse group of professionals, including medical doctors and imaging technologists, to perform clinical research, meet deliverables, and submit the findings to various international conferences [Pubs: 11,12,13]¹
- Collected my own data, provided the necessary care for our experimental animals, and greatly expanded my laboratory and engineering skills by performing a variety of hands-on experimental and engineering tasks¹
- Facilitated communication between students and staff with the university's Information Technology group²

University of Wisconsin - Madison

Madison, Wisconsin

Student Research Assistant Department of Medical Physics 2008 - 2011
Chapter President American Nuclear Society (ANS) 2010 - 2011

- Researched methods for non-invasive quality assurance assessment of radioactive brachytherapy seeds
- Managed the American Nuclear Society organizational duties, including activities such as recruiting guest speakers to present at meetings, organizing conference travel, and arranging public outreach events
- Mentored an taught a variety of students through volunteering at various events, such as Science Olympiad, middle and high school science fairs, and teaching local Boy Scout chapters to achieve their merit badges

^{*} Paperwork submitted June, 2016 for reinstatement of DOE Q-level clearance

Areas of Expertise

Physics/Engineering

- Nuclear Engineering
- Fourier Analysis
- Computational Physics
- Monte Carlo Methods
- Magnetic Resonance Imaging
- Modeling and Simulation
- Statistical Analysis
- High Performance Computing
- Signal/Image Processing
- Regularization Methods
- Radiation Detectors
- Multi-physics coupling
- Radioactive Material Handling
- Computer Aided Engineering
- LaGrangian Methods
- Finite Element Analysis

Software

- MCNP
- Abaqus/CAE
- Linux
- Matplotlib
- Microsoft Office
- Google Docs
- Matlab
- MacOS
- Eclipse IDE
- Django Webframework
- PostgreSQL
- Windows
- $\circ \, GADRAS$
- Vislt
- O RELAP

Programming

- Python
- Bash
- LATEX
- Unit Testing
- Object Oriented
- Matlab
- Mercurial
- Git
- **○** C/C++
- Fortran
- Debugging
- \circ HTML
- Javascript
- o Java
- Android

Other Skills

- Mentoring/Leadership
- Technical Writing
- Presentations
- Version Control
- File Input/Output
- Scripting
- Data Collection
- Data Analytics
- Data Visualization
- Validation & Verification
- SQL Databases
- XML/JSON File Format
- Working with Patients
- DICOM Image Analysis
- Server Management
- Animal Experimentation

Key (Skill Level)

• Expert • Intermediate O Beginner

Awards & Honors

SPOT Award Los Alamos National Laboratory August, 2017
Magna Cum Laude ISMRM Proceeding May, 2016

Silver Medal: Student Poster ISMRM Conference 2014
Exelon Scholarship University of Wisconsin - Madison 2009, 2010

Afilliations

American Nuclear Society (ANS) 2008-2012, 2016-Present American Association of Physicists in Medicine (AAPM) 2009-2011, 2013-2016

International Society of Magnetic Resonance in Medicine (ISMRM) 2012-2016

Education

Primary Education

M. Sc, Biophysics[†] Medical College of Wisconsin April, 2016
M. Sc, Nuclear Engineering & Engineering Physics
B. Sc, Nuclear Engineering University of Wisconsin - Madison May, 2011
University of Wisconsin - Madison May, 2011

[†]Thesis: "Quantitative Susceptibility Mapping: Exploratory Development and Initiation of Processing Pipelines"

Additional Classes & Trainings

MCNP6 Intermediate Workshop CPR Certification Training General Electric MR Programming Workshop

Dale Carnegie Training Introduction to Abaqus

Introduction to Python Programming MCNP5 Beginner Workshop

Los Alamos New Mexico Milwaukee, Wisconsin Madison, Wisconsin Los Alamos, New Mexico Minneapolis, Minnesota Los Alamos, New Mexico

Los Alamos, New Mexico

May, 2016 May, 2015 October, 2014 August, 2011 June, 2011 July, 2010

May, 2010

References

A list of professional, academic, and personal references can be at https://app.box.com/v/andersonreferences

Publications & Presentations

- 1. "MCNP6.2 User's Manual". In: LANL report: TBD (2017)
- 2. Useful prompt radiation applications and capabilities with MCNP6 (LA-CP-12-00490). Nuclear Weapons Effects User Group. 2012
- 3. Nuclear Explosives Design Physics Conference. "MCNP6 Efforts for EMP, atmospheric disperal, and unstructured mesh tracking (LA-CP-01705)". In: *Proceedings of the Nuclear Explovies Design Physics Conference 2011.* (Los Alamos National Laboratory, Los Alamos, New Mexico). Oct. 2012
- 4. Casey Anderson, Karen Kelley, and Tim Goorley. "Unstructured mesh human phantoms with MCNP". in: *Transactions of the American Nuclear Society* 106 (2012), pp. 50–51
- 5. Casey Anderson and Gregg McKinney. "MCNP6 Built-in High Level Detector Responses". In: 2017 IEEE Nuclear Science Symposium and Medical Imaging Conference. (Atlanta, Georgia). Oct. 2017,
- 6. [‡] Casey Anderson et al. "Neutron and Gamma Correlations using CGM in MCNP 6.2.0 (LA-UR-20353)". In: *Proceedings of the 27th American Nuclear Society Summer Meeting.* (San Fransisco, California). 2017, Link
- 7. § James Tutt and Gregg McKinney. "Speed and Memory Improvements to MCNP6 Delayed-Gamma Line Treatment (LA-UR-21050)". In: *Proceedings of the 27th American Nuclear Society Summer Meeting*. (San Fransisco, California). 2017
- 8. [‡] Casey Anderson et al. "Delta-ray production in MCNP6.2.0 (LA-UR-16-25402)". In: *24th Conference on Applications of Accelerators in Research and Industry*. (Forth Worth, Texas). Nov. 2016, Link
- 9. [‡] James Tutt, Casey Anderson, and Gregg McKinney. "Background-Source Cosmic-Photon Elevation Scaling and Cosmic-Neutron/Photon Date Scaling in MCNP6 (LA-UR-16-24928)". In: *24th Conference on Applications of Accelerators in Research and Industry*. (Forth Worth, Texas). Nov. 2016, Link
- 10. James Tutt, Casey Anderson, and Gregg McKinney. "Delayed-Gamma Energy Biasing with Exact Energy Sampling in MCNP6.2.0 (LA-UR-16-24057)". In: *Proceedings of the 26th American Nuclear Society Winter Meeting*. (Las Vegas, Nevada). Oct. 2016, Link
- 11. Casey Anderson et al. "Volume-Paracellated Quantitative Susceptibility Mapping". In: Proceedings of the International Society of Magnetic Resonance in Medicine 24th Conference. (Singapore, Singapore). May 2016, Link
- 12. † Casey Anderson and Kevin Koch. "Volume-parcellated Quantitative Susceptibility Mapping of the Human Brain at 7T". in: 2015 Minnesota Workshop on High and Ultra-High Field Imaging. (Minneapolis, Minnesota). Oct. 2015, Link
- 13. Casey Anderson, Kimberley Pechman, and Kathleen Schmainda. "Quantitative Susceptibility Mapping to Assess Iron Levels in Rat Brain Tumors". In: *Proceedings of the International Society of Magnetic Resonance in Medicine 22nd Conference*. (Milan, Italy). May 2014, Link
- 14. [‡] Casey Anderson, Tim Goorley, and Karen Kelley. "Mesh Human Phantoms with MCNP (LA-UR-12-01307)". In: *2012 3DS Simulia Community Conferece Proceedings*. (Providence, Rhode Island). May 2012, pp. 556–568, Link

‡Presentation Included; §Presentation Only; || Magna Cum Laude

Patents

i. Kevin Koch and Casey Anderson. System and method for localized processing of quantitative susceptibility maps in magnetic resonance imaging. WO Patent App. PCT/US2016/038,723. Dec. 2016. URL: https://www.google.com/patents/W02016209930A1?cl=en, Link