

Casey Icenhour

Contact Information

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Research Interests

Computational Physics, High-Performance Computing, Radio-Frequency Plasma Sheaths, Plasma Material Interactions, Plasma Neutron Sources, Industrial Applications of Plasma Physics, Nuclear Security, Nuclear Policy

Education

- PhD **North Carolina State University (NCSU)**, Nuclear Engineering **2012 - Dec 2019 (expected)**
- Concentration in Plasma Physics and Nuclear Fusion
 - Research Topic Area: Simulation of electromagnetic field structure and wave propagation in inhomogeneous media
 - Advisor: Dr. Steven C. Shannon
- BS **Western Carolina University (WCU)**, Electrical Engineering **2008 - 2012**
- GPA: 4.0
 - Honors College
 - Concentration in Optics and Communications
 - Minors: Mathematics, Physics

Honors and Awards

Idaho National Laboratory Graduate Fellowship	2018 - 2020
DOE Office of Science Graduate Student Research Program, Oak Ridge National Laboratory	2016 - 2017
NCSU College of Engineering Dean's Doctoral Fellowship	2012 - 2013
T. Ray and Frances Louise Gibbs Endowed Scholarship, WCU	2008 - 2012
Most Outstanding Upperclassman, WCU Electrical Engineering	2011

Research and Professional Experience

Idaho National Laboratory (INL), Idaho Falls, ID **Jan 2018 - present**
INL Graduate Fellow, Nuclear Science & Technology, Modeling and Simulation
Developing an INL-sponsored MOOSE Framework (see <https://mooseframework.org>)
App for general electromagnetic simulation, in direct collaboration with the INL MOOSE Development Team

Oak Ridge National Laboratory (ORNL), Oak Ridge, TN **Jul 2016 - Dec 2017**
Graduate Student Intern, Fusion and Materials for Nuclear Systems Division
Developed EELS, a MOOSE Framework App for basic vacuum radio-frequency electromagnetic simulation (see <https://github.com/cticenhour/EELS>) and Matlab codes for self-education in finite-element methods (see <https://github.com/cticenhour/matlab-fem>)

North Carolina State University, Nuclear Engineering Dept., Raleigh, NC **Jul 2013 - Jun 2016**
Graduate Research Assistant, 4th State Applications Research Group
Utilized particle-in-cell codes to study capacitively-coupled RF plasma discharges

Dean's Doctoral Fellow, NCSU College of Engineering **Aug 2012 - Jun 2013**
Modeled proof-of-concept Z-pinch plasma neutron source for concrete interrogation

Professional Society Affiliations & Memberships

American Physical Society (APS)
Institute for Electrical and Electronics Engineers (IEEE)
Society for Industrial and Applied Mathematics (SIAM)

Scientific Computing Skills

Languages	C++, bash, Python
Operating Systems	Windows, MacOS, Linux (Ubuntu, Fedora)
Mathematical Computing Environments	Matlab, Mathematica, Mathcad
Multiphysics Code Frameworks	MOOSE Framework
Plasma Physics Codes	VSIm, XPDP1
Version Control	git
Data Visualization	Paraview, Matplotlib
Mesh Generation Tools	Gmsh
Other Tools	L ^A T _E X

Presentations

- (1) **C. Icenhour**, A. Lindsay, R. Martineau, S. Shannon, “Electromagnetics Simulations with Vector-Valued Finite Elements in MOOSE”, **To be presented at 2019 SIAM Conference on Computational Science and Engineering**, http://meetings.siam.org/sess/dsp_talk.cfm?p=96892
- (2) **C. Icenhour**, S. Keniley, C. DeChant, C. Permann, A. Lindsay, R. Martineau, D. Curreli, S. Shannon, “Multi-Physics Object Oriented Simulation Environment (MOOSE)”, Invited workshop, APS Gaseous Electronics Conference 2018, <http://meetings.aps.org/Meeting/GEC18/Session/AS2.1>
- (3) **C. Icenhour**, A. Lindsay, D. Green, R. Martineau, S. Shannon, “Elk: A New MOOSE Framework Application for Radio-Frequency Electromagnetics”, APS Gaseous Electronics Conference 2018, <http://meetings.aps.org/Meeting/GEC18/Session/ET1.2>
- (4) S. Shannon, A. Lindsay, D. Graves, **C. Icenhour**, D. Peterson, S. White, “Plasma Simulation in the Multiphysics Object Oriented Simulation Environment MOOSE”, APS Gaseous Electronics Conference 2016, <http://meetings.aps.org/link/BAPS.2016.GEC.QR2.2>
- (5) **C. Icenhour**, A. Exum, E. Martin, D. Green, D. Smithe, S. Shannon, “PIC Simulation of RF Plasma Sheath Formation and Initial Validation of Optical Diagnostics using HPC Resources”, Poster, APS Division of Plasma Physics Meeting 2014, <http://meetings.aps.org/link/BAPS.2014.DPP.NP8.88>
- (6) **C. Icenhour**, T. Kummerer, D. Green, D. Smithe, S. Shannon, “Validation of RF CCP Discharge Model Against Experimental Data using PIC Method”, Poster, APS Gaseous Electronics Conference 2014, <http://meetings.aps.org/link/BAPS.2014.GEC.GT1.67>