Andrei Rykhlevskii

Contact Information

Graduate Research Assistant
University of Illinois, Urbana-Champaign
Nuclear, Plasma, and Radiological Engineering

mobile: (217) 305-2385
e-mail: andrewryh@gmail.com

Research Interests

Molten Salt Reactors physics, neutron transport, Monte Carlo, multiphysics simulation of advanced reactors, online reprocessing simulation, validation and verification, high performance computing

PhD

University of Illinois at Urbana-Champaign, Nuclear Engineering **Aug 2016 – Present**
- Neutronics simulation tool for load-following Molten Salt Reactor (MSR)
- Advisor: Professor Kathryn D. Huff

MSc

University of Illinois at Urbana-Champaign, Nuclear Engineering **Aug 2016 – May 2018**
- Advanced online fuel reprocessing simulation for thorium-fueled Molten Salt Breeder Reactor
- Advisor: Professor Kathryn D. Huff

MSc

Financial University - Moscow, Russia, Financial Management **Oct 2011 – Mar 2014**
- Using stock market tools for IT-industry investments
- Advisor: Professor Svetlana Grishkina

BSc

Bauman Moscow State Technical University,Nuclear Engineering **Sep 2004 – Jun 2010**
- Calculating structural materials activation for VVER-1200 decommissioning

Research Experience

University of Illinois at Urbana-Champaign, Urbana, IL
Graduate Research Assistant, Advanced Reactors and Fuel Cycles Group **Aug 2016 – Present**
- Developing computational tools and models for advanced reactor neutronics and safety analysis.
- Investigating load-following capabilities for MSRs.
- Neutronic calculations for MSRs using Monte-Carlo code Serpent.
- Creating MSR models in multiphysics environment MOOSE.
- Developed problem-oriented Nuclear Data libraries using Serpent and SCALE.

Oak Ridge Natinal Laboratory, Oak Ridge, TN
Reactor Physics Intern **May 2018 – Aug 2018**
- Developed a various Fast Spectrum Molten Salt Reactor neutronics models (SCALE, Serpent).
- Implemented and tested continuous online separation and feeds for MSR.
- Analyzed MSR Fuel Cycle Performance in comparison with Sodium-cooled Fast Reactors.

JSC OKB GIDROPRESS (State Atomic Energy Corporation "ROSATOM"), Russia
Lead Engineer **Dec 2015 – Jul 2016**
Extending lifecyle of Nuclear Power Plants (NPP) with VVER-440.

BUKO Ltd, Podolsk, Russia **Sep 2014 – Dec 2015**
Financial analyst
Developed and applied trading robots (C#, VB) for NYSE, LSE, CME, CBOT, GLOBEX and ICE.

Svyaz Standart Ltd, Podolsk, Russia **Feb 2012 – Aug 2014**
Chief Technology Officer
Designed and managed Internet Service Provider (ISP) metro networks.

JSC OKB GIDROPRESS (State Atomic Energy Corporation "ROSATOM"), Russia
Nuclear Engineer **Nov 2009 – Feb 2012**
- Performed neutronics calculations for expending operation period of Balakovo and Kola NPPs.
- Wrote the chapter about decommissioning for the Preliminary Safety Analysis Report (PSAR) of Belene NPP, Bulgaria.
- Performed numerous verifying computations for final state certification of KATRIN-2.0 code.
- Created a Matlab script for processing neutron flux data collected from NPPs.

Honors and Awards

American Nuclear Society, John and Muriel Landis Scholarship	**2017–2019**
Podolsk city council award for development of innovative entrepreneurship in Podolsk	**2014**
Graduated FU with high distinction (highest graduation honor)	**2014**
Graduate scholarship for excellent students, FU	**2013**
Research achievement award, OKB GIDROPRESS	**2011**
Academic scholarship for distinguished student, BMSTU	**2008–2010**
Student Society leadership scholarship, BMSTU	**2004–2010**

Journal Publications

[1] **Rykhlevskii, A.**, Bae, J.W., Huff, K. "Modeling And Simulation of Online Reprocessing in the Molten Salt Breeder Reactor." **Annals of Nuclear Energy**, `https://doi.org/10.1016/j.anucene.2019.01.030`, Jun. 2019.

[2] Lindsay, A., Ridley, G., **Rykhlevskii, A.**, Huff, K. "Introduction to Moltres: an Application for Simulation of Molten Salt Reactors." **Annals of Nuclear Energy**, vol. 114, Pages 530 - 540, 2018. `doi.org/10.1016/j.anucene.2017.12.025`, Apr. 2018.

Submitted

[3] Ashraf, O., **Rykhlevskii, A.**, Tikhomirov, G.V., Huff, K.D. "Whole core analysis of the Single-fluid Double-zone Thorium Molten Salt Reactor (SD-TMSR)." Submitted to **Annals of Nuclear Energy**, May 2019.

Refereed Conference Proceedings

[4] **Rykhlevskii, A.**, Betzler, B.R., Worrall, A., Huff, K. "Fuel Cycle Performance of Fast Spectrum Molten Salt Reactors designs." Submitted to **M&C 2019 - International Conference on Mathematics & Computational Methods Applied to Nuclear Science and Engineering.** Portland, OR, United States, August 2019.

[5] **Rykhlevskii, A.**, Lindsay, A., Huff, K. "Full-Core Analysis of Thorium-Fueled Molten Salt Breeder Reactor using the SERPENT 2 Monte Carlo code." **Transactions of the American Nuclear Society Winter Conference.** Washington, DC, United States, 2017.

[6] **Rykhlevskii, A.**, Lindsay, A., Huff, K. "Online Reprocessing Simulation for Thorium-Fueled Molten Salt Breeder Reactor." **Transactions of the American Nuclear Society Winter Conference.** Washington, DC, United States, 2017.

[7] **Rykhlevskii, A.**, Tsofin, V. "Comparing fast neutron transport calculations using code package KATRIN-2.0 for various options of VVER-440 core setup." **Scientific and technical conference of young specialists.** Podolsk, Russia. March, 2011.

Refereed Conference Abstracts

[8] **Rykhlevskii, A.**, Lindsay, A., Huff, K. "Simulation of Molten Salt Reactors with Moltres." **2019 SIAM Conference on Computational Science and Engineering**, Spokane, WA, February 2019.

[9] **Rykhlevskii, A.**, Betzler, B.R., Bae, J.W., Huff, K. "Fuel Cycle Performance of Fast Spectrum Molten Salt Reactor Designs." (poster) **Oak Ridge National Laboratory Nuclear Engineering Science Laboratory Synthesis Poster Session.** Oak Ridge, TN, United States, 2018.

[10] **Rykhlevskii, A.**, Huff, K. "Computational Tools for Advanced Molten Salt Reactor Simulation." **Blue Waters Symposium**, Sun River, OR, June 2018.

Invited Talks

U. Illinois, Nuclear, Plasma, & Radiological Engineering. *Seminar.* **Apr 10, 2018**

Engineering Teaching

University of Illinois at Urbana-Champaign **Nov 29, 2017**
Nov 9, 2018

Dept. of Nuclear, Plasma, and Radiological Engineering
NPRE 247, Modeling Nuclear Energy System
UNIX Shell, Basic Scripting, Serpent usage, Monte Carlo methods

Undergraduate Researchers

Name	Degree - Year	Role
Jin Whan Bae	BS - 2017	Mentor
Louis Kissinger	BS - 2019	Mentor

Scientific Computing Skills

Languages	Python, bash/csh, C++, FORTRAN, VB
Build Systems	make, CMake
Version Control	git
Other Tools	Serpent, SCALE, MOOSE, MCNP, MATLAB, Octave, ANSYS, PyNE, Cyclus

Other University Service

Hack Mentor, Hack Illinois **2017**

Editing and Reviewing

Manuscript Referee *Annals of Nuclear Energy*
2019 GLOBAL International Fuel Cycle Conference