

# Andrei Rykhlevskii

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| CONTACT INFORMATION | Graduate Research Assistant<br><i>University of Illinois, Urbana-Champaign</i><br><i>Nuclear, Plasma, and Radiological Engineering</i>  | mobile: (217) 305-2385<br>e-mail: andrewryh@gmail.com |
| RESEARCH INTERESTS  | Advanced nuclear reactors and fuel cycles analysis/optimization, reactor physics and multi-physics, accident transient analysis, reactor kinetics, High Performance Computing   |   |
| PhD                 | <b>University of Illinois at Urbana-Champaign, NUCLEAR ENGINEERING Aug 2016 – Present</b> <ul style="list-style-type: none"><li>Fuel processing simulation tool for liquid-fueled nuclear reactors</li><li>Advisor: Professor Kathryn D. Huff</li><li>Concentration in Computational Science and Engineering</li></ul>  |   |
| MSc                 | <b>University of Illinois at Urbana-Champaign, NUCLEAR ENGINEERING Aug 2016 – May 2018</b> <ul style="list-style-type: none"><li>Advanced online fuel reprocessing simulation for thorium-fueled Molten Salt Breeder Reactor</li><li>Advisor: Professor Kathryn D. Huff</li></ul>   |   |
| MSc                 | <b>Financial University - Moscow, Russia, FINANCIAL MANAGEMENT Oct 2011 – Mar 2014</b> <ul style="list-style-type: none"><li>Using stock market tools for IT-industry investments</li><li>Advisor: Professor Svetlana Grishkina</li></ul>   |   |
| BSc                 | <b>Bauman Moscow State Technical University, NUCLEAR ENGINEERING Sep 2004 – Jun 2010</b> <ul style="list-style-type: none"><li>Calculating structural materials activation for VVER-1200 decommissioning</li><li>Concentration in Computational Reactor Physics and Nuclear Fuel Cycle</li></ul>  |   |
| RESEARCH EXPERIENCE | <b>University of Illinois at Urbana-Champaign, Urbana, IL</b><br><i>Graduate Research Assistant, Advanced Reactors and Fuel Cycles Group Aug 2016 – Present</i> <ul style="list-style-type: none"><li>Developing computational tools and models for advanced reactors and fuel cycles</li><li>Investigating load-following capabilities of MSRs</li><li>Modeling MSR neutronics using Monte Carlo code Serpent</li><li>Creating MSR models in multi-physics environment MOOSE</li><li>Generating problem-oriented nuclear data libraries using Serpent, SCALE, OpenMC</li></ul><br><b>Oak Ridge National Laboratory, Oak Ridge, TN</b><br><i>NESLS Intern – Reactor Physics Group May 2018 – Aug 2018</i> <ul style="list-style-type: none"><li>Developed a various Fast Spectrum Molten Salt Reactor neutronics models (SCALE, Serpent)</li><li>Implemented and tested continuous online separation and feeds for MSR</li><li>Analyzed MSR fuel cycle performance in comparison with Sodium-cooled Fast Reactors</li></ul><br><b>OKB GIDROPRESS (State Atomic Energy Corporation “ROSATOM”), Russia</b><br><i>Lead Engineer Dec 2015 – Jul 2016</i><br>Extending life cycle of Nuclear Power Plants (NPP) with VVER-440<br><br><b>BUKO Ltd, Podolsk, Russia Sep 2014 – Dec 2015</b><br><i>Financial analyst</i><br>Developed and applied robots (C#, VB) for algorithmic trading<br><br><b>Svyaz Standart Ltd, Podolsk, Russia Feb 2012 – Aug 2014</b><br><i>Chief Technology Officer</i><br>Designed and managed Internet Service Provider (ISP) metro networks<br><br><b>OKB GIDROPRESS (State Atomic Energy Corporation “ROSATOM”), Russia</b><br><i>Nuclear Engineer Nov 2009 – Feb 2012</i> <ul style="list-style-type: none"><li>Performed neutronics calculations for expending operation period of Balakovo and Kola NPPs</li><li>Analyzed decommissioning for the Preliminary Safety Analysis Report of Belene NPP, Bulgaria</li><li>Performed simulations for V&amp;V and certification of KATRIN-2.0 deterministic <math>S_N</math> code</li><li>Developed a MATLAB code for processing neutron flux data collected from NPPs</li></ul> |   |
| HONORS AND AWARDS   | Kuck Computational Science & Engineering Scholarship  | 2019-2020   |
|                     | American Nuclear Society, John and Muriel Landis Scholarship  | 2017-2020   |
|                     | Podolsk city council innovative entrepreneurship award  | 2014  |
|                     | Graduated FU with high distinction (highest graduation honor)   | 2014  |
|                     | Graduate scholarship for excellent students, FU   | 2013  |
|                     | Research achievement award, OKB GIDROPRESS  | 2011  |

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| JOURNAL<br>PUBLICATIONS               | <p>[1] Bae, J.W., <b>Rykhlevskii, A.</b>, Chee, G., Huff, K.D. “Deep Learning Approach to Nuclear Fuel Transmutation in a Fuel Cycle Simulator.” <b>Annals of Nuclear Energy</b>, vol. 139. <a href="https://doi.org/10.1016/j.anucene.2019.107230">https://doi.org/10.1016/j.anucene.2019.107230</a>, May 2020.</p> <p>[2] Ashraf, O., <b>Rykhlevskii, A.</b>, Tikhomirov, G.V., Huff, K.D. “Whole core analysis of the single-fluid double-zone thorium molten salt reactor (SD-TMSR).” <b>Annals of Nuclear Energy</b>, vol. 137. <a href="https://doi.org/10.1016/j.anucene.2019.107115">https://doi.org/10.1016/j.anucene.2019.107115</a>, March 2020.</p> <p>[3] <b>Rykhlevskii, A.</b>, Bae, J.W., Huff, K. “Modeling And Simulation of Online Reprocessing in the Molten Salt Breeder Reactor.” <b>Annals of Nuclear Energy</b>, vol. 128, Pages 366 - 379. <a href="https://doi.org/10.1016/j.anucene.2019.01.030">https://doi.org/10.1016/j.anucene.2019.01.030</a>, June 2019.</p> <p>[4] Lindsay, A., Ridley, G., <b>Rykhlevskii, A.</b>, Huff, K. “Introduction to Moltres: an Application for Simulation of Molten Salt Reactors.” <b>Annals of Nuclear Energy</b>, vol. 114, Pages 530 - 540. <a href="https://doi.org/10.1016/j.anucene.2017.12.025">doi.org/10.1016/j.anucene.2017.12.025</a>, April 2018.</p>   |
| SUBMITTED                             | <p>[5] Ashraf, O., <b>Rykhlevskii, A.</b>, Tikhomirov, G.V., Huff, K.D. “Strategies for thorium fuel cycle transition in the SD-TMSR.” Submitted to <b>Annals of Nuclear Energy</b>, November 2019.</p>   |
| REFEREED<br>CONFERENCE<br>PROCEEDINGS | <p>[6] <b>Rykhlevskii, A.</b>, O’Grady, D., Kozlowski, T., Huff, K. “The Impact of Xenon-135 on Load Following Transatomic Power Molten Salt Reactor.” <b>Transactions of the American Nuclear Society Winter Meeting</b>. Washington, DC, United States, 2019.</p> <p>[7] Park, S.M., <b>Rykhlevskii, A.</b>, Huff, K. “Safety Analysis of the Molten Salt Fast Reactor Fuel Composition Using Moltres.” <b>Proc. GLOBAL International Fuel Cycle Conference</b>. Seattle, WA, United States, September 2019.</p> <p>[8] Betzler, B.R., <b>Rykhlevskii, A.</b>, Worrall, A., Huff, K. “Impacts of Fast Spectrum Molten Salt Reactor Characteristics on Fuel Cycle Performance.” <b>Proc. GLOBAL International Fuel Cycle Conference</b>. Seattle, WA, United States, September 2019.</p> <p>[9] <b>Rykhlevskii, A.</b>, Betzler, B.R., Worrall, A., Huff, K. “Fuel Cycle Performance of Fast Spectrum Molten Salt Reactors designs.” <b>Proc. M&amp;C 2019 - International Conference on Mathematics &amp; Computational Methods Applied to Nuclear Science and Engineering</b>. Portland, OR, United States, August 25-29, 2019.</p> <p>[10] <b>Rykhlevskii, A.</b>, Lindsay, A., Huff, K. “Full-Core Analysis of Thorium-Fueled Molten Salt Breeder Reactor using the SERPENT 2 Monte Carlo code.” <b>Transactions of the American Nuclear Society Winter Meeting</b>. Washington, DC, United States, 2017.</p> <p>[11] <b>Rykhlevskii, A.</b>, Lindsay, A., Huff, K. “Online Reprocessing Simulation for Thorium-Fueled Molten Salt Breeder Reactor.” <b>Transactions of the American Nuclear Society Winter Meeting</b>. Washington, DC, United States, 2017.</p> <p>[12] <b>Rykhlevskii, A.</b>, Tsofin, V. “Comparing fast neutron transport calculations using code package KATRIN-2.0 for various options of VVER-440 core setup.” <b>Scientific and technical conference of young specialists</b>. Podolsk, Russia, March 2011.</p> |
| REFEREED<br>CONFERENCE<br>ABSTRACTS   | <p>[13] <b>Rykhlevskii, A.</b>, Lindsay, A., Huff, K. “Simulation of Molten Salt Reactors with Moltres.” <b>2019 SIAM Conference on Computational Science and Engineering</b>, Spokane, WA, February 2019.</p> <p>[14] <b>Rykhlevskii, A.</b>, Betzler, B.R., Bae, J.W., Huff, K. “Fuel Cycle Performance of Fast Spectrum Molten Salt Reactor Designs.” (poster) <b>Oak Ridge National Laboratory Nuclear Engineering Science Laboratory Synthesis Poster Session</b>. Oak Ridge, TN, United States, 2018.</p> <p>[15] <b>Rykhlevskii, A.</b>, Huff, K. “Computational Tools for Advanced Molten Salt Reactor Simulation.” <b>Blue Waters Symposium</b>, Sun River, OR, June 2018.</p>   |
| TECHNICAL<br>REPORTS                  | <p>[16] <b>Rykhlevskii, A.</b>, Huff, K. “Milestone 2.1 Report: Demonstration of SaltProc.” <b>Advanced Reactors and Fuel Cycles Report Series</b>, Nuclear Plasma and Radiological Engineering, University of Illinois. Report UIUC-ARFC-2019-04, <a href="https://doi.org/10.5281/zenodo.3355649">https://doi.org/10.5281/zenodo.3355649</a>, June 2019.</p>  |
| OTHER<br>PUBLICATIONS                 | <p>[17] <b>Rykhlevskii, A.</b> Advanced online fuel reprocessing simulation for Thorium-fueled Molten Salt Breeder Reactor. M.Sc. thesis. University of Illinois at Urbana-Champaign. May 2018.</p>   |

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| SOFTWARE<br>PRODUCTS              | [18] <b>Rykhlevskii, A.</b> , Bae, J.W., Huff, K. “SaltProc v0.2.” <b>zenodo</b> , July 2018. <a href="http://dx.doi.org/10.5281/zenodo.1196454">http://dx.doi.org/10.5281/zenodo.1196454</a> .  |   |   |
|                                   | [19] Lindsay, A., Huff, K., <b>Rykhlevskii, A.</b> “moltres v0.1.” <b>zenodo</b> , June 2017. <a href="http://dx.doi.org/10.5281/zenodo.801823">http://dx.doi.org/10.5281/zenodo.801823</a> .  |   |   |
|                                   | [20] Bates, C., Biondo, E., Brachem, C., Carlsen, R., Cary, J., Davis, A., Dembia, C., Elfring, M., Flanagan, R., Gidden, M., Haines, T., Howland, J., Huff, K., Jackson, S., Kiesling, K., Klebenow, M., Kuett, M., Manalo, K., M. McCormick, A. Opotowsky, C., Pavlovsky, R., Rabbani, M., Relson, E., Romano, P., <b>Rykhlevskii, A.</b> , Scopatz, A., Shriwise, P., Slaybaugh, R., Wilson, P., Xia, J., J. Zachman, C., and Zweig, M. “PyNE v0.5.11.” <b>github</b> . <a href="https://github.com/pyne/pyne/releases/tag/0.5.11">github.com/pyne/pyne/releases/tag/0.5.11</a> . March 2018. |   |   |
| INVITED TALKS                     | <b>U. Illinois</b> , Nuclear, Plasma, & Radiological Engineering. <i>Seminar</i> .   |   | <b>Apr 10, 2018</b>   |
| ENGINEERING<br>TEACHING           | <b>University of Illinois at Urbana-Champaign</b>  |   | <b>Nov 29, 2017</b>   |
|                                   | <i>Guest Lecturer</i>  |   | <b>Nov 9, 2018</b>  |
|                                   | DEPT. OF NUCLEAR, PLASMA, AND RADIOLOGICAL ENGINEERING<br><i>NPRE 247, Modeling Nuclear Energy System</i><br>UNIX Shell, Basic Scripting, Serpent usage, Monte Carlo methods   |   |   |
| UNDERGRADUATE<br>RESEARCHERS      | <u>NAME</u>  | <u>DEGREE - YEAR</u>  | <u>ROLE</u>   |
|                                   | <b>Jin Whan Bae</b>  | BS - 2017   | Mentor  |
|                                   | <b>Louis Kissinger</b>   | BS - 2019   | Mentor  |
| SCIENTIFIC<br>COMPUTING<br>SKILLS | <b>Programming</b>   |   | Python, bash/csh, C++, FORTRAN, VB, MPI, OpenMP   |
|                                   | <b>Build Systems</b>   |   | make, CMake   |
|                                   | <b>Databases</b>   |   | HDF5, SQL   |
|                                   | <b>Test Frameworks</b>   |   | Travis CI, pytest   |
|                                   | <b>Version Control</b>   |   | git   |
|                                   | <b>Transport Software</b>  |   | Serpent, SCALE, MCNP, WIMS, CNCSN 2009, OpenMC  |
|                                   | <b>Other Tools</b>   | MOOSE, MATLAB/Octave, PyNE, CYCLUS, ANSYS CFX, Nek5000, L <sup>A</sup> T <sub>E</sub> X |   |
| OTHER<br>UNIVERSITY<br>SERVICE    | <b>Hack Mentor</b> , Hack Illinois   |   | <b>2017</b>   |
| EDITING AND<br>REVIEWING          | <b>Manuscript Referee</b>  |   | <i>Annals of Nuclear Energy</i><br><i>2019 GLOBAL International Fuel Cycle Conference</i> |
| PROFESSIONAL<br>SERVICE           | <b>Member</b> , American Nuclear Society   |   | <b>2016–present</b>   |
|                                   | <b>Member</b> , Society for Industrial and Applied Mathematics   |   | <b>2018–present</b>   |