

AMRIT PATEL

Experienced nuclear engineer with a demonstrated history of working for the United States Nuclear Regulatory Commission. Skilled in nuclear safety (radiation transport, criticality analysis, fuel performance, computer simulation validation) and computer programming.

Currently searching for a position that allows me to collaborate with a team solving interesting problems in the field of nuclear engineering, especially applying particle transport methods for reactor and fuel design modeling, simulation, and uncertainty quantification.



■ INDUSTRY EXPERIENCE

2019
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2009

● Nuclear Engineer

U.S. NRC, Office of Nuclear Reactor Regulation 📍 Rockville, MD

- Principal contributor for topical report, license amendment request, and guidance development safety review teams, presenting information to mid-size audiences, mentorship of peers, explaining technical material to non-technical audiences (members of the public) and management, oversight of interns.
- Planned/Conducted complex technical reviews in core nuclear engineering areas for the Offices of New Reactors and Nuclear Reactor Regulation (e.g., criticality, shielding, nuclear fuels, and method verification/validation) coordinating with project managers and technical staff in cross-cutting disciplines for several large projects (e.g., new reactor licensing, license renewal).
- Planned/Conducted research for the Office of Research: FAVOR/DAKOTA coupling for uncertainty quantification studies; SCALE-MAVRIC/DAKOTA coupling for uncertainty quantification studies to assess safety margins of degraded PWR bioshield concrete; facilitated INL MOOSE-based Grizzly code installation and training for modeling of engineering fracture assessments of reactor pressure vessels on shared internal cloud-hosted Linux systems.
- Proficient in safety evaluation reporting and confirmatory analysis including: Use of computer codes to perform simulations (e.g., SCALE code suite, MCNP, DAKOTA); complex data analysis using statistical software packages; use of various programming/scripting languages for software development, input/output processing, database management, and creating dynamic figures/reports/presentations.
- Communication and reporting skills: Development and presentation of original research in support of NRC guidance development for various audiences (e.g., senior level management, ACRS, national/international conferences).
- Collaboratively developed new guidance documents (e.g., spent fuel pool criticality safety and neutron fluence regulatory guides); NRC representative on ANS 19.10 standard committee.
- Developed and provided training (mostly one-on-one mentoring). An example can be provided upon request.
- Collaborated with international cohorts via participation in OECD/NEA Working Party on Nuclear Criticality Safety and associated expert groups including contributions to calculational benchmark reports.

View this CV online with links at amritpatel.rbind.io/about/cv.html

CONTACT

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🔗 linkedin.com/in/amritdpatel

LANGUAGE SKILLS

SCALE	
MCNP	
R	
Perl	
Python	
Fortan	
C++	

Made with the R package [page-down](#).

The source code is available on github.com/amritpatel/adpateLCV.

Last updated on 2020-07-27.

2008	<p>Intern</p> <p>U.S. NRC, Office of New Reactors</p> <ul style="list-style-type: none"> Assisted with the review of the GEH ESBWR CRB nuclear design life-time. Supported audit activities, performed confirmatory analyses (using MonteBurns and MCNP5), and provided safety evaluation input. Performed the acceptance review for the Levy Nuclear Plant, Units 1 and 2 combined license application. 	 Rockville, MD
2007	<p>Intern</p> <p>Southern Nuclear Operating Company</p> <ul style="list-style-type: none"> Worked with BWR core analysis engineers supporting Plant Hatch, Units 1 and 2. Gained experience with CASMO-3/SIMULATE-3 via model implementation of a proposed CRB design; performed a study on the effect of the design on existing core. Gained experience with GEH lattice physics codes working with bundle designs and control rod blade pattern development. 	 Birmingham, AL

EDUCATION

2019	<p>Teaching Certificate</p> <p>TEACH-NOW Graduate School of Education</p> <ul style="list-style-type: none"> Secondary Computer Science Secondary Mathematics 	 Washington, D.C.
2009 I 2006	<p>M.S., Nuclear Engineering</p> <p>University of Florida</p> <ul style="list-style-type: none"> Thesis: <i>Detailed Neutron Flux Characterization of the Experimental Shield Tank Facility at the UFTR</i>. Research included modeling of the University of Florida Training Reactor using the 3-D deterministic discrete ordinates PENTRAN code to accurately characterize the neutron flux distribution within a surrounding experimental facility composed of water; code-to-code benchmarking was performed with MCNP5. Served as teaching assistant for graduate level “Neutron Transport Theory” course. Duties included assisting students with coursework and grading assignments. Received EIT certification. 	 Gainesville, FL
2006 I 2002	<p>B.S., Nuclear Engineering</p> <p>University of Florida</p> <ul style="list-style-type: none"> Inducted into Alpha Nu Sigma Honor Society. Member of American Nuclear Society (UF Chapter). 	 Gainesville, FL



TEACHING EXPERIENCE

2020
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2019

- **Secondary School Technology & Design Teacher**
Lincoln School 📍 Kathmandu, Nepal
- Taught courses for students to develop 21st century skills with an emphasis on information and communication technology literacy, media and internet literacy, data interpretation and analysis, computer programming through use of the design cycle of thinking, making, and refining (including troubleshooting, debugging, polishing).
- Leader of the Technology and Innovation Curriculum Planning Committee charged with developing a school-wide technology and innovation philosophy, and looking at standards-based outcomes in order to design curriculum units.
- Created a website hosted on Github Pages using Harvard's CS50 curriculum to facilitate teaching computer science principles.
- Started a student-led video production team to record, produce, and edit videos supporting various school events.
- As the manager of this team, I also recorded, produced, and edited a miniseries documenting a community service project in the Chitwan region of Nepal where Grade 9 students along with myself and several other teachers worked on constructing two biogas digesters at neighboring sites.
- Made several short films ("Exploratory' Students Showcase of Season 2 Projects"; "Tiny Stage Series Fine Arts Edition, Theme: Water").
- Coordinated and led the live streaming of the South Asian Inter-Scholastic Association (SAISA) swimming tournament hosted at Lincoln School. This was the first time in SAISA history that a wireless in-field camera setup was used to capture live footage.
- Led the filming of a special event at one of Nepal's cherished ancient religious sites (also a UNESCO world heritage site) – Swayambhunath Stupa – in collaboration with the World Wildlife Fund and Decca/Universal Music Group in support of making resolutions with communities around the world calling for urgent action on the climate crisis.
- Pioneered the use of drone video camera technology for sporting events as a means to identify areas of athlete and team improvement.



SELECTED DATA SCIENCE WRITING

2020

- **Imputing running economy over time data²**
Personal Blog
 - Creating custom R functions to treat missing data to visualize running economy data over time.

2019

- **Creating and validating a continuous heat limited pace model³**
Personal Blog
 - Using a trial and error approach, I create various multivariate regression models based on (temperature, humidity, pace) data points to see if I could come up with a continuous analytical formula for heat limited running pace as a function of temperature and humidity.



WORK-RELATED TRAINING

- 2019 • Nuclear Data Fundamentals and AMPX Libraries Generation Course Rockville, MD
- 2018 • WONDER 2018: 5th International Workshop On Nuclear Data Evaluation for Reactor Applications Aix-en-Provence, France
- 2018 • Best Estimate Plus Uncertainty International Conference Lucca, Italy
 - Presented on *The history and future of credibility assessment frameworks: from CSAU to EMDAP and beyond*.
- 2017 • A.N.T. International's Fuel Introduction Course (online) Rockville, MD
- 2016 • Uncertainty Quantification for Computer Simulations by Applied Biomathematics Setauket, NY
- 2016 • Knowledge Management Seminar: RPV P/T Limits and Metallurgy 101 for RPV Materials Rockville, MD
- 2016 • Knowledge Management Seminar: Fluence in RPV Regulations, and Codes and Standards Rockville, MD
- 2016 • Criticality Safety Engineer Hands-On Training Las Vegas, NV; Albuquerque, NM
- 2015 • Johns Hopkins University Data Science Specialization Coursework (online) Rockville, MD
 - Statistical Inference
 - Regression Models
 - R Statistical Software Programming
 - Getting and Cleaning Data
 - Exploratory Data Analysis
 - Reproducible Research
- 2015 • Fuel Modeling with SCALE Training Rockville, MD
 - ORIGEN
 - ORIGAMI
 - Polaris
 - Sampler
- 2015 • 1st Workshop on Methodologies for SFP Simulations
Virginia Tech Arlington, VA
- 2015 • Shielding Analysis Using SCALE/Monaco/MAVRIC Rockville, MD

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| 2015 | ● Edward Tufte's One-Day Course on "Presenting Data and Information" | 📍 Washington, D.C. |
| 2014 | ● Lattice Physics Analysis Using SCALE/Polaris and GenPMAXS | 📍 Rockville, MD |
| 2014 | ● Tennessee Industries Week: Nuclear Criticality Safety
University of Tennessee | 📍 Knoxville, TN |
| 2013 | ● SCALE Computational Methods for Burnup Credit, Including ISG-8 Revision 3 | 📍 Rockville, MD |
| 2012 | ● ORNL Burnup Credit Validation Training Using SCALE6 | 📍 Bethesda, MD |
| 2011 | ● TRACE/SNAP Advanced User Workshop | 📍 Potomac, MD |
| 2011 | ● Burnup Credit Workshop
Oak Ridge National Laboratory | 📍 Knoxville, TN |
| 2011 | ● Shielding Analysis Using SCALE/MAVRIC | 📍 Rockville, MD |
| 2010 | ● HTGR Training Course | 📍 Rockville, MD |
| 2010 | ● TRACE/SNAP Computer Code Workshop | 📍 Potomac, MD |
| 2009 | ● SCALE Training Using ORIGEN-ARP/TRITON | 📍 Bethesda, MD |
| 2009 | ● OECD/NEA Workshop on Future Criticality Safety Research Needs | 📍 Pocatello, ID |
| 2009 | ● SCALE Training Using TSUNAMI/TSURFER/TSAR | 📍 Rockville, MD |
| 2009 | ● International OECD Halden Reactor Project Summer School | 📍 Halden, Norway |
| 2009 | ● FRAPCON/FRAPTRAN Fuel Performance Code Training | 📍 Richland, WA |

SELECTED PUBLICATIONS

2019

- **Best-Estimate Plus Uncertainty Analysis for Continuous Energy Monte Carlo Coupled Neutron-Gamma Transport Simulations Through a 3-Loop Westinghouse PWR Concrete Biological Shield Wall⁵**

- Simulation models based on previous neutron/photon transport code benchmarking study.
- UQ studies to identify best methods to use with the FAVOR-DAKOTA code coupling project (e.g., LHS, PCE, PBA).
- Authored FAVOR-DAKOTA UQ analysis tool to allow for inclusion of additional uncertainty parameters of interest when performing probabilistic fracture mechanics simulations.
- FAVOR Fortran source code updated to allow running via command-line to allow coupling to DAKOTA.
- The FAVDAKOTA utility was created as a simple user interface to set-up (and launch) all of the necessary files for a successful FAVOR-PFM-DAKOTA run. FAVDAKOTA is currently designed to work with the following DAKOTA UQ method types: 'random', 'lhs', 'wilks', 'pba', 'pce'.

2018

- **The History and the Future of Credibility Assessment Frameworks: from CSAU to EMDAP and Beyond**

Proceedings of the Best Estimate Plus Uncertainty International Conference: Multi-Physics Multi-Scale Simulations with Uncertainty

 Lucca, Italy

- Authored with Josh S. Kaizer.

2018

- **White Paper: Criticality Code Validation of Spent Fuel Pool Criticality Safety Analyses for ATF Fuel System Concepts with Greater Than 5% Enriched Uranium⁶**

2018

- **Draft Safety Evaluation for Topical Report 3002010613, "Benchmarks For Qualifying Fuel Reactivity Depletion Uncertainty—Revision 1" and Topical Report 3002010614, "Utilization Of the EPRI Depletion Benchmarks for Burnup Credit Validation—Revision 1"**⁷

U.S. NRC ADAMS

- Authored *Meta-analysis of k-effective uncertainty for the depleted fuel state in a spent fuel pool*⁸, which informed draft safety evaluation report for EPRI's depletion uncertainty benchmarking project – a cornerstone of the NEI 12-16 industry-wide criticality safety guidance document focused largely on UQ.

2017

- **Neutron Fluence Monitoring for Subsequent License Renewal**

Proceedings of the 16th International Symposium on Reactor Dosimetry

 Sante Fe, NM

- Authored with Joel Risner, Ben Parks, and Matthew Hardgrove.

- 2015 ● **Case Studies Examining Spent Fuel Pool Criticality Uncertainty Analysis⁹**
 - Authored with Scott T. Krepel.
 - Shiny web app: *NCS Database Explorer*¹⁰.
- 2014 ● **Mitigation Potential of Higher Burnup Fuel in Spent Fuel Pools with Uniform Neutron Absorber Degradation¹¹**

Transactions of the American Nuclear Society, Vol. 111  Anaheim, CA
- 2014 ● **Spent Fuel Pool K-Effective Sensitivity to Uniform Neutron Absorber Degradation¹²**

Transactions of the American Nuclear Society, Vol. 111  Anaheim, CA

 - Shiny web app: *Map of Absorber Degradation Sensitivity*¹³.
 - Python script: *MADS*¹⁴.
 - Presentation: *Spent Fuel Pool Neutron Absorber Degradation, K-effective Sensitivity Studies*¹⁵.
- 2014 ● **pySTATS¹⁶**
 - An alternative to the USLSTATS utility packaged with SCALE.
- 2012 ● **Benchmark on Sensitivity Calculation (Phase III)**

Proceedings of PHYSOR 2012: Advances in Reactor Physics Linking Research, Industry, and Education  Knoxville, TN

 - Authored with Tatiana Ivanova et al.
 - Served as the U.S. NRC representative for an international benchmarking effort.
- 2010 ● **Development of an Efficient PENTRAN Model for Neutron Flux Simulation of the UFTR Shield Tank**

Proceedings of PHYSOR 2010  Pittsburgh, PA

 - Authored with Alireza Haghigat.

LINKS

- 1: https://ufdcimages.uflib.ufl.edu/UF/E0/02/41/61/00001/patel_a.pdf
- 2: <https://amritpatel.rbind.io/2020/03/29/running-economy-over-time/>
- 3: <https://amritpatel.rbind.io/2020/06/13/heat-training/>
- 4: <https://docs.google.com/presentation/d/18yaVKH1WApXcDlrla8hb9TCawl8jboz3hXPtMKuil/edit?usp=sharing>
- 5: https://drive.google.com/file/d/1-cIEqtOP1CM5wKIWCEYyA4HN8_XPwtEO/view
- 6: <https://drive.google.com/file/d/1D6qGyT7cloLOC-WNFoycF1btfLH3iTnk/view>
- 7: <https://www.nrc.gov/docs/ML1812/ML18121A245.pdf>
- 8: <https://www.nrc.gov/docs/ML1614/ML16146A035.pdf>
- 9: <https://drive.google.com/file/d/1Mk2FtbDEVOLJYZabJTlzmUGijsxGC4Js/view>
- 10: <https://amritpatel.shinyapps.io/NCSdatabase/>

- 11: https://drive.google.com/open?id=1p3g8_--pXmNRefV8SXTtmvOn7G4Z3Yy6
- 12: <https://drive.google.com/open?id=1IU5Cpsr3dqOWDgJoE6eTrRWBeV3IrxFB>
- 13: <https://amritpatel.shinyapps.io/MADS/>
- 14: <https://github.com/AmritPatel/MADS>
- 15: <http://amritpatel.github.io/MADS/slides/mads.html>
- 16: <https://amritpatel.github.io/pySTATS/>