Seungmin KWAK

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RESEARCH INTERSTS

- Technoeconomic analysis of Large LWRs and SMRs (ex. APR1400, AP1000, NuScale, BWRX-300, SMART)
- Financing decision making of Nuclear Projects based on Building Information Modeling (BIM) method
- Solving Optimization Problems with Artificial Intelligence
- High Temperature Oxidation behavior of Zircaloy-based cladding materials
- Accident Tolerant Fuel (ATF)

EDUCATION

Sep. 2024 – Aug. 2025 (Expected) **SEOUL NATIONAL UNIVERSITY** **Seoul, Korea**

M.S., Nuclear Engineering

- GPA Cumulative: 4.02/4.30
- Advisor: Prof. Youho Lee
- *SNU Tomorrow's Engineers Membership (STEM)* Honor Society

Mar. 2018 – Aug. 2023 **SEOUL NATIONAL UNIVERSITY** **Seoul, Korea**

B.S., Nuclear Engineering

- *Cum Laude;* GPA Cumulative: 3.76/4.30. Nuclear Engineering GPA: 4.02/4.30
- Advisor: Prof. Youho Lee
- Thesis: "Exploring steam oxidation hysteresis of Zirconium based alloy cladding materials at 850-1350°C"
- *Best Paper Award* for the undergraduate thesis presentation
- *SNU Tomorrow's Engineers Membership (STEM)* Honor Society
- *Presidential Science Scholarship, Physics (Full Scholarship)*

RESEARCH EXPERIENCES

Jul. 2023 – *present* **Assessing economic impact of LEU+ deployment in *i*-SMR reactor**

- Estimating impact of LEU+ fuel deployment on fuel cycle cost of *i*-SMR design

Jul. 2023 – *present* **Building BIM-based construction schedule & cash flow estimator**

- Built nuclear construction process database in collaboration with KHNP
- Database employs design, work breakdown structure, and productivity
- Compared construction process of Korea and U.S., apple-to-apple, at a daily construction work level, for the first time
- Made BIM-based Construction schedule estimation tool and is currently applicable to AP1000, APR1400, NuScale, SMART-100, and BWRX-300 designs
- Working on incorporating Cost data for Cash Flow Simulation

Apr. 2022 – Jul.2023 **Revisiting resiliency of Nuclear Plant Licensing after accidents**

- Revisited historical licensing duration of USA, S. Korea, Japan and France
- Evaluated resiliency of licensing process after severe accidents

Feb. 2022 – Feb. 2024 **Exploring steam oxidation behavior of Nuclear Fuel Cladding materials**

- Experimentally demonstrated "anomalous oxidation" behavior of Zircaloy
- Offered a quantitative explanation of "anomalous oxidation" behavior of Zircaloy
- Developed a mechanistic code modeling oxidation hysteresis

PUBLICATIONS

Seungmin Kwak, Youho Lee, Will be mainly about *"Lessons learned from the comparative study of recent nuclear plant construction cases: AP1000 and APR1400" (Working on manuscript)*

Seungmin Kwak, Youho Lee, Will be about *"Exploring steam oxidation hysteresis of Zirconium based alloy cladding materials" (Working on manuscript)*

CONFERENCES

- **Seungmin Kwak**, Youho Lee*, *"Comparison of AP1000 and APR1400 construction processes and its implications for SMR deployment"*, International Congress on Advances in Nuclear Power Plants (ICAPP), Las Vegas, United States, Oral Presentation *(Jun 2024)*

- **Seungmin Kwak**, Youho Lee*, *"Comparison of APR1400 and AP1000 construction: What brought such big differences?",* Korean Nuclear Society Spring Meeting, Jeju, S.Korea, Oral Presentation *(May 2024)*

- **Seungmin Kwak**, Youho Lee*, *"Exploring steam oxidation hysteresis of Zr-Nb cladding materials"*, 6th Asian Zirconium Workshop, Tokyo, Japan, Oral Presentation *(Feb 2024)*

AWARDS & HONORS

Oct. 2022 - *present* — ***SNU Tomorrow's Engineers Membership* (STEM) Honor Society**
Selected as a member of Department of Engineering Honor Society
- Hosted annual science talks sharing personal stories on choosing the major
- Hosted semi-annual conference with Honor Society of College of Natural Sciences
- Participated bi-weekly academic presentation session

Aug. 2023 — **Best Paper Award**
Undergraduate Thesis Presentation

Jun. 2018 – Aug. 2023 — **Presidential Science Scholarship (Physics)**
President of the Republic of Korea
- One of the 25 recipients nationwide
- Fully funded by Korean Government during Bachelor's degree

Dec. 2022 — **Minister of Unification Award**
2nd place in Nationwide Unification research paper competition
- Offered energy cooperation scenario between South and North Korea involving nuclear energy and coal resources

May. 2022 — **President of Korean Nuclear Society (KNS) Award**
1st Place in KNS Spring Meeting, Student Session

Dec. 2021 — **Minister of Trade, Industry and Energy Award**
1st Place in Nationwide Innovative Nuclear Idea Presentation Competition
- Presented about producing the most economic hydrogen, by utilizing microreactors and wind generation at North Sea

Jun. 2021 — **U.S. Army Commendation Medal**
Commanding General, U.S. Eighth Army
- Winner of General Paik, Sun-Yup Leadership Board

TEACHING EXPERIENCE

Nov. 2024 – Jun. 2024 — ***Teaching Assistant,*** Introduction to Nuclear Engineering (Prof. Youho Lee); 54 students; grade

EXTRACURRICULAR ACTIVITIES

Mar. 2020 – Sep. 2021	**Sergeant,** 21st Military Police DET (CID), Camp Casey • Obligatory Military Service
Dec. 2018 – Nov. 2019	**Vice President,** Department of Nuclear Engineering Student representative • Led student movement against Nuclear Phase out policy

SKILL SETS

Programming	• C • Python • MATLAB
3D Modeling	• AutoCAD (Autodesk) • REVIT (Autodesk) • ArchiCAD (Graphisoft) • Vectorworks (Nemetscheck)
Construction Scheduling & Financing	• NAVISWORKS (Autodesk) • Synchro Pro (Bentley) • BEXEL manager
Experimental	• TGA (Thermo-Gravimetric Analysis) • DSC (Differential Scanning Calorimetry) • Steam Oxidation Facility (for nuclear fuel cladding materials)