

SULGIYE PARK

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POSITIONS

Research Scholar, Stanford University (September 2025—present)

Center for International Security and Cooperation

Senior Scientist, Union of Concerned Scientists (January 2023—June 2025)

Global Security Program

Research Scientist, Stanford University (August 2022—January 2023)

Stanford Doerr School of Sustainability

MacArthur Fellow, Stanford University (November 2021—July 2022)

Center for International Security and Cooperation

Stanton Nuclear Security Fellow, Stanford University (September 2020—June 2021)

Center for International Security and Cooperation

Postdoctoral Research Scientist, Stanford University (July 2018—August 2020)

Stanford Institute for Materials and Energy Sciences, Geological Sciences

EDUCATION

Ph.D., Stanford University (September 2013—June 2018)

Geological and Environmental Sciences

Thesis Title: Response of Lanthanide Ternary Oxides to Swift Heavy Ion Irradiation and High Pressure

Advisors: Rodney C. Ewing & Wendy L. Mao

B.S., University of Michigan (September 2008—August 2012)

Recipient of Bachelor's Degree Distinction, Highest Honors

Major 1: Geological Sciences; Programs in the Environment

Minor: Global Change

GRANTS, AWARDS, HONORS

- Human Artificial Intelligence (2025) – Enhancing Nuclear Proliferation Detection through Integrated Multi-Sensor Satellite Imagery (grant amount: \$75,000)
- Stanton Foundation Grant (2023) – Rethinking China's Military Power: examining China's nuclear program within the Framework of Military and Energy Security (grant amount: \$90,000)
- Jamieson Award (2021) – Recognized young scientist for outstanding achievement in high-pressure research
- Best Poster Award - 5th High Power Laser Workshop (2017) –hosted by SLAC/LCLS
- Harriet Benson Fellowship Award (2017)
- Shell Fund (2015,2016)
- McGee Levorsen Scholarship (2015,2016)
- Graham Scholars Field Experience Award (2012)
- Bachelor's Degree Distinction: Highest Honors (2012)
- Geology Fellowship for Academic Excellence (2012)
- Undergraduate Academic Excellence Award (2012)
- Programs in the Environment Fellowship (2011)
- Programs in the Environment Honor's Thesis Scholarship (2011)

PROFESSIONAL ACTIVITIES AND MEMBERSHIP

- Board Member, [Pacific Century Institute](#), Spring 2023-Present

- Member, [Mid-Career Cadre](#), Project on Nuclear Issues, Summer 2024-Present

TEACHING

- **INTPOL 256/EPS 193:** Technology and National Security (Fall 2025, 2026 Stanford University)
- **INTLPOL 296:** Strategic Technologies and Emerging Challenges (Winter 2025 Stanford University)
- **IIS 198, 199:** Interschool Honors Program in International Security Studies (2025, 2026 Stanford University)

PUBLICATIONS

Manuscripts under review:

- **Sulgiye Park**, Ayazhan Muratbek, Andrii Tuz, Allison Puccioni, Rose Gottemoeller. Nuclear Safety Monitoring Under Restricted Access: A Remote Sensing and OSINT Approach to the Zaporizhzhia Nuclear Power Plant. (in review: *Remote Sensing and Applications: Society and Environment*)
- **Sulgiye Park**, Yanliang Pan, Qiqi Chen, Selena Sun, Allison Puccioni. Catching Proliferation at the Fence: Vision Language Models for Detecting Nuclear Infrastructure (in review: *Remote Sensing*)

Accepted/published articles:

- Yanyao Zhang, **Sulgiye Park**, Shengcai Zhu *et al.*, Stishovite formation from α -quartz under laser shock compression. (Accepted at *Communication Materials*, 2026)
- Minkyung Han, Anna Celesta...**Sulgiye Park et al.**, Ultrafast X-ray Pump-Probe Investigation of the Formation Dynamics of SiV Centers in Diamond. *Journal of American Chemical Society*. (2026). <https://doi.org/10.1021/jacs.6c05691>
- Naseem Akhtar, Aznan Fazli Ismail... **Sulgiye Park**. Evaluating environmental impacts of thorium extraction: A comparative study of solvent and electrosorption technologies using life cycle assessment (LCA). *Cleaner Engineering and Technology*, 26, 100960. (2025).
- **Sulgiye Park**. Why Russia's designs on North Korean rare-earth metals probably won't pan out. *NK Pro*. July 8, 2024. <https://www.nknews.org/pro/why-russias-designs-on-north-korean-rare-earth-metals-probably-wont-pan-out/>
- **Sulgiye Park**. "[Is Russia Helping China Expand its Nuclear Weapons Program?](#)" *The Equation*, September 19, 2024
- **Sulgiye Park**. "[How Have Nuclear Weapons Evolved Since Oppenheimer and the Trinity Test?](#)" *The Equation*, August 4, 2023
- **Sulgiye Park**. "[Why Would North Korea Conduct Another Nuclear Test?](#)" *The Equation*, April 6, 2023
- **Sulgiye Park** & Rodney C. Ewing. Environmental Impacts of Underground Nuclear Weapons Testing. *The Bulletin of Atomic Scientist*. 80(2): 102-111 (2024).
- **Sulgiye Park** & Allison Puccioni. North Korea's Pursuit of an ELWR: Potential Power in Nuclear Ambitions? *38 North*. January 24, 2024. <https://www.38north.org/2024/01/north-koreas-pursuit-of-an-elwr-potential-power-in-nuclear-ambitions/>
- Yue Xia, **Sulgiye Park**, Jing Zhang, Pengcheng Mu, LongCheng Liu, Hiroshi Watabe, Rodney C Ewing, Dongyan Yang, Yuhong Li. The local-structure and radiation resistance of Ln_3TaO_7 (Ln = Y, Sm, Gd). *Journal of Alloys and Compounds*. 1010. 17708 (2024).
- Ta Tang, **Sulgiye Park**, Thomas Devereaux, Chunjing Jia, Yu Lin. Molecular Geometry Specific Monte

Carlo Simulation of the Efficacy of Diamond Crystal Formation from Diamondoids. *Communications Chemistry*. 7 194 (2024).

- Yan-Kai Tzeng, Feng Ke, Chunjing Jia, Yayuan Liu, **Sulgiye Park**, Mungo Frost, Xinxin Cai, Wendy Mao, Rodney C. Ewing, Yi Cui, Thomas Devereaux, Yu Lin. Improving the creation of SiV centers in diamond via sub- μ s pulsed annealing treatment. *Nature Communications*. 15 7251 (2024).
- **Sulgiye Park** & Rodney C. Ewing. U.S. Legal and Regulatory Framework for Nuclear Waste from Present and Future Reactors Fuel Cycles. *Annual Review of Environment and Resources*. 48: 716-736 (2023).
- **Sulgiye Park**, Cameron L. Tracy, Rodney C. Ewing. Reimagining US Rare Earth Production. *Resources Policy*. 85. 104022 (2023).
- James Timbie, John Deutch, Rodney C. Ewing, James O. Ellis. Jr., Rajeev Ram, David Fedor, **Sulgiye Park**. Progress on Critical Materials Resilience. Hoover Report. (2023).
- **Sulgiye Park**, Terry P. McNulty, Rodney C. Ewing. Critical metal resources in Democratic People's Republic of Korea. *International Geology Review*. 1-21 (2022).
- **Sulgiye Park**. Allison Puccioni, Rodney C. Ewing. Machine learning improves satellite imagery analysis of North Korean nuclear activity. *The Bulletin of Atomic Scientists*. 78(1): 26-37 (2022).
- Terry McNulty, Nick Hazen, **Sulgiye Park**. Processing the ores of rare earth elements. *MRS Bulletin*. 47: 258-266 (2022).
- Arianna E. Gleason, **Sulgiye Park (co-first author)**, Dylan R. Rittman, Alessandra Ravasio, Falko Langenhorst, Riccardo M. Bolis, Eduardo Granados, Sovannndara Hok, Thomas Kroll, Marcin Sikorski, Tsu-Chien Weng, Hae Ja Lee, Bob Nagler, Thomas Sisson, Zhou Xing, Diling Zhu, Gabriele Giuli, Wendy L. Mao, Siegfried H. Glenzer, Dimosthenis Sokaras, Roberto Alonso-Mori, Ultrafast structural response of shock-compressed plagioclase. *Meteoritics and Planetary Science*. 57: 635-643 (2022).
- Rodney C. Ewing and **Sulgiye Park**. The concept of geological disposal of highly radioactive nuclear waste. in *Encyclopedia of Nuclear Energy*. Elsevier. 588-602. (2021).
- **Sulgiye Park**, Rodney C. Ewing, Terry McNulty, Allison Puccioni. Assessing uranium ore processing activities at Pyongsan, Democratic People's Republic of Korea, using satellite imagery. *Science and Global Security*. 29(3): 111-144 (2021).
- Cameron Tracy, **Sulgiye Park**, Mariia Plevaka, Ekaterina Bogdanova, Daniil Popovich. Opportunities for US-Russian collaboration on the safe disposal of nuclear waste. *The Bulletin of Atomic Scientists*, 77(3): 146-152 (2021).
- **Sulgiye Park**, Allison Puccioni, Cameron L. Tracy, Elliot Serbin, Rodney C. Ewing. Geologic analysis of the Democratic People's Republic of Korea's Uranium Resources and Mines. *Science and Global Security*, 28(2): 89-118 (2020).
- Federico Derby and **Sulgiye Park**. A multi-disciplined approach to identifying uranium deposits and mining activity in North Korea. *Jane's Intelligence Review* Pg. 40. (Oct. 2019).
- Samuel P. Girdzis, Yu Lin, Linn Leppert, Adam H. Slavney, **Sulgiye Park**, Karena W. Chapman, Hemamala I. Karunadasa, Wendy L. Mao. Revealing local disorder in a silver-bismuth halide perovskite upon compression. *J. of Phys. Che. Let.* 12(1): 532-536 (2020).
- **Sulgiye Park**, Iwnetim I. Abate, Jin Liu, Chenxu Wang, Jeremy E.P. Dahl, Robert M.K. Carlson, Liuxiang Yang, Vitali B. Prakapenka, Eran Greenberg, Thomas P. Devereux, Chunjing Jia, Rodney C. Ewing, Wendy L. Mao, Yu Lin. Facile diamond synthesis from lower diamondoids. *Sci. Adv.* 6(8) (2020).

- Claudia E. Reissner, Ulrich Bismayer, Daniel Kern, Michael Reissner, **Sulgiye Park et al.**, Mechanical and structural properties of radiation-damaged allanite-(Ce) and the effect of thermal annealing. *Phys. and Chem. of Min.* 46:92-933 (2019).
- Chenxu Wang, Cameron L. Tracy, **Sulgiye Park**, Jin Liu, Feng Ke, Fuxiang Zhang, Tengfei Yang, Songgin Xia, Congvi Li, Yugang Wang, Yong Zhang, Wendy L. Mao, Rodney C. Ewing. Phase transformations of Al-bearing High-entropy alloys $\text{Al}_x\text{CoCrFeNi}$ ($x = 0, 0.1, 0.3, 0.75, 1.5$) at high pressure. *Applied Physics Letters*. 114(9): 091902 (2019).
- **Sulgiye Park**, Dylan R. Rittman, Cameron L. Tracy, Fuxiang Zhang, Karena Chapman, Changyong Park, Sergey N. Tkachev, Eric O'Quinn, Jacob Shamblin, Maik Lang, Wendy L. Mao, Rodney C. Ewing. A_2TiO_5 ($A = \text{Dy, Gd, Er, and Yb}$) at high pressure. *Inorg. Chem.* 57(4): 2269-2277 (2018).
- **Sulgiye Park**, Cameron L. Tracy, Fuxiang Zhang, Changyong Park, Christina Trautmann, Sergey N. Tkachev, Maik Lang, Wendy Mao, Rodney C. Ewing. Radiation-induced disorder in compressed lanthanide zirconates. *Phys Chem Chem Phys*. 20:6187-6197 (2018).
- Cameron L. Tracy, Chien-Hung Chen, **Sulgiye Park**, M. Lee Davisson, Rodney C. Ewing. Measurement of the UO_2 surface oxidation using grazing-incidence x-ray diffraction: implications for nuclear forensics. *J. Nucl. Mater.* 502: 68-75 (2018).
- Cameron L. Tracy, Maik Lang, Fuxiang Zhang, **Sulgiye Park**, Raul I. Palomares, Rodney C. Ewing. Review of recent experimental results on the behavior of actinide-bearing oxides and related materials in extreme environments. *Prog. Nucl. Energ.* 104:342-358 (2018).
- **Sulgiye Park**, Cameron L. Tracy, Fuxiang Zhang, Changyong Park, Christina Trautmann, Maik Lang, Wendy L. Mao, Rodney C. Ewing. Swift-heavy ion irradiation response and annealing behavior of A_2TiO_5 ($A = \text{Nd, Gd and Yb}$). *J. Sol. State Chem.* 258:108-116 (2017).
- Dylan R. Rittman, Katlyn M. Turner, **Sulgiye Park**, Antonio F. Fuentes, Jinyuan Yan, Wendy L. Mao, Rodney C. Ewing. High pressure behavior of $\text{A}_2\text{B}_2\text{O}_7$ pyrochlore ($A = \text{Eu, Dy; B = Ti, Zr}$). *J. Appl. Phys.* 121:045902 (2017).
- Dylan R. Rittman, **Sulgiye Park**, Cameron L. Tracy, Lei Zhang, Raul I. Palomares, Maik Lang, Alexandra Navrotsky, Wendy L. Mao, Rodney C. Ewing. Structure and bulk modulus of Ln-doped UO_2 ($\text{Ln} = \text{La, Nd}$) at high pressure. *J. Nucl. Mater.* 490:28-33 (2017).
- Dylan R. Rittman, Katlyn M. Turner, **Sulgiye Park**, Antonio F. Fuentes, Changyong Park, Wendy L. Mao, Rodney C. Ewing. Strain engineered pyrochlore at high pressure. *Sci. Rep.* 7: 2236 (2017).
- Chenxu Wang, Tengfei Yang, Chien-Hung Chen, **Sulgiye Park**, Shaoshuai Liu, Yuan Fang, Zhanfeng Yan, Jianming Xue, Jie Zhang, Jingyang Wang. Ion irradiation-induced structural evolution in Ta_4AlN_3 . *Scripta Mater.* 133:19 (2017).
- Cameron L. Tracy, **Sulgiye Park**, Dylan R. Rittman, Steven J. Zinkle, Honbgin Bei, Maik Lang, R. C. Ewing, Wendy L. Mao. Formation of a hexagonal close-packed phase of the high-entropy alloy CrMnFeCoNi at high pressure. *Nat. Comm.* 8:1 (2017).
- Cameron L. Tracy, Maik Lang, Jacob Shamblin, **Sulgiye Park**, Fuxiang Zhang, Christina Trautmann, Rodney C. Ewing. Role of composition, bond covalency, and short-range order in disordering of stannate pyrochlores by swift heavy ion irradiation. *Phys. Rev. B* 94:064102 (2016).
- Fuxiang Zhang, Cameron L. Tracy, Jacob Shamblin, Raul I. Palomares, Maik Lang, **Sulgiye Park**, Changyong Park, Sergey Tkachev, Rodney C. Ewing. Pressure-induced phase transitions of β -type pyrochlore CsTaWO_6 . *RSC Adv.* 6:94287-94298 (2016).
- **Sulgiye Park**, Maik Lang, Cameron L. Tracy, Jiaming Zhang, Fuxiang Zhang, Christina Trautmann, Matias D. Rodriguez, Patrick Kluth, Rodney C. Ewing. Response of $\text{Gd}_2\text{Ti}_2\text{O}_7$ and $\text{La}_2\text{Ti}_2\text{O}_7$ to swift-

heavy ion irradiation and annealing. *Acta Mater.* 93:1-11 (2015).

- **Sulgiye Park**, Maik Lang, Cameron L. Tracy, Fuxiang Zhang, Christina Trautmann, Zhongwu Wang, Rodney C. Ewing. Synchrotron x-ray diffraction analysis of gadolinium and lanthanum titanate oxides irradiated by xenon and tantalum swift heavy ions. *MRS Proceedings*, 1743, (2015). doi:10.1557/opl.2015.205.
- **Sulgiye Park**, Maik Lang, Cameron L. Tracy, Jiaming Zhang, Fuxiang Zhang, Christina Trautmann, Patrick Kluth, Matias D. Rodriguez, Rodney C. Ewing. Swift heavy ion irradiation-induced amorphization of $\text{La}_2\text{Ti}_2\text{O}_7$. *Nucl. Instrum. Meth. B.* 326:145 (2014).

BOOK CHAPTER

- **Park, Sulgiye**. *North Korea's Nuclear Gambit: Balancing Civilian and Military Uses*. Book chapter manuscript (edited volume, details forthcoming).
- **Sulgiye Park**, Yu Lin, Wendy L. Mao. Diamondoids under pressure. *Geophysical Monograph Series. American Geophysical Union: Carbon in Earth's Interior (published by John Wiley & Sons, Inc)*, Chapter 27 (Mar. 2020).

BOOTCAMPS, GUEST LECTURES

- **Open Source Intelligence Bootcamp, Federation of American Scientists and Stanley Center** (Summer 2025, 2026)
- **Public Policy and Nuclear Threats Bootcamp** (Summer 2026)
- **NUCENG/PUBPOL C285: Nuclear Security** (Winter 2025-2026, UC Berkeley)
- **EARTHSYS 144: Fundamentals of Geographic Information Science** (Spring 2024, Stanford University).
Lecture title: *Satellite Imagery for the Detection and Monitoring of Nuclear Weapons*
- **NUCENG 225: The Nuclear Fuel Cycle** (Spring 2024, UC Berkeley).
Lecture title: *Uranium Mining, Environmental Legacy, and Proliferation Issues*
- **EPS 145Q: Nuclear Issues – Energy, Weapons, and the Environment** (Winter 2024, Stanford University).
Lecture title: *Nuclear History, Environmental Legacies of the US Nuclear Program*
- **STS/NSEG/SPIA 528A: Nuclear Proliferation, Safeguards, and Security** (Fall 2023, Virginia Tech).
Lecture title: *North Korea and fissile material production capacity*
- **INTLPOL 247: Verification for 21st century Arms Control Treaties** (Winter 2024, Stanford University)
Lecture title: *Ubiquitous sensing*
- **INTPOL 256/MS&E 193: Technology and National Security** (Autumn 2022, Stanford University)

INVITED PRESENTATIONS

- University of California, Berkeley, Goldman School of Public Policy, 2026: **From Crust to Core, Geological Analysis of Uranium**
- Global Technical Security Talk, MIT, 2024: **North Korea and Fissile Material Production**
- US Strategic Command, 2024: **Status on North Korea's Fissile Material Production**
- Human AI Center, Research Seminar, Stanford University, 2024: **Satellite Imagery for the Detection and Monitoring of Nuclear Weapons: Early Approaches for Automating Imagery Analysis**
- EU Non-Proliferation and Disarmament Consortium, Next Generation Workshop, 2023: **China's nuclear program from energy and military security framework**
- Programs on Nuclear Issues, 2023: **Status on North Korea's fissile materials production**

- Union of Concerned Scientists, 2023: **Multidisciplinary tools to study nuclear fuel cycle**
- Los Alamos National Lab, 2022: **North Korea's nuclear fuel cycle**
- KAIST invited talk 2022: **Research Relevant to Nuclear Materials:** 1) Materials under extreme conditions; 2) Fissile material flow in the DPRK
- AIRAPT invited talk 2021: **Diamondoids to diamond phase transition** (award talk)
- CISAC Research Seminar, Stanford University 2021: **Remote Sensing and North Korea, Beyond the Focus of Nuclear Proliferation + North Korea's Nuclear Fuel Cycle, Multidisciplinary approach and Earth observations over Pyongsan to Yongbyon**
- Deep Carbon Observatory, Center for High-Pressure Science and Technology, 2018: **Diamondoids to diamond phase transition.**
- 5th High Power Laser Workshop at SLAC, 2017: **Direct diamondoids to diamond phase transition** (best poster award).

JOURNAL REFEREED

*Nuclear Instruments and Methods in Physics Research
Section B
Chemistry of Materials
Stanford Science, Technology, Society Journal
Geophysical Research Letters
Royal United Services Institute
Social Science & Humanities*

*Crystals
Chemical Papers
Journal of Applied Physics
Minerals
Earth and Space Science
Environmental Politics
Remote Sensing*