




MINHO KIM

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RESEARCH INTERESTS

- **Geospatial Analysis:** Remote Sensing, Computer Vision, GIScience, Network Science
- **Machine Learning:** Deep Learning, GeoAI, Explainable AI, GraphML
- **Environmental Planning:** Risk & Resilience, Natural Hazards, Sustainable Development

EDUCATION

-  **University of California, Berkeley** Sep 2021 – Present
Ph.D. Environmental Planning
Topic: Data-Driven Planning for Resilience Against Natural Hazard Risks2
Advisors: [Marta Gonzalez](#), [John Radke](#)
-  **Seoul National University** Mar 2017 – Feb 2021
M.S. Civil & Environmental Engineering
Thesis: [Local Climate Zone Classification Using Multi-Scale Convolutional Networks](#)
Advisor: [Yongil Kim](#)
-  **Seoul National University** Sep 2012 – Feb 2017
B.S. Civil & Environmental Engineering
Thesis: North Korea's 4th Nuclear Test Site with Sentinel-1A Data Using DInSAR
Advisor: [Yongil Kim](#)

RESEARCH EXPERIENCE

-  **Graduate Student Researcher (River Lab, Funded by CalTrans)** May 2023 – present
Advisors: [Mathias Kondolf](#), [John Radke](#) *UC Berkeley*
 - Burn severity potential mapping using deep CNN models in *TF/PyTorch* with sub-pixel uncertainty quantification in North California [W4].
 - Post-fire debris flow prediction using ML models from multi-modal geospatial datasets [W3].
 - Network science analysis of post-fire debris flow risk on critical transportation infrastructure
-  **Graduate Student Researcher (HuMNet Lab, Funded by C3.AI)** Jan 2022 – present
Advisor: [Marta Gonzalez](#), Mentor: [Cristobal Pais](#) *UC Berkeley*
 - Trained physics-based, semi-empirical data computed in *R* with ML models (*scikit-learn*, *XGBoost*, *AutoGluon*, *PyTorch*) to integrate into a cellular automata simulator (ported into *C++*) to conduct fire spread simulations at global scales with state-of-the-art accuracy [W2].
 - Built convolutional autoencoders (i.e., semantic segmentation) using *TF & PyTorch* to map surface fuels and vegetation at high spatio-temporal resolution. [C10].
-  **Research Assistant (SPINS-RS Lab)** Mar 2019 – Feb 2021
Advisor: [Yongil Kim](#) *Seoul National University*
 - Urban Remote Sensing: Generated high resolution Local Climate Zone classification maps multi-scale CNNs (~80% accuracy) [C7] and multi-scale, multi-level attention CNNs (~90% accuracy) trained with multitemporal Sentinel-2 images and multi-modal GIS data (vectorized national land cover maps and OpenStreetMap) [P4]. DL models were built in *TF & PyTorch*.
 - Renewable Energy: Predicted photovoltaic power of solar farms with high precision (< 5% Normalized MAE) using large-scale time series of multitemporal geostationary satellite images and multi-source meteorological data (up to 5TB) via ML/DL models *TF*) [C2], [C4], [P3].
 - Image Fusion: Developed a spatiotemporal image fusion model in Matlab to produce disaggregated Landsat-8 thermal images in heterogeneous urban areas [C6].
 - Change Detection/Monitoring: Applied radiometric calibration methods to help detect and monitor wildfire burn scars using change detection results from multitemporal Sentinel-2 and PlanetScope images [C3], [P2].
-  **Undergraduate Research Assistant (SPINS-RS Lab)** Aug 2016 – Feb 2017
Advisor: [Yongil Kim](#) *Seoul National University*

- Analyzed ground deformations in inaccessible, remote areas using dInSAR with Sentinel-1 SAR images.
- Carried out fieldwork and experiments using a ground-based hyperspectral imager to monitor crop health.

📄 **Research Assistant (Lawson Health Research Institute)** **Sep 2011 – Jan 2012**
Advisor: Jeffrey Carson *London, Canada*

- Researched photoacoustic image reconstruction of a line source using multiple regularization percentages with the addition of maximum intensity projection using Matlab.

WORK EXPERIENCE

📄 **Researcher at Institute of Construction & Env. Eng.** **Mar 2021 – Aug 2021**
Advisor: Yongil Kim *Seoul National University*

- Developed high resolution land cover maps of inaccessible areas using a semantic segmentation DL model in TF trained with very high resolution satellite imagery [C8].

📄 **PR Manager** **Mar 2021 – Aug 2021**
Education & Research Program (InfraSPHERE) *Seoul National University*

- Promoted and coordinated the Brain Korea 21 Seminar Series (New Frontiers of InfraSPHERE).
- Designed the main website for Brain Korea InfraspHERE (hosted by Dept. of Civil and Environmental Engineering) and maintained their Youtube channel.

📄 **Lab Manager** **Mar 2021 – Aug 2021**
SPINS-RS Lab *Seoul National University*

- Organized lab's surveying equipment (GPS/GNSS, total stations, etc) and software licenses.

HONORS & AWARDS

ICE-KSCE Master's Thesis Award **July 2021**
 🏆 *Institution of Civil Engineers (UK) & Korean Society of Civil Engineers*

Best Student Paper Award at ISRS2021 **May 2021**
 🏆 *Korean Society of Remote Sensing and Gaia3D*

Environmental Geospatial Data Idea Contest (Excellence Award) **Nov 2020**
 🏆 *Ministry of Environment, South Korea*

SPINS Lab (Outstanding Research Award) **Mar 2020**
 🏆 *Seoul National University*

Student Competition using Meteorological Satellites (Research Award) **Jan 2019**
 🏆 *Korean Meteorological Administration*

SCHOLARSHIPS

Beatrix C. Farrand Memorial Fellowship **May 2023**
 🏆 *UC Berkeley (Dept. of Landscape Architecture & Environmental Planning)*

Robert N. Colwell Memorial Fellowship **Feb 2023**
 🏆 *The American Society for Photogrammetry and Remote Sensing*

Brain Korea 21 Plus Scholarship **2019 – 2021**
 🏆 *National Research Foundation of Korea*

Merit-based Scholarship **2014–2017, 2019**
 🏆 *Seoul National University*

National Scholarship for Science and Engineering **2013 – 2014**
 🏆 *Korea Student Aid Foundation*

SNU Global Scholarship **2012 – 2013**
 🏆 *Seoul National University*

PUBLICATIONS

* indicates equal contribution

Preprints & Working Papers

[W4] **Minho Kim**, Marc Castellnou, John Radke, Marta Gonzalez. *Fire suppression decision-making simulator using network science and computer vision.*

- [W3] **Minho Kim**, John Radke, Marta Gonzalez. *Post-fire debris flow prediction using machine learning in North California*.
- [W2] **Minho Kim**, Cristobal Pais, Marta Gonzalez. *Cell2FireML: An Open-Source Fire Spread Simulation Framework Using Machine Learning*. (**In Review**).
- [W1] Cristobal Pais, **Minho Kim**, Yanyan Xu, John Radke, Marta Gonzalez. *An interdisciplinary data-science approach to managing natural hazards risk*. (**In Review**).

Peer Reviewed Journal Papers

- [P4] **Minho Kim**, Jeong, D. & Kim, Y. (2021). *Local climate zone classification using a multi-scale, multi-level attention network*, ISPRS Journal of Photogrammetry and Remote Sensing, 181, (345-366). (***2022 IF:12.7**)
- [P3] **Minho Kim**, Song, H. & Kim, Y. (2020). *Direct short-term forecast of photovoltaic power through a comparative study between COMS and Himawari-8 meteorological satellite images in a deep neural network*, Remote Sensing, 12(15), (2357).
- [P2] **Minho Kim**, Jung, M. & Kim, Y. (2019). *Histogram matching of Sentinel-2 spectral information to enhance Planetscope imagery for effective wildfire damage assessment*, Korean Journal of Remote Sensing, 35(4), (517-534).
- [P1] Kim, Y., **Minho Kim**, Choi, J. & Kim, Y. (2017). *Image fusion of spectrally nonoverlapping imagery using SPCA and MTF-based filters*, IEEE Geoscience and Remote Sensing Letters, 14(12), (2295-2299).

Conference & Workshop Papers

- [C12] **Minho Kim**, & Gonzalez, M.C. (2024). *Spatial Responsibility of Wildfire Risk Mitigation Using Network Modeling*, Accepted in NetSci 2024. International School and Conference on Network Science, Quebec, Canada, June 16-21, 2024.
- [C11] Yao, X. & **Minho Kim**. (2023). *A Lidar-based Method for 3D Urban Forest Evaluation and Microclimate Assessment, a Case Study in Portland, Oregon, USA*, Accepted in AGU23. American Geophysical Union. Dec 11-25, 2023.
- [C10] **Minho Kim**, Dronova, I. & Radke, J. (2023). *Semantic Segmentation of Enhanced Landform Maps Using High Resolution Satellite Images*, Accepted in IGARSS 2023 IEEE International Geoscience and Remote Sensing Symposium. IEEE. Pasadena, California, US., July 16-21, 2023. (***Attended as Session Chair**)
- [C9] Yao, X. & **Minho Kim** (2023). *Exploratory remote sensing data analysis and clustering of urban vegetation and land surface temperature in Portland, Oregon*, Accepted in IGARSS 2023 IEEE International Geoscience and Remote Sensing Symposium. IEEE. Pasadena, California, US., July 16-21, 2023.
- [C8] **Minho Kim**, Kwak, T., Jung, J. & Kim, Y. (2021). *Mapping inaccessible areas using deep learning based semantic segmentation of VHR satellite images with OpenStreetMap data*, In Proceedings of the 2021 International Symposium of Remote Sensing, Virtual, May 26-28, 2021. (***Awarded Best Student Paper**)
- [C7] **Minho Kim**, Jeong, D., Choi, H. & Kim, Y. (2020). *Developing High Quality Training Samples for Deep Learning Based Local Climate Zone Classification in Korea*, arXiv preprint, Presented at **AI for Earth Sciences Workshop at NeurIPS 2020**, Virtual, [arXiv:2011.01436](https://arxiv.org/abs/2011.01436).
- [C6] **Minho Kim**, Cho, K., Kim, H. & Kim, Y. (2020). *Fusion of High Resolution Land Surface Temperature Using Thermal Sharpened Images from Regression-based Urban Indices*, ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 3, (pp247-254).
- [C5] Song, A., Kim, C., **Minho Kim** & Kim, Y. (2019). *Analysis of Geospatial Technology for Smart City Development: Case Study of South Korea*, In Proceedings of The 1st Tunisian Smart Cities Symposium, Tunisia, 2019.
- [C4] Kim, G., Song, H., Kim, **Minho Kim** & Kim, Y. (2019). *Multimodal Merging of Satellite Imagery with Meteorological and Power Plant Data in Deep Convolutional Neural Network for Short-Term Solar Energy Prediction*, In Proceedings of the 40th Asian Conference on Remote Sensing, Daejeon, South Korea, Oct 14-18, 2019.
- [C3] **Minho Kim** & Kim, Y. (2019). *Integration of Sentinel-2 Spectral Information with High Spatial Resolution Planetscope Imagery for Wildfire Damage Assessment*, In Proceedings of the 40th Asian Conference on Remote Sensing, Daejeon, South Korea, Oct 14-18, 2019.

- [C2] Song, H., Kim, G., **Minho Kim** & Kim, Y. (2019). *Short-Term Forecasting of Photovoltaic Power Integrating Multi-Temporal Meteorological Satellite Imagery in Deep Neural Network*, In 2019 IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC), Macao, (pp1-5).
- [C1] **Minho Kim** & Kim, Y. (2019). *Monitoring the Catastrophic 2018 Mendocino Complex Wildfire Using the Sentinel Constellation*, In Proceedings of the 2019 International Symposium of Remote Sensing, Taiwan, April 14-17, 2019.

Invited Talks & Panels

- [T3] “Exploring Research in the Environmental Field”, UC Berkeley Oct 2021
Berkeley Environmental Economics and Policy Students
- [T2] “Urban Remote Sensing”, Seoul National University April 2020
Guest lecture for graduate course Satellite Image Processing
- [T1] “Urban Remote Sensing”, Seoul National University Jan 2020
2020 Summer Seminar for the Interdisciplinary Program in Landscape Architecture

PATENTS & SOFTWARE

Song, H., Kim, Y., **Minho Kim**, Kim, K. *Convolutional neural networks for short-term photovoltaic forecast using satellite imagery, meteorological data, and power station data*. Patent, South Korea, 2021.

TEACHING

UC Berkeley

Lead Instructor ([Course Link](#))

- GEOG/LDARCH C188: Geographic Information Systems (*Lead Instructor*) Fall 2022
- Teaching Effectiveness: **6.311/7** from **61/169** students (Dept. Average: 6.230/7)

Graduate Student Instructor

- LDARCH/ESPM 289: Applied Remote Sensing Spring 2024
- GEOG/LDARCH C188: Geographic Information Systems Fall 2021

Seoul National University

Teaching Assistant

- 457.542*: Advanced Surveying (*Head TA*) Spring 2021
- 457.205: Introduction to Geospatial Engineering (*Lab Tutor & Head TA*) Spring 2021
- 457.539*: Advanced Remote Sensing: VHR Imagery (*Head TA*) Fall 2020
- 457.402: Remote Sensing (*Lab Tutor & Head TA*) Fall 2020
- 457.544*: Satellite Image Interpretation (*Head TA*) Spring 2020
- Leadership for Civil Engineers (*TA*) Spring 2020
- 457.205: Spatial Informatics and Systems (*Lab Tutor & Head TA*) Spring 2020

*Graduate-level Courses

Mentored Students at UC Berkeley

- [Stella Wing](#) (*BS Conservation and Resource Studies & Minor in Data Science*) Sep 2023 – Present
- [Harrison Raine](#) (*Dual Masters in Environmental Planning & City Planning*) Sep 2023 – Present
- Zeff Fengze Lin (*ME Landscape Design at South China University of Technology*) Jan 2023 – May 2023
- [Weixin Li](#) (*MS Civil & Environmental Engineering*) Sep 2022 – May 2023
- [Xihan Yao](#) (*MLA Environmental Planning*) Sep 2022 – Present
- [Madison Chi](#) (*BS Environmental Science & Minor in Sustainable Design*) Sep 2022 – May 2023

Mentored Students at Seoul National University

- Hyoungwoo Choi (*BS Civil and Environmental Engineering*) Sep 2020 – Feb 2021

SERVICES

Reviewer (Total: 38 reviews)

GISciences & Remote Sensing, Remote Sensing, Geo-Spatial Information Science, European Journal of Remote

Sensing, International Journal of Digital Earth, ISPRS International Journal of Geo-Information, Geocarto International, Applied Sciences, Agronomy, Forecasting

 [Web of Science](#)

Membership

- IEEE Geoscience and Remote Sensing Society 2023
- American Society for Photogrammetry and Remote Sensing 2022
- Korean-American Scientists and Engineers Association 2022
- International Society for Photogrammetry and Remote Sensing Student Consortium 2020
- Korean Society of Civil Engineers 2019

Session Chair (Image Analysis for Land Cover Mapping), IGARSS 2023 July 2023

Ammunition Inspector, Republic of Korea Army May 2017 – Jan 2019

- Recorded ammunition transactions and composed ammunition inventory reports. After working hours, contributed to write-up on pan-sharpening image fusion research using Worldview images [P1].

General Education Peer Tutor, Seoul National University Mar 2016 – June 2016

- Tutored college-level English to undergraduate students for incoming freshmen

Section Editor, [The SNU Quill](#) - SNU's English Press Sep 2013 – June 2015

- SNU campus news section reporter and editor for 9 volumes; responsible for 6-8 journal reporters. Also coordinated English writing/composition workshops and orientations.

SKILLS

GitHub <https://github.com/minhokim93>

Programming Python, C/C++, CMake, Matlab, Javascript (Google Earth Engine), Git, Scripting (Bash), LaTeX

ML/DL Tensorflow, Keras, PyTorch, Scikit-learn, Scikit-image, OpenCV

Remote Sensing ENVI (SARscape), Google Earth Engine (Javascript/geemap), Python (Rasterio/GDAL)

GIS ArcGIS, QGIS, Python (Geopandas, Shapely, Fiona, NetworkX), PostGIS

Languages English (Native), Korean (Native), French (Fluent)

Certification

- Certificate in Teaching and Learning in Higher Education Expected
- Graduate Certificate in Geospatial Information Science and Technology 2022

REFERENCES

Dr. Prof. Marta Gonzalez

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University of California, Berkeley

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Dr. Prof. John Radke

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Dr. Prof. Yongil Kim

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