Minho Kim

Ph.D. Student

Department of Landscape Architecture & Environmental Planning
University of California, Berkeley

mhk@berkeley.edu
Website | Scholar | RG | Twitter | ORCID

Research Interests

`Remote Sensing`, `Machine Learning`, `Network Science`, `Natural Hazards`, `Environmental Planning`

Education

Ph.D. Landscape Architecture & Environmental Planning Sep 2021 – Present
University of California, Berkeley Berkeley, CA
Topic: "Natural Hazard Modeling and Understanding Resilience Using GeoAI and Network Science"
Advisors: Marta Gonzalez, John Radke
Exam Committee: John Radke, Marta Gonzalez, Iryna Dronova, Solomon Hsiang

M.Sc. Civil & Environmental Engineering Mar 2017 – Feb 2021
Seoul National University Seoul, South Korea
Thesis: "Local Climate Zone Classification Using Multi-Scale Convolutional Networks" (Link)
Advisor: Yongil Kim

B.Sc. Civil & Environmental Engineering Sep 2012 – Feb 2017
Seoul National University Seoul, South Korea
Thesis: "Study Analysis of North Korea's 4th Nuclear Test Site with Sentinel-1A Data Using DInSAR Techniques"
Advisor: Yongil Kim

Research Experience

Graduate Student Researcher Berkeley, CA
Landscape Arch. & Env. Planning, *University of California, Berkeley* May 2023 – present
Advisors: John Radke, Mathias Kondolf

- Post-fire soil burn severity prediction using machine learning in Northern California
- Post-fire debris flow prediction using machine learning in Northern California
- Mapping post-fire soil burn severity and debris flow risk to critical transportation infrastructure

Graduate Student Researcher Berkeley, CA
HumNet Lab, *University of California, Berkeley* Jan 2022 – present
Advisor: Marta Gonzalez & Mentor: Cristobal Pais

- Data-driven, machine learning-based fire spread simulation using Cell2Fire (Working Paper [W1])
- High spatio-temporal resolution mapping of fuel and wildfire hazards in the landscape [C1]

Researcher Seoul, South Korea
Institute of Construction & Env. Eng., *Seoul National University* Mar 2021 – Aug 2021

- Developed high resolution land cover maps of inaccessible areas using a deep learning-based semantic segmentation model and very high resolution satellite imagery.

Research Assistant Seoul, South Korea
SPINS-RS Lab, *Seoul National University* Mar 2019 – Feb 2021
Advisor: Yongil Kim

- **Urban Remote Sensing**: Generated high resolution Local Climate Zone classification maps of key cities in South Korea using newly developed multi-scale CNN models with multitemporal Sentinel-2 images and GIS data (national LULC maps and OpenStreetMap).
- **Multi-Disciplinary Research**: Conducted photovoltaic power forecasts of solar farms using large-scale, multitemporal geostationary satellite images and multi-source meteorological data via machine learning and CNN.
- **Data Fusion**: Developed a spatiotemporal fusion model to produce disaggregated Landsat-8 thermal images in heterogeneous urban areas.
- **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.

Research Assistant (Undergraduate Intern) Seoul, South Korea
SPINS-RS Lab, *Seoul National University* Aug 2016 – Feb 2017
Advisor: Yongil Kim

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

Research Assistant (Co-op student) London, Canada
Carson Lab (Medical Imaging), *Lawson Health Research Institute* Sep 2011 – Jan 2012
Advisor: Jeffrey Carson

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

Work Experience

Geospatial Data Consultant Berkeley, California
Investigative Reporting Program, *University of California, Berkeley* Sep 2022 – Present

- Developed and managed geospatial data (multispectral satellite images, nighttime light images, vector data processing) related to deforestation and human activity in Brazil using Google Earth Engine and ArcGIS for J298 OSINT Seminar

PR Manager Seoul, South Korea
Education & Research Program: InfraSPHERE, *Seoul National University* Mar 2021 – Aug 2021

- Promoted and coordinated the BK21 Seminar Series (New Frontiers of InfraSPHERE).
- Designed the main website for BK Infrasphere (hosted by Dept. of Civil and Environmental Engineering) and maintained their Youtube channel.

Lab Manager Seoul, South Korea
SPINS-RS Lab, *Seoul National University* Mar 2021 – Aug 2021

- 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 & 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 Arch. & Env. 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

**Papers reported in reverse chronological order*

Preprints & Working Papers

[W1] **Minho Kim**, Cristobal Pais, Marta Gonzalez. *Towards a global open-source fire spread simulator using machine learning.*

Peer Reviewed Journal Papers

[P1] **Minho Kim**, Jeong, D. & Kim, Y. *Local climate zone classification using a multi-scale, multi-level attention network*, ISPRS Journal of Photogrammetry and Remote Sensing, 181, (345-366).

[P2] **Minho Kim**, Song, H. & Kim, Y. *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).

[P3] **Minho Kim**, Jung, M. & Kim, Y. *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).

[P4] Kim, Y., **Minho Kim**, Choi, J. & Kim, Y. *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

[C1] **Minho Kim**, Dronova, I. & Radke, J. *Semantic Segmentation of Enhanced Landform Maps Using High Resolution Satellite Images*, Accepted in IGARSS 2023 IEEE International Geoscience and Remote Sensing Symposium. IEEE

[C2] Yao, X. & **Minho Kim** *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

[C3] **Minho Kim**, Kwak, T., Jung, J. & Kim, Y. *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.

[C4] **Minho Kim**, Jeong, D., Choi, H. & Kim, Y. *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.

[C5] Song, A., Kim, C., **Minho Kim** & Kim, Y. *Analysis of Geospatial Technology for Smart City Development: Case Study of South Korea*, In Proceedings of The 1st Tunisian Smart Cities Symposium, 2019.

[C6] Kim, G., Song, H., Kim, **Minho Kim** & Kim, Y. *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.

[C7] **Minho Kim** & Kim, Y. *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.

[C8] Song, H., Kim, G., **Minho Kim** & Kim, Y. *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).

[C9] **Minho Kim**, Cho, K., Kim, H. & Kim, Y. *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).

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

Lead Instructor(Course Link) *University of California, Berkeley*

• GEOG/LDARCH C188: Geographic Information Systems (*Lead Instructor*) Sep 2022 – Dec 2022 - Teaching effectiveness: 6.311/7 (Dept. avg: 6.230/7)

Graduate Student Instructor *University of California, Berkeley*

• GEOG/LDARCH C188: Geographic Information Systems (*Lab Tutor & GSI*) Sep 2021 – Dec 2021

Teaching Assistant *Seoul National University*

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

*Graduate-level Courses

List of Mentored Students

- Zeff Fengze Lin (ME in Landscape Design, South China University of Technology) (Jan 2023 - May 2023) ***Through the BISP Program at UC Berkeley*
- Weixin Li (MS Civil & Environmental Engineering, UC Berkeley) (Sep 2022 - May 2023) **Current: Data Consultant*
- Xihan Yao (MLA Environmental Planning, UC Berkeley) (Sep 2022 - May 2023)
- Madison Chi (BS Environmental Science & Minor in Sustainable Design, UC Berkeley) (Fall 2022 - May 2023) **Current: MS Environmental Health Sciences at UCLA*

Services

Reviewer (Total: 33 reviews for 11 publications)
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

Ammunition Inspector Pocheon, South Korea
Republic of Korea Army May 2017 – Jan 2019
- Recorded ammunition transactions and composed ammunition inventory reports using Excel. After working hours, contributed to writeup on pan-sharpening image fusion research using Worldview images.

General Education Peer Tutor Seoul, South Korea
Seoul National University Mar 2016 – June 2016
- Tutored college-level English to undergraduate students for incoming freshmen

Section Editor Seoul, South Korea
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, Matlab, C++, R, LaTeX
Machine Learning	Tensorflow, Keras, Pytorch, Scikit-learn
Remote Sensing	ArcGIS, QGIS, ENVI (SARscape), Google Earth Engine (Javascript)
Fire Modeling	FARSITE/FLAMMAP
Languages	English, Korean, French

References

Dr. Prof. John Radke
Department of Landscape Architecture and Environmental Planning
Department of City and Regional Planning
University of California, Berkeley
412 Wurster Hall #2000
Email: ratt@berkeley.edu

Dr. Prof. Marta Gonzalez
Department of Civil and Environmental Engineering
Department of City and Regional Planning
University of California, Berkeley
406C Wurster Hall
Email: martag@berkeley.edu

Dr. Prof. Yongil Kim
Department of Civil and Environmental Engineering
Seoul National University
Building 35, Room 410 1, Gwanak-ro, Gwanak-gu, Seoul, 08826
E-mail: yik@snu.ac.kr
Tel: +82-2-880-7364