

Seunghyeon Lee (Clay Lee) · CURRICULUM VITAE

Ph.D., expected Aug 2026 · Forest Structure & Remote Sensing & GIS & AI

Landscape & Ecological Planning Lab, Seoul National University, Seoul, Republic of Korea

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RESEARCH INTERESTS

Airborne & spaceborne LiDAR (GEDI) for vertical forest structure · forest typology and stratification · biomass and carbon estimation · urban ecology, green infrastructure, and microclimate · thermal remote sensing · reproducible, code-driven geospatial science.

EDUCATION

Ph.D., Interdisciplinary Program in Landscape Architecture 2022.03 — Aug 2026

Integrated Major in SmartCity Global Convergence · Seoul National University · Landscape & Ecological Planning Lab ·

Advisor: Prof. Youngkeun Song

- Dissertation: “LiDAR-Based Characterization of Vertical Structure and Disturbance in Temperate Forests”
- Committee: Dongkun Lee, Youngryel Ryu (Seoul National Univ.); Hansoo Kim (Gyeonggi Research Institute); Dennis Heejoon Choi (Dankook Univ.); Youngkeun Song (advisor, SNU)

M.A., Landscape Architecture 2020.03 — 2022.02

Integrated Major in SmartCity Global Convergence · Graduate School of Environmental Studies, Seoul National University ·

Advisor: Prof. Youngkeun Song

- Thesis: “Feasibility of Wildlife Detection Using UAV-derived Thermal and True-color Imagery”

B.S., Landscape Architecture 2011.03 — 2017.02

College of Agriculture & Life Sciences, Kyungpook National University, Daegu, Republic of Korea

RESEARCH EXPERIENCE

Visiting Research Intern — Virginia Tech (PI: Prof. Jaeyoung Ha) 2024.07 — 2024.08

Blacksburg, VA, United States · Landscape architecture

Visiting Research Intern — Purdue University, FNR FUSE Lab (PI: Prof. Brady Hardiman) 2023.12 — 2024.02

West Lafayette, IN, United States · Forest structure & LiDAR

Graduate Researcher — Landscape & Ecological Planning Lab, Seoul National University 2020.03 — Present

National R&D and municipal projects on LiDAR forest structure, carbon, and urban ecology

Research Assistant — Architecture & Urban Research Institute (AURI) 2019.08 — 2019.11

Republic of Korea

PEER-REVIEWED PUBLICATIONS

APA 7th. Name in bold = author; † = first author. Impact Factor / quartile shown where available. (SCI then KCI; newest first)

1. Kim, J., Han, S., Yun, J., **Lee, S.**, & Song, Y. (2026). Ecological structures and terrestrial insect diversity across successional stages in abandoned paddy fields. *Agriculture, Ecosystems & Environment*, 399, 110172. <https://doi.org/10.1016/j.agee.2025.110172> · IF 6.4, Q1 (2026)
2. **Lee, S.†**, Ha, U., Lee, H., Choe, H., Kim, H., & Song, Y. (2026). Multi-scale forest typologies using novel vertical layer metrics from airborne LiDAR in temperate mixed forests. *Ecological Indicators*, 185, 114798. <https://doi.org/10.1016/j.ecolind.2026.114798> · IF 7.4, Q1 (2026)

3. Shao, J., Choi, D. H., Liu, J., Tian, X., Thapa, B., **Lee, S.**, Habib, A., & Fei, S. (2026). A three-stage framework for stand-level automated stem volume estimation in temperate forests using Mobile laser scanning. *Remote Sensing of Environment*, 335, 115246. <https://doi.org/10.1016/j.rse.2026.115246> · IF 11.4, Q1 (2026)
4. Yun, J., **Lee, S.**, & Song, Y. (2025). Assessing *Corvus frugilegus* (Rook) habitat preferences through flock-size-specific species distribution modeling using citizen science data. *Global Ecology and Conservation*, 63, e03866. <https://doi.org/10.1016/j.gecco.2025.e03866> · IF 3.4, Q1 (2025)
5. **Lee, S.†**, Song, Y., & Kil, S.-H. (2021). Feasibility Analyses of Real-Time Detection of Wildlife Using UAV-Derived Thermal and RGB Images. *Remote Sensing*, 13(11), 2169. <https://doi.org/10.3390/rs13112169> · IF 5.0, Q1 (2022)
6. **Lee, S.†**, & Song, Y. (2026). Forest-Type and Seasonal Analysis of GEDI-ALS Canopy Height Agreement and GEDI Structural Metrics (FHD, PAI): A Case Study of Forests in Gwacheon-si and Uiwang-si. *Journal of the Korean Society of Environmental Restoration Technology*, 29(2), 21–40. <https://doi.org/10.13087/kosert.2026.29.2.21>
7. **Lee, S.†**, Jang, G., Song, Y., & Kil, S.-H. (2026). Comparing LST Estimation Methods under Matched Spatiotemporal Conditions in Low- and High-Rise Residential Areas: Satellite, Simulation, and UAV Approaches. *Journal of the Korean Society of Environmental Restoration Technology*, 29(2), 41–59. <https://doi.org/10.13087/kosert.2026.29.2.41>
8. Jekal, G., Yang, Y., **Lee, S.**, & Song, Y. (2025). Non-destructive Carbon Storage Estimation of *Salix* Spp community In Wetlands Using LiDAR: A Case Study of Ungok Wetland. *Journal of the Korean Society of Environmental Restoration Technology*, 28(6), 95–105. <https://doi.org/10.13087/kosert.2025.28.6.95>
9. Han, Y.-H., Shin, W.-H., Kim, J.-H., Kim, D.-H., Yun, J.-W., Yi, S.-Y., Kim, Y.-H., **Lee, S.**, & Song, Y. (2024). Diel Activity Patterns of Water Deer (*Hydropotes inermis*) and Wild Boar (*Sus scrofa*) in a Suburban Area Monitored by Long-term Camera-Trapping. *Journal of the Korean Society of Environmental Restoration Technology*, 27(2), 55–65. <https://doi.org/10.13087/kosert.2024.27.2.55>

MANUSCRIPTS UNDER REVIEW

APA 7th. Name in bold = author; † = first author. (5 manuscripts; first-author listed first)

1. **Lee, S.†**, Choi, D. H., Song, Y., & Thorne, J. H. (2026). Spaceborne LiDAR reveals post-fire vertical structural loss in a dense temperate Asian conifer plantation [Manuscript under review]. *Science of Remote Sensing*. · 2026.04
2. **Lee, S.†**, Kim, H., & Song, Y. (2026). Systematic bias in urban-forest vegetation coverage assessment: the influence of topo-edaphic conditions on discrepancies between ALS and field surveys [Revise and resubmit, 1st round]. *Geoscience Letters*. · 2026.06
3. **Lee, S.†**, Kim, Y., Kim, D., Kim, H., & Song, Y. (2026). Bi-temporal ALS assessment of vertical–horizontal forest structures and their association in a temperate urban forest [Revise and resubmit, 2nd round]. *Forest Science and Technology*. · 2026.05
4. Kim, Y., **Lee, S.**, Shin, W., & Song, Y. (2026). Integrating UAV-derived habitat metrics with movement persistence and species distribution models to characterize seasonal habitat use of invasive turtles in urban wetlands [Revise and resubmit, 1st round]. *Global Ecology and Conservation*. · 2026.05
5. Jekal, G., Kim, Y. H., **Lee, S.**, Yun, J. W., Kim, D. Y., & Song, Y. (2026). Monitoring transition-zone dynamics of a *Phragmites communis*–*Suaeda japonica* mosaic from multi-season Sentinel-2 in a coastal wetland [Revise and resubmit, 1st round]. *Journal of Coastal Conservation*. · 2026.02

BOOKS

1. YOZMDOSI collective (**Seunghyeon Lee**, contributing author) (2021). *New Normal City*. Urban Issue. ISBN 9791197343100.

FELLOWSHIPS & FUNDING

Competitive fellowships / scholarships (amounts converted at ₩1,400 = \$1).

Chung Mong-Koo Foundation — OnDream Future Industry Talent Graduate Fellowship (full) (\$25,000)	2022 — 2025
BK21 FOUR — Integrated Major in SmartCity Global Convergence (full) (\$39,285)	2020 — 2025
Ilju Foundation Undergraduate Scholarship, 23rd Scholar (full) (\$10,714)	2015 — 2017
Challenge Scholarship, Kyungpook National University (full) (\$18,571)	2011 — 2013

INVITED TALKS

- **Seunghyeon Lee** (2025). The understanding and applications of thermal sensors. *Guest lecture, SmartCity Industrial Technology Seminar (3 cr.), Seoul National University.*
- **Seunghyeon Lee** (2025). Understanding spatial information and research cases. *Guest lecture, Environmental Conservation & Land Management (3 cr.), Seoul National University.*
- **Seunghyeon Lee** (2024). Remotely sensed smart-city ecological value maps. *NEF (Neocity Empowerment Forum), Orlando, FL.*
- **Seunghyeon Lee** (2024). Invasive species monitoring development and its application. *Asia Week, Fukuoka, Japan.*

CONFERENCE PRESENTATIONS (INTERNATIONAL)

First author / presenter unless marked "team". 10 domestic presentations (KOSERT, KSEE, KILA) available on request.

- **Seunghyeon Lee**, Hansoo Kim, Youngkeun Song (2025). Novel LiDAR indices reveal scale-dependent vertical structure and typologies in a temperate forest. *[Poster] AGU Fall Meeting, New Orleans, US.*
- **Seunghyeon Lee**, Hansoo Kim, Youngkeun Song (2024). Quantifying the number of forest stratification layers of city-scale forest and characterizing by forest types. *[Poster] AGU Fall Meeting, Washington D.C., US.*
- **Seunghyeon Lee**, Hansoo Kim, Youngkeun Song (2024). Canopy layers distribution by forest patch and species at the city-level forest using airborne LiDAR. *[Oral] ICLEE, Kitakyushu, Japan.*
- **Seunghyeon Lee**, Hansoo Kim, Youngkeun Song (2024). Characterizing forest vegetation stratification by forest biotope types using airborne LiDAR. *[Poster] ESA Annual Meeting, Long Beach, CA, US.*
- BK21 SmartCity Team (2024). Smart city & green infrastructure. *[Video, team] CES (Consumer Electronics Show), Las Vegas, NV.*
- Landscape & Ecological Planning Lab (2023). Property-information analysis of Gyeonggi-do Province biotopes. *[Oral, team] JCK Symposium (18th), Kyoto, Japan.*
- **Seunghyeon Lee**, Youngkeun Song (2023). Wildfire-driven forest vegetation height change comparison. *[Poster] JCK Symposium (18th), Kyoto, Japan.*
- **Seunghyeon Lee**, Youngkeun Song (2023). The impacts of fire-induced disturbances on tree height and structure using GEDI-derived variables. *[Poster] ESA Annual Meeting, Portland, OR, US.*
- **Seunghyeon Lee**, Youngkeun Song (2022). Monitoring structural change of fire-induced forest vegetation using GEDI. *[Oral] ICLEE (12th), Online.*
- **Seunghyeon Lee**, Youngkeun Song (2022). Comparison of GEDI and aerial laser scanning datasets according to leaf-on and leaf-off seasons. *[Oral] AGU Fall Meeting, Chicago, IL, US / Online.*
- **Seunghyeon Lee**, Dennis Heejoon Choi, Youngkeun Song (2022). Classification of tree species and forest floor using XGBoost with forest maps, airborne LiDAR, and satellite imagery. *[Video] World Forestry Congress (15th), Seoul, South Korea.*
- **Seunghyeon Lee**, Sung-Ho Kil, Youngkeun Song (2022). Feasibility analyses of real-time detection of wildlife using UAV-derived thermal and RGB images. *[Poster] World Forestry Congress (15th), Seoul, South Korea.*

- **Seunghyeon Lee**, DaeYeol Kim, Dennis Heejoon Choi, Hansoo Kim, Youngkeun Song (2021). Detecting individual broad-leaved trees by a trunk-extraction method using leaf-off airborne LiDAR. [Poster] AGU Fall Meeting, New Orleans, US / Online.

RESEARCH PROJECTS

National R&D and municipal projects (newest first). Budget = total project funding (national R&D).

Janghang National Wetland Restoration — ecosystem monitoring

2025.07 — 2025.11 · Korea Environmental Conservation Institute · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU)

- Led UAV multispectral and LiDAR mapping of the restoration site
- Estimated current carbon stock from UAV LiDAR and predicted future stock from the wetland-park vegetation master plan

→ **Related outputs:** Coastal-wetland multi-season Sentinel-2 monitoring (manuscript under review)

Carbon storage/sink analysis and inventory for Gyeonggi-do by biotope type

2024.06 — 2025.05 · Gyeonggi Research Institute · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU)

- Analyzed province-wide vertical and horizontal forest structure from ALS
 - Estimated forest carbon storage by fusing ALS, airborne hyperspectral, and PlanetScope imagery
- **Related outputs:** Multi-scale forest typologies (Ecological Indicators 2026, first author); post-fire structural loss via spaceborne LiDAR (Science of Remote Sensing, under review); coastal-wetland Phragmites-Suaeda monitoring (Journal of Coastal Conservation, under review); AGU & ESA presentations

Integrated assessment tool for carbon reduction by offset and synergy with ecosystem services

2023.04 — 2027.12 · Korean Ministry of Environment · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU) · \$1.13M (total project)

- Acquired 3-D structure of abandoned-paddy wetlands using drone LiDAR
 - Quantified carbon storage of abandoned paddies and adjacent vegetation
- **Related outputs:** Insect diversity & ecological structure (Agric., Ecosyst. & Environ. 2026); Rook habitat preferences (Global Ecology & Conservation 2025)

Gyeonggi-do biotope property-information analysis

2022.12 — 2023.11 · Gyeonggi Research Institute · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU)

- Developed and quantified a method to analyze vegetation layer structure by forest type
- **Related outputs:** Forest layer-typology metrics (Ecological Indicators 2026); JCK 2023 presentation

Creation, restoration & management technology of carbon-accumulated abandoned-paddy wetland

2022.04 — 2026.12 · Korean Ministry of Environment · **Role: Researcher** · PI: Prof. Bonhak Koo (Sangmyung Univ.) · \$391K (total project)

- Mapped abandoned-paddy sites and built field drone multispectral / LiDAR datasets
- **Related outputs:** Non-destructive carbon storage of Salix spp. (KOSERT 2025); paddy-terrestrialization patent (pending)

Gwacheon-si urban ecological status mapping

2021.09 — 2022.12 · Gyeonggi Research Institute · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU)

- Classified forest types and tree species of Gwacheon-si forests and urban green spaces
 - Analyzed the vertical and horizontal forest structure of Gwacheon-si
- **Related outputs:** Forest-type GEDI-ALS canopy height (KOSERT 2026, first author); systematic ALS-vs-field urban-forest bias (Geoscience Letters, under review); bi-temporal ALS forest-structure assessment (Forest Science & Technology, under review)

Real-time web-based positioning surveillance system for introduced exotic species

2021.04 — 2023.12 · Korean Ministry of Environment · **Role: Project Manager** · PI: Prof. Youngkeun Song (SNU) · \$863K (total project)

- Led the project as managing researcher — scheduling, budget, and research-output management
- Attached GPS trackers to four invasive species (red-eared slider, Formosan sika deer, nutria, raccoon) and built movement datasets
- Built drone multispectral, LiDAR, and hyperspectral imagery of invasive-turtle habitats

- Produced invasive-species control manuals and developed a real-time positioning-tracking platform
→ **Related outputs:** *Invasive-turtle habitat model (manuscript under review, GEC); wildlife-tracker missing-point patent (reg. 2023) and optimal-capture-range patent (pending)*

IT-ET-BT convergence-based distribution and spread models for introduced exotic species

2021.04 — 2023.12 · Korean Ministry of Environment · **Role: Researcher** · PI: Prof. Wanmo Kang (Kookmin Univ.) · \$464K (total project)

- Modeled habitat distribution and spread of invasive turtles from GPS-tracking data using MaxEnt
→ **Related outputs:** *Invasive-turtle MaxEnt distribution model (manuscript under review, GEC)*

Redundancy-based green-infrastructure technology for urban ecosystem challenges

2020.04 — 2022.12 · Korean Ministry of Environment · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU) · \$662K (total project)

- Tracked wild-boar distribution / movement with camera traps and analyzed home range
- Built drone multispectral / LiDAR imagery of wild-boar habitat and performed real-time thermal-UAV tracking
→ **Related outputs:** *Diel activity of water deer & wild boar via long-term camera-trapping (KOSERT 2024); drone thermal/RGB & LiDAR wild-boar habitat datasets*

Monitoring and simulation of climate conditions by spatial type

2020.01 — 2020.08 · The Seoul Institute · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU)

- Acquired and analyzed field measurements of particulate matter and temperature/humidity by urban spatial type
- Ran ENVI-met microclimate simulations and designed green-space planting plans for PM reduction, predicting post-implementation outcomes
→ **Related outputs:** *LST estimation comparison — satellite / simulation / UAV (KOSERT 2026); outdoor thermal-comfort optimization patent (reg. 2022)*

Customized habitat-management technique for urban species

2019.04 — 2022.12 · Korean Ministry of Environment · **Role: Researcher** · PI: Prof. Chan Park (Univ. of Seoul) · \$525K (total project)

- Developed a wildlife-detection method using thermal UAV imagery
→ **Related outputs:** *Real-time UAV thermal/RGB wildlife detection (Remote Sensing 2021, first author); UAV thermal wildlife-detection patent (reg. 2022)*

Assessment scheme and ecosystem-restoration model by degradation type

2018.07 — 2020.12 · Korean Ministry of Environment · **Role: Researcher** · PI: Prof. Youngkeun Song (SNU) · \$257K (total project)

- Performed land-cover classification using satellite imagery

PATENTS (REPUBLIC OF KOREA)

7 registered, 4 pending.

Registered

- System and method for providing a tree-management platform. *Registered 2025.09 · Seunghyeon Lee*
- Method and system for determining wetland vegetation structure using drone LiDAR. *Registered 2025.04 · Seoul National University*
- Image-based roadside-tree information management system and method. *Registered 2024.11 · Seunghyeon Lee*
- Prediction of missing location points of a wildlife GPS tracker by combining in-situ and biological information. *Registered 2023.07 · Seoul National University*
- Self-heating target module for thermal-camera performance testing and precision data acquisition. *Registered 2022.10 · Seoul National University*
- Automated wildlife detection method and device using drone-mounted thermal-camera imagery. *Registered 2022.05 · Seoul National University*
- A method to derive an optimal plan for outdoor thermal-comfort mitigation. *Registered 2022.04 · Seoul National University*

Pending

- Quantitative assessment and automatic classification of wildfire damage using spaceborne LiDAR. *Pending 2025 · Seoul National University & Dankook Univ.*
- Monitoring halophyte distribution from multi-period vegetation indices in coastal wetlands. *Pending 2025 · Seoul National University*
- Determining terrestrialization of abandoned-paddy wetlands using multi-temporal drone LiDAR and stratigraphic volume change. *Pending 2023 · Seoul National University*
- Deriving optimal wildlife-capture range via machine learning by fusing GPS-tracking data and drone footage. *Pending 2023 · Seoul National University*

AWARDS & HONORS

Awards

Best Presentation Award — KOSERT Autumn Meeting (GEDI vs. airborne LiDAR field agreement by vegetation type and season) 2022

Best Presentation Award — KOSERT Spring Meeting (forest layer-structure indices and their correlation with carbon storage) 2025

PROFESSIONAL SERVICE & MEMBERSHIP

Peer reviewer, International Journal of Applied Earth Observation and Geoinformation 2026 – present

Professional memberships

Member, American Geophysical Union (AGU) 2021 – present

Member, Ecological Society of America (ESA) 2021 – present

Member, Korean Society of Environmental Restoration Technology (KOSERT) 2020 – present

Member, Ecological Society of Korea (ESK) 2023 – present

TEACHING EXPERIENCE

2 university courses · 4 online courses (1,000+ students) · 20+ invited lectures and workshops.

University Courses

- Instructor — “Understanding and Application of Spatial Information” (3 credits; 30 students)
Division of Architecture & Urban Design, Incheon National University.
Designed and taught a semester-long undergraduate course (20% lecture / 80% hands-on lab): GIS fundamentals (coordinate systems, vector/raster data models); QGIS labs (data acquisition, editing, spatial analysis, cartographic visualization); and remote sensing — satellite-image preprocessing and spectral-index (e.g., NDVI) analysis, plus UAV imagery.
Term project: public open-data GIS analysis projects and map outputs on urban, architectural, environmental, and ecological topics for the Incheon region. 2024 — 2025

Online Courses (1,000+ students enrolled)

- QGIS Trendy Visualization — Election-Result Mapping 2025
- QGIS Beginner All-in-One Starter Pack (theory & practice) 2024
- QGIS Mapping Visualization A to Z (Vector / Basic) 2023
- QGIS Python Automation 2022

Invited Lectures & Workshops (20+ sessions, 2022 — 2025)

- Hyundai NGV — Understanding GIS & spatial analysis/visualization via DBMS (basic & advanced) 2025
- Korea Water Resources Corp. (K-water) — Q-GIS practice for water-sector professionals 2023 — 2025
- Korea Environment Corporation (K-eco) — Data-analysis expert training program 2024 — 2025
- Seoul Software Academy (SeSAC) — AI Big-Data Analyst course: GIS module 2025
- Chungcheongnam-do Agricultural Research & Extension Services — QGIS disease-spread visualization 2024
- Gyeonggi-do HRD Institute — Data visualization for better reports 2022
- BK21 SmartCity · SNU GSES — WISE-UP urban spatial-data analysis workshop 2024
- SNU Lifelong Education Center — “Map My School Using Public Data” (high-school outreach) 2024

PROFESSIONAL EXPERIENCE

Founder / CEO — TREE:ID (startup) 2023.09 — 2025.03

A web platform for individual-tree detection & mapping — urban-tree inventory, diagnosis, and management. ~\$71,000 startup grant; two patents held as assignee. Republic of Korea

Landscape Architect — SUNJIN Engineering & Architecture Co., Ltd. (full-time) 2017.03 — 2018.11

Seoul, Republic of Korea · landscape and urban-planning practice

Landscape Design Intern — ATLAS Landscape Architecture, China 2016.09 — 2017.02

China · landscape design practice

REFERENCES

Available upon request.



Seunghyeon Lee

Date: 07 July 2026