

Henrikki Tenkanen

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Google Scholar | ResearchGate

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SUMMARY

My research lies at the intersection of Spatial Data Science, Sustainability Science, and GeoAI, with a focus on sustainable mobility, spatial accessibility, and human–environment interactions. I develop computational methods, open-source software, and geospatial data infrastructures that support socially and environmentally sustainable urban and regional planning.

As Assistant Professor of Geoinformation Technology at Aalto University and Director of the GIST Lab, I have secured over €2 million in competitive external funding as PI and Co-PI, and published 45 peer-reviewed articles with more than 5,100 citations.

DEGREES AND HONORARY POSITIONS

12/2017	PhD, University of Helsinki, Department of Geosciences and Geography. <i>"Capturing time in space: Dynamic analysis of accessibility and mobility to support spatial planning with open data and tools."</i> Supervisor: Tuuli Toivonen Examiners: Robert Weibel (opponent), Michael Widener, Tao Cheng
12/2013	MSc, University of Helsinki, Department of Geosciences and Geography. <i>"Geographic knowledge discovery from sparse GPS-data: Revealing spatio-temporal patterns of Amazonian river transports."</i>
11/2011	BSc, University of Helsinki, Department of Geosciences and Geography.

HONORARY POSITIONS

06/2022	Adjunct Professor / Title of Docent in GIScience, University of Helsinki, Faculty of Science.
11/2020	Honorary Research Fellow, University College London, Centre for Advanced Spatial Analysis.

LANGUAGE SKILLS

Finnish: Native	Swedish: Good	Spanish: Fair
English: Excellent	German: Fair	Japanese: Beginner

EMPLOYMENT

CURRENT EMPLOYMENT

09/2020 –	Assistant Professor (Geoinformation Technology), AALTO UNIVERSITY, Department of Built Environment. Current academic career stage: Category B – Senior researcher.
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PREVIOUS WORK EXPERIENCE

01/2020 – 08/2020	Postdoctoral researcher, UNIVERSITY COLLEGE LONDON (UCL), Centre for Advanced Spatial Analysis (CASA).
01/2019 – 12/2019	Postdoctoral researcher, UNIVERSITY COLLEGE LONDON (UCL), Geospatial Analytics and Computing Research Group.
01/2018 – 12/2018	Postdoctoral researcher, UNIVERSITY OF HELSINKI, Department of Geosciences and Geography.

CAREER BREAKS

I have had parental leave for 4 months during 2025–2026.

RESEARCH FUNDING AND GRANTS

Continuous external research funding (since starting at Aalto): 2022-2029.

Number of externally funded projects / grants: 13.

Received research funding: 2 073 500 €

Total budget*: 2 819 500 €

*Total budget includes funding received from the funder and the contribution of the host institution.

Project	Role	Duration	Funder	Received	Total
Geo-R2LLM: Knowledgeable and Interpretable multimodal Geographic Large Language Models Grounded with Reasoning and Retrieval (Grant No. 368679, Consortium)	PI*	2025–2028	ERA-NET CHIST-ERA	446 000 €	637 000 €
Hands-on Geospatial Artificial Intelligence (GeoAI) - Joint online course development	Co-PI	2025–2026	TU Graz (seed funding)	15 000 €	15 000 €
Data-Driven Mobility: Collaborative Tools for Sustainable Transport in Nordic Nations (Grant No. 103221, Consortium)	PI*	2025	Québec - Nordic Council of Ministers	13 000 €	13 000 €
Geoportti RI: New Frontiers (Grant No. 367653, Consortium)	PI* & Deputy director	2025–2029	Research Council of Finland (FIRI)	522 000 €	746 000 €
MAPICO: Mapping commute-related carbon emissions with high spatial resolution using big data and probabilistic approaches (Grant No. 354342)	PI	2023–2027	Research Council of Finland	595 000 €	851 000 €
Location Innovation Hub (EDIH) (Grant No. 944/31/2023, Consortium)	PI*	2023–2025	European Commis- sion	106 000 €	138 000 €
Knowledge discovery and visual analysis for urban mobility data in Helsinki and Munich	PI	2023	Aalto University (seed funding)	8 000 €	8 000 €
Knowledge discovery and visual analysis for urban mobility data in Helsinki and Munich	Co-PI	2023	TU Munich (seed funding)	10 000 €	10 000 €
Threat and risk analysis of open geospatial data of National Land Survey	PI	2022–2023	National Land Survey of Finland	59 000 €	59 000 €
Geo-Python MOOC video production	PI	2023	Maanmittausalan edistämissäätiö	1 500 €	1 500 €
Open Geospatial RI (Geoportti consortium). Aalto PI: Jussi Nikander	Co-PI	2022–2024	Research Council of Finland	98 000 €	141 000 €
Investigating modal equity in urban environments with big data	PI	2019–2020	Finnish Cultural Foundation	100 000 €	100 000 €
Spatio-temporal accessibility and mobility analysis to support spatial planning	PI	2015–2017	DENVI doctoral programme	100 000 €	100 000 €

* Consortium project with multiple PIs – PI at Aalto University.

RESEARCH OUTPUT

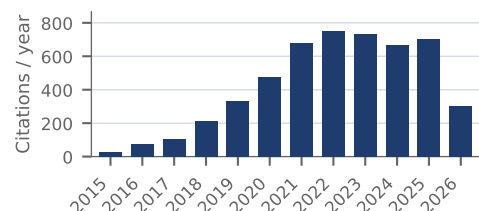
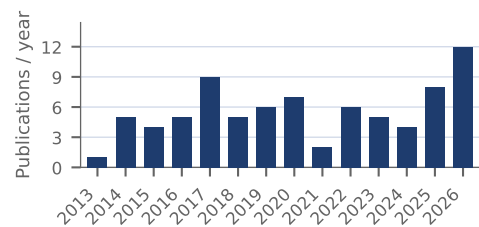
Full list of publications can be found at the end of the CV.

STATISTICS – PUBLISHED WORK

- Total number of peer-reviewed publications: 46 (articles, conference papers and books).
- Number of other scientific publications: 22 (non-refereed articles, software, data).

KEY RESEARCH / CITATION METRICS

- Citations (May 2026): 5 108 (Google Scholar), 3 342 (Scopus).
- h-index: 25 (Google Scholar), 21 (Scopus).
- i10-index: 31.
- Number of co-authors: 99.



SCIENTIFIC FOCUS AREAS

My work develops three connected research lines, each grounded in open and reproducible methods. In 1) *Sustainable mobility and spatial accessibility*, I develop time-sensitive, multimodal accessibility methods, including the Helsinki Region Travel Time Matrix and the *safe-and-just accessibility* framework that integrate social and ecological thresholds to advance equitable and environmentally sustainable urban access. In 2) *human–environment interactions and digital trace data*, I use large-scale digital traces (social media, GPS, mobile phones) to understand how people use and interact with urban and natural environments. In 3) *Spatial data science and GeoAI*, I develop open geospatial methods and GeoAI / LLM approaches for spatial reasoning, including e.g. data quality assessment of global gridded population datasets and OpenStreetMap-grounded LLM evaluation of navigation instructions.

SELECTED PUBLICATIONS

My research work has appeared in leading multidisciplinary journals (e.g. *Nature* and *Nature Communications*), leading GIScience journals (e.g. *International Journal of Geographical Information Science*, *Computers, Environment and Urban Systems*, *Geographical Analysis* and *Transactions in GIS*), and leading journals for urban and transport analysis (e.g. *Transport Reviews*, *Environment and Planning B: Urban Analytics and City Science*, *Sustainable Cities & Society*, *Landscape and Urban Planning*). Of my 46 peer-reviewed publications, 13 have been cited more than 100 times and 4 have exceeded 500 citations (Google Scholar, April 2026), reflecting sustained community impact across GIScience, transport geography, conservation biology, and urban studies.

Below, I highlight selected publications organised by research area, showing how individual contributions connect to each other and to the overarching goal of sustainable, equitable access.

Sustainable Mobility and Spatial Accessibility

- Järv, O., H. Tenkanen, M. Salonen, R. Ahas & T. Toivonen (2018). Dynamic cities: Location-based accessibility modelling as a function of time. *Applied Geography* 95, 101–110.
 - Establishes the methodological foundation for time-sensitive accessibility modelling by integrating dynamic human mobility data, transport networks and service supply. A standard reference in dynamic accessibility modelling.
- Tenkanen, H. & T. Toivonen (2020). Longitudinal spatial dataset on travel times and distances by different travel modes in Helsinki Region. *Scientific Data* 7(77), 1–15.
 - The Helsinki Region Travel Time Matrix: open longitudinal multimodal travel time dataset (walking, cycling, PT, car) at 250-metre resolution for an entire capital region (2013, 2015, 2018). Widely adopted by municipalities, businesses, and researchers.
- Willberg, E., H. Tenkanen, H. Miller, R.H. Pereira & T. Toivonen (2024). Measuring just accessibility within planetary boundaries. *Transport Reviews* 44(1), 140–166.
 - Introduces the safe-and-just space framework for spatial accessibility (socio-ecological accessibility)—the first unified conceptual framework considering both environmental and social sustainability of access simultaneously in the transport geography literature.
- Pönkänen, M., H. Tenkanen & M. Mladenovic (2025). Evaluating the equity of access on a national level with open source tools: Case of Finland. *Computers, Environment and Urban Systems* 116.
 - First national-scale equity audit of spatial access to everyday destinations by transit and cycling—revealing persistent inequalities across Finnish municipalities. Operationalises the equity dimension of the just-accessibility framework at national scale.
- Dey, S., C. Marin Flores & H. Tenkanen (2026). A Methodological Framework for Microscale Mapping of Carbon Emissions from Daily Multimodal Travel: Application to the Helsinki Metropolitan Area. *Sustainable Cities & Society* 140(1).
 - First microscale (200×200 m) mapping of CO₂ emissions from daily multimodal urban travel—operationalising the environmental sustainability dimension of the just-accessibility framework and revealing intra-urban inequalities in transport carbon footprints.
- Marin-Flores, C., L. Ferres & H. Tenkanen (2026). When Proximity Falls Short: Inequalities in Commuting and Accessibility by Public Transport in Santiago, Chile. *Geographical Analysis* 58(2), e70039.
 - Shows that similar commuting times mask deep accessibility inequalities in Santiago between socio-economic groups. Demonstrates that physical proximity is a poor proxy for real accessibility and has direct implications for transport equity policy in the Global South.

Human–Environment Interactions and Digital Trace Data

- Tenkanen, H., Di Minin, E., Heikinheimo, V., et al. (2017). Instagram, Flickr, or Twitter: Assessing the usability of social media data for visitor monitoring in protected areas. *Scientific Reports* 7, 17615.
 - One of the first studies to establish social media platforms as instruments for visitor monitoring in protected areas—providing the methodological foundation for digital trace-data research in human–environment interactions.
- Heikinheimo, V., H. Tenkanen, C. Bergroth, O. Järv, T. Hiippala & T. Toivonen (2020). Understanding the use of urban green spaces from user-generated geographic information. *Landscape and Urban Planning* 201, 1–15.
 - Extends the visitor-monitoring methodology from national parks to everyday urban greenery—providing the first systematic characterisation of *who* uses urban green spaces and *when* using multiple user-generated data sources.

Spatial Data Science and GeoAI

9. Lång-Ritter, J., M. Keskinen & H. Tenkanen (2025). Global gridded population datasets systematically underrepresent rural population. *Nature Communications* 16: 1.
 - First article to systematically assess the quality of global gridded population datasets for rural areas—revealing significant underrepresentation across 300+ locations worldwide, with direct implications for accessibility, health, and humanitarian analyses.
10. Shami, F., S. Dey, N. Van de Weghe & H. Tenkanen (2026). GROKE: Vision-Free Navigation Instruction Evaluation via Graph Reasoning on OpenStreetMap. In *Proceedings of the 64th Annual Meeting of the Association for Computational Linguistics (ACL)*.
 - Introduces the first AI LLM agent-based approach to evaluate navigation instruction quality via graph reasoning over OpenStreetMap without visual input—demonstrating how geospatial graph structures can ground large language model reasoning for spatial tasks.

METHODS, SOFTWARE, AND DATA DEVELOPED

SOFTWARE (SELECTED)

1. Tenkanen, H. (2020–2026). *pyrosm*: OpenStreetMap PBF reader. <https://doi.org/10.5281/zenodo.5561232>.
 - Role: Lead developer.
 - Total downloads: 650 000 | Monthly downloads: 15 000 (Source: Clickpy).
2. Fink, C., Klumpenhouwer, W., Saraiva, M., Pereira, R. & Tenkanen, H. (2022–2026). *r5py*: Rapid Realistic Routing with R5 in Python. <https://doi.org/10.5281/zenodo.7060437>.
 - Role: Core developer.
 - Total downloads: 65 000 | Monthly downloads: 3 000 (Source: Clickpy).
3. Jordahl, K., et al. (2021). *GeoPandas*: Python tools for geographic data. <https://doi.org/10.5281/zenodo.7422493>.
 - Role: (1) Added support for writing GeoDataFrame to PostGIS (see PR #1248); (2) Suggested and prototyped a new feature `sjoin_nearest()` that came part of geopandas in 2021 (see Issue #1096 and PR #1865).
 - Total downloads: 365 million | Monthly downloads: 21 million (Source: Clickpy).
4. Boeing, G., et al. (2018). *OSMnx*: Python for street networks. Retrieve, model, analyze, and visualize street networks and other spatial data from OpenStreetMap. <https://doi.org/10.5281/zenodo.557105>.
 - Role: Created functionality to extract Point of Interest data from OSM (see PR #146).
 - Total downloads: 12 million | Monthly downloads: 631 000 (Source: Clickpy).

Further software contributions: <https://htenkanen.org/software>.

DATA

1. Tenkanen, H., et al. (2015). Helsinki Region Travel CO₂ Matrix. <https://bit.ly/3RoWvSq>
2. Tenkanen, H. & Toivonen, T. (2020). Longitudinal spatial dataset on travel times and distances by different travel modes in Helsinki Region. <https://doi.org/10.5281/zenodo.3247564>
3. Bergroth, C., Järv, O., Tenkanen, H., Manninen, M. & Toivonen, T. (2022). A 24-hour dynamic population distribution dataset based on mobile phone data from Helsinki Metropolitan Area, Finland. <https://doi.org/10.5281/zenodo.6106064>

SUPERVISION AND LEADERSHIP

LEADERSHIP EXPERIENCE

1. Founding Director of GIST Lab, Department of Built Environment, Aalto University. 2020–
My team of 10 researchers (1 senior lecturer, 3 Postdocs, 6 PhD researchers).
2. Group leader, Geoinformatics Research Group (GIS), Department of Built Environment, Aalto University. Led GIS group (4 profs, 2 senior lecturers) during the sabbatical of Prof. Rautiainen. Tasks: Departmental meetings, School Workshops, TT-professorship preparations, Wellbeing. 9/2025–3/2026
3. Deputy director of the Geoportti Research Infrastructure. Geoportti RI is one of the 20 national research infrastructures in Finland. 2025–
4. PI in 11 projects and Co-PI in 2 projects. See "Research funding and grants" for details. 2019–

POSTDOCTORAL SUPERVISION (N=4)

1. Karasov, Oleksandr 2024–
2. Dey, Subhrasankha 2023–
3. Rinne, Tiina 2022–2023
4. Lang-Ritter, Josias 2021–

DOCTORAL SUPERVISION (N=10)

*Main supervisor: 6 ongoing, 0 completed. Co-supervisor: 3 ongoing, 1 completed.
All researchers pursue their PhD at Aalto University unless otherwise stated.*

1. Vallejo, Bryan 2025–
2. Shami, Farzad 2025–
3. Hosseini, Seyed 2025–
4. Kankaanpää, Laura. *Co-supervisor* 2025–
5. Turunen, Ville. *Co-supervisor* 2025–
Tampere University
6. Modjrian, Newsha 2023–
7. Marin Flores, César 2023–
8. Koski, Christian. Stakeholder perceptions of digitalisation and automation in geospatial planning and data production workflows. 2022–2026
9. Jama, Teemu. *Co-supervisor*. Zoning for Zero: Climate impacts of zoning plans in a Nordic context. 2021–2026
10. Willberg, Elias. *Co-supervisor*. Measuring sustainable accessibility: Geospatial approaches toward integrating people and the environment. 2018–2023
University of Helsinki

MSC SUPERVISION (N=37)

5 ongoing, 26 completed at Aalto University, and 6 completed prior to joining Aalto. Thesis topics spanned accessibility and sustainable mobility (n=13), GIS methods, data integration and AI (n=13), carbon emissions and environmental modelling (n=5), and urban analytics and population dynamics (n=2). Per-student details are omitted from the public CV; the full list is available on request.

BSC STUDENT SUPERVISION (N=7)

7 completed BSc theses supervised, plus additional academic advising of BSc students. Per-student details available on request.

MENTORING AND HOSTING INTERNATIONAL VISITING SCHOLARS (N=5)

Hosted 5 visiting scholars at GIST Lab (Aalto University) for stays ranging from 10 days to 6 months. Visitors came from: UK, Estonia, France.

TEACHING MERITS

TEACHING EXPERIENCE IN GENERAL

I have 10 years of teaching experience at the university level. I started developing and teaching my own course (Automating GIS Processes) already during the first year of my PhD studies (2014). I have taught at BSc, MSc and PhD level, as well as further education (CSC Finland, workshops at UCL, GIScience conference). I have been the responsible teacher on 7 MSc/PhD level courses and have taught at altogether 20 different courses including both national and international teaching (Germany, UK).

LEADERSHIP

1. Deputy Director of the MSc programme of Geoinformatics, Department of Built Environment. In this role, I i) initiated the GISwap studies collaboration between Aalto and University of Helsinki, creating a shared 50 ECTS course pool; ii) established a student exchange agreement between Aalto University and University of Glasgow (2027–). Aalto University
2021–2022, 2025–

PEDAGOGICAL AND LEADERSHIP TRAINING

27 ECTS of University pedagogy courses:

1. Breakdowns and breakthroughs in communication (2 ECTS). Aalto University
2020
 2. AI Peda Intro (5 ECTS). Aalto University
2021
 3. Learning and teaching in higher education (5 ECTS). Aalto University
2021
 4. Course design (5 ECTS). Aalto University
2021
 5. Sustainability in Teaching (3 ECTS). Aalto University
2022
 6. Teaching practice (5 ECTS). Aalto University
2023
 7. Doctoral Supervision (3 ECTS). Aalto University
2024
 8. Versatile assessment for learning (2 ECTS). Aalto University
2026
- Leadership training:
9. New Aalto Manager Program (including 360° assessment). Aalto University
2025

DEVELOPMENT OF STUDY PROGRAMMES

1. Renewal of MSc programme of Geoinformatics, Department of Built Environment. Aalto University
2021–2024
2. Participated in planning the MSc programme in Geography / Geoinformatics. University of Helsinki
2017

DEVELOPMENT OF COURSES (N=10)

1. Hands-on Geographical Artificial Intelligence (3 ECTS). Joint course with TU Graz. Openly available online at handson-geoai.readthedocs.io. Aalto University & TU Graz
2026–
2. Location & AI: Deep dive into practical solutions. Location Innovation Academy. Openly available online at academy.ogc.org. Open Geospatial Consortium
2025–
3. GIS-E1130 Introduction to Spatial Data Analysis (6 ECTS). Openly available online at introsda.readthedocs.io. Aalto University
2024–
4. GIS-E4040 Spatial Data Science for Sustainable Development (5 ECTS). Openly available online at sustainability-gis.readthedocs.io. Aalto University
2021–
5. GIS-E1060 Spatial Analytics (5 ECTS). Openly available online at spatial-analytics.readthedocs.io. Aalto University
2021–2023
6. Geospatial Challenge Camp Finland (5 ECTS). Openly available online at challenge-camp.geoportti.fi. Aalto / University of Turku
2023–
7. GEOG-329-2 Automating GIS Processes (5 ECTS). Creator and responsible teacher 2014–2018. Openly available online at autogis-site.readthedocs.io. University of Helsinki
2014–2020
8. GEOG-329-1 Geo-Python (5 ECTS). Creator and responsible teacher 2014–2018. Openly available online at geo-python-site.readthedocs.io. University of Helsinki
2015–2020
9. Spatial Data Science for Sustainable Mobility (1–2 ECTS). ERASMUS+ special course. Openly available online at sumogis.readthedocs.io. University of Augsburg + TU Munich
2022–
10. Introduction to Python GIS (2 ECTS). Further education, CSC Finland. Openly available online at automating-gis-processes.github.io/CSC/. CSC Finland
2018

DEVELOPMENT OF EDUCATIONAL WORKSHOPS (N=4)

1. [Mobility data and network analysis tools for understanding sustainable mobility](#), PhD School workshop, Mobile Tartu 2024, 11-12 June. Tartu, Estonia
2024
2. [Python for Geospatial data and analytics, "Utilizing Urban Digital Twin in Smart City Context"](#), FinEst PhD School -workshop, 25 January. Tallinn, Estonia
2023
3. [Open tools for large-scale spatial accessibility analysis in Python and R -workshop](#). Centre for Advanced Spatial Analysis (CASA), University College London, 2 December. London, UK
2022
4. [Spatio-temporal and multimodal transport network analysis with Python](#), Digital Geography Lab, University of Helsinki, 10 January. Helsinki
2020

DEVELOPMENT OF TEXTBOOKS AND ONLINE LEARNING MATERIALS

1. [Pythongis.org – Introduction to Python for Geographic Data Analysis \(2025\)](#). An open textbook and learning environment including tutorials, exercises and a cost-free cloud computing environment. Openly available online.
2. 10 open websites including educational materials, tutorials and exercises to learn geospatial analysis and modelling.

FUNDING RECEIVED FOR THE DEVELOPMENT OF TEACHING

1. [Hands-on Geographical Artificial Intelligence](#). 15 000 € (seed funding). A project with TU Graz (with Prof. Ivan Majic) to develop a joint course on GeoAI TU Graz
2025–2026
2. [Geoportti RI: New Frontiers project](#). Part of the funding is used to organize the Geospatial Challenge Camp which is an innovation service and challenge based learning course targeted for junior researchers Research Council of Finland
2025–2029
3. [Geo-Python Massive Open Online Course \(MOOC\)](#). 1 500 €. Funding used to hire an assistant for video production. The MOOC is developed as a collaboration between David Whipp (University of Helsinki) and me Maanmittausalan edistämissäätiö
2023
4. [Geoportti RI 2.0](#). Part of the funding is targeted at advancing open educational materials for GIS; one work package is dedicated to this. We are developing online teaching tutorials for QGIS Research Council of Finland
2022–2024
5. [Location Innovation Hub](#). Part of the funding is targeted at creating educational activities for Finnish stakeholders in business, public sector and academia European Commission
2023–2025

PEDAGOGICAL COMMITTEES

Member of the Teaching Competence Assessment Committee (TCAC) at the School of Engineering, Aalto University (2023–).

AWARDS AND HONOURS

1. ENG Publication award for the scientific article of the year at School of Engineering – Lang-Ritter, J., M. Keskinen & H. Tenkanen. (2025). *Nature Communications*. Aalto University
2026
2. Zephyr Foundation's Impactful Research Award for the R5 Ecosystem: travel analysis research contributing to the public good. Zephyr Foundation, USA
2025
3. European Digital Innovation Hubs (EDIH) Network Success Stories – Geospatial Challenge Camp: Pioneering Health and Well-being with Young Innovators in the Location Intelligence industry. EDIH Network, EU
2024
4. Honorary Research Fellow, The Bartlett Centre for Advanced Spatial Analysis (CASA). UCL, London
2020
5. ProGIS association of Finland thesis prize for the best PhD thesis. ProGIS, Finland
2018
6. Best paper / talk at the DENVI Annual Meeting, University of Helsinki. Helsinki, Finland
2017
7. Annual prize from the Association of Planning Geographers: Mapple – Accessibility Planner. Helsinki, Finland
2017
8. Helsinki Region Infoshare Challenge Award (Capital Region data): Helsinki Region Travel Time Matrix. Apps4Finland, Finland
2014
9. ProGIS association of Finland thesis prize for the best MSc thesis. ProGIS ry, Finland
2014

RECOGNITION OF TEACHING

1. *Automating GIS Processes*. Best online course for learning Geospatial Data Science. Towards Data Science
2020
2. *Geo-Python*. Best online course for learning Geospatial Data Science. Towards Data Science
2020

OTHER KEY ACADEMIC MERITS

EXAMINER OF DOCTORAL DISSERTATIONS (N=3)

1. Kesarovski, Todor. *Optimising Urban Densities for Sustainable Cities: A Multivariable Framework to Evaluate Territorial Balance in the Stavanger City Region, Norway*. Faculty of Science and Technology, Department of Safety, Economics and Planning. University of Stavanger
2025
2. Bhatt, Pragya. *Using social media to assess nature-based tourism in Nepal*. School of Environment and Science, Centre for Planetary Health and Food Security. Griffith University
2022
3. Uusitalo, Ruut. *Geospatial risk analysis of disease vectors and vector-borne diseases in boreal and tropical landscapes*. Faculty of Science, Department of Geosciences and Geography. University of Helsinki
2022

EVALUATOR OF DOCENTSHIPS (N=3)

1. Kulha, Niko. Docentship in Landscape Ecology, Faculty of Science. University of Turku
2024
2. Hasanzadeh, Kamyar. Docentship in Urban Informatics, Faculty of Science. University of Helsinki
2024
3. Siljander, Mika. Docentship in Spatial Modelling, Faculty of Science. University of Helsinki
2022

EVALUATOR OF RESEARCH FUNDING APPLICATIONS (N=6)

1. Fondazione Cariplo. Expert review panel; 1 application; Funding program: Young researchers PE II Phase. Italy
2024
2. Fondazione Cariplo. Expert review panel; 5 applications; Funding program: Young researchers PE I Phase. Italy
2024
3. Fondazione Cariplo. Expert review panel; 1 application; Funding program: Young researchers PE II Phase. Italy
2023
4. Swiss Data Science Centre. Expert review panel; 1 application; Funding program: Collaborative Data Science Projects. Switzerland
2023
5. National Science Centre Poland. Expert review panel; 1 application. Poland
2022
6. Estonian Research Council. Expert review panel; 1 application; Funding program: Mobilitas Pluss incoming postdoctoral grant (MOBJD). Estonia
2021

MEMBERSHIP IN SCIENTIFIC NETWORKS (N=3)

1. Association of Geographic Information Laboratories in Europe (AGILE). Member of AGILE and representative of Aalto University. Europe
2023–
2. Young Academy Finland (YAF). First geographer invited to YAF (100 members). Board member (2019–2021) and leader of the open science working group. Finland
2019–
3. Open Science representative of the Council of Finnish Academies. Represented CoFA as one of 10 expert members in the international open science working group at the InterAcademy Partnership (IAP). Finland
2020

EDITORIAL BOARD MEMBERSHIPS (N=3)

1. Journal of Location Based Services (2025–).
2. Scientific Reports, Nature Research (2018–2022).
3. ISPRS International Journal of Geo-Information (2019–2020).

GUEST EDITOR (N=3)

1. *Computers, Environment and Urban Systems* (2023). Advances towards environmentally and socially sustainable transport and urban systems. McKenzie, G., Calafiore, A., Tenkanen, H., Pereira, R. & Eun-Kyeong, K.
2. *Environment and Planning B: Urban Analytics and City Science* (2022). Advances in Spatial and Transport Network Analysis. Tenkanen, H., Pereira, R., Arcaute, E. & Gonzalez, M.
3. *Frontiers in Big Data* (2022). Big Data for Urban Systems. Botta, F., Zhang, Z., Gutiérrez-Roig, M. & Tenkanen, H.

PEER REVIEW (N=18)

Peer reviewer of 18 manuscripts for international scientific journals. The full list of journals is available on request.

EVALUATOR / MEMBER IN SCIENTIFIC PROCESSES

1. Member of the workshop / hearing of tenure-track professors by the Scientific Advisory Board (SAB) of Aalto University. Aalto University
2021
2. Expert member in the international Open Science working group of the InterAcademy Partnership (IAP) related to UNESCO's Recommendation on Open Science. InterAcademy Partnership
2020

INVITED TALKS AND KEYNOTES (SELECTED) (N=23)

1. ANETI Seminars, Corvinus University. TO BE ADDED Budapest, Hungary (online)
2026
2. Evaluating Sustainable Lands and Cities seminar, University of Edinburgh. How spatial data and modelling can support sustainable development? Sustainable mobility and accessibility Edinburgh, UK (online)
2026
3. Mobility Science Lab Seminar, University of Leeds. Geospatial Sustainability Data Science: Using spatial data and modelling to support sustainable development Leeds, UK
2025
4. Geospatial Foundation Models, International Workshop, University of Leeds. GeoAI and LLMs for context-aware navigation Leeds, UK
2025
5. Finnish Embassy in London. Sufficient mobility within limits? Modelling carbon footprints of urban mobility London, UK
2025
6. KEYNOTE: Cycle4Climate Forum, Interreg, EU. Where to target sustainable mobility incentives? Data-driven approaches for mapping travel-related greenhouse gas emissions Espoo, Finland
2025
7. What's Modelling got to do with Planning -seminar. Environmental impacts of access and mobility Espoo, Finland
2025
8. SpaceTimeLab seminar, University College London. GeoAI and LLMs for context aware navigation London, UK
2025
9. KEYNOTE: Rasti Seminar, Finnish Environment Institute. Arkiliikkumisen hiilidioksidipäästöjen estimointi tarkalla spatio-temporaalisella resoluutiolla Suomen kaupunkiseuduilla Helsinki, Finland
2023
10. KEYNOTE: GeoForum Finland. Paikkatietoteknologiat murrosten maailmassa Helsinki, Finland
2021

CONFERENCE PRESENTATIONS (SELECTED)

1. ACL 2026, The 64th Annual Meeting of the Association for Computational Linguistics. GROKE: Vision-Free Navigation Instruction Evaluation via Graph Reasoning on OpenStreetMap San Diego, USA
2026
2. AGILE 2024, 27th AGILE Conference on Geographic Information Science. A data-driven approach for estimating travel-related carbon emissions with high spatial and temporal granularity Glasgow, UK
2024
3. Mobile Tartu 2024. Big data-driven scenario tools for estimating carbon-reduction potential of transport Tartu, Estonia
2024
4. GIScience 2023, The 12th International Conference on Geographic Information Science. Measuring equity of access in Finland with open-source GIS-tools Leeds, UK
2023
5. LBS 2022, 17th International Conference on Location Based Services. Reproducible methods for spatio-temporal accessibility and mobility studies Munich, Germany
2022
6. AAG Annual Meeting 2022. Reproducible methods for extracting spatio-temporal data about urban fabrics on a large scale New York, USA
2022
7. ICHC 2019, International Conference on Historical Cartography. Novel approaches to study the circulation of cartographic knowledge using machine learning Amsterdam, Netherlands
2019
8. NECTAR 2019, 15th biannual NECTAR conference. Analyzing centrality and modal equity of transport in comparable manner across city regions Helsinki, Finland
2019
9. GISRUK 2019, Geographical Information Science Research UK. Where are the centers of a city? A method to analyze centrality and modal equity of transport in comparable manner across city regions Newcastle, UK
2019
10. GIScience 2018, The 10th International Conference on Geographic Information Science. Web 3.0 and the future of decentralized GIS, blockchain technologies and self-sovereign location data? Melbourne, Australia
2018

MEMBER OF THE ORGANISING / SCIENTIFIC COMMITTEE FOR CONFERENCES (N=13)

1. Scientific committee, WPSC 2026 (6th World Planning Schools Congress), 29 June–3 July. Helsinki|Tampere, Finland
2026
2. Scientific committee, COSIT 2026 (17th Conference on Spatial Information Theory), 22–25 September. York, UK
2026
3. Scientific committee, AGILE 2026 (29th AGILE Conference on Geographic Information Science), 16–19 June. Tartu, Estonia
2026
4. Scientific committee, GeoAI 2026 (1st International Conference on Geospatial Artificial Intelligence), 3–6 June. Ghent, Belgium
2026
5. Conference chair & scientific committee, LBS 2025 (International Conference on Location Based Services), 7–9 May. Espoo, Finland
2025
6. Reproducibility committee, AGILE 2024 (27th AGILE Conference on Geographic Information Science), 4–7 June. Glasgow, UK
2024
7. Scientific committee, LBS 2023 (International Conference on Location Based Services), 20–22 November. Ghent, Belgium
2023
8. Co-organiser, GIScience 2023: Workshop on Open Tools for Equitable and Sustainable Accessibility and Mobility Analysis (OTESAMA '23), 12 September. Leeds, UK
2023
9. Co-organiser, GIScience 2023: Equitable Accessibility and Sustainable Mobility Workshop (EASM '23), 12 September. Leeds, UK
2023
10. Scientific committee, LBS 2022 (International Conference on Location Based Services), 12–14 September. Munich, Germany
2022
11. Scientific committee, CUPUM 2021 (International Conference on Computational Urban Planning and Urban Management), 9–11 June. Espoo, Finland
2021
12. Scientific and organizing committee, NECTAR 2019 (Network on European Communications and Transport Activities Research), 7–9 June. Helsinki, Finland
2019
13. Organising committee, Annual Meeting of Finnish Geographers 2018, 25–26 October. Helsinki, Finland
2018

ORGANIZING INTERNATIONAL WORKSHOPS AND SEMINARS (N=10)

1. **MobilityBank**, AGILE 2026 Workshop (University of Tartu, Estonia), "Building a Global Collective for Open, FAIR, and Ethical Human Mobility Data", 16 June
Tartu, Estonia
2026
2. **GeoSPA Talks Seminar**, Weiming Huang (University of Leeds, UK), "Embedding Geography: Spatial Representation Learning for Foundation Models", 14 November
Espoo, Finland
2025
3. **Data-driven Mobility Analytics Workshop #2**, McGill University: Building collaborative tools for sustainable transport, 27 October
Montreal, Canada
2025
4. **Data-driven Mobility Analytics Workshop #1**, Aalto University: Building collaborative tools for sustainable transport, 6 May
Espoo, Finland
2025
5. **GeoSPA Talks Seminar**, Martin Tomko (University of Melbourne, Australia), "Don't throw the baby out with the water! Echos of human spatial and information behavior in exhaust data", 13 September
Espoo, Finland
2024
6. **GeoSPA Talks Seminar**, Adam Dennett (University College London, UK), "Challenges in Transitioning the UK to 'Net-Zero' – Some observations from Housing and Transport", 30 August
Espoo, Finland
2024
7. **GeoSPA Talks Seminar**, Franz-Benjamin Mocnik (University College London, UK), "Place Representation and Place Communication – A Challenge for Geographical Information Science", 21 May
Espoo, Finland
2024
8. **GeoSPA Talks Seminar**, Qunshan Zhao (University of Glasgow, UK), "Understanding cities by urban sensing and analytics", 17 October
Espoo, Finland
2023
9. **OTESAMA 2023**, "Open Tools for Equitable and Sustainable Accessibility and Mobility Analysis", GIScience 2023 conference workshop, 12 September.
Leeds, UK
2023
10. **EASM 2023**, "Equitable Accessibility and Sustainable Mobility", GIScience 2023 conference workshop, 12 September.
Leeds, UK
2023

OTHER ACADEMIC DISTINCTIONS

1. Shortlisted (top 5 candidates) for Assistant / Associate Professor in Spatial Data Science, Centre for Advanced Spatial Analysis (CASA).
University College London, UK
2020
2. Selected for Assistant Professor in Digital Geography, Department of Geography. Declined the offer.
University of Vienna, Austria
2020

SCIENTIFIC AND SOCIETAL IMPACT

1. Industry collaboration. GeoAI and GenAI in the use of large-language models for spatial data infrastructure.
Spatineo Oy, Finland
2025–
2. Industry collaboration. Human mobility analytics for spatial decision support systems and urban planning.
Locomizer Ltd, UK
2023–
3. Scientific Advisory Board member. International CyberTraining for Disaster Management (CTDM) network. Funder: National Science Foundation.
Texas A&M University, USA
2023–
4. Commissioned research. Report on Threats and risks of open geospatial data of the National Land Survey of Finland.
National Land Survey of Finland
2022–2023
5. Open science working group leader, Young Academy Finland.
Young Academy Finland
2019–2021
6. Open Science representative, Council of Finnish Academies.
Council of Finnish Academies
2020
7. Open Science working group member at the InterAcademy Partnership (IAP), related to the UNESCO Recommendation on Open Science.
InterAcademy Partnership
2020
8. Trainings and presentations about open science for various audiences; see *Invited talks and keynotes* for further information.
Various
2019–
9. Producer of two open scientific datasets (Tenkanen & Toivonen, 2022; Bergroth et al., 2022).
Aalto University
2022
10. Developer / maintainer of open source scientific software for Python (n=4): *pyrosm*, *r5py*, *osmnx*, *geopandas*.
Open source
2018–
11. Co-founder and board member of Mapple Analytics Oy (2017–2022), a spin-out company from the University of Helsinki.
Helsinki, Finland
2017–2022

A. Peer-reviewed scientific articles

1. Jama, T., J. Heinonen & H. Tenkanen (2026). The Impact of Land-Use Planning on Lifestyle Carbon Footprints. *Environments* 13(3), 173. <https://doi.org/10.3390/environments13030173>
2. Czepkiewicz, M., G. Mattioli, F. Schmidt, E. Willberg, L. Kilian, H. Tenkanen, D. Timmer, Á. Gosztonyi, J. Raudsepp, S. Ala-Mantila, L. Jacobson, M. Guillen-Royo, D. Krysiński, K. Dillman, J. Heinonen & P. Næss (2026). Sufficient Mobility and Access Within Limits: Research Agenda for Bringing Together Corridor Frameworks and Transportation Research. *Transportation Research Interdisciplinary Perspectives* 37, 102029. <https://doi.org/10.1016/j.trip.2026.102029>
3. Modjrian, N., R. Emmanuel & H. Tenkanen (2026). Heat Stress Prediction in Glasgow: Integration of Historical Data With Machine Learning Models. *Transactions in GIS* 30(2), e70265. <https://doi.org/10.1111/tgis.70265>
4. Shami, F., S. Dey, N. Van de Weghe & H. Tenkanen (2026). GROKE: Vision-Free Navigation Instruction Evaluation via Graph Reasoning on OpenStreetMap. In *Proceedings of the 64th Annual Meeting of the Association for Computational Linguistics (ACL 2026)*. Pre-print: <https://arxiv.org/abs/2601.07375>
5. Marin-Flores, C., L. Ferres & H. Tenkanen (2026). When Proximity Falls Short: Inequalities in Commuting and Accessibility by Public Transport in Santiago, Chile. *Geographical Analysis* 58(2), e70039. <https://doi.org/10.1111/gean.70039> | Citations: 1 |
6. Latvala, J., C. Marin-Flores, S. Vosough, B. Vallejo, H. Tenkanen, C. Roncoli, A. Meister & K. Axhausen (2026). Cyclists' route preferences in the electrification era: A case study in Zurich, Switzerland. *Transportation Research Procedia* 95, 784–791. <https://doi.org/10.1016/j.trpro.2026.02.099>
7. Dey, S., C. Marin Flores & H. Tenkanen (2026). A Methodological Framework for Microscale Mapping of Carbon Emissions from Daily Multimodal Travel: Application to the Helsinki Metropolitan Area. *Sustainable Cities & Society* 140(1). <https://doi.org/10.1016/j.scs.2026.107226> | Citations: 1 |
8. Hosseini, S.H., B. Zolghadr-Asli, H. Tenkanen, K. Madani, M.A. Matin, I. Demir, A. Ostfeld, V.P. Singh & D. Savic (2026). Making waves: A conceptual framework exploring how large language model-based multi-agent systems could reshape water engineering. *Water Research* 291, 125157. <https://doi.org/10.1016/j.watres.2025.125157> | Citations: 3 |
9. Láng-Ritter, J., M. Keskinen & H. Tenkanen (2025). Global gridded population datasets systematically underrepresent rural population. *Nature Communications* 16, 2170. <https://doi.org/10.1038/s41467-025-56906-7> | Citations: 55 |
10. Rinne, T., A. Poom & H. Tenkanen (2025). Stronger together: integrating geospatial data to understand human outdoor recreation. *Scandinavian Journal of Hospitality and Tourism*, 1–22. <https://doi.org/10.1080/15022250.2025.2484715> | Citations: 4 |
11. Pönkänen, M., H. Tenkanen & M. Mladenovic (2025). Spatial accessibility and transport inequity in Finland: Open source models and perspectives from planning practice. *Computers, Environment and Urban Systems* 116. <https://doi.org/10.1016/j.compenvurbsys.2024.102218> | Citations: 16 |
12. Karasov, O., T. Rinne, O. Järv & H. Tenkanen (2025). Making Cultural Ecosystem Services Truly Cultural: Mapping Outdoor Experiences in Ukraine with Telegram. *Proceedings of the 19th International Conference on Location Based Services*, 112–117. <https://doi.org/10.5281/zenodo.15350321>
13. Nikander, J., T. Jama & H. Tenkanen (2024). Threats related to open geospatial data in the uncertain geopolitical environment. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* 48, 121–126. <http://dx.doi.org/10.5194/isprs-archives-XLVIII-4-W12-2024-121-2024> | Citations: 2 |
14. Jama, T., H. Tenkanen, H. Lönnqvist & A. Joutsiniemi (2024). Compact city and urban planning: Correlation between density and local amenities. *Environment and Planning B: Urban Analytics and City Science*. <https://doi.org/10.1177/23998083241250264> | Citations: 25 |
15. Tenkanen, H., N. Chau & S. Dey (2024). A data-driven approach for estimating travel-related carbon emissions with high spatial and temporal granularity. *Short papers and posters of the 27th AGILE Conference on Geographic Information Science*, 4–7 June 2024, Glasgow, United Kingdom. | Citations: 2 |
16. Willberg, E., H. Tenkanen, H. Miller, R.H. Pereira & T. Toivonen (2024). Measuring just accessibility within planetary boundaries. *Transport Reviews* 44(1), 140–166. <https://doi.org/10.1080/01441647.2023.2240958> | Citations: 49 |
17. Tenkanen, H., R. Pereira, E. Arcaute & M. Gonzalez (2023). Advances in geospatial approaches to transport networks and sustainable mobility. *Environment and Planning B: Urban Analytics & City Science* 50(8), 2009–2016. | Citations: 6 |
18. Bergroth, C., O. Järv, H. Tenkanen, M. Manninen & T. Toivonen (2022). A 24-hour population distribution dataset based on mobile phone data from Helsinki Metropolitan Area, Finland. *Scientific Data*. | Citations: 76 |
19. Heikinheimo, V., O. Järv, H. Tenkanen, T. Hiippala & T. Toivonen (2022). Detecting country of residence from social media data: a comparison of methods. *International Journal of Geographical Information Science*. | Citations: 29 |
20. Tenkanen, H. & C. Fink (2022). Reproducible methods for spatio-temporal accessibility and mobility studies. *Proceedings of the 17th International Conference on Location-Based Services*, 12–14 September.
21. Willberg, E., H. Tenkanen, A. Poom, M. Salonen & T. Toivonen (2021). Comparing spatial data sources for cycling studies – A review. In M. Mladenovic, T. Toivonen, E. Willberg & K. Geurs (Eds.), *Transport in Human Scale Cities*, 288 p. Edward Elgar Publishing. | Citations: 38 |
22. Tenkanen, H. & T. Toivonen (2020). Longitudinal spatial dataset on travel times and distances by different travel modes

- in Helsinki Region. *Scientific Data* 7(77), 1–15. | Citations: 67 |
23. Heikinheimo, V., H. Tenkanen, C. Bergroth, O. Järvi, T. Hiiippala & T. Toivonen (2020). Understanding the use of urban green spaces from user-generated geographic information. *Landscape and Urban Planning* 201, 1–15. | Citations: 328 |
 24. Hausmann, A., T. Toivonen, C. Fink, V. Heikinheimo, R. Kulkarni, H. Tenkanen & E. Di Minin (2020). Understanding sentiment of national park visitors from social media data. *People and Nature* 2, 750–760. | Citations: 114 |
 25. Hausmann, A., T. Toivonen, C. Fink, V. Heikinheimo, H. Tenkanen, S. Butchart, T. Brooks & E. Di Minin (2019). Assessing global popularity and threats to Important Bird and Biodiversity Areas using social media data. *Science of the Total Environment* 683, 617–623. | Citations: 73 |
 26. Tenkanen, H., J. Londoño Espinosa & T. Toivonen (2019). Where are the centers of a city? A method to analyze centrality and modal equity of transport in comparable manner across city regions. *Proceedings of the 27th GISRUK conference*, 23–26 April.
 27. Toivonen, T., V. Heikinheimo, C. Fink, A. Hausmann, T. Hiiippala, O. Järvi, H. Tenkanen & E. Di Minin (2019). Social media data for conservation science: a methodological overview. *Biological Conservation* 233, 298–315. | Citations: 615 |
 28. Di Minin, E., C. Fink, T. Hiiippala & H. Tenkanen (2019). A framework for investigating illegal wildlife trade on social media with machine learning. *Conservation Biology* 33(1), 210–213. | Citations: 134 |
 29. Järvi, O., H. Tenkanen, M. Salonen, R. Ahas & T. Toivonen (2018). Dynamic cities: Location-based accessibility modelling as a function of time. *Applied Geography* 95, 101–110. | Citations: 224 |
 30. Hiiippala, T., A. Hausmann, H. Tenkanen & T. Toivonen (2018). Exploring the linguistic landscape of geotagged social media content in urban environments. *Digital Scholarship in the Humanities* fqy049. <https://doi.org/10.1093/llc/fqy049> | Citations: 92 |
 31. Di Minin, E., C. Fink, H. Tenkanen & T. Hiiippala (2018). Machine learning for tracking illegal wildlife trade on social media. *Nature Ecology and Evolution* 2, 406–407. | Citations: 143 |
 32. Järvi, O., H. Tenkanen & T. Toivonen (2017). Enhancing spatial accuracy of mobile phone data using multi-temporal dasymetric interpolation. *International Journal of Geographical Information Science* 31, 1630–1651. | Citations: 92 |
 33. Tenkanen, H., E. Di Minin, V. Heikinheimo, A. Hausmann, M. Herbst, L. Kajala & T. Toivonen (2017). Instagram, Flickr, or Twitter: Assessing the usability of social media data for visitor monitoring in protected areas. *Scientific Reports* 7, 17615. | Citations: 579 |
 34. Heikinheimo, V., E. Di Minin, H. Tenkanen, A. Hausmann, J. Erkkonen & T. Toivonen (2017). User-Generated Geographic Information for Visitor Monitoring in a National Park: A Comparison of Social Media Data and Visitor Survey. *International Journal of Geo-Information* 6, 85. | Citations: 375 |
 35. Hausmann, A., T. Toivonen, V. Heikinheimo, H. Tenkanen, R. Slotow & E. Di Minin (2017). Social media reveal that charismatic species are not the main attractor of ecotourists to sub-Saharan protected areas. *Scientific Reports* 7, 763. | Citations: 136 |
 36. Hausmann, A., T. Toivonen, R. Slotow, H. Tenkanen, A. Moilanen, V. Heikinheimo & E. Di Minin (2017). Social Media Data Can Be Used to Understand Tourists' Preferences for Nature-Based Experiences in Protected Areas. *Conservation Letters* 11. | Citations: 514 |
 37. Tenkanen, H., P. Saarsalmi, O. Järvi, M. Salonen & T. Toivonen (2016). Health research needs more comprehensive accessibility measures: integrating time and transport modes from open data. *International Journal of Health Geographics* 15, 23. | Citations: 95 |
 38. Tenkanen, H., M. Salonen, M. Lattu & T. Toivonen (2015). Seasonal fluctuation of riverine navigation and accessibility in Western Amazonia: An analysis combining a cost-efficient GPS-based observation system and interviews. *Applied Geography* 63, 273–282. | Citations: 23 |
 39. Tenkanen, H., V. Heikinheimo, O. Järvi, M. Salonen & T. Toivonen (2016). Open data for accessibility and travel time analyses: Helsinki Region Travel Time and CO₂ Matrix. In T. Sarjakoski, M.Y. Santos & L.T. Sarjakoski (eds.), *Geospatial Data in a Changing World: The short papers and poster papers of the 19th AGILE Conference on Geographic Information Science*, 14–17 June 2016, Helsinki, 1–4. AGILE. | Citations: 5 |
 40. Di Minin, E., H. Tenkanen & T. Toivonen (2015). Prospects and challenges for social media data in conservation science. *Frontiers in Environmental Science* 3. | Citations: 437 |
 41. Laatikainen, T., H. Tenkanen, M. Kytä & T. Toivonen (2015). Comparing conventional and PPGIS approaches in measuring equality of access to urban aquatic environments. *Landscape and Urban Planning* 144, 22–33. | Citations: 108 |
 42. Toivonen, T., M. Salonen, H. Tenkanen, P. Saarsalmi, T. Jaakkola & J. Järvi (2014). Joukkoliikenteellä, autolla ja kävellen: Avoin saavutettavuusaineisto pääkaupunkiseudulla. *Terra* 126(3), 127–136. | Citations: 10 |
 43. Tenkanen, H., M. Salonen, M. Lattu & T. Toivonen (2014). Geographic knowledge discovery from sparse GPS data with R – Spatio-temporal examination of Amazonian river transports. In A. Jolma, P. Sarkola & L. Lehto (eds.), *Proceedings of the 3rd Open Source Geospatial Research & Education Symposium OGRS 2014*. Aalto University publication series, Science + Technology 5, 123–130. | Citations: 2 |
 44. Järvi, J., M. Salonen, P. Saarsalmi, H. Tenkanen & T. Toivonen (2014). Reititin: an open source tool for analysing accessibility by public transport in Greater Helsinki. In A. Jolma, P. Sarkola & L. Lehto (eds.), *Proceedings of the 3rd Open Source Geospatial Research & Education Symposium OGRS 2014*. Aalto University publication series, Science +

Technology 5, 149–154. | Citations: 7 |

45. Montesino Pouzols, F., T. Toivonen, E. Di Minin, A. Kukkala, P. Kullberg, J. Kuusterä, J. Lehtomäki, H. Tenkanen, P.H. Verburg & A. Moilanen (2014). Global protected area expansion is compromised by projected land-use and parochialism. *Nature* 516, 383–386. | Citations: 522 |

B. Non-refereed scientific articles

1. Oksanen, J., H. Tenkanen, P. Kettunen & V. Mäkinen (2025). Proceedings of the 19th International Conference on Location Based Services. *International Conference on Location Based Services, 2025*. https://scholar.google.com/citations?view_op=view_citation&hl=en&user=1DQECkAAAAAJ&pagesize=100&sortby=pubdate&citation_for_view=1DQECkAAAAAJ:NhqRSuP_F_18C
2. Kettunen, P., J. Oksanen, V. Mäkinen & H. Tenkanen (2026). Editorial: Progress in location-based services from LBS 2025. *Journal of Location Based Services*, 1-2. <https://doi.org/10.1080/17489725.2026.2655616>
3. Nikander, J., T. Jama & H. Tenkanen (2023). Selvitys Maanmittauslaitoksen avoimiin peruspaikkatietoihin kohdistuvista uhkista. *Maanmittauslaitoksen julkaisuja*.
4. Salonen, M., H. Tenkanen, V. Heikinheimo & T. Toivonen (2016). Future mobility and accessibility – Greater Helsinki: a case study. In *Transitions towards a more sustainable mobility system: TERM 2016: Transport indicators tracking progress towards environmental targets in Europe*, 35–37. European Environment Agency, Publications Office of the European Union, Luxembourg. | Citations: 1 |
5. Whipp, D., H. Tenkanen & V. Heikinheimo (2018). Geo-Python: An open online introduction to programming in Python for geoscientists. In *European Geosciences Union General Assembly (EGU)*.

C. Scientific books

1. Tenkanen, H., V. Heikinheimo & D. Whipp (accepted for publication, available online). *Introduction to Python for Geographic Data Analysis*. CRC Press / Taylor & Francis. | Citations: 5 |

D. Publications intended for professional communities

1. Tenkanen, H., G. McKenzie & M. Toger (2026). *Data-Driven Mobility Analytics, Aalto University Workshop Report*. DOI: <https://osf.io/zxu8q/files/cv6qb>
2. McKenzie, G., H. Tenkanen & M. Toger (2026). *Data-Driven Mobility Analytics, McGill University Workshop Report*. DOI: <https://osf.io/zxu8q/files/cv6qb>
3. Tenkanen, H. (2023). *Spatial Data Science for Sustainable Development* – course and educational materials. Available at <https://sustainability-gis.readthedocs.org/>. DOI: <https://doi.org/10.5281/zenodo.7807804>
4. Tenkanen, H. (2023). *Spatial Analytics* – course and educational materials. Available at <https://spatial-analytics.readthedocs.io>. DOI: <https://doi.org/10.5281/zenodo.7807832>
5. Tenkanen, H., V. Heikinheimo, H. Wallin Aagesen & C. Fink (2022). *Automating GIS Processes* – course. Available at <https://autogis-site.readthedocs.io>. DOI: <https://doi.org/10.5281/zenodo.7807846>
6. Whipp, D., H. Tenkanen, V. Heikinheimo & H. Wallin Aagesen (2021). *Geo-Python* – course. Available at <https://geo-python-site.readthedocs.io>. DOI: <https://doi.org/10.5281/zenodo.7807869>
7. Medeiros, C., B. Darboux, J.A. Sanchez, H. Tenkanen, M.L. Meneghetti, Z.K. Shinwari, J. Montoya, I. Smith & A. McCray (2020). IAP input into the UNESCO Open Science Recommendation. UNESCO / InterAcademy Partnership (IAP). | Citations: 13 |
8. Bergroth, C., O. Järvi, H. Tenkanen & T. Toivonen (2019). Matkapuhelinaineisto paljastaa kaupungin dynamiikan. *Positio: paikkatiedon erikoislehti* 1, 17–18.
9. Heikinheimo, V., H. Tenkanen, T. Hiippala & T. Toivonen (2018). Digital Imaginations of National Parks in Different Social Media: A Data Exploration. In R. Westerholt, F.-B. Mocnik & A. Zipf (eds.), *On the Way to Platial Analysis: Can Geosocial Media Provide the Necessary Impetus? Proceedings of the First Workshop on Platial Analysis*, 45–52. Heidelberg University, Heidelberg, PLATIAL'18, 20 September 2018. DOI: <https://doi.org/10.5281/zenodo.1472745> | Citations: 14 |
10. Toivonen, T., V. Heikinheimo, T. Hiippala & H. Tenkanen (2017). Sosiaalinen media tarjoaa aineistoa liikkumisen tutkimukseen. *Positio: paikkatiedon erikoislehti* 4, 11–13. | Citations: 1 |
11. Salonen, M., T. Toivonen, H. Tenkanen, V. Heikinheimo & O. Järvi (2016). Saavutettavuuden analyysia todellisilla matka-ajoilla. *Positio: paikkatiedon erikoislehti* 1. | Citations: 1 |

E. Publications intended for the general public

Media appearances, interviews, etc.

1. Lundvall, A. & H. Tenkanen. (2025). GeoAI development in global competition: Navigating challenges in data, resources, and trust. *Positio Magazine*.
2. Ali-Hokka, H. & H. Tenkanen. (2025). "Maapallon väkiluku voi olla suurempi kuin on laskettu – suomalaistutkimus voi panna arvion uusiksi" (News article). *YLE News*.
3. YLE Evening News, Television Interview. (2025). *YLE - Finnish Broadcasting Company*.
4. Science News (2023). Sustainable mobility planning supported by doughnut thinking. *Science Daily*.
5. Törmänen, E. (2017). "Näin vältät aamuruuhkan ja etsit uuden asunnon hyvillä kulkuyhteyksillä – saavutettavuusanalyysi yhdistää älypuhelin aineiston liikennedataan." *Tekniikka & Talous*.
6. Tamminen, T. & H. Tenkanen (2017). "Tieto vie perille" (interview). *Yliopisto-lehti*.
7. Väre, S. & H. Tenkanen (2016). "Sitkeys palkitaan, vakuuttaa tutkijatohtori Tenkanen." *Merikarvia-lehti*.
8. Kivipelto, A., P. Salmén, T. Toivonen, H. Tenkanen & M. Salonen (2015). Pyörä on Helsingissä nopein lyhyillä matkoilla. *Helsingin Sanomat*.
9. Toivonen, T., M. Salonen, H. Tenkanen & P. Saarsalmi (2014). *Kvartti: Helsingin kaupungin tietokeskuksen neljännesvuosijulkaisu*, 56–65.

G. Theses

1. Tenkanen, H. (2017). *Capturing time in space: Dynamic analysis of accessibility and mobility to support spatial planning with open data and tools*. PhD thesis, University of Helsinki. | Citations: 11 |
2. Tenkanen, H. (2013). *Geographic knowledge discovery from sparse GPS data: Revealing spatio-temporal patterns of Amazonian river transports*. MSc thesis, Department of Geosciences and Geography, University of Helsinki. | Citations: 2 |

I. Audiovisual material, ICT software

1. Fink, C., W. Klumpenhouwer, M. Saraiva, R. Pereira & H. Tenkanen (2022). r5py: Rapid Realistic Routing with R5 in Python. DOI: <https://doi.org/10.5281/zenodo.7060437> | Citations: 27 |
2. Tenkanen, H. (2022). pygieons: A tool to visualize and keep track of GIS and Earth Observation libraries in Python. DOI: <https://doi.org/10.5281/zenodo.7807978>
3. Tenkanen, H. (2020). transx2gtfs – A library for converting public transport data from TransXchange format (UK) into GTFS format for use with routing engines. <https://pypi.org/project/transx2gtfs>
4. Tenkanen, H. (2020). pyrosm – Fast Python library for reading OpenStreetMap from protobuf (*.osm.pbf) files into GeoPandas GeoDataFrames (written in Cython / C). <https://pypi.org/project/pyrosm>
5. Tenkanen, H. (2020). GeoPandas: A method to write geospatial data from GeoDataFrames into a PostGIS database using GeoPandas.
6. Tenkanen, H. (2019). ua2nx – UrbanAccess to NetworkX converter for public transport accessibility analyses in Python. <https://pypi.org/project/ua2nx>