Merve KESKIN

PhD, Geomatics Engineer/Senior Researcher

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My expertise lies in cartography, (geo)visualization, spatial cognition and behavior, human sensing, incorporating HCI/UX/UI principles for map use/design, and mixed-methods multi-modal user experiment design. My research interests are understanding human spatial behavior utilizing wearables (eye tracking, electrodermal activity, skin temperature, cardiovascular activity), and information fusion leveraging geospatial XAI for emotion detection in active mobility context. Being always passionate about interdisciplinary research, I strive to integrate new technologies and methods from various disciplines (marketing, psychology, computer science, sociology) with geoinformatics through innovation and open science and I am experienced in scientific proposal writing and funding acquisition.

PERSONAL INFORMATION

Date of birth: 24.10.1988
Place of birth: Istanbul

LANGUAGES

Turkish - Mother tongue • English - 94 (TOEFL IBT) • German - A2 (Goethe Institut)

TECHNICAL SKILLS

Excellent command of GIS & Remote sensing software (e.g., QGIS, ESRI ArcGIS, ENVI, ERDAS); eye tracking and other psychological experiment software (e.g., SMI Experiment Suite, Tobii Pro Lab, OGAMA, PsychoPy, BIOPAC Acqknowledge and statistics software (SPSS (ANOVA, non-parametric tests)).
Good command of MATLAB, Octave, Python, SQL, Adobe Photoshop, Google Analytics and GoogleAds

PROFESSIONAL MEMBERHIPS

International Cartographic Association (ICA); vice chair of Commission on User Experience (UX) (2023-2027) & active member of Commission on Geovisualizetion & Commission on Cognitive Visualization • International Federation of Surveyors (FIG) Young Surveyors • International Society for Photogrammetry and Remote Sensing (ISPRS) • Union of Chamber of Survey and Cadastre Engineers (HKMO); member of the Standing Commission on Cartography and Spatial Informatics

EDUCATION

2013 - 2020 **Joint PhD** - Geomatics Engineering *between* Istanbul Technical University (ITU) & Ghent University (UGent)
supervised by Assoc. Prof. Dr. A. Ozgur Dogru & Prof. Dr. Philippe De Maeyer, funded by *TUBITAK (The Scientific and Technological Research Council of Turkey)*
Thesis topic: Exploring the Cognitive Processes of Map Users Employing Eye Tracking and EEG (Electroencephalogram)
- rewarded as the most successful dissertation of 2021 by ITU
Explored the cognitive strategies of expert and novice map users within a spatial memory task using eye tracking and EEG. Focusing on the cartographic user experimental design issues, setting up experiment environment, conducting user experiments, preprocessing large volume of collected data, interpreting results regarding to data triangulation (digital sketch map evaluation, EEG power spectrum, fixation-related eye tracking data analysis and qualitative user feedback).

2011 - 2013 **MSc** - Geomatics Engineering, ITU
supervised by Assoc. Prof. Dr. A. Ozgur Dogru
Thesis topic: Investigating The Potential of Satellite Images in Topographic Map Production
Created requirement matrices for image mapping by exploring topographic maps of small, medium, large scales and satellite images of different resolutions.

2006 - 2011 **BSc** - Geomatics Engineering, ITU
supervised by Assoc. Prof. Dr. A. Ozgur Dogru, funded by EnviroGRIDS project under EU 7th Framework Programme
Thesis topic: Comparison of Interpolation Methods for Meteorological Data
Employed GIS-based (i.e. IDW, NN, Kriging) spatial interpolation methods for meteorological data (i.e. temperature, precipitation, wind speed)

2009 - 2010 ERASMUS - Geodesy & Geoinformation, Leibniz Üniversität Hannover

WORK EXPERIENCE

2023 - Present

Post-doctoral research associate - Department of Geoinformatics (ZGIS), PLUS
Working in research leading roles for the following projects at Geo-social analytics lab:
DIGITALSELF (supporting the development of digital competences and resilience among young women and girls to empower and enable their participation in the digital realm of today's society);
GeoEPI (leveraging crowdsourced data and occurrence data to improve early disease detection systems for spatiotemporal epidemiology of emerging viruses);
TEMA (Horizon Europe) (improving natural disaster management by providing a state-of-the-art disaster management support system, dynamically exploiting multiple data sources and AI technologies for providing an accurate assessment of an evolving crisis situation)
Also focusing on proposal writing and funding acquisition on multimodal mixed methods human sensing in the context of active/sustainable mobility.

2021 - 2023

Senior research scientist - Finnish Geospatial Research Institute, National Land Survey of Finland (FGI/NLS)
Worked at the department of Geoinformatics and Cartography for several projects on user experience:
TUGEVA (main researcher): Modeling visual enhancement via effective cartographic design and machine learning and building user interaction based on eye movement behavior of map users, i.e., *AI-assisted and gaze-aware interactive map displays (GAIMS).*
KartoEye (project leader): Mixed-methods (eye tracking, structured pre- and post- test questionnaires) User experience testing for new topographic map designs through several visuospatial tasks with a focus on cycling/active mobility.
AquaInfra (assisting researcher): Designing user requirements for Data Discovery and Access Service (DDAS) connecting an extensive selection of marine and freshwater data resources.

2016 - 2020

Visiting researcher - UGent Geography department
Worked on the cognitive and usability issues of maps, with the aim of understanding how different map users (novices and experts) read, interpret and use visual information presented in maps, by employing eye tracking and EEG. Collaborating with the marketing department and the department of information and communications technologies of UGent and the Experimental Psychology department of KU Leuven.

2019 - 2020

GIS assistant - Antea Group, Ghent, water management unit
Researching, maintaining, aggregating, and reporting geospatial data to produce an Integrated Vulnerability and Adaptation Assessment for the Coastal Zone, Water, Agriculture and Fisheries Sectors with the aim of assisting the *United Nations Development Program (UNDP).* Recently worked on an ecosystem valuation and mapping for a project in South Africa; mainly classifying the land cover using Sentinel-2 satellite images.

2018 - 2019

Digital marketing intern - Pozyx Labs, Ghent
Dealt with ad-campaign management, search engine optimization (SEO), weekly/monthly analytics reports, customer profiling and segmentation, social media planning, blog content creation. Communicated the high-tech content in the simplest and the most effective way with the target audience.

2011 - 2017

Research assistant - Geomatics Engineering, ITU, Istanbul
Assisted cartography, GIS, Computer aided graphic & map design, topography, fieldwork, and surveying classes. Worked on international and national scientific projects such as:

- *Remote sensing assistance: TUBITAK (The Scientific and Technological Research Council of Turkey) 1001 project: A Methodology Proposal to Identify Landscape Identity Indices of Rural Settlement – Aegean Region Case*
- *GIS-based geostatistical analysis: European Commission FP7 - EnviroGRIDS, Black Sea Catchment Project*

PUBLICATIONS

Out of nine journal articles, one book chapter, one editorial work, 25 conference full papers and abstracts (full list on ResearchGate), selected examples are:

A1 Journal M. Keskin, P. Kettunen (2023). Potential of Combining Artificial Intelligence and Eye-Tracking for Interactive Geovisual Exploration. International Journal of Cartography: State of Art & Science in Cartography Special Issue, https://doi.org/10.1080/23729333.2022.2150379

A1 Journal M. Keskin, V. Krassanakis, A. Çöltekin (2023). Visual attention and recognition differences based on expertise in a map reading and memorability study. ISPRS International Journal of Geo-Information: Eye-Tracking in Cartography Special Issue, 12(1):21. https://doi.org/10.3390/ijgi12010021

A1 Journal M. Keskin, K. Ooms, A. O. Dogru, P. De Maeyer. (2020). Exploring the Cognitive Load of Expert and Novice Map Users Using EEG & Eye Tracking. ISPRS International Journal of Geo-Information, 9(7), 429. https://doi.org/10.3390/ijgi9070429

CERTIFICATIONS

2022 **Practical Machine Learning with spatial data**
"Practical Machine Learning with spatial data" IT Center for Science, Espoo, Finland
This course gave a practical introduction to machine learning with spatial data, both to shallow learning and deep learning models, including convolutional neural networks (CNN). It consisted of lectures and hands-on exercises in Python (i.e., scikit-learn for the shallow learning and keras for deep learning)

2019 **Entrepreneurship**
"Plunge into your own business plan" International Summer School in cooperation with UGent and Food2Know, Ghent, Belgium
In this entrepreneurial course, I learned the basics of business development skills, implemented the theoretical principles in our specific business case (i.e. smart phone application, UX and eye tracking domain), and pitched it to the jury including distinctive experts, investors and entrepreneurs.

2018 **Blue Growth Expert**
"3rd International Blue Growth Summer School" in cooperation with GreenBridge and UGent, Oostende, Belgium
As Blue Growth being Europe's top policy priorities, this summer school provided opportunity to explore the role of oceans and seas in our future society and collaborate on innovative future projects within in an interdisciplinary group from engineering, bioengineering, geography, marine biology, and civil engineering.

2014 **Entrepreneurship**
ITU CEKIRDEK, Early-Stage Incubation Centre, Istanbul Technical University, ARI Teknokent,
Our innovative idea: "YouCanJo" is a community building mobile/web application based on location-based events by offering spatial-based activity suggestions to its users (i.e. individuals, groups and institutions / organizations) in line with their interests and needs.

SCIENTIFIC AWARDS

2023 Nico-Rüpke Cartography prize - The best review of scientific articles in "Journal of Cartography and Geographic Information" (issues 4/2022 to 3/2023)

2022 The most successful doctoral thesis of 2021, Istanbul Technical University, Turkey

2018 & 2019 International Federation of Surveyors (FIG) Foundation Grant for
6th FIG Young Surveyors European Meeting & 4th FIG Young Surveyors Conference.

2015 International Cartographic Association (ICA) Young Scientist Research Grant (see publication below)
M. Keskin, B. Celik, A. O. Dogru, M. E. Pakdil (2015): "A Comparison of Space-Time 2D and 3D Geovisualization", 27th International Cartographic Conference (ICC), p.23-28 August 2015, Rio de Janeiro, Brazil. ISBN 978-85-88783-11-9

REFERENCES

Prof. Dr. Philippe De Maeyer - emeritus senior full professor in cartography and GIS, UGent, Belgium
philippe.demaeyer@ugent.be

Prof. Dr. Arzu Çöltekin - head of the FHNW Institute for Interactive Technologies, Switzerland
arzu.coltekin@fhnw.ch