Jakub Krukar, PhD

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———— PROFILE ————

Academic Background

2.2015—	**Post-Doctoral Researcher** *Angela Schwering's Spatial Intelligence Lab, Institute for Geoinformatics, University of Münster, Germany.* "Wayfinding Through Orientation" project (ERC No. 637645). • Involved in project management and recruitment of PhD candidates; • Co-supervising PhD students, supervising and examining Master and Bachelor theses, supervising 1-2 student assistants per semester.
8.2019-9.2019	**Visiting Research Fellow** *Cognition, Perception and Urban Behaviour Group, Future Cities Laboratory, Singapore-ETH Centre, Singapore*
9.2018-3.2019	**Parental leave**. *Institute for Geoinformatics, University of Münster.*
10.2016-3.2017	**Research Associate** *Substitution of Professor Angela Schwering as the Head of Spatial Intelligence Lab.* • Principal supervision of PhD students, supervision and examination of Master and Bachelor theses; • Project management for the 'WayTO' project, research group coordination, budgeting (10+ researchers).
25.11.2015	**PhD** (*viva voce* on 19.06.2015) *Department of Architecture and the Built Environment, Northumbria University, Newcastle, United Kingdom.* "The Influence of an Art Gallery's Spatial Layout on Human Attention to and Memory of Art Exhibits." Principal Supervisor: Prof. Ruth Conroy Dalton (Architecture). Second Supervisor: Prof. Chris Dorsett (Fine Arts).
6.9.2011	**MA degree** in Psychology. *University of Social Sciences and Humanities, Warsaw.* "Cross-Cultural Differences in Cognitive Representations of the Hagia Sophia Building in Istanbul." Supervisor: Andrzej Strzałecki (Psychology).

2007–2008	Volunteer Research Assistant. *Institute of Psychology, University of Social Sciences and Humanities, Warsaw, Poland.*
10-12.2010	Erasmus-Sponsored Intern. *E-Medya Consultancy, Istanbul, Turkey.*
1-7.2010	Erasmus Exchange Student. *Maltepe Universitesi, Istanbul, Turkey.*
12.2009	Intern. *UseLab Website Usability Research Company, Warsaw, Poland*
2003-2006	Marie Sklodowska-Curie High School. *Gorzów Wielkopolski, Poland.*

RESEARCH

Publications

journals   **Krukar, J.**, Anacta, V. J., & Schwering, A. (2020). The effect of orientation instructions on the recall and reuse of route and survey elements in wayfinding descriptions. Journal of Environmental Psychology, 68, 101407. doi: 10.1016/j.jenvp.2020.101407

Krukar, J., & Dalton, R. C. (2020). How the Visitors' Cognitive Engagement Is Driven (but Not Dictated) by the Visibility and Co-visibility of Art Exhibits. Frontiers in Psychology, 11. doi: 10.3389/fpsyg.2020.00350

Löwen, H., **Krukar, J.**, & Schwering, A. (2019). Spatial Learning with Orientation Maps: The Influence of Different Environmental Features on Spatial Knowledge Acquisition. *ISPRS International Journal of Geo-Information*, 8(3), 149. doi: 10.3390/ijgi8030149

von Stülpnagel, R., & **Krukar, J.** (2018). Risk perception during urban cycling: An assessment of crowdsourced and authoritative data. *Accident Analysis & Prevention*, 121(May), 109–117. doi: 10.1016/j.aap.2018.09.009

Ranasinghe, C., **Krukar, J.**, & Kray, C. (2018). Visualizing Location Uncertainty on Mobile Devices. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, 2(1), 1–22. doi: 10.1145/3191762

Schwering, A., **Krukar, J.**, Li, R., Anacta, V. J., & Fuest, S. (2017). Wayfinding Through Orientation. *Spatial Cognition & Computation*, 17(4), 273–303. doi: 10.1080/13875868.2017.1322597
most-read paper in journal's history (according to its website)

Krukar, J., Hölscher, C., & Conroy Dalton, R. (2017). Indoor Wayfinding: Interview with Christoph Hölscher and Ruth Conroy Dalton. *German Journal of Artificial Intelligence (Künstliche Intelligenz)*, 31(2), 185–191. doi: 10.1007/s13218-016-0483-3
(not peer-reviewed)

Krukar, J., Schwering, A., & Anacta, V. J. (2017). Landmark-Based Navigation in Cognitive Systems. *German Journal of Artificial Intelligence (Künstliche Intelligenz)*, 31(2), 121–124. doi: 10.1007/s13218-017-0487-7
editorial to a special issue (not peer-reviewed)

Krukar, J. (2014). Walk, look, remember: The influence of the gallery's spatial layout on human memory for an art exhibition. *Behavioral Sciences*, 4(3), 181–201. doi: 10.3390/bs4030181

book chapters

Dalton, R. C., **Krukar, J.**, & Hölscher, C. (2018). Architectural cognition and behavior. In D. R. Montello (Ed.), *Handbook of Behavioral and Cognitive Geography* (pp. 337–356). doi: 10.4337/9781784717544.00030

Krukar, J., Dalton, R. C., & Hölscher, C. (2016). Applying HCI Methods and Concepts to Architectural Design (Or Why Architects Could Use HCI Even If They Don't Know It). In S. N. Dalton, H. Schnädelbach, M. Wiberg, & T. Varoudis (Eds.), *Architecture and Interaction: Human Computer Interaction in Space and Place* (pp. 17–35). doi: 10.1007/978-3-319-30028-3_2

peer-reviewed conference proceedings

Löwen, H., **Krukar, J.**, & Schwering, A. (2019). Functional Scales in Assisted Wayfinding. In S. Timpf, C. Schlieder, M. Kattenbeck, B. Ludwig, & K. Stewart (Eds.), *Proceedings of the 14th International Conference on Spatial Information Theory (COSIT 2019)* (Vol. 142, pp. 3:1-3:7). doi: 10.4230/LIPIcs.COSIT.2019.3

Krukar, J., & Van Eek, A. (2019). The Impact of Indoor/Outdoor Context on Smartphone Interaction During Walking. In P. Kyriakidis, D. Hadjimitsis, D. Skarlatos, & A. Mansourian (Eds.), *Accepted Short Papers and Posters from the 22nd AGILE Conference on Geo-information Science*. Limassol, Cyprus: Stichting AGILE.

Krukar, J., Münzer, S., Lörch, L., Anacta, V. J., Fuest, S., & Schwering, A. (2018). Distinguishing Sketch Map Types: A Flexible Feature-Based Classification. In S. Creem-Regehr, J. Schöning, & A. Klippel (Eds.), *Spatial Cognition XI* (pp. 279–292). doi: 10.1007/978-3-319-96385-3_19

Krukar, J., Schwering, A., Löwen, H., Galvao, M., & Anacta, V. J. (2018). Rethinking Wayfinding Support Systems—Introduction. In P. Fogliaroni, A. Ballatore, & E. Clementini (Eds.), *Proceedings of Workshops and Posters at the 13th International Conference on Spatial Information Theory (COSIT 2017)* (pp. 151–152). doi: 10.1007/978-3-319-63946-8_29
editorial to workshop proceedings

Krukar, J., Schultz, C., & Bhatt, M. (2017). Towards Embodied 3D Isovists. In T. Heitor, M. Serra, J. P. S. M. Bacharel, & L. C. da Silva (Eds.), *Proceedings of the 11th Space Syntax Symposium*. Lisbon: Instituto Superior Tecnico.

Löwen, H., Schwering, A., **Krukar, J.**, & Winter, S. (2017). Perspectives in Externalizations of Mental Spatial Representations. In A. Bregt, T. Sarjakoski, R. van Lammeren, & F. Rip (Eds.), *Societal Geo-innovation. AGILE 2017. Lecture Notes in Geoinformation and Cartography* (pp. 111–127). doi: 10.1007/978-3-319-56759-4_7

Anacta, V. J. A., Humayun, M. I., Schwering, A., & **Krukar, J.** (2017). Investigating Representations of Places with Unclear Spatial Extent in Sketch Maps. In A. Bregt, T. Sarjakoski, R. van Lammeren, & F. Rip (Eds.), *Societal Geoinnovation. AGILE 2017. Lecture Notes in Geoinformation and Cartography* (pp. 3–17). doi: 10.1007/978-3-319-56759-4_1

Padmanaban, R., & **Krukar, J.** (2017). Increasing the Density of Local Landmarks in Wayfinding Instructions for the Visually Impaired. In G. Gartner & H. Huang (Eds.), *Progress in Location-Based Services 2016* (pp. 131–150). doi: 10.1007/978-3-319-47289-8_7
publication developed from the student's Master thesis (first author)

Krukar, J., & Conroy Dalton, R. (2013). Spatial Predictors of Eye Movement in a Gallery Setting. In P. Kiefer, I. Giannopoulos, M. Raubal, & M. Hegarty (Eds.), *Eye Tracking for Spatial Research, Proceedings of the 1st International Workshop (in conjunction with COSIT 2013)* (pp. 14–19). Scarborough, UK.

Krukar, J., & Conroy Dalton, R. (2013). Walk, Look, Remember: Art Galleries as Spaces Facilitating Memory. In Y. O. Kim, H. T. Park, & K. W. Seo (Eds.), *Proceedings of Ninth International Space Syntax Symposium* (pp. 074:1-19). Seoul: Sejong University Press.
presented at the plenary session of the symposium

extended
abstracts
and posters

Krukar, J., Mavros, P., and Hölscher, C. (in press) Capturing focal/ambient attention during dynamic wayfinding. *Eye-Tracking Research and Applications 2020*

Dalton, R., Dalton, N., Hölscher, C., Veddeler, C., **Krukar, J.**, & Wiberg, M. (2020). HabiTech : Inhabiting Buildings, Data & Technology. *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–8. doi: 10.1145/3334480.3375179

Schick, W., **Krukar, J.**, & Schwering, A. (2019). Functional verbal scales in route instructions of wayfinding assistance systems. *Speaking of Location (Workshop in conjunction with COSIT 2019)*. Regensburg, Germany.

Schwering, A., Mukhametov, S., **Krukar, J.** (2018). A Tool for Large-Scale Spatial Behavior Analysis in Indoor Environments. *Spatial Cognition 2018*, Tübingen, Germany.

Schwering, A., Sahib, J., **Krukar, J.**, Chipofya, M. (2018). Evaluating Sketch Maps Qualitatively: A new Software-Supported Method. *Spatial Cognition 2018*, Tübingen, Germany.

Münzer, S., Lörch, L., Schwering, A., **Krukar, J.**, Anacta, V.J. (2018). Wayfinding and Spatial Learning with Navigation Assistance. In *The 40th Annual Meeting of the Cognitive Science Society*, Madison, USA.

Löwen, H., **Krukar, J.**, Schwering, A. (2018). How should Orientation Maps look like? *The 21th AGILE International Conference on Geographic Information Science: AGILE 2018*, Lund, Sweden.

Löwen, H., **Krukar, J.**, Schwering, A. (2018). Towards automatically generating maps for wayfinding and orientation. *The 21th AGILE International Conference on Geographic Information Science: AGILE 2018*, Lund, Sweden.

Krukar, J. (2017). Cognitively Sustainable Built Environments. *Annual Meeting of the American Association of Geographers*. Boston, USA.

Krukar, J., & Schwering, A. (2016). What is Orientation? In T. B. Barkowsky, Z. Falomir Llansola, H. Schultheis, & J. van de Ven (Eds.), *KogWis: 13th Biannual Conference of the German Cognitive Science Society* (pp. 115–117). Bremen, Germany.

Anacta, V., **Krukar, J.**, Humayun, M., & Schwering, A. (2016). Visualizing salient features in spatial descriptions. *European Workshop on Image and Cognition (EWIC)*. Paris, France.

Du, G., Lohoff, L., **Krukar, J.**, & Mukhametov, S. (2016). Comparing Two Methods to Overcome Interaction Blindness on Public Displays. *Proceedings of the 5th ACM International Symposium on Pervasive Displays*, 243–244. doi: 10.1145/2914920.2940339
publication developed from the students' course project

von Stülpnagel, R., Wächter, L., Holland, N., & **Krukar, J.** (2016). Subjective Risk Perception in Urban Cycling - Assessing The Validity of Opinion-Based Volunteered Geographic Information. *Vulnerable Road Users Symposium at the 57. Tagung Experimentell Arbeitender Psychologen*. Heidelberg, Germany.

Krukar, J., & von Stülpnagel, R. (2015). Adjusting for Cognitive and Spatial Biases of VGI: The Case of Perceived Risks in Urban Cycling. In H. Skov-Petersen (Ed.), *Human mobility, cognition and GISc*. Copenhagen, Denmark.

Conroy Dalton, R. and **Krukar, J.** (2014; equal contribution). Augmenting Intuitive Navigation at Local Scale. *Spatial Search Specialist Meeting*. Santa Barbara, USA.

Krukar, J. (2014). Cognitively Biased Agent-Based Models. In B. Emo, K. Al Sayed, & T. Varoudis (Eds.), *Design Cognition and Behavior: Usability in the Built Environment. Proceedings of the workshop held at Spatial Cognition 2014* (pp. 4–5). Bremen, Germany.

Krukar, J. (2014). Spontaneous Memory of Art Exhibitions: Explanations from Eye-Tracking. In C. Freksa, B. Nebel, M. Hegarty, & T. Barkowsky (Eds.), *Spatial Cognition 2014: Poster Presentations* (pp. 60–63). Bremen, Germany.

Krukar, J., & Conroy Dalton, R. (2012). Towards a Unified Model of Building Usability. *22nd International Association People-Environment Studies (IAPS) Conference*. Glasgow, UK.

Editorial and Organisational Experience

Journals | **Künstliche Intelligenz - German Journal of Artificial Intelligence.**
Guest co-editor of the special issue on *Landmark-Based Navigation in Cognitive Systems* (Springer).
http://www.springer.com/computer/ai/journal/13218

Workshops | **HabiTech: Inhabiting Buildings, Data & Technology**
Workshop organised at the *Computer-Human Information (CHI 2020) Conference* in Honolulu, USA.
http://chi2020.acm.org/

Rethinking Wayfinding Support Systems
Workshop organised at the *13th International Conference on Spatial Information Theory (COSIT 2017) in L'Aquila, Italy.*
http://www.cosit2017.org

Program Committee Member

Eye Tracking for Spatial Research Workshop (ET4S 2020)
Eye Tracking Research and Application (ETRA 2019, 2020)
Conference on Spatial Information Theory (COSIT 2017, 2019)

Reviewer for

Journals | *Cognitive Research: Principles and Implications*
Computers, Environment and Urban Systems
International Journal of Geo-information
Journal of Location-based Services
Environment and Planning B: Planning and Design
Tourism Geographies
International Journal of Design Creativity and Innovation
IxD&A: Interaction Design and Architecture Journal
Journal of Urban Technology
Frontiers in Psychology

Conferences | *Conference on Spatial Information Theory (COSIT)*
Cognitive Science Society (CogSci)
Eye-Tracking Research and Applications (ETRA)
Spatial Cognition Conference
Designing Interactive Systems Conference (DIS)

Books | *European Handbook of Crowdsourced Geographic Information*, Ubiquity Press

Doctoral and Post-Doctoral Training

2017	**Bayesian Modeling for Cognitive Science** *University of Amsterdam.*
	Growing Your Leadership Skills *University of Münster.*
2016	**Managing Conflicts** *University of Münster.*
	Summer School on Topological and Scaling Analyses. *EU COST Action TU1305, Gävle University, Sweden.*
	Finding Funding - an introduction to the German funding system *University of Münster.*
	Geo-Ethics Symposium. *University Twente, Netherlands.*
	Eye Tracking–Experimental Design, Implementation, and Analysis *Winter School, ETH Zürich.*
2015	**EU Funding for Early-Career Researchers.** *European Research Services.*
2014	**Innovation Challenge Knowledge Exchange School.** *5-day long training programme on business-academic collaboration organised by The Work Foundation, London, UK.*
	Talk Nerdy to Me. *Public engagement seminar organised by the British Science Association.*
2013	**Introduction to Computational Space Syntax.** *9th International Space Syntax Symposium in Seoul, South Korea.*
	International Spatial Cognition Summer Institute. *University of California Santa Barbara, USA.*
2012	**ProAnVis—Processing, Analysis and Visualisation of Tracking Data.** *COST Action, TU Delft, NL.*

Research Skills and Methods

desktop and mobile eye-tracking, architectural analysis (Space Syntax), advanced statistics (Bayesian mixed-effects models), R

—— IMPACT ——

Invited Academic Talks and Expert Meetings

Sep 2019	**Future Cities Lab, Singapore** *(invited research talk).*
July 2018	**Center for Cognitive Science.** *University of Freiburg, Germany (invited research talk).*
Mar 2016	**Chair of Cognitive Science.** *ETH Zürich, Switzerland (invited research talk).*
Jun 2015	**Rethinking the Senses: Experimental Approaches and Methods in the Art Museum.** *TATE Modern and Centre for the Study of the Senses at the University of London (expert meeting).*
May 2015	**Center for Cognitive Science.** *University of Freiburg, Germany (invited research talk).*

Public Engagement

Feb 2014	**What are you staring at? Space, Psychology, Eye-Tracking.** *BWA Dizajn Centre for Contemporary Arts, Wroclaw, Poland.* Designed and conducted a workshop on Eye-Tracking and Space Syntax techniques for curatorial design.
Oct 2013	**Field study.** *BALTIC Centre for Contemporary Art, Newcastle, UK.* Oversaw a Mobile Eye-Tracking study in a working art gallery, involving its staff and visitors.
2012	**Popular science articles.** *'Zielone Miasto' [Green City] Magazine, Poland.* A series of articles on sustainability and city livability [in Polish].

Policy

Mar 2014	**Visual Museum Experiment.** *Cultural NGOs, Warsaw, Poland.* Member of a working group of academics, curators, and art educators designing action scenarios for museums in Poland. Scenarios and guidelines published under a Creative Commons licence. http://wizualnyeksperymentmuzealny.wordpress.com

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TEACHING

Staff Training Delivered

2019	**Bayesian Mixed Effect Models with brms R package**. *Cognition, Perception and Urban Behaviour Group, Future Cities Lab, Singapore.*
2018	**Linear-Mixed Effect Models**. *Institute for Geoinformatics, Münster.*

Courses Designed and Taught

2019	*Wayfinding and Navigation* (MA; lecture and seminar)
2018	*Spatial Cognition* (MA; lecture and seminar)
2017	*Spatial Cognition* (MA; lecture and seminar)
2016	*Research Methods in HCI* (MA; lecture and seminar) *Interaction with Geographic Information* (BA; lecture and seminar)
2015	*Research Methods in HCI* (MA; lecture and seminar) *SenseBox for People-Centred Urban Planning* (study project) *Architectural Design* (study project) *Human-Computer Interaction and Usability* (BA; seminar and lecture)

Supervison

PhD	Co-supervising 3 PhD students involved in the 'WayTO' project. Moderating the meetings of the *Graduate School of Geoinformatics* - an internal body providing support to the Institute's PhD students through monthly, research skills-oriented supervision meetings.
MA theses	*Stop and Think: Pauses During Giving Route Instructions* - Yusi Ji

	Landmark-Based Wayfinding System for the Blind - Rajchandar Padmanaban
	Visualizing Off-Screen Landmarks on Maps for Mobile Devices - Maurin Radtke
	Conceptual Design, Implementation and Evaluation of a Motorbike Group Riding System with a Focus on a Group Navigation Feature - Fabian Röhr (in colaboration with BMW)
	Location-Based Notifications to Encourage VGI Participation and Contribution: Combining persuasive technologies with citizen science for controlled intervention - Joanna Kwong
	Environmental Forms and Route Directions: Influences on the Acquisition of Spatial Knowledge - Stefan Fuest
	Predefining regionalised environments for assisted navigation - Caitlin Lara Thorn
	Pointing to a place across a barrier: Study of barriers effect on human survey knowledge - Sarah Abdelkader
	A Gesture Inspired Navigation Support - Shankarlingam Sundaresan
	Analysis of the validity and reliability of the Sketch Map Classifier tool - Laura Meierkort
	Embodied 3d Isovist as a Predictor of Spatial Experience - Charu Manivannan
	The influence of tasks on the reliability of sketch map analysis methods - Antonia van Eek
	Driver stress level prediction - Nico Steffens (in collaboration with Bosch GmbH)
BA theses	*Space Syntax and Navigation* - Bartosz Mazurkiewicz
	Towards a 'Calm' Navigational System - Boris Stöcker
	Visibility Analysis of the GEO1 and Psychology Buildings, in Comparison (Space Syntax) - Lasse Einfeldt
	Designing a Research Tool for Studying Real-time Uncertainty in Inferring Spatial Knowledge while Drawing a Sketch Map - Torben Kraft
Assistants	Overlooking and supervising research of 1–2 Student Assistants per semester.
External	External PhD co-supervisor (2019–): Dajana Snopková . *Department of Geography, Masaryk University, Brno, Czech Republic.*
	External examiner (2019). *MSc Programme, Geo-Information Science and Earth Observation (ITC), University of Twente, The Netherlands.*

SERVICE

ethics	Head of the Institute's Ethics Committee (2019–).
	Designed and supervised the implementation of an institute-wide ethics clearance policy for all studies involving human participants (2017-2018).
data protection	Co-designed and supervised the implementation of an institute-wide data protection policy and server infrastructure (2017-2018).

AWARDS AND FUNDING

As Postdoctoral Researcher

Nominations	**Heinz Maier-Leibnitz-Preis**. University of Münster's nominee for the Heinz Maier-Leibnitz-Preis. Each German university can nominate up to 2 untenured researchers per year, recognising 'outstanding research achievements'. *DFG: German Research Foundation.*
Grants	**AGILE early-stage research bursary**. 1200 EUR early-stage research bursary towards the cost of purchasing a mobile eye-tracker in order to gather preliminary data for own research proposal. *AGILE: Association of Geographic Information Laboratories in Europe.*
	DAAD travel grant. 1100 EUR for participating in the course on Bayesian Modeling for the Cognitive Science. *DAAD: German Academic Exchange Service.*
	Conference travel grant Travel and accomodation grant to attend and present at the symposium "Interdisciplinarity Revisited" (grant renounced). *VolkswagenStiftung.*

As PhD Student

Awards	**Fee waiver and maintenence grant** Received a 100% tuition fee waiver and a 3-year maintenance grant towards pursuing the doctoral degree. *Northumbria University, Newcastle, UK.*
Individual Travel Grants	Secured **over £4700** of travel funding from organisations: *Experimental Psychology Society (Grindley Grant), Spatial Cognition Research Center SFB/TR 8, MOVE (COST Action IC0903), COSIT2013, University of California Santa Barbara, ETH Zürich, Northumbria University Graduate School (x3).*
Public Engagement	Secured **over £900** towards the costs of attending and co-organising public engagement activities (see section on Public Engagement).
Conference Volunteering	Volunteered as staff at MuseumNext2012 and GIScience2014 conferences in exchange for a fee waiver.

As MA Student

Awards	Scholarships for excellent admission scores (year 1) and high GPA (year 2); Erasmus Exchange (year 3) and Erasmus Internship (year 4) scholarships; Student conference attendance scholarship (year 5).

OTHER

Languages spoken

Polish	Native.
English	Professional Fluency.
German	B1-Level Certificate (intermediate).