

# Jakub Krukar, PhD

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*Situated Spatial Cognition — Space Syntax — Architectural/Urban Usability*

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## RESEARCH

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### Academic Background

Oct 2016- Mar 2017	Substitute Professor (Vertretungsprofessur), <i>Substitution of Angela Schwering's W2 Professorship in Geoinformatics at Spatial Intelligence Lab.</i> <ul style="list-style-type: none"><li>• Principal supervision of PhD students, supervision and examination of Master and Bachelor theses;</li><li>• Project management for the 'WayTO' project, research group coordination, budgeting (10+ researchers).</li></ul>
Feb 2015—	Post-Doctoral Researcher, <i>Spatial Intelligence Lab, Institute for Geoinformatics, University of Münster, Germany.</i> <b>Wayfinding Through Orientation ('WayTO')</b> An ERC Starting Grant project awarded to Prof. Angela Schwering.
Sep 2011– Jun 2015	PhD Student, <i>Department of Architecture and the Built Environment, Northumbria University, Newcastle, United Kingdom.</i> <b>The Influence of an Art Gallery's Spatial Layout on Human Attention to and Memory of Art Exhibits</b> Principal Supervisor: Prof. Ruth Conroy Dalton (Architecture). Second Supervisor: Prof. Chris Dorsett (Fine Arts). <ul style="list-style-type: none"><li>• 100% tuition fee waiver</li><li>• 3-year maintenance grant</li></ul>
2006–2011	MA in Psychology, <i>University of Social Sciences and Humanities, Warsaw.</i> <b>Cross-Cultural Differences in Cognitive Representations of the Hagia Sophia Building in Istanbul</b> Supervisor: Andrzej Strzałecki, Professor of Psychology. <ul style="list-style-type: none"><li>• Scholarships for excellent admission scores (year 1) and high GPA (year 2).</li><li>• Erasmus Exchange (year 3) and Erasmus Internship (year 4) scholarships</li><li>• Student conference attendance scholarship (year 5).</li></ul>
Jan-Dec 2010	Erasmus Exchange Programme. <i>Maltepe Universitesi, Istanbul, Turkey.</i>
2003-2006	Marie Skłodowska-Curie High School. <i>Gorzów Wielkopolski, Poland.</i>

## Publications

fully  
peer-reviewed

Schwering, A., Krukar, J., Li, R., Anacta, V. J., and Fuest, S. (2017). Wayfinding Through Orientation. *Spatial Cognition & Computation*, pages 1–31

Krukar, J., Schultz, C., and Bhatt, M. (2017b). Towards Embodied 3D Isovists. In Heitor, T., Serra, M., Bacharel, J. P. S. M., and da Silva, L. C., editors, *Proceedings of the 11th Space Syntax Symposium*. Instituto Superior Tecnico, Departamento de Engenharia Civil, Arquitetura e Georrecurso, Lisbon

Löwen, H., Schwering, A., Krukar, J., and Winter, S. (2017). Perspectives in Externalizations of Mental Spatial Representations. In Bregt, A., Sarjakoski, T., van Lammeren, R., and Rip, F., editors, *Societal Geo-innovation. AGILE 2017. Lecture Notes in Geoinformation and Cartography*, pages 111–127, Cham. Springer

Anacta, V. J. A., Humayun, M. I., Schwering, A., and Krukar, J. (2017). Investigating Representations of Places with Unclear Spatial Extent in Sketch Maps. In Bregt, A., Sarjakoski, T., van Lammeren, R., and Rip, F., editors, *Societal Geo-innovation. AGILE 2017. Lecture Notes in Geoinformation and Cartography*, pages 3–17. Springer, Cham

Krukar, J., Dalton, R. C., and 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 Dalton, S. N., Schnädelbach, H., Wiberg, M., and Varoudis, T., editors, *Architecture and Interaction: Human Computer Interaction in Space and Place*, pages 17–35, Cham. Springer International Publishing

Padmanaban, R. and Krukar, J. (2017). *Increasing the Density of Local Landmarks in Wayfinding Instructions for the Visually Impaired*, pages 131–150. Springer International Publishing, Cham  
*publication developed from the student's Master thesis (first author)*

Krukar, J. (2015). *The Influence of an Art Gallery's Spatial Layout on Human Attention to and Memory of Art Exhibits*. Unpublished doctoral dissertation, University of Northumbria at Newcastle, UK

Krukar, J. (2014c). Walk, Look, Remember: The Influence of the Gallery's Spatial Layout on Human Memory for an Art Exhibition. *Behavioural Sciences*, 4(3):181–201

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

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

conference  
abstracts  
and posters

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

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

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

Du, G., Lohoff, L., Krukar, J., and Mukhametov, S. (2016). Comparing Two Methods to Overcome Interaction Blindness on Public Displays. In *Proceedings of the 5th ACM International Symposium on Pervasive Displays, PerDis '16*, pages 243–244, New York, NY, USA. ACM  
*publication developed from the students' course project*

von Stulpnagel, R., Wachter, L., Holland, N., and Krukar, J. (2016). Subjective Risk Perception in Urban Cycling - Assessing The Validity of Opinion-Based Volunteered Geographic Information. In *"Vulnerable road users" Symposium at the 57. Tagung Experimentell Arbeitender Psychologen*, Heidelberg, Germany

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

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

Krukar, J. (2014a). Cognitively Biased Agent-Based Models. In Emo, B., Al Sayed, K., and Varoudis, T., editors, *'Design Cognition and Behavior: Usability in the Built Environment'*. *Proceedings of the workshop held at Spatial Cognition 2014*, pages 4–5, Bremen, Germany

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

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

editorials and  
other

Krukar, J., Hölscher, C., and Conroy Dalton, R. (2017a). Indoor Wayfinding: Interview with Christoph Hölscher and Ruth Conroy Dalton. *KI - Künstliche Intelligenz*, 31(2):185–191

Krukar, J., Schwering, A., and Anacta, V. J. (2017c). Landmark-Based Navigation in Cognitive Systems. *KI - Künstliche Intelligenz*, 31(2):121–124

## Editorial Experience

Journals	<i>Künstliche Intelligenz - German Journal of Artificial Intelligence (Springer)</i> - guest co-editor of the special issue on "Landmark-Based Navigation in Cognitive Systems" <a href="http://www.springer.com/computer/ai/journal/13218">http://www.springer.com/computer/ai/journal/13218</a>
Workshops	<i>Rethinking Wayfinding Support Systems</i> workshop organised at the 13th International Conference on Spatial Information Theory (COSIT2017) <a href="http://www.cosit2017.org">http://www.cosit2017.org</a>

## Program Committee Member

*Conference on Spatial Information Theory (COSIT2017)*

## Reviewer for

Journals	<i>Computers, Environment and Urban Systems</i> <i>Journal of Location-based Services</i> <i>Environment and Planning B: Planning and Design</i> <i>International Journal of Design Creativity and Innovation</i> <i>IxD&amp;A: Interaction Design and Architecture Journal</i> <i>Journal of Urban Technology</i>
Conferences	<i>Conference on Spatial Information Theory (COSIT)</i> <i>Cognitive Science Society (CogSci)</i>
Books	<i>European Handbook of Crowdsourced Geographic Information</i> , 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.*

## Pre-Doctoral Research Experience and Employment

- Oct–Dec 2010 | **Erasmus-Sponsored Intern.** *E-Medya Consultancy, Istanbul.*  
Oversaw usability studies in webdesign and architecture (way-finding systems and behavioural mapping).
- Dec 2009 | **Intern.** *UseLab Research Company, Warsaw.*  
Conducted website eye-tracking research for a corporate client from the banking sector.
- 2007–2008 | **Volunteer Research Assistant.** *Institute of Psychology, University of Social Sciences and Humanities, Warsaw.*  
Conducted experiments and assisted in data analysis throughout a project on mechanisms of implicit memory.

## Research Skills

Methods	desktop and mobile eye-tracking, architectural analysis (Space Syntax), statistics (experience with GLM-family including linear mixed-effects models, factor analysis and basic spatial statistics), user-based experiments (in-the-wild studies preferred over laboratory-based settings)
Software	R, SPSS, Vizard (python-based virtual reality toolkit), OpenSesame (python-based experiment builder), online survey platforms, DepthMap (Space Syntax analysis), CAD packages, ArcGIS (including Axwoman plug-in) and QGIS (including SpaceSyntax plug-in)
Hardware	desktop and mobile eye-tracking, virtual reality headsets

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## IMPACT

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## Invited Academic Talks and Expert Meetings

Mar 2016	<b>Chair of Cognitive Science.</b> <i>ETH Zürich, Switzerland (invited research talk).</i>
Jun 2015	<b>Rethinking the Senses: Experimental Approaches and Methods in the Art Museum.</b> <i>TATE Modern and Centre for the Study of the Senses at the University of London (expert meeting).</i> <a href="http://bit.ly/1W4X94R">http://bit.ly/1W4X94R</a>
May 2015	<b>Center for Cognitive Science.</b> <i>University of Freiburg, Germany (invited research talk).</i>

## Public Engagement

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

## Policy

Mar 2014	<b>Visual Museum Experiment.</b> <i>Cultural NGOs, Warsaw, Poland.</i> <a href="http://wizualnyeksperymentmuzealny.wordpress.com">http://wizualnyeksperymentmuzealny.wordpress.com</a> 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.
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## TEACHING

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### Courses Taught

2017	<i>Spatial Cognition</i> (MA; lecture and seminar)
2016	<i>Research Methods in HCI</i> (MA; lecture and seminar) <i>Interaction with Geographic Information</i> (BA; lecture and seminar)
2015	<i>Research Methods in HCI</i> (MA; lecture and seminar) <i>SenseBox for People-Centred Urban Planning</i> (study project) <i>Architectural Design</i> (study project) <i>Human-Computer Interaction and Usability</i> (BA; seminar and lecture)

### Supervision

PhD	Leading the <i>Graduate School of Geoinformatics</i> - an internal body providing support to the Institute's PhD students through monthly, research skills-oriented supervision meetings. Co-supervising 3 PhD students involved in the 'WayTO' project.
MA theses	<i>Stop and Think: Pauses During Giving Route Instructions</i> - Yusi Ji <i>Landmark-Based Wayfinding System for the Blind</i> - Rajchandar Padmanaban <i>Visualizing Off-Screen Landmarks on Maps for Mobile Devices</i> - Maurin Radtke <i>Conceptual Design, Implementation and Evaluation of a Motorbike Group Riding System with a Focus on a Group Navigation Feature</i> - Fabian Röhr <i>Location-Based Notifications to Encourage VGI Participation and Contribution: Combining persuasive technologies with citizen science for controlled intervention</i> - Joanna Kwong <i>Environmental Forms and Route Directions: Influences on the Acquisition of Spatial Knowledge</i> - Stefan Fuest
BA theses	<i>Space Syntax and Navigation</i> - Bartosz Mazurkiewicz <i>Towards a 'Calm' Navigational System</i> - Boris Stöcker <i>Visibility Analysis of the GEO1 and Psychology Buildings, in Comparison (Space Syntax)</i> - Lasse Einfeldt
Assistants	Overlooking and supervising research of 1–2 Student Assistants per semester.

### Service

ethics	Designed and supervised the implementation of an institute-wide ethics clearance policy for all studies involving human participants.
data protection	Co-designed and supervised the implementation of an institute-wide data protection policy and server infrastructure.

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## FUNDING

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### As Postdoctoral Researcher

Research Grants	<i>1200 EUR Early-stage research bursary from AGILE: Association of Geographic Information Laboratories in Europe</i> A seed-grant towards the purchase of a Mobile Eye-Tracking system with the aim of preliminary data collection for an independent research proposal.
Travel Grants	<i>1100 EUR towards participation in the course on Bayesian Modeling for the Cognitive Science</i> German Academic Exchange Service (DAAD).

### As PhD Student

Individual Travel Grants	Secured <b>over £4700</b> of travel funding from organisations: <i>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).</i>
Public Engagement	Secured <b>over £900</b> 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.