

# Jakub Krukar, PhD

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

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## RESEARCH EXCELLENCE

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### Academic Background

Feb 2015—	Post-Doctoral Researcher, <i>Spatial Intelligence Lab, Institute for Geoinformatics, University of Münster, Germany.</i> <b>Wayfinding Through Orientation</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 Strzalecki, Professor of Psychology. <ul style="list-style-type: none"><li>• Scholarship for excellent admission scores (year 1).</li><li>• Scholarship for high GPA (year 2).</li><li>• Erasmus Student Exchange scholarship (year 3).</li><li>• Erasmus Internship scholarship (year 4)</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>

## Doctoral and Post-Doctoral Training

Aug 2016	<b>Managing Conflicts</b> <i>University of Münster.</i>
Jun 2016	<b>Summer School on Topological and Scaling Analyses.</b> <i>EU COST Action TU1305, Gävle University, Sweden.</i>
Jun 2016	<b>Finding Funding - an introduction to the German funding system</b> <i>University of Münster.</i>
Mar 2016	<b>Geo-Ethics Symposium.</b> <i>University Twente, Netherlands.</i>
Jan 2016	<b>Eye Tracking—Experimental Design, Implementation, and Analysis</b> <i>Winter School, ETH Zürich.</i>
Nov 2015	<b>EU Funding for Early-Career Researchers.</b> <i>European Research Services.</i>
May 2014	<b>Innovation Challenge Knowledge Exchange School.</b> <i>The Work Foundation, London, UK.</i> 5-day long training programme on business-academic collaboration.
Feb 2014	<b>Talk Nerdy to Me.</b> <i>Science in Society, British Science Association.</i> Public engagement seminar.
Nov 2013	<b>Introduction to Computational Space Syntax.</b> <i>9th International Space Syntax Symposium in Seoul, South Korea.</i> Workshop on computational techniques for Space Syntax alternative to the existing, ready-made software.
Aug 2013	<b>International Spatial Cognition Summer Institute.</b> <i>University of California Santa Barbara, USA.</i> Summer school on Spatial Cognition for international PhD students.
May 2012	<b>ProAnVis—Processing, Analysis and Visualisation of Tracking Data.</b> <i>University of Technology, Delft, NL.</i> COST-sponsored clinic on movement behaviour (GIS).
2011–2014	<b>Massive Open Online Courses</b> <i>Coursera.org, Udacity.com</i> Self-directed learning of R, ArcGIS Online, and Spatial Computing.

## Pre-Doctoral Research Experience and Employment

Oct–Dec 2010	<b>Erasmus-Sponsored Intern.</b> <i>E-Medya Consultancy, Istanbul.</i> Oversaw usability studies in webdesign and architecture (way-finding systems and behavioural mapping).
Dec 2009	<b>Intern.</b> <i>UseLab Research Company, Warsaw.</i> Conducted website eye-tracking research for a corporate client from the banking sector.
Sep 2009	<b>Experiment Facilitator.</b> <i>Polish Academy of Sciences, Warsaw.</i> Assisted in a psychological marketing research for a judicial hearing; conducted a field study in a two-person team.
2007–2008	<b>Volunteer Research Assistant.</b> <i>Institute of Psychology, University of Social Sciences and Humanities, Warsaw.</i> 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 Online (including Axwoman plug-in) and QGIS (including SpaceSyntax plug-in)
Hardware	Tobii (desktop and mobile eye-trackers), Oculus Rift (virtual reality headset)

## Publications

fully peer-reviewed	<p>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, <i>Architecture and Interaction: Human Computer Interaction in Space and Place</i>, pages 17–35, Cham. Springer International Publishing</p> <p>Padmanaban, R. and Krukar, J. (2016). [accepted, in press] Increasing the Density of Local Landmarks in Wayfinding Instructions for the Visually Impaired. In Huang, H. and Gartner, G., editors, <i>Lecture Notes in Geoinformation and Cartography</i>. Springer, Vienna, Austria <i>publication developed from the student's Master thesis (first author)</i></p> <p>Krukar, J. (2015). <i>The Influence of an Art Gallery's Spatial Layout on Human Attention to and Memory of Art Exhibits</i>. Unpublished doctoral dissertation, University of Northumbria at Newcastle, UK</p> <p>Krukar, J. (2014c). Walk, Look, Remember: The Influence of the Gallery's Spatial Layout on Human Memory for an Art Exhibition. <i>Behavioural Sciences</i>, 4(3):181–201</p> <p>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, <i>Eye Tracking for Spatial Research, Proceedings of the 1st International Workshop (in conjunction with COSIT 2013)</i>, pages 14–19, Scarborough, UK</p> <p>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, <i>Proceedings of Ninth International Space Syntax Symposium</i>, pages 074:1–19, Seoul. Sejong University Press <i>presented at the plenary session of the Symposium</i></p>
conference abstracts and posters	<p>Krukar, J. and Schwering, A. (2016). What is Orientation? [accepted, talk to be delivered]. In <i>KogWis: Space for Cognition</i>, Bremen, Germany</p> <p>Anacta, V., Krukar, J., Humayun, M., and Schwering, A. (2016). Visualizing salient features in spatial descriptions. In <i>Poster at European Workshop on Image and Cognition (EWIC)</i>, Paris, France</p>

- 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

## Editorial Experience

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

## Reviewer for

- Journals | *Computers, Environment and Urban Systems*  
*Environment and Planning B: Planning and Design*  
*International Journal of Design Creativity and Innovation*  
*Journal of Urban Technology*
- Conferences | *Conference on Spatial Information Theory - COSIT* (sub-reviewer)
- Books | *Ubiquity Press Book Publishers* - provided peer-review for 30+ chapters in a book publication

### Invited Academic Talks and Expert Meetings

- Mar 2016 | **Chair of Cognitive Science.** *ETH Zürich, Switzerland (invited research talk).*
- Jun 2015 | **Rethinking Research: 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).*  
<http://bit.ly/1W4X94R>
- 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.*  
<http://wizualnyeksperymentmuzealny.wordpress.com>  
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

SS 2016	<i>Interaction with Geographic Information</i> (lecture and seminar) HCI course focusing on diverse ways of communicating and manipulating geographic information. Course co-lead with Prof. Chris Kray.
WS 2015	<i>Research Methods in HCI</i> (lecture and seminar) Advanced Research Methods course containing a block of lectures as well as an HCI study project. Course co-designed and co-lead with Prof. Chris Kray.
WS 2015	<i>SenseBox for People-Centred Urban Planning</i> (study project) A study project aimed at utilising an arduino-based sensor platform (SenseBox) for the extraction and analysis of meaningful urban data with the involvement of city citizens. Course co-designed and co-lead with Thomas Bartoschek and Dr Carl Schultz.
SS 2015	<i>Architectural Design</i> (study project) Aimed at Geoinformatics students who learn to identify and formalise aspects of an indoor space significant from the viewpoint of a user-centric design. Students developed user studies and software applications in order to demonstrate the concept of their interest. Course co-designed and co-lead with Dr Carl Schultz.
SS 2015	<i>Human-Computer Interaction and Usability</i> (seminar and lecture) Students acquire knowledge about basic HCI methods and Usability Testing and run demo user studies of geo-spatial software. Course co-lead with Prof. Angela Schwering and Prof. Chris Kray.

### (co-)Supervision

Assistants	Overlooking and supervising 1–2 research Student Assistants per semester.
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
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
PhD	Co-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.

### Service

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

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## FUNDING

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### As PhD Student

Individual Travel Grants	Secured <b>over £4700</b> of travel funding from organisations: <i>Experimental Psychology Society (Grindley Grant)</i> , <i>Spatial Cognition Research Center SFB/TR 8</i> , <i>MOVE (COST Action IC0903)</i> , <i>COSIT2013</i> , <i>University of California Santa Barbara</i> , <i>ETH Zürich</i> , <i>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 <i>MuseumNext2012</i> and <i>GIScience2014</i> conferences in exchange for a fee waiver.