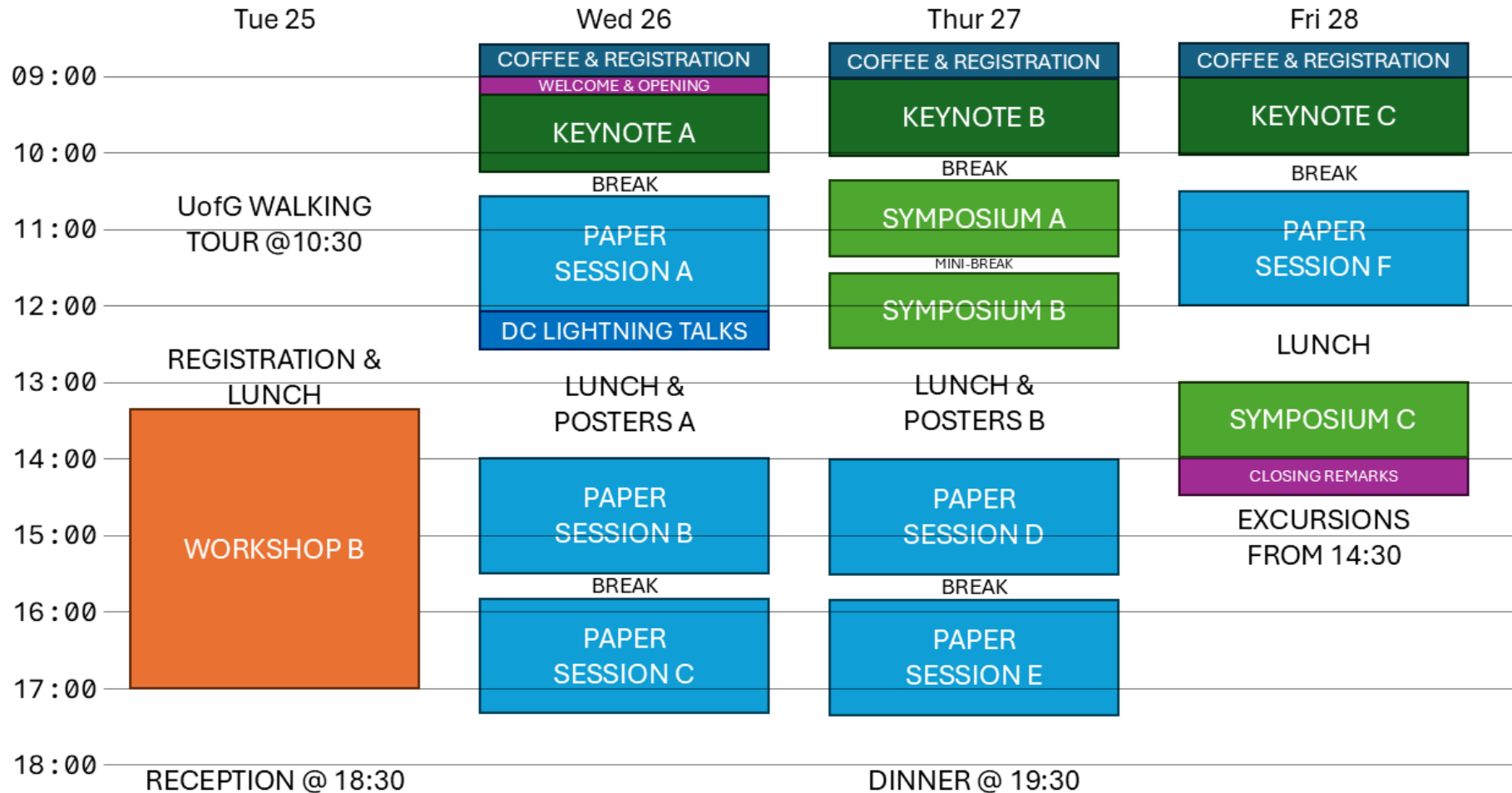


Schedule



Detailed Schedule

Tuesday 25 – Day 1	
10:00	Registration opens
10:30	University of Glasgow campus walking tour and networking
12:30	Lunch
13:20	Workshop B: Creating Requirements for a Spatial Cognition Grand Challenge <i>Stephen Gilbert, Jonathan Kelly, Michael Dorneich, Jundi Liu and James Lathrop</i>
17:00	Day 1 end
18:30	Civic Reception

Wednesday 26 – Day 2	
08:30	Coffee & Registration
09:00	Welcome & Opening
09:15	Keynote A: From Classroom Observations to National Trials: The Role of Spatial Reasoning in Mathematics Cognition <i>Tom Lowrie</i>
10:15	Break
10:35	Paper Session A: Navigation Behaviour and Environmental Interaction Human Navigation Under GPS Jamming: A Natural Experiment on the Society Level <i>Robert Gorodnitsky and Shachar Maidenbaum</i> An Empirical Study of Pedestrian Comfortable Distances in Real-World Interactions <i>Mengnan Cai, Ehsan Hamzei, Martin Tomko and Stephan Winter</i> Quality but not Quantity of Exploration Predicts Environmental Learning and Navigation in Immersive Virtual Environments <i>Mable Zhou, Daisy Vargas, Elizabeth Chrastil and Mary Hegarty</i> How Floor Rotation Fragments 3D Cognitive Maps <i>Amirtha Varshini Raja, Tianyi Xiao, Martin Raubal, Angela Schwering and Jakub Krukar</i>
12:05	Doctoral Colloquium Lightning Talks
12:35	Lunch & Poster Session A
14:00	Paper Session B: Spatial Perception, Attention and Representation From Gaze to Choice: Attention-Informed Spatial Decision Modeling in Virtual Atrium Spaces <i>Toshihiro Osaragi, Takumi Nishikawa, Shokatsu Chen, Maki Kishimoto, Hiroyuki Kaneko and Junichi Makieda</i> Seeing, Following, and Exploring: Perceptual Range, Social Imitation, and Environmental Familiarity in Collective Wayfinding <i>Zahra Alinam and Patrick Roberts</i> Performance Convergence as a Driver of Visual Strategy: A Study Focusing on Scanpath Similarities in Mental Rotation Tasks <i>Mirko Saunders and Claudia M. Quaiser-Pohl</i> Externalizing Perceived Distance and Slant on Sloped Terrain: Comparing Verbal Estimates, 2D, and 3D Sketch Mapping

	<i>Yuzhe Che, Tianyi Xiao, Yunan Yang, Ece Beren Genc, Diah Iraw and Martin Raubal</i>
15:30	Break
15:50	Paper Session C: Spatial Thinking and STEM Education Untapped Spatial Strengths: Supporting STEM Pathways in Rural and Regional Education <i>Danielle Harris</i> Reframing Spatial Reasoning in Early Fraction Learning <i>Chelsea Cutting, Danielle Harris and Zachary Hawes</i> Toward a Transdisciplinary Account of Spatial Thinking in STEM <i>Ilyse Resnick</i> STEM Attitudes and Aspirations Across Early and Mid-Adolescence: Associations With Spatial Ability and Visuospatial Working Memory <i>Styliani Malkogeorgou, Gavin Duffy, Marianna Pagkratidou and Petra Jansen</i>
17:20	Day 2 end

Thursday 27 – Day 3	
08:30	Coffee & Registration
09:00	Keynote B: Spatial Skills and Memory: How Spatial Training Defies the Odds to Improve Overall Performance <i>Lauren Margulieux</i>
10:00	Break
10:20	Symposium A: Mechanisms Underlying the Spatial–Mathematical Connection <i>Chair: Ilyse Resnick</i>
11:20	Break
11:40	Symposium B: Spatial skills measurement for cognitive, developmental and educational research: Challenges and solutions <i>Chair: Emily Farran</i>
12:40	Lunch & Poster Session B
14:00	Paper Session D: Navigation, Cognition and Brain Function Navigation as a Digital Marker of Cognitive Impairment: Five Years of Evidence from the Spatial Performance Assessment for Cognitive Evaluation (SPACE) <i>Victor R. Schinazi and Giorgio Colombo</i> From Space to Experience: Understanding Visitor Behaviour in Museums Through Visibility Analysis <i>Mohammad Forghanielahabadi, Sergei Gepshtein, Sergey Savel'Ev, Kathryn Brown, Alison Kahn, Haotian Dai and Asya Natapov</i> Clarification of Developmental Topographical Disorientation (DTD): Identification of a Distinct Navigation Profile <i>Midas Stöfösel, Martine van Zandvoort and Ineke van der Ham</i> Reliability of Spatial Cues Modifies Entorhinal-Hippocampal Functional Connectivity <i>Maayan Merhav</i>
15:30	Break
15:50	Paper Session E: Development and Education

	Associations Between Children's Socioeconomic Status, Their Spatial Abilities and Later Mathematics Proficiency <i>Sarah McCarthy</i> Greater Male Variability in Mental Rotation Skills Emerges Early in Childhood <i>Jillian Lauer</i> Impact of an Intervention for Improving Spatial Skills Among Adolescents by Gender and SES <i>Gavin Duffy, Liam Maquet, Sheryl Sorby and Jeffrey Buckley</i> Assessing Map–Environment Transformations in Children: A VR-Based Study of Large-Scale Spatial Abilities <i>Helen Müller and Angela Schwering</i>
17:20	Day 3 end
19:30	Conference Dinner

Friday 28 – Day 4	
08:30	Coffee & Registration
09:00	Keynote C: Educating the Next Generation of Engineers: Spatial Thinking Is Key to Their Success <i>Sheryl Sorby</i>
10:00	Break
10:30	Paper Session F: Computational Approaches to Spatial Cognition Computational Spatial Fluency: A Framework for Interactive Three-Dimensional Making <i>Tracy Gardner and Yasemin Allsop</i> Context-Aware Personalized Routing: Learning User Preferences Through Geographic Features <i>Leon Preusker and Mina Karimi</i> Evaluating Large Language Models' Ability to Reason About Anatomical Spatial Relations <i>Maria Tsourma, Manolis Koubarakis, Anthony Cohn, Robert E. Blackwell and Anastasios Drosou</i> When Correct Is Not Human: Comparing Human and LLM Preferences in Spatial Reasoning <i>Robert Blackwell, Daniel Brand, Marco Ragni and Anthony Cohn</i>
12:00	Lunch
13:00	Symposium C: New Perspectives on Individual Differences in Human Navigation <i>Chair: Chiara Meneghetti</i>
14:00	Closing remarks
14:30	Day 4 end
14:30	Excursions

Programme

Paper Presentations

Paper Session A: Navigation Behaviour and Environmental Interaction

Human Navigation Under GPS Jamming: A Natural Experiment on the Society Level

Robert Gorodnitsky and Shachar Maidenbaum

An Empirical Study of Pedestrian Comfortable Distances in Real-World Interactions

Mengnan Cai, Ehsan Hamzei, Martin Tomko and Stephan Winter

Quality but not Quantity of Exploration Predicts Environmental Learning and Navigation in Immersive Virtual Environments

Mable Zhou, Daisy Vargas, Elizabeth Chrastil and Mary Hegarty

How Floor Rotation Fragments 3D Cognitive Maps

Amirtha Varshini Raja, Tianyi Xiao, Martin Raubal, Angela Schwering and Jakub Krukar

Paper Session B: Spatial Perception, Attention and Representation

From Gaze to Choice: Attention-Informed Spatial Decision Modeling in Virtual Atrium Spaces

Toshihiro Osaragi, Takumi Nishikawa, Shokatsu Chen, Maki Kishimoto, Hiroyuki Kaneko and Junichi Makieda

Seeing, Following, and Exploring: Perceptual Range, Social Imitation, and Environmental Familiarity in Collective Wayfinding

Zahra Alinam and Patrick Roberts

Performance Convergence as a Driver of Visual Strategy: A Study Focusing on Scanpath Similarities in Mental Rotation Tasks

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Externalizing Perceived Distance and Slant on Sloped Terrain: Comparing Verbal Estimates, 2D, and 3D Sketch Mapping

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Untapped Spatial Strengths: Supporting STEM Pathways in Rural and Regional Education

Danielle Harris

Reframing Spatial Reasoning in Early Fraction Learning

Chelsea Cutting, Danielle Harris and Zachary Hawes

Toward a Transdisciplinary Account of Spatial Thinking in STEM

Ilyse Resnick

STEM Attitudes and Aspirations Across Early and Mid-Adolescence: Associations With Spatial Ability and Visuospatial Working Memory

Styliani Malkogeorgou, Gavin Duffy, Marianna Pagkratidou and Petra Jansen

Paper Session D: Navigation, Cognition and Brain Function

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Victor R. Schinazi and Giorgio Colombo

From Space to Experience: Understanding Visitor Behaviour in Museums Through Visibility Analysis

Mohammad Forghanielahabadi, Sergei Gepshtein, Sergey Savel'Ev, Kathryn Brown, Alison Kahn, Haotian Dai and Asya Natapov

Clarification of Developmental Topographical Disorientation (DTD): Identification of a Distinct Navigation Profile

Midas Stöfösel, Martine van Zandvoort and Ineke van der Ham

Reliability of Spatial Cues Modifies Entorhinal-Hippocampal Functional Connectivity

Maayan Merhav

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Greater Male Variability in Mental Rotation Skills Emerges Early in Childhood

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Evaluating Large Language Models' Ability to Reason About Anatomical Spatial Relations

Maria Tsourma, Manolis Koubarakis, Anthony Cohn, Robert E. Blackwell and Anastasios Drosou

When Correct Is Not Human: Comparing Human and LLM Preferences in Spatial Reasoning

Keynotes

Keynote A: From Classroom Observations to National Trials: The Role of Spatial Reasoning in Mathematics Cognition

Tom Lowrie

Arguably, some of the most important insights in mathematics education research begin not with large-scale data, but with the careful observation of individual students at work. This keynote traces a sustained programme of research that builds from small-scale, authentic classroom observations — in which students were seen to employ spatial skills and tools to varying degrees as they encountered mathematics tasks — to broad, nation-wide randomised control trials examining the relationship between spatial reasoning and mathematics achievement. The more consequential challenge is to understand the mechanisms that underpin this transfer, and to improve program efficacy in ways that can be sustained and scaled. It is at this juncture — where cognitive science, curriculum design, and implementation research converge — that the present program of work is now situated, and it is from this position that the keynote will chart a path forward.

Keynote B: Spatial Skills and Memory: How Spatial Training Defies the Odds to Improve Overall Performance

Lauren Margulieux

This talk will explore the unexpected relationship between spatial skills and achievement in a range of fields, many of which have nothing to do with physical space. Unlike most other cognitive skills that are either untrainable or ungeneralizable, spatial skills can both be developed through practice and improve performance on non-spatial tasks. Discovering the mechanisms for this connection is important for understanding spatial cognition and how to apply spatial training to improve learning and outcomes for people of all ages. This talk draws upon concepts from psychology, education, and neuroscience to examine likely mechanisms, opportunities for future research, and connections to current topics in human learning and performance.

Keynote C: Educating the Next Generation of Engineers: Spatial Thinking Is Key to Their Success

Sheryl Sorby

This keynote addresses the link between engineering success and spatial skills through three themes. In the first theme, data is examined from several studies where positive correlations have been found between spatial skill levels and proficiency in tasks that are a part of what it means to be an engineer. Studies in Theme 1 explore the positive contribution of spatial skills in solving mathematical problems, solving engineering problems, coding, designing, and even technical writing. Theme 2 examines how spatial skills naturally develop just by being enrolled in an engineering program. Taking part in

the spatially demanding activities inherent to engineering studies appears to improve the spatial skills of enrolled students. In Theme 3, we examine the result of implementing explicit spatial skills training for students with initially weak skills. In this theme, the impact of spatial skills training on spatial skills, grades in technical courses, and retention in engineering is explored. The keynote concludes with a call for reform, advocating for an engineering education that acknowledges the importance of spatial skills development for student success and committing to ensuring that all who want to can become the future innovators in the profession.

Workshops

Workshop B: Creating Requirements for a Spatial Cognition Grand Challenge

Stephen Gilbert, Jonathan Kelly, Michael Dorneich, Jundi Liu and James Lathrop

Join us for *the Grand Challenge to Model Human Spatial Cognition*, a half-day workshop at Spatial Cognition 2026 (Tuesday, 25 August, Glasgow), defining the requirements and evaluation rubric for the first Navigator Agent Grand Challenge Competition. Help shape how we build navigation systems that mirror human spatial cognition, not just algorithmic GPS routing.

Symposia

Symposium A: Mechanisms Underlying the Spatial–Mathematical Connection

Chair: Ilyse Resnick

Symposium B: Spatial skills measurement for cognitive, developmental and educational research: Challenges and solutions

Chair: Emily Farran

Symposium C: New Perspectives on Individual Differences in Human Navigation

Chair: Chiara Meneghetti

Posters

Poster Session A

1. Multisensory Spatial Processing Deficits in Mild-to-Moderate Traumatic Brain Injury: Normative Oculomotor Reference Data and Preliminary Evidence for Recovery via Passive Neurosensory Reintegration Training (PNRT) (Kayla Minesinger and Erin Williams)
2. When do pedestrians decide where to go? Temporal dynamics of path commitment in wayfinding (poster) (Wenjie Chen, Asya Natapov and Yasir Ali)
3. Where do park users spend time? Network centrality and activity-location choice in small urban parks (Siwen Wang, Robby Soetanto and Asya Natapov)
4. Headfirst into VR: How dimensionality, guidance, and congruency shape spatial learning in neuroanatomy (Celine Kuipers, Ineke van der Ham, Angus Mol, Jos van der Hage and Judith Schomaker)

5. How LLMs Can Assist Human Coding of Children's Spatial Language (Qingzhou Shi and David Uttal)
6. Healthy Ageing Determinants of Spatial Navigation Performance Measured with the Spatial Performance Assessment for Cognitive Evaluation (SPACE) (Giorgio Colombo)
7. Individual differences in path integration abilities reflect separable components (Alina S. Tu, Michael J. Starrett, Marie Karpinska, Craig E.L. Stark, Mary Hegarty and Elizabeth R. Chrastil)
8. Spatial Interference in Maths Study (SIMS): Investigating the Association Between Spatial Skills and Mathematics Using a Dual-Task Paradigm. (Katie Gilligan-Lee)
9. Scoring Multimodal Spatialized Reasoning Tasks in STEM with a Hybrid LLM Pipeline (Qingzhou Shi, Lauren Smith, Bob Kolvoord and David Uttal)
10. Relationships between spatial visualization, oral communication, and gesture production. (John Lynch and Sheryl Sorby)
11. Improving young adults' performance in paper-folding-and-hole-punching reasoning using a videogame (Zoe Falomir and Pablo García Segarra)
12. Switching Spatial Perspectives and Children's Spatial Reasoning (Jennifer Way)
13. Exploring why and how spatial ability and skills are linked with educational outcomes (Emma Greenwood)
14. The Role of Visual Experience and Sensory Modality in Spatial Language Processing (Yiting Chen)
15. Nonverbal Cognitive Ability Moderates Children's Spatial Language Comprehension Across Live and Video Contexts (Adrienne Wyble)
16. Terra Cognita Toolset - A digital platform for mental mapping and navigation tasks (Dóra Hegyesi)
17. Questions of Domain-Specificity and Transfer: A Case Study of the Field of Prosthetics and Orthotics (Danielle Rothschild Doyle)
18. Spatial Reference Frames in Ageing and Language Across Functional Object Relations (Mohammad Erfanikia)
19. Spatial language in healthy ageing and individuals at increased genetic risk for Alzheimer's disease (Ayesha Areej)
20. Spatial Training and Mathematics Performance in Early Adolescence: The Roles of Anxiety and Attitudes (Nicola Kovacs)
21. The STAMP (Spatial Thinking and Mathematical Performance) Project: Investigating the Spatial-Mathematics Relation across Socioeconomic Backgrounds (Shannon Rosbotham)
22. 3D Mental Rotation Aptitude Modulates Performance and EEG Dynamics in a 2D Letter Rotation Paradigm (Rozemun Khan)
23. Towards Understanding Outbound and Return Wayfinding: Insights from Eye Movements and Environmental Variables (Xuhui Cui)

24. It's Not Only About the Macros: Hippocampal Subfield Microstructure and the Development of Navigation (Stephanie Doner)
25. Spatial Ability Development in Secondary Schools in Ireland – Teachers' experiences of a professional development programme (Ganjina Khujanazarova)

Poster Session B

1. Spatial Estimation of Portion Size in Virtual Reality: an Eye-tracking Study (Nina Rosa, Jiayan Zhao, Jan Oliver Wallgrün, Esther Kok, Travis Masterson and Alexander Klippel)
2. Spatial Configuration, Attention, and Performance in Work-from-Home Environments: A Virtual Reality Study (Or Regev and Dafna Fisher-Gewirtzman)
3. Human navigation under Sustained multisensory clashes in immersive virtual reality (Ariel Kuvatov, Eden Or and Shachar Maidenbaum)
4. Decoding Spatial Reference in a 4D Language: Evidence from Italian Sign Language (Sergio Cámara Mateos, Chiara Bonsignori, Gabriele Gianfreda and Olga Capirci)
5. Augmented Reality as Spatial Scaffolding in Observational Drawing: Supporting Non-Specialist Teachers in Primary Visual Arts (Chia-Pin Kao, Chu-Yu Christine Cheng and Qunshan Zhao)
6. Exploring mechanistic pathways between spatial reasoning and mathematical achievement: A qualitative approach to understanding transfer (Jonathan Adams, Ilyse Resnick and Tom Lowrie)
7. Cockpit Visibility and Accessibility in Emergency Departments: A Space Syntax and Immersive Prototyping Approach (Chenyang Li, Simon Ladouce, Theresa Wheele, Leonel Aguilar Melgar, Michal Gath-Morad, Christoph Hölscher and Ruth Dalton)
8. How Do Outbound and Return Wayfinding Behaviours Differ? Insights from Eye Movements and Environmental Variables (Xuhui Cui, Asya Natapov and Thomas Wilcockson)
9. Elevation Affects Spatial Demonstrative Choice in English: Spatial Communication Systems Reflect (some) Universal Constraints (Kenny Coventry, Harmen Gudde and Dimitra Lazaridou-Chatzigoga)
10. Spatial Ability and STEM Pedagogy in Irish Primary Schools: Examining the Relationship Between Teachers' Spatial Reasoning and Classroom STEM Integration (Cormac Máirtín Ó Tuairisg and Marianna Pagkratidou)
11. Placement Events in English and Korean: Is the 'Tight-Fit/Loose-Fit' Distinction a Location Control Contrast? (Pavla Novakova, Danni Walters, Hongoak Yun and Kenny R. Coventry)
12. Exploring Action Video Games as Spatial Training Tools for Mathematics Ability: Virtual Reality versus Traditional Computers (Marianna Pagkratidou and Conor O'Flaherty)

13. Examining the effects of a co-design process on outreach providers' awareness and perception of spatial ability in STEM (Alissa Roslan, Gavin Duffy, Marija Zivkovic and David Dorran)
14. Geo-Savvy Agents: Integrating Spatial Cognition into Agent-Based Simulation (Sabine Timpf and Franziska Klügl)
15. Spatial Skills in Children Born Preterm: A Systematic Review and Meta-Analysis of Case-Control Studies (Niamh Gaynor, Katie Gilligan-Lee and Shannon Rosbotham)
16. Shifting Viewpoints: The Influence of Sign Language on Social-Spatial Cognition (Vasiliki Sampa, Sergio Cámara Mateos and Olga Capirci)
17. Visual-Spatial Abilities in Children With and Without Intellectual Disabilities (Santa Bartuševica)
18. Exploring spatial development in Scottish secondary education (William Whittaker)
19. Spatial Reasoning from Birth to 11 Years: An evidence-based learning trajectory (Sue Gifford, Emily Farran, Alison Borthwick, Cath Gripton, Andrea Lancaster and Helen Williams)
20. EFFECTS OF VIRTUAL HAND REACH EXTENSION ON DEMONSTRATIVE PRONOUN USAGE IN VR (Atsushi Osaki)
21. An Agent to Teach Support Affordances and Path Stability in Spatial Puzzles (Abhishek Jaiswal, Zoe Falomir and Joan Ruiz Berenguer)
22. 3D Sketch Maps (Suvodip Chakraborty, Marie Simonet, Jakub Krukar, Jiayan Zhao, Kevin Kim, Panos Mavros, Tianyi Xiao, Peter Kiefer, Christoph Holscher, Angela Schwering and Martin Raubal)
23. Exploring the Link between Spatial Skills, Executive Functions and Fluid Reasoning (Dana G. Stefanescu, Aida Moreno-Rus, Zoe Falomir and Noelia Ventura-Campos)
24. Mental Mapping of Transformed Virtual Environments (Jenny Chen and Kate Jeffery)
25. Supporting Reflection Through Visualizations in Informal Climate Change Learning (Danielle Rothschild Doyle, Lauren Smith, Annika Macy, Milla Metlicka, Grace Ocular, Amanda Dickes, Catherine Haden and David Uttal)