

## TSG 23 Agenda

### **TSG 23: *Visualization in the Teaching and Learning of Mathematics.***

Class: A

#### **Session 1 (July 13, 14:30 – 16:30)**

14:30 – 14:50 Welcome and introduction - Setting the scene: Visualization and problem-solving

1. 14:50–15:06

FERDINANDO ARZARELLO, Cristina Sabena, Carlotta Soldano (University of Turin, Torino, Italy). IMAGING AND VISUALIZING IN GEOMETRY: EXPLORATIONS BY MATHEMATICS UNIVERSITY STUDENTS

2. 15:06–15:22

BEATA DONGWI, Marc Schäfer (Rhodes University, Windhoek, South Africa).  
VISUALIZATION AS AN EMBODIED PROBLEM-SOLVING PROCESS

3. 15:22 – 15: 38

LEAH MICHELLE FRAZEE, Michael Battista (Central Connecticut State University, US).  
Characterizing visualization and spatial analytic reasoning for solving isometry problems

4. 15:38 –15:54

DENNIS LEE JARVIS BARING YBANEZ, Catherine Vistro Yu (Ateneo de Manila University, Quezon City, Philippines).  
THE ROLE OF VISUALIZATION TOWARDS STUDENT'S MATHEMATICAL ABSTRACTION AND REPRESENTATION IN SOLVING PROBABILITIES

15: 54 – 15:58 Introduction to the theme: Classroom interaction

5. 15:58 – 16: 14

CLEMENCE CHIKIWA, Marc Schäfer (RHODES UNIVERSITY, Grahamstown, South Africa).  
THE USE OF GESTURES AND LANGUAGE AS CO-EXISTING VISUALISATION TEACHING TOOLS IN MULTILINGUAL CLASSES

6. 16:14 – 16:30

MAREI FETZER (Goethe-University, Frankfurt, Germany).

On objects and visualizations – An interactionistic perspective

**Session 2 (July 13, 19:30 – 21:00)**

19:30 -19:33 Link with previous session and introducing the new session: Visualization and teaching

7. 19:33 – 19:49

HUI-YU HSU (National Tsing Hua University, Hsinchu City, Taiwan).

HOW TEACHERS SCAFFOLD STUDENTS IN VISUALIZING DIAGRAM FOR UNDERSTANDING GEOMETRIC PROBLEM SOLVING

8. 19:49 – 20:05

VIMOLAN MUDALY (University of KwaZulu-Natal, Durban, ZA, South Africa).

Preservice and Inservice teachers' mathematics visualization skills

9. 20:05 – 20:16

HIROTSHI FURUTSU, Yukiko Ishii, Hisashi Kato, Yusuke Washio, Noriko Hirata-Kohno (Nihon University, Japan).

DYNAMIC VISUAL INSTRUCTIONS BY GEOGEBRA FOR INTRODUCING TAKADA'S THEOREM ON PENTAGONS

10. 20:16 – 20:27

WEI WANG, Xue Huang (Northeast Yucai School, Shenyang, China).

HIGH SCHOOL MATHEMATICS INQUIRY TEACHING BASED ON GEOGEBRA VISUALIZATION ENVIRONMENT

20:27 – 20:28 Introduction to the theme: Different kinds of representations, different technologies

11. 20:28 – 20:44

JILL A. COCHRAN (Berry College, Rome, US).

The Development of 3D Representations Using Physical Manipulatives, Technology-Aided Design and 2D Drawings

12. 20:44 – 21:00

ELENA NAFTALIEV (Achva Academic College, Israel).

The Social Construction of Knowledge in a New Pedagogical Setting: the Same Activity Presented as Three Different Interactive Diagrams

### **Session 3 (July 14, 19:30 – 21:00)**

19:30 -19:35 Emerging themes from previous session and prompt for discussion

19:35 – 19:58 Discussion

19:58 – 19:59 Introduction to the theme: Diagrams and mathematics visualization

13. 19:59 – 20:15

FRANCESCO BECCUTI (University of Turin, Italy).

Visualization as vision, imagination and intuition: reflections on graduate students struggling with a visual conjecturing problem

14. 20:15 – 20:26

MARTIN FLASHMAN (Humboldt State University, US).

MAPPING DIAGRAMS: FUNCTION VISUALIZATION OF REAL AND COMPLEX ANALYSIS AND MATRIX ALGEBRA

15. 20:26 – 20:37

ANTTI RASILA (Guangdong Technion Israel Institute of Technology, Shantou, China).

Interactive visualizations of topics in engineering mathematics

20:37 – 20:38 Introduction to the theme: Math, visualization and other disciplines

16. 20:38 – 20:49

LIORA NUTOV (Gordon Academic College of Education, Haifa, Israel).

CONCEPT IMAGES OF INFINITY IN PRE-SERVICE TEACHERS ARTWORKS

17. 20:49 – 21:00

YAN LI, Pan Liu, Xinyu Liu (East China Normal University, Shanghai, China).

RESEARCH ON VISUALIZATION IN MATHEMATICS LEARNING BASED ON MATHEMATICAL DRAMA PERFORMANCE OR BY VIDEO

### **Session 4 (July 17, 21:30 – 23)**

21:30 – 21:33 Link with previous session and introduction to the theme: Visualization and (latest) technologies

18. 21:33 – 21:49

GIULIA BINI, Ornella Robutti (University of Turin, Italy).

SOME LIKE IT SOCIAL: LOOKING INTO THE INTERPLAY BETWEEN MATH AND INTERNET MEMES

19. 21:49 – 22:05

DANIELA GOETZE (University of Siegen, Germany).

CHILDREN'S AMBIGUOUS INTERPRETATION OF VISUALIZATIONS - EYE TRACKING AS A DIAGNOSTIC TOOL FOR DIVISION CONCEPTS

20. 22:05 – 22:16

LUONA WANG (East China Normal University, China).

A REVIEW OF THE APPLICATION CASES OF AUGMENTED REALITY (AR) IN MATHEMATICS EDUCATION

22:16 – 22: 17 Introduction to the theme: Educational materials

21. 22:17 – 22: 28

JILING GU, Fei Zhang (Nanjing normal university, Nanjing, China).

The textbook design of geometrical visualization in "number and algebra" field

22. 22:28 – 22:39

JANOS SZASZ SAXON, Zsuzsa Dardai (Poly-Universe Ltd, Budapest, Hungary).

PUSE (POLY-UNIVERSE IN SCHOOL EDUCATION) METHODOLOGY VISUAL EXPERIENCE BASED MATHEMATICS EDUCATION 2019

23. 22:39 – 22:50

Santanu Dutta, Charudatta Sharad Navare, HARITA RAVAL (Homi Bhabha Centre for Science Education, Mumbai, IN).

DRAWING (ON) DIAGRAMS: TYPICALITY OF GEOMETRIC SHAPES IN CONCEPT IMAGE ELICITATION FOR SECONDARY STUDENTS

22:50 – 23:00 Discussion and conclusion