

1st Joint Workshop on Cross Reality
to be held in conjunction with the 2023 IEEE
International Symposium on Mixed and
Augmented Reality (ISMAR 2023)

April 2023

1 Abstract

Cross Reality (CR) is an emerging technology that focuses on the concurrent usage of or the transition between multiple systems at different points on the reality-virtuality continuum (RVC), including Virtual Reality (VR), Augmented Virtuality (AV), and Augmented Reality (AR). CR has gained significant attention in recent years due to its potential for revolutionizing various research and industry areas where users need to comprehend and explore spatial data and its relevant information in different forms. It is expected that in the near future, more CR applications will arise to allow users to transition along the individual stages of the RVC or to collaborate in-between these stages to use their distinct advantages and mitigate their potential problems.

CR Visualization refers to the ability to create and display abstract or inherently spatial data along the RVC. The visual representations of a Cross-Reality system offer different degrees of virtuality to users and enable users to seamlessly move back and forth across the reality-virtuality continuum.

CR Interaction allows users to naturally and intuitively engage with real and virtual objects and environments. CR enables various forms of interaction, including hand gestures, voice commands, haptic feedback, and eye-tracking. Advanced interaction techniques for object manipulation, locomotion, and spatial interaction enhance the level of immersion and interactivity in CR experiences, enabling users to seamlessly perform complex tasks and interactions.

CR user behavior and experience are concerned with how users perceive and respond to visual content in CR environments. CR technology enables users to immerse themselves in virtual or augmented reality spaces, allowing them to interact with and seamlessly transition between virtual and physical environments and objects.

CR design and development is concerned with processes, methods, and tools to increase the effectiveness and efficiency of design and development teams

tasked with creating CR applications and systems. Testing and evaluation are a substantial part of these processes.

CR Collaboration is an area of growing interest, as it allows users to work together in real and virtual environments using different interaction techniques and interfaces with different degrees of virtuality. Collaborative CR experiences have the potential to enhance local, remote, and hybrid communication, foster creativity, and improve decision-making in various domains such as design, training, and education.

Five separate workshops on individual CR topics have been held in the past three years. This workshop will bring together the community of CR researchers and aims to establish the research area further. The goal of the workshop is to explore the current challenges, solutions, and opportunities in the field of CR and provide a comprehensive overview of the related research on the design of interactive techniques for effective CR visualization, interaction, collaboration, user experience, and behavior. We are particularly interested in blurring the lines between and merging the virtual and physical worlds to support users in understanding data in different forms. The workshop provides a forum for researchers from VR/AV/AR, visualization, HCI, and related fields to present their technical and systems papers that introduce new approaches, ideas, discussions, and applications.

2 Topics of Interests

The workshop solicits submissions of unpublished works on topics including (but not limited to) the following applications and emerging topics in CR visualization, interaction, collaboration, and user behavior and experience:

- Cross-reality environment design: virtuality and reality
- Visual representations in cross-reality systems
- Cross-reality transitions across multiple interfaces
- Cross-reality interaction
- Multimodal interaction, perception, and cognition
- Real-world tool use and tangibles as input to CR systems
- Collaborative cross-reality immersive analytics
- Collaboration across the reality-virtuality continuum
- Cross-reality user experience
- Cross-reality user behavior
- Cross-reality tools, frameworks, and APIs

- Testing Cross-reality systems
- Design guidelines for Cross-reality applications
- Evaluation of Cross-reality experiences and systems
- Cross-reality applications and scenarios
- Cross-reality use cases in, e.g., education, industry, transportation, sports, healthcare

Selected papers will be recommended for a special journal issue linked to this workshop. These revised papers are expected to have 30-40% new materials and will be reviewed by the same reviewers from the technical committee to allow for a fast review process.

3 Workshop Structure

This will be a half-day to a full-day workshop with a mixture of invited keynote speeches, presentations of short position papers, and group work discussing important topics for current and future research. Position papers will each be presented for ten minutes, while thirty to sixty minutes will be allocated for the group discussion activity. It will be a hybrid event supporting both face-to-face and online participation. A discord channel will be created, enabling people to discuss the workshop topic both before and after the ISMAR event.

4 Submissions

We welcome position paper submissions from 2-4 pages long, excluding references. All paper submissions must be in English. Paper quality versus length will be assessed according to a contribution-per-page judgment. All submissions will be accepted or rejected as workshop papers. All accepted papers will be archived in the IEEE Xplore digital library. Detailed submission and review guidelines are available on the workshop website at that link: <https://tc.computer.org/vgtc/publications/conference/>. All paper submissions must be made through PCS using that link: [TBA].

5 Important Dates

- **Papers submission:** July 17th, 2023
- **Notification of acceptance:** August 7th, 2023
- **Camera-ready copy:** August 21st, 2023
- **Workshop date:** October 16th/20th, 2023

Each deadline expires at 23:59:59 (AoE)

6 Organization

6.1 Organizing Committee

- Hai-Ning Liang (Xi'an Jiaotong-Liverpool University)
- Hans-Christian Jetter (Universität zu Lübeck)
- Frank Maurer (University of Calgary)
- Uwe Gruenefeld (University of Duisburg-Essen)
- Mark Billingham (University of South Australia and University of Auckland)
- Christoph Anthes (University of Applied Sciences Upper Austria)

6.2 Program Committee

- Jan Gugenheimer (TU Darmstadt)
- Mohamed Khamis (University of Glasgow)
- Lingyun Yu (Xi'an Jiaotong-Liverpool University)
- Fotis Liarokapis (CYENS - Centre of Excellence and Cyprus University of Technology)
- Jan-Henrik Schröder (Universität zu Lübeck)
- Eric Wang (University of Calgary)
- Lorans Alabood (University of Calgary)
- Judith Friedl (University of Applied Sciences Upper Austria)
- Fabian Pointecker (University of Applied Sciences Upper Austria)
- Abraham Campbell (University College Dublin)
- Joaquim Jorge (Univ. Lisboa, Portugal)
- Mauricio Sousa (University of Toronto, Canada)
- Craig Anslow (Victoria University of Wellington, New Zealand)
- Arnaud Prouzeau (Université de Bordeaux)
- Sven Mayer (LMU Munich)
- Stefan Schneegass (University of Duisburg-Essen)
- Jonas Auda (University of Duisburg-Essen)
- Florian Mathis (University of Glasgow)
- Michael Nebeling (University of Michigan)