

# Special Issue on 2023 Augmented Environments for Computer-Assisted Interventions (AE-CAI): Guest Editors’ Foreword

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## Abstract

Welcome to this Special Issue of Wiley’s Healthcare Technology Letters (HTL) journal dedicated to the 2023 edition of the Augmented Environments for Computer-Assisted Interventions (AE-CAI), Computer Assisted and Robotic Endoscopy (CARE), and Context-aware Operating Theatres (OR 2.0) joint workshop. We are pleased to present the proceedings of this exciting scientific gathering held in conjunction with the Medical Image Computing and Computer-Assisted Interventions (MICCAI) conference on October 8th, 2023 in Vancouver, British Columbia, Canada. We hope that you will enjoy reading this Special Issue and we look forward to your continuing support and participation in future editions of the AE-CAI, CARE and OR 2.0 workshops. Their continued success demands our ongoing commitment and support, and we hope to welcome you all to the next edition of the workshop at MICCAI 2024 in Marrakesh, Morocco.

## Special Issue on 2023 Augmented Environments for Computer-Assisted Interventions (AE-CAI): Guest Editors’ Foreword

Welcome to this *Special Issue* of Wiley’s *Healthcare Technology Letters (HTL)* journal dedicated to the 2023 edition of the *Augmented Environments for Computer-Assisted Interventions (AE-CAI)*, *Computer Assisted and Robotic Endoscopy (CARE)*, and *Context-aware Operating Theatres (OR 2.0)* joint workshop. We are pleased to present the proceedings of this exciting scientific gathering held in conjunction with the Medical Image Computing and Computer-Assisted Interventions (MICCAI) conference on October 8<sup>th</sup>, 2023 in Vancouver, British Columbia, Canada.

Over the past several years, the satellite workshops and tutorials at MICCAI have experienced increased popularity. This year’s workshop brings together three communities that joined forces for the first time in February 2020 for a MICCAI 2020 Joint Workshop, in light of our common interests in image guidance, navigation and visualization for computer-assisted interventions and have continued this joint venture legacy every year since.

The 2023 edition of AE-CAI | CARE | OR 2.0 was a joint event between the series of MICCAI-affiliated AE-CAI workshops founded in 2006 and now on its 17<sup>th</sup> edition, the CARE workshop series, now on its 10<sup>th</sup> edition, and the OR 2.0 workshop now on its 5<sup>rd</sup> edition. This year's edition of the workshop featured 20 accepted submissions and reached more than 70 registrants, not including the members of the organizing and program committees, making AE-CAI | CARE | OR 2.0 one of the best received and best attended workshops with more than a decade-long standing tradition at MICCAI 2023.

Computer-Assisted Interventions (CAI) is a field of research and practice, where medical interventions are supported by computer-based tools and methodologies. CAI systems enable more precise, safer, and less invasive interventional treatments by providing enhanced planning, real-time visualization, instrument guidance and navigation, as well as situation awareness and cognition. These research domains have been motivated by the development of medical imaging and its evolution from being primarily a diagnostic modality towards its use as a therapeutic and interventional aid, driven by the need to streamline the diagnostic and therapeutic processes via minimally invasive visualization and therapy. To promote this field of research, our workshop seeks to showcase papers that disseminate novel theoretical algorithms, technical implementations, and development and validation of integrated hardware and software systems in the context of their dedicated clinical applications. The workshop attracts researchers in computer science, biomedical engineering, computer vision, robotics, and medical imaging.

The workshop was hosted as a single track, in person, event, where all accepted papers were featured as a podium presentation as part of three sessions: *Endoscopy Applications*, *AR/VR/MR Applications*, and *Surgical Data Science*. To foster networking and discussion, all authors were provided with the opportunity to present their work as a poster presentation in addition to their podium presentation.

In addition to the presentations of contributed papers, we were delighted to welcome two top notch keynote lecturers. Dr. Danny Goel, an orthopaedic surgeon at the University of British Columbia, as well as Founder and CEO of Precision OS, spoke on transforming global medical education with spatial computing, enabling a new era of technology in healthcare. Dr. Gabor Fichtinger, Professor at Queen's University School of Computing, spoke about the use and power of point-of-care ultrasound-guided therapies and interventions in the global health context.

All manuscripts submitted to the joint AE-CAI | CARE | OR2.0 2023 joint workshop were held up to journal standards, as the ultimate objective was to publish accepted work in this Special Issue of Wiley's Healthcare Technology Letters journal. This year's joint workshop received 28 manuscripts spanning a strong geographic representation from Europe, North America and Asia. The review process was rigorous and involved a double blind evaluation of each manuscript by three to five external reviewers. Following the first round of review, eight manuscripts were accepted pending minor revisions, ten manuscripts were accepted pending major revisions, three manuscripts were recommended for major revision and resubmission followed by another round of review, and the remaining 7 manuscripts were rejected. All authors were required to submit a response to reviewers for all manuscripts, along with a revised manuscript indicating all edits and changes in response to the reviewers' critiques.

Once revised, all resubmitted manuscripts entered a second round of review conducted by the Program Committee, Workshop Chairs, as well as the Wiley's HTL Managing Editor and Editor-in-Chief to ensure that all reviewers' critiques were properly addressed in the revised manuscripts and that the quality of the revised manuscripts was appropriate for journal publication. All author responses and revised manuscripts were revisited and assessed by the Joint Workshop Program Committee and Associate Editors, while also seeking the original reviewers' opinion on the authors' responses and revisions for manuscripts that underwent major revision and resubmission, as needed. Throughout the review process, three additional manuscripts were withdrawn by the authors, leading to eighteen manuscripts accepted for publication in this special issue and forwarded to the journal for production.

On behalf of the 2023 AE-CAI | CARE | OR 2.0 Joint Workshop Organizing Committee, we would like to extend our sincere gratitude to all authors, presenters, and attendees for their scientific contribution,

enthusiasm, and support. We also extend special thanks to all reviewers for providing detailed and timely critiques of the submitted manuscripts. We also express our sincere thanks to our Keynote Lecturers for taking time on a Sunday to be with us and deliver their presentations. We also acknowledge the support we received from the MICCAI 2023 Conference Organizing Committee and the MICCAI Workshop and Satellite Events Committee, as well as Wiley’s HTL Editorial Office for supporting us in maintaining the high quality of the workshop through outstanding research contributions that fostered exciting discussions at the event.

Last but not least, we acknowledge our generous sponsors. We thank *Northern Digital Inc. (NDI)*, and *Intuitive Surgical* for their continued support. Our sponsors’ generous contributions have enabled us to recognize our authors for their much-deserved dedication and scientific enthusiasm through several paper awards, as well as offset registration costs for student authors from developing countries. In closing, a big thank you on behalf of all awardees and registrants, and, once again, sincere congratulations to all award winners listed below!

The following manuscripts appearing in this Special Issue have been recognized with an Outstanding Paper Award at the 2023 edition on the AE-CAI Workshop in Vancouver!

Jasper Hofman *et al.* from Orsi Academy for their paper entitled

*First-in-human Realtime AI-assisted Augmented Reality for Renal Surgery*

Daiwei Lu *et al.* from Vanderbilt University for their paper entitled *ASSIST-U: A System for Segmentation and Image Style Transfer for Ureteroscopy*

Gerardo Loza Galindo *et al.* from the University of Leeds for their paper entitled *Real-time Surgical Tool Detection with Multi-scale Positional Encoding and Contrastive Learning*

We hope that you will enjoy reading this Special Issue and we look forward to your continuing support and participation in future editions of the AE-CAI, CARE and OR 2.0 workshops. Their continued success demands our ongoing commitment and support, and we hope to welcome you all to the next edition of the workshop at MICCAI 2024 in Marrakesh, Morocco.

Guest Editors,

Wiley’s Healthcare Technology Letters Special Issue on Augmented Environments for Computer-Assisted Interventions (AE-CAI) 2023

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