Virtual Environments 2024

ICAT - EGVE

34th International Conference on Artificial Reality and Telexistence
29th Eurographics Symposium on Virtual Environments

Tsukuba, Japan
December 1 - 3, 2024

General Chair
Hiroaki Yano - University of Tsukuba, Japan

Program Chairs
Shoichi Hasegawa - Tokyo Institute of Technology, Japan
Nobuchika Sakata - Ryukoku University, Japan
Veronica Sundstedt - Blekinge Institute of Technology, Sweden

Poster & Demo Chairs
Takeshi Tanabe - National Institute of Advanced Industrial Science and Technology, Japan
Vibol Yem - University of Tsukuba, Japan

Publication Chair
Shoichi Hasegawa - Tokyo Institute of Technology, Japan

Proceedings Production Editor
Dieter Fellner (TU Darmstadt & Fraunhofer IGD, Germany)

Sponsored by
The Virtual Reality Society of Japan

In-cooperation with EUROGRAPHICS Association

DOI: 10.2312/egve.20242027

Dieter W. Fellner, Werner Hansmann, Werner Purgathofer, François Sillion
Series Editors

Published by the Eurographics Association
–Postfach 2926, 38629 Goslar, Germany–
in cooperation with
Institute of Computer Graphics & Knowledge Visualization at Graz University of Technology
and
Fraunhofer IGD (Fraunhofer Institute for Computer Graphics Research), Darmstadt

ISBN 978-3-03868-245-5
ISSN 1727-530X (Eurographics Symposium on Virtual Environments)

The electronic version of the proceedings is available from the Eurographics Digital Library at `https://diglib.eg.org`

Table of Contents

Haptics

Avatar

Table of Contents

Table of Contents

Partner Organizers

ICAT-EGVE is organized with the support and cooperation of

European Association for Computer Graphics (Eurographics)

Virtual Reality Society of Japan (VRSJ)

Steering Committee

Mark Billinghurst - University of South Australia , Australia
Gerd Bruder - University of Central Florida, USA
Sabine Coquillart - INRIA, France
Carolina Crutz-Neira - University of Central Florida, USA
John Dingliana - The University of Dublin, Ireland
Andre Hinkenjann - H-BRS, Germany
Masahiko Inami - The University of Tokyo, Japan
Yoshifumi Kitamura - Tohoku University
Kiyoshi Kiyokawa - NAIST, Japan [Vice Chair]
Ernst Kruijff - H-BRS, Germany
Michael Manzke - The University of Dublin, Ireland
Despina Michael-Grigoriou - Cyprus University of Technology, Cyprus
Dirk Reiners - University of Central Florida, USA
Hideo Saito - Keio University, Japan
Ross T Smith - University of South Australia, Australia
Anthony Steed - University College London, UK
Maki Sugimoto - Keio University, Japan
Susumu Tachi - The University of Tokyo, Japan [Chair]
Haruo Takemura - Osaka University, Japan
Bruce H. Thomas - University of South Australia, Australia
Gabriel Zachmann - University of Bremen, Germany

International Program Committee

Toshiyuki Amano - Wakayama University
Wolfgang Broll - Ilmenau University of Technology
Valerio De Luca - University of Salento
John Dingliana - Trinity College Dublin
Francesco Ferrise - Politecnico di Milano
Valeria Garro - Blekinge Institute of Technology
André Hinkenjann - Bonn-Rhein-Sieg University of Applied Sciences
Yuichi Hiroi - Cluster Metaverse Lab
Robin Horst - RheinMain University of Applied Sciences
Naoto Ienaga - University of Tsukuba
Daisuke Iwai - Osaka University
Hiroyuki Kajimoto - The University of Electro-Communications
Ikkaku Kawaguchi - University of Tsukuba
Kiyoshi Kiyokawa - Nara Institute of Science and Technology
Naoya Koizumi - The University of Electro-Communications
Ryota Kondo - The University of Tokyo
Ernst Kruijff - Bonn-Rhine-Sieg University of Applied Sciences
Yuen C. Law - Costa Rica Institute of Technology
Chang Liu - Kyoto University
Rachel McDonnell - Trinity College Dublin
Christos Mousas - Purdue University
Fumihiko Nakamura - Ritsumeikan University
Takuji Narumi - The University of Tokyo
Takuya Nojima - The University of Electro-Communications
Eimei Oyama - Toyama Prefectural University
Etienne Peillard - IMT Atlantique
Alexander Plopski - Graz University of Technology
Satoshi Saga - Kumamoto University
Kuniharu Sakurada - The University of Tokyo
Katsunari Sato - Nara Women's University
Maki Sugimoto - Keio University
Riichiro Tadakuma - Yamagata University
Kazuki Takashima - Shibaura Institute of Technology
Theophilus Teo - University of South Australia
Yusuke Ujitoko - NTT Communication Science Laboratories
Yuki Uranishi - Osaka University
Goshiro Yamamoto - Kyoto University
Gabriel Zachmann - University of Bremen

External Reviewers

Hideyuki Ando - Osaka University of Arts
Gerd Bruder - University of Central Florida
Zhuang Chang - Auckland Bioengineering Institute
Dixuan Cui - Sam Houston State University
Yuichiro Fujimoto - Ryukoku University
Kazuyuki Fujita - Tohoku University
Joe Geigel - Rochester Institute of Technology
Daiki Hagimori - NTT DOCOMO, INC.
Ping-Hsuan Han - National Taipei University of Technology
Yutaro Hirao - Nara Institute of Science and Technology
Xiaodan Hu - Graz University of Technology
Keiichi Ihara - University of Tsukuba
Maakito Inoue - Tohoku University
Yoshio Ishiguro - The University of Tokyo
Alberto Jovane - Trinity College Dublin
Takayuki Kameoka - Kyushu University
Masayuki Kanbara - Konan University
Dominic Kao - Purdue University
Ruoting Lian - Institute of Science Tokyo
Yasutoshi Makino - The University of Tokyo
Michael Manzke - Trinity College Dublin
Alexander Marquardt - Bonn-Rhine-Sieg University of Applied Sciences
Katsutoshi Masai - Kyushu University
Miguel Melo - Institute for Systems and Computer Engineering, Technology and Science
Noriki Mochizuki - Nippon Institute of Technology
Guillaume Moreau - IMT Atlantique
Tao Morisaki - NTT Communication Science Laboratories
Takuto Nakamura - The University of Tokyo
Kieran Nolan - Dundalk Institute of Technology
Colm O Fearghail - Trinity College Dublin
Mai Otsuki - National Institute of Advanced Industrial Science and Technology (AIST)
Photchara Ratsamee - Osaka Institute of Technology
Bernhard Riecke - Simon Fraser University
Yushi Sato - Osaka University
Hirohito Sato - Institute of Science Tokyo
Hideaki Uchiyama - Nara Institute of Science and Technology
Peter Vangorp - Utrecht University
Gergana Vladova - Humboldt University of Berlin
Peng Wang - Northwestern Polytechnical University
Axel Wiepke - University of Potsdam

Author Index

Author Index

Keynote

The Impact of Virtual Reality in Psychiatric Treatment: Is VR the Dawn of a New Era in Mental Health?

Keiko Ino, National Center of Neurology and Psychiatry

Abstract

In recent years, the use of virtual reality (VR) in the treatment of mental disorders has been researched internationally. Cognitive Behavioral Therapy, a treatment for mental disorders, makes use of methods including role-playing anxiety-triggering situations for patients with social phobia, and for those with PTSD, revisiting traumatic memories through visualization and discussion. Efforts are underway to combine these approaches with VR to create more impactful treatments. However, using VR for medical purposes presents various difficulties, and it has not become widespread clinically. This keynote will introduce these efforts and researches, discussing how VR may revolutionize psychiatric treatment and the difficulties it faces.

Short Biography

Since 2021, Keiko Ino has served as the Section Chief at the National Center of Neurology and Psychiatry's Institute of Mental Health, conducting research on treatments for Post-Traumatic Stress Disorder (PTSD). She specializes in Cognitive Behavioral Therapy, particularly in Prolonged Exposure Therapy for PTSD, and holds a consultancy certification in this treatment method.

Keynote

Narrative Turn in Human Augmentation with Avatars: Connecting Minimal Self Transformations to Narrative Self Development

Takuji Narumi, The University of Tokyo

Abstract

The experience of embodying avatars with distinct characteristics from one's actual body in virtual reality has been shown to transform self-perception, affecting sensory experiences, behaviors, thinking and capabilities. The speaker has been conducting research on technologies that help individuals achieve their desired cognitive states and abilities by actively utilizing these transformative effects. Through this research, it has become evident that for such technologies to be accepted by users and society, it is crucial not only to develop technologies that augment human capabilities through instantaneous self-transformation but also to create systems that provide meaningful narratives, contextualizing these augmented selves within users' lives. This keynote will emphasize the importance of considering "narrative self," which involves personal identity and continuity across time, in discussions of human augmentation. It will present case studies that explore the relationship between avatar-based self-transformation and narrative self-development, and discuss future directions for research in virtual reality and tele-existence.

Short Biography

Prof. Dr. Takuji Narumi is an associate professor at the Graduate School of Information Science and Technology, the University of Tokyo. His research interests lie at the intersection of technology and human science, focusing on extending human senses, cognition, capabilities and communication by combining virtual and augmented reality technologies with insights from psychology and cognitive science. He has received numerous awards, including the Young Researcher Award from the Minister of Education, Culture, Sports, Science and Technology, the IPSJ/IEEE Computer Society Young Computer Researcher Award, the SIGCHI Japan Chapter Distinguished Young Researcher Award, and the Excellence Award of the Japan Media Arts Festival.

Keynote

Ontenna: Socialization of Co-Design with the Deaf and Hard of Hearing

Tatsuya Honda, FUJITSU LIMITED

Abstract

Ontenna is a wearable device that converts sound intensity into real-time vibrations and light, transmitting features like rhythm and volume. It has been adopted by over 80% of schools for the deaf in Japan, where it is used for rhythm and speech training. In addition to the story of how this product was developed from university research to commercialization, we are also introducing a new co-creation project called "Ekimatope," which uses AI to translate ambient station sounds into text, sign language, and onomatopoeia.

Short Biography

Tatsuya Honda is a UI designer and project leader of Ontenna. At university he volunteered as a sign language interpreter and established a sign language club and NPO. From his graduation research he started working with deaf people on Ontenna, a device to perceive new sounds, based on the theme of extending the human body and senses. Ontenna has since been commercialized and is now used in 80% of the schools for the deaf in Japan. Tatsuya hopes to use design and technology to create more smiles in society. His awards include the MIT Innovators Under 35 Japan and Forbes 30 Under 30 Asia.