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Brooks, Anthony L

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Encyclopedia of Computer Graphics and Games

Newton Lee
Editor

Encyclopedia of Computer Graphics and Games

With 906 Figures and 116 Tables

Springer

Editor
Newton Lee
Institute for Education, Research, and Scholarships
Los Angeles, CA, USA

Vincennes University
Vincennes, IN, USA

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To all my students, past, present, and future!

Preface

The *Encyclopedia of Computer Graphics and Games* (ECGG) is an authoritative reference work covering the history, technologies, and trends of computer graphics and games catered to industry professionals and academic communities worldwide. The breadth and depth of topics covered by the encyclopedia benefit a wide diversity of readers including researchers, practitioners, teachers, and students who seek general as well as specific knowledge in computer graphics and games.

Los Angeles, USA — Newton Lee
November 2023

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The *Encyclopedia of Computer Graphics and Games* (ECGG) is a labor of love by more than 365 contributing authors, peer reviewers, academic and industry co-chairs, editorial board members, and volunteers. I would like to extend my heartfelt thanks to everyone including Springer Nature editors and project coordinators for making this encyclopedia a reality.

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About the Editor

Newton Lee is the founding president of the 501(c)(3) nonprofit Institute for Education, Research, and Scholarships based in Los Angeles, California, a former Disney and Bell Labs engineer, and a 2021 graduate of the FBI Citizens Academy.

Serving as an FBI Ambassador, Prof. Lee expounds on social media, campus safety, student mental health, cybersecurity, and counterterrorism as portrayed in the highly acclaimed Total Information Awareness book series published by Springer Nature. The Total Information Awareness trilogy has garnered rave reviews from *Newsweek*, *The Daily Beast*, *ACM Computing Reviews*, *AdWeek*, and *Choice Magazine*, among others. Veteran Staff Sergeant Andrew Price of the United States Air Force (USAF) remarked, "I am inspired by the prospect of world peace. I'd fully recommend following the author's steps, reaching beyond our borders, making friends outside our norm, and helping to foster world peace and a better tomorrow."

Prof. Lee has co-developed over 100 online games at The Walt Disney Company, and 12 bestselling and award-winning interactive titles including The Lion King Animated Storybook and Winnie the Pooh and the Honey Tree that were featured in the *Billboard* Magazine. He has also executive produced original songs that have played on American Idol and charted on US Billboard, UK Music Week, and US iTunes HOT 100 (Electronic).

He earned a B.S. and M.S. in Computer Science from Virginia Tech as well as an A.S. in Electrical Engineering and an honorary doctorate in Computer Science from Vincennes University. He has

been honored with a Michigan Leading Edge Technologies Award, two community development awards from the California Junior Chamber of Commerce, and four volunteer project leadership awards from The Walt Disney Company.

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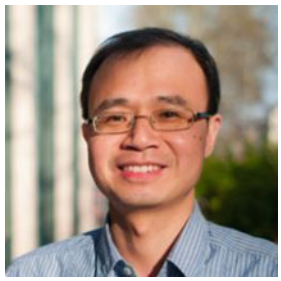

Xiaomao Wu
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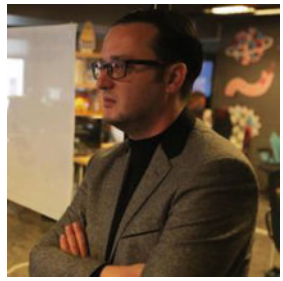

Barbaros Bostan
BUG Game Lab
Bahçeşehir University (BAU)
Istanbul, Turkey

Anthony L. Brooks
Aalborg University
Aalborg, Denmark

Guven Catak
BUG Game Lab
Bahçeşehir University (BAU)
Istanbul, Turkey

Alvin Kok Chuen Chan
Cambridge Corporate University
Lucerne, Switzerland

Anirban Chowdhury
Department of User Experience and Interaction Design, School of Design (SoD)
University of Petroleum and Energy Studies (UPES)
Dehradun, Uttarakhand, India

Saverio Debernardis
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Politecnico di Bari,
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Chris Joslin
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Sicilia Ferreira Judice
Department of Computer Science
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Hoshang Kolivand
Department of Computer Science
Faculty of Engineering and Technology
Liverpool John Moores University
Liverpool, UK

Dario Maggiorini
Department of Computer Science
University of Milan
Milan, Italy

Tim McGraw
Purdue University
West Lafayette, IN, USA

George Papagiannakis
ORamaVR S.A.
Heraklion, Greece

FORTH-ICS
Heraklion Greece University of Crete
Heraklion, Greece

Florian Richoux
Nantes Atlantic Computer Science
Laboratory (LINA)
Université de Nantes
Nantes, France

Andrea Sanna
Dipartimento di Automatica e Informatica
Politecnico di Torino
Turin, Italy

Yann Savoye
Institut fur Informatik
Innsbruck University
Innsbruck, Austria

Sercan Şengün
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Normal, IL, USA

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Ritsumeikan University
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Asia Pacific University of Technology & Innovation
Kuala Lumpur, Malaysia

Rojin Vishkaie
Amazon
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Duncan A. H. Williams
Digital Creativity Labs
Department of Computer Science
University of York
York, UK

Sai-Keung Wong
National Chiao Tung University
Hsinchu, Taiwan

Editorial Board Intern

Sam Romershausen
Vincennes University
Vincennes, IN, USA

Contributors

Nur Ameerah Abdul Halim Mixed and Virtual Reality Research Lab, Vicubelab, Johor Bahru, Malaysia

School of Computing, Faculty of Engineering, Universiti Teknologi Malaysia, Johor, Malaysia

Aref Abedjooy Faculty of Science, Ontario Tech University, Oshawa, ON, Canada

Juliana Aida Abu Bakar Institude of Creative Humanities, Multimedia & Innovation, School of Creative Industry Management & Performing Arts, Universiti Utara Malaysia, Sintok, Kedah, Malaysia

Faris Abuhashish Animation & Multimedia, University of Petra, Amman, Jordan

Arab Open University, Amman, Jordan

Leigh Achterbosch Faculty of Science and Technology, Federation University Australia, Mt Helen, Ballarat, VIC, Australia

Ali Adjorlu Aalborg University, Copenhagen, Denmark

Ahmad Hakim Ahmad Rahman Universiti Teknologi Malaysia, Skudai, Malaysia

Zahra Ahmadi Ontario Tech University, Oshawa, Canada

Ahmed Sabah Ahmed Business of Information Technology(BIT), College of Business Informatics, University of Information Technology and Communications, Baghdad, Iraq

Ecehan Akan Digital Game Design, Bahçeşehir University Faculty of Communication, Istanbul, Turkey

Ryuya Akase Graduate School of Information Science and Electrical Engineering, Kyushu University, Fukuoka, Japan

Kemal Akay Unity Technologies, Copenhagen, Denmark

Mohamad Yahya Fekri Aladin Mixed and Virtual Reality Research Lab, Vicubelab, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

School of Computing, Faculty of Engineering, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Mac Alexander Vincennes University, Vincennes, IN, USA

Aisha Al-Hamar Department of Computer Science, Loughborough University, Loughborough, UK

Yousef Al-Hamar Department of Computer Science, Faculty of Engineering and Technology, Liverpool John Moores University, Liverpool, UK

Itimad Raheem Ali Information System Management(ISM), College of Business Informatics, University of Information Technology and Communications, Baghdad, Iraq

Dhiya Al-Jumeily Liverpool John Moores University, Liverpool, UK

Mohammed Hazim Alkawaz Faculty of Information Sciences and Engineering, Management and Science University, Shah Alam, Malaysia

Mansour Alqarni Ontario Tech University, Oshawa, ON, Canada

Tariq Alrimawi Graphic Design Department, University of Petra, Amman, Jordan

Chan Kok Chuen Alvin Cambridge Corporate University, Lucerne, Switzerland

Luís Aly FEUP, University of Porto, Porto, Portugal

Inês Amaral Instituto Superior Miguel Torga, Coimbra, Portugal

University of Minho, Braga, Portugal

Christos-Nikolaos Anagnostopoulos Intelligent Multimedia and Virtual Environments Lab, Department of Cultural Technology and Communication, University of the Aegean, Mytilene, Greece

Jaime Arias Université Paris 13, Sorbonne Paris Cité, LIPN, CNRS UMR 7030, Villetaneuse, France

Metin Arıca Nowhere Studios, Istanbul, Turkey

Sylvester Arnab Disruptive Media Learning Lab, Coventry University, Coventry, West Midlands, UK

Shiva Asadianfam Department of Computer Engineering, Qom Branch, Islamic Azad University, Qom, Iran

Sima Asadianfam Department of Computer Engineering, Zanjan Branch, Islamic Azad University, Zanjan, Iran

Ramazan S. Aygun Computer Science Department, University of Alabama in Huntsville, Huntsville, AL, USA

Abdullah Bade Mathematics, Graphics and Visualization Research Group (MGRAVS), Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Jean-François Baffier Graduate School of Information Science and Technology, The University of Tokyo, Tokyo, Japan

Steve Bakos Ontario Tech University, Oshawa, ON, Canada

Tamilesh Balasuntharam Ontario Tech University, Oshawa, ON, Canada

Shakti Banerjee Immersive Media Design, MIT Institute of Design, MIT Art, Design & Technology University, Pune, Maharashtra, India

Mason Bates Creative Technologies Program, Illinois State University, Normal, IL, USA

Stefania Bau Init Esports, Lewes, DE, USA

Jean-Paul Bécar LAMAV-CGAO, FR CNRS 2956 EA 4015, Valenciennes, France

Nicola Bellotto School of Computer Science, University of Lincoln, Lincoln, UK

Geraldine Anna Berger Department of Business Information Systems, Friedrich-Schiller University, Jena, Germany

Ross Berger Vistance Consulting, Los Angeles, CA, USA

Mehmet Ilker Berkman Communication Design, Bahçeşehir University Faculty of Communication, Istanbul, Turkey

Gilberto Bernardes INESC TEC and University of Porto, Faculty of Engineering, Porto, Portugal

Stéphanie Bertrand Foundation for Research and Technology Hellas, Heraklion, Greece

Vineetha Bettaiah Computer Science Department, University of Alabama in Huntsville, Huntsville, AL, USA

Mark Billinghurst School of Information Technology and Mathematical Sciences, University of South Australia, Mawson Lakes, SA, Australia

Muhammad Anwar Bin Ahmad Universiti Teknologi Malaysia, Skudai, Malaysia

João Ricardo Bittencourt Universidade do Vale do Rio dos Sinos (UNISINOS), Porto Alegre, Brazil

Jeremy Blackburn Department of Computer Science, University of Alabama at Birmingham, Birmingham, AL, USA

A. Seugnet Blignaut Technology Enhanced Learning for Innovative Teaching and Training South Africa (TELIT-SA), North-West University, Vanderbijlpark, South Africa

Nicholas Bode Ontario Tech University, Oshawa, ON, Canada

Dominik Borer ETH Zurich, Zürich, Switzerland

Adriano Ferreti Borgatto Department of Informatics and Statistics (INE), Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil

Daniel N. Boulos University of Hawai'i Manoa, Honolulu, HI, USA

Evren Bozgeyikli School of Information, University of Arizona, Tucson, AZ, USA

Lal "Lila" Bozgeyikli School of Information, University of Arizona, Tucson, AZ, USA

Anthony L. Brooks Aalborg University, Aalborg, Denmark

Douglas Brown Games Academy, Falmouth University, Cornwall, UK

Cameron Browne Maastricht University, Maastricht, The Netherlands

Jon Ram Bruun-Pedersen Department of Architecture, Design & Media Technology, Aalborg University Copenhagen, Copenhagen, Denmark

Petyo Budakov New Bulgarian University, Sofia, Bulgaria

Natasha Bulatovic Trygg Department of Art History, University of Turku, Turku, Finland

Alyssa Bump Creative Technologies Program, Illinois State University, Normal, IL, USA

Dawson Bundren Vincennes University, Vincennes, IN, USA

Haley Burch Vincennes University, Vincennes, IN, USA

John Burnett Department of Music, Sonic Arts Research and Development Group, Qualcomm Institute, University of California, San Diego, La Jolla, CA, USA

Bernard Butler Emerging Networks Laboratory, Telecommunications Software & Systems Group, Waterford Institute of Technology, Waterford, Ireland

Josh Bycer Game-Wisdom, Cherry Hill, NJ, USA

Marco Antonio Martínez Cano Ontario Tech University, Oshawa, ON, Canada

Emanuele Carlini ISTI-CNR, Pisa, Italy

Inma Carpe The Animation Workshop, VIA University College, Viborg, Denmark

Polytechnic University of Valencia, Valencia, Spain

Michal Čertický Agent Technology Center at Czech Technical University in Prague, Prague, Czech Republic

Alan Chalmers WMG, University of Warwick, Coventry, UK

Kompalli Jwala Seethal Chandra Microsoft Corporation, Redmond, WA, USA

Arindam Chaudhuri Samsung R & D Institute Delhi, Noida, India

Min Chen School of Computer Science and Technology, Huazhong University of Science and Technology, Wuhan, China

Yingjie Chen Department of Computer Graphics Technology, Purdue University, West Lafayette, IN, USA

Yinsheng Chen Liverpool John Moores University, Liverpool, UK

Vien Cheung Leeds Institute of Textiles and Colour, University of Leeds, Leeds, UK

Sanmitra Chitte World University of Design, Dean, School of Management, Sonepat, Haryana, India

Arsh Chowdhry Ontario Tech University, Oshawa, ON, Canada

David Churchill Computing Science Department, University of Alberta, Edmonton, AB, Canada

Murat Çınar Department of Computer Education and Instructional Technology, Hacettepe University, Ankara, Turkey

David M. Clark Vincennes University, Vincennes, IN, USA

Matthew Clark Vincennes University, Vincennes, IN, USA

Diogo Cocharro INESC TEC and University of Porto, Faculty of Engineering, Porto, Portugal

Brandon Coker Vincennes University, Vincennes, IN, USA

Bryce Coleman Vincennes University, Vincennes, IN, USA

Shane Conley Vincennes University, Vincennes, IN, USA

Marco Corbetta Cloud Imperium Games, London, UK

Brody Corenflos Vincennes University, Vincennes, IN, USA

Serhan Cosar School of Computer Science, University of Lincoln, Lincoln, UK

Peter I. Cowling Digital Creativity Labs, Department of Computer Science, University of York, York, UK

Claire M. Culver Ontario Tech University, Oshawa, ON, Canada

Sabrina Culyba Schell Games, Pittsburgh, PA, USA

Fabrizio Cutolo Department of Information Engineering, University of Pisa, Pisa, Italy

Gabriele D'Angelo Department of Computer Science and Engineering, University of Bologna, Bologna, Italy

Igor Dall'Avanzi Computing, Goldsmiths College, University of London, London, UK

Girish Dalvi IDC School of Design, Indian Institute of Technology, Bombay, India

Sarah Dashti Cardiff School of Technologies, Cardiff Metropolitan University, Cardiff, UK

Jeffery Jonathan Joshua (ישוע) Davis The Embassy of Peace, Whitianga, New Zealand

Manoj Dawarwadikar SP Jain School of Global Management, Sydney, Bangalore, India

Francesco De Pace Dipartimento di Automatica e Informatica, Politecnico di Torino, Turin, Italy

Sébastien Deguy Allegorithmic, Venice, CA, USA

Fatemeh Dehghani Faculty of Science, Ontario Tech University, Oshawa, ON, Canada

Myriam Desainte-Catherine Univ. Bordeaux, Bordeaux INP, CNRS, LaBRI, UMR5800, Talence, France

Surojit Dey Design Programme, Indian Institute of Technology, Kanpur, Uttar Pradesh, India

Malay Dhamelia IDC School of Design, Indian Institute of Technology, Bombay, India

Roberto Dillon James Cook University, Singapore, Singapore

Kosmas Dimitropoulos Information Technologies Institute, CERTH, Thessaloniki, Greece

Simena Dinas Departamento de Electrónica y Ciencias de la Computación, Pontificia Universidad Javeriana Cali – Colombia, Cali, Valle, Colombia

Simena Dinas Facultad de Ingeniería, Universidad Santiago de Cali, Cali, Colombia

Dilek Doğan Department of Informatics, Ankara University, Ankara, Turkey

Oğuz Orkun Doma Architectural Design Computing, Istanbul Technical University, Istanbul, Turkey

Matt Dombrowski University of Central Florida, College of Arts & Humanities, School of Visual Arts & Design, Orlando, FL, USA

Joshua Dove-Henfrey Department of Computer Science, Faculty of Engineering and Technology, Liverpool John Moores University, Liverpool, UK

Jennifer Coleman Dowling Communication Arts Department, Framingham State University, Framingham, MA, USA

Giannis Drossis Computer Science Department, University of Crete, Heraklion, Greece

Foundation for Research and Technology Hellas, Heraklion, Greece

Lucie Druoton Arts et Métiers, University of Burgundy-Franche-Comté, Dijon, France

Shlomo Dubnov Department of Music and Computer Science and Engineering, University of California San Diego, San Diego, CA, USA

Tammuz Dubnov Zuzor, Tel Aviv, Israel

Adam Dubrowski Disciplines of Emergency Medicine and Pediatrics and the Marine Institute, Memorial University of Newfoundland, St. Johns, Canada

Elena Dzardanova Department of Product and Systems Design Engineering, University of the Aegean, Ermoupoli, Greece

Department of Product and Systems Design Engineering, University of the Aegean, Mytilene, Greece

Anwar Yahya Ebrahim University of Babylon, Babylon, Iraq

Mehran Ebrahimi Faculty of Science, Ontario Tech University, Oshawa, ON, Canada

Brian Edington Vincennes University, Vincennes, IN, USA

Gabriel Elvery University of Glasgow, Glasgow, Scotland

Chris Exton University of Limerick, Limerick, Ireland

Fazliaty Edora Fadzli School of Computing, Faculty of Engineering, Universiti Teknologi Malaysia (UTM), Johor, Malaysia

Mixed and Virtual Environment Research Lab (mivielab), ViCubeLab, Universiti Teknologi Malaysia, Johor, Malaysia

Marcelo Fantinato School of Arts, Sciences and Humanities, University of Sao Paulo, Sao Paulo, Sao Paulo, Brazil

Sehar Shahzad Farooq Department of Computer Science and Engineering, Sejong University, Seoul, South Korea

Stefano Ferretti Department of Computer Science and Engineering, University of Bologna, Bologna, Italy

Mikhail Fiadotau Centre of Excellence in Media Innovation and Digital Culture (MEDIT), Tallinn University, Tallinn, Estonia

Frederico Fonseca Instituto Superior Miguel Torga, Coimbra, Portugal

Brandon Ford Vincennes University, Vincennes, IN, USA

Felipe Oviedo Frosi UniRitter Laureate International Universities, Porto Alegre, Brazil

Laurent Fuchs Université de Poitiers, Chasseneuil, France

Seth Gaither Vincennes University, Vincennes, IN, USA

Robert John Gandy Liverpool Business School, Liverpool John Moores University, Liverpool, UK

Tom Alexander Garner VIA Research, University of Portsmouth, Portsmouth, UK

Lionel Garnier Arts et Métiers, University of Burgundy-Franche-Comté, Dijon, France

Damianos Gavalas Department of Product and Systems Design Engineering, University of the Aegean, Ermoupoli, Greece

Michele Geronazzo Department of Architecture, Design, and Media Technology, Aalborg University, København, Denmark

Efstratios Geronikolakis Computer Science Department, University of Crete, Heraklion, Greece

Foundation for Research and Technology Hellas, Heraklion, Greece

David Gibson Curtin University, Perth, WA, Australia

Gilson A. Giraldi National Laboratory of Scientific Computing (LNCC), Petrópolis, Brazil

Curtis Gittens Department of Computer Science, Mathematics and Physics, University of the West Indies, Cave Hill Campus, Bridgetown, Barbados

Sam Godby Creative Technologies Program, Illinois State University, Normal, IL, USA

Eg Su Goh Media and Game Innovation Centre of Excellence, Institute of Human Centered Engineering, Universiti Teknologi Malaysia, Johor Bahru, Johor, Malaysia

Rafael Gonzales Creative Technologies Program, Illinois State University, Normal, IL, USA

Randy Goodman Vincennes University, Vincennes, IN, USA

Alexandros Gouvatsos Hibbert Ralph Animation, London, UK

National Centre for Computer Animation, Bournemouth University, Dorset, UK

Paweł Grabarczyk Center for Computer Games Research, IT University of Copenhagen, København, Denmark

Alonso Gragera Aguaza Graduate School of Information Science and Technology, The University of Tokyo, Tokyo, Japan

Nikolaos Grammalidis Information Technologies Institute, CERTH, Thessaloniki, Greece

Athina Grammatikopoulou Information Technologies Institute, CERTH, Thessaloniki, Greece

Fabien Gravot SQUARE-ENIX, Tokyo, Japan

Jordan Greenwood Federation University, Mt Helen, VIC, Australia

Christiane Gresse von Wangenheim Department of Informatics and Statistics (INE), Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil

Martin Guay Disney Research, Zürich, Switzerland

Simone Guggiari ETH Zurich, Zürich, Switzerland

Bouilly Guillaume Advanced Technology Division, SQUARE ENIX CO., LTD., Tokyo, Japan

Chen Guo School of Media Arts & Design, James Madison University, Harrisonburg, VA, USA

Adan Häfliger Cygames Research, Cygames, Inc., Tokyo, Japan

Hooria Hajiyan Faculty of Science, Ontario Tech University, Oshawa, ON, Canada

D. Fox Harrell MIT Comparative Media Studies Program and CSAIL, Cambridge, MA, USA

Adrian R. G. Harwood Research IT, IT Services, The University of Manchester, Manchester, UK

Jian He Department of Computer Science, University of Texas at Austin, Austin, TX, USA

Benjamin Hebgen NEC Research Labs Europe, Heidelberg, Germany

Laura L. Henderson The Honourable Society of Lincoln's Inn, London, UK
The City Law School, City, University of London, London, UK

Ryan Hilderbrand Vincennes University, Vincennes, IN, USA

Hanno Hildmann Departamento de Ingenieria de Sistemas y Automatica, Universidad Carlos III de Madrid, Leganes/Madrid, Spain

Jule Hildmann The University of Edinburgh, Edinburgh, UK

Takuya Hiraoka HEROZ, Inc., Osaka, Japan

Fatemeh Hirbodvash Faculty of Science, Ontario Tech University, Oshawa, ON, Canada

Dylan Hires Vincennes University, Vincennes, IN, USA

Benjamin Hirsch Emirates ICT Innovation Center (EBTIC) / Khalifa University, Abu Dhabi, United Arab Emirates

Aaron Hitchcock Computing and Software Systems, University of Washington Bothell, Bothell, WA, USA

John Hoback Vincennes University, Vincennes, IN, USA

Celia Hodent Epic Games, Cary, NC, USA

Eric Hodgson Miami University, Oxford, OH, USA

Kunihito Hoki Department of Communication Engineering and Informatics, The University of Electro-Communications, Chofu, Tokyo, Japan

Jin Huang Zhejiang University, Hangzhou, China

Patrick C. K. Hung Faculty of Business and IT, Ontario Tech University, Oshawa, ON, Canada

William Hurst Department of Computer Science, Liverpool John Moores University, Liverpool, UK

Wolfgang Hürst Utrecht Center for Game Research, Utrecht University, Utrecht, The Netherlands

Abir Hussain Liverpool John Moores University, Liverpool, UK

Sami Hyrynsalmi Pervasive Computing, Tampere University of Technology, Pori, Finland

Sara Al Hajj Ibrahim Faculty of Science, Ontario Tech University, Oshawa, ON, Canada

Kokolo Ikeda School of Information Science (Department of Information Science & Artificial Intelligence), Japan Advanced Institute of Science and Technology, Nomi, Ishikawa, Japan

Jouni Ikonen Software engineering, Lappeenranta University of Technology, Lappeenranta, Finland

Farkhund Iqbal College of Technological Innovation, Zayed University, Abu Dhabi, United Arab Emirates

Leah Irving Charles Sturt University, Wagga Wagga, NSW, Australia

Setsuko Ishii Independent Artist, Bunkyo-ku, Tokyo, Japan

Ajune Wanis Ismail Mixed and Virtual Reality Research Lab, Vicubelab, School of Computing, Faculty of Engineering, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Ismahafezi Ismail Universiti Sultan Zainal Abidin, Gong Badak, Malaysia

Takeshi Ito Department of Communication Engineering and Informatics, The University of Electro-Communications, Chofu, Tokyo, Japan

Masahiko Itoh Institute of Industrial Science, The University of Tokyo, Tokyo, Japan

Ranjit Jagtap Symbiosis Institute of Design, Pune, India

Christian F. Janßen Institute for Fluid Dynamics and Ship Theory, Hamburg University of Technology, Hamburg, Germany

Brendan Jennings Emerging Networks Laboratory, Telecommunications Software & Systems Group, Waterford Institute of Technology, Waterford, Ireland

Nancy Johnson Vincennes University, Vincennes, IN, USA

Taeya Johnson Vincennes University, Vincennes, IN, USA

Susan Johnston Select Services Films Inc., Los Angeles, CA, USA

Sicilia Ferreira Judice Faculty of Technical Education State of Rio de Janeiro, FAETERJ Petropolis, Petropolis, Brazil

Oytun Kal Game Design, Bahcesehir University, Istanbul, Turkey

Devkan Kaleci Department of Computer Education and Instructional Technology, Faculty of Education, Inonu University, Malatya, Turkey

Kosuke Kaneko Cyber Security Center, Kyushu University, Fukuoka, Japan

Kamen Kanev Research Institute of Electronics, Shizuoka University, Hamamatsu, Japan

Yowei Kang Kainan University, Taoyuan, Taiwan

Howard Kaplan University of South Florida, Tampa, FL, USA

Bill Kapralos Software Informatics Research Centre, University of Ontario Institute of Technology, Oshawa, Canada

José Karam-Filho National Laboratory of Scientific Computing (LNCC), Petrópolis, Brazil

Vlasios Kasapakis Department of Cultural Technology and Communication, University of the Aegean, Mytilene, Greece

Daniel Kasnick Vincennes University, Vincennes, IN, USA

Yihao Ke Department of Computer Science, Sun Yat-sen University, Guangzhou, China

Rhiannon Kelly Wonsook Kim School of Art, Illinois State University, Normal, IL, USA

Grady Kestler Department of Physics, Sonic Arts Research and Development Group, Qualcomm Institute, University of California, San Diego, La Jolla, CA, USA

Umair Azfar Khan School of Science & Engineering, Habib University, Karachi, Sindh, Pakistan

Raksha Khandelwal Symbiosis Institute of Design, Pune, India

Huy Kang Kim Graduate School of Information Security, Korea University, Seongbuk-Gu, Seoul, Republic of Korea

School of Cybersecurity, Korea University, Seoul, South Korea

Kyung-Joong Kim Department of Computer Science and Engineering, Sejong University, Seoul, South Korea

Kai K. Kimppa Turku School of Economics, University of Turku, Turku, Finland

Antti Knutas Lappeenranta University of Technology, Lappeenranta, Finland

Hartmut Koenitz Professorship Interactive Narrative Design, HKU University of the Arts, Utrecht, The Netherlands

Hoshang Kolivand Department of Computer Science, Faculty of Engineering and Technology, Liverpool John Moores University (LJMU), Liverpool, UK

Stacey A. Koornneef Ontario Tech University, Oshawa, ON, Canada

Aki Koponen School of Economics, University of Turku, Turku, Finland

Mehmet Kosa Department of Information Systems, Middle East Technical University, Ankara, Turkey

Robert Kozma CLION, Department Mathematical Sciences, University of Memphis, Memphis, TN, USA

Fabrizio Lamberti Dipartimento di Automatica e Informatica, Politecnico di Torino, Torino, Italy

Eike Langbehn Human-Computer Interaction, Universität Hamburg, Hamburg, Germany

Andrea Lanzi Università degli Studi di Milano, Milan, Italy

Kieran Latham Department of Computer Science, Liverpool John Moores University, Liverpool, UK

Vicki Lau Seyenapse, Los Angeles, CA, USA

Chung V. Le Center for Simulation and Visualization, Duy Tan University, Da Nang, Vietnam

Jaci Lee Lederman Vincennes University, Vincennes, IN, USA

Jong Weon Lee Department of Digital Contents, Sejong University, Seoul, South Korea

Newton Lee Institute for Education, Research, and Scholarships, Los Angeles, CA, USA

Vincennes University, Vincennes, IN, USA

Sangho Lee School of Cybersecurity, Korea University, Seoul, South Korea

Richard Levy University of Calgary, Calgary, AB, Canada

Peter R. Lewis Ontario Tech University, Oshawa, ON, Canada

Yong Li Department of Electronic Engineering, Tsinghua University, Beijing, China

Fotis Liarokapis Masaryk University, Ponava, Brno, Czech Republic

Thomas Lilge gamelab.berlin, Humboldt University Berlin, Berlin, Germany

Song Shuli Lily School of Digital Art and Animation, Communications University of China, Beijing, P.R. China

Feng Lin China-Singapore International Joint Research Institute, Singapore, Singapore

School of Computer Science and Engineering, Nanyang Technological University, Singapore, Singapore

Jan Linxweiler Center for Mechanics, Uncertainty and Simulation in Engineering, Technische Universität Braunschweig, Braunschweig, Germany

Yen-Hung Liu Faculty of Business and IT, Ontario Tech University, Oshawa, ON, Canada

Nathan Lloyd Ontario Tech University, Oshawa, ON, Canada

Jaime Lochner Licensed Mental Health Counselor, Assistant Team Lead, CAT Team, Aspire Health Partners, Orlando, FL, USA

Borja Barinaga López Universidad Francisco de Vitoria de Madrid, Madrid, Spain

Victor M. López-Menchero Spanish Society of Virtual Archaeology, Seville, Spain

Danny Ngo Lung Yao Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu, Malaysia

Jonathan A. Ly Vincennes University, Vincennes, IN, USA

Lizhaung Ma Shanghai Jiao Tong University, Shanghai, China

Krystina S. Madej Georgia Tech, Atlanta, Georgia, USA

Nadia Magnenat-Thalmann MIRALab, University of Geneva, Geneva 4, Switzerland

Adnan Mahmood Emerging Networks Laboratory, Telecommunications Software & Systems Group, Waterford Institute of Technology, Waterford, Ireland

Communications Research Group, Faculty of Engineering, Universiti Malaysia Sarawak, Sarawak, Malaysia

Amol D. Mali Computer Science Department, University of Wisconsin-Milwaukee, Milwaukee, WI, USA

Kazuko Manabe Square Enix Co., Ltd., Tokyo, Japan

Federico Manuri Dipartimento di Automatica e Informatica, Politecnico di Torino, Turin, Italy

Raphaël Marczak Univ. Bordeaux, Bordeaux INP, CNRS, LaBRI, UMR5800, Talence, France

George Margetis Foundation for Research and Technology Hellas, Heraklion, Greece

Ilaria Mariani Department of Design, Politecnico di Milano, Milan, Italy

Dianne Marsh Liverpool John Moores University, FET, SBE, Liverpool, UK

Hector J. Martínez Universidad del Valle, Cali, Colombia

Moreno Marzolla Department of Computer Science and Engineering, University of Bologna, Bologna, Italy

Deepak John Mathew Indian Institute of Technology, Hyderabad, India

Wilfred Matipa Liverpool John Moores University, FET, SBE, Liverpool, UK

Ken S. McAllister Rhetoric, Composition, and the Teaching of English, University of Arizona, Tucson, AZ, USA

Kyle McCarter Vincennes University, Vincennes, IN, USA

Tim McGraw Purdue University, West Lafayette, IN, USA

Michael Mcloughlin Centre for Digital Music, Queen Mary University of London, London, UK

Ryan P. McMahan University of Texas at Dallas, Richardson, TX, USA

Michael McMillan Vincennes University, Vincennes, IN, USA

Nannapat Meemongkolkiat Faculty of Business and IT, Ontario Tech University, Oshawa, ON, Canada

Felipe M. Megale Ontario Tech University, Oshawa, ON, Canada

Devi Meghana Department of Design, Indian Institute of Technology Hyderabad, Hyderabad, India

Grant Meredith Federation University, Mt Helen, VIC, Australia

Tristan Michael Simmons Wonsook Kim School of Art, Illinois State University, Normal, IL, USA

Risto Miikkulainen Department of Computer Science, University of Texas at Austin, Austin, TX, USA

Hidenori Mimura Research Institute of Electronics, Shizuoka University, Hamamatsu, Japan

Xiaoping Min College of Computer and Information Science, Northeastern University, Boston, MA, USA

Silvia Mirri University of Bologna, Bologna, Italy

Youichiro Miyake Square Enix Co., Ltd., Tokyo, Japan

Yuta Mizuno SQUARE ENIX Co., Ltd., Tokyo, Japan

M. Mohan School of Design, University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India

Norhaida Mohd Suaib Universiti Teknologi Malaysia, Skudai, Malaysia

Géraldine Morin Laboratoire IRIT, Université Paul Sabatier, Toulouse, France

Brooke Morrill Schell Games, Pittsburgh, PA, USA

Christos Mousas Visual Computing Lab, Department of Computer Science, Dartmouth College, Hanover, NH, USA

Martin Müller University of Alberta, Edmonton, AB, Canada

Damian T. Murphy Department of Electronic Engineering, University of York, York, UK

Jamila Mustafina Kazan Federal University, Kazan, Russia

Devon Myers Vincennes University, Vincennes, IN, USA

Ricardo Nakamura Polytechnic School, University of São Paulo, São Paulo, Brazil

Eugene Nalivaiko School of Biomedical Sciences and Pharmacy, University of Newcastle, Callaghan, NSW, Australia

Andrés Adolfo Navarro-Newball Electronics and Computer Science, Pontificia Universidad Javeriana, Cali, Colombia

Nicusor Nedelcu 7thFACTOR Entertainment Studios, Brasov County, Romania

Keith Nesbitt School of Electrical Engineering and Computing, University of Newcastle, Callaghan, NSW, Australia

Kim J. L. Nevelsteen Immersive Networking, DSV, Stockholm University, Kista, Sweden

Philip W. S. Newall Experimental Gambling Research Laboratory, School of Health, Medical and Applied Sciences, CQUniversity, Sydney, NSW, Australia

Tho L. Nguyen Center for Simulation and Visualization, Duy Tan University, Da Nang, Vietnam

Rune K. L. Nielsen Center for Computer Games Research, IT University of Copenhagen, København, Denmark

Niels Christian Nilsson Aalborg University Copenhagen, Copenhagen, Denmark

Muhammad Nur Affendy Nor'a Mixed and Virtual Reality Research Lab, Vicubelab, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Chris North CVG Group, Crytek, Frankfurt am Main, Germany

Fátima L. S. Nunes School of Arts, Sciences and Humanities, University of São Paulo, São Paulo, Brazil

Darryl O'Hare Imagin3D, Office 4, CTH, Sci Tech Daresbury, Daresbury, UK

Yoshihiro Okada Department of Informatics, ISEE, Graduate School of Information Science and Electrical Engineering, Kyushu University Library, Kyushu University, Nishi-ku, Fukuoka, Japan

Innovation Center for Educational Resource, Kyushu University, Nishi-ku, Fukuoka, Japan

Danielle Marie Olson Computer Science Artificial Intelligence Laboratory (CSAIL), Massachusetts Institute of Technology (MIT), Cambridge, MA, USA

Prasad S. Onkar Department of Design, Indian Institute of Technology Hyderabad, Hyderabad, India

Santiago Ontañón Computer Science Department, Drexel University, Philadelphia, PA, USA

Ozan Özkan Augmea Simulation Technologies A.S., Istanbul, Turkey

Department of Information Technologies, Marmara University, Istanbul, Turkey

Selcen Ozturkcan Jönköping International Business School, Jönköping University, Jönköping, Sweden

Faculty of Communication, Bahcesehir University, Istanbul, Turkey

Francesco De Pace Institute of Visual Computing and Human-Centered Technology, TU Wien, Wien, Austria

Marlene Palafox Mexico City, Mexico

Swapnil Pande Product Designer (UI/UX), Delhi, India

George Papagiannakis Computer Science Department, University of Crete, Heraklion, Greece

Foundation for Research and Technology Hellas, Heraklion, Greece

Gianluca Paravati Dipartimento di Automatica e Informatica, Politecnico di Torino, Torino, Italy

Nikolaos Partarakis Foundation for Research and Technology Hellas, Heraklion, Greece

Maria Pateraki Foundation for Research and Technology Hellas, Heraklion, Greece

Emily Peed Institute for Education, Research, and Scholarships, Los Angeles, CA, USA

Ulka Chandini Pendit Department of Virtual Reality, Faculty of Creative Multimedia, Multimedia University, Cyberjaya, Selangor, Malaysia

Rui Penha INESC-TEC and FEUP, University of Porto, Porto, Portugal

Giani Petri Department of Informatics and Statistics (INE), Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil

Jaden C. Pfoff Vincennes University, Vincennes, IN, USA

Michael Phillips Vincennes University, Vincennes, IN, USA

Krzysztof Pietroszek Game Research Lab, School of Computing and Design, California State University Monterey Bay, Seaside, CA, USA

Immesive Designs, Experiences, Applications and Stories (IDEAS) Lab, School of Communication, American University, Washington, DC, USA

Éric Piette Maastricht University, Maastricht, The Netherlands

Louis Pisha Department of Electrical and Computer Engineering, Sonic Arts Research and Development Group, Qualcomm Institute, University of California, San Diego, La Jolla, CA, USA

Zac Pitcher Vincennes University, Vincennes, IN, USA

Vaughan Powell VIA Research, University of Portsmouth, Portsmouth, UK

Wendy Powell VIA Research, University of Portsmouth, Portsmouth, UK

Rachel Power Init Esports, Lewes, DE, USA

Edmond Prakash Cardiff School of Technologies, Cardiff Metropolitan University, Cardiff, UK

Catia Prandi University of Bologna, Bologna, Italy

Mike Preuss Information Systems and Statistics, Westfälische Wilhelms-Universität Munster, Münster, Germany

A. Protopsaltis University of Western Macedonia, Kozani, Greece

ORamaVR S.A., Heraklion, Greece

Anna Pyayt University of South Florida, Tampa, FL, USA

John Quarles Department of Computer Science, University of Texas at San Antonio, San Antonio, TX, USA

Rupendra Raavi Faculty of Business and IT, Ontario Tech University, Oshawa, ON, Canada

Laura Rafferty Faculty of Business and IT, University of Ontario Institute of Technology, Oshawa, ON, Canada

Madhusudan Rao NTT Data Services Pvt. Ltd, Bangalore, India

Shawkh Ibne Rashid Faculty of Science, Ontario Tech University, Oshawa, ON, Canada

Werner Ravyse Faculty of ICT and Chemical Engineering, Futuristic Interactive Technologies, Turku University of Applied Sciences, Turku, Finland

Technology Enhanced Learning for Innovative Teaching and Training South Africa (TELIT-SA), North-West University, Vanderbijlpark, South Africa

Manuel Rebol American University, Washington, DC, USA

Graz University of Technology, Graz, Austria

Carol Luckhardt Redfield Computer Science Department, St. Mary's University, San Antonio, TX, USA

Brayden Rexing Vincennes University, Vincennes, IN, USA

Laura Ricci Department of Computer Science, University of Pisa, Pisa, Italy

Florian Richoux Nantes Atlantic Computer Science Laboratory (LINA), University of Nantes, Nantes, France

David W. Rick Rhetoric, Composition, and the Teaching of English, University of Arizona, Tucson, AZ, USA

Erin Elizabeth Ridgely Creative Technologies Program, Illinois State University, Normal, IL, USA

Nicholas Ries Vincennes University, Vincennes, IN, USA

Jorge Roa Research and Development Center of Information Systems Engineering (CIDISI), Universidad Tecnológica Nacional – Facultad Regional Santa Fe (UTN-FRSF), Santa Fe, Santa Fe, Argentina

Sergio Rodríguez Valdunciel Department of Drawing, Universidad Politécnica de Valencia, Valencia, Spain

Jake Romershausen Indiana University, Bloomington, IN, USA

Sam Romershausen Vincennes University, Vincennes, IN, USA

Nina Rosa Utrecht Center for Game Research, Utrecht University, Utrecht, The Netherlands

Satyaki Roy Design Programme, Indian Institute of Technology, Kanpur, Uttar Pradesh, India

Judd Ethan Ruggill School of Social and Behavioral Sciences, Arizona State University, Tempe, AZ, USA

Sun Ruoqi Shanghai Jiao Tong University, Shanghai, China

Pensyl William Russell College of Arts, Media and Design, Northeastern University, Boston, MA, USA

Nur Syafiqah Safiee Mixed and Virtual Reality Research Lab, Vicubelab, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

School of Computing, Faculty of Engineering, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Parisa Salmani Ontario Tech University, Oshawa, Canada

Paola Salomoni University of Bologna, Bologna, Italy

Yavuz Samur Computer Education and Instructional Technologies, Bahcesehir University, Istanbul, Turkey

Isidro Moreno Sánchez Universidad Complutense de Madrid, Madrid, Spain

Andrew Sands Imagin3D, Office 4, CTH, Sci Tech Daresbury, Daresbury, UK

Andrea Sanna Dipartimento di Automatica e Informatica, Politecnico di Torino, Turin, Italy

Stevie C. F. Sansalone Ontario Tech University, Oshawa, ON, Canada

Pratiti Sarkar Design Programme, Indian Institute of Technology, Kanpur, Uttar Pradesh, India

Yukiko Sato Cygames, Inc., Shibuya, Tokyo, Japan

Daiki Satoi SQUARE ENIX Co., Ltd., Tokyo, Japan

Yann Savoye Institut fur Informatik, Innsbruck University, Room 3M11, Innsbruck, Austria

Manuel Schmidt University of Innsbruck, Innsbruck, Austria

Ferdinand Schober Xbox Advanced Technology Group, Microsoft Corporation, Redmond, WA, USA

Jacob Schrum Department of Mathematics and Computer Science, Southwestern University, Georgetown, TX, USA

Florian Schübeler The Embassy of Peace, Whitianga, New Zealand

John Scott Vincennes University, Vincennes, IN, USA

Katy Scott Curtin University, Perth, WA, Australia

Hock Soon Seah School of Computer Science and Engineering, Nanyang Technological University, Singapore, Singapore

Sercan Şengün Wonsook Kim School of Art, Illinois State University, Normal, IL, USA

Massachusetts Institute of Technology CSAIL, Cambridge, MA, USA

Stefania Serafin Multisensory Experience Lab, Aalborg University Copenhagen, Copenhagen, Denmark

Diğdem Sezen Faculty of Communications, Istanbul University, Istanbul, Turkey

Tonguc Ibrahim Sezen Faculty of Communication and Environment, Rhine-Waal University of Applied Sciences, Kamp-Lintfort, Germany

Raj Shah Liverpool John Moores University, FET, SBE, Liverpool, UK

Yuanyuan Shen Liverpool John Moores University, Liverpool, UK

Isabel Cristina Siqueira da Silva UniRitter Laureate International Universities, Porto Alegre, Brazil

Adalberto L. Simeone KU Leuven, Department of Computer Science, Heverlee, Belgium

Cansu Nur Simsek Kadir Has University, Istanbul, Turkey

Tulasii Sivaraja Mathematics, Graphics and Visualization Research Group (MGRAVS), Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

Petter Skult Faculty of Arts, Psychology and Theology, Åbo Akademi University, Turku, Finland

Jouni Smed Department of Future Technologies, University of Turku, Turku, Finland

Ross T. Smith School of Information Technology and Mathematical Sciences, University of South Australia, Mawson Lakes, SA, Australia

Dennis J. N. J. Soemers Maastricht University, Maastricht, The Netherlands

Chaitanya Solanki Indian Institute of Technology, Hyderabad, India

Christian Stein gamelab.berlin, Humboldt University Berlin, Berlin, Germany

Frank Steinicke Human-Computer Interaction, Universität Hamburg, Hamburg, Germany

Constantine Stephanidis Computer Science Department, University of Crete, Heraklion, Greece

Foundation for Research and Technology Hellas, Heraklion, Greece

Conor Stephens University of Limerick, Limerick, Ireland

Matthew Stephenson Maastricht University, Maastricht, The Netherlands

Lauren Elizabeth Stipp Creative Technologies Program, Illinois State University, Normal, IL, USA

Mahadeo Sukhai ARIA Team, Canadian National Institute for the Blind, Toronto, ON, Canada

CNIB Foundation, Kingston, ON, Canada

Robert W. Sumner Disney Research, Zürich, Switzerland

Mohd Shahrizal Sunar Media and Game Innovation Centre of Excellence, Institute of Human Centered Engineering, Universiti Teknologi Malaysia, Johor Bahru, Johor, Malaysia

Kelvin Sung Computing and Software Systems, University of Washington Bothell, Bothell, WA, USA

Vorapong Suppakitpaisarn JST, ERATO Kawarabayashi Large Graph Project, National Institute of Informatics, Tokyo, Japan

Elif Surer Department of Modeling and Simulation, Graduate School of Informatics, Middle East Technical University, Ankara, Turkey

Elisabeth Ainsley Sutherland Mediate VR, Cambridge, MA, USA

Erkki Sutinen Department of Future Technologies, University of Turku, Turku, Finland

Christian Swinford Vincennes University, Vincennes, IN, USA

Stella Sylaiou Hellenic Open University, Patras, Greece

Gabriel Synnaeve Cognitive Science and Psycholinguistics (LSCP) of ENS Ulm, Paris, France

Mostafa Tajdini Staffordshire University, Stoke on Trent, UK

Takenobu Takizawa Faculty of Political Science and Economics, Waseda University, Tokyo, Japan

Sin Ying Tan Liverpool John Moores University, Liverpool, UK

Kimmo Tarkkanen Faculty of ICT and Chemical Engineering, Futuristic Interactive Technologies, Turku University of Applied Sciences, Turku, Finland

Huda Kadhim Tayyeh Information System Management(ISM), College of Business Informatics, University of Information Technology and Communications, Baghdad, Iraq

Sam-Odusina Temitope Liverpool John Moores University, FET, SBE, Liverpool, UK

Tansel Tepe Department of Computer Education and Instructional Technology, Muallim Rıfat Education Faculty, Kilis 7 Aralık University, Kilis, Turkey

Burak Tezateşer Nowhere Studios, Istanbul, Turkey

Daniel Thalmann Institute for Media Innovation, Nanyang Technological University, Singapore, Singapore

Mattia Thibault Interdisciplinary Center of Research on Communication, University of Turin, Turin, Italy

Bruce H. Thomas School of Information Technology and Mathematical Sciences, University of South Australia, Mawson Lakes, SA, Australia

Özhan Tıngöy Department of Information Technologies, Marmara University, Istanbul, Turkey

Romero Tori Polytechnic School, University of São Paulo, São Paulo, Brazil

Rodrigo Torres Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico City, Mexico

Róbert Tóth Faculty of Informatics, University of Debrecen, Debrecen, Hungary

Jolanda G. Tromp Center for Simulation and Visualization, Duy Tan University, Da Nang, Vietnam

Tsung-Chih Tsai Fashion Tech, Nogle, Taipei, Taiwan

Michael Tsioumas Hellenic Ministry of Culture and Sports, Service of Modern Monuments and Technical Works of Central Macedonia, Thessaloniki, Greece

Cetin Tuker Graphic Design Department, Mimar Sinan Fine Arts University, Istanbul, Turkey

Hakan Tüzün Department of Computer Education and Instructional Technology, Faculty of Education, Hacettepe University, Ankara, Turkey

Alberto Uriarte Computer Science Department, Drexel University, Philadelphia, PA, USA

Alvaro Uribe-Quevedo Software Informatics Research Centre, University of Ontario Institute of Technology, Oshawa, Canada

Ahmet Uysal Department of Psychology, Middle East Technical University, Ankara, Turkey

Jukka Vahlo School of Economics, University of Turku, Turku, Finland

Peter Vamplew Faculty of Science and Technology, Federation University Australia, Mt Helen, Ballarat, VIC, Australia

Martha Vassiliadi Department of Philology, School of Philosophy, Aristotle University of Thessaloniki, Thessaloniki, Greece

Carolina Padilla Velasco Ontario Tech University, Oshawa, ON, Canada

Remco Veltkamp Utrecht Center for Game Research, Utrecht University, Utrecht, The Netherlands

Anja Venter Applied Design, Cape Peninsula University of Technology, Cape Town, South Africa

Rojin Vishkaie College of Communication, Information, and Media, Ball State University, Muncie, IN, USA

G. Stewart Von Itzstein School of Information Technology and Mathematical Sciences, University of South Australia, Mawson Lakes, SA, Australia

Evan Lee Wagoner Vincennes University, Vincennes, IN, USA

Isaac Wake Vincennes University, Vincennes, IN, USA

Min Wang Shanghai Jiao Tong University, Shanghai, China

Tong Wang Cygames, Inc., Tokyo, Japan

Shuang Wei Department of Computer Graphics Technology, Purdue University, West Lafayette, IN, USA

Peter Werkhoven Utrecht Center for Game Research, Utrecht University, Utrecht, The Netherlands

Duncan A. H. Williams Digital Creativity Labs, Department of Computer Science, University of York, York, UK

Mark H. M. Winands Department of Data Science and Knowledge Engineering, Maastricht University, Maastricht, The Netherlands

Inon Wiratsin Faculty of Business and IT, Ontario Tech University, Oshawa, ON, Canada

Sai-Keung Wong National Chiao Tung University, Hsinchu, Taiwan

Ji Young Woo Department of Big Data Engineering, Soonchunhyang University, Asan-si, South Korea

Jiyoung Woo Graduate School of Information Security, Korea University, Seongbuk-Gu, Seoul, Republic of Korea

Di Wu Department of Computer Science, Sun Yat-sen University, Guangzhou, China

Leon Y. Xiao The Honourable Society of Lincoln's Inn, London, UK

School of Law, Queen Mary University of London, London, UK

Center for Computer Games Research, IT University of Copenhagen, København, Denmark

Zhidong Xiao National Centre for Computer Animation, Bournemouth University, Dorset, UK

Rebecca Ruige Xu Syracuse University, Syracuse, NY, USA

Shahrokh Yadegari Department of Music, Sonic Arts Research and Development Group, Qualcomm Institute, University of California, San Diego, La Jolla, CA, USA

Junzi Yang Mixed and Virtual Reality Research Lab, Vicubelab, School of Computing, Faculty of Engineering, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Kenneth C. C. Yang The University of Texas at El Paso, El Paso, TX, USA

Anna Yankovskaya Tomsk State University of Architecture and Building, Tomsk, Russia

Benjamin Yankson Faculty of Business and IT, University of Ontario Institute of Technology, Oshawa, Ontario, Canada

Masasuke Yasumoto Department of Information Media, Kanagawa Institute of Technology, Kanagawa, Japan

Matthew Yee-King Computing, Goldsmiths College, University of London, London, UK

Murat Yilmaz Virtual Reality Research and Development Laboratory, Department of Computer Engineering, Cankaya University, Ankara, Turkey

Han Kyu Yoo Department of Digital Contents, Sejong University, Seoul, South Korea

Hiroshi Yoshikawa Department Computer Engineering, College of Science and Technology, Nihon University, Funabashi, Chiba, Japan

Kazuki Yoshizoe Graduate School of Frontier Sciences, The University of Tokyo, Tokyo, Japan

Fares Yousefi Department of Computer Science, Faculty of Engineering and Technology, Liverpool John Moores University (LJMU), Liverpool, UK

Fangyi Yu Ontario Tech University, Oshawa, ON, Canada

Shigang Yue School of Computer Science, University of Lincoln, Lincoln, UK

Müberra Yüksel Faculty of Applied Sciences, Department of International Trade, Boğaziçi University, Istanbul, Turkey

Cik Suhaimi Yusof Mixed and Virtual Reality Research Lab, Vicubelab, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

Paulo Zaffari Hoplon Infotainment S.A., Florianopolis, Brazil

Syamsul Bahrin Zaibon Institude of Creative Humanities, Multimedia & Innovation, School of Creative Industry Management & Performing Arts, Universiti Utara Malaysia, Sintok, Kedah, Malaysia

Cagri Hakan Zaman MIT CSAIL, Cambridge, MA, USA

Hushairi Zen Communications Research Group, Faculty of Engineering, Universiti Malaysia Sarawak, Sarawak, Malaysia

YanXiang Zhang Department of Communication of Science and Technology, University of Science and Technology of China, Hefei, Anhui, China

Feng Zhao School of Information Science and Technology, University of Science and Technology of China, Hefei, China

QingQing Zhao Department of Communication of Science and Technology, University of Science and Technology of China, Hefei, Anhui, China

Marianna Zichar Faculty of Informatics, University of Debrecen, Debrecen, Hungary