

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Alfred Kobsa

*University of California, Irvine, CA, USA*

Friedemann Mattern

*ETH Zurich, Switzerland*

John C. Mitchell

*Stanford University, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

Oscar Nierstrasz

*University of Bern, Switzerland*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*University of Dortmund, Germany*

Madhu Sudan

*Massachusetts Institute of Technology, MA, USA*

Demetri Terzopoulos

*University of California, Los Angeles, CA, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Gerhard Weikum

*Max-Planck Institute of Computer Science, Saarbruecken, Germany*

George Bebis Richard Boyle  
Bahram Parvin Darko Koracin  
Paolo Remagnino Fatih Porikli  
Jörg Peters James Klosowski  
Laura Arns Yu Ka Chun  
Theresa-Marie Rhyne Laura Monroe (Eds.)

# Advances in Visual Computing

4th International Symposium, ISVC 2008  
Las Vegas, NV, USA, December 1-3, 2008  
Proceedings, Part I

## Volume Editors

George Bebis, E-mail: [bebis@cse.unr.edu](mailto:bebis@cse.unr.edu)

Richard Boyle, E-mail: [richard.boyle@nasa.gov](mailto:richard.boyle@nasa.gov)

Bahram Parvin, E-mail: [parvin@hpcrd.lbl.gov](mailto:parvin@hpcrd.lbl.gov)

Darko Koracin, E-mail: [darko@dri.edu](mailto:darko@dri.edu)

Paolo Remagnino, E-mail: [p.remagnino@kingston.ac.uk](mailto:p.remagnino@kingston.ac.uk)

Fatih Porikli, E-mail: [fatih@merl.com](mailto:fatih@merl.com)

Jörg Peters, E-mail: [jorg@cise.ufl.edu](mailto:jorg@cise.ufl.edu)

James Klosowski, E-mail: [jklosow@us.ibm.com](mailto:jklosow@us.ibm.com)

Laura Arns, E-mail: [larns@purdue.edu](mailto:larns@purdue.edu)

Yu Ka Chun, E-mail: [kcyu@dmns.org](mailto:kcyu@dmns.org)

Theresa-Marie Rhyne, E-mail: [tmrhyne@unity.ncsu.edu](mailto:tmrhyne@unity.ncsu.edu)

Laura Monroe, E-mail: [lmmonroe@lanl.gov](mailto:lmmonroe@lanl.gov)

Library of Congress Control Number: 2008939872

CR Subject Classification (1998): I.4, I.5, I.2.10, I.3.3, I.3.5, I.3.7, I.2.6, F.2.2

LNCS Sublibrary: SL 6 – Image Processing, Computer Vision, Pattern Recognition, and Graphics

ISSN 0302-9743

ISBN-10 3-540-89638-4 Springer Berlin Heidelberg New York

ISBN-13 978-3-540-89638-8 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

[springer.com](http://springer.com)

© Springer-Verlag Berlin Heidelberg 2008

Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper SPIN: 12568406 06/3180 5 4 3 2 1 0

# Preface

It is with great pleasure that we present the proceedings of the 4th International Symposium on Visual Computing (ISVC 2008) in Las Vegas, Nevada. ISVC offers a common umbrella for the four main areas of visual computing including vision, graphics, visualization, and virtual reality. Its goal is to provide a forum for researchers, scientists, engineers and practitioners throughout the world to present their latest research findings, ideas, developments and applications in the broader area of visual computing.

This year, ISVC grew significantly; the program consisted of 15 oral sessions, 1 poster session, 8 special tracks, and 6 keynote presentations. The response to the call for papers was very strong; we received over 340 submissions for the main symposium from which we accepted 102 papers for oral presentation and 70 papers for poster presentation. Special track papers were solicited separately through the Organizing and Program Committees of each track. A total of 56 papers were accepted for oral presentation and 8 papers for poster presentation in the special tracks.

All papers were reviewed with an emphasis on potential to contribute to the state of the art in the field. Selection criteria included accuracy and originality of ideas, clarity and significance of results, and presentation quality. The review process was quite rigorous, involving two to three independent blind reviews followed by several days of discussion. During the discussion period we tried to correct anomalies and errors that might have existed in the initial reviews. Despite our efforts, we recognize that some papers worthy of inclusion may have not been included in the program. We offer our sincere apologies to authors whose contributions might have been overlooked.

We wish to thank everybody who submitted their work to ISVC 2008 for review. It was because of their contributions that we succeeded in having a technical program of high scientific quality. In particular, we would like to thank the ISVC 2008 Area Chairs, the organizing institutions (UNR, DRI, LBNL, and NASA Ames), the industrial sponsors (Intel, DigitalPersona, Equinox, Ford, Siemens, Hewlett Packard, MERL, UtopiaCompression, iCore), the international Program Committee, the special track organizers and their Program Committees, the keynote speakers, the reviewers, and especially the authors that contributed their work to the symposium. In particular, we would like to thank Siemens, MERL, and iCore who kindly offered three “best paper awards” this year.

# Organization

## ISVC 2008 Steering Committee

Bebis George	University of Nevada, Reno, USA
Boyle Richard	NASA Ames Research Center, USA
Parvin Bahram	Lawrence Berkeley National Laboratory, USA
Koracin Darko	Desert Research Institute, USA

## ISVC 2008 Area Chairs

### Computer Vision

Remagnino Paolo	Kingston University, UK
Porikli Fatih	Mitsubishi Electric Research Labs, USA

### Computer Graphics

Peters Jorg	University of Florida, USA
Klosowski James	IBM, USA

### Virtual Reality

Arns Laura	Purdue University, USA
Yu Ka Chun	Denver Museum of Nature and Science, USA

### Visualization

Rhyne Theresa-Marie	North Carolina State University, USA
Monroe Laura	Los Alamos National Labs, USA

### Publicity

Li Wenjing	STI Medical Systems, USA
------------	--------------------------

### Local Arrangements

Veropoulos Kostas	Desert Research Institute, USA
-------------------	--------------------------------

### Publications

Wang Junxian	UtopiaCompression, USA
--------------	------------------------

## ISVC 2008 Keynote Speakers

Pavlidis Ioannis	University of Houston, USA
Medioni Gerard	University of Southern California, USA
Gaither Kelly	University of Texas at Austin, USA
Aggarwal J.K.	University of Texas at Austin, USA
Kaufman Arie	Stony Brook University (SUNY), USA
Grimson Eric	Massachusetts Institute of Technology, USA

## ISVC 2008 International Program Committee

### (Area 1) Computer Vision

Abidi Bisma	University of Tennessee, USA
Aggarwal J. K.	University of Texas, Austin, USA
Agouris Peggy	George Mason University, USA
Anagnostopoulos George	Florida Institute of Technology, USA
Argyros Antonis	University of Crete, Greece
Asari Vijayan	Old Dominion University, USA
Basu Anup	University of Alberta, Canada
Bebis George	University of Nevada at Reno, USA
Belyaev Alexander	Max-Planck-Institut fuer Informatik, Germany
Bhatia Sanjiv	University of Missouri-St. Louis, USA
Bioucas Jose	Instituto Superior Tecnico, Lisbon, Portugal
Birchfield Stan	Clemson University, USA
Goh Wooi-Boon	Nanyang Technological University, Singapore
Bourbakis Nikolaos	Wright State University, USA
Brimkov Valentin	State University of New York, USA
Cavallaro Andrea	Queen Mary, University of London, UK
Chellappa Rama	University of Maryland, USA
Cheng Hui	Sarnoff Corporation, USA
Chung, Chi-Kit Ronald	The Chinese University of Hong Kong, Hong Kong
Darbon Jerome	UCLA, USA
Davis James	Ohio State University, USA
Debrunner Christian	Colorado School of Mines, USA
Duan Ye	University of Missouri-Columbia, USA
El-Gammal Ahmed	University of New Jersey, USA
Eng How Lung	Institute for Infocomm Research, Singapore
Erol Ali	Ocali Information Technology, Turkey
Fan Guoliang	Oklahoma State University, USA
Ferri Francesc	Universitat de Valencia, Spain
Fisher Robert	University of Edinburgh, UK
Foresti GianLuca	University of Udine, Italy
Gandhi Tarak	University of California at San Diego, USA
Georgescu Bogdan	Siemens, USA

Gleason, Shaun	Oak Ridge National Laboratory, USA
Guerra-Filho Gutenberg	University of Texas Arlington, USA
Hammoud Riad	Delphi Corporation, USA
Harville Michael	Hewlett Packard Labs, USA
He Xiangjian	University of Technology, Australia
Heikkilä Janne	University of Oulu, Finland
Heyden Anders	Malmo University, Sweden
Hou Zujun	Institute for Infocomm Research, Singapore
Kamberov George	Stevens Institute of Technology, USA
Kamberova Gerda	Hofstra University, USA
Kakadiaris Ioannis	University of Houston, USA
Kettebekov Sanzhar	Keane inc., USA
Kimia Benjamin	Brown University, USA
Kisacanin Branislav	Texas Instruments, USA
Klette Reinhard	Auckland University, New Zeland
Kollias Stefanos	National Technical University of Athens, Greece
Komodakis Nikos	Ecole Centrale de Paris, France
Kuno Yoshinori	Saitama University, Japan
Lee D.J.	Brigham Young University, USA
Lee Seong-Whan	Korea University, Korea
Leung Valerie	Kingston University, UK
Li Wenjing	STI Medical Systems, USA
Liu Jianzhuang	The Chinese University of Hong Kong, Hong Kong
Little Jim	University of British Columbia, Canada
Ma Yunqian	Honyewell Labs, USA
Maeder Anthony	CSIRO ICT Centre, Australia
Maltoni Davide	University of Bologna, Italy
Maybank Steve	Birkbeck College, UK
McGraw Tim	West Virginia University, USA
Medioni Gerard	University of Southern California, USA
Metaxas Dimitris	Rutgers University, USA
Miller Ron	Ford Motor Company, USA
Mirmehdi Majid	Bristol University, UK
Monekosso Dorothy	Kingston University, UK
Mueller Klaus	SUNY Stony Brook, USA
Mulligan Jeff	NASA Ames Research Center, USA
Nachtegaele Mike	Ghent University, Belgium
Nait-Charif Hammadi	Bournemouth University, UK
Nefian Ara	Nokia, USA
Nicolescu Mircea	University of Nevada, Reno, USA
Nixon Mark	University of Southampton, UK
Nolle Lars	The Nottingham Trent University, UK
Ntalianis Klimis	National Technical University of Athens, Greece

Pantic Maja	Imperial College, UK
Papadourakis George	Technological Education Institute, Greece
Papanikolopoulos Nikolaos	University of Minnesota, USA
Parvin Bharam	Lawrence Berkeley National Lab, USA
Pati Peeta Basa	First Indian Corp., India
Patras Ioannis	Queen Mary University, London, UK
Petrakis Euripides	Technical University of Crete, Greece
Peyronnet Sylvain	LRDE/EPITA, France
Piccardi Massimo	University of Technology, Australia
Pietikäinen Matti	LRDE/University of Oulu, Finland
Pitas Ioannis	University of Thessaloniki, Greece
Prabhakar Salil	DigitalPersona Inc., USA
Prati Andrea	University of Modena, Italy
Qian Gang	Arizona State University, USA
Raftopoulos Kostas	National Technical University of Athens, Greece
Reed Michael	Columbia University, USA
Regazzoni Carlo	University of Genoa, Italy
Ribeiro Eraldo	Florida Institute of Technology, USA
Robles-Kelly Antonio	National ICT Australia (NICTA), Australia
Ross Arun	West Virginia University, USA
Samal Ashok	University of Nebraska, USA
Schaefer Gerald	Aston University, UK
Shi Pengcheng	The Hong Kong University of Science and Technology, Hong Kong
Salgian Andrea	The College of New Jersey, USA
Samir Tamer	Ingersoll Rand Security Technologies, USA
Sarkar Sudeep	University of South Florida, USA
Sarti Augusto	DEI, Politecnico di Milano, Italy
Scalzo Fabien	University of Nevada, Reno, USA
Shah Mubarak	University of Central Florida, USA
Singh Rahul	San Francisco State University, USA
Skurikhin Alexei	Los Alamos National Laboratory, USA
Su Chung-Yen	National Taiwan Normal University, Taiwan
Sugihara Kokichi	University of Tokyo, Japan
Sun Zehang	eTrepid Technologies, USA
Tan Kar Han	Hewlett Packard, USA
Tan Tieniu	Chinese Academy of Sciences, China
Tavares, Joao	Universidade do Porto, Portugal
Teoh Eam Khwang	Nanyang Technological University, Singapore
Thiran Jean-Philippe	Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland
Trucco Emanuele	University of Dundee, UK
Tsechenakis Gabriel	University of Miami, USA

Tubaro Stefano	DEI, Politecnico di Milano, Italy
Uhl Andreas	Salzburg University, Austria
Velastin Sergio	Kingston University London, UK
Veropoulos Kostas	Desert Research Institute, USA
Verri Alessandro	Università di Genova, Italy
Wang Song	University of South Carolina, USA
Wang Junxian	UtopiaCompression, USA
Wang Yunhong	Beihang University, China
Webster Michael	University of Nevada, Reno, USA
Wolff Larry	Equinox Corporation, USA
Wong Kenneth	The University of Hong Kong, Hong Kong
Xiang Tao	Queen Mary, University of London, UK
Xu Meihe	University of California at Los Angeles, USA
Yeasin Mohammed	Memphis University, USA
Yi Lijun	SUNY at Binghamton, USA
Yu Ting	GE Global Research, USA
Yuan Chunrong	University of Tuebingen, Germany
Zhang Yan	Delphi Corporation, USA
Zhang Yongmian	eTrepid Technologies, USA

## (Area 2) Computer Graphics

Abram Greg	IBM T.J. Watson Research Center, USA
Andres Eric	Laboratory XLIM-SIC, University of Poitiers, France
Baciu George	Hong Kong PolyU, Hong Kong
Barneva Reneta	State University of New York, USA
Bartoli Vilanova Anna	Eindhoven University of Technology, The Netherlands
Belyaev Alexander	Max-Planck-Institut fuer Informatik, Germany
Benes Bedrich	Purdue University, USA
Bilalis Nicholas	Technical University of Crete, Greece
Bohez Erik	Asian Institute of Technology, Thailand
Bouatouch Kadi	University of Rennes I, IRISA, France
Brimkov Valentin	State University of New York, USA
Brown Ross	Queensland University of Technology, Australia
Callahan Steven	University of Utah, USA
Chen Min	University of Wales Swansea, UK
Cheng Irene	University of Alberta, Canada
Chiang Yi-Jen	Polytechnic University, USA
Choi Min	University of Colorado at Denver, USA
Comba Joao	Univ. Fed. do Rio Grande do Sul, Brazil
Coming Daniel	Desert Research Institute, USA
Cremer Jim	University of Iowa, USA

Crosa Pere Brunet	Universitat Politecnica de Catalunya, Spain
Debled-Rennesson	
Isabelle	University of Nancy I, France
Damiand Guillaume	SIC Laboratory, France
Deng Zhigang	University of Houston, USA
Dingliana John	Trinity College, Ireland
El-Sana Jihad	Ben Gurion University of The Negev, Israel
Entezari Alireza	University of Florida, USA
Fiorio Christophe	LIRMM, France
Floriani Leila De	University of Maryland, USA
Gaither Kelly	University of Texas at Austin, USA
Geiger Christian	Duesseldorf University of Applied Sciences, Germany
Gotz David	IBM, USA
Gu David	State University of New York at Stony Brook, USA
Guerra-Filho Gutemberg	University of Texas Arlington, USA
Hadwiger Helmut	
Markus	VRVis Research Center, Austria
Haller Michael	Upper Austria University of Applied Sciences, Austria
Hamza-Lup Felix	Armstrong Atlantic State University, USA
Han JungHyun	Korea University, Korea
Hao Xuejun	Columbia University and NYSPI, USA
Hernandez Jose Tiberio	Universidad de los Andes, Colombia
Hinkenjann Andre	Bonn Rhein Sieg University of Applied Sciences, Germany
Huang Zhiyong	Institute for Infocomm Research, Singapore
Ju Tao	Washington University, USA
Julier Simon J.	University College London, UK
Kakadiaris Ioannis	University of Houston, USA
Kamberov George	Stevens Institute of Technology, USA
Kim Young	Ewha Womans University, Korea
Kobbelt Leif	RWTH Aachen, Germany
Lai Shuhua	Virginia State University, USA
Lakshmanan Geetika	IBM T.J. Watson Reseach Center, USA
Lee Chang Ha	Chung-Ang University, Korea
Lee Seungyong	Pohang University of Science and Technology (POSTECH), Korea
Lee Tong-Yee	National Cheng-Kung University, Taiwan
Levine Martin	McGill University, Canada
Lindstrom Peter	Lawrence Livermore National Laboratory, USA
Linsen Lars	Jacobs University, Germany
Liu Zicheng	Microsoft, USA
Lok Benjamin	University of Florida, USA

Loviscach Jorn	University of Applied Sciences, Bremen, Germany
Martin Ralph	Cardiff University, UK
McGraw Tim	West Virginia University, USA
Meenakshisundaram Gopi	University of California-Irvine, USA
Mendoza Cesar	NaturalMotion Ltd., USA
Metaxas Dimitris	Rutgers University, USA
Moorhead Robert	Mississippi State University, USA
Myles Ashish	University of Florida, USA
Nait-Charif Hammadi	University of Dundee, UK
Noma Tsukasa	Kyushu Institute of Technology, Japan
Oliveira Manuel M.	Univ. Fed. do Rio Grande do Sul, Brazil
Pajarola Renato	University of Zurich, Switzerland
Palanque Philippe	University of Paul Sabatier, France
Pascucci Valerio	Lawrence Livermore National Laboratory, USA
Pattanaik Sumanta	University of Central Florida, USA
Qin Hong	State University of New York at Stony Brook, USA
Reed Michael	Columbia University, USA
Reif Ulrich	Darmstadt University of Technology, Germany
Renner Gabor	Computer and Automation Research Institute, Hungary
Sapidis Nickolas	University of the Aegean, Greece
Sarfraz Muhammad	Kuwait University, Kuwait
Schaefer Scott	Texas A&M University, USA
Sequin Carlo	University of California-Berkeley, USA
Shamir Arik	The Interdisciplinary Center, Herzliya, Israel
Silva Claudio	University of Utah, USA
Snoeyink Jack	University of North Carolina at Chapel Hill, USA
Sourin Alexei	Nanyang Technological University, Singapore
Tan Kar Han	Hewlett Packard, USA
Teschner Matthias	University of Freiburg, Germany
Umlauf Georg	University of Kaiserslautern, Germany
Vinacua Alvar	Universitat Politecnica de Catalunya, Spain
Wald Ingo	University of Utah, USA
Wylie Brian	Sandia National Laboratory, USA
Ye Duan	University of Missouri-Columbia, USA
Yi Beifang	Salem State College, USA
Yin Lijun	Binghamton University, USA
Yoo Terry	National Institutes of Health, USA
Yuan Xiaoruv	Peking University, China
Zhang Eugene	Oregon State University, USA

### (Area 3) Virtual Reality

Alcañiz Mariano	Technical University of Valencia, Spain
Behringer Reinhold	Leeds Metropolitan University, UK
Benes Bedrich	Purdue University, USA
Bilalis Nicholas	Technical University of Crete, Greece
Blach Roland	Fraunhofer Institute for Industrial Engineering, Germany
Blom Kristopher	University of Hamburg, Germany
Boyle Richard	NASA Ames Research Center, USA
Brady Rachael	Duke University, USA
Brega Jos Remo Ferreira	Universidade Estadual Paulista, Brazil
Brown Ross	Queensland University of Technology, Australia
Chen Jian	Brown University, USA
Cheng Irene	University of Alberta, Canada
Coming Daniel	Desert Research Institute, USA
Coquillart Sabine	INRIA, France
Craig Alan	NCSA University of Illinois at Urbana-Champaign, USA
Crawfis Roger	Ohio State University, USA
Cremer Jim	University of Iowa, USA
Crosa Pere Brunet	Universitat Politecnica de Catalunya, Spain
Encarnacao L. Miguel	Imedia Labs, USA
Dachselt Raimund	Otto-von-Guericke-Universität Magdeburg, Germany
Figuerola Pablo	Universidad de los Andes, Colombia
Friedman Doron	IDC, Israel
Geiger Christian	Duesseldorf University of Applied Sciences, Germany
Gregory Michelle	Pacific Northwest National Lab, USA
Gupta Satyandra K.	University of Maryland, USA
Haller Michael	FH Hagenberg, Austria
Hamza-Lup Felix	Armstrong Atlantic State University, USA
Harders Matthias	ETH Zürich, Switzerland
Hinkenjann Andre	Bonn-Rhein-Sieg University of Applied Sciences, Germany
Hollerer Tobias	University of California at Santa Barbara, USA
Julier Simon J.	University College London, UK
Klinger Evelynne	Arts et Metiers ParisTech, France
Klinker Gudrun	Technische Universität München, Germany
Klosowski James	IBM T.J. Watson Research Center, USA
Kuhlen Torsten	RWTH Aachen University, Germany
Liere Robert van	CWI, The Netherlands
Lindt Irma	Fraunhofer FIT, Germany

Lok Benjamin	University of Florida, USA
Luo Gang	Harvard Medical School, USA
Malzbender Tom	Hewlett Packard Labs, USA
Molineros Jose	Teledyne Scientific and Imaging, USA
Moorhead Robert	Mississippi State University, USA
Muller Stefan	University of Koblenz, Germany
Paelke Volker	Leibniz Universität Hannover, Germany
Papka Michael	Argonne National Laboratory, USA
Peli Eli	Harvard University, USA
Pugmire Dave	Los Alamos National Lab, USA
Qian Gang	Arizona State University, USA
Raffin Bruno	INRIA, France
Reiners Dirk	University of Louisiana, USA
Richir Simon	Arts et Metiers ParisTech, France
Rodello Ildeberto	UNIVEM, PPGCC, Brazil
Rolland Jannick	University of Central Florida, USA
Santhanam Anand	MD Anderson Cancer Center Orlando, USA
Sapidis Nickolas	University of the Aegean, Greece
Schmalstieg Dieter	Graz University of Technology, Austria
Slavik Pavel	Czech Technical University in Prague, Czech Republic
Sourin Alexei	Nanyang Technological University, Singapore
Srikanth Manohar	Indian Institute of Science, India
Stefani Oliver	COAT-Basel, Switzerland
Varsamidis Thomas	Bangor University, UK
Wald Ingo	University of Utah, USA
Yuan Chunrong	University of Tuebingen, Germany
Zachmann Gabriel	Clausthal University, Germany
Zara Jiri	Czech Technical University in Prague, Czech Republic
Zyda Michael	University of Southern California, USA

#### **(Area 4) Visualization**

Andrienko Gennady	Fraunhofer Institut, Germany
Apperley Mark	University of Waikato, New Zealand
Avila Lisa	Kitware, USA
Balázs Csébfalvi	Budapest University of Technology and Economics, Hungary
Bartoli Anna Vilanova	Eindhoven University of Technology, The Netherlands
Brady Rachael	Duke University, USA
Brandes Ulrik	Konstanz University, Germany
Benes Bedrich	Purdue University, USA
Bertino Elisa	Purdue University, USA
Bilalis Nicholas	Technical University of Crete, Greece

Bonneau Georges-Pierre	Grenoble Université, France
Brodie Ken	University of Leeds, UK
Brown Ross	Queensland University of Technology, Australia
Callahan Steven	University of Utah, USA
Chen Jian	Brown University, USA
Chen Min	University of Wales Swansea, UK
Cheng Irene	University of Alberta, Canada
Chiang Yi-Jen	Polytechnic University, USA
Crosa Pere Brunet	Universitat Politècnica de Catalunya, Spain
Doleisch Helmut	VRVis Research Center, Austria
Duan Ye	University of Missouri-Columbia, USA
Dwyer Tim	Monash University, Australia
Ebert David	Purdue University, USA
Encarnasao James Miguel	Imedia Labs, USA
Entezari Alireza	University of Florida, USA
Ertl Thomas	University of Stuttgart, Germany
Floriani Leila De	University of Maryland, USA
Fujishiro Issei	Tohoku University, Japan
Geiger Christian	Duesseldorf University of Applied Sciences, Germany
Gotz David	IBM, USA
Grinstein Georges	University of Massachusetts Lowell, USA
Goebel Randy	University of Alberta, Canada
Gregory Michelle	Pacific Northwest National Lab, USA
Hadwiger Helmut Markus	VRVis Research Center, Austria
Hagen Hans	Technical University of Kaiserslautern, Germany
Ham van Frank	IBM, USA
Hamza-Lup Felix	Armstrong Atlantic State University, USA
Heer Jeffrey	Armstrong University of California at Berkeley, USA
Hege Hans-Christian	Zuse Institute Berlin, Germany
Hochheiser Harry	Towson State University, USA
Hollerer Tobias	University of California at Santa Barbara, USA
Hotz Ingrid	Zuse Institute Berlin, Germany
Julier Simon J.	University College London, UK
Kao David J.	NASA Ames, USA
Kohlhammer Jörn	Fraunhofer Institut, Germany
Koracin Darko	Desert Research Institute, USA
Kosara Robert	University of North Carolina at Charlotte, USA
Laidlaw David	Brown University, USA

Laramée Robert	Swansea University, UK
Lee Chang Ha	Chung-Ang University, Korea
Liere Robert van	CWI, The Netherlands
Lim Ik Soo	Bangor University, UK
Linsen Lars	Jacobs University, Germany
Liu Zhanping	Mississippi State University, USA
Ma Kwan-Liu	University of California-Davis, USA
Maeder Anthony	CSIRO ICT Centre, Australia
Malpica Jose	Alcala University, Spain
Masutani Yoshitaka	The University of Tokyo Hospital, Japan
McGraw Tim	West Virginia University, USA
Melançon Guy	CNRS UMR 5800 LaBRI and INRIA Bordeaux Sud-Ouest, France
Miksch Silvia	Vienna University of Technology, Austria
Mueller Klaus	SUNY Stony Brook, USA
Museth Ken	Linköping University, Sweden
Paelke Volker	Leibniz Universität Hannover, Germany
Papka Michael	Argonne National Laboratory, USA
Pugmire Dave	Los Alamos National Lab, USA
Rabin Robert	University of Wisconsin at Madison, USA
Raffin Bruno	INRIA, France
Rolland Jannick	University of Central Florida, USA
Santhanam Anand	MD Anderson Cancer Center Orlando, USA
Scheuermann Gerik	University of Leipzig, Germany
Shen Han-Wei	Ohio State University, USA
Silva Claudio	University of Utah, USA
Sips Mike	Stanford University, USA
Slavik Pavel	Czech Technical University in Prague, Czech Republic
Snoeyink Jack	University of North Carolina at Chapel Hill, USA
Sourin Alexei	Nanyang Technological University, Singapore
Theisel Holger	Bielefeld University, Germany
Thiele Olaf	University of Mannheim, Germany
Tory Melanie	University of Victoria, Canada
Tricoche Xavier	Purdue University, USA
Umlauf Georg	University of Kaiserslautern, Germany
Viegas Fernanda	IBM, USA
Viola Ivan	University of Bergen, Norway
Wald Ingo	University of Utah, USA
Wan Ming	Boeing Phantom Works, USA
Ward Matt	Worcester Polytechnic Institute, USA
Weinkauff Tino	ZIB Berlin, Germany

## XVIII Organization

Weiskopf Daniel	University of Stuttgart, Germany
Wetering van de Huub	Technische Universiteit Eindhoven, The Netherlands
Wijk van Jarke	Technische Universiteit Eindhoven, The Netherlands
Wylie Brian	Sandia National Laboratory, USA
Yeasin Mohammed	Memphis University, USA
Yuan Xiaoru	Peking University, China
Zachmann Gabriel	Clausthal University, Germany
Zhang Eugene	Oregon State University, USA
Zhukov Leonid	Caltech, USA

## ISVC 2008 Special Tracks

### 1. Object Recognition

#### Organizers

Andrea Salgian	The College of New Jersey, USA
Fabien Scalzo	University of Nevada, Reno, USA

#### Program Committee

Boris Epshtein	The Weizmann Institute of Science, Israel
Svetlana Lazebnik	University of North Carolina at Chapel Hill, USA
Bastian Leibe	ETH Zurich, Switzerland
Vincent Lepetit	EPFL, Switzerland
Ales Leonardis	University of Ljubljana, Slovenia
Bogdan Matei	Sarnoff Corporation, USA
Raphael Maree	Universite de Liege, Belgium
Randal Nelson	University of Rochester, USA
Justus Piater	Universite de Liege, Belgium
Bill Triggs	INRIA, France
Tinne Tuytelaars	Katholieke Universiteit Leuven, Belgium
Michel Vidal-Naquet	RIKEN Brain Science Institute, Japan

### 2. Real-Time Vision Algorithm Implementation and Application

#### Organizers

D.J. Lee	Brigham Young University, USA
James Archibald	Brigham Young University, USA
Brent Nelson	Brigham Young University, USA
Doran Wilde	Brigham Young University, USA

**Program Committee**

Jiun-Jian Liaw	Chaoyang University of Technology, Taiwan
Che-Yen Wen	Central Police University, Taiwan
Yuan-Liang Tang	Chaoyang University of Technology, Taiwan
Hsien-Chou Liao	Chaoyang University of Technology, Taiwan

**3. Visualization and Simulation on Immersive Display Devices****Organizers**

Daniel Coming	Desert Research Institute, USA
Darko Koracin	Desert Research Institute, USA
Laura Monroe	Los Alamos National Lab, USA
Rachael Brady	Duke University, USA

**Program Committee**

Andy Forsberg	Brown University, USA
Bernd Hamann	University of California, Davis, USA
Arie Kaufman	Stony Brook University (SUNY), USA
Phil McDonald	Desert Research Institute, USA
Dave Modl	LANL/LAVA/Worldscape, USA
Patrick O'Leary	Desert Research Institute, USA
Dirk Reiners	LITE, USA
Bill Sherman	Desert Research Institute, USA
Steve Smith	LANL/LAVA/Worldscape, USA
Oliver Staadt	University of Rostock, Germany

**4. Analysis and Visualization of Biomedical Visual Data****Organizers**

Irene Cheng	University of Alberta, Canada
Anthony Maeder	University of Western Sydney, Australia

**Program Committee**

Walter Bischof	University of Alberta, Canada
Pierre Boulanger	University of Alberta, Canada
Ross Brown	Queensland University of Technology, Australia
Pablo Figueroa	Universidad de los Andes, Colombia
Carlos Flores	University of Alberta, Canada
Paul Jackway	CSIRO, Australia
Shoo Lee	iCARE, Capital Health, Canada
Tom Malzbender	HP Labs, USA
Mrinal Mandal	University of Alberta, Canada
Steven Miller	University of British Columbia, Canada
Jiambo Shi	University of Pennsylvania, USA

Claudio Silva	University of Utah, USA
Dimitris Gramenos	Institute of Computer Science-FORTH, Greece
Lijun Yin	University of Utah, USA
Xenophon Zabulis	Institute of Computer Science-FORTH, Greece
Jeffrey Zou	University of Western Sydney, Australia

## 5. Soft Computing in Image Processing and Computer Vision

### Organizers

Gerald Schaefer	Nottingham Trent University, UK
Mike Nachtgael	Ghent University, Belgium
Aboul-Ella Hassanien	Cairo University, Egypt

### Program Committee

Hüseyin Çakmak	Forschungszentrum Karlsruhe, Germany
Emre Celebi	Louisiana State University, USA
Kevin Curran	University of Ulster, UK
Mostafa A. El-Hosseini	Mubarak City for Science and Technology, Egypt
Hajime Nobuhara	Tokyo Institute of Technology, Japan
Samuel Morillas	Technical University of Valencia, Spain
Daniel Sanchez	University of Granada, Spain
Mayank Vatsa	University of Virginia, USA
Ioannis Vlachos	Aristotle University of Thessaloniki, Greece
Huiyou Zhou	Brunel University, UK

## 6. Computational Bioimaging and Visualization

### Organizers

João Manuel R.S. Tavares	University of Porto, Portugal
Renato Natal Jorge	University of Porto, Portugal
Goswami Samrat	University of Texas at Austin, USA

### Program Committee

Alberto De Santis	Università degli Studi di Roma “La Sapienza”, Italy
Ana Mafalda Reis	Instituto de Ciencias Biomedicas Abel Salazar, Portugal
Arrate Muñoz Barrutia	University of Navarra, Spain
Chang-Tsun Li	University of Warwick, UK
Christos E. Constantinou	Stanford University School of Medicine, USA

Mrinal Mandal	University of Alberta, Canada
Daniela Iacoviello	Università degli Studi di Roma “La Sapienza”, Italy
Dinggang Shen	University of Pennsylvania, USA
Eduardo Borges Pires	Instituto Superior Tecnico, Portugal
Enrique Alegre Gutiérrez	University of León, Spain
Filipa Sousa	University of Porto, Portugal
Gerhard A. Holzapfel	Royal Institute of Technology, Sweden
Hélder C. Rodrigues	Instituto Superior Tecnico, Portugal
Hemerson Pistori	Dom Bosco Catholic University, Brazil
Jorge M.G. Barbosa	University of Porto, Portugal
Jorge S. Marques	Instituto Superior Tecnico, Portugal
Jose M. García Aznar	University of Zaragoza, Spain
Luís Paulo Reis	University of Porto, Portugal
Manuel González Hidalgo	Balearic Islands University, Spain
Michel A. Audette	University of Leipzig, Germany
Patrick Dubois	Institut de Technologie Medicale, France
Reneta P. Barneva	State University of New York, USA
Roberto Bellotti	University of Bari, Italy
Sabina Tangaro	University of Bari, Italy
Sónia I. Gonçalves-Verheij	VU University Medical Centre, The Netherlands
Valentin Brimkov	State University of New York, USA
Yongjie Zhan	Carnegie Mellon University, USA
Xavier Roca Marvà	Autonomous University of Barcelona, Spain

## 7. Discrete and Computational Geometry and Their Applications in Visual Computing

### Organizers

Valentin Brimkov	State University of New York, USA
Reneta Barneva	State University of New York, USA

### Program Committee

K. Joost Batenburg	University of Antwerp, Belgium
Bedrich Benes	Purdue University, USA
Isabelle Debled-Rennesson	Institut Univ de Formation des Maitres de Lorraine, France
Christophe Fiorio	LIRMM, University Montpellier II, France
Gisela Klette	University of Auckland, New Zealand
Reinhard Klette	University of Auckland, New Zealand
Kostadin Koroutchev	Universidad Autonoma de Madrid, Spain
Benedek Nagy	University of Debrecen, Hungary

Kalman Palagyi	University of Szeged, Hungary
Arun Ross	West Virginia University, USA
K.G. Subramanian	Universiti Sains, Malaysia
João Manuel R.S. Tavares	University of Porto, Portugal

## 8. Image Analysis for Remote Sensing Data

### Organizers

Jose A. Malpica	Alcala University, Spain
Maria A. Sanz	Technical University of Madrid, Spain
Maria C. Alonso	Alcala University, Spain

### Program Committee

Hossein Arefi	Stuttgart University of Applied Sciences, Germany
Manfred Ehlers	University of Osnabrueck, Germany
María J. García-Rodríguez	University of Madrid, Spain
John L. van Genderen	ITC, The Netherlands
Radja Khedam	Technology and Sciences University, Algeria
José L. Lerma	Technical University of Valencia, Spain
Qingquan Li	Wuhan University, China
Dimitris Manolakis	MIT Lincoln Laboratory, USA
Farid Melgani	University of Trento, Italy
Jon Mills	University of Newcastle, UK
Francisco Papí	IGN, Spain
Karel Pavelka	Technical University in Prague, Czech Republic
William D. Philpot	Cornell University, USA
Daniela Poli	Swiss Federal Institute of Technology, Switzerland
Mohammad-Reza Saradjian	University of Tehran, Iran
Sriparna Saha	Indian Statistical Institute, India

### Additional Reviewers

Shawn Hempel	RTT, USA
Chris Town	Cambridge University, UK
Steffen Koch	University of Stuttgart, Germany
Cliff Lindsay	Worcester Polytechnic Institute, USA
Florian Bingel	University of Applied Sciences Bonn Rhein Sieg, Germany

Ingo Feldmann	HHI, Germany
Javier Civera	University of Zaragoza, Spain
Vitor F. Pamplona	Federal University of Rio Grande do Sul (UFRGS), Brazil
Yong-wei Miao	Zhejiang University of Technology, China
Giacinto Donvito	Istituto Nazionale di Fisica Nucleare, Italy
Vincenzo Spinoso	Istituto Nazionale di Fisica Nucleare, Italy
Michel Verleysen	Université catholique de Louvain, Belgium
Mark Keck	Ohio State University, USA
Arthur Szlam	University of California at Los Angeles, USA
Karthik Sankaranarayanan	Ohio State University, USA

## Organizing Institutions and Sponsors



SIEMENS

intel.



## Utopia Compression



# Table of Contents – Part I

## ST: Object Recognition

Detection of a Large Number of Overlapping Ellipses Immersed in Noise .....	1
<i>Armando Manuel Fernandes</i>	
Recognizing Ancient Coins Based on Local Features .....	11
<i>Martin Kampel and Maia Zaharieva</i>	
Learning Pairwise Dissimilarity Profiles for Appearance Recognition in Visual Surveillance .....	23
<i>Zhe Lin and Larry S. Davis</i>	
Edge-Based Template Matching and Tracking for Perspectively Distorted Planar Objects .....	35
<i>Andreas Hofhauser, Carsten Steger, and Nassir Navab</i>	
Enhancing Boundary Primitives Using a Multiscale Quadtree Segmentation .....	45
<i>Robert Bergevin and Vincent Bergeron</i>	
3D Object Modeling and Segmentation Based on Edge-Point Matching with Local Descriptors .....	55
<i>Masahiro Tomono</i>	

## Computer Graphics I

Cumulus Cloud Synthesis with Similarity Solution and Particle/Voxel Modeling .....	65
<i>Bei Wang, Jingliang Peng, and C.-C. Jay Kuo</i>	
An Efficient Wavelet-Based Framework for Articulated Human Motion Compression .....	75
<i>Chao-Hua Lee and Joan Lasenby</i>	
On Smooth Bicubic Surfaces from Quad Meshes .....	87
<i>Jianhua Fan and Jörg Peters</i>	
Simple Steps for Simply Stepping .....	97
<i>Chun-Chih Wu, Jose Medina, and Victor B. Zordan</i>	
Fairing of Discrete Surfaces with Boundary That Preserves Size and Qualitative Shape .....	107
<i>Jana Kostlivá, Radim Šára, and Martina Matýšková</i>	

Fast Decimation of Polygonal Models . . . . .	119
<i>Muhammad Hussain</i>	

## Visualization I

Visualizing Argument Structure . . . . .	129
<i>Peter Sbarski, Tim van Gelder, Kim Marriott, Daniel Prager, and Andy Bulka</i>	
Visualization of Industrial Structures with Implicit GPU Primitives . . . .	139
<i>Rodrigo de Toledo and Bruno Levy</i>	
Cartesian vs. Radial – A Comparative Evaluation of Two Visualization Tools . . . . .	151
<i>Michael Burch, Felix Bott, Fabian Beck, and Stephan Diehl</i>	
VoxelBars: An Informative Interface for Volume Visualization . . . . .	161
<i>Wai-Ho Mak, Ming-Yuen Chan, Yingcai Wu, Ka-Kei Chung, and Huamin Qu</i>	
Wind Field Retrieval and Display for Doppler Radar Data . . . . .	171
<i>Shyh-Kuang Ueng and Yu-Chong Chiang</i>	
Dual Marching Tetrahedra: Contouring in the Tetrahedral Environment . . . . .	183
<i>Gregory M. Nielson</i>	

## ST: Real-Time Vision Algorithm Implementation and Application

Vision-Based Localization for Mobile Robots Using a Set of Known Views . . . . .	195
<i>Pablo Frank-Bolton, Alicia Montserrat Alvarado-González, Wendy Aguilar, and Yann Frauel</i>	
On the Advantages of Asynchronous Pixel Reading and Processing for High-Speed Motion Estimation . . . . .	205
<i>Fernando Pardo, Jose A. Boluda, Francisco Vegara, and Pedro Zuccarello</i>	
An Optimized Software-Based Implementation of a Census-Based Stereo Matching Algorithm . . . . .	216
<i>Christian Zinner, Martin Humenberger, Kristian Ambrosch, and Wilfried Kubinger</i>	
Mutual Information Based Semi-Global Stereo Matching on the GPU . . .	228
<i>Ines Ernst and Heiko Hirschmüller</i>	

Accurate Optical Flow Sensor for Obstacle Avoidance .....	240
<i>Zhaoyi Wei, Dah-Jye Lee, Brent E. Nelson, and Kirt D. Lillywhite</i>	
A Novel 2D Marker Design and Application for Object Tracking and Event Detection .....	248
<i>Xu Liu, David Doermann, Huiping Li, K.C. Lee, Hasan Ozdemir, and Lipin Liu</i>	

## Segmentation

Automatic Lung Segmentation of Volumetric Low-Dose CT Scans Using Graph Cuts.....	258
<i>Asem M. Ali and Aly A. Farag</i>	
A Continuous Labeling for Multiphase Graph Cut Image Partitioning .....	268
<i>Mohamed Ben Salah, Amar Mitiche, and Ismail Ben Ayed</i>	
A Graph-Based Approach for Image Segmentation .....	278
<i>Thang V. Le, Casimir A. Kulikowski, and Ilya B. Muchnik</i>	
Active Contours Driven by Supervised Binary Classifiers for Texture Segmentation.....	288
<i>Julien Olivier, Romuald Boné, Jean-Jacques Rousselle, and Hubert Cardot</i>	
Proximity Graphs Based Multi-scale Image Segmentation .....	298
<i>Alexei N. Skurikhin</i>	
Improved Adaptive Spatial Information Clustering for Image Segmentation.....	308
<i>Zhi Min Wang, Qing Song, Yeng Chai Soh, and Kang Sim</i>	
Stable Image Descriptions Using Gestalt Principles .....	318
<i>Yi-Zhe Song and Peter M. Hall</i>	

## Shape/Recognition I

A Fast and Effective Dichotomy Based Hash Algorithm for Image Matching .....	328
<i>Zhoucan He and Qing Wang</i>	
Evaluation of Gradient Vector Flow for Interest Point Detection .....	338
<i>Julian Stöttinger, René Donner, Lech Szumilas, and Allan Hanbury</i>	
Spatially Enhanced Bags of Words for 3D Shape Retrieval .....	349
<i>Xiaolan Li, Afzal Godil, and Asim Wagan</i>	

Image Matching Using High Dynamic Range Images and Radial Feature Descriptors .....	359
<i>Krishnaprasad Jagadish and Eric Sinzinger</i>	
Random Subwindows for Robust Peak Recognition in Intracranial Pressure Signals .....	370
<i>Fabien Scalzo, Peng Xu, Marvin Bergsneider, and Xiao Hu</i>	
A New Shape Benchmark for 3D Object Retrieval .....	381
<i>Rui Fang, Afzal Godil, Xiaolan Li, and Asim Wagan</i>	
Shape Extraction through Region-Contour Stitching .....	393
<i>Elena Bernardis and Jianbo Shi</i>	

## Video Analysis and Event Recognition

Difference of Gaussian Edge-Texture Based Background Modeling for Dynamic Traffic Conditions .....	406
<i>Amit Satpathy, How-Lung Eng, and Xudong Jiang</i>	
A Sketch-Based Approach for Detecting Common Human Actions .....	418
<i>Evan A. Suma, Christopher Walton Sinclair, Justin Babbs, and Richard Souvenir</i>	
Multi-view Video Analysis of Humans and Vehicles in an Unconstrained Environment .....	428
<i>D.M. Hansen, P.T. Duizer, S. Park, T.B. Moeslund, and M.M. Trivedi</i>	
Self-Organizing Maps for the Automatic Interpretation of Crowd Dynamics .....	440
<i>B. Zhan, P. Remagnino, N. Monekosso, and S.A. Velastin</i>	
A Visual Tracking Framework for Intent Recognition in Videos .....	450
<i>Alireza Tavakkoli, Richard Kelley, Christopher King, Mircea Nicolescu, Monica Nicolescu, and George Bebis</i>	
Unsupervised Video Shot Segmentation Using Global Color and Texture Information .....	460
<i>Yuchou Chang, Dah-Jye Lee, Yi Hong, and James Archibald</i>	
Progressive Focusing: A Top Down Attentional Vision System .....	468
<i>Roland Chapuis, Frederic Chausse, and Noel Trujillo</i>	

## Virtual Reality I

The Benefits of Co-located Collaboration and Immersion on Assembly Modeling in Virtual Environments .....	478
<i>David d'Angelo, Gerold Wesche, Maxim Foursa, and Manfred Bogen</i>	

Simple Feedforward Control for Responsive Motion Capture-Driven Simulations .....	488
<i>Rubens F. Nunes, Creto A. Vidal, Joaquim B. Cavalcante-Neto, and Victor B. Zordan</i>	
Markerless Vision-Based Tracking of Partially Known 3D Scenes for Outdoor Augmented Reality Applications .....	498
<i>Fakhreddine Ababsa, Jean-Yves Didier, Imane Zendjebil, and Malik Mallem</i>	
Multiple Camera, Multiple Person Tracking with Pointing Gesture Recognition in Immersive Environments .....	508
<i>Anuraag Sridhar and Arcot Sowmya</i>	
Augmented Reality Using Projective Invariant Patterns .....	520
<i>Lucas Teixeira, Manuel Loaiza, Alberto Raposo, and Marcelo Gattass</i>	
Acquisition of High Quality Planar Patch Features .....	530
<i>Harald Wuest, Folker Wientapper, and Didier Stricker</i>	

## ST: Computational Bioimaging and Visualization

Level Set Segmentation of Cellular Images Based on Topological Dependence .....	540
<i>Weimiao Yu, Hwee Kuan Lee, Srivats Hariharan, Wenyu Bu, and Sohail Ahmed</i>	
A Novel Algorithm for Automatic Brain Structure Segmentation from MRI .....	552
<i>Qing He, Kevin Karsch, and Ye Duan</i>	
Brain Lesion Segmentation through Physical Model Estimation .....	562
<i>Marcel Prastawa and Guido Gerig</i>	
Calibration of Bi-planar Radiography with a Rangefinder and a Small Calibration Object .....	572
<i>Daniel C. Moura, Jorge G. Barbosa, João Manuel R.S. Tavares, and Ana M. Reis</i>	
Identification of Cell Nucleus Using a Mumford-Shah Ellipse Detector .....	582
<i>Choon Kong Yap and Hwee Kuan Lee</i>	
Evaluation of Brain MRI Alignment with the Robust Hausdorff Distance Measures .....	594
<i>Andriy Fedorov, Eric Billet, Marcel Prastawa, Guido Gerig, Alireza Radmanesh, Simon K. Warfield, Ron Kikinis, and Nikos Chrisochoides</i>	

## Computer Graphics II

User Driven Two-Dimensional Computer-Generated Ornamentation . . . . <i>Dustin Anderson and Zoë Wood</i>	604
Efficient Schemes for Monte Carlo Markov Chain Algorithms in Global Illumination . . . . . <i>Yu-Chi Lai, Feng Liu, Li Zhang, and Charles Dyer</i>	614
Adaptive CPU Scheduling to Conserve Energy in Real-Time Mobile Graphics Applications . . . . . <i>Fan Wu, Emmanuel Agu, and Clifford Lindsay</i>	624
A Quick 3D-to-2D Points Matching Based on the Perspective Projection . . . . . <i>Songxiang Gu, Clifford Lindsay, Michael A. Gennert, and Michael A. King</i>	634
Deformation-Based Animation of Snake Locomotion . . . . . <i>Yeongho Seol and Junyong Noh</i>	646
GPU-Supported Image Compression for Remote Visualization – Realization and Benchmarking . . . . . <i>Stefan Lietsch and Paul Hermann Lensing</i>	658

## ST: Discrete and Computational Geometry I

Linear Time Constant-Working Space Algorithm for Computing the Genus of a Digital Object . . . . . <i>Valentin E. Brimkov and Reneta Barneva</i>	669
Offset Approach to Defining 3D Digital Lines . . . . . <i>Valentin E. Brimkov, Reneta P. Barneva, Boris Brimkov, and François de Vieilleville</i>	678
Curvature and Torsion Estimators for 3D Curves . . . . . <i>Thanh Phuong Nguyen and Isabelle Debled-Rennesson</i>	688
Threshold Selection for Segmentation of Dense Objects in Tomograms . . . . . <i>W. van Aarle, K.J. Batenburg, and J. Sijbers</i>	700
Comparison of Discrete Curvature Estimators and Application to Corner Detection . . . . . <i>B. Kerautret, J.-O. Lachaud, and B. Naegel</i>	710
Computing and Visualizing Constant-Curvature Metrics on Hyperbolic 3-Manifolds with Boundaries . . . . . <i>Xiaotian Yin, Miao Jin, Feng Luo, and Xianfeng David Gu</i>	720

## ST: Soft Computing in Image Processing and Computer Vision

Iris Recognition: A Method to Segment Visible Wavelength Iris Images Acquired On-the-Move and At-a-Distance .....	731
<i>Hugo Proença</i>	
3D Textural Mapping and Soft-Computing Applied to Cork Quality Inspection .....	743
<i>Beatriz Paniagua, Miguel A. Vega-Rodríguez, Mike Chantler, Juan A. Gómez-Pulido, and Juan M. Sánchez-Pérez</i>	
Analysis of Breast Thermograms Based on Statistical Image Features and Hybrid Fuzzy Classification .....	753
<i>Gerald Schaefer, Tomoharu Nakashima, and Michal Zavisek</i>	
Efficient Facial Feature Detection Using Entropy and SVM .....	763
<i>Qiong Wang, Chunxia Zhao, and Jingyu Yang</i>	
Type-2 Fuzzy Mixture of Gaussians Model: Application to Background Modeling .....	772
<i>Fida El Baf, Thierry Bouwmans, and Bertrand Vachon</i>	
Unsupervised Clustering Algorithm for Video Shots Using Spectral Division .....	782
<i>Lin Zhong, Chao Li, Huan Li, and Zhang Xiong</i>	
<b>Reconstruction</b>	
Noise Analysis of a SFS Algorithm Formulated under Various Imaging Conditions .....	793
<i>Amal A. Farag, Shireen Y. Elhabian, Abdelrehim H. Ahmed, and Aly A. Farag</i>	
Shape from Texture Via Fourier Analysis .....	803
<i>Fabio Galasso and Joan Lasenby</i>	
Full Camera Calibration from a Single View of Planar Scene .....	815
<i>Yisong Chen, Horace Ip, Zhangjin Huang, and Guoping Wang</i>	
Robust Two-View External Calibration by Combining Lines and Scale Invariant Point Features .....	825
<i>Xiaolong Zhang, Jin Zhou, and Baoxin Li</i>	
Stabilizing Stereo Correspondence Computation Using Delaunay Triangulation and Planar Homography .....	836
<i>Chao-I Chen, Dusty Sargent, Chang-Ming Tsai, Yuan-Fang Wang, and Dan Koppel</i>	

## ST: Visualization and Simulation on Immersive Display Devices

Immersive Visualization and Analysis of LiDAR Data .....	846
<i>Oliver Kreylos, Gerald W. Bawden, and Louise H. Kellogg</i>	
VR Visualisation as an Interdisciplinary Collaborative Data Exploration Tool for Large Eddy Simulations of Biosphere-Atmosphere Interactions .....	856
<i>Gil Bohrer, Marcos Longo, David J. Zielinski, and Rachael Brady</i>	
User Experience of Hurricane Visualization in an Immersive 3D Environment .....	867
<i>J. Sanyal, P. Amburn, S. Zhang, J. Dyer, P.J. Fitzpatrick, and R.J. Moorhead</i>	
Immersive 3d Visualizations for Software-Design Prototyping and Inspection .....	879
<i>Anthony Savidis, Panagiotis Papadakos, and George Zargianakis</i>	
Enclosed Five-Wall Immersive Cabin .....	891
<i>Feng Qiu, Bin Zhang, Kaloian Petkov, Lance Chong, Arie Kaufman, Klaus Mueller, and Xianfeng David Gu</i>	
Environment-Independent VR Development .....	901
<i>Oliver Kreylos</i>	

## ST: Discrete and Computational Geometry II

Combined Registration Methods for Pose Estimation .....	913
<i>Dong Han, Bodo Rosenhahn, Joachim Weickert, and Hans-Peter Seidel</i>	
Local Non-planarity of Three Dimensional Surfaces for an Invertible Reconstruction: k-Cuspal Cells .....	925
<i>Marc Rodríguez, Gaëlle Largeteau-Skapin, and Éric Andres</i>	
A New Variant of the Optimum-Path Forest Classifier .....	935
<i>João P. Papa and Alexandre X. Falcão</i>	
Results on Hexagonal Tile Rewriting Grammars .....	945
<i>D.G. Thomas, F. Sweetey, and T. Kalyani</i>	
Lloyd's Algorithm on GPU .....	953
<i>Cristina N. Vasconcelos, Asla Sá, Paulo Cezar Carvalho, and Marcelo Gattass</i>	
Computing Fundamental Group of General 3-Manifold.....	965
<i>Junho Kim, Miao Jin, Qian-Yi Zhou, Feng Luo, and Xianfeng Gu</i>	

## Virtual Reality II

OmniMap: Projective Perspective Mapping API for Non-planar Immersive Display Surfaces .....	975
<i>Clement Shimizu, Jim Terhorst, and David McConville</i>	
Two-Handed and One-Handed Techniques for Precise and Efficient Manipulation in Immersive Virtual Environments .....	987
<i>Noritaka Osawa</i>	
Automotive Spray Paint Simulation .....	998
<i>Jonathan Konieczny, John Heckman, Gary Meyer, Mark Manyen, Marty Rabens, and Clement Shimizu</i>	
Using Augmented Reality and Interactive Simulations to Realize Hybrid Prototypes .....	1008
<i>Florian Niebling, Rita Griesser, and Uwe Woessner</i>	
Immersive Simulator for Fluvial Combat Training .....	1018
<i>Diego A. Hincapié Ossa, Sergio A. Ordóñez Medina, Carlos Francisco Rodríguez, and José Tiberio Hernández</i>	
A Low-Cost, Linux-Based Virtual Environment for Visualizing Vascular Structures .....	1028
<i>Thomas Wischgoll</i>	

## ST: Analysis and Visualization of Biomedical Visual Data

Visualization of Dynamic Connectivity in High Electrode-Density EEG .....	1040
<i>Alfonso Alba and Edgar Arce-Santana</i>	
Generation of Unit-Width Curve Skeletons Based on Valence Driven Spatial Median (VDSM) .....	1051
<i>Tao Wang and Irene Cheng</i>	
Intuitive Visualization and Querying of Cell Motion .....	1061
<i>Richard Souvenir, Jerrod P. Kraftchick, and Min C. Shin</i>	
Registration of 2D Histological Images of Bone Implants with 3D SR $\mu$ CT Volumes .....	1071
<i>Hamid Sarve, Joakim Lindblad, and Carina B. Johansson</i>	
Measuring an Animal Body Temperature in Thermographic Video Using Particle Filter Tracking .....	1081
<i>Atousa Torabi, Guillaume-Alexandre Bilodeau, Maxime Levesque, J.M. Pierre Langlois, Pablo Lema, and Lionel Carmant</i>	

A New Parallel Approach to Fuzzy Clustering for Medical Image Segmentation .....	1092
<i>Huynh Van Luong and Jong Myon Kim</i>	

### **Computer Graphics III**

Tracking Data Structures Coherency in Animated Ray Tracing: Kalman and Wiener Filters Approach .....	1102
<i>Sajid Hussain and Håkan Grahñ</i>	
Hardware Accelerated Per-Texel Ambient Occlusion Mapping.....	1115
<i>Tim McGraw and Brian Sowers</i>	
Comics Stylization from Photographs .....	1125
<i>Catherine Sauvaget and Vincent Boyer</i>	
Leaking Fluids.....	1135
<i>Kiwon Um and JungHyun Han</i>	
Automatic Structure-Aware Inpainting for Complex Image Content ....	1144
<i>Patrick Ndjiki-Nya, Martin Köppel, Dimitar Doshkov, and Thomas Wiegand</i>	
Multiple Aligned Characteristic Curves for Surface Fairing .....	1157
<i>Janick Martinez Esturo, Christian Rössl, and Holger Theisel</i>	
<b>Author Index</b> .....	1167

# Table of Contents – Part II

## Visualization II

SUNVIZ: A Real-Time Visualization Environment for Space Physics Applications . . . . .	1
<i>S. Eliuk, P. Boulanger, and K. Kabin</i>	
An Efficient Quality-Based Camera Path Planning Method for Volume Exploration . . . . .	12
<i>Ming-Yuen Chan, Wai-Ho Mak, and Huamin Qu</i>	
A Fast and Simple Heuristic for Metro Map Path Simplification . . . . .	22
<i>Tim Dwyer, Nathan Hurst, and Damian Merrick</i>	
Visual Verification of Hypotheses . . . . .	31
<i>Thorsten May and Joern Kohlhammer</i>	
LDR-LLE: LLE with Low-Dimensional Neighborhood Representation . . .	43
<i>Yair Goldberg and Ya'acov Ritov</i>	
SudokuVis: How to Explore Relationships of Mutual Exclusion . . . . .	55
<i>Gudrun Klinker</i>	

## ST: Image Analysis for Remote Sensing Data

Identification of Oceanic Eddies in Satellite Images . . . . .	65
<i>Armando Manuel Fernandes</i>	
Multi-image Fusion in Remote Sensing: Spatial Enhancement vs. Spectral Characteristics Preservation . . . . .	75
<i>Manfred Ehlers</i>	
Classification of Multispectral High-Resolution Satellite Imagery Using LIDAR Elevation Data . . . . .	85
<i>María C. Alonso and José A. Malpica</i>	
Semi-supervised Edge Learning for Building Detection in Aerial Images . . . . .	95
<i>Fenglei Yang, Ye Duan, and Yue Lu</i>	
High Resolution Satellite Classification with Graph Cut Algorithms . . .	105
<i>Adrian A. López and José A. Malpica</i>	

Satellite Image Segmentation Using Wavelet Transforms Based on Color and Texture Features .....	113
<i>Ricardo Dutra da Silva, Rodrigo Minetto, William Robson Schwartz, and Helio Pedrini</i>	

## Shape/Recognition II

A System for Rapid Interactive Training of Object Detectors .....	123
<i>Nathaniel Roman and Robert Pless</i>	
An Integrated Method for Multiple Object Detection and Localization .....	133
<i>Dipankar Das, Al Mansur, Yoshinori Kobayashi, and Yoshinori Kuno</i>	
A Context Dependent Distance Measure for Shape Clustering .....	145
<i>Rolf Lakaemper and JingTing Zeng</i>	
A New Accumulator-Based Approach to Shape Recognition .....	157
<i>Karthik Krish and Wesley Snyder</i>	
Multi-dimensional Scale Saliency Feature Extraction Based on Entropic Graphs .....	170
<i>P. Suau and F. Escolano</i>	
Merging Active Contours .....	181
<i>Ismail Ben Ayed and Amar Mitiche</i>	
Contour Extraction Using Particle Filters .....	192
<i>ChengEn Lu, Longin Jan Latecki, and Guangxi Zhu</i>	

## Motion

Combining Line and Point Correspondences for Homography Estimation .....	202
<i>Elan Dubrofsky and Robert J. Woodham</i>	
Integration of Local Image Cues for Probabilistic 2D Pose Recovery ....	214
<i>Paul Kuo, Dimitrios Makris, Najla Megherbi, and Jean-Christophe Nebel</i>	
Indirect Tracking to Reduce Occlusion Problems .....	224
<i>Peter Keitler, Michael Schlegel, and Gudrun Klinker</i>	
Real-Time Lip Contour Extraction and Tracking Using an Improved Active Contour Model .....	236
<i>Jingying Chen, Bernard Tiddeman, and Gang Zhao</i>	

Particle Filter Based Object Tracking with Discriminative Feature Extraction and Fusion .....	246
<i>Yao Shen, Parthasarathy Guturu, Thyagaraju Damarla, and Bill P. Buckles</i>	
A New Global Alignment Method for Feature Based Image Mosaicing .....	257
<i>A. Elibol, R. Garcia, O. Delaunoy, and N. Gracias</i>	
An Effective Active Vision System for Gaze Control .....	267
<i>Yann Ducrocq, Shahram Bahrami, Luc Duviolbourg, and François Cabestaing</i>	

## Face/Gesture

Face Recognition Based on Normalization and the Phase Spectrum of the Local Part of an Image .....	278
<i>Jesus Olivares-Mercado, Kazuhiro Hotta, Haruhisa Takahashi, Hector Perez-Meana, Mariko Nakano Miyatake, and Gabriel Sanchez-Perez</i>	
A Novel Shape Registration Framework and Its Application to 3D Face Recognition in the Presence of Expressions .....	287
<i>Rachid Fahmi and Aly A. Farag</i>	
Frontal Face Recognition from Video .....	297
<i>Angshul Majumdar and Panos Nasiopoulos</i>	
Real Time Hand Based Robot Control Using 2D/3D Images .....	307
<i>Seyed Eghbal Ghobadi, Omar Edmond Loepprich, Farid Ahmadov, Jens Bernshausen, Klaus Hartmann, and Otmar Loffeld</i>	
Facial Trait Code and Its Application to Face Recognition .....	317
<i>Ping-Han Lee, Gee-Sern Hsu, Tsuhan Chen, and Yi-Ping Hung</i>	
Using Multiple Masks to Improve End-to-End Face Recognition Performance .....	329
<i>Christopher A. Neylan and Andrea Salgiani</i>	
Sparse Representation for Ear Biometrics .....	336
<i>Imran Naseem, Roberto Togneri, and Mohammed Bennamoun</i>	

## Computer Vision Applications

Image-Based Information Guide on Mobile Devices .....	346
<i>Jimmy Addison Lee, Kin-Choong Yow, and Andrzej Sluzek</i>	
Estimating Atmospheric Visibility Using General-Purpose Cameras .....	356
<i>Ling Xie, Alex Chiu, and Shawn Newsam</i>	

Numismatic Object Identification Using Fusion of Shape and Local Descriptors . . . . .	368
<i>R. Huber-Mörk, M. Zaharieva, and H. Czedik-Eysenberg</i>	
Personalized News Video Recommendation Via Interactive Exploration . . . . .	380
<i>Jianping Fan, Hangzai Luo, Aoying Zhou, and Daniel A. Keim</i>	
Browsing a Large Collection of Community Photos Based on Similarity on GPU . . . . .	390
<i>Grant Strong and Minglun Gong</i>	
Security Analysis for Spread-Spectrum Watermarking Incorporating Statistics of Natural Images . . . . .	400
<i>Dong Zhang, Jiangqun Ni, and Dah-Jye Lee</i>	
Multi-view Feature Matching and Image Grouping from Multiple Unordered Wide-Baseline Images . . . . .	410
<i>Xiuyuan Zeng, Heng Yang, and Qing Wang</i>	
Stitching Video from Webcams . . . . .	420
<i>Mai Zheng, Xiaolin Chen, and Li Guo</i>	

## Poster

GpuCV: A GPU-Accelerated Framework for Image Processing and Computer Vision . . . . .	430
<i>Yannick Allusse, Patrick Horain, Ankit Agarwal, and Cindula Saipriyadarshan</i>	
A Comparison Study on Two Multi-scale Shape Matching Schemes . . . . .	440
<i>Bo Li and Henry Johan</i>	
PAD Model Based Facial Expression Analysis . . . . .	450
<i>Jie Cao, Hong Wang, Po Hu, and Junwei Miao</i>	
Calibration and Pose Estimation of a Pox-slits Camera from a Single Image . . . . .	460
<i>N. Martins and H. Araújo</i>	
Covariance Matrices for Crowd Behaviour Monitoring on the Escalator Exits . . . . .	470
<i>Md. Haidar Sharif, Nacim Ihaddadene, and Chabane Djeraba</i>	
User Verification by Combining Speech and Face Biometrics in Video . . . . .	482
<i>Imran Naseem and Ajmal Mian</i>	
A Gibbsian Kohonen Network for Online Arabic Character Recognition . . . . .	493
<i>Neila Mezghani and Amar Mitiche</i>	

Shading through Defocus .....	501
<i>José R.A. Torreão and João L. Fernandes</i>	
A Gabor Quotient Image for Face Recognition under Varying Illumination .....	511
<i>Sanun Srisuk and Amnart Petpon</i>	
Personal Identification Using Palmprint and Contourlet Transform .....	521
<i>Atif Bin Mansoor, M. Mumtaz, H. Masood, M. Asif A. Butt, and Shoab A. Khan</i>	
Generating Reflection Transparent Image Using Image Fusion Space .....	531
<i>Satoru Morita and Yasutoshi Sugiman</i>	
Fingerprint Images Enhancement in Curvelet Domain .....	541
<i>Gholamreza Amayeh, Soheil Amayeh, and Mohammad Taghi Manzuri</i>	
Effective Frame Rate Decision by Lagrange Optimization for Frame Skipping Video Transcoding .....	551
<i>Ching-Ting Hsu, Chia-Hung Yeh, and Mei-Juan Chen</i>	
Symmetry of Shapes Via Self-similarity .....	561
<i>Xingwei Yang, Nagesh Adluru, Longin Jan Latecki, Xiang Bai, and Zygmunt Pizlo</i>	
Robust Estimation Approach for NL-Means Filter .....	571
<i>J. Dinesh Peter, V.K. Govindan, and Abraham T. Mathew</i>	
View-Invariant Pose Recognition Using Multilinear Analysis and the Universum .....	581
<i>Bo Peng, Gang Qian, and Yunqian Ma</i>	
Scaling Up a Metric Learning Algorithm for Image Recognition and Representation .....	592
<i>Adrian Perez-Suay and Francesc J. Ferri</i>	
Smile Detection for User Interfaces .....	602
<i>O. Deniz, M. Castrillon, J. Lorenzo, L. Anton, and G. Bueno</i>	
A Novel Segmentation Algorithm for Digital Subtraction Angiography Images: First Experimental Results .....	612
<i>Danilo Franchi, Pasquale Gallo, and Giuseppe Placidi</i>	
Image Representation in Differential Space .....	624
<i>Shengzhi Du, Barend Jacobus van Wyk, M. Antonie van Wyk, Guoyuan Qi, Xinghui Zhang, and Chunling Tu</i>	
A Four Point Algorithm for Fast Metric Cone Reconstruction from a Calibrated Image .....	634
<i>Jin Zhou and Baoxin Li</i>	

Texture-Based Shadow Removal from a Single Color Image . . . . .	644
<i>Qiang He and Chee-Hung Henry Chu</i>	
Multi-source Airborne IR and Optical Image Fusion and Its Application to Target Detection . . . . .	651
<i>Fenghui Yao and Ali Sekmen</i>	
A New Adaptive Combination Approach to Score Level Fusion for Face and Iris Biometrics Combining Wavelets and Statistical Moments . . . . .	661
<i>Nicolas Morizet and Jérôme Gilles</i>	
Medical Image Zooming Algorithm Based on Bivariate Rational Interpolation . . . . .	672
<i>Shanshan Gao, Caiming Zhang, Yunfeng Zhang, and Yuanfeng Zhou</i>	
2D Shape Decomposition Based on Combined Skeleton-Boundary Features . . . . .	682
<i>JingTing Zeng, Rolf Lakaemper, XingWei Yang, and Xin Li</i>	
Removing Pose from Face Images . . . . .	692
<i>Seán Begley, John Mallon, and Paul F. Whelan</i>	
A Real Time Fingers Detection by Symmetry Transform Using a Two Cameras System . . . . .	703
<i>Rachid Belaroussi and Maurice Milgram</i>	
High Resolution and High Dynamic Range Image Reconstruction from Differently Exposed Images . . . . .	713
<i>Hiroyuki Nakai, Shuhei Yamamoto, Yasuhiro Ueda, and Yoshihide Shigeyama</i>	
PDE-Based Facial Animation: Making the Complex Simple . . . . .	723
<i>Yun Sheng, Phil Willis, Gabriela Gonzalez Castro, and Hassan Ugail</i>	
A Variational Level Set Method for Multiple Object Detection . . . . .	733
<i>Zhenkuan Pan, Hua Li, Weibo Wei, and Shuhua Xu</i>	
Detecting Thalamic Abnormalities in Autism Using Cylinder Conformal Mapping . . . . .	743
<i>Qing He, Ye Duan, Xiaotian Yin, Xianfeng Gu, Kevin Karsch, and Judith Miles</i>	
Extraction of Illumination Effects from Natural Images with Color Transition Model . . . . .	752
<i>Hiroaki Nishihara and Tomoharu Nagao</i>	
A Novel Macrobloc-Level Rate-Distortion Optimization Scheme for H.264/AVC . . . . .	762
<i>Hong-jun Wang, Chang Sun, and Hua Li</i>	

Automatic Segmentation of the Apparent Contour for 3D Modeling of Cutting Tools from Single View .....	772
<i>Xi Zhang, Waiming Tsang, Xiaodong Tian, Kazuo Yamazaki, and Masahiko Mori</i>	
On Semantic Object Detection with Salient Feature .....	782
<i>Zhidong Li and Jing Chen</i>	
A Generic and Parallel Algorithm for 2D Image Discrete Contour Reconstruction .....	792
<i>Guillaume Damiani and David Coeurjolly</i>	
Spatial Filtering with Multi-scale Segmentation Based on Gaussian Function .....	802
<i>Chi-Fan Chen and Chia-Hsin Liang</i>	
Visibility-Based Test Scene Understanding by Real Plane Search .....	813
<i>Jae-Kyu Lee, Seongjin Ahn, and Jin Wook Chung</i>	
Real-Time Face Verification for Mobile Platforms .....	823
<i>Sung-Uk Jung, Yun-Su Chung, Jang-Hee Yoo, and Ki-Young Moon</i>	
3D Human Motion Tracking Using Progressive Particle Filter .....	833
<i>Shih-Yao Lin and I-Cheng Chang</i>	
Visual Servoing for Patient Alignment in ProtonTherapy .....	843
<i>Rachid Belaroussi and Guillaume Morel</i>	
Improving Recognition through Object Sub-categorization .....	851
<i>Al Mansur and Yoshinori Kuno</i>	
Similarity Measure of the Visual Features Using the Constrained Hierarchical Clustering for Content Based Image Retrieval .....	860
<i>Sang Min Yoon and Holger Graf</i>	
An Experimental Study of Reconstruction of Tool Cutting Edge Features Using Space Carving Method .....	869
<i>Wai Ming Tsang, Xi Zhang, Kazuo Yamazaki, Xiaodong Tian, and Masahiko Mori</i>	
Real Time Object Tracking in a Video Sequence Using a Fixed Point DSP .....	879
<i>Syed Aamir Ali Shah, Tahir Jamil Khattak, Muhammad Farooq, Yahya M. Khawaja, Abdul Bais, Asim Anees, and Muhammad U.K. Khan</i>	
Gesture Recognition for a Webcam-Controlled First Person Shooter ....	889
<i>Robert W. Wilson and Andrea Salgian</i>	

3D Line Reconstruction of a Road Environment Using an In-Vehicle Camera . . . . .	897
<i>Toshihiro Asai, Koichiro Yamaguchi, Yoshiko Kojima, Takashi Naito, and Yoshiki Ninomiya</i>	
Braille Document Parameters Estimation for Optical Character Recognition . . . . .	905
<i>Zhenfei Tai, Samuel Cheng, and Pramode Verma</i>	
Bio-imaging Toolkit for Indexing, Searching, Navigation, Discovery and Annotation . . . . .	915
<i>Afzal Godil, Benny Cheung, Asim Wagan, and Xiaolan Li</i>	
Stereoscopic View Synthesis by View Morphing . . . . .	924
<i>Seon-Min Rhee, Jongmoo Choi, and Ulrich Neumann</i>	
Edge Detection from Global and Local Views Using an Ensemble of Multiple Edge Detectors . . . . .	934
<i>Yuchou Chang, Dah-Jye Lee, Yi Hong, and James Archibald</i>	
An Effective and Fast Lane Detection Algorithm . . . . .	942
<i>Chung-Yen Su and Gen-Hau Fan</i>	
Towards Real-Time Monocular Video-Based Avatar Animation . . . . .	949
<i>Utkarsh Gaur, Amrita Jain, and Sanjay Goel</i>	
Temporal Computational Objects: A Process for Dynamic Surface Generation . . . . .	959
<i>Kurt W. Swanson, Kenneth A. Brakke, and David E. Breen</i>	
Hardware-Accelerated Particle-Based Volume Rendering for Multiple Irregular Volumes . . . . .	970
<i>Naohisa Sakamoto, Ding Zhongming, Takuma Kawamura, and Koji Koyamada</i>	
Immersive Visualization of Casting Flow and Solidification . . . . .	980
<i>Jiyoung Park, Sang-Hyun Cho, Jung-Gil Choi, and Myoung-Hee Kim</i>	
Graph-Based Visual Analytic Tools for Parallel Coordinates . . . . .	990
<i>Kai Lun Chung and Wei Zhuo</i>	
Modeling and Visualization Approaches for Time-Varying Volumetric Data . . . . .	1000
<i>Kenneth Weiss and Leila De Floriani</i>	
Ubiquitous Interactive Visualization of 3-D Mantle Convection through Web Applications Using Java . . . . .	1011
<i>Jonathan C. Mc Lane, Wojciech W. Czech, David A. Yuen, Michael R. Knox, James B.S.G. Greensky, M. Charley Kameyama, Vincent M. Wheeler, Rahul Panday, and Hiroki Senshu</i>	

Streaming Mesh Optimization for CAD .....	1022
<i>Tian Xia and Eric Shaffer</i>	
An Iterative Method for Fast Mesh Denoising .....	1034
<i>Shuhua Lai and Fuhua (Frank) Cheng</i>	
On the Performance and Scalability of a GPU-Limited Commodity Cluster .....	1044
<i>Jorge Luis Williams and Robert E. Hiromoto</i>	
Algorithms for the Automatic Design of Non-formal Urban Parks .....	1056
<i>Soon Tee Teoh</i>	
Hybrid Shading Model Based on Device Performance for LOD Adaptive Service .....	1066
<i>Hakran Kim and Hwajin Park</i>	
Incremental Texture Compression for Real-Time Rendering .....	1076
<i>Ying Tang and Jing Fan</i>	
Geometry Independent Raindrop Splash Rendering for Generic, Complex Scenes .....	1086
<i>Jürgen Rossmann and Nico Hempe</i>	
Extension of B-Spline Curves with $G^2$ Continuity .....	1096
<i>Yuan-feng Zhou, Cai-ming Zhang, and Shan-shan Gao</i>	
Building New Mixed Reality Devices .....	1106
<i>Camilo A. Perez and Pablo A. Figueroa</i>	
A Novel Acceleration Coding/Reconstruction Algorithm for Magnetic Resonance Imaging in Presence of Static Magnetic Field In-Homogeneities .....	1115
<i>Giuseppe Placidi, Danilo Franchi, Angelo Galante, and Antonello Sotgiu</i>	
Reconstruction of Some Segmented and Dynamic Scenes: Trifocal Tensors in $\mathbb{P}^4$ , Theoretical Set Up for Critical Loci, and Instability .....	1125
<i>Marina Bertolini, GianMario Besana, and Cristina Turrini</i>	
Efficient Algorithms for Reconstruction of 2D-Arrays from Extended Parikh Images .....	1137
<i>V. Masilamani, Kamala Krithivasan, K.G. Subramanian, and Ang Mui Huey</i>	
Reconstruction of Binary Images with Few Disjoint Components from Two Projections .....	1147
<i>Péter Balázs</i>	

A Connection between $\mathbb{Z}^n$ and Generalized Triangular Grids.....	1157
<i>Benedek Nagy and Robin Strand</i>	
Collage of Hexagonal Arrays .....	1167
<i>F. Sweet, D.G. Thomas, and T. Kalyani</i>	
Discrete Contour Extraction from Reference Curvature Function .....	1176
<i>H.G. Nguyen, B. Kerautret, P. Desbarats, and J.-O. Lachaud</i>	
Change Detection with SPOT-5 and FORMOSAT-2 Imageries .....	1186
<i>Patricia Cifuentes, José A. Malpica, and Francisco J. González-Matesanz</i>	
<b>Author Index</b> .....	1197