2013 ASIAN CONFERENCE ON DESIGN & DIGITAL ENGINEERING

Aug 12 - 14, 2013
Dongguk University, Seoul, Korea

Contact information
This conference is organized by Society of CAD/CAM Engineers, Republic of Korea. If you have any further questions about the conference and logistics, please contact:

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Hosted by
Society of CAD/CAM Engineers

Co-hosted by
Dongguk University, Department of Industrial & Systems Engineering
Human-oriented Product Innovation Research Center (HPRC) at Korea University
China Society for Industrial and Applied Mathematics (CSIAM)
Japan Society of Mechanical Engineers (JSME), Design & Systems Division

Supported by
National Research Foundation of Korea (NRF)
Japan Society for the Promotion of Science (JSPS)

This proceedings was supported by the Dongguk University Research Fund of 2013
Welcome to the 2013 Asian Conference on Design and Digital Engineering (ACDDE 2013)!

This program book contains the ACDDE 2013 conference schedule organized during August 12 ~14, 2013, at Dongguk University, Seoul, Republic of Korea. The Asian Conference on Design and Digital Engineering (ACDDE) is an annual international conference which covers state-of-the-art developments in design and digital engineering technologies as well as scientific, industrial, and business applications. The annual conference provides an excellent opportunity for researchers, developers, practitioners to present and discuss new problems, solutions, and technologies in design and digital engineering and facilitates sharing recent research results and trends among the participants. We hope that our experience through this conference and future efforts on the series of the conference will help to understand each other better and facilitate closer collaborations among participating researchers. The annual conference is the flagship international meeting for Design and Digital Engineering and includes the following workshops on:

- Geometric Computing W/S
- Graphics, VR, & Multimedia W/S
- PLM W/S
- Computational Design Methodology W/S
- Emerging Applications of CAD W/S
- Design Optimization W/S
- Human-Oriented Product Innovation W/S

Overall, 81 papers have been selected for presentation. Specifically, 14 papers for the Computational Design Methodology Workshop, 10 papers from the Design Optimization Workshop, 16 papers from Emerging Applications Workshop, 16 papers from Geometric Computing Workshop, 22 papers from Graphics/VR/Multimedia Workshop, and 8 papers from Product Lifecycle Management. have been published in this volume of proceedings. The papers are submitted by excellent researchers from 6 countries (Brazil, Netherlands, United States, China, Japan and Republic of Korea). These papers reflect the recent research trends and future directions.

Some excellent papers selected from the conference presentation will be considered for publication in the special issues of

- Journal of Mechanical Science and Technology (SCIE)
- Applied Mathematics-A Journal of Chinese Universities (SCIE)
- Journal of Advanced Mechanical Design, Systems, and Manufacturing (SCIE) and
- International Journal of CAD/CAM.

We would like to express our sincere gratitude to all the authors who have submitted their research results and the international program committee members who had devoted their precious time and efforts to the success of this conference. Also, our special thanks go to the sponsors of this conference, Dongguk University, Human-oriented Product Innovation Research Center (HPRC) at Korea University, China Society for Industrial and Applied Mathematics (CSIAM), Japan Society of Mechanical Engineers (JSME), National Research Foundation of Korea (NRF), and Japan Society for the Promotion of Science(JSPS).

Young Choi, Caiming Zhang, Hiroshi Kato (Conference Co-Chairs)
Hayong Shin, Yongjin Liu, Takashi Maekawa (Organizing Committee Co-Chairs)
Deok Soo Kim, Changhe Tu, Hidetsu Aoyama (International Program Committee Co-Chairs)
Joan Young Park, Hyung Yun Choi, Hyunwoo Bang, Kang soo Lee, Sung Do Noh (Local Organizing Committee)
Joo Haeng Lee, Taewan Kim, Xu Li Han, Kenjio T. Misra (Geometric Computing Workshop Co-chairs)
Jae Yeol Lee, Ruo Feng Tong, Tensuro Oghi (Graphics, VR, Multimedia Workshop Co-chairs)
Duhwan Mun, Hywon Suh, Shu Ming Gao, Masahiko Onosato (PLM Workshop Co-chairs)
Haejin Choi, Soo Bong Han, Dong Liang Zhang, Masato Toma (Computational Design Methodology Workshop Co-chairs)
Hyungjun Park, Liang Liu, Satoshi Kanai (Emerging Applications of CAD Workshop Co-chairs)
Gil Ho Yoon, Jian Song Dimg, Akihito Takezawa (Design Optimization Workshop Co-chairs)
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- Jae Yeol Lee (Chonnam Univ.)
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- Haemin Choi (Chung-Ang Univ.)
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- Dong-Liang Zhang (Zhejiang Univ.)
- Masatoshi Inui (Baraki Univ.)

### Emerging Applications of CAD W/S
- Hyungjin Park (Chonbuk Univ.)
- Ligang Liu (UST of China)
- Satoshi Kanai (Hokkaido Univ.)

### Design Optimization W/S
- Gil Ho Yoon (Hanyang Univ.)
- Jian-Song Deng (UST of China)
- Akihiro Takezawa (Hiroshima Univ.)

## Program

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Abstract: Image cloning, which aims to create a new image by pasting a source image patch into the target, is a popular operation in image editing. Traditional gradient-based cloning can paste the source patch into the target image seamlessly, but the pasted patch may be contaminated by the surrounding color. In this talk, I will introduce a generic model able to not only prevent pasted important region from being contaminated by the surrounding, but also provide users a tool to make the embedded patch roughly coincide with the global illumination of the background. I will also introduce an efficient method for depth-consistent stereoscopic composition, in which a source 2D image is interactively blended into a target stereoscopic image.

Biography: Dr. Ruofeng Tong is a professor in the college of Computer Science and technology, Zhejiang University, China. He received his B. Sc from Fudan University, China in 1991, and his Ph.D from Zhejiang University, China in 1996. He visited Hiroshima University, Japan from 1999 to 2001. He is currently the vice-director of Multimedia Branch of China Society of Image and Graphics, and the vice-director of Geometric Design Branch of China Society of Applied Mathematics. His research interests include image and video processing, computer graphics and CAD.
Geometric Computing

Session GC-1: Geometric Computing (Chair: Xuli Han (Central South Univ.))

GC-1-1 B-spline Surface Blending by the Semi-structured B-spline ………………………. Hongwei Lin and Yunyung Xiong
GC-1-2 Plate bending based on the differential geometry properties of lines of curvature of parametric surfaces ……………………………………………………………………………………………………………………Tatsuya Yazaki, Han Kyul Joo and Takashi Maekawa
GC-1-3 A practical method for generating trigonometric polynomial surfaces over triangular domain …………………………………………………………………………………………………………………………………………………Xiali Han and Yuapeng Zhu
GC-1-4 Upright Orientation with Three-Order Tensor Low-Rank ………………………. Wang Weiming, Liu Xiaoping and Liu Ligang
GC-1-5 The Degree Elevation of UE-spline Curves ……………………………………………………Xiaojian Daan and Guozhao Wang
GC-1-6 Robot Trajectory Generation with Smoothly Changing Curvature Using the Clothoid Spline …………………………………………………………………………………………………………………………………………Dai Shibuya, Kenjiro Miura and Shin Usuki

Session GC-2: Geometric Computing (Chair: Takashi Michikawa (Univ. of Tokyo))

GC-2-1 Mesh Generation of Porous Metals from X-ray Computed Tomography Volume Data ………………………………………………………………………………………………………………………………………………………………Zhenyu Niu, Hiromasa Suzuki, Yutaka Ohtake and Takashi Michikawa
GC-2-2 Curvature-aware Filtering of Point-Set Surfaces ……………………………………………………..Min Ki Park, Seung Joo Lee, In Yeop Jang, Yong Yi Lee and Kwan H. Lee
GC-2-3 Rough tool path generation for NC machining of Loop subdivision surfaces ……………………………………………………………………………………………………………………………………………………………………………………Tiantian Chen and Gang Zhao
GC-2-4 Quadrilateral Mesh Fitting that Preserves Sharp Features based on Multi-Normals for Laplacian Energy …………………………………………………………………………………………………………………………………………..Yunuke Imai, Hiroynuki Hiraoka, Hiroshi Kawaharada and Shogo Moriya
GC-2-5 Computing rectilinear grids by iterative coarsening of grid lines …………………………………………………………………………………………………………………………………………………………………………………………………………Takashi Michikawa, Isato Iwata, Hiromasa Suzuki, Eiji Ohta, Masayoshi Hashima and Yuchi Sato

Session GC-3: Geometric Computing (Chair: Yunsheng Liu (Zhejiang Univ.))

GC-3-1 Reconstructing Individual Hand Models from Motion Capture Data ………………………………..Yui Endo, Mitsunori Tada and Masaaki Machimaru
GC-3-2 Parallel Generation of Medial Axis for Solid Model …………………………………………………….Youngho Chung and Yusheng Liu
GC-3-3 Direct Construction of a Four-Dimensional Mesh Model from Three-Dimensional Object with Continuous Rigid Body Movement …………………………………………………………………………Biaru Otomo, Masahiko Onosato and Fumiki Tanaka
GC-3-4 BetaConcept: A Program for Voronoi diagrams, Quasi-triangulations, and Beta-complexes in R³ ……………………………………………………………………………………………………………………………………………………………………………………..Jae-Kwan Kim, Youngsong Cho, Donguk Kim and Deck-Soo Kim
GC-3-5 Quasi-triangleulation: anomalies and its similarity with the Delaunay and regular triangulation …………………………………………………………………………………………………………………………………………………………………………………………………………Donguk Kim, Youngsong Cho and Deck-Soo Kim

Graphics / VR / Multimedia

Session GVM-1: Graphics / VR / Multimedia (Chair: Jae Yeol Lee (Chonnam Univ.))

GVM-1-1 Spectral Analysis of the Moving System with Multi-object Based on V-system 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Human-oriented product innovation

Session HRPC-1 : Human-oriented product innovation (Chair : Hyungyun Choi (Hongik Univ.))

HRPC-1-1 Accessibility Evaluation of the as-built two-storey Large-scale Indoor Environments by combining Digital Human Model and Terrestrial Laser Scanners ................................. Tsutaya Manyama, Satoshi Kanai and Hiroaki Date
HRPC-1-2 3D Blood Vessel Modeling Method using CT, IVUS and Angiogram Images .............................................................. Jin-Won Son, Sang-Chul Hwang and Young Choi
HRPC-1-3 Development of Aspect Dummy considering Seat Dimension Factor ................................................................. Jungtae Yang, Hyungyun Choi, Sungjin Sah and Inhyeok Lee
HRPC-1-4 Design 3D Garments for Scanned Human Bodies ........................................................................................................ Dongliang Zhang and Jin Wang
HRPC-1-5 Multi-resolution digital human model data structure ........................................................................................................ Hyundok Cho and Kunwoo Lee

Computational Design Methodology

Session CDM-1 : Computational Design Methodology (Chair : Masatomo Inui(Ibaraki Univ.))

CDM-1-1 3D CAD Model Classification with Deep Neural Networks ............................................................. Feiwei Qin, Luye Li, Shu-Ming Gao, Xiaoling Yang and Xiang Chen
cDM-1-2 Modeling the addendum surfaces in automotive draw dies ........................................................................................... Yanchun Chung, Sungoh Kwon and Woong Park
CDM-1-3 Robust Kansei Design Based on Taguchi Method - A Case study on floral patterns- .................................................. Yuka Kawamura, Hideki Aoyama and Oya Tetsuo
CDM-1-4 Job Assignment Simulation of the Ship Hull Production Design Using High-level Discrete-event Modeling-based Business Process Simulation ........................................ Myeong-Jo Son and Tae-Won Kim
CDM-1-5 Automatic detection of the optimal ejecting direction based on a discrete Gauss map .............................................. Masatomo Inui, Nobuyuki Umemura and Hidekazu Kanai
CDM-1-6 Generation of Contact mesh for Inner Contact Bodies using Projective Method ............................................... Jeong-Ho Nam and Si-Young Kwak

Session CDM-2 : Computational Design Methodology (Chair : Si-Young Kwak (KITECH))

CDM-2-1 Fabric Model for Clothing Design by Wrinkle Simulation .......................................................................................... Ayumi Haru, Hideki Aoyama and Tetsuo Oya
CDM-2-2 Estimation of Influence of Design Parameter’s Accuracy on Hit Probability of an Anti-aircraft Gun .......................... Kang Park
CDM-2-3 A Method for Structuring Service Failure Factors to Realize Highly Reliable Services ................................................................. Junpei Saito, Yusuke Kurita, Koji Kimita and Yoshiki Shimomura
CDM-2-4 Automatic Extraction of Maximum Cutting Section and Shape Simplification from Defect Shape Data by CT Scanning .................................................................................................................. Jae-Woo Park, Si-Young Kwak and Jeong-Ho Nam

Emerging Applications

Session EAC-1 : Emerging Applications of CAD (Chair : Satoshi Kanai (Hokkaido Univ.))

EAC-1-1 Parametric Surface Defined on Parallellogrammic Domain and its Properties ......................................................... Shiqian Fan, Jiulong Zou and Minquan Shi
EAC-1-2 Variational hand modeling based on image-based 3D model reconstruction ............................................................. Yuliya Xie, Satoshi Kanai and Hiroaki Date
EAC-1-3 As-built modeling of piping system from terrestrial laser scanned point clouds using normal-based region-growing ............................. Kazuaki Kawashima, Satoshi Kanai and Hiroaki Date
EAC-1-4 Automatic reconstruction of the arterial and venous trees on volumetric chest CT for quantification of the vessel distribution and extent ........................................................................... Seysoun Park and Honyung Shin

Session EAC-2 : Emerging Applications (Chair : Hyungjun Park (Chosun Univ.))

EAC-2-1 A CAD Client on a Smart Device with Drag-type Buttons ................................................................................. Yuna Kang and Soonhun Han
EAC-2-2 Note on Tangible AR Interaction based on Fingertip Touch using Small-sized Markers .............................. Hyungjun Park, Ho-Kyun Jung and Sang-Jin Park
EAC-2-4 A multi-user Selective Undo/Redo Approach for Collaborative CAD Systems .................................................. Yuan Cheng, Fazhi He, Bin Xu, Xiantao Cai and Yilin Chen
EAC-2-5 Development of wheel-gesture control interface to prevent distracted driving ........................................... Ji Hyun Yang, So-One Yoon and Sang Hun Lee

Product Lifecycle Management

Session PLM-1 : Product Lifecycle Management (Chair : Duhwan Mun (Kyoungpuk Univ.))

PLM-1-1 Linking a plant item and its geometric representation using ISO 15926 templates ................................................ Duhwan Mun, Gabriel B. Monteiro Lopes and Hans Teijgeler
Design Optimization

Session DO-1 : Design Optimization (Chair : Gil Ho Yoon (Hanyang Univ.))

DO-1-1 Topology Optimization for Foam Shock-Absorbing Structure Using Hybrid Cellular Automata

- Wonho Lee, Jinhoon Kim and Changbae Park

DO-1-2 Topology optimization with a mixed u/p finite element formulation for acoustic-porous-structure interaction system

- Gil He Yoon

DO-1-3 A development of Transient Quasi-static Ritz Vector (TQRSV) Method for Dynamic Finite Elementsimulation

- Gil He Yoon

DO-1-4 Structural topology optimization considering heat conductivity and strength

- Akhiro Takezawa, Gil Ho Yoon, Makoto Kobashi and Mitsu K Takezawa and Mitsu K Kitamura

DO-1-5 Topology Optimization of Reinforcement in the Ship Engine Room

- Masafumi Daifuku, Akhiro Takezawa and Mitsu K Takezawa

DO-1-6 Multi-objective optimization using evolutionary algorithm for axial flow pump impeller

- Hong-Seok Park and Fu-Qing Miao

Session DO-2 and PLM-2 : Design Optimization and Product Lifecycle Management (Hae-Jin Choi (ChungAng Univ.))

DO-2&PLM-2-1 Damage detection method based on vibration characteristic in non-destructive inspection

- Takafumi Nishizu, Akhiro Takezawa and Mitsu K Takezawa

DO-2&PLM-2-2 Voxel-Encoded Descriptor for 3D Model Retrieval by Exploring Mode’s Spatial Information

- Jinyuan Jia

DO-2&PLM-2-3 Decomposing Ship Hull to Manufacturable Plates Using Mesh Model

- Erkan Gungpinar and Hiromasu Suzuki

DO-2&PLM-2-4 Simulation based integrated design of materials and products; a high performance blast resistance panel design problem

- Sangwoo Jang, Woongkyung Baek and Hae-Jin Choi

DO-2&PLM-2-5 Development of conceptual PLM based on ARAS innovator for small and medium-sized shipbuilding yards

- Thanar Kumar Putepalli, Boram Kim, Myeong-Jo Son and Tae-Wan Kim

DO-2&PLM-2-6 Development of Integrated Design Methodology for various types of Product - Service Systems

- Tuan Anh Tran and Joon Young Park
Transportation

How to Get to Dongguk University

Subway line
- Take Subway Line 3 (Orange Line) to Dongdaeipgu (Dongguk University) Station. Come out through ‘Exit No. 6’ at the station and walk along for 5 minutes.

City Bus:
- Take ‘Blue Bus’ No. 144, 407, 301 to Jangchung Gymnasium Bus Stop.

Taxi:
- It takes about an hour from the airport to the University. (Taxi fare: approx. KRW 75,000)

KAL Limousine Bus:
- It takes about 90 minutes from the airport to the University. (Bus Fare: KRW 14,000)

City Bus:
- Take Blue Bus No. 144, 407, 301 to Jangchung Gymnasium Bus Stop.

From Incheon International Airport or Kimpo Airport to the venue

The trains are very handy and cheap to get to the venue. We recommend to use the trains or the buses. (http://www.airport.kr/)

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1. Take an airport train (commuter or express) to “Seoul Station”
2. From “Seoul Station”, transfer to subway line number 4 to Chungmuro station.
3. The venue is within walking distance from Chungmuro-station (15min)

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Venue

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2.