

eCAADe 2010

Future Cities

Proceedings of the 28th Conference on
Education in Computer Aided Architectural Design in Europe

September 15-18, 2010
Zurich, Switzerland
ETH Zurich

www.ecaade2010.ethz.ch

Edited by
Gerhard Schmitt, Ludger Hovestadt, Luc Van Gool,
Frédéric Bosché, Remo Burkhard, Suzanne Coleman,
Jan Halatsch, Michael Hansmeyer, Silke Konsorski-Lang,
Antje Kunze and Martina Sehmi-Luck

Contents

| | |
|---|------------|
| Preface | 7 |
| CAAD Curriculum..... | 19 |
| Searching for Innovation Through Teaching Digital Fabrication | 21 |
| Timothy L Hemsath | |
| Collaborative 3D Modelling and Printing: What You See Is Not Directly What You Get | 31 |
| Farid Mokhtar Noriega, Harald Gaterman, Enrique Rayoon Alvarez | |
| A Preliminary Study for a Teaching Framework that Incorporates CAD/CAM Media into the Basic Design Studio | 41 |
| Chor-Kheng Lim | |
| Increasing Design Reflection and Improving Feedback using Wikis | 51 |
| Michael W Knight, Andre G.P Brown | |
| Future Users, Future Cities: Dweller as Designer | 57 |
| Murat Germen, Emrah Kavlak | |
| Limited Embodied Programming | 65 |
| Teaching programming languages to architects | |
| Julien Nembrini, Guillaume Labelle, Jeffrey Huang | |
| A Design Studio Pedagogy for Experiments in Collaborative Design | 73 |
| Kateřina Nováková, Henri Achten, Dana Matějovská | |
| Revisiting the Architecture Curriculum | 81 |
| The programming perspective | |
| António Leitão, Filipe Cabecinhas, Susana Martins | |
| Utilizing 4D BIM models in the Early Stages of Design | 89 |
| Ozan Önder Özener, Woonseong Jeong, James Haliburton, Mark J. Clayton | |
| Teaching Building Information Modeling at Undergraduate and Graduate Levels | 97 |
| Wei Yan | |
| SKG IN_FLUX: An Urban 'Process-Plan' | 107 |
| Anastasia Tzaka, Nikos Kalogirou, Giorgos Papakostas, Ioanna Symeonidou | |
| Use of Grammar for Shape Exploration with Novice Students | 115 |
| Experiment 1: against the first impressions | |
| Mohamed S. Ibrahim, Alan Bridges, Scott C. Chase, Samir Bayoumi, Dina S. Taha | |
| Emotive Spaces | 125 |
| Spatial interpretations based on the book "Der Ohrenzeuge" by Elias Canetti | |
| Marco Hemmerling, Anke Tiggemann | |
| Urban Infrastructure & Architectronics | 133 |
| AnnaLisa Meyboom, Jerzy Wojtowicz | |
| Exploring the Patterns and Trends of Socio-spatial Activities of Architecture Student Community in Istanbul by Data Mining | 143 |
| Ahu Sokmenoglu, Ceyhun Burak Akgul | |

Designing Interactions 151

A step forward from time based media and synthetic space design in architectural education

Vassilis Bourdakis

Contemporary Metropolitan Conditions 157

New challenges for design education

Guilherme Lassance, Djamel Klouche, Fabiana Izaga, Gabriel Duarte

New Design Concepts and Strategies167

A Design Methodological Framework for Interactive Architecture 169

Henri Achten, Miloš Kopřiva

Generation of a New Urban Block for the Future City 179

A bottom-up approach for the future city block

Betül Tuncer, Sinan Mert Sener

Shape Grammars for Innovative Hybrid Typological Design 187

Dhuha Al-kazzaz, Alan Bridges, Scott Chase

SOMcity: Networks, Probability, the City, and its Context 197

Klaus Wassermann

Urban Protophenomenon 207

Introducing the notion of primordial phenomenon in urbanism

Claudio Aranedá

Uneasy Coincidence? Massive Urbanization and New Exotic Geometries with Algebraic Geometry as an Extreme Example 217

Günter Barczik

Digital Fabrication Inspired Design 227

Influence of fabrication parameters on a design process

Agata Guzik

How To Make The Soft Skin? 237

A preliminary framework for the parametric design of the bionic soft skin

Yun-Ying Chiu

Parametric Origami 243

Adaptable temporary buildings

Heike Matcha, Ante Ljubas

Interfacial Design 253

Situating Contemporary Autopoietic Techniques within the Context of the Autonomy Project and Biotechnological Revolution

Joshua M. Taron, Sebastian von Mammen

Generative and Parametric Design263

Implementing a Generative Urban Design Model 265

Grammar-based design patterns for urban design

José Beirão, Gelly Mendes, José Duarte, Rudi Stouffs

Palladian Graphs 275

Using a graph grammar to automate the Palladian grammar

Thomas Grasl, Athannassios Economou

| | |
|---|------------|
| From Mesh to Ornament | 285 |
| Subdivision as a generative system | |
| Michael Hansmeyer | |
| Future Community in Istanbul | 295 |
| An interpretation of Istanbul to generate a new urban life | |
| Ebru Arkut Ulu, Burcu Arkut, Onur Yuce Gun | |
| Schemas and Rules in the Design Process: A Case Study | 305 |
| Gabriela Celani, Leandro Medrano | |
| Parametric Approach to the Bioclimatic Design of a Student Housing Building in Patras, Greece | 313 |
| Angelos Chronis, Katherine A. Liapi | |
| Performance-Oriented Design of Large Passive Solar rRoofs | 321 |
| A method for the integration of parametric modelling and genetic algorithms | |
| Michela Turrin, Peter von Buelow, Rudi Stouffs, Axel Kilian | |
| Energy Codes Re-Investigated | 331 |
| Aant van der Zee, Bauke de Vries | |
| Procedural Modeling of Urban Green Space Pattern Designs Taking into Account Ecological Parameters | 339 |
| Ulrike Wissen Hayek, Noemi Neuenschwander, Jan Halatsch, Adrienne Grêt-Regamey | |
| A Grammar for Portuguese Historical Urban Design | 349 |
| Alexandra Paio, Benamy Turkienicz | |
| Design Tool Development | 359 |
| Assessing Computational Tools for Urban Design | 361 |
| Towards a "city information model" | |
| Jorge Gil, José Beirão, Nuno Montenegro, José Duarte | |
| Towards a Meaningful Usage of Digital CNC Tools | 371 |
| Within the field of large-scale landscape architecture | |
| Christophe Girot, Mathias Bernhard, Yves Ebnöther, Pia Fricker, Alexandre Kapellos, James Melsom | |
| Attractive City - An Interactive City Generator | 379 |
| Edyta Augustynowicz, Stefanie Sixt, Sofia Georgakopoulou | |
| Function & Action | 389 |
| Verifying a functional program in a game-oriented environment | |
| Gabriel Wurzer, Antonio Fioravanti, Gianluigi Loffreda, Armando Trento | |
| Proposition of a Parametric Model for Non Standard Timber Construction | 395 |
| Shaghayegh Shadkhou, Jean-Claude Bignon | |
| Geometric Programming Framework | 403 |
| ANAR+: geometry library for processing | |
| Guillaume Labelle, Julien Nembrini, Jeffrey Huang | |
| Form Generator | 411 |
| A CAD tool for conceptual design development | |
| Birgül Çolakoğlu, Gökhan Keskin | |
| Experimenting with Building Footprint Formation and Volume Optimization | 419 |
| A constraint programming approach for the optimization of building-volumes based on combinatorial rectangular footprint formations | |
| Martin Schoch, Apichat Praditsmanont | |

One Mill per Student 429

Designing a low cost prototype mill for architectural use

Volker Koch, Willy Abraham, Sebastian Selbmann, Andreas Kindsvater, Petra von Both

Spatializing Planar Ornaments 437

Towards esthetic control in segmenting and building curved surfaces

Milena Stavric, Urs Hirschberg, Albert Wiltsche

FREAC: A Technical Introduction to a Framework for Enhancing Research in Architectural Design and Communication 445

Reinhard Koenig, Torsten Thurow, Jörg Braunes, Christian, Tonn, Dirk Donath, Sven Schneider

Mixer Modeling – An Intuitive Design Tool 453

Using a hardware controller to actuate parametric design software

David Lemberski, Marco Hemmerling

Simulation and Visualization, Prediction and Evaluation459

Optimizing Solar Insolation in Transformable Fabric Architecture 461

A parametric search design process

Earl Mark

A Framework for a Sustainable Design and Presentation Process of Furniture Collection 471

Marco Gaiani, Silvia Ferioli, Pier Carlo Ricci, Mirko Barone, Michele Agnoletti

Integrating Sound Scattering Measurements in the Design of Complex Architectural Surfaces 481

Informing a parametric design strategy with acoustic measurements from rapid prototyping scale models

Brady Peters, Tobias S. Olesen

Illuminating the Design 493

Incorporation of natural lighting analyses in the design studio using BIM

Ozan Önder Özener, Francisco Farias, James Haliburton, Mark J. Clayton

The Use of Digital 3-D Information to Assess Urban Environmental Quality Indicators 499

Eugenio Morello, Cláudio Carneiro, Gilles Desthieux

Computing Towards Responsive Architecture 507

Energy based simulation software for responsive structures

Angeliki Fotiadou

Evaluating the Environmental Implications of Density 515

A comparative case study on the relationship between density, urban block typology and sky view factor performance

Ji Zhang, Chye Kiang Heng, Daniel Jun Chung Hii, Patrick Janssen, Lai Choo Malone-Lee, Beng Kiang Tan

Macro Thinking & Micro Action 529

A digital simulation example for the southern part of Beijing, China

Xiaofan Deng, Haidong Ma

A Virtual Environment Model for Brussels Capital Region's Future Urban Development Projects:

Preliminary Ideations 539

Burak Pak, Johan Verbeke

Digital Simulation of the City for Three Millions Inhabitants by Le Corbusier 549

Geometrical analysis, electronic reconstruction and video animation

Alberto Sdegno

Use of a WiFi Location Estimation Service as a Tool for Presenting Real Time Information during a River Cruise 557

Yuri Queiroz Abreu Torres, Tomohiro Fukuda, Nobuyoshi Yabuki

- Development and Social Experiment for a Tourism Information Collection System by Tourists** 565
Yasuyo Yoshikawa, Tomohiro Fukuda, and Nobuyoshi Yabuki
- Visual Perception and Visualization Tools for Visual Impact Assessment (VIA) on Urban Streetscape** 575
Ahmad Rafi and Ruzaimi Mat Rani
- Energy Monitoring and Visualization System for U-ECO City** 583
Designing a spatial information model for energy monitoring in the context of large amount data management on a web based platform
Dongyoun Shin, Thomas Seibert, Steffen P.Walz, Yoon Choe, Sung Ah Kim
- World16** 593
Innovation and collaboration in VR technology
Yoshihiro Kobayashi, Christopher J. Grasso, Michael J. McDearmon
- Protocol Growth** 605
Development of adaptable city models through self-organization
Dimitris Gourdoukis
- A Study on Viewshed Frequency Analysis for Establishing Viewpoints** 615
Sang Bok Lee, Jung Rim Ryu, Seung Yeon Choo, Seung Hak Woo, Ji Hyo Seo, Jin Sung Jo
- Computer-Generated Circulation Diagrams in Macro-scale Design Investigation** 623
Odysseas Kontovourkis
- Applied Multi-Scale Design and Optimization for People Flow** 633
Sam Joyce, Vincent Tabak, Shrikant Sharma, Chris Williams
- System-Embedded Building Design and Modeling** 641
Parametric systems modeling of buildings and their environment for performance-based and strategic design
Phillipp Geyer, Martin Buchholz
- Scale and Complexity** 651
Multi-layered, multi-scalar agent networks in time-based urban design
Jeannette Kuo, Dominik Zausinger

Collaborative Design659

- Extreme Designing** 661
Proposal for the transfer of concepts from the agile development to the architectural design process
Stephan Droste
- Developing Shared Urban Visions Through Participation Supported by Digital Tools** 667
Matevz Juvancic, Spela Verovsek, Anja Jutraz, Tadeja Zupancic
- Co-Adaptive Environments** 677
Investigation into computer and network enhanced adaptable, sustainable and participatory environments
Yasu Santo, John Hamilton Frazer, Robin Drogemuller
- Operations of Conception in Architectural Collaborative Design** 687
Samia Ben Rajeb, Caroline Lecourtois, François Guéna
- A Conceptual Framework for the Formulation of Stakeholder Requirements** 697
Antje Kunze, Gerhard Schmitt
- Facilitating Architectural Communities of Practice** 707
Bige Tunçer, Sevil Sariyildiz
- Agent based Emission Evaluation of Traffic in Dynamic City Models** 717
Gideon D. P. A. Aschwanden, Tobias Wullschlegler, Hanspeter Müller, Gerhard Schmitt

Virtual Reality727

Integration of VR technology in Buildings Management 729

The lighting system

Alcnia Zita Sampaio, Miguel M. Ferreira, Daniel P. Rosrio

e-Warisan SENIBINA 739

Towards a collaborative architectural virtual heritage experience

Ahmad Rafi, Azhar Salleh, Avijit Paul, Reza Maulana, Faisal Athar, Gatya Pratiniyata

Development of a City Presentation Method by Linking Viewpoints of a Physical Scale Model and VR 747

Toshiki Tokuhara, Tomohiro Fukuda, Nobuyoshi Yabuki

Spatial Navigational Patterns Induced by Real and Virtual Architectural Environments 755

Anastasia Pechlivanidou-Liakata, Maria P. Kerkidou, Stelios C. Zerefos, Mladen Stamenic, Tina Mikrou, Adam Doulgerakis

City Modelling765

3D-GIS Integration for Virtual NewcastleGateshead 767

Emine Mine Thompson, Margaret Horne

Urban Space Planning for Sustainable High Density Environment 777

Nicolas Ladouce, Limin Hee, Patrick T. Janssen

Models for Creating the Prospective City 787

Opportunities and challenges of 4D GIS and virtual environments

Burak Pak, Johan Verbeke

Ontologies for Cities of the Future 797

The quest of formalizing interaction rules of urban phenomena

Armando Trento, Antonio Fioravanti, Gianluigi Loffreda

Environmental Catalysts for a Computational Urbanism 805

Steve(n) Hardy, Jonas Lundberg

Analyzing the Changes of Bosphorus Silhouette 815

Suzan Girginkaya Akdag, Gulen Cagdas, Caner Guney

Enhancing a Virtual City with Collective Memory 825

A pilot study of Jalan Malloboro in Yogyakarta

Sushardjanti Felasari, Chengzhi Peng

A Grammar-based Procedural Design Guideline Visualization Diagram for the Development of SVA Masdar 833

Jan Halatsch, Thomas Caro, Bruno Moser, Gerhard Schmitt

A Generative Design Model for Gaziantep's Traditional Pattern 841

Esra Grbz, Glen ada, Sema Alaam

A Generative Design System to Interactively Explore Different Urban Scenarios 851

Giuseppe Pellitteri, Raimondo Lattuca, Giuseppe Conti, Raffaele De Amicis

Information / Knowledge Architecture861

A Semantic and Parametric Method for 3D Models used in 3D Cognitive-Information System 863

Fabrizio I. Apollonio, Marco Gajani, Cristiana Corsi

Exploring the Patterns and Relationships of Urban Attributes by Data Mining 873

Ahu Sokmenoglu, Gulen Cagdas, Sevil Sanyildiz

The Digital Emerging and Converging Bits of Urbanism 883
Crowddesigning a live knowledge network for sustainable urban living
Flora Dilys Salim, Jane Burry, David Taniar, Vincent Cheong Lee, Andrew Burrow

Space Index 893
A retrieval-system for building-plots
Benjamin Dillenburg

Index of Authors.....901