

# Advances in Architectural Geometry

Vienna, Austria  
September 13-16, 2008



## Workshop Programme (part 1 – timetable)

[Venue: TU Wien, Freihaus building, Green Tower A, 7<sup>th</sup> and 8<sup>th</sup> floor,  
Wiedner Hauptstrasse 8-10, 1040 Wien]

### Saturday September 13, 2008

08.30-09.00: Registration (TU Wien, ZS 3)

09.00-10.30: Workshops #1, #3, #4

Coffee Break (at ZS 3)

11.00-12.30: Workshops #2, #3, #4

Lunch Break – attendees on their own

14.30-17.00: Workshops #3, #4

### Sunday September 14, 2008

08.30-09.00: Registration (TU Wien, ZS 3)

09.00-10.30: Workshops #3, #4, #5

Coffee Break (at ZS 3)

11.00-12.30: Workshops #3, #4, #5

Lunch Break – attendees on their own

12.45-14.15: Workshop #7

14.30-17.00: Workshops #3, #4, #6

18.00-20.00: *Opening Reception*

*[Venue: TU Wien, Böcklsaal, Karlsplatz 13*

*Note: other building than workshops]*

## Workshop Programme (part 2 – details on workshops)

[Venue: TU Wien, Freihaus building, Green Tower A, 7<sup>th</sup> and 8<sup>th</sup> floor,  
Wiedner Hauptstrasse 8-10, 1040 Wien]

### Workshop #1 (Saturday 9.00-10.30, DZ, 25 participants)

*Freeform Glazed Roof Structure Informed by Mathematical, Structural, and Environmental Considerations*

Halcrow Yolles (Studio for Progressive Modeling), Jonathan Hendricks, Crispin Howes, Daniel Hambleton

### Workshop #2 (Saturday 11.00-12.30, DZ, 25 participants)

*Architectural Modeling with Shape Grammars*

Pascal Mueller (Procedural Inc.)

### Workshop #3 (Saturday 9.00-17.00 & Sunday 9.00-17.00, ZS 1, 10 participants)

*Structural Tessellations*

Christian Troche (University Kassel)

### Workshop #4 (Saturday 9.00-17.00 & Sunday 9.00-17.00, CAD 1, 21 participants)

*PARAKNIT*

Norbert Palz and Martin Tamke (Royal Academy of Fine Arts, School of Architecture, CITA), Eyal Nir (Paracloud Ltd)

### Workshop #5 (Sunday 9.00-12.30, CAD 2, 25 participants)

*Paneling NURBS Surfaces and Polysurfaces in Rhinoceros*

Rodrigo Bárcena (McNeel)

### Workshop #6 (Sunday 14.30-17.00, CAD 2, 25 participants)

*Grasshopper, Generative Modeling for Rhino*

David Rutten (McNeel)

### Workshop #7 (Sunday 12.45-14.15, CAD 2, 25 participants)

*Calculated Nature in Architecture*

Milena Stavric, Albert Wiltsche (TU Graz, Faculty of Architecture)

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All workshops are held at the Institute of Discrete Mathematics and Geometry,  
TU Wien, Freihaus building, green tower A, 7<sup>th</sup> and 8<sup>th</sup> floor, Wiedner Hauptstr. 8-10, 1040 Wien.

#### Rooms in 7<sup>th</sup> floor

ZS 3: Zeichensaal 3 (Registration, coffee breaks, discussion room)

CAD 2: Computer Room 2 (Workshop #5, #6, #7)

#### Rooms in 8<sup>th</sup> floor

DZ: Dissertantenzimmer (Workshop #1, #2)

ZS 1: Zeichensaal 1 (Workshop #3)

CAD 1: Computer Room 1 (Workshop#4)

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## Conference Programme (part 1 – timetable)

[Venue: Theatersaal, Austrian Academy of Sciences, Sonnenfelsgasse 19, 1010 Wien]

### Monday September 15, 2008

08.00-09.00: Registration

09.00-09.30: Opening by Christian Kühn (Dean of Architectural Studies, TU Wien)  
Music by "Art of Brass Vienna"

09.30-10.30: *Algorithmically Acquired Architectural and Artistic Artifacts*  
Invited Speaker Carlo Séquin (UC Berkeley)  
Chair: Helmut Pottmann

Coffee break

11.00-12.30: Session #1 *Regular and Irregular Structures* (4 speakers)  
Chair: Robert Aish

Lunch break – attendees on their own

14.30-15.30: *Rationalization, Complexity and Emerging Ontologies of Design*  
Invited Speaker Dennis R. Shelden (Gehry Technologies)  
Chair: Fabian Scheurer

Coffee break

16.00-17.00: Session #2 *Design Tools and Origami* (3 speakers)  
Chair: Jane Burry

17.00-17.30: Poster Session #1

17.45-18.00: Departure of buses to Conference Dinner (Note: a short walk from the venue)

18.30-24.00: Conference Dinner at Heuriger Fuhrgasslhuber

23.00-24.00: Buses will bring participants back to the centre of Vienna

### Tuesday September 16, 2008

09.00-09.30: Registration

09.30-10.30: *Optimal Surfaces and Meshes*  
Invited Speaker Konrad Polthier (FU Berlin)  
Chair: Johannes Wallner

Coffee break

11.00-12.30: Session #3 *Construction Technology for Freeform Geometry* (4)  
Chair: Alexander Bobenko

Lunch break – attendees on their own

14.30-15.30: Invited Speaker Arnold Walz (designtoproduction)  
Chair: Lars Hesselgren

Coffee break

16.00-17.00: Session #4 *Geometry from Linear Elements* (3 speakers)  
Chair: Toni Kotnik

17.00-17.30: Poster Session #2

17.30-18.30: *Get Real*  
Invited Speaker Charles Walker (Zaha Hadid Architects)  
Chair: Axel Kilian

18.30-18.40: Closing of Conference

## **Conference Programme (part 2 – oral presentations)**

[Venue: Theatersaal, Austrian Academy of Sciences, Sonnenfelsgasse 19, 1010 Wien]

### **Regular and Irregular Structures – Session One (Chair: Robert Aish, Mon 11.00-12.30)**

*Symmetry for Architectural Design*

Niloy Mitra (IIT Delhi), Mark Pauly (ETH Zürich)

*Frameworks for practical parametric design in architecture*

Roly Hudson (The University of Bath)

*Generating Geometry of Irregular Frameworks Algorithmically*

Arne Hofmann, Klaus Bollinger (UAK Wien, B+G Ingenieure), Manfred Grohmann (Uni Kassel, B+G Ingenieure)

*Bitmap-driven Parametric Facades*

Steffen Lemmerz (ETH Zürich)

### **Design Tools and Origami – Session Two (Chair: Jane Burry, Mon 16.00-17.00)**

*Curved Crease Origami*

Duks Koschitz, Erik Demaine, Martin Demaine (MIT)

*Developable Surfaces with Curved Creases*

Martin Kilian, Simon Flöry (TU Wien, Evolute), Zhonggui Chen (TU Wien, Zhejiang University), Niloy J. Mitra (IIT Delhi), Alla Sheffer (UBC), Helmut Pottmann (TU Wien)

*Design By Tool Design*

Urs Füssler (Füssler Berlin)

### **Construction Technology and Freeform Geometry – Session Three (Chair: Alexander Bobenko, Tue 11.00-12.30)**

*Glazing Technology: the Hidden Side of Free-Form Design*

Niccolò Baldassini (RFR Paris)

*Architectural freeform structures from single curved panels*

Alexander Schiftner (Evolute), Niccolò Baldassini (RFR Paris), Pengbo Bo (The University of Hong Kong), Helmut Pottmann (TU Wien)

*Generative surface smoothing and automated analysis model processing*

Florian Gauss, Mitsuhiro Kanada, Daniel Bosia (Arup Advanced Geometry Unit)

*mem[e]brane development as a case study for approaching architecture as a complex network of interactive spatial components*

Tomasz Jaskiewicz (TU Delft)

### **Geometry from Linear Elements – Session Four (Chair: Toni Kotnik, Tue 16.00-17.00)**

*Planar Hexagonal Meshes by Tangent Plane Intersection*

Christian Troche (Universität Kassel)

*On Vertex Offsets of Polyhedral Surfaces*

Yang Liu, Wenping Wang (The University of Hong Kong)

*Complex geometries in Wood*

Martin Tamke, Mette Ramsgard Thomsen, Jacob Riiber (Royal Academy of Fine Arts)

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## **Conference Programme (part 3 – posters on Monday)**

**[Venue: Theatersaal, Austrian Academy of Sciences, Sonnenfelsgasse 19, 1010 Wien]**

### **Poster Session #1 – Monday September 15, 2008**

**Each poster will be accessible to all participants throughout the whole day for discussion at coffee breaks and in the special poster session.**

*Using Parametric Software to Expand Geometric Limits of Vernacular Materials*  
Beorkrem, Christopher and Ault, Nicholas (University of North Carolina-Charlotte)

*Structural Components, parametric associative conceptual structural design tools*  
Breider, Janwillem and Coenders, Jeroen (TU Delft / Arup, The Netherlands)

*Catastrophes in architectural model space*  
Burry, Jane (RMIT University, Australia)

*Sloping façade building section: an exploratory study with shape grammar*  
Cypriano, Débora and Celani, Gabriela (State University of Campinas, Brazil)

*From parameter to production*  
Dempsey, Alan

*Notes on the potential of simulation for architectural conception*  
Feringa, Jelle (The Netherlands)

*The Effects of Advances in Architectural Geometry on the Building Form and Structure*  
Halicioglu, F. Hilal (Dokuz Eylul University, Turkey)

*The Role of Architectural Geometry in Performance-orientated Design*  
Holzer, Dominik (Rmit University, Melbourne) and Downing, Steven (Arup, Sydney, Australia)

*Spatial and Sectional Geometry of the Bearing Structure of the Open Theater at Hellenic World Foundation Complex in Athens*  
Kyriazis, Manos and Bachounzouzi, Georgia and Makriyannis, Michael (ESK Str. Engineering Technical Office, Greece)

*Geometric Configuration of Helical Tensegrity Structures*  
Liapi, Katherine (University of Patras, Greece) and Kim, Jinman

**Poster presenters: Please mount your posters in the morning and demount them in the evening of the same day.**

## Conference Programme (part 4 – posters on Tuesday)

[Venue: Theatersaal, Austrian Academy of Sciences, Sonnenfelsgasse 19, 1010 Wien]

### Poster Session #2 – Tuesday September 16, 2008

**Each poster will be accessible to all participants throughout the whole day for discussion at coffee breaks and in the special poster session.**

*An Anti-Clastic, Double-Curved SLEs-Structure*

Petrova, Polina (TU Wien, Austria) and Sommer, Bernhard (TU Delft, The Netherlands)

*Advanced Geometry, Rudimentary Construction: Structural form finding for unreinforced thin-shell masonry vaults*

Ramage, Michael (Cambridge University, UK), Ochsendorf, John (MIT, USA), Block, Philippe (MIT) Rich, Peter (Peter Rich Architects, South Africa)

*Nonlinear Systems Biology and Design: Surface Design*

Sabin, Jenny and Jones, Peter Lloyd (University of Pennsylvania, USA)

*Design and Panelization of Architectural Freeform-Surfaces by Planar Quadrilateral Meshes*

Schmiedhofer, Heinz (TU Wien), Brell-Cokcan, Sigrid (TU Wien / II Architects int.), Schiftner, Alexander (TU Wien) and Ziegler, René (Waagner-Biro, Austria)

*Precision of Continuously Variable Structures*

Sommer, Bernhard (TU Delft, The Netherlands)

*Beyond Isocurves*

Stehling, Hanno (University of Kassel, Germany)

*Iterative Geometric Design for Architecture*

Stotz, Ivo and Gouaty, Gilles and Weinand, Yves (Ecole Polytechnique Fédérale de Lausanne, Switzerland)

*Evolving space frames*

Tessmann, Oliver and Schein, Markus (University of Kassel, Germany)

*Integrated Delivery Empowered by Computational Geometry*

Vilkner, Gregor and Laufs, Will (Thornton Tomasetti, USA)

*Rule-based Procedural Reconstruction of NURBS Surfaces for Architectural Exploration*

Wang, Tsung-Hsien (Carnegie Mellon University, USA)

**Poster presenters: Please mount your posters in the morning and demount them in the evening of the same day.**