

# Peter von Bülow

## Education

- |      |   |
|------|---|
| 2007 | <b>Doctor of Engineering</b><br>University of Stuttgart, Institute for Lightweight Structures and Conceptual Design (ILEK)<br>institute director and dissertation advisor: Werner Sobek |
| 1991 | <b>Master of Science in Civil Engineering</b><br>University of Tennessee, Department of Civil Engineering   |
| 1980 | <b>Fulbright Scholar</b><br>University of Stuttgart, Institute for Lightweight Structures. director: Frei Otto  |
| 1979 | <b>Bachelor of Architecture</b><br>University of Tennessee, School of Architecture, with honors   |

## Registration and Professional Societies

- |       |   |
|-------|---|
| 1999  | <b>Registered Architect.</b> Baden-Württemberg, Germany (11197)             |
| 1998  | <b>Registered Engineer.</b> Baden-Württemberg, Germany (5732)               |
| 1996- | <b>The International Association of Shell and Spatial Structures (IASS)</b> |
| 2004- | <b>American Institute of Steel Construction (AISC)</b>                      |
| 2015- | <b>American Concrete Institute (ACI)</b>                                    |
| 2009- | <b>Association for Computer Aided Design in Architecture (ACADIA)</b>       |
| 1980- | <b>The Fulbright Association</b>  |

## Academic Experience

- |              |   |
|--------------|---|
| 2014-present | <b>Professor in Architecture.</b> University of Michigan, Taubman College.<br>Teaching Graduate and Undergraduate courses in Structures.                          |
| 2009-2014    | <b>Associate Professor in Architecture.</b> University of Michigan, Taubman College.  |
| 2001-2009    | <b>Assistant Professor in Architecture.</b> University of Michigan, Taubman College.  |
| 1994-1996    | <b>Associate Professor in Architecture.</b> University of Tennessee, School of Architecture.<br>Teaching courses in: structures, computer programming and design. |
| 1982-1994    | <b>Assistant Professor in Architecture.</b> University of Tennessee.  |

## Professional Experience

- |           |   |
|-----------|---|
| 2001      | <b>RFR Stuttgart,</b> Germany. Architectural Engineer.  |
| 1998-2000 | <b>Office of Switbert Greiner.</b> Oberaichen, Germany. Architectural Engineer.   |
| 1997-1998 | <b>Sonderkonstruktionen und Leichtbau GmbH (SL).</b> Oberaichen, Germany. Arch. Engineer.   |
| 1980      | <b>Office of Robert Kennedy.</b> Knoxville, Tennessee. Architect.   |
| 1978      | <b>Office of Jörg Anders .</b> Bonn, Germany. Architect.  |
| 1977      | <b>Freie und Hansestadt Hamburg Baubehörde,</b> Schulbau (City Building Bureau for School Buildings). Hamburg, Germany. Architect Practicant. |

# Scholarly Work

## Book

- 2007 von Buelow, P. **Genetically Engineered Architecture: design exploration with evolutionary computation.** AV Akademiker Verlag, Saarbrücken, Germany. ISBN 978-3-639-42628-1 (dissertation – see <http://www.umich.edu/~pvbuelow>)

## Book Chapter

- 2002 von Buelow, P. **"Using Evolutionary Algorithms to Aid Designers of Architectural Structures"** in *Creative Evolutionary Systems*, ed. Bentley, P. and Corne, D. Morgan Kaufmann, 2002.

## Journal Articles

- 2016 Alaghmandan, Elnimeiri, Krawczyk and von Buelow. **"Modifying Tall Building Form to Reduce the Along-Wind Effect"** *CTBUH Journal*. Council on Tall Buildings and Urban Habitat. Issue 2. pp. 34-39. 2016.
- 2014 Kodadadi, A.; von Buelow, P. **"Performance Based Exploration of Generative Design Solutions Using Formex Algebra"** *International Journal of Architectural Computing*. Vol.12, Issue 3. pp. 321-338. Sept. 2014.
- 2012 von Buelow, P. **"ParaGen: Performative Exploration of Generative Systems"** in *Journal of the International Association for Shell and Spatial Structures*. Vol. 53 (2012) No. 4, n. 174. pp. 271-284.
- 2012 Turrin, M., von Buelow, P., Kilian, A., Stouffs, R. **"Performative skins for passive climatic comfort: A parametric design process"** in *Automation in Construction International Journal*. Vol. 22, Mar 2012 ISSN 0926-5805, pp. 36-50
- 2011 Turrin, M., von Buelow, P., Stouffs, R. **"Design explorations of performance driven geometry in architectural design using parametric modeling and genetic algorithms"** in *Advanced Engineering Informatics*. Elsevier, Vol. 25, Issue 4, October 2011, pp. 656-675.
- 2011 van Embden Andres, M.V., Turrin, M., von Buelow, P. **"Architectural DNA: A genetic exploration of complex structures"** in *International Journal of Architectural Computing*. Multi-Science Publ., Vol. 9, Issue 2, pp. 133-150, 2011
- 2008 von Buelow, P. **"Suitability of Genetic Based Exploration in the Creative Design Process"** in *Digital Creativity*. Routledge, Vol.19, No.1, pp.51-61, 2008
- 2007 von Buelow, P. **"Advantages of Evolutionary Computation used for Exploration in the Creative Design Process"** in *Journal of Integrated Systems, Design, and Process Science*. Vol. 11, No. 3, September 2007.
- 2004 Synnes, K.; von Buelow, P. **"A Tree for a House: designing for super-mobility by means of digital craft"** in *Journal of Architectural Education*. eds. Cavanagh, Ted and Allen, Edward. Vol. 58. Issue 1. 2004.

## Technical Reports

- 2007 von Buelow, P. **A Survey and Comparison of Biological Genetics and Evolutionary Computation.** University of Stuttgart, ILEK. Forschungsbericht 01-07.
- 1989 Moriarty, T.; von Buelow, P. **Development, Design, Fabrication and Testing of Frame Supported Tension Structures (FSTS) Expeditionary Shelters – Phase I & II- Final Reports.** N00123-87-C-0574. U.S. Navy.
- 1989 Moriarty, T.; von Buelow, P. **Development of Two Prefabricated Hyperbolic Paraboloid Shell Structural Systems.** ESL-TR-89-03. 153 pp. U.S. Air Force.
- 1986 Moriarty, T.; von Buelow, P. **Development and Testing of an Underground Protective Shelter Constructed of Hyperbolic Paraboloid Shell Elements.** ESL-TR-86-37. 71 pp. U.S. Air Force.
- 1985 Moriarty, T.; von Buelow, P.; Kersavage, J. **Composite Hypar Structural System - Final Report.** ESL-TR-85-07. 66 pp. U.S. Air Force.

## Conference Papers (Peer Reviewed)

- 2018 von Buelow, P.; Oliyan Torghabehi, O.; Mankouche, S.; Vliet, K. **"Combining parametric form generation and design exploration to produce a wooden reticulated shell using natural tree crotches"**. in *Creativity in Structural Design*, (IASS 2018). July 15-20, 2018. Boston, USA.
- 2018 Emami, N.; Giles, H.; von Buelow, P. **"Performative perforations: structural and daylighting performance assessment of Candela's High Life Textile Factory"**. in *Creativity in Structural Design*, (IASS 2018). July 15-20, 2018. Boston, USA.
- 2017 von Buelow, P. **"Choosing parents to produce better performing children: a comparison of selection methods used for evolutionary search"**. in *Interfaces: architecture . engineering . science*, (IASS 2017). Sept. 25-28, 2017. Hamburg, Germany.
- 2017 Emami, N.; Giles, H.; von Buelow, P. **"Continuous to discrete: computational performative design and search of shell structures"**. in , (IASS 2017). Sept. 25-28, 2017. Hamburg, Germany.
- 2017 Oliyan Torghabehi, O.; von Buelow, P.; Seyedahmadian, A. **"A Performance Based Computational Method for Assembly Design of Reciprocal Architectural Systems with 2D Elements"**. in *Symposium on Simulation for Architecture and Urban Design (SimAUD 2017)*. ed. Michela Turrin. Proceedings of the 8<sup>th</sup> SimAUD Symposium. 22 - 24 May 2017, Toronto, Canada.
- 2016 Chaszar, A.; von Buelow, P. **"Multivariate Interactive Visualisation of Data for Multi-Objective Design Space Exploration"**. in *Spatial Structures in the 21st Century* (IASS 2016). Sep 26-30, 2016 Tokyo, Japan.
- 2016 Emami, N.; von Buelow, P. **"Teaching Structures to Architecture Students through Hands-On Activities"**. Canadian International Conference on Advances in Education, *Teaching & Technology*. 16-17 July, 2016 , Toronto, Canada.
- 2016 von Buelow, P. **"Genetically Enhanced Parametric Design in the Exploration of Architectural Solutions"**. in *Structures and Architecture - Beyond their Limits*. Ed. Paulo J. da Sousa Cruz. CRC Press 2016 (ICSA 2016) <http://dx.doi.org/10.1201/b20891>
- 2016 Chaszar, A.; von Buelow, P.; Turrin, M. **"Multivariate Interactive Visualization of Data in Generative Design"**. in *Symposium on Simulation for Architecture and Urban Design (SimAUD 2016)*. May 16-18, 2016 London, UK.
- 2015 Falk, A.; von Buelow, P.; Khodadadi, A. **"Form Exploration of Timber-based Folded Plate Domes"**. *Future Visions*. Proceedings of the IASS 2015 Symposium. 17 - 20 August 2015, Amsterdam, The Netherlands.
- 2015 Yang, D.; Turrin, M.; von Buelow, P.; Paul, J. **"Multi-objective and multidisciplinary design optimization of large sports building envelopes: a case study"**. *Future Visions*. Proceedings of the IASS 2015 Symposium. 17 - 20 August 2015, Amsterdam, The Netherlands.
- 2014 von Buelow, P. **"Using Database Storage to Improve Explorative Optimization of Form Critical Structures"** *Shells, Membranes and Spatial Structures: Footprints*. eds. R. Brasil and R. Pauletti. Proceedings of the IASS-SLTE 2014 Symposium. 15 - 19 September 2014, Brasilia, Brazil.
- 2014 Oliyan Torghabehi, O.; von Buelow, P. **"Performance oriented generative design of structural double skin facades inspired by cell morphologies"** *Shells, Membranes and Spatial Structures: Footprints*. eds. R. Brasil and R. Pauletti. Proceedings of the IASS-SLTE 2014 Symposium. 15 - 19 September 2014, Brasilia, Brazil.
- 2014 Emami, N.; Khodadadi, A.; von Buelow, P. **"Design of a Shading Screen Inspired by Persian Geometric Patterns: An Integrated Structural and Daylighting Performance Evaluation"** *Shells, Membranes and Spatial Structures: Footprints*. eds. R. Brasil and R. Pauletti. Proceedings of the IASS-SLTE 2014 Symposium. 15 - 19 September 2014, Brasilia, Brazil.

- 2014 Omidfar, A.; Oliyan Torghabehi, O.; von Buelow, P. **"Performance-based design of a self-standing building skin; A methodology to integrate structural and daylight performance in a form exploration process"** *Shells, Membranes and Spatial Structures: Footprints*. eds. R. Brasil and R. Pauletti. Proceedings of the IASS-SLTE 2014 Symposium. 15 - 19 September 2014, Brasilia, Brazil.
- 2014 Khodadadi, A.; von Buelow, P. **"Form Exploration and GA-Based Optimization of Lattice Towers Comparing with Shukhov Water Tower"** *Shells, Membranes and Spatial Structures: Footprints*. eds. R. Brasil and R. Pauletti. Proceedings of the IASS-SLTE 2014 Symposium. 15 - 19 September 2014, Brasilia, Brazil.
- 2014 Khodadadi, A.; von Buelow, P. **"Dynamic Configuration Processing and Optimization of Forms (Exploring Truss-bridges)"** *1<sup>st</sup> International Conference on Engineering and Applied Sciences Optimization (OPT-i)*. 4-6 June 2014, Kos, Greece.
- 2014 Oliyan Torghabehi, O.; von Buelow, P. **"Genetic Based Form Exploration of Mid-Rise Structures Using Cell Morphologies"** in *Symposium on Simulation for Architecture and Urban Design (SimAud 2014)*. Society for Modeling and Simulation International (SCS) Simulation Series 2014. April 13–16, Tampa Florida
- 2013 von Buelow, P. **"Techniques for More Productive Genetic Design: Exploration with GAs using Non-Destructive Dynamic Populations"** in *Adaptive Architecture* eds Philip Beesley, Omar Khan and Michael Stacey. Proceedings of the Association for Computer-Aided Design in Architecture 2013 International Conference. October 24-26, 2013. Cambridge, Ontario, Canada.
- 2013 von Buelow, P. **"Improving Generative Design through Selective Breeding"** in *Beyond the Limits of Man*. eds J.B. Obrębski and R. Tarczewski. Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2013. 23-27 Sept, Wroclaw University of Technology, Poland.
- 2013 Pronk, A.; Dominicus, M.; von Buelow, P.; van Dijck, S.; van de Koppel, J. **"RIGIDIZED INFLATABLES: An innovative production method for structurally optimized elements"** in *Proceedings of Structural Membranes 2013*, VI International Conference on Textile Composites and Inflatable Structures, K.-U.Bletzinger, B. Kröplin and E. Oñate (Eds). Munich, Germany.
- 2013 Pronk, A.; Dominicus, M.; von Buelow, P.; van Dijck, S.; van de Koppel, J. **"Producing optimized structures with inflatables structural membranes 2013"** in *Proceedings of Structural Membranes 2013*, VI International Conference on Textile Composites and Inflatable Structures, K.-U.Bletzinger, B. Kröplin and E. Oñate (Eds). Munich, Germany.
- 2013 Pronk, A.; Dominicus, M.; von Buelow, P.; van Dijck, S.; van de Koppel, J. **"Rigidized inflatable structures a production method for optimized structures"** in *Beyond the Limits of Man*. eds J.B. Obrębski and R. Tarczewski. Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2013. 23-27 September, Wroclaw University of Technology, Poland.
- 2012 Falk, A.; von Buelow, P.; Kirkegaard, P. **"Folded Plate Structures as Building envelopes"** in *World Conference on Timber Engineering 2012 (WCTE 2012)* ed. Quenneville, P. Proceedings Vol. 4. pp. 155-164. Curran Associates, Inc. Dec 2012.
- 2011 von Buelow, P. **"Genetically Enhanced Parametric Design for Performance Optimization"** Proceedings of the 7<sup>th</sup> Seminar of the IASS Structural Morphology Group International. chair Borgart, Andrew. Sept. 17-18, 2011. London, UK.
- 2011 Falk, A.; von Buelow, P. **"Form Exploration of Folded Plate Timber Structures based on Performance Criteria"** in *Taller, Longer, Lighter: Meeting growing demand with limited resources*. eds. Nethercot, D. and Pellegrino, S. Proceedings of the 35<sup>th</sup> Annual Symposium of IABSE and the 52<sup>nd</sup> Annual Symposium of IASS. 20 Sept. – 23 Sept. 2011. London, UK.
- 2011 Turrin, M.; von Buelow, P.; Kilian, A.; Stouffs, R. **"Parametric modeling and optimization for adaptive architecture"** in Proceedings of 18<sup>th</sup> EG-ICE Workshop. European Group for Intelligent Computing in Engineering. 6-8, July 2011 Twente University, The Netherlands.

- 2010 Turrin, M.; von Buelow, P.; Kilian, A.; Sariyildiz, S. **"Performance-based design of SolSt; a roof system integrating structural morphology and solar energy transmittance"** in *Spatial Structures – Temporary and Permanent*. ed. Qilin Zhang. Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2010. 28 Nov. – 12 Nov. 10. Shanghai, China.
- 2010 Falk, A.; Turrin, M.; von Buelow, P. **"Folded plate assemblies with branching column supports – interaction and control of overall shape"** in *Spatial Structures – Temporary and Permanent*. ed. Qilin Zhang. Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2010. 28 Nov. – 12 Nov. 10. Shanghai, China.
- 2010 Turrin, M.; von Buelow, P.; Stouffs, R.; Kilian, A. **"Performance-oriented design of large passive solar roofs: A method for the integration of parametric modelling and genetic algorithms"** in *Future Cities*. Proceedings of the 28th Conference of eCAADe. ETH. Zurich. 15-18 Sept. 2010.
- 2010 Turrin, M.; von Buelow, P.; Stouffs, R. **"Structural morphologies and sun transmittance control: integrated parametric design using genetic algorithms"** in *Computing in Civil and Building Engineering, Proceedings of the International Conference*. ed. Tizani, W. Nottingham 30 June – 2 July 2010. Nottingham University Press, Paper No 168, pp.335-340.
- 2010 von Buelow, P.; Falk, A.; Turrin, M. **"Optimization of structural form using a genetic algorithm to search associative parametric geometry"** in *Structures & Architecture*. ed. Cruz, P. Proceedings of the First International Conference on Structures and Architecture (ICSA 2010). 21-23 July 2010. Guimarães, Portugal.
- 2009 von Buelow, P. **"A comparison of methods for using genetic algorithms to guide parametric associative design"** in *Evolution and Trends in Design, Analysis and Construction of Shell and Spatial Structures*. eds. Domingo, A. and Lazaro, C. Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium. Valencia, Spain.
- 2009 von Buelow, P. **"Parametric exploration of discrete structures using evolutionary computation"** in *Evolution and Trends in Design, Analysis and Construction of Shell and Spatial Structures*. eds. Domingo, A. and Lazaro, C. Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2009. Valencia, Spain.
- 2009 Falk, A.; von Buelow, P. **"Combined Timber Plate and Branching Column Systems – Variations and Development of System Interaction"** in *Evolution and Trends in Design, Analysis and Construction of Shell and Spatial Structures*. eds. Domingo, A. and Lazaro, C. Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2009. 28 Sept. – 2 Oct. 09. Valencia, Spain.
- 2009 van Embden Andres, M.; Turrin, M.; von Buelow, P. **"Structural DNA: Genetic Exploration of Biological Micro Structures for Architectural Applications"** in *Chang[e]ing Identities; Design, Culture + Technology*. Southwest ACSA Proceedings. Albuquerque, New Mexico. 15-17 Oct. 09.
- 2008 von Buelow, P. **"Design of a Modular Truss Structure as a Disaster Shelter using Evolutionary Computation"** in *Shell and Spatial Structures: New Materials and Technologies, New Designs and Innovations*. Acapulco, Mexico. 27-31 Oct. 08.
- 2008 von Buelow, P. **"Using Evolutionary Computation to explore geometry and topology without ground structures"** in *Proceedings of the 6th International Conference on Computation of Shell and Spatial Structures, IASS-IACM, Ithaca, New York*.
- 2008 Falk, A.; von Buelow, P. **"Exploration and Optimization of Combined Timber Plate and Branching Column Systems using Evolutionary Computation"** in *Shell and Spatial Structures: New Materials and Technologies, New Designs and Innovations*. Acapulco, Mexico. 27 Oct. 2008.
- 2008 von Buelow, P. **"Breeding Topology: special considerations for generative topology exploration using evolutionary computation"** in *ACADIA 2008: Silicon + Skin*. Proceedings of ACADIA ed. Kudless, A., Oct. 16-19 2008.

- 2007 von Buelow, P. **"A Geometric Comparison of Branching Structures in Tension and Compression versus Minimal Paths"** in *Shell and Spatial Structures: Structural Architecture – Towards the future looking to the past*. Venice, Italy. 3-6 December 2007.
- 2006 von Buelow, P. **"Following a Thread: A tree column for a tree house"** in *IASS 2006 International Symposium: 8th Asian Pacific Conference on New Shell and Spatial Structures*. Beijing, China. October 16-19, 2006.
- 2006 von Buelow, P. **"Breeding Bridges: Genetic based form exploration"** in *IASS 2006 International Symposium: 8th Asian Pacific Conference on New Shell and Spatial Structures*. Beijing, China. October 16-19, 2006.
- 2004 Johnson, S.; Tripeny, P.; von Buelow, P. **"Linking Analyses and Architectural Data: Why It's Harder than We Thought"** in *Fabrication: a conference examining the digital practice of architecture*, Proceedings of The Assoc. for CAD in Architecture. ed. Beesely, P. Toronto, Can.
- 1999 von Buelow, P. **"Development of an Intelligent Genetic Design Tool (IGDT) for Use in Architectural Engineering"** in *Proceedings of The Society for the Study of Artificial Intelligence and the Simulation of Behavior (AISB) 1999 Symposium on Creative Evolutionary Systems*.
- 1996 von Buelow, P. **"Applications of Genetic Algorithms in Optimal Truss Design"** in *Conceptual Design of Structures*. Proceedings of the International Association of Shell and Spatial Structures (IASS) Vol. 1, p. 178. University of Stuttgart, October 7-11, 1996.
- 1994 von Buelow, P. **"The Feasibility of Shells Made with Recycled Tires"** in *Design and Technological Innovation for the Environment: Proceedings of the 12th Annual ACSA Technology Conference*. Association of Collegiate Schools of Architecture, 1994.
- 1989 Moriarty, T.F., von Buelow, P. **"Design, Development and Testing of a Hardened Underground Transportable Hyperbolic Paraboloid (HUTCH) Shelter"** in *Interaction of Non-nuclear Munitions with Structures - International Symposium USAF and the German Federal Academy for Defense*

## Lectures and Articles (not reviewed)

- 2016 von Buelow, P. **"Design Explorations: Using ParaGen to explore parametric design by mapping performance"**. invited lecture TU Delft, Netherlands, Oct. 11, 2016
- 2014 von Buelow, P. **"From Database to Solution Space: exploring parametric design by mapping performance"**. invited lecture: Doctoral Colloquium (TCAUP), Feb. 12, 2014.
- 2014 von Buelow, P. **"ParaGen: a performance based form exploration method"**. invited lecture: *Selforganizing Forms and Processes*, Institute for Structure and Design (KoGe), University of Innsbruck, Jan. 18, 2014
- 2014 von Buelow, P. **"Using the ParaGen Method to Explore the Design Space"**. invited lecture TU Delft, Netherlands, Jan. 6, 2014
- 2013 von Buelow, P. **"Performative Design of Genetically Engineered Structures"**. invited lecture Massachusetts Institute of Technology, Cambridge, Mass. Apr 29, 2013
- 2012 von Buelow, P. **"ParaGen: using genetic search to explore performative design of parametric systems"**, invited lecture, Institute for Lightweight Structures and Conceptual Design (ILEK - director Werner Sobek) at the University of Stuttgart. Sept. 2012
- 2012 von Buelow, P. **"Genetically Enhanced Performative Design for Generative Systems"**, invited lecture, Lawrence Technological University. Southfield, Michigan. Feb. 2012
- 2011 Turrin, M., von Buelow, P., Stouffs, R., Sariyildiz, S. **"Interactive performance driven exploration of large design solution spaces"** AAAI 2011 Spring Symposium Artificial Intelligence and Sustainable Design March 21 to 23, 2011 at Stanford University, California
- 2008 von Buelow, P. **"Morphogenic Explorations of 3D Tree Structures using Evolutionary Computation"**. Inter'l Workshop on Computational Morphogenesis 2008. Acapulco, Mexico. 23-24 Oct. 2008.

- 2008 von Buelow, P. **"Using Evolutionary Computation to explore geometry and topology without ground structures"**. Proceedings of the 6th Intl. Conf. on Computation of Shell and Spatial Structures. IASS-IACM 2008, Cornell Univ., Ithaca, NY.
- 2006 von Buelow, P. **"Mutate and Repair: Special operators for topology evolution of trusses"**. International Workshop on Computational Morphogenesis 2006. Nagoya, Japan.
- 2005 von Buelow, P. **"Branching Out: Structural steel supports a tree house designed for children with special needs"** in *Modern Steel Construction*. Vol 45,. Number 9. pp 44-47
- 2005 von Buelow, P. **"Breeding Bridges at Michigan"** in *Steel Bridge News*, July 2005, Vol. 6, No. 3. AISC
- 2005 von Buelow, P. **"A Treehouse for Everyone"** in *Ventilator-Assisted Living*, Spring 2005, Vol. 19, No. 1
- 2003 von Buelow, P. **"Structuring Structures"** in *Connector: A Forum for Teachers of Technology in Schools of Architecture*. ed. Theodoropoulos, Christine. Univ. of Oregon, Spring 2003
- 2001 von Buelow, P. **"Exploring Structural Form Using Genetic Algorithms"**. ACSA Regional Conf. On Growth and Form: The Engineering of Nature.

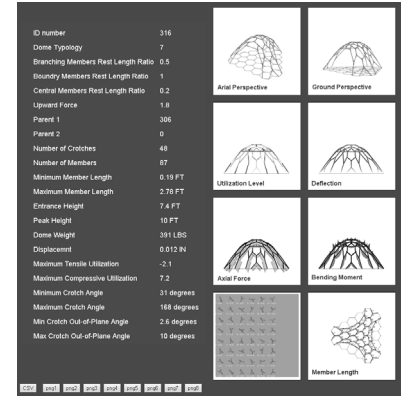
## Awards and Grants

### Limb: Rethinking Heavy Timber Joinery through Analysis of Tree Crotches.

2017-2018 Co- Investigator  
 Research through Making Grant, Taubman College  
 Funding Level: \$20,000.  
 Citation for R&D from Architect magazine.

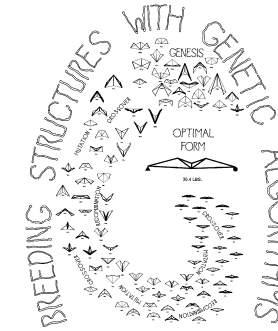
### Development of ParaGen, a parametric design tool using genetic algorithms for performance based form exploration.

2009-2010 Principal Investigator  
 Professional Development Award, Taubman College  
 Funding Level: \$5,000.



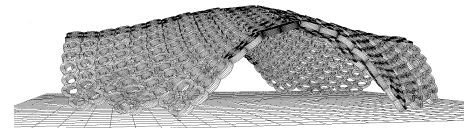
### Intelligent Genetic Design Tools (IGDT) Applied to the Exploration of Architectural Trussed Structural Systems

1995 Principal Investigator  
 Professional Development Award, University of Tennessee  
 Funding Level: \$15,000.



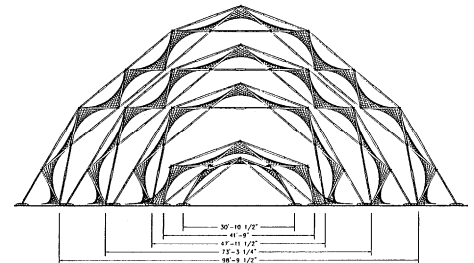
### The Feasibility of Shells Made with Recycled Tires

1993-1994 Principal Investigator  
 Professional Development Award, University of Tennessee and  
 The Ronald McNair Program  
 Funding Level: \$4,900.



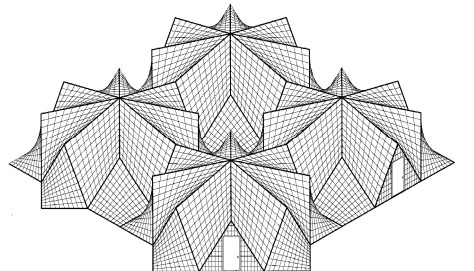
### Development, Design, Fabrication and Testing of Frame Supported Tension Structures (FSTS) Expeditionary Shelters - Phases I and II

1987-1989 Co-Principal Investigator  
 (Principal: Dr. T.F. Moriarty)  
 Sponsor: US Navy  
 Funding Level: \$318,374.



### Development of Two Prefabricated Hyperbolic Paraboloid Shell Structural Systems

1984-1989 Co-Principal Investigator  
 (Principal: Dr. T.F. Moriarty)  
 Sponsor: US Air Force  
 Funding Level: \$545,686.

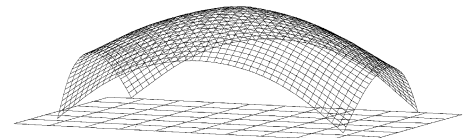


### Composite Hypar Structural System - Phases I and II

1982-1984 Investigator  
 (Principal: Dr. T.F. Moriarty)  
 Sponsor: US Air Force  
 Funding Level: \$306,206.

### Full Scale Construction and Structural Testing of a Wooden Grid Shell

1983-1984 Principal Investigator  
 The University of Tennessee School of Architecture  
 Funding Level: all materials and equipment.



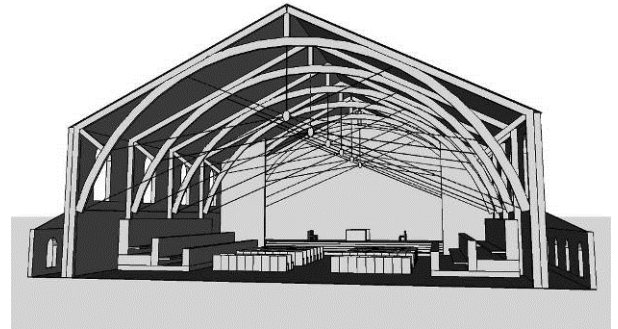


# Professional Work

## Design Projects

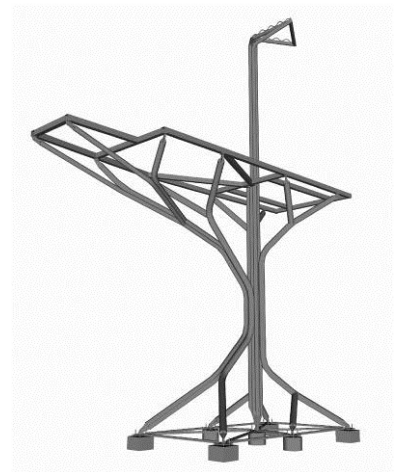
Our Lady of the Angels Monastery Chapel  
**Irondale, Alabama**

Date: 2007  
Engineer: Peter von Buelow  
Responsibility: Structural concept exploration,  
design analysis and 3D modeling



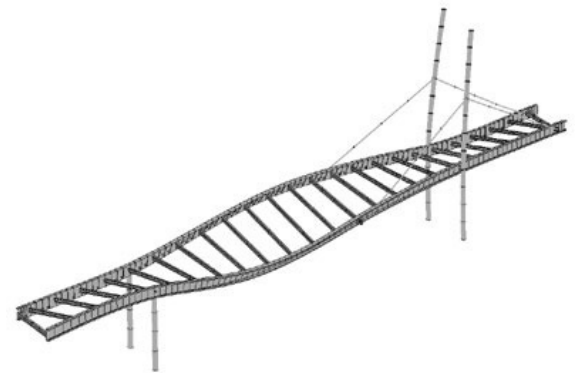
Craig Van Laanen Memorial Tree House  
and Woodland Retreat in **Mayville, Michigan**

Date: 2002-04  
Architect: Kristine Synnes  
Engineer: Peter von Buelow  
Responsibility: Structural concept, design, analysis  
and detailing. 3D modeling of steel  
tree and structural drawings.



Petritor Pedestrian Bridge  
**Braunschweig, Germany**

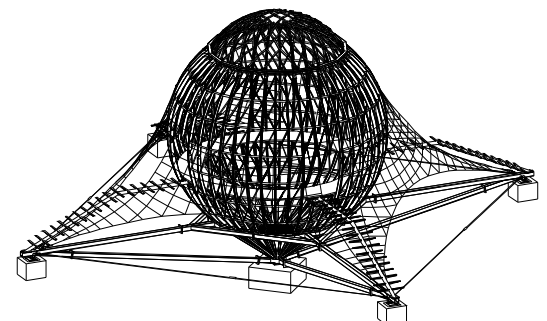
Date: 2001  
Architect: Schulitz + Partner Architekten BDA  
Engineer: Dr.-Ing. Mathias Kutterer,  
RFR - Stuttgart, Germany  
Responsibility: Structural analysis and detailing.  
3D modeling and development.



"Eyeball", an Art Installation for  
**Expo 2000, Hannover**

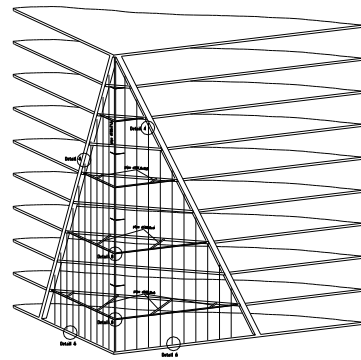
Date: 1999-2000  
Artists: Carsten Höller and Rosemarie  
Trockel  
Contractor: Werner Lorke, Arge iO  
Architect: Jörg Esefeld, SCALA  
Consultant: Jürgen Hennicke, Stuttgart  
Engineer: Dr.-Ing. Switbert Greiner,  
Oberaichen, Germany  
Responsibility: Structural detailing, geometric  
development and 3D modeling for  
rapid prototyping, checking  
of shop drawings.

Deutscher Verzinkerpreis 2001 Honorable Mention



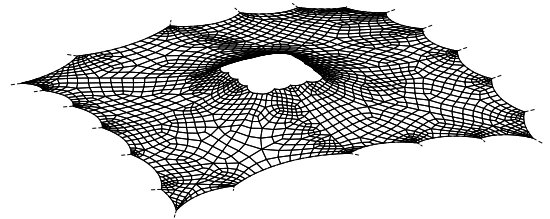
Shanghai 21st Century Tower - Sky Gardens

Date: 1999  
Architect: Murphy / Jahn, Chicago  
Eng. Cont.: Werner Sobek, Engineers,  
Stuttgart, Germany  
Engineer: Dr.-Ing. Switbert Greiner,  
Oberaichen, Germany  
Responsibility: Development of load patterns from  
windtunnel tests for FEA analysis.  
Checking of steel detailing and  
engineering drawings.



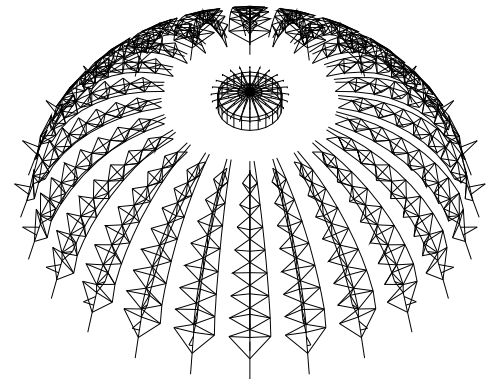
Textile Courtyard Coverings at Oberbaum City in Berlin

Date: 1998-1999  
Eng. Cont.: Leonhardt, Andrä + Partners,  
Berlin Affiliate  
Engineer: Dr.-Ing. Switbert Greiner  
Oberaichen, Germany  
Responsibility: Detailing design of the fasteners,  
development of cutting pattern,  
production of all  
construction drawings.



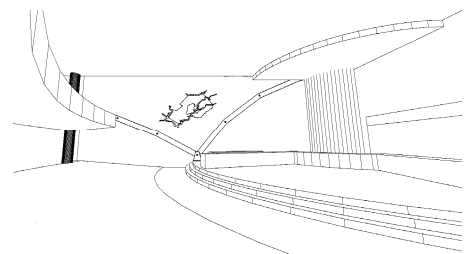
Masjid Wilayah Mosque in Kuala Lumpur, Malaysia

Date: 1997-1998  
Architect: Specialty and Lightweight  
Construction (SL-Rasch)  
Leinfelden-Echterdingen, Germany  
Engineer: Dr.-Ing. Switbert Greiner  
Oberaichen, Germany  
Responsibility: Detailing design of the steel structure.  
Overseeing production of construction  
drawings.



Knoxville, Knox County and the Bridge

Date: 1989  
Architect: Morna Livingston  
Engineer: Peter von Buelow  
Sponsor: City of Knoxville  
Responsibility: Design, analysis and erection.



# Teaching

## Award

2011 Donna M. Salzer Award for Teaching Excellence

## Dissertation Committees

2018	Anahita Khodadadi	chair
2018	Azadeh Omidfar	committee member
2018	Omid Torghabehi	chair
2018	Niloufar Emami	co-chair
2017	Ha Nguyen	committee member
2016	Nuri Bae	committee member
2016	Jong-Jin Park	committee member (diss. at University of Melbourne)
2016	Rudai Shan	committee member
2014	Michela Turrin	committee member (diss. at TU Delft)
2014	Sung Kwon Jung	committee member
2013	Joost van de Koppel	committee member (thesis at TU Eindhoven)
2013	Stan van Dijck	committee member (thesis at TU Eindhoven)
2012	Aysu Berk	co-chair
2012	Sentagi Utami	committee member

## At the University of Michigan (2001 – present):

### Structures Courses

ARCH 314	Structures I (3 credit hrs.)
ARCH 324	Structures II (3 credit hrs.)
ARCH 514	Frame Structures (3 credit hrs.)
ARCH 534	Reinforced Concrete Structures (3 credit hrs.)
ARCH 544	Wood Structures (3 credit hrs.)
ARCH 739	Independent Research (3 credit hrs.)
ARCH 819	Supervised Research (3 credit hrs.)
ARCH 825	Area Seminar: Building Technology (3 credit hrs.)
ARCH 839	Research Practicum (4 credit hours)

## At the University of Tennessee (1983 – 1995):

### Structures Courses

ARC 232	Introduction to Architectural Technology (3 credit hrs.)
ARC 331/2	Architectural Structures I/II (4 credit hrs.)
ARC 334	Advanced Architectural Structures (3 credit hrs.)
ARC 431	Structural and Mechanical Applications (4 credit hrs.)

### Computer Utilization

ARC 231	Computer Applications in Design I (3 credit hrs.)
ARC 432	Computer Applications in Design II (3 credit hrs.)

### Design

ARC 101	Introduction to the Built Environment (3 credit hrs.)
ARC 102	Visual Design (2 credit hrs.)
ARC 121/2	Drawing and Perception / Abstraction (2 credit hrs.)
ARC 171/2	Design Fundamentals I/II (4 credit hrs.)
ARC 489	Structural Innovations (6 credit hrs.)

# Service

## University Service

2016-2018	Grievance Committee
2016-2017	Rackham Graduate Exercises - Marshal
2014	Provost's Task Team on Engaged Education and Digital Learning
2011-2014	Faculty Senate Assembly member
2010-2014	University Rules Committee
2011-2014	UMOR grant reviewer (OVPR)
2007-2009	Faculty Senate Assembly member

## College Service

2018	Reappointment Review Committee
2018	Opportunity Hire Committee
2018	Post Doc Fellowship Committee
2015	Promotion and Tenure Committee
2014, 13, 06	Ph.D. Advisory Committee (area representative for technology)
2014, 09	Tenure (interim) Review Committee
2013, 10	Architecture Chair Search Committee
2013, 09	Architecture Faculty Search Committee
2005, 07	Ph.D. Research Committee

## Program Service

2018, 13	LEO Faculty Review Committee
2002-18	Admissions Committee
2012	Undergraduate Curriculum Review Committee
2012	Physics Requirement Review Committee

## Academic Service

### Tenure/Promotion Reviews

2018	University of Southern California - External Reviewer
2017	University of Virginia - External Reviewer
2016	University of Illinois at Urbana – Champaign - External Reviewer
2016	KU Leuven, Review of senior research professor (senior BOFZAP) - External Reviewer
2013	Syracuse University. Architecture Faculty - External Reviewer
2013	Washington State Univ. Architecture Faculty - External Reviewer

### Journal / Book / Research Grant Reviews

2018-2010	<i>Built</i> . Int'l J. of Building, Urban, Interior and Landscape Tech. Editorial Board
2018	<i>Computer-Aided Design and Applications</i> - Reviewer
2018,16,15,13	<i>Automation in Construction</i> - Reviewer
2017,14	<i>Engineering Structures Journal</i> . Elsevier - Reviewer
2017,16,11	Austrian Science Fund (FWF). Proposal Review / Referee
2016	<i>Frontiers in Robotics and AI</i> - Reviewer
2016	<i>Construction &amp; Building Materials</i> , Elsevier – Reviewer
2016,15,13,12	<i>International Journal of Space Structures</i> , Multi-Science Publ. - Reviewer
2015	<i>Evolutionary Computation Journal</i> - Review
2015	<i>Applied Energy Journal</i> - Review
2015	<i>Artificial Intelligence for Eng. Design, Analysis and Manufacturing</i> - Reviewer
2015	Oxford Press – Book Review

2015, 14	KU Leuven, Research Council Grant Review
2014	<i>Journal of Cultural Heritage</i> . Elsevier - Reviewer
2013	<i>Buildings</i> . MDPI Publishing. - Journal Paper Reviewer
2012	<i>Building Structures Illustrated</i> , John Wiley & Sons Publishers - Book Review
2012	<i>Spatial Structures</i> , Laurence King Publishing - Book Review
2011	<i>Journal of Architectural Education</i> - Reviewer

#### Conference Session Chair / Paper Reviews

2018,16,15,14,13,08	<i>International Association of Shell and Spatial Structures (IASS)</i> Reviewer / Session Chair
2017,16,15,13	Simulation for Architecture and Urban Design (SimAUD). – Reviewer
2016,14	Association for Computer Aided Design in Architecture (ACADIA). – Reviewer
2016	IEEE Congress on Evolutionary Computation - Reviewer
2015,13,11	Design Modelling Symposium - Reviewer
2006	<i>Intelligent System Design and Applications</i> - Reviewer

#### Pro Bono

2018	Structural inspection / repair of steeple platforms, St Joseph Oratory – built 1855
2017	Dynamic structural inspection / repair of bell carriage St Joseph Oratory – built 1855
2016	Structural inspection of rectory basement, St Joseph Oratory – built 1855, Detroit, MI
2013	Structural inspection of the steeple, St Josaphat's Church – built 1889, Detroit, MI
2013	Entrance re-design for ADA criteria, St Patrick's Church – built 1878, MI
2012	Structural inspection of foundation, St Josaphat's Church – built 1889, Detroit, MI
2011	Optimization analysis of natural lighting for below grade space for Miles Christi
2006	Structural analysis of choir loft, St Josaphat's Church – built 1889, Detroit, MI
2005-06	Architectural Engineering consultant for Miles Christi monastery and retreat center
2005	Matthaei Botanical Garden, University of Michigan, Ann Arbor, Michigan Structural analysis, and recommendations for upgrade of 15,000 SF greenhouse
2002-04	Craig Van Laanen Memorial Tree House and Woodland Retreat, Mayville, Mich Structural design and analysis, fabrication shop drawings, construction supervision

#### Public Service

2004-Present	Committee member for Boy Scout Troop
1984-Present	Member / officer of The Knights of Columbus
2004	"Certificate of Appreciation" from the Univ. of Michigan Council for Disability Concerns, for work on the Trail's Edge Camp for handicapped children
2001-06	Taught a series of art, architecture and engineering classes in different public and private schools, K-12
1997-2001	Design consultation and help with erection of several frame supported fabric structures for the KPE - German scouting organization
1988-96	American Institute of Architects (AIA) sponsored Scout Explorer Post advisor and contact with the Tennessee School of Architecture