Rudi Stouffs

Dean's Chair Associate Professor — Deputy Head (Research)
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Education

Ph.D.	Doctor of Philosophy in Architecture, Carnegie Mellon University, 15 May 1994 Dissertation: *The Algebra of Shapes*
M.Sc.	Master of Science in Architecture, Carnegie Mellon University, 19 May 1991 Major in Computational Design (QPA 4.0 out of 4.0)
Ir.-Arch. / M.Sc.	Burgerlijk Ingenieur-Architect, Vrije Universiteit Brussel, Belgium, 14 July 1989 Master of Science in Architectural Engineering (with great honor) Thesis: *TRIAD: Three-Dimensional Intelligent Architectural Design*

Honors—awards

buildingSMART International Special Distinction in Innovation, 2019. *Strict and automatic mapping of IFC-BIM models into semantically enriched 3D CityGML building models (exterior and interior)*

Received a five-year personal research grant (Vidi – € 670.000) from the Netherlands Organization for Scientific Research (NWO), November 2000. *Dynamic Digital Design Representations*

Offered a postdoctoral research fellowship by the Australian Research Council, October 1995. *A model for shape arithmetic with non-spatial attributes*

"Grote Onderscheiding" (magna cum laude / with great honor)
Vrije Universiteit Brussel, Belgium

Experience

Dean's Chair Associate Professor	Department of Architecture, School of Design & Environment, National University of Singapore (NUS), since May 2020 (tenured)
Deputy Head (Research)	Department of Architecture, School of Design & Environment, National University of Singapore (NUS), July 2018 - June 2021
Associate Professor	Department of Architecture, School of Design & Environment, National University of Singapore (NUS), January 2016 - April 2020 (tenured) Research Thrust Leader (Parametric BIM), *NUS Centre of Excellence in BIM Integration* Leader, *Technologies* research cluster and *Architectural and Urban Prototyping* lab Supervisor of Ph.D. and M.Arch. students; teaching; research; service
Guest Assoc. Prof.	Design Informatics, Faculty of Architecture and the Built Environment, Delft University of Technology (TU Delft), December 2014 - November 2017
Visiting Assoc. Prof.	Department of Architecture, School of Design & Environment, National University of Singapore (NUS), August 2011 - July 2012, July 2013 - December 2015 Member *Urban Prototyping* research group Supervisor of Ph.D. and M.Arch. students; teaching; research

Associate Professor	Design Informatics, Faculty of Architecture and the Built Environment, TU Delft, September 2003 - July 2014 (tenured) Leader, faculty research programme/group *Computation & Performance* (2008-2011) Programme coordinator, International Joint M.Sc. Programme *Computational Design and Fabrication Technologies in Architecture*, in collaboration with the Department of Architecture, Middle East Technical University, Ankara (2008-2012) Co-supervisor of Ph.D. students; supervisor of M.Sc. students; teaching; research; management; service
Visitor	SUTD-MIT International Design Centre, Massachusetts Institute of Technology, August 2012-June 2013
Visiting Faculty	Department of Architecture, Faculty of Architecture, Middle East Technical University, September 2009 - June 2012
Acting Chair/Head	Design Informatics Chair/Informatics Section, Faculty of Architecture and the Built Environment, TU Delft, January 2006 - September 2009
Researcher	Design Informatics, Faculty of Architecture and the Built Environment, TU Delft, August 1999 - August 2003 Principal investigator of Netherlands Organization for Scientific Research (NWO) project "Dynamic Digital Design Representation" (2000-2005) Teaching coordinator; supervisor of M.Sc. students; teaching; service
Researcher	Chair for Architecture and CAAD, Faculty of Architecture, Swiss Federal Institute of Technology Zurich (ETH Zurich), January 1996 - July 1999 Research coordinator; research team leader in Swiss National Science Foundation project *ICCS: A Tool Set for the Virtual AEC Company* (1996-1999) Teaching
Assistant Professor	School of Architecture, Carnegie Mellon University (CMU), September - December 1995 Computing Facilities coordinator; research; teaching; student advising; service
Instructor	Computational Design, School of Architecture, CMU, September 1994 - May 1995 Teaching; research; student advising
Software Manager	"SEED: A Software Environment to Support the Early Phases in Building Design" research project, Carnegie Mellon / Building Industry CAD Consortium (CBCC), CMU, June - August 1994
Adjunct Instructor	School of Architecture, CMU, September 1993 - May 1994
Research Assistant	School of Architecture, CMU, September 1991 - August 1993 Researcher in Japan Research Institute project "Rule Based Simulation Applied to Robotized Building Construction"
Teaching Assistant	School of Architecture, CMU, September 1992 - May 1993

Training

	LEadership Accelerator Programme (LEAP) for Academic Leadership: "Organisational Excellence," NUS, 22 March 2019
	Coaching workshop series: "TOI Group Coaching," TU Delft, June 2011, led by Van Eijnsbergen & Partners
	SmartGeometry 2007 Winter Workshop, New York, NY, 26-29 January 2007, organized by the SmartGeometry Group

HR Management course: "The human side of management: Interpersonal and managerial skills within the university," TU Delft, September 2002 - March 2003, organized in cooperation with the Association of Universities in the Netherlands (VSNU)

Summer school: "Self-organization of Cognitive Systems," Rijksuniversiteit Groningen, the Netherlands, 29 August - 2 September 1988, organized in cooperation with the Transdisciplinair Centrum of the Vrije Universiteit Brussel

Seminar: "Initiation in Prolog with Graphic Extension," part of joint-study program "FORM-STRUCTURE grammars as tool for CAAD," Ecole d'Architecture de Marseille, France, 14-29 September 1987, supported by a grant from the European Community

Apprenticeship, Study departments of architecture and urbanism, City of Macon, France, 24 August - 11 September 1987

Service

■ **Research coordination** (present)

Deputy Head (Research), Department of Architecture, NUS, July 2018 - June 2021

FRS Management Committee (MC), Future Resilient Systems II research programme (coordinator: Singapore ETH Centre (SEC)), since May 2020

Research Cluster Leader, "Technologies", Department of Architecture, NUS, since January 2020

Research Thrust Leader, "Parametric BIM," NUS Centre of Excellence in BIM Integration, NUS, since August 2018

■ (past)

Research Cluster leader, "Technologies" (previously Research and Teaching Group (RTG) "Design, Technology and Sustainability;" encompassing "Architectural and Urban Prototyping" lab and "NUS-CDL Tropical Technologies Laboratory"), Department of Architecture, NUS, April 2016 - June 2018

Research Council member, Faculty of Architecture and the Built Environment, TU Delft, September 2009 - July 2011

Research programme/group leader, "Computation & Performance," Faculty of Architecture and the Built Environment, TU Delft, September 2008 - July 2011, bringing together the Design Informatics, Hyperbody, Structures and Adaptive Building Systems research groups of the Department of Architectural Engineering + Technology and the BEMNext Laboratory of the Faculty of Civil Engineering and GeoSciences

Research sub-programme leader, "Design Correspondence," Faculty of Architecture and the Built Environment, TU Delft, November 2006 - December 2008

Research coordinator, Chair for Architecture and CAAD, Faculty of Architecture, ETH Zurich, April 1998 - July 1999

Research team leader in Swiss National Science Foundation project "ICCS: A Tool Set for the Virtual AEC Company", ETH Zurich, January 1996 - July 1999

■ **Teaching coordination** (past)

Programme coordinator, International Joint M.Sc. Programme Computational Design and Fabrication Technologies in Architecture, Faculty of Architecture and the Built Environment, TU Delft, February 2008 - July 2012, in collaboration with the Department of Architecture, Middle East Technical University, Ankara

Graduation lab coordinator, Computational Architecture specialization of the Architecture track of the MSc Architecture, Urbanism & Building Sciences programme, Faculty of Architecture and the Built Environment, TU Delft, September 2009 - July 2011

Graduation lab coordinator, Computation & Performance specialization of the Building Technology track of the MSc Architecture, Urbanism & Building Sciences programme, Faculty of Architecture and the Built Environment, TU Delft, September 2009 - July 2011

Graduation lab coordinator of the Architectural Engineering specialization of the Architecture track of the MSc Architecture, Urbanism & Building Sciences programme, Faculty of Architecture and the Built Environment, TU Delft, September 2007 - June 2009

Teaching coordinator, Design Informatics Chair, Faculty of Architecture and the Built Environment, TU Delft, August 1999 - June 2001

Academic committees (present)

■ Executive Programme Committee, Chair, Department of Architecture, NUS, since July 2019

Center for Advanced Studies in Architecture (CASA) Committee, Chair, Department of Architecture, NUS, since July 2019, member since April 2016

Department Ethics Review Committee (DERC), School of Design and Environment, NUS, August 2019 - June 2020

School Research Committee (SRC), School of Design and Environment, NUS, July 2018 - June 2020

Department Management Committee (DMC), Department of Architecture, NUS, July 2018 - June 2020

Department Finance Committee, Department of Architecture, NUS, July 2019 - June 2020

Mid-Term Advisory Report (MTAR) Committees, Chair, Department of Architecture, NUS, 2019

Search Committees (SCs), Chair/member, Department of Architecture, NUS, 2016 - 2019

(past)

■ Aptitude Test Committee, Chair, Department of Architecture, NUS, January 2016 - June 2019

IT Committee, Department of Architecture, NUS, July 2013 - June 2019

Department Evaluation Committees (DECs), Chair/member, Department of Architecture, NUS, 2016 - 2018

MSc ISD (Integrated Sustainable Design) Admissions Committee, Department of Architecture, NUS, 2018

Working group International Master, Faculty of Architecture and the Built Environment, TU Delft, October 2009 - July 2011

Turkish technical University Long term International Program (TULIP) between Delft University of Technology and Middle East Technical University, Ankara, Turkey, representative of the Faculty of Architecture and the Built Environment, TU Delft, September 2006 - June 2010

Synergy committee Architecture – Civil Engineering and GeoSciences, representative of the Faculty of Architecture and the Built Environment, TU Delft, December 2008 - June 2009

Committee for the Library, TU Delft, February 2003 - February 2005

ICTO platform, TU Delft, since August 2002 - November 2003

CAD committee, Faculty of Architecture and the Built Environment, TU Delft, November 2000 - January 2002

M.Sc./Ph.D. Committee, School of Architecture, CMU, September 1994 - December 1995

Computing Committee, School of Architecture, CMU, September 1994 - December 1995

M.Sc./Ph.D. Committee, student representative, School of Architecture, CMU, 1992 - 1993

Computing Committee, student representative, School of Architecture, CMU, 1990 - 1993

Curriculum planning (past)

■ Curriculum Review Committee (CRC), member, Department of Architecture, NUS, April 2016 - June 2018

Digital Portfolio Bouwkunde project, co-coordinator, Faculty of Architecture and the Built Environment, TU Delft, September 2009 - July 2011

NeXTGEN Research graduate school curriculum workgroup, Faculty of Architecture and the Built Environment, TU Delft, February - April 2010

Interfaculty M.Sc. track Building Engineering/Building Technology, project co-leader, Faculties of Architecture and the Built Environment, and Civil Engineering and GeoSciences, TU Delft, March - December 2009

"Rendement en studieduur Masteropleiding (Efficiency and duration Master education)," Terms of Reference/betaalbaar onderwijs (affordable education) workgroup 3, Faculty of Architecture and the Built Environment, TU Delft, April - June 2009

International Joint M.Sc. Programme in Computational Design and Fabrication Technologies in Architecture, project leader, in collaboration with the Department of Architecture, Middle East Technical University, Ankara, Turkey, 2007-2008

Educational committees for Epistemology and Mathematics, Faculty of Architecture and the Built Environment, TU Delft, September - November 2006

"Versterking wetenschappelijke oriëntatie BSc- en MSc-opleiding (Strengthening the scientific orientation of the BSc and MSc education)," project leader, Onderwijsveranderplan (curriculum change plan) project 3, Faculty of Architecture and the Built Environment, TU Delft, March 2005 - June 2006

Curriculum revision workgroup, Faculty of Architecture and the Built Environment, TU Delft, June 2000 - June 2001

Portfolio workgroup, Faculty of Architecture and the Built Environment, TU Delft, April 2000 - February 2001

Reviewing   (editorial board memberships)

Editorial Board (Senior Editor), *International Journal of Architectural Computing* (SAGE), since January 2018

Editorial Board, *Cogent Social Sciences* (Cogent OA, Taylor & Francis Group), since October 2016

Editorial Board, *Artificial Intelligence for Engineering Design, Analysis and Manufacturing* (Cambridge University Press), since December 2008

(grants)

Eurostars Technical Expert, EUREKA and the European Union

Reviewer (past):
· Mistletoe Foundation
· Mitacs – Canada
· Natural Sciences and Engineering Research Council of Canada
· Flanders Innovation & Entrepreneurship
· Research Foundation – Flanders
· ETH Zurich
· Swiss National Science Foundation
· Royal Netherlands Academy of Arts and Sciences
· EraSME (EU)
· Academy of Finland
· Australian Research Council
· TU Wien
· KU Leuven
· New Venture (Netherlands)

(journals)

Journal reviewer (recent):
· *Advanced Engineering Informatics* (Elsevier)

· *Automation in Construction* (Elsevier)
· *Building and Environment* (Elsevier)
· *Computer-Aided Design* (Elsevier)
· *Environment & Planning B: Urban Analytics and City Science* (SAGE)
· *IEEE Access* (IEEE)
· *Journal of Information Technology in Construction* (CIB)
· *Nexus Network Journal* (Springer)
· *Sustainable Cities and Society* (Elsevier)
· *SN Applied Sciences* (Springer)
· *International Journal of Geo-Information* (ISPRS)
· *Transactions in GIS* (Wiley)
· *Spatial Cognition & Computation* (Taylor&Francis)

Journal reviewer (prior to 2019):
· *International Journal of Architectural Computing* (SAGE)
· *Journal of Computational Design and Engineering* (Elsevier)
· *Homo Oeconomicus* (Springer), *PLOS ONE* (PLOS)
· *Building Research & Information* (Taylor&Francis)
· *Computers & Graphics* (Elsevier)
· *Artificial Intelligence for Engineering Design, Analysis and Manufacturing* (Cambridge University)
· *Frontiers of Architectural Research* (Higher Education Press/Elsevier)
· *Design Studies* (Elsevier), *Building Simulation* (Springer)
· *Journal of Computing in Civil Engineering* (ASCE)
· *Footprint* (Techne), *Journal of Design Research* (Inderscience)
· *Computer-Aided Civil and Infrastructure Engineering* (Blackwell)
· *International Journal of IT in Architecture, Engineering and Construction* (Millpress Science)
· *Research in Engineering Design* (Springer)

<div align="center">(conferences)</div>

■ Best Paper Award committee member:
· *14th 3D GeoInfo Conference* (2019)
· *Symposium on Simulation for Architecture and Urban Design* (SimAUD 2017)
· *Int. Conference on Computer-Aided Architectural Design Research in Asia* (CAADRIA 2016, 2015, 2013)
· *14th International Conference on Computer Aided Architectural Design* (CAAD Futures 2011)
· *First* and *Second International Conference on Design Computing and Cognition* (DCC 2006, 2004)

Best Presentation Award committee chair, *Int. Conference on Computer-Aided Architectural Design Research in Asia* (*CAADRIA* 2019, 2018)

Best Poster Presentation Award committee chair, *Eight International Conference on Design Computing + Cognition* (DCC 2018)

Conference reviewer (recent):
· *International Conference on Computer Aided Architectural Design* (CAAD Futures)
· *Int. Conference on Education and Research in Computer Aided Architectural Design in Europe* (eCAADe)
· *International Conference on Computer-Aided Architectural Design Research in Asia* (CAADRIA)
· *eCAADe Regional International Symposium* (eCAADE-RIS)
· *Symposium on Simulation for Architecture and Urban Design* (SimAUD)
· *International Conference on Design Computing + Cognition* (DCC)

· *IEEE Congress on Evolutionary Computation* (CEC)
· *Conference of the Iberoamerican Society of Digital Graphics* (SIGraDi)

Conference reviewer (prior to 2019):
· *International Sustainable Buildings Symposium* (ISBS)
· *Annual Conference of the Association for Computer Aided Design in Architecture* (ACADIA)
· *SmartGeometry Workshop*
· *Architectural Engineering Institute Biennial Professional Conference* (AEI)
· *International Tools and methods of Competitive Engineering Symposium* (TMCE)
· *International Conference on Innovation in Architecture, Engineering and Construction* (AEC)
· *EuropIA International Conference* (EIA)
· *International Conference on Education and Information Systems, Technologies and Applications* (EISTA)
· *International Conference on Artificial Intelligence in Design* (AID)
· *AAAI Artificial Intelligence and Sustainable Design* (2011)
· *Engineering Education and Educational Technologies* (EEET 2009)
· *Smart and Sustainable Built Environments* (SASBE 2009)
· *Int. Conference on Design & Decision Support Systems in Architecture and Urban Planning* (DDSS 2006)
· *International Workshop on Intelligent Computing in Engineering* (EG-ICE 2006)
· *International Conference on Computing in Civil and Building Engineering* (ICCCBE 2006)
· *European Conference on Product and Process Modelling* (ECPPM 2004)
· *Generative CAD Systems Symposium* (G-CADS 2004)
· *International Workshop on Construction Information Technology in Education* (ITC@EDU 2003)
· Workshop of the *International Conference on Concurrent Engineering* (CECONF 2002)

■ (peers)
Internal/external teaching reviewer, School of Environment and Planning, NUS, since September 2014

■ **Event organizing** (conferences)

Co-chair, *3D Singapore: 14th 3D GeoInfo Conference*, 24-27 September 2019, Asian Civilisations Museum, Singapore

Scientific co-chair, *8th Symposium on Simulation for Architecture and Urban Design* (SimAUD), 22-24 May 2017, University of Toronto, Canada

Chair, *31st International Conference on Education and research in Computer Aided Architectural Design in Europe: Computation and Performance* (eCAADe), 18-20 September 2013, TU Delft, The Netherlands

Chair, Paper Selection Committee, *18th International Conference of the Association for Computer-Aided Architectural Design Research in Asia* (CAADRIA 2013)

Organizer and chair, *Decision Support Systems for Sustainable Buildings* symposium, 18 May 2010, TU Delft, in cooperation with Prof. Sevil Sariyildiz (Design Informatics), Prof. Anke van Hal (Sustainable Housing Transformations) and Prof. Bauke de Vries (Design Systems, Faculty of Architecture, Building and Planning, TU Eindhoven)

Organizing committee member:
· *18th International Conference of the Association for Computer-Aided Architectural Design Research in Asia* (CAADRIA), 15-18 May 2013, NUS, Singapore
· *12th EuropIA International Conference*, 18-20 March 2009, University of Paris8, Paris
· *3rd International Conference on Innovation in Architecture, Engineering and Construction* (AEC), 15-17 June

2005, TU Delft, Rotterdam
· *9th EuropIA International Conference*, 8-10 October 2003, Istanbul Technical University, Istanbul

Administrative assistant at *CAAD Futures '93*, 7-10 July 1993, Pittsburgh PA and *AI in Design '92*, 20-25 June 1992, Pittsburgh PA

(workshops)

Executive team member, *International Forum on Urbanism Winter School 2015: Jurong Vision 2050* (IFoU), 12-23 January 2015, NUS, Singapore

Co-chair, workshops:
· *2nd International IAG Workshop on BIM and GIS Integration*, 25 September 2019, Singapore
· *GH Shape Grammars*, eCAADe workshop, 9-10 September 2019, University of Porto, Portugal
· Visual Algorithms, Prototyping the Future International Workshop "Ouroboros", 24-31 August 2019, National Yunlin University of Science and Technology, Taiwan
· *Rhino/GH Shape Grammars*, CAAD Futures workshop, 22-25 June 2019, KAIST, Daejeon, South Korea
· *Hands-on with Custom Digital Workflows*, eCAADe workshop, 16 September 2013, TU Delft, The Netherlands
· *Open Systems and Methods for Collaborative Built Environment Modeling: Techniques and Concepts*, eCAADe workshop, 10 September 2012, Czech Technical University, Prague
· *Open Systems and Methods for Collaborative Built Environment Modeling*, CAAD Futures workshop, 4 July 2011, Université de Liège, Belgium
· *Generative Urban Design*, Design Computing + Cognition (DCC) workshop, 21 June 2008, Georgia Institute of Technology, Atlanta, GA

Local organizer, workshops:
· *Automatic-Architecture* prologue workshop, 15-17 December 2010, TU Delft, in cooperation with Pim Marsman, Sander Boer, Pim van Wylick and rhinocentre.nl
· *Open Platform*, SmartGeometry workshop, 27-29 November 2009, TU Delft, in cooperation with the SmartGeometry Group

Co-organizer study excursions "Holland im Fluss" (1998) and "Alvar Aalto und Finnland" (1997), Department of Architecture, ETH Zurich

(advisory)

International Advisory Board member:
· *Sixth*, *Seventh*, *Eight* and *Ninth International Conference on Design Computing and Cognition* (DCC 2014, 2016, 2018, 2020)
· *10th* and *11th International Conference on Design Sciences & Technology* (EuropIA.10 2005, EuropIA.11 2007)

International Programme Committee member:
· *CEC2015 Special Session on Evolutionary Computation in Architectural Design*
· *AAAI Artificial Intelligence and Sustainable Design* 2011
· *Computers in Art and Design Education* 2004

Vice-chair, *First* and *Second International Conference on Design Computing and Cognition* (DCC 2004, 2006)

Memberships (present)

Vice-President (Elect), Education and research in Computer Aided Architectural Design in Europe (eCAADe), September 2019 - September 2021, Council member since September 2014

Iberoamerican Society of Digital Graphics (SIGraDi)

The Association for Computer-Aided Architectural Design Research in Asia (CAADRIA)

Computational BIM Community Singapore

EG-ICE: European Group for Intelligent Computing in Engineering

KVIV: Koninklijke Vlaamse Ingenieursvereniging / Royal Flemish Society of Engineers

ie-net ingenieursvereniging vzw / Inspired by Engineers network of Flanders

BrEA: Brussels Engineering Alumni

■ (past)

CAADRIA Executive Committee, The Association for Computer-Aided Architectural Design Research in Asia (CAADRIA), Award/Scholarship Committee Chair, April 2017 - April 2019; Publication officer, May 2013 - April 2017

Computational Design Synthesis SIG (Special Interest Group), the Design Society

Executive secretary, SOON: Stichting Ontwerp Onderzoek Nederland / Design Research Foundation, The Netherlands, January 2002 - December 2007

Research

Funded research

"Digital-Twin-Based Resilience Analysis and Management of District Energy Systems," PI, April 2020 - March 2025

National Research Foundation - Future Resilient Systems II research programme, S$ 1,893,000 (total budget S$ 26,658,000); coordinator: Singapore ETH Centre (SEC)

Development of a digital-twin-driven analysis system regarding the vulnerability, efficiency and resilience of future district energy systems.

"Data modelling and integration for environmental-behavioural data analytics," PI, September 2020 - November 2022

Ng Teng Fong Charitable Foundation (NTFCF) research funding, S$ 300,000

Exploration of the integration of building models, geospatial data and time-based sensor data within a common data model, in order to support environmental-behavioural data analytics research.

"Pedestrian comfort in high pedestrian activity areas," co-PI, September 2017 - June 2020

National Research Foundation (NRF) / Urban Redevelopment Authority (URA) – Land and Liveability National Innovation Challenge (L2 NIC), S$ 36,000 (total budget S$ 1,137,500)

To provide the behavioural understanding and necessary tools and guidelines for enhancing existing and designing new comfortable and functional high pedestrian density walkways in Singapore, including a mesoscopic, district-level pedestrian demand model, a social force model for pedestrian micro-simulation, empirical experiments to understand the perceptual and cognitive processes underlying pedestrian movements and wayfinding behaviour, and design guidelines for pedestrian walkways influencing comfort and functionality during peak uses.

Collaborators: SUTD, Singapore ETH Centre (FCL), Agency, URA. HDB, LTA

"Future Resilient Systems II seed funding," PI, May 2019 - April 2020

National Research Foundation - Future Resilient Systems research programme, S$ 130,000; coordinator: Singapore ETH Centre (SEC)

Development of a report that contains a system architecture and blueprint drawings of digital twins.

"Greater One North 2050," PI, January - February 2020

NUS - JTC i³ Centre, S$ 134,000

Design research investigating different aspects of the transformation of the Greater One North area from an eclectic aggregation of poorly connected urban islands into a coherent township that can fulfil the role of a sub-regional centre in accordance with the decentralisation policy of the Singaporean government, and integrating the findings into a long-term vision 2050 for the development of the township.

"Parametric urban modelling for JTC's Jurong Vision, Phase 2," co-PI, April 2018 - December 2019

NUS - JTC i³ Centre, S$ 147,300

Proof-of-concept and partial deployment study to directly support JTC's planning processes with computational approaches and techniques that enable iterative generation and evaluation of possible future urban outcomes based on predictive feedback to support decision-making.

"Strict and automatic mapping of IFC-BIM models into semantically enriched 3D CityGML building models (exterior and interior)," PI, May 2017 - April 2019

National Research Foundation (NRF) / GovTech – Virtual Singapore R&D Programme, S$ 1,531,200

Development of a methodology and algorithms to automate the mapping of IFC-BIM models into CityGML building models while ensuring a complete and near- lossless mapping. The mapping captures both geometric and semantic information as available in the IFC-BIM models, in order to create semantically enriched 3D city models and to extend these city models to include exterior as well as interior structures such as corridors, rooms, internal doors, and stairs.

Collaborators: Ordnance Survey (Int'l), HDB, BCA, Bentley Systems Inc, Graphisoft SE, Trimble Solutions SEA PL

"Computational support for spatial grammars for urban and architectural design," PI, May 2016 - October 2018
Ministry of Education (MOE) – Academic Research Fund (AcRF) – Tier 1 Start-up Grant, Singapore, S$ 180,000
Research and development of a shape grammar interpreter, in the form of a program library and an Application Program Interface (API), supporting the implementation of shape and other spatial grammars, and the rapid development, adaptation, and maintenance of grammar-based systems.

"Smart design: human-centric planning of urban districts," Co-PI, January 2017 - June 2018
National University of Singapore – Global Alliance (UC Berkeley-U Cambridge-NUS), S$ 87,500
Seed project for the application of Smart Design to urban design and planning, including a case study to define the requirements for Smart Design, the development of systems and models for enabling Smart Design, and a demonstration case study.
Collaboration with U Cambridge (Prof. Koen Steemers, Prof. Ying Jin, Prof. Ruchi Choudhary and UC Berkeley (Prof. Paul Waddell, Prof. Peter Bosselmann, Prof. John Ellis)

"Parametric urban modelling for JTC's Jurong Vision, Phase 1," PI, April 2017 - March 2018
NUS - JTC i³ Centre, S$ 97,300
Feasibility study to directly support JTC's planning processes with computational approaches and techniques that enable iterative generation and evaluation of possible future urban outcomes based on predictive feedback to support decision-making.

"Design research for sustainable, adaptive reuse of industrial structures," PI, December 2015 - January 2017
NUS - JTC i³ Centre, S$ 65,000
Design research targeting the adaptive reuse of industrial structures, focusing on land-use optimization, mixed-use development, and preservation of industrial heritage. The design research is conducted in a Master of Architecture studio relating to Techniques and Tectonics. The design exploration process takes into account social, economical, ecological and historical factors, including user requirements, environmental sustainability, urban design, building materials and construction.

"BigData-Informed Urban Design," co-PI, September 2015 - August 2020
National Research Foundation - Future Cities Laboratory Phase 2 research programme, S$ 0 (total budget S$ 45,000,000); coordinator: Singapore ETH Centre (SEC)
Research that establishes, applies and validates urban planning and design methods based on advanced data analytics.

"Design Research for Mixed-use Developments for JTC's Jurong Vision," PI, April 2015 - March 2016
NUS - JTC i³ Centre, S$ 65,000
Design research addressing the optimization of land use, specifically concerning co-location and mixed developments and land creation through construction over air-space. The design research is conducted within two thesis studios that aim to integrate research into design processes specifically informed by site data and performance issues, and to investigate and develop innovative design prototypes for the future vision of an industrial area that is targeted to integrate one millon inhabitants by 2050.

"Rethinking our urban planning and design processes," co-PI, August 2014 - June 2015
National University of Singapore, School of Design and Environment – "Rethinking Our Urban Living for Singapore's Next 50 Years," S$ 25,000
Exploration through a series of studio projects of a new urban planning and design workflow, leveraging a set of GIS based tools and techniques: CityEngine for the development of urban design options and CommunityViz for evaluation and analysis.

"UKNA: Urban Knowledge Network Asia," investigator, April 2012 - April 2016
European Commission – People programme (Marie Curie Actions)
International research staff exchange scheme (IRSES) to address critical urban development issues in Asia, taking into account the challenges of the diversity of societies, with their heterogeneous populations.

"Urban Prototyping," investigator, September 2011 - July 2012, July 2013 - July 2015
National University of Singapore, School of Design and Environment (Prof. Jürgen Rosemann, Prof. Fu Yuming)
Urban Prototyping is a collaborative research initiative of the School of Design and Environment and the School of Computing of NUS with the aim to develop an integrative tool for design, planning and management of the built environment in a sustainable way, based on the application of advanced technologies of Virtual Prototyping.

"Enhancing building safety assessment through computation," applicant, December 2010 - November 2013
Dr. Ir. Cornelis Lely Stichting, Delft, € 127,000
Research and development of computational concepts, frameworks and tools to pull the assessment of safety-related issues to the early stages of the building design process.

"Voorraad in de Vingers – pilot Westraven," co-PI, June - October 2010
Dutch Government Building Agency (Rijksgebouwendienst; Rgd), € 13,000; led by van de Geijn Partners, in cooperation with TIM/Aquadis
Pilot application of the Rgd BOEI® CLIP software tool to inspections of the Westraven building using RFID tags to identify building components.

"Analyse visualisaties Koepel Windenergie Noordoostpolder," PI, July - October 2009
Province of Flevoland, Stuurgroep Windenergie Noordoostpolder, The Netherlands, € 3,600
Analysis of the accuracy of visualizations of the windmills park at Noordoostpolder.

"EPI-CREM Software Tool," PI, June 2009 - February 2010
Dutch Government Building Agency (Rijksgebouwendienst; Rgd), € 58,000; subcontracted from the "EPI-CREM: Energy Performance Integration in Corporate public Real Estate Management" project funded by European Commission – Intelligent Energy Europe programme
Development of an integrated software tool (CLIP EPI-CREM) for Rgd BOEI® and EPI-CREM work processes.

"An Integral Commissioning Tool," PI, February 2007 - December 2009
Dutch Government Building Agency (Rijksgebouwendienst; Rgd), € 129,000
Development of an Integral Commissioning model and software tool providing support for lifecycle building performance assessment (LBPA) activities of Rgd and aiming to improve the quality and efficiency of assessment methods including Rgd BOEI® inspections.

"Wie Weet Wat," PI, January - December 2008
Delft University of Technology, Faculty of Architecture, € 30,000; in collaboration with the TU Delft Library
Development of a web-based application for finding scientists by keywords automatically extracted from scientific publications.

"Analyse voor uitbreiding ATS-WinKozijn® met nieuwe kozijnvormen," PI, October 2007 - February 2008
ATS-Ambiance Technical Software, Berkel and Rodenrijs, the Netherlands, € 7,000
Analysis of the ATS-WinKozijn® application for designing and drafting windows and doors towards new forms of window frames.

"Dynamic Digital Design Representations," PI, January 2001 - December 2005
Netherlands Organization for Scientific Research (NWO) – Vernieuwingsimpuls/Innovational Research Incentives Scheme (Vidi) programme, € 447,000 (total budget € 670,000)
Development of a framework for representational flexibility that supports an exploration of alternative design representations, a comparison of design representations with respect to scope and coverage, and a mapping of design information between representations.

"Variomatic," PI, November - December 2000
Oosterhuis Associates, Rotterdam
Database design for a parametric housing design website.

"woonwerf.nl," PI, June - October 2000
DPI, Den Haag, and TRS ontwikkelingsgroep, Rotterdam
Database design and data analysis support for a residential development project website.

"ICCS: A Tool Set for the Virtual AEC Company," research team leader, April 1996 - July 1999
Swiss National Science Foundation
Development of an information platform for communication and collaboration between all partners in the building planning, design, construction, and management processes.
Chair for Architecture and CAAD, ETHZ (Prof. Gerhard Schmitt); ISS/IMAC – Structural Engineering and Mechanics,

EPFL (Prof. Ian Smith); AI Lab, EPFL; CRB – Swiss Centre for Building Rationalization; SIA – Swiss Association of Engineers and Architects; AfB Amt für Bundesbauten – Swiss Federal Building Office; Zwahlen & Mayr SA, Aigle; ZRH Zoelly Rüegger Holenstein Architekten AG, Zollikon-Zurich; ABB CMC Systeme AG; Amstein + Walthert AG; Allemand Jeanneret Schmid SA, Neuchatel

"SEED: A Software Environment to Support the Early Phases in Building Design," investigator, 1993 - 1995
CBCC – Carnegie Mellon/Building Industry Computer-Aided Design Consortium
Development of a software environment to support the early phases in building design.
Ömer Akin, James Garrett, Rob Woodbury, Steven Fenves, Ulrich Flemming, et al., CMU

"Rapid Runway Repair," developer, December 1992
Carnegie Mellon University, School of Computer Science
GUI development.

"Rule Based Simulation Applied to Robotized Building Construction," investigator, October 1991 - July 1992
Japan Research Institute, Tokyo, $ 50,000
Development of a rule based simulation program for robotized building construction based on a motion language to describe the behavior of automated agents in a dynamically changing environment and in cooperation with human labor crews.
Irving Oppenheim, Ramesh Krishnamurti, Stephen Lee and Rudi Stouffs, CMU

"A Visual Interface for Modular Housing Design and Representation," developer, June 1990 - April 1991
Pennsylvania Advanced Technology Housing Consortium and Muncy Homes, Muncy PA
GUI development.

Educational research

"Studionet: an online community for learning digital design tools and techniques," co-PI, July 2016 - September 2017
National University of Singapore – Learning Innovation Fund - Technology (LIFT), S$ 100,607
Develop, test, deploy, and evaluate the Studionet platform to support student-centred collaborative learning of a range of digital design tools and techniques and applying these tools and techniques within the design studio running in parallel.

"Data sets and tutorials to support contextual modeling," PI, November 2014 - October 2015
National University of Singapore, Centre for Development of Teaching and Learning, S$ 4,000
Demonstration of the possibilities and opportunities of using context maps within architectural/urban design and planning studios.

"Kennis delen = kennis vermenigvuldigen," investigator, January - December 2009
E-merge consortium
Development of a communication platform enabling students to collaborate with researchers and practitioners

"Efficient en toch persoonlijk," PI, July 2008 - June 2010
Delft University of Technology – Strategic Educational Funds, € 145,000 (total budget € 290,000)
ICT in Education: development of e-learning resources for building technology for BSc student.

"Digitale Portfolio Bouwkunde," PI, April 2008 - February 2010
Delft University of Technology – Strategic Educational Funds, € 145,000 (total budget € 290,000)
ICT in Education: supporting students, teachers and study advisors with a student portfolio that manifests itself as a showcase portfolio, a design process portfolio and a study progress portfolio.

"Mediated Discourse," PI, January - June 2003
Foundation of Art and Public Space (SKOR) and Delft University of Technology – Central Educational Funds
A multi-disciplinary discourse held around the theme of cultural transformation in relation to the ParkStad development project in Rotterdam.
Students and instructors, Faculty of Architecture, TU Delfrt; visiting Prof. Maia Engeli (ETH Zurich); artists; management- consultancy partners De Beuk; foundation Steunpunt Wonen Rotterdam

"InfoBase: A multimedia learning environment to support group work and discourse," PI, August 2002 - December 2004
Delft University of Technology – Central Educational Funds, € 283,000 (total budget € 546,000)
ICT in Education: provide students with and teach them how to utilise a digital environment in which they can store, exchange and manage the (scientific) information they collect and generate, individually and in group, and at their own initiative.
Design Informatics Chair, Faculty of Architecture (Prof. Sevil Sariyildiz); Faculty of Social Sciences, U Utrecht (Jan Kooistra); Library (Helen Warmoeskerken); WIT-Lab, Faculty of Technology, Policy and Management (Jelle Attema); EDUTEC, Faculty of Technology, Policy and Management (Ellen Sjoer)

"ICTO: Ontwerpen, Berekenen, Construeren en Produceren m.b.v. ICT," workpackage leader, September 2001 -December 2003
Delft University of Technology – Central Educational Funds
ICT in Education: Integration of various software and hardware tools in a digital learning environment.

Consultancy

"BESCAM: Integration of Building Energy Simulation and Urban Canopy Modelling for Assessment of District Energy Demand," collaborator, 2018 - 2020
National Research Foundation (NRF) / GovTech – Virtual Singapore R&D Programme

"iBuild GreenTM: Design for Sustainability," workgroup leader Digital Asset Management and Domotica, May 2011 - July 2011
iBuild and European Design Centre

"Revolt House: energy adaptive floating unit," advisor, September 2010 - July 2011
Solar Decathlon Europe

"ICT Innovatieplatform Domotica & Smart Living," board/core group member, January 2010 - February 2011
ICTRegie

"EPI-CREM: Energy Performance Integration in Corporate public Real Estate Management," National Feedback Committee member, October 2007 - 2010
European Commission – Intelligent Energy Europe programme

"City Induction: a model for formulating, evaluating and generating urban designs," consultant, June 2007 - May 2010
Portuguese Science and Technology Foundation (FCT); led by Prof. Jose Duarte, U Lisbon

"Flextool: Berekening Toekomstwaarde Verzorgingstehuizen," consultant, October - December 2006
Netherlands Board for Healthcare Institutions (Bouwcollege)

"SEEMseed: Study, Evaluate, and Explore in the Domain of the Single Electronic European Market," expert, January - December 2005
European Commission

"EDAT: an electronic design assistance tool for case-based representation of design," external advisor, May - December 1995
Carnegie Mellon University, School of Architecture

Pending proposals

"Smart Integrative Assessment of Building Development Applications," PI, February 2020
National Research Foundation (NRF) / Ministry of National Development (MND) - Cities of Tomorrow (CoT) R&D programme, S$ 1,666,500
Investigation of an Augmented Intelligent (AI) solution to enable URA (Urban Redevelopment Authority) planners and AI

systems to work together to assess the compatibility of a building development application more holistically and efficiently, extracting references and making recommendations based on an array of information available in the application and URA's planning resources.

"Circular Future Cities," PI, January 2020
National Research Foundation and Swiss National Science Foundation - "FCL Global" programme, S\$ 1,800,000; coordinator: Singapore ETH Centre (SEC)
Development of integrated frameworks and tools based on advanced digital technology for informing the design of circular buildings and deploying more effective resource solutions.

"Interdisciplinary study on seniors' activity and mobility in transit-oriented high-density urban neighbourhoods of Singapore," co-PI, July 2019
National Research Foundation (NRF) / Ministry of National Development (MND) - Cities of Tomorrow (CoT) R&D programme, S\$ 2,137,450
Investigation of the relationships between seniors' activity and mobility behaviour, physical environment, urban planning, design and policy in transit-oriented high-density urban neighbourhoods.

Publications and Reports

Books   (not peer reviewed)

R. Stouffs, *Design Research for Sustainable, Adaptive Reuse of Industrial Structures: Three case studies*, Centre of Advanced Studies in Architecture (CASA), NUS, 2017, 167pp.

R. Stouffs and P. Janssen, *Rethinking Urban Practices: Designing for Jurong Vision*, Centre of Advanced Studies in Architecture (CASA), NUS, 2016, 109pp.

(in preparation)

D.R.Y. Gan, X. Hua and R. Stouffs, *Knowledge city planning: Greater one-north urban futures by design*, submitted to NUS Press.

Book editorships   (peer reviewed)

M. Turrin, B. Peters, W. O'Brien, R. Stouffs and T. Dogan, eds., *2017 Proceedings of the Symposium on Simulation for Architecture and Urban Design*, The Society for Modeling and Simulation International (SCS), San Diego, CA, 2017.

R. Stouffs and S. Sariyildiz, eds., *Computation & Performance: Proceedings of the 31st International Conference on Education and research in Computer Aided Architectural Design in Europe*, vol. 1, eCAADe, Brussels, and Faculty of Architecture, Delft University of Technology, Delft, The Netherlands, 2013.

R. Stouffs and S. Sariyildiz, eds., *Computation & Performance: Proceedings of the 31st International Conference on Education and research in Computer Aided Architectural Design in Europe*, vol. 2, eCAADe, Brussels, and Faculty of Architecture, Delft University of Technology, Delft, The Netherlands, 2013.

R. Stouffs, P. Janssen, S. Roudavski and B. Tunçer, eds., *Open Systems: 18th International Conference on Computer-Aided Architectural Design Research in Asia (CAADRIA 2013)*, The Association for Computer-Aided Architectural Design Research in Asia (CAADRIA), Hong Kong, and Center for Advanced Studies in Architecture (CASA), Department of Architecture, School of Design and Environment, National University of Singapore, Singapore, 2013.

(not peer reviewed)

A. van den Dobbelsteen, M. Eekhout, T. Klein, U. Knaack and R. Stouffs, eds., *BT Research Portfolio: Computation & Performance, Green Building Innovation*, Publikatieburo Bouwkunde, Delft, The Netherlands, 2010.

Journal editorships   (peer reviewed)

R. Stouffs, F. Biljecki, K.H. Soon and V. Khoo, eds., Special Issue of *ISPRS Ann. Photogramm. Remote Sens. Spatial Inf. Sci.*, IV-4/W8 (2019). doi:10.5194/isprs-annals-IV-4-W8-1-2019

R. Stouffs, F. Biljecki, K.H. Soon and V. Khoo, eds., Special Issue of *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLII-4/W15 (2019). doi:10.5194/isprs-archives-XLII-4-W15-1-2019

P. Janssen, C. Herr and R. Stouffs, eds., Protocols, Flows and Glitches, Special Issue of *International Journal of Architectural Computing* 16(3) (2018).

R. Stouffs and Y. Rafiq, eds., Generative and Evolutionary Design Exploration, Special Issue of *AI EDAM* 30(4) (2015).

R. Stouffs and B. Tunçer, eds., Special Issue Articles of Design to Fabrication, *Automation in Construction* 51 (2015).

R. Stouffs, ed., Open Systems, Special Issue of *International Journal of ArcZhitectural Computing* 12(1) (2014).

R. Stouffs, ed., Design Spaces: the Explicit Representation of Spaces of Alternatives, Special Issue of *AI EDAM* 20(2) (2006).

(in preparation)

F. Biljecki, R. Stouffs and M. Kalantari, Emerging topics in 3D GIS, Special Issue of *Transactions in GIS*.

R. Stouffs, Virtual 3D City Models, Special Issue of *ISPRS International Journal of Geo-Information*.

Book chapters   (peer reviewed)

R. Stouffs, Shape rule types and spatial search, *Computer-Aided Architectural Design "Hello, Culture"* (ed. J.-H. Lee), *Communications in Computer and Information Science*, vol. 1028, pp. 474-488, Springer Nature, Singapore, 2019.

R. Stouffs, A practical shape grammar for Chinese ice-ray lattice designs, *Computational Studies on Cultural Variation and Heredity* (ed. J.-H. Lee), *KAIST Research Series*, pp. 161-174, Springer Nature, Singapore, 2018.

R. Stouffs and P. Janssen, A rule-based generative analysis approach for urban planning, *Morphological Analysis of Cultural DNA* (ed. J.-H. Lee), *KAIST Research Series*, pp. 125-136, Springer Nature, Singapore, 2017.

R. Stouffs, Sortal grammars for urban design, *Studying Visual and Spatial Reasoning for Design Creativity* (eds. J. Gero), pp. 51-66, Springer, Berlin, 2015.

R. Stouffs, J. Beirão and J. Duarte, Sortal grammars for urban design: a sortal approach to urban data modeling and generation, *Digital Urban Modeling and Simulation* (eds. S. Müller Arisona, P. Wonka, G. Aschwanden and J. Halatsch), *Communications in Computer and Information Science*, vol. 242, pp. 99-116, Springer, Berlin, 2012.

R. Stouffs, Computation & Performance, *Architecture and the Built Environment: Research in Context 2003-2009* (ed. F. van der Hoeven), pp. 115-137, TU Delft Architecture, Delft, The Netherlands, 2010.

S. Sariyildiz, R. Stouffs, Ö. Çiftçioglu and B. Tunçer, Future ICT Developments, *Ways to Study and Research* (eds. T.M. de Jong and D.J.M. van der Voordt), pp. 377-383, DUP Science, Delft, The Netherlands, 2002.

(not peer reviewed)

R. Stouffs and P. Janssen, Data driven urban planning & design practice, *Jurong Vision 2050: Re-inventing the Industrial City* (eds. J. Rosemann and M. Tiwari), pp. 55-62, International Forum on Urbanism (IFoU), Singapore, 2017.

R. Stouffs and M. Harada, IT and Praxis, *Bits & Spaces* (ed. M. Engeli), pp. 147-151, Birkhäuser, Basel, 2001.

Journal articles   (peer reviewed)

K. Adouane, R. Stouffs, P. Janssen and B. Domer, A model-based approach to convert a building BIM-IFC data set model into CityGML, *Journal of Spatial Science* (2019), doi:10.1080/14498596.2019.1658650

R. Stouffs and R. Krishnamurti, A uniform characterization of augmented shapes, *Computer-Aided Design* 110 (2019), 37-49. doi:10.1016/j.cad.2018.12.004

D. Hou and R. Stouffs, An algorithmic design grammar embedded with heuristics, *Automation in Construction* 102 (2019), 308-331. doi:10.1016/j.autcon.2019.01.024

D. Hou and R. Stouffs, An algorithmic design grammar for problem solving, *Automation in Construction* 94 (2018), 417-437. doi:10.1016/j.autcon.2018.07.013

Y. Liu and R. Stouffs, 基于条件生成对抗网络的城市设计研究 Urban design process with conditional generative adversarial networks, 建筑学报 *Architectural Journal* 600 (2018), 108-113.

R. Stouffs, H. Tauscher and F. Biljecki, Achieving complete and near-lossless conversion from IFC to CityGML, *ISPRS International Journal of Geo-Information* 7(9) (2018), 355, 17pp. doi:10.3390/ijgi7090355

R. Stouffs, Implementation issues of parallel shape grammars, *AI EDAM (Artificial Intelligence for Engineering Design, Analysis and Manufacturing)* 32 (2018), 162-176. doi:10.1017/ S0890060417000270

T. Wortmann and R. Stouffs, Algorithmic complexity of shape grammar implementation, *AI EDAM (Artificial Intelligence for Engineering Design, Analysis and Manufacturing)* 32 (2018), 138-146. doi:10.1017/S0890060417000440

H. Malekitabar, A. Ardeshir, M.H. Sebt, R. Stouffs and E.A.L. Teo, On the calculus of risk in construction projects: Contradictory theories and a rationalized approach, *Safety Science* 101 (2018), 72-85. doi:10.1016/j.ssci.2017.08.014

R. Stouffs, Description grammars: precedents revisited, *Environment and Planning B: Urban Analytics and City Science* 45(1) (2018), 124-144. doi:10.1177/0265813516667301

R. Stouffs, Description grammars: a general notation, *Environment and Planning B: Urban Analytics and City Science* 45(1) (2018), 106-123. doi:10.1177/0265813516667300

Y. Liu, R.Stouffs, A. Tablada, N.H. Wong and J. Zhang, Comparing Micro-scale Weather Data to Building Energy Consumption in Singapore, *Energy and Buildings* 152 (2017), 776-791. doi:10.1016/j.enbuild.2016.11.019

H. Malekitabar, A. Ardeshir, M.H. Sebt and R. Stouffs, Construction safety risk drivers: a BIM approach, *Safety Science* 82 (2016), 445-455. doi:10.1016/j.ssci.2015.11.002

R. Stouffs and B. Tunçer, Typological descriptions as generative guides for historical architecture, *Nexus Network Journal* 17(3) (2015), 785-805. doi:10.1007/s00004-015-0260-x

Y. Liu, Y. Huang and R. Stouffs, Using a data-driven approach to support the design of energy-efficient buildings, *Journal of Information Technology in Construction* 20 (2015), 80-96. [www.itcon.org/2015/6]

S. Khalili Araghi and R. Stouffs, Exploring cellular automata for high density residential building form generation, *Automation in Construction* 49 (2015), 152-162. doi:10.1016/j.autcon.2014.10.007

I. Gürsel Dino and R. Stouffs, Evaluation of reference modeling for building performance assessment, *Automation in Construction* 40 (2014), 44-59. doi:10.1016/j.autcon.2013.12.007

I. Gürsel Dino, R. Leeuw, S. Sariyildiz and R. Stouffs, Method for energy performance integration in corporate public real estate management, *Journal of Performance of Constructed Facilities* 28(2) (2014), 286-302. doi:10.1061/(ASCE)CF.1943-5509.0000428

B. Toth, P. Janssen, R. Stouffs, A. Chaszar and S. Boeykens, Custom digital workflows: a new framework for design analysis integration, *International Journal of Architectural Computing* 10(4) (2012), 481-500. doi:10.1260/1478-0771.10.4.481

J. Beirão, J. Duarte, R. Stouffs and H. Bekkering, Designing with Urban Induction Patterns: a methodological approach, *Environment and Planning B: Planning and Design* 39(4) (2012), 665-682. doi:10.1068/b38052

M. Turrin, P. von Buelow, A. Kilian and R. Stouffs, Performative skins for passive climate comfort: a parametric design process, *Automation in Construction* 22 (2012), 36-50. doi:10.1016/j.autcon.2011.08.001

M. Turrin, P. von Buelow and R. Stouffs, Design explorations of performance driven geometry in architectural design using parametric modelling and genetic algorithms, *Advanced Engineering Informatics* 25(4) (2011), 656-675. doi:10.1016/j.aei.2011.07.009

J. Beirão, J. Duarte and R. Stouffs, Creating specific grammars from generic grammars: towards flexible urban design, *Nexus Network Journal* 13(1) (2011), 73-111. doi:10.1007/s00004-011-0059-3

I. Gürsel, S. Sariyildiz, Ö. Akin and R. Stouffs, Modeling and visualization of building lifecycle performance assessment, *Advanced Engineering Informatics* 23(4) (2009), 396-417. doi:10.1016/j.aei.2009.06.010

R. Stouffs, Constructing design representations using a sortal approach, *Advanced Engineering Informatics* 22(1) (2008), 71-89. doi:10.1016/j.aei.2007.08.007

R. Stouffs, R. Krishnamurti and K. Park, Sortal structures: supporting representational flexibility for building domain processes, *Computer-Aided Civil and Infrastructure Engineering* 22(2) (2007), 98-116. doi:10.1111/j.1467-8667.2006.00473.x

R. Stouffs and R. Krishnamurti, Algorithms for classifying and constructing the boundary of a shape, *Journal of Design Research* 5(1) (2006), 54-95. doi:10.1504/JDR.2006.010796

R. Krishnamurti and R. Stouffs, The boundary of a shape and its classification, *Journal of Design Research* 4(1) (2004), 75-101. doi:10.1504/JDR.2004.009843

R. Stouffs, J. Kooistra and B. Tunçer, Metadata as a means for correspondence on digital media, *Journal of Information Technology in Construction* 9 (2004), 129-142. [www.itcon.org/2004/9]

B. Tunçer, R. Stouffs and S. Sariyildiz, Document decomposition by content as a means for structuring building project information, *Construction Innovation* 2(4) (2002), 229-248. doi:10.1108/14714170210814784

K. Zreik, R. Beheshti, R. Stouffs, B. Tunçer and S. Ozsariyildiz, The building and construction eDocuments, *International journal of design sciences and technology* 10(1) (2002), 7-16.

R. Stouffs, Visualizing information structures and its impact on project teams: an information architecture for the virtual AEC company, *Building Research & Information* 29(3) (2001), 218-232. doi:10.1080/096132101300099754

C. Lottaz, R. Stouffs and I. Smith, Increasing understanding during collaboration through advanced representations, *Journal of Information Technology in Construction* 5 (2000), 1-25. [www.itcon.org/2000/1]

R. Krishnamurti and R. Stouffs, Spatial change: continuity, reversibility and emergent shapes, *Environment and Planning B: Planning and Design* 24(3) (1997), 359-384. doi:10.1068/b240359

R. Stouffs, R. Krishnamurti and I. Oppenheim, A behavioral language for motion planning in building construction, *Automation in Construction* 3(4) (1995), 305-320. doi:10.1016/0926-5805(94)00033-J

R. Stouffs, R. Krishnamurti, S. Lee and I. Oppenheim, Construction process simulation with rule-based robot planning, *Automation in Construction* 3 (1994), 79-86. doi:10.1016/0926-5805(94)90035-3

Conference articles (peer reviewed)

R. Stouffs and A. Li, Learning from users and their interaction with a dual-interface shape-grammar implementation, to appear in *RE: Anthropocene, Proceedings of the 25th International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) 2020*, CAADRIA, Hong Kong, 2020.

B. Tuncer, Z. Trivic, R. Stouffs, J.W. Mok and J. Lim, Informed design of pedestrian pathways, to appear in *RE: Anthropocene, Proceedings of the 25th International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) 2020*, CAADRIA, Hong Kong, 2020.

R. Stouffs, Predicates and directives for a parametric-associative matching mechanism for shapes and shape grammars, *Architecture in the Age of the 4th Industrial Revolution* (eds. J.P. Sousa, G.C. Henriques, J.P. Xavier), vol. 2, pp. 403-412, eCAADe, Brussels, 2019.

H. Tauscher and R. Stouffs, Extracting different spatio-semantic structures from IFC using a triple graph grammar, *Intelligent & Informed* (eds. M.H.Haeusler, M.A. Schnabel and T. Fukuda), vol. 1, pp. 605-614, CAADRIA, Hong Kong, 2019.

P. Alva, P. Janssen and R. Stouffs, A spatial decision support framework for planning - creating tool-chains for organisational teams, *Intelligent & Informed* (eds. M.H.Haeusler, M.A. Schnabel and T. Fukuda), vol. 2, pp. 11-20, CAADRIA, Hong Kong, 2019.

R. Stouffs and D. Hou, Composite shape rules, *Design Computing and Cognition '18* (eds. J.S. Gero), pp. 439-457, Springer Nature, Switzerland, 2019.

Y. Zhang, S. Azzali, P. Janssen and R. Stouffs, Design for walkable neighbourhoods in Singapore using form-based codes, *IFoU 2018: Reframing Urban Resilience Implementation: Aligning Sustainability and Resilience*, MDPI, 2018. (doi:10.3390/IFOU2018-05934)

B. Dy and R. Stouffs, Combining geometries and descriptions - a shape grammar plug-in for Grasshopper, *Computing for a better tomorrow* (eds. A. Kepczynska-Walczak and S. Bialkowski), vol. 2, pp. 509-518, eCAADe, Brussels, 2018.

H. Tauscher and R. Stouffs, An IFC-to-CityGML triple graph grammar, *Computing for a better tomorrow* (eds. A. Kepczynska-Walczak and S. Bialkowski), vol. 1, pp. 517-524, eCAADe, Brussels, 2018.

R. Stouffs, Where associative and rule-based approaches meet - a shape grammar plug-in for Grasshopper, *Learning, Adapting and Prototyping* (eds. T. Fukuda, W. Huang, P. Janssen, K. Crolla and S. Alhadidi), vol. 2, pp. 453-462, CAADRIA, Hong Kong, 2018.

R. Stouffs, a triple graph grammar approach to mapping IFC models into CityGML building models, *Learning, Adapting and Prototyping* (eds. T. Fukuda, W. Huang, P. Janssen, K. Crolla and S. Alhadidi), vol. 2, pp. 41-50, CAADRIA, Hong Kong, 2018.

J. Lim, P. Janssen and R. Stouffs, Automated generation of BIM models from 2D CAD drawings, *Learning, Adapting and Prototyping* (eds. T. Fukuda, W. Huang, P. Janssen, K. Crolla and S. Alhadidi), vol. 2, pp. 61-70, CAADRIA, Hong Kong, 2018.

R. Stouffs and D. Hou, The complexity of formulating design(ing) grammars, *ShoCK! Sharing of Computable Knowledge* (eds. A. Fiorovanti, S. Cursi, S. Elahmar, S. Gargaro, G. Loffreda, G. Novembri and A. Trento), vol. 2, pp. 443-452, eCAADe, Brussels, and Sapienza University of Rome, Italy, 2017.

A. Narangerel, J.-H. Lee and R. Stouffs, Thermal and daylighting optimization of complex 3D faceted façade of office building, *ShoCK! Sharing of Computable Knowledge* (eds. A. Fiorovanti, S. Cursi, S. Elahmar, S. Gargaro, G. Loffreda, G. Novembri and A. Trento), vol. 1, pp. 209-218, eCAADe, Brussels, and Sapienza University of Rome, Italy, 2017.

Y. Liu, R. Stouffs and A. Tablada, Rethinking the urban design process from a data perspective, *ShoCK! Sharing of Computable Knowledge* (eds. A. Fiorovanti, S. Cursi, S. Elahmar, S. Gargaro, G. Loffreda, G. Novembri and A Trento), vol. 1, pp. 449-460, eCAADe, Brussels, and Sapienza University of Rome, Italy, 2017.

Y. Liu and R. Stouffs, Energy performance of residential buildings at district level from data perspective, *2017 Proceedings of the Symposium on Simulation for Architecture and Urban Design* (eds. M. Turrin, B. Peters, W. O'Brien, R. Stouffs and T. Dogan), pp. 353-360, SCS, San Diego, CA, 2017.

Y. Liu and R. Stouffs, Familiar and unfamiliar data sets in sustainable urban planning, *Protocols, Flows and Glitches* (eds. P. Janssen, P. Loh, A. Raonic and M.A. Schnabel), pp. 705-714, CAADRIA, Hong Kong, 2017.

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R. Stouffs, A tool set for the virtual AEC company, *Swiss Priority Programme for Information and Communications Structures Proceedings of the Closing Conference 2000* (ed. SPP ICS), pp. 54-55, vdf, Zurich, 2000.

B. Tunçer and R. Stouffs, Computational richness in the representation of architectural languages, *Architectural Computing: from Turing to 2000* (eds. A. Brown, M. Knight, and P. Berridge), pp. 603-610, eCAADe and The University of Liverpool, Liverpool, UK, 1999.

R. Stouffs, D. Kurmann, B. Tunçer, K.H. Mieusset and B. Stäger, An information architecture for the virtual AEC company, *Product and Process Modelling in the Building Industry* (ed. R. Amor), pp. 479-486, Building Research Establishment, Watford, UK, 1998.

R. Stouffs, B. Tunçer and G. Schmitt, Supports for information and communication in a collaborative building project, *Artificial Intelligence in Design 98* (eds. J. Gero and F. Sudweeks), pp. 601-617, Kluwer Academic, Dordrecht, The Netherlands, 1998.

R. Stouffs and R. Krishnamurti, An algebraic approach to comparing representations, *Mathematics & Design 98* (ed. J. Barallo), pp. 105-114, The University of the Basque Country, San Sebastian, Spain, 1998 .

R. Stouffs and R. Krishnamurti, Sorts: A concept for representational flexibility, *CAAD Futures 1997* (ed. R. Junge), pp. 553-564, Kluwer Academic, Dordrecht, The Netherlands, 1997.

G. Schmitt, R. Stouffs and M. Engeli, An architecture for collaborative design support: models, tools and interfaces, *Preprints of IFIP WG 5.2 Workshop on Formal Aspects of Collaborative CAD* (eds. M. Maher, J. Gero and F. Sudweeks), pp. 125-142, Key Centre of Design Computing, University of Sydney, Sydney, 1997.

R. Stouffs, R. Krishnamurti and C.M. Eastman, A formal structure for nonequivalent solid representations, *Proceedings of IFIP WG 5.2 Workshop on Knowledge Intensive CAD II* (eds. S. Finger, M. Mäntylä and T. Tomiyama), International Federation for Information Processing, Working Group 5.2, 1996.

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R. Stouffs and R. Krishnamurti, The extensibility and applicability of geometric representations, *Architecture proceedings of 3rd Design and Decision Support Systems in Architecture and Urban Planning Conference*, pp. 436-452, Eindhoven University of Technology, Eindhoven, The Netherlands, 1996.

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R. Krishnamurti and R. Stouffs, Spatial grammars: motivation, comparison and new results, *CAAD Futures '93* (eds. U. Flemming and S. Van Wyk), pp. 57-74, North-Holland, Amsterdam, 1993.

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Published reports

R. Stouffs, Computation & Performance, *RuMOER* 47 (2009), 18-24.

R. Stouffs, An interfacultary MSc track, *RuMOER* 46 (2009), 20-22.

M. Ertsen, J. Kooistra and R. Stouffs, Linking action, exchange and documentation in engineering design projects through the use of metadata (abstract), *CAL'07 - Development, Disruption & Debate - D3 Abstract Book*, Trinity College, Dublin, 26-28 March 2007.

R. Stouffs and R. Krishnamurti, Sortal grammars: a framework for exploring grammar formalisms, Abstract appears in *International Journal of COMADEM* 4(1) (2001), 38.

R. Stouffs, A tool set for the virtual AEC company, *in* Results of the Swiss Priority Programme for Information and Communication Structures (ed. F.L. Nicolet), *Informatik/Informatique* (Zurich) 5, no. 4 (1999), 34-35.

R. Woodbury, Z. Aygen, T-W. Chang, S-C. Chiou, B. Choi and R. Stouffs, Review of the fifth international conference on computer-aided architectural design futures, CAADfutures 1993, *ACADIA Newsletter 10*, no. 3 (1993), 7-10.

■ Unpublished reports

P. Janssen, R. Stouffs and Y. Zhang, Rethinking our urban planning and design process, SG50 research project final report, School of Design and Environment, National University of Singapore, February 2016.

R. Stouffs and P. Janssen, Data sets and tutorials to support contextual modelling, Teaching Enhancement Grant final report, Centre for Development of Teaching and Learning (CDTL), National University of Singapore, November 2015.

R. Stouffs, Eindrapportage efficient en toch persoonlijk, Technical report, Design Informatics Chair, Faculty of Architecture, Delft University of Technology, May 2010.

R. Stouffs, Eindrapportage digitale portfolio bouwkunde, Technical report, Design Informatics Chair, Faculty of Architecture, Delft University of Technology, April 2010.

R. Stouffs and J. Beintema, Analyse voor uitbreiding van ATS-Winkozijn® met nieuwe kozijnvormen, Technical report, Design Informatics Chair, Faculty of Architecture, Delft University of Technology, February 2008.

R. Stouffs, S. Sariyildiz, J. Kooistra, B. Tunçer, E. Janssen Groesbeek, J. Attema and E. Akar, Eindevaluatie ICTO-InfoBase, Technical report, Design Informatics Chair, Faculty of Architecture, Delft University of Technology, November 2004.

R. Stouffs and R. Krishnamurti, Grammars, sorts and implementation, Workshop notes of *Implementation Issues in Generative Design Systems, First International Conference on Design Computing and Cognition (DCC'04)*, MIT, Cambridge, Mass., 17 July 2004.

R. Stouffs, S. Sariyildiz, J. Kooistra, B. Tunçer, E. Janssen Groesbeek, J. Attema and E. Akar, Tussenevaluatie ICTO-InfoBase, Technical report, Design Informatics Chair, Faculty of Architecture, Delft University of Technology, March 2004.

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R. Stouffs and R. Krishnamurti, The boundary of a shape, Technical report, Architecture and CAAD, Dept. of Architecture, Swiss Federal Institute of Technology Zurich, September 1997.

R. Stouffs and R. Krishnamurti, Classifying the boundary of a shape, Technical report, Architecture and CAAD, Dept. of Architecture, Swiss Federal Institute of Technology Zurich, September 1997.

R. Stouffs and R. Krishnamurti, Constructing the boundary of a shape, Technical report, Architecture and CAAD, Dept. of Architecture, Swiss Federal Institute of Technology Zurich, September 1997.

R. Stouffs and R. Krishnamurti, A note on the computational complexity of dealing with the boundary of a shape, Technical report, Architecture and CAAD, Dept. of Architecture, Swiss Federal Institute of Technology Zurich, September 1997.

R. Stouffs and B. Tunçer, Information architecture: presentation and representation, Technical report, Architecture and CAAD, Dept. of Architecture, Swiss Federal Institute of Technology Zurich, April 1997.

R. Stouffs, R. Krishnamurti, C. Eastman and H. Assal, Non-"standard" solid representations, Preprints of *CAAD Futures, International Conference on Computer-Aided Architectural Design*, Singapore, 24-26 September 1995.

U. Flemming, R. Coyne, R. Woodbury, S. Bhavnani, S-F. Chien, S-C. Chiou, B. Choi, H. Kilicotte, R. Stouffs, T-W. Chang, S-J. Han, C. Jo, J. Shaw and K. Suwa, SEED-Layout requirements analysis, Technical report, Carnegie Mellon/

Building Industry CAD Consortium (CBCC), Carnegie Mellon University, Pittsburgh, Pa., July 1994. [seed.edrc.cmu.edu/SL/SL-start.book.html]

U. Flemming, R. Stouffs and J. Snyder, ACL object specification, Technical report, Dept. of Architecture, Carnegie Mellon University, July 1994.

J. Snyder, U. Flemming and R. Stouffs, ACL object specification language, Technical report, Dept. of Architecture, Carnegie Mellon University, July 1994.

R. Stouffs and R. Krishnamurti, The complexity of the maximal representation of shapes, Preprints of the *IFIP Workshop on Formal Methods for Computer-Aided Design*, Talinn, Estonia, 16-19 June 1993.

R. Stouffs and R. Krishnamurti, Efficient algorithms for boolean operations on plane segments, Technical report, Dept. of Architecture, Carnegie Mellon University, November 1992.

I. Oppenheim, R. Krishnamurti, S. Lee and R. Stouffs, Rule based simulation for construction robotics, presented at *The Construction Robot Consortium International Workshop*, Pittsburgh, Pa., 16-17 July 1992.

■ **Invited presentations**

"Rule-based computational design," *ArchXpo UAP Singapore Lecture Series 2019*, Singapore, 1 October 2019

"Spatial change 25 years on: a personal history of shape grammars," keynote lecture, *Prototyping the Future International Workshop 'Ouroboros'*, National Yunlin University of Science and Technology, Douliou, Taiwan, 26 August 2019.

"Drawing information from BIM models to enrich virtual city models," keynote lecture, *Digital Twin Conference*, *Smart Geo Expo 2019*, Seoul, 8 August 2019 (organized by The Korea Land & Housing Corporation).

"Rule-based computational design," *2019 Academic Annual Conference (Computational Design Forum)* of the Architectural Society of China, Suzhou, China, 24 May 2019.

"BIM/Geo IFC2CityGML," *Integrated Digital Built Environment (IDBE) Summit, OGC's 110th Technical Committee Meeting*, Singapore, 28 February 2019.

"Design representations," *International Seminar on Computational and Performative Design Thinking*, School of Architecture and Urban Planning, Nanjing University, Nanjing, China, 6 December 2018.

"Design representations," School of Architecture, Tianjin University, Tianjin, China, 16 May 2018.

"Potentiality analysis for urban planning," *4th International Symposium on Formal Methods in Architecture*, ESAP-Escola Superior Artística do Porto, Porto, Portugal, 3 April 2018.

"Shapes and attributes," *4th international symposium on Formal Methods in Architecture*, ESAP-Escola Superior Artística do Porto, Porto, Portugal, 3 April 2018.

"The automation challenge of mapping IFC-BIM models into CityGML building models," *1st International IAG Workshop on BIM and GIS Integration Workshop,* University of Melbourne, 25 October 2017.

"Computational thinking for DfMA," *International BIM Competition 2017: Computational Design, Analysis and Optimisation for 'Design for Manufacturing and Assembly' (DfMA)*, Building and Construction Authority – Singapore Polytechnic, 19 May 2017.

"A practical shape grammar for Chinese ice-ray lattice designs," *2nd International Workshop on Cultural DNA*, Graduate School of Culture and Technology, KAIST, South Korea, 13 January 2017.

"Urban performance, computation, and the citizen," *On Cities and Citizenship International Conference*, Singapore University of Technology and Design, 8-9 June 2016.

"Data sets and tutorials to support contextual modelling," *Teaching Enhancement Grant (TEG) Talks*, Centre for Development of Teaching and Learning, National University of Singapore, 19 April 2016.

"A rule-based generative analysis approach for urban planning," *Cultural DNA Workshop*, Graduate School of Culture and Technology, KAIST, 20 November 2015.

"Représentation numérique en architecture," Ecole Polytechnique de Bruxelles, Université Libre de Bruxelles, Belgium, 28 May 2015.

R. Stouffs and P. Janssen, "Data-driven urban planning and design," *IFoU Winter School*, School of Design and Environment, NUS, 19 January 2015.

J. Rosemann, P. Janssen and R. Stouffs, "Urban Prototyping: a data-driven planning approach for sustainable urban development," IDEA League, Future Cities Laboratory, SEC, Singapore, 13 November 2014.

"Sortal grammars," Faculty of Architecture, University of Lisbon, Lisbon, Portugal, 16 September 2014.

"Digital design," School of Architecture, University of Sheffield, Sheffield, UK, 7 July 2014.

"Custom design representations for performative architecture," *Computational Design for BIG&TALL Structures*, Faculty of Architecture, Delft University of Technology, 6 January 2014.

"Design representations," *arTT* lecture, Department of Architecture, National University of Singapore, 13 May 2013.

"Giving designers access to design representations: sortal structures and sortal grammars," *Computation* lecture, Department of Architecture, Massachusetts Institute of Technology, 20 November 2012.

"Urban data modelling and simulation," *Workshop IV Integrated Resource and Urban Modelling for Sustainable Liveability*, School of Design and Environment, National University of Singapore, 2 May 2012.

"Custom design representations for performative architecture," *arTT* lecture, Department of Architecture, National University of Singapore, 6 October 2010.

"Sortal grammars for urban design: Urban Induction Patterns," *NSF International Workshop on Studying Visual and Spatial Reasoning for Design Creativity SDC'10*, Aix-en-Provence, France, 14-15 June 2010.

"Computation & Performance" and "Computational Design and Fabrication Technologies in Architecture," Department of Architecture, Middle East Technical University, Ankara, Turkey, 18 December 2009.

"Computation & Performance," *Open Platform SmartGeometry* workshop, Faculty of Architecture, TU Delft, 27 November 2009.

"Computational design for architectural engineering," *2nd Sino-Italian Workshop on Bridges and Special Structures*, Department of Architectural Construction, University IUAV of Venice, 12 December 2008.

"Sortal grammars for urban design and simulation," *Value Lab Workshop 'New Methods in Urban Simulation,'* Chair for Information Architecture, Swiss Federal Institute of Technology Zurich, 22 November 2008.

R. Stouffs and E. Janssen Groesbeek, "Performance Based Design," *'Wind and Buildings' Symposium*, Department of Building Technology, Delft University of Technology, The Netherlands, 11 April 2007.

"Design Informatics Research," Department of Civil and Environmental Engineering, University College Cork, Ireland, 29 March 2007.

"Sorts: a framework for representational flexibility," Graduate School of Computational Design, National Yunlin University of Science & Technology, Touliu, Taiwan, 17 October 2003.

"Flexibility and dynamism in digital design representations," Department of Architecture, Carnegie Mellon University, Pittsburgh, Pa., 10 October 2001.

"Motion in digital and information architecture," *Ontwerp Contrast Workshop 'Research in Motion,'* Stylos, Delft University of Technology, The Netherlands, 27 March 2001.

"ICT als schakel tussen ontwerp en constructie," *BouwToekomst Congres 'Virtueel Bouwen,'* IntraBouw, Zeewolde, The Netherlands, 1 February 2001.

"Sorts, a concept for representational flexibility," Department of Architecture, Carnegie Mellon University, Pittsburgh, Pa., 10 September 1996.

"Shape arithmetic, mixed-dimensional geometry, shape emergence, non-geometric elements, and shape interaction," Department of Architecture and Urban Design, University of California Los Angeles, 28 February 1995.

"An algebraic approach to shape modeling," Daimler Benz - AI Research Group, Berlin, 6 January 1995.

Invited panels

"Smart Cities, Smart Grids and a Smart Future Roundtable," *buildingSmart International Standards Summit 2019*, Beijing, 29 October 2019.

"Reinventing the Architectural Profession for the Digital Era," *ArchXpo UAP Singapore Lecture Series 2019*, Singapore, 1 October 2019.

Chair, "Simulations, interdisciplinarity, and early design," *Symposium on Simulation for Architecture and Urban Design*, Toronto, 23 May 2017.

Leader of the proposition team, "It is never too early to introduce computer software in architecture education," The Architecture Society (National University of Singapore), 10 July 2015, The URA Centre, Singapore.

Interviews

"ICT-tools zijn vaak welkom hulpmiddel," Frans van Velden, Dagblad Cobouw (90), p. 15, Sdu, The Hague, 13 May 2009.

"Victor op zoek," Victor Reinier, broadcast on RTL5, The Netherlands, 26 April 2003 (20:00).

"Kloof tussen ontwerp en maakbaarheid," Marcel van Rijnbach, Stedebouw & Architectuur 18 (7), p. 10, Arko Uitgeverij, Nieuwegein, The Netherlands, September 2001.

"Architectonisch ontwerpen met de computer," Lex Veldhoen, NRC Handelsblad, p. 32, NRC Handelsblad, Rotterdam, The Netherlands, 21 July 2001.

"Wetenschap vraagt om dwarskijkers," Lara van den Bosch, Delta 32 (34), p. 10, Delft University of Technology, Delft, The Netherlands, 9 November 2000.

Exhibitions

P. Janssen and R. Stouffs "Rethinking Urban Practices for Jurong Vision 2050," National Library Building (7th floor), Singapore, 4-30 August 2015; The URA Centre, Singapore, 31 August - 19 September 2015.

School of Design and Environment, National University of Singapore, "Rethinking Our City for Singapore's Next 50 Years," The URA Centre, Singapore, 23 July - 13 August 2015.

Academic Supervision

Supervisor and co-supervisor to Ph.D. students, Department of Architecture, NUS

Chen Jielin, "3D-ArchiNet: Representation-Learning-Based Generative Architecture Design with Interpretable Contextualized Feature Representation Models" (supervisor)

Zhang Jie, "Data-driven approach to sensory synesthesia in urban design: using multi-sourced and multi-modal data"

Choo Thian Siong, "An Interactive Multi-objective Design Method for Performance-based Design of Multi-functional Facade Using Surrogate Models," 2018

Liu Yuezhong, "A data-driven workflow for data mining to support the urban data analysis process," 2018 (supervisor)

Dan Hou (Tianjin University, School of Architecture), "Dynamic-Description-Grammars Based Interactive Optimization for Sustainable Building with Qualitative and Quantitative Objectives," Chinese Scholarship Council (CSC) Scholar, September 2016 - January 2018

Supervisor and co-supervisor to Ph.D. students, Faculty of Architecture and the Built Environment, TU Delft

Ahu Sokmenoglu, "Exploring social and spatial dynamics of a complex urban system: the case of Beyoglu," May 2016 (Joint Ph.D. with Istanbul Technical University) (supervisor)

Onur Sönmez, "Evolution for architecture: an exploration of evolutionary computation for architectural design," May 2015 (Joint Ph.D. with Istanbul Technical University)

Michela Turrin, "Performance assessment strategies for large structures," January 2014

José Beirão, "Urban Design Machine," October 2012

Ipek Gürsel, "CLIP: Computational support for Life-cycle Integral building Performance assessment," November 2010

Michael Bittermann, "Intelligent Design Objects: a cognitive approach for performance-based design," October 2009 (cum laude)

Committee member to Ph.D. graduates

Doina Andreea Ilies, "Aesthetic awareness and understanding in architectural education," Department of Architecture, National University of Singapore, March 2018

Yazid Bin Ninsalam, "Three Men and a Boat: Initiating Field and Design Strategies for Rivers in Mega-Urban Regions," Department of Architecture, National University of Singapore, January 2017

Nguyen Thi Lan Truc, "Theoretical Model of Mediated Shared Space for Supporting Informal Interaction at a Distance," Department of Architecture, National University of Singapore, September 2015

Hafizur Rahaman, "A Framework for Digital Heritage Interpretation," Department of Architecture, National University of Singapore, July 2012

Jacqueline de Jong, "Collective Talent: A Study on Improvisational Group Performance in Music," Faculty of Science, Universiteit van Amsterdam, October 2006

Michael Cumming, "Constructing Process Models from Distributed Design Activity," School of Architecture, CMU, January 2005

Shang-chia Chiou, "Computational Considerations of Historical Architectural Analysis: A Case Study of Chinese Traditional Architecture," School of Architecture, CMU, September 1996

External examiner of PhD dissertation

Andrew Burrow, "Typed Feature Structures and Design-Space Exploration," Department of Computer Science, The University of Adelaide, 2006

Supervisor/tutor to M.Arch. graduates, Department of Architecture, NUS

Vanetta Law Chung Yan, "Bridging the nature gap at ECP waterfront: re-rendering a coexisting habitat for human and hawksbill sea turtle," May 2020

Guo Qian, "Large roof design to improve the value of Orchard Road," May 2020

Wang Changren, "Weaving the complex," May 2020

Yu Jiake, "CYBERDRIFT: an online-to-offline smart mall for independent shop owners," May 2020

Chu Yi Ling, "Amphibious settlement," May 2019

Lin Zhuoli, "The coil," May 2019

Wong Kee Zhang, "Acoustic comfort for tropical urban living," May 2019

Tu Wen, "Amphibious living," May 2018

Shirley Lee Mei Ying, "Design your life," May 2018

Tan Xiao Li, "Metaverse Junior College," May 2018

Hong Shi'en Mirabell, "Housing to-gather," May 2017

Lim Pei Yi, "Cohesion enclave hub," May 2017

Lim Pei Yi, "The impact of energy consumption behaviours and schedule in leading Singapore public housing towards substainability," September 2016 (technical dissertation)

Sakina Bte Mohamed Halim, "Rethinking computer-aided design driven architecture typologies: a classification & review of material-based computational design," September 2016 (technical dissertation)

Baey Yan Ling, "Regem: regenerate, retrofit, a ramp-up factory," May 2016

William Chuo, "An industrial urban interface," May 2016

Ong Kai Liang, "A community factory: making connections," May 2016

Joshua Lee Binwei, "The mathematics of Muqarnas," September 2015 (technical dissertation)

Joanna Cho Enqi, "Electricity consumption in Singapore's public housing: a study of its determinants," September 2015 (technical dissertation)

Jasmin Mok Wei Lin, "The sound rise: sound barrier along the AYE," July 2015

Hao Yi Chun, "Adaptable future 2050," July 2015

Koh Teck Wei, "EleVate," May 2015

Chiang Wei Han, "The ascent: Jurong Hill in 2050," May 2015

Xie Yanglei, "In pursuit of the 4th 'R': government-initiated materials recovery facility-cum-community centre at Kampong Bugis eco-district," July 2014

Gracia Vera Quek Jia Min, "Mitigating the rural-urban dialectic: concrete shell bamboo mesh," May 2014

Sylvia Chen, "Fuelling 2015: algae," May 2014

Wu Yifan, "Potential of energy conservation through renovation of existing HDB in Singapore," September 2012 (technical dissertation)

Baskar Nittin Vignesh, "Energy retrofit of an existing research building: optimization through passive strategies," July 2012

Cheong Yong Hui Grace, "Design for disassembly: re-using the HDB," May 2012

Chin Qian Lyn, "Coexistence of nature and resources degradation in an urban city," May 2012

Tan Yong Shen, "Customized joints in architecture," May 2012

Vinod, "Re-rooting rail corridor: hope for slum upgradation; case Delhi," May 2012

Hartono Wijaya, "Generative-parametric design of high-performance airport terminal," May 2012

Supervisor and co-supervisor to M.Sc. graduates, Faculty of Architecture and the Built Environment, TU Delft

Ifigeneia Dilaveraki, "Constructed textiles," January 2012

Axel van Zalingen, "A single comprehensive computational building model," June 2011 (supervisor)

Tijl Uijtenhaak, "Communicating structural design options: using dashboard portals for exploring alternatives," Faculty of Civil Engineering and GeoSciences, June 2011

Bart van den Ende, "Standard principles: double curved facades," June 2011

Roel van de Straat, "Parametric modeling of architectural developables," April 2011 (supervisor)

Thijs Welman, "Digitale tool voor het ontwerpen van glasconstructies in het Bouwkunde onderwijs," January 2011

Tim Castelijn, "Self-supporting sandwich element for free-form building envelopes," January 2011 (supervisor)

Bart van de Water, "Herbruikbaar wandsysteem," January 2011 (supervisor)

Michiel Oosterhuis, "A parametric structural design tool for plate structures," June 2010

Michael Assal, "Een bouwtechnisch ontwerp en een economische haalbaarheidsstudie voor een ondergrondse luchthaven pier," June 2010 (supervisor)

Salman Khalili Araghi, "Generating high density residential housing apartments in the edge of city Den Haag," November 2009

Juan Manuel Davila Delgado, "Daylight respondent envelope design," October 2009

Lonneke Tiggeler, "Interactief drukvlak," October 2009

Silvana Paniagua Tufinio, "Architectural engineering improvements in the design projects," June 2009 (honorable mention)

Andres Pinzon Latorre, "Center of ecological technology," October 2008

Peter van Mourik, "Uitwisselbaarheid van BIM," Faculty of Civil Engineering and GeoSciences, September 2008

Megan Ng, "Research laboratory in Den Bosch," July 2008

Marcel Haasnoot, "Non-linear grid optimization and rain analysis on free formed glass roof," April 2008

Martijn Verster, "Gaming and simulation as a decision tool in highway projects," B.Sc. graduation project, Faculty of Civil Engineering and GeoSciences, March 2008

Paul de Ruiter, "Gebruik van High Resolution Design methode voor het ontwerp van een organisch vormgegeven windpaviljoen op het eiland Neeltje Jans," June 2005

Bas Plasschaert, "Architune, de standaardrealisatie van een beslissingsmodel," June 2005

Sanne van der Burgh, "Apres nous le Déluge," June 2004

Adriaan de Kroon, "De Enclave: Ontwerp voor oud-stadion Strahov," June 2004

Wouter van Vegchel, "Het BouwPortaal: Een onderzoek naar de mogelijkheden van het Semantisch Web in de civiele techniek," Faculty of Civil Engineering and GeoSciences, March 2004

Tymon Ros, "Rio de Cultura: Ontwerp van een woon, werk en expositieplek voor jonge kunstenaars," June 2003

Simon van Vegten, "Een middelgrote gesloten penitentiaire inrichting," December 2001

Committee member to M.Sc. graduates

Amartuvshin Narangerel, "Daylighting based parametric design exploration of 3D facade patterns," Graduate School of Culture Technology, Korea Advanced Institute of Science and Technology, December 2016

Thomas Wortmann, "Representing shapes as graphs: a feasible approach for the computer implementation of parametric visual calculating," Department of Architecture, Massachusetts Institute of Technology, June 2013

Canan Albayrak, "Performative architecture as a guideline for transformation of the defence line of Amsterdam," Department of Architecture, Middle East Technical University, January 2011

Selen Ercan, "Haarlemmermeer|Mobility & Infrastructure: a new system for making the co-existence of infrastructure, agriculture and inhabitance possible," Department of Architecture, Middle East Technical University, September 2010

External examinor to M.Sc. graduates, Faculty of Architecture and the Built Environment, TU Delft, February 2001 - June 2011

Committee member from industry to M.Sc. graduates, Department of Informatics, The Hague University, May 2003 - July 2005

Advisor to M.Sc. students, School of Architecture, CMU, September 1994 - December 1995

Teaching

■
Modules taught at the Department of Architecture, NUS

AR5807, Architectural Design Thesis, tutor, Semester 2 2018-2019, 2019-2020
> *This is a required, comprehensive and extensive, design studio for 2nd year M.Arch. students. Design projects can be research investigations where design forms a principal mode of enquiry; methods can be heuristic or empirical or in mixed modes of inquiry.*

AR5806, Architectural Design Research Report, tutor, Semester 1 2018-2019, 2019-2020
> *This is a required course for 2nd year M.Arch. students. This research report module supports the development of the architectural design thesis.*

AR5805, Advanced Architecture Studio, tutor, Semester 1 2018-2019, 2019-2020
> *This is a required course for 2nd year M.Arch. students. This design research studio supports the development of the architectural design thesis.*

AR5802, Options Design Research Studio 2, tutor, Semester 2 2018-2019, 2019-2020
> *This is a design studio for 1st year M.Arch. The focus is generally on computational analysis and rule-based design at the urban scale.*

AR5953E, Topics in Design Technology: Rule-based Design of an Urban Village, module leader and instructor, Semester 1 2019-2020
> *This is an elective course for M.Arch (or 4th year B.A. (Arch.)) students. This module takes a hybrid form between a collaborative design studio and an elective module on computational rule-based design generation. With respect to the former, students are joined by Architecture students from Harbin Institute of Technology (HIT) Shenzhen. With respect to the latter, students are introduced to a Grasshopper plug-in that allows them to express and apply graphical rules to generate urban massing. A comparative study between Singapore and Shenzhen is part of the analysis process. The Greater One North area serves as the site for the planning and design.*

AR5959H/AR5953L, Topics in Design Technology: Design Space Exploration, module leader and instructor, Semester 1 and 2 2013-2014, Semester 2 2018-2019
> *This is an elective course for M.Arch (or 4th year B.A. (Arch.)) students. This module focuses on design space exploration as the ability to explore alternative design solutions as a means to inform the design and decision-making process, using techniques of parametric/associative modelling, spatial and shape grammars and/or algorithmic design generation. Students define and investigate a family or language of designs as well as the main characteristics of the design space and its structure.*

AR5959B/AR5953B_2 Parametric Design and Analysis Support Tools, module leader and instructor, Semester 1 2017-2018, 2018-2019
> *This is an elective course for M.Arch (or 4th year B.A. (Arch.)) students. This module is conceived in support of students' design activities in a design studio. It gives students the opportunity to explore parametric design and analysis support tools, within the Rhino/Grasshopper environment, and apply these to their design project.*

AR5103/AR5104, Architectural Design Thesis/Final Design Project, tutor, 2011-2012, 2013-2014, 2014-2015, 2015-2016, 2016-2017 and 2017-2018
> *This is a required design studio for M.Arch. students. This studio module encompasses a design enterprise enquiring into specific issues (e.g., in technology or sustainability) with the intent to define an original, intelligent and creative architectural proposition.*

AR5105/AR5121, Architectural Design Research/Special Topics in Technology, tutor, 2011-2012, 2013-2014, 2014-2015, 2015-2016, 2016-2017 and 2017-2018

This is a required course for M.Arch. students. This research module supports the development of the architectural design thesis/final design project.

AR4002 Advanced Architectural Study 2: BIM focus, instructor, Semester 2 2015-2016, 2016-2017 and 2017-2018

This is a required course for 4th year B.A. (Arch.) students in the BIM focus of the General Programme track. This independent study module focuses on computational advances relating to Building Information Modelling (BIM).

AR4101/AR4103, Design 7/Architectural & Technology Design 1, tutor, Semester 1 2017-2018

This is a required design studio for 4th year (sem. 7) B.A. (Arch.) students in the Design/Design Technology & Sustainability track. The specific, collaborative studio focused on the transformation of the Greater One North area from an eclectic aggregation of poorly connected urban islands into a coherent, sub-regional urban centre positioned halfway between the CBD and Jurong East, which includes many leading institutions of education, research and development.

AR4001 Advanced Architectural Study 1: BIM focus, instructor, Semester 1 2015-2016, 2016-2017 and 2017-2018

This is a required course for 4th year B.A. (Arch.) students in the BIM focus of the General Programme track. This module focuses on Building Information Modelling (BIM) and introduces parametric BIM, performative BIM and collaborative BIM.

AR2521, Digital Modelling & Simulation, instructor, Semester 1 2013-2014, 2014-2015, 2015-2016 and Semester 2 2016-2017

This is a required course for 2nd year B.A. (Arch.) students. This module focuses on the theoretical foundations of digital modelling and performance simulation, enabling students to develop a critical understanding of relevant digital tools and techniques, and the role that they can play in the design process. The theoretical understanding is enhanced by hands-on experimentation with a subset of tools and techniques. I led the communication part of the module (next to the simulation and modelling parts), with an emphasis on digital manufacturing.

AR4322, Design Simulation & Analysis, module leader and instructor, Semester 1 2014-2015, 2015-2016 and 2016-2017

This is an elective course for 4th year B.A. (Arch.) students. This module covers the concept of performance-based architectural design and the fundamentals of design simulation and analysis in the formulation of design strategies. It is aimed to provide students with quantitative means to evaluate architectural design in areas of climate response, day-lighting, solar analysis, and energy efficiency in achieving sustainable objectives.

AR5142, Technical Dissertation, module leader (2016-2017) and tutor, (summer and) Semester 1 2012-2013, 2014-2015, 2015-2016 and 2016-2017

This is a required course for M.Arch. students in the Design Technology & Sustainability track. This module evaluates the students' ability to carry out independent research in technical design issues and systems relevant to building and architectural design.

IFoU Winter School "Jurong Vision 2050," tutor, 12-23 January 2015

The International Forum on Urbanism (IFoU; www.ifou.org) is a network of 17 universities mainly in Asia and in Europe. The IFoU Winter School in Singapore is the 11th of its kind. About 40 professors and 170 students participated in developing scenarios and design strategies for the transformation of the Jurong West area from an almost mono-functional, segregated and fragmented, partly highly polluted industrial area into a major catchment area for future population growth that combines clean(ed) industrial plants with green lungs, attractive housing and vibrant urbanity for one million people.

AR5953I, Topics in Design Technology: Façade Rules, Spatial Grammars and Processing, module leader and instructor, Semester 2 2011-2012

This is an elective course for 4th year B.A. (Arch.) and M.Arch students in the School of Design & Environment. This module focuses on spatial and shape grammars as a generative approach and their application to façade design,

and considers Processing as the development environment. Formal and informal aspects of grammars, evolution of grammatical ideas, application of a grammatical approach to façade design and its implementation in Processing are emphasized.

AR4102, Urban and Architectural Design Studio (Housing), tutor, Semester 2 2011-2012
This is a required design studio for 4th year (sem. 8) B.A. (Arch.) students in the Design track. This studio module studies the issues and methods involved with the urban community and high-density housing. The particular studio topic concerns the urban potential of Tanjong Pagar as a mix-use, culturally significant neighborhood acting as a generative node within the urban fabric of Singapore. The first part of the studio focuses on the urban context, analyzing the existing urban fabric of Singapore and the potential role of Tanjong Pagar as a creative hub within this fabric, leading to the design of a site plan for Tanjong Pagar that is explored and visualized using procedural modeling. The second part focuses on the architectural design of an individual building within the site plan.

AR4101, Urban and Architectural Design Studio (Technology), tutor, Semester 1 2011-2012
This is a required design studio for 4th year (sem. 7) B.A. (Arch.) students in the Design track. This studio module provides students the opportunity to demonstrate their understanding and ability in integrating technology with architecture. The particular studio topic concerned an architectural intervention aimed at increasing the quality of life in the new town of Punggol. The objective was to achieve both rigor in the design approach and elegance in the design result, through an interactive process of design concept development and (computational) design method research.

Graduation lab leader at the Faculty of Architecture and the Built Environment, TU Delft

Computational Architecture specialization of the Architecture track of the MSc Architecture, Urbanism & Building Sciences programme, part of the International Joint M.Sc. Programme Computational Design and Fabrication Technologies in Architecture in collaboration with Department of Architecture, Middle East Technical University, Ankara, September 2009 - July 2011

Computation & Performance specialization of the Building Technology track of the MSc Architecture, Urbanism & Building Sciences programme, September 2009 - July 2011

Architectural Engineering specialization of the Architecture track of the MSc Architecture, Urbanism & Building Sciences programme, September 2007 - June 2009

Courses taught at the Faculty of Architecture and the Built Environment, TU Delft

AR3010, NeXTGEN Research Methods, course leader and instructor, autumn and spring semester 2010-2011
This is an elective course at the MSc and Phd level, presenting a variety of research methods and models that are relevant to researchers and students in Architecture, Urbanism and Building Sciences.

AR3B960, Stand Up Architecture (formerly AR3B310, Computation and Performance Design & Research), course leader and instructor, autumn and spring semester 2009-2010, 2010-2011
This is a required course for 3rd semester MSc students in the Design and Technology variant Computation and Performance of the Building Technology track, as well as an elective course at the MSc level. This course concerns the design, computation and digital manufacturing of performative architecture in an exploratory process.

AR0050, Design Informatics Study (formerly Mediated Discourse), course leader and instructor, autumn and spring semester 2004-2005, 2005-2006, 2006-2007, 2007-2008, 2008-2009, 2009-2010, 2010-2011
This is an elective course at the MSc level. This course is concerned with the advanced possibilities afforded by ICKT (information, communication and knowledge technology) and new media in supporting the design process during the various stages of design, materialization and realization in architecture, urbanism and building technology. The students explore these advanced possibilities (one or more) within a project that they each define themselves.

AR0960, Stand Up Architecture, course leader and instructor, spring semester 2007-2008, autumn and spring semester 2008-2009, 2009-2010

> *This is an elective course at the MSc level, recommended for students in the Architectural Engineering specialization. This course focuses on establishing fluency in digital design techniques, presenting a limited design problem with the goal of introducing students to using parametric design tools and evaluation techniques as well as digital fabrication for a full design iteration loop. Problems are drawn from the different research areas of building technology and linked to a short sketch design proposal which is taken as the starting point of the loop. Physical prototypes are built at the appropriate scale to evaluate the proposal.*

AR3Ae020, Design Theory, instructor, autumn and spring semester 2008-2009

> *This is a required course for 3rd semester MSc students in the Architectural Engineering specialization of the Architecture track. This course focuses on theoretical issues of architecture and the use of technology as the inseparably linked basis for explorations of building design and technological advances, and the field of fascination between these. The course intends to create an environment for critical discourse on selected subjects concerning technological architecture and enable the students to conduct research and write position papers.*

AR3Ae010, Design Research Studio, course leader, autumn semester 2007-2008 and 2008-2009

> *This is a required course for 3rd semester MSc students in the Architectural Engineering specialization of the Architecture track. This course focuses on design as a collaborative enterprise informed by research findings drawn from different disciplines. A particular emphasis is placed on the influence of engineering sciences of performance evaluation regarding to wind, light and energy and structural tectonics. To achieve such an integrated approach to design specific computational models need to be developed and explored in the design context. Traditionally studios focus on conceptual development at first, the design research studio series sets out to start conceptual development in parallel with the development of computational approaches responding to research questions from the building sciences. In the ideal case research is as creative as it is rigorous and architectural design is ideally suited to incorporate knowledge from different domains and translate it into built form.*

AR3B030, Computer Aided Design II, course leader and instructor, spring semester 2005-2006, autumn and spring semester 2006-2007

> *A required course for all MSc students in the Building Technology track. In three exercises, the student is acquainted with the possibilities of scripting for building technical design. The first exercise concerns a simple repetitive structure, such as a load bearing structure consisting of columns and beams on a grid. The second exercise concerns a more complex repetitive structure, such as a 3D rafter where the repetition is guided by one or more 3D curves. The third exercise concerns a moving structure, such as a dynamic shading device.*

BK6B030, Introduction to scripting and programming, course leader and instructor, autumn and spring semester 2003-2004, 2004-2005, 2005-2006, 2006-2007

> *An elective course at the BSc level offering students an introduction to the method and application of scripting for the development of design support tools. Attention is paid to the basic concepts of scripting or imperative programming on the basis of a graphic scripting language (Maya/MEL). These basic concepts are applied in a series of small exercises with an emphasis on the iterative development and testing of small programs and tools. Finally a scripting assignment is developed and implemented that can be used in design.*

BKMVK12, Urban CAD, course leader, fall semester 2003-2004

> *An elective course at the MSc level.*

BKMVK38, Computer programming in the design process, course leader, autumn semester 2003-2004

> *An elective course at the MSc level.*

BKM3BC4, Constructions: Geometrical Design & Modelling, course leader, autumn semester 2002-2003

> *A required course for MSc Building Technology students with a Constructions major.*

BKM2B06a, ZAPPI & Blob Design: Computer Aided Design II, course leader, autumn semester 2002-2003

A required course for MSc Building Technology students with a Constructions or Materials major

BKM1B03, Component & System Design: Computer Aided Design I, course leader, autumn semester 2002-2003
A required course for all MSc Building Technology students.

CX Block Complex, course leader and lecturer, 2nd and 3rd period 1999-2000, 2000-2001, 2001-2002
A lecture and lab sessions form a part of a 1st-year study block focusing on the compositional and constructive unity of the main elements in the design of an appartment building. This block forms a part of the study stream "Design and Theory" and provides a first introduction to urban design. The lecture considers the role of information technology in the design process and serves as a theoretical introduction to the use of this technology in the lab sessions. In these lab sessions, the students use the computer as a tool for decomposition and analysis of an existing building and for the modeling of their own design.

PU Block Production & Assemblage, course leader and lecturer, 4th and 5th period 1999-2000, 2000-2001
A couple of lectures and computer support sessions form a part of a 2nd-year study block focusing on the production and realization stage in the building process. The lecture considers the role of ICT in the exchange of information within the collaborative building process with an emphasis on Web-based project management environments, product models and Computer-Supported Collaborative Work (CSCW). The students roleplay the different participants in the production and realization process and organize all information generated in the process through an intranet.

OT Block Design & Theory, course leader and lecturer, 2nd and 4th period 1999-2000, 2000-2001
A lecture and lab sessions form a part of a 2nd-year study block focusing on theory forming with respect to architectonic and urban design. The lecture considers the influence of Information and Communication Technology (ICT) on architectonic and urban design processes and analysis techniques. In the lab sessions, the students use the computer as a tool for the positioning of a building in an existing environment and for the analysis of the building and the environment (2D and 3D).

Courses taught at the Department of Architecture, ETH Zurich

10-729 CAAD Programming, instructor, Winter 1996-97, 1997-98 and 1998-99
An elective course for Architecture students and a required course for CAAD post-graduate students, this course presents an introduction to programming for architectural design.

I have lectured on Artificial Intelligence in Design, Summer 1996 and Winter 1996-97, and on Spatial Grammars, Winter 1996-97.

Courses taught at the School of Architecture, CMU

48-120 Computer Modeling I, course leader and instructor, Fall 1994 and 1995
A required course for Architecture freshman students intended to give the student a taste of the possible role(s) of computers in the design process, in particular for drawing, representation and visualization. In a lecture series, we presented various concepts in computer modeling and computer-aided design. In lab sessions, the students gained familiarity with a number of modeling programs for two and three dimensions.

48-745 Geometric Modeling, course leader and instructor, Spring 1994 and 1995
An Architecture and EDRC (Engineering Design Research Centre) graduate core course, this course gave an overview of geometric and solid modeling including the following topics: the mathematical foundation of vectors, planes and frames for geometric programming; solid models based on point-set topology and algebraic topology; a constructive representation scheme for solids (CSG); a boundary representation scheme for solids (B-rep); approaches for the inclusion of non-solid geometric objects.

48-746 Design Interfaces for CAD, instructor, Spring 1995

> *An Architecture and EDRC (Engineering Design Research Centre) graduate core course, this course dealt with the issues surrounding the design of software interfaces, including aspects of human computer interaction. Each student chose an interface project to complete during the duration of the course. The lectures provided the knowledge base as well as discussion time on the projects.*

48-750 Programming in C, instructor, Fall 1993

> *A required course for Architecture graduate students presenting a thorough introduction to the C programming language.*

I was a Teaching Assistant for 48-135 Fundamentals of Architectural Geometry, Spring 1993, and 48-750 Programming in C, Fall 1992.

I have tutored on Shape Grammars, Spring 1993, and on Prolog in Geometric Modeling, Spring 1991 and 1992.