

# Faculty of Architecture

RESEARCH LEADERS: Frank van der Hoeven PhD & Research Council  
RESEARCH COUNCIL: Prof. Andy van den Dobbelaere PhD, Irem Erbas, Ipek Gursesel, Frank van der Hoeven PhD, Prof. Vincent Nadin,  
Lara Schrijver PhD, Rudi Stourfs PhD, Marie-Thérèse van Thoor PhD, Prof. Henk Visscher PhD, Theo van der Voordt PhD

# 1

## Objectives and research area

### 1.1 Vision, mission and objectives

**Vision:** The vision of the 'Architecture and the Built Environment' Research Portfolio is to consolidate the excellent international academic reputation of the Faculty of Architecture as a leading design academy; to be an international platform for innovation in architectural design, building engineering, urban planning, landscape architecture and management for the built environment; and to be a platform for the debate on current and social themes in architecture and the built environment.

**Mission:** The Faculty's mission is to educate leading international Master's and PhD students about architectural design, building engineering, urban planning and management for the built environment; to perform excellent and innovative design-oriented research; to transfer its knowledge through its Bachelor's and Master's degree programmes, through journal articles and book publications, exhibitions and events, and through consulting.

**Objectives:** The faculty's objective is to play a key role in the cluster of architectural and urban design industry in the western part of the Netherlands, and develop a strong international presence, exploiting the reputation of Dutch architecture and spatial planning and the significance of the Randstad as a leading European region.

### 1.2 Societal concerns and issues

The principal societal concern addressed by the Faculty's research is 'quality of life in buildings, cities and regions'. This quality of life is related to various issues such as aesthetics, energy efficiency, land-use efficiency and value creation. It affects the life styles of individuals and the social, economic and territorial cohesion of communities.

### 1.3 Position

The Faculty of Architecture at Delft University of Technology is one of the largest architecture faculties in Europe with more than 3,000 students and around 250 full time equivalent (FTE) scientific staff. Traditionally a high percentage of the scientific staff are also practitioners. Well-known designers such as Jo Coenen, Tony Fretton, Dick van Gameren, Winy Maas, Michiel Riedijk, Kas Oosterhuis and Dirk Sijmons conduct research and teach at this faculty. This produces innovative and revolutionary architects, building engineers, urban designers and managers.

### 1.4 Research area

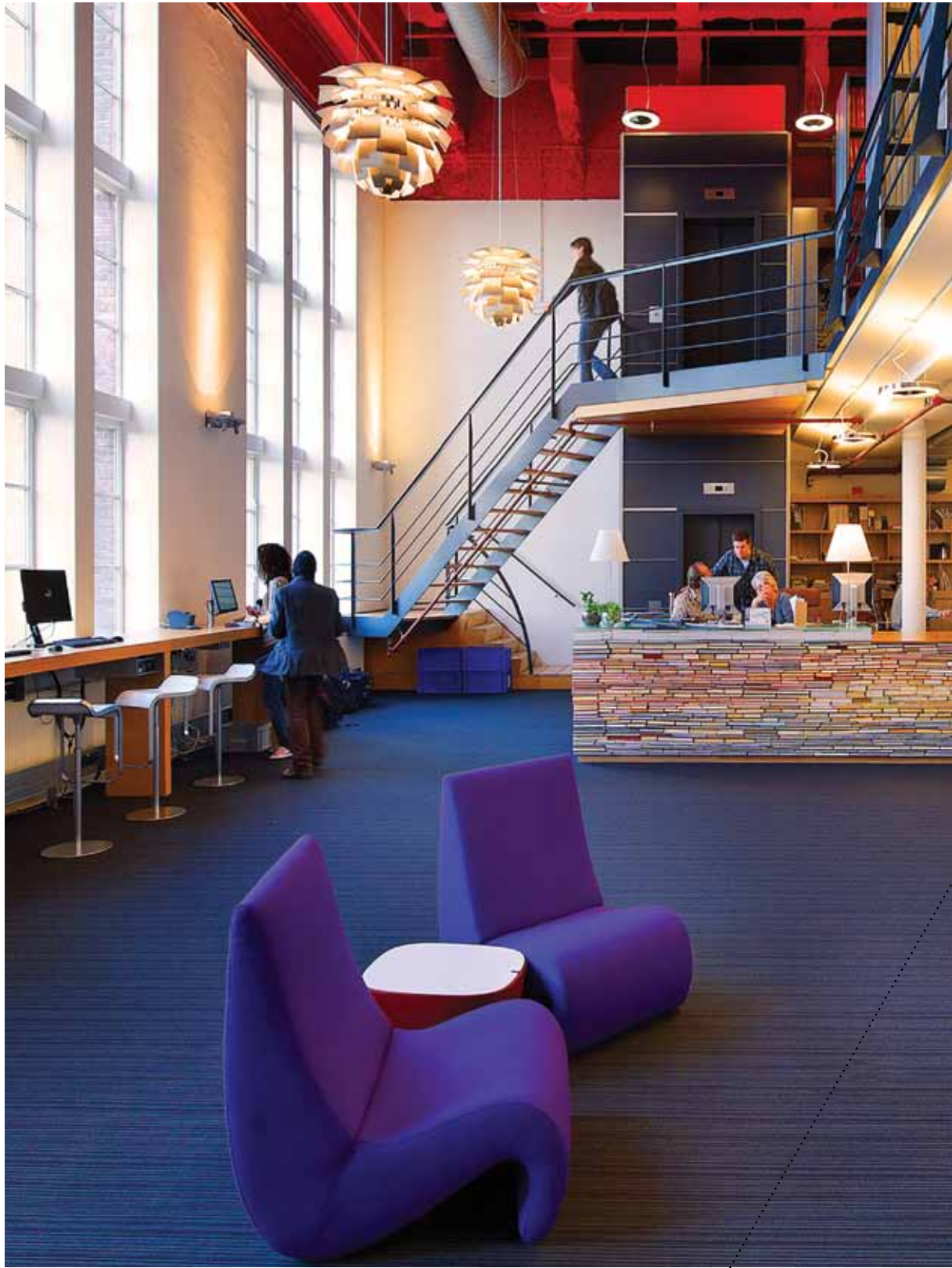
The specific characteristics of the faculty's research are referred to by the concept of 'design-oriented research'. Central to the discussion on 'design-oriented research' is the level of scientific rigour of the design activities. These activities involve building theory, appropriate research methods, communication patterns, scientific critique, and so on. This scientific rigour, however, has to be balanced with specific contextual demands of this field such as reflection and creativity in the design process. The concept thus encompasses a broad typology of research activities situated on an imaginary axis ranging between intuitive design on the 'art' side of the axis towards optimizing scientific research on the 'science' side of the axis. This broad typology is reflected in the various ways in which the concept of 'design-oriented research' is defined by the different Research Groups. The following categories of research can be distinguished:

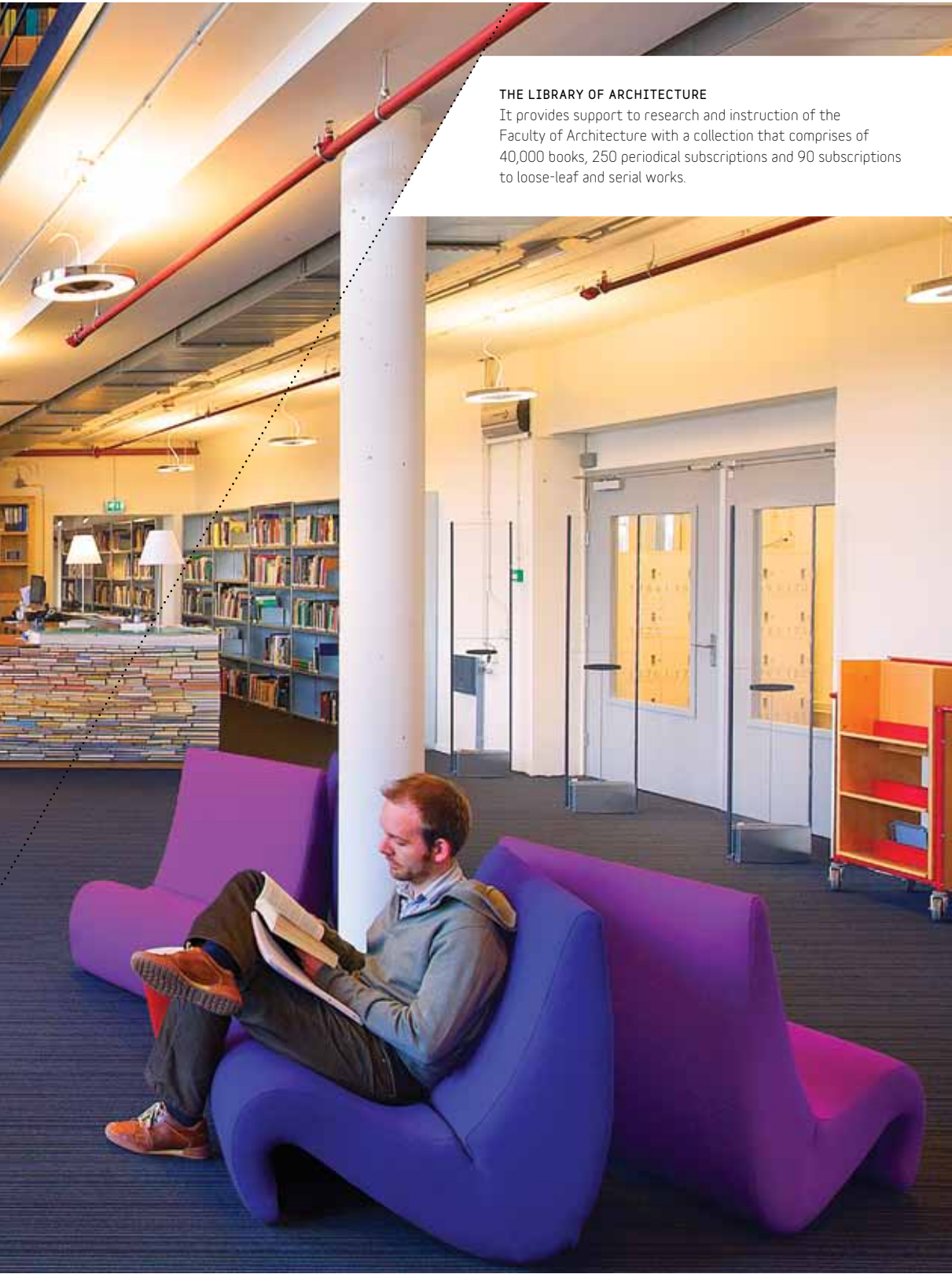
1. evaluation research, which is characterised as the empirical study of existing objects and processes. It analyses the effects and consequences which manifest themselves once architectural objects or processes have been realised.
2. historical research, which interprets, understands and explains designs, while taking site characteristics into account.
3. conceptual research is exploratory and experimental and aims at innovative, revolutionary concepts, manifestos and visions of the built environment.
4. practical research is research done for educational purposes and for professional practices and refers to the research architect's need to find optimum solutions for certain building assignments.

The Faculty of Architecture comprises seven research groups (including one joint group with OTB).

**Table a. Research groups**

DEPARTMENTS	RESEARCH GROUPS	LEADERS
Architecture	Architecture	Lara Schrijver PhD & Tom Avermaete PhD
@MIT & IHA AU	Design & History	Marie-Thérèse van Thoor PhD & Cor Wagenaar PhD
Building Technology	Computation & Performance	Rudi Stouffs PhD & Prof. Joop Paul PhD
	Green Building Innovation	Prof. Andy van den Dobbelsteen PhD
Urbanism	Urbanism	Prof. Vincent Nadin
Real Estate & Housing	Innovations in Management of the Built Environment	Prof. Hans Wamelink PhD & Prof. Hans de Jonge
	Housing Quality	Prof. Henk Visscher PhD & Vincent Gruis PhD





**THE LIBRARY OF ARCHITECTURE**

It provides support to research and instruction of the Faculty of Architecture with a collection that comprises of 40,000 books, 250 periodical subscriptions and 90 subscriptions to loose-leaf and serial works.

# 2 Composition

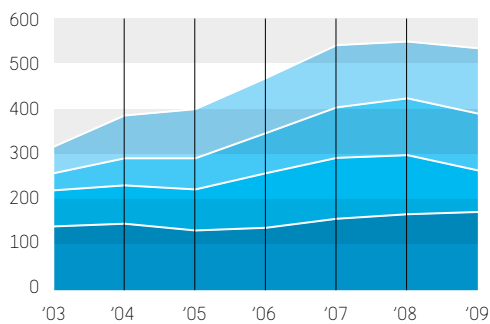
**Table a. Research staff at institutional and programme level**

	2003		2004		2005		2006		2007		2008		2009	
	NR	FTE	NR	FTE	NR	FTE	NR	FTE	NR	FTE	NR	FTE	NR	FTE
Tenured staff	141	34	149	34	130	32	137	36	159	40	168	45	169	43
Non-tenured staff	80	22	87	19	91	22	121	31	138	37	133	43	92	34
PhD-students	39	20	60	29	81	41	94	49	124	53	124	48	145	41
Guests	58		96		109		118		139		126		146	
<b>TOTAL RESEARCH STAFF</b>	<b>318</b>	<b>76</b>	<b>392</b>	<b>82</b>	<b>411</b>	<b>95</b>	<b>470</b>	<b>116</b>	<b>560</b>	<b>131</b>	<b>551</b>	<b>136</b>	<b>552</b>	<b>118</b>

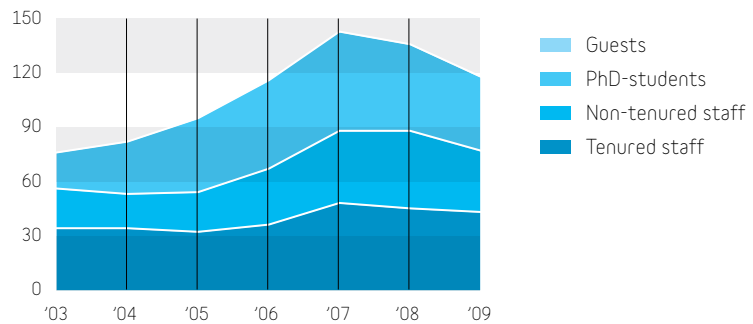
Tenured staff (assistant professors, associate professors and professors) spend an average of 35% of their time on research, non-tenured staff (researchers) spend 70% of their time on research, PhD students spend 80%. These percentages are incorporated into the Full Time Equivalent (FTE) figures above. Much of difference between the FTE numbers and staff numbers can be explained by these percentages. However, the difference is also caused by a substantial number of part-time staff members, as is the case with many of the non-tenured staff.

'Guests' is something of an eclectic grouping. It includes people who make use of the faculty's facilities (such as the library or the model shop). It also includes visiting professors, emeritus professors and guest researchers, as well as staff that have moved to a new job but in the near future are expected to publish on the research they have conducted at TU Delft. Guests are not employed by the faculty and therefore not included in the FTE figures.

**Chart a. Total research staff in numbers**



**Chart b. Total research staff in fte**



**Table b. Research staff with position in practice**

WHO	ROLE	FIRM/ORGANISATION	WHERE
Prof. Thijs Asselbergs	Director	aTA Architectuurcentrale	Haarlem NL
Prof. Henco Bekkering	Partner and director	HKB Stedebouwkundigen	Rotterdam/ Groningen NL
Prof. Monica Chao-Duivis PhD	Managing director	Dutch Institute for Construction Law	The Hague NL
Prof. Jo Coenen	Founder and owner	Jo Coenen & Co Architects	Maastricht NL
Prof. Mick Eekhout PhD	Director	Octatube International bv	Delft NL
Prof. Tony Fretton	Founder and director	Tony Fretton Architects	London UK
Prof. Dick van Gameren	Founder and director	Dick van Gameren Architecten	Amsterdam NL
Prof. Anke van Hal PhD	Prof. Sustainable Building and Development	Nijenrode Business University	Breukelen NL
Prof. Rob van Hees	Research coordinator	TNO Building Conservation	Delft NL
Prof. Maurits de Hoog	Senior urban advisor	Urban Planning Department	Amsterdam NL
Prof. Hans de Jonge	Managing director	Brink Groep bv	Leidschendam NL
Prof. Kees Kaan	Founder, partner and director	Claus en Kaan Architecten	Rotterdam NL
Prof. Ulrich Knaack PhD	Prof. Design and construction	Hochschule OWL	Detmold DE
Prof. Marieke Kuipers PhD	Specialist	Cultural Heritage Agency	Amersfoort NL
Prof. Eric Luiten	Advisor on Spatial Quality	Province of South Holland	The Hague NL
Prof. Peter Luscuere	Director	Royal Haskoning Building Services	Rotterdam NL
Prof. Winy Maas	Co-founder and director	MVRDV Architects	Rotterdam NL
Prof. Paul Meurs PhD	Co-founder and owner	Steenhuis-Meurs bv	Schiedam NL
Prof. Rob Nijssse	Managing partner	ABT bv	Velp NL
Prof. Kas Oosterhuis	Principal	ONL	Rotterdam NL
Prof. Joop Paul PhD	Managing director	Arup Netherlands	Amsterdam NL
Prof. Michiel Riedijk	Founder, partner and director	Neutelings Riedijk Architecten	Rotterdam NL
Prof. Joost Schrijnen	Director of Spatial and Mobility Planning	Province of South Holland	The Hague NL
Prof. Dirk Sijmons	Owner and director	H+N+S Landscape Architects	Utrecht NL
Prof. Patrick Teuffel PhD	Managing partner	Teuffel Engineering Consultants	Stuttgart DE
Prof. Hans Wamelink PhD	Leading professional	DHV bv	Amersfoort NL

# 3

## Research environment and embedding

### 3.1 Embedding

The Faculty of Architecture is well embedded in the international design-oriented practices of Architecture and the Built Environment. In the past seven years, the faculty has seen an influx of foreign PhD students and staff members, while the geographical scope of its activities such as conferences, networks and consortia clearly hint at an increased level of interaction with both national and international stakeholders and partners. The extent of the faculty's integration becomes evident in the positions that its professors and associate professors hold in industry, government and the community. The networks in which they participate, the research commissions they receive from industrial partners, local, regional and national authorities are evidence of their research endeavour, as are the exhibitions, conferences and congresses in which they participate. Detailed highlights of these performances are presented in chapter 8 'academic reputation'.

### 3.2 Number and affiliation of guest researchers

The number of staff that received academic hospitality has grown from about 60 (2003) to over 140 (2009). As explained on page 18 this is something of an eclectic grouping. Among their affiliations are:

#### *Europe and the Middle East*

- Bilkent University, TR
- Ghent University, BE
- Istanbul Technical University ITU, TR
- National Laboratory for Civil Engineering LNEC, PT
- Norwegian University of Science and Technology Trondheim, NO
- Tel Aviv University, IL
- TU Budapest, HU
- TU Lisbon (UTL), PT
- TU Wien, AT
- Université de Paris I-Panthéon-Sorbonne, FR
- University of Birmingham, UK
- University of Dortmund, DE
- University of Liverpool, UK
- University of Parma UNIPR, IT
- University of Reading, UK
- University of Salford, UK
- University of Torino UNITO, IT
- University IUAV of Venice, IT
- Utrecht University, NL
- Middle East Technical University METU, TR

#### *North and South America*

- Dalhousie University, CA
- Harvard University, US
- Massachusetts Institute of Technology MIT, US
- Princeton University, US
- Southern California Institute of Architecture Sci-Arc, US
- Universidade Federal da Bahia UFBA, BR
- University of Calgary, CA
- University of Tennessee, US
- University of Texas, US

#### *South-East Asia:*

- Hanyang University, KR
- Kyoto University, JP
- National University of Singapore, SG
- Southeast University SEU, CN
- Tsinghua University, CN

### 3.3 International and national positioning

In 2008/2009 the Faculty of Architecture took part in a pilot to explore evaluation methods, the NWO-funded Evaluating Research in Context (ERIC) project. The ERIC pilot concluded that: *“there is no stable publication pattern nor a core set of scientific journals to make a valid bibliometric benchmarking of architectural departments. Only a small sample of scientific journals is covered by ISI databases. Although these data can be included in an evaluation report, clearly for an assessment of the research quality of the programs, information about program, other scientific outputs and good peer assessment will be required and are of more value.”*

However, we would still like to be clear about the institutes that we consider to be competitors. The faculty is positioned within a leading group of European, American, Asian and Australian design schools, including ETH, MIT, RMIT and NUS. Based on the SCOPUS index, we have visualised the publication record of these institutes based using the (sub)affiliation as indicated in the table on page 22.

The publication record is, as the ERIC project noted, not on a par with research excellence. RMIT Architecture, for example, has a modest publication record although the *discipline scored 5, the highest possible result, in the ERA trial to assess the research excellence of Australian Humanities and Creative Arts (HCA) disciplines for 2002-2007.* Bartlett, on the other hand, with its very substantial publication record has only one high-flying group. *The Space Group was noted as the highest performer of the Bartlett (which has the highest proportion of 4\*, ‘world leading’, research in the field of Architecture and the Built Environment), in the 2008 Research Assessment Exercise.*

Although we would not wish to overstate the overall significance of publication records, we would like to point out the combined strength of the Faculty of Architecture and the OTB Research Institute. The OTB will be integrated into the Faculty of Architecture in the course of 2011, turning the joint institute a strong player indeed.

**Table a. Score table academic publications listed in Scopus**

THE NETHERLANDS										
WHERE	INSTITUTE		2003	2004	2005	2006	2007	2008	2009	TOTAL
NL	Berlage Institute		0	0	0	1	0	1	1	3
NL	TU Delft	Architecture	15	18	16	18	29	29	21	146
NL	TU Delft	OTB	34	37	43	39	53	68	70	344
NL	TU Delft	Architecture OR OTB	49	54	57	57	81	94	89	481
EUROPE & MIDDLE EAST										
WHERE	INSTITUTE		2003	2004	2005	2006	2007	2008	2009	TOTAL
AT	University of Applied Arts Vienna		2	5	0	3	4	4	5	23
BE	KU Leuven	Architecture OR Urbanism OR Planning	4	4	7	1	9	7	2	34
CH	ETH Zurich	Architecture	0	0	2	2	5	4	5	18
DE	Bauhaus Universität Weimar	Architecture	0	1	0	0	3	0	3	7
UK	University of Sheffield	Architecture	9	13	15	14	26	16	28	121
FR	École nationale supérieure d'architecture Paris-Malaquais		0	0	0	1	0	0	2	3
IL	Technion	Architecture	7	12	13	20	11	13	17	93
IT	Università Iuav di Venezia		7	14	17	12	28	30	33	141
NL	TU Eindhoven	Architecture OR Building Physics OR Urban	19	23	29	48	47	50	61	277
UK	Architectural Association		0	1	1	3	6	3	2	16
UK	Bartlett		22	32	41	55	58	55	56	319
NORTH AMERICA										
WHERE	INSTITUTE		2003	2004	2005	2006	2007	2008	2009	TOTAL
US	Carnegie Mellon	Architecture	5	13	8	13	12	7	20	78
US	Columbia University	Architecture OR Planning OR Preservation OR GSAPP	4	7	11	10	14	8	9	63
US	Cornell University	Architecture OR Art OR Planning	10	8	12	15	17	27	21	110
US	Harvard University	Architecture OR Design OR GSD	12	9	11	13	12	20	15	92
US	MIT	Architecture OR Planning	8	8	9	8	10	10	9	62
US	Rice University	Architecture	1	2	1	1	0	1	2	8
US	UC Berkeley	Design OR Architecture OR Planning	17	33	28	37	45	28	41	229
US	Yale University	Architecture	0	1	3	3	5	4	3	19
ASIA & AUSTRALIA										
WHERE	INSTITUTE		2003	2004	2005	2006	2007	2008	2009	TOTAL
AU	RMIT	Architecture	0	0	3	7	5	8	4	27
CN	Southeast University	Architecture	0	0	0	5	3	7	16	31
CN	Tongji University	Architecture	1	1	6	9	17	13	16	63
CN	Tsinghua University	Architecture	11	22	23	36	36	53	54	235
JP	Kyoto University	Architecture	8	6	7	23	18	11	23	96
SG	National University Singapore, NUS	Design AND Environment	40	49	37	38	25	20	20	229

Document types included in Scopus: Article, Article-in-Press, Conference Paper, Editorial, Erratum, Letter, Letter to or correspondence with the editor, Note, discussion or commentary, Review, Short Survey.

### 3.4 Actual collaborations with stakeholders

The faculty works with ministries and national agencies, regional and local authorities, European and national research funding agencies, industrial partners, research institutes and societal institutes and foundations.

#### **Ministries and national agencies**

- Ministry of Economic Affairs (EZ)
- Ministry of Education, Culture and Science (OCW)
- State Service for Cultural Heritage (RACM/RDMZ)
- Ministry of Foreign Affairs (BUZA)
- Ministry of Housing, Spatial Planning and the Environment (VROM)
- Dutch Government Buildings Agency (RGD)

#### **Regional authorities**

- Cityregion Eindhoven (SRE)
- Province of Groningen
- Province of Noord-Holland
- Province of Zuid-Holland

#### **Local authorities**

- Almere
- Amsterdam
- Graft-De Rijp
- Rotterdam
- Ootmarsum
- The Hague
- Tilburg
- Delft

#### **European funding**

- European Science Foundation (ESF)
- ALFA-IBIS
- Seventh Framework Programme (FP7)
- Interreg IIIIB/IIIC
- Urbact

#### **National research funding agencies**

- Knowledge for Climate (KvK)
- Netherlands Organisation for Scientific Research (NWO)
- SenterNovem
- Technology Foundation (STW)

#### **Industrial partners**

- Amsterdam Airport Schiphol
- Bouwfonds
- INBO architecten
- Octatube International
- Raab Karcher Eshuis Bouwstoffen
- Saint-Gobain Isover Benelux
- Trespa International

#### **Research institutes**

- TNO
- WUR-Alterra
- WUR-PPO

#### **Societal institutes and foundations**

- Belvedere
- EFL Foundation
- European Association Architectural Education (EAAE)
- International New Town Institute (INTI) Netherlands Architecture Institute (NAi)
- The Netherlands Architecture Fund

### 3.5 Participation in consortia

Participation in consortia takes place in externally funded projects, international doctoral programmes, research centres, committees and networks, some highlights:

- Belvédère programme
- Centre for People and Buildings (CFPB)
- Centre for Process Innovation (CPI)
- Dutch Green Building Council (DGBC)
- EU ALFA-IBIS network
- EU Urbact Housing Praxis for Urban Sustainability (HOPUS)
- EU Interreg IIIIB Spatial Metro
- EU Interreg IIIC Connected Cities CC
- EU FP7 Rural Future Networks (RUFUS)
- European Architectural History Network (EAHN)
- European Association Architectural Education (EAAE)
- Housing Quality 2020
- International Committee Documentation and Conservation of buildings, sites and neighbourhoods of the Modern Movement (DOCOMOMO)
- International Council for Building (CIB)
- International Forum on Urbanism (IFOU)
- Knowledge for Climate (KvK)
- Villard d'Honnecourt International Research Doctorate.



The model shop in Glasshouse South as a central place in BK City, the new faculty building. The glasshouse was designed by Prof. Mick Eekhout PhD.



# 4

## Scientific relevance and quality

### 4.1 Quality and scientific relevance of the research

The faculty's portfolio on Architecture and the Built Environment is unique in combining evaluation research, historical research, conceptual research and practical research. It includes architectural design and history, which generally tend towards the research methods of the humanities (discursive and interpretive); urban/spatial planning and management, which tend more towards the methods of the social sciences; and building technology, which is based primarily on the methods of the technical sciences. By arranging the portfolio around this diverse range of methods as well as the crucial component of design, a new generation of researchers is being 'schooled' whose approach includes the practical capabilities of design-oriented research as well as the reflective capabilities of scientific reasoning.

### 4.2 Significance of the contribution to the field

The Faculty of Architecture is the largest academic institute in the Netherlands conducting research into interventions in the built environment by means of design, engineering, planning and management. As such, its research work is able to consolidate the excellent international academic reputation of the Faculty of Architecture as a leading design academy; as an international

platform for innovation in design, engineering, planning and management; and a vital platform for the debate on current and social themes in architecture and the built environment. The faculty has an outstanding reputation in Europe for its leading academics and designers, its PhDs, and its dissemination activities – book publications, seminars and conferences – and it has expanded its reach worldwide.

### 4.3 Coherence

The activities of the faculty's research groups spans architecture, building technology, urbanism, real estate and housing and specifically includes history, heritage, sustainability and innovation. Its coherence stems predominantly from the Dutch practice in which the government has influenced architecture, urban development and landscape design through its social housing programmes and spatial planning policies.

### 4.4 Quality of the scientific publications

The scientific output of the Faculty of Architecture bears the characteristics of arts & humanities, social sciences and technical sciences. It places a strong emphasis on high-quality book publications. The ISI coverage of academic (design-oriented) journals in the field of Architecture and the Built Environment is notoriously weak. This fact is compensated by a rich culture of journalism which blends academic writing and professional discussion. That is where we find the majority of the faculty's journal output, both in English and in other European languages such as Dutch, German, Spanish and Italian.

## 4.5 Results and outputs

### KEY RESULTS/HIGHLIGHTS

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The Faculty of Architecture has made significant scientific progress in the areas of cultural heritage (buildings, cities and landscapes), energy-efficiency and climate (facades, housing, urban areas), design practice (architecture, building technology, urbanism), digital technologies (building technology, architecture and urbanism) and history (architecture, urbanism).

- Delft School of Design (DSD), 2002. Laboratory for emerging research and experimentation concerning doctoral research.
- @MIT, 2006. Research centre for Restoration, Modification, Intervention, Transformation.
- The Why Factory, 2009. Think tank on urban futures.
- protoSPACE 3.0, 2010. State of the art multi-purpose facility designed for the development of nonstandard, virtual, and interactive architecture, replacing its two predecessors that were lost in the May 2008 fire.

### KEY PUBLICATIONS

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- Linden, A.C. van der, Boerstra, A.C., Raue, A.K., Kurvers, S.R. & Dear, R.J. de, 2006. 'Adaptive temperature limits: A new guideline in the Netherlands: A new approach for the assessment of building performance with respect to thermal indoor climate.' *Energy and Buildings*. Vol 38, No.21. Elsevier, Amsterdam, p. 8-17.
- Rots, J.G. & Invernizzi, S., 2004. 'Regularized sequentially linear saw-tooth softening model.' *International Journal for Numerical and Analytical Methods in Geomechanics*. Vol 28, No.7-8. Wiley, Malden, p. 821-856.
- Lubelli, B., Van Hees, R.P.J. & Brocken, H.J.P., 2004. 'Experimental research on hygroscopic behaviour of porous specimens contaminated with salts.' *Construction and Building Materials*. Vol 18, No.5. Elsevier, Amsterdam, p. 339-348.
- Gruis, V., Elsinga, M., Wolters, A. & Priemus, H., 2005. 'Tenant empowerment through innovative tenures: An analysis of Woonbron-Maasoevers' client's choice programme.' *Housing Studies*. Vol 20, No.1. Taylor & Francis, Oxford, p. 127-147.
- Nadin, V. & Stead, D., 2008. 'European spatial planning systems, social models and learning.' *DISP*. Vol 172, No.1. ETH, Zürich, p. 35-47.

### KEY BOOKS OR CHAPTERS OF BOOKS

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- Avermaete, T.L.P., Havik, K.M. & Teerds, P.J. (eds.), 2009. *Architectural Positions*. SUN Publishers, Amsterdam.
- Graafland, A.D., 2003. *Versailles and the Mechanics of Power*. 010 Publishers, Rotterdam.
- Maas, W. (ed.) 2006. *Space fighter. The evolutionary city (Game:)* MVRDV/DSD in collaboration with the Berlage Institute, MIT and cThrough. Actar, Barcelona.
- Oosterhuis, K. & Feireiss, L. (eds.) 2006. *GameSetandMatch II; On Computer Games Advanced Geometries and Digital Technologies*. Episode publishers, Rotterdam.

- Steenbergen, C.M. et al., 2009. *The Polderatlas of the Netherlands*. THOTH, Bussum.
- Uyttenhaak, R., 2008. *Cities full of space; Qualities of density*. 010 Publishers, Rotterdam.

#### KEY DISSERTATIONS

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- Baumeister, R., 2009. *Une Architecture Sauvage. Asger Jorn's Konzept und Kritik der Modernen Architektur* (publication forthcoming by 010 Publishers, Rotterdam).
- Berghauser Pont, M.Y. & Haupt, P.A., 2009. *Spacemate; Space, density and urban form* (published in 2010 by NAI Publishers, Rotterdam).
- Bitterman, M.S., 2009. *Intelligent Design Objects (IDO). A cognitive approach for performance-based design (cum laude)*.
- Heer, de J., 2008. *The Architectonic Colour. The Polychromy in the Purist Architecture of Le Corbusier* (published in 2009 by 010 Publishers, Rotterdam).
- Peek, G.J., 2006. *Locatiesynergie* (published in 2006 by Eburon Academic Publishers, Delft).

#### KEY EVENTS

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- GameSetandMatch II (2006) provided a fascinating, kaleidoscopic view of the most recent developments in the field of digital design.
- Third International Symposium on Restoration. World Heritage Site Olinda in Brazil. Proposals for Intervention, Delft University of Technology, the Netherlands 26 & 27 October 2006. Meurs, P.H. & Verhoef, L.G.W. (eds), 2006. *Proceedings*. IOS Press, Amsterdam.
- 10th International Docomomo Conference. The Challenge of Chance. Dealing with the Legacy of the Modern Movement, Rotterdam 2008. Heuvel, D. van den, Mesman, M., Quist, W. & Lemmens, B., 2008. *Proceedings*. IOS Press, Amsterdam.
- Architectural Positions (2009) presented the views of thirty-six international architects who, over the past fifty years, have made their voices heard in the debate on the public sphere.
- SASBE 2009 (2009) was one of the biggest events in sustainable building and development in the European region.
- Annual *Future Envelope conference series*, 2007-2010. Faculty of Architecture, TU Delft, Delft.

#### KEY EXHIBITIONS

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- Redesigning Polderscapes (2005, NAI Rotterdam) - a major exhibition on polders as part of the 2nd International Architecture Biennale Rotterdam.
- Team 10 (2005/2006, NAI Rotterdam) - about the European architects who played a leading role in the debate on cities and architecture in the 1950s and 1960s.
- A Wider View (2008, Triënnale Apeldoorn) - had 37,000 national and international visitors and presented recognised cultural landscapes of undisputed historical significance in a dynamic perspective and placed them within the context of spatial planning and design.

# 5

## Societal relevance and quality

### 5.1 Socio-cultural, technical and/or economic quality

The faculty's research interacts intensively with the practice of architecture, building technology, urbanism, landscape architecture, housing and management. Architecture, urban design and landscape architecture are regularly the subject of public debate in the Netherlands, Europe and beyond. The performance of buildings (including energy-efficiency and user satisfaction) is vital for both the building industry and individuals. The effectiveness of building processes and the institutional arrangements behind them impact our economy and influence the purchasing power of households. The impact of the faculty's research is predominantly design-oriented and deals with dimensions such as cultural heritage, quality of life, and sustainability. Valuable contributions to that practice are made by means of externally funded research projects (including PhDs), research in joint consortia of scientific and societal partners, and through publications, exhibitions and events. Little of our work is shielded from the public through patents or non-disclosure agreements.

### 5.2 Key results/highlights

- InteractiveWall: Prototype For An Emotive Wall, commissioned by Festo, Hannover Messe, Germany, 2009.
- Computational support for Lifecycle Integral Performance assessment (CLIP) software tool developed for use by the Dutch Government Buildings Agency (Rijksgebouwendienst), 2009.

- Team 10: A Utopia of the Present (Rotterdam, 2005 / New Haven (USA), 2006 / Paris, 2007) exhibition and publication.
- Energy potential studies in the new Provincial Environmental Plan (POP) of Groningen, 2007.
- The Netherlands Architecture Institute commission for research, analysis and building of 15 polder models, 2005.
- A tool with which to assess the potential for transformation of office buildings and the risks involved (Transformation Potential Meter, Vacancy Risk Meter), 2003.

### 5.3 Key knowledge contributions to practices and policies

The most significant knowledge contributions comprise fundamental insights, tools and instruments, and novel approaches.

Fundamental insights into theory, practice and territory:

- 'Team 10: A Utopia of the Present' that contributes to the understanding of one of the main paradigms in contemporary architecture culture and to general thinking on the built environment.
- The contributions by IHAAU to a Reinterpretation of the history of modernism.
- The research, analysis and documentation of Dutch polders by Steenberg.

Tools and instruments to support design and engineering:

- Computational support for Lifecycle Integral Performance assessment (CLIP) software tool.
- Spacemate Instrument for Describing Space Usage in Quantitative and Qualitative Terms.
- Flextool model developed for the calculation of the transformation value of care dwellings.
- Harmonization protocol for LCA databases and calculation methods.

Novel approaches to design, planning and management:

- UNESCO WHC's Recommendations on Historic Urban Landscapes.
- Rotterdam Energy Approach and Planning (REAP).
- Managing the campus of the future in connection with the Knowledge City.

#### 5.4 Evidence of the appreciation of stakeholders

In the summer of 2010, the Faculty of Architecture conducted an online survey among its stakeholders and received over 50 completed questionnaires. The partnership between the Faculty of Architecture and its stakeholders is predominantly based on joint research projects or proposals (47%), joint collaboration on book or journal publications (27%) and joint collaboration on conferences, seminars and workshops (24%). The nature of the contacts is primarily focused on discussing projects, proposals and/or programming (44%), on conducting joint projects, proposals and/or programming (29%) and on developing formal partnerships with for example contractors and partners (31%).

There is a strong appreciation for general reputation, impartiality, methodology, creativity, competence and reliability. Contributions are made through providing information on developments in the field, encouraging innovation, contributing tools and designs, and participating in conferences and other events.

#### 5.5 Dissemination strategies

The faculty's researchers produce high-quality commercial book publications and publish frequently in journals that target both a professional and academic readership. They organise academic and professional events such as exhibitions, seminars, expert meetings, conferences and design competitions. Key staff members are regularly interviewed for newspapers, magazines, websites and television programmes.

The best dissertations are often published as commercial books. Most dissertations are digitally stored in the TU Delft Library Repository. All dissertations are listed on the faculty website and (if available) linked to the full version in the repository. TU Delft is one of the signatories of the 2003 Berlin Declaration on Open Access and encourages open access publishing by its employees.

#### 5.6 Evidence of impacts

Evidence of the social relevance and quality of the research can be found in the large number of books and dissertations published by faculty staff commercially, in the number of conferences and exhibitions attended, and in the implementation of the tools and instruments developed:

- The opening of the Why Factory in Delft by Dutch Minister of Education, Culture and Science, Ronald Plasterk, and the symposium "My Future City", where a variety of students, inhabitants, architects, urbanists, thinkers, developers, politicians, technicians presented their ideas on the future city. Delft, 2009.
- The conference and exhibition 'A Wider View on Cultural Landscape Challenges in Europe' during the Triennale at the Radio Klootwijk, Apeldoorn, which attracted 35,000 visitors.
- Dutch Dialogues: workshops, conferences, publications and advice, which contributed to the reconstruction of New Orleans as a sustainable delta-city (Meyer and de Hoog) (2008-2009); 'Dutch Dialogue' assistance provided to New Orleans, South Louisiana and the United States Congress.
- The Genadendal Conference in South Africa, with the Ministries of Foreign Affairs and Education, Culture and Science, COST Europe, SenterNovem, 2003-2006.
- InteractiveWall: Prototype For An Emotive Wall, commissioned by Festo, Hannover Messe, Germany, 2009.
- Computational support for Lifecycle Integral Performance assessment (CLIP) software tool developed for use by the Dutch Government Buildings Agency (Rijksgebouwendienst), 2009.

**Figure 1 Stakeholder analysis 2010**

Figure 1a. General reputation

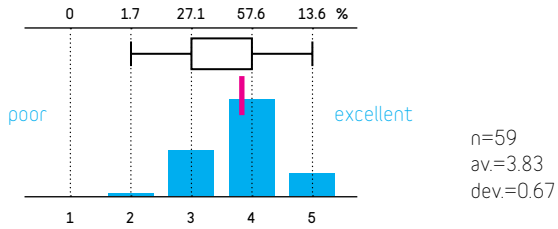


Figure 1c. Providing a source of information on developments in the field

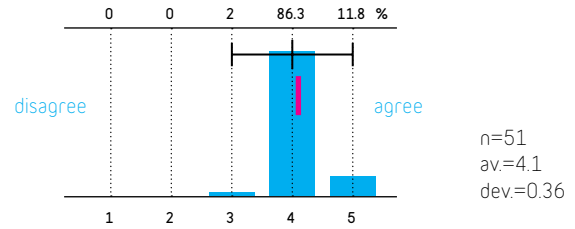


Figure 1b. Impartiality and independence

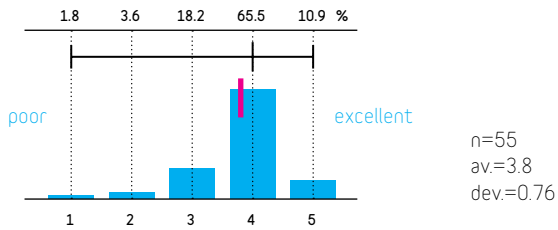


Figure 1d. Encouraging innovation in our work

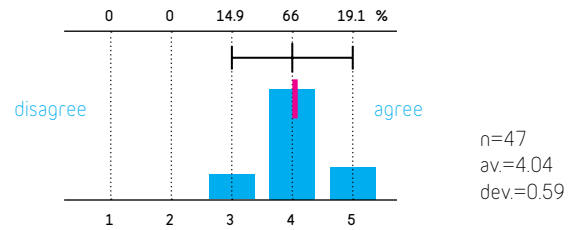


Figure 1e. Involvement in conferences and other events

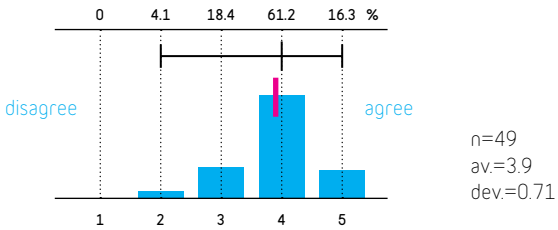


Figure 1g. Creativity

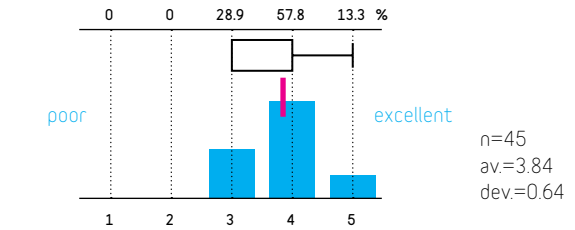


Figure 1f. Understanding of methodology

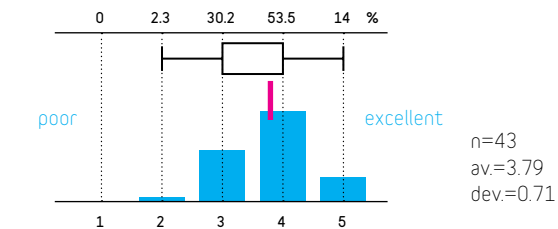
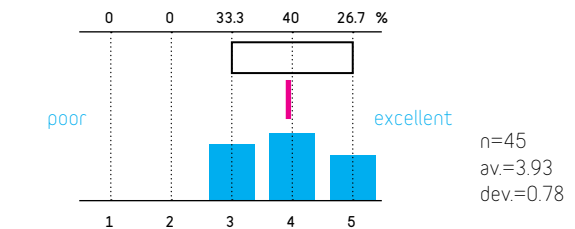


Figure 1j. Competence and reliability



### 5.7 Commissioned research by societal actors

- Computational support for Lifecycle Integral Performance assessment (CLIP) software tool, 2009, commissioned (in three consecutive projects) by the Dutch Government Buildings Agency (Rijksgedebouwendienst).
- The Netherlands Architecture Fund (Stimuleringsfonds voor Architectuur): Beyond Clinical Buildings (2007-2008)
- National Housing and Town Planning Advisory Unit, UK: European Planning Systems and their Impact on the Provision of Housing, 2009.
- STAWON, Research foundation for dwelling and living environments of the Royal Institute of Dutch Architects (BNA): Parkeren in de woonomgeving (2008-2010)
- Spatial Metro Interreg IIIIB North-west Europe: a project funded by the ERDF, Norwich, Koblenz, Rouen and Biel/Bienne investigating pedestrian mobility and regeneration of the European city centre (2005-2008).



**THE 'URBANISM ON TRACK' SEMINAR, HELD AT THE DELFT SCHOOL OF DESIGN, JANUARY 2007.** The Delft School of Design (DSD) was formally instituted in 2002 as a laboratory for emerging research and experimentation in the context of doctoral research within the faculty's departments of architecture and urbanism and building technology. Since its foundation, the DSD has provided both a platform - both academic and public - for events such as lectures and debates, conferences, colloquia, seminars and workshops.

# 6

## Earning capacity

Table a. Research funding

	2003		2004		2005		2006		2007		2008		2009	
FUNDING	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%
Direct funding	3,285	87%	5,255	77%	6,375	78%	6,882	79%	8,027	80%	7,930	78%	6,269	64%
External funding	486	13%	1,544	23%	1,806	22%	1,880	21%	1,961	20%	2,192	22%	3,467	36%
<b>TOTAL FUNDING</b>	<b>3,771</b>	<b>100%</b>	<b>6,799</b>	<b>100%</b>	<b>8,181</b>	<b>100%</b>	<b>8,762</b>	<b>100%</b>	<b>9,988</b>	<b>100%</b>	<b>10,122</b>	<b>100%</b>	<b>9,736</b>	<b>100%</b>
EXPENDITURE	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%
Staff costs	3,255	91%	5,000	90%	5,605	87%	6,872	90%	9,337	92%	9,995	91%	7,656	88%
Other costs	318	9%	566	10%	869	13%	789	10%	858	8%	1,039	9%	1,050	12%
<b>TOTAL EXPENDITURE</b>	<b>3,573</b>	<b>100%</b>	<b>5,566</b>	<b>100%</b>	<b>6,474</b>	<b>100%</b>	<b>7,661</b>	<b>100%</b>	<b>10,195</b>	<b>100%</b>	<b>11,034</b>	<b>100%</b>	<b>8,706</b>	<b>100%</b>

Chart a. Research funding in M€

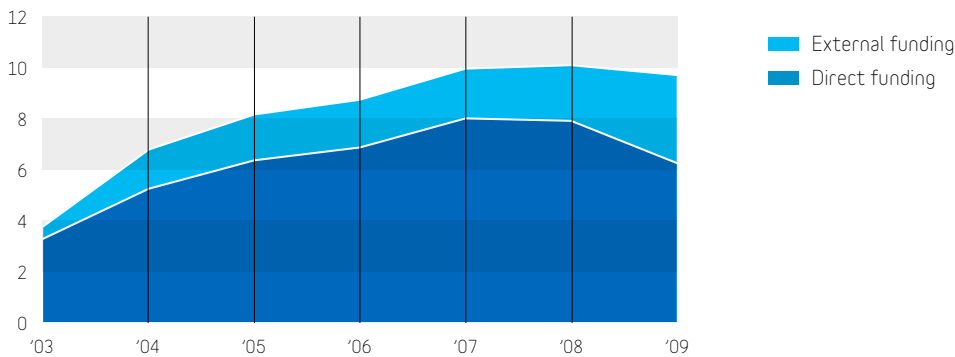
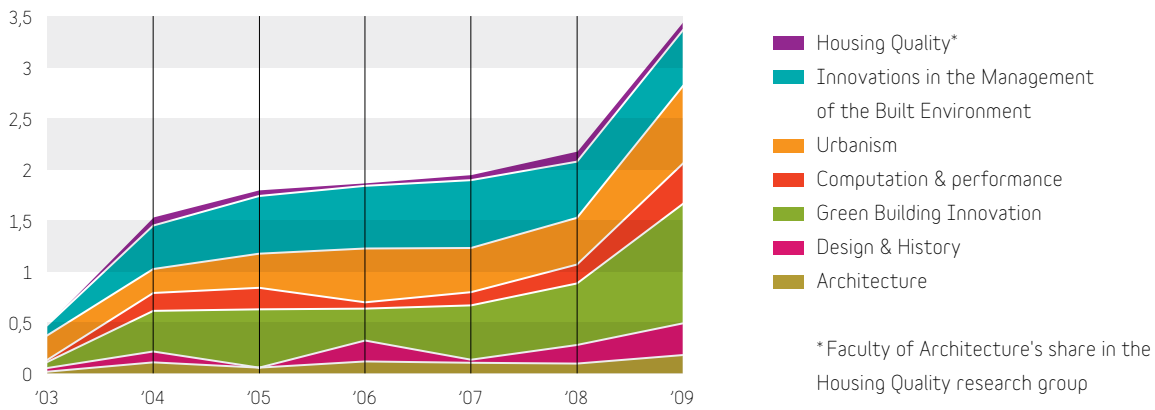


Chart b. External research funding in M€



\*Faculty of Architecture's share in the Housing Quality research group

# 7 Output

Table a. Main categories of research output

	2003		2004		2005		2006		2007		2008		2009	
	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS	STAFF	GUESTS
Refereed articles	27	1	26	6	17	1	27	3	37	1	26	2	24	5
Non-refereed articles	20	0	7	2	14	2	35	7	18	1	24	0	26	12
Books	27	2	31	14	52	15	62	15	84	5	55	11	59	11
Book chapters	132	15	150	31	268	72	229	37	309	52	197	62	225	53
PhD-theses	4	3	7	5	2	9	10	5	4	7	13	9	9	3
Conference papers	215	18	205	22	268	38	334	42	349	39	262	23	238	43
Professional publications	253	6	193	49	227	41	268	36	241	62	280	46	245	33
Editorships journals/book	26	5	27	7	39	9	36	11	52	16	80	7	67	10
<b>TOTAL PUBLICATIONS</b>	<b>704</b>	<b>50</b>	<b>646</b>	<b>136</b>	<b>887</b>	<b>187</b>	<b>1001</b>	<b>156</b>	<b>1094</b>	<b>183</b>	<b>937</b>	<b>160</b>	<b>893</b>	<b>170</b>

Table b. PhD-students with employee status

STARTING YEAR	ENROLMENT			SUCCESS RATES													
	GENDER			GRADUATED ≤ 4 YEARS		GRADUATED ≤ 5 YEARS		GRADUATED ≤ 6 YEARS		GRADUATED ≤ 7 YEARS		TOTAL GRADUATED (1-9-'10)		NOT YET FINISHED		DISCONTINUED	
	MALE	FEMALE	TOTAL	NR	%	NR	%	NR	%	NR	%	NR	%	NR	%	NR	%
2000	2	1	3	0	0%	2	67%	2	67%	2	67%	3	100%	0	0%	0	0%
2001	2	3	5	1	20%	4	80%	4	80%	4	80%	4	80%	0	0%	1	20%
2002	5	6	11	1	9%	6	55%	6	55%	6	55%	6	55%	2	18%	3	27%
2003	7	7	14	1	7%	4	29%	7	50%	7	50%	7	50%	5	36%	2	14%
2004	12	10	22	2	9%	10	45%	11	50%	11	50%	12	55%	4	18%	6	27%
2005	14	7	21	1	5%	6	29%	6	29%	6	29%	6	29%	11	52%	4	19%
<b>TOTAL</b>	<b>42</b>	<b>34</b>	<b>76</b>	<b>6</b>	<b>8%</b>	<b>32</b>	<b>42%</b>	<b>36</b>	<b>47%</b>	<b>36</b>	<b>47%</b>	<b>38</b>	<b>50%</b>	<b>22</b>	<b>29%</b>	<b>16</b>	<b>21%</b>

Table c. PhD-students with scholarship or external funding

STARTING YEAR	ENROLMENT			SUCCESS RATES													
	GENDER			GRADUATED ≤ 4 YEARS		GRADUATED ≤ 5 YEARS		GRADUATED ≤ 6 YEARS		GRADUATED ≤ 7 YEARS		TOTAL GRADUATED (1-9-'10)		NOT YET FINISHED		DISCONTINUED	
	MALE	FEMALE	TOTAL	NR	%	NR	%	NR	%	NR	%	NR	%	NR	%	NR	%
2000	1	1	2	0	0%	1	50%	1	50%	1	50%	2	100%	0	0%	0	0%
2001	0	0	0	0	-	0	-	0	-	0	-	0	-	0	-	0	-
2002	0	0	0	0	-	0	-	0	-	0	-	0	-	0	-	0	-
2003	1	1	2	1	50%	2	100%	2	100%	2	100%	2	100%	0	0%	0	0%
2004	1	0	1	0	0%	0	0%	1	100%	1	100%	1	100%	0	0%	0	0%
2005	4	3	7	3	43%	3	43%	3	43%	3	43%	3	43%	1	14%	3	43%
<b>TOTAL</b>	<b>7</b>	<b>5</b>	<b>12</b>	<b>4</b>	<b>33%</b>	<b>6</b>	<b>50%</b>	<b>7</b>	<b>58%</b>	<b>7</b>	<b>58%</b>	<b>8</b>	<b>67%</b>	<b>1</b>	<b>8%</b>	<b>3</b>	<b>25%</b>

Chart a. Refereed articles

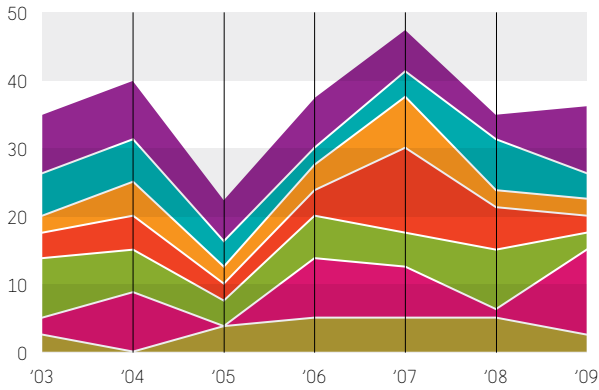


Chart b. Books

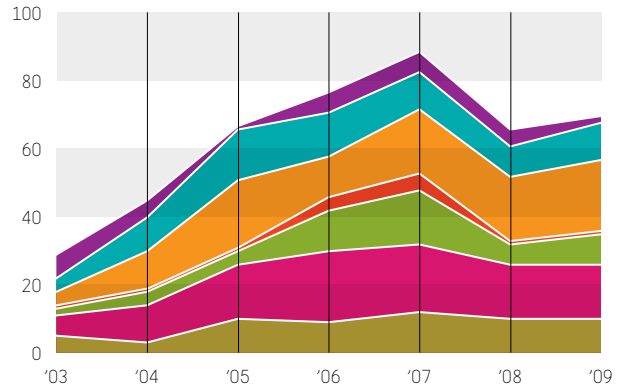


Chart c. Conference papers

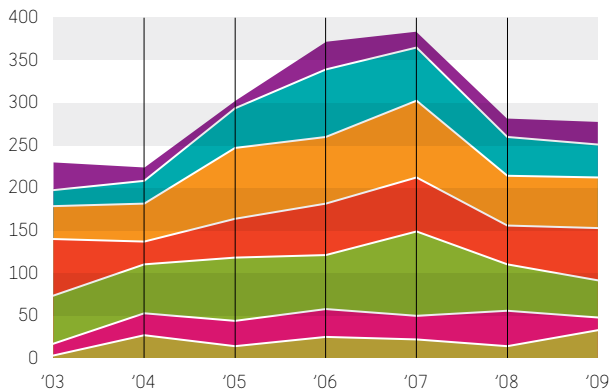
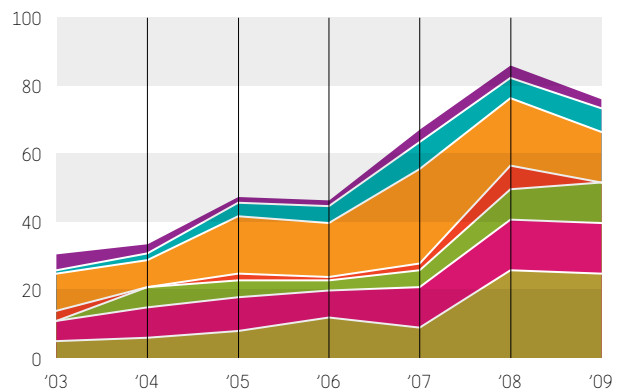


Chart d. Editorships journals/books



- Housing Quality\*
- Innovations in the Management of the Built Environment
- Urbanism
- Computation & performance
- Green Building Innovation
- Design & History
- Architecture

\* Faculty of Architecture's share in the Housing Quality research group

## 8

## Academic reputation

Table a. Invitations to address major conferences

YEAR	CONFERENCE	WHO	WHERE
2004	Internationales Symposium 'Animation des Industrieerbes'.	Bollerey	Ostrava SK
2007	5th Int Sem Urban Conservation, Changing Role and Relevance Urban Conservation Charters	Meurs	Recife BR
2007	Architecture Now! Int Symposium on Architecture and Renewable Energy Sources MÉSZ	Schuetze	Budapest HU
2008	6th Int Conf on Computation of Shell and Spatial Structures Cornell University IASS-IACM	Teuffel	Ithaca US
2008	Design Firm Leadership Conference, Harvard University	Wamelink	Harvard US
2006	2nd Int Conf on energy planning, energy saving, environmental education WSEAS/IASME	Jong	Corfu GR

Table b. Conference organisation activities

YEAR	CONFERENCE	ROLE	WHO	WHERE
2006	Modernization and Regionalism - Re-inventing Urban Identify, IFOU	Organisation	Wang	Beijing CN
2006	The Architectur of Hospitals, UMC	Organisation	Wagenaar	Groningen NL
2007	GameSetandMatch II: the architecture co-laboratory	Organisation	Oosterhuis	Delft NL
2007/9	The Future Envelope I, II, III	Organisation	Knaack, Klein	Delft NL
2009	SASBE2009 (Smart and Sustainable Built Environments), CIB	Organisation	Dobbelsteen, Dorst, Timmeren	Delft NL

Table c. Involvement in scientific or professional event

YEAR	EVENT	ROLE	WHO	WHERE
2007	15 jaar Bouwbesluit (15 years Building code), Min VROM	Keynote, panel	Visscher	The Hague NL
2007	Urbanism on Track - Expert meeting tracking technologies	Organiser	Spek, Schaick	Delft NL
2007	RESPONSE-ABILITY - 2nd Congress of Croatian Architects	Organiser	Jerkovic	Opatija HR
2008	International expert meeting Randstad 2040	Organiser	Hoeven	Delft NL
2008	International open ideas competition Building for Bouwkunde	Organiser	Volker	Delft NL

Table d. Involvement in exhibitions

YEAR	EXHIBITION	ROLE	WHO	WHERE
2005	Team 10 - In Search of a Utopia of the Present, Cite de l'Architecture	Curator	Risselada, Heuvel	Paris FR
2006	The Memory of the City	Curator	Meyer	Delft NL
2008	A Wider View on Cultural Landscapes in Europe, Triennale Apeldoorn	Curator	Luiten	Apeldoorn NL
2009	Brazil contemporary; Architecture • Visals Culture • Art, NAI	Curator	Meurs	Rotterdam NL
2009	From Berlage to Koolhaas, A Hundred Years of Dutch Architecture	Curator	Duin	Beijing CN

Table e. Prizes, awards, competitions

YEAR	PRIZES, AWARDS, COMPETITIONS	ISSUER	WHO	WHERE
2005	European Steel Award: V-House, Nesya - Norway	ECCS	Nijse	Brussels BE
2007	Aga Khan Award for Architecture: Dutch Embassy Addis Ababa	Aga Khan	Gameren	Kuala Lumpur MY
2008	International Architectural Award: OBA Amsterdam	Chicago Athenaeum	Coenen	Chicago US
2009	RIBA Award: Fuglsang Kunstmuseum	RIBA	Fretton	London UK
2009	GOOD DESIGN™ Award: FESTO Interactive Wall	Chicago Athenaeum	Oosterhuis	Chicago US

**Table f. Honorary positions**

YEAR	INSTITUTE	POSITION	WHO	WHERE
2003/>	Cornell's International Workplace Studies Program	Visiting professor	Voordt	Ithaca US
2007	Royal Danish Academy of Fine Arts School of Architecture (KARCH)	Visiting professor	Leupen	Copenhagen DK
2007/8	National University Singapore (NUS)	Visiting professor	Meyer	Singapore SG
2008/9	Harvard University Graduate School of Design (GSD)	Visiting professor	Sijmons	Harvard US
2009	American Institute of Architects (AIA)	Honorary fellowship	Coenen, Maas	New York US

**Table g. Election to academies or academic professional associations**

YEAR	INSTITUTE	ROLE	WHO	WHERE
2003/>	Royal Dutch Academy of Arts & Science (KNAW)	Full member	Eekhout	Amsterdam NL
2005/9	Advisory Committee for Architecture of the European Commission	Member	Duin	Brussels EU
2009	Dutch professional organisation of urban designers and planners (BNSP)	Board member	Zonneveld	Amsterdam NL
2009	Int. Association Computer Science and Information Technology (IACSIT)	Senior member	Bier	Singapore SG

**Table h. Evaluator of research programme**

YEAR	PROGRAMME	ROLE	WHO	WHERE
2006/8	Belgian Federal Science Policy (BELSPO)	Evaluator	Thomsen/Itard	Brussels BE
2008	EU 7th Framework Programme (FP7)	Evaluator	Stead	Brussels EU
2009	Australian Research Council (ARC)	Evaluator	Stouffs	Canberra AU
2009	Slovenian Research Agency (ARRS)	Evaluator	Zijlstra	Ljubljana SI

**Table i. Editorship academic journal**

YEAR	JOURNAL	ROLE	WHO	WHERE
2003/>	ARQ - covering all aspects of architectural endeavour	Editorial board	Fretton	Cambridge UK
2003/>	Journal of Design Research - human aspects as central issue of design	Editor	Klaasen	Olney UK
2003/>	Oase - architecture, urban design and landscape design	Editors	Avermaete, Grafe, Havik, Teerds, Schrijver	Rotterdam NL
2003/>	Planning Practice and Research	Editor-in-Chief	Nadin	Oxford UK
2009/>	Positions - Journal on Modern Architecture and Urbanism	Editor	Wagenaar	Rotterdam NL

**Table j. Editorship professional journal**

YEAR	JOURNAL	ROLE	WHO	WHERE
2003/>	Bulletin KNOB - Dutch Journal for Cultural Heritage	Editor	Thoor	Amersfoort NL
2003/>	Tijdschrift voor de Volkshuisvesting	Editor	Flier	The Hague NL
2006/>	Čovjek i prostor - bimonthly Croatian Architecture Association	Editorial board	Jerkovic	Zagreb HR
2009/>	Delft Architectural Studies on Housing design (DASH)	Editor-in-Chief	Gameren	Delft NL

**Table k. Role in practice and policy making**

YEAR	FIRM/ORGANISATION	ROLE	WHO	WHERE
2003/>	H+N+S Landscape Architects	Director/owner	Sijmons	Utrecht NL
2003/>	MVRDV	Principal architect	Maas	Rotterdam NL
2005/>	Royal Haskoning, Buiding Services	Director	Luscuere	Nijmegen NL
2005/>	Netherlands Architecture Fund	Advisory cmte	Grafe, Schrijver, Velde	Rotterdam NL





**THE WHY FACTORY (T?F), LOCATED IN GLASSHOUSE EAST AT BK CITY.**

The Why Factory was opened in October 2009. It functions as a think tank on urban futures. T?F runs independent research projects, PhD programmes, Architecture and Urbanism Master studios, Postgraduate studios at the Berlage Institute in Rotterdam, master classes, workshops, debates and Q and A's. The Why Factory Tribune was awarded the ninth Lensvelt / De Architect interior Prize in 2009. The Why Factory Tribune was designed by MVRDV, where Winy Maas is principal architect.

# 9

## Next generation

### 9.1 Objectives and institutional embedding

In 2008, the Faculty of Architecture produced 22 dissertations, the largest number in its history. This increased volume of PhD candidates meant rethinking the way the faculty deals with its doctoral research in terms of logistics, procedures, quality and viability. The faculty has developed (jointly with the OTB Research Institute and the Berlage Institute) a graduate school initiative that places it firmly within the new framework of the overall TU Delft Graduate School. Starting in 2010, it aims to:

- [a] raise the quality of dissertations
- [b] teach generic skills
- [c] provide methodological and theoretical support
- [d] devise and coordinate a Pre-PhD track in the MSc curriculum and the doctoral curriculum for PhD candidates.
- [e] facilitate training on research competencies for PhD candidates.
- [f] provide a collaborative platform where (associate) professors and PhD candidates develop externally funded research proposals.

### 9.2 Structure of the programmes

The Graduate School programme combines training in the Master's phase and training in the PhD phase. Courses on research skills, methodology, study and writing are introduced in the Master's phase. The training and education programme of the PhD phase includes courses that introduce students to the foundations and methods of design-oriented research in the humanities, social sciences and technical sciences, topical colloquia and peer-review presentations in which PhD students are invited to present their work in peer-review sessions.

### 9.3 Supervision

PhD students are motivated to find the supervisor that best matches his or her field of interest. The first supervisor is chosen in advance of the go/no go assessment. This first supervisor will guide the PhD student for the next three years. In special cases, the school may assign a second supervisor. The PhD student is free to choose a daily supervisor. PhD students may ask the Graduate School to switch supervisors but in such cases, must demonstrate how such a switch will benefit the quality of the research and dissertation before the request is granted.

### 9.4 Success rates

See tables 7b and 7c.

It should be noted that many of the PhD students did suffer a severe setback as a result of the May 2008 fire that destroyed the faculty building.

### 9.5 Educational resources

The Faculty of Architecture is home to a unique and dedicated library. Through the TU Delft Library, the faculty provides digital subscriptions to all major international scientific journals. The faculty is home to a large model shop and the protoSPACE 3.0 lab facility. The faculty shares the Building Technology Lab with the Faculty of Civil Engineering and the Faculty of Industrial Design Engineering.

# 10

## Viability

### 10.1 Resource management

Researchers are supported by '100% Research', a team chaired by the Director of Research. In 2009, it created the Research Council as its main body to organise research at the faculty. The Research Council includes representatives of all Research Groups, the PhD Council, the Berlage Institute and the OTB Research Institute. The faculty staff are also supported by the TU Delft Valorisation Centre in applying for subsidised projects.

### 10.2 Available infrastructure

The faculty comprises a library with 40,000 items and a Map Room with an extensive collection documenting the Netherlands. TU Delft Library provides access to major online scientific journals. A digital repository allows staff members to store their output as open access. The faculty shares a Building Technology Lab with other faculties. The faculty is home to a large model shop and the protoSPACE 3.0 lab, a state of the art multi-purpose facility designed for the development of nonstandard, virtual, and interactive architecture.

### 10.3 Innovative capacity

The extensive MSc programme with the 1,000 students contributes significantly to the innovative capacity of the faculty's staff. The majority of MSc and PhD students are free to choose their own research topics and are able to respond quickly to the newest trends and developments. The faculty's innovative capacity is enhanced by the ever increasing number of PhDs on staff, by its close cooperation with professional practice and by the integration of the OTB Research Institute.

# 11

## SWOT analysis

### STRENGTHS

A considerable and enviable resource base through the confederation of the Faculty of Architecture, the OTB Research Institute and the Berlage Institute.

The institutions involved have an extremely high international standing.

Staff is increasingly PhD-educated. The staff is well integrated into the rich practice of Dutch architecture, urban design, spatial planning and housing.

A growing body of excellent PhD research, attracting PhD students from all over the world.

A sense of a vibrant young community of researchers interested in each other's work.

Successful in resolving the fragmentation of its research portfolio, replacing the eighteen research programmes with seven research groups.

### WEAKNESSES

The Faculty of Architecture has not been successful in obtaining research grants from the Netherlands Organisation for Scientific Research (NWO). The community of researchers is rather pessimistic about its future chances in this respect. External funding of specific research groups lags behind. Architecture is a field with a weak academic journal culture. In response to the internal TU Delft output bonus system, the faculty developed alternative publishing strategies, channelling its output towards books, professional magazines and conference proceedings. The community is adverse to publishing in ISI-indexed journals. PhD supervisors do an average job in providing theoretical and methodological support.

### OPPORTUNITIES

With its large contingent of PhD students, the Faculty of Architecture, the OTB Research Institute and the Berlage Institute can become a centre for research, not just in the Netherlands but in Europe and beyond. Design and engineering are increasingly accepted as mature academic activities in the Netherlands (ERIC-project, upcoming policy advise KNAW-TWINS committee). Cooperation with TUE and UTWente in the 3TU Federation Centre of Competence for the Built Environment. Emerging new challenges and funding opportunities: energy-efficiency, climate change, JPI Urban Europe. Abolition of TU Delft's bonus system in 2010 creates the opportunity for a new publishing environment.

### THREATS

The May 2008 fire and subsequent collapse of the original faculty building posed the most challenging threat to the faculty's research so far. In that fire most of the personal libraries and research work has been lost. This setback was beyond any experienced in its 100 years of existence. TU Delft faces severe austerity measures and cuts in direct funding of the Faculty of Architecture from an average €34 million a year to €29 million in 2010. Due to austerity measures, it is difficult to offer promising young researchers the prospect of tenure.

### 12.1 Strategic planning; investments and collaboration

The Faculty of Architecture, the OTB Research Institute and the Berlage Institute are joining forces to benefit from mutual strengths and reputations.

Architecture, the OTB and the Berlage Institute are launching a joint Graduate School in 2010. In 2011, the OTB will be integrated into the Faculty of Architecture.

The faculty will participate in the newly established 3TU.Federation Centre of Competence for the Built Environment: 3TU.BOUW.

The Faculty of Architecture establishes a reconfigured institute History and Theory. The faculty will work with Elsevier's SCOPUS to develop an Architecture-rich journal index.

### 12.2 Research topics planned for the near future and their perspectives

New research topics and funding opportunities will be absorbed by thematic programming in the Graduate School: cross-disciplinary topics such as Energy-Efficiency, Climate Change and Urban Europe.

The faculty, working with the Valorisation Centre, will identify individual staff members that are likely to be successful in obtaining research grants, to support and coach them in developing proposals for NWO, FP7-EEB, IEE and Urban Europe JPI.

### 12.3 Flexibility and anticipation of expected changes

The Faculty of Architecture is moving from PhD employees towards PhD students, significantly reducing staff costs. The abolition of TU Delft's output bonus system in 2010 is creating the opportunity to introduce effective new incentives. Two-thirds of the direct funding will be allocated on the basis of staff size. One third will be allocated on the basis of performance indicators that are critical to the success of the Faculty's research (journals, NWO funding, external funding) and to cross-cutting topics and opportunities.