

Pierre SMARS

Belgian, born May 1st 1966 in Etterbeek (Belgium), married with Lin Chia-Hui (Taiwan), two children

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EDUCATION

April 2000 **Ph.D. in civil engineering**, Catholic University of Louvain (K.U.Leuven, B)

Dissertation: *Études sur la stabilité des arcs et voûtes, confrontation des méthodes de l'analyse limite aux voûtes gothiques du Brabant. (Studies on the stability of arches and vaults, confrontation of limit analysis methods with gothic vaults in Brabant)*

Award: Premio Edoardo Benvenuto 2002, awarded by the "Associazione Edoardo Benvenuto per la ricerca sulla Scienza e l'Arte del Costruire nel loro sviluppo storico"

1990-1992 **Master degree in conservation of monuments**, *R. Lemaire Centre for Conservation*, K.U.Leuven (prepared at the University of Florence, I)

Dissertation: *Études sur les structures en maçonnerie. (Studies on masonry structures)*

1989-1990 **Certificate in the conservation of historic towns and buildings**

R. Lemaire Centre for Conservation, K.U.Leuven

Dissertation: An Art-Nouveau house, *La maison Hankar à Bruxelles*

1984-1989 **Architectural engineer**, Catholic University of Louvain (UCL, B)

Final dissertation: architectural project: *Un centre de retraite*

1978-1984 Secondary school in Louvain-la-Neuve

Orientation: mathematics-sciences

WORK EXPERIENCE

Since 8/2005 **Assistant Professor**, National Yunlin University of Science and Technology (Taiwan)

Academic activities: lectures

- Architectural Documentation (I, II), Structural Analysis of Historical Buildings. Conservation History and Theory. Vernacular Architecture. Traditional Construction Techniques (wood, bamboo, earth). History of Western Architecture (I,II), Computer-aided design, Digital photogrammetry, inventories, GIS

Research and consultancies

- Surveying techniques: parametric models, digital photogrammetry, software development (2005-present)
- Stability of masonry structures: influence of friction, of large displacements and of earthquakes on the stability of masonry structures, experimentation and software development (2005-present)
- Documentation of Traditional Architecture, adobe construction in Yunlin county (Taiwan) (2005-present): GIS, digital photogrammetry, metric surveys
- Construction techniques of masonry vaults (2005-2009), consultant for a project involving the construction of 25 rib-vaults in granite in Indonesia (2014-2015).
- Participation as expert in workshops on the World Heritage Sites of Baalbek and Tyre (Lebanon) (UDAS workshops organised by UNESCO and the Council for Development and Reconstruction) (2015-2019)
- Participation to a UNESCO - DGA (Directorate General of Antiquities) project in Baalbek (Lebanon),

preparation of a risk management strategy, structural engineer expert (2010)

- Collaboration between NYUST University (departments of Cultural Heritage Conservation and department of Architecture) and IES School of Architecture (Mumbai, India); (scholar collaboration with profs Yang Kaicheng (TW) and prof. Chaitra Sharad (India), exchange of students, visits in Taiwan and India) (2018-present)
- An interdisciplinary approach to raise awareness on the traditional built heritage of Yunlin County (taiwan) (collaboration between NYUST University departments) (2019-2020)
- Collaboration with the Great Yarmouth Preservation Trust (UK): development of a design concept for an Heritage Centre (2021)

Organisation of Conferences and workshops

- ATC19 Geotechnical Engineering for Conservation of Heritage Monuments and Historical Sites, Douliu (Taiwan), October 12th 2019 (local organiser, in collaboration with Lee Yu (NYUST) and Yoshinori Iwasaki, Geo Research Institute, Osaka)
- GIS and documentation of built heritage (organiser and main animator): Industrial heritage in Suantou (TW), 2018, Vernacular heritage in Douliu (TW), 2019
- Earth architecture: wattle-and-daub and plastering, Douliu, October 2019 (main lecturer and animator: Darren Barker, Great Yarmouth Preservation Trust, UK)
- ICCHP2006, Cultural Heritage Policies in Belgium, France, Japan and Taiwan, National Center for Research and Preservation of Cultural Properties, Tainan (Taiwan) (in collaboration with Chen W.J.)

2003-2005 **Freelance Heritage Conservation Specialist**

- Paris (F): Consultant of the UNESCO World Heritage Centre, "Camino Inca", "Astronomy & World Heritage" and "Transsaharian cultural itineraries" projects, design and implementation of a web-based information management system
- Moenjodaro (Pakistan): UNESCO expert, documentation of an archaeological site
- Rabat (Morocco): lectures at the "Ecole Nationale d'Architecture" in the framework of a project of the British Council on the Fundouks of the Medina of Salé
- Bamiyan (Afghanistan): site coordination of documentation work, mission of ICOMOS Germany & of the department of Urban History of the University of Aachen

2001-2003 **Research Associate**, University of Bath (UK)

Research experience: projects

- "Minimum requirement for metric use of non metric photographic documentation", funded by English Heritage
- Preparation of a web-based database to be used for the restoration of Jesse Window in Wells Cathedral, funded by EPSRC and Wells Cathedral
- "An interactive logbook for the conservation management of cathedrals", funded by EPSRC

Academic experience: part-time lecturer

- Surveying 2 (photogrammetry and structural monitoring) for Undergraduates Civil Engineers
- Surveying for Master students in the program of Conservation of Historic Buildings
- Soil mechanics and monument conservation for Master students in the program of Conservation of Historic Buildings

May 2001 **Expert**, documentation work on an archaeological site: Otrar Tobe, Kazakhstan; in cooperation with the department of Urban history of the University of Aachen.

1999-2001 **Research Associate**, *R. Lemaire Centre for Conservation*, K.U.Leuven

Research project: "Three-dimensional digital information system for the documentation, representation and conservation of our architectural heritage". Design and implementation of software tools for the documentation of architecture.

1993-1999 **Assistant Lecturer, R. Lemaire Centre for Conservation, K.U.Leuven**

Academic experience

- Students' follow-up for their survey exercises, practical work and master thesis
- Participation in the practical organisation of the centre
- Member of the educational commission of the centre (POC)

Structural analysis of churches

- Church "Onze-lieve-vrouw-ter-Predikheren" in Leuven
- Participation at the stability study of diverse churches in Italy (Siena, Modica, ...) under the supervision of professor Di Pasquale
- Participation at the preparation of a report on the stability of Saint-Pierre church in Beauvais (France), under the supervision of professor Lemaire (co-founder and past president of ICOMOS)
- Sint-Jacob church in Leuven (including a monitoring of the deformations)
- Church in Indre (France)

Development of computer programs

- CALPA, finite-element program for the calculation of masonry structures (1990-1995)
- BLOC, program for the calculation of rigid-bloc structures (1990-1992)
- CALIPOUS, program for the calculation of lines of thrust in arches (1990-2000)
- Interfaces for the use of the CALIPOUS program in conjunction with AutoCAD.
- Programs for the geometric construction of vaults.

Since 1998 , Lectures and conferences given at the IES School of Architecture, Mumbai (2019), China University of Technology (2007, 2009), Chung-Yuan Christian University (2006), K.U.Leuven (2003), Centre des Hautes Etudes de Chaillot, Paris (2000), Universidad Iberoamericana, Mexico DF (1998)

SKILLS

- Structural Analysis of Historical Buildings (limit analysis, FEM (FEAP, CalculiX, Code Aster), structural monitoring)
- Architectural Heritage Documentation, Surveying (practical and theoretical experience: total station, photogrammetry, laser scanner)
- Heritage Conservation: good knowledge of the general context
- Software Development (C++, html, PHP, Tcl/Tk) (open source surveying and structural analysis tools: <http://sourceforge.net/projects/pointsforces/>)
- Computer graphics: AutoCAD, Rhino, GIMP, Metashape, Darktable, custom software
- GIS: QGIS
- Computer literacy: Microsoft (Word, Excel), Latex, MySQL, UN*X (Linux, FreeBSD)
- DIY: wood working (furniture, carpentry), electricity (student jobs for an electrician), electronics

RESEARCH STAYS

- IES School of Architecture, Mumbai, Ahmedabad, Nashik, Yeola [1 week (6/2019), 1 week (12/2019)]
- Università degli Studi di Firenze, Italy [1 year (10/90-9/91), 1 week (3/92), 1 week (1/95)]
- Training course of vaults construction at the CRA-Terre, Grenoble, France (3 weeks (5/97))
- Workshop "learning from the Umbria and Marche earthquake: study on some historic center", Preci & Sellano (I), may 15th-17th, 1998

- ICOMOS representative at the congress "Initiative for promoting the use of compatible materials in the protection of european cultural heritage from environmental risks", Athens, december 11th-12th 1998; intervention: "Some reflections on the application of the concept of compatibility to heritage"
- Workshop "The restoration of the leaning tower: present situation and perspectives", Pisa, July 8th-9th 1999
- Historic Buildings International Training Session, Saint Antoine en Dauphiné, July 27th – August 12th 1996
- Intern in the Practice of Arch. Edward Din, Yaoundé (Cameroon), July 1987

PUBLICATIONS

- P. Smars**, "Some Technical and Cultural Observations about Compatibility and Heritage", *International Symposium on Geotechnical Aspects of Heritage Structures ISGHS 2024*, Tiruchirappalli (India), 14-16 Feb 2024. Keynote Lecture (to be published).
- P. Smars**, "Rules of the Art and the Non-standard Behaviour of Masonry", in Endo, Y., Hanazato, T. (eds) *Structural Analysis of Historical Constructions. SAHC 2023*. RILEM Bookseries, vol. 47. Springer, Cham, 2024.
- P. Smars**, "Safety analysis of masonry arches and vaults with a note on the kinematic safety of arches", in Aita, Benvenuto, Corradi, Pedemonte (eds) *Edoardo Benvenuto Prize. Collection of papers*, Studia Ligustica 16, pp.23-50, Fondazione Franzoni ETS, Genova, 2023.
- P. Smars**, "Under the skin", in Lancellotta, Viggiani, Flora, de Silva & Mele (eds) *Geotechnical Engineering for the Preservation of Monuments and Historic Sites III - Invited Papers*, pp.137-154, CRC Press, 2022
- P. Smars**, "Documenting Traditional Architecture in Yún-lín County - Inventorisation and GIS Workshop" in Smars, Yang (eds), *Vernacular Architecture – International Experience in Documentation, Preservation and Transmission of Skills* [to be published]
- P. Smars**, "Authenticity and integrity in archaeological sites", *Asian Regional Conference on Soil Mechanics and Geotechnical Engineering*, October 14-18 2019, Taipei (Taiwan)
- P. Smars**, "Adobe constructions in Yún-lín county, Taiwan", *6th International Congress on Construction History*, July 9-13 2018, Brussels (Belgium)
- P. Smars**, "A rig for experimenting the Dynamic Behaviour of Masonry Arches", *Structural Analysis of historical constructions*, Leuven (Belgium), 2016
- P. Smars**, T. Patrício, "Ethical questions around Structural Interventions in Archaeological Sites", *Structural Analysis of historical constructions*, Leuven (Belgium), 2016
- P. Smars**, "Documenting Structures of Built Heritage", *ISCARSAH newsletter* n. 8-9, 39-44, 2015
- P. Smars**, "Software Tools for in-situ documentation of built heritage", *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XL-5/W2, 589-594, 2013
- P. Smars**, "Values - Threats ... and Uncertainty / Baalbek (Lebanon)", *2012 International Conference on Conservation and Adaptive Reuse of Cultural Properties*, Tai-Zhong (Taiwan), 2012.
- P. Smars**, Assaad Seif, and Mario Santana. "Archaeological site of Baalbek, defining the structural risk". In *ICOMOS Symposium 2012 - Reducing Risks to Cultural Heritage from Natural and Human-Caused Disasters*, 27 October 2012, Beijing (China).

- E. Verstrynge, L. Schueremans, **P. Smars**, "Controlled intervention: monitoring the dismantlement and reconstruction of the flying buttresses of two Gothic churches", *International Journal of Architectural Heritage*, Available online: 12 Oct 2011
- P. Smars**, T. Patrício, M. Santana, A. Seif, "Archaeological site of Baalbek, Structural Risk Management Strategy", *International Conference on Disaster Management and Cultural Heritage*, 12-14 December, Thimphu (Bhutan), 2010.
- M. Santana Quintero, B. Van Genechten, T. Patricio, A. Seif, **P. Smars**, "A recording project for risk preparedness: protecting Baalbek's World Heritage Integrity", 7th International Conference on Science, Technology in Archaeology and Conservation", October 7-12 2010, Petra (Jordan)
- P. Smars**, "Surveying Software Tools for Parametric modelling of Architectural Heritage", 2010 *International Symposium on Cultural Heritage Conservation*, December 5-8 2010, Tainan (Taiwan)
- S. Kelley, D. Look, D. Yeomans, **P. Smars**, "國際建築文化遺產結構分析和修復學術委員會 (The International Scientific Committee on the Analysis and Restoration of Structures of Architectural Heritage)", 13th *Conference on Conservation Science, Preservation and Reuse of Cultural Properties*, Oct.30-Nov.1, 2010, Taipei (Taiwan)
- P. Smars**, "Kinematic Factor of Safety of Masonry Arches", *Advanced Materials Research*, vol.133-134, 2010, pp.429-434 [paper presented at the 7th *International Conference on Structural analysis of historical constructions (SAHC 2010)*, Oct. 6-8, Shanghai, China]
- P. Smars**, K. De Jonge, "Geometry and Construction Techniques of Gothic Vaults in Brabant (Belgium)", K.-E. Kurrer, W. Lorenz, V. Wetzka (eds), *Third International Congress on Construction History*, Cottbus (Germany), 20-24 May 2009, pp.1347-1354
- P. Smars**, U. Dahlhaus, "Mission to Bamiyan, October to December 2003", in M.Petzet (ed.), *The Giant Buddhas of Bamiyan, safeguarding the remains (Monuments and Sites XIX)*, 2009
- P. Smars**, "Influence Of Friction And Tensile Resistance On The Stability Of Masonry Arches", D. D'Ayala, E. Fodde (eds), *Structural Analysis of Historic Constructions*, Bath (UK), 2-4 July 2008, pp. 1199-1206
- L. Schueremans, K. Van Balen, K. Brosens, D. Van Gemert, **P. Smars**, "Structural assessment and consolidation measures – case study of Church of Saint-James in Leuven (B)", Mumbai, India, *Forensic Engineering: Failure Diagnosis and Problem Solving*, 6-9 December 2007, pp. 303-314.
- P. Smars**, "Documenting Architectural Heritage, Looking for a balance between automation and control", in 文化資產保存科學季刊 (*Journal of Cultural Conservation Science*, Taiwan), vol.2, October 2007, pp. 3-10
- E. Verstrynge, L. Schueremans, **P. Smars**, D. Van Gemert, "Design and testing of masonry arches: a project of Bachelor students in Civil Engineering", in P.B. Lourenço, D.V. Oliveira, A. Portela (eds), *Arch'07, 5th International Conference on Arch Bridges*, September 12-14, 2007
- L. Schueremans, K. Van Balen, K. Brosens, D. Van Gemert, **P. Smars**, "Church of Saint-James at Leuven: Structural Assessment and Consolidation Measures", *International Journal of Architectural Heritage*, vol.1/1, 2007, pp. 82-107
- P. Smars**, L. Schueremans, K. Van Balen, "Monitoring the dismantlement of four flying buttresses", in P.B. Lourenço, P. Roca, C. Modena, S. Agrawal (eds), *Structural Analysis of historical constructions*, New Delhi 2006, pp.1421-1428

- L. Schueremans, K. Van Balen, K. Brosens, D. Van Gemert, **P. Smars**, "Church of Saint-James at Leuven (B) - structural assessment and consolidation measures", in P.B. Lourenço, P. Roca, C. Modena, S. Agrawal (eds), *Structural Analysis of historical constructions*, New Delhi 2006, pp. 1729-1737
- L. Schueremans, K. Van Balen, **P. Smars**, V. Peeters, D. Van Gemert, "Hydrostatic levelling system: monitoring of historical structures", in P.B. Lourenço, P. Roca, C. Modena, S. Agrawal (eds), *Structural Analysis of historical constructions*, New Delhi 2006, pp. 529-536
- A. Sinopoli, M. Rapallini, **P. Smars**, "Plasticity, Coulomb Friction and Sliding in the Limit Analysis of Masonry Arches", *4th international conference on arch bridges (Arch'04)*, Barcelona (Spain), 17-19 November 2004
- D. D'Ayala, **P. Smars**, "Architectural and structural modelling for the conservation of cathedrals", *Journal of Architectural Conservation*, 3/9, 2003, pp. 51-72
- D. D'Ayala, **P. Smars**, Minimum requirement for metric use of non-metric photographic documentation (Report for English Heritage: report, illustrations), July 2003
- De Jonge, Verpoest, Cardon, Koldewij, de Vries, Hörsch, **Smars**, Geleyns, *Gotische architectuur in het voormalige hertogdom Brabant* (Gothic architecture in the former duchy of Brabant) (report for the province Vlaams-Brabant), 2002
- P. Smars**, D. D'Ayala, "Parametric shape model for conservation oriented surveying", *World Heritage in the Digital Age, Heritage Management Mapping: GIS and Multimedia*, Alexandria, 21-23 October 2002
- P. Smars**, K. Van Balen, K. Nuyts, "Layered Geometric Information System", *CIPA 2001 International Symposium (Surveying and Documentation of Historic Buildings - Monuments - Sites Traditional and Modern Methods)*, Potsdam University, September 18- 21, 2001
- K. Nuyts, K. Van Balen, **P. Smars**, "VIRTERF, a Vision on Heritage Conservation", *Seventh International Conference on Virtual Systems and Multimedia (VSMM'01)*, October 25 - 27, 2001, Berkeley, California
- K. Nuyts, J.-P. Kruth, B. Lauwers, H. Neuckermans, M. Pollefeys, L. Qiongyan, J. Schouteden, **P. Smars**, K. Van Balen, L. Van Gool and M. Vergauwen. "From a conservationist's point of view", in V. Gruen, Kahmen (eds) *Proc. Conference on Optical 3-D Measurement Techniques*, Vienna, October, 2001, pp. 179-186
- K. Nuyts, J.-P. Kruth, B. Lauwers, H. Neuckermans, M. Pollefeys, L. Qiongyan, J. Schouteden, **P. Smars**, K. Van Balen, L. Van Gool, M. Vergauwen, "Vision on Conservation", in B. Fischer, K. Dawson-Howe, and C. O'Sullivan (eds), *Virtual and Augmented Architecture (VAA'01), Proceedings of the International Symposium on Virtual and Augmented Architecture (VAA'01)*, Trinity College, Dublin 21-22 June 2001, 2001, pp. 125-132
- L. Schueremans, D. Van Gemert, **P. Smars**, " Safety assessment of masonry arches using probabilistic methods", *International Journal for restoration of buildings and monuments*, 7/5 (2001), pp. 517-538
- L. Schueremans, **P. Smars**, D. Van Gemert, "Safety of Arches - A Probabilistic Approach", *9th Canadian masonry symposium (Spanning the Centuries with Masonry)*, New Brunswick, 4,5,6 June 2001
- P. Smars**, *Etudes sur la stabilité des arcs et voûtes, confrontation des méthodes de l'analyse limite aux voûtes gothiques du Brabant* (doctoral thesis, K.U.Leuven), Leuven, 2000
- P. Smars**, "Some reflections on the application of the concept of compatibility to Heritage", *Initiative for promoting the use of compatible materials in the protection of european cultural heritage from environmental risks*, Athens, 11-12 december 1998

- K. Van Balen, **P. Smars**, "L'importance de la qualité de l'étude préalable", *Deuxième symposium européen des entreprises de restauration du patrimoine architectural, 4-5 juin 1998*
- P. Smars**, J.-J. Derwael, V. Peeters, K. Van Balen, "Supervisión en el proceso de conservación de monumentos", *First european congress on restoration of gothic cathedrals, Vitoria (E), 20-23 may 1998*, pp. 357-365
- K. Van Balen, **P. Smars**, "Modèle considérant la maçonnerie comme matériau non-résistant à la traction" in *IABSE symposium, Rome, September 1993*.
- C. Pesciullesi, **P. Smars**, "A numerical approach to analysis of masonry structures" in *2d international symposium on computational methods in structural masonry, Swansea, April 1993*.
- P. Smars**, *Etudes sur les structures en maçonnerie*, (master's thesis, K.U.Leuven), Leuven, 1992.
- T. Patrício, J.-M. Rubio, **P. Smars**, "De Woning Hankar", *Monumenten & Landschappen*, 11/2, mars/avril, Ministerie van de Vlaamse Gemeenschap, Brussels, 1992.
- T. Patrício, J.-M. Rubio, **P. Smars**, *La maison Hankar à Bruxelles*, (dissertation, K.U.Leuven), Leuven, 1990.

LANGUAGES

French (mother language), English and Italian (professional proficiency), Dutch (limited working proficiency), Notions of Spanish, German and Chinese

MISCELLANEOUS

- Member of **ICOMOS** (International Council on Monuments and Sites)
- Expert Member of **ISCARSAH**: ICOMOS International Scientific Committee on the Analysis and Restoration of Structures of Architectural Heritage
- Member of **Scientific Committees**
 - International CIPA Symposiums: 27th, 26th, 25th and 24th in Ávila (2019), Ottawa (2017), Taipei (2015), Strasbourg (2013)
 - International Conference on the Structural Analysis of Historical Constructions": 13th, 12th and 10th in Kyoto(2023), Barcelona (2021), Leuven (2016)
 - International Congress on Construction History: Cottbus (2009), Brussels (2018)
 - III Congreso Internacional Hispanoamericano de Historia de la Construcción: Mexico (2019)
 - International symposium "Heritage Recording and Information Management in the Digital Age (SMARTdoc)": Philadelphia (2011)
 - CSAAR 2011 Conservation of Architecture, Urban Areas, Nature & Landscape: Towards a Sustainable Survival of Cultural Landscape: Amman (2011)
- **Reviews** for
 - International Journal of Architectural Heritage
 - Bulletin of Earthquake Engineering
 - Journal of Cultural Heritage Management and Sustainable Development
 - Conservation & Management of Archaeological Sites
 - Architectural Engineering and Design Management
 - 2014 World Monuments Watch

- 2020 UNESCO World Heritage Centre
- PADI, Rescue Diver (experience in Taiwan, Palau, Cuba, Indonesia, UK and Spain)
- Reserve officer (the engineers) from 1992 to 1993
- Drone pilot license
- Numerous trips in Europe (France, Italy, Germany, Greece, the Netherlands, Great-Britain, Spain, Portugal...), Asia (Afghanistan, Bhutan, China, Kazakhstan, India, Indonesia, Japan, Laos, Lebanon, Pakistan, Taiwan, Thailand), Africa (Cameroon, Morocco) and America (Mexico, Cuba)