Curriculum Vitae, Sep 2017

Salmaan Craig Eng.D

Lecturer in Environmental Technology,
Harvard University Graduate School of Design

Research Associate,
Harvard Center for Green Buildings & Cities

Salmaan is a designer, educator, consultant and occasional writer, who specializes in materials design and building physics. He studied product design before undertaking a doctorate in environmental technology hosted by Brunel University and Buro Happold consulting engineers. During this time he designed and tested a biologically inspired material for protecting buildings from solar and ambient heat, while allowing them to cool through radiation to outer space.

After completing his doctorate, Salmaan continued at Buro Happold as a Facade Engineer, specializing in the design of material systems in extreme climates, such as the perforated, multilayer dome of the Louvre Abu Dhabi. He then moved to the Specialist Modeling Group at Foster+Partners, continuing to develop his research interests in the context of a number of high profile building projects, such as the Masdar Institute, Apple Campus, and Bloomberg Place.

Now at Harvard University, Salmaan splits his time between the Graduate School of Design—where he lectures on energy and materials in architecture—and the Center for Green Buildings and Cities. He is working on how to design thermally autarkic buildings for warming climates, using 'smart geometry' and 'dumb materials', and the internet to share and develop the results. He also practices as an independent consultant, and his clients include Timberland, Ábalos & Sentkiewicz Arquitectos, and Empresa de Desarrollo Urbano (EDU) of Medellín.

Education

2004—2008 Eng.D, Environmental Technology, *Brunel University, UK (with Buro Happold)*

2000—2004 B.Sc, Product Design, *Brunel University, UK*

2003 Erasmus exchange program, *Politecnico di Milano, Italy*

Academic Appointments

2014—Now Lecturer in Environmental Technology, *Department of Architecture, Graduate School of Design, Harvard University*

2014—Now Research Associate, *Center for Green Buildings & Cities, Graduate School of Design, Harvard University*

2014—Now Instructor, *Executive Education Program, Graduate School of Design, Harvard University*

2013—2014 Visiting Lecturer, *Department of Architecture, Graduate School of Design, Harvard University*

Professional Employment

2011—2013 Associate, *Specialist Modeling Group, Foster + Partners, London, UK. Key Projects: Bloomberg Headquarters, London; Apple Campus, Cupertino*

2010—2011 Environmental Design Analyst, *Specialist Modeling Group, Foster + Partners. Key Projects: Masdar Institute, UAE.*

2009—2010 Facade Engineer, *Buro Happold, London, UK. Key Projects: Louvre Abu Dhabi, UAE.*

2008—2009 Sustainability Consultant, *Buro Happold*

2004—2008 Research Engineer, *Buro Happold (industrial sponsor of doctoral research)*

Independent Consulting

2015—Now Empressa de Desarrollo Urbano (EDU), Medellin. *New naturally ventilated headquarters (no air-conditioning; buoyancy + thermal mass). Performance to be broadcast live on the internet. Due for completion Spring 2017.* On ArchDaily here and here.

2013—Now Ábalos & Sentkiewicz Arquitectos. *Artist's residence in Gais, Switzerland; Art museum in Zhuhai, China; Retail space in Shanghai; Art museum in Lleida, Spain*

2013—2014 Timberland, *Thermoregulation in footwear with new materials*

Academic Service

2016—2017 Co-coordinator, *MDes Energy & Environments, Graduate School of Design, Harvard University*

2016—Now MArchI Program, applications committee, *Graduate School of Design, Harvard University*

2016—2017 Loeb Fellowship, applications committee (2 year appointment). *Graduate School of Design, Harvard University*

Courses Taught [or contributed to]

2017 SCI 6477: Nano Micro Macro: Adaptive Material Laboratory. *Lecture/Studio (Fall)*. Co-listed with SEAS, co-taught with Joanna Aizenberg. Course description. Course syllabus.

SCI 6464: Thermal Tectonics for the Next Billion People. *Seminar (Spring). Participant survey, overall rating: 4.83/5*. Course description, online journal.

2016 SCI 6121: Construction Lab: An Introduction to Materials in Architecture & Science. *Lecture course, MArch core (Fall). Participant survey, overall rating: 3.93/5*. Course description, syllabus

SCI 6347: The Thermal Allometry of Massive, Breathing Buildings. *Seminar (Spring). Participant survey, overall rating: 4.18/5*. Course description, student project

[STU 1201: Integrate. *Third semester core studio (Fall). Consultant.*]

[ADV 9301: MArch II Superstudio, Part 2. *Seminar (Spring), Iñaki Abalos. Consultant.*]

2015 SCI 6121: Construction Lab: An Introduction to Materials in Architecture & Science. *Lecture course, MArch core (Fall). Participant survey, overall rating: 3.8/5*

SCI 6453: Designed Porous Media. *Seminar (Spring). Participant survey, overall rating: 4.32/5*

Breathing Buildings. *Global Leadership Program, for Empresa de Desarrollo Urbano (EDU). Harvard GSD Executive Education. Sep 2-4th, Medellín, Colombia. Participant survey, overall rating: 4.92/5*

[STU 1201: Integrate. *Third semester core studio (Fall). Consultant.*]

2014 SCI 6121: Construction Lab: An Introduction to Materials in Architecture & Science. *Lecture course, MArch core (Fall). Participant survey, overall rating: 3.83/5*

SCI 6453: Designed Porous Media. *Seminar (Spring). Participant survey, overall rating: 4.5/5*

New Approaches to Materials Design. *Global Leadership Program, for Empresa de Desarrollo Urbano (EDU). Harvard GSD Executive Education. May 7-8th, Medellín. Participant survey, overall rating: 4.82/5*

New Materials and Environmental Technology in Construction. *Advanced Management Development Program in Real Estate. Harvard GSD Executive Education. Feb 11th. Participant survey, overall rating: 4.09/5*

[STU 6453: In the Land of Ñandutí. *Option Studio, Jorge Silvetti. Consultant.*]

2013 SCI 6345: Thermoregulation Using Hybrid Materials. *Seminar. Participant survey, overall rating: 4.63/5*

SCI 6123: Materials, Constructions, Processes. *Lecture course, MArch core. Co-taught with Eric Höweler. Participant survey, instructor rating: 4.22/5*

[STU 1201: Integrate. *Third semester core studio. Consultant.*]

Publications

2017 S. Craig, J. Grinham. "Breathing walls: The design of porous materials for heat exchange and decentralized ventilation". *Energy and Buildings, Vol 149 doi: 10.1016/j.enbuild.2017.05.036 (link)*

S. Craig. "Mass & Material-Architecture: The Antidote to HVAC Infrastructure?" In: *Infrastructure Space*, Ilka & Andreas Ruby (Eds.). Ruby Press. ISBN: 9783944074184 *(link)*

S. Craig. "On Porosity and Surface". In: *Interior Matters*, a+t 47, SOLID Harvard GSD series, ISSN: 1132-6409

S. Craig. "On the Forces That Shape Trees, Or How to Steal Order from the Molecular Storm". In: *What is Energy, and How Might We Think About it?* K. Moe & S. Kwinter (Eds.). Actar. ISBN: 9781940291451. *Article preprint available here.*

S. Craig. "Breathing Walls Made of Wood". In: *"Wood Urbanism: From the Molecular to the Territorial", K. Moe, J. Hutton, D. Ibañez (Eds.) Actar*

J. Martin, A. Goyal, S. Craig. "Oesteomorphic Hybrid Blocks: Material Research on Thermoregulation." In: Monograph. Research REDS 03. Flowing Knowledge, LIStLab, Trento, ISBN 978889985431

2015 S. Craig. "Messages From Material Reality". *Harvard Design Magazine, No. 40. (link)*

2014 S. Craig. "Breathing Walls". In: *Insulating Modernism: Isolated and Non-Isolated Thermodynamics in Architecture",* K. Moe. Birkhäuser. ISBN: 3038215392

2013 J. Rimmer, S. Craig et. al. "In-Situ Performance of Chilled Ceilings in Stratified Environments". *Clima 2013: 11th REHVA World Congress: Energy Efficient, Smart & Healthy Buildings, 16-19th June, Prague, Czech Republic.*

2012 M. Hensel, D. Sunguroglu-Hensel, M. Gharleghi, S. Craig. "Towards an Architectural History of Performance: Auxiliarity, Performance & Provision in Historical Persian Architectures". *In 'Iran: Past, Present & Future', Architectural Design*

Dowson, Grogan, Burks, Harrison, Craig. "Streamlined LCA of transparent silica aerogel made by supercritical drying". *Applied Energy (97)*

Susman, Dehouche, Craig. "*Energy Performance of an Office Cooling System with PCM Tank". Proceedings of the Institution of Civil Engineers: Energy, 165 (4)*

Coombe, Harrison, Craig, Young. "An Investigation into usability and exclusivity issues of digital programmable thermostats". *Journal of Engineering Design, 23 (5)*

2011 Coombe, Harrison, Dong, Craig, Gill. "Assessing the number of users who are excluded by domestic heating controls", *Int. Journal of Sustainable Engineering, 4 (1)*

Dowson, Harrison, Craig, Gill. "Improving the thermal performance of single-glazed windows using translucent granular aerogel", *Int. Jour. of Sustainable Engineering, 4(3)*

Susman, Dehouche, Cheechern, Craig. "Tests of prototype PCM 'sails' for office cooling". *Applied Thermal Engineering, 31 (5)*

Whitehead, Gallou, Thapar, Betti, Craig. "Driving an Ecological Agenda with Project-Led Research". *In 'Experimental Green Strategies: Redefining Ecological Design Research', Architectural Design*

2010 A case study in BioTRIZ: 'heat-selective' insulation for radiative cooling of buildings". *Proceedings of the COST Strategic Workshop, Principles and Development of Bio-inspired Materials, 13-15th, April 2010, Vienna, Austria, pp 110-111.* (link)

2008 S. Craig. "Biomimetics Design Tool Used To Develop New Components For Lower Energy Buildings". *Doctoral Thesis. Brunel University (link)*

Craig, Harrison, Cripps, Knott. "BioTRIZ Suggests Radiative Cooling of Buildings Can Be Done Passively by Changing the Structure of Roof Insulation to Let Longwave Infrared Pass". *Journal of Bionic Engineering, 5 (1) (link, pdf)*

Awards

2009 Hamilton Prize, Best Thesis in Design for the 2008/09 Academic Season. *"Biomimetics design tool used to develop new components for lower energy buildings". School of Engineering & Design, Brunel University. (link)*

Theses supervision

2017 Jonathan Grinham, DDes. "The Vascularization of Buildings: Micro-to-Milli-Scale Flow Systems for Heating and Cooling in the Built Environment". Co-supervised with Martin Bechthold (GSD) & Donald Ingber (Wyss Institute)

2016 Daekwon Park, DDes. "Multiscale Thermal Design for Buildings". Co-supervised with Martin Bechthold (GSD) & Joanna Aizenberg (Wyss Institute)

Palak Gadodia, MDes. "Coupling Thermal Mass & Buoyancy for Thermoregulation and Ventilation in India"

2015 Jared Friedman, MDes. "Working Matter: Optimizing Material Distribution for Thermal Performance"*(link)*

2012 Gideon Susman, EngD. "The application of phase change materials to cool buildings". Co-supervised with Z. Dehouce. *(link)*

Invited Lectures

2017 On Breathing Buildings and Termite Mounds, or How to Disinvent the Need for Air-Conditioning. *Master-lecture for ARCH602, Penn Design, UPenn, Feb 15th*

On the Thermal Resonance of Buildings. *ArtScience Lecture Series, Le Laboratoire, Cambridge, MA, Jan 11th*

2016 On the Forces that Shape Trees, or How to Print Buildings from Carbon Dioxide. *Séminaire Phyllis Lambert, Université de Montréal, 5th Nov*

On Breathing Buildings and Termite Mounds, or How to Disinvent the Need for Air-Conditioning. *Conférence B.E.S.T, Université de Montréal, 1st Nov*

Three Kinds of Heliomorphism. *Heliomorphism, Inaugural Conference for the Office for Urbanization, Harvard Graduate School of Design, 15th Sep*

Como nos Desconectamos del Aire Acondicionado. *EDU Forum, Medellín, Colombia, 26th Apr*

Plastic Enclosures. *Interior Matters Symposium, Harvard Graduate School of Design, Apr 22nd*

Mass & Material Architecture: The Antidote to HVAC Infrastructure? *Larfarge Holcim, 5th Int. Forum for Sustainable Construction, Detroit, USA, Apr 9th.*

Mass & Material Architecture: The Antidote to HVAC Infrastructure? *Master-lecture for ARCH602, Penn Design, UPenn, Feb 22nd*

2015 Geometrically Activated Thermal Mass. *Ultrastructures Conference. Princeton University, Sep 19th*

Fit Form to Flow. *Keynote Speech, Green Building in China Symposium, China GSD and Yuexiu Property, 5th Jan*

2014 Trees as Flow Structures. *Wood Urbanism: From the Molecular to the Territorial. Colloquium, Harvard Graduate School of Design, Sep 25-26th.*

2013 Porous Flow Structures. *Thermodynamic Materialism Symposium II: Polyvalent Porosity. ETH Zürich, 29th Nov.*

Breathe! '*Innovate' Lecture Series, Harvard Graduate School of Design, Sep 10th*

Heuristics of Heat. *Thermodynamic Materialism Symposium I: Recovering Authority Through Knowledge. Harvard Graduate School of Design, 11th Apr.*

2012 Use Hybrid Materials to Resolve Thermal Conflicts. *Smart Geometry, Rensselaer Polytechnic Institute, Troy, New York, 27th Mar*

Materials & Heat. *Estonian Academy of Arts, Tallinn, Estonia, 4th April*

2011 Radiative Cooling in Desert Environments, *Digital Realization Series, The Bartlett School of Architecture, London, 28th Jan*

Abu Dhabi Dew Drops. *Fabricate—Digital Fabrication Conference, The Bartlett School of Architecture, London, 15th April*

Toward a New Desert Architecture. *Forward Thinking: Discussions of the Future of Architecture in the Arab World, Shubbak Festival, RIBA, London, 19th July*

Experiments Toward a New Desert Architecture. *Sverre Fehn Symposium, The Oslo School of Architecture & Design, 28th Oct*