

Jianyun Wang

Contact

Prof. Dr. Jianyun Wang

“Young Talent Support Plan A” of Xi’an Jiaotong University

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Education

2009.03-2013.03	Ghent University (Belgium)	Civil Engineering	Ph.D
2005.09-2009.02	Southeast University	Materials Physics and Chemistry	Master-Doctor
2001.09-2005.06	Southeast University	Materials Science and Engineering	B.S

Work experience

2018.10 - present, **Professor**, Xi’an Jiaotong University, China

2014.10 - 2018.09, **Postdoctoral Researcher**, Research Foundation Flanders (FWO-Vlaanderen), Magnel Laboratory for Concrete Research & Center for Microbial Ecology, Ghent University, Ghent, Belgium

Project: Development of efficient and reliable microbial-based self-healing concrete

Advisors: Prof. dr. Nele De Belie, Prof. dr. Nico Boon

2013.04 - 2014.09, **Postdoctoral Researcher**, Strategic Initiative Materials (SIM, program Self-healing Materials), Magnel Laboratory for Concrete Research & Center for Microbial Ecology, Ghent University, Ghent, Belgium

Project: Self-healing Cementitious and Mineral building materials (SECEMIN)

Advisors: Prof. dr. Nele De Belie, Prof. dr. Nico Boon

Research fields

Microbially induced calcium carbonate precipitation;
Bacteria-based self-healing concrete;
Bacteria-based surface protection and consolidation of building materials;
Bio-enhanced recycled aggregates and concrete;
Bio-cement;
Durability and sustainability of cementitious materials

Research outcomes

Prof. Wang has led/participated in several advanced research projects in Belgium and European Union and have generated many world-class papers, which make her become one of world's pioneer experts in the field of microbially induced calcium carbonate precipitation and bacteria-based self-healing concrete. The research output has a significant impact in the field of construction and building materials and applied microbial biotechnology. So far, she has published 20 SCI papers, in which 11 as first or corresponding author in her research field's top Journals such as *Cement and Concrete Research* (IF=5.43), *Cement and Concrete Composites* (IF=4.66), *Construction and Building Materials* (IF=3.485), *Journal of Cleaner Production* (IF=5.715), *Applied Microbiology and Biotechnology* (IF=3.420), *Frontiers in Microbiology* (IF=4.076). Her current Google Scholar total citations are 1490; H-index is 15; and i10-index is 19. One single paper has been cited 280 times. She has also contributed to 3 English book chapters and was granted 1 US patent and 3 Chinese patents. Moreover, she has contributed to 26 international conference papers. During the same period, she was granted the Belgian Government Postdoctoral Fellowship (2014-2018) and Ghent University international PhD Scholarship (2009-2013). She has guided 9 master students and is supervising 2 PhD students.

Full publication list:

Google scholar: <https://scholar.google.com/citations?user=dT1KfBwAAAAJ&hl=en>

Representative publications

Jianyun Wang, Arn Mignon, Gilles Trensou, Sandra Van Vlierberghe, Nico Boon, Nele De Belie. (2018) A chitosan based pH-responsive hydrogel for encapsulation of bacteria for self-healing concrete. *Cement and Concrete Composites*, 93, 309-322. (IF: 4.66)

Jianyun Wang, Henk M Jonkers, Nico Boon, Nele De Belie. *Bacillus sphaericus* LMG 22257 is physiologically suitable for self-healing concrete. (2017) *Applied Microbiology and Biotechnology*. 1-14. (IF: 3.34)

Jianyun Wang, Brecht Vandevyvere, Sam Vanhessche, Joris Schoon, Nico Boon, Nele De Belie. (2017). Microbial carbonate precipitation for the improvement of quality of recycled aggregates. *Journal of Cleaner Production*. 2017, 156, 355-366. (IF: 5.651)

Jianyun Wang, Yusuf Çağatay Erşan, Nico Boon, Nele De Belie. (2016). Application of microorganisms in concrete: a promising sustainable strategy to improve concrete durability. *Applied Microbiology and Biotechnology*, 100 (7), 2993-3007. (IF: 3.34)

Jianyun Wang, Arn Mignon, Didier Snoeck, Virginie Wiktor, Sandra Van Vlierberghe, Nico Boon, Nele De Belie. (2015). Application of modified-alginate encapsulated carbonate producing bacteria in concrete: a promising strategy for crack self-healing. *Frontiers in Microbiology*, 2015, 6: 1088. (IF: 4.019)

Jianyun Wang, Hugo Soens, Willy Verstraete, Nele De Belie. (2014). Self-healing concrete by use of microencapsulated bacterial spores. *Cement and Concrete Research*, 56, 139-152. (IF: 5.430, journal's most cited paper)

Jianyun Wang, Didier Snoeck, Sandra Van Vlierberghe, Willy Verstraete, Nele De Belie. (2014). Application of hydrogel encapsulated carbonate precipitating bacteria for approaching a realistic self-healing in concrete. *Construction and Building Materials*, 68, 110-119. (IF: 3.485)

Jianyun Wang, Jan Dewanckele, Veerle Cnudde, Sandra Van Vlierberghe, Willy Verstraete, Nele De Belie. (2014). X-ray computed tomography proof of bacterial-based self-healing in concrete. *Cement and Concrete Composites*, 53, 289-304. (IF: 4.66)

Jianyun Wang, Kim Van Tittelboom, Nele De Belie, Willy Verstraete. (2012). Use of silica gel or polyurethane immobilized bacteria for self-healing concrete. *Construction and Building Materials*, 2012, 26(1), 532-540. (IF: 3.485, journal's most cited paper)

Jianyun Wang, Nele De Belie, Willy Verstraete. (2012). Diatomaceous earth as a protective vehicle for bacteria applied for self-healing concrete. *Journal of Industrial Microbiology and Biotechnology*, 39 (4), 567-577. (IF: 3.103)

Chunxiang Qian, **Jianyun Wang***, Ruixing Wang, Liang Cheng. Corrosion protection of cement-based building materials by surface deposition of CaCO₃ by *Bacillus pasteurii*. *Materials Science and Engineering C*, 2009, 29(4), 1273-12803. (*corresponding author, IF: 1.842)

Book chapters

Nele De Belie, **Jianyun Wang**, Zeynep B Bundur, Kevin Paine. Bacteria based concrete. In: *Eco-efficient Repair and Rehabilitation of Concrete Infrastructures*, Woodhead publishing 2018, 531-567.

Eirini Tziviloglou, Kim Van Tittelboom, Damian Palin, **Jianyun Wang**, Sierra-Beltrán M Guadalupe, Yusuf Çağatay Erşan, Renée Mors, Virginie Wiktor, Henk M Jonkers, Erik Schlangen, Nele De Belie. Bio-based self-healing concrete: from research to field application. In: *Self-healing Materials*. Springer 2016, 345-385. (SCI)

Hans W Reinhardt, Henk M Jonkers, Kim Van Tittelboom, Didier Snoeck, Nele De Belie, Willem De Muynck, Willy Verstraete, **Jianyun Wang**, Viktor Mechtcherine. Recovery against environmental actions. In: *Self-Healing Phenomena in Cement-Based Materials*. Springer 2013, 266 p. ISBN: 978-94-007-6623-5 (Print) 978-94-007-6624-2 (Online)

Representative proceedings

Jianyun Wang, Kim Van Tittelboom, Nele De Belie. (2014). Microscopy and computed micro-tomography for evaluation of microbial self-healing in concrete. XIII International Conference on Durability of Building Materials and Components. Sept 02-05, 2014, Sao Paulo, Brazil. pp736-743.

Jianyun Wang, Nele De Belie. (2014). Effect of water availability on microbial self-healing of concrete. 1st Concrete Innovation Conference. June 11-13, 2014, Oslo, Norway. pp1-8.

Jianyun Wang, Sandra Van Vlierberghe, Peter Dubruel, Willy Verstraete, Nele De Belie. (2013). Hydrogel encapsulated bacterial spores for self-healing concrete: proof of concept. In: De Belie, N., van der Zwaag, S., Gruyaert, E., Van Tittelboom, K., Debbaut, B. (eds.) Proceedings of the 4th International Conference on Self-healing materials, Ghent, 16-20 June 2013, p. 280 in abstract book, full paper on USB p. 606-609. ISBN: 9789082073706.

Jianyun Wang, Willy Verstraete, Nele De Belie. (2013) Enhanced self-healing capacity in cementitious materials by use of encapsulated carbonate precipitating bacteria: from proof-of-concept to reality. 8th International Symposium on Cement and Concrete, 20-23 September, Nanjing, China, p 114 in abstract book, 7 p full paper on CD.

Jianyun Wang, Nele De Belie, Willy Verstraete. (2011). A microbial based system developed for self-healing concrete cracks. In: Godbout S., Potvin L. (eds). Proceedings of the 7th International Symposium on Cement Based Materials for a sustainable Agriculture (CSA), Quebec, 18-21 September, 2011, p. 17-24.

Jianyun Wang, Nele De Belie, Willy Verstraete. (2011). Self-healing concrete by use of diatomaceous earth immobilized bacteria. 3rd International Conference on Self-healing materials, Bath, 27-29 June 2011, p.293 in abstract book, 2 p. abstract on USB.

Jianyun Wang, Kim Van Tittelboom, Nele De Belie, Willy Verstraete. (2010). Potential of applying immobilized *Bacillus sphaericus* to heal cracks in concrete autonomously. In: Zachar J., Claisse P., Naik T.R., Ganjian, E. (eds). Second international conference on Sustainable construction materials and technologies, Vol. 3, Ancona, Italy, 31 May - 3 June 2010, p 1807-1818. ISBN 978-1-4507-1490-7.

Jianyun Wang, Nele De Belie. Ureolytic bacteria based self-healing concrete. In: V. Wiktor, H. Jonkers, A. Bertron (eds) Proceedings PRO102, 23 June, 2016, Delft, P37 in book of abstracts and 11p. paper online. E-ISBN: 978-2-35158-160-5.

Jianyun Wang, Domien Fraeye, Yusuf Cagatay Ersan, Willem De Muynck, Nico Boon, Nele De Belie. (2017). Surface consolidation of natural stones by use of bio-agents and chemical consolidate. 14th International Conference on Durability of Building Materials and Components. May 28-31, Ghent, Belgium.

Nele De Belie, **Jianyun Wang**, Julia García González, Desirée Rodríguez Robles, Brecht Vandevyvere, Sam Vanhessche, Nico Boon, Joris Schoon, Andrés Juan Valdés. (2017). Improving the quality of various types of recycled aggregates by biodeposition. 14th International Conference on Durability of Building Materials and Components. May 28-31, Ghent, Belgium. (keynote speaker)

Patent

American Patent: Microcapsules and concrete containing the same. Applicants: Devan Chemicals NV, Universiteit Gent. Inventors: Soens, H, De Belie, N., **Wang, J.**, Durka M. Patent No. US1962638.

Chinese Patent: Production of CaCO₃ by means of microbial deposition. Inventors: Qian, C., Wang, R., **Wang, J.** Patent No. CN1778934

Chinese Patent: Methodology and application of microbial deposition for surface protection of cement based materials. Inventors: Qian, C., Wang, R., **Wang, J.**, Cheng, L. Patent No. CN101234909

Chinese patent: Soil consolidation by use of a carbonate-mineralization bacterium. Inventors: Qian, C., Lu, W., Wang, R., **Wang, J.** Patent No. CN101368384

Teaching

1. Supervisor of the practical course “Non-destructive Characterization of Cementitious Materials” within the framework of the course “Materials Technology: Basic Concepts and Project”, Ghent University, 2010~2014.
2. Lecturer of the session “Micro-organisms and building materials” in the course “Durability of Materials”, Ghent University, 2014~2017.

Social activities

1. Active member of RILEM TC-MCI (Microorganisms-Cementitious Materials Interactions); RILEM is International Union of Laboratories and Experts in Construction Materials, Systems and Structures.
2. Reviewer of *Cement and Concrete Research*, *Cement and Concrete Composite*, *Construction and Building Materials*, *International Journal of Smart and Nano Materials*, *Materials and Structures*, *Journal of Advanced Concrete Technology*, *Journal of Building Engineering*, *Materials*, *Materials Characterization*, *Journal of Materials in Civil Engineering*.