



Installation Publication for Professor Hongbo Zhang

I, Hongbo Zhang, was born on April, 1982 in a small town in Northeast, China. After completing high school, I enrolled into Fudan University in Shanghai where I chose to major in biology. From then on, I started to realize the beauty of life and embarked my academic journey. I joined a laboratory and was involved in a project analyzing the genetic patterns of the plant *Solidago canadensis*, to understand the mechanism of its invasion. We needed to go to the wild fields to pick samples and made multiple steps of extraction and analysis. It was the first time I got a true feeling of what research is. After receiving my bachelor's degree, I decided to go abroad to broaden my horizons and I came to the University of Helsinki. I spent 7 years there, finalizing my master's degree in biotechnology and my PhD degree in pharmaceutical chemistry. I continued my journey to Harvard University, where I was a post doc researcher in Prof. David A. Weitz lab, focusing on physics and engineering. Before my time at Harvard, I visited the biomedical engineering lab in Imperial College London, UK and the biomaterials lab in Ghent University, Belgium. Therefore, I became very multidisciplinary in my training.

In September 2016, I was very fortunate to get a position at Åbo Akademi University and established my lab in the Pharmaceutical Sciences Laboratory, where there is a great research atmosphere. Professor Niklas Sandler and Professor Jessica M. Rosenholm are both very supportive for young PIs. My early career has focused on microfluidic based nano and microparticles' fabrication for drug delivery applications. I developed and published several novel methodologies based on microfluidics, and I have also studied the mechanism of particle formation in microfluidics. Later, my research group has expanded to 20, 30 and 40 people, and my research areas have also broadened to all types of functional materials for medication.

I have made a series of innovative achievements in the fields of microfluidics, nanomedicine, and targeted drug delivery. I established close collaborations with clinicians and hospitals, and by involving them in the project, our projects are highly relevant to real-life clinical problems, and we also aim to drive some of the successful cases to clinical usage.

In 2023, I was very honored to be awarded with the position of professor in pharmaceutical biomaterials at Åbo Akademi University. Now I am also the director of the research program for biomaterials and medical devices in BioCity. These positions not only allow me to share my insights but also provide me solid support to continuously dig into the fields of biomaterials and biomedical engineering and find new solutions for health.

Personal details

Born on April 1982 in China

ORCID: <https://orcid.org/0000-0002-1071-4416>

Degrees and Title of Docent

2009–2012 Doctor of Philosophy, Pharmaceutical Chemistry, University of Helsinki, Finland

2005–2008 Master of Science, Biotechnology, University of Helsinki, Finland

2000–2004 Bachelor of Science, Biology, Fudan University, P. R. China

2017 Docent in Pharmaceutical Technology, University of Helsinki

Employment

Professor in Pharmaceutical Biomaterials, Åbo Akademi University, 2023–

Associate Professor (tenure track) in Drug Development and Diagnostics, Åbo Akademi University, 2018–2023

Assistant Professor (tenure track) in Drug Development and Diagnostics, Åbo Akademi University, 2016–2018

Research funding

2021–2024 “Finland-China Food and Health” International Pilot, funded by the Finnish Ministry of Education and Culture, subproject (about 40 000 € per year)

2022–2024 Business Finland, Research to Business funding, 670 000 €.

2022–2026 Academy of Finland Project, 470 000 €.

2022–2024 Academy of Finland Research Fellow Continuation Research fund, 200 000 €.

2020–2021 “In Vivo Delivery of CRISPR/Cas9 for Advanced Liver Cancer Therapy Through c-Myc Knockout”, Sigrid Juselius Foundation, 40 000 €.

2019–2020 “Electron Microscopy Supported Development of Functional Biomaterials and Nanomedicines for Precision Medication”, Tor, Joe och Pentti Borgs minnesfond, 69 000 €.

2019–2024 Academy of Finland Research Fellow, Biology and Health panel, 430 000 €.

2019–2022, Academy of Finland Research Fellow Initial Research fund, 300 000 €.

2018–2019 Innovation catalyst of Åbo Akademi University, 5 000 €.

2017–2020 “Microfluidic Based Single Cell Transcriptome Sequencing for Investigating Tumour Heterogeneity” Sigrid Juselius Foundation, 120 000 €.

2016–2019 “Porous silicon-DNA hydrogel Assembled Platform for Intracellular Drug Delivery to the Heart”, Academy of Finland Postdoc Fellow, Health Panel, 279 000 €.

2015–2018 “Porous silicon based multifunctional nano shuttle for targeted intracellular drug delivery Jane and Aalto Foundation three-year project, 283 000 €.

Participation in other projects

2024–2027 Research Council of Finland, FIRI Roadmap “EUOPENSREEN Finland (EUOS FI)”, 4 500 000 €.

2024–2028 Åbo Akademi Center of Excellence in Research “Materials-Driven Solutions for Combatting Antimicrobial Resistance”, 1 100 000 €.

2024–2028 Nordic Pharmaceutical Translation and innovation, ca 1 700 000 €.

2018–2023 Nordic POP (Patient-Oriented Products), 4 600 000 €.

2024–2028, Innovation Ecosystem based on the Immune System (InFLAMES flagship), 10 400 000 €.

2020–2024, Innovation Ecosystem based on the Immune System (InFLAMES flagship), 10 600 000 €.

Research output and academic merits (selection)

More than 100 international papers as the first or corresponding author in journals such as Science Advances, Advanced Materials, Nature Communication, PNAS, Cell Reports, etc. The papers have been cited 10 000 times, with the H-index of 58 according to the Google scholar database.

10 patents

Executive Editor-in-Chief of Smart Medicine (Wiley)

Deputy Editor in Research (Science Partner-Journal)

Associate Editor of Engineered Regeneration (Elsevier)

Reviewer of Chemical Review, Nature Review Clinical Oncology etc.

Corresponded 13 research projects in Finland and participated in many national and international projects.

Coordinated many company projects, with Bayer Pharma, UPM and other large international companies.

Awards (selection)

Best Oral Formulation Award issued by the American Association for Controlled Release in 2014

The 2019 Royal Society of Chemistry Outstanding Young Investigator Award in Biomaterials Science

Top 5 nominations of 2019 USERN world leading young scientists award

The first place in the 2019 Chinese Medical Association Orthopedic Research Award

The 2020 Swiss MDPI Pharmacy Young Scientist Award

The 2021 Per Brahe Prize issued by the Åbo Akademi University Foundation

The 2021 Best Young Scientist Award of Turku Oncology Association

The 10 leading Chinese talents in science and technology in Europe, 2023

Supervision

Main supervisor for three doctoral theses (2022, 2023, 2024) and 21 master's theses.

Main supervisor for 25 ongoing doctoral theses (two of them have received permission for defense).

Co-supervisor of two graduated doctoral students (2021 and 2019), main supervisor was prof. Helder A. Santos from University of Helsinki

Selected publications

Total publications: 189; Google citation: 10 000+; H-index: 58; Patents: 10

1. **Hongbo Zhang**, Wenguo Cui, Xiangmeng Qu, Huayin Wu, Liangliang Qu, Xu Zhang, Ermei Mäkilä, Jarno Salonen, Yue-Qi Zhu*, Zhou Yang, Dong Chen, Hélder A. Santos, Mingtan Hai*, David A. Weitz*, "Photothermal Responsive Nanosized Hybrid Polymersome as Versatile Therapeutics Co-Delivery Nanovehicle for Effective Tumor Suppression", Proc. Natl. Acad. Sci. U.S.A. 2019, 116(16) 7744–7749.
2. **Hongbo Zhang**, Dongfei Liu, Mohammad-Ali Shahbazi, Ermei Mäkilä, Bárbara Herranz-Blanco, Jarno Salonen, Jouni Hirvonen, Hélder A. Santos, Fabrication of a Multifunctional Nano-in-micro Drug Delivery Platform by Microfluidic Templated Encapsulation of Porous Silicon in Polymer Matrix, Advanced Materials, 26 (2014) 4497–4503.
3. Jiagi Yan, Xiaodong Ma, Danna Liang, Meixin Ran, Dongdong Zheng, Xiaodong Chen, Shichong Zhou, Weijian Sun, Xian Shen, **Hongbo Zhang***, "An autocatalytic multi-component DNzyme nanomachine for tumor-specific photothermal therapy sensitization in pancreatic cancer", Nature communications, 2023, 14, 6905.

4. Jiaqi Yan, Meixin Ran, Xian Shen* and **Hongbo Zhang***, "Therapeutic DNazymes: From Structure Design to Clinical Applications", *Advanced Materials*, 2023, e2300374.
5. Jia Shen, Chang Liu, Pengpeng Yan, Hongfeng Huang, Meifang Wang, Luying Guo, Shuaihui Liu, Jianghua Chen, Jessica M. Rosenholm, Rending Wang and **Hongbo Zhang***. "Helper T Cell (CD4+) Targeted Tacrolimus Delivery Mediates Precise Suppression of Allogeneic Humoral Immunity", *Research*, 2022, 9794235.
6. Xiaoyu Xu, Chang Liu, Yonghui Wang, Oliver Koivisto, Junnian Zhou, Yilai Shu, **Hongbo Zhang***, "Nanotechnology-based Delivery of CRISPR/Cas9 for Cancer Treatment " *Advanced Drug. Delivery Review*, 2021., 176, 113891.
7. **Hongbo Zhang**, Yueqi Zhu, Liangliang Qu, Huayin Wu, Haixin Kong, Zhou Yang, Dong Chen, Ermei Makila, Jarno J. Salonen, Hélder A. Santos, Mingtan Hai*, David A. Weitz*, "Gold Nanorods Conjugated Porous Silicon Nanoparticles Encapsulated in Calcium Alginate Nano Hydrogels Using Microemulsion Templates", *Nano Letter*, 2018, 18(2), 1448-1453.
8. Guicai Li, Qi Han, Liling Zhang, Panjian Lu, Yuezhou Zhang, Shiyu Chen, Ping Zhang, Luzhong Zhang, Wenguo Cui, Hongkui Wang, **Hongbo Zhang***. "Construction of Dual-Biofunctionalized Chitosan/Collagen Scaffolds for Simultaneous Neovascularization and Nerve Regeneration". *Research* 2020, <https://doi.org/10.34133/2020/2603048>.
9. Yuezhou Zhang, Jing Tu, Dongqing Wang, Haitao Zhu, Sajal Kumar Maity, Xiangmeng Qu, Bram Bogaert, Hao Pei, **Hongbo Zhang***. Programmable and Multifunctional DNA-Based Materials for Biomedical Applications. *Advanced Materials*, 2018 30(24), 1703658.
10. Chang Liu, Xiaoyu Xu, Yongyang Chen, Miao Yin, Ermei Mäkilä, Wenhui Zhou, Wenmei Su*, **Hongbo Zhang***, " Metabolism-Regulating Nanozyme System for Advanced nanocatalytic Cancer Therapy", *Small*. 2024. e2307794.