Hou Zheng, PhD

Scientist / Research Engineer

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Profile

Innovative and passionate Research Engineer with strong background in polymer chemistry with 6 years of research experience in polymer, peptide, polysaccharide field and biocompatible medical surface modification. Numerous publications in prestigious polymer chemistry or material science journals including *ACS Central Science*, *ACS Applied Materials & Interfaces*, *Polymer Chemistry*, *Biomacromolecules*, *Macromolecular Rapid Communication*.

Adept at various design, formulation, synthesis, characterization, testing and analytical skills in Polymer Chemistry field. Great ability to transform advanced scientific findings into products as proven by industrial co-operations and patents.

Flexible, passionate and hard-working team player, seeking to leverage research and teamwork skills to deliver projects on schedule, and fulfil client requirements within budget.

Skills

- Professional knowledge and experience in polysaccharide modification, polypeptide and polymer synthesis, nanoparticle preparation and surface modification technologies.
- Professional knowledge and experience on analytical techniques required in organic chemistry, polymer chemistry, material science and biochemistry such as NMR, FTIR, UV-Vis, SEM, and all kinds of chromatography (GPC, HPLC, GC-MS, LCMS/MS).
- Experienced in conducting experiments in Schlenk system and cleanroom.
- Experienced in animal handling (mice and rats).
- Experienced in microbiological experiment (BSL-2 labs) handling multidrug resistant (MDR) pathogens.
- Proficient with professional software relevant to analytical chemistry such as MestreNova, MassHunter (Agilent), Empower (Waters), LabSolutions (Shimadzu).
- Proficient in common office suite including MS office, Teams, Outlook etc.

Employment History

Postdoctoral (Project officer/Research Fellow) at Nanyang Technological University, Singapore

February 2019 — Present

Projects undertaken:

- Singapore Ministry of Education (Tier 3) Project on developing cationic antimicrobial polymer
- Singapore Ministry of Health Industry Alignment (Tier 2) Project on infection control coatings on medical device

Responsibilities:

- Synthesis of novel antimicrobial polymers, polypeptide, and polysaccharide.
- Characterization of bacterial metabolite using different analytical techniques, such as GCMS, LCMSMS, NMR, ITC, etc.
- Developing anti-infective coatings on medical devices.
- Maintenance of GPC, HPLC and LCMSMS.

Industrial cooperations

B. Braun Medical Industries Sdn. Bhd

- Developed a reactor for scaling up of superior antifouling coating on the Introcan™ IV catheter.

Clearlab SG Pte Ltd

- Developed a novel antibacterial coating on the surface of silicone-based contact lens with > 99.99% killing of multi-drug resistant bacteria (MRSA).

P&G Singapore

- Developed degradable polypeptide based antibacterial addictive for detergent, which can kill >99% bacteria in 10 minutes.

Patents

Precisely linked Nitric Oxide-donor coated catheter with in vivo antibacterial, antibiofilm and non-thrombogenic functions-First inventor

- Singapore provisional patent application number 10201912422Q
- Approval in progress

New Mixed-Charge Copolymer as Good Antibiofilm Coating

- Singapore provisional patent application number 10202000204Y
- Approval in progress

Publications

- Precisely Structured Nitric-Oxide-Releasing Copolymer Brush Defeats Broad-Spectrum Catheter-Associated Biofilm Infections *In Vivo*, *ACS Central Science*, *2020*, https://doi.org/10.1021/acscentsci.0c00755
- Novel Antimicrobial Coating on Silicone Contact Lens Using Glycidyl Methacrylate and Polyethyleneimine Based Polymers, *Macromolecular Rapid Communications*, 2020, https://doi.org/10.1002/marc.202000175
- Antimicrobial Effect of Novel Chitosan Derivative and Its Synergistic Effect with Antibiotics, *ACS Applied Materials & Interfaces, 2020* (Revision in progress)
- Nanoparticles of Short Cationic Peptidopolysaccharide Self-assembled by Hydrogen Bonding with Antibacterial Effect against Multi-Drug Resistant Bacteria, *ACS Applied Materials & Interfaces, 2017* https://doi.org/10.1021/acsami.7b12120
- Increasing Bacterial Affinity and Cytocompatibility with Janus Four-arm Glycopolymers and Antimicrobial alpha-Polylysine, *Polymer Chemistry 2017*, https://doi.org/10.1039/C7PY00441A
- Synthesis and Antibacterial Study of Sulfobetaine/Quaternary Ammonium-Modified Star-Shaped Poly[2-(dimethylamino)ethyl methacrylate]-Based Copolymers with an Inorganic Core, *Biomacromolecules 2017*, https://doi.org/10.1021/acs.biomac.6b01279

Education

Doctor of Philosophy (PhD) in Chemical and Biomedical Engineering, Nanyang Technological University, Singapore

August 2014 — August 2019

Specializations:

- Development of bio-functional polypeptide/polysaccharide and other biopolymers
- Smart surface anti-infection coatings on medical devices such as catheter

Conducted Presentations in international conferences:

- International Conference on Biomolecular Engineering (ICBE), AICHE (2018)
- International Conference on Cellular & Molecular Bioengineering (ICCMB) (2017)
- International Forum of Biomedical Materials (IFBM), Nano-biomaterials (2016)

Bachelor's Degree in Chemical and Biological Engineering with Honors, Nanyang Technological University, Singapore

August 2010 — August 2014

Victoria Junior College

January 2008 — December 2009

- Silver medalist in Singapore Chemistry Olympiad, 2008