Yu GAO

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Experience

Postdoctoral Associate Nov 2018-Present
Department of Mechanical Engineering, University of Colorado Boulder, Boulder, CO, USA

Postdoctoral Associate Mar 2018-Oct 2018
Department of Chemical and Biological Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

Education

Doctor of Philosophy Sep 2013-Jan 2018
Department of Chemical and Biological Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

- Overall GPA: 3.91/4.30

Bachelor of Engineering Sep 2009-Jul 2013
Department of Chemical Engineering, East China University of Science and Technology, Shanghai, China.

- Overall GPA: 88.03/100 Major GPA: 89.16/100

Publications

Journal publications

- **Yu Gao**, Richard Lakerveld. "Feedback control for shaping density distribution of colloidal particles in microfluidic devices", ***Lab on a chip (2019),*** 19, 2168-2177. ***(Inside front cover)***
- **Yu Gao,** Richard Lakerveld. "Gain Scheduling PID Control for Directed Self-assembly of Colloidal Particles in Microfluidic Devices", ***AIChE Journal (2019)***, 65(6).
- **Yu Gao**, Richard Lakerveld. "Feedback control for defect-free alignment of colloidal particles", ***Lab on a chip (2018),*** 18, 2099-2110.
- **Yu Gao**, Yongli Mi, and Richard Lakerveld. "An optimization-based approach for structural design of self‐assembled DNA tiles", ***AIChE Journal (2017)***, 63(6), 1804-1817.

Peer-reviewed papers in conference proceedings

- **Yu Gao,** Richard Lakerveld. "Automated open-loop control of directed self-assembly with multiple electrokinetic actuators in microfluidic devices", ***Computer-Aided Chemical Engineering 46 (2019),*** 43-48.
- Baggie W. Nyande, **Yu Gao**, Richard Lakerveld. "A dynamic model for automated control of directed self-assembly of colloidal particles at low densities", ***Computer-Aided Chemical Engineering 46 (2019),*** 1783-1788.
- **Yu Gao**, Richard Lakerveld. "Experimental validation of scheduled PID control for directed self-assembly of colloidal particles in microfluidic devices", ***Computer-Aided Chemical Engineering 44 (2018),*** 2455-2460.

Conference presentations (presenting author)

- **Yu Gao,** Richard Lakerveld. "Experimental validation of scheduled PID control for directed self-assembly of colloidal particles in microfluidic devices", **Process System Engineering Conference (PSE 2018), July 2018, San Diego, USA**. (**poster presentation**)
- **Yu Gao,** Richard Lakerveld. "Automated control of directed self-assembly for non-periodic structures with single-particle resolution." **APCChE, Hong Kong, August 2017. (oral presentation)**
- **Yu Gao,** Richard Lakerveld. "An optimization-based approach for structural design of self-assembled DNA tiles." **AIChE Annual Meeting, San Francisco, USA, November 2016. (oral presentation)**
- **Yu Gao,** Yongli Mi, Richard Lakerveld. "Towards experimental validation of a multi-resolution approach for directed self-assembly of non-periodic structures: Spatial control of particle densities." **AIChE Annual Meeting, San Francisco, USA, November 2016. (oral presentation)**

Honor and Awards

Scholarship

- Research Travel Grant 2017&2018
- HKUST postgraduate studentship(PGS) award 2013-2017
- National Scholarship 2012

- Chemical Industry Scholarship for Innovation 2011
- The First Prize University Scholarship in 2010 & 2011

Competition

- The First Prize in the National Undergraduate Mathematics Competition (**TOP 1 ‰ Nationwide**) Mar 2012
- The First Prize in the National Undergraduate Physics Competition Dec 2010
- Honorable Mention in the 2012 USA Mathematical Contest in Modeling May 2012

Research Experience

Graduate Research Assistant &Postdoctoral Associate (Advisor: Prof LAKERVELD, Richard) Jul 2015-Oct 2018
Project: Automated Feedback Control of Colloidal Self-assembly

- Designed and fabricated a microfluidic device with micro-patterned electrodes, using standard microfabrication techniques such as photolithography, sputtering and wet-etching.
- Built up an automated control system consisting of camera-equipped microscope, function generator, PC and microfluidic device, where colloidal self-assembly can be directed by applied electric field in closed-loop automatically.
- Designed and implemented different feedback control strategies (e.g. PID control, gain-scheduled PID control, on-off control, integrated control) to achieve various goals in directed colloidal self-assembly: control of particles density, control of particle alignment, assembling defect-free single lines, shaping particle distributions.

Graduate Research Assistant (Advisor: Prof LAKERVELD, Richard &Prof MI, Yongli) Oct 2014-Aug 2015
Project: Optimization of DNA Self-assembly for Structural Design of DNA Tiles

- Minimized potential energy function of different DNA tiles with both multi-start optimization and determinist global optimization methods.
- Identified optimal locations for crossovers in a special DNA tile: tensegrity triangle, using MINLP optimization, which matches experimental results in literature and shows much higher computation efficiency than conventional approach of exhaustive enumeration.

Teaching Assistant Experience

Pharmaceutical Engineering 2016 spring
Chemical Engineering Laboratory 2015 spring
A First Course on Materials Science and Applications 2014&2015 fall

Computer Skills

C/C++ language, Matlab, GAMS, MS Office, Photoshop, Adobe Illustrator, Sublime.