Yifan Qin

800 Park Avenue, Fort Lee, NJ 07024

(929) 989-7805 & yq2343@columbia.edu

EDUCATION

Columbia Engineering, Columbia University New York, NY

Master of Science in Chemical Engineering *09/2022-present*

- Overall GPA: 4.0/4.0
- Courses: Transport in Fluid Mixtures, Soft Condensed Matter

Zhiyuan College, Shanghai Jiao Tong University (SJTU) Shanghai, CN

Bachelor of Science in Chemistry (Zhiyuan Honors Program) *09/2018-06/2022*

- Overall GPA: 85/100 | Senior GPA: 90.5/100
- Courses: Organic Chemistry, Polymer Chemistry, Physical Chemistry, Polymer composite

ACHIEVEMENTS & AWARDS

- **Zhiyuan Honors Scholarship of Shanghai Jiao Tong University** 12/2018; 12/2019; 12/2020;12/2021
- **Scholarship of Shanghai Jiao Tong University** 12/2019; 12/2020;12/2021
- **First Prize in Shanxi Province, The 31st National Chemistry Competition for High School Students** 10/2017

RESEARCH EXPERIENCES

Transport and Mechanical Properties of Grafted Nanoparticles 02/2023-present

Student Research Worker | Supervisor: Prof. Sanat K. Kumar | Columbia Kumar Research Group

- Mechanical Properties Research on Polymer-Grafted Nanoparticle Membranes via Oligoaniline Environments
  - Investigated the impact of polyoligoanilines inclusion in poly (methyl acrylate) (PMA) graft nanoparticles (GNPs).
  - Conducted rheological measurements using small amplitude oscillatory shear (SAOS) on both polyoligoanilines integration methods: (1) bimodal systems where chains of polyoligoanilines and PMA are attached to the silica; (2) diblock copolymer systems: PMA-*b*-polyoligoanilines are attached to the silica.
  - Systematically optimized film mechanical properties by strategically tuning the content and positioning of polyoligoanilines within the GNP matrix, achieving superior material outcomes.
- Mechanical and Gas Transport Properties Research on GNP Membranes with Added Free Polymers
  - Incorporated homopolymers with distinct molecular weights into GNP solutions, followed by the fabrication of a range of GNP membranes through precise control of homopolymer content, molecular weight, and evaporation kinetics.
  - Performed comprehensive rheological assessments using SAOS techniques on the resulting membranes. The introduction of larger free chains exhibited a marginal enhancement in mechanical properties, whereas the incorporation of smaller free chains led to a noticeable reduction in modulus.
  - Conducted small-angle X-ray scattering and small-angle neutron scattering analyses to elucidate the spatial arrangement of the free chains within the GNPs.
  - Performed gas permeation tests under various temperatures and gas compositions to investigate the activation energy.

Nano-horticulture Technology based on Micellar Brush 06/2020-06/2022

(Awarded the Zhiyuan Scholars Research Program funds of 75000 RMB)

Team Leader | Supervisor: Prof. Huibin Qiu | SJTU Qiu Group: Precision Hierarchical Self-Assembly

- Used poly(lactide)-containing block copolymer for assembly into micellar brushes, resulting in nanostructure construction on material surfaces and enhanced material functionalization for new applications.
- Synthesized a series of block copolymers with crystalline PLLA as core-forming block and different amorphous corona-forming blocks, investigated their active self-assembly behavior in solution, obtained the controllable morphology and size by adjusting parameters such as block ratio, assembly time, temperature, and types of selective solvent
- Anchored the cylindrical micelle seeds onto material interfaces, prepare the micellar brushes with controllable density and uniform length, and explore the controllable growth process of poly(lactide)-containing cylindrical micellar brushes
- Executed functionalization of micellar brushes, expanding their applicability in medical materials, drug delivery, antibacterial operations, and more.

A Self-Assembly Pathway to Soft-matter Toroidal Nanostructures 06/2020-11/2020

Individual Research | Supervisor: Prof. Huibin Qiu | SJTU Qiu Group: Precision Hierarchical Self-Assembly

- Mapped the preparation landscape of toroidal nanostructures, emphasizing the evolving self-assembly methodologies of soft matters.
- Demonstrated the intricate constructions of hierarchical nanostructures, harnessing toroidal micelles as foundational building units.
- Consolidated insights on self-assembly principles, while evaluating and addressing the impending challenges and considerations for this nascent realm of nanomaterials.

LEADERSHIP & VOLUNTEER EXPERIENCES

- **Class Monitor of Zhiyuan Honors Program of Chemistry, Zhiyuan College of SJTU** 09/2018-09/2019
- **Excellent Member of the Secretary Department of Student Union of Zhiyuan College of SJTU** 09/2019-09/2020
- **Excellent Member of Summer Volunteer Teaching Activities of SJTU** 08/2019
- **Volunteer of Zhiyuan College of SJTU (over 100 hours of volunteer service)** 07/2019-09/2021
- **Volunteer of Shanghai International Marathon** 12/2019

ADDITIONAL INFORMATION

- **Software and Programming Skills**: Python, Mathematica, ChemDraw, MestReNova, Gaussian 09
- **Experiment Skills**: Gas Permeation Cell, Rheometer, Thermogravimetric Analysis (TGA), Small angular X-ray scattering (SAXS), Column Chromatography, Thin Layer Chromatography (TLC), High-Performance Liquid Chromatography (HPLC), Nuclear Magnetic Resonance (NMR), Transmission Electron Microscope (TEM), Scanning Electron Microscope (SEM)