RAHUL PANDARE | New York, NY

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INTEREST STATEMENT

Experienced in physics-based simulations, machine learning, data-driven decision making, and exploratory data analysis, with strong communication skills demonstrated in technical and industry settings

EDUCATION

Ph.D. in Chemical Engineering Aug 2021 - May 2026

City College of New York ***CGPA: 3.91/4.0***

Relevant Coursework: Fluid Mechanics, Powder Science, Applied AI, Image Processing, PDE

Bachelor of Chemical Engineering Aug 2015 - May 2019

Institute of Chemical Technology, Mumbai, India

Relevant Coursework: Thermodynamics, Process Simulation, Design of Experiments (DOE)

RESEARCH EXPERIENCE

Graduate Research Assistant | Rheology of dense bidisperse suspensions using LF-DEM Jul 2023 - Present

Advisor: Prof. Jeffrey Morris, The Benjamin Levich Institute, The City College of New York *New York, NY*

- Studied the rheology & contact networks of highly bidisperse dense non-Brownian suspensions under high shear to gain fundamental insights into contact networks such as stress distribution in different contact size pairs and microstructure composition using graph theory and statistical physics.
- Built a robust data processing pipeline to acquire, analyze, and visualize rheological properties of large simulation datasets using Python libraries.

Graduate Research Assistant | Flow of soft deformable particles through hopper Jan 2022 - Jun 2023

Advisor: Prof. Mark Shattuck, The Benjamin Levich Institute, The City College of New York *New York, NY*

- Developed a particle tracking algorithm using statistical methods and image processing fundamentals to study the network structure of the clogged soft particle system; and optimize hopper parameters to reduce industrial hopper downtime. [Article]
- Developed a precise convolutional neural network (CNN) to track particle positions in non-Brownian suspensions, achieving $\pm 1.7\%$ pixel accuracy using advanced statistical methods (convolution and χ^2 method). Analyzed contact network structures in clogged soft particle systems.

Undergraduate Research Assistant | Process intensification by DMG recycling 2017 - 2019

Advisor: P.K. Ghosh, Institute of Chemical Technology *Mumbai, India*

- Consulted Rubamin Industries Ltd., Vadodara, India - Developed a cost-effective process to regenerate the expensive dimethylglyoxime (DMG) reagent from DMG-nickel residue, achieving a 94% efficiency in reusing the reagent.

PROFESSIONAL EXPERIENCE

Process Engineer | Aker Solutions, Mumbai, India Aug 2019 - Jun 2021

- Projects: 0.9MM TPA ethylene capacity dual feed cracker unit (DFCU) project, petrochemical fluidized catalytic cracking unit (PFCCU) pre-bid project, and Sonatrach's gas field extension project.
- Activities: Preparing P&IDs, pipeline sizing, vessel sizing, pressure drop calculations, pump hydraulics, tank vent calculations, and relief valve calculations. Standards: API-520, 521, 620.
- Led a team of 3 trainee engineers to deliver 50+ datasheets in the project time frame.
- Implemented strategic, cost-effective process-specific modifications for clients, saving $8,000.
- Built several Excel-based calculation and productivity tools saving 100+ man-hours.
- Performed thermal ratings for various shell and tube heat exchangers on HTRI software.
- Performed an exhaustive feasibility study for the de-carbonization unit, recommending an amine absorption system over a membrane-based system resulting in an additional 0.2 Mtpa CO_2 capture.

Process Engineering Intern | Panorama Consulting, Mumbai, India May 2018 - Aug 2018

- Worked on a greenfield project to conceptualize a batch process into a continuous process.
- Developed a scheme of continuous operation to produce Methoxyamine. Performed sizing & design calculations for process equipment - PFR, venturi tube, and flash drum.

CORE SKILLS

Strong background in chemical engineering, process engineering and numerical simulations

Skills	Exploratory data analysis (EDA), Machine learning, Multivariate statistics, Numerical simulations, Process engineering
Programming	Python, MATLAB, Bash scripting, LaTeX, C++, R
Libraries/Tools	NumPy, Pandas, Tensorflow, Keras, Matplotlib, OpenCV, Image Processing Toolbox, scikit-learn, Jupyter, HPC, AWS, SQL, SLURM, Git, github, BLAS LAPACK, SuiteSparse, OpenFoam, HDF5, ffmpeg
Operating systems	LINUX, MacOs, Windows
Numerical Methods	Molecular dynamics (MD) via DEM, Iterative solvers
Certifications	Deep Learning (DeepLearning.AI), Python Bootcamp (Udemy)

TEACHING EXPERIENCE

Delivered lectures and solved application-based engineering problems, providing mentorship to 75+ students

- Teaching assistant - *Chemical Reaction Engineering* Fall 2022
- Teaching assistant - *Chemical Engineering Thermodynamics* Spring 2023
- Introduction to MATLAB programming for Chemical Engineers Fall 2023, 2024

PUBLICATIONS AND TECHNICAL PRESENTATIONS

- **Pandare, R.**, Orsi, M., Shattuck, M. D., and Morris, J. F., "Contact network structures and rigidity development in bidisperse suspensions," *Journal of Rheology*, 2025 (accepted). Preprint available at ResearchGate.
- B Chakraborty, Orsi M., **Pandare R.**, Morris J.F., Chakraborty B., "Shear thickening rheology: analogy to a phase transition," *APS DFD 2025, Houston, USA (November 2025)*
- **Pandare R.**, Morris J.F., Orsi M., Santra A., Shattuck M.D., Chakraborty B., "Microstructures, Correlation, and Jamming in Shear-Thickened Dense Bidisperse Suspensions," *AIChE 2025, Boston, USA (November 2025)*
- **Pandare R.**, Morris J.F., Orsi M., Santra A., Shattuck M.D., Chakraborty B., "Scaling of structural and rheological properties in dense suspensions," *Society of Rheology (SOR 2025), Santa Fe, USA (October 2025)*
- Orsi M., **Pandare R.**, Morris J.F., Chakraborty B., "Network structure and motion correlation in mono- and bi-disperse dense suspensions *(AERC 2025), Lyon, France (April 2025)*
- **Pandare R.**, Morris J.F., Orsi M., Santra A., Shattuck M.D., Chakraborty B., "Rigid structure development in dense mono- and bidisperse suspensions," *Society of Rheology (SOR 2024), Austin, USA (October 2024)*
- **Pandare, R.**, Orsi, M., Shattuck, M. D., and Morris, J. F., "Study of rigid clusters in dense bidisperse suspensions under high shear," *Webinar – The Hitchhiker's Guide to Rheology (July 2024).* Recording available on YouTube.
- **Pandare R.**, O'Hern C.S., Weeks E.R., Morris J.F., Shattuck M.D., "Properties of 3D arches in a clogged hopper of soft deformable particles," *APS March Meeting, Las Vegas, USA (March 2023)*

LEADERSHIP AND EXTRACURRICULAR

- PADI certified Advanced Open Water Scuba Diver 2025
- Social Chair, ChE Graduate Student Council, The City College of New York 2023 - 2025
- Recruitment Chair, ChE Graduate Student Council, The City College of New York 2022 - 2023
- Organized a Health, Safety, Security, and Environment (HSSE) quiz to promote awareness among employees at Aker Solutions. 2020
- Conducted a workshop on 'Basics of Graphic Designing' for 30 students. 2017
- Served as the Graphic Design Head (Core Committee) for Vortex-2017, the Largest Chemfest in Asia. 2017