

Education

MBA for Working Professionals (2020), *Collins College of Business, The University of Tulsa, Oklahoma,*

Ph.D. (2010), Chemical and Biomolecular Engineering, *Johns Hopkins University, Maryland,*

Thesis: *Microparticle Assembly and Contact Line Dynamics*

- Investigated particle self-assembly by dip coating. Developed a MATLAB model for thin-film instability
- Cross-functional collaboration to apply microfluidics for cell adhesion studies
- Wrote proposals, gave supplementary lectures, designed homework, exams and held office hours

Master of Technology (2004), Chemical Engineering, *Indian Institute of Technology Kanpur (IITK), India.*

Thesis: *Pattern Formation during Adhesion and Debonding of Thin Elastic Films*

- Demonstrated a theoretically predicted instability in confined elastic films upon contact with a rigid surface.

Bachelor of Engineering (2002), Chemical Engineering, *Jadavpur University, India* (Top of class)

Work Experience

Phillips 66 Company, Senior Engineer Lead, Operations Support (November 2018 - present)

Develop and lead the Phillips 66's Functional Excellence Network and analytics in chemical treatment for process and water applications in refining with 40 members enterprise-wide

- Regularly collaborate with key stakeholders to understand business problems, define objectives, and assist in strategy development, promotion, and execution of programs for water management and conservation
- Integrate data sources from a vendor cloud platform to the Phillips 66 cloud platform. Survey, analyze, and maintain operational database of desalter, crude overhead, cooling towers, and boilers from 13 Phillips 66 refineries. Performed benchmarking using machine learning analytical tools (Alteryx, Knime, Python)
- Developed key performance metrics (KPI) monitoring dashboard using Tableau.
- Project management involving cross-functional teams in a chemical vendor bid process led to a savings of about \$11 MM on a \$32 MM contract. **Work received special recognition award in 2019.**
- Regularly support plant operations in areas of desalting, cooling towers, and boilers.
- Conduct annual chemical vendor performance reviews and present results to senior management.
- Authored 5 company internal reports and best practice documents

Phillips 66 Company, Director, Coking and Fouling (October 2015 – October 2018)

Strategic management and supervision of a team of ten professionals and technicians in a core competency

- **Managed a \$4MM** budget and developed research programs in two refining areas of Delayed Coking Technology & Fouling Mitigation.
- Managed more than 25 technical support projects per year from 13 Philips 66 refineries, which captured **\$10MM per year**
- Developed productive and collaborative relationships with external stakeholders to translate business objectives into project goals for the group. Maintained monthly cost reports and control external and internal expenses. Regularly provided expense forecasts
- **Safety Leadership** through the implementation of hazard reviews, incident investigations, safety audits, job safety analysis, startup checklist and preventative maintenance
- Conducted market research, SWOT analysis, and developed strategies to qualify premium Phillips 66 needle coke for a growing Li-ion battery anode market for consumer electrics and EV.
- Created new laboratory capabilities in battery coke evaluation to support product commercialization that led to **team award in 2018 selected from across the Research organization**
- Engaged in the career development and performance reviews of direct reports

- Authored 10 company internal reports. Monitored, reviewed, and implemented standard operating procedures (SOPs) with a focus on safety, data quality, control charts, work process improvements, data loss and downtime minimization, and housekeeping in 4 laboratories and 50 equipment

ConocoPhillips Company, Phillips 66 Company, Associate Engineer, Operations Support (August 2010 – October 2015)

Provided engineering support to plant operations while executing R&D projects

- Demonstrated individual initiative through the developed MATLAB models for process development in desalting that resulted in a 10% improvement in performance.
- Created test protocols in desalting, followed plant trials, data analysis (Minitab, Excel) and communicated test results
- Designed and develop high-temperature desalting equipment which improved product screening capabilities
- Used predictive analytics on operation metrics and developed performance prediction models with MATLAB
- Managed 10 projects per year from 13 Phillips 66 refineries. SME for technical support and solutions to refinery desalting operations, chemical vendor reviews, audits, chemical evaluations
- Developed key performance metrics (KPI) monitoring dashboard using Tableau
- Developed, planned, and executed collaborative 3 university partnerships **with the University of Oklahoma, Ohio University, and Oklahoma State University**. Led to a patent and an external publication
- Developed and implemented safe operating procedures in lab and pilot-scale processes. Implemented routine Preventive Maintenance programs for a safe and reliable lab environment
- Trained new technicians/engineers
- Authored 20 company internal reports and best practice documents

Indian Oil Corporation Limited, Haldia Refinery, India

- Internship in specific areas of refining (desulphurization, vacuum distillation unit, quality control)

Awards

- Special Recognition Award for creating and leading the Phillips 66 Chemical Treatment Network (2019)
- Special Recognition Award for safety leadership in incident investigation (2019)
- Phillips 66 Technical Achievement Team Award for battery coke development (2018)
- Steele MBA scholarship by Collins College of Business, University of Tulsa (2018)
- Recognized by ACS and featured in the local newspaper for support of the Chemistry Olympiad (2018)
- Cadence gold medal (for best research in masters Level) at Indian Institute of Technology Kanpur (2004)
- University gold medal for Rank 1 and five Name Scholarships in bachelor's at Jadavpur University (2002)
- Inducted to Beta Gamma Sigma (2020), Sigma Xi (2010) Honor Societies

Outreach Activities

- *Chair, Northern Oklahoma American Chemical Society, (January 2016-December 2017)*
 - Lead the 5 neighboring Section's seminar circuits.
 - Planned and executed 10 outreach activities aimed at promoting science education and motivating local high school students, chemists, and technicians
 - Established the NOKACS Science Grant in collaboration with the Bartlesville Public School Foundation. The grant will be administered through with the Bartlesville Public Schools Foundation (BPSF) to support chemistry-based initiatives at Bartlesville public schools. Grants

are awarded to projects that enhance the science instruction in a classroom and make science more engaging to the students. The grant is aligned with the mission of the NOK Section to further science education in the local communities, and we are thankful to BPSF for helping us set this up. In 2017, the grant was awarded to middle and high school chemistry teachers that went on to help over 1100 students.

- Led five neighboring Section's in managing their science outreach activities
- Reviewer for the Journal of colloid and interfacial science and Fuel
- Mentored high school and undergraduate students in science and engineering research
- Member: The American Chemical Society, The American Institute of Chemical Engineers

Patents and Publications

1. Patent on high-temperature emulsion characterization, US1 0330663, 2019
2. Patent on sequential mixing for improved desalting, US 10392568, 2019
3. Impact of filterable solids, Potential effects of upstream additives on refinery corrosion & fouling, **NACE International Publication** 21415, 2017
4. G. Yu, K. Karinshak, J. Harwell, B. Grady, A. Woodside, M. Ghosh, " Interfacial Behavior and Water Solubility of Various Asphaltenes at High Temperature", Colloids and Surfaces A: Physicochemical and Engineering Aspects (2013).
5. M. Ghosh, K. J. Stebe, "Spreading and retraction as a function of drop size", **Advances in Colloid and Interface Science** (2010).
6. K. J. Stebe, E. Lewandowski, M. Ghosh, "Oriented assembly of metamaterials", **Science** (2009).
7. M. Ghosh, C. S. Alves, Z. Tong, K. Konstantopoulos, K. J. Stebe, "Multi-functional surfaces with discrete functionalized regions for biological applications", **Langmuir** (2008).
8. M. Ghosh, F. Fan, K. J. Stebe, "Spontaneous pattern formation by dip coating of colloidal suspensions on homogeneous surfaces", **Langmuir** (2007).
9. M. Gonuguntala, A. Sharma, J. Sarkar, S. A. Subramanian, M. Ghosh, V. Shenoy, Contact instability in adhesion and debonding of thin elastic films", **Physical Review Letters** (2006).
10. M. Ghosh, K. J. Stebe, "Convective assembly of patterned media" for "Evaporative self-assembly of ordered complex structures", Chapter 2, page 59 -107, World Scientific Publishing Company.

Presentations

1. "Industrial Research Collaboration" – Invited Lecture, Bethune College, Kolkata, India (2019)
2. "Interfacial behavior of asphaltenes at extreme conditions", *Petrophase*. (2013)
3. "Spreading and retraction as a function of drop sizes", *American Chemical Society Colloid and Surface Science Symposium*. (2010)
4. "Retraction of drops on surfaces", *American Institute of Chemical Engineers Annual Meeting*. (2009)
5. "Contact line jumping in dewetting", *American Chemical Society Annual Meeting*. (2009)
6. "Contact line jumping of drops on surfaces". *American Institute of Chemical Engineers Annual Meeting*. (2008)
7. "Multi-functional surfaces for biosensor assays and cell adhesion studies", *American Chemical Society Colloid and Surface Science Symposium*. (2008)
8. "Multi-functional surfaces for biosensor assays and cell adhesion studies", *American Institute of Chemical Engineers Annual Meeting*. (2007)
9. "Spontaneous ordering of colloidal particles on energetically uniform substrates", *American Chemical Society Colloid and Surface Science Symposium*. (2007)
10. "Spatially-resolved multi-functional surfaces with control over functionalized shape and length scale for biological applications," *ACS Colloid and Surface Science Symposium*. (2007)
11. "Engineering protein presenting patch surfaces for biological study ", *AIChE*, (2009)
12. "Direct measurement of receptor-ligand binding kinetics utilizing micropatterning and microfluidics," *ACS* (2008)
13. "Multifunctional surfaces for cell adhesion study", *INBT Fall retreat*, (2008)
14. "Multi-functional surfaces with precise spatial resolution for biosensors and cell adhesion Studies," *BMES Annual Meeting*, (2007)