

KHUSHBOO SUMAN

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EDUCATION

University of Delaware

(2020-Present)

Post-doctoral Researcher in Chemical and Biomolecular Engineering Department

Thesis: Understanding the microstructure and viscoelasticity of anisotropic particles

Indian Institute of Technology Kanpur, Uttar Pradesh, India

(2015-2020)

Doctor of Philosophy (PhD) in Chemical Engineering

Cumulative Grade Point: 8.5/10

Thesis: Microstructure and viscoelasticity of Physical Gel

National Institute of Technology Durgapur, West Bengal, India

(2009-2013)

Bachelor of Technology (B.Tech) in Chemical Engineering

Cumulative Grade Point: 8.61/10 (Graduated with First Class)

Thesis: Fabrication and Study of Cross Flow Plate Type Heat Exchanger

RESEARCH PROJECT

Postdoctoral Research- University of Delaware

(2020-Present)

Supervisor: Professor Norman J Wagner

1. *Synthesizing anisotropic hollow rod like particles with well-defined aspect ratios.*
2. *Characterization of anisotropic particles using rheology, microscopy and scattering study.*

PhD PROJECT- IIT Kanpur

(2015-2020)

Thesis Advisor: Professor Yogesh M. Joshi, IIT Kanpur

1. *Universality of critical exponents in the neighborhood of sol-gel transition*
2. *A kinetic model for a critical gel transition: Application of the modified Bailey criterion*
3. *Analyzing Linear to Nonlinear transition of a Fractal Colloidal Gel in the Neighborhood of Critical Point*
4. *Large amplitude oscillatory shear (LAOS) study of a colloidal gel at the critical point*
5. *Effect of sodium pyrophosphate and understanding microstructure of aqueous LAPONITE® dispersion using dissolution study*
6. *Phase behavior of block copolymer Pluronic: A rheological perspective*
7. *Effect of gap thickness on rheological behavior of thin bituminous films*

SENIOR YEAR DISSERTATION- NIT Durgapur

(July 2012- May 2013)

Thesis Advisor: Professor Subhamay Halder, Department of Chemical Engineering, NIT Durgapur

Title: Fabrication and Study of Cross Flow Plate Type Heat Exchanger

INDUSTRIAL COLLABORATIVE PROJECT

The collaborative project with Unilever R&D Bangalore, Shell and S. C. Johnson focuses on understanding the stability of the various commercial products by carrying out different characterization techniques like rheometry and rheo-microscopy.

PROFESSIONAL EXPERIENCE

ASSISTANT MANAGER- *Production*, SESA STERLITE LIMITED, Odisha, India

(July 2013- September 2014)

PUBLICATIONS

1. **Suman K.**, Joshi Y. M. "Kinetic model for a sol-gel transition: Application of the modified Bailey criterion", *Rheologica Acta* 59 (2020), 745-753.
2. **Suman K.**, Joshi Y. M. "On the universality of the scaling relations during sol-gel transition", *Journal of Rheology* 62 (2020) 863-877, (Feature Article and Scilight story).
3. Joshi N.,^a **Suman K.**,^a Joshi Y. M., "Rheological Behavior of Aqueous Poly (vinyl alcohol) Solution During a Freeze-Thaw gelation Process" *Macromolecules* 53 (9), 3452-3463, (Cover Art).

4. **Suman K.**, Mittal M., Joshi Y. M., "Effect of sodium pyrophosphate and understanding microstructure of aqueous LAPONITE® dispersion using dissolution study" *Journal of Physics: Condensed Matter* 32 (2020), 224002.
5. **Suman K.**, Joshi Y. M., "Analyzing onset of nonlinearity of a colloidal gel at the critical point" *Journal of Rheology* 63, 991 (2019), Cover Art.
6. **Suman K.**, Joshi Y. M., "Microstructure and Soft Glassy Dynamics of an Aqueous Laponite Dispersion", *Langmuir* (2018), Invited Feature Article and Cover Art.
7. Mohanty R. P., **Suman K.**, Joshi Y. M., "In Situ Ion Induced Gelation of Colloidal Dispersion of Laponite: Relating Microscopic Interactions to Macroscopic Behavior", *Applied Clay Science*, 138 (2017) 17-24.

^a Both authors contributed equally to this manuscript.

CONFERENCES

1. Delivered a talk on "Nonlinear response of a colloidal gel at the critical point under large amplitude oscillatory shear flow" at **CompFlu-2019, Bhopal** organized by Indian Society of Rheology and **91th Annual Meeting of Society of Rheology, Raleigh, USA, 2019**.
2. Presented a poster titled "*A kinetic model for a sol - gel transition in a colloidal dispersion of nanoparticles: Application of the Modified Bailey Criterion*" at **CompFlu-2019, Bhopal** organized by Indian Society of Rheology and **91th Annual Meeting of Society of Rheology, Raleigh, USA, 2019**.
3. Delivered a talk on "*Analyzing the linear to nonlinear transition of a Fractal Colloidal Gel in the Neighborhood of Critical Point*" at **Stony Brook University, New York, USA, 2019**.
4. Delivered a talk on "*Analyzing Onset of Non-Linearity of a Fractal Colloidal Gel in the Neighborhood of Critical Point*" at **APS March Meeting, Boston, USA, 2019** and **University of Delaware, USA, 2019**.
5. Presented a poster titled "'Phase Behaviour of Block Copolymer Pluronic: A Rheological Perspective" at **APS March Meeting, Boston, USA, 2019**.
6. Presented a poster titled "*Phase behavior of block copolymer Pluronic: A rheological perspective*" at **International Union of Theoretical and Applied Mechanics, IIT Kanpur, Dec 17-21, 2018**.
7. Delivered a talk and presented a poster titled "*Phase behavior of block copolymer Pluronic: A rheological perspective*" at **Research Scholars' Day, 2018** organized by IIT Kanpur, **89th Annual Meeting of Society of Rheology, Denver, USA, 2017** and **International Union of Theoretical and Applied Mechanics, IIT Kanpur, Dec 17-21, 2018**.
8. Delivered a talk on "*Viscoelastic property and onset of non-linearity of a Colloidal Gel in the neighborhood of Critical Point*" at **89th Annual Meeting of Society of Rheology, Denver, USA, 2017**
9. Presented a poster titled "*Viscoelastic property and onset of non-linearity of a Colloidal Gel in the neighborhood of Critical Point*" at **CompFlu-2017, Madras** organized by Indian Society of Rheology and **Research Scholars' Day, 2017** organized by IIT Kanpur.
10. Presented a poster titled "*Influence of Multivalent Salts on Gelation of Aqueous Laponite Dispersion*" at **CompFlu-2016, Hyderabad** organized by Indian Society of Rheology.
11. Presented a poster titled "*Influence of Pyrophosphate and Etidronate on Gelation of Aqueous Laponite Dispersion*" at an International conference **CompFlu-2016, Pune** organized by Indian Society of Rheology.

POSITION OF RESPONSIBILITY

Teaching Duties:

- Tutor in Thermodynamics course (ESO 201), Instructor-in-charge: Professor Ashok De, (Jul-Dec 2018)
- Tutor in Thermodynamics course (ESO 201), Instructor-in-charge: Professor Jayant K. Singh, (Jul-Dec 2017)

Teaching Assistantship Duties:

- Transport Phenomenon, *Supervisor*: Professor Yogesh M. Joshi (Fall 2019)
- Thermodynamics, *Supervisor*: Professor Yogesh M. Joshi (Spring 2018)
- Unit Operations Laboratory, *Supervisor*: Professor Rahul Mangal (Fall 2017)
- Chemical Engineering Thermodynamics, *Supervisor*: Professor Yogesh M. Joshi (Spring 2016 and 2017)
- Structure and Rheology of Complex Fluids, *Supervisor*: Professor Yogesh M. Joshi (Fall 2016)
- Graduate Seminar, *Supervisor*: Professor Yogesh M. Joshi (Fall 2015)

Gardening Secretary, Girls Hostel 1, IIT Kanpur

(July 2017-July 2018)

Core Member, Chemical Engineering Students Society (CHESS), NIT Durgapur

(April 2010- March 2013)

ADDITIONAL RESPONSIBILITY

- Assisted the editors in editing a book: Joshi, Y. M. and Khandekar S. (Editors), Nanoscale and Microscale Phenomena: Fundamentals and Applications, Springer Tracts in Mechanical Engineering, Springer, 2015, ISBN: 978-81-322-2288-0
- Mentored **sixteen** undergraduate students in successfully completing their **Surge** Internship projects in Indian Institute of Technology Kanpur.

TECHNICAL SKILL

- **Rheometry:** Extensive experience in working with TA Instrument DHR3, Anton Paar MCR 501 Rheometer.
- **Software:** MATLAB, Origin, C, C++, Java, MS Office

SCHOLASTIC ACHIEVEMENTS

- Received MHRD Scholarship for PhD.
- Awarded the Best Poster presentation at CompFlu, Dec 2017 and 2019.
- Awarded 1st prize in Micrography contest organised by Material Advantage@ IIT Kanpur, 2019.
- Received CSIR Travel Grant, Department of Science & Technology Travel grant, APS student travel grant and Society of Rheology student travel grant for participation in International conferences.
- Awarded the Best Poster presentation at the Chemical Engineering Research Scholars' Day, Nov 2017 and 2018.
- Awarded Scholarship from Oil and Natural Gas Corporation (ONGC) for Outstanding Scholar in B.Tech.

EXTRACURRICULAR ACTIVITIES

- **Leadership Skill-** Best Captain Award (2008), Best Leadership Award (2006)
- **Social Skill-** Awarded **Gold Medal** by Cancer Aid Society for Cancer Awareness Campaign Program (2002), Awarded Certificate of Appreciation by Naturopathy and Yoga Centre IIT Kanpur (2017).