

SANTANU KUNDU

Dave C. Swalm School of Chemical Engineering

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Education

2001- 2006: Ph.D. in Chemical Engineering, Clemson University, SC, USA

Dissertation Title: *Investigation of flow and microstructure in rheometric and processing flow conditions for liquid crystalline pitch.*

1993-1997: B.E. in Chemical Engineering, Jadavpur University, Kolkata, India

Citizenship

Permanent Resident of the United States, Citizen of India.

Affiliation

2012 (Jan)- Assistant Professor, Dave C. Swalm School of Chemical Engineering, Mississippi State, USA

2009-2011 Postdoctoral Guest Researcher, Polymers Division, National Institute of Standards and Technology (NIST), Gaithersburg, USA

Virginia Polytechnic Institute and State University, Chemistry Department

Advisors: Dr. Kathryn Beers (NIST), Prof. Timothy E. Long (Virginia Tech)

2007-2009 Postdoctoral Researcher, Department of Polymer Science and Engineering, University of Massachusetts-Amherst, Amherst, USA

Advisor: Prof. Alfred J. Crosby

2001-2006 Graduate Research Assistant, Department of Chemical and Biomolecular Engineering, NSF-Clemson-MIT Engineering Research Center for Advanced Engineering Fibers and Films (CAEFF), Clemson University, Clemson, USA

Prof. Amod A Ogale

1999-2001 Engineer, Indian Oil Corporation Limited, India

1997-1999 Engineer, TCG Refineries Limited, India

Honors and Awards

NSF Early Career Award, 2014

Sigma Xi National Scientific Research Honor Society, 2010.

Awarded 1st prize, *Elsevier Carbon Journal award, 2007* for the best Ph.D. dissertation in Carbon Science.

Awarded 2nd prize, *Science as Art exhibit, Clemson University, 2006.*

Finalist, *Prof. H. L. Roy Memorial Award, Alumni Association, N.C.E. Bengal & Jadavpur University, 1996.*

Awarded National Merit Scholarship (India) for higher education, 1991.

Research Interest

My research interest is investigating the *processing-structure-property* relationships for various soft materials both of biological and synthetic origin towards different applications ranging from biomedical to water purification to structural composites. The goals are identifying and synthesizing suitable

materials systems, developing novel synthesis/processing/fabrication strategies for these materials, characterizing these materials using a combination of established and new experimental tools, and studying the engineering aspects needed to facilitate the transition from scientific discovery to practical implementation. The systems of present interest are *polysaccharide networks, self-assembled gels, shear-thickening fluids, pulmonary mucus, thin-film nanocomposites, and biofilms*.

Teaching Interest

My teaching interests are transport phenomena, biomaterials, materials science, polymer science, and soft materials. I believe that teaching is not limited to the classroom and it involves formal and informal discussions with the students outside the classroom.

Students Achievement

Graduate students:

Seyed Meysam Hashemnejad, selected to present in the *Frank J. Padden, Jr. Award* symposium in the APS March Meeting, New Orleans, 2017.

Mahla Zabet, Best Presentation, *Structure and Properties in Polymers* session, AIChE Annual Meeting, Atlanta, November 2014.

Undergraduate students:

Kevin Trinh, 1st Place Poster Award, Physical Sciences and Engineering category, Mississippi State University Undergraduate Research Symposium, Summer, 2017.

Igor Kevin, 1st Place Poster Award, Physical Sciences and Engineering category, Mississippi State University Undergraduate Research Symposium, Spring, 2016.

Elizabeth N. Stafford, 2nd Place Award, Physical Sciences and Engineering category, Mississippi State University Undergraduate Research Symposium, Summer, 2015.

Dennis Omari, 2nd Place Poster Award, Physical Sciences and Engineering category, Undergraduate Research Symposium. Summer, 2014 (REU student, Ohio State University).

Igor Kevin, Bagley College of Engineering Undergraduate Research Scholarship (Spring 2015, Spring 2016)

Kinsey Naas, Bagley College of Engineering Undergraduate Research Scholarship (Fall 2014, Spring 2015)

Dalton Pruitt, Bagley College of Engineering Undergraduate Research Scholarship (Spring 2016)

Book Chapter

Kundu S*, Hashemnejad SM, Zabet M, Mishra S. Self-Assembly and Mechanical Properties of a Triblock Copolymer Gel in a Mid-block Selective Solvent. *In press, ACS Symposium Series*, 2018.

Kundu S and Chan EP, *Adhesion Behavior of Soft Materials in Engineering Biomaterials for Regenerative Medicine*, Springer, Sujata K Bhatia(Editor), Springer, 2012. DOI 10.1007/978-1-4614-1080-5_4.

Publications (refereed) (* indicates corresponding author)

Manuscript Submitted

1. Mishra S, Prado RMB, Lacy TL, **Kundu S***. Investigation of failure behavior of a thermoplastic elastomer gel.
2. Marroquin Salvador M, Lacy TE, Kundu S, Pittman CU. Hypervelocity impact of spherical aluminum 2016-T4 projectiles on aluminum 6061-T6 multilayered sheets, submitted.

Journal Articles in Preparation

1. Rangappa S, Maurya A, Angamuthu M, Hashemnejad SM, **Kundu S**, Murthy SN*. Critical quality attributes of Acyclovir topical cream products: characterization of microstructural properties with relevance to topical bioavailability. (*this paper will be published in collaboration with FDA*).
2. Sharma S, Rangappa S, Hashemnejad SM, **Kundu S**, Murthy SN*. Effect of process parameters on the critical quality attributes and performance of o/w topical semi-solid creams.
3. Hashemnejad SM, **Kundu S***. Nonlinear rheological properties and structure of polysaccharide-based hydrogels.
4. Vasquez ES, Duggan ES, Metcalf JP, Walters KB*, **Kundu S***. Human pulmonary mucus: a mechanical and nanomechanics study.
5. Warren J, Cole M, Offenberger S, Burchell M, Toghiani H, Pittman CU, Lacy TE*, and **Kundu S**. Hypervelocity impact of honeycomb core sandwich panels filled with shear thickening fluid.
6. Warren J, Mishra S, Toghiani H, Pittman CU, Lacy TE, and **Kundu S***. Capturing structural change in fumed silica based shear thickening fluids using in situ small angle neutron scattering.

Publications based on research conducted at Mississippi State University

30. Whang CH, Lee HK, **Kundu S**, Muthy SN, Jo S*. Pluronic-Based Dual-Stimuli Sensitive Polymers Capable of Thermal Gelation and Ph-Dependent Degradation for In Situ Biomedical Application, *Journal of Applied Polymer Science*, in press, DOI: 10.1002/app.46552.
29. Zabet M, Trinh K, Toghiani H, Lacy TL, Pittman CU, **Kundu S***. Anisotropic Nanoparticles Contributing to Shear Thickening Behavior of Fumed Silica Suspensions, *ACS Omega*, 2, 8877–8887 (2017).
28. Mendonsa NS, Murthy S, Hashemnejad SM, **Kundu S**, Zhang F, Repka MA*. Development of Poloxamer Gel Formulations via Hot-Melt Extrusion Technology, *International Journal of Pharmaceutics*, 537, 122-131 (2018).
27. Wijayapala R, Hashemnejad SM, and **Kundu S***. Carbon nanodots crosslinked photoluminescent alginate hydrogels. *RSC Advances*, 7, 50389 – 50395 (2017).
26. Mishra S, Lacy TL, **Kundu S***. Effect of surface tension and geometry on cavitation in soft solids, *International Journal of Non-Linear Mechanics*, 98, 23-31 (2018).
25. Hashemnejad SM, **Kundu S***. Probing gelation and rheological behavior of a self-assembled molecular gel, *Langmuir*, 33, 7769-7779 (2017).
24. Hashemnejad SM, Huda M, Rai N*, **Kundu S***. Molecular insights into gelation of di-Fmoc-L-Lysine in organic solvent-water mixture, *ACS Omega*, 2, 1864–1874 (2017). (**†recommended by the editor**)
23. Zabet M, Mishra S, Boy R, Walters KB, Naskar AK, **Kundu S***. Temperature-dependent self-assembly and rheological behavior of a thermoreversible PMMA-PnBA-PMMA triblock copolymer gel, *Journal of Polymer Science Part B: Polymer Physics*, 55, 877–887 (2017).
22. Hashemnejad SM, **Kundu S***. Strain stiffening and negative normal stress in alginate hydrogels, *Journal of Polymer Science Part B: Polymer Physics*, 54, 1767–1775 (2016).
21. Manda P, Kushwaha AS, **Kundu S**, Shivakumar HN, Jo SB, Nanjappa SH, Murthy S*. Delivery of Ziconotide to cerebrospinal fluid via intranasal pathway for the treatment of chronic pain, *Journal of Controlled Release*, 224, 69-76 (2016).
20. Bhagurkaar AM, Murali A, Patil H, Tiwari RV, Maurya A, Hashemnejad SM, **Kundu S**, Murthy S, Repka MA*. Development of an ointment formulation using hot-melt extrusion technology, *AAPS PharmSciTech*, 1-9 (2015).
19. Zabet M, Mishra S, **Kundu S***. Effect of graphene on self-assembly and rheological behavior of a triblock copolymer gel, *RSC Advances*, 5, 83936-83944 (2015).

18. Warren J, Offenberger S, Toghiani H, Pittman CU, Lacy TE, and **Kundu S***. Effect of temperature on shear-thickening behavior of fumed-silica suspensions, *ACS Applied Materials & Interfaces*, 7 (33), 18650–18661 (2015).
17. Hashemnejad SM, **Kundu S***. Nonlinear viscoelasticity and cavitation of a triblock copolymer gel, *Soft Matter*, **11**, 4315-4325 (2015).
16. Vasquez ES, Bowser J, Swiderski C, Walters KB*, **Kundu S***. Rheological characterization of Mammalian Lung Mucus, *RSC Advances*, 4 (66), 34780 – 34783 (2014).

Publications based on prior work but manuscript was prepared and communicated after joining Mississippi State University

15. Waters MS, **Kundu S***, Lin NJ, Gibson SL*. Microstructure and mechanical properties of in situ biofilms, *ACS Applied Materials & Interfaces*, 6(1), 327-332 (2014).
14. Orski SV, **Kundu S**, Gross RA, Beers KL. Design and Implementation of Two-Dimensional Polymer Adsorption Models: Evaluating the Stability of *Candida antarctica* Lipase B/Solid-Support Interfaces by QCM-D, *BioMacromolecules*, 14 (2), 377–386 (2013).

Publications based on prior work

13. **Kundu S**, Johnson PM, Beers KL. Increasing molecular mass in enzymatic lactone polymerizations, *ACS Macro Letters*, 1, 347–351 (2012).
12. Kratz K, Narasimhan A, Tangirala R, Moon SC, Revanur R, **Kundu S**, Kim HS, Crosby AJ, Russell TP, Emrick T, Kolmakov G, and Balazs AC. Probing and repairing damaged surfaces with nanoparticle-containing microcapsules, *Nature Nanotechnology*, 7, 87-90 (2012). (**Highlighted in sciencedaily, physorg**)
11. Hunley MT, Bhangale AS, **Kundu S**, Johnson PM, Gross RA, Beers KL, In situ monitoring of enzyme-catalyzed polymerizations by Raman spectroscopy, *Polymer Chemistry* 3 (2), 314-318(2012).
10. Johnson PM, **Kundu S**, Beers KL. Modeling Enzymatic Kinetic Pathways for Ring-Opening Lactone Polymerization, *Biomacromolecules*, 12 (9), 3337–3343(2011).
9. **Kundu S**, Bhangale AS, William WE, Flynn KM, Guttman CM, Gross RA, Beers KL. Continuous flow enzyme-catalyzed polymerization in a microreactor, *Journal of the American Chemical Society*, 133(15):6006-6011 (2011). (**Highlighted in NIST newsletter, sciencedaily, physorg**)
8. Chan EP, **Kundu S**, Lin Q, Beers KL, Stafford CM. Thickness effect on the viscoelastic properties of polystyrene thin films as measured by thermal wrinkling, *ACS Applied Materials & Interfaces*, 3 (2): 331–338 (2011).
7. **Kundu S**, Davis CS, Long T, Sharma R, Crosby AJ. Adhesion of non-planar wrinkled surfaces, *Journal of Polymer Science Part B: Polymer Physics*, 49(3):179-185, 2011 (**Cover Art**).
6. **Kundu S**, Ogale AA. Rheostructural studies of a discotic mesophase pitch at processing flow conditions, *Rheologica Acta* 49(8): 845-854 (2010).
5. **Kundu S**, Crosby AJ. Cavitation and fracture behavior of polyacrylamide hydrogels, *Soft Matter* 5(20), 3963-3968 (2009).
4. **Kundu S**, Grecov D, Rey AD, Ogale AA. Shear flow induced microstructure of a synthetic mesophase pitch, *Journal of Rheology* 53(1):85-113(2009).
3. **Kundu S**, Naskar AK, Ogale AA, Anderson D, Arnold JR. Observations on a low-angle x-ray diffraction peak for AR-HP mesophase pitch, *Carbon* 46(8):1166-1169 (2008).
2. **Kundu S**, Ogale AA. Microstructural effects on the dynamic rheology of a discotic mesophase pitch, *Rheologica Acta* 46(9):1211-1222 (2007).
1. **Kundu S**, Ogale AA. Rheostructural studies on a synthetic mesophase pitch during transient shear flow, *Carbon* 44(11): 2224-2235 (2006).

Conference Proceedings

Based on research conducted at Mississippi State University

21. Vasquez ES, **Kundu S**, Walters KB. Examining mucin type and morphology effects on mammalian mucus mechanical and microstructural properties. *Proc. 1st Thermal and Fluid Engineering Summer Conference*, TFESC, New York City (2015).
20. Warren J, Kota KR, Westberg SM, Lacy TE, **Kundu S**, Toghiani H, Pittman CU. Hypervelocity impacts of shear thickening fluid imbedded metallic foam core sandwich panels. *Proc. 30th Technical Conference of the American Society for Composites, East Lansing, Michigan* (2015).
19. Warren J, Offenberger S, Lacy TE, Toghiani H, **Kundu S**, Pittman CU. Effect of temperature on shear thickening fluid rheology. *Proc. 29th Technical Conference of the American Society for Composites, La Jolla, California* (2014).
18. Warren J, Offenberger S, Lacy TE, Toghiani H, **Kundu S**, Pittman CU. Hypervelocity impacts on metallic foam core sandwich panels filled with shear thickening fluid. *Proc. 29th Technical Conference of the American Society for Composites, La Jolla, California* (2014).
17. Warren J, Cole M, Offenberger S, Lacy TE, Toghiani H., Burchell M, **Kundu S**, Pittman CU. Hypervelocity impact of honeycomb core sandwich panels filled with shear thickening fluid. *Proc. 28th Technical Conference of the American Society for Composites, State College, Pennsylvania* (2013).
16. **Kundu S**, Kleiderer AC. High strain deformation of a strain stiffening gel. *PMSE Preprints* (2013).

Based on prior work

15. Orski SV, **Kundu S**, Gross RA, Beers KL. Stability of solid-supported enzyme catalysts for ring-opening polymerization. *Polymer Preprints*, 53(2), 316-317 (2012).
14. Waters MS, **Kundu S**, Gibson SL. Structure-mechanical characterization of extracellular polymeric substance from biofilms. *Polymer Preprints*, 53(1), 662-663 (2012).
13. Hunley MT, Bhangale AS, **Kundu S**, Johnson PM, Gross RA, Beers KL. In situ Raman monitoring of ring-opening copolymerizations. *PMSE Preprints* (2012)
12. Johnson PM, **Kundu S**, Beers KL. Molecular mass and kinetic modeling of poly(ϵ -caprolactone) from enzyme catalysis. *Polymer Preprints* 52(1) (2011).
11. **Kundu S**, Bhangale A, William WE, Flynn KM, Gross RA, Beers KL. Immobilized enzyme catalyzed polymerization reactions in microreactors. *Polymer Preprints* 51(1):745-746 (2010).
10. Bhangale A, **Kundu S**, Xie W, William WE, Flynn KM, Beers KL, Gross RA. Impact of immobilization supports for polyesters synthesis activity of *Candida Antartica* Lipase B. *Polymer Preprints* 51(1):760-761 (2010).
9. **Kundu S**, Zimmerlin J, Crosby AJ. Cavitation rheology and fracture behavior of soft polymeric materials. Proceedings of the 14th International Conference on Deformation, Yield, and Fracture of Polymers. Rolduc Abbey, Kerkrade, Netherlands. April 2009, 91-92.
8. **Kundu S**, Anderson DP, Ogale AA. Rheostructural studies of mesophase pitch using WAXD and OM. "Carbon 2007" Proceedings of International Carbon Conference, Japan (2008).
7. Rey AD, von Oehsen JB, EDuffy EB, **Kundu S**, Cox CL, Ogale AA. Flow-microstructure of mesophase pitch-based discotic liquid crystalline fluids. Proceedings of the Polymer Processing Society- 23rd annual meeting, Salvador, Brazil (2007).
6. **Kundu S**, Ogale AA. Investigation of flow and microstructure in rheometric and processing flow conditions for liquid crystalline pitch, "Carbon 2007" Proceedings of International Carbon Conference, USA (2007).
5. Grecov D, **Kundu S**, Ogale AA, Rey AD. Flow-induced microstructure of a synthetic mesophase pitch, "Carbon 2007" Proceedings of International Carbon Conference, USA (2007).

4. Ogale AA, Naskar AK, Walker Robert, **Kundu S**, Sweeney D. Carbon fibers from melt-spun PAN and pitch precursors: composition and process-based control of microstructure, Invited Lecture, International Workshop on Carbon Materials for Energy Applications, Proceedings of Indian Carbon Society, New Delhi, India (2004).
3. **Kundu S**, Ogale AA. Rheostructural evolution of AR-HP mesophase pitch in shear flow, "Carbon 2004" Proceedings of International Carbon Conference, USA (2004).
2. **Kundu S**, Edie DD, Ogale AA. Rheostructural study of pure and modified mesophase pitches, "Carbon 2003" Proceedings of International Carbon Conference, Spain (2003).
1. Cho T, **Kundu S**, Lee YS, Rao R, Rao AM, Edie DD, Ogale AA. Processing and structure of nanotube-reinforced mesophase pitch, "Carbon 2002" Proceedings of International Carbon Conference, China (2002).

Selected Presentations/Posters (*indicates presenter, underline indicates undergraduate researcher)

93. **Kundu S***, Hashemnejad SM, Wijayapala R, Mishra S, Prado RMB. Mechanical Properties and Failure Behavior of Alginate Hydrogels. ACS Spring Meeting, New Orleans, April, 2018.
92. Abbaszadeh M*, **Kundu S**. Graphene Oxide Nanoplatelets Embedded Polyamide Thin Films for Water Desalination. ACS Spring Meeting, New Orleans, April, 2018.
91. Mishra S*, Lacy T, **Kundu S**. Effect of Surface Energy and Confinement on Cavitation in Soft Gels. *Poster Presentation*. APS March Meeting, Los Angeles, March 2018.
90. **Kundu S***, Hashemnejad SM, Wijayapala R, Prado RMB, Mishra S. Failure Behavior of Alginate Hydrogels. APS March Meeting, Los Angeles, March 2018.
89. Mishra S*, Prado RMB, Lacy T, **Kundu S**. Failure of a Polystyrene-Polyisoprene-Polystyrene Gel in Mineral Oil. APS March Meeting, Los Angeles, March 2018.
88. Hashemnejad SM, Huda M, Rai N, **Kundu S***. Self-assembly and mechanical properties of di-Fmoc-L-Lysine containing molecular gels. AIChE Annual Meeting, Minneapolis, October-November, 2017.
87. Wijayapala R*, Frazier D, Elmore B, Freeman C, **Kundu S**. Synthesis and characterization of crosslinked polymers from cottonseed oil. Poster presentation, AIChE Annual Meeting, Minneapolis, October- November, 2017.
86. Wijayapala R, Hashemnejad SM, **Kundu S***. Non-linear rheology and fracture in alginate hydrogels. AIChE Annual Meeting, Minneapolis, October- November, 2017.
85. Huda M, Hashemnejad SM, **Kundu S**, Rai N*. Molecular insights in self-assembly of di-Fmoc-L-Lysine in organic solvent/water mixtures. AIChE Annual Meeting, Minneapolis, October-November, 2017.
84. Wijayapala R*, Hashemnejad SM, Defranc D, and **Kundu S**. Carbon nanodots crosslinked photoluminescent alginate hydrogels. ACS Fall Meeting, Washington DC, August, 2017.
83. Wijayapala R*, Frazier D, Elmore B, Freeman C, **Kundu S**. Crosslinked cottonseed oil polymer synthesis and characterization. Poster presentation. ACS Fall Meeting, Washington DC, August, 2017.
82. Zabet M*, Trinh K, Toghiani H, Pittman CU, Lacy TE, and **Kundu S**. Shear thickening behavior of graphene nanoplatelets and carbon nanotubes containing fumed silica suspensions. ACS Spring Meeting, San Francisco, April, 2017.
81. Zabet M*, Mishra S, **Kundu S**. Effect of temperature and concentration on self-assembly and mechanical properties of triblock copolymer gels. Poster Presentation. ACS Spring Meeting, San Francisco, April, 2017.
80. Hashemnejad SM, **Kundu S**. Large strain deformation behavior of polymeric gels in shear- and cavitation rheology. *Padden Award Symposium*, APS March Meeting, New Orleans, March 2017.

79. Mishra S, **Kundu S**. Effect of geometry on cavitation in polymeric gels. APS March Meeting, New Orleans, March 2017.
78. Mishra S, Yrle B, Zabet M, Hashemnejad SM, **Kundu S**. Effect of gel microstructure on the cavitation instability. Poster Presentation. APS March Meeting, New Orleans, March 2017.
77. Hashemnejad SM, **Kundu S***. Strain-stiffening and negative normal stress in alginate hydrogels. Society of Rheology Meeting, Tampa, February, 2017.
76. **Kundu S***. Mechanical properties of ionically and covalently crosslinked alginate hydrogels. *Invited Presentation*, AIChE Annual Meeting, San Francisco, November 2016.
75. Frazier D*, Wijayapala R, Elmore B, Freeman C, **Kundu S**. Polymer synthesis from cottonseed oil. Undergraduate Poster Presentation. AIChE Annual Meeting, San Francisco, November 2016.
74. Stafford E*, Abbaszadeh M, Zabet M, Elmore B, Kundu S. Layer-by-layer assembly of polyamide thin films. Undergraduate Poster Presentation, AIChE Annual Meeting, San Francisco, November 2016.
73. **Kundu S***, Hashemnejad SM. Self-assembly of Di-Fmoc-L-Lysine based supramolecular hydrogels. AIChE Annual Meeting, Poster Presentation, San Francisco, November 2016.
72. Srinatha A, Hashemnejad SM, **Kundu S**, Ghosh P, Raney SG, Murthy SN. Clinical relevance of rheological characteristics of topical creams: relationship between yield stress and dose spreading area. AAPS meeting, Poster presentation, Denver, November, 2016.
71. Kundu S*. Harnessing self and directed assembly in soft materials. *Invited Presentation*, Earth and Environmental Engineering, Columbia University, October 2016.
70. Zabet M*, Mishra S, Walters KB, Kundu S. Investigation of self-assembly, thermal, and mechanical properties of thermoreversible triblock copolymer gels. ACS Fall Meeting, Philadelphia, August 2016.
69. **Kundu S***. Structure and properties of engineered soft materials. *Invited Presentation*, SSCET Conference, Jackson, August 2016.
68. Trinh K, Zabet M, Kundu S, and Toghiani H. Dispersion and rheology of multi-wall carbon nanotubes in fumed silica, Poster Presentation, Summer Undergraduate Research Symposium, July 2016, Mississippi State University.
67. Hashemnejad SM*, **Kundu S**. Nonlinear elasticity of alginate gels, APS March Meeting, Baltimore, March 2016.
66. Hashemnejad SM*, Nass K, **Kundu S**. Supramolecular hydrogels from self- assembly of di-Fmoc-L-lysine. Poster Presentation. APS March Meeting, Baltimore, March 2016.
65. Mishra S*, Zabet M, **Kundu S**. Effect of temperature and strain on a self-assembled gel. Poster Presentation, APS March Meeting, Baltimore, March 2016.
64. Mishra S*, **Kundu S**. Cavitation of a physically associating gels, APS March Meeting, Baltimore, March 2016.
63. **Kundu S***, Hashemnejad SM, Zabet M, Mishra S. Self-assembly and mechanical properties of a physically associating gel. *Invited Presentation*, ACS Spring Meeting, San Diego, March 2016.
62. **Kundu S***, Hashemnejad SM. strain stiffening and negative normal stress in alginate gels. ACS Spring Meeting, San Diego, March 2016.
61. **Kundu S***. Self-assembly, nonlinearity, and elastic instabilities of swollen gels. *Invited talk*, MIT, December, 2015.
60. **Kundu S***, Hashemnejad SM, Zabet M, Mishra S, Namani M. Nonlinear rheology and cavitation of a triblock copolymer gel. AIChE Annual Meeting, Salt Lake City, November 2015. (selected as the best presentation for the session)
59. Hashemnejad SM, **Kundu S***. Mechanical properties of ionically crosslinked alginate gels. AIChE Annual Meeting, Salt Lake City, November 2015.

58. Zabet M*, Mishra S, Weigandt K, **Kundu S**. Self-assembly and mechanical properties of thermally reversible triblock copolymer gels. Poster Presentation. AIChE Annual Meeting, Salt Lake City, November 2015.
57. Warren J*, **Kundu S**, Weigandt K, Lacy TE, Toghiani H, and Pittman CU. rheology and structural investigation of fumed silica based shear thickening fluids. AIChE Annual Meeting, Salt Lake City, November 2015.
56. Zabet M*, Mishra S, **Kundu S**. Self-assembly and mechanical properties of graphene containing acrylic triblock copolymer gels. Poster Presentation. AIChE Annual Meeting, Salt Lake City, November 2015.
55. Vasquez ES*, Duggan E, Metcalf J, **Kundu S**, Walters KB. surface and rheological effects of mucus/mucin coupled with chitosan-coated gold nanoparticles. Poster Presentation. AIChE Annual Meeting, Salt Lake City, November 2015.
54. **Kundu S***, Hashemnejad SM, Zabet M, Mishra S, Namani M. Nonlinear rheology and cavitation of a triblock copolymer gel. Society of Rheology Meeting, Baltimore, October 2015.
53. Warren J, Toghiani H, Pittman CU, Lacy TE, Weigandt K, and **Kundu S***. Rheology and Structural Investigation of Fumed Silica Based Shear Thickening Fluid. Poster Presentation. Society of Rheology Meeting, Baltimore, October 2015.
52. **Kundu S***. Soft materials: self-assembly, nonlinearity, and elastic instabilities. *Invited talk*, New York University, October, 2015.
51. **Kundu S***. Soft materials: self-assembly, nonlinearity, and elastic instabilities. *Invited talk*, City College of New York, October, 2015.
50. **Kundu S***. Self-assembly, nonlinearity, and elastic instabilities of swollen gels. *Invited talk*, New Jersey Institute of Technology, October, 2015.
49. **Kundu S***. Self-assembly, nonlinearity, and elastic instabilities of swollen gels. *Invited talk*, University of Southern Mississippi, September, 2015.
48. **Kundu S***. Non-linear rheology and fracture behavior of swollen polymer gels. *Invited talk*, Rutgers University, April, 2015.
47. **Kundu S***. Large strain deformation behavior of swollen polymers gels. *Invited talk*, Columbia University, March, 2015.
46. **Kundu S***, Hashemnejad SM, Zabet M, Mishra S. Nonlinear elasticity and cavitation of a triblock copolymer gel. APS march Meeting, San Antonio, Texas, 2015
45. Hashemnejad SM*, Zabet M, **Kundu S**. Nonlinear behavior of ionically and covalently cross-linked alginate hydrogels. APS march Meeting, San Antonio, Texas, 2015.
44. Zabet M, Hashemnejad SM*, **Kundu S***. Self-assembly and relaxation behavior of graphene containing acrylic triblock copolymer gels. Poster Presentation, APS march Meeting, San Antonio, Texas, 2015
43. **Kundu S***. Large strain deformation behavior of swollen polymers gels. *Invited talk*, Indian Institute of Technology-Bombay, December, 2014.
42. **Kundu S***. Large strain deformation behavior of swollen polymers gels. *Invited talk*, National Chemical Laboratory, Pune (India), December, 2014.
41. Vasquez ES*, Bowser J, Swiderski C, Walters KB, **Kundu S**. Rheological and microstructural characterization of native lung mucus. AIChE Annual Meeting, Atlanta, November 2014.
40. **Kundu S**, Warren J*, Pittman CU, Lacy TE, Toghiani H, and Offenberger S. Temperature effect on shear thickening responses. AIChE Annual Meeting, Atlanta, November 2014.
39. Zabet M*, **Kundu S**. Self-assembly and mechanical properties of graphene/acrylic triblock copolymer gels. AIChE Annual Meeting, Atlanta, November 2014.
38. Hashemnejad SM*, **Kundu S**. Investigation of mechanical properties of a triblock copolymer gel using cavitation rheology and LAOS. AIChE Annual Meeting, Atlanta, November 2014.

37. **Kundu S***. Large strain deformation behavior of swollen polymers gels. *Invited talk*, Advanced Polymer Series, 3M, St Paul, November, 2014.
36. **Kundu S***. Soft Materials: non-linearity, elastic instability, and fracture. *Invited talk*, Chemistry Department, Mississippi State University, October, 2014.
35. **Kundu S**. Large-strain deformation of polymer gels. *Invited talk*, SMAT-C Soft Matter Research and Technology Center, University of Santiago, May, 2014.
34. **Kundu S**. Deformation behavior of a strain stiffening gel. *Invited talk*, American Chemical Society, Spring Meeting, Dallas, March, 2014.
33. **Kundu S**. Large-strain deformation of polymer gels. *Invited talk*, Department of Chemical and Biomolecular Engineering, Tulane University, January, 2014.
32. **Kundu S**. Large-strain deformation of polymer gels. *Invited talk*, Department of Chemical Engineering, The City College of New York, November, 2013.
31. **Kundu S**, Kleiderer A. High strain deformation of a strain stiffening gel. American Chemical Society, Spring Meeting, New Orleans, April 2013.
30. **Kundu S**. Elastic instabilities in soft materials. *Invited talk*, Chemical Engineering Department, University of Alabama, February, 2013.
29. **Kundu S**, Waters MS, Calizo I, Hight Walker AR, Beers KL. In Situ characterization of polyhydroxyalkanoates using Surface-Enhanced Raman Spectroscopy. AIChE Annual Meeting. Pittsburg, October-November 2012.
28. **Kundu S**, Waters MS, Lin-Gibson S. Microstructure and mechanical properties of bacterial biofilms. AIChE Annual Meeting. Pittsburg, October-November 2012.

Before joining Mississippi State University

27. **Kundu S**, Bhangale AS, Johnson PM, William WE, Gross RA, Beers KL. Continuous flow enzyme-catalyzed polymerization in a microreactor: reactivity and stability of enzymes. 15th Annual Green Chemistry & Engineering Conference, Washington DC, Jun 2011.
26. **Kundu S**, Waters MS, Calizo I, Hight Walker AR, Beers KL. Characterization of bacterial polymer formation using vibrational spectroscopy. Poster presentation. 15th Annual Green Chemistry & Engineering Conference, Washington DC, Jun 2011.
25. **Kundu S**. Soft materials mechanics: developing multi-scale structure – property relationships. *Invited talk*, Department of Mechanical Engineering, Stevens Institute of Technology, April 2011.
24. **Kundu S**. Engineering sustainable polymers through biology. Dave C. Swalm School of Chemical Engineering. Mississippi State University, Mississippi State, March 2011.
23. **Kundu S**. Soft materials mechanics: developing multi-scale structure – property relationships. Department of Chemical Engineering, Louisiana Tech University, Ruston, February, 2011.
22. **Kundu S**. Soft materials mechanics: developing multi-scale structure – property relationships. *Invited talk*, Cabot Corporation Limited, Billerica, February, 2011.
21. **Kundu S**, Bhangale A, William WE, Gross RA, Beers KL. Lab-On-a-Chip: a novel platform for enzyme catalyzed polymerization reactions. AIChE Annual Meeting. Salt Lake City, November 2010.
20. **Kundu S**, Bhangale A, William WE, Flynn KM, Gross RA, Beers KL. Immobilized enzyme catalyzed polymerization reactions in microreactors. American Chemical Society, Spring Meeting, San Francisco, March 2010.
19. **Kundu S**, Sharma R, Crosby AJ. Adhesion behavior of non-planar wrinkled surfaces. AIChE Annual Meeting. Nashville, November 2009.
18. **Kundu S**, Crosby AJ. Cavitation rheology and fracture behavior of polyacrylamide hydrogels, AIChE Annual Meeting. Nashville, November 2009.
17. **Kundu S**, Crosby AJ. Cavitation rheology and fracture behavior of polyacrylamide hydrogels, American Physical Society -March meeting, Pittsburgh, USA, March, 2009.

16. **Kundu S**, Sharma R, Crosby AJ. Adhesion behavior of non-planar wrinkled surfaces. Poster presentation, American Physical Society -March meeting, Pittsburgh, USA, March, 2009.
15. **Kundu S**. Soft materials mechanics: developing multi-scale structure – property relationships. *Invited talk*, American Chemical Society, Delaware Section, December meeting. Newark, December 2008.
14. **Kundu S**, Crosby AJ. Cavitation rheology and fracture behavior of polyacrylamide hydrogels. AICHE Annual Meeting. Philadelphia, November 2008.
13. **Kundu S**, Zimberlin JA, Crosby AJ. Cavitation rheology and fracture mechanics of polyacrylamide hydrogels. Poster presentation, American Physical Society -March meeting, New Orleans, USA, March, 2008.
12. **Kundu S**, Zimberlin JA, Crosby AJ. Cavitation rheology and fracture mechanics of polyacrylamide hydrogels. Poster presentation, American Physical Society -March meeting, New Orleans, USA, March, 2008.
11. **Kundu S**, Ogale AA. Investigation of flow and microstructure in rheometric and processing flow conditions for liquid crystalline pitch. *Elsevier Carbon Journal award* presentation, International Carbon Conference “Carbon 2007”, Seattle, July, 2007.
10. **Kundu S**. Investigation of flow and microstructure in rheometric and processing flow conditions for liquid crystalline pitch. *Invited talk*, Department of Polymer Science and Engineering, University of Massachusetts-Amherst, January, 2007.
9. **Kundu S**. Investigation of flow and microstructure in rheometric and processing flow conditions for liquid crystalline pitch. *Invited talk*, Prof. Gareth Mckinley’s group, Hatsopoulos Microfluidics Laboratory, Department of Mechanical Engineering, Massachusetts Institute of Technology, January, 2007
8. **Kundu S**. Investigation of flow and microstructure in rheometric and processing flow conditions for liquid crystalline pitch. *Invited talk*, The Institute for Advanced Learning and Research, The Advanced and Applied Polymer Processing Institute, Virginia, December, 2006.
7. **Kundu S**, Ogale AA. Rheostructural Studies of discotic liquid crystalline materials. Poster presentation, NSF-CAEFF site visit, October, 2006.
6. **Kundu S**, Ogale AA. Rheo-structural study of a discotic thermotropic mesophase pitch. AICHE Annual Meeting. Cincinnati, November 2005.
5. **Kundu S**, Kone A, Ogale AA. Rheostructural Studies of discotic liquid crystalline materials. Poster presentation, NSF-CAEFF site visit, October, 2005.
4. **Kundu S**, Ogale AA. Rheology and microstructure of mesophase pitch. *3rd Prize*, Student Presentation Competition, CAEFF Student Retreat, Asheville, August, 2005.
3. **Kundu S**, Sweeney D, Naskar A, Ogale AA. Carbon fibers from pitch precursors: rheo-structural characterization of mesophase pitch. Carbons for a Greener Planet Research Frontiers Workshop, Pennsylvania State University, May 2005.
2. **Kundu S**, Ogale AA. Rheostructural evolution of AR-HP mesophase pitch in shear flow. Invited presentation in *Jack White Honorary Session*, International Carbon Conference “Carbon 2004”, Providence, July, 2004.
1. **Kundu S**, Cho T, Edie DD, Ogale AA, Rao R, Parker A, Rao AM. Rheology and microstructure of modified mesophase pitch. Poster presentation, NSF-CAEFF site visit, October, 2003.

Other Research Activities

- Visiting Researcher, Carbon and Composite Group of Oak Ridge National Laboratory. Duration: July 17, 2014 – July 31, 2014.

Teaching and Supervisory Experience

Course Instructor

CHE 8523: Advanced Transport Phenomena [Spring, 2012; Spring, 2013; Spring, 2014; Spring, 2015; Spring 2016; Spring 2017]

CHE 3413: Engineering Materials [Fall, 2012; Fall, 2013; Fall 2014; Fall 2015; Fall 2016; Fall 2017]

CHE 4990/6990: Soft Materials: Theory and Characterization [Spring 2016; Spring 2018]

Additional Instructions

Guest Lecturer, ME 4990/6990: Smart Materials, Spring 2014

Guest Lecturer, ABE/ChE/ME 4624/6624: Experimental Methods in Materials Research, Fall 2013

Workshops

As a part of the EPSCoR Track-II award, co-developed, organized and managed a ‘Research Experiences for Teachers’ program. Total nine high school and middle school teachers participated in this two-week workshop.

Postdoctoral research advisor

Current:

Ran Wijayapala (August 2016 – present)

Former:

Erick Vasquez (August 2014 – July 2015). co-advised with Prof. Keisha Walters, major advisor (Chemical Engineering, MSU). Present address, University of Dayton, Chemicals and Materials Engineering.

Graduate Research Advisor

Current:

Satish Mishra (PhD): August 2014 – present

Mahsa Abbaszadeh (PhD): August 2015 – present

Rosa Badani (PhD): August 2016 – present

Daniel Krizak (MS): August 2016 – present (converted to PhD from August 2017)

Anandavalli Varadarajan (PhD): January 2018 – present

Justin Warren (PhD): August 2012 – present. co-advised with Prof. Tom Lacy, major advisor (Aerospace Engineering, MSU)

Former:

Seyed Meysam Hashemnejad (PhD): January 2013 – August 2017, Dissertation: Investigation of Large Strain Deformation Behavior of Soft Gels in Shear- and Cavitation rheology. Present address: Postdoctoral researcher at MIT.

Mahla Zabet (PhD): August 2013 – May 2018, Dissertation: Structure-Property Relationships of Polymer Gels and Concentrated Suspensions Modified with Anisotropic Nanoparticles. Present address: Scientist, Cooper Tires.

Undergraduate Research Advisor

REU students:

Kevin Trinh (MS State University), Summer 2017

Brandon Yrle (University of Southern Mississippi), Summer 2016

Evan Dolling (University of Florida), Summer 2015

Justyn Forehand (NC State University), Summer 2015

Dennis Omari (Ohio State University), Summer 2014

Current:

Buck Morgan, Spring 2018- Present

Taylor Henry, Summer 2017 – Present

Sam Lucas, Spring 2017 – Present

Devarsionta Williams, Spring 2017 – Present

Former:

William Krizak, Spring 2017 – Fall 2017

Will Calderon, Fall 2016 – Fall 2017

Vindula Basnayake Pussepitiyalage, Spring 2017 – Spring 2018

Erik Sanchez Antonio, Fall 2016 – Summer 2017

Jacob Salem, Summer 2016 – Summer 2017

Deonante Frazier, Fall 2016 – Spring 2017

David Defranc, Fall 2016 – Spring 2017

Kevin Trinh, Summer 2016 – Spring 2017

Olivia Williams, Fall 2016 – Spring 2017

Joseph Tyson, Fall 2016

Kinsey Naas, Summer 2014 – Summer 2016

Elizabeth Stafford, Summer 2015 – Fall 2016

Aalaap Desai, Spring 2016 – Summer 2016

Franklyn Hall III, Spring 2016

Dalton Pruitt, Spring 2015 – Spring 2016

Igor Kevin, Spring, 2015 – Spring 2016

Jasmine Ross, Fall 2014 – Fall 2015

David Mooney, Summer 2014 – Spring 2015

Brian Dyess, Summer 2014 – May 2015

Isaiah Darden, Fall 2013 – Spring 2014

Deirdre Brokwell, Fall 2013

Bruce Strong, Summer 2013

Arthur Kleiderer, Spring 2012 – Summer 2013

Jeremy Walker, Spring 2012

High School Students Research Advisor

Latonia Parker, Fall 2015

William Kao, Fall 2014

Sarah Kaitlyn Timmins, Summer 2013

Dissertation/Thesis Committee Member

Current:

Varsha Jain, PhD Student, Chemical Engineering

Md Abdus Sabuj, PhD Student, Chemical Engineering

Xianchun Zhu, PhD Student, Chemical Engineering

Masrul Huda, PhD Student, Chemical Engineering

Shanmuga Venkatesan, PhD Student, Chemical Engineering

Former:

Marta Amirsadeghi, PhD, Chemical Engineering (2016)

Swati Kumari, MS, Chemical Engineering (2016)
Laibao Zhang, MS, Chemical Engineering (2015)
Caterina Tran, MS, Chemical Engineering (2015)

Non-thesis Masters Committee Member

Ernest Rufus (2016)
Niranjan Adhikari (2016)

Graduate Student Mentor

Atul Bhangale (NIST), March 2009 – April 2010

Other Education/Teaching Activities

- Served as an external examiner for doctoral thesis –McGill University

Professional Service

Manuscript Reviewer (journal)

- Journal of the American Chemical Society (JACS)
- Advanced Materials
- Advanced Energy Materials
- Advanced Engineering Materials
- Advanced Materials Interfaces
- Soft Matter
- Langmuir
- ACS Applied Materials and Interface
- Macromolecular Chemistry & Physics
- Polymer Engineering & Science
- Journal of Applied Polymer Science
- Process Biochemistry
- Journal of Chemical Physics
- Journal of Colloid and Interface Science
- Journal of Polymer Science: Polymer Physics
- Journal of Inorganic and Organometallic Polymers and Materials
- Acta Biomaterialia
- Journal of Rheology
- European Polymer Journal
- Scientific Reports
- Gels

Conference Proceedings Reviewer

- Society of Plastics Engineer (ANTEC conference)

External WERB manuscript reviewer for NIST

- Number of articles reviewed: 4

Textbook Reviewer

Analysis of Transport Phenomena, William M. Deen (MIT), 2nd Edition, Oxford University Press

Proposal Reviewer

- Served on NSF Review Panels (2017, 2018)
- Served as an ad hoc reviewer for NSF DMR, NSF EPSCoR Track 4
 - total proposal reviewed 9 (2013-2017)
- Served as an ad hoc reviewer for ACS- PRF
 - total proposal reviewed: 2 (2014, 2017)
- Served on NSF Graduate Research Fellowships Program Panels (2013, 2014, 2015)
- Served on EPA Star Fellowships Panel (2013)

Symposium and Plenary Series Organizers

- Co-Organizer, ACC POLY symposium on Polymer Networks: Soft Gels to Stiff Networks. ACS Spring Meeting, New Orleans, April, 2018.
- Co-Organizer, AIChE Area 8A Plenary Session: Emerging Areas in Polymer Science and Engineering, Minneapolis, MN, November 2017.

Conference Session Chair/co-Chair

American Institute of Chemical Engineers (AIChE)

- Biomacromolecular Gels, AIChE Annual Meeting, San Francisco, November, 2016
- Mechanics and Structure in Polymers, AIChE Annual Meeting, San Francisco, November, 2016.
- Polymer Thin Films and Interfaces, AIChE Annual Meeting, Salt Lake City, November, 2015
- Polymer Networks and Gels, AIChE Annual Meeting, Salt Lake City, November, 2015
- Polymer Networks and Gels, AIChE Annual Meeting, Atlanta, November, 2014
- Polymer Processing and Rheology session, AIChE Annual Meeting, San Francisco, November, 2013.

American Chemical Society (ACS)

- PMSE symposium on Supramolecular Assembly and Gelation in Organic Media, American Chemical Society, Spring Meeting, Dallas, March, 2014.

University, College, and Departmental Committees

- Chemical Engineering Graduate Affairs Committee member, 2012 –present
- Chemical Engineering and Petroleum Engineering Faculty Search Committee member, 2012- present
- Chemical Engineering Director Search Committee member, 2016
- Associate Dean Research Advisory Committee member, 2017- present
- Library Liaison: 2016 –present

University Working Groups

- Materials Working Group, Member, 2012- present, Treasurer, 2016 – present
- Biomechanics and Bio-Inspired Design, Member 2013

Panels and Workshops

- Panel Member, 3D printing panel discussion, Mississippi State University Libraries, October 21st, 2016

Student (Group) Advising

- Faculty Mentor: Girls Engineering Change. Helped to establish the MSU chapter

Other Services

Judge, Materials Poster Competition, AIChE Annual Meeting, Atlanta, November 2014.
Judge, ACS Meeting POLY Poster Award, American Chemical Society, Spring Meeting, Dallas, March, 2014.
Judge, Graduate Research Poster Competition, Bagley College of Engineering, Bagley College of Engineering, Mississippi State University, March 24th -25th, 2014.
Graduate Students Recruitment Seminar, Tulane University, January 17th, 2014.
Graduate Students Recruitment Seminar, Louisiana State University, April 10th, 2013.
Oral Presentation Judge, 10th Annual Graduate Student Association Research Symposium, Mississippi State University, April 14th, 2012.

Outreach Activities

- Visited Columbus Middle School multiple times to conduct laboratory demonstrations to the middle school students (2015).
- Conducted laboratory demonstration to elementary to high school students through programs such as Girls Scout Merit Badge Day, Women in Engineering, I AM Girl, BATMEN Academy (2012-present)

Media Coverage

- News article on *MSU program helps broaden perspective of local teachers* (July 21, 2016, retrieved on August 5, 2017) <http://www.msstate.edu/newsroom/article/2016/07/msu-program-helps-broaden-perspective-local-teachers/>.
- News article on *MSU honors 11 for undergraduate research projects* (August 6, 2015, retrieved on August 5, 2017) <http://www.msstate.edu/newsroom/article/2015/08/msu-honors-11-undergraduate-research-projects/> .
- News article on *Chemical engineer earns competitive NSF CAREER grant* (May 9, 2014, retrieved on August 5, 2017) <http://www.bagley.msstate.edu/news/chemical-engineer-earns-competitive-nsf-junior-faculty-grant/> and Starkville Daily.
- News articles on *Probing and repairing damaged surfaces with nanoparticle*, **Sciencedaily**, **Physorg**, and many others, January 2012.
- News articles on *Enzyme catalyzed polymerization in microreactors*, **Techbeat (NIST newsletter)**, **Sciencedaily**, **Physorg**, and many others, March 2011.
- Cover art, *Journal of Polymer Science Part B: Polymer Physics*, February, 2011

Professional Affiliations

Member, American Chemical Society
Member, American Physical Society
Member, American Institute of Chemical Engineers
Member, Society of Rheology
Member, American Carbon Society
Sigma Xi, 2010-2013

Professional Development

Workshops

2012 ASEE Chemical Engineering Summer School, July 20th – 26th, Orono, Maine, 2012.
2nd Annual Neutron Scattering For Novices Workshop, Oak Ridge National Laboratory, Tennessee, May 16th, 2012.
Faculty Development Workshop, Mississippi State University, April 1st, 2012.
Career Planning for Prospective Faculty, AIChE Annual Meeting, Salt Lake City, November 7th, 2010.

Funded/Approved Proposals

Active Grants:

Title: CAREER: Large-Strain Deformation of Polymeric Gels: Non-Linearity, Instability, and Fracture
Sponsor: NSF

Investigator (s): Santanu Kundu

Role on Project: Principal Investigator

Period of Performance: 05/01/14-04/30/19

Amount: \$533,200

Title: The Smart MATerial Design, Analysis, and Processing (SMATDAP) Consortium: Building Next-Generation Polymers and the Tools to Accelerate Cost-Effective Commercial Production

Sponsor: NSF

Investigator(s): Drew Hamilton, Sara Morgan, Keisha B Walters, Daniel Savin, Santanu Kundu

Role on Project: co-Principal Investigator

Period of Performance: 08/01/14-07/31/18

Amount: \$ 2,699,753 (my share \$399,123)

Title: Topical Products and Their Critical Quality Attributes

Sponsor: FDA

Investigator(s): Narasimha Murthy (University of Mississippi), Santanu Kundu

Role on Project: co-Principal Investigator

Period of Performance: 10/01/14-08/31/18

Amount: \$107,821 (my share for the years 1-4 and similar level of funding is expected for 1 additional year)

Title: Integration of Food Grade Coatings into Ham Nests as a Means to Control Ham Mite Infestation

Sponsor: US Department of Agriculture - NIFA

Investigator(s): Charles Freeman, Wes Schilling, Santanu Kundu, Catherine Black

Role on Project: Co-Principal Investigator

Period of Performance: 9/1/17-9/30/20

Amount: \$499,473 (my share \$67,135)

Title: WD 67: Modeling and Simulation of Multi-Physics Material Response in Geo-environments

Sponsor: US Army TARDEC

Investigator(s): Roger King, Thomas Lacy, Santanu Kundu, Charles Pittman

Role on Project: Investigator

Period of Performance: 9/30/16-8/30/18

Amount: \$292,156 (one graduate student support, a major equipment upgrade, and summer support)

Title: Topic 4: Proving Ground and Dismounted Troops

Sponsor: US Army ERDC

Investigator(s): Roger King, Santanu Kundu, Neeraj Rai

Role on Project: Investigator

Period of Performance: 3/1/17-2/28/20

Amount: \$663,382

Completed Grants:

Title: Development of Cottonseed Oil Based Polymers for 3D-Printing and Molding Applications

Sponsor: Cotton Inc

Investigator(s): Charles Freeman, Santanu Kundu, Bill Elmore

Role on Project: co-Principal Investigator

Period of Performance: 01/01/16-12/31/17

Amount: \$36,800

Title: WD 65: Design Concept Tradespace on HPC

Sponsor: US Army TARDEC

Investigator(s): Roger King

Role on Project: Investigator

Period of Performance: 1/21/16-4/30/17

Amount: \$1,199,203 (one graduate student support, and summer/academic year support)

Title: Effect of Functionalized Nanoparticles on the Mechanical Properties of Native and Simulant Lung Mucus

Sponsor: NSF Mississippi Experimental Program to Stimulate Competitive Research (EPSCoR)

Investigator(s): Santanu Kundu

Role on Project: Principal Investigator

Period of Performance: 08/16/15-08/15/16

Amount: \$36,000

Title: Integrated Virtual Prototyping for Product Engineering and Design

Sponsor: US Army Engineering Research and Development Center (ERDC)

Investigator(s): Roger King

Role on Project: Senior Investigator

Period of Performance: 09/16/14-09/15/15

Amount: \$104,720 (one graduate student support, and summer/academic year support)

Title: Planning Grant: I/UCRC for Advanced Composites in Transportation Vehicles

Sponsor: NSF

Investigators: Ratneshwar Jha, Santanu Kundu, Thomas Lacy, Judy Schneider, Masoud Rais-Rohani

Role on Project: co-Principal Investigator

Period of Performance: 04/01/14-03/31/15

Amount: \$15,423

Title: Microstructure and Nanomechanics of Native and Simulant Lung Mucus Doped with Nanoparticles

Sponsor: NSF Mississippi Experimental Program to Stimulate Competitive Research (EPSCoR)

Investigator(s): Erick S. Vasquez, Santanu Kundu, Keisha B Walters

Role on Project: co-Principal Investigator

Period of Performance: 09/01/14-08/31/15

Amount: \$36,000

Title: Vehicular Fluids

Sponsor: Computational Research for Engineering and Science./ERS: Engineering Resilient Systems/
Center for Advanced Vehicular Systems (CAVS)

Investigator(s): Santanu Kundu

Role on Project: Principal Investigator
Period of Performance: 02/14/14-09/18/14
Amount: \$44,581 (one graduate student support, and summer/academic year support)

Title: Mechanical Properties of Pulmonary Mucus
Sponsor: NSF Mississippi Experimental Program to Stimulate Competitive Research (EPSCoR)
Investigator(s): Santanu Kundu
Role on Project: Principal Investigator
Period of Performance: 09/01/12-08/31/14
Amount: \$36,000

Title: Organic/Inorganic Composites for EMI Shielding: A Molecular Design Approach
Sponsor: RASPET, MSU
Investigator(s): Santanu Kundu, Hossein Toghiani, Tom Lacy, Charles U. Pittman, Jr., Ratneshwar Jha
Role on Project: Principal Investigator
Period of Performance: 03/01/2013- 09/30/2014
Amount: 10,000

Title: Lignin-Derived Materials: Ecofriendly Nano-reinforcements for Automotive, Aerospace and
Wind Turbine Applications
Sponsor: RASPET, MSU
Investigator(s): Hossein Toghiani, Santanu Kundu, Tom Lacy, Charles U. Pittman, Jr., Ratneshwar Jha
Role on Project: co-Principal Investigator
Period of Performance: 03/01/2013- 09/30/2014
Amount: 22,000

Proposals to Access National Laboratory Facilities:

Title: Microstructural of a Physical Gel
Sponsor: CNMS, Oak Ridge National Laboratory
Investigator(s): Santanu Kundu
Role on Project: Principal Investigator
Period of Performance: 3 days (August, 2014 – September, 2015)
Amount: N/A

Title: Effect of Temperature and Shear on the Evolution of Microstructure of Shear-Thickening Fumed-Silica Suspensions
Sponsor: National Institute of Standards and Technology (NIST)
Investigator(s): Santanu Kundu
Role on Project: Principal Investigator
Period of Performance: 3 days (May, 2014 – October, 2014)
Amount: N/A

Title: Structural Investigation of a Physically Associating Gel using Small Angle Neutron Scattering
Sponsor: National Institute of Standards and Technology (NIST)
Investigator(s): Santanu Kundu
Role on Project: Principal Investigator
Period of Performance: 2 days (January, 2015 – June, 2015)
Amount: N/A

Title: Evolution of Microstructure of Shear-Thickening Fumed-Silica Suspensions

Sponsor: National Institute of Standards and Technology (NIST)
Investigator(s): Santanu Kundu, Justin Warren
Role on Project: Principal Investigator
Period of Performance: 4 days (January, 2015 – June, 2015)
Amount: N/A

Pending/To be Submitted Grants:

Title: Value-Added Food Utilization of Catfish By-Products
Sponsor: US Department of Agriculture
Investigator(s): Sam Chang, Ben Posadus, Santanu Kundu
Role on Project: Co-Principal Investigator
Period of Performance: 10/1/17-9/30/20
Amount: \$ 499,810

Title: Mississippi EPSCoR: Center for Emergent Molecular Optoelectronics (CEMOs)
Sponsor: NSF EPSCoR- Track I
Investigator(s): Santanu Kundu, Neeraj Rai, Dong Meng, and Scott Colleen from Mississippi State (total 20 researchers from all Mississippi Research Universities)
Role on Project: Senior Investigator, Core Team Member
Period of Performance: submitted in August, 2017
Amount: \$20,000,000

Title: Nanomanufacturing of Thin Film Polymer Nanocomposites with Controlled Assembly of Graphene Nanoplatelets
Sponsor: NSF
Investigators: Santanu Kundu
Role on Project: Principal Investigator
Period of Performance: 08/16/18- 08/15/21
Amount Requested: \$ 314,628