3rd International Symposium

MATERIALS FROM RENEWABLES 2018
NORTH DAKOTA STATE UNIVERSITY, FARGO

July, 17-18, 2018

PROGRAM

Organized by North Dakota State University and University of Georgia

Sponsored by ND EPSCoR, United Soybean Board, ND Soybean Council, ND Department of Commerce, NDSU Coatings and Polymeric Materials Department, College of Science and Mathematics, College of Engineering and MDPI (Coatings)
Tuesday, July 17

NDSU Memorial Union, Century Theatre

7:30 am - REGISTRATION BEGINS

7:30 am - CONTINENTAL BREAKFAST

8:30 am - INTRODUCTORY REMARKS

LECTURE SESSION I (Sergiy Minko)

9:00 am - (1) Amar Mohanty, University of Guelph, CANADA
Renewable Resourced-based Materials towards Improved Sustainability through a Circular Economy Path: Light-weight Car Parts to Eco-friendly Packaging

9:30 am - (2) Janice Tardiff, Ford Motor Company
Incorporation of Sustainable/Renewable Materials into Automotive Parts

10:00 - 10:30 am - BREAK

10:30 am - (3) Sylvain Caillol, Institute Charles Gerhardt, FRANCE
Platform of Biobased Aromatic Building Blocks for Polymers Synthesis
11:00 am - (4) Kevin J. Edgar, Virginia Tech
Creating New and Useful Polysaccharide Architectures

11:30 am - (5) Christian Lenges, DuPont Industrial Biosciences
DuPont Industrial BioSciences: Sustainable Material Innovation & Application Examples

12:00 - 1:15 pm - LUNCH

LECTURE SESSION II (Srikanth Pilla)

1:15 pm - (6) Eric Cochran, Iowa State University
Waterborne glycerol based thermoplastic adhesives for wood composites

1:45 pm - (7) Richard Gross, Rensselaer Polytechnic Institute
Biocatalysis Enables New Options in Polymer Science

2:15 pm - (8) Yiqi Yang, University of Nebraska - Lincoln
Fully Stereo-Complexed PLLA-PDLA Fibers with Excellent Wet Processing and Performance Properties

2:45 - 3:15 pm - BREAK
3:15 pm - (9) Manjusri Misra, University of Guelph, CANADA
Design and Engineering of Biodegradable Nano-blends by Reactive Extrusion

3:45 pm - (10) Chad Ulven, North Dakota State University
Fatigue Failure of Flax Fiber Reinforced Thermoset Composites

4:15 - 6 pm - POSTER SESSION
NDSU Memorial Union, Great Plains room

6:30 pm - SYMPOSIUM DINNER
NDSU Alumni Center

Students Poster Awards Ceremony
Wednesday, July 18

NDSU Memorial Union, Century Theatre

8:00 am - CONTINENTAL BREAKFAST

LECTURE SESSION III (Alexander Sidorenko)

9:00 am - (11) Jennifer Dunn, Argonne National Laboratory
Life cycle analysis considerations for bioproducts

9:30 am - (12) Lee Walko, Omni Tech International Ltd
Biobased Resins in Coatings

10:00 - 10.30 am - BREAK

10:30 am - (13) Srikanth Pilla, Clemson University
Green Transformation of Lignin to Sustainable Graphenic-Fixed Bed Adsorbents and Their Application in Water Purification

11:00 am - (14) Jerzy Leszczynski, Jackson State University
Rational Selection of Materials from Renewables - Role of Computational Chemistry
11:30 am - (15) Igor Luzinov, Clemson University  
Polymer Nanocomposites Reinforced with Renewable SiC Whiskers

11:55 am - (16) Sergiy Minko, University of Georgia  
Biodegradable Filament Nanofibers

12:20 - 1:30 pm - LUNCH

LECTURE SESSION IV (Dean Webster)

1:30 pm - (17) Alexander Sidorenko, University of the Sciences Philadelphia  
Biocompatible Hybrid Molecular Brushes with Chitosan Backbone: Synthesis and Cell Interactions

1:55 pm - (18) Hrvoje Kusic, University of Zagreb, CROATIA  
TiO$_2$-composites as effective photocatalysts for solar driven treatment of emerging contaminants in water

2:25 - 2:50 pm - BREAK
2:50 pm - (19) Surojit Gupta, University of North Dakota
Recent Progress on the Design of Novel Structural Materials for Multifunctional Applications (Automobiles, Aerospace, and Environmental Applications)

3:15 pm - (20) Anuradhi Liyanapathiranage, University of Georgia
Sustainable Industrially Reliable Novel Textile Dyeing Technology and High-Performance Functional Coatings from Nanocellulose.

3:45 pm - (21) Jamileh Shojaeiarani, North Dakota State University
Structure and Performance Characteristics of Cellulose Nanocrystals Reinforced Poly(Lactic Acid) Biocomposites

4:05 pm - SYMPOSIUM ENDS
1. Rheological Characterization of Nano-Fiber Filled Hybrid Bio-Ink for Tissue Engineering
   Ahasan Habib, Bashir Khoda
   Department of Mechanical Engineering, University of North Dakota

2. Lattice Structure Manufacturing with 3D Printing and Joining
   AMM Nazmul Ahsan and Bashir Khoda, Industrial and Manufacturing Engineering Department, North Dakota State University

3. Toward Better NIPU Coatings: Analysis of Aldehyde/Carbamate Reaction and Synthesis of Dialdehyde Precursors
   Anna C. Renner¹, ², Eric M. Serum¹, ², Samantha D. Silbert², ³, Dean C. Webster*², ³, Mukund P. Sibi¹, ² ¹Department of Chemistry and Biochemistry, ²Center for Sustainable Materials Science, ³Department of Coatings and Polymeric Materials, North Dakota State University

4. Sustainable Novel Industrial Applications of Fibrillated Nanocellulose
   Anuradhi Liyanapathiranage¹, Yunsang Kim¹, Lauren McCoy¹, Corbin Feit² Eliza Lee¹, Alexey
Gruzd¹, Raha Saremi¹, Hansol Lee³, Paula F. De Castro⁴, Dmitry G. Shchukin⁴, Igor A. Luzinov⁵, Sudhagar Mani², Ian R. Hardin¹, Suraj Sharma¹, Sergiy Minko¹,² ¹ Department of Textiles, Merchandising, and Interiors, University of Georgia, ² Department of Chemistry, University of Georgia, ³ College of Engineering, University of Georgia, ⁴ Chemistry Department, Stephenson Institute for Renewable Energy, The University of Liverpool, UK ⁵ Department of Materials Science and Engineering, Clemson University

5. A Lignomics Toolkit Analysis of Hydrothermally Treated Alkali Lignin
LaVallie, A., Bilek, J., Voeller, K., Furey, K., Lu, S., Kozliak, E., Kubátová, A. University of North Dakota

6. Design and Characterization of Novel Porous Scaffolds
Surojit Gupta, Maharshi Dey, Caleb Matzke, Trevor Seidel, Kathryn Hall, Grant Ellis, Sabah Javaid, and Yun Ji, Department of Mechanical Engineering, University of North Dakota

7. HMF oxidations: Green metrics of scale-up procedures
Catherine Sutton, Eric Serum, Mukund Sibi, Department of Chemistry and Biochemistry, North Dakota State University
8. Enhancing Terrestrial and Celestial Water Purification with Graphene Oxide Membranes
Chris Buelke¹, Ali Alshami¹*, James Casler ², Jeremy Lewis¹, Maram Abdulhakim Qasem¹, Mike Hickner³ ¹ Department of Chemical Engineering, University of North Dakota ² Department of Space Studies, University of North Dakota ³ Department of Material Science and Engineering, Pennsylvania State University

Eric Krall, Mitchell Maw and Dean Webster, Department of Coatings and Polymeric Materials, North Dakota State University

10. Bio-renewable Bicyclic Diacids
Eric M. Serum and Mukund P. Sibi Department of Chemistry and Biochemistry and Center for Sustainable Materials Science North Dakota State University

11. A large in-house assembled dataset of glass transition temperatures of homopolymers. Data preprocessing and QSPR study
Gerardo M. Casañola-Martín, Bakhtiyor Rasulev, Department of Coatings and Polymeric Materials, North Dakota State University

12. Novel Nanocellulose Based Fire Retardant for Polymer Composites
Ghazal Vahidi¹, Dilpreet Bajwa¹, Nicole Stark² & Jamileh Shoajearani¹. ¹ Department of
13. Facile and Scalable Preparation of a Renewable Cyclobutane-1,2-diacid Building Block via [2+2] Photocyclization
Houssein Amjaour, Zhihan Wang, Jenna Puttkammer, and Qianli R. Chu
Department of Chemistry, University of North Dakota

14. Bio-Based Contact Killing Anti-Bacterial Coatings
Karan Bansal, Mohiuddin Quadir, Department of Coatings and Polymeric Materials, North Dakota State University

15. Design of Polymer Matrix Composites (PMCs) fabricated by Solvent Casting and Additive Manufacturing
Kathryn Hall, Maharshi Dey, and Surojit Gupta
Industrial and Manufacturing Engineering Dept, North Dakota State University

16. Synthesis of Novel Bis-furan and Tris-furan Dialdehydes
Krystal Grieger, Mukund P. Sibi Department of Chemistry and Biochemistry, North Dakota State University
17. Effect of Comonomer Aqueous Solubility on Feasibility of Emulsion Copolymerization with Plant Oil-Based Monomers
Kyle Kingsley¹, Vasylyna Kirianchuk¹,², Oleh Shevchuk¹,², Andriy Voronov¹
¹Department of Coatings and Polymeric Materials, North Dakota State University,
²Department of Organic Chemistry, Lviv Polytechnic National University, Lviv, Ukraine

18. The Use of Sustainable Bio-derived Carbon and Nanoclay as Flame Retardants for Poly(butylene terephthalate) Biocomposites
Boon Peng Chang¹, Suman Thakur¹, Amar K. Mohanty¹,², Manjusri Misra¹,²
¹Bioproducts Discovery and Development Centre, Department of Plant Agriculture,
²School of Engineering, University of Guelph, Canada.

M. Dey, C. Matzke, F. Al-Anazi, S. Ghosh, M. Fuka, and S. Gupta, Department of Mechanical Engineering, University of North Dakota

20. A Cyclobutane-Containing Diacid Building Block Synthesized \textit{via} ECO-UV
Micah Mabin, Zhihan Wang, and Qianli R. Chu
Department of Chemistry, University of North Dakota
21. Pharmaceutical Polymers from Biobased Resources: Designing Drug Delivery systems and Multifunctional Biomaterials from Soybean Oil Fatty Acids
   Ruvimbo Chitemere, Dean C. Webster, Mohiuddin Quadir, Department of Coatings and Polymeric Materials, North Dakota State University

22. Comparison of Bamboo vs Glass Fiber as Composite Reinforcement
   Niyati Shah, Joseph Fehrenbach, Chad Ulven, Mechanical Engineering Department, North Dakota State University

23. Electron Paramagnetic Resonance Study of Invertible Polymer Micelles and Peptides (“Host-Guest”) Interactions in Aqueous Medium
   Oksana Zholobko¹, Yanxiong Pan², Zhongyu Yang², Andriy Voronov¹ ¹Coatings and Polymeric Materials Department, ²Chemistry and Biochemistry Department, North Dakota State University

24. High Oleic Soybean Oil as a Plasticizer for Recycled Crumb Rubber
   Olena Shafranska, Ryan Burgett, Lyndsi Vanderwal, Dean Webster, Department of Coatings and Polymeric Materials, North Dakota State University
25. Synthesis of Acrylated and Methacrylated Resins from Epoxidized Sucrose Soyate
Dean Webster, Raul Setien, Department of Coatings and Polymeric Materials, North Dakota State University

26. Wheat Bran Fibers Reinforced Thermoplastic Composite
Romello Hicks¹, Chad Ulven², and Khwaja Hossain¹ ¹Mayville State University, Mayville, ND; Mechanical Engineering Department, ²North Dakota State University

27. Wettability Study of MAX-Polymer (MAXPOL) Multifunctional Composites
S. Javaid, M. Dey, S. Ghosh, K. Hall, B. Bednarek, and S. Gupta. Department of Mechanical Engineering, University of North Dakota

28. Comprehensive Characterization of Lignin Molecular Weight Fractions
Reagen, S.; Andrianova, A; Lu, S.; Kozliak, E.; Kubátová, A. University of North Dakota

29. Kenaf (Hibiscus cannabinus L.) Potential as a Material for Renewable Uses
Dulan Samarappuli, M.T. Berti, A. Peterson, Sergio Cabello, B. Andersen, A.Wittenberg, and S. Podder, Department of Plant Sciences, North Dakota State University
30. Nanocellulose Gel based Dyeing of Cotton/Polyester Blended Fabrics
Smriti Rai, Suraj Sharma, Sergiy Minko
Department of Textile, Merchandising, and Interiors, University of Georgia

31. Potential uses of Flax Fibers in Various Applications
Swarda Radkar, Chad Ulven, Mechanical Engineering Department, North Dakota State University

32. (Mini)emulsion Copolymerization of Plant Oil-Based Monomers with Methyl Methacrylate
Vasylyna Kirianchuk¹, Zoriana Demchuk², Kyle Kingsley², Stanislav Voronov¹, Andriy Voronov²
¹Organic Chemistry, Lviv Polytechnic National University, Lviv, Ukraine; ²Department of Coatings and Polymeric Materials, North Dakota State University

33. FTIR Analysis of Osteosarcoma Cells Treated by Invertible Micellar Polymer Nanoassemblies
Vitalii Serdiuk¹, ², Andriy Voronov², Michael Yaszemski³ and Avudaiappan Maran³
¹Department of Organic Chemistry, Lviv Polytechnic National University, Lviv, Ukraine
²Department of Coatings and Polymeric Materials, North Dakota State University,
³Department of Orthopedics, Mayo Clinic, Rochester, MN
34. Synthesis of Semi-Rigid Diacid Building Blocks from Renewables by Photoreaction
Zhihan Wang¹, Zijun D. Wang¹, Quintin Elliott¹, Micah Mabin¹, Rahul K. Shahni¹, Houssein Amjaour¹, Angel Ugrinov², and Qianli R. Chu¹,*
¹Department of Chemistry, University of North Dakota ²Department of Chemistry and Biochemistry, North Dakota State University

35. Plant Oil-Based Latexes with High Biobased Content Synthesized in Miniemulsion Polymerization
Zoriana Demchuk¹, Oleh Shevchuk², Vasylyna Kirianchuk², Stanislav Voronov², Andriy Voronov¹
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