The Fibril Angle

The Newsletter of the Cellulose and Renewable Materials Division

Fall 2020 Edition

Letter from the Chair

Division Chair: Gordon Selling

Greetings to you. I hope you are all bearing up as well as you can during these difficult times. I am truly sorry if this pandemic has impacted you and your family in a fashion which is not easily surmounted.

As many of you are aware, this disease has impacted the ACS in a large way. The 2020 Spring meeting was cancelled, and the fall meeting has been dramatically altered. Our Division Programming leaders (Wim and Glen), and one of our Members at Large (Silvia) led efforts to put on the Division's first "Live" online ACS CELL Division meeting. This two day event was well attended, and the speakers did a great job in presenting their research to the world. I look forward future similar events.

You will soon be getting ballots for voting in the next group of CELL leadership. I give a thanks to all of our current leaders and those willing to run for those positions which need to be filled. I wish to also thank those who volunteered to serve in the CELL non-elected positions. When you get a call from a CELL nominating official, please strongly consider answering with a hearty 'YES I want to help'. In order for CELL to continue to be the global leader in providing a venue to deliver the latest research, your help is needed.

We all look forward to returning to some type of normalcy, and perhaps we have to alter our definition of normalcy. I hope that we are all healthy, and that I can see you next spring in San Antonio.

What does CELL Division provide its Members?

- An avenue to present your research and network with possible collaborators. CELL organizes and sponsors programming at ACS National Meetings and Exposition, including special symposia, award symposia, and poster sessions. On occasion, we participate in joint symposia with other divisions, including recent and popular joint symposia with CARB, POLY, PMSE. Please continue to submit abstracts for ACS CELL programming!
- Organize and sponsor symposia at international meetings dedicated to cellulose and renewable materials, such as the International Cellulose Conference (ICC) in Japan, International Carbohydrate Symposia, EPNOE (European Polysaccharide Network of Excellence), etc.;
- Support other ACS symposia relevant to cellulose chemistry and glycosciences, including the ACS Division of Professional Relations, ACS Undergraduate Chemistry Students, ACS Regional Meetings, etc.;
- Provide opportunities for early career researchers, and undergraduate chemists, for example, travel awards and poster awards;
- Organize and support award programs, including the Anselme Payen Award, the KINGFA award, the Division Fellow Award, Graduate Student Award, Poster Awards, Student Travel Award. With the ACS Sustainable Chemistry and Engineering journal we jointly award lectureships at our Spring Meeting.

2020 CELL Division Officials

Chair: Gordon Selling

Chair-Elect: Scott Renneckar

Immediate Past Chair: Stephen Eichhorn

Secretary: Tatiana Budtova

Treasurer: World Nieh

Councilors: Sheila Murphy, Lucian Lucia & Kevin Edgar

Alternate Councilors: Orlando Rojas, Noureddine Abidi & Nicole Labbe

Members-at-Large: Ulrica Edlund, Casey Elkins & Silvia Vignollini

Program Chair: Glenn Larkin

Vice Program Chair: Falk Liebner

Awards Chair: Alexander Bismarck

Membership Chair: Michael Bortner

Events Chair: Maria Auad

Publicity Chair: Koon-Yang Lee

2020 Anselme Payen Award

The 2020 Anselme Payen Award winner is Dr Run-Cang Sun, a distinguished Professor and the director of the Center for Lignocellulose Chemistry and Biomaterials, Dalian Polytechnic University, Dalian, China. Dr Sun will be presented with the award at the ACS Cellulose and Renewable Materials Division Awards Banquet following a symposium in his honour during the 2021 ACS Spring National Meeting in San Antonio, TX.

Dr Sun has made outstanding contributions to efficient fractionation and high-value utilization of lignocellulosic materials for production of sustainable biofuels and biomaterials. Several of his novel techniques have been successfully applied at industrial scale. His major scientific achievements include:

- Clarification of the cell wall complexes in lignocellulose, and the distribution of lignin, hemicelluloses, and cellulose in the cell walls;
- Isolation of hydroxycinnamic acids from plant cell walls and determined the linkages between hydroxycinnamic acids and lignin or hemicelluloses;
- Development of a two-step method for the isolation of lignin free of hemicelluloses, as well as elucidated the structural features of the lignins and the linkages between lignin and hemicelluloses;
- Homogeneous modification of hemicelluloses to produce novel biomaterials, such as intelligent hydrogels for drug delivery, nanostructrued pDNA carries and degradable films for food packaging;
- Degradation of cellulose in ionic liquids, as well as development of functional biomaterials based on cellulose;
- Environmentally friendly fractionation of the cell wall components into cellulose, hemicelluloses and lignin, and their subsequent conversion into biofuels, biomaterials, and biochemicals at industrial scale.

Dr Sun currently holds 119 Chinese National patents on the conversion of lignocelluloses into biomaterials and biofuels, published 835 peer-reviewed articles and 35 book/book chapters, with more than 36,000 citations. He is a Co-Editor-in-Chief of Industrial Crops and Products, Associate Editor of Carbohydrate Polymers and Journal of Biobased Materials and Bioenergy, and a member of editorial board in ChemSusChem, Journal of Agricultural and Food Chemistry, Cellulose Chemistry and Technology, BioResources, Bioresources and Bioprocessing, etc.

Division News

In place of the cancelled 2020 ACS Spring National Meeting in Philadelphia, the CELL Division ran a successful "live" online CELL Division meeting - "New Horizons: Early Career Researchers in Renewable Materials" to share some of the exciting research in the area of cellulose and renewable materials to our division members. This two-day "Live and Online" Division meeting was held remotely on YouTube Live Stream on the 22nd and 23rd April 2020. The event attracted over 100 virtual attendees. Many thanks to Silvia Vignolini and Wim Thielemanns for organising this event!

On day 1 of the meeting, we had the following presentations:

Title of the presentation	**Presenter**
Approaches to Polysaccharide-Based Block Co-polymers	Kevin Edgar
New one-pot sulfonyl-modification of cellulose nanocrystal	Reeta Salminen
Cellulose building blocks design for scattering engineering	Han Yang
Nanocellulose and 2D Conductors: Interactions and Forces Studied by Colloidal Probe Atomic Force Microscopy	Michael Reid
High precision 3-D printing of nanocellulose into super strong yet flexible structure	Feng Jiang
Towards Sustainable and Renewable Carbon Products: A Comprehensive Analytical and Statistical Study of Graphitization in Lignin Carbon	Valerie García-Negrón
Pickering emulsions as synthetic tool for nanocellulose modification	Katja Heise
Twist geometry of nanocelluloses probed by electron microdiffraction	Yu Ogawa

And on day 2 of the meeting, we had an exciting line up of:

Title of the presentation	**Presenter**
Optical consequences of distortions in cellulose nanocrystal films	Bruno Frka-Petesic
Emerging Cellulose Science and Engineering towards Energy, Water and Sustainability	Tian Li
Substrate interactions as a handle to control long-range order in micro- and macrostructures formed from cellulose nanocrystals	Blaise L. Tardy
Saccharide Autofluorescence: Its Origins and Applications	Marcus Johns
Hyper-production of Cellulase based Macromolecules by Escherichia coli engineered with UV & EMS mutated cellulase gene from Aspergillus niger for Industrial Applications	Qurat-ul-ain Daud
Understanding the structural diversity in chitin as a versatile biomaterial	Ahu Dumanli
Modifying materials using rod shaped fillers	Johan Foster

Meeting-at-a-glance: Symposia of CELL Division at the 2020 ACS Fall National Meeting & Exposition

This year's Fall ACS National Meeting will be held remotely, for the first time, between August 17th - 20th 2020. The symposia ran by the CELL Division will comprise of 52 presentations. The full schedule of the symposia organised by CELL Division can be found on the ACS Fall National Meeting & Exposition website.

Abstract number	Title of the presentation
CELL 1	Combining plant-derived polymers and silicones in sustainable commercial products
CELL 2	Diversifying biochar applications towards the implementation of a circular economy
CELL 3	New paradigm for manufacturing high strength-high softness (HS)2 tissue paper and towels products
CELL 4	Electro-conversion of renewables originating from trees to highly value-added products
CELL 7	High-throughput method for lignin and its decomposition & processing products characterization using thermal carbon analysis and electrospray mass spectrometry
CELL 8	Unraveling fast pyrolysis of lignin: Mechanistic studies using model compounds
CELL 9	Effect of ash on enzymatic hydrolysis of paper sludge to produce sugars
CELL 10	Electron paramagnetic resonance analysis of moist heat-treated wood
CELL 11	Unveiling biopolymer modification in stored corn stover using analytical pyrolysis coupled with multidimensional gas chromatography mass spectrometry
CELL 12	Analyses of the valley of death
CELL 13	Manufacturing USA®, bridging the missing middle
CELL 14	Taking Hemp Innovation from Bench to Market
CELL 15	Investing in the Future – Angel Investing, STEM Research and YOU
CELL 16	Supporting bioproducts industry growth with a system dynamics decision-support tool
CELL 17	Solving bottlenecks of modern biorefineries
CELL 18	Intellectual Property Considerations – From Bench to Market
CELL 19	Translating real world results into a two-dimensional page: Demystifying patent law
CELL 21	Ionic complexes of nanochitin and nanocellulose
CELL 22	Multiscale modeling of the fluorescent zinc phthalocyanine-cellulose nanocrystal conjugates: Towards highly functional CNCs
CELL 23	Enabling continuous processing of mechanically fibrillated cellulose nanofibril (CNF) sheets through single-screw extrusion
CELL 24	Dynamic nanocellulose networks for thermoset-like yet recyclable plastics with a high melt stiffness and creep resistance
CELL 25	Catalytic surface engineering of cellulose and nanocelluloses
CELL 26	Surface modification of spray dried cellulose nanofiber in supercritical CO2
CELL 27	Elucidation of chemical reactivity of cellulose nanofibrils with varyingdDegree of fibrillation for barrier properties application
CELL 28	Bioinspired lignocellulose matrices for tunable sorption and release- from sustainable agriculture to environment remediation
CELL 29	UV-assisted additive manufactoring of lignocellulosic nanomaterials
CELL 30	Preparation of masterbatch for 3D printing filament with lignin-containing microfibrillated cellulose and poly(lactic acid)

Meeting-at-a-glance: Symposia of CELL Division at the 2020 ACS Fall National Meeting & Exposition

Abstract number	Title of the presentation
CELL 31	Highly efficient, stable, and renewable cellulosic composite film for lithium ion extraction from seawater
CELL 32	Flexible, water resistant cellulose nanocrystal-polyvinyl alcohol nanocomposite films for humidity and acid vapor sensing applications
CELL 33	Production of valuable biopolymer precursors from fructose without 5-hydroxymethylfurfural isolation
CELL 34	Development of electrochemical strategies for lignin valorization
CELL 35	Optimization of sequential periodate/chlorite oxidation to C2,C3 dialdehyde/dicarboxylate nanocelluloses from rice straw
CELL 36	Mechanochemical action of PFI mill refiner on cellulose fibers for controlled production of cellulose nanofibrils
CELL 37	Graft copolymerization to synthesis lignin-based polyesters
CELL 38	Selective radical depolymerization of cellulose to glucose induced by high frequency ultrasound
CELL 40	Tunable Boc modification of lignin and its impact on microbial degradation rate
CELL 41	Preparing boreal peat carbon sorbents for aqueous p-nitrophenol adsorption: Equilibrium and kinetic studies
CELL 42	Wood-mimic biocomposites from micro- and nanocellulose and biobased polyesters
CELL 43	Structural characterization and properties of high strength CMC-Eu/PVA composite hydrogels with fluorescent behavior
CELL 44	Understanding the structural, thermal and morphological properties of cellulose-keratin biocomposites
CELL 45	Characterization of silk/cellulose biocomposites infused with rGO
CELL 46	3D printable cellulose nanofiber hydrogel
CELL 47	Efficient fabrication of spherical bacterial cellulose hydrogel by direct ink writing
CELL 48	Highly marine-degradable, water-soluble packaging films
CELL 49	PCL aminolysis via reactive melt processing as sustainable self-compatibilization strategy for lignocellulose biocomposites
CELL 50	Cellulose sulfate nanofibers for ammonium removal and water purification applications
CELL 51	Characteristics of CNF film fabricated by controlling of hydrogen bondings during formation
CELL 52	Characteristics of porous materials fabricated by surface modification of ligno-nanocellulose
CELL 53	Nanocellulose derived soft material for efficient removal of hazardous fluoride from drinking water
CELL 54	Structure properties relationships of nitro-oxidized carboxycellulose nanofibers
CELL 55	Characterization of lytic polysaccharide monooxygenase mediated cellulose from underutilized biomass
CELL 56	Cellulose nanocrystal films - Effect of electrolytes and lignin on optical and mechanical properties