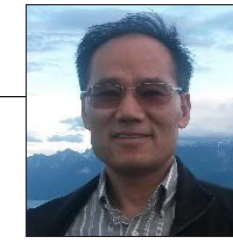
Editorial



J.Y. ZHU
TAPPI Journal
Editorial Board

TAPPI's 2022 Nanotechnology Conference convenes in Finland

TAPPI's International Conference on Nanotechnology for Renewable Materials was finally held in person this past June 13-17 in Helsinki, and more than 200 attendees gathered to participate in the 36-session program. A total of 24 countries were represented at the event and more than one-third of attendees were first-time participants.

I personally enjoyed the conference very much in terms of the venue, technical content, and other activities. I had a great time thanks to the technical program committee, local organizing committee, and of course the excellent support from our great TAPPI staff. I heard similar comments from many attendees. In this column, I'd like to review some highlights from the event.

There were more than 200 attendees at TAPPI's International Conference on Nanotechnology for Renewable Materials that was held June 13-17 in Helsinki.

VTT/ Aalto University tour

The Monday, June 13, tour of VTT and Aalto University was outstanding. We visited the new VTT facility (away from their Otaniemi main campus, Espoo) dedicated to biomass utilization, specifically for producing textile fibers, cellulose nanomaterials, and biofuels. The facility is newly established, especially their scale-up cellulose nanofibers (CNF) production facility. VTT is now able to accomplish two things: (1) high solids (30%) CNF (most likely microfibrillated cellulose [MFC]) production using high solids endoglucanase treatment of bleached pulp fibers, and (2) continuous MFC film production. The work is very impressive. I had the opportunity to discuss in detail with their CNF production manager, Panu Lahtinen, about potential collaboration in producing lignin containing CNF, as I have known him for several years since the last TAPPI nanotechnology conference in Helsinki.

We then visited Aalto University (originally called HUT or TKK) for lunch. This was my first visit since I left Aalto in 2016 for my Fulbright program. There have been many changes at Aalto. First of all, the Metro is completed and operational, and it is very convenient to get to Aalto from downtown Helsinki. The new School of Art, Design, and Architecture has finally moved into a new building on the Otaniemi campus (next to the Metro). The new building was designed by Aino and Alvar Aalto themselves. Also, renovation of the Dipoli Event and Conference Facilities is now complete. There is still a lot of construction going on within the campus, and there are many more new buildings next to the campus for housing startup companies. After lunch, we visited the textile lab at the School of

Art, Design, and Architecture. To see how different pattens were made in weaving machines was really fascinating. I have not seen this type of machine since the one my mom used when I was a child.

We also quickly visited the ion cell pilot plant in the Department of Bioproducts and Biosystems, which had been renovated after I left in 2016. The Ioncell process was developed by retired Professor Herbert Sixta, the host of my Fulbright program at Aalto. The process uses ionic liquid developed by Professor Ilkka Kilpeläinen at the University of Helsinki to solubilize cellulose for production of textile fibers. The ionic liquid is very robust and can solubilize thermomechanical pulp (TMP) and old newspapers without delignification. The spun fibers have excellent properties. Professors Sixta and Kilpeläinen were selected as the winner of the 2022 Marcus Wallenberg Award for this work.

Conference sessions

The International Conference on Nanotechnology for Renewable Materials had three parallel tracks, and all were well attended. As a matter of fact, two session rooms were a bit smaller and were always crowded. My session attendances were mainly in cellulose nanomaterials (CNM) production and utilization for papermaking. I found that there have been significant advances in these areas. Below are specific observations:

- There were several papers on ***high solids CNF (or MFC) production through enzymatic treatment*** from VTT, the University of British Columbia, and others. I believe that high solids production can remove one major barrier for CNF transportation and application in composites.
- It appears ***barrier coating using MFC*** has made its way into commercial products. Marc Foulger of Valmet presented their newly designed surface coating applicator for installation on a commercial paper machine.
- Empa presented that ***coating fruits with CNF*** significantly improves their freshness, especially bananas. This is a very interesting application for CNM. A similar application was presented by Washington State University to use CNF coating for preventing on-tree damage from frost/freezing.
- The ***student rapid fire session*** was really fired up. Each student was given 5 minutes (including Q&A) to summarize their poster. I really enjoyed this session and chose certain posters to visit for specific questions afterwards.
- The ***plenary sessions*** by special guests were well attended.
- The food and drinks provided for breaks and lunches were very good for networking, and the conference banquet was outstanding, with dancing after the awards ceremony.

According to TAPPI, the most attended presentations included:

- Session 2: Paper & Packaging — "Cellulose-based biofoam for temperature-controlled packaging" — ***Xiao Zhang, Washington State University***
- Session 5: Paper & Packaging — "Cellulose nanofiber coatings for food packaging applications" — ***Gilberto Siqueira, Empa***
- Session 20: Renewable Production — "Methods to produce dry nanoscale cellulose nanocrystal powders: Challenges and opportunities" — ***Douglas Gardner, University of Maine***

Upcoming nano activities

On Tuesday, June 28, from 9:00 am to 10:00 am (ET), TAPPI will host a free webinar on "*Cellulose nanocrystals in cementitious systems – Pilot and commercial scale*" from Sean McAlpine. McAlpine is chief technical officer for Blue Goose Biorefineries Inc., a manufacturer of cellulose nanocrystals. He will discuss what improvements the addition of cellulose nanocrystals (CNC) to cementitious systems have made on a number of fresh and hardened properties.

Previous work has reported benefits from CNC use in cementitious systems that include improved strength, viscosity, and barrier properties. These improvements can provide fundamental improvements in the performance of concrete structures, while decreasing their carbon footprint. **TJ**

J.Y. Zhu is a member of the TAPPI Journal *Editorial Board and is research general engineer at the USDA Forest Products Laboratory in Madison, WI, USA.*