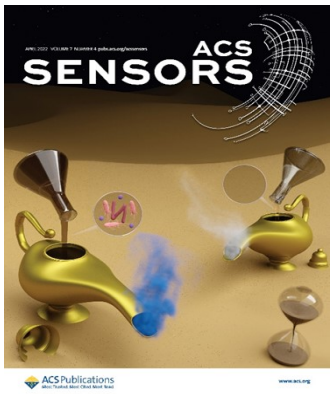
BioPRIA NEWSLETTER

July 2022

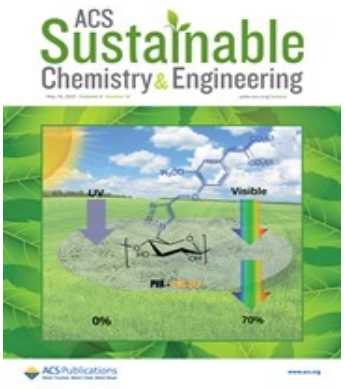
Cover Feature

Our published article on visual biosensor for the detection of Gram-positive and –negative bacteria in water samples has been chosen as the cover feature in ACS Sensor journal. The work by Naseri et al. demonstrates that the biosensor generates a blue signal when the water is contaminated and becomes colorless in the absence of bacteria. The link to the article is here.



Rapid Detection of Gram-Positive and –Negative Bacteria in Water Samples Using Mannan-Binding Lectin-Based Visual Biosensor (ACS Sensors Vol 7, Issue 4, 2022)

Research by Mendoza et al. has been featured on the cover journal of ACS Sustainable Chemistry & Engineering. The study highlights the incorporation of nature-inspired phenolic ester-grafted cellulose nanocrystals in polyvinyl alcohol to engineer performant UV-blocking polymer films. The link to the article is here.



Phenolic Ester-Decorated Cellulose Nanocrystals as UV-Absorbing Nanoreinforcements in Polyvinyl Alcohol Films (ACS Sustainable Chemistry & Engineering Vol 9, Issue 18, 2021)

Distinguished Seminar by Prof. Florent Allais

Last month, BioPRIA hosted a Distinguished seminar on "**Combining green chemistry, biotechnologies and downstream process to upscale biomass and by-products"**, by Professor Florent Allais from the URD ABI-AgroParis Tech in France. The seminar ran in a hybrid mode, with in-person meetings and live-streamed online. There were approximately 54 attendees from Monash students and staff, as well as from the industry representatives.

At this seminar, Professor Allais showed some examples on how lignocellulosic biomass can be efficiently transformed into the production of high value-added products such as: flavors, antioxidants, UV filters, monomers and polymers, by combining biotechnology, green chemistry and process engineering.

Photo captions (Left to right): The Q&A session after the seminar; Attendees at the distinguished seminar; Prof. Florent Allais (at the centre) together with Prof. Gil Garnier and Prof. Mark Banaszak Holl.

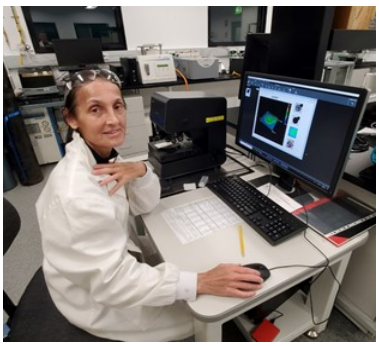
Visiting Researcher - Sheila Bhatt (University of Cambridge, UK)

Here's what Sheila had to say about her visit at BioPRIA.

As part of an ongoing collaboration between the BP Institute colloidal research group led by Professor Alex Routh's group at the University of Cambridge and the BioPRIA research group at Monash University, an invitation was extended to me by Professor Gil Garnier for an initial visit to work in their blood-research lab. I am investigating the drying of blood droplets, looking at the time evolution of structure driven by evaporation.

I was welcomed by a wonderful, enthusiastic young group for my 2-months visit, who went out of their way to help me. My programme of work was a little ambitious for such a short visit, so I am doubly grateful to Professor Garnier who helped expedite my lab access and training. Professor Garnier personally encouraged me to take advantage of access to the advanced laser-profilometer for my measurements of blood droplet residue shapes resulting from evaporation. Together with my own equipment, this allowed me to collect a large body of data, which it will take me some time to process and analyse!

I was delighted to be able to host the group for a meal before I left, and surprised by the lovely gifts they bought me! I shall treasure them, along with the many friendships I made at BioPRIA. We in Cambridge are hugely excited to be working with BioPRIA, and I hope to see you all again soon!



Congratulations to our PhD Graduates

We were delighted to celebrate the achievement of Dr. Ruth Barajas Ledesma who had completed her PhD in 2021 and is now able to attend the graduation ceremony in person. Ruth's thesis was entitled "Engineered nanocellulose superabsorbents for application in agricultural soils". Her supervisors were Prof. Gil Garnier and Prof. Antonio Patti and A/Prof. Vanessa Wong.

We also extend our congratulations to the following who have recently completed their PhDs:

- Dr. Mostafa Dehghani, "Photocatalytic degradation of persistent organic pollutants in water using ZnO/CNF catalyst". Supervisors: A/Prof. Warren Batchelor and Prof. Mark M Banaszak Holl.

- Dr Simin Miri, "Development of modified cellulose nanofiber wastewater treatment membranes for combined ultrafiltration". Supervisors: A/Prof. Warren Batchelor, Prof. Philip Andrews.

- Dr. David Mendoza, "Engineering nanocellulose chemical functionalization for applications". Supervisors: Prof. Gil Garnier and Prof. George Simon.

- Dr. Mahdi Naseri, "Point-of-test biosensor for the detection of waterborne bacteria". Supervisors: A/Prof. Warren Batchelor and Prof. George Simon.

- Dr. Maisha Maliha, "Applications of organobismuth-nanocellulose composites as antimicrobial materials". Supervisors: A/Prof. Warren Batchelor, Prof. Phil Andrews and Melissa Werrett.

- Dr. Laila Hossain, "Engineering sustainable nanocellulose superabsorbent: characterization and applications". Supervisors: Prof. Gil Garnier and Dr. Joanne Tanner.

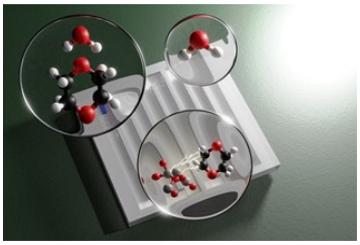
- Dr. Wriju Kargupta, " Energy efficient production of nanocellulose". Supervisors: Prof. Gil Garnier and Dr. Joane Tanner.

- Dr. Humayun Nadeem, "Advances in spray deposited nanocellulose films". Supervisors: A/Prof. Warren Batchelor and Prof. Gil Garnier.

Latest Publications

A selection of research articles from the BioPRIA team:

1. Nadeem, H., Athar, M., Dehghani, M., Garnier, G., Batchelor, W. (2022). **Recent advancements, trends, fundamental challenges and opportunities in spray deposited cellulose nanofibril films for packaging applications**. Science of the Total Environment 836, 155654. DOI: 10.1016/j.scitotenv.2022.155654.



2. Dehghani, M., Naseri, M., Nadeem, H., Banaszak Holl, M. M. and Batchelor, W. (2022). **Photocatalytic Degradation of 1,4-Dioxane and Malachite Green over Zinc Oxide/ Cellulose Nanofiber Using UVA/B from Direct Sunlight and a Continuous Flow Reactor**. ACS ES&T Water 2(5): 786-797. DOI: 10.1021/acsestwater.1c00484.

Farewell to Colleague

Last month we said goodbye to Ms. Janette Anthony, who for the past 16 years, has been very much the public face of BioPRIA whilst managing reception. To staff, students and visitors, Janette was the "go-to" person for all manner of enquiries, from room bookings to equipment requests. She looked after the day-to-day operations of BioPRIA and oversaw the project management of the PALS Hub.

Janette was known for her warmth. Her humour and energy were infections to others. She loves to bake and would often bring cakes and sweets to share with all of us.

Having moved to a similar position at the Department of Chemical and Biological Engineering, we wish Janette all the very best :)

Welcome!

BioPRIA is thrilled to have Ms. Nancy Hawe joining our team. Nancy brings with her a wealth of experience in administration, having previously worked in different Engineering Departments at Monash University. In her current role as EA, Nancy will coordinate and support Professor Gil Garnier in meeting his range of professional responsibilities.

We also welcome two new PhD students at BioPRIA: Yasuaki Inoue and Sara Barricella. Yasuaki will be working under the supervision of A/Prof. Warren Bastchelor and Dr. Leonie van't Hag. His research focuses on developing novel packaging materials comprising nanocellulose and lignin. While Sara will work at designing enzymatic *tandem* reactions in nanofiltration/ ultrafiltration membranes for the production of valuable chemicals, under the supervision of Prof. Gil Garnier and A/Prof. Victoria Haritos.

Upcoming Events

PALS Review Meeting—27 July 2022.
Further information will be sent closer to date.

2022 Fibre Value Chain Conference - FVCCON22
THE ERA OF TRANSFORMATIONAL CHANGE
Commencing 20 July 2022—Nine special events over 6 months.
Further details can be found here.

2022 New Speaker Competition - **Registration closes 24 Aug 2022, APPLY NOW**
To learn more about New Speaker Competition, click here.

Advances in Pulp and Paper Research Symposium— REGISTER NOW
Jesus College, University of Cambridge, 28th Aug—1st Sept 2022

Chemeca 2022: Greener, Safer, Cleaner—Chemical Engineering for the Next Century
Melbourne Convention and Exhibition Centre, 25th –27th Sept 2022