

BioPRIA NEWSLETTER

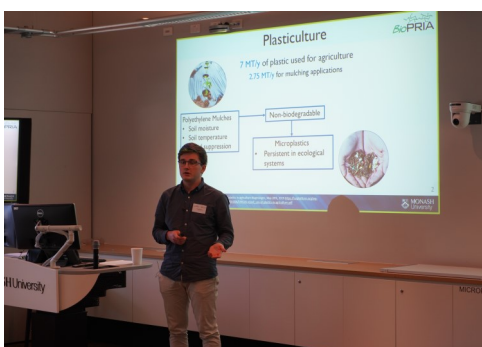
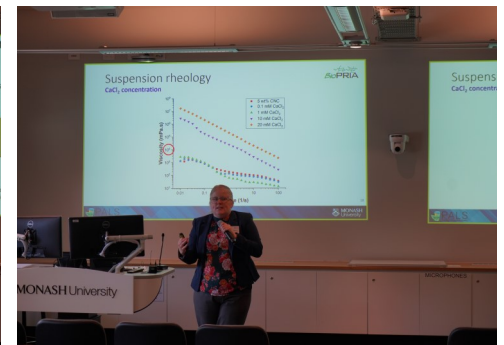
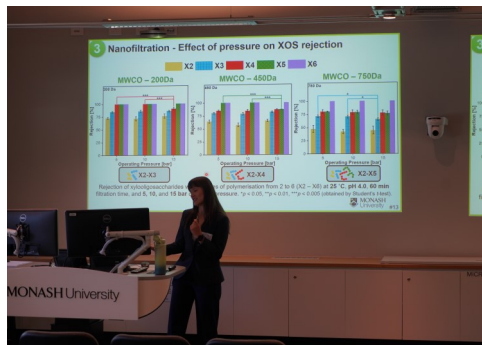
December 2023

The second half of this year has been a very busy and rewarding time at BioPRIA. We hosted numerous seminars, visitors, workshops, new students commencing and conferences attended by both staff and students.

Please enjoy our newsletter. Wishing you and your families a wonderful and safe holiday break- best wishes for 2024!!

BioPRIA Final PALS Review Presentations Symposium

On the 15th August 2023, BioPRIA hosted its Final PALS Review Presentations at New Horizons, Clayton Campus. The event was a great success featuring nine exciting talks from BioPRIA PhD candidates and researchers. The presentations covered the strategic science and engineering required to develop high value chemicals and materials from Australian Biomass for a variety of applications.



Conference News



First International STIMULUS Conference Smart Antimicrobial & Sensing Materials

Gil was an invited Plenary speaker at this conference in September held in Darmstadt (Germany).

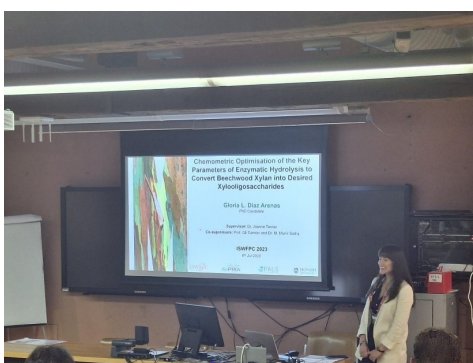
This two day conference hosted over 15 international speakers in both academia and industry. The STIMULUS project aims to discuss and connect research, medicine and industry towards new wound care concepts.

Gil delivered a presentation on “Engineering Paper Diagnostics for Sustainable Bio-Medical Applications”.

Conferences Highlights

PhD PALS student, **Gloria Diaz Arenas** had the privilege of participating in the **21st International Symposium on Wood, Fiber, and Pulping Chemistry (ISWFPC2023)** held in Venice, Italy, where she presented her research on the production and separation of functional oligomers derived from hemicellulose. This conference offered an outstanding platform for engaging with leading researchers in the field and receiving valuable feedback.

Gloria also had the opportunity to be hosted by Prof. Florent Allais at URD ABI - AgroParisTech /European Center for Biotechnology and Bioeconomy in Pomacle, France. During her visit, she collaborated with Dr. Marie E. Vuillemin on investigating potential causes of membrane fouling during nanofiltration of steam explosion liquors for the recovery of valuable compounds.



Dr. David Mendoza represented BioPRIA in this year's **American Chemical Society (ACS) Fall Conference** held in San Francisco, California on August 13-17th, 2023. The ACS Fall Conference is one of the biggest conferences in the world where thousands of chemists and other professionals gather to share advanced scientific knowledge in chemistry and relevant fields. David presented two oral presentations in the Division of Cellulose and Renewable Materials of ACS:

"Click chemistry meets nanocellulose: Grafting biobased phenolic esters on cellulose nanocrystals for anti-UV applications"- a collaborative project between BioPRIA and Prof Florent Allais and Dr. Louis Mouterde of AgroParisTech URD-ABI.

"Silver-promoted decarboxylative polymerization: A green and versatile approach to graft polymers from nanocellulose" – a pioneering research with Dr. Joel Hooper and Dr. Meri Ayurini of the School of Chemistry.



In July, PhD PALS student **Craig Stocker** attended the **International Symposium on Wood Fibre and Pulping Chemistry (ISWFPC) in Venice, Italy** and the **CLOCKS Circular Economy summer school in Padua, Italy**. Here are a few words from Craig:

In the conference, I was fortunate to present my work on improving the viability of cellulose nanofibers for agriculture applications by controlling the lignin content to some of the top researches in the area of wood valorisation. The platform to share new ideas and gain feedback on my research was invaluable. Throughout the conference there were many opportunities for networking and discussing ideas, with numerous coffees and croissants shared. It was an honour to be able to connect and engage with the top researchers in the world for wood and fibre utilisation.

The circular economy summer school was a five-day workshop, with 32 hours of lectures and a hackathon where we conceptualised and designed a new process to valorise food waste from Barilla. Throughout this time I developed new friendships and learned much about the European Unions' advances in circular economy.



Joint-Collaboration with the Pulp and Paper Centre at the University of British Columbia



PhD PALS student **Hans Cainglet** visited the Pulp and Paper Centre at the University of British Columbia (Canada) from September to October 2023. He worked alongside Prof. Mark Martinez, investigating the internal structure of cellulose nanofibre films using their micro-CT scanner. Together they are improving our current and fundamental understanding of the way cellulose fibres bind during the papermaking process.

Two Day Visit by Assoc Prof Brenda Prager, The University of Mississippi

We had the privilege of Assoc Prof Brenda Prager spending two days with us at BioPRIA. Here is what Brenda wrote about her visit to BioPRIA:

“On Thursday and Friday, 16th and 17th of November, I visited BioPria and Chemical & Biological Engineering at Monash University, as part of my sabbatical from the University of Mississippi, Chemical Engineering Department, USA. My research in the USA focuses on two main areas: paper packaging for food-based applications and soil remediation methods, where the connection between the two areas is the fundamental science of surfaces and interfaces, and fluid flow over porous materials.

It was wonderful to reconnect with this vibrant, intelligent, and caring group of people after 17 years when I was employed at APPI (as it was previously known) as a Research Fellow. Both days were well organized and ran seamlessly, allowing me to have some amazing research discussions and information sharing with many of the BioPria people: Gil Garnier and Warren Batchelor; BioPria and other engineering PhD students; Research Fellows Vikram, Christine, Rahul; and Sasha from Varden. We explored many new ideas for future collaborative work, and demonstrated the immense benefit of having such visits. I was very impressed with the quality of the research being conducted at Biopria, and also the excellent work being done by all the PhD students – what a great team!

On the Friday I learned about some highly innovative teaching methods and labs from Joanne Tanner, as well as some educational-based research projects run by Nicoleta Maynard from the Chemical Engineering Department. I also had some fruitful and interesting discussions with the head of department, Sankar Bhattacharya, topped off by a lovely lunch at the Notting Hill Hotel!

Thank you to Nancy for organizing this visit, and thank you all for your hospitality and willingness to share and discuss your research with me. “



Latest Publications

R Sharma, KH Putera, MMB Holl, G Garnier, V Haritos **Modulating the hydrophobicity of cellulose by lipase-catalyzed transesterification.** International Journal of ..., 2023 - Elsevier DOI: [10.1016/j.ijbiomac.2023.127972](https://doi.org/10.1016/j.ijbiomac.2023.127972)

S Barricella, JM Fuertes, KH Putera, AE Quigley, V Haritos, BD Freeman, G Garnier **Spatially confined enzymatic tandem system with GOx and HRP compartmentalized in ultrafiltration membrane.** Journal of Membrane ..., 2023 - Elsevier DOI: [10.1016/j.memsci.2023.122214](https://doi.org/10.1016/j.memsci.2023.122214)

VS Raghuwanshi, DJ Mendoza, C Browne, M Ayurini, G Gervinskis, JF Hooper, J Mata, CM Wu, Gp Simon, G Garnier **Journal of Colloid and ...**, 2023 - Elsevier **Effect of temperature on the conformation and functionality of poly (N-isopropylacrylamide) (PNIPAM)-grafted nanocellulose hydrogels.** DOI: [10.1016/j.jcis.2023.08.152](https://doi.org/10.1016/j.jcis.2023.08.152)

R Sharma, K Putera, MM Banaszak Holl, G Garnier, V Haritos **Laccase and LPMO-Driven Biocatalysis Produces Surface Carboxylic Acids on Lignocellulose and Promotes Nanofiber Production** ACS Sustainable ..., 2023 - ACS Publications DOI: [10.1021/acssuschemeng.3c01599](https://doi.org/10.1021/acssuschemeng.3c01599)

C Browne, VS Raghuwanshi, G Garnier, W Batchelor **Modulating the chiral nematic structure of cellulose nanocrystal suspensions with electrolytes** Journal of Colloid and ..., 2023 - Elsevier DOI: [10.1016/j.jcis.2023.07.073](https://doi.org/10.1016/j.jcis.2023.07.073)

GL Diaz-Arenas, HQ Hoang, H Cainglet, MM Sadiq, G Garnier, J Tanner **Unlocking the Potential of Xylooligosaccharides: Nanofiltration for Efficient Fractionation of Hardwood Hydrolysates** DOI: [10.2139/ssrn.4484952](https://doi.org/10.2139/ssrn.4484952)

Vikram Singh Raghuwanshi ^a, Anil B. Vir ^{a b}, Maoqi Lin ^a, Gil Garnier **From transparent to structural white: Modulating nanoscale self-assembly in silica and nanocellulose composites** Colloids and Surfaces A ..., 2023 - Elsevier DOI: [10.1016/j.colsurfa.2023.131999](https://doi.org/10.1016/j.colsurfa.2023.131999)

Wriju Kargupta, Thomas Stevenson, Scot Sharman, Joanne Tanner, Warren Batchelor **Sustainable production of nanocellulose: Technoeconomic assessment, energy savings and scalability** Journal of Cleaner ..., 2023 - Elsevier DOI: [10.1016/j.jclepro.2023.138748](https://doi.org/10.1016/j.jclepro.2023.138748)

S Bürgmayr, J Tanner, W Batchelor, AF Hoadley **Evaporation of process water from recycled containerboard mills** TAPPI JOURNAL, 2023 - researchgate.net

Welcome to BioPRIA!

We are pleased to welcome three new PhD candidates, Vasanth Prasad, Zinia Anjunman Ara and Yang Yang to the BioPRIA team.

Vasanth will be researching upgrading paper industry waste through hydrothermal treatments for composite applications under supervisors Assoc Prof Warren Batchelor and Prof Sankar Bhattacharya on his project.

Zinia will be working on developing novel and efficient platforms for paper diagnostics for a variety of applications, under the supervision of Assoc Prof Warren Bachelor and Prof. Gil Garnier.

Yang's research project will focus on development of functional cellulose based composite membranes for water treatment with Assoc Prof Warren Batchelor and Prof Matt Hill as his supervisors.

Conferences of Interest

FVCCON23 – Appita Fibre Value Chain Conference, Melbourne, 23-24 November 2023

Would your company like to collaborate and discuss any research opportunities with us?

CONTACT BIOPRIA

Bioresource Processing Research Institute of Australia (BioPRIA)

Department of Chemical and Biological Engineering

15 Alliance Lane (Building 59), Clayton Campus

Monash University Victoria

Tel: (03) 9905 3456

Fax: (03) 99053413



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