BioProducts Institute

BIOPRODUCTS INSTITUTE

ANNUAL REPORT
2020-2021

THE UNIVERSITY OF BRITISH COLUMBIA

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UNLOCKING NATURE FOR A SUSTAINABLE FUTURE

MISSION

Bringing together state of the art research and resources in a unique innovative ecosystem, our aim is to unlock the power of nature to make a positive impact on all sectors from transportation to building to healthcare

> *The BioProducts Institute is changing the way our society collaborates with nature for a sustainable and renewable future*

MESSAGE FROM THE DIRECTOR

January in 2020 brought a new beginning as I relocated from Finland, after accepting my appointment at UBC as the Canada Excellence Research Chair in Forest Bioproducts. In this role, one of my missions is to deliver next-generation materials from renewable, forest-based resources. Sustainable and cost-competitive advanced materials are key for the success of the bioeconomy and the reinvention of the Canadian forest and agriculture industries. For this purpose, and as the new Director of the BioProducts Institute and the Pulp and Paper Centre, my immediate attention is focused on people. Faculty members, researchers, collaborating researchers and supporting staff are all key contributors of the BPI mission.

Our research teams work to uncover solutions provided by nature to fulfill our material needs. The resources we find around us, including wood, agricultural by-products and marine residues are the core of our research and primed for society's sustainable use. Some of our work deals with small objects (colloids), including fibres and particles. Forest products continue to be central in our efforts and collaborations with industry. Work driving the adoption of nanomaterials and enabling nanotechnologies will also continue.

Related efforts take advantage of the inherent ability of biomolecules to assemble into fibres and other highly hierarchical and multidimensional structures. Lignin, cellulose nanoparticles and the possibility of controlling their assembly in hydrogels, aerogels, foams and emulsions are the subjects of current interest in our quest to develop functional properties offering promise in future applications.

Some examples relate to passive and active components in advanced functional materials that will expand the use of plant fibres.

The present and the future carry much promise. Our responsibilities are directed to the fulfillment of that promise.

Orlando Rojas
Canada Excellence Research Chair in Bioproducts
Scientific Director, BioProducts Institute

BPI HISTORY

2016

BioProducts Institute (BPI) established under the leadership of Dr. James Olson

The cluster of UBC faculty and researchers in biomaterials research groups was formed to leverage shared infrastructure and resources under the name of BioEconomy Research Innovation & Education (BERIE) which is renamed as BioProducts Institute in 2016

2017

MARCH
Dr. Mark Martinez appointed as BPI Scientific Director

APRIL
Dr. Emily Cranston joins BPI as President's Excellence Chair (PEC) with $2.3M awarded for sustainable nanomaterial development

SEPTEMBER
Canada Excellence Research Chair (CERC) Phase 1 approved for $28M

NOVEMBER
BC BioProducts Alliance is established
An industry led consortium with BPI & FPInnovations. The $2.7M industry funding accelerates the development of new bioproduct solutions

2018

JANUARY
GCRC awarded $150K for building operational support structure

JULY
CFI awarded $11.6M with BiMat for novel biomaterials research from forest biomass

2019

MARCH
Dr. Scott Renneckar appointed as BPI Interim Director

APRIL
BC BioAlliance awarded WED Grant $2.38M for research spearheaded by BPI in reducing BC's carbon footprint through utilizing forest residues

Dr. Orlando Rojas accepts CERC in forest bioproducts

DECEMBER
Dr. Orlando Rojas appointed as new BPI Scientific Director

2020

APRIL
UBC awards GREx Designation to BPI recognizing the institution at its highest level of Global Research Excellence Institute

JUNE
NRCan Grant $1.1M awarded from Clean Growth Program for renewable energy product development from forest residues

AUGUST
BPI Internship 1st cohort of 5 interns hired for business intelligence projects

NOVEMBER
PPC renovation began to complete in May 2021

DECEMBER
WED Grant $3.5M awarded to provide pre-pilot equipment to accelerate the commercialize pathway of BC forestry based bioproducts

2021

MARCH
Boreal Alliance launched MOU is signed with FinnCERES of Finland for research & operational collaborations

Nonwood Fibers Consortium is formed together with NCSU and other industry partners

Supply Chain Grant $150K awarded for developing sustainable bioproducts supply chain

BY THE NUMBERS

61
Principal Investigators

287
Graduate Students

196
Researchers & Postdoctoral Fellows

9
Canada Research Chairs

24
Research Groups

220+
Publications by PI's in 2020-2021

$4.9M
Grant Awarded Total in FY 2020-2021

$2.9M
Grant Applications Total in Progress

12
Operations Team Staff

12
Buildings on UBC Campus

260+
Research Instruments

OUR RESEARCH THEMES

1 BIOCATALYTIC TRANSFORMATION & ENGINEERING OF BIOMASS

Led by Dr. Lindsay Eltis, this theme encompasses the biosynthesis and biological degradation of biomass as well as the engineering of these processes to extract and valorize the different biomass components. Fundamental research is aimed at understanding how genes and their products function in the context of complex biological systems to synthesize, assemble and degrade biomass. Applied research includes using protein engineering and synthetic biology to design “biomass crops” and biocatalysts. These applications include developing new biocatalytic routes to valorize biomass, to reduce energy requirements and waste production, as well as to functionalize biomass for novel uses in chemical and materials manufacturing.

2 BIO-NANOPARTICLE ENABLED MATERIALS

Led by Dr. Emily Cranston, this theme examines the parameters that dictate assembly into supramolecular structures as well as the fundamental interactions between bio-based nanoparticles and surrounding liquids, and other components in composite and hybrid materials. The studies aim to elucidate the effects of nanoparticle production parameters, post-production modification routes, and material processing on physicochemical properties to optimize performance and impart unique structural, conductive, thermal, optical, dispersibility, biocompatibility, and diagnostic abilities.

3 BIO-BASED POLYMERS & CARBON MATERIALS

Led by Dr. Scott Renneckar, researchers in this theme have interest in identifying structural attributes of these polymers and establishing structure-property relationships to understand the impact of structures on their thermo-physical and rheological properties as well as processing (including 3-D printing). Bio-based polymers have unique functionality and variability unavailable in synthetic materials. Research in this theme will seek a fundamental understanding of the materials and their potential transformation into advanced bioproducts.

OUR RESEARCH THEMES

4 BIOREFINERY SYSTEMS

Led by Dr. Heather Trajano, this theme looks at how we move from a hydrocarbon to a carbohydrate society: forest/agricultural resides will be transformed through a biorefinery into chemicals and fuels that are functionally equivalent or superior to the products we now make from oil. To achieve an effective reduction in the carbon intensity footprint of our global society will require a multi-prong approach. British Columbia is endowed with plentiful “green” (hydro) electricity, innovative policies such as the low carbon fuels standard, and an innovative forest sector. For example, decarbonizing long distance (planes, ships, trains and trucks) transport will require some form of biofuels. In addition to the technical aspects of biorefining the economic, sustainability and policy metrics required to transform our current oil-based society to a more sustainable world will be researched.

5 BIOPRODUCTS ECOSYSTEM ANALYSIS

Led by Dr. Qingshi Tu, researchers in this theme combine industrial ecology principles with computational modeling to promote the sustainable development of bioeconomy. Specific foci include; (i) Transforming the information of engineering systems through process simulation, statistical methods and machine learning for sustainability modeling applications (e.g., life cycle assessment, techno-economic analysis, material flow analysis); (ii) Building models and tools for analyzing the environmental, economic and social impacts of emerging technologies for bioenergy, biofuels and bioproducts at different scales; and (iii) Investigating the synergies and tradeoffs between bioeconomy, circular economy and climate change mitigation through a system modeling approach.

The BioProducts Institute network brings together world-leading, interdisciplinary researchers who are developing fundamental and applied understanding of cutting-edge technologies for the conversion of biomass into sustainable advanced biomaterials, chemicals and clean energy

RESEARCH IMPACTS

BIODEGRADABLE MASK DEVELOPED

BPI team has developed a biodegradable face mask using natural cellulosic fibres and nano-materials made from wood-based products. The Can Mask matches the performance of disposable polypropylene masks but is much safer for the environment. The main shell of the mask uses inexpensive paper-type materials that are readily available and in the centre the mask has a specially engineered filter or a membrane that ensures high breathability and filters out tiny particles.

The biodegradable face mask is part of the institute's effort to mitigate the impact of the dramatic rise in the use of single-use plastics, which according to some estimates has spiked by 40 per cent worldwide since the onset of the COVID-19 pandemic."In a PP [polypropeline] mask biodegradability doesn't exist, a PP mask is used for a very short time on average for 12 minutes – but they last for thousands of years," Dr. Rojas said. "On the contrary, the fibre masks are fully biodegradable, and not only biodegradable, they are compostable."

BPI team is in talks with a major mask producing company that is interested in commercializing their invention and getting all the regulatory approvals needed for the mask to be used in medical settings.

Dr. Rojas and Dr. Foster at a conference call with Prime Minister JustinTrudeau and UBC President Santa Ono discussing how BPI researchers are partnering with industry to develop innovative PPE -*Photo from President Ono's Tweet posted on September 2, 2020*

BPI DESIGNATED AS GREx INSTITUTE

In April 2020, UBC has approved BPI to be its newest Global Research Excellence (GREx) Institute. The funding of $2M over the next five years will accelerate the innovations in biobased material research to address ciritcal problems such as climiate change and plastic wastes.

Through BPI faculty will expand educational platforms, including workshops and enhanced disciplinary degree programs. Futher, the BPI will become a “one-stop-shop” for forest, chemical and biotechnology industries to acquire and advance transformational research outputs. The Institute will foster technology transfer and innovative spin-off companies from its work on new sustainable materials, chemicals and fuels.

A significant communal effort from the research and operational teams within the Institute has already built a strong foundation. The GREx investment will have a significant return, not only in growing funding value but also in societal, educational, scientific and industrial impacts. The Institute will provide a centralized hub to capture value for Canada and bring resources to the university, and serve as a conduit to highlight solutions to complex consumption and disposal problems.

WD GRANT $3.5M AWARDED

Western Economic Diversification Canada awarded BPI $3.5M grant for developing prototypes, and scale-up fabrication of bio-based nonwovens, light-weight materials and micro-particles using BC’s local resources to fulfil targeted application needs. The project engages participants along the value chain, from forest industries (BioAlliance members) and research centers (BPI), to leaders in knowledge translation (FPInnovations), SMEs, start-up and manufacturers.

DR. SIDDIQUA UNCOVERS A WAY TO USE WASTE FOR ROAD CONSTRUCTION

Researchers at UBC Okanagan are developing guidelines to use paper mill waste for road construction in an environmentally friendly manner instead of having these materials end up in landfills. The researchers were interested in wood-based pulp mill fly ash (PFA), which is a nonhazardous commercial waste product.

Dr. Sumi Siddiqua, associate professor at UBC Okanagan's School of Engineering and leader of the Advanced Geomaterials Testing Lab, with Postdoctoral Research Fellow Dr. Chinchu Cherian investigated using untreated PFA as an economically sustainable low-carbon binder for road construction. "The porous nature of PFA acts like a gateway for the adhesiveness of the other materials in the cement that enables the overall structure to be stronger and more resilient than materials not made with PFA," says Dr. Cherian. "Through our material characterization and toxicology analysis, we found further environmental and societal benefits that producing this new material was more energy efficient and produced low-carbon emissions." The research was published in the Journal of Cleaner Production with support from the BioAlliance Initiative — an organization representing BC pulp and paper mills — and Mitacs.

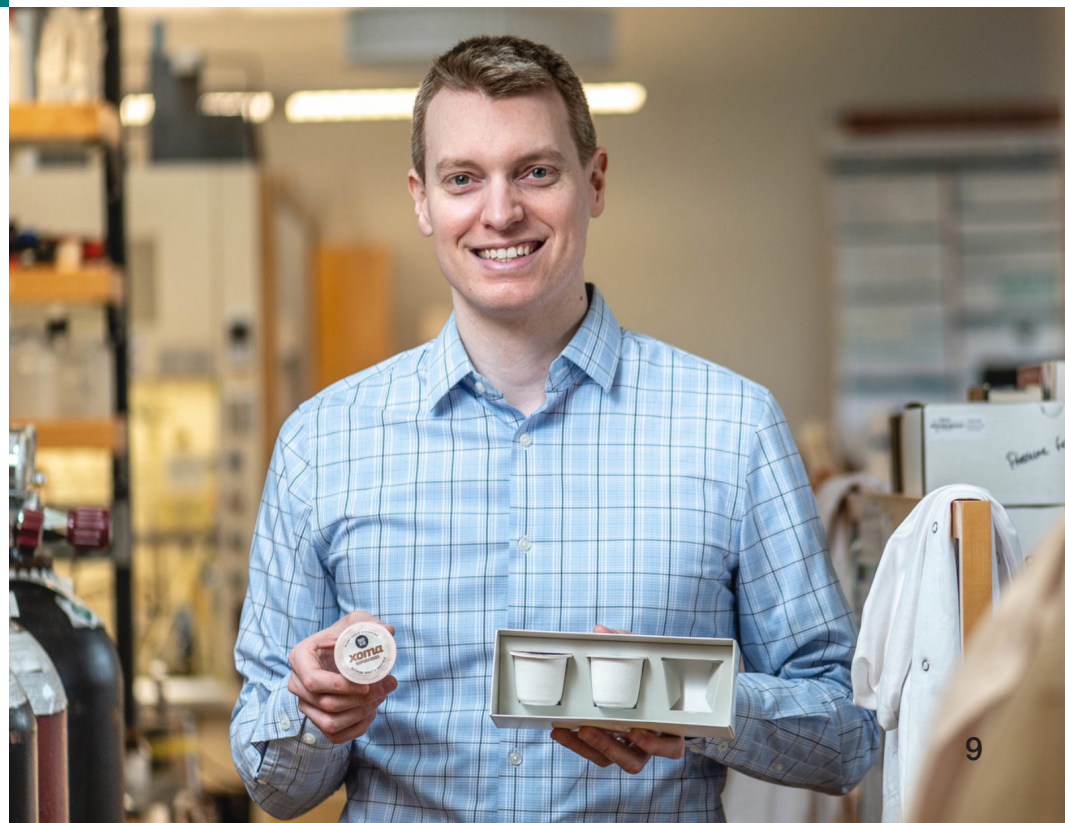
Source: *UBC Okanagan News* (2021) https://news.ok.ubc.ca/2021/04/08/ubco-researchers-find-a-new-use-for-waste/

DR. HUDSON CREATES A FULLY COMPOSTABLE COFFEE POD

"Every year more than 40 billion single-use coffee pods end up in landfill. If they're made of plastic, they could be sitting there for hundreds or thousands of years," said Dr. Hudson, an assistant professor, Canada Research Chair in Sustainable Chemistry and also Chief Scientific Officer at NEXE Innovations. The NEXE pod, on the other hand, composts completely in as little as 35 days in industrial compost.

To create compostable pods with the look and feel of regular plastic, the team settled on a two-part solution: 1. a bioplastic inner capsule made from polylactic acid (PLA) compounded with other natural ingredients that addresses moisture, air and heat issues and holds a large volume of coffee grounds. 2. an outer jacket made from bamboo that still looks and feels like plant fibre. The pods manufactured at a local facility in Surrey are compatible with all Keurig K-Cup brewing systems and launched commercially in February – selling out of their entire launch inventory in one day. The company recently announced Nespresso-compatible pods set to begin production later in 2021.

Source: *UBC News* (2021) https://news.ubc.ca/2021/02/22/ubc-chemist-helps-create-new-compostable-coffee-pod/



BPI INTERNS COMPLETED THEIR TERM WITH HUGE SUCCESS

The first cohort of interns are wrapping up a 6 month business intelligence project at the BioProducts Institute. “The BPI team was reinvigorated with the active participation of the interns, who were integral to our activities, daily meetings and weekly “power hour”, where they provided excellent insights about their discoveries. The interns were deeply engaged and connected with the team and I cannot think of a better way to learn about topical subjects and provide valuable intelligence to an organization than this exercise with our first group of interns.” – Orlando Rojas, BPI Scientific Director.

Although they come from different technical backgrounds, from just entering university to recent PhD graduate, Kelsi, Tilda, Kate, Shivani and Tyler have enjoyed working together to learn and to develop their professional skills. “Coming from a chemistry background, the internship at BPI was an excellent opportunity to dive head first into a new area and learn both the technical and economic aspects of the bioproducts field.” - Kelsi Lix

The interns started at BPI at the beginning of October, working virtually due to the pandemic. Although they never met in person, their online connection and communication allowed them to work seamlessly together. They have worked to become subject matter experts on topics such as lignin and nanocellulose, and they developed an understanding of the bioproducts business landscape and market. Over the 6 month internship, they have applied their collective knowledge to many different projects within and outside of the BPI operations team. “Working on a collaborative market study with the BC Pulp & Paper BioAlliance was an amazing opportunity to see how innovative research at UBC is making its way into industry.” - Kate Hickey

In their final week, on March 25th, the interns hosted and presented a webinar titled Wiped Out: The Need for Biodegradability Innovations in Wet Wipes. Based on the research from their review paper, the webinar included presentations from experts in industry and academia, as well as a panel discussion. “Through my term at BPI, I have learned much about the technical processes of manufacturing wipes, and through my findings have gained a deeper appreciation for the environmental and economic impacts of everyday items.” - Tyler Berretta

The first cohort of BPI interns will be leaving behind several business intelligence research initiatives, reports, and presentations. Kelsi, Tilda, Kate and Tyler will take with them a host of new skills as researchers and communicators as they move on to roles as students, engineers, and research scientists. “Although my time at BPI was short, I have learned many new research skills and made many lasting connections. The internship has given me experience in a field that I really enjoy and is a great stepping stone to continuing my career in environmental sustainability.” - Tilda Hadley.

STRATEGIC PARTNERSHIP

BC PULP & PAPER BIOALLIANCE

BC Pulp and Paper BioAlliance is a consortium representing all BC Pulp and Paper companies, FPInnovations and UBC BPI. The 4 major themes continue to make excellent progress related to Syngas / Renewable Natural Gas, Lignin platform technologies, Barrier Paper applications and Ash by-product valorization.

UBC has been an active participant in the development of the 2016 Forest Sector Competitiveness Strategy in partnership with the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development, FP Innovations and forest sector CEOs, including those of Canfor, Catalyst, Paper Excellence, West Fraser, Domtar and Harmac Pacific. One of the key recommendations was the establishment of the BC Pulp and Paper BioAlliance (BioAlliance) to identify, research and deliver “best bet” technologies for the provincial industry to accelerate the biobased economy.

INDUSTRY & NFP PARTNER PROJECTS

Applied research activities with industry and government partners were very active. Project examples include: biobased filtration material development, fabrication and characterization for textile applications, tree bark analysis and characterization, and pulp mill ash valorization.

In addition, a new initiative has been worked on that will support the derisking and scaling up of technologies towards commercialization. This has included fiber based and lignin value-added market evaluations and well as securing key pieces of equipment.

SME & STARTUPS COLLABORATIONS

SME and start-up collaborations continue in full intensity with several companies such as BioForm, Performance BioFilaments and Simplifyber leveraging the expertise and facilities of the BioProducts Institutes to develop new products.

BOREAL ALLIANCE LAUNCHED

The BPI together with FinnCERES (Flagship Institute founded by Aalto University and VTT) will lead the “Boreal Alliance”, an initiative that will catalyze innovation beyond Canada’s borders, internationalizing our science and creating research exchange, funding and business opportunities. The launch was celebrated at the premiere event of “Fibre and Beyond” documentary that was watched by over 500 audience from 16 countries on March 10th, 2021.

Together with TreeSearch (Sweden) and EMPA and ETH (Switzerland), who will also join the alliance, this transnational initiative aggregates research from nations that optimally utilize the forest resource to advance prosperity and well-being in balance with sustainable development. Further initiatives are being developed with RISE and other partners. A high-level conference is being planned for next year in Switzerland, which will attract world leaders in the area of advanced lignocellulosic materials and include one of the biannual meetings under the Boreal Alliance initiative.

NCSU NON-WOOD FIBERS CONSORTIUM

BPI joined the Non-wood Fibers Consortium, an initernational initiative led by North Carolina State University to research nonwood fibers for market pulp and hygiene product applications. As an honorary partner, BPI will work closely with NCSU and other members to develop fundamental understanding on the potential of non-wood fibers and consumer perception toward sustainable products.

The consortium will offer a great opportunity to perform high-risk R&D at low cost leveraging on the USDA federal grant of $420K with additional fundings from corporate partners and members.

KOREA INSTITUTE OF SCIENCE & TECHNOLOGY

The second 5 year MOU has been established to further expand the presence of Korea Institute of Science & Technology (KIST) at the UBC campus and the associated collaborations in the areas of biorefining, biofuels and biomaterials.

ENERGY REDUCTION IN MECHANICAL PULPING (ERMP)

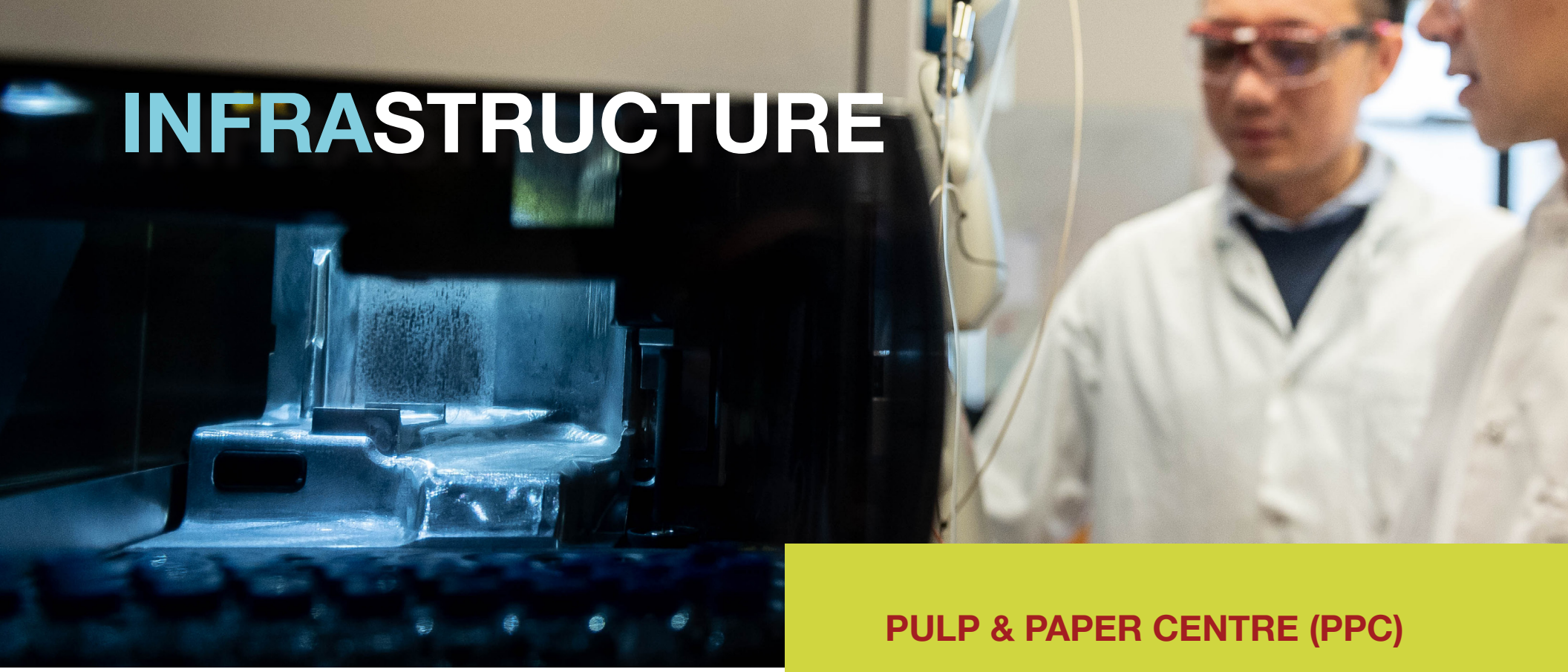
The Energy Reduction in Mechanical Pulping (ERMP) research program brings together a unique technical team of mechanical pulp producers, associated supplier industries, research institutes, universities, utilities and governments to develop and demonstrate the technologies to reduce electrical energy consumption and innovate new products specifically for the mechanical pulp producers. The industrial consortium, matched by Natural Sciences and Engineering Research Council of Canada (NSERC), invests in the new approaches to innovation developed by researchers from the Universities of British Columbia, Victoria, Toronto, and BCIT and in the associated equipment at UBC's Pulp and Paper Centre.

BC-SMART BIOFUELS CONSORTIUM

The BC-SMART Biofuels Consortium strives to help deliver the BC government's CleanBC GHG emission targets by developing Sustainable, low-carbon intensity drop-in biofuels for long-distance transportation sectors, including Marine, Aviation, Rail and long-distance Trucking (SMART). The consortium encourages the production and use of low carbon intensity biofuels for long-distance transport. We are a "coalition-of-the-willing" of industry, British Columbia (BC) government and academic stakeholders committed to decarbonising long-distance transport in British Columbia and beyond.

PARTNERS

INFRASTRUCTURE



MICHAEL SMITH LABORATORIES (MSL)

Fundamental to the success of the MSL has been the establishment of internationally recognized research programs by our faculty members in several areas: medical and animal molecular genetics/ biology, plant and forest molecular genetics/biology, bioprocess engineering, chemical biology, proteomics, micro-fluidics, bioinformatics and statistical genomics.

The exceptional breadth of expertise among Michael Smith Laboratories faculty reaches from tissue engineering to medical diagnostics, and explores organisms as diverse as bacteria, worms, mice and trees. This powerful blend of strengths and resources creates unique opportunities for cross-disciplinary approaches to the full range of exciting biotechnology issues. Facilities include Nucleic Acid Protein Service Unit (NAPS), Proteomics Core Facility, BioThermodynamics Core Facility, and Michael Smith Genome Sciences Centre

PULP & PAPER CENTRE (PPC)

The PPC is an inter-disciplinary, cross-faculty research centre with specialized laboratories and high-head piloting facility for those who conduct research for the benefit of the current and future pulp and paper industry. The centre serves to bring together faculty and student researchers to work collaboratively with the manufacturing industry, utilities, supplier industry, consultants and government agencies.

The centre also serves as a point of entry for industry looking for innovative solutions, new technology, future employees and training programs. The Centre supports competitiveness and transformation through research and development, education and training, and through demonstration of new technology in their pilot facilities and mill trials.

The Centre contains several specialized laboratories including Pulp quality evaluation lab (FQA and Microscopy, Wet Lab and Paper test lab), Low Consistency Refining Facility, Pulp screening research facility, Advanced Fibre Lab, and Papermaking Chemistry Labelectron microscopes.

BIOENERGY RESEARCH & DEMONSTRATION FACILITY (BRDF)

The system, fueled by biomass, creates synthesis (syn) gas that is then burned, in raw form, to produce steam or conditioned to create ultra clean syn gas that is injected into an internal combustion engine used to generate electricity.The system provides heat and power to The University of British Columbia's Vancouver campus. It facilitates research to develop feedstock (fuel) and process innovations, set new global standards for performance and emissions and lowers the campus's greenhouse gas emissions (GHGs) and fossil fuel consumption. The Bioenergy Research and Demonstration Facility, is a partnership between UBC and two of the world's leading developers of green technology – Vancouver-based Nexterra Systems Corporation and GE Energy. The facility is a "Campus as a Living Laboratory" project integrating UBC's core academic mandate (research and teaching) with the University's infrastructure and business operations. UBC is committed to taking advantage of its unique capacity for research and problem solving to embrace and deploy leading-edge technology and concepts using the campus infrastructure as a real-world demonstration and testing lab.

CENTRE FOR ADVANCED WOOD PROCESSING (CAWP)

CAWP was created, in consultation with the University's Forestry Advisory Council, with input from the National Education Initiative on the Canadian Wood Processing Industry (NEI), to address the need for advanced technical and managerial training for the value-added wood products manufacturing sector. CAWP is an interdisciplinary initiative administered by the Department of Wood Science, Faculty of Forestry, in collaboration with the Faculty of Applied Science at The University of British Columbia.

CAWP's mission is to offer training and technical assistance to promote the success and sustainable growth of Canada's value-added wood products manufacturing sector.

BIOIMAGING FACILITY AT BIOLOGICAL SCIENCES BUILDING

The UBC Bioimaging Facility helps BPI visually represent its research. Services and equipment include: optical microscopes and electron microscopes, sample and image processing equipment, training sessions and equipment booking services, TEM, SEM and sample preparation techniques.

ADVANCED MATERIALS & PROCESS ENGINEERING LABORATORY (AMPEL)

AMPEL is a vibrant place for research in Advanced Materials and Process Engineering with cutting edge research that coalesces from the theoretical nanofibre physical properties to the production of advanced composites.

- Surface and Interface Analysis Laboratory with various forms of electron and ion beam spectroscopy.
- High head area for process engineering experiments. The high head area provides laboratory space for large scale experiments such as casting of metals and alloys, preparation of ceramics, plasma spray oxide coatings, fluidization, and a steel run out mill.
- Nanofabrication and Cleanroom facility with apparatus for electron beam and optical lithography, thin film coating methods, electronic device fabrication.
- Machine Shop facility (co-sponsored by ICICS), consisting of an NC-equipped Machine Shop and a Small Tools Shop with versatile model-making capabilities.
- Metallurgical materials testing laboratory with facilities.
- Electron microscopy facility with scanning electron microscopes, transmission electron microscopes.

CLEAN ENERGY RESEARCH CENTRE (CERC)

CERC's multi-disciplinary approach is dedicated to developing knowledge and solutions that will reduce the environmental impact of the use of energy, and ensuring sustainability of energy supply and use.

CERC provides state-of-the-art research facilities in a recently-completed building for the investigation of clean energy problems; the focus has grown to include energy demand, energy supply, conservation and efficiency. A total of nine laboratories makes up CERC, they are

- High Headroom Lab
- Fuel Cell Lab
- Clean Combustion Lab
- Clean Burning Engines Lab
- New Fuels from Biological Processes
- Reducing Energy Losses Lab
- Gas Hydrate Technologies Lab
- Renewable Energy Lab
- New Methods for Hydrogen Generationtron microscopes.

EQUITY, DIVERSITY, INDIGENOUS & INCLUSION

BPI recognizes the importance of EDI in improving research, operations and training excellence and is working on strategies to proactively raise awareness and address barriers to provide equal opportunities to all members of the institute and its network. BPI is developing EDI and Indigenous strategic plans that will target the engagement of all BPI members and other resources available at UBC and beyond. Some elements of the EDI plan include:

- Hiring a Stakeholder Engagement & EDII Coordinator to provide proactive leadership to identify potential gaps at all levels (e.g., structure, policy and process) and to design new initiatives to address them towards continuous improvement. -*Completed*
- Focusing on BPI's trainee recruitment and training strategy to ensure all possible implicit and explicit EDI barriers are removed. -*In progress*
- The BPI Rising Star Awards recognizes trainees from under-represented groups. -*Ongoing*
- Seeking feedback from BPI members and trainees on EDI metrics and culture as measured in an anonymous annual full membership survey. -*Ongoing*
- Promoting EDI training opportunities and resources available through the faculties of Applied Science, Forestry, Land and Food Systems, and Science, as well as the UBC Office of Equity and Inclusion. -*Ongoing*
- Connecting BPI representation in EDI with committees serving the faculties of Applied Science, Forestry, Land and Food Systems, and Science to ensure seamless and consistent integration of EDI principles and opportunities. -*In progress*

AWARDS & RECOGNITION

BPI RESEARCHERS NAMED AMONG WORLD'S MOST-CITED SCIENTISTS

Seventeen BPI researchers were named among the 100,000 most-cited scientists across all scientific fields, or among the top two percent of most-cited scientists in their respective subfields. The database, which classifies scientists into 22 fields and 176 subfields and covers citations between 1996 and 2019, is based on citation metrics including total citations, the number of citations to papers in different authorship positions, and the Hirsch h-index, a measure of productivity and citation impact.

The names of the listed BPI researchers are Joerg Bohlmann, Peter Englezos, Sheldon Green, Savvas Hatzikiriakos, Reinhard Jetter, Frank Ko, Hongbin Li, Jim Lim, Mark MacLachlan, Shawn Mansfield, William Mohn, Madjid Mohseni, James Olson, Orlando Rojas, Jack Saddler, Shahab Sokhansanj, and Stephen Withers. Congratulations!

DR. GOLOVIN NAMED CANADIAN FINALIST FOR INTERNATIONAL FORESTRY INNOVATION AWARD

Dr. Kevin Golovin, assistant professor of Engineering, has been chosen as one of the two Canadian finalists for the global Blue Sky Young Researchers and Innovation Award.

The Blue Sky Young Researchers and Innovation Award is part of a global initiative spearheaded by the International Council of Forest & Paper Associations (ICFPA), which is currently lead by FPAC's President and CEO, Derek Nighbor. The contest is an opportunity for forest sector researchers and professionals under the age of 30 to showcase how their ideas, practices, processes, and technologies are advancing the global bioeconomy while sustaining the natural environment.

DR. FOSTER WON THE 2020 TAPPI NANODIVISION MID-CAREER AWARD

The TAPPI NanoDivision's Mid-Career Award recognizes individuals with less than 20 years past the date of their latest degree for their outstanding accomplishments or contributions that have helped advance the industry's technology in renewable nanomaterials.

Dr. Johan Foster was selected as the recipient of the award for his significant contribution to research on cellulosic nanocrystals, smart materials, nanocomposites, synthesis, functionalization, and biomedical implants. Congratulations!

DR. HUDSON RECEIVED THE 2020 WALL SOLUTIONS AWARD

Dr. Zachary Hudson received the Covid-19 Wall Solutions Award for his application titled "*A Rapidly Deployable Negative Pressure Enclosure for Aerosol-generating Medical Procedures*" Congratulations!

The award is to support research activities on developing innovative tools for early detection and diagnosis of COVID-19, improvements to design of PPE, building design and modification for safe reopening, and impacts on immigration detainees and public health communications.

DR. MANSFIELD ELECTED TO IAWS ACADEMY BOARD AND DR. RENNECKAR FELLOW OF IAWS

Dr. Shawn Mansfield, member of the International Academy of Wood Science (IAWS), was recently elected to the IAWS Academy Board. Prof. Scott Renneckar was recently elected a Fellow of the International Academy of Wood Science. Congratulations!

The International Academy of Wood Science is a non-profit assembly of wood scientists, recognizing all fields of wood science with their associated technological domains, and securing a worldwide representation.

EVENTS & ENGAGEMENT

INNOVATION SESSION

BPI's first Innovation Session was held successfully on February 19th, 2021 which facillitated a meaningful discussion on how to solve the technical challenges in bringing research innovations to commercialization. Participants included the leads from Lab2Launch, Climate Venture Studio, and Creative Destruction Lab.

FIBRE & BEYOND

As a kick-off celebration of the Boreal Alliance, BPI and FinnCERES co-hosted the Fibre & Beyond documentary premiere on March 10th, 2021, which was attended by more than 500 audience from over 17 countries across the world. The breathtaking documentary showcased the cutting-edge research discoveries in bio-based material innovations from Finland, Sweden and Canada

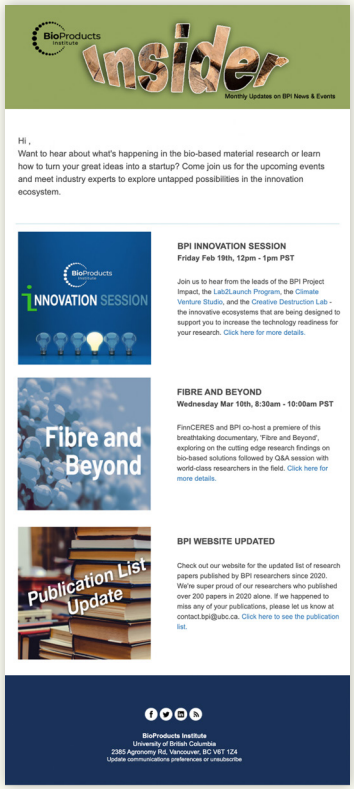
WIPED OUT

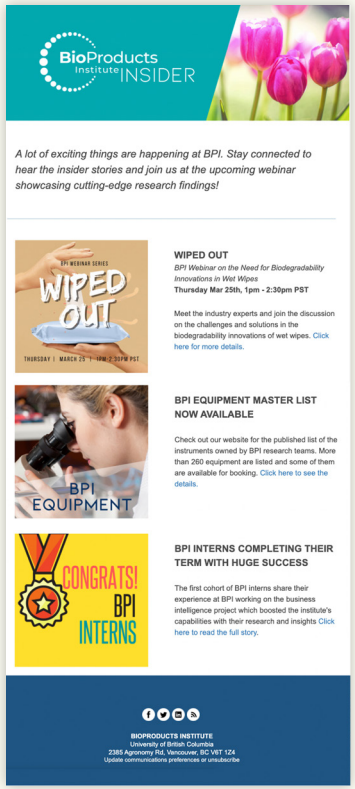
On March 25th 2021, BPI interns hosted and presented a webinar titled Wiped Out: The Need for Biodegradability Innovations in Wet Wipes. 139 researchers and industry professionals joined from 16 countries to listen to the presentations on how to achieve a cost competitive and high performing biodegradable wet wipe.

NEWSLETTER & WEBSITE LAUNCH

In February 2021, BPI launched a monthly newsletter channel called BPI Insider to engage stakeholders via email marketing platform. Since then, over 850 subscribers have been receiving regular updates on what is happening at BPI. The campaign reports indicate average 45% open rate which is much higher than industry average rate of18%.

BPI website has been updated on an ongoing basis since its launch in September 2020. Most recent updates include the BPI equipment list posted to give visibility for collaborative access and planning for strategic acquisition of new experimental capabilities. More than 260 equipment are posted and will be updated regularly.





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