INSTITUTE FOR POLYMER RESEARCH (IPR)
UNIVERSITY OF WATERLOO
WATERLOO, ONTARIO N2L 3G1

NEWSLETTER 2024

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1. NOTE FROM PROFESSOR JEAN DUHAMEL, IPR DIRECTOR

The past year has been a year full of activities for the IPR, with a two-day annual symposium held on May 1st and May 2nd, 2024, followed by the IPR Distinguished Lecture on October 2nd, 2024. More details about these highlights are provided below.

The 2024 IPR Symposium revived an old tradition, when the annual IPR Symposium was held over two days. This time, students and our two keynote speakers presented their research on May 1st followed by presentations on May 2nd by six IPR faculties that provided a deeper perspective about their respective fields of research. Twenty-two students presented their work during the symposium. Among them were our two 2024 IPR awardees, Sanjay Patel and Hunter Little. Sanjay described how pyrene excimer formation (PEF) could be applied in the same manner as the much better known fluorescence resonance energy transfer (FRET) for the characterization of macromolecular conformations while Hunter explained how PEF could be used to probe the local density of macromolecules in solution. The IPR Industry Keynote was Dr. Steven Teertstra, a former IPR graduate student who obtained his PhD in 2006 under the supervision of Prof. Mario Gauthier. Steven, who is now working in a technical role with the commercial team of Arlanxeo, gave an inspiring presentation linking the fundamental properties of polymers to industrial applications involving butadiene rubber (BR), butyl rubber, a copolymer of isobutylene and isoprene, and styrene-butadiene rubber (SBR) used to make tires or chewing gum. Our second keynote lecture was given by Prof. Alexander Penlidis, who was the IPR Director from 1994 to 2010. Alex' presentation was entitled "Copolymerization Composition Control Policies: Batch, Semi-Batch, or Flow". It provided a broad and deep overview of the research that he conducted on copolymerization over his many years at UW, but also its extension to ter- and multi-component polymerization. For those of us like myself who had interacted with Alex for numerous years, Alex' presentation provided an impressive summary of his many achievements, a real scientific treat!

The second day of the symposium on May 2nd, 2024 was devoted to a rich and diversified array of talks given by the IPR academic members. Prof. Michael Tam gave an overview on how sustainable nanomaterials can be designed in an innovative fashion for advanced engineering applications. Prof. Dereck Schipper presented developments in the reactions used to synthesize conjugated organic materials requiring fewer toxic and pricey chemicals. Prof. Yuning Li described how semiconductor polymers could be prepared for flexible and cost-effective thin film sensors. Prof. Boxin Zhao offered his perspective on how he develops adhesives and coatings, that can be applied to generate advanced materials in a sustainable manner. Prof. Jamie Forrest gave a fascinating talk on the rationalization of the anomalous dynamics observed in thin polymer films. I also gave a presentation highlighting new developments on the analysis of multiexponential fluorescence decays that enables the characterization of conformation of macromolecules, which has been deemed too complex to study. The incredible scientific breadth and fundamental depth of the presentations delivered by the IPR faculties illustrated the impressive knowledge that is concentrated within its walls.

The IPR was delighted to host Prof. Kevin Edgar on October 2nd and 3rd, 2024. Prof. Edgar had been working at Eastman Chemicals Company before joining Virginia Tech, where he now is the Associate Dean for Graduate Studies. He is also the Editor-in-Chief of the prestigious journal Polymer Carbohydrate. In his presentation entitled "Sustainability through Selectivity: Polysaccharides Hydrogels and Block Copolymers", Prof. Edgar described how polysaccharides like dextran, amylose, or cellulose could be modified to generate block copolymers or hydrogels, demonstrating that it is possible to such applications that often involves fossil-based polymers, can also be developed from biopolymers. The breadth and quality of Prof. Edgar's presentation was very well attended reflecting the broad appeal of biomacromolecules among the current generation of macromolecular scientists.

Beside these on-going activities, the IPR members also continue to distinguish themselves for their contributions to the publication of important and novel achievements in polymer research as indicated by their editorial responsibilities and recognition of their accomplishments in polymer research. Prof. Tzoganakis serves on the editorial board of Adv. Polym. Technol. and was elected a fellow of the Canadian Academy of Engineering, which recognizes outstanding achievements and service to engineering in Canada and the world. Prof. Zhao is a member of the Board of Directors of the Waterloo Institute for Nanotechnology and he received the 2024 Ontario Professional Engineers Award (Engineering Medal – Research and Development). Prof. Tam is an associate editor for ACS Sustain. Chem. Eng. Prof. Tam was also interviewed by the Waterloo Record with the news "University of Waterloo researchers mimic trees to turn salt water into drinking water" which was featured on the front page of the newspaper. Prof. Mekonnen received the 2024 Macromolecular Science and Engineering (MSED) Early Career Investigator Award of the Canadian Society for Chemistry and is a Tier 2 Canada Research Chair (CRC). Profs. Penlidis is serving on the editorial board of Polymer-Plastics Techn. and Eng., Macromol. React. Eng., and Processes. Prof. Jean Duhamel is a member of the advisory editorial board of Langmuir and an editorial board member of Polymers. These activities are further evidence of the major impact that our IPR colleagues have on polymer research.

Finally, I invite you to attend the 2025 IPR Symposium. It will represent the 47th iteration of the IPR Symposium and will be held over two days on April 30th and May 1st. Our two keynote speakers will be Prof. Meghan Roberts from the Department of Chemistry at Western and Dr. Nicholas Lanigan from the company Davwire – Mechatronic Systems and Subsystems. Prof. Roberts and Dr. Lanigan will give their keynote presentations on April 31st with the IPR graduate students followed on May 1st by presentations given by IPR members Profs. Tizazu Mekonnen, Leonardo Simon, and Xianshe Feng. Together these activities represent an exciting feast in polymer research and we look forward to welcoming you during the symposium.

2. ANNUAL IPR SYMPOSIUM

The 46th Annual IPR Symposium will be held May 1st and 2nd, 2024. A schedule and registration forms will be circulated electronically.

Many thanks to all who participated in the 2024 Symposium. IPR received very positive feedback regarding the topics covered. The 2024 program and the list of industrial participants are attached (Appendix 1).

3. IPR INDUSTRIAL MEMBERS

An up-to-date list of our current industrial members is attached (Appendix 2).

4. IPR PREPRINTS

During 2024, the IPR office sent out 25 preprints to our members (Appendix 3).

5. RESEARCH PROGRAMS

We have more than 90 research personnel (excluding faculty) involved in polymer research at the University of Waterloo. Industrial members may find it interesting to keep up to date with the various research projects that are underway.

6. RECENTLY GRADUATED STUDENTS

J. Duhamel

MASc	ChE	Lloyd, R.	Surfactant-DNA Interactions Probed with a Pyrene-Labeled Gemini Surfactant
PhD	ChE	Patel, S.	Pyrene Excimer Formation: A Tool to Study Macromolecular Conformations in Solution

Z. Feng

MASc	ChE	Davari, S.	Recovery of volatile aroma compounds by membranes
MASc	ChE	Li, Xiaojia.	Solubility and mobility of silver ions in chitosan and fibroin

Y. Li

MASc	ChE	Zhong Y.	Development of Semiconducting Polymers with Acid-Cleavable Side Chains for Size-Selective Gas Sensors Based on Organic Thin-Film Transistors
MASc	ChE	Stella, A.	Novel Copolymers Based on Methoxythiophene-Flanked Diketopyrrolopyrole for Wearable Resistive Sensors
PhD	ChE	Yuan, Y.	Novel Wide Bandgap Polymer Donors Containing Benzodithiophene and Substituted-Thiophene as Donating and Accepting Units for High Performance Non-Fullerene Acceptor Based Organic Solar

T. Mekonnen

MASc	ChE	Kalani, S.	Melt-blowing of Polymers for Porous and Functional Air Filters
PhD	ChE	Tadele, D.	Modifications of Zein Biopolymer for Material Applications: Biopolymer Blends, Films, Bioactive Delivery Nanoparticles, and Nanofibers
PhD	ChE	Ojogbo, E.	Highly Crosslinked Natural Rubber-Cellulose Nanocrystals Composites for Sustainable Material Applications

MASc	ChE	Blanchard, R.	Upcycling Plastic Waste to Activated Carbon for Wastewater Treatment Applications conductive biofilm in dry digestion
MASc	ChE	Pieters, K.	Waterborne Biopolymer Dispersions for Barrier Paper Coatings

A Penlidis

MASc	ChE	Shahrzad, G.	Polymeric materials as sensors for gases in energy storage devices

D. Schipper

MASc	CHEm	Brutto, M.	Lithium Selective Organic Materials

M. Tam

PhD	ChE	Han, L.	Sustainable Antimicrobial Compounds Using Functionalized Cellulose Nanocrystals
MASc	ChE	Choi, H.	Development of Cellulose-based Softwood Pulp Foam for the Removal of Microplastics

E. Vivaldo-Lima

PhD	ChE	Romero-Herandez, J.E.	Modelado de sistemas novedosos de polimerizació

B. Zhao

PhD	ChE	Bauman, L.	Photopolymerization based 3D printing of thermoresponsive hydrogel Precursors
MASc	ChE	Chen, I.	Development and Characterization of an Antimicrobial Coating for Medical Textiles

7. ACADEMIC MEMBERS OF THE INSTITUTE FOR POLYMER RESEARCH

Professors:

R. Dhib	Chem. Eng.	Ryerson
T.A. Duever	Chem. Eng.	Ryerson
J. Duhamel, Director,	Chemistry	Waterloo
X. Feng	Chem. Eng.	Waterloo
J. Forrest	Phys. Astro.	Waterloo
M. Gauthier (retired),	Chemistry	Waterloo
Y. Li	Chem. Eng.	Waterloo
T. Mekonnen	Chem. Eng.	Waterloo

A. Penlidis	Chem. Eng.	Waterloo
D. Schipper	Chemistry	Waterloo
L. Simon	Chem. Eng.	Waterloo
M. Tam	Chem. Eng.	Waterloo
C. Tzoganakis	Chem. Eng.	Waterloo
E. Vivaldo-Lima	Chem. Eng.	UNAM, Mexico
X. Wang	Chemistry	Waterloo
B. Zhao	Chem. Eng.	Waterloo

For a brief description of research interests and projects, along with contact information, please visit the following web link: www.uwaterloo.ca/institute-polymer-research/

8. MEMBER COMPANIES—2022

Currently, there are **7 member companies**: (refer also Appendix 3)
Afton
Compuplast Canada Inc.
Lanxess Inc.
Mondelez Inc.
Synothomer Inc.
PolyVision, The Netherlands
Princeton Polymer Consultants, USA

9. STUDENT AWARDS

J. Duhamel

Hunter Little received a PGS-D NSERC award

X. Feng

Sharafat Ali, Vanier Canada Graduate Scholarship; WIN Nano Fellowship
Iris Samputu, IBET Momentum Fellowship

Y. Li

Zhe Huang: WIN Nanofellowship
Yonglin Wang: WIN Nanofellowship
Alex Jin: WIN Nanofellowship
Naixin Zhao: Best Poster Presentation in the Student Poster Presentation Competition Advances in Functional Polymers and Polymerization Engineering at CSChE 2024. Zhao, N., Li, Y., Linear conjugated polymer transformed from a partially conjugated building block for aqueous chemical sensing. Canadian Chemical Engineering Conference (CSChE 2024), Toronto, October 6 – 9, 2024.

T. Mekonnen

Rachel Blanchard: NSERC Graduate scholarships – Masters program (2023- 2024)
Rachel Blanchard: WIN Nanofellowship – University of Waterloo (2023 – 2024)
Rachel Blanchard: Faculty of Engineering Graduate Award (2022 – 2023)
Kyle Pieters: Faculty of Engineering Graduate Award (2022 – 2024)

D. Schipper

Poster presentation by Scott) Ryan Scott, Derek Schipper.* "Developments in the synthesis of imidazopyrimidine homogeneous bimetallic ligands." 34th Quebec-Ontario Mini-Symposium for Synthetic and Bioorganic Chemistry, Concordia University, Montreal, Quebec. November 9, 2024.

*Scott received a **Top Poster Presentation Award** for this presentation.*

(Poster presentation by Abaeva) Mila Abaeva, Tess Fortier, Derek J. Schipper.* "Imidazopyrimidine-Based Ligand for the Selective Synthesis of Heteromultimetallic Catalysts." Guelph-Waterloo Centre annual general meeting, Waterloo, Ontario, May 3, 2024.

*Abaeva received the **1st Poster Presentation Prize** for this presentation.*

M. Tam
Shakiba – WIN fellowship

B. Zhao
MASc student
Aline Braz Ramirez was awarded with Globalink Graduate Fellowship in 2024

10. FACULTY AWARDS

T. Mekonnen

Tizazu Mekonnen: Macromolecular Science and Engineering Division (MSED) Early Career Instigator Award. The award is sponsored by NOVA Chemicals, 2024.

Tizazu Mekonnen: Canada Research Chair (Tier II) in Sustainable Multiphase Polymers; (NSERC funded; Chemical Engineering, University of Waterloo), 2024

C. Tzoganakis

Election to the Canadian Academy of Engineering (CAE) recognizes outstanding achievements and service to engineering in Canada and the world. Fellows have distinguished themselves in different sectors including business, academia and government and in different roles such as business management, executive management, technical, and university faculty. Fellows of the CAE are

nominated and elected by their peers (current CAE Fellows) in view of their distinguished achievements and career-long service.

D. Schipper

Selected as Delegate for Science Meets Parliament
-Inorganic Chemistry Journal Front Cover
-CSC/EuChemS Organic Division Young Investigator Travel Award

B. Zhao

Prof. Boxin Zhao received the 2024 Ontario Professional Engineers Award (Engineering Medal – Research and Development)

11. FULL REFEREED JOURNAL PAPERS

J. Duhamel

Little, H.; Patel, D.; Suh, D.; Duhamel, J. Accurate Determination of the Average rate Constant of Pyrene Excimer Formation for Pyrene-Labeled Macromolecules from the Analysis of Individual Fluorescence Decays with Sums of Exponentials. J. Phys. Chem. B 2024, 128, 2583-2594.

Thoma, J.; Little, H.; Duhamel, J. Location of a Hydrophobic Load in Poly(oligo(ethylene glycol) methyl ether methacrylate)s (PEGMAs) Dissolved in Water and Probed by Fluorescence. Langmuir 2024, 40, 5900-5912.

Kim, D.; Patel, S.; Duhamel, J. Glycogen □□Particles Characterized by a Combination of Size Exclusion Chromatography and Pyren Excimer Fluorescence Before and After □□Amylolysis. Carbohydr. Polym. 2024, 338, 122090.

Lulic, K.; Muller, G.; Gutierrez, R.; Little, H.; Duhamel, J. Flexibility of Poly(alkyl methacrylate)s Characterized by their Persistence Length Determined Through Pyrene Excimer Formation. Polymers 2024, 16, 2126.

Patel, S.; Duhamel, J. Advantages of Pyrene Excimer Formation (PEF) over Fluorescence Resonance Energy Transfer (FRET) for Probing the Conformation of Macromolecules in Solution. Macromolecules 2024, 57, 8421-8431.

Lulic, K.; Wang, J.; Li, X.; Markandeya, N.; Huc, I.; Maurizot, V.; Duhamel, J. Probing the Close Association of Oligoquinoline Foldamers by Time-Resolved Fluorescence Anisotropy. J. Phys. Chem. B 2024, 41, 10297-10308.
Liu, D.; Patel, J.; Xie, Y.; Zhang, H.; Duhamel, J. Probing Macromolecular Conformations in Restricted Geometries: Application ot Hydrophobically Modified PAMAM Dendrimers Isolated in Surfactant Micelles. J. Phys. Chem. B 2025, 129, 1144-1153.

X. Feng

C. Fan, Q. Ge, S. Lu, X. Feng, Y. Tu, L. Jia, S. Lin, Q. Pan, F.T.T. Ng, "One-pot synthesis of polycarbonate-b-polyester block copolymers from CO2/epoxide/ε-caprolactone catalyzed by salen-cobalt(III) complex," Journal of Polymer Science, accepted Dec 29, 2024
S. Ali, X. Feng (2024), "Interfacially crosslinked polydopamine/polybenzimidazole composite membranes for organic solvent nanofiltration," ACS Applied Materials & Interfaces, 16, 65517–65528.

Wang, B. Yu, Z. Liu, X. Feng, J. Meng (2024), "Regulating pore intrusion in PDMS/PSF composite membrane formation for enhanced O2/N2 separation," Industrial & Engineering Chemistry Research, 63, 15225–15234.

S. Ali, R. Wang, H. Huang, S. Yin, X. Feng (2024), "Per- and polyfluoroalkyl substance separation by NF and RO membranes: a critical evaluation of advances and future perspectives," Environmental Science: Water Research & Technology, 10, 1994-2012.

H. Xiong, H. Liu, X. Feng, Y. Sun, Q. Huang, C. Xiao (2024), "A review of two-dimensional porous graphene with in-plane pores: Pore construction and membrane applications," Carbon, 229, 119547.

P. Charnkeitkong, W. Jonglertjunya, X. Feng (2024), "Modification of the chitosan spray coating on pineapple pulp as adsorbent for copper ion adsorption from aqueous solution," Advances in Science and Technology, 155, 13-18.
X. Cao, K. Wang, X. Feng (2024), "Mass transfer fundamentals in pervaporation, perstraction and sorption: A unified approach," Chemical Engineering Research and Design, 204, 282-291.

X. Wang, J. Zhang, X Feng (2024), "Membranes impregnated with bis(2-ethylhexyl) phthalate for enhanced VOC/N2 separation," Journal of Membrane Science, 696, 122530.

Mumtaz, B. Li, M.R. Al Shehhi, X. Feng, K. Wang (2024), "Treatment of phenolic-wastewater by hybrid technologies: A review," Journal of Water Process Engineering, 57, 104695.

H. Liu, Y. Sun, S. Cheng, Y. Qin, X. Feng, Q. Huang, K. Chen (2024), "Nanochannel regulation of graphene quantum dots composite membranes via electrospray assisted self-assembly method," Carbon, 216, 118566

J. Forrest

Measurement of the depth-dependent local dynamics in thin polymer films through rejuvenation of ultrastable glasses, S Karimi, J. Yin, T. Salez, J.A. Forrest, Comms. Phys. 7 237 (2024)

Y. Li

Zhao, N.; Jeon, S. J.; Yuan, Y.; Venkateswarlu, S.; Stella, A.; Papazotos, J.; Li, Y. Full Conjugation in a Polymer with Non-conjugated Piperazine-2,5-dione Units via Energy-minimized Lactam-to-Lactim Tautomerization Enables Water-gated Transistor Fluoride Sensors. Angew Chem Int Ed 2024, e202419314. https://doi.org/10.1002/anie.202419314. (IF: 16.1)

Singh, R.; Venkateswarlu, S.; Zhong, Y.; Li, Y. Synthesis of Fluorene-flanked Diketopyrrolopyrrole-based Semiconducting Polymers with Thermocleavable Side Chains and Their Application in Organic Field Effect Transistors. Can J Chem Eng 2024, 102 (12), 4137–4151. https://doi.org/10.1002/cjce.25314. (IF: 1.6)

Wang, Y.; Huang, Z.; Gao, X.; Fazaeli, R.; Li, Y. Effective Stabilization of Organic Cathodes Through Formation of a Protective Solid Electrolyte Interface Layer via Reduction. ChemSusChem 2024, e202401599. https://doi.org/10.1002/cssc.202401599. (IF: 7.5)

Fazaeli, R.; Huang, Z.; Wang, Y.; Aliyan, H.; Li, Y. Melamine-Based Nanoscale Porous Organic Frameworks as Multifunctional Separator Modifiers to Mitigate the Polysulfide Shuttle Effect in Lithium–Sulfur Batteries. Applied Materials Today 2024, 41, 102490. https://doi.org/10.1016/j.apmt.2024.102490. (IF: 7.2)

Yuan, Y.; Flynn, S.; Li, X.; Liu, H.; Wang, J.; Li, Y. Wide Bandgap Polymer Donors Based on Succinimide-Substituted Thiophene for Nonfullerene Organic Solar Cells. Macromol. Rapid Commun. 2024, 2400275. https://doi.org/10.1002/marc.202400275. (IF: 4.2)

Yuan, Y.; Cui, S.; Li, X.; Liu, H.; Wang, J.; Li, Y. Wide Bandgap Polymer Donors Containing Dihalovinyl Thiophene Building Blocks for Organic Solar Cells. Macromolecules 2024, 57 (10), 4757–4768. https://doi.org/10.1021/acs.macromol.4c00195. (IF: 5.1)

Pecunia, V.; … Jeon, S. J.; Zhao, N.; Li, Y., etc. Roadmap on Printable Electronic Materials for Next-Generation Sensors. Nano Futures 2024, 8 (3), 032001. https://doi.org/10.1088/2399-1984/ad36ff. (IF: 2.5)

Jeon, S. J.; Zhao, N.; Yuan, Y.; Li, Y. Water/Alcohol-Processable Low-Cost Dihydropyrazine-Based Polymers for Highly Sensitive, Stable and Flexible Temperature Sensors. Adv Materials Technologies 2024, 2301542. https://doi.org/10.1002/admt.202301542. (IF: 6.4)

Flynn, S.; Yuan, Y.; Cui, S.; Liu, H.; Li, X.; Wang, J.; Li, Y. Acetal- and Aldehyde-Substituted Thiophene-Benzodithiophene Copolymers for Organic Solar Cells. ACS Appl. Energy Mater. 2024, 7 (3), 1277–1286. https://doi.org/10.1021/acsaem.3c02921. (IF: 5.5)

Ngai, J. H. L.; Li, Z.; Wang, J.; He, J.; Ding, J.; Li, Y. Strategic Design of Hemi-Isoindigo Polymer for a Highly Sensitive and Selective All-Printed Flexible Nitrogen Dioxide Chemiresistive Sensor. Small Methods 2024, 2301521. https://doi.org/10.1002/smtd.202301521. (IF: 10.7)

T. Mekonnen

Kalani, S., Jubinville, D., Mekonnen, T.* Nano-porous melt-blown poly(lactic acid) fiber mat air filters for high efficiency particulate capture. Advanced Sustainable Systems, 2025. DOI: 10.1002/adsu.202400898 (Accepted).

Ohaka, T., Mekonnen, T.* Recyclable and sustainable natural rubber biocomposite vitrimers induced by dynamic anhydride-epoxy bonds. ACS Applied Polymer Materials. 10.1021/acsapm.4c03054 (Accepted).

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Ojogbo, E., Tzoganakis, C., Mekonnen T.H.* Silane-modified cellulose nanocrystals (CNCs) based natural rubber

composites. Composites Part A: Applied Science and Manufacturing, 2025, 190, 108632

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Tadele, T.D., David, D., Yim, Y., Mekonnen, T.H.* Development and characterization of PVA-zein/α-tocopherol nonwoven mats for functional wound dressing applications. Colloids and Surfaces B: Biointerfaces 2024, 246, 114355.

Pieters, K., Mekonnen, T.H.* Waterborne cellulose acetate pickering emulsion generation mediated by cellulose nanocrystals for paper coating applications. Materials Today Chemistry 2024, 42, 102370.

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Crawford, E., Gupta, S., Trinh, B., Mekonnen, T.* Styrene-ethylene-butylene-styrene (SEBS) melt-blown fibers for oil spill remediation and oil barrier geotextiles. Polymer, 2024, 298, 126942.

Chen, G., Adibi, A., Jubinville, D., Hao, C., Yan, N., Mekonnen, T.* Rubber-lignin-ammonium polyphosphate bio-composite foams: Fabrication, thermomechanical properties and flame retardancy. International Journal of Biological Macromolecules, 2024, doi.org/10.1016/j.ijbiomac.2024.135884.

Chandra, R., Mekonnen, T., Charles, T., Juntpally, S., Aghasa, A., Lee, H.S.* Production and Characterization of Biopolymer from Food Waste Using Pseudomonas putida. ACS ES&T. 2024, 4(9): 2177–2185.

Tsegaye, G., Kiflie, Z., Mekonnen, T., Jida, M. Synthesis and characterization of coffee husk extract (CHE)-capped Fe3O4/PU/ZnO nanocomposites with antimicrobial activity. Biomass Conv. Bioref. (2024). https://doi.org/10.1007/s13399-024-05918-2.

Shorey, R., Ataeian, P., Mekonnen, T.* Effect of acetylation of kraft lignin on the blend compatibility with

cellulose acetate and the resulting physicomechanical properties. Cellulose. DOI : 10.1007/s10570-024-06073-7.

Jubinville, D., Lee, H.S, Mekonnen, T.* High-Biocontent Polymer Blends and Their Wood Plastic Composites: Blending, Compatibilization, and Their Recyclability. Appl Compos Mater 31, 1625–1644 (2024). https://doi.org/10.1007/s10443-024-10253-w.

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Jubinville, D., Awad, M., Lee, H.S., Mekonnen, T.* Effect of compatibilizers on the physico-mechanical properties of a poly(lactic acid)/ poly(butylene adipate-co-terephthalate) matrix with rice straw micro-particle fillers. Journal of Polymers and the Environment. 2024, 32, 5857–5872.

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Blanchard, R., Mekonnen, T.H.* Valorization of plastic waste via chemical activation and carbonization into activated carbon for functional material applications. RSC Appl. Polym., 2024, DOI: 10.1039/D4LP00016A.
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A Penlidis

Mavani, B.H. and A. Penlidis (2024). Tailoring polyaniline for improved acetaldehyde detection. Macromolecular Reaction Engineering (MRE), # 2400018, 11 pages; accepted on July 30, 2024; online on Aug 16, 2024; doi: 10.1002/mren.202400018; open access.

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D. Schipper

Monika Snowdon, Ekaterina Sukhanova, Zakhar Popov, Shisheng Li, Leanddas Nurdiwijayanto, Takaaki Taniguchi, Shinsuke Ishihara, Takeshi Tanaka, Hiromichi Kataura, Kazuhito Tsukagoshi, Robert Liang, Marina

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Wang, Y.; Zhao, W.; Lee, Y.B..; Li, Y.; Wang, Z.; Tam, K.C., Dynamic Water Gating Enhanced Thermo-Adaptive Solar Interfacial Evaporation, Nature Communications (2024) 15, 6157 (1-13) [Impact factor: 14.7]

C. Tzoganakis

J. Yang, A. Arefi, V. Gritsichine and C. Tzoganakis (2024). "Non-PFAS Polymer Processing Aids: Slip Velocity Measurements and Time-to-Clear Studies in Blown Film Extrusion", accepted in J. Plastic Film and Sheeting.

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Miguel Ángel Vega-Hernández, María Fernanda Munguía-Quintero, Alberto Rosas-Aburto, Jorge Alcaraz-Cienfuegos, María de los Ángeles Valdivia-López, Martín G. Hernández-Luna, and Eduardo Vivaldo-Lima*, Effect of Teak Wood Lignocellulose Pretreatment on the Performance of Cellulose-Graft-(Net-Poly(Acrylamide-co-Acrylic Acid)) for Water Absorption and Dye Removal, Int. J. Biol. Macromol., 274, Part 2, 133482, 2024; 15 pages; https://doi.org/10.1016/j.ijbiomac.2024.133482.

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A-Reum Kim, Sushanta Mitra, Boxin Zhao, "Unlocking passive collection of microplastics in coral reefs by adhesion measurements", ACS ES&T Water [IF =4.9], Accepted, Nov, 2024

Yverick Rangom, Parisa Jafarzadeh, Alek Cholewinski, Alex Sherepenko, Ahad Shafie, Kiran Gundegowdaa Kalligodanadoddi, Boxin Zhao, Elliot Biro, Holger Kleinke, Michael A. Pope, “High Cycle-Life under Fast Charging: Covalent Carbide Interconnects for Li-ion Batteries”, Advanced Sciences [IF=14.3], Accepted, Sept 23, 2024

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Aleksander Cholewinski, Joseph Wortman, Misa Hayashida, Bill Anderson, Boxin Zhao, “3D Imaging Photocatalytically Degraded Micro- and Nanoplastics”, IOP Nanotechnology [IF=2.9], 35, 395706, 2024

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A-Reum Kim, Surjyasish Mitra, Sudip Shyam, Boxin Zhao, Sushanta K. Mitra “Flexible hydrogels bridging adhesion and wetting”, Soft Matter, 20, 5516-5526, 2024 – Cover image

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Ashna Rajeev, Lu Yin, Pramod K. Kalambate, Mahsa Barjini, Khabbaz, Binh Trinh, Milad Kamkar, Tizazu H. Mekonnen, Shirley Tang, Boxin Zhao, “Nano-enabled smart and functional materials toward human well-being and sustainable developments”, IOP Nanotechnology [IF=2.9], 35, 352003, 2024.

Lu Yin, Aleksander Cholewinski, Boxin Zhao, “Solvent-free Urethane-based Prepolymer as a Versatile Underwater Adhesive Material” Chemical Engineering Journal [IF=15.1], 481:148487, 2024

13. CONFERENCE PRESENTATIONS/INVITED SEMINARS

J. Duhamel

Pyrene Excimer Formation to Characterize Macromolecular Conformations. Duhamel, J. Department of Chemistry, University of Saskatchewan, Winnipeg, MN, Canada, March 21st, 2024.

Advances in the Characterization of Macromolecular Conformations by Pyrene Excimer Formation – Applications to the Conformation of Amylopectin and Glycogen. Duhamel, J. Department of Chemistry, UNAM, Mexico, June 26th, 2024.

X. Feng

X. Feng, "Biopolymers for separation and recovery of heavy metals from industrial wastewater," Invited talk presented at the IC-IMPACTS Conference (India-Canada Innovative Multidisciplinary Partnerships to Accelerate Community Transformation and Sustainability), New Delhi, India, Dec 9-11, 2024.

J. Zhang, X. Feng, "Facilitated transport membranes for highly selective and Stable olefin/paraffin separation," presented at the 2024 AIChE Annual Meeting, San Diego, CA, Oct 27-31, 2024.

Malczewska, X. Feng, "Application of dynamic membranes for nutrient removal/recovery from wastewater," presented at the Canadian Chemical Engineering Conference, Toronto, ON, Oct 6 – 9, 2024.

X. Li, J. Zhang, S. Hazarika, X. Feng, "A study of the solubility and mobility of silver ions in chitosan and fibroin membranes," presented at the Canadian Chemical Engineering Conference, Toronto, ON, Oct 6 – 9, 2024.

K. Hou, Z. Cai, X. Feng, "Fabrication of mechanically stable fabric-based hydrogel membranes based on dual network toughening strategy for highly efficient oil-water emulsion separation," presented at the Canadian Chemical Engineering Conference, Toronto, Oct 6 - 9, 2024.

J. Zhang, X. Feng, "Facilitated transport membranes for highly selective and stable olefin/paraffin separation," presented at the Canadian Chemical Engineering Conference, Toronto, ON, Oct 6 – 9, 2024.

B. Malczewska, M. Dziadas, X. Feng, "Application of dynamic membrane technology for removal of organic compounds with amino groups," presented at the 2024 IWA World Water Congress & Exhibition, Toronto, ON, Aug 11-15, 2024.

X. Feng, "Impregnating organophilic membranes with lipophilic phthalates to enhance VOC/N2 separation," Invited Keynote at the International Congress on Separation and Purification Technology, Zhengzhou, China, July 7-11, 2024.

X. Feng, "Pressure-vacuum swing permeation: A novel approach to gas separation by membranes," Invited Speaker at the International Congress on Separation and Purification Technology, Zhengzhou, China, July 7-11, 2024.

X. Feng, "Membrane technologies for wastewater treatment as related to bioeconomics," Invited Lecture at Institute of Environmental Engineering, Wrocław University of Environmental and Life Sciences, Wrocław, Poland, Jun 13, 2024.

X. Feng, “Membrane technologies applied to water and wastewater treatment,” Invited Lecture at Institute of Environmental Engineering, Wrocław University of Environmental and Life Sciences, Wrocław, Poland, Jun 12, 2024.

X. Feng, “A unified approach to mass transfer in pervaporation, perstraction, and sorption,” Invited Lecture at National Taiwan University of Science and Technology, Taipei, Taiwan, Apr 22, 2024

Y. Li

Li, Y., invited seminar, Design of Polymer Semiconductors for Sensor Applications. Nanjing University of Posts and Telecommunications, Nanjing, China, November 6, 2024.

Li, Y., invited talk, Functional polymer semiconductors for temperature and chemical sensors, 22nd Conference on International Exchange of Professionals – Energy, Chemicals & Nanomaterials, Changzhou, China, November 1-8, 2024

Li, Y., invited seminar, Development of conductive polymers for sensors. Eastern Institute of Technology, Ningbo, China, October 27, 2024.

Li, Y., invited lecture, Polymer semiconductors for organic field effect transistors, Sustainable strategies for Organic Electronics summer school, Université D'Angers, Angers, France, June 24 – July 1, 2023.

Zhao, N., Li, Y., Linear conjugated polymer transformed from a partially conjugated building block for aqueous chemical sensing. Canadian Chemical Engineering Conference (CSChE 2024), Toronto, October 6 – 9, 2024

Wang, Y., Gao, X., Zhe Huang, Z., Li, Y., Investigation of a Coordination Polymer-Based Metastable Metal-Organic Framework Enabled Through Coordinated Water as a Cathode Material for Lithium-Ion Batteries. Canadian Chemical Engineering Conference (CSChE 2024), Toronto, October 6 – 9, 2024

T. Mekonnen

T. Mekonnen (Invited talk): Waterborne sustainable polymers for paper coating and packaging. National Institute of Technology. Rourkela, India.

T. Mekonnen (Invited talk): Navigating the pathways towards zero plastic waste, Packaging Conference at the School of Packaging Michigan State University, East Lansing, Michigan, USA, Feb 13, 2024.

T. Mekonnen (Invited talk): Plastics for Sustainability and Climate Goals. CSC 2024. Winnipeg, MB, Canada. June 3rd, 2024.

T. Mekonnen (Invited talk): Renaissance of papers for food packaging. University of Manitoba, June 6th, Winnipeg, MB, Canada.

T. Mekonnen (Invited talk): Sulfur free rubber crosslinking, and adaptive covalent bonds in rubbers for sustainability. Addis Ababa University, Addis Ababa, Ethiopia. July 17th, 2024.

Ethan, C., Mekonnen, T. Rheology modification and supercritical foaming of PLA. Polymer Research Conference. Waterloo, ON, Canada May 1st, 2024.

T. Mekonnen (Award talk): Plastics for sustainability and climate change. ChCSE 2024. Oct 8th, 2024. Toronto, ON, Canada.

T. Mekonnen (Invited talk): Carbohydrates and PLA for sustainable multifunctional polymeric material design. Nov 6th, 2024. Trent University. Peterborough, ON, Canada.

D. Schipper

Eduarda Omena, Scott McNeil, Derek J. Schipper.* "Reaction Development for the Synthesis of Low Exciton Binding Energy Conjugated Organic Materials. International Symposium on Novel Aromatic Compounds, Toronto, Ontario, August 13, 2024. Poster

(Poster presentation by Abaeva) Mila Abaeva, Ryan Scott, Riley Woods, Tess Fortier, Derek Schipper.* "Imidazopyrimidine-Based Ligands for the Selective Synthesis of Heteromultimetallic Catalysts." 24th Tetrahedron Symposium, Le Corum Congress Center, Montpellier, France. June 19, 2024.

Invited Seminar, University of Manitoba, Winnipeg, Canada, Nov. 29, 2024

Invited Seminar, National Research Council, Mississauga, Canada, Oct.15, 2024.

Invited Lecture, Annual Symposium on Polymer Science and Engineering, Waterloo, Canada, May 2, 2024.

(Poster presentation by Scott) Ryan Scott, Derek Schipper.* "Developments in the synthesis of imidazopyrimidine homogeneous bimetallic ligands." 34th Quebec-Ontario Mini-Symposium for Synthetic and Bioorganic Chemistry, Concordia University, Montreal, Quebec. November 9, 2024.

*Scott received a **Top Poster Presentation Award** for this presentation.*

(Poster presentation by Woods) Riley Woods, Derek J. Schipper* "Design and Synthesis of Imidazopyrimidine-based Trinucleating Ligands" 34th Quebec-Ontario Mini-Symposium for Synthetic and Bioorganic Chemistry, University of Toronto, Toronto, Ontario. November 9, 2024.

(Poster presentation by Abaeva) Mila Abaeva, Tess Fortier, Derek J. Schipper.* "Imidazopyrimidine-based Ligand for the Selective Synthesis of Heteromultimetallic Catalysts." 34th Quebec-Ontario Mini-Symposium for Synthetic and Bioorganic Chemistry, University of Toronto, Toronto, Ontario. November 9, 2024.

(Poster presentation by Ieritano) Christian Ieritano, Mila Abaeva, Alexander Haack, Derek Schipper, and W. Scott Hopkins.* "Symmetry (in)action: How protonation can induce pseudochirality within achiral molecules." 38th ASMS Asilomar Conference, Pacific Grove, California. October 13, 2024.

(Poster presentation by Abaeva) Mila Abaeva, Tess Fortier, Derek J. Schipper.* "Imidazopyrimidine-Based Ligand for the Selective Synthesis of Heteromultimetallic Catalysts." Guelph-Waterloo Centre annual general meeting, Waterloo, Ontario, May 3, 2024.

*Abaeva received the **1st Poster Presentation Prize** for this presentation.*

M. Tam

Invited talk, National Cheng Kung University, 20 March 2024, Tainan, Taiwan

Invited talk, National Taiwan University of Science & Technology, 20 March 2024, Taipei, Taiwan

Invited ACS Science Talks (Virtual), 23 April 2024

Invited talk, City University, 4 March 2024, Hong Kong, China

A. Penlidis

Mavani, B. and A. Penlidis. (2024). From polymers to polymeric sensors and applications. 74th CSChE conference, Toronto, ON, Canada (Oct 6-9, 2024); CJChE Symposium (PM1) session, Mon, Oct 7, 2024 (2:00-4:00 pm). Invited presentation.

Mavani, B. and A. Penlidis. (2024). Unlocking the potential: Exploring polymeric materials as gas detectors. 74th CSChE conference, Toronto, ON, Canada (Oct 6-9, 2024); Advances in Functional Polymers and Polymerization Engineering (AM2) session, Mon, Oct 7, 2024 (10:00-12:00 am).

B. Tzoganakis

M. Bulsari and C. Tzoganakis (2024). "Peroxide-Induced degradation of Polypropylene Blends" accepted in the 2025 Annual Technical Conference (ANTEC) of the Society of Plastics Engineers (SPE), March 3-6, 2025, Philadelphia, PA, USA.

M. Bulsari, C. Mai, M. Hashemnejad, H. Mavridis and C. Tzoganakis (2024). "Peroxide Modification of Polyolefin Elastomers", accepted in the 2025 Annual Technical Conference (ANTEC) of the Society of Plastics Engineers (SPE), March 3-6, 2025, Philadelphia, PA, USA.

E. Vivaldo-Lima

"Uso de herramientas matemáticas en ingeniería de reacciones de polimerización: muchos casos de aplicación con un número reducido de aproximaciones numéricas" (Use of mathematical tools in polymer reaction engineering: many aplication cases with a reduced number of numerical approaches), Eduardo Vivaldo Lima, invited contribution, "2º. Simposio de Matemáticas y Polímeros (SIMAPOL)", Auditorio D de la Facultad de Química de la UNAM, en CdMx, México, 15 y 16 August 2024.

"Deconstructed Lignocellulosic Biomass Products Used As Poly(3,4-ethylenedioxythiophene) Templates" (oral); Rosas Aburto, Alberto; Vivaldo Lima, Eduardo; Perez Salinas, Patricia; Hernández Luna, Martín Guillermo; Alcaraz Cienfuegos, Jorge; Celis Moreno, Giancarlo; Quintero Lizárraga, César David; Sánchez Huerta, Miranda,

E7. Use of Agro-industrial and Marine Biomass SE7-O016 at the 32nd International Materials Research Congress held in Cancun, Mexico, from August 18th to 23rd, 2024.

"SYNTHESIS AND CHARACTERIZATION OF POLYMER NETWORKS OBTAINED IN SUBCRITICAL AND SUPERCRITICAL CARBON DIOXIDE" (poster); Patricia Pérez Salinas, Eduardo Vivaldo Lima, Graeme Moad, Almar Postma, Humberto Vázquez, Alberto Rosas Aburto, 32nd International Materials Research Congress held in Cancun, Mexico, from August 18th to 23rd, 2024.

"SYNTHESIS AND CHARACTERIZATION OF LIGNOSULFONATE COMPOSITE HYDROGEL WITH POLY(ACRYLIC ACID-CO-ACRYLAMIDE) FOR REMOVAL HEAVY METALS" (poster); María Fernanda Munguía Quintero, Alberto Rosas Aburto and Eduardo Vivaldo Lima, 32nd International Materials Research Congress held in Cancun, Mexico, from August 18th to 23rd, 2024.

"Algunas Contribuciones en el Modelado de Procesos de Polimerización Radicálica por Desactivación Reversible" (A few contributions in the modeling of reversible deactivation radical polymerization), Eduardo Vivaldo Lima, Plenary presentation, XII Simposio Nacional de Ingeniería Química y Bioquímica Aplicada, Benemérita Universidad Autónoma de Puebla (BUAP), Ciudad Universitaria, Puebla, México, 9-11 September 2024.

"Desarrollo de tecnologías de producción de materiales de valor agregado a partir de residuos de biomasa lignocelulósica" (Development of technologies for the production of added-value materials from lignocellulosic biomasses), Eduardo Vivaldo Lima, Plenary presentation, 1er Simposio de Polímeros: "De la investigación a la aplicación. Perspectivas interdisciplinarias en polímeros", Escuela Superior de Ingeniería Química e Industrias Extractivas (ESIQIE) del Instituto Politécnica Nacional, Ciudad de México, 14-15 October 2024

B. Zhao

Boxin Zhao, "Bio-inspiration and Polymer Nanotechnology for Soft Matter Engineering and Sustainability", Bio-inspired Materials and Design Symposium, University of Toronto, 2024 June 10 (invited talk)

Boxin Zhao, "Adhesives and Coatings Research for Advanced Materials and Sustainable Development", IPR Annual Symposium on Polymer Science and Engineering 2024, May 1-2, Waterloo, ON (invited talk)

Ashna Rajeev, Sarswati Koul, Aaron Guan, Boxin Zhao, "Nanochitin as a strength-enhancing agent for paper-based packaging materials", Canadian Chemical Engineering Conference, Toronto, Oct 6-9, 2024

Aleksander Cholewinski, Joseph Wortman, William Zhang, Philippe Van Cappellen, Boxin Zhao "Experimental simulations of microplastic flows in fresh and salt water", Canadian Chemical Engineering Conference, Toronto, Oct 6-9, 2024

Lukas Bauman, Boxin Zhao, Orlando Rojas, "Hydrophobic Cellulose Nanofiber as a W/O Pickering emulsifier for ionic polysaccharides", Canadian Chemical Engineering Conference, Toronto, Oct 6-9, 2024

14. PATENTS/MAJOR TECHNICAL REPORT/CHAPTERS IN BOOKS/OTHER

T. Mekonnen

TH Mekonnen, A Gupta - BIODEGRADABLE POLYMER BASED BIOCOMPOSITES. **Application.** US Patent App. 18/699,343, 2024

Behabtu, N., Downey, J., Lenges, C., **Mekonnen, T.** Polysaccharide-elastomer masterbatch compositions. **Granted**. US Patent number 12077640, 2024

A. Penlidis

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M. Tam

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Tam, K.C.; Serrano, J.F., Scaling Sustainable Manufacturing: A Fireside Chat with Solugen CTO & Co-Founder Sean Hunt, ACS Sustainable Resource Management 2024 1 (6), 1037-1040

Moores, A.; Chen, J.; Subramaniam, B.; Tam, K.C.; Biddinger, E.J.; Brady, D.; Carrier, D.J.; Ferrer, I.; Gathergood, N.; Han, H.; Hermans, I.; Hii, K.K.M.; Hwang,B.J.; Kamkar, M.; Leonard, K.; Loh, W.; Loo, S.C.J.; Marr, A.C.; Meier, M.A.R.; Nakamura, R.; Newton, G.N.; Pradeep, T.; Satoh, K.; Srubar III,W.V.; Yan, N.; James, A.; Jha, M.; Shivhare, A.; Serrano, J.F.; Licence, P., Reintroducing the INTRODUCTION: How to Write a Compelling Introduction for the ACS Sustainable Family of Journals, ACS Sustainable Chemistry & Engineering 2024 12 (23), 8581-8583

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C. Tzoganakis

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B. Zhao

Ashna Rajeev, Boxin Zhao, Sara Koul, Aaron Guan, “Nano-chitin as a strength enhancing agent for paper-based packaging materials” USPTO 63/703,149, Oct 3, 2024

15. OTHER HIGHLIGHTS FOR THE YEAR 2021

Jean Duhamel

Jean Duhamel is a member of the Editorial Advisory Board of the journals Polymers and Langmuir.

Michael Tam

Interviewed by Waterloo Record and the news "University of Waterloo researchers mimic trees to turn salt water into drinking water" on was featured on the front page of the newspaper. https://www.therecord.com/news/waterloo-region/university-of-waterloo-researchers-mimic-trees-to-turn-salt-water-into-drinking-water/article_a18b8301-bba0-55c2-b8e5-be0666cb5471.html

Vivaldo-Lima

Prof. Vivaldo-Lima continued his participation as member of FQ-UNAM's Editorial Committee, ongoing since June 2022.

Prof. Vivaldo-Lima continued his membership in the UK Research and Innovation International Development Peer Review College (UK, 2018 to present).

Prof. Vivaldo-Lima continued his role as Patron (Benefactor) of Faculty of Chemistry-UNAM, 2018 to present.

Prof. Vivaldo-Lima continued his participation as member of FQ-UNAM's Honorable Technical Council (HCT) (Maximum technical authority at FQ-UNAM), representing the Department of Chemical Engineering. The appointment goes from August 2023 to July 2027.

A. Penlidis

2024, Journal reviewer, 13 manuscripts
2024, Consultant, 3 companies (USA, Europe); specific names available upon request
2024, Editorial Board Member, Polymer-Plastics Techn. and Eng.
2024, Editorial Board Member, Macromol. React. Eng.
2024, Editorial Board Member, Processes
2024, International/national academic collaborations (regular basis with co-authored articles): UNAM (Mexico), and, more locally, University of Ottawa, UNB, and Ryerson Polytechnic Univ.

2024, Membership in Professional Societies, CIC, CSChE, MSED; Association of Professional Engineers (Europe/Greece); Canadian Academy of Engineering (CAE)

B. Zhao
Board of Directors, Waterloo Institute for Nanotechnology (2022 -2025)

Awarded a CFI-JELF equipment grant for the project titled "Infrared Imaging and Drop Shape Analyzer Systems for Surface Science and Bionanomaterials Development".

Awarded an OCI Collaborate 2 Commercialize grant (2024-2026) for the project with AirBoss Rubber Solutions, titled "Development of Conductive Coatings for Advanced Anti-static Rubber Products"

Awarded an OCI Collaborate 2 Commercialize grant (2024-2025) for the project with Neptune Nanotechnologies, titled “Application of nanochitin to reinforce paper-based products”

APPENDIX 1

INSTITUTE FOR POLYMER RESEARCH
CELEBRATING 40 YEARS OF OFFICIAL INSTITUTE STATUS
FORTY-SIXTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING 2024
E7 7303-7363
Faculty Hall
University of Waterloo, Waterloo, Ontario
Wednesday, May 1, 2024

8:45 a.m. **Open Symposium Portal**

8:50 **Welcome and Opening Remarks**

9:00 - 9:20 **Sanjay Patel, Chemistry, Waterloo**
Could PEF Become the New FRET?
(Winner of 2023 IPR Award for Academic Excellence in Polymer Science/Engineering)

9:20 - 10:20 Industry Speaker: **Dr. Steven Teerstra, Arlenxo**

Elastomers in Commercial Applications – BR, SBR, and Butyl Rubber in Tires to Chewing Gum

10:20 – 10:55 **Coffee**

10:55 – 11:20 **5-Min. Mini Presentations**

1) **Shayan Ghasemi**
   Unlocking the Potential of Interfacial Assembly for Aerogel Bead Fabrication
2) **Monica Ho**
   Polymer-MOF Composite Scaffolds for Direct Air CO_2 Capture
3) **Gillian Binley**
   Hydrogen Peroxide Induced Degradation of Poly(Lactic Acid)
4) **Akliu Getnet Messele**
   Development of a Multi-filler Nanocompsite for Application of X-ray Shielding
5) **Ethan Crawford**
   Melt-Blown Fibers for Oil Spill Remediation and Oil Barrier Geotextiles

11:20 – 11:40 **Ryan Lloyd**
Studying the Interactions Between DNA and Cationic Surfactants by Pyrene Excimer Fluorescence and Dynamic Light Scattering

11:40 – 12:00 **Debela Tadele**
Co-encapsulation of Quercetin and α-Tocopherol Bioactives in Zein Nanoparticles: Synergistic Interactions, Stability, and Controlled Release

12:00-1:00 Lunch

1:00 – 2:00 **Academic presenter: Prof. Alex Penlidis**
Copolymerization Composition Control Policies: Batch, Semi-batch or Flow?

2:00 – 2:20 **5-Min. Mini Presentations**

6) **Aline Braz Ramirez**
3D Printing of Soft-Gel with Bio-Derived Solvent for Biomedical Applications
7) **Shakiba Samsami**
Chaotic 3D-Printing of Cellulose Nanocrystal-based Hydrogels for the Fabrication of Electromagnetic Shields
8) **Shikuan Xu**
Chitosan Thermosensitive Hydrogel System
9) **Tobechukwu Ohaka**
Designing Recyclable Natural Rubber – CNC Vitrimers

2:20 – 2:40 **Saba Karimi**
Thermal Expansion Study on Polymer Stable Glasses

2:40 – 3:00 **Hunter Little**
Probing the Local Density of Macromolecules by Fluorescence **(Winner of the 2023 IPR Award for Academic Excellence in Polymer Science/Engineering)**

3:00 – 3:40 **Coffee**

3:40 – 4:00 **Franklin Frasca**
Determining the Conformations of Pyrene-Labeled Polyamines and Polyols in Solution via Pyrene Excimer Fluorescence

4:00 – 4:20 **Kristijan Lulic**
Pyrene Excimer Formation as a Means to Investigate Persistence Length of Alkyl Methacrylate Copolymers

4:20 – 4:40 **Shahrzad Ghodrati**
Sensing the Invisible: An Overview of Polymeric Materials for Gas Detection

4:40 – 5:00 **Saeed Hadad**
Highly Conductive MXene Quantum Dots/Starch Nanocomposite Polymer Electrolytes for All-Solid-State Lithium-Ion Batteries: Unveiling Insights for Future Sustainable Energy Storage

5:00-5:15 **<u>5-Min. Mini Presentations</u>**

10) Estatira Amirieh
Conductive Bacteria Cellulosic Scaffolds

11) Naixin Zhao
Hydrogen-bond Bearing Conjugated Polymer for Fluoride Sensing

12) Talha Ince
Non-Invasive Sweat
Induction for Wearable
Sweat-Based
Biosensors

5:15 **Closing remarks**

APPENDIX 2

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Dr. William H. Sachs
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El: wsachs@alumni.princeton.edu

24-001 **Solvent-free urethane-based prepolymer as a versatile underwater adhesive material**
L. Yin, A. Cholewinshi, and B. Zhao
Chemical Engineering Journal, 12/23

24-002 **Acetal and Aldehyde-Substituted Thiophene-Benzodithiophene Copolymers for Organic Solar Cells**
S. Flynn, Yi Yuan, S. Cui, H. Liu, X. Li, J. Wang, Y. Li
ACS Applied Energy Materials. 01/24

24-003 **Applications of ionic liquids and deep eutectic solvents for the extraction of phenolic compounds for coal-based crude oils**
L. Yi, X. Wu, L. Guo, J. Chen, M. Gauthier, W. Li
Separation and Purification Technology. 01/24

24-004 **Water/Alcohol-Processable Low-Cost Dihydropyrazine-Based Polymers for Highly Sensitive, Stable and Flexible Temperature Sensors**
S. Jeon, N. Zhao, Y. Yuan, and Y. Li
Advanced Materials Technologies. 01/24

24-005 **Strategic Design of Hemi-Isoindigo Polymer for a Highly Sensitive and Selective All-Printed Flexible Nitrogen Dioxide Chemiresistive Sensor**
J. Ngai, Z. Li, J. Wang, J. He, J. Ding, Y. Li
Small Methods. 01/24

24-006 **A Palladium Precatalyst for Direct Arylation Polymerization**
R. Mirabal, J. Buratynski, R. Scott, D. Schipper
Polymer Chemistry. 01/24

24-007 **Room temperature synthesis, characterization and enhanced gas transport properties of novel poly(oxindolylidene arylene)s with dibenzothiophene, dibenzothiophene-S-oxide and dibenzothiophene-S,S-dioxide fragments in the main chain**
E. Cetina-Mancilla[a]*, C. Camacho-Zuñiga[b], M. Ortencia González-Díaz[c]*, A. Cervantes T.[d], A. F. Ruiz-Treviño[e], E. Vivaldo-Lima[a], R. Vera-Graziano[d], M. G. Zolotukhin[d]*, R. Sulub-Sulub[f], M. Aguilar-Vega
Separation and Purification Technology. 02/24

24-008 **Location of a Hydrophobic Load in Poly(oligo(ethylene glycol) methyl ether methacrylate)s (PEGMAs) Dissolved in Water and Probed by Fluorescence**
J. Thoma, H. Little, and J. Duhamel
Langmuir. 02/24

24-009 **Accurate Determination of the Average Rate Constant of Pyrene Excimer Formation for Pyrene-Labeled Macromolecules from the Analysis of Individual Fluorescence Decays with Sums of Exponentials**
H. Little, S. Patel, D. Suh and J. Duhamel
J. Phys. Chem. B. 02/24

24-010 **Impact of Ionic Strength (Sodium Chloride Concentration) on Homopolymerization and Copolymerization Kinetics of Acrylamide and 2-Acrylamido-2-Methylpropane Sulfonic Acid**
I. Conrod, B. Topcuoglu, A. Penlidis, and A. Scott.
Macromol. React. Eng. 02/24

24-011 **Glycogen Particles Surface Characterized by a Combination of Size Exclusion Chromatography and Pyrene Excimer Fluorescence Before and After Amylolysis**
D. Kim, S. Patel, and J. Duhamel
Carbohydrate Polymers. 03/24

24-012 **Synthesis and Properties of Degradable Polyesters Based on a Lignin Derivative, 4 Hydroxybenzoic Acid**
P. Pan, Z. Cheng, J. Li, L. Djouonkep, Z. Lv, and M. Gauthier
Journal of Polymers and the Environment. 04/24

24-013 **Bulk Free Radical Terpolymerization of Butyl Acrylate, 2-Methylene-1,3-Dioxepane and Vinyl Acetate: Terpolymer Reactivity Ratio Estimation**
M. Movafagh, K. Meek, A. Scott, A. Penlidis, M. Dube
Polymers MDPI. 05/24

24-014 **Synthesis of fluorene-flanked diketopyrrolopyrrole-based semiconducting polymers with thermocleavable side chains and their application in organic field effect transistors**
R. Singh, S. Venkateswarlu, Y. Zhong, Y. Li
The Canadian Journal of Chemical Engineering. 05/24

24-015 **Wide bandgap polymer donors containing dihalovinyl thiophene building blocks for organic solar cells**
Y. Yuan, S. Cui, X. Li, H. Liu, J. Wang, Y. Li
Macromolecules. 05/24

24-016 **Effect of Teak Wood Lignocellulose Pretreatment on the Performance of Cellulose-Graft (Net-Poly(Acrylamide-co-Acrylic Acid)) for Water Absorption and Dye Removal**
M. Vega-Hernández, M. Munguía-Quintero, A. Rosas-Aburto, J. Alcaraz-Cienfuegos, M. de los Ángeles Valdivia-López, M. G. Hernández-Luna, and E. Vivaldo-Lima
Int. J. Biol Macromol. 06/24

24-017 **Flexibility of Poly(Alkyl Methacrylate)s Characterized from 2their Persistence Length Determined by Pyrene Excimer For- 3mation**
K. Lulic, G. Muller, R. Gutierrez, H. Little, and J. Duhamel
Polymers. 07/24

24-018 **Tailoring Polyaniline for Improved Acetaldehyde Detection**
B. Mavani and A. Penlidis
Macromol. React. Eng. (MRE) J. 07/24

24-019 **Advantages of Pyrene Excimer Formation (PEF) Over Fluorescence Resonance Energy Transfer (FRET) for Probing the Conformation of Macromolecules in Solution 3mation**
S. Patel and J. Duhamel
Macromolecules. 08/24

24-020 **Probing the Closed Association of Oligoquinoline Foldamers by Time-Resolved Fluorescence Anisotropy**
K. Lulic, J. Wang, X. Li, N. Markandeya, I. Huc, V. Maurizot, and J. Duhamel
Polymers. 09/24

24-021 **Melamine-Based Nanoscale Porous Organic Frameworks as Multifunctional Separator Modifiers to Mitigate the Polysulfide Shuttle Effect in Lithium–Sulfur Batteries**
R. Fazaeli, Z. Huang, Y. Wang, H. Aliyan, Y. Li
Applied Materials Today. 10/24

24-022 **Synthesis, characterization and evaluation of cellulose-graft-poly(4-vinylpirydine), using cellulose from a new pretreatment process, for heavy metal removal from wastewater**
M. García-Vargas, M. Fernanda Munguía-Quintero, J. Alcaraz-Cienfuegos, A. Rosas-Aburto, M. de los Ángeles Valdivia-López, M. Guillermo Hernández-Luna and E. Vivaldo-Lima
International Journal of Biological Macromolecules. 11/24

24-023 **Unlocking passive collection of microplastics in coral reefs by adhesion measurements**
A. Kim, S. Mitra, B. Zhao
ACS ES&T Water 11/24

24-024 **Full Conjugation in a Polymer with Non-conjugated Piperazine-2,5-dione Units via Energy minimized Lactam-to-Lactim Tautomerization Enables Water-gated Transistor Fluoride Sensors**
N. Zhao, S. Jeon, Yi Yuan, S. Venkateswarlu, A. Stella, J. Papazotos, and Y. Li
Angewandte Chemie International Edition. 11/24

24-025 **Probing Macromolecular Conformation in Restricted Geometry by PEF: Application to Hydrophobically Modified PAMAM Dendrimers Isolated Inside Surfactant Micelles**
D. Liu, S. Patel, Y. Xie, H. Zhang, J. Duhamel
J. Phys. Chem. B. 12/24