

February 2016

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

NEWSLETTER 2015

1. NOTE FROM PROFESSOR JEAN DUHAMEL, IPR DIRECTOR

As we all know, the Institute for Polymer Research, also known as IPR, is an *institute*. But what I was unaware of, at least before last year, was that to be recognized as an *institute*, the activities of an *institute* need to be reviewed and approved by the Senate of the University of Waterloo. As it turns out, this review process is substantial and requires the write up of a report for the University Senate that overviews the activities of the *institute* over the past five years. Fortunately, Alex having gone through the process several times during his long tenure as IPR Director had left Colleen and me with a well-structured document whose information simply needed to be updated and for the update, I need to thank all my IPR colleagues who responded promptly when I requested specific information on their research activities for the Senate Report. Colleen and I gathered and updated the information, packaged it for the report, and after having it reviewed by Alex for feedback, submitted the report to Senate. All this work paid off and the Senate Graduate Research Council gave the IPR a very strong endorsement, renewing the IPR *institute* status for another five years. That the process went so smoothly is certainly a testimony to the long history of excellence in polymer research conducted at the IPR and the collegial atmosphere that exists within the IPR making it a real pleasure to serve as its director.

While the successful renewal of the IPR *institute* status was certainly one of last year's important achievements, another was an impressive IPR symposium where no less than 22 of our IPR students gave oral presentations in front of an audience constituted of the graduate students and professors of the IPR and a total of eleven researchers from the industry sector with representatives from BASF, Afton, Imperial Oil, Arkema, Lorama, OMNOVA, Princeton Polymer, and Xerox. Marzieh Rianhinezhad and Behnam Meschi Amoli were the two recipients of the 2015 annual IPR award for academic excellence in Polymer Science/Engineering. Marzieh's presentation dealt with the "Relationships between Copolymerization Kinetics and Structural Properties of Acrylamide/Acrylic Acid Copolymer" while Behnam discussed about "Hybrid Epoxy-Based Conductive Composites with Macro/Nano Filler Systems". Drs. Doug MacLaren from Imperial Oil with a presentation on "Polymers in the Petroleum Industry: From Additive Chemistry to Feedstock Production to Equipment Fouling" and James Taylor from BASF with a presentation on "Glass Transition Evolution of Plasticized Latex Films" were our two keynote speakers. Our poster session was well-attended with 11 students answering questions about their posters from other students, professors, and our industry visitors. As has been the case in the past years, the IPR Symposium benefitted tremendously from the financial support of the Departments of Chemistry and Chemical Engineering, the Faculties of Science and Engineering, and the Office of Research and the IPR is indebted to them.

Another activity conducted by IPR in 2015 was the offering of the course "Troubleshooting Polymerizations – Tools for Polymerization Troubleshooting: A case Study and Problem-Solving Approach". The course taught by Alex Penlidis and Costas Tzoganakis brought together students and professionals from Green Mantra and Sabic. The feedback from the participants was highly positive and their interest in the course topics was clear. The IPR is thankful to Alex and Costas for putting together such an interesting course.

The IPR community was also fortunate to have two high profile presentations by Profs. Mark Matsen in Physics held on May 27th, 2015 on “Monte Carlo Field-Theoretic Simulations Applied to Block Copolymer Melts” and Michael Tam in Chem. Eng. held on November 10th, 2015 on “Cellulose Nanocrystal-a Promising Sustainable Nanomaterial for Various Advanced Engineering Applications”. Each presentation was very well-attended and was followed by a lively discussion due to the interesting topics that were discussed. Other highlights from 2015 can be viewed at the end of the newsletter but a few stand out. Alex Penlidis was a keynote speaker at the opening ceremony for the 50th Anniversary of Graduate Studies in UNAM’s Faculty of Chemistry and Chemical Engineering. Costas Tzoganakis obtained prestigious Berkley-Haas Open Innovation Award and the Heinz List Award, Extrusion Division, Society of Plastics Engineers. Finally Prof. Mario Gauthier continues to represent the IPR on the international stage as recipient of the High-end Foreign Experts Program Award with Wuhan in the Hubei Province (China).

For this year’s upcoming symposium, we are delighted to announce the two following keynote speakers; Dr. Prince Anthony from 3M (London, ON) who will give a talk on “Pressure Sensitive Adhesives & Related Products: A 3M Core Technology Platform” and Dr. Ian Jobe from NOVA Chemicals (Calgary, AL). Beside our annual IPR symposium to be held on May 4th, 2016, the IPR is also sponsoring a short course entitled “Polymer Characterization – A Molecular Approach: Chromatography, Light Scattering, Rheology, and Fluorescence” that will be taught by Profs. Gauthier, Tam, and myself on June 20th – 22nd, 2016 included. I invite you to check our website for more information. To conclude this introduction to our 2015 newsletter, I speak on behalf of the entire IPR community that we very much look forward to welcoming you at the 2016 IPR symposium.

2. ANNUAL IPR SYMPOSIUM

The 38th Annual IPR Symposium will be held May 4, 2016. A schedule and registration forms have been circulated electronically, as usual.

Many thanks to all who participated in the 2015 Symposium (an audience of about 80 people). IPR received very positive feedback regarding the topics covered. The 2015 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 2015, 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 (see list attached of research personnel, Appendix 4). For more information on any project, please email/call the appropriate supervisor or the IPR office at <ipr@uwaterloo.ca>, 519/888-4789.

6. RECENTLY GRADUATED STUDENTS

J. Duhamel

PhD	Chem	Pirouz, S.	Characterization of Modified PIBSA-Based Dispersants
MASc	Chem	Casier, R.	Visible Light Emission to Probe Inter-Particle Diffusion in Latex Films

X. Feng

MASc	ChE	Wu, K.	Nitrogen removal from natural gas by membranes
PhD	ChE	Wu, S.D.	Thin film composite membranes for nanofiltration and pervaporation
PhD	ChE	Sun, J.	Layer-by-layer self-assembly of nanofiltration membranes

M. Gauthier

MASc	Chem	Casier, R.	Visible Light Emission to Probe Inter-Particle Diffusion in Latex Films
PhD	Chem	Nguon O.	Polymer-Stabilized Transition Metal Nanocatalysts
PhD	Chem	Nguyen, V.	Magnetic Polyion Complex Micelles as Therapy and Diagnostic Agents.

N. McManus

PhD	ChE	Riahinezhad M.	Copolymerization of acrylamide-acrylic acid in aqueous media
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A. Penlidis

MASc	ChE	Scott, A.	Water-soluble copolymers and terpolymers (AAm/AAC/AMPS)
PhD	ChE	Riahinezhad M.	Copolymerization of acrylamide-acrylic acid in aqueous media
PhD	ChE	Amintowlieh, Y.	Scale up of continuous photo-modification process

M. Tam

MASc	ChE	Song, Y.	The Design of Novel Functional Materials Based on Cellulose Nanocrystals/Nanofibrils
MASc	ChE	Zhao, Xinyao	Cationic Cellulose Nanocrystals (CNCs) for the Flocculation of Organic and Inorganic Colloids

C. Tzoganakis

MASc	ChE	Nie, S.	Rheological Properties of Tailor-Made Metallocene and Ziegler-Natta Based Controlled Rheology Polypropylenes
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E. Vivaldo-Lima

M.Eng.	ChE	Lopez-Dominguez, P.	Modeling the copolymerization kinetics of vinyl/divinyl monomers for hydrogel formation in the presence of a RAFT controller
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B. Zhao

PhD	ChE	Zhang, W.	
PhD	ChE	Meschi Amoli, B.	Functionalization and dispersion of silver nanofillers (co-supervised with N. Zhou in MME)

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	Chemistry	Waterloo
	Y. Li	Chem. Eng.	Waterloo
	N. McManus	Chem. Eng.	Waterloo
	A. Penlidis	Chem. Eng.	Waterloo
	L.C. 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—2015

Currently we have **7 member companies**: (refer also Appendix 3)

Afton Chemical
BASF
Compuplast Canada Inc.
Lanxess Inc.
OMNOVA Solutions Inc.
PolyVation, The Netherlands
Princeton Polymer Consultants, USA

9. STUDENT AWARDS

Y. Li

Bin Sun (PhD student) received a WIN Nanofellowship
Jesse Quinn (PhD student) received a WIN Nanofellowship

N. McManus

PhD Student Marzieh Riahinezhad received the Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) top three project.
Certificate in University Teaching award, Centre for Teaching Excellence (CTE);
University of Waterloo, Waterloo, Canada (March 2015)
Merit scholarship, Department of Chemical Engineering, University of Waterloo, Waterloo, Canada (March 2015)
IPR Award for Academic Excellence in Polymer Science/Engineering, Institute for Polymer Research, University of Waterloo, Waterloo, Canada (Jan 2015)

A. Penlidis

PhD student Marzieh Riahinezhad received several awards in 2015 (a total of 4), notable among which are the following two: ADIPEC PhD dissertation award, top 3 finalists out of 501 submissions internationally; and the UW certificate in University Teaching Award (one among 30 nominations).

PhD student Kate Stewart received several recognitions, notable among which are the following: 2nd place overall (out of 60+ posters) in poster competition at the AUTO21 Annual Conference, May 26-27, 2015, Ottawa, ON for “Sensor Array for DUI Detection System”; Best poster in Theme F in poster competition at the AUTO21 Annual Conference, May 26-27, 2015, Ottawa, ON for “Sensor Array for DUI Detection System”; and poster prize (one out of 3) for Best Poster (out of 66 posters) at Polymer Reaction Engineering IX Conference, May 10 - 15, 2015, Cancun, Mexico for “Selecting Polymeric Sensing Materials for the Detection of Ethanol”.

MASc (and now PhD) student, Allison Scott, received yet another prestigious recognition in 2015, the J. Alan George Leadership Award.

In addition, in 2015, one of our experimental set-ups (with PhD student Kate Stewart) was video- taped to be featured in the last AUTO21 Conference, Ottawa, May 26-27, 2015. This promotional video was one of only six to be showcased at the conference (interviews and lab tours).

M. Tam

Debbie Wu- WIN Fellowship

Li Chen- WIN Fellowship

Nathan Grishkewich-William F. Giauque Memorial Awards

X. Wang

Nimer Murshid received a WIN fellowship and an NSERC graduate scholarship.

B. Zhao

Alek Cholewinski, NSERC- Postgraduate Scholarships-Doctoral (PGS D)

Hamed Shahsavan, Queen Elizabeth II Graduate Scholarship

10. FACULTY AWARDS

A. Penlidis

2009-2015 Canada Research Chair, Tier 1 (second 7 year period)

E. Vivaldo-Lima

Winner of the “IMIQ 2014 Award: “B.Eng. Estanislao Ramírez Ruiz” to the excellence in the teaching of Chemical Engineering”, San Luis Potosí, S.L.P., México, October 2014. This is a prestigious lifelong award for excellence in the teaching of Chemical Engineering in Mexico. IMIQ is the equivalent to AIChE in USA or CSE in Canada.

A.Gauthier

Hubei Province High-end Foreign Experts Program Award, Huazhong University of Science and Technology, Wuhan, China (2012-2014).

B. Zhao

2015, Fulbright Visiting Research Chair Award from Fulbright Canada

Y. Li

2015 Engineering Research Excellence Award from the University of Waterloo

11. FULL REFEREED JOURNAL PAPERS**J. Duhamel**

Yang, B.; Duhamel*(2015). Extraction of Oil from Oil Sands Using Thermo-Responsive Polymeric Surfactants. *J. ACS Applied Materials & Interfaces*, 7, 5879-5889.

Pirouz, S.; Duhamel*, J.; Jiang, S.; Duggal, A.(2015). Quantifying the Level of Intermacromolecular Interactions in Ethylene-Propylene Copolymers by Using Pyrene Excimer Formation. *Macromolecules*, 48, 4620-4630.

Pirouz, S. Wang, Y.; Chong, J. M.; Duhamel (2015). Chemical Modification of Polyisobutylene Succinimide Dispersants and Characterization of their Associative Properties. *J. J. Phys. Chem. B*, 119, 12202-12271.

Fowler, M.; Hisko, V.; Henderson, J.; Casier, R.; Li, L.; Thoma, J.; Duhamel*(2015). DiPyMe in SDS Micelles – Artefacts and their Implications on Micellar Properties., *J. Langmuir*, 31, 11971-11981.

Farhangi, S.; Duhamel, J. (2015). Probing Side Chain Dynamics of Branched Macromolecules by Pyrene Excimer Fluorescence. *ASAP Macromolecules*

Farhangi, S.; Duhamel, J. (2016). A Pyrenyl Derivative with a Four Atom-Linker that Can Probe the Local Polarity of Pyrene-Labeled Macromolecules. *ASAP J. Phys. Chem. B*.

X. Feng

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Wu, D., Yu, S., Lawless, D., Feng, X. (2015). "Thin film composite nanofiltration membranes fabricated from polymeric amine polyethylenimine imbedded with monomeric amine piperazine for enhanced salt separation," *Reactive and Functional Polymers*, 86, 168-183 (invited contribution).

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M. Gauthier

Lamboni, L.; Gauthier, M.; Yang, G.; Wang, Q. (2015). Silk Sericin: Applications to Tissue Engineering and Drug Delivery. *Biotechnol. Adv.* 33, 1855-1867.

Whitton, G.; Gauthier, M. (2015). Arborescent Micelles: Dendritic Poly(γ -benzyl L-glutamate) Cores Grafted with Hydrophilic Chain Segments. *J. Polym. Sci., Part A: Polym. Chem.*, early view DOI: 10.1002/pola.27943.

Vagias, A.; Schultze, J.; Doroshenko, M.; Koynov, K.; Butt, H.-J.; Gauthier, M.; Fytas, G.; Vlassopoulos, D. (2015). Molecular Tracer Diffusion in Non-Dilute Polymer Solutions: Universal Master Curve and Glass Transition Effects. *Macromolecules*, early view DOI: 10.1021/acs.macromol.5b01464.

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A. Penlidis

Chen, W.T., K.M.E. Stewart, C.K. Yang, R.R. Mansour, J. Carroll and A. Penlidis (2015). Wearable RF sensor array implementing coupling-matrix readout extraction technique. *IEEE Trans. on Microwave Theory and Techniques (TMTT)*, 63 (12), 4157-4168 (; doi 10.1109/TMTT.2015.2490675).

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M. Tam

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E. Vivaldo-Lima

Zhang, Y., Dubé, M., Vivaldo-Lima, E. (2015). “Modelling Degradative Chain Transfer in d-Limonene/n-Butyl Methacrylate Free-Radical Copolymerization”, *J. Renew. Mater.* 3(4), 318-326, DOI: 10.7569/JRM.2015.634115.

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X. Wang

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B. Zhao

Shahsavani*, H., Muhammad Salili, S., Jákli, A., and Zhao, B. (2015). "Smart Muscle-driven Self-cleaning of Biomimetic Microstructures from Liquid Crystal Elastomers", *Advanced Materials*.

Pan, Z., Wang, T., Sun, S., Zhao, B. (2015). "Durable Multifunctional Microstructures: Combining Electrical Conductivity and Superoleophobicity", *ACS Applied Materials and Interfaces*.

Marzbanrad, E., Zhao, B., Zhou, N., (2015). "Porous silver nanosheets: a novel sensing material for nanoscale and microscale gas flow sensors", *Nanotechnology*.

Zhang, Z., Zhou, Y., Feng, K., Trinidad, J., Yu, A., and Zhao, B. (2015). "Morphologically Controlled Bio-Inspired Dopamine-Polypyrrole Nanostructures with Tunable Electrical Properties" *Advanced Electronic Materials*.

Sun*, S., Pan*, Z., Yang*, F., Huang, Y., Zhao, B. (2015). "A transparent silica colloidal crystal/PDMS composite film and its application for crack suppression of metallic coatings", *Journal of Colloid and Interface Science*.

Jun, Y., Sy, S., Ahn, W., Zarrin, H., Rasen, L., Tjandra, R., Meschi Amoli*, B, Zhao, B. Chiu, G., Yu, A. (2015). "Highly Conductive Interconnected Graphene Foam Based Polymer Composite", *Carbon*, Accepted Aug 2015, 10.1016/j.carbon.2015.08.079

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Shahsavani*, H., Quinn, J., d'Eon, J., Zhao, B. (2015). "Surface Modification of Polydimethylsiloxane Elastomer for Stable Hydrophilicity, Optical Transparency and Film Lubrication", *Colloids and Surfaces A: Physicochemical and Engineering Aspects*.

Zhang*, W., Meschi Amoli*, B., d'Eon, J., Zhao, B., Chen, A. (2015). "Application of Novel Dopamine-polypyrrole Nanofibers for Electrically Conductive Adhesives", *Journal of Surface Mount Technology*.

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Meschi Amoli*, B., Hu, A., Zho, N.Y., Zhao, B. (2015). "Recent Progresses on Hybrid Micro-nano Filler Systems for Developing Advanced Electrically Conductive Adhesives", *J. Materials Science: Materials in Electronics*, 1-16

Zhang*, W., Pan*, Z., Yang, F.K., Zhao, B. (2015). "A Facile In-Situ Approach to Polypyrrole Functionalization through Bio-Inspired Catechols", *Advanced Functional Materials*, 2015, 25(10), 1588-1597

13. CONFERENCE PRESENTATIONS/INVITED SEMINARS

J. Duhamel

Duhamel, J. (2015). Innovations in the Coating Industry. Duhamel, J. 102nd Annual Conference of the Canadian Paint and Coating Association, Niagara-on-the-Lake, May 27-29, 2015.

Farhangi, S.; Duhamel, J. (2015). A Novel Pyrenyl Derivative to Probe the Local Polarity of Pyrene-Labeled Macromolecules. XXIV IMRC, Cancun, Mexico, August 16-20, 2015.

Duhamel, J. (2015). Pyrene Excimer Fluorescence to Probe the Side Chains of Branched Macromolecules. **Keynote speaker** at the Semana de Química Internacional at the University of Chihuahua, Chihuahua, Mexico, October 5-9, 2015.

Kim, D., Amos, R., Duhamel, J. and Gauthier, M. (2015). Hydrophobic Modification of Starch Nanoparticles for Drug Delivery, , Polymat-2015, Huatulco, Mexico, October 18-22, 2015.

Raimbault, J., Casier, R., Little, H., Duhamel, J. (2015). Probing Intermolecular Forces by Pyrene Excimer Formation, Polymat-2015, Huatulco, Mexico, October 18-22, 2015.

Duhamel, J. (2015). What Can Fluorescence Resonance Energy Transfer Do that Pyrene Excimer Formation Can't? Macromolecules and Interfaces Institute at Virginia Tech, Blacksburg, VA, USA, November 4-5, 2015.

X. Feng

Sampranpiboon, P, Feng, X. (2015). "Removal of hexavalent chromium from water using carbonaceous product of mangosteen activated with potassium hydroxide and phosphoric acid," presented at the 5th International Conference on Green and Sustainable Innovation (ICGSI2015), Pattaya, Thailand, Nov 8-10, 2015.

Feng, X. (2015). "Membrane applications - from wastewater to aerospace," presented at the 5th Canadian Symposium on Teaching & Research Excellence, Waterloo, ON Sep11-12, 2015.

Feng, X. (2015). "Pervaporative extraction of phenol from dilute aqueous solutions as high purity crystals," **Invited Keynote** at the 9th Conference of Aseanian Membrane Society (AMS9), Taipei, Taiwan, July 19-21, 2015.

Li, H.B., Shi, Q., Liu, D.Q., Zhang, Y.F, Meng, J.Q., Du, R.R, Feng, X. (2015). "Preparation and characterization of PPTA/PVDF blend membranes by in situ polycondensation for improved fouling and compaction resistances," presented at the 9th Conference of Aseanian Membrane Society (AMS9), Taipei, Taiwan, July 19-21, 2015.

Feng, X. (2015). "Membranes for gas separations," a lecture series presented at Taiyuan University of Technology, Taiyuan, China, June 23-26 and July 6-8, 2015.

Wu, D., Martin, J., Du, J., Zhang, Y., Lawless, D., Feng, X. (2015). "Thin film composite membranes comprising of interfacially polymerized polyamide and self-polymerized polydopamine for ethylene glycol dehydration", **Invited Keynote** at the 8th International Conference on Materials for Advanced Technologies (ICMAT'2015), Singapore, June 28 - July 3, 2015.

Feng, X. (2015). "CO₂ capture by high-flux asymmetric hollow fibers and facilitated transport membranes," Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, China, June 25, 2015.

Feng, X. (2015). "Advances in membrane technology for water treatment," presented at Joint Workshop on Water Research (Hohai University, University of Waterloo Water Institute), Nanjing, China, May 29-30, 2015.

Feng, X. (2015). "Polymer-enhanced ultrafiltration for heavy metal removal from water," Zhejiang University of Technology, Hangzhou, China, May 28, 2015.

Feng, X. (2015). "Advances in membrane technology for water treatment," presented at the First Sino-Canada Water Environment Workshop, Hangzhou, China, May 27-28, 2015.

Feng, X. (2015). "Advanced membranes for water treatment," presented at the China-Canada Workshop on Water Science, Chongqing, China, May 25-26, 2015.

Feng, X. (2015). "Advances in membrane technology," presented at Joint Workshop on Water Research (Wuhan University, China University of Geosciences, and University of Waterloo Water Institute), Wuhan, China, May 21 - 22, 2015.

Feng, X. (2015). "Permeate pressure build-up in hollow fiber membranes: Facts and perceptions," **Keynote Lecture** at the 2nd International Conference on Fluid Flow, Heat and Mass Transfer (FFHMT'15), Ottawa, ON, Apr 30 - May 1, 2015.

M. Gauthier

Huazhong University of Science and Technology, Wuhan, China, March 2015. "Metallic Nanoparticles for Biomedical and Catalysis Applications"

24th International Materials Research Conference, August 2015, Cancún, México. "Magnetic Micelles as Therapy and Diagnostic (Theranostic) Agents"

24th International Materials Research Conference, August 2015, Cancún, México. “Arborescent Polypeptides for Sustained Drug Delivery”

International Conference on Polymers and Advanced Materials (Polymat), October 2015, Huatulco, Mexico. “Hydrophobic Modification of Starch Nanoparticles for Drug Delivery”

98th Canadian Chemistry Conference, June 2015, Ottawa, ON. “Arborescent Polymers as Templates for the Preparation of Metallic Nanoparticles”

98th Canadian Chemistry Conference, June 2015, Ottawa, ON. “Synthesis of Vegetable Oil-Based Resins”

98th Canadian Chemistry Conference, June 2015, Ottawa, ON. “Use of Pyrene Excimer Fluorescence to Probe Polymer Chain Diffusion Between Latex Particles During Film Formation”

98th Canadian Chemistry Conference, June 2015, Ottawa, ON. “Water-Soluble Micelles by Complexation of Arborescent Copolymers and Double-Hydrophilic Block Copolymers”

Y. Li

Sun B, Hong W, Aziz H, Li Y. (2015). Record Electron Mobility for Polymer Semiconductor Thin-film Transistors Based on a New Building Block. 64th Canadian Chemical Engineering Conference, Niagara Falls, Canada

He Y, Guo C, Quinn J, Sun B, Li Y. (2015). Synthesis of (3E,7E)-3,7- bis(2-oxoindolin-3-ylidene)-5,7-dihydropyrrolo[2,3-f]indole-2,6(1H,3H)-dione Based Polymers and their Application in Organic Thin Film Transistors. 98th Canadian Chemistry Conference and Exhibition, Ottawa, Canada

Yan Z, Sun B, He Y, Guo C. (2015). Structural design, synthesis and processing of polymer semiconductors for n-channel thin film transistors. 98th Canadian Chemistry Conference and Exhibition, Ottawa, Canada

Quinn J, Jin E, Li Y. (2015). Pyrimido[4,5-g]quinazoline-4,9-dione Based p-Conjugated Small Molecules and Polymers for Organic Thin-film Transistors. 98th Canadian Chemistry Conference and Exhibition, Ottawa, Canada

Li, Y. Development of high mobility polymer semiconductors for p-channel, n-channel, and ambipolar thin film transistors. The 227th ECS Meeting, Chicago, United States

A. Penlidis

Penlidis, A. (2015). Development of basic and applied research that sells: The role of Polymer Reaction Engineering (PRE) in the continuous success with industry of the Institute for Polymer Research (IPR) of the University of Waterloo (and a few thoughts about a future roadmap in PRE). UNAM Colloquium on ‘New Trends in PRE’, May 18, 2015, Mexico City, Mexico. **Invited Keynote Lecture at the opening ceremonies for the 50th Anniversary of Graduate Studies in UNAM’s Faculty of Chemistry and Chemical Engineering, and the 100th Anniversary of UNAM’s Faculty of Chemistry and Chemical Engineering. I consider this to be one of the highest honours and recognitions of my career so far (the opening lecture among 4 international speakers from Canada, USA and Europe).**

Riahinezhad, M., N. McManus and A. Penlidis (2015). Can copolymerization kinetics help tailor properties of poly(acrylamide-acrylic acid) for enhanced oil recovery? ADIPEC Confrence (Excellence in Energy 2015) and Award Ceremony, Abu Dhabi, UAE, Nov 9-12, 2015. **Invited presentation**; award presentation to Marzieh Riahinezhad (top 3 ‘best dissertation’ finalists).

Riahinezhad, M., N. McManus and A. Penlidis (2015). How to go full circle from polymerization kinetics (fundamentals) to final desirable application properties (applied engineering). Eur. Fed. Chem. Eng., Workshop on PRE, Furstenfeldbruck (near Munich), Germany, Oct 30-Nov 1, 2015. **Invited presentation.**

Chen, W.T., K.M.E. Stewart, R.R. Mansour, and A. Penlidis (2015). Polymeric sensing material-based selectivity-enhanced RF resonant cavity sensor for volatile organic compound (VOC) detection. IEEE MTT-S International Microwave Symposium (IMS 2015), paper # 1333, May 17-22, 2015, Phoenix AZ, USA.

Riahinezhad, M., N.T. McManus and A. Penlidis (2015). Can copolymerization kinetics help tailor properties of poly(acrylamide/acrylic acid) for enhanced oil recovery? PRE 9, Cancun, Mexico, May 10-15, 2015. **Invited presentation.**

Tzoganakis, C., Y. Amintowlieh, P. Sardashti and A. Penlidis (2015). Modification of polyolefins via UV-initiated reactive extrusion (ms length 5 pgs). SPE Intern. Polyolefins Conf., Houston TX USA, Feb 22-25, 2015.

Amintowlieh, Y., C. Tzoganakis and A. Penlidis (2015). Long-chain branching of polypropylene via UV radiation: Effect of coagent and other radiation variables on continuous modification. ANTEC 2015, March 23-25, 2015, Orlando, FL, USA.

M. Tam

Wu, X., Tang J., Duan, Y., Yu, A.P., Berry, R.M., Tam, K.C., (2015). Conductive Cellulose Nanocrystals with High Cycling Stability for Supercapacitor Applications, PAPTAC Workshop, Montreal, Quebec, Canada, February 2-3, 2015

Chen, L., Berry, R., Tam, K.C., (2015). Synthesis of β -cyclodextrin modified cellulose nanocrystals (CNCs@Fe₃O₄@SiO₂) superparamagnetic nanorods, PAPTAC Workshop, Montreal, Quebec, Canada, February 2-3, 2015

C. Tzoganakis

Tzoganakis, C., Amintowlieh, Y., Sardashti, P., Penlidis, A. (2015). "Modification of Polyolefins via UV Initiated Reactive Extrusion", 2015 SPE International Polyolefins Conference, February 22-25, 2015, Houston, TX, USA

Tzoganakis, C. (2015), "Rubber Devulcanization through Extrusion with Supercritical Carbon Dioxide", Chinese Rubber Recycling Association, December 2015, Shanghai, China.

E. Vivaldo-Lima

Vivaldo-Lima, E. (2015). "Modelación de cinética de polimerización y desarrollo de materiales novedosos usando polimerización vía radicales libres con desactivación reversible" (Modeling polymerization kinetics and development of novel materials by reversible deactivation radical polymerization), invited conference, "Premios Universidad Nacional" (National University Awardees) Seminar Program, organized by Colegio de Sinaloa, Facultad de Ciencias Químico-Biológicas, Universidad Autónoma de Sinaloa, Culiacán, Sinaloa, June 2, 2015.

Vivaldo-Lima, E. (2015). "Producción de bioetanol de segunda generación a partir de residuos lignocelulósicos: participación en redes de investigación multinacionales que desarrollan tecnologías innovadoras y competitivas a nivel mundial" (production of second generation bioetanol from lignocellulosic biomasses: participation in multinational research networks that develop innovative and competitive technologies worldwide), invited conference, "Premios Universidad Nacional" (National

University Awardees) Seminar Program, organized by Colegio de Sinaloa, Programa de Educación Continua de la Universidad Politécnica de Sinaloa, Mazatlán, Sinaloa, Sinaloa, June 3, 2015.

Vivaldo-Lima, E. (2015). Radio Interview for “En Curso” program from El Colegio de Sinaloa, about research in bioethanol production from second generation lignocellulosic biomasses:
<https://www.youtube.com/watch?v=Eb9Xf59GQfg&feature=share>

López-Domínguez, P., Hernández-Ortiz, J.C., Jaramillo-Soto, G., Vivaldo-Lima, E. (2015). “Modeling of RAFT Copolymerization with Crosslinking of Vinyl/Divinyl Monomers in Supercritical Carbon Dioxide”, Polymer Reaction Engineering IX, Cancún, Quintana Roo, May 10-15, 2015.

Pérez-Salinas, P., Orea-Cortina, D., Jaramillo-Soto, G., and Vivaldo-Lima, E. (2015). “Controlled Release of Vitamin B-12 using Hydrogels Synthesized by RAFT Copolymerization with Crosslinking in scCO₂”, Polymer Reaction Engineering IX, Cancún, Quintana Roo, May 10-15, 2015.

Antonio-Hernández, C.H., Rosas-Aburto, E., Pérez-Salinas, P., López-Domínguez, P., Vivaldo-Lima, E. (2015). “SEMIBATCH COPOLYMERIZATION OF 2-HYDROXYETHYL METHACRYLATE AND ETHYLENE GLYCOL DIMETHACRYLATE”, Polymer Reaction Engineering IX, Cancún, Quintana Roo, May 10-15, 2015.

Hernández-Meléndez, O., Montiel-Pacheco, C., Hernández-Luna, M., Bárzana, E., Vivaldo-Lima, E. (2015). “PRODUCTION AND CHARACTERIZATION OF DECONSTRUCTED BIOPOLYMERS AND SECOND GENERATION BIOETHANOL FROM LIGNOCELLULOSIC BIOMASSES”, Polymer Reaction Engineering IX, Cancún, Quintana Roo, May 10-15, 2015.

Vivaldo-Lima, E. (2015). “Building and preserving academic and industrial research networks in the field of polymer reaction engineering”, Colloquium “New Trends in Polymer Reaction Engineering”, Facultad de Química, Universidad Nacional Autónoma de México, México D.F., México, May 18, 2015.

Vivaldo-Lima, E. (2015). “Copolymerization of limonene: Towards more sustainable polymers”, Yujie Zhang, Marc A. Dubé and Eduardo Vivaldo-Lima, 98th Canadian Chemistry Conference, Ottawa, Ontario, June 13-17, 2015.

X. Wang

Ryerson University, 2015, September 11, Toronto, Canada

Tsinghua University, 2015, August 17, Beijing, China

Soochow University and the University of Waterloo Strategic Research Workshop, 2015, April 7-9, Soochow, China

National Chiao Tung University, 2015, April 13, Taiwan

Ulsan National Institute of Science and Technology, 2015, April 20, Korea

Beijing University of Chemical Technology, 2015, April 22, China

Zhejiang University of Technology, 2015, April 27, China

The University of Western Ontario, 2015, April 1, ON

B. Zhao

Zhang W., Zhao, B. (2015). "Zebra Mussel-inspired Electrically Conductive Polymer Nanofiber", Centre for Bioengineering & Biotechnology (CBB), Waterloo, June 11, 2015

Shahsavani*, H., Muhammad Salili, S., Jáklí, A., Zhao, B. (2015). "Liquid Crystal Elastomers and Networks with Hybrid Alignment for Novel Interfacial Engineering Applications", 8th International Liquid Crystal Elastomer Conference (ILCEC15), October 2-7, Erice, Italy

Cholewinski, A., Yang, K., and Zhao, B., (2015). "Bioinspired Adhesive Hydrogels for Biomedical Applications", Gordon Research Conference - Science of Adhesion, South Hadley, MA, July 26-31, 2015.

Yang, F.K., Cholewinski, A., Zhang, W., Zhao, B. (2015). "Tuning of Hydrogel Adhesion via Manipulated Rapid Formation of Nanoscale Gel Networks", Gordon Research Conference - Science of Adhesion, South Hadley, MA, July 26-31, 2015.

Pan, Z. Zhao, B. (2015). The study of self-cleaning property and oil adhesion reduction of bio-inspired superoleophobic micropillars, IPR Annual Symposium, Waterloo, Ontario, May 6, 2015.

Meschi Amoli, B., Trinidad, J., Zhou, N.Y., Zhao, B., Chen, A., Persic J., Lyn, R. (2015). "The Use Of Graphene To Replace Silver In Electrically Conductive Adhesives - An Study On Electrical Conductivity And Mechanical Properties", International Conference on Soldering and Reliability (ICSR), Markham, Ontario, Canada May 19-21, 2015

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

J. Duhamel

Duhamel, J. (2015). Pyrene-Labeled Water-Soluble Macromolecules as Fluorescent Mimics of Associative Thickeners. Duhamel, J. in *Fluorescence in Organic Polymer Science*; **2015**, Ed. Procházka, K.; Springer Series on Fluorescence.

X. Feng

Zhang, B., Sampranpiboon, P., Feng, X (2015). Pervaporative extraction of dairy aroma compounds in: Membrane Separations for Dairy Streams and Ingredients, K. Hu, J. Dickson (Eds.), Chapter 7, John Wiley and Sons.

Feng, X. Lawless, D.F. (2015). "Unsteady-state gas permeation process," US Patent No. 9,044,703 (issued Jun 2, 2015).

M. Gauthier

Gauthier, M.(2015). Arborescent Graft Polymers (*Invited Book Chapter*). In *Encyclopedia of Polymeric Nanomaterials*, Kobayashi, S.; Müllen, K. Eds. Springer: Berlin, 2015, 64-70.

Y. Li

Li, X.; Wang, J.; Quinn, J.; Guo, L.; Wang, J.; Li, Y. Organic semiconductors containing large heterocyclic moiety and their devices. U. S. Provisional Appl. No. 62262640 (December 3, 2015).

Li, Y.; Ong, B. S.; Wu, Y.; Liu, P. Compound having indolocarbazole moiety and divalent linkage. U.S. Patent 9,184,391 (November 10, 2015).

Chen, Z.; Li, J.; Ong, B.; Sonar, P.; Ong, K. H.; Ng, G. M.; Lim, S. L.; Singh, S. P.; Li, Y. P-type materials and organic electronic devices. U.S. Patent 9,166,167 (October 20, 2015).

Li, Y.; Deng, Y. Organic semiconductors based on quinoidal thiophene-oxide and its analogues and their devices. US Provisional Appl. No. 62182582 (21 Jun 2015)

A. Penlidis

Polak, M.A., H. Sepiani and A. Penlidis. Modelling Material Behaviour of Polymers, Chapter in Computational Modelling, Optimization, and Manufacturing Simulation of Advanced Engineering Materials (25 pgs), (Pablo Munoz-Rojas, Ed.), Elsevier.

M. Tam

Process for Preparing Amine-functionalized Cellulose Nanocrystals and Nitrogen Doped Carbon Nanofibres, by Shi Z, Wu, X, Tam, KC, Berry, RM, Patent Application No 62/197,815 , July 28, 2015.

C. Tzoganakis

Tzoganakis, C., Amintowlieh, Y., Penlidis, A. (2015). US Patent 14/684,261, filed on June 15/15, "Method for Modifying Polyolefin to Increase Long Chain Branching".

E. Vivaldo-Lima

A positive book review for "*Handbook of Polymer Synthesis, Characterization and Processing*, Edited by Enrique Saldívar-Guerra and Eduardo Vivaldo-Lima" (2013) was provided in *Angewandte Chemie* (Annette Schmidt, *Angewandte Chemie International Edition*, Volume 53, Issue 2, page 358, January 7, 2014, DOI: 10.1002/anie.201309282). The review concludes that "Handbook of Polymer Synthesis, Characterization and Processing is a valuable reference work for everyone working in the area of polymer science and technology, and for advanced students who wish to get a good insight into specific aspects of this field".

X. Wang

Wang, X. S.; Cao, K.; Murshid, N. Synthesis and Hydration of Hydrophobic Metal-Carbonyl Building Blocks for Aqueous Vesicles: High Structure Integration, High Efficiency of Encapsulation, Self-Enhanced IR Absorption and Fluorescent Sensing. patent pending.

B. Zhao

Boxin Zhao, Wei Zhang, Fut (Kuo) Yang (2014). "Fabrication, Composition and Application of Electrically Conductive Catechol-Polypyrrole Nanofibers", Provisional US Patent Application # 62/054,192.

15. OTHER HIGHLIGHTS FOR YEAR 2015

Penlidis, A. (2015). Development of basic and applied research that sells: The role of Polymer Reaction Engineering (PRE) in the continuous success with industry of the Institute for Polymer Research (IPR) of the University of Waterloo (and a few thoughts about a future roadmap in PRE). UNAM Colloquium on 'New Trends in PRE', May 18, 2015, Mexico City, Mexico. **Invited Keynote Lecture at the opening ceremonies for the 50th Anniversary of Graduate Studies in UNAM's Faculty of Chemistry and Chemical Engineering, and the 100th Anniversary of UNAM's Faculty of Chemistry and Chemical Engineering. I consider this to be one of the highest honours and recognitions of my career so far (the opening lecture among 4 international speakers from Canada, USA and Europe).**

Alex Penlidis' ex-PhD students has recently accepted an academic position, which brings my 'academic' PhDs to 10 out of 30 so far.

Alex Penlidis' polymer reactor simulation package WATPOLY is being used at the Univ. of Ottawa, Canada, UNAM, Mexico, and in Iran (recent collaboration), helping people with their research and mentioned in refereed publications. More and more research groups are using our work on copolymerization as a 'standard' (e.g., recent research groups from India, Ottawa, McGill and Toronto).

Journal reviewer, 24 manuscripts (many requests from editors to act as adjudicator between reviewers)

Consultant; 7 companies (Canada, USA, Europe); specific names available upon request

Editorial Board Member, J. Macromol. Sci.-Pure and Appl. Chem. (considerable work as editorial board member promoting special issues, organizing surveys and adjudicating for editor)

Editorial Board Member, Polymer-Plastics Techn. and Eng.

Editorial Board Member, Macromol. React. Eng. (considerable work as editorial board member guest-editing special issues, promoting the journal and adjudicating for editor)

MITACS College of Reviewers

International academic collaborations (regular basis with co-authored articles): UNAM (Mexico), Los Andes (Venezuela), Univ. of Guanajuato (Mexico), and (more locally), University of Ottawa, Ryerson Polytechnic Univ. and McGill Univ.

Alex was organizer/Lecturer of the 34th North American Intensive Industrial Short Course, June 22-24, 2015 (audience of 8 polymer scientists/engineers), Waterloo, ON

PRE 9, Cancun, Mexico; this is the most prestigious conference in my area, held once in 3 yrs with no parallel sessions. I have been involved with the organization/coordination of all of them, since the early 90s. For PRE 9 (chaired by one of my ex-PhD students for the 2nd time), I acted as session organizer and chair for 2 half-day sessions, presented an invited paper, and my PhD students presented 3 posters that became publications in a special issue. One poster (Kate Stewart) received one (of 3) poster awards among 66 posters.

Alex Penlidis was interviewed (Feb/Mar 2015) for Ottawa Life Magazine with my ex-PhD student Marc Dube, now Assoc Dean in the Dept of Chem Eng, Univ of Ottawa, on the use of polymers in 'green' plastics

Jean Duhamel taught a 1-wk course (15 hrs) "Fluorescence: Principles, Theory, and Application to the Characterization of Macromolecules and their Supramolecular Assemblies" at the Semana de Qimica Internacional at the University of Chihuahua, Chihuahua, Mexico, October 5-9, 2015.

Jean Duhamel is the PI for a \$ 150K NSERC Research Tools and Instruments award for a fast time-resolved fluorometer with Profs. Yuning Li, Juewen Liu, Michael Palmer, and Thorsten Dickmann.

Michael Tam was Appointed Associate Editor, ACS Sustainable Chemistry & Engineering

E. Vivaldo-Lima continues to participate as Member of the Editorial Board of Journal of Macromolecular Science, Part A: Pure & Applied Chemistry (Taylor & Francis).

E. Vivaldo-Lima was conference chair of “Polymer Reaction Engineering 9 (PRE-9)”, organized by Engineering Conferences International (ECI). The conference took place May 10-15, 2015, in Cancún, Quintana Roo, México. PRE 9 was co-chaired by Dr. Jon Debling (BASF, USA), Dr. Fernando Zaldo-García (COMEX, México) and Prof. John Tsavalas (University of New Hampshire, USA). The conference, the major North American conference on emerging technologies and scientific advancements in the area of polymer reaction engineering, provided an update on several core and emerging aspects of PRE, and was organized into six lecture sessions and two poster sessions. A special issue of Macromolecular Symposia (volume 360) dedicated to PRE-9, edited by E. Vivaldo-Lima, is expected to appear in February 2016. More information is available in: <http://www.engconf.org/past-conferences/2015-conferences/polymer-reaction-engineering-ix-pre-9/>

E. Vivaldo-Lima organized the colloquium “New trends in Polymer Reaction Engineering” as a post PRE-9 activity in Mexico, and as part of the celebrations on the 50 years of research activities at UNAM’s Faculty of Chemistry. The colloquium took place on May 18, 2015, at Facultad de Química, Universidad Nacional Autónoma de México, Mexico City, Mexico. The invited speakers were (in order of presentation): Eduardo Vivaldo-Lima (FQ-UNAM), Alex Penlidis (U. of Waterloo, Canada), Marco A. Villalobos (Cabot Corporation, USA), Marc A. Dubé (U. of Ottawa, Canada), and Markus Busch (Technische Universität Darmstadt, Germany). More information is available at: http://webcast.unam.mx/?tribe_events=coloquio-new-trends-in-polymer-reaction-engineering

Boxin Zhao was featured in Waterloo stories March 30, 2015 Zebra mussel is inspiration for human body super glue <https://uwaterloo.ca/stories/zebra-mussel-inspiration-human-body-super-glue-0>. As well as in the Globe and Mail on September 23. Amazing Technology (Inspired by Birds, Bees and Beetles) <https://gereports.ca/amazing-technology-inspired-birds-bees-beetles/>

Prof. Tzoganakis’ startup company, Tyromer Inc., was recognized through a prestigious **Berkley-Haas Open Innovation Award** in Santa Clara, CA (2015)
<http://woic.corporateinnovation.berkeley.edu/industry-awards/>
<http://www.newsunited.com/ninesigma-and-berkeley-haas-announce-news/20065246/>
http://article.wn.com/view/2015/12/03/NineSigma_and_BerkeleyHaas_Announce_Open_Innovation_Award_Wi/

Professor Tzoganakis was awarded the **Heinz List Award, Extrusion Division, Society of Plastics Engineers** (2015)

The Heinz List Award is presented each year to an individual who has made outstanding contributions and achievements in the area of polymer devolatilization and/or reactive polymerization technologies. This award is sponsored by List AG, Switzerland.

http://www.listdryprocessing.com/fileadmin/user_upload/download/news/2015_Heinz_List_Award_Webseite.pdf

<https://uwaterloo.ca/institute-polymer-research/news/professor-costas-tzoganakis-recipient-2015-heinz-list-award>

INSTITUTE FOR POLYMER RESEARCH
CELEBRATING 31 YEARS OF OFFICIAL INSTITUTE STATUS
THIRTY-SEVENTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING 2015
Conrad Grebel College
Great Hall
University of Waterloo, Waterloo, Ontario
Wednesday, May 6, 2015

8:30 a.m.	Coffee
8:50	Welcome and Opening Remarks
9:00 - 9:20	Marzieh Rianhinezhad , Chemical Engineering, Waterloo Relationships between copolymerization kinetics and structural properties of acrylamide/acrylic acid copolymer (Winner of the 2014 IPR Award for Academic Excellence in Polymer Science/Engineering)
9:20 - 10:00	Industry Speaker: Dr. James Taylor BASF Title
10:00 – 10:25	<u>5-Min. Mini Presentations</u> 1) Yu Chai Crystallization of low molecular weight atactic polystyrene 2) Kai Cao Synthesis of main-chain metal carbonyl organometallic macromolecules (MCMCOMs) by migration insertion polymerization (MIP) 3) Shouliang Nie Rheological properties of tailor-made metallocene and Ziegler-Natta based controlled rheology polypropylenes 4) Zihe Pan The study of self-cleaning property and oil adhesion reduction of bio-inspired superoleophobic micropillars 5) Lu Li Intramolecular Chain Dynamics of Polysaccharides Probed by Pyrene Excimer Formation
10:25 - 10:45	Coffee
10:45 - 11:05	Alison Scott Reactivity ratio estimation for AMPS/AAm and AMPS/AAC copolymers: a comparative experimental study
11:05 – 11:25	Yasam Amin How to Scale-up Polypropylene Photo-modification Process
11:25 – 12:00	<u>5-Min. Mini Presentations</u>

- 6) **Yung Priscilla Lai**
Development of weak cation exchange membrane absorber materials for protein capture
- 7) **Mosa Alsehli**
Arborescent polypeptides for sustained drug release
- 8) **Yinghui He**
Developing Novel Materials for Perovskite Solar Cells.
- 9) **Li Chen**
Enhanced catalytic property of gold nanoparticles loaded on polyamidoamine dendrimer-grafted cellulose nanocrystals
- 10) **Dapeng Liu**
Temperature stimulated self-assembly of metal organometallic polymer PFpP in DMSO

12:00 - 1:00

Lunch

1:00 - 1:40

Industry Speaker: **Dr. Bryce McGarvey, Esso**
Title:

1:40 – 2:00

Kate Stewart
Tips for selecting polymeric ethanol-sensing materials: Detection mechanisms and sensing materials

2:00 – 2:20

Remi Casier
Use of Pyrene Excimer Fluorescence to Probe Polymer Chain Diffusion between Latex Particles during Film Formation

2:20 - 2:40

Shiva Farhangi
Novel Pyrenyl Derivative to Probe Polymer Polarity

2:40 - 3:00

Behnam Meschi Amoli, Chemical Engineering, Waterloo
Title: Hybrid epoxy-based conductive composites with Macro/nano filler systems
(Winner of 2014 IPR Award for Academic Excellence in Polymer Science/Engineering)

3:00 - 3:20

Coffee

3:20 - 3:40

Nishil Mohammed
Cellulose nanocrystals incorporated hydrogels for wastewater treatment

3:40 - 4:00

Vo Thu An Nguyen
Magnetic micelles as therapy and diagnostic (theranostic) agents

4:00 - 4:20

Shuixiu Lai
Sorption separation of phenolic compounds from wastewater

4:20 – 4:40

Nimer Murshid
Synthesis and Self-Assembly of Iron-Carbonyl Amphiphilic Macromolecules

4:40 – 5:00

Ryan Amos
Synthesis of Vegetable Oil-Based Resins

5:00

Closing remarks

6:00 - 7:30

IPR Industrial Member DINNER
University Club, Main Dining Room

7:30 - 9:00

Poster Presentations and Informal Get-together
University Club, Main Dining Room
(IPR graduate students/researchers and symposium participants)

**INSTITUTE FOR POLYMER RESEARCH
THIRTY-SEVENTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING 2015
POSTER SESSION
WEDNESDAY, MAY 6, 2015
UNIVERSITY CLUB
7:30 – 9:00 pm**

Akilu Worku Chemistry, Waterloo	Polyion complexes for the preparation of gold nanoparticles
Mosa Alsehil Chemistry, Waterloo	Arborescent polypeptides for sustained drug release
Sun Bi Chem. Eng., Waterloo	A high mobility pyridine-flanked DPP-based polymer showing ambipolar and n-type unipolar transport performance in organic thin film transistors
Yinghui He Chem. Eng., Waterloo	(3E,7E)-3,7-Bis(2-oxoindolin-3-ylidene)-5,7-dihydropyrrolo[2,3-f]indole-2,6(1H,3H)-dione based polymers for ambipolar organic thin film transistors
Alison Scott Chem. Eng., Waterloo	Contrasting binary and ternary reactivity ratios for AMPS, AAm and AAc
Lu Li Chemistry, Waterloo	Characterization of Structure and Dynamics of Starch Nanoparticles by Fluorescence
Yu Chai Physics and Astronomy, Waterloo	Crystallization of low molecular weight atactic polystyrene
Yung Priscilla Lai Chemistry, Waterloo	Development of weak cation exchange membrane absorber materials for protein capture
Nicholas Lanigan Chemistry, Waterloo	Truss Arrangement of Iron Atoms in Supramolecular Polymers
Paulina Arczewska Civil and Envi. Eng., Waterloo	Effects of alkaline environment on mechanical properties of Glass Fiber Reinforced Polymer (GFRP) bars
Justin Raimbault Chemistry, Waterloo	Probing the Interactions between Hydrophobically Modified Water-Soluble PEOs by Pyrene Excimer Fluorescence
Akilu Worku Chemistry, Waterloo	Polyion complexes for the preparation of gold nanoparticles

**THIRTY-SIXTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING
May 6, 2015--CONRAD GREBEL COLLEGE**

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**THIRTY-SIXTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING
May 21, 2014--CONRAD GREBEL COLLEGE**

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Preprints 2015

- 15-001 **Extraction of Oil from Oil Sands Using Thermo-Responsive Polymeric Surfactants**
B. Yang, J. Duhamel*
ACS Applied Materials and Interfaces, Acc. 02/15
- 15-002 **Ethylene Carbonate used as Reagent and Green Solvent in Chemical Modification of Corncob**
Adriana Chamú-Muñoz, Oscar Hernández-Meléndez*, Martín Hernández-Luna, Jorge Alcaraz-Cienfuegos, Eduardo Vivaldo-Lima*, Eduardo Bárzana
Macromolecular Materials and Engineering, Acc. 03/15
- 15-003 **Doped Poly (2,5-dimethyl aniline) for the Detection of Ethanol**
K.M.E. Stewart, W.T. Chen, R.R. Mansour, A. Penlidis*
Journal of Applied Polymer Science, Acc. 03/15
- 15-004 **Case Studies with Mathematical Modeling of Free-radical Multi-component Bulk/Solutions Polymerizations: Part 1**
W. Jung, M. Riahinezhad, T. Duever, A. Penlidis*
J Macromol Sci, Pure & Chem., Acc. 05/15
- 15-005 **Intelligent Responsive Copolymers Based on Cellulose. Structure, Properties and Applications**
X. Chen, Y. Huang, H. Zhang, M. Gauthier, G. Yang
Cellulose-Based Graft Copolymers Structure and Chemistry, CRC Press 2015
Chapter 20
- 15-006 **Continuous Modification of Polypropylene via Photoionitiation**
Y. Amintowlieh, C. Tzoganakis*, A. Penlidis
Polym Eng Sci., Acc. 05/15
- 15-007 **Novel undercoupled radio-frequency (RF) resonant sensor for gaseous ethanol and interferences detection**
W.T. Chen*, K.M.E. Stewart, R.R. Mansour, A. Penlidis
Sensors and Actuators A (Physical), Acc. 05/15
- 15-008 **Quantifying the Level of Intermacromolecular Interactions in Ethylene-Propylene Copolymers by Using Pyrene Excimer Formation**
S. Pirouz, J. Duhamel*, S. Jiang, A. Duggal
Macromolecules, Acc. 06/15

- 15-009 **Modelling Degradative Chain Transfer in d-Limonene/2-Ethylhexyl acrylate Free-Radical Copolymerization**
Y. Zhang, M. Dube *, E. Vivaldo-Lima
Macromolecular Symposia, PRE-9 Conference Cancun special issue, Acc. 06/15
- 15-010 **Shear Viscosity of Poly (acrylamide/acrylic acid) Solutions**
M. Riahinezhad, N. McManus, A. Penlidis*
Macromol. Symp., Acc. 07/15
- 15-011 **Chemical Modification of Polyisobutylene Succinimide Dispersants and Characterization of their Associative Properties**
S. Pirouz, Y. Wang, J.M. Chong, J. Duhamel*
J. Phys. Chem., Acc. 08/15
- 15-012 **Modelling Degradative Chain Transfer in d-Limonene/n-Butyl Methacrylate Free-Radical Copolymerization**
Y. Zhang, M. Dube*, Eduardo Vivaldo-Lima
Journal of Renewal Materials, Acc. 08/15
- 15-013 **Designing Polymeric Sensing Materials for Analyte Detection and Related Mechanisms**
K. Stewart, A. Penlidis*
Macromol Symp (PRE 9), Acc. 09/15
- 15-014 **An Overview of the Potential of UV Modification of Polypropylene**
Y. Amintowlieh, C. Tzoganakis, A. Penlidis*
Macromol Symp (PRE 9), Acc. 09/15
- 15-015 **Arborescent Micelles: Dendritic Poly(γ -benzyl L-glutamate) Cores Grafted with Hydrophilic Chain Segments**
G. Whitton and M. Gauthier*
Journal of Polymer Science, Part A: Polymer Chemistry, Acc. 10/15
- 15-016 **DiPyMe in SDS Micelles – Artefacts and their Implications on the Interpretation of Micellar Properties**
Michael Fowler, Victoria Hisko, Jason Henderson, Remi Casier, Lu Li, Janine Lydia Thoma, Jean Duhamel*
Langmuir, Acc. 10/15
- 15-017 **Controlled Release of Vitamin B-12 using Hydrogels Synthesized by Free Radical and RAFT Copolymerization in scCO₂**
Patricia Pérez-Salinas*, Alberto Rosas-Aburto, Carlos Hipólito Antonio-Hernández, Gabriel Jaramillo-Soto, Eduardo Vivaldo-Lima*, Ángel Licea-Claverie, Ana Bertha Castro-Ceseña, Humberto Vázquez-Torres.
Macromolecular Symposia - PRE-9 Conference Cancun, Acc. 10/15

- 15-018 **Conductive Elastomer Composites Based on Inherent and Extrinsic Conductive Polymers**
Alberto Rosas-Aburto*, Pedro Roquero-Tejeda, Eduardo Vivaldo-Lima, Patricia Pérez-Salinas, Daniel W. Phifer, R. Javier Revilla Vázquez
Macromolecular Symposia - PRE-9 Conference Cancun, Acc. 10/15
- 15-019 **Silk sericin: a versatile material for tissue engineering and drug delivery**
Lallepak Lamboni,^a Mario Gauthier,^b Guang Yang^{a*} and Qun Wang^{c*}
Biotechnology Advances, Acc. 10/15
- 15-020 **Optimal Design for Reactivity Ratio Estimation: A Comparison of Techniques for AMS/Acrylamide and AMPS/Acrylic Acid Copolymerizations**
Alison J. Scott, Marzieh Riahinezhad and Alexander Penlidis*
Processes, Acc. 10/15
- 15-021 **Pyrene-Labeled Water-Soluble Macromolecules as Fluorescent Mimics of Associative Thickeners**
Jean Duhamel*
Springer Ser.Fluorescence, Vol. 16, Karel Procházka (Eds): Fluorescence Studies of Polymer Containing Systems, 978-3-319-26786-9, 324593_1_En, (7), Acc. 11/15
- 15-022 **Probing Side Chain Dynamics of Branched Macromolecules by Pyrene Excimer Fluorescence**
Shiva Farhangi and Jean Duhamel*
Processes, Acc. 12/15
- 15-023 **Modeling of the copolymerization kinetics of n-butyl acrylate and D-limonene using PREDICI**
Shanshan Ren, Eduardo Vivaldo-Lima, Marc A. Dube*
Processes, Acc. 12/15

APPENDIX 4

Research Personnel (SUPERVISOR)

NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	NMc	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
P. Arczewska	2	CivE								X					Polymeric fibre-reinforced bars (co-supervised with Prof MA Polak, Civ Eng)	Dec 16
M. Alsehli	2	Chem					X								Arborescent polypeptide micelles (Saudi Arabia Scholarship)	Aug 15
A. Alturk	2	Chem					X								Arborescent Polybutadiene Synthesis and Rheology	Aug 18
Y. Amintowlieh	3	ChE								X					Rheology and Kinetics of water-soluble polymers	Mar15
B.M. Amoli	2	ChE												X	Functionalization and dispersion of silver nanofillers (co-supervised with N. Zhou in MME)	Mar 15
R. Amos	2	Chem					X								Hydrophobic Modification of Starch Nanoparticles	Aug 17
F. Awan	1	Chem									X				Functionalized CNC for cosmetic applications	May 17
K. Cao	2	Chem											X		Synthesis and self-assembly of iron carbonyl polymers	May 16
R. Casier	2	Chem		X			X								Probing Protein Folding by Pyrene Excimer Fluorescence	Dec 19
L. Chen	2	Chem									X				Development of hybrid cellulose nanocrystals for chemical applications	Jan 17
S. Chen	2	ChE				x									Membranes for gas separations	Dec 19
A. Cholewinski	2	ChE												x	Functionalized alginate tissue adhesives	Aug 18
M. Celarek	1	ChE				x									Oily water treatment with membranes	Aug 17
L. DaPeng	2	Chem											X		Self-assembly of PFpP for functional nanomaterials	Sep 18
Y. Deng	3	ChE						X							Polymer semiconductors	
J. Ellard	1	ChE						X							New organic semiconductors	
H. Essawi	2	ChE				x									Membranes for dialysis applications	Aug 16
S. Farhangi	2	Chem		X											Characterizing polymer chain dynamics in solution of various polymeric backbones by pyrene excimer formation by pyrene excimer formation	May 16
M.U. Farooq	1	ChE										X			UV modification of ethylene copolymers	May 16
J. Fernandez	2	Chem					X								Grafting of Starch Nanoparticles	Aug 18
A.. Gao	1	ChE				x									Desalination of high salinity water	Apr 16

1 = MASc 2 = PhD 3 = Postdoctoral Fellow 4 = Res. Associate 5 = Technician

TD=T.A. Duever JD=J. Duhamel RD=R. Dhib XF=X. Feng JF=J.Forrest MG=M. Gauthier YL=Y.Li NMc=N. McManus AP=A. Penlidis MT=M. Tam CT=C. Tzoganakis XW=X.Wang BZ=B. Zhao

NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	NMc	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
D. Geng	1	Chem											X		Synthesis of metal carbonyls polymers for chain conformation characterization	2017
K. Gholami	1	Chem		X											Associations between EP copolymers in Base Oils Probed by Fluorescence	Sep 16
N. Grishkewich	2	Chem									X				Sustainable nanomaterials for water treatment	May 18
C. Guo	2	ChE						X							High Performance polymer semiconductors for organic electronics	Sep 15
E. Halakoo	2	ChE				x									Wastewater treatment with membranes	Aug 18
Y. He	2	ChE						X							New polymer semiconductors for printed electronics	Sep 17
V. Hisko	1	Chem		X			X								Effect of Linker Length between Pyrene and PBMA to Probe Interparticle Polymeric Diffusion	Aug 17
Y. Huang	2	ChE				X									Micelle-enhanced ultrafiltration	Jan 16
G. Kaminskao	2	Chem									X				Double water emulsion systems	Aug 19
D. Kim	1	Chem		X											Characterization of Modified Starch Nanoparticles by Fluorescence	Sep 16
S. Lai	2	ChE				X									Heavy metal removal from waste water	Aug 16
K Liew	1	ChE												x	Hydrogel-based functional materials	Apr 17
N. Lanigan	2	Chem											X		Supramolecular polymerization of metal carbonyls in solid state	Dec 18
M. Le Borgne	2	ChE						X							Photovoltaic solar cells based on low-molecular weight solution processable organic semiconductors:from material design to efficient devices	Sep 16
L. Li	2	Chem		X											Intrinsic Properties of Starch Nanoparticles Probed by Pyrene Excimer Fluorescence	Aug 16
X. Li	1	ChE						X							Optimization of conductive ink formulations for inject printing of circuits	Apr 15
J. Liu	2	Chem											X		Synthesis and characterization of PFpP using migration insertion polymerization	Sep 15
D. Liu	2	Chem											X		Self-assembly of metal carbonyl polymers	2018
N. Mohammed	2	ChE									X				Removal of organic dyes using functional cellulose nano crystals in polymer beads	Sep 17
N. Murshid	2	Chem											X		Aqueous self-assembly of metal carbonyl building blocks	Sep 17
M. Neqal	2	Chem					X								Smart Polymeric Nanomaterials by Encapsulation	Sep 17
O. Nguon	2	Chem					X								Polymer-Stabilized Metallic Nanoparticle Catalysts	Jan 15
Z. Pan	2	ChE												X	Development of low friction and oleophobic coating materials	Sep 16
B. Qiu	1	ChE				X									Waste water treatment by absorption	Aug 16
L. Qiu	4	ChE				x									Removal of organic contaminants from water by pervaporation	Aug 16

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J. Quinn	2	ChE						X							N-type polymer semiconductors for printed electronics	Sep 17
M. Rahman	2	Chem											X		Synthesis and characterization of non-iron metal-carbonyls	Sep 18
M. Reza	2	ChE				X									Membrane bioreactor for wastewater treatment	Aug 16
M. Riahinezhad	2	ChE							X	X					Copolymerization kinetics of acrylic acid and acrylamide for enhanced oil-recovery applications	Dec 15
M. Riahinezhad	3	ChE								x					Product design criteria for water-soluble polymers	Apr 16
Alison Scott	1	ChE								X					Water-soluble co- and ter-polymerizations	Aug 15
Alison Scott	2	ChE								x					Design criteria for novel functional polymeric materials for specific applications	Aug 19
H. Sepiani	2	CivE								X					Finite element analysis of polymeric fibre-reinforced bars (co-supervised with Prof MA Polak, Civ Eng)	Dec 16
H. Shahsavan	2	ChE												x	Gecko-inspired smart adhesives	Dec 16
S.Shi	3	Chem											X		Supramolecular metal carbonyl materials	2017
N. Singh	1	Chem											X		Functionalization of CpCOFeCOMe for metal containing polymers	May 14
K. Stewart	2	ChE								X					Polymeric sensors for the detection of toxic analytes	Aug 16
B. Sun	2	ChE						X							Donor-accepter polymers for printed electronics	Apr 16
J. Sun	2	ChE				X									Polyelectrolyte membranes	Apr 15
Y. Song	1	Chem									X				Functionalisation of cellulose nanocrystals	Sep 16
J. Tang	2	ChE									X				Development of functionalised cellulose nano crystals for Pickering emulsion stabilization	Sep 17
J. Thoma	1	Chem		X											Characterization of Polymeric Bottlebrushes by Pyrene Excimer Fluorescence	Aug 17
J. Trinidad	1	ChE												x	Electrically conductive nanocomposite	Aug 16
D. Vishnu	3	Chem					X								Butyl rubber carboxylated ionomers by "click"	Mar 15
A. Vo Thu Nguyen	2	Chem					X								Magnetic micelles as therapy and diagnostic (theranostic) agents	Sep 15
H. Waheed	2	ChE				x									Interfacially polymerization for membrane formation	Apr 16
T. Wang	3	ChE												x	Advanced nanocomposite adhesives	May 17
W. Wang	3	ChE				x									Nanostructured membranes	Dec 16

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X. Wang	4	ChE				X									Oil separation by membranes	Dec 15
A.Worku	2	Chem					X								Arborescent Micelles from Polyelectrolyte Complexes	Aug 17
D. Wu	2	ChE				X									Nanofiltration membranes	Apr 15
K. Wu	1	ChE				X									Nitrogen removal from natural gas by membranes	Apr 15
X. Wu	2	ChE									X				Conductive Cellulose Nanocrystals for Next Generation Energy Storage	Sep 16
X. Xu	2	ChE				X									Surface modification of membranes	Dec 17
F. Yang	2													x	Mussel-inspired hydrogel bonding solution	Aug, 17
Y.Yang	2	ChE						X							Electrochemically grown nanostructured metal oxide semiconductors for hybrid solar cells	Aug 16
S. Zenggian	3	Chem									X				Polydopamine Cellulose Nanocrystals	Aug 16
B. Zhang	2	ChE				X									Aroma compound recovery from aqueous solutions	Dec 16
J. Zhang	4	ChE				X									Waste water treatment nanofiltration	Aug 15
W. Zhang	2	ChE												X	Surface and tribological behaviour of Mussel-inspired polydopamine thin films	July 15
W Zhang	3													x	Electrically conductive polymer composite	Feb 16
Z.Zhang	2	Chem									X		X		Crystal nano cellulose materials via polymer modification	2017
N. Zhou	1	Chem											X		Synthesis and characterization of metal carbonyl side chain polymers	Sep 16
X. Zhou	1	Chem									X				Functional colloids for flocculation applications	May 16

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