February 2017

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

NEWSLETTER 2016

1. NOTE FROM PROFESSOR JEAN DUHAMEL, IPR DIRECTOR

As it has done for the past 38 years since its inception in 1978, the IPR continued in 2016 to promote ground-breaking research and the training of the next generation of scientists and engineers in Polymer Science and Engineering. A consequence of this research activity is that its faculty members publish on average over 50 papers and graduate more than 15 MSc and PhD students each year.

The result of this intense research was on full display at our 2016 annual IPR Symposium, its 38th edition, where our graduate students gave 22 oral and 10 poster presentations. The 2016 IPR awardees were Kai Cao from Chemistry and Li Chen from Chemical Engineering. They both delivered two excellent presentations on the synthesis of metal-containing polymers and binding of CdS quantum dots to nanocellulose, respectively. The Symposium was also quite fortunate to host two well-attended keynote addresses from industry scientists. The first presentation, given by Dr. Steven Brown from NOVA Chemicals, illustrated the impressive level of control that is being achieved in an industrial setting to deliver a polyolefin with the desired polymer composition. The second presentation by Dr. Prince Antony from 3M Canada reviewed the technology that underlies the design of pressure adhesives. As usual, the symposium was attended by the majority of the IPR graduate students and faculties who were able to interact with 18 industry scientists. Visitors from Afton, Arlanxeo Canada, EcoSynthetix, Firestone Textiles, Malvern Instruments, Nova Chemicals, Princeton Polymer, the Woodbridge Foam Corporation, and 3M Canada congregated during the symposium, interacting with students and faculty members, and fostering research exchanges between Academia and Industry. The annual IPR Symposium remains the main venue where the institute displays the breadth and depth of its research and continues to be the *must-attend* IPR event of the year.

While the IPR Symposium represents the pinnacle of the IPR activity, the IPR remains active throughout the year and it hosted a presentation by Prof. Derek Schipper on July 11th, 2016 on the synthesis of conjugated polymers. His talk illustrated the recent success of his group at developing new synthetic strategies for the preparation of conjugated polymers.

Among other IPR research highlights of 2016, it is worth mentioning an editorial written by the Editor in Chief of Advance Materials, Peter Gregory, on a paper by our colleague Boxin Zhao that became one of the most read articles on the Advanced Science News website. In this paper, Boxin's group demonstrated that cantilevers topped with a fibrillar adhesive made of PDMS micropillars (50 µm diameter, 150 µm height, and 100 µm center-to-center spacing) could mimic the peeling mechanism of Gecko locomotion, a result with fascinating implications. A link to Boxin's paper has been posted on the IPR website. Among other highlights, the IPR Director Jean Duhamel was also invited to deliver a lecture on use of pyrene excimer fluorescence in the characterization of polymeric systems at the Department of Chemistry of Nanjing University, China. Nanjing University is one of the nine top universities constituting the Chinese C9 League, China's Ivy League.

Our next IPR Symposium has been scheduled on May 3rd, 2017. As part of the symposium, we will be hosting two keynote speakers, Drs. Andrew Kee and Greg Davidson from the Woodbridge Foam Corporation and Arlanxeo Canada, respectively. Both Greg and Andrew are former graduates from the University of Waterloo and we are very happy to welcome them back to their alma mater.

In closing this introduction to our 2016 Newsletter, I look forward to seeing you at the 2017 IPR symposium to share with you the exciting ground-breaking research by our students.

2. ANNUAL IPR SYMPOSIUM

The 39th Annual IPR Symposium will be held May 3, 2017. A schedule and registration forms have been circulated electronically.

Many thanks to all who participated in the 2016 Symposium (an audience of about 90 people). IPR received very positive feedback regarding the topics covered. The 2016 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 2016, the IPR office sent out 16 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	Farhangi, S.	Long Range Polymer Chain Dynamics Probed with Pyrene Excimer Fluorescence

X. Feng

MASc	ChE	Gao, A.	Desalination of high-salinity water by membranes
PhD	ChE	Huang, Y.	Application of polyvinylamine in removal of heavy metals from wastewater by polymer-enhanced ultrafiltration and absorption

M. Gauthier

MSc	Chem	Chang, X.	Synthesis of Fluorescent Latex Particles by Emulsion Polymerization

Y. Li

PhD	ChE	Sun, B.	High Performance n-Type Polymer Semiconductors for Printed Logic Circuits
PhD	ChE	Le Borgne, M.	Solution-processable oligomeric and small molecule semiconductors for organic solar cells
PhD	ChE	Yang, Y.	Electrodeposition of p-Type Cuprous Oxide and its Application in Oxide Solar Cells
MASc	ChE	Ellard, J.	Thiophene-*S,S*-dioxidized Indophenine for Use in Organic Field-effect Transistors

A. Penlidis

PhD	ChE	Stewart,K.	Copolymerization of acrylamide-acrylic acid in aqueous media

M. Tam

PhD	ChE	Tang, J.	Functionalized Cellulose Nanocrystals (CNC) for Advanced Applications
PhD	ChE	Chen, L.	Functionalization of Cellulose Nanocrystals with Inorganic Nanoparticles
PhD	ChE	Mohammaed, N.	Cellulose Nanocrystals Incorporated Nanocomposites for Water Treatment Applications
PhD	ChE	Wu, X.	Conductive cellulose nanocrystals for electrochemical applications.
MASc	ChE	Awan, F.	Design of functionalized cellulose nanocrystals for personal care applications

C. Tzoganakis

MASc	ChE	Farooq, M.U.	Modification of Metallocene Alpha-Olefin Copolymer by UV- Irradiation

B. Zhao

PhD	ChE	Zihe, P.	Bio-inspired Oleophobic/Conductive Micro/nano Structures and Their Applications in Frozen Oil Adhesion Reduction
PhD	ChE	Marzbanrad, E.	Joining of Silver Nanoparticles: Computer Simulations and Experimental Observations (co-supervised with N. Zhou in MME)
MASc	ChE	Trinidad, J.	Evaluation of electrically conductive adhesives

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—2016

Currently we have **7 member companies**: (refer also Appendix 3)
Afton Chemical
Compuplast Canada Inc.
EcoSynthetix
Lanxess Inc.
OMNOVA Solutions Inc.
PolyVation, The Netherlands
Princeton Polymer Consultants, USA

9. STUDENT AWARDS

Y. Li

PhD student Jesse Quinn received the WIN Nanofellowship
PhD Student Bin Sun received the 2015 National Award for Outstanding Self-financed Chinese Students Study Abroad
PhD student Chang Guo received the 2015 National Award for Outstanding Self-financed Chinese Students Study Abroad

A. Penlidis

Marzieh Riahinezhad, was the 2016 recipient of the Chem Eng Medal for Proficiency in Research.

Alison Scott, was awarded a 3-yr NSERC Alexander Graham Bell Canada Graduate Scholarship (CGS D)

M. Tam

Li Chen, 2015 IPR Award

X. Wang

PhD student Kai Cao, 2015 IPR Award

B. Zhao

Alek Cholewinski, NSERC-PGS
Kelvin Liew, NSERC-CGS
Ryan Neufeld (co-supervised with Nasser Abukhdeir), NSERC-CGS, WIN-Nano fellowship
Hamed Shahsavan, Queen Elizabeth II Graduate Scholarship

10. FACULTY AWARDS

X. Feng

University Research Chair

B. Zhao
Best Oral Presentation Award, 2016 Global Conference on Polymer and Composite Materials, May 20-23, Hangzhou, China

11. FULL REFEREED JOURNAL PAPERS

J. Duhamel

Farhangi, S., and Duhamel, J. (2016). "Probing Side Chain Dynamics of Branched Macromolecules by Pyrene Excimer Fluorescence." *Macromolecules* 49.1 :353-61

Farhangi, S., and Duhamel, J. (2016). "Pyrenyl Derivative with a Four-Atom Linker That Can Probe the Local Polarity of Pyrene-Labeled Macromolecules." *The Journal of Physical Chemistry B* 120.4 : 834-42.

Farhangi, S., and Duhamel, J. (2016). "Long Range Polymer Chain Dynamics Studied by Fluorescence Quenching." *Macromolecules* 49.17: 6149-162.(Cover Article)

Zhang, T. H., Taylor, S., Palmer, M., and Duhamel, J. (2016). Membrane Binding and Oligomer Formation by the Calcium-Dependent Lipopeptide Antibiotic A54145: A Quantitative Study with Pyrene Excimer Fluorescence. *Biophysical J. 111*, 1267-1277.

Pirouz, S., and Duhamel (2017). New Approaches to Characterize Polymeric Oil Additives in Solution Based on Pyrene Excimer Fluorescence. Pirouz, S., Duhamel, J. *J. Polym. Sci. B*: *Polym. Phys. 55*, 7-18.

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Farhangi, S., Casier, R., Li, L., Thoma, J., and Duhamel, J. (2016) Characterization of the Long Range Internal Dynamics of Pyrene-Labeled Macromolecules by Pyrene Excimer Fluorescence. *Macromolecules*: *49*, 9597-9604.

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Wu, D., Tan, Z., Yu, H., Li, Q., The, J., and Feng, X. (2016). "Use of nanofiltration to reject cobalt (II) from ammoniacal solutions involved in absorption of SO_2/NOx," *Chemical Engineering Science*, **145**, 97–107.

Huang, Y., Wu, D., Wang, X., Huang, W., Lawless, D., Feng, X. (2016). "Removal of heavy metals from water using polyvinylamine by polymer-enhanced ultrafiltration and flocculation," *Separation and Purification Technology*, **158**, 124-136

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M. Neqal, L. Pichavant, M. Gauthier, V. Heroguez. (2106). Plurifunctional Polyglycidol-Based Particles Prepared by Dispersion Ring-Opening Metathesis Polymerization. *Colloids Surf. A: Physicochem. Eng. Aspects*, *510*, 254-262.

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N. McManus

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A. Penlidis

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M. Tam

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C. Tzoganakis

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E. Vivaldo-Lima

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X. Wang

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Cai, C. H., Lin, J. P.*, Zhu, X. Y., Gong, S. T., Wang, X. S.*, Wane, L. Q. (2016). Superhelices with Designed Helical Structures and Temperature-Stimulated Chirality Transitions, *Macromolecules*, 49, 15-22.

Feng, A. C., Wang, Y., Peng, L., Wang, X. S.*, Yuan, J. Y.* (2016). Breathing catalyst-supports: CO2 adjustable and magnetic recyclable "smart" hybrid nanoparticles, RSC ADVANCES 6, 97030-97035

Liu, J., Guan, Z., Tian, X. H., Lin, J. P.*, Wang, X. S.* (2016). Solvent-dependent chain conformation for ring closure of metal carbonyl oligomers via migration insertion polymerization (MIP) of $CpFe(CO)_2(CH_2)6PPh2$, *Poly. Chem.* 7, 4419-4426.

He, H. W., Chen, S., Tong, X. Q., Chen, Y. N., Wu, B. Z., Ma, M., Wang, X. S., Wang, X.* (2016). Strong and fast-recovery organic/inorganic hybrid AuNPs-supramolecular gels based on loofah-like 3D networks, *Soft Matter.* 12, 957-964.

B. Zhao

Shahsavan, H. *, Muhammad S, Jákli†, A. , and Zhao, B.†,(2016). "Thermally Active Liquid Crystal Network Gripper Mimicking the Self-peeling of Gecko Toe Pads", Advanced Materials.

Liew, K., * Shahsavan, H. *, and Zhao†, B. (2016) "Functionally Graded Dry Adhesives Based on Film-Terminated Silicone Foam", International Journal of Adhesion and Adhesives].

Pan, Z. *, Wang, T. **, Zhou, Y.*, Zhao†B.,(2016). Electrically Conductive–Superoleophobic Micropillars for Oil Adhesion Reduction at Low Temperatures, Applied Surface Science.

Trinidad, J.*, Meschi Amoli, B. *, Zhang, W.**, Pal, R. and Zhao, B. † (2016). "Effect of SDS Decoration of Graphene on the Rheological and Electrical Properties of Graphene-filled Epoxy/Ag Composites", Journal of Materials Science: Materials in Electronics.

Marzbanrad, E.*, Rivers, G.*, Lee-Sullivan, P., Zhao,B., Zhou,Y. (2016). Highly repeatable kinetically-independent synthesis of one- and two-dimensional silver nanostructures by oriented attachment, RSC Advances.

Rivers, G.*, Marzbanrad*E., Hook, M., Lee-Sullivan,P., Zhou,Y., and Zhao,B. (2016). "Resistance reductions in silver nanobelt networks via temperature-controlled oriented attachment", Nanotechnology.

Sun, S.*, Pan, Z. *, Zhang, W.,**, Yang, K.*, Huang,Y., and Zhao, B.†(2016). "Acid treatment of silver flake coatings and its application in the flexible electrical circuits", J Materials Science, Materials in Electronic, 27 (5), 4363-4371.

13. CONFERENCE PRESENTATIONS/INVITED SEMINARS

J. Duhamel

Duhamel, J. (2016). Why Use Fluorescence Resonance Energy Transfer When Pyrene Excimer Fluorescence Is Conceptually Much Simpler and Works as Well in Many Instances. SooChow University, China, June 21st, 2016.

Duhamel, J. (2016). Why Use Fluorescence Resonance Energy Transfer When Pyrene Excimer Fluorescence Is Conceptually Much Simpler and Works as Well in Many Instances. Nanjing University, China, June 22nd, 2016
Duhamel, J. (2016). The Amazing Photophysical Properties of Pyrene. Nanjing University, China, June 23rd, 2016.

Li, L. and Duhamel, J. (2016). Conformation of Amylose and Amylopectin in DMSO Probed by Pyrene Excimer Fluorescence. XXV International Materials Research Congress, Cancun, Mexico, August 14-19, 2016.

X. Feng

Kundu, P., and Feng,X. (2016). "Permeate pressure build-up in hollow fiber membranes: How well do we know

it?" presented at the *10th Conference of Aseanian Membrane Society* (AMS10), Nara, Japan, July 26-29, 2016.

Wang, X., Wei, Q., Yan, M, Huang, W., Hao, X.,and Feng, X.(2016) "Preparation and pervaporation property of poly(ether block amide) with carbon nanotubes," presented at the *10th Conference of Aseanian Membrane Society* (AMS10), Nara, Japan, July 26-29, 2016.

Sampranpiboon, P. and Feng,X., (2016) "Equilibrium isotherm models for chromium (VI) adsorption from aqueous solutions on carbonized oil palm kernels," presented at the *International Conference on Engineering Innovation* (ICEI 2016), Bangkok, Thailand, June 6-7, 2016.

Huang,Y. and Feng,X. (2016) "Removing mercury (II) from wastewater by polymer-enhanced ultrafiltration," presented at the *26th North American Membrane Society Meeting*, Bellevue, WA, May 21-25, 2016.

Feng, X., Lawless, D., Towe, G. (2016) "Pressure-vacuum swing permeation: a novel process for gas separations," presented at the *26th North American Membrane Society Meeting*, Bellevue, WA, May 21-25, 2016.

Wu, D., Feng, X., and Tan, Z.(2016) "Use of nanofiltration to reject cobalt (II) from ammoniacal solutions," presented at the *Oil, Gas and Chemicals Filtration & Separations Conference*, Houston, TX, May 9 – 11, 2016.

Sampranpiboon, P. and Feng, X. (2016) "Kinetic models on chromium (VI) adsorption onto carbonized Oil Palm kernel with potassium hydroxide activation," presented at the *2nd International Conference on Chemical, Metallurgy and Environmental Engineering (CMAEE-16)*, Kyoto, Japan, April 12-13, 2016.

M. Gauthier

26th International Materials Research Conference, August 2016, Cancún, México. "Polypeptide Micelles for Sustained Drug Delivery"

251st ACS Meeting, March 2016, San Diego, CA. "Unimolecular Micelles Based on Arborescent Polypeptides for Sustained Drug Delivery"

37th Canadian High Polymer Forum, August 2016, Gananoque, ON. "Atom Transfer Radical Polymerization (ATRP) Grafting of Starch Nanoparticles with Sodium Acrylate"

37th Canadian High Polymer Forum, August 2016, Gananoque, ON."Fluorescently Labelled Latex Particles to Monitor Film Formation"

37th Canadian High Polymer Forum, August 2016, Gananoque, ON. "Arborescent Polypeptides based on Poly(γ-benzyl L-glutamate) for Drug Delivery Applications"

37th Canadian High Polymer Forum, August 2016, Gananoque, ON. "Modification of Cooked Waxy Corn Starch with Alkenyl Succinic Anhydrides"

37th Canadian High Polymer Forum, August 2016, Gananoque, ON."Complex Arborescent Copolymer Architectures by Self-assembly"

5th Polymer Chemistry Conference, August 2016, Dublin, Ireland."Smart Polymeric Nanomaterials by ROMP"

Y. Li

Yuning Li (invited) (2016). New approaches to high performance n-type polymer semiconductors, SUN-WIN Workshop 2016 at *CHInano2016 Conference & Expo*, Soochow, China.

Yuning Li (Invited) (2016). Development of n-type polymer semiconductors, International Symposium on Polymer Chemistry (PC2016), Changchun, China.

Yuning Li (invited) (2016). Development of p-type, n-type and ambipolar polymers for organic electronics, 1st International Hybrid TE Workshop Singapore,Singapore.

Yuning Li (invited), (2016). Development and application of polymer semiconductors for flexible and printable electronics, The WIN Cambridge Workshop.

A. Penlidis

Arczewska, P., M.A. Polak and A. Penlidis (2016). Significance of GFRP bars shear testing. 8th Intern. Conf. on Fibre-Reinforced Polymer (FRP) Composites in Civil Enginerring (CICE 2016), paper reference code 62, ms length 6 pgs, Hong Kong, China.

Arczewska, P., M.A. Polak and A. Penlidis (2016). GFRP bars-Material stiffness and its influence on flexural properties. 7th Intern. Conf. on Advanced Composite Materials in Bridges and Structures (ACMBS-VII), paper 053, ms length 6 pgs, Vancouver BC.

Arczewska, P., M.A. Polak and A. Penlidis (2016). Significance of GFRP bars shear testing. 8th Intern. Conf. on Fibre-Reinforced Polymer (FRP) Composites in Civil Enginerring (CICE 2016), paper reference code 62, Hong Kong, China.

Arczewska, P., M.A. Polak and A. Penlidis (2016). GFRP bars-Material stiffness and its influence on flexural properties. 7th Intern. Conf. on Advanced Composite Materials in Bridges and Structures (ACMBS-VII), paper 053, Vancouver BC.

Scott, A.J., N. Kazemi and A. Penlidis (2016). Ternary reactivity ratio estimation for AMPS/AAm/AAc water soluble polymers. 12th Intern. Workshop on Polymer Reaction Engineering, Hamburg, Germany. **Invited presentation.**

M. Tam

Ho, Y.K., Zhou L.H., Tam, K.C., Too, H.P. (2016). Enhanced non-viral gene delivery by coordinated endosomal release and inhibition of β-tubulin deactylase, Nucleic Acids Research

Mohammed, N., Baidya, A., Murugesan, V., Avula, A.K., Tam, K.C., Pradeep, T. (2016). Diffusion controlled simultaneous sensing and scavenging of heavy metal ions in water using atomically precise cluster – cellulose nanocrystal composites, ACS Sustainable Chemistry & Engineering 4 (11), 6167–6176.

Awan, F., Bulger, E., Berry, R.M., Tam, K.C. (2016). Enhanced radical scavenging activity of polyhydroxylated C60 functionalized cellulose nanocrystals, Cellulose 23(6), 3589-3599

Chen, L., Lai, C., Marchewka R., Berry, R.M., Tam, K.C.(2016). CdS quantum dot-functionalized cellulose nanocrystal films for anti-counterfeiting applications, Nanoscale 8, 13288-13296

Wu, X., Shi, Z., Fu S., Chen J., Berry, R.M., Tam, K.C. (2016). A Strategy for Synthesizing Porous Cellulose Nanocrystals Supported Metal Nanocatalysts, ACS Sustainable Chemistry & Engineering 4 (11), 5929–5935.

Tang, J., Berry, R.M., Tam, K.C. (2016). Stimuli-responsive cellulose nanocrystals for surfactant-free oil harvesting, Biomacromolecules 17(5), 1748-56.

Lee M.F.X., Chan E.S., Tan W.S., Tam K.C., Tey B.T., (2016). Negative chromatography of hepatitis B virus-like particle: Comparative study of different adsorbent designs, Journal of Chromatography A 145, 1-9

Grishkewich, N., Akhlaghi, S.P., Yao Z.L., Berry, R.M., Tam, K.C. (2016). Cellulose Nanocrystal-poly(oligo(ethylene glycol) methacrylate) brushes with tunable LCSTs, Carbohydrate polymers, 144, 215-222.

Loh, W., Brinatti, C., Tam, K.C. (2016). Use of Isothermal Titration Calorimetry to Study Surfactant Aggregation in Colloidal Systems, Biochim. Biophys. Acta (BBA) 1860, 999-1016

Brinatti, C., Huang, J., Berry, R.M., Tam, K.C., Loh, W. (2016). Structural and Energetic Studies on the Interaction of Cationic Surfactants and Cellulose Nanocrystals, Langmuir 32 (3), 689–698.

Mohammed, N., Grishkewich, N., Waeijen, H.A., Berry, R.M., Tam, K.C. (2016). Continuous flow adsorption of methylene blue by cellulose nanocrystal-alginate hydrogel beads in fixed bed columns, Carbohydrate Polymers 136, 1194-1202.

Grishkewich N, Mohammed N, Tam KC (2016). Cellulose Nanocrystal-Alginate hydrogel beads as novel adsorbents for the remediation of organic dyes in Textile Effluents, Nano Ontario Conference, Guelph, Ontario, Canada

Grishkewich N, Mohammed N, Berry RM, Tam KC (2016). Cellulose Nanocrystal-Alginate hydrogel beads as novel adsorbents for organic dyes in aqueous solutions PAPTAC Workshop, Montreal, Quebec, Canada,

Tang J, Berry RM, Tam KC (2016). Stimuli-responsive cellulose nanocrystals for surfactant-free oil harvesting applications, PAPTAC Workshop, Montreal, Quebec, Canada.

Cellulose Nanocrystals:A Promising Sustainable Nanomaterial for Advanced Engineering applications. McMaster University, Hamilton, Canada, December 2016

Cellulose Nanocrystals: A Promising Sustainable Nanomaterial for Advanced Engineering applications. Nano Ontario Conference, Guelph, Canada, November 2016
Cellulose Nanocrystals: A Promising Sustainable Nanomaterial for Advanced Engineering applications., SUN-WIN Workshop, Suzhou, China, October, 2016

Cellulose Nanocrystals : A Promising Sustainable Nanomaterial for Advanced Engineering, Lubrizol, USA, Cleveland, United States, August 2016

Cellulose Nanocrystals: Synthesis, Properties and Applications. UNICAMP, Campinas, Brazil, July 2016

Cellulose Nanocrystals: Production, Properties and Applications. Workshop, Campinas, Brazil, July 2016

Cellulose Nanocrystals: A Promising Sustainable Nanomaterial for Personal Care and Related Applications. Natura Inc., Canjamar, Brazil, July 2016

Cellulose Nanocrystals:A Promising Sustainable Nanomaterial for Advanced Engineering Applications. Invited talk at University of Surrey, Guilford, United Kingdom, June 2016

Cellulose Nanocrystals:A Promising Sustainable Nanomaterial for Advanced Engineering Applications. Workshop at University of Bristol, Bristol, United Kingdom, June 2016

Cellulose Nanocrystals:A Promising Sustainable Nanomaterial for Advanced Engineering Applications. University Science Malaysia, Penang, Malaysia, April 2016

Cellulose Nanocrystals: A Promising Sustainable Nanomaterial for Personal Care Applications, Proctor & Gamble, Singapore, April 2016

Cellulose Nanocrystals:A Promising Sustainable Nanomaterial for Chemical Engineering Applications. Monash University, Kuala Lumpur, Malaysia, April 2016

Cellulose Nanocrystals: A Promising Sustainable Nanomaterial for Advanced Engineering Applications. Invited talk at IIT Madras, Madras, India, April 2016

C. Tzoganakis

Nie, S. and Tzoganakis, C. (2016). "Production of Controlled Rheology Polypropylenes from Metallocene and Ziegler-Natta Resins", Proceedings of the 74th Annual Technical Conference of the Society of Plastics Engineers, May 2016, Indianapolis, IN, USA, pp.918-922.

Tzoganakis, C. (2016). "Model-Based Inferential Sensing of Melt Flow Rate in Polymer Compounding Operations", Fundamentals Tutorial, 74th Annual Technical Conference of the Society of Plastics Engineers, May 2016, Indianapolis, IN, USA

Tzoganakis, C. (2016). "Supercritical CO2 extrusion for Rubber Devulcanization", Detroit Rubber Group, Royal Oak, MI, USA.

Tzoganakis, C. and McRae, D. (2016). "Rubber Devulcanization and Applications in Tire Retreading", Excellence in Manufacturing Consortium, University of Waterloo, Waterloo, ON.

E. Vivaldo-Lima

Vivaldo-Lima, E. (2016). "On the RAFT synthesis of homogeneous polymer networks and cellulose based hybrid materials", Eduardo Vivaldo-Lima (**invited key-note speaker**), XV Simposio Latinoamericano de Polímeros and XIII Congreso Iberoamericano de Polímeros (SLAP 2016), Riviera Maya, Quintana Roo.

Vivaldo-Lima, E. (2016). "Estimation of the Heterogeneity in Polymer Networks Raft vs Free Radical Polymerization Processes" (poster), Pérez-Salinas, Patricia, VIVALDO-LIMA, EDUARDO, ROSAS-ABURTO, ALBERTO. Vázquez-Torres, Humberto, Antonio-Hernández, Carlos Hipólito. XV Simposio Latinoamericano de Polímeros y XIII Congreso Iberoamericano de Polímeros (SLAP 2016), Riviera Maya, Quintana Roo.

X. Wang

Wang, X. (2016). Imperial Colleague London, UK, metal carbonyl polymers and vesicles.

Wang, X. (2016). Tsinghua University, Beijing, China, Synthesis and self-assembly of metal carbonyls.

Wang, X. (2016). Beijing University, Beijing, China, Synthesis and self-assembly of metal carbonyls.

Wang, X. (2016). CHINano Conference & Expo 2016, Soochew, China, Air-Stable Metal Carbonyl Polymers for

Anti-Microbial Materials.

Wang, X. (2016). 3M Shanghai, Metal carbonyl supramolecular materials.

Wang, X. (2016). Nanyang technological university, Singapore, Migration insertion polymerization for metal carbonyl polymers.

B. Zhao

Boxin, Z. (2016). "High-performance Electrically Conductive Adhesives Enhanced with Nanofillers", 3rd International Conference on Nanojoining and Microjoining (NMJ2016), Niagara Falls, Canada, Invited

Boxin, Z. (2016). "Bioinspired Catechol-Polypyrrole Nanostructures With Tunable Electrical Properties", Canadian Society of Chemistry Annual conference, Halifax, N.S.

Boxin, Z. (2016). "Biomimicry and Interfacial Material Engineering", Taiyuan University of Science and Technology, China,– Invited

Boxin, Z. (2016). "Biomimetic adhesion and its application for developing functional polymeric materials", 2016 Global Conference on Polymer and Composite Materials, Hangzhou, China,– Invited

Boxin, Z. (2016). "Bio-inspired Polydopamine Thin Films and Dopamine-Polypyrrole Electrically Conductive Nanocomposites", Beijing University of Chemical Technology,– Invited

Boxin, Z. (2016). "Contact Dynamics of Interfacial Materials and Thin Films: Bioadhesion and Biomimicry", Liquid Crystal Institute, Kent State University– Invited

Shahsavan ,H., Salli, M., Jakli, A., Boxin, Z. (2016). "Switchable Biomimetic Fibrillar Adhesives Based on Liquid Crystal Networks " 66th Canadian Chemical Engineering Conference, Quebec City, Canada,

Neufeld, R., Shahsavan, H., Zhao, B., Abukhdeir,N. (2016). "Simulation-aided Design of Liquid Crystal Elastomer-based Actuators", 66th Canadian Chemical Engineering Conference, Quebec City, Canada,

Liew, K., Shahsavan, H., Boxin, Z. (2016). "Sponge-based Peel-able Functionally Graded Dry Adhesives for Mounting Applications," 66th Canadian Chemical Engineering Conference, Quebec City, Canada, October 16-19, 2016

Sun, S., Z Pan, Z., Yang, F., Huang, Y., Boxin, Z. (2016). " A transparent silica colloidal crystal/PDMS composite and its application for crack suppression of metallic coating", 2016 Global Conference on Polymer and Composite Materials, Hangzhou, China, May 20-23, 2016.

Shahsavan*, H., Salili, S., Jákli, A., Boxin, Z. (2016). "Smart Muscle-driven Manipulation of Gecko-inspired Structures by Liquid Crystal Elastomers", 2016 Annual meeting of the Adhesion Society, San Antonio, TX.

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

J. Duhamel

Jiang, S., Duggal, A., Pirouz, S., and Duhamel, J. (2016). Quantifying the Level of Intermacromolecular Interactions by Using Pyrene Excimer Formation, US 20160077012 A1 20160317.

Duhamel, J. (2016). Pyrene-Labeled Water-Soluble Macromolecules as Fluorescent Mimics of Associative Thickeners. in *Fluorescence Studies of Polymer Containing Systems*, Ed. Procházka, K., Springer Series on Fluorescence.

X. Feng

Feng, X., Towe, I.G., Hamza, A., and Perez,J. "Replenishing liquids to membrane," China Patent No. CN 103796742 (issued March 9, 2016)

A. Penlidis

Vivaldo-Lima, E., G. Jaramillo-Soto and A. Penlidis (2016). Nitroxide-Mediated Polymerization, Chapter in Encyclopedia of Polymer Science and Technology (EPST), pgs (not known yet, chapter length: 48 pgs), Wiley (accepted on July 12 2016, appeared online on Nov 15, 2016). **Invited.**

Amintowlieh, Y., C. Tzoganakis and A. Penlidis (2013). Polypropylene with improved strain hardening characteristics and long chain branching with UV irradiation. May 2013, 61/854,188 US provisional patent application. Refiled in April 2014 as 61/995,627 USPTO, revised in Dec 2016.

M. Tam

Method of synthesis of atomically precise metal cluster-cellulose nanocrystal composite for diffusion controlled simultaneous sensing and scavenging of heavy metal ions in water.
Filing Date: 2016/09/16

E. Vivaldo-Lima

Book (Encyclopedia) Chapter (by invitation to E. Vivaldo-Lima, but the contribution was peer reviewed)

Eduardo Vivaldo-Lima*, Gabriel Jaramillo-Soto, Alexander Penlidis, "NITROXIDE-MEDIATED POLYMERIZATION (NMP)", in: *Encyclopedia of Polymer Science and Technology*, John Wiley & Sons, pp. 1-48, 15 November 2016.

Books Edited
Eduardo Vivaldo-Lima, Ed., *Macromolecular Symposia, Special Issue: Polymer Reaction Engineering IX (PRE 9)*, Volume 360, John Wiley & Sons, February 2016. Link: http://onlinelibrary.wiley.com/doi/10.1002/masy.v360.1/issuetoc

B. Zhao

Zeinab Jahed Motlagh , Hamed Shahsavan , Mohit S. Verma , Jacob L. Rogowski , Brandon B. Seo, Boxin Zhao , Ting Y. Tsui , Frank X. Gu , Mohammad R. K. Mofrad "Bacterial Networks on Hydrophobic Micropillars" Invention Disclosure, at the University of California at Berkeley (UCB),

15. OTHER HIGHLIGHTS FOR YEAR 2015

Prof Penlidis acted as panelist in CTE 806 workshop for new faculty members and panelist on graduate student supervision organized by CTE (Centre for Teaching Excellence) of UW.

Prof Penlidis acted as journal reviewer/adjudicator for 25 manuscripts.
Prof Penlidis acted as consultant for 7 companies (Canada, USA, Europe, India).
Prof Penlidis served on the editorial boards of the following journals: J. Macromol. Sci.-Pure and Appl. Chem. (considerable work as editorial board member promoting special issues, organizing surveys and adjudicating for editor), Polymer-Plastics Techn. and Eng., Macromol. React. Eng. (considerable work as editorial board member, guest-editing special issues, promoting the journal and adjudicating for editor), Processes (considerable work as editorial board member promoting special issues, organizing surveys and adjudicating for editor, guest-editor in 2016/2017 of a special issue on water-soluble polymers).
Prof Penlidis served on the MITACS College of Reviewers.
Prof Penlidis' 2016 International/national academic collaborations (regular basis with co-authored articles): UNAM (Mexico), Iran (Paints/Coatings Institute) and, more locally, University of Ottawa, UNB, Ryerson Polytechnic Univ. and McGill Univ.

Prof Penlidis acted as co-organizer of the 35th North American Intensive Industrial Short Course, to be delivered in June 2017 (with Prof Jean Duhamel, IPR Director, Chemistry, UW)

Jean Duhamel received an academic invitation to Nanjing University, one of the top 9 (C9) Chinese Universities.

Michael Tam Appointed Associate Editor, ACS Sustainable Chemistry & Engineering

E. Vivaldo-Lima Session Chair (by invitation), Symposium "Polymer engineering, processing and rheology", XV Simposio Latinoamericano de Polímeros (SLAP 2016) and XIII Congreso Iberoamericano de Polímeros, XXIX Congreso Nacional de la Sociedad Polimérica de México (S.P.M.), which took place in Cancún-Riviera Maya, Quintana Roo, México, October 23-27, 2016.

E. Vivaldo-Lima was appointed member of FQ-UNAM's (Faculty of Chemistry, UNAM) Research Advisory Council ("Consejo Asesor de Investigación", CAI), representing its Chemical Engineering Department. CAI is in charge analyzing and making recommendations to FQ-UNAM's governing council on all issues related to Research and Graduate Studies, including relevant symposia organization, selection of new professors and evaluation of their performance, research strategic planning, etc.

E. Vivaldo-Lima was appointed member of the Steering Committee of the Engineering Conferences International (ECI) series on "Polymer Reaction Engineering". This appointment is officially effective since May 2016, although it was decided in May 2015, during the activities of "Polymer Reaction Engineering IX", in Cancún, México, when E. Vivaldo-Lima was conference chair.

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

Boxin Zhao Our development of gecko soft gripper was highlighted in Waterloo Stories on Dec 15, 2016

Prof. Tzoganakis received the Fellow of the Society of Plastics Engineers (2016) for outstanding contributions in the field of plastics engineering, science and technology. Prof. Tzoganakis was officially recognized at the SPE Celebrates Banquet on May 22, 2016 during the Society's 74th Annual Technical Conference (ANTEC® 2016) in Indianapolis, IN.
http://www.4spe.org/Resources/news.aspx?ItemNumber=23395

INSTITUTE FOR POLYMER RESEARCH
CELEBRATING 32 YEARS OF OFFICIAL INSTITUTE STATUS
THIRTY-EIGHTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING 2016
Conrad Grebel College
Great Hall
University of Waterloo, Waterloo, Ontario
Wednesday, May 4, 2016

8:30 a.m. **Coffee**

8:50 **Welcome and Opening Remarks**

9:00 - 9:20 **Kai Cao, Chemistry, Waterloo**
(Winner of the 2015 IPR Award for Academic Excellence in Polymer Science/Engineering)
Title: **Synthesis and Self-assembly of Main-Chain Metal Carbonyl Organometallic Macromolcules Prepared by Migration Insertion Polymerization**

9:20 - 10:00 Industry Speaker: **Dr. Steve Brown NOVA Chemical Canada**
Title:NOVA Cehmical's Advanced Sclairtech™

10:00 – 10:25 **5-Min. Mini Presentations**

1) **Zihe Pan**
Development of Durable Multifunctional Microstructures with Electrical Conductivity and Superoleophobicity.
2) **Dapeng Liu**
Self-assembly of nanosheets by organometallic homopolymer PFpC3P
3) **Liying Wang**
Synthesis of Polylactide-b-polylysine Copolymers
4) **Kishor Regmi**
Statistical analysis of AGET ATRP of MMA in two-step emulsion system
5) **Jesse Quinn**
The synthesis and properties of pyrazino[2,3-g]quinoxaline-2,7-dione and pyrimido[4,5-g]quinazoline-4,9-dione based conjugated polymers and application in organic thin film transistors

10:25 - 10:40 **Coffee**

10:40 - 11:00 **Nimer Murshid**
Aqueous Self-Assembly of Multifunctional Metal-Carbonyl Nanovesicles

11:00 – 11:20 **Justin Raimbault**
Probing Intramacromolecular Forces by Pyrene Excimer Fluorescence

11:20 – 11:50 **5-Min. Mini Presentations**

6) **Kiarash Gholami**
The Study of Interactions between Viscosity Index Improvers and Wax by Fluorescence

7) **Kuo Yang**
Bonding Hydrogels to Both Plastic and Inorganic Surfaces

8) **Janine Thoma**
Probing the Conformations for Polymeric Bottle Brushes in Solution by Pyrene Excimer Formation

9) **Abdullah Ba Salem**
Probing the Interactions between Pyrene-labeled Gemini Surfactants and DNA by Fluorescence

10) **Ethan Massicotte**
Title: Simulation of the AGET ATRP of Butyl Acrylate in a Two-Stage Dispersed System

12:00 - 1:00 **Lunch**

1:00 - 1:40 Industry Speaker: **Prince Antony, Ph.D.| Sr. Research Specialist**
Technology Development Lab3M Canada Company,
Title: **Pressure Sensitive Adhesives & Related Products: A 3M Core Technology Platform**

1:40 – 2:00 **Kate Stewart**
Evaluation of Polymeric Nanocomposites for the Detection of Toxic Gas Analytes

2:00 – 2:20 **Remi Casier**
Comparison of the Diffusion Coefficients Obtained for Latex Film Formation Studied by FRET and Pyrene Excimer Formation

2:20 - 2:40 **Shiva Farhangi**
Probing Side Chain Dynamics of Branched Macromolecules by Pyrene Excimer Fluorescence

2:40 - 3:00 **Li Chen , Chemical Engineering, Waterloo**
Title: CdS quantum dot-functionalized cellulose nanocrystal for anti-counterfeiting applications
(Winner of 2015 IPR Award for Academic Excellence in Polymer Science/Engineering)

3:00 - 3:20 **Coffee**

3:20 - 3:40 **Lu li**
Conformation of Amylose in DMSO Probed by Pyrene Excimer Fluorescence

3:40 - 4:00 **Aklilu Worku**
Complex Arborescent Copolymer Architectures by Self-assembly

4:00 - 4:20 **Zhen Zhang**
Grafting polystyrene on Cellulose (CNC) by surface initiated Atom Transfer Radical Polymerization (SI ATRP)

4:20 – 4:40 **Tori Hisko**
Fluorescently Labelled Latex Particles to Monitor Film Formation

4:40 – 5:00 **Damin Kim**
Characterization of Hydrophobic Modification of Starch NanoParticle by Pyrene Fluorescence

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)

Poster presentations follow on next page

INSTITUTE FOR POLYMER RESEARCH
THIRTY-EIGHTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING 2016
POSTER SESSION
WEDNESDAY, MAY 4, 2016
UNIVERSITY CLUB
7:30 – 9:00 pm

Kiana Amini Chem. Eng., Waterloo	Liquid Crystalline Phases of Polymer Brushes
Deepak Vishnu Chemistry, Waterloo	Synthesis of cleavable amphiphilic block copolymers
Ethan Massicotte Chem. Eng., Ryerson	Monte Carlo Simulation of the AGET ATRP of Butyl Acrylate in a Two-Stage Dispersed System
Kate Stewart Chem. Eng., Waterloo	Detection of Toxic Analytes using a Sensor Array
Pendar Mahmoudi Chem. Eng., Waterloo	Entropic Segregation of Short Polymers to the Surface of a Polydisperse Blend
Alison Scott Chem. Eng., Waterloo	Benefits of Continuous Reactor Operation for Reactivity Ratio Estimation (Comparison with Batch Polymerization)
Kishor Regmi Chem. Eng., Ryerson	Statistical analysis of AGET ATRP of MMA in two-step emulsion system
Hunter Little Chemistry, Waterloo	Dimensions of Perylene-Labeled Foldamers in Solution Determined by Time-Resolved Fluorescence Anisotropy
Janine Thoma Chemistry, Waterloo	Probing the Conformations for Polymeric Bottle Brushes in Solution by Pyrene Excimer Formation
Russell Spencer	Field-Theoretic Monte Carlo Simulations of Ternary Blends

THIRTY-EIGTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING
May 4, 2016--CONRAD GREBEL COLLEGE

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THIRTY-EIGTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING
May 4, 2016--CONRAD GREBEL COLLEGE

LIST OF ORAL AND POSTER PRESENTERS

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Preprints 2016

16-001 **A Pyrenyl Derivative with a Four Atom-Linker that Can Probe the Local Polarity of Pyrene-Labeled Macromolecules**
S. Farhangi, J. Duhamel*
J. Phys. Chem. B., Acc. 01/16

16-002 **Surrogate Models for Online Monitoring and Process Troubleshooting of NBR Emulsion Copolymerization**
C. Madhuranthakam, A. Penlidis*
Process, Acc. 03/16

16-003 **Molecular architecture manipulation in free radical copolymerization: An advanced Monte Carlo approach to screening copolymer chains with various comonomer sequence arrangements**
M. Reza Saeb, Y. Mohammadi, A. Saeid Pakdel, A. Penlidis*
Macromol Theory Simul., Acc. 03/16

16-004 **Enhanced Bioethanol Production from Blue Agave Bagasse in a Combined Extrusion-Saccharification Process**
C. Montiel*, O. Hernandez-Melendez, E. Vivaldo-Lima, M. Hernandez-Luna, E. Barzana
Bioenerg. Res. Acc. 05/16

16-005 **Characterization of Blue Agave Bagasse (BAB) as Raw Material for Bioethanol Production Processes by Gravimetric, Thermal, Chromatographic, X-ray Diffraction, Microscopy and Laser Light Scattering Techniques**
O. Hernandez-Melendez , F. Miguel-Cruz, C. Montiel*, M. Hernandez-Luna, E. Vivaldo-Lima, C. Mena-Brito, E. Barzana
Bioenerg. Res. Acc. 05/16

16-006 **Plurifunctional polyglycidol-based particles prepared by Dispersion Ring-Opening Metathesis Polymerization**
M. Neqal, L. Pichavant, M. Gauthier, V. Heroguez*
Colloids Surf. A. Acc. 05/16

16-007 **Determination of Reactivity Ratios for the Copolymerization of Poly(Acrylic Acid-co-Itaconic Acid)**
S. Cummings, Y. Zhang, N. Kazemi, Al. Penlidis, M. Dube*
J Appl Polym Sci. Acc. 06/16

16-008 **Design of Tailor-made Water-Soluble Copolymers for Enhanced Oil Recovery Polymer Flooding Applications**
M. Riahinezhad, L. Romero-Zeron, N. McManus, A. Penlidis*
Macromol. React. Eng., Acc. 06/16

16-009 **Evaluation of Polymeric Nanocomposites for Detection of Toxic Gas Analytes**
K. Stewart, A. Penlidis*
J. Macromol. Sci., Pure & Appl. Chem., Acc. 06/16

16-010 **Sensor Array for Volatile Organic Compounds based on Doped Poly (2,5-dimethyl aniline)**
K. Stewart, A. Penlidis*
Macromol. Symp. (Hamburg PRE).Acc. 07/16

16-011 **Nitroxide-Mediated Polymerization (NMP)**
E. Vivaldo-Lima, A. Penlidis
Encyclopedia of Polymer Science and Technology, Acc. 07/16

16-012 **Membrane binding and oligomer formation by the calcium-dependent lipopeptide antibiotic A54145: a quantitative study with pyrene excimer fluorescence**
T. Zhang, S.Taylor, M. Palmer, J. Duhamel
Biophysical Journal, Acc. 07/16

16-013 **Long Range Polymer Chain Dynamics Studied by Fluorescence Quenching**
S. Farhangi, J. Duhamel
Macromolecules, Acc. 08/16

16-014 **Designing Polymeric Sensing Materials: What are we Doing Wrong?**
K. Stewart, A. Penlidis*
Polymers in Advanced Technologies, Acc. 08/16

16-015 **New Approaches to Characterize Polymeric Oil Additives in Solution Based on Pyrene Excimer Fluorescence**
S. Pirouz, J. Duhamel*
J. Polym. Sci. B: Polym. Phys, Acc. 09/16

16-016 **Conformation of Pyrene Labeled Amylose in DMSO Characterized with the Fluorescence Blob Model**
L. Li, J. Duhamel*
Macromolecules, Acc. 10/16

16-017 **Characterization of the Long Range Internal Dynamics of Pyrene-Labeled Macromolecules by Pyrene Excimer Fluorescence**
S. Pirouz, r. Casier, L. LI, J. Thoma, J. Duhamel*
Macromolecules., Acc. 12/16

16-018 **Honeycomb structure porous films prepared from arborescent graft polystyrenes via the breath figure method**
M. Huh, M. Gauthier, S. Yun*
Elsevier, Acc. 12/16

16-019 **Biocompatible Polyion Complex Micelles Synthesized from Aborescent Polymers**

T. Nguyen, M. Pauw-Gillet, O. Sandre, M. Gauthier*

Langmuir, Acc. 12/16

16-020 **Low-bandgap Donor-Acceptor Polymers for Photodetectors with Photoresponsivity from 300 nm to 1600 nm**

J. Han, J. Qi, X, Zheng, L. HU, C. Guo, Y.Wang, Y. Li, D. Ma, W. Qiao*, and Z. Wang

J. Materials Chemistry C, Acc. 12/16 Phys, Acc. 09/16

16-021 **Converting a semiconducting polymer from ambipolar into n-type dominant by amine end-capping**

J. Quinn, H. Patel, F. Haider, D. Kan, Y. Li*

Chemelectrochem, Acc. 12/16

16-022 **Naphthalene Diimide−Diketopyrrolopyrrole Copolymers as Non-Fullerene Acceptors for Use in Bulk-Heterojunction All−Polymer UV−NIR Photodetectors**

L. Hu, W. Qiao, J.Han, X. Zhou, C. Wang, D. Ma, Z. Y. Wang and Y. Li

Polymer Chemistry, Acc. 12/16

16-023 **Development and characterization of a flexible electrochromic device based on polyaniline and enzymatically synthesized poly (gallic acid)**

J. Diaz-Sanchez, A. Rosas-Aburto, E. Vivaldo-Lima, J. Hernandez-Alcantara, I. Gracia-Mora, H. Vazquez-Torres, L. Ordonez, M. Gimeno*

Synthetic Metals, Acc. 11/16

APPENDIX 4

Research Personnel (S U P E R V I S O R)

NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	NMc	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
A. Albiladi	1	ChE				**X**									Seawater desalination by membranes	Dec 18
M. Alsehli	2	Chem					**X**								Arborescent polypeptide micelles (Saudi Arabia Scholarship)	Apr 17
P. Arczewska	2	CivE								X					Polymeric fibre-reinforced bars (co-supervised with Prof MA Polak, Civ Eng)	May 17
A. Alturk	2	Chem					X								Arborescent Polybutadiene Synthesis and Rheology	Aug 18
R. Amos	2	Chem					X								Hydrophobic Modification of Starch Nanoparticles	Aug 18
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
N. Dasgupta	1	Chem					X								Synthesis of Thermosensitive Polymer-Grafted Starch Nanoparticles	
Y. Deng	3	ChE						X							Polymer semiconductors	Jan 16
J. Ellard	1	ChE						X							Thiophene-*S,S*-dioxidized Indophenine for Use in Organic Field-effect Transistors	Dec 16
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
D. Geng	1	Chem											X		Synthesis of metal carbonyls polymers for chain conformation characterization	2017

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
K. Gholami	1	Chem		X											Associations between EP copolymers in Base Oils Probed by Flourescence	Sep 16
N. Grishkeweich	2	Chem									X				Sustainable nanomaterials for water treatment	May 18
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
M. Iqbal	2	ChE				X									Wastewater treatment by membranes	Dec 20
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							Solution-processable oligomeric and small molecule semiconductors for organic solar cells	Sep 16
L. Li	2	Chem		X											Intrinsic Properties of Starch Nanoparticles Probed by Pyrene Excimer Fluorescence	Aug 16
D. Liu	2	Chem											X		Self-assembly of metal carbonyl polymers	2018
B. Mahi	2	Chem					X								Synthesis of pH-responsive Arborescent Amphiphilic Copolymers based on Glycine and Benzyl Glutamate	
H. Manston	2	ChE				X									Membranes for environmental applications	Aug 19
H. Meng		ChE						X							Polymer semiconductors for solar cells	Aug 18
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 ROMP	Aug 17
J. Ngai	1ChE							X							Polymer Solar Cells	Dec 20
Z. Pan	2	ChE												X	Development of low friction and oleophobic coating materials	Sep 16
Y. Quan	4	ChE				X									Wastewater treatment with membranes	Aug 17
B. Qiu	1	ChE				X									Waste water treatment by absorption	Aug 16

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NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	NMc	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
L. Qiu	4	ChE				x									Removal of organic contaminants from water by pervaporation	Aug 16
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	3	ChE								x					Product design criteria for water-soluble polymers	Apr 16
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
K. Stewart	2	ChE								X					Polymeric sensors for the detection of toxic analytes	Aug 16
K. Stewart	3	ChE								x					Polymeric sensors for aqueous analytes	Dec 17
B. Sun	2	ChE						X							High Performance n-Type Polymer Semiconductors for Printed Logic Circuits	Jan 16
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 Fluorscence	Aug 17
J. Trinidad	1	ChE												x	Electrically conductive nanocomposite	Aug 16
D. Vishnu	4	Chem					X								Synthesis of controlled architecture polymers	Aug 17
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
X. Wang	1	ChE													Degassing membranes	Aug 18
A.Worku	2	Chem					X								Arborescent Micelles from Polyelectrolyte Complexes	Aug 17
D. Wu	3	ChE				X									Nanofiltration membranes	Aug 16
X. Wu	2	ChE									X				Conductive Cellulose Nanocrystals for Next Generation Energy Storage	Sep 16
J. Xu	2	ChE				X									Air pollution control	Aug 19

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NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	NMc	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
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							Electrodeposition of p-Type Cuprous Oxide and its Application in Oxide Solar Cells	Jan 17
S. Zenggian	3	Chem									X				Polydopamine Cellullose Nanocrystals	Aug 16
B. Zhang	2	ChE				X									Aroma compound recovery from aqueous solutions	Dec 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
J. Zhu	2	ChE						X							Organic thin film transistor chemical sensors	Aug 18

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