

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

**NEWSLETTER 2013**

**1. NOTE FROM PROFESSOR JEAN DUHAMEL, IPR DIRECTOR**

Another year has passed and it has been filled with exciting changes and successes at the Institute for Polymer Research.

The first big change of the year occurred when the University of Waterloo, in compliance with government accessibility legislation, undertook a University-wide initiative to update all University websites. Please note that as a result, our web address has changed to [www.uwaterloo.ca/institute-polymer-research](http://www.uwaterloo.ca/institute-polymer-research), although the previous [www.ipruw.com](http://www.ipruw.com) site address will redirect you to the new site. At your leisure, please visit our new site.

Our lecture series organized by the IPR, welcomed Prof. Costas Tzoganakis in April and Prof. Mario Gauthier in November. Both delivered well-attended presentations entitled, “Analysis and Optimization of Polymer Compounding Operations for Automotive Plastics”, and “Arborescent and other branched polymer structures: Why bother?”, respectively. The lecture series is presented on an on-going basis to keep the IPR community abreast of the latest research, scientific breakthroughs and expertise being developed in the IPR laboratories.

The highlight of the year is always the annual symposium which was held on May 8, 2013. Dr. Steven Bloembergen, Executive VP Technology at Ecosynthetix and Prof. Alex Adronov from the Department of Chemistry at McMaster University delivered the keynote presentations. Dr. Bloembergen spoke of the scientific developments spearheaded by Ecosynthetix to produce the starch nanoparticles that are currently used industrially in paper coating applications. Prof. Adronov illustrated the difficulties associated with the productions of carbon nanotubes having well-defined features.

In addition, our two IPR award recipients, Hadi Izadi and Parinaz Akhlaghi gave exciting presentations about their research. Beside Hadi and Parinaz, twenty additional graduate students presented the results of their research at the symposium. The high level of preparedness for both the oral and poster presentations and the strong quality of the research ensured that the 2013 IPR symposium was extremely well received by all attendees. The interactions generated throughout the symposium with the student presentations and follow-up question-and-answer exchanges ensured that the IPR symposium continues to provide a collegial forum for informal discussions and connections within the IPR community of students, professors and industry visitors. The 2013 IPR symposium hosted the largest number of industry attendees in many years who enjoyed the student presentations and their enthusiasm for research. New this year, the organization of the symposium was supported by both industrial and University sponsors reflecting their commitment to the symposium and recognition of the valuable research being conducted by IPR researchers.

Finally, I want to thank our colleagues, Profs. Gauthier and Penlidis, for their professional activities that help project the IPR to the international stage. Prof. Gauthier is spending several months/yr in Hubei Province (Wuhan, China) taking part in the High-end Foreign Experts Program Award. Prof. Penlidis and his PhD student Hadi Izadi coordinated and acted as guest editors (by special invitation from MRE/Wiley

editors) for two special issues on Adhesive Technology and Bio-inspired Adhesives, for Macromol. React. Eng, issues 7(10) and 7(11), with 16 papers from the 'who-is-who' internationally on Adhesion Science and Engineering.

For this year's symposium, we are delighted to announce the two following keynote speakers; Dr. Guerino Sacripante from the Xerox Research Center in Mississauga and Prof. Harald Stoeber from McMaster University. Our students are conducting the last experiments to finalize the research that they will present at the next symposium which promises to be equally exciting and stimulating. In closing this introduction to our 2013 Newsletter, I look forward to welcoming you at the 2014 IPR symposium on May 21<sup>st</sup>.

## 2. ANNUAL IPR SYMPOSIUM

The 36<sup>th</sup> Annual IPR Symposium will be held May 21, 2014. A schedule and registration forms have been circulated electronically, as usual.

Many thanks to all who participated in the 2013 Symposium (an audience of about 80 people). IPR received very positive feedback regarding the topics covered. The 2013 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 2013, the IPR office sent out 26 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

### T. Duever

|       |     |             |                                                     |
|-------|-----|-------------|-----------------------------------------------------|
| PhD   | ChE | Masoumi, S. | Parameter estimation in nonlinear models using MCMC |
| MASc. | ChE | Mathew, M.  | Model discrimination using MCMC methods             |

### X. Feng

|      |     |            |                                                                                                                         |
|------|-----|------------|-------------------------------------------------------------------------------------------------------------------------|
| MASc | ChE | Bailey, K. | Potential applications of silk fibroin as a biomaterial                                                                 |
| PhD  | ChE | Kundu, P.  | Process analysis of asymmetric hollow fiber membranes, unsteady state permeation and hybrid systems for gas separations |
| MASc | ChE | Snow, M.   | Polymer electrolyte membranes for liquid olefin/paraffin separation                                                     |

### M. Gauthier

|       |      |               |                                                                                                       |
|-------|------|---------------|-------------------------------------------------------------------------------------------------------|
| M.Sc. | Chem | Alzahrany, Y. | Currently in the PhD program with Nikos Hadjichristidis, KAUST, Saudi Arabia                          |
| PhD   | Chem | Aridi, T.     | Now working at Imperial Oil, Sarnia, ON, Canada.                                                      |
| PDF   | Chem | Moingeon, F.  | Now working at Thomas Swan, UK.                                                                       |
| PhD   | Chem | Whitton, G.   | Now working as a postdoctoral fellow in the group of Elizabeth Gillies, University of Western Ontario |

**Y. Li**

|       |     |            |                                                                                                                    |
|-------|-----|------------|--------------------------------------------------------------------------------------------------------------------|
| MASc. | ChE | Murphy, L. | Influence of High Mobility Polymer Semiconductors in Organic Photovoltaics                                         |
| MASc. | ChE | Yan, Z.    | Development of New Building Blocks for Constructing Novel Polymer Semiconductors for Organic Thin Film Transistors |

**M. Tam**

|      |     |            |                                                                                                                         |
|------|-----|------------|-------------------------------------------------------------------------------------------------------------------------|
| PhD  | ChE | Peng, B.   | Interactions between Surfactants and Biodegradable Thermo-Responsive Polymeric Nanostructures in Bulk and at Interfaces |
| MASc | ChE | Batmaz, R. | Adsorption of an Organic Dye with Cellulose Nanocrystals                                                                |

**C. Tzoganakis**

|     |     |             |                                                    |
|-----|-----|-------------|----------------------------------------------------|
| PhD | ChE | Mutyala, P. | Production of TPV's from Devulcanized Rubber Crumb |
|-----|-----|-------------|----------------------------------------------------|

**X. Wang**

|      |      |         |                                                                                                                                 |
|------|------|---------|---------------------------------------------------------------------------------------------------------------------------------|
| MASc | Chem | Liu, Y. | Synthesis and Characterization of Cyclopentadienyl Dicarboxyldiphenylphosphinopropyliron for Migratory Insertion Polymerization |
|------|------|---------|---------------------------------------------------------------------------------------------------------------------------------|

**B. Zhao**

|      |     |              |                                                                                                                          |
|------|-----|--------------|--------------------------------------------------------------------------------------------------------------------------|
| MASc | ChE | McDonald, B. | Pattern Transfer and Characterization of Biomimetic Micro-Structured surfaces for Hydrophobic and Icephobic Applications |
|------|-----|--------------|--------------------------------------------------------------------------------------------------------------------------|

**7. ACADEMIC MEMBERS OF THE INSTITUTE FOR POLYMER RESEARCH**

|             |                      |              |              |
|-------------|----------------------|--------------|--------------|
| Professors: | R. Dhib              | Chem. Eng.   | Ryerson      |
|             | T.A. Duever          | Chem. Eng.   | Waterloo     |
|             | 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/](http://www.uwaterloo.ca/institute-polymer-research/)

## **8. MEMBER COMPANIES—2013**

Currently we have **8 member companies:** (refer also Appendix 3)

Afton Chemical  
BASF SE  
Compuplast Canada Inc.  
Lanxess Inc.  
OMNOVA Solutions Inc.  
PolyVation, The Netherlands  
Princeton Polymer Consultants, USA  
SABIC Europe, B.V.

## **9. STUDENT AWARDS**

### **J. Duhamel**

Mike Fowler received the Doctoral Thesis Completion Award from UW and the H. G. McLeod Award from GWC2.

### **M. Gauthier**

Alsehli, M. PhD Scholarship from Saudi Arabia  
Alturk, A. PhD Scholarship from Saudi Arabia  
Nguon, O. Best poster prize at the EnviroAnalysis conference 2013 (Toronto)

### **A. Penlidis**

Kate Stewart (PhD) had a poster that was one of 15 finalists (out of 60 posters), AUTO21 Conf., Toronto, ON, May 22-23, 2013.  
Pouyan Sardashti (PhD) was selected to participate in BASF Research Forum, Tarrytown, NY, USA, July 25-27, 2013. He also received two Faculty of Engineering Graduate Scholarships.  
Alison Scott (MAsc) received the Sanford Fleming Foundation Silver Medal for Co-operative Proficiency, Univ of Wloo.  
Marzieh Riahinezhad (PhD) received a Merit scholarship from the Dept. of Chem. Eng. (based on academic performance) in April. She also completed a certificate in Fundamentals of University Teaching from the UW Center for Teaching Excellence (Fall 2013).  
Hadi Izadi (PhD) received the Institute for Polymer Research Award (IPR) for academic excellence during a graduate student's degree in polymer science/engineering, May 2013.  
Yasaman Amintowlieh (PhD) received a Graduate research studentship (given to students with GPA above 90).

### **M.Tam**

Parinaz Akhlaghi received the Institute for Polymer Research Award (IPR) for academic excellence during a graduate student's degree in polymer science/engineering and the WIN Fellowship.

### **E.Vivaldo-Lima**

Porfirio López-Domínguez was awarded a CONACYT scholarship for M. Eng. (Chem. Eng.) studies at UNAM (Faculty of Chemistry, Engineering Graduate Program –PMYDI-) 2013-2015.

### **B. Zhao**

Hamed Shahsavan, recipient of the WIN Nanofellowship 2013  
Hamed Shahsavan, recipient of an OGS scholarship, 2013

## **10. FACULTY AWARDS**

### **M. Gauthier**

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

### **E. Vivaldo-Lima**

Premio Universidad Nacional (PUN) 2013, categoría de Docencia en ciencias exactas (“National University Award in the area of Teaching in exact sciences”), UNAM, México, November 2013. This is the most prestigious award granted by UNAM to its researchers and professors.

Granted Level 3 (the highest) of the Mexican National Researchers System (S.N.I.), 2013-2017 (Results released in December 2012, distinction effective January 2013-December 2017).

## **11. FULL REFEREED JOURNAL PAPERS**

### **R. Dhib**

Roudsari, Sh., F., F. Ein-Mozaffari, R. Dhib (2013). Use of CFD in Modeling MMA Solution Polymerization in a CSTR. *Chemical Engineering Journal*, 219 429-442.

### **T. Duever**

Kazemi, N., T.A. Duever, A. Penlidis (2013). Design of Experiments for Reactivity Ratio Estimation in Multicomponent Polymerizations Using the Error-in-Variables Approach. *Macromol. Theory Simul.* 22(5), 261-272.

Kazemi, N., T.A. Duever, A. Penlidis (2013). A Powerful Estimation Scheme with the Error-in-Variables-Model for Nonlinear Cases: Reactivity Ration Estimation Examples. *Computers and Chemical Engineering*, 48, 200-208.

### **J. Duhamel**

Chen, S. J. Duhamel (2013). Probing the Hydrophobic Interactions of a Series of Pyrene End-Labeled Poly(ethylene oxide)s in Aqueous Solution Using Time-Resolved Fluorescence. *Langmuir*. 29, 2821-2834.

Chen, S., W. Yi, J. Duhamel, K. Heinrich, G. Bengtson, D. Fritsch (2013). Effect of the Porosity of a Polymer of Intrinsic Microporosity (PIM) on its Intrinsic Fluorescence. *J. Phys. Chem. B*, 117, 5249-5260.

Fowler, M.A., B. Siddique, J. Duhamel (2013). Effect of Sequence on the Ionization Behaviour of a Series of Amphiphilic Polypeptides. *Langmuir* 29, 4451-4459.

Duhamel, J. (2013). Global Analysis of Fluorescence Decays to Probe the Internal Dynamics of Fluorescently Labeled Macromolecules. Invited Instructional Review in *Langmuir*. DOI: 10.1021/la403714u.

Farhangi, S., H. Weiss, J. Duhamel (2013). Effect of Side-Chain Length on the Polymer Chain Dynamics of Poly(alkyl methacrylate)s in Solution. *Macromolecules* 46, 9738-9747.

Chen, S., H. Siu, J. Duhamel (2013). Interactions Between Hydrophobically Modified Alkali-Swellable Emulsion Polymers and Sodium Dodecyl Sulfate Probed by Fluorescence and Rheology. *J. Phys. Chem. B*. 118 (1), 351-361.

### **X. Feng**

Zhang, X., C. Li, X. Hao, X. Feng, H. Zhang, H. Hou and G. Liang (2013). Recovering phenol as high purity crystals from dilute aqueous solutions by pervaporation. *Chemical Engineering Science*, 108, 183-187.

Wang, X., F. Shi, X. Gao, C. Fan, W. Huang, X. Feng (2013). A sol-gel dip/spin coating method to prepare titanium oxide films. *Thin Solid Films*, 548, 34-39.

Kundu, P., R. Zakaria, A. Chakma, X. Feng (2013). Analysis of permeate pressure build-up effects on intrinsic separation performance of asymmetric hollow fiber membranes. *Chemical Engineering Science*, 104, 849–856.

Xu, J., X. Feng, J. Hou, X. Wang, B. Shan, L. Yu, C. Gao (2013). Preparation and characterization of a novel polysulfone UF membrane using a copolymer with capsaicin-mimic moieties for improved anti-fouling properties. *J. of Membrane Science*, 446, 171-180.

Huang, Q.-L., C. Xiao, Z.-Q. Miao, X. Feng, X.-Y. Hu (2013). Preparation and characterization of poly(tetrafluoroethylene-cohexafluoropropylene) (FEP) hollow fiber membranes for desalination. *Desalination and Water Treatment*, 51, 3948-3953.

Zhang, Y., J.W. Rhim, X. Feng (2013). Improving the stability of layer-by-layer self-assembled membranes for dehydration of alcohol and diol. *J. of Membrane Science*, 444, 22-31.

Huang, Q., C. Xiao, X. Feng, X. Hu (2013). Design of super-hydrophobic microporous polytetrafluoroethylene membranes. *New Journal of Chemistry*, 37, 373-379.

Khosa, M.A., S.S. Shah, X. Feng (2013). Micellar enhanced ultrafiltration of organic dyes. *Separation Science and Technology*, 48, 1315–1323.

Sun, A.C., W. Kosar, Y. Zhang, X. Feng (2013). A study of thermodynamics and kinetics pertinent to formation of PVDF membranes by phase inversion. *Desalination*, 309, 156-164.

Kundu, P., A. Chakma, X. Feng (2013). Modelling of multicomponent gas separation with asymmetric hollow fibre membranes - methane enrichment from biogas. *Canadian J. of Chemical Engineering*, 91, 1092-1102.

### **M. Gauthier**

Truzzolillo, D., D. Vlassopoulos, M. Gauthier (2013). Rheological Detection of Caging and Solid-liquid Transitions in Soft Colloid – Polymer Mixtures. *J. Non-Newtonian Fluid Mech.* 193, 11-20.

Truzzolillo, D., D. Vlassopoulos, M. Gauthier, A. Munam (2013). Thermal Melting in Depletion Gels of Hairy Nanoparticles. *Soft Matter*, 9, 9088-9093.

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Whitton, G., M. Gauthier (2013). Arborescent Polypeptides from  $\gamma$ -Benzyl L-Glutamic Acid. *J. Polym. Sci., Part A: Polym. Chem.*, 51, 5270-5279.

Aly Saad Aly, M., O. Nguon, M. Gauthier, J.T.W. Yeow (2013). Antibacterial Porous Polymeric Monolith Columns with Amphiphilic and Polycationic Character on Cross-linked PMMA Substrates for Cell Lysis Applications. *RSC Adv.*, 3, 24177-24184.

### **Y. Li**

Murphy, L., W. Hong, H. Aziz, H., Y. Li (2013). Influences of Using a High Mobility Donor Polymer on Solar Cell Performance. *Organic Electronics*, 14, 3484-3492.

Hong, W., G. Guo, S. Sun, Z. Yan, C. Huang, Y. Hu, Y. Zheng, A. Facchetti, Y. Li, Y. (2013). Cyano-disubstituted dipyrrolopyrazinedione (CNPzDP) small molecules for solution processed n-channel organic thin-film transistors. *J. Mater. Chem. C*, 1 (36), 5624 - 5627.

Sun, B., W. Hong, H. Aziz, N.M. Abukhdeir, Y. Li (2013). Dramatically Enhanced Molecular Ordering and Charge Transport of a DPP-based Polymer Assisted by Oligomers through Antiplasticization. *J. Mater. Chem. C*, 1, 4423.

Lu, S., M. Drees, Y. Yao, D. Boudinet, H. Yan, P. Pan, J. Wang, Y. Li, H. Usta, A. Facchetti (2013). 3,6-Dithiophen-2-yl-diketopyrrolo[3,2-*b*]pyrrole (isoDPPT) as an Acceptor Building Block for Organic Opto-Electronics. *Macromolecules*, 46, 3895.

Li, Y., P. Sonar, L. Murphy, W. Hong (2013). High mobility diketopyrrolopyrrole (DPP)-based organic semiconductor materials for organic thin film transistors and photovoltaics. *Energy Environ. Sci.*, 6, 1684.

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Yan, Z., B. Sun, Y. Li (2013). Novel stable (3*E*,7*E*)-3,7-bis(2-oxindolin-3-ylidene)benzo[1,2-*b*:4,5-*b'*]difuran-2,6(3*H*,7*H*)-dione based donor-acceptor polymer semiconductors for n-type organic thin film transistors. *Chem. Commun*, 49, 3790.

Hong, W.B. Sun, G. Guo, J. Yuen, Y. Li, S. Lu, H. Huang, A. Facchetti (2013). Dipyrrolo[2,3-*b*:20,30-*e*]pyrazine-2,6(1*H*,5*H*)-dione based conjugated polymers for ambipolar organic thin-film transistors. *Chem. Commun.*, 49, 484.

Jiang, C., W.L. Koh, M.Y. Leung, W. Hong, Y. Li, J. Zhang (2013). Influences of alcoholic solvents on spray pyrolysis deposition of TiO<sub>2</sub> blocking layer films for solid-state dye-sensitized solar cells. *J. Solid State Chem.*, 198, 197.

#### **N. McManus**

Riahinezhad, M., N. Kazemi, N. McManus, A. Penlidis (2013). Optimal Estimation of Reactivity Ratios for Acrylamide/Acrylic Acid Copolymerization. *J. Polym. Sci.* 51 4819-4827.

#### **A. Penlidis**

Izadi, H., K. Sarikhani, A. Penlidis (2013). Instabilities of teflon AF thin films in alumina nanochannels and adhesion of bi-level Teflon AF nanopillars. *Nanotechnology*, 24, 505306 (12 pp).

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Nabifar, A., J. Hernandez-Ortiz, E. Vivaldo-Lima, A. Penlidis (2013). Cross-linking NMRP copolymerization from a Bayesian experimental design angle. *Macromol. Symp.*, 324, 19-32.

Stewart, K.M.E., A. Penlidis (2013). Novel test system for gas sensing materials and sensors. *Macromol. Symp.*, 324, 11-18.

#### **L. Simon**

Guettler, B.E., C. Moresoli , L.C. Simon (2013). Contact angle and surface energy analysis of soy materials subjected to potassium permanganate and autoclave treatment. *Ind. Crops Prod.*, 50, 219–226.

Tajvidi, M., A. M. Sharma, L. C. Simon (2013). Thermal transitions and temperature dependent mechanical behavior of wheat straw/talc isotactic/impact modified polypropylene composites. *J. Reinf. Plast. Comp.*, 32, 1430-1443.

Guettler, B.E., C. Moresoli , L.C. Simon (2013). Mechanical properties and crack propagation of soy-polypropylene composites. *J. Appl. Polym. Sci.*, 130 (1), 175–185.

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#### **M. Tam**

Yao Z.L., N. Grishkewich, K.C. Tam (2013). Swelling and shear viscosity of stimuli-responsive colloidal systems. *Soft Matter.*, 9, 5319-5335.

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Akhlaghi, S.P., R.M. Berry, K.C. Tam (2013). Surface modification of cellulose nanocrystal with chitosan oligosaccharide for drug delivery applications. *Cellulose*, 20, 1747-1764.

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Suh, Y.H., B.J. Kim, K.C. Tam, M.G. Aucoin (2013). Detection and characterization of hemoglobin dissociation and aggregation using microcalorimetry. *Journal of Thermal Analysis and Calorimetry* DOI10.1007/s10973-013-3424-5.

### **C. Tzoganakis**

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Younes, A., A. Elkamel, M. Leung, C. Tzoganakis, A. Lohi (2013). The Quality-constrained Scheduling Problem in Plastics Compounding. *Can. J. Chem. Eng.*, 91, 1229-1243. DOI 10.1002/cjce.21739.

### **E. Vivaldo-Lima**

García-Leal, E., M.A. Ordaz-Quintero, E. Saldívar-Guerra, M.E. Albores-Velasco, E. Vivaldo-Lima (2013). Nitroxide-Mediated Controlled Radical Styrene Polymerization Via a Mass-Suspension Process. *Macromol. React. Eng.*, 7(12), 699-712.

López-Domínguez, P., E. Vivaldo-Lima (2013). Analysis of the Microwave Activated Atom Transfer Radical Polymerization of Methyl Methacrylate and Styrene using Modeling Tools. *Macromol. React. Eng.*, 7(9), 463-476.

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### **X. Wang**

Lanigan, N., X.S. Wang (2013). Supramolecular chemistry of metal complexes in solution. *Chem. Commun.*, 49, 8133-8144.

Wang, X.S., K. Cao, Y.B. Liu, B. Tsang, S. Liew (2013). Migration insertion polymerization (MIP) of cyclopentadienyldicarbonyldiphenylphosphinopropyliron (FpP): a new concept for main chain metal-containing polymers (MCPs). *J. Am. Chem. Soc.*, 135, 3399-3402.

Cai, C.H., Y.L. Li, J.P. Lin, L.Q. Wang, S.L. Lin, X.S. Wang, T. Jiang (2013). Simulation-Assisted Self-Assembly of Multicomponent Polymers into Hierarchical Assemblies with Varied Morphologies. *Angew. Chem. Int. Ed.*, 30, 7732–7736.

Nawaza, S.M.H., J. Liu, F. Liu, X.S. Wang, W.A. Zhang (2013). Synthesis of porphyrinic polystyrenes and their self-assembly with pristine fullerene (C60) *Mater. Lett.*, 91, 71-74.

Ghasdian, N., Y.B. Liu, R. McHale, J.J. He, Y.Q. Miao, X.S. Wang (2013). Synthesis of Prussian Blue Metal Coordination Polymer Nanocubes via Cyanoferrate Monomer Design. *J. Inorg. Organomet. P.*, 23, 111-118.

Cao, K., B. Tsang, Y.B. Liu, D. Chelladural, W.P. Power, X.S. Wang (2013). Synthesis, Cyclization, and Migration Insertion Oligomerization of CpFe(CO)<sub>2</sub>(CH<sub>2</sub>)<sub>3</sub>PPh<sub>2</sub> in Solution. *Organometallics*, Article ASAP DOI: 10.1021/om4010516.

### **B. Zhao**

Shahsavan, H., B. Zhao (2013). Bio-inspired Functionally Graded Adhesive Materials: Synergetic Interplay of Top Viscous-elastic Layers with Base Micropillars, *Macromolecules*, DOI: 10.1021/ma4018718.

Zhang, W., Fut K. Yang, Z. Pan, J. Zhang, B. Zhao (2013). Bio-Inspired Dopamine Functionalization of Polypyrrole for Improved Adhesion and Conductivity. *Macromolecular Rapid Communications*, DOI: 10.1002/marc.201300761.

McDonald, B., P. Patel, B. Zhao (2013). Micro-Structured Polymer Film Mimicking the Trembling Aspen Leaf. *Chemical Engineering & Process Techniques*, 1(2):101.

Amoli, B.M., E. Marzbanrad, A. Hu, Y.N. Zhou, B. Zhao (2013). High-aspect Ratio Silver Nanobelts for Electrical Conductive Adhesive Nanocomposites. *Macromolecular Materials and Engineering*, DOI: 10.1002/mame.201300295.

Marzbanrad, E., A. Hu, B. Zhao, Y. N. Zhou (2013). Room Temperature Nanojoining of Triangular and Hexagonal Silver Nanodisks. *J. of Physical Chemistry C*, 117 (32), 16665–16676.

McDonald, B., H. Shahsavan, B. Zhao (2013). Biomimetic Micro-Patterning of Epoxy Coatings for Enhanced Hydrophobicity and Low Friction. *Macromolecular Materials and Engineering*, DOI: 10.1002/mame.201300112

Gumfekar, S.P., B.M. Amoli, A. Chen, B. Zhao (2013). Polyaniline-tailored Electromechanical Responses of the Silver/Epoxy Conductive Adhesive Composites. *J. of Polymer Science: Part B*, 51, 1448–1455.

Wang, W., S. P. Gumfekar, Q. Jiao, B. Zhao (2013). Ferrite-grafted Polyaniline Nanofibers as Electromagnetic Shielding Materials. *J. of Materials Chemistry C*, 1 (16), 2851 – 2859.

Zhang, W., F.K. Yang, Y. Han, R. Gaikwad, Z. Leonenko, B. Zhao (2013). Surface and Tribological Behaviors of the Bio-inspired Polydopamine Thin Films in Dry and Wet Conditions. *Biomacromolecules*, 14, 394–405.

### **13. CONFERENCE PRESENTATIONS/INVITED SEMINARS**

#### **R. Dhib**

Fathi Roudsari S., F Ein-Mozaffari, R Dhib (2013). Effect of Mixing Geometry and Configuration on PMMA Latex Quality in a Batch Reactor. 63rd Canadian Chemical Engineering Conference, Fredericton, NB, Canada, October 20-23, 2013.

Fathi Roudsari, S., F Ein-Mozaffari, R Dhib (2013). Exploring the Effect of Agitation on MMA Emulsion Polymerization. 63rd Canadian Chemical Engineering Conference, Fredericton, NB, Canada, October 20-23, 2013.

Hamad, D., M. Mehrvar, R. Dhib (2013). Experimental Study and Kinetic Modeling of Photo-oxidative Degradation of PVA by UV/ H<sub>2</sub>O<sub>2</sub> Process. 63rd Canadian Chemical Engineering Conference, Fredericton, NB, Canada, October 20-23, 2013.

#### **T. Duever**

Kazemi, N., T. Duever, A. Penlidis (2013). A Systematic Approach to Estimating Reactivity Ratios in Multicomponent Polymerization Systems. AIChE Annual Meeting, San Francisco, November 3-8, 2013.

#### **J. Duhamel**

Pirouz, S., J. Duhamel (2013). Modification of Polyisobutylene-Based Oil-Soluble Dispersants. XXII IMRC, Cancun, Mexico, August 11-15, 2013.

Farhangi, S., H. Weiss, J. Duhamel (2013). To Which Extent Can Pyrene Excimer Formation Probe Polymer Chain Dynamics in Pyrene-Labeled Polymers? Polymat, Huatulco, Mexico, October 13-16, 2013.

Duhamel, J. (2013). Probing the Internal Dynamics of Macromolecules in Solution Quantitatively by Using Time-Resolved Fluorescence. Département de Chimie, Université de Montréal, Montréal QC, Canada, January 25<sup>th</sup>, 2013.

Duhamel, J. (2013). Internal Dynamics of Macromolecules Probed by Using Pyrene Excimer Formation: From Theory to Applications. 96<sup>th</sup> CSC Conference in Québec, Québec QC, Canada, May 26 – 30, 2013.

Duhamel, J. (2013). Bubbly Chemistry: The Many Uses and Applications of Surfactants. CHEMED 2013 Conference, Waterloo, July 28- August 1<sup>st</sup>, 2013.

#### **X. Feng**

Huang, Y., Y. Zhang, D. Lawless, X. Feng (2013). Removal of heavy metals from wastewater using polymer-enhanced ultrafiltration. Invited Keynote Presentation, 13th Pacific Polymer Conference (PPC 2013), Kaohsiung, Taiwan, Nov 17 - 22, 2013.

X. Feng (2013). Olefin/paraffin separations by membranes via facilitated transport. SM Nutritional Products Canada Inc., Dartmouth, NS, Oct 24, 2013.

Huang, Y., D. Lawless, X. Feng (2013). Polyvinylamine-enhanced ultrafiltration for removal of heavy metals from wastewater. 63rd Canadian Chemical Engineering Conference, Fredericton, NB, Oct 20-23, 2013.

Wang, X., X. Deng, Z. Bai, W. Huang, X. Feng (2013). Synthesis of superior hydrophilic and acid-resistant Ge-ZSM-5 membranes by simultaneously incorporating Ge and Al into Silicalite-1 framework. 17th Zeolite Conference, Yinchuan, China, Aug 29-Sept 2, 2013.

Chen, Y., D. Lawless, X Feng (2013). Pressure-vacuum swing permeation: a novel process mode for membrane separation of gases. Invited Keynote Presentation, International Conference on Membrane Science & Technology (MST2013), Kuala Lumpur, Malaysia, August 27-29, 2013.

X. Feng (2013). Advanced membranes for gas separations based on facilitated transport. National Institute of Clean and Low-Carbon Energy (NICE), Beijing, China, Aug 23, 2013.

Zhang, Y., J.W. Rhim, X. Feng (2013). Layer-by-layer self-assembly of polyelectrolyte membranes for solvent dehydration by pervaporation. Invited Keynote Presentation, 7th International Conference on Materials for Advanced Technologies (ICMAT 2013), Singapore, June 30-July 5, 2013.

Kim, J. H., X. Feng (2013). Preparation of facilitated transport membranes using Ag<sup>+</sup>-chitosan complex and their propylene/propane separation. 23rd Annual North American Membrane Society Meeting, Boise, ID, June 8-12, 2013.

Zhang, Y., J.W. Rhim, D. Lawless, X. Feng (2013). Self-assembled polyelectrolyte membranes for dehydration of isopropanol by pervaporation. 23rd Annual North American Membrane Society Meeting, Boise, ID, June 8-12, 2013.

### **M. Gauthier**

Gauthier, M. (2013). Arborescent Copolymer Micelles Based on Poly( $\gamma$ -benzyl L-glutamate). 96th Canadian Chemistry Conference, Québec, QC, May 2013.

Gauthier, M. (2013). Synthesis of Arborescent Polymers by "Click" Grafting. 96th Canadian Chemistry Conference, Québec, QC, May 2013.

Gauthier, M. (2013). Arborescent Polymer-stabilized Palladium Nanoparticles as Green Catalysts for the Suzuki-Miyaura Reaction. 96th Canadian Chemistry Conference, Québec, QC, May 2013.

Gauthier, M. (2013). Synthesis of Ammonium, Sulfobetaine, and Carboxylated Polyisobutylene-based Materials by Azide – Alkyne "Click" Chemistry. 96th Canadian Chemistry Conference, Québec, QC, May 2013.

Gauthier, M. (2013). Synthesis of Carboxylated Polyisobutylene-based Materials by Thiol-ene "Click" Chemistry. 96th Canadian Chemistry Conference, Québec, QC, May 2013.

Gauthier, M. (2013). Determination of the Loading and Stability of Pd Nanocatalysts by Microplasma-AES. EnviroAnalysis 2013 Conference, Toronto, ON, September 2013.

Gauthier, M. (2013). Synthesis of Arborescent Polymers by "Click" Grafting. XXII International Materials Research Congress, Cancún, Mexico, August 2013.

Gauthier, M. (2013). Arborescent Copolymers as Templates for the Formation of Palladium Nanoparticle 'Green' Catalysts. International Conference on Polymers and Advanced Materials (Polymat/SILQCOM), Huatulco, Mexico, October 2013.

Gauthier, M. (2013). Arborescent Polymers: Dendritic Macromolecules with Unusual Properties. Universidad Nacional Autónoma de México, October 2013.

### **Y. Li**

Li, Y., W. Hong, B. Sun, C. Guo, Z. Yan (2013). Design and synthesis of new donor-acceptor polymers for organic thin film transistors. 96th Canadian Chemistry Conference and Exhibition, Quebec City, Quebec, May 26-30, 2013.

Hong, W., B. Sun, C. Guo, J. Yuen, Y. Li, S. Lu, C. Huang, A. Facchetti (2013). Dipyrrolo[2,3-*b*:2',3'-*e*]pyrazine-2,6(1*H*,5*H*)-dione based conjugated small molecules and polymers for organic thin-film transistors. 96th Canadian Chemistry Conference and Exhibition, Quebec City, Quebec, May 26-30, 2013.

Li, Y. (2013). Development of Printable Electronic Materials. Invited seminar. FPInnovations, Montreal, Quebec, December 11, 2013.

Li, Y. (2013). Novel Building Blocks for Organic Semiconductors for Printed Electronics. Waterloo-Suchow Workshop, Waterloo, ON, August 1, 2013.

Li, Y. (2013). Development of Printable Electronic Materials. Invited seminar. Celestica, Toronto, ON, April 16, 2013.

#### **N. McManus**

Wu, Y.R., N. McManus, C. Tzoganakis (2013). Cross metathesis of olefin terminated polypropylene and polydimethylsiloxane in the melt phase. Society of Plastics Engineers Annual Technical Conference 2013, Proceedings Pages 2174 - 2178.

Riahinezhad, M., N. Kazemi, N. McManus, A. Penlidis (2013). Reactivity Ratios for Acrylamide/Acrylic Acid Copolymerization: Optimal design of experiments and estimation. Canadian Society of Chemical Engineering Conference, Fredericton, New Brunswick. October 2103.

McManus, N., Y.R. Wu, C. Tzoganakis (2013). Cross metathesis of olefin terminated polypropylene and polydimethylsiloxane in the melt phase. Society of Plastics Engineers Annual Technical Conference 2013, Cincinnati Ohio, May 2013.

#### **A. Penlidis**

Sepiani, H., M.A. Polak, A. Penlidis (2013). Viscoelastic material modelling of polyethylene using modified superposition principle. GEN-277 (1-8). CSCE Conf., Montreal, QC, May 29-June 1, 2013.

Izadi, H., A. Penlidis (2013). Development of a new generation of dry adhesives by electrostatic interactions of Teflon AF nanopillars. (ms length 3 proceedings pgs). 36<sup>th</sup> Adhesion Soc. Conf., Hilton resort, Daytona Beach, Florida, USA, March 3-6, 2013.

Sardashti, P., C. Tzoganakis, A. Penlidis (2013). Methodologies for obtaining reliable indicators for ESCR of polymers. AIChE Annual Mtg., San Francisco, CA, USA., Nov. 3-8, 2013.

Kazemi, N., T.A. Duever, A. Penlidis (2013). A systematic approach to estimate reactivity ratios in multicomponent polymerization systems. AIChE Annual Mtg., San Francisco, CA, USA., Nov. 3-8, 2013.

Scott, A.J., A. Penlidis (2013). Application of Principal Component Analysis to nitrile butadiene rubber polymerization reactor performance. 63<sup>rd</sup> CSChE Conf., Fredericton, NB, Canada, Oct. 20-23, 2013.

Riahinezhad, M., N. Kazemi, N. McManus, A. Penlidis (2013). Reactivity ratios for acrylamide/acrylic acid copolymerization-optimal design of experiments and estimation. 63<sup>rd</sup> CSChE Conf., Fredericton, NB, Canada, Oct. 20-23, 2013.

Chen, W.T., K. Stewart, J. Carroll, R. Mansour, E. Abdel-Rahman, A. Penlidis (2013). Novel gaseous phase ethanol sensor implemented with underloaded RF resonator for SHF sensor-embedded passive chipless RFIDS. (ms length 4 pgs). 17<sup>th</sup> Intern. Conf. on Solid-State Sensors, Actuators and Microsystems, Barcelona, Spain, June 16-20, 2013.

Penlidis, A. (2013). Gas sensors and polymeric sensing materials. AUTO21 Conference, Toronto, ON, Canada., May 22-23, 2013.

Penlidis, A. (2013). Could polymers detect volatile organic compounds? Invited talk AIChE Annual Mtg., San Francisco, CA, USA., Nov. 3-8, 2013.

Penlidis, A. (2013). Volatile organic compounds and their interaction with polymeric materials. Invited seminar, Don Grierson Memorial Seminar Series, Dubai, Feb. 5, 2013.

#### **L. Simon**

Finkle, A., R. Berry, L. Simon (2013). Application of Nanocrystalline Cellulose in Polycarbonate Nanofibers Prepared by Electrospinning. Invited, 245 ACS National Meeting, New Orleans, USA, April 7-11, 2013.

Park, S.R., L. Simon (2013). Accelerated Chemical Ageing of Renewable Polyethylene-Biofibre Thermoplastic Composites. 9<sup>th</sup> World Congress of Chemical Engineering, Seoul, South Korea, August 18-23, 2013.

Simon, L. (2013). Advances in Lightweight and Renewable Thermoplastic Composites. Invited, Canadian Innovation Day Ford Motors Company, Dearborn, USA, March 1, 2013.

Simon, L.C., M. Warmelink (2013). Increasing Sustainability & Competitiveness with Natural Fibre Thermoplastic Composites. Invited, Canadian Plastics Industry Association Innovation Forum, Toronto, Canada, November 28, 2013.

Finkle, A., R. Berry, L. Simon (2013). New Applications of Nanocrystalline Cellulose in 3-D Printing. Invited, 2<sup>nd</sup> Canada-Brazil Workshop on Nanotechnology, Waterloo, Canada, September, 18-20, 2013.

Simon, L. (2013). Road to Innovation: Renewable Materials, Nanocomposites, Advanced Thermoplastics, Bioeconomy Research Highlights. Invited, Ontario Ministry of Agriculture Food and Rural Affairs, Guelph, Canada, November 27, 2013.

Simon, L. (2013). Thermoplastic Composites Using Renewable Materials. Braskem America, Pittsburgh USA, July 29, 2013.

Simon, L. (2013). New Nanocomposites with Nanocellulose for Applications in 3D Printing. National Center of Nanomaterials and Energy, Campinas, Brazil, December 2, 2013.

Simon, L., C.D. Castel (2013). Molecular Structure and Morphology of Cassava Starch. Bahiamido, Palmas, Brazil, April 26, 2013.

#### **C. Tzoganakis**

McManus, N., C. Tzoganakis, Y. Wu (2013). Cross Metathesis of Olefin Terminated Polypropylene and Polydimethylsiloxane in the Melt Phase. Proceedings of the 71st Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA, pp.2174-2178, April 2013.

Meysami, M., P. Mutyala, S. Zhu, C. Tzoganakis (2013). Effect of process parameters on properties of devulcanized rubber obtained from a supercritical CO<sub>2</sub> assisted devulcanization process. Proceedings of the 71st Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA, pp. 1006-1012, April 2013.

Mutyala, P., M. Meysami, S. Zhu, C. Tzoganakis (2013). A Study of the Cure Compatibilization of Devulcanized Tire Tread Rubber and Polypropylene. Proceedings of the 71st Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA. pp. 2548-2555, April 2013.

Tzoganakis, C. (2013) Rubber Devulcanization through Extrusion with Supercritical Carbon Dioxide. Grand Valley Chapter of Engineers, Invited Talk. Cambridge, Ontario. December 2013.

#### **E. Vivaldo-Lima**

Domínguez, P.L., E. Vivaldo Lima (2013). Análisis de la polimerización radicalica por transferencia de átomo activada por microondas de metacrilato de metilo y estireno usando herramientas de modelación” (Analysis of the microwave activated atom transfer radical polymerization of styrene and methyl methacrylate using modeling tools) (oral). XXVI Congreso Nacional de la Sociedad Polimérica de México, Coatzacoalcos, Veracruz, November 6-9, 2013.

Domínguez, P.L., L. Espinosa Pérez, E. Vivaldo Lima (2013). Hacia la modelación de la síntesis de hidrogeles con HEMA y otros entrecruzantes: comparación con datos experimentales” (Towards the modeling of the synthesis of hydrogels from HEMA and other crosslinkers: comparison against experimental data) (oral). XXVI Congreso Nacional de la Sociedad Polimérica de México, Coatzacoalcos, Veracruz, November 6-9, 2013.

#### **X. Wang**

Wang, X.S. (2013). Exploring Metal-Containing Supramolecular Nanomaterials via Block Copolymer Self-Assembly. 96<sup>th</sup> Canadian Chemistry Conference and Exhibition, Quebec, Quebec, May 26-30, 2013.

Wang, X.S. (2013). Cyclization vs Migration Insertion Polymerization (MIP) of Cyclopentadienyldicarbonyldiphenyl phosphinopropyliron (FpP) in Solution. 96<sup>th</sup> Canadian Chemistry Conference and Exhibition, Quebec, Quebec, May 26-30, 2013.

#### **B. Zhao**

Shahsavani, H., Z. Pan, B. McDonald B. Zhao (2013). Biomimetic Micro/Nano Structured Surfaces: Fabrication, Characterization, and Application. 2013 Nano Ontario Conference, Kingston, Ontario - Won the Best Poster Award. Nov 7-8, 2013.

Shahsavani, H., B. McDonald, B. Zhao (2013). Fabrication and Characterizations of Biomimetic Micro and Nano Structured Surfaces. 96th Canadian Chemistry Conference, Quebec City, May 26-30, 2013.

Rivers, G., A. Rogalsky, P. Lee-Sullivan, B. Zhao (2013). Misinterpretation of cure data analysis in epoxy-based nanocomposites. 23rd CTAS Annual workshop and exhibition, Oshawa, Ontario, May 7-8, 2013.

Meschi Amoli, B., A. Hu, N. Zhou, Boxin Zhao (2013). Synthesis and Functionalization of the Silver Nanoparticles for Electrical Conductive Adhesive Application. Nominated as the best poster award (one of the 10 nominations out of about 1000 posters). MRS Spring Meeting in San Francisco, April 2013.

Zhang, W., Fut K. Yang, B. Zhao (2013). Polydopamine Nanoscale Thin Films as Multifunctional Coatings. 19th International Vacuum Congress IVC-19 (jointly organized with) International Conference on Nanoscience and Technology ICN+T 2013, Paris, France, Sept 9-13, 2013.

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

### **M. Gauthier**

Dockendorff, J., M. Gauthier (2013). Dendritic Polymers (Invited Book Chapter). In *Handbook of Polymer Synthesis, Characterization and Processing*, Saldívar, E., Vivaldo-Lima, E. Eds. Wiley: Hoboken (Ch. 30).

### **Y. Li**

US 9,609,867 Wu, Y., B.S. Ong, Y. Qi, Y. Li. (2013). Substituted indolocarbazoles.

US 8,461,292 Li, Y., Y. Wu, P. Liu, P.F. Smith (2013). Organic Thin Film Transistors.

US 8,419,822 Li, Y. (2013). Methods for producing carboxylic acid stabilized silver nanoparticles.

US 8,382,970 Qi, Y., Q. Zhang, Y. Li, N-X. Hu (2013). Metallization process for making fuser members.

US 8,382,878 Li, Y. (2013). Silver nanoparticle process.

### **A. Penlidis**

Penlidis, A., E. Vivaldo-Lima, J.C. Hernandez-Ortiz, E. Saldívar-Guerra (2013). Polymer Reaction Engineering, Ch. 12, in *Handbook of Polymer Synthesis, Characterization and Processing*, 251-271, (E. Saldívar-Guerra and E. Vivaldo-Lima, Eds.), Wiley.

Izadi, H., A. Penlidis (2013). Recent advances in synthesis and characterization of adhesives. *Macromol. React. Eng.*, 7 (10), 482-483 (mren.201300178). Featured in MaterialsViews, Nov. 2013.

Izadi, H., A. Penlidis (2013). Science and technology of bio-inspired adhesives. *Macromol. React. Eng.*, 7 (11), 570-572 (doi 10.1002/mren.201300182). Featured in MaterialsViews, Nov. 2013.

### **L. Simon**

Fatoni, R., A. Almansoori, A. Elkamel, L. Simon (2013). Computer-aided product design of wheat straw polypropylene composites, in *Modeling and Prediction of Polymer Nanocomposite Properties*. First Edition. Edited by Vikas Mittal. Wiley-VCH © 2013.

### **M. Tam**

Akhlaghi S.P., M. Zaman, P.L. Peng, K.C. Tam (2013). Cationic Cellulose and Chitin Nanocrystals for Novel Therapeutic Applications in *Cationic Polymers in Regenerative Medicine* (Royal Society of Chemistry).

### **E. Vivaldo-Lima**

Saldívar-Guerra, E., E. Vivaldo-Lima, Eds. (2013). *Handbook of Polymer Synthesis, Characterization, and Processing*, John Wiley & Sons. ISBN 978-0-470-63032-7.

Saldívar-Guerra, E., E. Vivaldo-Lima (2013). Ch. 1: Introduction to Polymers and Polymer Types in: *Handbook of Polymer Synthesis, Characterization, and Processing*. E. Saldívar-Guerra, E. Vivaldo-Lima Eds., John Wiley & Sons. ISBN 978-0-470-63032-7.

Hernández-Ortiz, J.C., E. Vivaldo-Lima (2013). Ch. 9: Crosslinking In: *Handbook of Polymer Synthesis, Characterization, and Processing*. E. Saldívar-Guerra, E. Vivaldo-Lima, Eds., John Wiley & Sons. ISBN 978-0-470-63032-7.

Penlidis, A., E. Vivaldo-Lima, J.C. Hernández-Ortiz, E. Saldívar-Guerra (2013). Ch. 12: Polymer Reaction Engineering in: *Handbook of Polymer Synthesis, Characterization, and Processing*. E. Saldívar-Guerra, E. Vivaldo-Lima, Eds., John Wiley & Sons. ISBN 978-0-470-63032-7.



Herrera-Ordoñez, J., E. Saldívar-Guerra, E. Vivaldo-Lima (2013). Ch. 14: Dispersed Phase Polymerization Processes in: *Handbook of Polymer Synthesis, Characterization, and Processing*. E. Saldívar-Guerra, E. Vivaldo-Lima, Eds., John Wiley & Sons. ISBN 978-0-470-63032-7.

Vivaldo-Lima, E., C. Guerrero-Sánchez, C. Hornung, I.A. Quintero-Ortega, G. Luna-Bárceñas (2013). Ch. 15: New Polymerization Processes in: *Handbook of Polymer Synthesis, Characterization, and Processing*. E. Saldívar-Guerra, E. Vivaldo-Lima, Eds., John Wiley & Sons. ISBN 978-0-470-63032-7.

## 15. OTHER HIGHLIGHTS FOR YEAR 2013

Prof Penlidis was a consultant with 9 companies (Canada, USA, Europe) Prof Penlidis was an Editorial Board Member for J. Macromol. Sci.-Pure and Appl. Chem., Polymer-Plastics Techn. and Eng., and Macromol. React. Eng.

In 2013, Prof Penlidis and his PhD student Hadi Izadi **coordinated and acted as guest editors** (by special invitation from MRE/Wiley editors) for two special issues on Adhesive Technology and Bio-inspired Adhesives, for Macromol. React. Eng, issues 7(10) and 7(11), with 16 papers from the 'who-is-who' internationally on Adhesion Science and Engineering.

Prof Penlidis continued International academic collaborations (regular basis with co-authored articles): Universities of UNAM (Mexico), Los Andes (Venezuela), Manipal (Karnataka, India), and (more locally), University of Toronto and McGill Univ.

Prof Penlidis spent the winter 2013 school term (Jan to May 2013) in Dubai, UAE, teaching Chemical Engineering Thermodynamics and Fluid Mechanics to 2<sup>nd</sup> year Chem Eng students, as part of the Wloo/Dubai campus. It was a great teaching and socio-cultural experience, despite the fact that the UW administration decided to terminate the program.

Prof. Boxin Zhao was featured on the University of Waterloo website citing "Waterloo researcher is developing nano-glue for electronics" on Sept 16, 2013.  
<https://uwaterloo.ca/stories/waterloo-researcher-developing-nano-glue-electronics>

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 started a sabbatical leave from UNAM as Visiting Professor at the Department of Chemical & Biological Engineering of the University of Ottawa, carrying out research collaboration with Professor Marc A. Dubé. The research leave goes from August 2013 to July 2014.

E. Vivaldo-Lima concluded his participation as a Member for UNAM in the Scientific Committee and technical coordinator for the UNAM team, in Project "BABETHANOL" ([www.babethanol.com](http://www.babethanol.com)), funded by the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 227498. The Project concluded satisfactorily in May 2013.

**INSTITUTE FOR POLYMER RESEARCH**  
**CELEBRATING 29 YEARS OF OFFICIAL INSTITUTE STATUS**  
**THIRTY-FIFTH ANNUAL SYMPOSIUM**  
**ON POLYMER SCIENCE/ENGINEERING 2013**  
**Conrad Grebel College Great Hall**  
**University of Waterloo, Waterloo, Ontario**  
**Wednesday, May 8, 2013**

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|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8:30 a.m.     | <b>Coffee</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 8:50          | <b>Welcome and Opening Remarks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 9:00 - 9:20   | <b>Hadi Izadi, Chemical Engineering, Waterloo</b><br>How to make a Fluoropolymer Sticky!<br><b>(Winner of 2012 IPR Award for Academic Excellence in Polymer Science/Engineering)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 9:20 - 10:00  | Industry Speaker: <b>Dr. Steven Bloembergen, Exec. Vice Pres. Technology of Ecosynthetix</b><br>Transforming renewable resources into high performance biomaterials that replace petroleum based chemicals                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 10:00 – 10:30 | <b><u>5-Min. Mini Presentations</u></b><br><b>1) Mosa Alsehli</b><br>Arborescent Polypeptides for Sustained Drug Delivery Applications<br><b>2) Greg Whitton</b><br>Synthesis of Arborescent Copolymers Based on Poly( $\gamma$ -benzyl L-glutamate)<br><b>3) Kurt Schreiter</b><br>Optical Calorimetry in Ultra-thin Polymer Films<br><b>4) Wei Yi</b><br>Effect of the Porosity of a Polymer of Intrinsic Microporosity (PIM) on its Intrinsic Fluorescence<br><b>5) Yu Chai</b><br>Cappillary-Driven Flow as a Probe of Enhanced Surface Mobility in Glassy Polymer Films<br><b>6) Kevin Bailey</b><br>Potential Biomaterial Applications for Regenerated Silk Fibroin Films |
| 10:30 - 11:00 | <b>Coffee</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 11:00 - 11:20 | <b>Andrew Finkle</b><br>Polymer Nanocomposites for 3-D Printing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 11:20 – 11:40 | <b>Olivier Nguon</b><br>Arborescent Polymer-Stabilized Palladium Nanoparticles as Green Catalysts for the Suzuki-Miyaura Reaction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 11:40 – 12:00 | <b><u>5-Min. Mini Presentations</u></b><br><b>7) Remi Casier</b><br>Using Fluorescence to Probe the Effect of Salt on the Interactions between Pyrene-Labeled Poly (ethylene oxide) and Sodium Dodecyl Sulfate Micelles<br><b>8) Solmaz Pirouz</b><br>Fluorescence Study of Polyisobutylene-Based Oil-Soluble Dispersants                                                                                                                                                                                                                                                                                                                                                       |

- 9) Aklilu Worku**  
Arborescent Core-Shell-Corona Structures as Templates for the Preparation of Metallic Nanoparticles
- 10) Toufic Aridi**  
Synthesis of Arborescent Polymers by "Click" Grafting

12:15 - 1:00

**Lunch**

1:00 - 1:40

Academic Speaker: **Prof. Alex Adronov, McMaster University**  
Design, Synthesis and Applications of New Macromolecules in Nanotechnology and Therapeutics

1:40 – 2:00

**Marzieh Riahinezhad**  
Clarification of the Reactivity Ratios for Acrylamide/Acrylic Acid Copolymerization

2:00 – 2:20

**Manoj Mathew**  
Parameter Estimation in Polymerization Systems Using Markov Chain Monte Carlo Methods

2:20 - 2:40

**Niousha Kazemi**  
Reactivity Ratio Estimation for the 9-(-4-vinylbenzyl)-9H-carbazole and Methyl Methacrylate Free Radical Copolymerization System Using the Error-in-Variables-Model (EVM) Framework: From preliminary estimation to optimal design

2:40 - 3:00

**Parinaz Akhlagi**  
Novel Green Antioxidants Derived from Cellulose Nanocrystals  
**(Winner of the 2012 IPR Award for Academic Excellence in Polymer Science/Engineering)**

3:00 - 3:20

**Coffee**

3:20 - 3:40

**Jane Yan**  
Novel stable (3*E*,7*E*)-3,7-bis(2-oxoindolin-3-ylidene)benzo[1,2-*b*:4,5-*b'*]difuran-2,6(3*H*,7*H*)-dione based donor-acceptor polymer semiconductors for n-type organic thin film transistors

3:40 - 4:00

**Shiva Farhangi**  
Effect of Side-Chain Length on the Internal Dynamics of Polymethacrylates in Solution Probed by Pyrene-Excimer Formation

4:00 - 4:20

**Alice Yang**  
Preparation and Characterization of Temperature-Responsive PEO-*b*-PMEO<sub>2</sub>MA Surfactants

4:20 – 4:40

**Deepak Vishnu**  
Synthesis of Carboxylated Polyisobutylene-based Ionomers by Thiol-ene "Click" Chemistry

4:40 – 5:00

**Ilias Mahmud**  
Synthesis of Ammonium, Sulfobetaine, and Carboxylated Polyisobutylene-based Ionomers by Azide - Alkyne "Click" Chemistry

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-FIFTH ANNUAL SYMPOSIUM  
ON POLYMER SCIENCE/ENGINEERING 2013  
POSTER SESSION  
WEDNESDAY, MAY 8, 2013  
UNIVERSITY CLUB  
7:30 – 9:00 pm**

|                                        |                                                                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Mosa Alsehli<br>Chemistry, Waterloo    | Arborescent Polypeptides for Sustained Drug Delivery Applications                                                                                   |
| Toufic Aridi<br>Chemistry, Waterloo    | Synthesis of Arborescent Polymers by “Click” Grafting                                                                                               |
| Rémi Casier<br>Chemistry, Waterloo     | Using Fluorescence to Probe the Effect of Salt on the Interactions between Pyrene-Labeled Poly (ethylene oxide) and Sodium Dodecyl Sulfate Micelles |
| Yu Chai<br>Physics, Waterloo           | Capillary-driven flow as a probe of enhanced surface mobility in glassy polymer films                                                               |
| Chad Daley<br>Physics, Waterloo        | Nanoporous polystyrene samples created via the selective removal of low-Mw components in PS/PS blend samples                                        |
| Jeremy Flannery<br>Physics, Waterloo   | A Study of Glass Transitions of Thin Polymer Films Using Raman Spectroscopy                                                                         |
| Mike Fowler<br>Chemistry, Waterloo     | Temperature Effects on the Solution Behaviour of Pyrene-Labeled Poly(N-Isopropylacrylamide)                                                         |
| Niousha Kazemi<br>Chem. Eng., Waterloo | Tips and prescriptions for the numerical implementation of the EVM framework for copolymerizations                                                  |
| Braham Nayyar<br>Chemistry, Waterloo   | Synthesis of FpP monomers for migration insertion polymerization                                                                                    |
| Solmaz Pirouz<br>Chemistry, Waterloo   | Fluorescence Study of Polyisobutylene-Based Oil-Soluble Dispersants                                                                                 |
| Wei Yi<br>Chemistry, Waterloo          | Effect of the Porosity of a Polymer of Intrinsic Microporosity (PIM) on its Intrinsic Fluorescence                                                  |
| Kai Cao<br>Chemistry, Waterloo         | NMR study of cyclopentadienyl dicarbonyl diphenylphosphinopropyliron (FpP) and its cyclic, polymeric molecules                                      |

**THIRTY-FIFTH ANNUAL SYMPOSIUM  
ON POLYMER SCIENCE/ENGINEERING  
May 8, 2013--CONRAD GREBEL COLLEGE**

**LIST OF PARTICIPANTS**

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**THIRTY-FIFTH ANNUAL SYMPOSIUM  
ON POLYMER SCIENCE/ENGINEERING  
May 8, 2013--CONRAD GREBEL COLLEGE  
LIST OF ORAL AND POSTER PRESENTERS**

**ORAL PRESENTERS**

**INDUSTRIAL GUEST SPEAKER**

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**ACADEMIC GUEST SPEAKER**

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## PREPRINTS 2013

- 13/001      **Probing the Hydrophobic Interactions of a Series of Pyrene End-Labeled Poly(ethylene oxide)s in Aqueous Solution Using Time-Resolved Fluorescence**  
S. Chen, J. Duhamel  
Langmuir, Acc., 01/13
- 13/002      **Migration Insertion Polymerization (MIP) of Cyclopentadienyl dicarbonyldiphenylphosphinopropyliron (FpP): A New Concept for Main Chain Metal-Containing Polymers (MCPs)**  
X. Wang, K. Cao, Y. Liu, B. Tsang and S. Liew  
Journal of the American Chemical Society, Acc., 02/13
- 13/003      **Design of experiments for reactivity ratio estimation in multicomponent polymerizations using the error-in-variables-model approach**  
N. Kazemi, T.A. Duever, A. Penlidis  
Macromol. Theory Simulation., Acc. 02/13
- 13/004      **Effect of Sequence on the Ionization Behaviour of a Series of Amphiphilic Polypeptides**  
M. Fowler, B. Siddique, J. Duhamel  
Langmuir, Acc. 03/13
- 13/005      **Effect of the Porosity of a Polymer of Intrinsic Microporosity (PIM) on its Intrinsic Fluorescence**  
S. Chen, W. Yei, J. Duhamel, K. Heinrich, G. Bengtson, D. Fritsch  
J. Phys. Chem. B, Acc. 04/13
- 13/006      **Nitrile Rubber Reactor Operation Troubleshooting with Principal Component Analysis**  
A.J. Scott, A. Penlidis  
J. Macromol. Sci., Pure & Appl. Chem., Acc. 04/13
- 13/007      **Analysis of the Microwave Activated Atom Transfer Radical Polymerization of Methyl Methacrylate and Styrene using Modeling Tools**  
P. López-Domínguez, E. Vivaldo-Lima  
Macromolecular Reaction Engineering, Acc. 05/13
- 13-008      **Nitroxide-Mediated Controlled Radical Styrene Polymerization Via a Mass-Suspension Process**  
E. García-Leal, M.A. Ordaz-Quintero, E. Saldívar-Guerra, M.E. Albores-Velasco, E. Vivaldo-Lima.  
Macromolecular Reaction Engineering, Acc. 07/13
- 13-009      **Supramolecular Chemistry of Metal Complexes in Solution**  
N. Lanigan, X. Wang  
ChemCommun., Acc. 08/13

- 13-010      **Optimal Estimation of Reactivity Ratios for Acrylamide/Acrylic Acid Copolymerization**  
M. Riahinezhad, N. Kazemi, N. McManus, A. Penlidis  
Journal of Polymer Science Polymer Chemistry, Acc. 08/13
- 13-011      **Radiation Induced Long Chain Branching in High Density Polyethylene through a Reactive Extrusion Process**  
P. Sardashti, C. Tzoganakis, M.A. Polak, A. Penlidis  
Macromol. React. Eng., special issue Acc. 07/13
- 13-012      **Polymeric Bio-Inspired Dry Adhesives: Van der Waals or Electrostatic Interactions?**  
H. Izadi, A. Penlidis  
Macromol. React. Eng., Acc. 08/13
- 13-013      **Recent Advances in Synthesis and Characterization of Adhesives**  
H. Izadi, A. Penlidis  
**Science and Technology of Bio-inspired Adhesives**  
H. Izadi, A. Penlidis  
Macromol. React. Eng., special issues, Acc. 09/13
- 13-014      **Synthesis of Arborescent Polymers by "Click" Grafting**  
T. Aridi, M. Gauthier  
MRS Proc., Acc. 09/13
- 13-015      **Arborescent Polypeptides from  $\gamma$ -Benzyl L-Glutamic Acid**  
G. Whitton, M. Gauthier  
J. Polymer Science: Part A., Acc. 09/13
- 13-016      **Glassy States in Asymmetric Mixtures of Soft and Hard Colloids**  
D. Truzzolillo, D. Marzi, J. Marakis, B. Capone, M. Camargo, A. Munam, F. Moingeon, M. Gauthier, C.N. Likos, D. Vlassopoulos.  
PhysRevLett, Acc. 09/13
- 13-017      **Arborescent Polypeptides from  $\gamma$ -Benzyl L-Glutamic Acid**  
G. Whitton, M. Gauthier  
J. Polymer Science: Part A., Acc. 09/13
- 13-018      **Thermal Melting in Depletion Gels of Hairy Nanoparticles**  
D. Truzzolillo, D. Vlassopoulos, M. Gauthier, A. Munam  
Soft Matter, Acc. 05/13
- 13-019      **Arborescent Polymers**  
M. Gauthier  
Springer, Acc. 09/13
- 13-020      **Instabilities of Teflon AF Thin Films in Alumina Nanochannels and Adhesion of Bi-level Teflon AF Nanopillars**  
H. Izadi, K. Sarikhani, A. Penlidis  
J. Nanotechnology, Acc. 10/13

- 13-021      **Global Analysis of Fluorescence Decays to Probe the Internal Dynamics of Fluorescently Labeled Macromolecules**  
J. Duhamel  
Langmuir, Acc. 11/13
- 13-022      **Effect of Temperature on Environmental Stress Cracking Resistance and Crystal Structure of Polyethylene**  
P. Sardashti, A.J. Scott, C. Tzoganakis, M.A. Polak, A. Penlidis  
J. Macromol. Sci., Pure & Appl. Chem., Acc. 11/13
- 13-023      **Effect of Side-Chain Length on the Polymer Chain Dynamics of Polk(alkyl methacrylate)s in Solution**  
S. Farhangj, H. Weiss, J. Duhamel  
Macromolecules, Acc. 11/13
- 13-024      **Modeling of Network Formation in Reversible Addition-Fragmentation Transfer (RAFT) Copolymerization of Vinyl/Divinyl Monomers Using a Multifunctional Polymer Molecule Approach**  
J.C. Hernández-Ortiz, E. Vivaldo-Lima, M.A. Dubé, A. Penlidis  
Macromolecular Theory and Simulations, Acc. 12/13
- 13-025      **Crosslinking Nitroxide-Mediated Radical Copolymerization of Styrene with Divinylbenzene**  
A.J. Scott, A. Nabifar, J.C. Hernández-Ortiz, N.T. McManus, E. Vivaldo-Lima, A. Penlidis  
European Polymer Journal, Acc. 12/13
- 13-026      **Interactions Between Hydrophobically Modified Alkali-Swellable Emulsion Polymers and Sodium Dodecyl Sulfate Probed by Fluorescence and Rheology**  
S. Chen, H. Siu, J. Duhamel  
J. Phys. Chem. B., Acc. 12/13

## Research Personnel

(SUPERVISOR)

| NAME           | CAT | DEPT | TD | JD | RD | XF | MG | YL | NMc | AP | MT | CT | XW | BZ | THESIS/PROJECT TOPIC                                                                                                                     | COMPL. DATE |
|----------------|-----|------|----|----|----|----|----|----|-----|----|----|----|----|----|------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| P. Akhlaghi    | 2   | ChE  |    |    |    |    |    |    |     |    | X  |    |    |    | Cosmetic delivery systems using nanocrystalline cellulose                                                                                | Apr 14      |
| M. Alsehli     | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Arborescent polypeptide micelles (Saudi Arabia Scholarship)                                                                              | Aug 15      |
| A. Alturk      | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Arborescent polybutadienes                                                                                                               | Dec 16      |
| Y. Amintowlieh | 2   | ChE  |    |    |    |    |    |    |     | X  |    | X  |    |    | UV Modification of Polypropylene                                                                                                         | Sep 14      |
| B.M. Amoli     | 2   | ChE  |    |    |    |    |    |    |     |    |    |    |    | X  | Functionalization and dispersion of silver nanofillers (co-supervised with N. Zhou in MME)                                               | Dec 14      |
| R. Amos        | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Hydrophobic Modification of Starch Nanoparticles                                                                                         | Aug 17      |
| K. Cao         | 2   | Chem |    |    |    |    |    |    |     |    |    |    | X  |    | Migration insertion polymerization                                                                                                       | May 14      |
| R. Casier      | 1   | Chem |    | X  |    |    | X  |    |     |    |    |    |    |    | Design and Use of a Minimum Filming Temperature Bar to Probe Inter-Particle Diffusion in Latex Films                                     | Apr 15      |
| S. Chen        | 2   | Chem |    | X  |    |    |    |    |     |    |    |    |    |    | Characterization of solutions of pyrene end-labelled poly(ethylene oxide) by fluorescence and Rheology                                   | May 14      |
| Y. Du          | 2   | ChE  | X  |    |    |    |    |    |     |    |    |    |    |    | Fault detection in chemical processes                                                                                                    | Aug 15      |
| S. Farhangi    | 2   | Chem |    | X  |    |    |    |    |     |    |    |    |    |    | Characterizing polymer chain dynamics in solution of various polymeric backbones by pyrene excimer formation by pyrene excimer formation | Apr 16      |
| M. Farooq      | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Waste water treatment by membrane/adsorption                                                                                             | Jan 14      |
| J. Fernandez   | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Grafting of Starch Nanoparticles                                                                                                         | Aug 16      |
| M. Fowler      | 2   | Chem |    | X  |    |    |    |    |     |    |    |    |    |    | Characterization of the properties of polypeptide aggregates                                                                             | May 14      |
| M. Guan        | 1   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Waste water treatment by adsorption and membranes                                                                                        | Jan 14      |
| D. Hammad      | 2   | ChE  |    |    | X  |    |    |    |     |    |    |    |    |    | Photo-oxidative Degradation of Polyacrylamide in Wastewater                                                                              | Aug 15      |

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. Zhou

| NAME          | CAT | DEPT | TD | JD | RD | XF | MG | YL | NMc | AP | MT | CT | XW | BZ | THESIS/PROJECT TOPIC                                                                                | COMPL. DATE |
|---------------|-----|------|----|----|----|----|----|----|-----|----|----|----|----|----|-----------------------------------------------------------------------------------------------------|-------------|
| Y. Hu         | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Facilitated transport membranes                                                                     | Jan 14      |
| Y. Huang      | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Micelle-enhanced ultrafiltration                                                                    | Aug 14      |
| H. Izadi      | 2   | ChE  |    |    |    |    |    |    |     | X  |    |    |    |    | Polymers with tailor-made adhesive properties at nano-scale                                         | May 14      |
| N. Kazemi     | 2   | ChE  |    |    |    |    |    |    |     | X  |    |    |    |    | Parameter estimation in terpolymerization                                                           | Aug 14      |
| H. Lad        | 3   |      |    |    |    |    | X  |    |     |    |    |    |    |    | Butyl rubber ammonium ionomers by "click" chemistry                                                 | Aug 14      |
| S. Lai        | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Heavy metal removal from waste water                                                                | Aug 15      |
| N. Lanigan    | 2   | Chem |    |    |    |    |    |    |     |    |    |    | X  |    | Orgnometallic supramolecular polymers                                                               | Dec 14      |
| C. Legros     | 2   | ChE  |    |    |    |    |    |    |     |    | X  |    |    |    | Biodegradable and biocompatible nanogels for drug delivery applications                             | Oct 14      |
| L. Li         | 2   | Chem |    | X  |    |    |    |    |     |    |    |    |    |    | Studies of oil-in-water emulsion prepared with PNIPAM-based thermo-responsive polymeric surfactants | Aug 16      |
| J. Liu        | 2   | Chem |    |    |    |    |    |    |     |    |    |    | X  |    | Migration insertion polymerization of FpC6P                                                         | Sep 15      |
| A. Maneshi    | 4   | ChE  |    |    |    |    |    |    |     |    |    | X  |    |    | Flow additives for polypropylene                                                                    | Apr 14      |
| E. Massicotte | 1   | ChE  |    |    | X  |    |    |    |     |    |    |    |    |    | MPC Control of a Living Polymerization in CSTR Reactor                                              | Aug 15      |
| T. Matsumura  | 4   | ChE  |    |    |    |    |    |    |     |    |    | X  |    |    | Extrusion of UHMWPE with scCO2                                                                      | Aug 14      |
| M. Meysami    | 3   | ChE  |    |    |    |    |    |    |     |    |    | X  |    |    | Rubber devulcanization with scCO2                                                                   | Dec 14      |
| N. Murshid    | 2   | Chem |    |    |    |    |    |    |     |    |    |    | X  |    | Self-assembly of organometallic amphiphiles                                                         | Sep 15      |
| P. Mutyala    | 3   | ChE  |    |    |    |    |    |    |     |    |    | X  |    |    | Production of TPVs from devulcanized rubber crumb                                                   | Dec 14      |
| L.Y. Nan      | 2   | ChE  |    |    |    |    |    |    |     |    | X  |    |    |    | Nanoparticle synthesis using polyacrylic acids                                                      | Apr 14      |
| M. Neqal      | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Smart Polymeric Nanomaterials by Encapsulation                                                      | Aug 17      |
| S. Nie        | 1   | ChE  |    |    |    |    |    |    |     |    |    | X  |    |    | Study of die drool of controlled-rheology polypropylene resins                                      | Sep 15      |
| O. Nguon      | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Polymer chain dynamics                                                                              | May 14      |

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| NAME             | CAT | DEPT | TD | JD | RD | XF | MG | YL | NMc | AP | MT | CT | XW | BZ | THESIS/PROJECT TOPIC                                                                                             | COMPL. DATE |
|------------------|-----|------|----|----|----|----|----|----|-----|----|----|----|----|----|------------------------------------------------------------------------------------------------------------------|-------------|
| Z. Pan           | 2   | ChE  |    |    |    |    |    |    |     |    |    |    |    | X  | Development of low friction and oleophobic coating materials                                                     | Sep 16      |
| B.L. Peng        | 2   | ChE  |    |    |    |    |    |    |     |    | X  |    |    |    | Interactions between functionalized biocompatible polymer systems and surfactants                                | Sep 14      |
| K. N. Regmi      | 1   | ChE  |    |    | X  |    |    |    |     |    |    |    |    |    | CFD Analysis and Experimental Study of MMA Emulsion Polymerization                                               | Aug 14      |
| M. Reza          | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Membrane bioreactor for wastewater treatment                                                                     | Aug 14      |
| M. Riahinezhad   | 2   | ChE  |    |    |    |    |    |    | X   | X  |    |    |    |    | Copolymerization kinetics of acrylic acid and acrylamide for enhanced oil-recovery applications                  | Sep 15      |
| S. Roudsari      | 2   | ChE  |    |    | X  |    |    |    |     |    |    |    |    |    | CFD Analysis and Experimental Study of MMA Emulsion Polymerization                                               | Aug 14      |
| A. Saika         | 1   | ChE  |    |    |    |    |    |    |     |    |    | X  |    |    | DSC analysis of curing of devulcanized rubber                                                                    | Sep 14      |
| A. Sardashti     | 2   | ChE  |    |    |    |    |    |    |     | X  |    | X  |    |    | Methodologies for Obtaining Reliable Indicators for the Environmental Stress Cracking Resistance of Polyethylene | May 14      |
| A.J. Scott       | 1   | ChE  |    |    |    |    |    |    |     | X  |    |    |    |    | Water-soluble co- and ter-polymerizations                                                                        | Aug 15      |
| N. Singh         | 1   | Chem |    |    |    |    |    |    |     |    |    |    | X  |    | Functionalization of CpCOFeCOMe for metal containing polymers                                                    | May 14      |
| K. Stewart       | 2   | ChE  |    |    |    |    |    |    |     | X  |    |    |    |    | Polymeric sensors for detection of toxic analytes                                                                | May 16      |
| J. Sun           | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Polyelectrolyte membranes                                                                                        | Aug 14      |
| D. Vishnu        | 3   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Butyl rubber ammonium ionomers by "click" chemistry (PDF)                                                        | Jun 14      |
| A. Vo Thu Nguyen | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Magnetic micelles as therapy and diagnostic (theranostic) agents                                                 | Aug 15      |
| Z. Wang          | 3   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Potential-responsive membranes                                                                                   | Dec 14      |
| A.Worku          | 2   | Chem |    |    |    |    | X  |    |     |    |    |    |    |    | Arborescent Micelles from Polyelectrolyte Complexes                                                              | Aug 17      |
| D. Wu            | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Nanofiltration membranes                                                                                         | Dec 14      |
| K. Wu            | 1   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Membranes for gas separations                                                                                    | Dec 14      |

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|----------|-----|------|----|----|----|----|----|----|-----|----|----|----|----|----|---------------------------------------------------------------------------------------|-------------|
| X. Xu    | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Surface modification of membranes                                                     | Dec 14      |
| A. Yang  | 1   | Chem |    | X  |    |    |    |    |     |    |    |    |    |    | Synthesis and characterization of block copolymers of PNIPAM and PEO prepared by ATRP | May 14      |
| W. Yi    | 1   | Chem |    | X  |    |    |    |    |     |    |    |    |    |    | Characterization of Starch Nanoparticles by Fluorescence Quenching                    | Aug 14      |
| B. Zhang | 2   | ChE  |    |    |    | X  |    |    |     |    |    |    |    |    | Aroma compound recovery from aqueous solutions                                        | Aug 15      |
| W. Zhang | 2   | ChE  |    |    |    |    |    |    |     |    |    |    |    | X  | Surface and tribological behaviour of Mussel-inspired polydopamine thin films         | Sep 16      |

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