

# CURRICULUM VITAE



Zhenghe Xu

(Teck Professor, PhD., P.Eng., FRSC, FCAE, FCIM)

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## Education

- 1982 B.Sc. in Mining Engineering, Central-South Institute of Mining and Metallurgy, PRC
- 1985 M.Sc. in Minerals Engineering, Central-South Institute of Mining and Metallurgy, PRC (Supervisors: Professors J. Chen and W. Chen)
- Thesis:** The adsorption of sulphonated polyacrylamide on and flocculation separation of titanomagnetite, ilmenite and feldspar
- 1990 Ph.D. in Materials Science and Engineering, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, USA (Supervisor: Dr. Roe-Hoan Yoon)
- Dissertation:** A study of hydrophobic interaction in fine particle coagulation

## Academic and Research Experience

- July 2017- Dean, College of Engineering, Southern University of Science and Technology, Shenzhen, China
- 2016-2018 Visiting Professor, Kumamoto University, Kumamoto, Japan
- 2014-2017 NSERC Industry Research Chair in Oil Sands Engineering (Renewal): Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
- 2013-2017 Canada Research Chair in Mineral Processing (Tier I Renewal): Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
- 2011-2017 Visiting Professor: Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China
- 2008-2014 NSERC Industry Research Chair in Oil Sands Engineering: Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
- May 2007- Teck Cominco Professor (now Teck Professor): Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
- 2006-2013 Canada Research Chair in Mineral Processing (Tier I): Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada

2002-2008	NSERC/EPCOR/AERI Industrial Research Chair: Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
2001-2002	McCalla Professor of University of Alberta: Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
2000-	Professor: Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
1997-1999	Associate Professor: Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada
1992-1996	Assistant Professor: Department of Mining and Metallurgical Engineering, McGill University, Montreal, Canada
1991-1992	Postdoctoral Fellow: Department of Chemical and Nuclear Engineering, University of California, Santa Barbara, USA (Supervisor: Dr. Jacob Israelachvili)
1990-1991	Research Associate: Department of Mining and Minerals Processing Engineering, Virginia polytechnic Institute and State University, Blacksburg, USA (Supervisor: Dr. Roe-Hoan Yoon)
1990-1991	Research Assistant: Department of Mining and Minerals Processing Engineering, Virginia Polytechnic Institute and State University, Blacksburg, USA (Supervisor: Dr. Roe-Hoan Yoon)
1982-1985	Lecturer: Department of Minerals Engineering, Central South Institute of Mining and Metallurgy, PRC

## Professional Memberships

American Chemical Society (ACS)

American Society of Mining, Metallurgy and Exploration (SME)

Canadian Institute of Mining, Metallurgy and Petroleum (CIM)

International Association of Colloid and Interface Scientists (IACIS)

Association of Professional Engineers and Geoscientists of Alberta (APEGA)

## Major Recognitions

- 16 [IMPC Council Member](#), 2016-2020.
- 15 Visiting Professor at [Kumamoto University](#) (Japan), 2016-2018.
- 14 [President, Metallurgy and Materials Society of CIM](#), 2016-2017.
- 13 [MetSoc Award for Research Excellence](#), Metallurgical and Materials Society of CIM, Canada, 2016.
- 12 [Fellow of Royal Society of Canada \(FRSC\)](#), 2015
- 11 [Syncrude Award for Excellence in Sustainable Development](#), Canadian Institute of Mining, Metallurgy and Petroleum (CIM), 2015
- 10 [The Teck Environmental Award](#), Metallurgical and Materials Society of CIM, Canada, 2013.
- 9 [APEGA Frank Spragins Technical Award](#), Association of Professional Engineers and Geoscientists, 2012.
- 8 [Fellow of Canadian Institute of Mining](#), Metallurgy and Petroleum (CIM), 2010.
- 7 [Bantrel Award in Design and Industrial Practice](#), Canadian Society for Chemical Engineering, 2009.
- 6 [NSERC Industry Research Chair in Oil Sands Engineering](#), 2008-2018.
- 5 [Fellow of Canadian Academy of Engineering](#), 2008.
- 4 [Bill Moore Special Achievement Award of Canadian Mineral Processor](#), 2008.
- 3 Teck Cominco Professor (now Teck Professor), May 2007.
- 2 [Canada Research Chair \(Tier I\)](#) in Mineral Processing, 2006-2020.
- 1 [NSERC/EPCOR/AERI Industrial Research Chair](#) in Advanced Coal Cleaning and Combustion Technology, 2002-2007.

## Major Contributions

### **18 Basic science in reducing operating temperature of oil sands processing (J255, J257):**

Recognizing the need to reduce operating temperature with thorough analysis on the theory of oil sands extraction, Dr. Xu's team studied interactions of bitumen with solids and air bubble. Basic knowledge from their study led to the development of a robust, aqueous-nonaqueous hybrid extraction process operating at ambient temperatures. This new line of thinking is anticipated to greatly reduce energy intensity of oil sands extraction, and hence green-house gas emission and operating cost, while improving utilization of oil sands reserves by robust, high bitumen recovery operations.

### **17 Design of interfacially active and magnetically responsive demulsifiers (J244, J251):**

Despite generations' effort of scientist and engineers, effective separation of water from crude oil continuous to be a major challenge. By applying basic surface science and materials synthesis to design of a novel interfacially active and magnetically responsive demulsifier with a combination of nano technology with surface science, interfacially active magnetic nano particles were designed to effectively attach these particles to the emulsified water droplets in crude oil. The magnetic properties of the particles allow enhanced coalescence of the water droplets and effective separation of water by an external magnetic field, not only improving the quality of crude oil at reduced capital and operating cost due to shortened separation time, but also reducing the oil loss and associated environmental impact as a result of reduced sludge (waste) volume. More importantly, the magnetic demulsifiers can be regenerated for reuse, reducing again the operating cost.

### **16 Comprehensive Handbook on Theory and Practice of Bitumen Recovery from Athabasca Oil Sands, Vol. 1: Theoretical Basis (co-author, Kingsley, Calgary, 2011):**

As noted by Dr. Eric Newell (OC), this handbook is "to provide the technology foundation that will serve as the springboard for the future enhancement required for sustainable development of our vast oil sands resource. It is their bright ideas and innovations that will be so vitally important if we, as Canadians, are to realize the huge socio-economic potential of this strategic global resource." Vol. 2: Industry Practice (co-editor, Kingsley, Calgary, 2013): Dr. Clem Bowman (FCAE) noted that "Achieving full value from this treasure house will be the task for the next generation of researchers and project developers. But they will be standing on the shoulders of those visionaries who brought the oil sands into full commercial development, as evidenced in the two volumes that comprise this Handbook. Full recognition should be given to the authors of these two volumes for their commitment of time and energy in highlighting this fast moving technological venture, and to their organizations for sharing their experiences."

### **15 Report of The Royal Society of Canada Expert Panel: Environmental and Health Impacts of Canada's Oil Sands Industry (co-author, Royal Society of Canada, 2010):**

This 438-page report is being used as bench-mark by government and industry to evaluate their programs and to measure their performances. It also provides a scientific and accurate view of oil sands industry. Since its publication, many initiatives have been taken by government and industry to address environmental and sustainability issues facing the oil sands industry. As noted by Senator Elaine McCoy, reprinted in the Ottawa Citizen, "Happily, the Royal Society of Canada

has given us a roadmap outlining precisely what we do know and, more importantly, what we still need to learn. Its expert panel issued their exhaustive review of environmental and health impacts of the oil sands last December. Their 438-page report is the best I've seen on this subject - it deals with the issues clearly, objectively, and without hyperbole, giving us all a much-needed beacon for establishing a research agenda." The report attracted a high level of media interest, including the front page of the Globe and Mail, an editorial of the National Post, Nature.com, Reuters International, The Economist and the New York Times, just to name a few. It is interesting to note that the report has been quoted in media stories by sources as diverse as the Canadian Association of Petroleum Producers and Green Peace.

**14 Development of flocculation-enhanced filtration of oil sands tailings for improved water and energy recovery and rapid land reclamation (J217, J259):**

After identifying a critical role of effective flocculation of ultrafine particles, a novel organic-inorganic hybrid polymer was applied to fluid fine tailings prior to filtration to produce stackable filter cake while recycle the maximum amount of clear (warm) water. By innovative design of process, a flocculation-assisted thickening followed by filtration of sediments (thickener underflow) was proven to be most viable and economical, providing a sustainable solution to challenges of managing tailings, land reclamation, water and energy.

**13 Introduction of the state-of-the-art instrumentation to probe molecular level science behind mega scale industrial processing of minerals and oil sands (J89, J98, J113, J121, J136, J138, J144, J148, J149, J159):**

The atomic force microscope (AFM) was used for the first time to measure interaction forces between various components in oil sands in both aqueous and nonaqueous solutions, providing scientific basis for developing cutting edge technology for processing and utilization of natural resources and materials recycling. Combined with ultra-microtome, AFM also allowed us to probe anisotropic properties of clays, providing critical information needed to enhance process performance and tailings handling.

**12 Establishment of slime coating theory to account for poor processability of high fine and high salt water (electrolyte concentration) ores (J67, J77, J81, J153):**

We pioneered study on particle interactions by zeta potential distribution measurement (J77, J81). With this method, we established a detrimental synergistic effect of swelling clays and divalent cations and developed a slime coating theory to explain the depression of bitumen (or coal) recovery and poor froth quality. From this fundamental understanding, we were able to invent a novel process of selective flocculation of solid fines to avoid slime coating, not only improving bitumen (or coal) recovery and froth quality, but also enhancing settling of fine solids in tailings. The determination of fine particle interactions by zeta potential distribution measurement has been extended to a number of other important systems, and adopted by many other research laboratories.

**11 Establishment of hydrodynamic cavitation theory for enhanced fine particle flotation (J35, J42, J43, J57, J122, J241):**

The concept proved in this area had significant impact on how one thinks and designs new flotation machines. The recognition of the work is also illustrated by the invitation for two book

chapter contributions (Flotation Development and Feed Aeration) to Encyclopedia of Separation Science, published by Academic Press. The concept has been adapted by CSIRO (Australia) in to their flotation machine design for fine coal cleaning and implemented in pico bubble flotation technology. Recently, the concept is introduced to oil sands processing with an estimated overall increase in bitumen recovery by up to 2%, accounting for an additional \$1,000,000/day net revenue gain, with a significantly reduced impact on environment and greenhouse gas emission. Due to its commercialization and impact to mineral and oil sands industry, this work was highly recognized by invitation to make a plenary presentation at XXIV International Mineral Processing Congress.

**10 Oily bubble flotation technology (J79, J97, J137, P1, P6):**

Taking advantage of oil spreading characteristics and easy attachment of oil with air bubbles, an (reactive) oily bubble flotation technology was developed and tested to demonstrate significant improvement in valuable (minerals or bitumen) recovery while reducing variability of flotation process dependency on ore characteristics. The paper published (J79) won 2004 best paper award for papers published in Can. J. Chem Eng. and led to an invitation to make a plenary presentation at 6th World Congress of Beneficiation of Phosphate.

**9 Design of regenerable mercury sorbent (J183, 185, J198, J203, P7):**

With urgent need to reduce mercury emissions in flue gases of coal fired plant while maintain the cost effectiveness of power generation, Dr. Xu's group applied basic surface science and materials synthesis to design of novel regenerable reactive sorbent. A combination of nano technology with surface science led to the development of silver nanoparticles supported on natural zeolite minerals-magnetite composites. While silver nano particles act as the reactors for amalgamation of mercury, the magnetic properties of the reactive sorbent allowed effective recovery of spent sorbent and regeneration. This type of recycle sorbent is anticipated to become a future generation of technology for abatement of mercury emissions from coal-fired power plant and municipal waste incinerators.

**8 Chemical and mechanical bromination of biomass ash as mercury sorbent (P8, J250):**

The idea is to replace more expensive activated carbon based sorbent using a waste product of biomass combustion to engineer mercury sorbent using novel chemical and mechanical bromination process. Our patented technology has been demonstrated successful capture of mercury from a plant test, with the potential to be commercialized as replacement of costly activated carbon based sorbent.

**7 Coal cleaning and upgrading as an attractive alternative for mercury emission control (J115, J142, J154, J163, J178, J192, J229):**

Based on fundamental understanding of mercury association with mineral matter in coal, coal cleaning by air dense medium fluidized bed separator as an effective alternative for abatement of mercury emission from coal fired power plants, a major environmental concern. Incorporated with thermal upgrading of coal, this integrated technology will become a corner stone technology for improving air quality by reducing mercury emissions. This work was awarded an outstanding poster award at the 21PstP Annual International Pittsburgh Coal Conference and recently a distinguished paper award at the 33PrdP International Symposium on Combustion. We were



invited to make a plenary presentation on this subject at ChemCon 2006 and at the 6PthP International Symposium on Coal Combustion.

**6 A novel process for recovering clean coal and water from coal tailings (J62, J64):**

Based on hydrophobic nature of coals, we developed a hydrophobic extraction process using waste oil to recover fine coal lost in tailings ponds, as fuels in the form of coal-in-oil slurry suitable for direct firing in boilers. Our patented technology (P3) has been licensed by Energy Pacific in Idaho, USA.

**5 An ambient temperature ferrite process for acid mine drainage treatment (J29, J60, J61, J65):**

We developed a process not only to treat acid rock (mine) drainage-an environmental hazardous, but also to produce valuable ferrite of many important uses. This has been widely publicized by news media, including New Scientist (August 10, 1996, p.23), American Chemical Society Press Digest (No. 12050, July 25, 1996), Ground Water Monitor (September 18, 1996, p. 176) and Hazardous Waste News (August 26, p. 272, 1996). The impact of this work is also illustrated by inclusion of the technology in the data base by Industry Canada in Canadian Environmental Solutions.

**4 A novel coating technology for self-assembly of bio-specific monolayers on nano-sized magnetic particles using a bolaamphiphile (16-mercaptohexadecanoic acid) (J19, J36):**

In this study, we proposed the use of self-assembly with bolaamphiphile molecules to engineer magnetically responsive bio tags for blood cell separation. This work has been recognized internationally as illustrated by an invitation for a keynote presentation at Composites at Lake Louise and for a book chapter contribution to Surfaces of Nanosize Particles and Porous Materials (Marcel Dekker, 1999). The work continued by Dr. S. Gelinis won the best poster award at the Engineering Foundation Conference, Kona, Hawaii, January 1998.

**3 Novel two-step silica coating process (J52, J103, J104, J127, J128, J170):**

We developed a two- step silica coating theory and technology which allowed extra-thin silica film to protect magnetic nano particles while providing a surface amenable for further modification to tailored applications, such as sorbent for recovery of valuable metals or detoxification of industrial effluent, magnetic demulsifiers, switchable soft gels. This importance of this work is recognized by a high number of more than 300 citations.

**2 Direct measurement of hydrophobic and DLVO forces in bubble-surface interactions in aqueous solutions using atomic force microscope (J10):**

This pioneer work laid the foundation for understanding interaction forces between an air bubble and a solid substrate, which is extremely important in flotation widely used in mineral recovery, paper recycling (de-inking), waste water treatment, bitumen recovery and de-oiling of petroleum processing water. The impact of our work is clearly demonstrated by the article having been cited by other researchers for more than 235 times.

**1 Identification of hydrophobic forces in colloidal suspensions (J6, J7):**

By careful design of experiments, the long range hydrophobic attraction which was not considered in the classical DLVO theory, was identified to play a critical role in determining the

stability of a colloidal suspension. A theory was developed to link the additional attractive forces with particle surface hydrophobicity. Incorporating this theory in the classical DLVO theory provides a much more accurate prediction of colloidal suspensions. Built on this foundation, a novel fine coal cleaning process was developed by taking advantage of hydrophobic attractive force to selectively coagulate hydrophobic fine coal, followed by gravity separation of fine coal aggregates.

## Other Evidence of Impact and Contributions

- 22 Member of Editorial Board of International Journal of Mineral Processing since 2016
- 21 Session organizer, New Opportunities for Recovery and Conversion of Fossil Fuels, 247th ACS National Meeting, Dallas, Texas, March 2014.
- 20 President, Metallurgical Society of CIM, Canada, 2016-17
- 19 Session organizer, Oil sands and heavy oil processing at 62nd CSChE Conference, Vancouver, October 2012.
- 18 Conference chair, Oilsands 2012, Edmonton, August 2012.
- 17 Symposium co-organizer, The First International Symposium: Water in Mineral Processing at 2012 SME, Seattle, WA, February 2012.
- 16 Conference chair, Oilsands 2011, Edmonton, February 2011.
- 15 Member of NSERC Strategic Project Grant Selection Panel (Energy and Environment panel), 2009-2011.
- 14 Distinguished paper award (Identifying modes of occurrence of mercury in coal by temperature programmed pyrolysis) selected by Stationary Combustion: 33rd International Symposium on Combustion, 2010.
- 13 Technical Program Co-Chair, Conference of Metallurgists 2010, Vancouver.
- 12 Guest co-editor, Asia-Pacific J. Chem Eng., Vol 5, No. 3, 2010.
- 11 Member of Royal Society Canada Expert Panel on Environmental and Health Impacts of Canada's Oil Sands Industry, 2009-2010.
- 10 Co-chair, Oil Sands symposium at the 8PthP World Congress of Chemical Engineering in Montreal, Montreal, August 2009.
- 9 Co-chair, Oil Sands Symposium at the 57th CSChE Conference, Edmonton, October 2007.
- 8 Symposium chair, 6th UBC-McGill-UA Biennial International Symposium on Fundamentals of Mineral Processing, Montreal, October 1-4, 2006.
- 7 Chair of Mineral Sciences and Engineering, Metallurgical Society of Canadian Institute of Mining, Metallurgy and Petroleum Engineering, 2003-2006.
- 6 The poster entitled "Mercury release characteristics from subbituminous coals during thermal upgrading", by Zhenghe Xu, Guoqing Lu and Onyi Chan, won the Award for Outstanding Technical Poster of 21st Annual International Pittsburgh Coal Conference, Osaka, Japan, September 2004.
- 5 The paper entitled "Bitumen recovery with oily air bubbles", co-authored with V. Wallwork and J. Masliyah and published in Canadian Journal of Chemical Engineering (2003, 81: 993-997) won the 2004 CSChE Best Paper Award for the papers published in the Canadian Journal of Chemical Engineering.
- 4 Regional representative of Canadian Mineral Processors-Albert, NWT and Nunuvut (2003-2004)

- 3 Member of Editorial Board of Multinational Journal Coal Preparation since 2002
- 2 Awarded a McCalla Professorship by the University of Alberta for 2001-2002.
- 1 Served as Treasurer for 37th Conference of Metallurgists (1998).

Research/Training Summary ([h-index: 46; Total citations 9752](#))\*

Year	2012	2013	2014	2015	2016	2017	Total (Life)
Refereed Journal publications	20	21	25	26	24	31	403
Conference Proceedings	3	1	3	1	2	0	64
Book and book chapters	0	1	2	1	0	0	15
Patents granted (pending)	2	1	0	0	0	0	7
External research fund (CAN\$)	1,845 k	2,780 k	1,192k	1,782k	1,416k	1,473k	25,866k
MSc, PhD students graduated	9, 1	3, 3	7, 5	5, 3	5, 3	3, 2	75, 31
PDF completed	4	3	5	4	2	2	53
U/G researcher	7	4	4	5	12	2	82

\*based on [Research ID of Web of Science](#)

## Books

- B3 Czarnecki, J., Masliyah, J., Xu, Z. and M. Dabros (eds.), 2013, *Handbook on Theory and Practice of Bitumen Recovery from Athabasca Oil Sands*, Vol. 2: Industry Practice, Kingsley, Calgary.
- B2 Masliyah, J., Czarnecki, J. and Z. Xu, 2011, *Handbook on Theory and Practice of Bitumen Recovery from Athabasca Oil Sands*, Vol. 1: Theoretical Basis, Kingsley, Calgary. (Translated to Chinese by Chinese Petroleum Press, 2016)
- B1 Xu, Z. and Q. Liu (eds.), 2006, *Interfacial Phenomena in Fine Particle Technology*, MetSoc, Montreal.

## Book Chapters

- BC12 Harbottle, D., Liang, C., El-Thaher, N., Liu, Q., Masliyah, J. and Z. Xu, 2015, Particle-stabilized emulsions in heavy oil processing, in *Particle-Stabilized Emulsions and Colloids: Formation and Application*, T. Ngai and S.A.F. Bon (eds.), The Royal Society of Chemistry, London, 283-316.
- BC11 Long, J., Xu, Z. and J. Masliyah, 2015 Bitumen recovery from oil sands, in *Encyclopedia of Surface and Colloid Science* (3<sup>rd</sup> ed.), P. Somasundaran (ed.), Taylor & Francis, London, 667-684.
- BC10 Wang, L., Englert, A., Masliyah, J. and Z. Xu, 2015, Oil sands processing: Colloidal chemistry role, in *Encyclopedia of Surface and Colloid Science* (3<sup>rd</sup> ed.), P. Somasundaran (ed.), Taylor & Francis, London, 5011-5025.
- BC9 Wang, L., Curran, M., Deng, M., Liu, Q., Xu, Z. and J. Masliyah, 2014, Physicochemical properties of heavy oil-water interface in the context of oil removal from sea water by froth flotation, in *Oil Spill Remediation: Colloid Chemistry-Based Principles and Solutions*, P. Somasundaran, R. Farinato, P. Patra and K. Papadopolous (eds.), John Wiley & Sons, Hoboken, NJ, 279-294.
- BC8 Cadien, K., Nolan, L., Pirayesh, H., Dawkins, K. and Z. Xu, 2014, Electrochemical Aspects of Chemical Mechanical Polishing, in *Electrodeposition and Surface Finishing, Fundamentals and Applications*, S. S. Djokic (ed.), Springer, New York, 303-339.
- BC7 Xu, Z. and J. Dong, 2008, Synthesis, characterization and application of magnetic nanocomposites for removal of heavy metals from industrial effluents, in *Emerging Environmental Technologies V*, Shah (ed.), Springer Publications, 105-148.
- BC6 Xu, Z. and J.H. Masliyah, 2007, Contact angle measurements for oxide and related surfaces, in *Encyclopedia of Surface and Colloid Science* (2<sup>nd</sup> Edition), P. Somasundaran (ed.), Taylor & Francis, New York, 1540-1554.
- BC5 Lopetinsky, R., Masliyah, J. and Z. Xu, 2006, Solids-stabilized emulsions: A review, in *Colloidal Particles at Liquid Interfaces*, B.P. Binks and T.S. Horozov (eds.), Cambridge University Press, 186-224.
- BC4 Xu, Z., 2000, Flotation Historical Development, in *Encyclopedia of Separation Science*, I. D. Wilson, T. R. Adlard, C. F. Poole and M. Cook (eds.), Academic Press, 1527-1537.
- BC3 Xu, M, Zhou, Z. and Z. Xu, 2000, Feed aeration, in *Encyclopedia of Separation Science*, I. D. Wilson, T. R. Adlard, C. F. Poole and M. Cook (eds.), Academic Press, 1556-1562.
- BC2 Xu, Z., Liu Q. and J.A. Finch, 1999, Engineering of Nano-size Superparamagnetic particles for the use in magnetic carrier technology, in *Surfaces of Nanoparticles and Porous Materials*, J. Schwarz and C. Contescu (eds.), Marcel Dekker, New York, pp. 31-50.
- BC1 Xu, Z., Zhang, Q. and J.A. Finch, 1999, Surface ionization and complexation, in *Surfaces of Nanoparticles and Porous Materials*, J. Schwarz and C. Contescu (eds.), Marcel Dekker, New York, pp. 593-612.

## Publications and Presentations

### Refereed Journal Papers

- J403 Wang, C., Najafi, A., Masliyah, J., Liu, Q. and Z. Xu, 2018, Flocculant-assisted dewatering of fluid fine tailings using a volute screw press, *Can. J. Chem. Eng.*, accepted.
- J402 Tang, Y., Zhang, X., Choi, P., Liu, Q. and Z. Xu, 2018, Underwater Adhesion of a Stimuli-Responsive Polymer on Highly Oriented Pyrolytic Graphite: A Single-Molecule Force Study, *J. Phys. Chem. C*, accepted.
- J401 Pensini, E.D., Tchoukov, P., Yang, F. and Z. Xu, 2018, Effect of humic acids on bitumen films at the oil-water interface and on emulsion stability: potential implications for ground water remediation, *Colloids Surfaces A*, in press.
- J400 Anvari, M., Liu, Q., Xu, Z., P. Choi, 2018, Molecular dynamics study of hydrophilic sphalerite (110) surface as modified by normal and branched butylthiols, *Langmuir*, in press.
- J399 Liu, S., Tao, H., Liu, Q., Xu, Z., Liu, Q. and J. Luo, 2018, Rational design of silver sulfide nanowires for efficient CO<sub>2</sub> electroreduction in ionic liquid, *ACS Catalysis*, 8: 1469-1475.
- J398 Liu, S., Wang, X., Tao, H., Li, T., Liu, Q., Xu, Z., Fu, X. and J. Luo, 2018, Ultrathin 5-fold twinned sub-25 nm silver nanowires enable highly selective electroreduction of CO<sub>2</sub> to CO, *Nano Energy*, 45: 456-462.
- J397 Xiong, Y., Li, Z., Cao, T., Xu, S., Yuan, S., Sjoblom, J. and Z. Xu, 2018, Synergistic adsorption of polyaromatic compounds on silica surfaces studied by molecular dynamics simulation, *J. Phys. Chem. C*, in press.
- J396 Yue, T., Xu, Z., Hu, Y., Han, H. and W. Sun, 2018, Magnetic separation and recycling of goethite and calcium sulfate in zinc hydrometallurgy in the presence of maghemite fine particles, *ACS Sustainable Chem. Eng.*, 6: 1532-1538.
- J395 Chen, Q., Cao, T., Xiong, Y., Wang, C., Lin, Z., Chen, Z., Xu, S. and Z. Xu, 2018, Understanding interactions between clay and model coal surfaces in electrolyte solutions by QCM-D study, *Energy Fuels*, 32: 233-240.
- J394 Liu, S., Zhong, H., Liu, G. and Z. Xu, 2018, Cu(I)/Cu(II) mixed-valence surface complexes of S-[(2-hydroxyamino)-2-oxoethyl]-N,N-dibutyldithiocarbamate: Hydrophobic mechanism to malachite flotation, *J. Colloids Interface Sci.*, 512, 701-712.
- J393 Zhou, F., Wang, L., Xu, Z., Ruan, Y. and R. Chi, 2018, A study on novel reactive oily bubble technology enhanced cellophane flotation, *Int. J. Mineral Process.*, 169: 85-90.
- J392 Yang, F., Tchoukov, P., Qiao, P., Ma, X., Pensini, E., Dabros, T., Czarnecki, J. and Z. Xu, 2018, Studying demulsification mechanisms of water-in-crude oil emulsions using a modified thin liquid film technique, *Colloids Surfaces A*, 540: 215-223.
- J391 Li, Z., Wang, W., Han, Y., Zhang, L., Li, S., Tang, B., Xu, S. and Z. Xu, 2018, Ether modified poly(ether ether ketone) nonwoven membrane with excellent wettability and stability as a lithium ion battery separator, *J. Power Sources*, 378: 176-183.

- J390 Li, Z., Han, Y., Wei, J., Wang, W., Cao, T., Xu, S. and Z. Xu, 2017, Suppressing Shuttle Effect Using Janus Cation Exchange Membrane for High-Performance Lithium–Sulfur Battery Separator, *ACS Appl. Mater. Interfaces*, 9: 44776-44781.
- J389 Anvari, M., Liu, Q., Xu, Z., P. Choi, 2017, Line tensions of galena (001) and sphalerite (110) surfaces: A molecular dynamics study, *J. Molecular Liquids*, 248: 634-642.
- J388 Cao, T., Li, Z., Xiong, Y., Yang, Y., Xu, S., Bisson, T., Gupta, R. and Z. Xu, 2017, Silica-silver nanocomposites as regenerable sorbents for HgO<sub>2</sub> removal from flue gases, *Env. Sci. Technol.*, 51: 11909-11917.
- J387 Wang, X., Zhang, R., Liu, L., Qiao, P., Simon, S., Sjoblom, J. and Z. Xu, 2017, Interactions of polyaromatic compounds: Part 2. Flocculation probed by dynamic light scattering and molecular dynamics simulation, *Energy Fuels*, 31: 9201-9212.
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## Invited Presentations

- 61 Xu, Z., Recent innovations in oil sands engineering: Contributions from NSERC IRC in Oil Sands Engineering, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCChE), Edmonton, AB, Canada, October 22-25, 2017. (Invited)
- 60 Xu, Z., Liu, Q. and Z. Li, Recent advances in studying colloidal interactions in mineral processing, COM 2017 Conference of Metallurgists, Vancouver, BC, Canada, August 27-30, 2017. (Keynote)
- 59 Xu, Z., Zhu, Y. and D. Russell, Progress of hybrid extraction of bitumen at ambient temperature from Alberta mineable oil sands, Solvent Leadership Series Workshop 2: Solvent Assisted and Solvent-Based Extraction for Surface Mined Oil Sands, Alberta Innovates, Calgary, AB, Canada, July 13, 2017. (Invited)
- 58 Xu, Z., Harbottle, D., Liu, Q. and J. Masliyah, Understanding Petroleum Emulsions, 91<sup>st</sup> ACS Colloid & Surface Science Symposium, New York, NY, USA, July 9-12, 2017. (Keynote)
- 57 Xu, Z., Sjöblom, J., Masliyah, J., Liu, Q. and D. Harbottle, Molecular mechanisms of petroleum emulsion stabilization and demulsification, PetroPhase 2016, Elsinore, Denmark, June 19-23, 2016. (Keynote)
- 56 Xu, Z., Production of oil from Canadian oil sands: Challenges and opportunities, International Energy Raw Materials and Energy Summit (Inerma 2015), Istanbul, Turkey, October 1-3, 2015. (Invited)
- 55 Xu, Z. and J. Masliyah, Interfacial sciences in water-in-oil petroleum emulsions, International Association of Colloid Interface Scientists (IACIS 2015), Mainz, Germany, May 24-29, 2015. (Keynote)
- 54 Xu, Z., Current state of technology for ore upgrading in hydrometallurgy, 6th International Hydrometallurgy Conference, Beijing, China, October 16-19, 2014. (Plenary)
- 53 Xu, Z., Zhang, X., Tchoukov, P., Wang, L., Liu, Q. and J. Masliyah, Role of colloidal forces in unconventional oil processing, 88th ACS Colloid & Surface Science Symposium, Philadelphia, PA, USA, June 22-25, 2014. (Keynote)
- 52 Xu, Z., Cadien, K. and M. Wyman, Energy and mineral resource development and utilization: past, present and future, International Conference on Engineering Science and Technology (ICEST2014), Beijing, China, June 2-3, 2014. (Keynote)
- 51 Xu, Z., Separation of emulsified water in oil emulsions by interfacially active magnetic nano particles, Separation Technology 2013, Stavanger, Norway, September 25-26, 2013. (Invited)
- 50 Xu, Z., Zhou, F., Wang, L., Liu, Q(X), Liu, Q., Masliyah, J. and R. Chi, Flotation technology for upgrading of rare earth ores, The 7th International Conference on Rare Earth Development and Application, Ganzhou, China, August 10-13, 2013. (Plenary)
- 49 Xu, Z. and J. Masliyah, Fundamental research and industrial innovation: A case study, Current State and Trend in Low Grade Complex Mineral Resource Utilization: A Life Time Celebration of Professor Wang Dianzuo, Changsha, China, June 14-16, 2013. (Invited)



- 48 Xu, Z. and Q. Liu, Surface engineering and application of magnetic particles, 2013 Taiwan-Mainland Functional Materials Summit, Chongqing, China, May 23-26, 2013. (Invited).
- 47 Xu, Z., Wang, L., Tchoukov, P. and J. Masliyah, Study of film drainage dynamics by thin film force apparatus, Sixth Biennial Australian Colloid & Interface Symposium, Noosa, Australia, February 3-7, 2013. (Keynote)
- 46 Xu, Z. and J. Masliyah, Production of bitumen from Canadian oil sands: challenges and opportunities for mineral processing, SUSMP'12 International Conference on Sustainable Mineral Processing, Oulu, Finland, December 10-13, 2012. (Invited)
- 45 Xu, Z. and J. Masliyah, Colloidal chemistry in fine particle flotation, International Mineral Processing Symposium 2012, Bodrum, Turkey, October 9-12, 2012. (Plenary)
- 44 Xu, Z., Zhou, F., Wang, L., Liu, Q., Masliyah, J. and R. Chi, Fundamental study on reactive oil bubble flotation technology, ECI on Rare Earth Minerals/Metals-Sustainable Technologies for the Future, San Diego, CA, USA, August 12-17, 2012. (Plenary)
- 43 Xu, Z., Hou, J., Feng, X. and J. Masliyah, Interfacial characteristics of a biodegradable ethyl cellulose in demulsification of water-in-heavy oil emulsions, 19th International Symposium on Surfactant in Solution, Edmonton, AB, Canada, June 24-28, 2012. (Keynote)
- 42 Wang, L., Masliyah, J. and Z. Xu, Dissipation of hydrodynamic forces by hydrophobic surfaces in aqueous solutions, IACIS 2012, Sendai, Japan, May 13-18, 2012. (Keynote)
- 41 Wang, J., Natarajan, A., Xie, J., Sjöblom, J., Zeng, H. and Z. Xu, Intermolecular interactions of asphaltenes and an asphaltene model compound in organic solvents using a surface forces apparatus, PetroPhase 2011, London, UK, July 10-14, 2011. (Keynote)
- 40 Xu, Z. and J. Masliyah, Solvent-assisted hybrid bitumen extraction from Athabasca oil sands, Los Alamos National Laboratory of DOE, Los Alamos, NM, USA, May 2011. (Invited)
- 39 Xu, Z., Wang, L. and J. Masliyah, Aqueous film rupture between hydrophobic particles and air bubbles measured by a new surface force device, 241st ACS National Meeting and Exposition, Anaheim, CA, March 27-31, 2011. (Invited)
- 38 Xu, Z., Wang, L., Wu, C. and Q. Liu, Phosphate flotation using reactive oily bubbles, 6th World Congress of Beneficiation of Phosphate, Kunming, China, March 6-9, 2011. (Plenary)
- 37 Xu, Z., Wang, L. and J. Masliyah, Role of colloidal forces in flotation, 5th Biennial Australian Colloid & Interface Symposium, Hobart, Tasmania, January 30 - February 3, 2011. (keynote)
- 36 Xu, Z., Bisson, T., Xia, S. and R. Gupta, Novel developments in mercury removal technologies, 60th Can. Chem. Eng. Conference, Saskatoon, SK, October 24-27, 2010. (Keynote)
- 35 Xu, Z. and J. Masliyah, Understanding molecular mechanism of demulsifying water-in-oil emulsions using a biodegradable demulsifier, The Statoil Research Summit, Trondheim, Norway, September 27-29, 2010. (Invited)
- 34 Xu, Z. and J. Masliyah, Enhance fine particle flotation by hydrodynamic cavitation, XXV International Mineral Processing Congress, Brisbane, QL, September 6-10, 2010. (Keynote)

- 33 Xu, Z. and J. Masliyah, Xu, Z., Current state of technology for mercury emission control from coal-fired power plants, 8th World Congress of Chemical Engineering, Montreal, QC, Canada, August 23-27, 2009. (Keynote)
- 32 Xu, Z., Production of petroleum from Canadian oil sands, Energia para el Desarrollo Sustentable en America del Norte, Puebla, Mexico, March 19-20, 2009. (Invited)
- 31 Xu, Z. and J. Masliyah, Understanding flotation by visualization, XXIV International Mineral Processing Congress, Beijing, China, September 24-28, 2008. (Plenary)
- 30 Xu, Z. and J. Masliyah, Bitumen production from Canadian oil sands deposits, Symposium of Frontier Energy Resources, ISOPE 2008, Vancouver, BC, Canada, July 6-11, 2008. (Invited)
- 29 Xu, Z., Bitumen production from Alberta oil sands, Workshop at University of Southern California on The Security & Prosperity Partnership: Expanding the Boundaries of North America?, Los Angeles, CA, USA, April 11, 2008. (Invited)
- 28 Xu, Z. and R. Gupta, Recent advances in mercury emission control from coal-fired power plant, 6th International Symposium on Coal Combustion, Wuhan, China, December 1-4, 2007. (Plenary)
- 27 Xu, Z., A comparison of mineral and oil sands flotation systems, 57th CSChE Conference, Edmonton, AB, Canada, October 28-31, 2007. (Keynote)
- 26 Xu, Z. and J. Masliyah, Bitumen production from Canadian oil sands deposits: opportunities and challenges, 3rd Canada-China Economic Cooperation Conference, Edmonton, AB, Canada, June 22, 2007. (Invited)
- 25 Xu, Z. and J. Masliyah, Bitumen production from Canadian oil sands deposits, AIChE 2007 Spring Meeting, Houston, TX, USA, April 24, 2007. (Invited)
- 24 Xu, Z., Kelly, D. and R. Gupta, Mercury emission control from coal fired power plant, ChemCon 2006, December 27-30, 2006, Bharuch, Gujarat, India. (Plenary).
- 23 Xu, Z. and J. Masliyah, Bitumen production from Canadian oil sands deposits, North West Mining Association Annual Meeting, Reno, NV, USA, December 6-8, 2006. (Invited)
- 22 Xu, Z., Magnetic nanocomposites for bio and environmental applications, Department of Materials Science and Engineering, Michigan Technological University, Houghton, MI, USA, November 10, 2006. (Invited)
- 21 Xu, Z., Xu, Z., Liu, Y., Kelly, D., Kuznicki, S., Mitlin, D. and C. Lin, Regenerable sorbent for mercury emission control, 19th Canadian Symposium on Catalysis, Saskatoon, SK, May 14-17, 2006. (Keynote)
- 20 Xu, Z., Lu, G., Choung, J., Kelly, D. and D. Tao, Potential of coal cleaning for mercury emission control from Western Canadian Coals, Symposium on Impact of Evolving Mercury Emission Regulations on the Low Rank and Bituminous Coal Industry, Coal Prep 2006, Lexington, KY, May 1-4, 2006. (Invited)
- 19 Xu, Z. and J. Masliyah, Role of fundamental research in bitumen production from oil sands ores, Laboratory of Environment and Minerals, CNRS/INPL, Nancy, France, July 2005. (Invited)

- 18 J. Masliyah and Z. Xu, Potential of flotation technology in bitumen recovery from oil sands, Centenary of Flotation Symposium, Brisbane, Australia, June 6-9, 2005. (Keynote)
- 17 Xu, Z. and J. Masliyah, Modern approach to induction time measurement, Ian Wark Research Institute, University of South Australia, Australia, May 2005. (Invited)
- 16 Xu, Z., Development of Novel sorbents for emission control from coal-fired power plants, 2nd International Conference on Energy and Environmental Materials, Guangzhou, China, December 27-29, 2004. (Plenary)
- 15 Xu, Z., The potential of coal cleaning and combustion technology for China, Canada-China Energy Cooperation Conference, Edmonton, AB, Canada, November 26-27, 2004. (Invited)
- 14 Xu, Z. and G. Lu, Mercury emission control by pre-combustion thermal upgrading, 2nd International Symposium on Energy and Environmental Materials, Zhang Jiajie, China, June 15, 2004. (Invited)
- 13 Xu, Z., Magnetic nano particles and composites for environmental applications, International Conference on Energy and Environmental Materials, Guangzhou, China, December 2002. (Plenary)
- 12 Xu, Z. and J. Liu, Study of interfacial phenomena with AFM, 9th National Conference on Colloid and Interfacial Chemistry, Jinan, China, October 22, 2002. (Plenary)
- 11 Xu, Z., Recent development in coal cleaning and combustion technology, State-Key Laboratory in Coal Chemistry, Chinese Academy of Science, Taiyuan, China, May 20, 2002. (Invited)
- 10 Xu, Z., Oil sands: Alberta treasure, Graduate Student Seminar series, Department of Chemical Engineering, Queens' University, Kingston, ON, Canada, March 21, 2002. (Invited)
- 9 Xu, Z., Atomic force microscopic study of colloidal forces, Graduate Student Seminar series, State-Key Laboratory in Colloidal and Interfacial Chemistry, Shandong University, Jinan, People's Republic of China, December 2, 2001. (Invited)
- 8 Liu, J. and Z. Xu, Study of slime-coatings by electrophoretic mobility distribution measurement, INCO Research, Inc., Mississauga, ON, Canada, August 24, 2001. (Invited)
- 7 Xu, Z., Gu, Y. and J. Zhu, Engineering of magnetic nanoparticles for bioseparation applications, 2001s' International Symposium on Nano Materials Technology, Beijing, China, July 4, 2001. (Invited)
- 6 Zhu, J. and Z. Xu, Recovery of metal ions using functionalised mesoporous magnetite/silica composites, Symposium on Recycling, 2001 SME Annual Meeting, Denver, CO, USA February 28, 2001. (Invited)
- 5 Xu, Z., Engineering of magnetic nanocomposites for bio and environmental applications, Brockhouse Institute for Material Research Seminar Series, McMaster University, Hamilton, ON, Canada, February 19, 2001. (Invited)
- 4 Xu, Z., In situ spectroelectrochemistry and STM, Workshop on the Application of Surface Science to Mineral Processing Research, UBC, Vancouver, BC, May 11-12, 2000. (Invited)

- 3 Xu, Z., Interfacial phenomena in primary oil recovery, Applications of Microgravity Sciences in Oil Recovery Workshop, Montreal, QC, Canada, June 21, 1999. (Invited)
- 2 Z. Xu, Surface engineering of nanosize supermagnetic particles for bio- and environmental applications, 3rd Annual Materials Symposium, University of Alberta, Edmonton, AB, Canada, April 28, 1997. (Keynote)
- 1 Xu, Z., Liu, Q. and J.A. Finch, Engineering of magnetic nanocomposites for biological and environmental applications, Composites at Lake Louise '97: Design for Performance, Lake Louise, AB, October 12-17, 1997. (Keynote)

## Other Technical Conference Presentations since 1997:

- 116 Hosseini Anvari, M., Liu, Q., Xu, Z. and P. Choi, A molecular dynamics study on contact angle and line tension of galena and sphalerite, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 115 Chen, X., Xu, Z. and D. Sun, Application of fast responsive CO<sub>2</sub> switchable microemulsions in drill cuttings treatment, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 114 Lu, Y., Sun, D. and Z. Xu, Enhancement of oil sands extraction using CO<sub>2</sub> responsive supra-amphiphiles, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 113 Russell, D., Xu, Z. and Q. Liu, Improved efficiency bitumen extraction process using petroleum diesel, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 112 Chang, J., Xu, Z. and Q. Liu, Investigation of the anisotropic surface characteristics of kaolinite by atomic force microscopy, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 111 Ng, J., Liu, Q. and Z. Xu, Applications of thermoresponsive hybrid polymer in oil sands mining, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 110 Tang, Y. C., Liu, Q. and Z. Xu, Polymer at interface: Single-molecule adhesion force of stimuli-responsive polymer on hydrophobic surfaces in aqueous solution, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 109 Manica, R., Liu, Q. and Z. Xu, Hydrodynamic interactions involving drops and bubbles, Honourary Symposium in Recognition of Jacob Masliyah for Outsanding Contributions in Heavy Oil Processing, 67<sup>th</sup> Canadian Chemical Engineering Conference (CSCHE), Edmonton, AB, Canada, October 22-25, 2017.
- 108 Tao, H., Liu, S., Luo, J-L., Choi, P., Liu, Q. and Z. Xu, Descriptor of oxygen reduction reaction (ORR) catalytic activity of metal chalcogenides: A potential indicator for mineral flotation and ORR catalyst design, COM 2017 Conference of Metallurgists, Vancouver, BC, Canada, August 27-30, 2017. (Awarded 1<sup>st</sup> prize PhD category for student poster.)

- 107 Ivanova, N, Manica, R., Liu, Q. and Z. Xu, Water-in-oil emulsion stabilized by model asphaltene compound C5PeC11: A study of approach velocity, wettability and temperature on thin liquid film drainage between water droplet and solid surface, 91<sup>st</sup> ACS Colloids & Surface Science Symposium, New York, NY, USA, July 9-12, 2017.
- 106 Dwaik, C., Zhang Y. and Z. Xu, Measuring electrocoalescence and interfacial tension under the influence of electric fields with various controlling factors, JIP Conference (NTNU), Aberdeen, UK, May 30-31 & June 1, 2017.
- 105 Wang, C. and Z. Xu, Volute Screw Press: Application in Fine Tailings Management, COSIA Innovation Summit 2017, Calgary, AB, Canada, March 21-22, 2017.
- 104 Zhu, Y., Masliyah, J. and Z. Xu, Innovative hybrid extraction process of bitumen from Athabasca oil sands, 66th Canadian Chemical Engineering Conference (CSCHE), Quebec City, QC, Canada, October 16-19, 2016.
- 103 Niu, Z., Yan, C. and Z. Xu, Molecular demulsification mechanism of EO-PO copolymers studied by C5Pe asphaltene model compound, 66th Canadian Chemical Engineering Conference (CSCHE), Quebec City, QC, Canada, October 16-19, 2016.
- 102 Wang, C. and Z. Xu, The new Volute Screw Press: Applications in fine tailings dewatering, Alberta NWT/Nunavut Regional CMP Conference, Fort McMurray, AB, Canada, October 13, 2016.
- 101 Dodonov, V. and Z. Xu, Dual bubble generator in a flotation column, Alberta NWT/Nunavut Regional CMP Conference, Fort McMurray, AB, Canada, October 13, 2016.
- 100 Masliyah, J. and Z. Xu, Oil sands tailings: A challenge, 65th Canadian Chemical Engineering Conference, Calgary, AB, Canada, October 4-7, 2015.
- 99 Hosseinienejad, S., Hayes, R.E. and Z. Xu, CFD modeling of bubble interactions in pipe flow using Eulerian and Lagrangian approaches, 65th Canadian Chemical Engineering Conference, Calgary, AB, Canada, October 4-7, 2015.
- 98 Zhang, Y., Xu, Z. and Q. Zhao, Oil sands processability analysis using symbolic regression, 65PthP Canadian Chemical Engineering Conference, Calgary, AB, Canada, October 4-7, 2015.
- 97 Chao, H., Tang, Y., Li, Z., Liu, Q. and Z. Xu, Design, synthesis and application of temperature switchable block co-polymers to oil sands extraction, 65th Canadian Chemical Engineering Conference, Calgary, AB, Canada, October 4-7, 2015.
- 96 Zhen, N., Li, Z. and Z. Xu, Demulsification performance of ethylene oxide/propylene oxide copolymer at elevated temperature/pressure studied by focused beam reflectance measurement, 65th Canadian Chemical Engineering Conference, Calgary, AB, Canada, October 4-7, 2015.
- 95 Liang, C. Liu, Q. and Z. Xu, Magnetic demulsifier nanoparticles using cellulosic derivatives, 65th Canadian Chemical Engineering Conference, Calgary, AB, Canada, October 4-7, 2015.
- 94 Wang, C., Han, C., Liu, Q. and Z. Xu, Role of pre-conditioning cationic Zetag® flocculant in enhancing MFT flocculation, 65th Canadian Chemical Engineering Conference, Calgary, AB, Canada, October 4-7, 2015.

- 93 Yan, L., Xu, Z. and J. Masliyah, Adsorption of carboxymethyl cellulose on talc basal and edge surfaces probed by atomic force microscopy, IMPC 2014, Santiago, Chile, October 20-24, 2014.
- 92 Bisson, T., Xu, Z., Zhou, Z., Liu, X. and M. Xu, Removal of Hg<sup>0</sup> and NO by novel Ag-VR<sub>2</sub>O<sub>5</sub> Rhazabazite catalytic sorbent, 64th Canadian Chemical Engineering Conference, Niagara Falls, ON, Canada, October 19-22, 2014.
- 91 Chen, T., F. Lin, Xu, Z., Effect of salinity on the warm-water based processing of oil sands, 11th Annual Canadian Mineral Processors Conference, Fort McMurray, AB, Canada, October 8, 2014.
- 90 Lin, F., He, L., Primkulov, B. and Z. Xu, Dewetting dynamics of two-liquid systems: a micro-scale study, 88th ACS Colloid and Surface Science Symposium, University of Pennsylvania, Philadelphia, PA, USA, June 22-25, 2014.
- 89 Li, Z., Sjøblom, J., Liu, Q., Xu, Z., Stabilizing asphaltenes with dodecyl benzene sulfonic acid, Joint Industry Program Meeting, Osnabrück, Germany, June, 4, 2014.
- 88 Pensini, E., Harbottle, D., Yang, F., Tchoukov, P., Li, Z., Xu, Z., Masliyah, J., Polymeric EO-PO demulsifier to break water-in-oil emulsions, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014.
- 87 Yang, F., Tchoukov, P., Dettman, H., Pensini, E., Dabros, T., Czarnecki, J., Xu, Z., Role of different asphaltene fractions in stabilization water-in-oil emulsions, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014. (Poster)
- 86 He, L., Lin, F., Xu, Z., Li, X., Sui, H., Mechanistic study on solvent-enhanced bitumen liberation from oil sands ores, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014. (Poster)
- 85 Chen, T., Lin, F., Xu, Z., Effect of salinity on the warm-water based processing of oil sands, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014. (Poster)
- 84 Lin, F., He, L., Hou, J., Masliyah, J., Xu, Z., Understanding the role of demulsifier in processing of mineable oil sands at ambient temperature using aqueous-nonaqueous extraction process, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014.
- 83 Liang, Y., Pensini, E., Harbottle, D., Xu, Z., Understanding demulsification mechanisms of water-in-oil emulsions by ethylcellulose-rheological properties and film morphology, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014. (Poster)
- 82 Li, Z., Xu, Z., Aggregation of asphaltenes from Athabasca Oil Sands, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014. (Poster)
- 81 Tchoukov, P., Harbottle, D., Yang, F., Czarnecki, J., Dabros, T., Xu, Z., A possible stabilization mechanism of water-in-crude oil emulsions: Thin liquid film and interfacial shear rheology study, Oil Sands 2014, Edmonton, AB, Canada, April 28-30, 2014.
- 80 Xu, Z., Harbottle, D., Moorthy, K., Tchoukov, P., Petroleum emulsion stability governed by interfacial rheological properties, 247th ACS National Meeting, Dallas, TX, USA, March 16-20, 2014.

- 79 Arguelles-Vivas, F., Bobicki, E., Irfan, M. Liu, Q., Babadagli, T., Bisson, and Z. Xu, Understanding CO<sub>2</sub> storage under geological storage conditions, 2014 SME Annual Meeting & Exhibit, Salt Lake City, UT, USA, February 23-26, 2014.
- 78 Xu, Z., Zhou, Z., Wang, L., Liu, Q., Masliyah, J., Xiao, N., Liu, Q. and R. Chi, Application of reactive oil bubble flotation technology to rare earth mineral flotation, MS&T'13, Montreal, QC, Canada, October 27-31, 2013.
- 77 Xu, Z., Klein, C., Osborn, I., Kaura, A. and D. Harbottle, Creating non-segregating tailings by activated sand particles, 63rd Canadian Chemical Engineering Conference, Fredericton, NB, Canada, October 20-23, 2013.
- 76 Yan, L., Masliyah, J., and Z. Xu, Study anisotropic platy minerals from direct force measurement using AFM, 63rd Canadian Chemical Engineering Conference, Fredericton, NB, Canada, October 20-23, 2013.
- 75 Xu, Z., Lin F., He L., Masliyah J., Hybrid bitumen extraction fundamentals, 10th Alberta Canadian Mineral Processors Conference, Fort McMurray, AB, Canada, October 3, 2013.
- 74 Kuznicki, N., Krasowska, M., Sellaperumage, P. M. F., Xu, Z., Masliyah, J., Ralston, J. and M. N. Popescu, Cascade partial coalescence of a rising oil droplet at an oil-electrolyte interface, ECIS 2013 - 27th Conference of European Colloid and Interface Society, Sofia, Bulgaria, September 1-6, 2013.
- 73 Tchoukov, P., Yang, F., Harbottle, D., Czarnecki, J., Dabros, T. and Z. Xu, Interfacial shear rheology and thin liquid film study of water-in-crude oil emulsions, ECIS 2013 - 27th Conference of European Colloid and Interface Society, Sofia, Bulgaria, September 1-6, 2013.
- 72 Xu, Z., Moorthy, K., Wang, L., Liu, Q., Masliyah, J. and P. Tchoukov, Bridge between drop coalescence and interfacial rheology, Petrophase 2013, Rueil-Malmaison, France, June 10-13, 2013.
- 71 Alagha, L., Wang, S., Yan, L., Xu, Z. and J. Masliyah, Probing polymer adsorption on anisotropic surfaces using QCM-D, 3rd Chinese QCM-D Users Workshop, Beijing, China, May 30-31, 2013.
- 70 Xu, Z., Yan, L., Alagha, L. and J. Masliyah, Probing anisotropic surface characteristics of clay minerals by atomic force microscope, CONRAD Oilsands Clay Conference, Edmonton, AB, February 20-21, 2013.
- 69 Kuznicki, N., Krasowska, M., Sellaperumage, P.M.F., Xu, Z., Masliyah, J., Ralston J. and M.N. Popescu, Surface potential bounds inferred from a cascade-partial coalescence phenomenon, ACIS 2013 Australia Colloid & Interface Symposium, Noosa, Australia, February 3-7, 2013.
- 68 Liang, C., Peng, J., Harbottle, D., Liu, Q., Xu, Z. and J. Masliyah, Dewatering emulsions using magnetic particles functionalized with cellulose, International Conference on Colloids and Complex Fluids: Challenges and Opportunities, Rueil-Malmaison, France, October 17-19, 2012.
- 67 Alagha, L., Wang, S., Xu, Z. and J. Masliyah, Adsorption kinetics of polyacrylamide-based polymers on kaolinite studied by quartz crystal microbalance, International Conference on Colloids and Complex Fluids: Challenges and Opportunities, Rueil-Malmaison, France, October, 17-19, 2012. (Poster)



- 66 Harbottle, D., Moorthy, K., Wang, L., Yang, F., Tchoukov, P., Masliyah, J., and Z. Xu, Interfacial rheology and its role in the stability of water-oil interfaces, 62nd CSChE Conference, Vancouver, BC, Canada, October 14-17, 2012.
- 65 Li, H., Xu, Z., Liu, Q., Afacan, A., Harbottle, D. and J. Masliyah, On line observation of heterogeneous nucleation on a bitumen surface under hydrodynamic conditions, 62nd CSChE Conference, Vancouver, BC, Canada, October 14-17, 2012.
- 64 Shahalami, M., Wang, L., Masliyah, J., Xu, Z., Wu, Ch. and D. Y. C. Chan, Study in dynamic forces between an air bubble and a hydrophilic glass surface with the integrated thin film drainage apparatus (ITFDA), 62nd CSChE Conference, Vancouver, BC, Canada, October 14-17, 2012.
- 63 Ghadirian, M., Mmbaga, J. P., Afacan, A., Hayes, R. E. and Z. Xu, A robust model for a hydrocyclone: Methodology and application, 62nd CSChE Conference, Vancouver, BC, Canada, October 14-17, 2012.
- 62 Curran M., Tamiz Bakhtiari, M., Zhu, Q., Harbottle, D., Xu, Z., Liu, Q., Masliyah, J., Spence, J., Siy, R. and S. Ng, Effect of caustic addition on the processing of oil sands, 62nd CSChE Conference, Vancouver, BC, Canada, October 14-17, 2012.
- 61 Zhang, Y., Zhao, Q. and Z. Xu, Understanding processability of oil sands ores using principal component analysis and support vector machine, 62nd CSChE Conference, Vancouver, BC, Canada, October 14-17, 2012.
- 60 Madjlessikupai, M., Harbottle, D., Xu, Z. and J. Masliyah, Characterization of rag-forming solids, Oil Sands 2012 Conference, Edmonton, AB, Canada, August 28-30, 2012.
- 59 Liang, C., Liu, Q. and Z. Xu, Stabilizing temporary emulsions using switchable wetting particles, Oil Sands 2012 Conference, Edmonton, AB, Canada August 28-30, 2012.
- 58 Curran, M., Tamiz Bakhtiari, M., Zhu, Q., Harbottle, D., Spence, J., Siy, R., Ng, S., Liu, Q.X., Masliyah, J. and Z. Xu, Role of caustic in processing of oil sands, Oil Sands 2012 Conference, Edmonton, AB, Canada, August 28-30, 2012.
- 57 Klein, C., Harbottle, D., Alagha, L. and Z. Xu, Effect of residual bitumen on polymer-based flocculation of mature fine tailings, Oil Sands 2012 Conference, Edmonton, AB, Canada, August 28-30, 2012.
- 56 Tchoukov, P., Yang, F., Xu, Z., Dabros, T., Czarnecki, J. and J. Sjöblom, Role of asphaltenes in stabilizing w/o emulsions-thin liquid film study, 19th International Symposium on Surfactants in Solutions (SIS2012), Edmonton, AB, Canada, June 24-28, 2012.
- 55 Tamiz Bakhtiari, M., Zhu, Q., Curran, M., Harbottle, D., Liu, Q., Xu, Z. and J. Masliyah, Effect of water chemistry on the processing performance of oil sands ores, 95th Canadian Chemistry Conference, Calgary, AB, Canada, May 26-30, 2012.
- 54 Yan, L., Masliyah, J. and Z. Xu, Determination of anisotropic surface charge characteristics of different phyllosilicates by direct force measurements, IACIS 2012, Sendai, Japan, May 13-18, 2012.

- 53 Tseng, H., Xu, Z. and J. Masliyah, Understanding the role of a clay binder in improving processability of low-grade oil sand ores, 8th Annual Alberta CMP Seminar, Fort McMurray, AB, Canada, October 20, 2011.
- 52 Wang, L., Trong, D.V., Xu, Z. and J. Masliyah, Use of amine in processing of weathered/oxidized oil sands ores, 8PthP Annual Alberta CMP Seminar, Fort McMurray, AB, Canada, October 20, 2011.
- 51 Xu, Z. and J. Masliyah, Bitumen Production from Alberta Oil Sands: Challenges and Opportunities, NRC-Steacie Institute of Molecular Science, Ottawa, ON, Canada, August 26, 2011.
- 50 Yan, L., Xu, Z. and J. Masliyah, Determining anisotropic surface character of different clays by direct force measurements, 85th ACS Colloid & Surface Science Symposium, McGill University, Montreal, QC, Canada, June 19-22, 2011.
- 49 Wang, J., Sjöblom, J., Xu, Z. and H. Zeng, Intermolecular and surface interactions of an asphaltene model compound in aqueous solutions, 85th ACS Colloid and Interface Science Symposium, McGill University, Montreal, QC, Canada, June 19-22, 2011.
- 48 Xu, Z., Wang, L., Deng, M., Liu, Q. and J. Masliyah, Physical properties of heavy oil-water interfaces in the context of oil removal from sea water by froth flotation, 2011 SME Annual Meeting and Exhibit, Denver, CO, USA, February 27-March 2, 2011.
- 47 Wang, L., Sharp, D., Xu, Z. and J. Masliyah, Study interactions between air bubble and bitumen surfaces by a novel induction timer, 2011 SME Conference, Denver, CO, USA, February 27-March 2, 2011.
- 46 Srinivasa, S., Flury, C., Afacan, A., Xu, Z. and J. Masliyah, Visualization of bitumen liberation using a novel flow cell, Oil Sands 2011, Edmonton, AB, Canada, February 23-24, 2011.
- 45 Xu, Z. and J. Masliyah, Challenges in oil sands tailings management, Oil Sands 2011, Edmonton, AB, Canada, February 23-24, 2011.
- 44 Xu, Z., Liu, Q., Peng, J. and J. Masliyah, A novel magnetic demulsifier for removal of water in diluted bitumen, Oil Sands 2011, Edmonton, AB, Canada, February 23-24, 2011.
- 43 Wang, L., Sharp, D., Xu, Z. and J. Masliyah, Study interactions between air bubble and bitumen surfaces by a novel surface force apparatus, Oil Sands 2011, Edmonton, AB, Canada, February 23-24, 2011.
- 42 Zhang, M., Xu, Z. and J. Masliyah, Role of bitumen viscosity in bitumen recovery from Athabasca oil sands, Oil Sands 2011, Edmonton, AB, Canada, February 23-24, 2011.
- 41 Zhu, R., Liu, Q., Xu, Z., Masliyah, J. and A. Khan, Role of carbon dioxide on sedimentation of oil sands tailings, 60th CSChE Conference, Saskatoon, SK, Canada, October 24-27, 2010.
- 40 Natarajan, A., Xie, J., Wang, S., Masliyah, J. Zeng, H. and Z. Xu, Interactions of asphaltenes surfaces in organic solvents using surface force apparatus (SFA), 60th CSChE Conference, Saskatoon, SK, Canada, October 24-27, 2010.
- 39 Wang, L., Sharp, D., Xu, Z. and J. Masliyah, A new surface force apparatus for determining interactions forces between an air bubble and bitumen surface under processing conditions, 60th CSChE Conference, Saskatoon, SK, Canada, October 24-27, 2010.

- 38 Feng, X., Gao, S., Mussone, P., Wang, S., Wu, S., Masliyah J. and Z. Xu, A biodegradable polymer for demulsification of water-in-bitumen emulsions, 8th World Congress of Chemical Engineering, Montreal, QC, Canada, August 23- 27, 2009.
- 37 Maham, Y., Dang-Vu, T., Xu, Z. and J. Masliyah, Understanding hydrophobicity origin of solids from Athabasca oil sands, 8th World Congress of Chemical Engineering, Montreal, QC, Canada, August 23-27, 2009.
- 36 Wang, L., Dang-Vu, T., Xu, Z. and J. Masliyah, Use of short chain amine in processing of weathered/oxidized oil sands ores, 8th World Congress of Chemical Engineering, Montreal, QC, Canada, August 23- 27, 2009.
- 35 Ren, S., Xu, Z. and J. Masliyah, Study of bitumen-bubble interactions by atomic force microscopy, 13th International Conference on Surface & Colloid Science, New York, NY, USA, June 14-19, 2009.
- 34 Mussone, P., Xu, Z. and J. Masliyah, UV-induced modifications in bitumen Langmuir films, 13th International Conference on Surface & Colloid Science, New York, NY, USA, June 14-19, 2009.
- 33 Liu, Y., Xu, Z., Zhu, Z., Feng, S., Kuznicki, S. and H. Yang, Crystalline perfection of silver nanoparticles formed on chabazite, 20th Canadian Material Science Conference, Edmonton, AB, Canada, June 18-19, 2008.
- 32 Dong, J., Xu, Z. and S. M. Kuznicki, Synthesis of novel, regenerable magnetic sorbent for mercury capture from flue gases, 82nd ACS Colloid and Surface Symposium, Raleigh, NC, USA, June 15-18, 2008.
- 31 Zhao, H., Long, J., Masliyah, J. and Z. Xu, Effect of divalent cations, surfactants and bicarbonates on bitumen extraction, 2007 Water Usage Workshop and Seminar, Calgary, AB, Canada, November 21-22, 2007.
- 30 Liu, Y., Kelly, D., Lin, C., Xu, Z. and S. Kuznicki, An Environmental Friendly Recyclable Sorbent for Mercury Control, 57th CSChE Conference, Edmonton, AB, Canada, October 28-31, 2007.
- 29 Dong, J., Mielczarski, J.A., Mielczarski E. and Z. Xu, In situ characterization of the adsorbed cancanavalin A on germanium surface at various pH, 57th CSChE Conference, Edmonton, AB, Canada, October 28-31, 2007.
- 28 Liu, Y., Chen, F., Kuznicki, S., Wasylishen, R. and Z. Xu, A study of silver nanocomposites as mercury sorbent, Material Science and Technology 2007 Conference and Exhibition, Detroit, MI, USA, September 2007.
- 27 Xu, Z., Application of surface analysis to study of water chemistry in flotation, Round Table-Effect of water quality on mineral processes, Quebec City, QC, Canada, September 19, 2007.
- 26 Xu, Z., Mercury emission control from coal-fired power plant, Mini-Workshop on Clean Coal Technology, University of Alberta, Edmonton, AB, Canada, February 2, 2007.
- 25 Long, J., Xu, Z. and J. Maslyah, On the role of temperature in oil sands processing. Oil Sands 2006 Conference, Edmonton, AB, Canada, 2006.
- 24 Su, L., Xu, Z. and J. Masliyah, Role of oily bubbles in enhancing bitumen flotation, Centenary of Flotation Symposium, Brisbane, Australia, June 6-9, 2005.

- 23 Zhao, H., Long, J., Masliyah, J. and Z. Xu, Effect of water chemistry on bitumen-silica interactions, 55th CSChE Conference, Toronto, ON, Canada, 2005.
- 22 Masliyah, J., Long, J. and Z. Xu, Colloidal interactions and stability of clay suspensions, 229th National Meeting American Chemical Society, San Diego, CA, USA, 2005.
- 21 Xu, Z. and N. Su, Role of oily bubble in bitumen extraction, Oil Sands Symposium, University of Alberta, Edmonton, AB, Canada, May 3, 2004.
- 20 Lopetinsky, R., Masliyah, J. and Z. Xu, Langmuir and Langmuir-Blodgett films of asphaltenes, deasphalted bitumen and silica nanoparticles at toluene-water interfaces, 54th CSChE Conference, Calgary, AB, Canada, 2004.
- 19 Liu, J., Xu, Z. and J. Masliyah, Insight into oil sands ore processability, 54th CSChE Conference, Calgary, AB, Canada, 2004.
- 18 Chen, Z. K., Lu, B. T., Luo, J. L., Patchett, B. and Z. Xu, Study of corrosion behavior of welded 304 austenitic stainless steel using scanning reference electrode technique, The 41st Annual Conference of Metallurgists, Montreal, QC, Canada, August 11-14, 2002. (Poster)
- 17 Choung, J. W., Xu, Z. and J. A. Finch, Ambient temperature ferrite process for acid rock drainage treatment, 5th International Conference on Acid Rock Drainage, Denver, CO, USA, May 21-24, 2000.
- 16 Xu, Z., Choung, J. and J. Szymanski, An integrated process for recovering fine coals and recycling water from coal tailings, Coal Prep 2000, Lexington, KY, USA, May 2-4, 2000.
- 15 Kasongo, T., Zhou, Z., Xu, Z. and J. Masliyah, On-line characterization of bubble behavior in a laboratory flotation machine, Flotation 2000, Adelaide, Australia, March 29-31, 2000.
- 14 Zhou, Z., Xu, Z., Masliyah, J., Kasongo, T., Christendat, D., Hyland, K., Kizior, T. and D. Cox, Application of on-line visualization of flotation systems, 32nd Annual Canadian Mineral Processors Operators Conference, Ottawa, ON, Canada, January 18-20, 2000.
- 13 Choung, J. W., Liu, J., Szymanski, J. and Z. Xu, An integrated approach for coal tailings management, 49th Canadian Chemical Engineering Conference, Saskatoon, SK, Canada October 3-6, 1999.
- 12 Chi, R., Xu, Z., DiFeo, T., Finch, J. A. and J. Yordan, "Measurement of interaction forces between talc and toner particles", 5th Research Forum on Recycling, Montreal, QC, Canada, September 28-30, 1999.
- 11 Choung, J.W., J. Liu, Z. Xu and J. Szymanski, Flocculant in integrated coal tailing's processing by hydrophobic extraction, 38th Annual Conference of Metallurgist, Quebec City, QC, Canada, August 22-25, 1999.
- 10 Xu, Z. and J. Masliyah, Effect of water chemistry on water recovery from oil sands, CONRAD Water Chemistry Workshop, Fort McMurray, AB, Canada, July 8, 1999.
- 9 Chi, R., Xu, Z. and J. Yordan, Measurement of interaction forces between ink and talc particles, 1999 SME Annual Meeting, Denver, CO, USA, March 1-3, 1999.

- 8 Chen, F., Finch, J. A., Xu, Z. and J. Czarnecki, Wettability of fine solids extracted from bitumen froth, 216th ACS National Meeting, Boston, MA, USA, August 23-27, 1998.
- 7 Choung, J. W., Xu, Z. and J. A. Finch, Solutions to calcium problem in ambient temperature ferrite process applied to acid mine drainage treatment, 37th Annual Conference of Metallurgists, Calgary, AB, Canada, August 16-19, 1998.
- 6 T. Difeo, J. A. Finch and Z. Xu, Sphalerite-silica interactions, Annual General Meeting of CIM, Montreal, QC, Canada, May 6, 1998.
- 5 Gelinas, S., Finch, J. and Z. Xu, Functionalization of nanosized maghemite particles by molecular self-assembly using dibenzonic acid diamide bolaamphiphile, Engineering Foundation Conferences: Surface Characterization of Adsorption and Interfacial Reactions II, Kona, HI, USA, January 11-16, 1998. (Won best poster award)
- 4 Xu, Z., Role of fine solids and air bubbles in froth flotation, 47th Canadian Chemical Engineering Conference, Edmonton, AB, Canada, October 5-8, 1997.
- 3 Wang, W., Xu, Z., Choung, J. W. and J. A. Finch, Challenges for ambient temperature ferrite process in acid mine drainage treatment, 36th Annual Conference of Metallurgists, Sudbury, ON, Canada, August 18-20, 1997.
- 2 Xu, Z., Organic thin films in tribology and corrosion applications, Workshop on Films and coatings in industrial applications, Montreal, QC, Canada, June 17, 1997.
- 1 Liu, Q., Xu, Z., and J. A. Finch, A novel approach for fabricating magnetic carriers, 2nd Joint CIESC/AIChE Conference, Beijing, China, May 19-22, 1997.

## External Research Support held as principal investigator

Year	Source/Program	Title of project	Total Fund in \$CAN
2017-2018	COSIA	EPA Led Studies (Volute Screw Press Filter)	\$120,000
2017	Teck Metals Ltd.	Volute Screw Press Testing	\$4,000
2015-2017	Saudi Aramco-Contract	Interfacial sciences in smart water flooding	\$379,850
2015-2016	NSERC EQPEQ	TGA integration system with FTIR-MS	\$126,429
2015-2017	UofA SCENEREI	Fate/partitioning of trace elements (TEs) in by-products	\$33,500
2014-2019	AB Innovates-Energy & Environment Solutions	Oil sands engineering	\$500,000
2014-2021	Canada Research Chair (Tier I, renewal)	Mineral processing	\$1,400,000
2014-2019	NSERC-IRC Renewal	Oil sands engineering	\$5,700,000
2014-2020	NSERC – Discovery	Understanding superhydrophobization for enhanced fine particle flotation	\$360,000
2012-2013	NSERC EQPEQ	SurPASS streaming potential measurement	\$91,730
2012-2017	Canadian Foundation for Innovation	Enhancing mining efficiency and decreasing environmental impact	\$164,460
2011-2017	UofAB C5MPT	Novel collectors for selective sulfide flotation	\$495,000
2010-2013	CMC-NCE	A pore scale microlab to perform fundamental laboratory-based studies of CO <sub>2</sub> transport and reactivity in reservoirs	\$96,000
2009-2014	NSERC-Discovery	Understanding ultrafine particles in mineral and coal processing	\$275,000
2009-2012	NSERC-CRD	Fine particle flotation	\$450,000
2009-2010	NSERC-Research Tool	Ultracut ultramicrotome	\$119,066
2009-2010	Alberta-Small Equipment Grant	AFM and XRF for mineral research	\$281,281
2008-2013	NSERC-IRC	Oil sands engineering	\$8,286,509

2008-2010	Teck Cominco-Research	Impact of high total dissolved solids in process water on Red Dog lead and zinc flotation	\$131,000
2006-2013	Canada Research Chair (Tier I)	Mineral processing	\$1,400,000
2004-2009	NSERC-Discovery	Fundamental study of reactive oily bubbles	\$282,590
2003-2008	NSERC/EPCOR/AERI-IRC	Advanced coal cleaning and combustion technology	\$1,900,000
2006-2007	NSERC/Research Tool	GC-MS	\$132,214
2005-2006	INCO/Contract	Filtration aid performance assessment	\$45,000
2004-2005	NSERC-Research Tool	Micro-GC	\$91,700
2003-2005	COURSE/Alberta Research	Production of hydrogen and nanocarbons from light hydrocarbons	\$195,840
2003-2004	NSERC/Research Tool	Triboscope nanoindenter	\$112,840
2003-2004	AERI/Contract	Coal cleaning review	\$20,000
2002-2005	NSERC-CAMIRO/ CRD	Investigation of fine particle flotation	\$412,500
2002-2003	NSERC/Research Tool	Atomic absorption spectrometer	\$48,460
2001-2004	NSERC-Syncrude-Albian Sands/Strategic	Fundamental study of water chemistry in bitumen extraction	\$409,000
2000-2004	NSERC/Discovery	Engineering of mesoporous magnetic nanocomposites	\$158,400
2000-2003	COURSE/Alberta Research	Fundamental study of bitumen digestion	\$270,000
2000-2001	NSERC/Equipment	Scanning probe microscope	\$120,500
2000-2001	DOW/Unrestrict	Adhesion force measurement	\$12,000
2000-2001	Luzenac USA/Contract	Interaction of talc with toner particles	\$14,000
1999-2001	NSERC-Suncor-Syncrude/CRD	Effect of recycle water on bitumen extraction	\$128,000
1999-2000	Shell-ARC/Contract	LEE chemicals in oil sands processing	\$32,000
1998-1999	NSERC/Equipment	Fourier transform infrared spectrometer	\$90,308
1996-2000	NSERC/Research	Surface forces in minerals and materials processing	\$114,026

1996-1999	NSERC/Strategic	Ambient temperature ferrite process for acid mine drainage treatment	\$276,500
1995-1996	NSERC/Major Equipment	Measurement and analysis of surface interactions and forces	\$236,512
1994-1997	NSERC/Strategic	The next generation of flotation machines	\$206,890
1993-1996	NSERC/Research	Bubble-particle interactions	\$78,000
1993-1996	FCAR/New Researcher	In situ characterization of collector adsorption	\$47,000
1993-1994	NSERC/Equipment	Fourier transform infrared spectrometer	\$79,108



## University Teaching Portfolio

Course number	Course Title	Affiliation
<b>Core Chemical and Materials Engineering courses</b>		
Ch E 265	Process Analysis	U of A
Mat E 331/306-341B	Introduction to Mineral Processing	U of A/McGill
306-317A	Materials Characterization	McGill
CME 422	Interfacial Engineering in Mineral Processing	U of A
Ch E 436	Colloids and Surfaces	U of A
Mat E 433	Applied Surface Chemistry in Minerals and Materials Processing	U of A
<b>Advanced Engineering courses</b>		
Ch E 617	Colloids and Interfaces	U of A
Ch E 534	Fundamentals in Oil Sands Engineering	U of A
Mat E 633	Surface Chemistry in Minerals and Materials Processing	U of A
306-546	Interfacial Phenomena in Engineering	McGill
<b>Laboratory courses</b>		
306-250A	Introduction to Extraction Metallurgy (lab-data analysis)	McGill
Ch E 531	Chemical Engineering Laboratory I (lab-data analysis and technical writing)	U of A
<b>Technical Presentation courses</b>		
Ch E 481	Colloquium I, non-technical	U of A
Ch E 483	Colloquium II, Technical	U of A
Ch E 632	Graduate Seminar	U of A

## Students supervised or co-supervised

## PhD Students

Name	Thesis project/title	Year	Co-supervised	Current affiliation
Qingxia Liu	An innovative approach in magnetic carrier technology	93-96	none	Prof., UofA
Zhiang Zhou	Gas nucleation and cavitation in flotation	92-96	Finch	Scientist, Innotech
Antony Difeo	Colloidal phenomena in sulphide flotation	95-00	Finch	Scientist, CANMET
Caroline Sui	Role of Pb ions in pyrite/xanthate system studied by voltammetry and FTIR	93-97	Finch/Butler	GE-Betz, USA
Volkan Bozkert	Interactions in the pentlandite/pyrrhotite/xanthate system	93-97	Finch/Butler	Prof., Osmangazi Univ., Turkey
Fu Chen	Role of sparger wettability in bubble generation	94-99	Finch	Scientist, California
Jianjun Liu	Colloidal forces in bitumen extraction	99-04	none	Engineer, Nalco, USA
Irene Karsten	Factors affecting the bond strength of textile artifact/adhesive/support fabric laminates	98-03	Keer	UofA
Tshitende Kasonga	Role of water chemistry in bitumen extraction	98-06	Szymanski	Petro-Canada
Hongying Zhao	Role of Water Chemistry in Bitumen Recovery from Oil Sands	03-08	Masliyah	Schlumberger
Jie Dong	Synthesis and characterization of magnetic sorbents	02-08	Kuznicki	Vale
Yan Liu	Sorbent development for on-line mercury detection	03-08	Kuznicki	PDF, UofA
Shad Siddiqui	Role of micro mixing by impinging jet reactor in synthesis of nano metal oxide particles	03-09	Kresta	Scientist, Innotech
Aref Seyyed Najafi	Bubble attachment to solid and bitumen surfaces	03-09	Masliyah	Eng. CNRL
Adebukola Adegrooye	Characterization of solids isolated from different oil sands ores	05-10	Masliyah	Eng. CNRL
Song Gao	Stability of water-in-diluted bitumen emulsions	05-09	Masliyah/Moran	Manager, Champion Technologies
Shengqun Wang	Understanding stability of water-in-diluted bitumen emulsions by colloidal force measurements	05-11	Masliyah	Engineer, Nalco, USA
Anand Natarajan	Probing the molecular mechanisms of asphaltenes in organic solvents using a surface forces apparatus	06-14	Masliyah/Zeng	Eng. Syncrude
Marjan Tamiz	Role of sodium hydroxide in production of natural surfactants, bitumen extraction and slime coating	08-15	Masliyah	Eng. Iran
Morteza Ghadirian	Modelling a hydrocyclone for fine particle separation	08-14	Hayes	Eng. Edmonton
Robel Teklebrhan	Studying structure – Nanoaggregation relations of polyaromatic molecules in the bulk oil-phase and at the oil-water interface using molecular dynamics simulation	08-13	Choi	Eng. Florida, USA
Mansoureh Shahalami	Study of non-equilibrium interactions between an air bubble and a hydrophilic/hydrophobic solid surface with the Stokes-Reynolds-Young-Laplace model	08-14	Masliyah	Eng. Huston, USA
Lujie Yan	Study anisotropic surface property of selected phyllosilicates by atomic force microscopy	08-13	Masliyah	Manager, Qingdao
Teresa Bisson	Design of carbonaceous mercury adsorbents from waste materials	08-14	none	Lecturer UofA

Louxiang Wang	A study of interactions between an air bubble and a solid surface in a liquid	09-12	Masliyah	Scientist, Teck
Meijiao Deng	Impact of gypsum supersaturated process water on the flotation of sphalerite	09-13	Q. Liu	Manager, Alberta Government
Natalie Kuznicki	Probing oil-water materials properties affecting stability of water-in-oil emulsions encountered in the oil sands processing	10-16	Masliyah	Scientist, Edmonton
Shaham Hosseiniadjad	CFD modeling and simulation of flotation cell equipped with high intensity agitation	11-16	Hayes	PDF, UofA
Erin Bobicki	Pre-treatment of ultramafic nickel ores for improved mineral carbon sequestration	10-14	Q. Liu	Prof., University Toronto
Chen Liang	Dewatering bitumen emulsions using novel organic composite adsorbents	11-16	Q. Liu	Eng., Ottawa
Manjeet Chowdhry	Theoretical study of reactivity of different sulfide collectors and their binding affinity toward Cu(II), Zn(II), and Pb(II) ions	10-15	Q. Liu	Eng., Suncor
Fan Yang	Bitumen fractions responsible for stabilizing water in oil emulsions	10-15	none	Manager, Calgary
Chen Wang	Flocculation-assisted dewatering of fluid fine tailings using a volute screw press	12-17	Q. Liu	PDF, UofA
Xurui Zhang	Study of thin liquid film drainage in bubble-liquid-solid systems using integrated thin liquid film force apparatus (ITLFFA)	12-17	Q. Liu	PDF, UofA
Xiangyu Chen	Understanding contamination of spent drilling muds for safe disposal/recycle	14-	none	UofA
Korel Dawkins	Shallow trench isolation (STI) chemical mechanical polish (CMP)	13-	K. Cadien	UofA
Xiao He	Design and synthesis of switchable polymers (magnetic particles) for enhanced froth cleaning	14-	none	UofA
Peiqi Qiao	Effect of water chemistry and fine clay particles on stability of water-in-diluted bitumen emulsions studied by micropipette techniques	14-	none	UofA
Rui Li	Multi-scale modeling of bitumen liberation and aeration	14-	none	UofA
Yixin Zhang	Understanding oil sands processability using pattern recognition modeling	14-	Qing Zhao	UofA
Yi Lu	Use of temperature/pH sensitive polymer for oil sands extraction and tailings management	14-	none	UofA
Yeling Zhu	Solvent chemistry on mass transfer and solvent loss in aqueous-nonaqueous hybrid extracton process	14-	none	UofA
Hongbiao Tao	TBD	14-	Q. Liu	UofA
Nina Ivanova	Understanding interactions of bitumen with silica and alumina surfaces in process water	15-	none	UofA
Zihui Chen	Interfacial phenomena in gas hydrates formation and interactions with solids encountered in oil production	15-	none	UofA
Jing Chan	NEW – CSC Scholarship 4 years	15-	none	UofA
Zhen Niu	Demulsification study at elevated temperatures and pressures using autoclave and FBRM	14-	none	UofA
An Li	Determination of illite clays in oil sands processing streams	14-	none	UofA

## Tsinghua University, China

Qian Chen	Interactions of fine clays with coal	12-16	none	Chengdu,
Tiantian Cao	Novel sorbent for mercury removal	13-	none	Tsinghua Univ
Yong Xiong	MD study of molecular adsorption from solvent on silica	14-	none	Tsinghua Univ

## MSc Students

Name	Thesis project/title	Year	Co-supervised	Current affiliation
Joachim Broomberg	Development of magnetic carrier for metal iron removal	96-98	Finch	France
Pinggui Wu	Mesoporous magnetic carriers	99-01	none	Praxair, NY
Fereshteh Rashchi	Activation mechanism of silica flotation	97-99	Finch	Iran
Jorlanda Vergouw	Heterocoagulation of sulphide ores	94-96	Finch	QIO Company, Montreal
Vince Wallwork	Oil sands processability by laboratory hydrotransport pipelines	00-02	Masliyah	CNRL, Calgary
Jessica Vandenberghe	Oil sands middling processing using a flotation column	00-02	Masliyah	Syncrude, Edmonton
Steven Lawrence	Characterization of asphaltene monolayers using a Langmuir trough and an atomic force microscope	00-02	Masliyah	Huckleberry Mines Ltd.
Siawling Lim	Mechanical and corrosion properties of particle-reinforced polymer composite coatings	01-04	Luo	Malaysia
Guifang Huang	Galactose-derivatized superparamagnetic nanoparticles as potential targeted carriers for hepatocyte delivery	99-03	Wiebe/Diakur	Cross Cancer Inst, Edmonton
Nancy Su	Bitumen recovery using oily bubbles	01-05	Masliyah	Cosyn, Edmonton
Stefan Smuk	Bitumen-air attachment study using induction time apparatus	00-	Masliyah	Schlumberger, UK
Carol Mak	Dry coal cleaning	04-06	none	Vale
Bo Lu	Synthesis of copper-doped catalysts for simultaneous production of hydrogen and nanocarbons	03-05	Etsell	China
Robert Lopetinsky	Interfacial phenomena of nano particles studied by Langmuir trough	02-05	Masliyah	Dynatec
Chris Repka	Interaction of fines with bitumen studied by zeta phoremeter	03-05	Masliyah	Baker Petrolite
Yong Gu	Processability of weathered oil sands ores	04-06	Masliyah	Syncrude Canada
Gang Qiu	Role of chemical additives in emulsion destabilization	03-06	Masliyah	Syncrude Canada
Adeolu Adetowubo	Processability of weathered ores	05-07	Masliyah	CNRL
Talat Mahmood	Separation of light particles from sands by hydrocyclone	03-07	Masliyah	Colt Engineering
Weinan Hu	Role of adhesion in biomedical applications	03-07	Uludag	UofA
Seungju Park	Role of adhesion forces in polymer blends processing	02-05	Sundararaj	Korea
Justin Walker	Surface phenomena in bitumen liberation	03-06	Masliyah	DOW Chemical
Xinling Ding	Role of metal ions and clays in bitumen recovery	02-05	Masliyah	SNC Lavalin
Hongjun Li	Role of temperature-sensitive polymer as a process aid in oil sands processing and tailings treatment	03-06	Masliyah	Design Engineer, CoSyn Technology
Alla Solovveyev	Interfacial characteristics of adsorbed bitumen films at oil-water interfaces	03-07	Masliyah	Imperial Oil/Exxon Mobile
Sanjay Harjai	Improvement of ore processability by kerosene addition	05-07	Masliyah	CNRL
Rahul Jha	Processability of oil sands ores	04-06	Masliyah	Cosyn
Sepideh Samiei	Mature fine tailing's slurry rheology	05-07	Masliyah	CNRL

Kingsley Ezeagwula	Role of polymer addition in settling of mature fine tailings	06-08	Masliyah	Total
Longhui Qui	Effect of oil sands slurry conditioning on bitumen recovery from oil sands ores	06-10	Masliyah	Japan Canada Oil Sands Ltd.
Xiaoyan Wang	Polymer aids for settling and filtration of oil sands tailings	06-09	Masliyah	ERCB
Fan Yang	Impact of solvents treatment on the wettability of froth solids	07-10	Masliyah/Moran	UofA
Jinggang Xie	Application of surface forces apparatus to study of asphaltene interactions in heptol	07-10	Zeng	Syncrude
Haijun Zheng	Filtration of nickel concentrates	07-09	none	NORAMCO Engineering Corporation, MN
Prashant Dave	Dry coal cleaning	06-12	Szymanski	Unimin Canada (Toronto)
Ji Li	Effect of solvent polarity on asphaltene aggregation	transferred	Masliyah	UofA
Chendi Wu	A fundamental study of bubble-solid interactions through zeta-potential distribution analysis	08-10	Masliyah	Teck Resources
Lina Guo	Understanding AI-PAM Assisted oil sands tailings treatment	07-12	Masliyah	Champion Technologies
Yuan Ma	Challenges in analysis of natural surfactants in the oil sands processing water	08-12	none	Nexen
Ren (Robin) Zhu	Role of carbon dioxide on densification of oil sands tailings	08-11	none	Imperial Oil
Morvarid Kupai	Effect of chemical additives in bitumen extraction on bitumen forth cleaning	09-12	none	Jacobs Minerals
Mei Zhang	Role of bitumen viscosity in bitumen recovery from Athabasca oil sands	07-12	Masliyah	Worley Parsons Edmonton
Henry Tseng	Role of polymeric process aids in bitumen extraction	08-10 10-13	none	Nalco
Qian (Judy) Zhu	Bitumen-air attachment in saline water	09-13	none	Maxxam Analytic Inc.
Chiwing (Margo), Chan	A novel flocculant for enhanced dewatering of oil sands extraction tailings	07-11	Masliyah	Hong Kong
Bei Jia	Distribution of oil sands formation water in bitumen froth	06-10	Masliyah	Unknown
Sundeep Srinivasa	Study of bitumen liberation from oil sands ores by visualization	07-10	Masliyah	Suncor
Mohammad Salehi	Characterization of MFT in the context of its response to chemical treatment	08-10	Masliyah	CNRL
Tenny Thomas	Hydrocarbon recovery from waste streams of oil sands processing	07-11	Masliyah	North West Redwater Partnership
Yiming Ji	Liquid degassing using fine droplets and micro bubbles	08-11	Tan (UofC)	Nexen
Ali Javaheri	Molecular dynamic simulation of asphaltene in supercritical CO <sub>2</sub>	08-10	Choi	Unknown
July Jose Kooran	Modeling cavitation in a high intensity agitation flotation cell	09-11	Hayes	Suncor
Aurangzeb Alamgir	AI-PAM assisted filtration of mature fine tailings from oil sands development	09-11	none	Worley Parsons, Edmonton
Christopher Flury	Understanding the role of caustic addition: A comparison of sodium hydroxide and ammonium hydroxide	09-12	none	Worley Parsons, Ft. St. John, BC
Sima Khademi	Effect of solid contamination on stability of model oil-water emulsions	09-12	none	Jacobs (Calgary, AB)
Jing Wang	Probing the molecular interactions of an asphaltene model compound in organic solvents and aqueous solutions using a Surface Force Apparatus (SFA)	09-11	Zeng	National Oilwell Varco, Nisku, AB
Jing (Cindy) Zhao	Extraction of surface active proteins for stabilization of food emulsions	09-11	Lingyun Chen	UofA
Fangjian Lin	A study of the colloidal stability of mixed abrasive slurries of silica and ceria nanoparticles for chemical mechanical polishing	09-11	Cadien	PhD Student ETH, Zurich
Shiqing Wang	Study on adsorption of inorganic-organic hybrid polymers and flocculation of oil sands tailings	10-12	none	Jacobs Consultancy

Jun (Jen) Hou	Role of biodegradable ethyl cellulose in bitumen production	09-12	none	Jacobs Consultancy (Calgary, AB)
Nesma Ansari	A TGA study of solvent loss from tailings solvent recovery unit (TSRU) tailings	10-12	none	Worley Parsons
Weina Zhang	Emulsifying properties of deamidated barley protein fractions	10-14	Lingyun Chen	UofA
Aditya Kaura	Understanding and developing new methods for treating oil sands tailings	10-14	none	Enbridge
Yixin Zhang	Understanding processability of oil sands ores by pattern recognition	10-13	Qing Zhao	UofA
Meghan Curran	Role of caustic in bitumen-air bubble attachment and slime coating	11-16	none	Syncrude
Colin Klein	Effect of residual bitumen on polymer-assisted flocculation and filtration of fluid fine tailing	11-14	none	SNF Inc.
Ian Osborn	Application of temperature-responsive polymers to oil sands tailings management	11-15	none	CANMET
Liang (Emily) Chen	Demulsifying water-in-bitumen emulsions of oil sands froth treatment	11-14	none	Unknown
Adriana Briones	Adsorption of asphaltenes on different solid surfaces	12-16	none	Unknown
Tong Chen	Effect of salinity on the warm water-based processing of mineable oil sands	12-15	none	Unknown
Jian Guo	Design, synthesis, characterization of a new pH-responsive copolymer and its application in oil sands tailings treatment	12-15	Qingxia Liu	Baker Hughes
Yin Liang	Dynamic demulsification mechanism of asphaltene-stabilized water-in-oil emulsions by ethylcellulose	12-15	none	China
Elham Rafie Borujeny	Fundamental study of the attachment of CeO <sub>2</sub> and SiO <sub>2</sub> : theory and experiments	12-14	K. Cadien	PhD Student, UofA
Bauyrzhan Primkulov	Bitumen liberation dynamics	12-14	none	PhD student, MIT
Haipeng Li	Role of hydrodynamic cavitation in fine particle flotation	13-14	none	Software Eng. UofA
Jiebin Bi	Interfacial properties of C5Pe as an asphaltene model compound	13-15	none	China
Jian Huang	Dual bubble generation for bitumen recovery using flotation columns	14-	none	UofA
Chao Han	Design, synthesis and application of temperature switchable non-ionic block copolymer to oil sands extraction	14-16	none	Baker Hughes
Xi Wang	Understanding asphaltenes aggregation and deposition in solvents	14-16	none	Unknown
Matthew Jackman	Deposition watering device	14-17	Qingxia Liu	Unknown
Xinrui Ma	Thin film balance based tool for chemical demulsifier evaluation	14-17	none	Maxxin, Edmonton
Asif Mammadov	Studying hydrodynamics in batch extraction unit and Denver flotation cells using CFD simulation method	15-16	Nykityuk	Unknown
Derek Russell	Petroleum diesel-assisted ambient temperature aqueous-nonaqueous hybrid bitumen extraction process	15-17	Qingxia Liu	UofA
Yang Tan	Study on polymer-clay interactions in oil sands tailings	15-	none	UofA
Jason Ng	Dewatering of mature fine oil sands tailings using Volute screw filter press	15-	none	UofA
Carol Dwaik	NEW	16-	none	UofA
Ye (Natalie) Zhang	NEW	16-	none	UofA

## MEng Students

Name	Thesis project/title	Year	Co-supervised	Current affiliation
Muhammad Ayyub	Wettability measurement of bitumen	09-09	none	Unknown
Ulhas Joshi	Zeta potential distribution measurement	11-12	none	Unknown
Alvin Kim	Water chemistry calculation for SAGD operations	09-11	none	Unknown
Linh Tran	Distribution of connate water in bitumen extraction	11-12	none	Unknown
Tarzan Mak	Novel mercury sorbent	11-12	none	Unknown
Krishna Moorthy	Effect of aging on water droplet coalescence in asphaltene model compound in toluene solutions	2012	Co-supervised	UofA
Zexi (Jessie) Sun	Effect of lime on bitumen extraction	2014	none	UofA
Zihui Chen	Interfacial tension of oil-water and water-oil interfaces	2014	none	UofA

## Undergraduate Students

Name	Project/title	Year	Co-supervised	Current affiliation
C. Doung	Development of novel technology for coal recovery from tailings	1997	none	Calgary
Wes McKinnon	Ferrite process for acid mine drainage treatment	1997	none	Suncor, Fort McMurray
Tarzan Mak	Reactive oily bubble flotation technology	1999	none	McGill
Jennifer Wong	Role of sonication in bitumen liberation	2000	none	Vancouver
Teresa VanEmber	Oil sands process	2002	none	UofA
Diana Vakulenko	Contact angle measurement	2002	none	UofA
Carolyn Kenney	Reactive oily bubble flotation fundamentals	2002	none	Calgary
Jenny Chia	Fine particle flotation	2002	none	Calgary
Justin Walker	Gas hold up measurement using a flotation column	2002	Masliyah	U of Maryland
Ayag Jaffer	Coal fractionation	2003	none	UofA
Onyi Chan	Mercury emission characterization	2003	none	UofA
Chris Repka	Zeta potential distribution measurement	2003	Masliyah	Baker Petrolite
Laurel Cooper	Bitumen recovery from tailings	2003	Masliyah	UofA
Ryan Lindmark	Bitumen-air attachment	2003	Masliyah	UofA
Michelle Chang	Dry coal cleaning	2003	none	Uof A
Swetha Partheneni	Mercury determination	2004	none	UofA
Yiming Zhang	Mercury emission control study	2004	none	UofA
Mathew Breakey	Triboelectric separation of fine coal	2004	none	UofA
Carol Mak	Dry heavy medium coal cleaning	2004	none	Teck Metals
Jason Bodez	Dry heavy medium coal cleaning	2005/07	none	UofA
Margo Chan	Mercury capture by novel sorbents	2005	none	Hong Kong
Tony Haastrup	Characterization of sorbents	2005	none	UofA
Riley Beauchamp	Wood ash-based sorbent	2006	none	Teck Energy
Nan Lu	Column flotation of coal	2006	none	U of Toronto
Arjun Chowdhury	Sorbent characterization	2006/07	none	UofA
Hoiyin Chi	Sorbent characterization	2006/07	none	UofA



Nataliya Segin	Sorbent characterization/bromination	07-08	none	UofA
Kirsten Nesset	Charge and size distribution of bubbles produced by hydrodynamic cavitation	08-09	none	McGill
Nataliya Segin	Molecular imaging of asphaltene in solvent	08-09	none	UofA
Mohammed Sharshar	Molecular behavior of asphaltene at heptol-water interface	08-09	Masliyah	UofA
Andreas Kusuma	Bitumen liberation in saline water	08-09	none	Uof
Mohamed Sharshar	Effect of Water Chemistry on Interfacial Properties of Bitumen at Diluted Bitumen Water Interface	09-10	none	UofA
Marwyn Vernon	Calorimetric study of asphaltene interactions	2010	Maham	UofA
Xiuzhu (Judy) Chen	NSERC Undergrad Student Research Award - Removing of Residual Water in Diluted Bitumen through Functionalized Magnet Particles	2010	Qingxia Liu	UofA
Tim Skwarok	Summer Student	2010	none	Grant MacEwan
Erin Bobicki	Summer Student	2010	Qingxia Liu	UofA
Amy Komaratat	International Work Student - Summer	2010	none	UofA
Blen Jimma	Summer Student – Study of interaction of particles from zeta-potential distribution measurement	2010	none	UofA
Shunbin Xia	Summer Student	2010	none	UofA
Zeyu (Davis) Wang	Summer Student – The Effects of Weathering on Bitumen Properties	2010	none	UofA
Rona Sun	Summer Student	2010	Qingxia Liu	UofA
Meghan Curran	Research Assistant (November/December 2010)	2010	None	UofA
Tim Skwarok	Summer Student	2011	None	UofA
Kimberly Tok	NSERC Undergrad Student Research Award	2011	None	UofA
Mingda Li	ISWSP – Summer Student	2011	None	UofA
Chanho (Brian) Shim	STEP – Summer Student	2011	None	UofA
Yini Zuo	Summer Student	2011	None	UBC
Zhe Bai	Summer Student	2011	None	UofA
Chen Liang	Summer Student	2011	None	UofA
Chris Afacan	January – April, 2012	2012	Harbottle	UofA
Kyla Cox	January – April, 2012	2012	Harbottle	UofA
Kyla Cox	STEP – Summer Student (May – August, 2012)	2012	Harbottle	UofA
Sahil Bangar	Summer Student	2012	Harbottle	UofA
Mohammed Ghuzi	ISWSP – Summer Student	2012	Harbottle	UofA

Krishna Moorthy	Summer Student	2012	Harbottle	UofA
Zong Qian (Zoey) Ong	Summer Student	2012	Harbottle	UofA
Zong Qian (Zoey) Ong	Summer Student	2013	Harbottle	UofA
Wayne Qin	Deans Research Award (September-December)	2013	Harbottle	UofA
Pradyumna Kedariseti	Deans Research Award (September-December)	2013	Harbottle	UofA
Wenhao Zhang	Deans Research Award (September-December)	2013	Harbottle	UofA
Xi Wang	Summer Student	2014	Pensini	UofA
Kieran McDonald	Summer Student	2014	Chen Wang	UofA
Tim Skwarok	Summer Student	2014	none	New England College of Optometry
Yingshuo Liu	4 <sup>th</sup> Year Undergraduate (No Pay)	14-15	none	UofA
Pradyumna Kedariseti	Summer Student (May–August) Casual – Saudi Aramco Project (Sept ember –December 2015) Casual – Saudi Aramco Project (January-October 2016)	15-16	none	UofA
Zehui Lin	ISWSP – Summer Student (May – August) Coop Student (September – December)	2015	none	UofA
Derek Russell	Summer Student	2015	none	UofA
Carol Dwaik	Casual – Saudi Aramco Project (September-December 2015) Casual - Saudi Aramco Project (January-August 2016)	15-16	none	UofA
Vitalii Dodonov	Dean’s Research Award (January – April) Measurement of drop coalescence ISWSP – Summer Student (May – August) Casual (September-December)	2016	none	UofA
Han Wang	NSERC USRA (May – August) Casual (September-December)	2016	none	UofA
Naliangzi Chen	NSERC USRA (May – August)	2016	none	UofA
Zhitong Lin	NSERC USRA (May – August)	2016	none	UofA
Jacob Sorken	NSERC USRA (May – August)	2016	none	UofA
Linyu Lin	Summer Volunteer (May – August)	2016	none	UofA
Rongyan Liu	Summer Volunteer (May – June)	2016	none	UofA
Qing (Lucy) Yao	Summer Volunteer (June – August)	2016	none	UofA
Max Yu	Dean’s Research Award (October-December2016) Attachment of oil droplets to KCl/NaCl Dean’s Research Award (January-April 2017) Attachment of oil droplets to KCl/NaCl	16-17	none	UofA
Yunting Guo	Dean’s Research Award (October-December2016) Induction time measurements with oil and calcium fluoride with surfactant in oil phase	2016	none	UofA
Qing Yao	ISWEP Summer Student (May-August 2017)	2017	none	UofA

## Postdoctoral Fellows

Name	Project/title	Year	Co-supervised	Current affiliation
Weixing Wang	Ferrite process for acid mine drainage treatment	93-94	Finch	SNC Lavalin
Stefan Brienne	Collector adsorption mechanisms	93-95	Finch/Butler	Teck-Cominco
Qingsong Zhang	Modeling of sulphide mineral electrokinetics	94-96	Finch	HP, CA
Guoxing Gu	Induction time apparatus development	98-02	Masliyah	MPCI
Jaewon Choung	Ferrite process for acid mine drainage	95-96	Finch	Teck Metals
Dharamdat Christendat	Surface force measurement using atomic force microscope	99-02	Masliyah	Toronto
Thomas Abraham	Surface force measurement using surface force apparatus	99-02	Masliyah	U of A
Liyan Zhang	Langmuir trough study of asphaltene at interfaces	02-06	Masliyah	Champion Tech
Xuefeng (Tom) Fu	Fine particle flotation fundamentals	02-03	none	Metso, China
Xiaosheng Yang	Fine particle flotation	02-03	none	Geological Survey, Finland
Ruan Chi	Rare earth extraction	99-01	none	WUCT, China
Jianhua Zhu	Synthesis of nano ferrite for bio-applications	99-01	none	Edmonton
Clark Lu	Mercury emission control	01-03	none	Atco Power
Alireza Naghash	Catalyst synthesis for hydrogen and nanocarbon production	02-04	Etsell	NAIT, Edmonton
David Kelly	Synthesis and characterization of mercury sorbent	02-07	none	EPCOR
Haihong Li	Oil sands processability study	03-07	Masliyah	ARC
Jun Long	Novel tailings processing	03-07	Masliyah	Syncrude Research
Dengli Qiu	Molecular imaging of asphaltenes in solvent	04-05	Masliyah	Bruker, Beijing
Wei Sun	Fine particle flotation fundamentals	04-05	none	CSU, China
Sili Ren	Colloidal force measurement in bitumen extraction	05-08	Masliyah	CAS, Lanzhou
Trong Dang-Vu	Characterization of solids isolated from oil sands	06-08	Masliyah	NRC
Sharath Mahavadi	Interfacial characteristics of asphaltene films	06-08	Masliyah	Schlumberger
Wei Sun	Single molecular forces of polymers	06-08	Masliyah	Hatch
Alan Yang	Sorbent development	06-08	Gupta	Husky
Paolo Mussone	Effect of ultra-violet light irradiation on the stability of bitumen interfacial films at toluene-water interface	07-09	Masliyah	NAIT
Xianhua Feng	Removing residual water in bitumen through polymer precipitation/flocculation	07-09	Masliyah	Baker Hughes

Hamid Hosseini	Effect of caustic addition on slime coating in oil sands processing (study of ten oil sands ores)	09 -10	none	COREM
Lana Alagha	Synthesis and characterization of novel polymers for dewatering of oil sands tailings	09-12	none	MUST, Rolla, Missouri
Yan Liu	Surface chemistry of mineral in supersaturated solutions	2009	none	NRCan
Hongying Zhao	Colloidal forces of anisotropic surfaces	2009	none	Schlumberger
Alexandre H. Englert	Direct measurements of air bubble-bitumen interactions using atomic force microscope	09-10	none	Professor, UFRGS, Brazil
Lingling Ge	Investigations on emulsion stability with model compounds of asphaltene and tetrameric acids	09-11	none	Yangzhou Univ., China
Weiping Shi	DETA adsorption on sulfide minerals and rocks	09-11	Qingxia Liu	Alberta Innovates – Technology Futures
Junxia Peng	Removing of residual water in diluted bitumen through functionalized magnetic particles	09 -11	Qingxia Liu	SSU, China
Zhu-Qi (David) Chen	Demulsification of water-in-diluted bitumen emulsions using modified EC	10-12	none	HUST, China
Shengqun Wang	Mechanistic study of chemical demulsification	11-12	Masliyah	Nalco Company (US)
Plamen Tchoukov	Thin film balance study of emulsion stability	11-12	none	UofA
Yunhui Li	Responsive polymers for oil sands tailings management	11-13	Qingxia Liu	NAIT
Erica Pensini	Physical chemistry of interfacial films	12-14	none	Assistant Professor, University of Guelph
Feng Lin	Chemical additives in aqueous-nonaqueous hybrid extraction process	12-15	none	CANMET
Diwen Zhou	Molecular dynamics study of collector-mineral-water systems	12-13	Choi	Unknown
Qian Liu	Molecular dynamics study of asphaltene aggregation at oi-water interfaces	12-14	none	Unknown
Muhammad Faisal Irfan	CO2 storage in rocks under saline environment	12-13	Qingxia Liu	Unknown
Zifu Li	Understanding asphaltene aggregation and stability of particle-stabilized emulsions	13-15	none	Georgia Tech, USA
Meijiao Deng	Fundamental study of polymer adsorption for oil sands tailings treatment	13-14	none	Govt of Alberta, Energy
Lan Liu	Studying interactions of chemical additives with asphaltenes using ESI-MS method	14-16	none	Unknown
Nayef El-Thaher	Molecular modelling of superhydrophobicity	14-14	P. Choi	Saudi Arabia
Robel Teklebrhan	Molecular dynamic simulation of polymer assisted demulsification	14-15	none	Unknown
Erin Bobicki	Microwave treatment of ores for enhanced processing	14-14	Qingxia Liu	Assistant Professor, University of Toronto
Zuoli Li	Intervening liquid film drainage between bitumen and bubble surfaces using thin liquid film balance	14-17	none	RA, UofA
Teresa Bisson	Reactive sorbent for multipollutant emission control	14-15	none	Lecturer, UofA
David (Ci) Yan	Surface forces of bitumen interacting with solids and air bubbles in process water with relation to hybrid extraction process	15-17	none	PDF, UofA
Li Wang	Probe clay surface properties and interactions with polymers using QCM-D and stream potential techniques	16-16	none	China
Binbin Luo	TBD	17-	none	UofA

Xurui Zhang	TBD	18-	none	UofA
Chen Wang	COSIA/Volute Screw Project	18	none	UofA

## Research Associates

Name	Project title	Year	Current affiliation
David Harbottle	Interfacial rheology of oil-water interface and emulsion stability	11-13	Lecturer – University of Leeds
Plamen Tchoukov	Thin film balance study of emulsion stability	12-15	Guardian Chemical
Rogério Manica	Modelling of thin film drainage	16-	UofA
Zuoli Li	Saudi Aramco Project	18	UofA

## Exchange Students

Name	Host University	Project title	Year	Current affiliation
Chen Zhang	Huzhong Univ. Science & Technology	Mercury occurrence in coal and emission control (Exchange student)	08-09	Lecturer, HUST
Guangqian Luo	Huzhong Univ. Science & Technology	Speciation of mercury in flue gas and emission control (Exchange student)	09-10	Lecture, HUST
Jingjing Ma	Huzhong Univ. Science & Technology	Novel inorganic mercury sorbent (Exchange student)	10-11	PhD student, HUST
Fang Zhou	Central South University	Reactive oily bubbles for phosphate flotation (CSC student)	11-12	PhD student, CSU
Zhijun Zhang	Northeastern University	Effect of fine clays on coal flotation	10-11	PhD student
Hiroyuki Goto	Graduate School of Science and Technology, Kumamoto University	Magnetically responsive hydrogel	2011	MSc student
Lin He	School of Chemical Engineering & Technology, Tianjin University	Mechanistic study on solvent-enhanced bitumen liberation from oil sand ores	12-14	PhD student
Chenghong Fu	University of Science & Technology Beijing	The role of caustic addition on bitumen liberation	12-13	PhD student
Xiaoyan Wu	Wuhan Institute of Technology	Phosphate ore sorting and its surface chemistry	13-15	MSc student
Deniz Karatas	Istanbul Technical University	Drug delivery via nano-sized purified clay minerals	13-14	PhD student
Qidong Zhang	Northeastern University	Effect of talc on molybdenite flotation	13-14	PhD student
Zhai Xue	China University of Mining and Technology	Efficiency coal flotation process	13-14	PhD student
Xiaoyuan Zheng	Zhejiang University	Experimental study on oil recovery from oil sludge	13-14	PhD student
Nancy Romero-Hernandez	Mexican Petroleum Institute	Study of the effect of branched polyethers on crude oil dehydration	2014	MSc student
Man Hin Kwok	Chinese University of Hong Kong	Properties of soft colloidal particles systems and the smart Pickering emulsions	2014	PhD student
Xiaoyong Qiu	Shandong University	Synthesis and application of functionalized organic/inorganic hybrid mesoporous silica	14-15	PhD student
Yanlong Huang	China University of Mining & Technology	Coal flotation fundamentals and reagents	14-16	PhD student
Chengbin Zhong	Wuhan Institute of Technology	Leaching and separating weathered crust elution-deposited rare earth ores	14-17	MSc student
Yang Xuan	China University of Petroleum (Beijing)	Design and synthesis of novel chemical additives	14-15	PhD student
Xianchen Wang	College of Mining, Guizhou University	Mineral processing and flotation	2015	MSc student
Xianbin Huang	China University of Petroleum (Beijing)	Environmentally friendly water-based drilling fluid with nano biomaterials to enhance soil fertility	15-16	PhD student
Shulei Li	China University of Engineering & Technology	Flocculation, agglomeration and interface interactions of fines	15-16	PhD student
Yi (Anna) Xiao	Donghua University	New sorbent for mercury removal from flue gas of coal fired power	15-16	PhD student
Yongjie Bu	Central South University	Nanocomposite materials for the separation of scandium and comprehensive utilization	15-17	PhD student
Rongya Zhang	Tianjin University	Molecular dynamic simulation to explore the mechanism of ionic liquid enhanced solvent extraction of bitumen recovery	15-16	PhD student
Kai Yu	Institution of Particle Science and Engineering, University of Leeds	Behavior of polymer-nanoparticle composites at the air-water interface	2016	PhD student
Tong Yue	Central South University	Magnetic separation of iron precipitate from sulphuric acid leach solution by magnetic seeding	16-18	PhD student

Xuan Zhang	China University of Petroleum	Interaction mechanism on composite ionic liquid with acid soluble oil and high efficient regeneration of used ionic liquid	16-17	PhD student
Huaizhi Shao	China University of Mining and Technology	Improving hydrophobic action of low rank coal slime and bridging liquids by high shearing oil and agglomeration	16-18	PhD student
Guoyong Huang	Central South University	Nanomaterials for metallurgical, environmental and energy applications	16-17	PDF
Ting Yao	Southeast University, China	Mercury emission control for coal fired gas	17-19	PhD student
Heloisa Pinto Dias	Universidade Federal do Espirito Santo-Vitorio, Brazil	Corrosion process in AISI 1020 steel using a molecule model	18-19	PhD student

## Visiting Professors

Name	Mother University	Time	Current position
Makoto Takafuji	Kumamoto University, Japan	2002	Associate Professor, Kumamoto University
Chenwen Wang	Wuhan University of Technology		Vice President, Wuhan University of Technology
Liangjun Zhang	Wuhan University of Technology		Professor, Wuhan University of Technology
Li Qing	Kunming University of Science and Technology	2011	Professor, Kunming University of Science and Technology
Ren Hao	Jinan University	07-08	Professor, Jinan University
Wangxi Zhu	National Science Foundation China	2008	Division leader, National Science Foundation China
Xiaolong Chen	Northeast University	2009	Professor, Northeast University
Yongtian Wang	China University of Mining Technology	2008	Professor, China University of Mining Technology
Hanwei He	Central South University	2007	Professor, Central South University
Mingliang Yuan	Central South University	2005	Professor, Central South University
Gang Chen	Huazhong University of Science and Technology	2005	Professor and Director, Thermal Engineering, HUST
Changgen Huang	Institute of Coal Chemistry, Chinese Academy of Sciences	2006	Division leader, Institute of Coal Chemistry, Chinese Academy of Sciences
Guangyi Liu	Central South University	10-11	Professor, Central South University
Liqi Zhang	Huazhong University of Science and Technology	12-13	Professor, HUST
Juan Carlos Pereira	Universidad de Carabobo, Venezuela	2013	Associate Professor, Universidad de Carabobo
Shiling Yuan	Shandong University of Technology	2013	Professor, Shandong University of Technology
Xian-ping Luo	Jiangxi University of Science & Technology	2013	Dean, Faculty of Resource & Environmental Eng.
Zhong-Xi Sun	University of Jinan	2013	Professor, University of Jinan
Xiao Chunqiao	Wuhan Institute of Technology	13-14	Associate Professor, Wuhan Institute of Technology
Quihong Li	Shandong University of Technology	13-14	Associate Professor, Shandong University of Technology
Runzhe Liu	Yunnan Phosphate Chemical Group Co. Ltd.	13-14	Lab Technician, Yunnan Phosphate Chemical Group Co. Ltd.
Guofan Zhang	Central South University	13-14	Associate Professor, Central South University
Xiaowen Liu	Central South University	13-14	Associate Professor, Central South University



Lining Gao	Chang'an University	13-14	Associate Professor, Chang'an University
Muhammed Fatih Can	Afyon Kocatepe University, Turkey	13-14	Assistant Professor, Afyon Kocatepe University
Cengiz Karaguzel	Dumlupinar University, Turkey	2014	Associate Professor, Dumlupinar University
Bingguo Liu	Kunming University of Science & Technology	13-14	Professor, Kunming University of Science & Technology
Xuelian Zhang	Kunming University of Science & Technology	13-14	Undergraduate Teaching Management, Kunming University of Science & Technology
Ying Chen	Zhejiang Ocean University	2014	Professor, School of Petroleum and Environmental Eng. At Zhejiang Ocean University
Zhigao Xu	Wuhan Institute of Technology	14-15	Associate Professor, Wuhan Institute of Technology
Gongzhen Li	China University of Mining & Technology	14-15	PDF, China University of Mining & Technology
Ye Chen	Guangxi University	14-15	Associate Professor, Guangxi University
Xianlong Zhang	Hefei University of Technology	15-16	Associate Professor, Hefei University of Technology
Zhen Li	Xi'an University of Science & Technology	15-16	Associate Professor, Xi'an University of Science & Technology
Renliang Lyu	Wuhan Institute of Technology	16-17	Associate Professor, Wuhan Institute of Technology
Hanwei He	Central South University	2016	Professor, Central South University
Junlian Wang	University of Science & Technology Beijing	16-17	Professor, University of Science & Technology, Beijing
Hongli Yang	College of Mining Engineering, Taiyuan University of Technology	17-18	Professor, Taiyuan University of Technology