Professor *Ajay Kumar Dalai*

Ph.D., P.Eng.

Associate Dean, Research and Partnerships
Professor and Canada Research Chair in Bioenergy and Environmentally Friendly Chemical Processing

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EXECUTIVE SUMMARY

Dr. Ajay K. Dalai completed his B.Sc. (Hons) at S.C.S. College, Puri (Utkal University, India), his B.Sc. Tech. at Nagpur University (India), his M.Tech. at the Indian Institute of Technology (Kampur, India), and his Ph.D. at the University of Saskatchewan (SK, Canada). Upon completing a Postdoctoral Fellowship at the Texas A&M University and the University of Calgary (AB, Canada), he began his career with the University of Saskatchewan in 1996 as Assistant Professor in the Department of Chemical Engineering. He was promoted to Associate Professor in 1998 and to Full Professor in 2002. To date, Dr. Dalai has supervised and co-supervised over 150 M.Sc., M.Eng., and Ph.D. students, 60 post-doctoral fellows, 35 visiting professors & students, and over 40 summer students. In 2009, Dr. Dalai accepted the position of Associate Dean of Research and Partnerships for the College of Engineering, in addition to his professorship and supervisory role.

Dr. Dalai's remarkable success in research is highly recognized and generously supported through various provincial, federal, and industry funding agencies, including Agriculture and Agri-Food Canada, Saskatchewan Canola Development Commission, the Saskatchewan Mustard Development Commission, Syncrude Canada, Imperial Oil Ltd., Petro-Canada Ltd., Natural Resources Canada, the Natural Sciences and Engineering Research Council of Canada, Saskatchewan Ministry of Agriculture, Canada Foundation for Innovation, SaskPower and SaskEnergy, the National Research Council, and Nova Chemicals Ltd. In 2001, he was awarded a Tier 2 *Canada Research Chair in Bioenergy and Environmentally Friendly Chemical Processing* and Tier 1 in 2009. His research focus is the novel catalyst development for gas to liquid (GTL) technologies, biodiesel production and applications, hydrogen/syngas production from waste materials, hydroprocessing of heavy gas oil, value-added products from biomass, and dry reforming of methane to produce high quality syngas. He is currently working on the production and applications of activated carbon and carbon nanotubes (CNTs). Dr. Dalai is also working on developing environmentally friendly processing methods for improved, reformulated gasoline, a project for which he was honored with the *Petro-Canada Young Innovator Award*. The worldwide impact of this research is tremendous in terms of combating pollution and finding alternate energy resources. His leading use of synchrotron radiation research and the Catalysis and Chemical Reaction Engineering Laboratory (CCREL) he established at the University of Saskatchewan have generated much interest and collaborative projects with research institutes and universities around the world.

During his years as a researcher, Dr. Dalai has published over 190 research papers in international journals and over 40 papers in conference proceedings. His groundbreaking research in environmentally friendly processing and the conversion of biomass to bio-energy have made him highly sought after as a guest lecturer/speaker at many National and International conferences, Universities, and discussion forums as an expert panel member. His expertise and strategic initiatives in bio-economy have earned him several national and international awards, including the *McMaster University's Brockhouse Institute for Materials Research Distinguished Speaker Award*, the Indian Chemical Engineering Congress *NEERI Distinguished Speaker Award*, the Institute of Chemical Technology's *Mumbai Professor R.A. Rajadhyaksha Memorial Lecture Series Award*, the *Professor Mann Lecture Series Award*, the *Kentucky Colonel Award*, the *Syncrude Owl Award*, and the *Japanese Society for the Promotion of Science Fellowship*. Dr. Dalai is an active board member, reviewer, and guest editor for several international journals. He is honoured as a *Fellow of the Engineering Institute of Canada*, a life member of the *Indian Institute of Engineers*, the *Indian Catalysis Society*, the *American Institute of Chemical Engineers*, and an active member of the *American Chemical Society*, the *Chemical Institute of Canada*, and the *Canadian Catalysis Society*.

CURRICULUM VITAE
for
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1. PERSONAL:
Born: April 13, 1959 in Orissa, India

2. ACADEMIC CREDENTIALS:
- Ph.D., University of Saskatchewan, Canada, Chemical Engineering, 1990
- M.Tech., Indian Institute of Technology, Kampur, India, Chemical Engineering, 1984
- B.Sc. Tech., Nagpur University, India, Chemical Engineering, 1982
- B.Sc. (Hons), S.C.S. College, Puri, Utkal University, India, Chemistry, 1979

3. OTHER CREDENTIALS:
- Professional Engineer (APEGS, Saskatchewan, Canada), 2000–present
- Professional Engineer (APEGGA, Alberta, Canada), 1993–2000

4. APPOINTMENT(S) AND PROMOTIONS (UOFS):
- Associate Dean of Research and Partnerships, College of Engineering, October 1, 2009–present
- Canada Research Chair I, Department of Chemical Engineering, July 1, 2009–present
- Head, Department of Chemical Engineering, July 1, 2007–September 30, 2009
- Adjunct Professor, Department of Chemical & Biotechnical Engineering, Faculty of Engineering, University of Sherbrooke, Québec, 2006–present
- Visiting Professor, Centre for Applied Energy Research, University of Kentucky, Lexington, KY, USA, July 1, 2003–June 30, 2004
- Professor, Department of Chemical Engineering, July 1, 2002
- Canada Research Chair II, Department of Chemical Engineering, July 1,2001–June 30, 2009
- Associate Professor, Tenured, Department of Chemical Engineering, July 1, 2000
- Associate Professor, Department of Chemical Engineering, July 1998
- Assistant Professor, Tenure Track, Department of Chemical Engineering, July 1997
- Assistant Professor, Term, Department of Chemical Engineering, July 1996

5. PREVIOUS POSITIONS (RELEVANT TO UOFS):
- Sessional Lecturer, Research Engineer, University of Calgary, Calgary, 1991–1996
- Research Associate, Texas A&M University, Texas, 1990-1991
- Research Associate, University of Saskatchewan, Saskatoon, 1990
- Production Engineer, Oil & Natural Gas Commission, Ahmedabad, India, 1984–1986

6. ASSOCIATE MEMBERSHIPS:
- Member, Virtual College of Biotechnology, University of Saskatchewan, 2000–2008
- Member, Division of Environmental Engineering, College of Engineering, University of Saskatchewan, 1997–present
- Member, College of Graduate Studies and Research, University of Saskatchewan, 1996–present

7. LEAVES:

- Visiting Professor, Karlsruhe Institute of Technology, Karlsruhe, Germany, July–August, 2010
- Visiting Professor, University of Kentucky Centre for Applied Energy Research, Lexington, KY, USA, July, 2003–June, 2004

8. HONOURS (MEDALS, FELLOWSHIPS, PRIZES):

- *Fellow* of the *Engineering Institute of Canada*, 2011
- *DAAD Visiting Professor Fellowship*, Institute of Industrial Production, Karlsruhe Institute of Technology (KIT), Government of Germany, 2010
- Nominated for *Leo Derikx Synergy Award* for Innovation with Syncrude Canada Ltd., Natural Science & Engineering, NSERC, 2009
- McMaster University's *Brockhouse Institute for Materials Research, Distinguished Speaker Award*, November 10, 2008
- *NEERI Distinguished Speaker Award*, Indian Institute of Chemical Engineers, Bharuch, India, December 27, 2006
- *Professor R.A. Rajadhyaksha Memorial Lecture Series Endowment Lectureship Award*, Institute of Chemical Technology, University of Mumbai, India, December 26, 2006
- *Professor Mann Lecture Series Endowment Lectureship Award*, Department of Chemical Engineering, University of Ottawa, December 5, 2006
- *Kentucky Colonel Award*, in recognition of Research Contributions of Gas to Liquid Technologies at the Centre for Applied Energy Research, University of Kentucky, Lexington, KY, USA, 2004
- *The Owl Award*, Syncrude Canada Ltd., in recognition of Outstanding Contribution to Knowledge Management, 2003
- Nominated for *Samanta Science and Technology Award*, Orissa, India, 2002
- *Japanese Society for the Promotion of Science Fellowship,* 1999
- *Petro-Can Young Innovator Award* ,1999
- MARQUIS *Who's Who in Finance and Industry*, 30th Edition, 1997
- MARQUIS *Who's Who in the World for Outstanding Achievements*, 14th Edition, 1996
- Best Social Worker, Hindu Society of Calgary, 1994
- Awarded Visiting Faculty position of I.I.T., Madras, 1993
- Scholarship awarded by Saskatchewan Power Corporation, 1986-1989
- Indian Institute of Technology scholarship, 1982-1984
- Third highest student in B. Tech. Nagpur University examination, 1982
- Provincial scholarship to continue Bachelors in Engineering, 1979-1982
- Top in first five semesters among 64 students with cash award each time, 1979-1982
- Awarded Indian National Scholarship, 1975-1979

Student Competitions:

- First Prize, Poster Competition, Auto 21 Workshop, Hamilton, ON Canada, *Wood Pyrolysis Oil-Upgrading via Solvent Extraction and Hydroprocessing*, K. Jacobson, M.Sc. Student (presenter) with Professor A.K. Dalai, 2010.
- First Prize, Oral Presentation, 58th Canadian Society Chemical Engineering (CSChE) Conference, Ottawa, ON Canada, October 19-22, 2008. *Effect of Anodic Alumina Pore Diameter on Template-Initiated Synthesis of Carbon Nanotubes for their Application as Catalyst Support for Hydroprocessing*, S. Sigurdson, M.Sc. Student (presenter) V. Sundaramurthy, J. Adjaye with Professor A.K. Dalai, 2008.
- Second Prize, Oral Presentation, 56th Canadian Society Chemical Engineering (CSChE) Conference, Sherbrooke, QC Canada, October 15-18, 2006, A. D'Cruz (presenter) with Professor A.K. Dalai, 2006.

9. TEACHING RECORD:

Since 1993, Dr. Dalai has taught over 10 UG courses and three graduate courses in Chemical Engineering, including Thermodynamics; Heat Transfer; Chemical Kinetics and Reactor Design; Heterogeneous Catalysis; Process & Design Engineering; Chemical Reaction Engineering; and Petroleum Processing.

10. GRADUATE STUDENTS AND RESEARCH PERSONNEL SUPERVISED:

The following table shows the number of Students and HQP from International Universities and industry that Professor Dalai has supervised/co-supervised during the course of his career. The co-supervision of students is due to the multidisciplinary research and joint funding with Colleagues across Canada and internationally. Approx. 39 MSc and 20 PhD students have graduated under Professor Dalai's supervision.

YTD	MSc	PhD	Post-doctoral Fellows	Visiting Professors /Students	Summer Students/ Research Assistants
2010-11	14[1]	7[2]	6	6	3
2009-10	11[3]	12[4]	4	6	2
2008-09	10[5]	12[6]	8	7	9
2007-08	4	6	8	7	7
2006-07	5	6	6	2	7
2005-06	3	6	6	2	6
2004-05	8	7	6	2	2
2003-04	8	5	4	0	0
2002-03	7	5	4	1	2
2001-02	6	6	4	2	3
2000-01	6	6	4	4	4
Prior 2000	4	0	0	0	0
Totals	86	78	60	39	45

[1] Includes 2 MEng students
[2] Includes 1 visiting PhD student
[3] Includes 2 visitng MSc students
[4] Includes 4 visiting PhD students
[5] Includes 1 visiting MSc student
[6] Includes 3 visiting PhD students

Most of the HQPs trained in Professor Dalai's research labs are working in Universities, Industry, or R&D Laboratories. His excellent record in training highly qualified personnel (HQP) is evident in three key areas:

i) **Research on the Hydroprocessing of Heavy and Light Gas Oils** (40% HQP) – focuses on understanding the interactions of complex molecules with various catalyst surfaces at severe reaction conditions. The petroleum research group under his leadership is unique and nationally and internationally known. Their research is widely supported by Syncrude Canada Ltd., in its application to the petroleum industry.

ii) **Bioenergy Research** (40% HQP) – includes novel methods for biodiesel production from various vegetable oils, hydrogen/syngas production from various biomaterials and its conversion to liquid fuels via gas-to-liquid technologies. These researchers are dedicated to finding alternative sources of energy.

iii) **Value-Added Chemicals from Various Waste Materials** (20% HQP) – this research deals with activated carbon and carbon nano-tubes production, their applications for environmental clean up, and chemical production including isobutene and isooctane using solid acids, which are more environmentally friendly compared to liquid acids.

11. SIGNIFICANT ENGINEERING ACHIEVEMENTS (HAVING INDUSTRIAL IMPACT)

a) Glycerol Conversion to Chemicals (2009-2010): A number of novel catalytic materials have been developed for the conversion of glycerol to green chemicals such as formaldehyde, acetaldehyde, acrolein, acetol and propylene glycol. Also, a patent application has been filed due to high glycerol conversion and propylene glycol selectivity at less severe conditions. (see K. Pathak, et al., 2010, *Applied Catalysis A: General*, 372(2): 224-238; L.C. Meher, et al., 2009, *Industrial & Engineering Chemistry Research*, 48(4), 1840-1846)

b) Production of Biodiesel from Vegetable Oils (2008-2010): Biodiesels were produced from various vegetable oils, and characterized for their fuel as well as low temperature properties. These materials were also tested for their lubricating properties in engines. (see K. Srilatha, et al. 2010, *Energy & Fuels*, 24(9): 4748-4755; T. Issariyakul & A.K. **Dalai**, 2010, *Energy & Fuels*, 24(9): 4652-4658; K. Jacobson, et al., 2008, *Applied Catalysis B: Environmental*. 85, 86-91; T. Issariyakul, et al., 2008, *Chemical Engineering Journal*, 140(1-3), 77-85)

c) Hydrotreating of Heavy Gas Oils and Heavy Oil Upgrading in a Fluidized-Bed Reactor (2008-2010): Sulfur and nitrogen containing compounds are being removed by hydrotreating of different heavy gas oil fractions in a trickle-bed reactor under high pressure (~90 bar) and moderate temperatures (~380oC). This research identifies the fractions in heavy gas oil, which are responsible for catalyst deactivation. Using an emulsion of bitumen-in-water containing 20-23% water an average liquid yield of 84.1% was obtained in a fluid-bed reactor compared with an average yield of 80.9% using bitumen alone as feed while the coke yield was reduced from 12.3 to 9.8%. It may be noted that with an increase in 1% liquid yield Syncrude upgrader at Fort McMurray, which processes 375,000 bbl/day of bitumen, will make an additional profit over $15M/year. An in-depth study was conducted to find clues, which caused the increased liquid yield. This research was exploited further by Syncrude Canada Ltd. to redesign the nozzles in fluid-bed cokers at Fort McMurray. (see M. Mapiour & Dalai, A.K. 2010, *Fuel*, 89, 2536-2543; K. Chandra Mouli & A.K. **Dalai**, 2009, *Applied Catalysis, A: General*, 364(1-2), 80-86; V. Sundaramurthy, et al., 2008. *Microporous and Mesoporous Materials*, 111(1-3),560-568; *Applied Catalysis, A: General*, 339(2),187-195)

d) Gas-to-Liquid Technology for the Production of Liquid Fuels from Syngas (2008-2010): Carbon nanotubes (CNTs) were synthesized, extensively characterized and applied for Fischer-Tropsch synthesis for the production of higher alcohols and liquid hydrocarbons. Both iron and cobalt nanoparticles were loaded inside and outside the CNTs, and were examined for syngas conversion and selectivity of desired products. Over the last three years, Dr. Dalai's group has published extensively in this area and has filed two US patent applications. (see A. Tavasoli, et al., 2010, *J Chemical & Engineering Data*, 55:2757-2763; V.R. Surisetty, et al., 2010, *Energy&Fuels*, 24: 4130:4137; A. Tavasoli, et al., 2008, *Fuel Proc. Tech*. 90:1486-1494)

e) Development of a Process for the Removal of Low Concentrations of H2S from Natural Gas, and Mercaptans from Hydrocarbon Fluids (2006-2008): An inexpensive method for the removal of low concentrations of hydrogen sulfide from sour natural gas and some wastewater is being developed using catalytic oxidation over an activated carbon. This process is being extended to treat acid gases and waste gases from an aerobic digester in a sewage plant to recover low BTU gases, for the use as gaseous fuels. The process also deals with desulfurization of mercaptans present in hydrocarbon fluids that are not extractable with alkaline solution. The process does not oxidize mercaptans to disulfide in oil. The hydrocarbon fluid is passed through a heated activated carbon bed, which converts the mercaptans to hydrogen sulfide and elemental sulfur. This process also reduces the thiophenes present in oils. (see R. Azargohar & A.K. **Dalai**, 2008, *Microporous and Mesoporous Materials*, 110, 413-421; R. Azargohar & A. K. **Dalai**, 2006, *Applied Biochemistry and Biotechnology*, 131(2), 762-773)

f) Other Evidence of Impact and Contributions:

Mentioned in '*Who's Who in the World*' 1997 and in '*Who's Who in Finance and Industry*' (1998). He has been awarded the *Japan Society for the Promotion of Science* (JSPS) research fellowship at Okayama University, July–August (1999); the *Petro-Canada Young Innovator's* award (2000); Tier 2 *Canada Research Chair in Bioenergy and Environmentally Friendly Chemical Processing* (2001); the *Syncrude Owl Award* for outstanding contributions to knowledge management (2003); the *Kentucky Colonel Award* (2004) by the Governor of Kentucky as the *State Ambassador of Good Will & Fellowship* around the world; the Indian Institute of Chemical Engineers – *NEERI Distinguished Speaker Award*, Bharuch, India (2006); McMaster University's *Brockhouse Institute for Materials Research Award* (2008); Tier 1 *Canada Research Chair in Bioenergy and Environmentally Friendly Chemical Processing* (2009); a *DAAD Fellowship* for visiting Professorship in KIT, Germany (2010); and was recently honoured as a *Fellow* of the *Engineering Institute of Canada* (2011).

12. PATENTS GRANTED OR PENDING:

ROI Submitted:

A.K. **Dalai**, B. Miryala, 2011, *Cr Promoted Cu/ZnO Catalyst for Selective Hydrogenolysis of Glycerol to Propylene Glyco*l. Submitted to ILO, University of Saskatchewan, Saskatoon, SK, Canada, January 2011.

R.M. Malek Abbaslou, A.K. **Dalai**, 2010, *Method for Preparing of Iron Catalysts Supported on Carbon Nanotubes for Fischer-Tropsch Synthesis*. Submitted to ILO, University of Saskatchewan, Saskatoon, SK, Canada, 2010.

A.K. **Dalai,** L. C. Meher, M. G. Kulkarni, R. Gopinath, 2007, *Conversion of Glycerol to Propylene Glycol using Mixed Metal Oxides as Catalyst* (ROI # 07-004). Submitted to ILO, University of Saskatchewan, Saskatoon, SK, Canada, 2010.

Patents Filed:

V.R. Surisetty, A.K. **Dalai**, 2010. *Higher Alcohols Synthesis using Alkali-Modified Co-Rh-Mo Trimetallic Catalyst Supported on Multi-Walled Carbon Nanotubes*. Submitted to ILO, University of Saskatchewan, Saskatoon, SK, Canada, 2010.

C. Niu, A.K. **Dalai**, 2010. *Ethanol Dehydration with Canola Meal Pellets*. Submitted to ILO, University of Saskatchewan, Saskatoon, SK, Canada, July 2010.

A.K. **Dalai**, S. N. Naik, L.C. Meher, M.G. Kulkarni, R. Gopinath, 2007, *Process for Preparation of Biodiesel*. Provisional U.S. patent filed (Serial No. 60/954)

A.K. **Dalai**, N.N. Bakhshi, 2007, *Process for Conversion of Glycerol to Value Added Chemicals*. Provisional U.S. patent filed (Serial No. 60/954,687)

J. Zhang, H. Wang, A.K. **Dalai**, 2006. *Dry Reforming of Methane Using Novel Catalysts*, Provisional U.S. patent, 60/771.057.

D.K. Hutchence, D.W. Soveran, A.K. **Dalai**, D.D. Anweiler, I. Eswaramoothi and V.R. Surisetty, 2008, *Catalyst and Process for the Production of Mixed Alcohols from Synthesis Gas*, Worldwide patent filed.

13. PUBLICATIONS:

Summary

During his career, Professor Dalai has authored/co-authored over 190 research papers in refereed international journals and over 40 in refereed conference proceedings. He has written over 120 research reports for funding agencies and has presented over 290 papers at national and international conferences. The journals in which his research is published are chosen for their high impact factors to reach wider audiences, covering the fields of nanocatalysis, chemical reaction engineering, bio- and petro-fuels, renewable energy, hydroprocessing, gas-to-liquid, and environmental technologies. These high impact journals include: the *Canadian Journal of Chemical Engineering*, the *Journal of Catalysis*, *Energy & Fuels*, *Industrial & Engineering Chemistry Research*, *Catalysis Letters*, the *Journal of Applied Catalysis,* the *International Journal of Hydrogen Energy*, *Fuel Processing Technology*, *Biomass and Bioenergy*, *Waste Management*, the *Journal of Molecular Catalysis*, *Fuel*, *Microporous and Mesoporous Materials*, *Molecular Catalysis, Catalysis Today*, *Catalysis Communications*, the *Journal of American Oil Chemists Society*.

Dr. Dalai's journal papers have been cited more than 2000 times, and over 1100 in the past six years, indicating a wide impact. He has made major impacts in petroleum, bioenergy, and nanocatalysis research. Over the past five years as a researcher at the University of Saskatchewan, he has produced an approx. annual average of 25 papers, 12 technical reports, and 10 invited lecture/conference presentations. In addition, six U.S. patents related to process and/or product development have been filed by Dr. Dalai and his HQPs.

The following table presents a summary of the number and type of publications authored/co-authored by Dr. Dalai during the course of his career, followed by a list of publications covering the past 6 years.

13.1 Number and Type of Publications authored/co-authored by A.K. Dalai (1985–2011):

	Refereed Journals			Published Conference Proceedings/Abstracts				Lectures & Presentations at Conferences / Institutions		
1	2	3	4	5	6	7	8	9	10	(4-10)
Year	Submitted	Accepted In Press	* Published	Non-Refereed	Book Chapters +Refereed Conferences	Published Abstracts	Technical Reports	Invited	Non-Invited	Year Total
2010-11	18	10	28/38*	2	3	55	7	8	0	113*
2009			21	3	12	11	11	4	6	68
2008			18	1	2	21	11	10	15	77
2007			12	4	4	14	9	7	0	50
2006			26	2	5	21	17	5	0	76
2005			12	0	3	29	9	3	0	56
since 2005			*117/127	12	29	151	64	37	21	327*
1985-2004			65	18	9	96	58	25	15	286
Career Totals		10+	*182/192	30	38	247	122	62	36	727*

* Total includes Accepted/In Press of current year

13.2 Publications Authored/Co-Authored by A.K. Dalai (covering 2005–2011)

Books, Chapters in Books, Expository, and Review Articles:

A.K. **Dalai**, T. Issariyakul, C. Baroi, 2011. Biodiesel Production Using Homogeneous and Heterogeneous Catalysts: A Review. Chapter 6, *Catalysis: Alternative Energy Generation*, Springer, New York, NY, USA, Accepted.

S.N. Naik, V.V. Goud, P.K. Rout, A.K. **Dalai**, 2010. Production of First and Second Generation Biofuels: A Comprehensive Review Article: *Renewable and Sustainable Energy Reviews*, Volume 14, Issue 2, February 2010, 578-597.

M.R. Abbaslou, Malek, J. Soltan, A.K. **Dalai**, 2009. Review on Fischer-Tropsch Synthesis in Super Critical Media, *Fuel Processing Technology*, 90, 849-856.

A.K. Dalai and B.H. Davis, 2008. Fischer-Tropsch Synthesis: *A Review* of Water Effects on the Performances of Unsupported and Supported Co Catalysts, *Applied Catalysis A*, 348(1), 1-15.

L.C. Meher, S.N. Naik, M.K. Naik, A.K. **Dalai**, 2007. Biodiesel Production using Jatropha (Jatropa curcas) and Karanja (Pongamia pinnata) Seed Oil, *Hand Book of Plant Based Biofuels*, Howarth press USA, Accepted.

A.K. **Dalai** and R. Azargohar, 2007. Production of Activated Carbon from Biochar Using Chemical and Physical Activation: Mechanism and Modeling. *Materials, Chemicals and Energy from Forest Biomass, ACS, Chapter 25*, Oxford University Press, April 16, 2007, 463-476.

M.G. Kulkarni and A.K. **Dalai**, 2006. Waste cooking oil - An economical source for biodiesel production: A Review, *Industrial and Engineering Chemistry Research*, 45 (9), 2901-2913.

M.G. Kulkarni, R. Gopinath, L.C. Meher, A.K. Dalai, 2006. Solid Acid Catalyzed Biodiesel Production by Simultaneous Esterification and Transesterification - A Review, *Green Chemistry*, 8, 1056-1062.

A.K. **Dalai** and D. Ferdous, 2005. Reformulated Gasoline, *Encyclopedia of Chemical Processing*, Marcel Dekker Inc. March.

A.K. **Dalai** and H.K. Mishra, 2003. Solid Acid Catalysts, *Encyclopedia of Petroleum Science and Technology*, Marcel Dekker Inc. March.

S.K. Bej, A.K. **Dalai**, S.K. Maity, 2000. Emerging process configurations for deep hydrodesulfurization of diesel, *Reviews in Process Chemistry and Engineering*, 3 (3), 203-228.

Papers Published In Refereed Journals:

V.R. Surisetty, A.K. **Dalai**, J. Kozinski, 2011. Influence of porous characteristics of the carbon support on alkali-modified trimetallic Co-Rh-Mo sulfided catalysts for higher alcohols synthesis from synthesis gas. *Applied Catalysis A: General*, 393(1-2):50-58.

V.R. Surisetty, Y.-F. Hu, A.K. **Dalai**, J. Kozinski, 2011. Structural characterization and catalytic performance of alkali (K) and metal (Co and Rh)-promoted MoS2 catalysts for higher alcohols synthesis. *Applied Catalysis A: General*, 392(1-2)166-172.

R.M. Abbaslou, J. Soltan, A.K. **Dalai**, 2010. Iron catalyst supported on carbon nanotubes for Fischer-Tropsch synthesis: Effects of Mo promotion. *Journal of Fuel*, available on line: http://www.sciencedirect.com/science

P.E. Boahene, K. Soni, A.K. **Dalai**, J. Adjaye, 2010. Hydrotreating of coker light gas oil on Ti-modified HMS supports using Ni/HPMo catalysts. *Applied Catalysis B: Environmental*, 101(3-4):294-305.

T. Issariyakul, A.K. **Dalai**, P. Desai, 2010. Evaluating esters derived from mustard oil (Sinapis alba) as potential diesel additives. *J American Oil Chemists Society*, DOI:10.1007/s11746-010-1679-6.

T. Issariyakul and A.K. **Dalai**, 2010. Biodiesel production from greenseed canola oil. *Energy & Fuels*,24(9), 4652-4658.

K. Srilatha, T. Issariyakul, N. Lingaiah, P.S. Sai Prasad, J. Kozinski, A.K. **Dalai**, 2010. Efficient esterification and transesterification of used cooking oil using 12-Tungstophosphoric acid (TPA)/Nb205 catalyst. *Energy & Fuels*, 24(9), 4748-4755.

J.V. Headley, K.M. Peru, S. Mishra, V. Meda, A.K. **Dalai**, D.W. McMartin, M.M. Mapolelo, R.P. Rodgers, A.G. Marshall, 2010. Characterization of oil sands naphthenic acids treated with ultraviolet and microwave radiation by negative ion electrospray Fourier transform ion cyclotron resonance mass spectrometry. *Rapid Communications in Mass Spectrometry*, 24, 3121-3126.

V.R. Surisetty, A.K. **Dalai**, J. Kozinski, 2010. Intrinsic reaction kinetics of higher alcohols syunthesis from synthesis gas over sulfided alkali-promoted Co-Rh-Mo trimetallic catalyst. *Energy & Fuels*, 24, 4130-4137.

V.R. Surisetty, A.K. **Dalai**, J. Kozinski, 2010. Synthesis of higher alcohols from synthesis gas over Co-promoted alkali-modified MoS2 catalysts supported on MWCNTs. *Applied Catalysis A: General*, 385, 153-162.

K. Soni, P.E. Boahene, A.K. **Dalai**, 2010. Hydrotreating of gas oil on Ti-HMS supported heteropolyacid catalysts. *American Chemical Society*, Division of Petroleum Chemistry Preprints, 55(2), 43-44.

A. Tavasoli, M. Trépanier, A.K. **Dalai**, N. Abatzoglou, 2010. Effects of confinement in carbon nanotubes on the activity, selectivity, and lifetime of Fischer-Tropsch Co/Carbon nanotube catalysts. *J Chemical & Engineering Data*, 55, 2757-2763.

S. Mishra, V. Meda, A.K. **Dalai**, D.W. McMartin, J.V. Headley, K.M. Peru, 2010. Photocatalysis of Naphthenic Acids in Water. *Journal of Water Resource and Protection*, 2(7), 644-650.

V.R. Surisetty, A.K. **Dalai**, J. Kozinski, 2010. Alkali-promoted trimetallic Co-Rh-Mo sulfide catalysts for higher alcohols synthesis from synthesis gas: Comparison of MWCNT and activated carbon supports. *Industrial & Engineering Chemistry Research*, 49, 6956-6963.

S. Naik, V.V. Goud, P.K. Rout, K. Jacobson, A.K. Dalai, 2010. Characterization of Canadian biomass for alternative renewable biofuel. *Renewable Energy* (2010), 35(8), 1624-1631.

A.K. **Dalai** and A. Bassi, 2010. Bioenergy and Green Engineering. Preface, *Energy & Fuels*, 24(9), 4627.

R.M. Malek Abbaslou, A. Tavasoli, J. Soltan, A.K. **Dalai,** 2010. Effects of carbon concentration in the precursor gas on the quality and quantity of carbon nanotubes synthesized by CVD method. *Applied Catalysis A: General*, 372, 147-152.

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A.K. Dalai, 2007. *Synthesis of Biodiesel from Various Edible and Non-Edible Oils and Efficient Utilization of Crude Glycerol*. University of Waterloo Class Seminar, Waterloo, ON, Canada, August 17.

A.K. Dalai, 2007. *Novel Bio-diesel from Waste Oils and Green Chemical Production from Crude Glycerol*. Bilbao, Spain, August 12-15.

A.K. Dalai, 2007. *Synthesis of Biodiesel from Various Edible and Non-Edible Oils and Efficient Utilization of Crude Glycerol*. Faculty of Engineering, Dalhousie University, Halifax, NS, Canada, July 4.

A.K. Dalai and M. Kulkarni, 2007. *Synthesis of Biodiesel from Various Edible and Non-Edible Oils and Efficient Utilization of Crude Glycerol*. 98th AOCS Annual Meeting & Expo., Québec City, QC, Canada, May 13-16.

A.K. Dalai, 2006. *Synthesis of Biodiesel from Various Edible and Non-edible Oils and Efficient Utilization of Crude Glycerol*, CHEMCON-India, December 26-29.

A.K. Dalai, 2006. Synthesis *of Biodiesel and efficient Utilization of Crude Glycerol*. University of Mumbai India, December 26.

A.K. Dalai, 2006. *Biodiesel from Edible and Non-edible Oils*. Ottawa University, Ottawa, ON, Canada, December 6.

A.K. Dalai, V. Sundaramurthy, C.M. Kotikalapudi, 2006. *Selective Ring Opening of Naphthenic Molecules in Heavy Gas Oil obtained from Athabasca Bitumen*. Upgrading Catalyst Development Network Annual Meeting, Saskatoon, SK, Canada, May 19.

A.K. Dalai, 2006. *Prospects of Production and Applications of Biodiesel and Biosyndiesel in Canada*. The Biocap Canada Foundation, 1st National Conference on Capturing Canada's Green Advantage, Ottawa, ON, Canada, February.

A.K. Dalai, 2005. *Biodiesel Productions and Applications*. Department of Chemical Engineering, Aston University, Birmingham, England, July 15.

A.K. Dalai and C.M. Kotikalapudi, 2005. *Selective Ring Opening of Naphthenic molecules in Heavy gas oil obtained from Athabasca Bitumen*. Upgrading Catalyst Development Network Annual Meeting, Devon, AB, Canada, June 16.

A.K. Dalai, 2005. *Prospects of Productions and Applications of Biodiesel and Biosyndiesel in Canada*. The Biocap Canada Foundation, 1st National Conference on Capturing Canada's Green Advantage, Ottawa, ON, Canada, February 2-3.

15. RESEARCH GRANTS (most recent 7 years; total over 2004-present = $9,058,697)

Role–Title–Award Source	Value	Year(s)
Principal Investigator, *Investigation and Demonstration of Close Coupled Gasification Combustion of Raw Glycerin and Canola Hull Fiber Fuel Pellets/Brique*, Agricultural Development Fund, Saskatchewan Ministry of Agriculture ($132,667) and Saskatchewan Canola Development Commission, ($66,333) for total of $199,000/3yrs, 2011-2014	199,000	2011–2014
Principal Investigator, *Production of Biolubricant from Canola Oil using Solid Catalysts*, Agricultural Development Fund, Saskatchewan Ministry of Agriculture, $194,000/3 yrs, 2011-2014	194,000	2011–2014
Principal Investigator, *Development of Catalysts for Hydrodeoxygenation and Transesterification of Nonedible Vegetable Oils, Estimation of Combustion Properties and Life Cycle Analysis on These Two Processes*, NSERC, Strategic Grant, $143,800/yr 1; $148,560/yr 2; $147,400/yr 3 for total of $439,760/3 yrs, 2010-2013.	439,760	2010–2013
Principal Investigator, *Biochar: Biofuel Help Themselves,* NSERC, Strategic Grant, $41,900/yr, 1/3, May 2010 & April 2013 (D. Smith & 4 others)	125,700	2010–2013
Co-Investigator, *Manufacturing of Lightweight Materials from Renewable Resources*, NSERC, Network, $26,500/yr, 1/5, April 2010 & March 2015 (M. Sain & others)	132,500	2010–2015
Principal Investigator, *Applications of Mesoporous Carbon, Carbon Nanohorns and M-SBA-15 (M=Zr and Ti) as Support to Ni-Mo Hydrotreating Catalysts*, NSERC, CRD, $122,000 March 2010 & 130,000 March 2012	252,000	2010 2012
Principal Investigator, *Bioenergy and Environmentally Friendly Chemical Processing*, CRC, Grant, $200,000/yr, 1/7, July 2009 & June 2016	1,400,000	2009–2016
Principal Investigator, *Bioenergy and Environmentally Friendly Chemical Processing*, Institute and the Province, HQP + equipment, $100,000/yr, 1/5, July 2009 & June 2014	500,000	2009–2014

Role–Title–Award Source	Value	Year(s)
Principal Investigator, *Bioenergy and Environmentally Friendly Processing*, (Govt of Saskatchewan, $50,000/yr & $50,000/yr by UofS), 2009-2014	500,000	2009–2014
Co-Investigator, *Second Generation Biofuels for Sustainable Transportation*, Auto21, Network Grant, $10,000/yr, 1/2, May 2009 & April 2011 (M. Thomson, Principal & 3 others)	20,000	2009–2011
UofS Publication Fund for *Book in Petroleum Processing*: $2,000	2,000	2009–2010
UofS Publication Fund for *Conference Proceeding Publication*: $2,000	2,000	2009–2010
ISTP Canada Fund for joint Conferences between India and Canada in Energy & Bioproducts: $25,000 (2009-2010)	25,000	2009–2010
Co-Investigator, *Utilization of Biomass for Energy, Agriculture, Food and Rural Revitalization*, Govt. of Saskatchewan Grant, $30,000/yr, 1/3, 2008 & 2011 (D. Anweiler, Principal; T. Pugsley & T. Fonstad, Co-investigators)	90,000	2008–2011
Principal Investigator, *Generation of Fuels and Chemical from Biomass*, Agriculture and Biomass Innovation network $250,000 / yr (2008-2011)	750,000	2008–2011
Co-Investigator, *Biodiesel from Microalgae Grown on Waste Resources Using Liquid-Solid Circulating Fluidized Beds and Photo-Bioreactors*, NSERC, Strategic Grant, $25,000/yr, 2/2, April 2008 & March 2010 (A. Bassi, A. Ray, J. Zhu)	50,000	2008–2010
Co-Investigator, *Development of Absorbent for Removal of Water from Ethanol-water Mixture*, Saskatchewan Canola Development Corp. and Pound-maker Agventures Ltd., Industry Contract, $30,000/yr, 1/2, 2008 & 2010 (C. Niu, Investigator)	60,000	2008–2010
NSERC Strategic Grant (with Dr. A. Bassi & 2 others), $100,000 (2008), $100,000 (2009)	200,000	2008–2009
Principal Investigator, *Development of Catalysts for Fischer-Tropsch Synthesis Using Biosyngas*, NSERC, ENERKEM, NRCan Grant & Industry Contract, $40,000/yr, 3/3, 2007 & 2010 (N. Abatzoglou, Principal & N.N. Bakhshi, Co-investigator)	120,000	2007–2010
Principal Investigator, *Ethanol and Methane Production from Biomass and Phenols Extraction from Bio-oils Using Supercritical Fluids*, NSERC Strategic Grant, $92,000/yr, 3/3, October 2007 & September 2010 (G.A. Hill & P. Basu, Co-investigators)	276,000	2007–2010
NSERC Strategic Grant (with Drs. G. Hill & P. Basu), $190,900 (2007-2008), $202,400 (2008-2009) & $122,000 (2009-2010)	515,300	2007–2010
NSERC-CRD Grant (CRDPJ 340667-06), $37,957 (2007-2008) & $37,957 (2008-2009)	75,914	2007–2009
NSERC-CRD Grant (CRDPJ 355234-07), $49,850 (2007-2008) & $49,950 (2008-2009)	99,800	2007–2009
Syncrude Canada Ltd., $92,100 in 2007-08 & $92,100 in 2008-2009	184,200	2007–2009
University of Saskatchewan *Forge Ahead Fund*, $22,000 (2007-2008)	22,000	2007–2008
Indo Sastri Canadian Institute, $20,000 (2007-2008)	20,000	2007–2008
NSERC CRD Grant, $103,500 (2007-2008) & $113,500 (2008-2009)	217,000	2007–2009

Role–Title–Award Source	Value	Year(s)
Agricultural Development Fund (T. Fonstad & T. Pugsley), $40,000/yr (2007-2009)	80,000	2007–2009
NSERC Equipment Grant (with 3 others), $105,290 (2007-2008)	105,290	2007–2008
Advanced Biorefinery Inc, $34,400/yr (2007-2008)	34,400	2007–2008
National Centre for Upgrading Technology (Grant No. G00006164), $53,000 (2007-2008)	53,000	2007–2008
Principal Investigator, *Applied Energy Research*, NSERC, Discovery Grant, $35,500/yr, 5/5, 2006-2011	175,000	2006–2011
NSERC Discovery Grant, $35,500/yr (2006-2011)	142,000	2006–2011
NSERC-CRD Grant (with 3 others) $100,000/yr (2006-2009)	300,000	2006–2009
NSERC CRD Grant (CRDPJ 335295-06), $95,000 (2006), $30,000 (2007) & $40,000 (2008)	165,000	2006–2008
Saskatchewan Canola Development Grant, $36,400 (2006-07) & $30,940 (2007-2008)	67,340	2006–2008
Saskatchewan Canola Development Grant, $39,750/yr (2006-2008)	79,500	2006–2008
TSE Research Fund (with Dr. T. Pugsley), University of Saskatchewan, $80,000/yr (2006-2008)	160,000	2006–2008
Agricultural Development Fund (with Dr. T. Fonstad), $30,000/yr (2006-2008)	60,000	2006–2008
Saskatchewan Research Council, $35,500 (2006) & $35,500 (2007)	71,000	2006–2007
University of Saskatchewan *Forge Ahead Fund*, $22,000 (2006-2007)	22,000	2006–2007
Natural Resources Canada, $24,363 (2006-2007)	24,363	2006–2007
NSERC CRD Grant, $91,318 (2005-2006) & $109,110 (2006-2007)	200,428	2006–2007
National Centre for Upgrading Technology (Grant No. G00006164), $60,000 (2006-2007)	60,000	2006–2007
University of Saskatchewan *Research Acceleration Grant*, $5,000 (2006)	5,000	2006
Auto21 Network of Centre of Excellence, $193,000 (25%)/yr for 2005-2009	193,000	2005–2009
Saskatchewan Research Council, $122,000 (2005-2008)		2005–2008
Syncrude Canada Ltd., $83,800 / 2005-2006 & $84,800 / 2006-2007	168,600	2005–2007
College of Engineering Goodfellow, $500 (2005-2006)	500	2005–2006
National Centre for Upgrading Technology, $77,000/yr (2005-2006)	154,000	2005–2006
NSERC CRD Grant, $71,000/yr (2004-2005)	142,000	2004–2005
National Centre for Upgrading Technology, $21,000 (2004-2005)	21,000	2004–2005
NSERC Equipment Grant, $47,102 (2004)	47,102	2004
Saskatchewan Research Council, $30,600 (2004)	30,600	2004
Dynamotive Energy Corp. Ltd., $25,400 (2004)	25,400	2004

16. SIGNIFICANT PROFESSIONAL PRACTICE & ASSOCIATION OFFICES / ACTIVITY:

- Chair, *Canadian Catalysis Society, 2010*
- Coordinator, Symposium on *Nanocatalysis for Fuels and Chemicals Production, Pacifichem*, Honolulu, Hawaii, USA, December 24–27, 2010
- Organizing Committee Member, *Pacifichem*, Honolulu, Hawaii, USA, December 24–27, 2010
- Coordinator, *Engage India Symposium*, Saskatoon, SK, Canada, October 28, 2010
- Conference Chair and Theme Coordinator, *60th Canadian Society of Chemical Engineering Conference*, October 24–27, 2010
- Expert Panel Member, *Royal Society of Canada,* 2009–2010
- Life Member, *Oil Technologists Association of India*, 2009
- Technical Committee Member, *International Oils Conference*, New Delhi, India, December 9–10, 2009
- Technical Committee Member, *2nd Climate Change Technology Conference*, Hamilton, ON, Canada, May, 2009
- Technical Committee Member, *Ag West Biotech Annual Meetings*, Saskatoon, SK, Canada, 2009
- Vice Chair, *Canadian Catalysis Society*, 2008–2010
- Member, Selection Committee, *NSERC GPX Science and Technology Centre of Ukraine* (STCU), 2008–present
- Panel Member, *Selection Committee of National Centres of Excellence*, Chile, 2008–2009
- Editorial Board Member, *Journal of Energy Engineering*, American Society of Civil Engineering (ASCE), 2006–present
- Member, *NSERC Discovery Grant Selection Committee* (GSC-04), 2006–2009
- Associate Editor, *Canadian Journal Chemical Engineering*, 2006–2009
- Secretary and Treasurer, *Canadian Catalysis Society*, 2006–2008
- Conference Chair, *Canadian Catalysis Society Symposium*, May 14–17, 2006
- Member, *Biological Future Technical Committee*, February 28–March 1, 2006
- Member, *Canadian Green Chemistry Network*, 2005–present
- Life Member, *American Institute of Chemical Engineers*, 2005–present
- Co-Organizer, *Biodiesel Production and Co-Product Utilization: Environmental Impacts and Challenges, Pacifichem*, Honolulu, Hawaii, December 15–20, 2005
- Member, *Canadian Biomass Innovation Network*, Natural Resources Canada, 2004–2009
- Member, *Advisory Committee on Canadian Biomass Pyrolysis Initiatives*, Biocap Canada, 2004–2005
- Organizing Committee Member, *Sciences in Thermal and Chemical Biomass Conversion Conference*, August 29–September 2, 2004
- Member, NSERC Strategic Grant Committee, *Greenhouse Gas Mitigation Program*, 2003–2006
- Member, *Advisory Committee on Canadian Biodiesel Initiatives*, Biocap Canada, 2003–2005
- Life member, *Indian Institute of Engineers*, 2002
- Life member, *Indian Catalysis Society*, 2002
- Member, Advisory Committee, *Chemical Technology Program, SIAST*, Kelsey Campus, Saskatoon, SK, Canada, 2002–present
- Member, *Western Canada Fuel Cells Initiative*, 2002–2008
- Member, *Upgrading Catalysis Development Network*, 2002–2007
- Member, Advisory Committee, *Canada Research Chair Program*, 2001–present
- Member, *Association of Professional Engineers, Geologists & Geophysicists of Saskatchewan* (APEGS*)*, 2000–present
- Editor, *Canadian Catalysis Society Newsletter*, 2000–2006
- Executive Member, *North Saskatchewan Chapter of CIC*, 2000–2005
- Chair, Poster Sessions, *North American Catalysis Society Conference*, June 3-8, 2000
- Member, Program Committee, *49th Canadian Chemical Engineering Conference*, Saskatoon, SK, Canada, 1999
- Executive Member, *Canadian Catalysis Society*, 1998–present
- Member, *American Chemical Society*, 1997–present
- Member, *Chemical Institute of* Canada, 1987–present
- Member, *Canadian Society for Chemical Engineers*, 1987–present
- Member, *North American Catalysis Society*, 1987–present
- Member, *American Institute of Chemical Engineers*, 1987–2005