

CURRICULUM VITAE OF AMIT CHAKMA, Ph.D., P.Eng., FCAE

HOME AND MAILING ADDRESS

1836 Richmond Street

London, ON.,Canada, N5X 4B9

Tel: (519) 660-0178; Fax: (519) 660-1440

e-mail: ProfChakma@gmail.com

PRESENT POSITION: President and Vice-Chancellor and Professor of Chemical Engineering, University of Western Ontario, London, Canada (2009-present).

The University of Western Ontario, commonly known as Western University, founded in 1887 is one of Canada's oldest universities. It is also one of Canada's leading teaching and research intensive universities with a student body of 32,000. Three affiliated colleges enroll an additional 6,000 students. Total annual budget for the University excluding the colleges is around \$1.15 billion. University has an excellent reputation for its teaching excellence and is known for providing the best student experience in a research intensive environment. It attracts top students from across Canada and beyond. Average entrance grade for first year students is the second highest in Canada at 89.4%. Student retention and graduate rates are also second highest in Canada at 93.3 and 83.6%, respectively. It is known for its broad based interdisciplinary learning opportunities allowing students to pursue academic programs from different Faculties through double majors and minor. It also fosters interdisciplinary research and has a number of research clusters that are world class.

As President, my mandate is to bring about structural and cultural changes to position the University to continue its journey from a well recognized national university to a well recognized international university while ensuring financial sustainability in the face of steady decline in public funding. Some of the structural changes are already in place. A new resource model allows the university to operate without any structural deficits and the operating budget routinely generates annual surpluses thus giving the university the fiscal capacity to make strategic investments even at times of fiscal austerity. An ambitious campaign to raise \$750 million was launched in 2011, of which over \$615 million has been raised to date.

Key Achievements at Western since 2009.

Academic KPIs.

- Steady improvement in quality of incoming students (Average entrance grade rising from 86% to 89.4%).
- Improvement in student success in first year (retention rate increasing from 91.8% to 93.6%).
- A 20% increase in graduate student enrollment from approx.4500 to 5400 FTE students.
- A 20% increase in 1st year undergraduate student enrollment from 4350 to 5300 while improving entrance average by 3.3% points.
- Quadrupled the number of international students in First year from 3 to 12%.
- Increased student support from \$61 million to \$77 million.
- Guaranteed bursary for international learning opportunities for students with 80% average in 2nd year of study.
- Increased the number of National Scholarships (Avg. Value \$40 K) from 12 to 30.
- Increased student housing by 1000 beds.
- Major research partnership with IBM and Fraunhofer Institute.
- Establishment of a new Advanced Manufacturing Park on a 25 acres site.
- Establishment of 21 new endowed research chairs.
- Launched an interdisciplinary research cluster initiative developing up to 4 research clusters.
- New buildings for the Business School, Family Medicine and Public Health, School of Nursing

Financial KPIs. (2009-2015)

- Increased balance sheet from \$1.6 billion to \$2.7 billion with net assets increasing from \$410 million to \$1.15 billion.
- Internally restricted net asset increasing from \$85 million to \$1.06 billion.
- Launched an aggressive revenue diversification plan resulting in a 24% increase in operating budget from 525 M to 728 M (Total budget:~ 1.16 billion)
- Increased share of operating revenues from non-Provincial sources from 58.6 to 66.4%
- Launched a capital campaign to raise \$750 M by 2018 (Raised \$650 M to date).
- Increased endowment and endowment equivalent from \$265 M to \$800 M.
- \$76 million (6.5 % of total revenue) in excess revenues over expenses in 2015.
- Annual licensing revenue averaging ~\$5 million is the third highest in Canada.
- \$800 million in capital expenditures for new construction and facilities renewal.
- S&P Credit Rating AA stable, compared to the AA- rating for Ontario.

Strategic Partnerships.

- IBM Corp, Fraunhofer Institute, Siemens
- City of London, Governments of Ontario and Canada
- Universities: McMaster, Waterloo, and Toronto

Public Policy Leadership:

- Advised the Federal Government on Canada's International Education Strategy as Chair of its Advisory Panel.
- Serving on Government of Canada's Science and Technology Innovation Council since 2011.
- As Chair of U-15, spearheaded the advocacy work leading to the establishment of \$1.2 billion Canada First Research Excellence Fund.
- Led the advocacy work leading to the creation of prestigious Vanier Post-Doctoral Fellowship program by the Federal Government.
- Regular contributor to Australia-Canada Economic Leadership Forum, an annual gathering of senior business and government leaders to promote closer cooperation between two countries.
- Participant in the Annual North American Forum, an annual gathering of senior business and government leaders from Canada, Mexico and the United States to promote closer ties between the NAFTA countries.

PREVIOUS POSITION: Vice-President (Academic) and Provost, University of Waterloo, Waterloo, Canada (2001-2009).

The University of Waterloo founded in 1957 is known as Canada's the most innovative university. With a major focus on science and technology, it is well known for its cooperative education program. Its computer science and engineering programs are highly regarded. During the hay days of Microsoft, the company used to recruit more graduates from Waterloo than any other university in North America.

My mandate as Provost was to work with the President to transform Canada's premier science and technology university, into a global player. During my time I led the development of Waterloo's Sixth Decade Plan. International enrollment at the first year undergraduate level increased from 3% to 10 percent, a campus in Dubai was established, overall undergraduate enrollment expanded by 30% percent while improving the quality of student intake significantly, graduate enrollment more than doubled, several new interdisciplinary research clusters including the Institute for Quantum Computing and Waterloo Nanotechnology Institute were established, a new research park was built. Annual fund raising increased from \$ 12 million to over \$50 million and a total of \$500 million was raised against a campaign initial goal of \$260 million.

Key Achievements at Waterloo

- Increase graduate student enrollment by 80% from 1951 to 3560.
- Increased Full Time Faculty positions by 30% from 758 to 986.
- Nearly doubled first year engineering intake from 735 to 1316.
- Increased undergraduate international student enrollment from 2 percent to over 10 percent.
- Creation of new undergraduate programs in Nanotechnology Engineering, Mechatronics Engineering, International Development, Financial Management and Accounting,
- Addition of a new School of Pharmacy.
- Establishment of a campus in Dubai, United Arab Emirates.
- Establishment of two satellite campuses in Cambridge and Kitchener.
- Establishment of the Institute for Quantum Computing.
- Establishment of Waterloo Institute of Nanotechnology.
- External research funding more than doubled from \$70 million to \$157 million.
- Establishment of a successful Research and Technology Park on a 120 acres site with 1 million sq. ft. of built space.
- Increased operating budget by 90 percent from \$227 million to \$430 million.
- Annual fund raising increased from \$ 6 million to over \$50 million.
- Successful capital campaign raised over \$500 million against a goal of \$ 260 million.
- \$1 billion worth of capital projects completed.

MAJOR PUBLIC SERVICE ASSIGNMENTS

Chair, Advisory Panel on International Education Strategy (2011-2013).

The Advisory Panel on International Education Strategy was commissioned by the Government of Canada in 2011. The mandate of the Advisory Panel on Canada's International Education Strategy was to make recommendations on a strategy that would maximise economic opportunities for Canada in the field of international education, including strengthening our engagement with emerging key markets, focusing on attracting the best/brightest international students, encouraging Canadians to study abroad, expanding the delivery of Canadian education services abroad, and building, expanding and ensuring greater partnerships between Canadian and foreign institutions. The panel reported jointly to the Minister of Finance and the Minister of International Trade. <http://www.international.gc.ca/education/advisory-consultation.aspx?view=d>. The Panel submitted its recommendation to the Government in August 2012 <http://www.international.gc.ca/education/report-rapport/strategy-strategie/index.aspx?lang=eng>. The Government of Canada issued its strategy titled "Harnessing our knowledge advantage to drive innovation and prosperity" in January 2015. <http://international.gc.ca/global-markets-marches-mondiaux/education/strategy-strategie.aspx?lang=eng>

Member, Science and Technology Innovation Council (2011-present)

The Science and Technology Innovation Council (STIC) is an advisory council established by the Government of Canada in 2007. It provides advice to the Minister of Industry on science, technology and innovation related matters. www.stic-csti.ca. I co-chaired the working group responsible for the bi annual State of the Nation report that compares Canada's performance with peer group of countries including Australia. http://www.stic-csti.ca/eic/site/stic-csti.nsf/eng/h_00058.html.

Chair, Board of Trustees, Asian University for Women (2012-2015)

Founded in 2008, the Asian University of Women is Asia's first regional liberal arts university with the goal of empowering women from challenging backgrounds through high quality Western liberal arts education. It currently enrolls 500 students from 16 different countries with a steady state capacity of enrolling 3000 students. AUW provides full financial support to all needy students. It is supported by individuals and organizations from around the world. www.auw.org.

Council Member, Association of Commonwealth Universities (2014-present). www.acu.ac.uk

Member, Board of Trustees, Rideau Hall Foundation. (2015-present) www.rhf-frh.ca

Chair, Board of Directors, World University Services Canada (2011-2015)

World University Services Canada is a nongovernmental development organization comprising of professionals, students, volunteers, faculty, and community leaders working together to find solutions and provide opportunities to the world's most marginalized people. www.wusc.ca

Chair, U-15 Group of Canada's Research Universities (2012-2014)

U-15 represents Canada's 15 research intensive universities (Similar to AAU, Group of 8 and Russell Group).

PERSONAL INFORMATION

Date of Birth:	January 26, 1959	Marital Status:	Married with two children
Citizenship:	Canadian	Languages:	English and French

EDUCATION

Ph.D. in Chemical Engineering	University of British Columbia Vancouver, BC, Canada	1984-1987
M.A.Sc., Chemical Engineering FIRST CLASS STANDING	University of British Columbia Vancouver, BC, Canada	1982-1984
Dipl. Ing. in Chemical Engineering Gas Engineering Specialization FIRST IN GRADUATING CLASS	Institut Algerien du Petrole Boumerdes, Alger, Algeria	1977-1982
Cours de Civilisation Francaises	Universite de Caen, France	1978

LEADERSHIP AWARDS

Michael P Malone International Leadership Award, Association of Public and Land Grant Universities, Washington DC	2014
Royal Bank of Canada (RBC) Top Immigrant Award	2014
Queen Elizabeth II Diamond Jubilee Medal	2012
Canada's Top 40 Under 40 Award. Awarded annually to honour a group of men and women who have become outstanding leaders in their chosen fields, before reaching 40 years of age (www.top40award-canada.org)	1998

OTHER AWARDS/HONOURS

UBC Faculty of Applied Science Life Time Achievement Award	2015
Doctor of Engineering (Honoris Causa), University of Waterloo	2010
Fellow, Canadian Academy of Engineering	2008
Guest Professor, Peking University, China	2001
Distinguished Lecturer, APEGS	2000
Canadian Who's Who. (www.utpress.utoronto.ca/cww)	2000

OTHER AWARDS/HONOURS (Cont'd..)

Consulting Professor, Wuhan University of Hydraulic and Electrical Engineering.	2000
Adjunct Professor, Hunan University, Changsa, China.	1998
Consulting Professor, Huazhong Univ. of Science & Technology, China.	1998
NSERC Post Doctoral Fellowship.	1987

INTERNATIONAL MISSIONS

Member, Canadian Delegation. State Visit to China by the Governor General of Canada	2013
Member, Canadian Delegation. State Visit to Ghana, Botswana and South Africa by the Governor General of Canada	2013
Member, Ontario Delegation. State Visit of the Premier of Ontario to China	2013
Member, Canadian Delegation. State Visit of the Prime Minister of Canada to China	2012

MANAGEMENT TRAINING

Senior University Administrators Course (SUAC).	Centre for Higher Education Research & Development, U. of Manitoba	1997
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ADMINISTRATIVE/LEADERSHIP EXPERIENCE:

President and Vice Chancellor	University of Western Ontario	2009-present
Vice-President Academic and Provost	University of Waterloo Waterloo, ON., Canada	2001 – 2009
Vice-President (Research)	University of Regina Regina, Saskatchewan, Canada	1999 – 2001
Dean, Faculty of Engineering	University of Regina	1996 – 1999
Chair, Young Professors Group	University of Calgary	1995 – 1996

BOARD LEADERSHIP

Chair, World University Services Canada, www.wusc.ca	2011-2015
Chair, Asian University for Women, www.auw.org	2013-present
Chair, U-15 Group of Canadian Research Universities	2012-2014

Chair, Advisory Panel on Canada's International Education Strategy, 2011-2013.
 Chair, Health Force Ontario Marketing and Recruitment Agency 2007-2010

BOARD MEMBERSHIP

Rideau Hall Foundation, www.rhf-frh.ca 2015-present
 Association of Commonwealth Universities, www.acu.ac.uk 2014-present
 Science and Technology Innovation Council, Govt. of Canada www.stic.ca 2012-present
 Canadian Scholarship Trust Foundation, www.cst.org 2013-present
 Research Ontario Expert Advisory Panel 2011-2013
 Ontario Centres of Excellence, www.oce-ontario.org, 2010-2013
 London Economic Development Corporation, www.leddc.com, 2009-2012.
 Waterloo North Hydro Inc. 2006-2009
 Board of Trustee, St Mary's Hospital, Kitchener, 2005- 2009
 Canada's Technology Triangle, Inc., 2004- 2009
 Canadian Knowledge Research Network, 2004 – 2007
 Canadian National Site Licensing Project Steering Committee, 2000- 2004
 University Advisory Group, Industry Canada 2000- 2003
 Calgary Centre for Innovative Technology, Calgary, Alberta. 2000– 2002
 Natural Sciences and Engineering Research Council of Canada, (www.nserc.ca) 1999- 2002
 WestLink Innovation Network Ltd, Edmonton, Alberta (www.westlink.ca) 1999- 2001
 Technology Networking Board, Regina Regional Economic Dev. Authority. 1999- 2001
 Regina Research Park Advisory Board. 1999- 2001
 Saskatchewan Population Health and Evaluation Research Unit, Canada. 1999- 2001
 Telecommunications Research Labs, Edmonton, Canada. (www.trlabs.ca) 1999- 2001
 Saskatchewan Research Council, Saskatoon, Canada. (www.src.sk.ca) 1997- 2000
 Petrosience Research Ltd, Calgary, Canada. 1991- present

TEACHING EXPERIENCE:

Professor of Chemical Engineering University of Waterloo 2001-2009
 NRCan Research Professor of Engineering University of Regina 1999 – 2001
 Professor of Environmental Engineering University of Regina 1996 – 2001

TEACHING EXPERIENCE (Cont'd..)

Adjunct Professor of Chemical and Petroleum Engineering	University of Calgary Calgary, Alberta, Canada	1996 – 2009
Professor of Chemical and Petroleum Engineering	University of Calgary Calgary, Alberta, Canada	1994 - 1996
Visiting Senior Lecturer of Chemical & Materials Engineering	University of Auckland, Auckland, New Zealand.	1992 - 1992
Associate Professor of Chemical and Petroleum Engineering	University of Calgary Calgary, Alberta, Canada	1990 - 1994
Assistant Professor of Chemical and Petroleum Engineering	University of Calgary Calgary, Alberta, Canada	1988 - 1990
Attache de Recherche Dept. of Chemical Engineering	University of Sherbrooke Sherbrooke, Quebec, Canada	1988 - 1988

OTHER INTERNATIONAL AFFILIATIONS

Visiting Professor	Petroleum and Petrochemical College, Chulalongkorn University, Thailand.	1997 - 1998
Expert Consultant	Asian Development Bank, Phillipines	1996 – 1997
Technical Consultant	Ministry of University Affairs, Thailand	1996 – 1997
Member Expert Group, IEA Green House Gas R&D Programme	Cheltenham, England, U.K.	1992 – 1996

PROFESSIONAL EXPERIENCE

Registered Professional Engineer (P.Eng.), The Province of Alberta, Canada	1990 - present
Registered Professional Engineer (P.Eng.), The Province of Saskatchewan, Canada	1997 - 2001

RESEARCH INTERESTS:

- Mass Transfer, Gas Separation, Membrane Separation, Air Pollution,
- CO₂ Related Green House Gas Issues, Environmental system modeling.

EDITORIAL RESPONSIBILITIES

Associate Editor, Journal of Environmental Informatics	2003 - 2009
Guest Editor, Special Issue on Gas Processing, Chemical Engineering Communications.	1994 - 1995
Member, Editorial Board, Environmental and Software News.	1993 - 1996
Technical Editor, SPE Editorial Review Committee.	1992 - 1994
Editor, Enhanced Oil Recovery, AIChE Symposium Series 280, Volume 87, 147 pages, AIChE, NY, 1991.	1990 - 1991
Member, Editorial Review Board, Journal of Canadian Petroleum Technology.	1989 - 1993

PROFESSIONAL SERVICE

Chair, Site Visiting Committee, NSERC Industrial Research Chair Program	1999 – 2000
Program Visitor, Canadian Engineering Accreditation Site Visiting Committee	1999 - 2000
Member, Technology Issues Table, National Implementation Plan on Climate Change.	1998 – 1999
Member, Regina Urban Environmental Advisory Council	1998 - 1999
Chair, Council of Western Engineering Deans.	1998 – 1999
Chair, Software Engineering Committee, National Council of Deans of Engineering and Applied Sciences (NCDEAS).	1997 – 1999
Member, Advisory Council of NSERC/Petro-Canada Chair for Women in Science and Engineering (Prairie Region).	1997 – 2001
Member, Canadian Engineering Accreditation Board Liaison Committee, National Council of Deans of Engineering and Applied Sciences (NCDEAS).	1996 – 1999
Member, Environmental Clusters Group, Regina Economic Development Authority.	1996 – 1999

PROFESSIONAL AFFILIATIONS:

The Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

CONFERENCE CHAIRMANSHIP/PANELLISTS

Member, International Program Committee, Fifth International Conference on Greenhouse Gas Control Technologies to be held in Cairns, Australia, August 2000.	1999 - 2000
Chair, Eight Saskatchewan Petroleum Conference, Regina, October 1999.	1999 – 1999

Member, International Advisory Board, 3 rd International Conference on Solvothermal Reactions and processes, Bordeaux, July 19-23, 1999.	1998 – 1999
Member, International Scientific Committee, International Workshop on Sustainable Management of Water, Wuhan, China, May 2-15, 1998.	1998- 1998
Member, International Program Committee, Fourth International Conference on Greenhouse Gas Control Technologies held in Interlaken, Switzerland, August 30-September 2, 1998.	1997 - 1998
Member, International Program Committee, Third International Conference on Carbon Dioxide Removal (ICCD-3), held in Boston, MA, September 9-11, 1996.	1995 - 1996
Member, International Advisory Committee, Second International Conference on Solvothermal Reactions, held in Takamatsu, Kagawa, Japan, December 18-20, 1996.	1995 – 1996
Co-Chair, Symposium on CO ₂ Chemistry and Efficient Utilization of Energy, PACIFICHEM'95, Honolulu, Hawaii, December 17-22, 1995.	1994 - 1995
Area Chair, Gas Processing, 44th Canadian Chemical Engineering Conference.	1993 - 1994
Panelists, Forum on High Performance Computing at The University of Calgary, March 3.	1993
Chairman, Symposium on Natural Gas Processing, 41st Annual Canadian Chemical Engineering Conference, Vancouver, BC.	1991
Chairman, Symposium on Enhanced Oil Recovery, AIChE Annual Meeting, Chicago.	1990
Chairman, Symposium on High Efficiency Absorbers, AIChE Spring National Meeting, Orlando, FL.	1990
Co-chairman, Symposium on Heavy Oil Upgrading to Refining, Canadian Society for Chemical Engineering, Calgary.	1990
Chairman, Symposium on Enhanced Oil Recovery, AIChE Summer National Meeting, Philadelphia, PA.	1989

UNIVERSITY COMMITTEE RESPONSIBILITIES:

University of Western Ontario

Chair, Senate (2009-present)
 Member, Properties and Finance Committee
 Member, Fund Raising and Donor Relations Committee

University of Waterloo

Vice-Chair, Senate, University of Waterloo (2001- 2009).
 Chair, Senate Long Range Planning Committee, University of Waterloo (2001-2009).
 Chair, Dean's Council, University of Waterloo (2001-2009)
 Chair, Vice-President University Research Nominating Committee, 2005.
 Chair, Decanal Nominating Committees (Faculty of Arts, Applied Health Sciences, Engineering, Environmental Studies, Mathematics, Dean of Graduate Studies, Science)
 Co-Chair, Faculty Relations Committee, University of Waterloo (2001-2009)

Member, Pension and Benefits Committee, Board of Governors, University of Waterloo (2001-2009)

University of Regina

Chair, Research Chair Advisory Committee, The University of Regina (2001 – 2001)

Chair, Committee to review the Director of Information Services, The University of Regina (2001).

Chair, President's Research Committee, The University of Regina (1999-2001)

Chair, Governing Committee on University Centres and Institutes (1999-2001)

Chair, University Promotion Committee, The University of Regina (1999-2001)

Chair, President's International Committee, The University of Regina (1999-2001)

Chair, CFI Steering Committee, The University of Regina (1999-2001)

Member, Planning and Priorities Committee (1999-2001)

Member, Dean of Engineering Search Committee, University of Regina (1999-2000).

Member, Dean of Education Search Committee, University of Regina (1999-2000).

Member, Presidential Search Committee, The University of Regina (1997-1998)

Member, President's Advisory Committee on Racial Harassment, U. of Regina (1997-1999)

Member, Executive Committee of the Senate, The University of Regina (1997-2001)

Member, CFI Steering Committee, The University of Regina (1997-1999)

Member, Graduate Studies Review Committee of Dean's Council, U. of Regina. (1997-1998)

Member, Senate, University of Regina (1996-2001)

Member, Executive of Council, University of Regina (1996-2001)

RESEARCH GRANTS:

Title	Granting Agency	Amount	Years
Novel CO ₂ Separation processes for GHG Mitigation	NSERC Discovery Grant	\$ 42,000/year	2007-2012
Novel CO ₂ Separation processes for GHG Mitigation	NSERC Discovery Grant	\$ 46,600/year	2003-2007
Molecular Design and Solvent Development For CO ₂ Capture from Industrial Gas Streams	NSERC Strategic Project	\$ 172,500/year	2003-2006
Int. Test Centre for CO ₂ Capture (Tontiwachwuthikul et al.)	Canada Foundation for Innovation/Sask. Innovation Fund/others	\$ 4,500,000	2002-2002

RESEARCH GRANTS:

Title	Granting Agency	Amount	Years
Greenhouse Gas Control Technology Centre	WED and Sask. Econ. and Co-op Dev.	\$ 5,660,000	2001-2003
Real-Time Liquid Droplet Analyzer	NSERC Equipment Grant	\$ 99,332	2001-2002
Int. Test Centre for CO ₂ Capture	WED and Sask. Econ. and Co-op Dev.	\$ 3,000,000	2000-2001
An information system for assessing and Managing environmental risks of air Pollution from petroleum industries (Huang, Chakma and Tontiwachwuthikul)	NSERC Strategic Project	\$ 85,000	2000-2001
		\$ 89,000	2001-2002
		\$ 89,000	2002-2003
Development of an Information System For Supporting Climate-Change Impact Studies Within the Prairie's Energy Sector (Huang et al.)	Natural Resources Can.	\$ 52,500	2000-2001
Adaptation Strategy of Petroleum Industries in Western and Northern Canada under Changing Climatic and Economic Conditions (Huang and Chakma.)	Prairie Adaptation Research Cooperative (PARC)	\$ 12,000	2000-2000
CO ₂ Capture Test Facility	SaskPower	\$ 300,000	1999-2002
Liquid Chromatography Mass Selective Detector (Tontiwachwuthikul & Chakma)	NSERC Equipment Grant	\$ 99,056	1999-1999
New Solvent development and Mass Transfer Studies for Simultaneous Separation of SO ₂ and CO ₂ (Tontiwachwuthikul et al.)	NSERC Strategic Project	\$ 95,000	1999-2000
		\$ 91,500	2000-2001
		\$ 88,500	2001-2003
Mass Transfer in Formulated Gas Treating Solvents and Foamy Oil Flow (A. Chakma)	NSERC Research Grant	\$ 29,610/year	1999-2003
Sustainable Heavy Oil Research Facility (Islam, Chakma, Tontiwachwuthikul & Huang)	Canada Foundation for Innovation/PTRC	\$ 2,381,798	1999-1999
Potential of Greenhouse Gas Storage and Utilization through Enhanced Oil recovery (Islam, Huang and Chakma)	PTRC	\$ 260,000	1998-1999
Development of Integrated Information and Decision Support System for Petroleum Waste Management (Chakma et al.)	NSERC Strategic Projects	\$ 258,000	1997-2000

RESEARCH GRANTS:

Title	Granting Agency	Amount	Years
CO ₂ Separation Using Activated Carbonate Solvents: Studies of Corrosion, Solvent Stability & Absorption Characteristics	NSERC IOR & Saskferco Inc.	\$ 200,000	1997-2000
Role of Foamy Oil Flow in Cold Lake Reservoirs	Alberta Energy	\$ 168,000	1997-2000
Risk Assessment and Decision Analysis for Site Contamination Problems at Hoosier Gas Plant and Cantuar Field Tank (Huang and Chakma)	TransGas and NSERC IOR Grant	\$ 41,600	1997-1999
GC/MS for Energy and Environmental Research	NSERC Equipment Grant	\$ 80,385	1997-1998
Foam Flow in Porous Media	NSERC IOR Grant	\$ 75,000	1994-1997
Foam Flow in Porous Media	Petroleum Recovery Inst.	\$ 75,000	1994-1997
Mass Transfer in Formulated Gas Treating Solvents and Foamy Oil Flow	NSERC Research Grant	\$ 95,200	1995-1999
Novel Gas Treating Processes and Enhanced Oil Recovery	NSERC Research Grant	\$ 66,000	1993-1995
Membrane Reactors	Japan Science and Tech. Fund (JSTF) Grant	\$ 8,684	1993- 1994
Mass Transfer Studies in Bubble Columns For Low Volume Gas Processing at the U of Auckland	NSERC International Collaborative Research Grant	\$ 7,400	1991-1992
Gas Analyzer and Mass Flow Control System	NSERC Equipment Grant	\$ 15,148	1991-1992
Modelling of CANMET/U de S High Shear Hydrovisbreaking Reactor	EMR/NSERC	\$ 13,500	1991-1992
Ultrasonic Visbreaking of Alberta Bitumens/Diluent Mixtures	URGC Pilot Study	\$ 4,500	1991-1992
Development of a Purification Technique For Degraded DEA Solutions	NSERC/AMOCO CRD Grant	\$ 243,000	1990-1993
Microbial Transport in Porous Media	ESSO Resources Canada	\$ 97,000	1990-1992
Contraves Rheometer	NSERC	\$ 38,064	1990-1991
Modelling of CANMET/ UdeS High Shear Jet Reactor	Energy, Mines and Resources Canada	\$ 11,250	1990-1991
Novel Gas Treating Processes	NSERC Operating Grant	\$ 54,000	1989-1992

RESEARCH GRANTS:

Title	Granting Agency	Amount	Years
Flow of Gas-Oil Mixtures in Deviated Wells (with J. Stanislav)	Energy, Mines and Resources Canada	\$ 21,000	1989-1991
Gas Chromatographic Method for Analyses of Amine Solutions	CGPA	\$ 36,000	1989-1991
Coprocessing of Coal and Bitumen Bitumen with Molten Halide Catalysts	Alberta Energy	\$ 70,000	1989-1990
Immobilized Liquid Membranes for Selective CO ₂ Permeation from Ethane	AMOCO Canada Petroleum Co. Ltd.	\$ 40,000	1989-1990
Study of Kinetics and Mass Transfer Rates for CO ₂ - Hindered Amine Systems	URGC Starter Grant	\$ 4,000	1988-1990
Pilot Plant Studies on CO ₂ Absorption by Hindered Amines	AMOCO Canada Petroleum Co. Ltd.	\$ 5,000	1989-1990
Scaled Model Studies on Electromagnetic Heating and Inert Gas Injection in Horizontal Wells	Energy, Mines and Resources Canada	\$ 245,600	1989-1992

OTHER GRANTS:

Title	Granting Agency	Amount	Years
China-Canada Flooding Control, Ecological Protection, and Sustainable Development (Huang et. al.)	CIDA UPCD Tier 2	\$ 750,000	1999-2004
GHG Technology Centre Design	WED	\$ 200,000	1999-2000
Scoping Study for the Setting up of Canadian GHG Control Technology Centre	NRCan/WED/Sask Energy & Mines	\$ 20,000	1998-1999
Establishment of Electronic Classrooms At U of R and U of S to facilitate course Exchange. (with F. Berruti)	Sask. Post Secondary Education & Skills Training.	\$ 40,000	1997

TEACHING:

Undergraduate Courses: Technology and Society, Unit Operations, Chemical Engineering Laboratory I, Chemical Reaction Engineering, Mass Transfer, Air Pollution, Water Pollution.

Graduate Courses: Advanced Topics in Mass Transfer, Natural Gas Processing Principles, Natural Gas Processing Technology, Petroleum Waste Management, Environmental Management, Sustainable Development, Energy Systems.

Continuing Ed Courses: Natural Gas Processing, Natural Gas Utilization, LNG Engineering, Air Pollution Engineering, Physical and Chemical Properties of Natural Gas.

INVITED LECTURES

1. "Recent Developments in Gas Conditioning." Bangladesh Petroleum Institute and Bangladesh University of Engineering and Technology sponsored seminar, August 13-14, 1990.
2. "Diethanolamine Degradation and Reclamation - A Researcher View", AMOCO Sour Gas Handling Symposium, Banff, September 24-29, 1990.
3. "Coproducting of Bitumen and Coal with Molten Halide Catalysts", Alberta Coal Research Contractors' Conference, Calgary, Alberta, October 30-31, 1991.
4. "Acid Gas Separation Using Immobilized Liquid Membranes", presented at the 1992 Lawrence Reid Gas Conditioning Conference, held at the University of Oklahoma, Norman, March 1992.
5. "Formulated Amines - Challenges and Opportunities For the Gas Processors ", presented at the Third Quarterly Meeting of the Canadian Gas Processors Association, Calgary Convention Centre, September 11, 1992.
6. "Applications of Adsorption Processes in the Petroleum Industry ", presented at the Department of Chemical Engineering, University of Ottawa, November 11, 1992.
7. "Facilitated Transport in Immobilized Liquid Membranes - Application to Gas Separation", presented at the Department of Chemical Engineering, University of Ottawa, November 11, 1992.
8. "Microcomputer Applications of Management of Petroleum Waste", Invited Lecture, Computers and Environment General Meeting, Calgary, June 8, 1993.
9. "Politics of Environment and Development - The Alberta Experience", Invited Plenary Lecture, International Pre-Symposium on Environmental Information Science in Cold Regions, Kitami, Hokkaido, Japan, July 3-4, 1993.
10. "Facilitated Transport in Membranes - From Biological Systems to Chemical Processing", Chemical Society of Japan lecture, presented at the Kitami Institute of Technology, Kitami, Japan, July 5, 1993.
11. "Catalytic Membranes - New Horizon in Separation", Catalysis Society of Japan Lecture, presented at the Kitami Institute of Technology, Kitami, Japan, July 8, 1993.
12. " Membrane Reactor Applications in Thermodynamically Limited Reactions - A Case Study of H₂S Decomposition", presented at the Seikei University, Tokyo, Japan, July 20, 1993.
13. "Gas Separation Membranes - Application to CO₂ Removal", presented at the Symposium on CO₂ Chemistry, Organized by the Swedish Royal Institute of Technology and the Swedish Chemical Society, Hemavan, Sweden, September 20-23, 1993.
14. "Coke, Lungs, Gas Reservoirs and The Carbon Dioxide Connection", Faculty of Engineering 1994 Leading Edge Lecture Series, presented at the University of Calgary, April 15, 1994.
15. "In Search of an Ideal CO₂ Separation Process", Presented at the University of Laval, Quebec City, Canada, September, 1994.

INVITED LECTURES (Cont'd..)

16. "An Energy Efficient Mixed Solvent for the Separation of CO₂", Presented at the 2nd International Conference on Carbon Dioxide Removal held in Kyoto, Japan, 25 - 27th October, 1994.
17. "Simultaneous Separation of CO₂ and SO₂ From Flue Gas Streams by Liquid Membranes", Presented at the 2nd Int. Conference on Carbon Dioxide Removal held in Kyoto, Japan, 25 - 27th October, 1994.
18. "Environmental Issues in the Alberta Agricultural Sector", Invited Plenary Lecture, International Symp. on Environmental Information Science in Cold Regions, Kitami, Hokkaido, Japan, October, 1994.
19. "Electromagnetic Heating of Heavy Oil Reservoirs - A Novel Method of Heavy Oil Production", presented at a Meeting on Technologies of Oil Recovery from Oil Sand Reservoir, University of Tokyo, Japan, December 9, 1994.
20. "Jet Reactor Concept - A Novel Method for the Upgrading of Heavy Oil and Bitumens by Solvo-Thermo-Mechanical Means", presented at the First Int. Solvo-Thermal Conference, Kagawa Prefecture, Japan, Dec. 5 - 7, 1994.
21. "CO₂ Production for Enhanced Oil Recovery in Canada: Current Issues", presented at the Sixth Saskatchewan Petroleum Conference held in Regina, October 16-18, 1995.
22. "Separation of CO₂ from Power Plant Flue Gases and Its Subsequent Disposal - Is It a Viable Option", presented at the Int. Chemical Congress of Pacific Basin Societies", held in Honolulu, Hawaii, December 17-22, 1995.
23. "Electromagnetic Heating of Heavy Oil Reservoirs - A Novel Method of Heavy Oil Production", presented at the Conference on technologies of Oil Recovery from Oil Sand Reservoir, University of Tokyo, Japan, December 9, 1994.
24. "Engineering Education in a Global Economy - Meeting Our Challenges", presented at the Southern Saskatchewan Section Meeting of the Petroleum Society of CIM, Regina, October 3, 1996.
25. "Heavy Oil Recovery via Solvo-Thermal Reactions Assisted by Electromagnetic Heating", presented at the First International Solvo-Thermal Conference, Kagawa Prefecture, Japan, December 18-20, 1996.
26. "Supercritical Extraction of Tar Sands Bitumen", presented at the International Conference on High Pressure Science and Technology, Kyoto, Japan, August 25-29, 1997.
27. "Technical Partnerships - Doers and Users", Seventh Saskatchewan Petroleum Conference, Regina, October 20, 1997.
28. "Research Potential and Needs to Improve Carbon Dioxide Separation Efficiency", Greenhouse Gas Abatement Technology Screening Group Meeting, Regina, March 23, 1998.
29. "Potential Consequences of Kyoto Accord for Canadian Industry", Canadian Prairie Group of Chartered Engineers Annual Meeting, Calgary, AB., April 8, 1998.
30. "Greenhouse Gases, Kyoto and the Environment", Annual Meeting of the Calgary Chapter of Sigma Xi, Calgary, AB., April 9, 1998.

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31. "Industrial Waste Water Management Challenges in Canada", International Workshop on Barriers to Sustainable Management of Water Quantity and Quality, May 12-15, 1998, Wuhan, China.
32. "Designer Solvents for Energy Efficient CO₂ Separation from Flue Gas Streams", Fourth International Conference on Greenhouse Gas Control Technologies, Interlaken, Switzerland, August 31, 1998.
33. "Energy Technology Futures 2020", Energy Technology Futures Project Focus Group, Calgary, AB., December 15, 1999.
34. "Petroleum Technology Research Centre: Who, What, Where and Why?", Petroleum Society of CIM, South Saskatchewan Section Luncheon Meeting, January 18, 1999.
35. "Energy Futures, GHG Challenge and Canadian Opportunities", Association of Professional Engineers and Geoscientists of Saskatchewan Distinguished Lecture 2000, Lloydminster SK - March 20, 2000; Estevan SK. - March 30, 2000.
36. "Climate Change and the Future of Natural Gas Industry", Keynote speaker, Canadian Gas Association Gas Measurement School, June 6, 2000, Regina, SK.
37. "International Test Centre for CO₂ Capture", Int. Energy Agency Greenhouse Gas R&D Program Open Forum, Regina, Saskatchewan, Canada, March 26, 2001.

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