

Curriculum Vitae of Anthony Halog, Ph.D., MBA

University Address

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Professional Training

International Postgraduate Course in Environment and Sustainable Development, United Nations University, Tokyo, Japan, May 2003 –July 2003

Doctor of Economics (Dr.rer.pol.), Faculty of Economics and Business Engineering, University of Karlsruhe, Germany, February 2002
Dissertation: *Selection of Sustainable Product Improvement Alternative*

Master of Business Administration, July 1998
Monash University, Melbourne, Australia

Master of Engineering in Industrial Engineering & Management, December 1993,
Asian Institute of Technology, Bangkok, Thailand

Bachelor of Science in Chemical Process Engineering (*Magna cum Laude*), April 1990
University of Mindanao, Davao City, Philippines

Professional Certificates

Life Cycle Assessment (LCA) Certified Professional (ID 2008-18)

(Expiration Date: Dec. 31, 2011), American Center for Life Cycle Assessment (ACLCA), USA.

Sustainable Business Challenge Certificate, World Business Council for Sustainable Development (WBCSD), Switzerland, effective January 28, 1998.

Research and Teaching Experience

From July 1, 2008- present **Assistant Professor of Industrial Ecology and Life Cycle Assessment (tenure track)** in the School of Forest Resources, the University of Maine, U.S.A.

August 2006 — July 2008: **Assistant Professor (Limited Term)** of Operations Management & Information Systems, Faculty of Business, Brock University, Canada.

January 2006 — August 2006: **Part-time Lecturer** of Management Science in the Sprott School of Business, Carleton University, Canada.

June 2004 — June 2006: **NSERC Visiting Research Fellow** in Sustainable Technology Laboratory of the National Research Council (NRC), Ottawa, Canada. Research: Application of Quantitative Methods to Environmental Technology Assessment and Foresighting; Environmental Management; Sustainability Analysis.

March 2002 — March 2004: **JSPS Visiting Research Fellow** in the Research Institute for Life Cycle Assessment of the National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan. Research: Application of Operations Research Methods to Environmental Life Cycle Assessment of Novel and Innovative Technologies.

April 1999 — March 2002: **Research Associate** in the Institute for Industrial Production and Management at the University of Karlsruhe, Germany. Research: Application of Decision Analysis for Economic, Environmental and Quality Assessment of Sustainable Product Designs; Life Cycle Analysis (LCA).

June 1995 — June 1996: **Assistant Professor** of Industrial Engineering & Management, College of Engineering at the De La Salle University, Manila, Philippines.

April 1988 — March 1990: **Teaching Assistant** in the Department of Chemical Process Engineering, College of Engineering & Architecture at the University of Mindanao, Davao City, Philippines.

Research Activities

Research/Teaching Grants and Fellowships Awarded/Funded

International Society for Industrial Ecology (ISIE), Conference Attendance Support to present paper in "*Modeling the Sustainability of Wood-Based Bio-refinery and its Supply Chains*, Industrial Ecology Conference (Theme: Transitions to Sustainability), June 21-24, 2009, Lisbon, Portugal (with Shashi Dhungel); Awarded \$1860.

Japan Society for Promotion of Science (JSPS), March 5 – 8, 2009, Participation in the "*Multifunctional Nanoscale Materials for the 21st Century*", Argonne National Laboratory, Illinois, USA; Awarded Participation Support of \$ 2000.

DFG-German Excellence Seed Funds 2009. "Risikoanalyse Energetischer Biomasseverwertung (Risk Analysis of Bio-energy Use)" , Collaborative project with Prof. Hollert of RWTH Aachen University, Germany (PI) and Prof. Angenent, Cornell University (co- PI); Requested Amount: Euro 44,200.

U.S. Department of Energy (DOE), October 1, 2008 - October 1, 2010. Awarded research Grant of US\$100,001 for the project "*Life Cycle Assessment of Bio-ethanol from Forest resource-based Hemi-cellulose*", (with Steve Shaler).

University of Maine Center for Teaching Excellence (CTE), November 5, 2008 - August 30, 2009. Awarded a Teaching Grant of \$1000 for the project "*An Active Learning Strategy in Teaching the New Interdisciplinary Course in Industrial Ecology and Life Cycle Assessment to Undergraduate Students*".

Tuition Grant, Canadian Operational Research Society (CORS), July 26-29 (2007 Teaching Management Science Workshop). Awarded workshop grant of C\$ 750.

Internal Seed Research Grant, Faculty of Business, Brock University, August 2006 –July 2008. Awarded research support of C\$ 5,000 for the project "*Towards Design of Sustainable Value Chain Networks: An Efficiency Approach*".

Natural Science and Engineering Research Council (NSERC) Visiting Research Fellowship, June 2004 –June 2006. Awarded a 2-year research grant of C\$ 100,000 for the project "*Development of Dynamic Systems Models for the Oil Sands Industry: Demonstrating Triple Bottom Line Concept of Sustainability*".

Japan Society for Promotion of Science (JSPS) Visiting Research Fellowship, March 2002 – March 2004. Awarded a 2-year research grant of 14,152,751.91 Yen for the project "*Development of Assessment Methodology for Waste Gasification Technologies with Data Uncertainty*".

German Academic Exchange Service (DAAD) Doctoral Research Grant, April 1999 – March 2002. Awarded a 3-year research grant of 65,000 Euros for the project "*Selection of Sustainable Product Designs*".

Research Proposals Recently Submitted

National Science Foundation/Environmental Sustainability. "Evaluating the Potential Environmental Impacts of Emerging Technologies in Industrial Ecology Modeled Biorefinery", Full Proposal submitted on March 2, 2009. Amount:\$ 240,000. (Pending).

Northeast Sun Grant Initiative Competitive Grants Program. "Development of a Dynamic Systems Model for Life Cycle Sustainability Analysis of Bio -fuel Supply Chains", (Full Proposal submitted on Feb. 2, 2009); Requested Amount: US\$150,000 (Pending)

AT & T Industrial Ecology Faculty Fellowship Program. “ICT Enabled Sustainability Framework for Developing Value Chains of Forest-based Products”, Full Proposal submitted on Dec. 15, 2008. Fixed Amount: \$25000. (Pending)

National Science Foundation/Integrative Graduate Education and Research Traineeship (NSF/IGERT). “Life Cycle Sustainability Assessment, Industrial Ecology and Product Disposal”, contributed as part of NSF/IGERT Proposal “Sustainable Forest Bioproducts” submitted by Douglas Gartner, Robert Lilieholm, Jessica Leahy and others on October 14, 2008 (Pending).

Research Proposals Not Funded

National Science Foundation/ EFRI-HyBi. “Hybrid Biological-Thermal Conversion of Biodiverse Feedstocks to Improve the Ecological and Economic Sustainability of Renewable Hydrocarbon Fuels, (with Peter, Aaron, Clayton and Brian); Requested Amount: \$2,449,969.

NSF Science and Technology Center (NSF/STC). “Life Cycle Sustainability Assessment of Forest Resource based Bio-products with Consideration of Uncertainty Issues”, contributed as part of NSF/STC Preproposal “Regional Science & Technology Center for Forest Bioproducts Research” submitted by Hemant Pendse, Bob Wagner, Stephen Shaler and others on November 3, 2008.

NIMMS Project, NC_TEMP1175 - Sustainability of Next Generation Biofuel Systems, Interest to Participate Submitted on January 7, 2009.

Submitted Papers (Currently in Review)

Halog, A. *Models for Evaluating Energy, Environmental and Sustainability Performance of Biofuels Value Chain*, the International Journal of Global Energy Issues (revision).

Halog, A. (2008). *Novel Biomass-based Technology for Sustainable Bioeconomy*, Abstract of the Proposed Paper, Submitted for an Edited Book titled "Technologies that May Shape Our Future".

Articles Published in Refereed Journals

Lilieholm, R., Pendse, H., Shaler, S., Benjamin, J. van Walsum, P. Gardner, D., Halog, A. *Forest Bio-products*, SAF's Wiki Encyclopedia on Forestry in the Americas.

Halog, A., Chan, A. (2008). *Developing a Dynamic Systems Model for Sustainable Development of the Canadian Oil Sands Industry*, **International Journal of Environmental Technology and Management**, Vol. 8, No. 1, pp. 3-22.

Halog, A. (2004). *An Approach to Selection of Sustainable Product Improvement Alternatives with Data Uncertainty*, **Journal of Sustainable Product Design**, Springer, the Netherlands, 4 (1-4), pp. 3-19.

Halog, A. (2004). *Development of Ecological Loss Function*, **International Journal of Research in Science and Engineering**, **1(3)**, ISSN: 1656-1996, pp. 22-32.

Halog, A., Wei B., Sagisaka, M., Inaba A. (2004). *A Multi-attribute Assessment of Environmentally-sound Electric Vehicle Battery Technologies*, **Journal of Industrial Engineering**, **1(1)**, ISSN 1656-2798, pp. 40-59.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Modeling Uncertainties in Assessing Waste Gasification Technology*, **MACRO Review Special Issue**, 16(1), S/N. 25, ISSN 0915-0560, pp. 251-255.

Halog, A., Schultmann, F. & Rentz, O. (2001) *Using Quality Function Deployment (QFD) for Technique Selection for Optimum Environmental Performance Improvement*, **Journal of Cleaner Production**, **9(5)**: 387-394.

Refereed Articles in Published Book Proceedings & On-line Dissertation

Halog, A., Chan, A. (2006). *Toward Sustainable Production in the Canadian Oil Sands Industry*, Proceedings of the 13th CIRP International Conference on Life Cycle Engineering, Leuven, Belgium, May 31-June 2, 2006, ISBN: 90-5682-712-X, copyright 2006, pp. 131-136.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Ecological Loss Function: Basis for Environmental Evaluation and Process Design*, Proceedings of 3rd International Symposium on Environmentally Conscious Design and Inverse Manufacturing, Tokyo, Japan, December 8-11, ISBN: 0-7695-2048-0, copyright 2003 IEEE, pp. 147-154.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Evaluation of Waste Gasification Technology under Data Uncertainty and Variability*, Proceedings of the 3rd International Symposium on Environmentally Conscious Design and Inverse Manufacturing, Tokyo, Japan, December 8-11, ISBN: 0-7695-2048-0, copyright 2003 IEEE, pp. 698-705.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Assessment of Electric Vehicle Battery Technologies Using Promethee-Gaia and Fuzzy Linguistic Multi-criteria Approaches*, Energy and Environment: A World of Challenges and Opportunities (EnerEnv' 2003 Conference), Science Press, Beijing, October 11-14, ISBN 1-880132-85-0, pp. 13-18.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Development of an Assessment Methodology for Waste Gasification Technology under Stochastic Data*, Energy and Environment: A World of Challenges and Opportunities (EnerEnv' 2003 Conference), Science Press, Beijing, October 11-14, ISBN 1-880132-85-0, pp. 177-184.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Environmental-Economic Assessment of Waste Gasification Technology under Data Uncertainty and Variability*, Proceedings of the 1st International Conference on Environmental Research, Ars Docendi Publishing House, Bucharest, Romania, ISBN 973-558-077-2, pp. 193-204.

Halog, A. (2002) *Selection of Sustainable Product Improvement Alternatives*, Ph.D.

Dissertation, University of Karlsruhe, Germany (electronically published and available online at <http://digbib.ubka.uni-karlsruhe.de/volltexte/242002>).

Conference Papers Published in Refereed Proceedings

Halog, A., Sagisaka, M., Tahara, K., Yamaguchi, K., Inaba, A. (2004). *Sectoral Eco-efficiency by Input-Output and Data Envelopment Analysis*, Proceedings of the 6th International Conference on EcoBalance, Tsukuba, Japan, Oct. 27-29; pp. 727-730.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Assessment of Electric Vehicle Battery Technologies Using Fuzzy Linguistic and AHP Approaches*, Proceedings of the 8th International Conference on Environmental Science and Technology, Lemnos, Greece.

Halog, A., Sagisaka, M., Inaba, A. (2003) *Evaluation of Electric Vehicle Battery Technologies Using Multi-criteria Decision Analysis*, Proceedings of the 2003 Annual Research Conference of the Philippine Institute of Industrial Engineers, Makati, Philippines, October 16-18 (CD version).

Halog, A., Sagisaka, M., Inaba, A. (2003) *A Fuzzy Linguistic Approach for Sustainable Product Design Selection*, Annual Research Conference (Theme: Accelerating National Development through Enhanced I.E. Research Capability), Makati, Philippines, October 16-18 (CD version).

Halog, A. (2002) *A Life Cycle Approach for Strategic Selection of Sustainable Product Improvement Alternatives under Data Uncertainty*, Proceedings of the 5th International Conference on EcoBalance, Tsukuba, Japan, Nov. 6- 8; pp. 515-518.

Halog, A. (2002) *Adapting QFD Methodology for Environmental Performance Improvement of Selected Environment-Conscious Techniques*, Proceedings of the 5th International Conference on EcoBalance, Tsukuba, Japan, Nov. 6- 8; pp. 43 1-434.

Published Short or Extended Abstracts

Halog, A., Bhandar, G., Shaler, S. (2009). *A Streamlined Life Cycle Analysis of Forest-based Bio-ethanol*, 2009 Sun Grant Initiative Energy Conference, March 10-13, 2009, Washington, DC.

Bhandar, G., Halog, A. *A Case Study: Life Cycle Assessment (LCA) of Bio-ethanol from Forest Hardwood from North-Eastern Part of the United States*, 15th SETAC Europe LCA Case Studies Symposium, January 22-23, 2009, Paris, France.

Bhandar, G. , Halog, A. *Comparative Life Cycle Assessment of Conventional and FBRI Hardwood Kraft Production Systems: A Case Study*, **Eastern CANUSA Forest Science Conference**, October 17- 18, 2008, Orono, Maine.
www.crsf.umaine.edu/pdf/ECANUSA/ECANUSA_2008_Proceedings_web.pdf, p. 70.

Halog, A., Bhandar, G. *Consideration of Data Uncertainty and Variability in the Life Cycle Assessment (LCA) of Forest Resource-based Bio-ethanol*, **SETAC North America 29th Annual Meeting**, November 16- 20, 2008, Tampa, Florida
(<http://www.setac.org/tampa/pdf/Abstract Book.pdf>), pp. 76-77.

Bhandar, G., Halog, A. (2008). *Life Cycle Assessment of Bio-ethanol from Forest Resources*, **Life Cycle Assessment VIII: Calculating Consequences beyond the Box**, Sept. 30 – Oct. 2, Seattle (available at <http://www.lcacenter.org/LCA8/presentations/297.pdf>)

Halog, A. (2008). *Assessing the Sustainability Performance of Global Supply Chains*, 2008 **Production and Operations Management Society (POMS) Conference**, May 9 -12, 2008, La Jolla (San Diego), California.

Halog, A. (2007). *Assessing Sustainable Supply Chain Network Performance Using Data Envelopment Analysis*, Data Envelopment Analysis Session, **Proceedings of INFORMS Annual Meeting 2007**, November 4-7, 2007, Seattle, USA.

Halog, A. (2007). *An Eco-efficiency Approach for Assessing Sustainable Value of Supply Networks*, Strategy and Efficiency Session, **International Conference on Business and Sustainability – “Sustainability in the Supply Chain**, November 1-2, 2007, Portland State University, Portland, USA, p. 14.

Halog, A., Inaba, A. (2007). *Application of Systems Modeling to Sustainability Assessment of Emerging Technologies in Canadian Oil Sands Industry*, **Final Program of CORS National Meeting** (http://www.apmaths.uwo.ca/cors2007/FullPGM_may4.pdf), May 14 - 16, 2007, London, Ontario, p. 75.

Halog, A., Chan, A. (2007). *Assessing Japanese Industrial Sector' Eco-efficiencies Using Data Envelopment Analysis*, **Final Program of CORS National Meeting** (http://www.apmaths.uwo.ca/cors2007/FullPGM_may4.pdf), May 14 - 16, 2007, London, Ontario, p. 58-59.

Halog, A., Sagisaka, M., Inaba, A. (2004). *Developing Industry-based Eco-efficiency Measure for Japanese Firms Using LCA and DEA Approaches*, **1st International Conference on Eco-efficiency for Sustainability: Quantified Methods for Decision Making**, Netherlands, February 2004, p.59.

Halog, A., Tahara, K., Sagisaka, M., Inaba, A. (2004). *Assessment of Eco-efficiency by Input-Output and Data Envelopment Analyses*, **SETAC 25th Annual Meeting in North America**, <http://abstracts.co.allenpress.com/pweb/setac2004/document/?ID=3876>

Halog, A., Sagisaka, M., Inaba, A. (2003). *Evaluating Recycling and Disposal Options for Batteries: The AHP Approach Multicriteria Analysis Approach Compared to a Fuzzy Sets Methodology*, **2003 International Society for Industrial Ecology Conference: Industrial Ecology for Sustainable Future**, Michigan, USA, June 29-July 2003, pp. 13-14.

Technical/Research Project Reports

Halog, A. (2006). *Development of a Dynamic Systems Models for the Oil Sands Industry: Demonstrating Triple Bottom Line Concept of Sustainability*, National Research Council Canada (NRC), NSERC Visiting Research Report.

Fu, G., Halog, A., Cook, K., Minns, D. (2005). *Conclusions from Environmental Life Cycle Assessment Studies of Bioproducts*, National Research Council Canada, Ottawa, Canada (Project Report for Environment Canada and Industry Canada).

Halog, A. (2004). *Assessment of Waste Gasification Technology under Data Uncertainty and Variability*, National Institute of Advanced Industrial Science and Technology (AIST), Japan, JSPS Visiting Research Report.

Halog, A. (2003) *Synergism of Cleaner Production and Zero Emission Initiatives towards Achieving Sustainable Development*, United Nations University (UNU) Research Paper, Tokyo, Japan.

Halog, A., Engels, B., Schultmann, F., & Rentz, O. (2000) *Report on Circulation Behaviour of Impurities in Ironmaking Process*, Institute for Industrial Production, Karlsruhe, Germany (for NKK, Japan project).

Accepted Abstracts

Halog, A. (2009). *Life Cycle Sustainability Modeling of Forest Resource Based Biofuel*, 3rd International Conference on Life Cycle Assessment (CILCA), April 27-29, 2009, Chile.

Dhungel, S., Halog, A. (2009). *Modeling the Sustainability of Wood-Based Bio-refinery and its Supply Chains*, Abstract Submitted to 2009 Industrial Ecology Conference (Theme: Transitions to Sustainability), June 21-24, 2009, Lisbon, Portugal.

Bhander, G., Halog, A. *A Life Cycle Sustainability Assessment of Wood Based Cellulosic Nan fibers with Application in Building Materials*, ENGINEERING SUSTAINABILITY 2009, Innovations that Span Boundaries, April 19-21, 2009, Pittsburgh, PA.

Halog, A., Shashi, D. (2009). *Sustainability Assessment of Wood-based Bioproducts through Life Cycle and Systems Perspective Approaches*, Extended Abstract Submitted to SETAC Europe 19th Annual Meeting, Goteborg, Sweden, May 31- June 4 2009.

Halog, A. (2009). *Sustainability Modeling and Analysis of Emerging Technologies in the Bio-fuel Supply Chain (Case of Wood-based Biorefinery System in Maine)*, Extended Abstract Submitted to 2009 IEEE International Symposium on Sustainable Systems and Technology, May 18-20, 2009, Arizona, USA

Halog, A., Dhungel, S., Neupane, B. (2009). *Modeling and Analysis of Woody Biomass Utilization and its Potential Impacts to Developing Forest Biorefinery System*, Abstract submitted to International Conference on Woody Biomass Utilization, August 4-5, 2009,

Mississippi, USA.

Halog, A., Bhandar, G., Shaler, S. (2009). *Environmental Issues of the Proposed FBRI Biorefinery System As Compared with the Conventional Pulp Mill*, Abstract Submitted to the 7th International Conference on Fate and Effects of Pulp and Paper Mill Effluents and 9th IWA Symposium on Forest Industry Wastewaters, June 14-17, 2009, Fredericton, New Brunswick, Canada.

Halog, A., Dhungel, S. (2009). *Modeling the Development of Sustainable Forest Biofuels Value Chain in US Northeast Region*, Bioenergy 2009 - Sustainable Bioenergy Business, Finland, August 31 - September 4, 2009.

Halog, A., Bhandar, G., Shaler, S. (2009). *A Streamlined Life Cycle Analysis of Forest-based Bio-ethanol*, 2009 Sun Grant Initiative Energy Conference, March 10-13, 2009, Washington, DC.

Halog, A. (2009). *Modeling and Analysis of Sustainability of Forest Biofuels Value Chain*, The Future of Biofuels, Snowbird, Utah, April 4-8, 2009.

Halog, A. (2008). *Sustainability Modeling and Analysis of Forest Biofuels*, WFC 2009: XIII World Forestry Congress, Buenos Aires, Argentina, Oct. 18-25, 2009.

Thesis (Masters and Bachelors)

Halog, A. (1993). *The Effect of Demand Forecasting Errors in Production System*, Asian Institute of Technology, AIT Thesis IE-93-33, Bangkok, Thailand.

Halog, A. (1990). *The Production of Organic Fertilizer Out of Musa Sapientum Plant*, University of Mindanao, Davao City, Philippines.

Oral/Poster Presentations in Meetings and Conferences

Halog, A. (2009). *A Streamlined Life Cycle Analysis of Forest-based Bio-ethanol*, 2009 Sun Grant Initiative Energy Conference, March 10-13, 2009, Washington, DC.

Halog, A., Bhandar, A. *Consideration of Data Uncertainty and Variability in the Life Cycle Assessment (LCA) of Forest Resource-based Bio-ethanol*, SETAC North America 29th Annual Meeting, November 16- 20, 2008, Tampa, Florida. (Presenter)

Comparative Life Cycle Assessment of Conventional and FBRI Hardwood Kraft Production Systems: A Case Study, Eastern CANUSA Forest Science Conference, October 17- 18, 2008 (Poster Session), with Gurbakhash Bhandar and Stephen Shaler.

Life Cycle Assessment of Bio-ethanol from Forest Resources, Life Cycle Assessment VIII: Calculating Consequences Beyond the Box, Sept. 30 – Oct. 2, Seattle, with Gurbakhash S

Bhander.

Assessing the Sustainability Performance of Global Supply Chains, 2008 Production and Operations Management Society (POMS) Conference, May 9 -12, 2008, La Jolla (San Diego), California.

Assessing Sustainable Supply Chain Network Performance Using Data Envelopment Analysis, INFORMS Annual Meeting, November 4-7, 2007, Seattle, USA

An Eco-efficiency Approach for Assessing Sustainable Value of Supply Networks, International Conference on Business and Sustainability – “Sustainability in the Supply Chain”, November 2 – 3, 2007, Portland, USA.

Application of Systems Modeling to Sustainability Assessment of Emerging Technologies in Canadian Oil Sands Industry, CORS National Meeting, May 14 - 16, 2007, London, Ontario, with Albert Chan.

Assessing Japanese Industrial Sector’ Eco-efficiencies Using Data Envelopment Analysis, CORS National Meeting, May 14 - 16, 2007, London, Ontario, with Atsushi Inaba.

Developing Industry-based Eco-efficiency Measure for Japanese Firms Using LCA and DEA Approaches, 1st International Conference on Eco-efficiency for Sustainability: Quantified Methods for Decision Making, Netherlands, February 2004, with Masayuki Sagisaka and Atsushi Inaba.

Ecological Loss Function: Basis for Environmental Evaluation and Process Design, Proceedings of 3rd International Symposium on Environmentally Conscious Design and Inverse Manufacturing, Tokyo, Japan, December 8-11, 2003 with Masayuki Sagisaka and Atsushi Inaba.

Evaluation of Waste Gasification Technology under Data Uncertainty and Variability, Proceedings of the 3rd International Symposium on Environmentally Conscious Design and Inverse Manufacturing, Tokyo, Japan, December 8-11, 2003 with Masayuki Sagisaka and Atsushi Inaba.

Assessment of Electric Vehicle Battery Technologies Using Promethee-Gaia and Fuzzy Linguistic Multi-criteria Approaches, Energy and Environment: A World of Challenges and Opportunities (EnerEnv’ 2003 Conference), Science Press, Beijing, October 11-14, with Masayuki Sagisaka and Atsushi Inaba.

Development of an Assessment Methodology for Waste Gasification Technology under Stochastic Data, Energy and Environment: A World of Challenges and Opportunities (EnerEnv’ 2003 Conference), Science Press, Beijing, October 11-14, 2003, with Masayuki Sagisaka and Atsushi Inaba.

Environmental-Economic Assessment of Waste Gasification Technology under Data Uncertainty and Variability, Proceedings of the 1st International Conference on Environmental Research, Ars Docendi Publishing House, Bucharest, Romania, 2003, with

Masayuki Sagisaka and Atsushi Inaba.

Evaluation of Electric Vehicle Battery Technologies Using Multi-criteria Decision Analysis, Proceedings of the 2003 Annual Research Conference of the Philippine Institute of Industrial Engineers, Makati, Philippines, October 16-18, 2003 with Masayuki Sagisaka and Atsushi Inaba.

A Fuzzy Linguistic Approach for Sustainable Product Design Selection, Annual Research Conference (Theme: Accelerating National Development through Enhanced I.E. Research Capability), Makati, Philippines, October 16-18, 2003.

Evaluating Recycling and Disposal Options for Batteries: The AHP Approach Multicriteria Analysis Approach Compared to a Fuzzy Sets Methodology, 2003 International Society for Industrial Ecology Conference, Michigan, USA, June 29-July 2003, with Masayuki Sagisaka and Atsushi Inaba.

A Life Cycle Approach for Strategic Selection of Sustainable Product Improvement Alternatives under Data Uncertainty, Proceedings of the 5th International Conference on EcoBalance, Tsukuba, Japan, Nov. 6- 8, 2002.

Adapting QFD Methodology for Environmental Performance Improvement of Selected Environment-Conscious Techniques, Proceedings of the 5th International Conference on EcoBalance, Tsukuba, Japan, Nov. 6- 8, 2002.

Invited Talks/Presentations

Sustainability of Industrial Ecology Modeled Forest Biorefinery System Through Life Cycle Assessment, Speaker of Environmental Seminar Series, School of Forest Resources, March 27, 2009, University of Maine, Orono, USA.

Introduction to Life Cycle Assessment and its Application to Sustainability Concerns, Guest Speaker in the BUA 645- Business and Sustainability (MBA Class), March 23, 2009, University of Maine, Orono, USA

Towards Sustainable Development of Forest Bio-product Supply Chains in the Northeast Region, Research Direction Presentation, American Association for the Advancement of Science (AAAS) Review and Recommendation Meeting, October 31, 2008, University of Maine, Orono, USA. (Presenter)

Capacity Building in LCA Education, American Association for the Advancement of Science (AAAS) Review and Recommendation Meeting, Oct. 30, 2008, University of Maine, Orono, USA. (Presenter)

Efficiency Models for Evaluating the Sustainability of Supply Chains, School of Business Administration, St. Mary's University, April 28, 2008.

Sustainability of Forest Bio-products: Understanding Economic Potentials, Environmental and Social Impacts through Life Cycle and Systems Perspective Approaches, School of Forest

Resources, University of Maine, November 29, 2007.

Efficiency Models for Evaluating the Sustainability of Supply Chain Networks, Department of Management and Marketing, University of Melbourne, Australia, October 11, 2007.

Sustainability Assessment of Emerging Technologies in the Canadian Oil Sands Industry, Department of Mechanical and Industrial Engineering, Ryerson University, Toronto, Canada, June 2007.

Environmental Due Diligence as a Driving Force for Environmental Management Systems (EMS), Department of Mechanical and Industrial Engineering, Ryerson University, June 2007.

Contribution of Management Sciences to Modeling Complex Systems, Faculty of Management, University of Ottawa, Ottawa, Canada, November 2006.

Development of Prototype Systems Model for Sustainability in Oil Sands Industry, Institute for Chemical Process and Environmental Technology, National Research Council Canada, Ottawa, April 2006

Developing Systems Model for Sustainability of the Canadian Oil Sands Industry, Institute for Chemical Process and Environmental Technology, National Research Council Canada, Ottawa, January 2006.

Systems Modeling for Industrial Sustainability, Centre for Environmental Strategy, School of Engineering, University of Surrey, London, United Kingdom, October 2005.

Systems Analysis for Sustainability in Oil Sands Sector, Department of Mechanical Engineering, University of Alberta, Canada, May 2005.

Time Value of Money, Department of Mechanical Engineering, University of Alberta, Canada, May 2005.

Millennium Development Goals: Environmental Responsibility, United Nations University Plenary Session, Tokyo, Japan, June 2003.

How to Deal with Data Uncertainty and Variability in LCA, Japan International Cooperation Agency (JICA), Tsukuba, Japan, October 2002.

Review Committees

Grant Proposal Reviewer, The Netherlands Foundation for the Advancement of Tropical Research (WOTRO) Integrated Program (Review No. 67.117/8), April 3, 2009.

Grant Proposal Reviewer, Alberta Ingenuity Fund (New Faculty Award), Canada, April 22, 2009.

Conferences/Symposiums/Workshops Participated

2009 Sun Grant Initiative Energy Conference, March 10-13, 2009, Washington, DC.

Multifunctional Nanoscale Materials for the 21st Century”, Argonne National Laboratory, Illinois, USA, March 5 – 8, 2009

American Association for the Advancement of Science (AAAS) Meeting, February 12 -16, 2009, Chicago.

Value Prior Pulping (VPP), North Carolina State University, Jan. 21- 22, 2009

3rd Annual Cellulosic Ethanol and Biofuels: Moving to Industrial Scale Production, Chicago, October 8-10, 2008.

Pacific Rim Summit on Industrial Biotechnology and Bio-energy, Vancouver, September 9 -12.

Teaching Management Science Workshop, Georgia Institute of Technology, Atlanta, USA, July 26-29, 2007.

Symposium on Current Status and Future Tasks for LCA Research in the World, Tokyo, Japan, February 17 -18, 2004.

International Symposium “Globally-Integrated Environmental Assessment Modeling” and Formal Launch of the GLEAM Forum, UNU Center, Tokyo, Japan, January 17, 2003.

The 2nd International Workshop on Ecomaterials, Tsukuba, Japan, AIST Workshop Gateway to Life Cycle Impact Assessment for APEC Member Economies, Nov. 5-8 , 2002, Tsukuba, Japan.

International Symposium on Sustainable Material Cycles, NIES, Tsukuba, Japan, Nov. 5, 2002

Roundtable Seminar on Climate Change, May 9, 2002, UNU, Tokyo, Japan

Scholarships, Awards and Prizes

2003 Tambuli Award (Highest Award for Outstanding Alumnus for National and International Excellence), University of Mindanao, Davao City, Philippines.

April –Sept. 2002 Japan Society for Promotion of Science (JSPS) Language Grant Tsukuba, Japan.

October 1998 –March 1999 German Academic Exchange Service (DAAD) Language Grant, Goethe Institute, Goettingen, Germany.

1998 *Sustainable Business Challenge Certificate*, World Business Council for Sustainable Development, Geneva, Switzerland.

July 1996 –July 1998 *Australian Postgraduate Merit Scholarship*.

May 1992 –December 1993 *Government of Belgium Academic Scholarship*, Asian Institute of Technology.

November 1985 –March 1990 *University of Mindanao Academic Scholarship*, Philippines

1990 **12th Placer, Chemical Engineering Licensure Examination**, Philippines

1990 *Leadership Award*, University of Mindanao, Philippines

1990 *Outstanding Chemical Engineering Graduate*, University of Mindanao, Philippines

1990 *Gold Academic Medalist*, University of Mindanao, Philippines

1989 *Silver Academic Medalist*, University of Mindanao, Philippines

1988 **2nd Place Winner**, Math Wizard Competition, University of Mindanao, Philippines

1988 *Gold Academic Medalist*, University of Mindanao, Philippines

1987 *Silver Academic Medalist*, University of Mindanao, Philippines

1986 *Bronze Academic Medalist*, University of Mindanao, Philippines

Professional Service

Reviewer

- *Forest Products Journal*
- *European Journal of Operational Research*
- Journal of Cleaner Production*
- Journal of Environmental Management*
- Journal of Construction Management & Economics*
- International Journal of Environmental Technology and Management*
- Philippine Institute of Chemical Engineering Journal*
- Environmental Progress Journal*
- International Journal of Life Cycle Assessment*
- Philippine Industrial Engineering Journal*
- Journal of Research in Science and Engineering*
- *EcoDesign 2003: 3rd International Symposium on Environmentally Conscious Design and Inverse Manufacturing*, December 8-11, 2003.
- Watanabe's thesis on "Research on Energy Balance of Squid-jigging Fishery in Japan", Graduate School of Fisheries, Hokkaido University, Japan, 2003.

Session Chair, Supply Chains Session, the 8th International Life Cycle Assessment (LCA) Conference: Calculating Consequences Beyond the Box, Sept. 30 – Oct. 2, Seattle.

Session Chair, Structural and Relational Supply Chain Networks, 2008 Production and Operations Management Society (POMS) Conference, May 9 -12, 2008, La Jolla (San Diego), California.

Session Chair, Data Envelopment Analysis, INFORMS Annual Meeting, November 4-7, 2007, Seattle, USA.

Member, Production and Operations Management Society (POMS) Emerging Scholars, starting May 2008.

Editorial Review Board (2003 -2005) - Journal of Philippine Institute for Industrial Engineers, *PIIE Journal of Industrial Engineering*

Keynote Speaker, "Development of an Assessment Methodology for Waste Gasification Technology under Stochastic Data", International Conference on Energy and Environment, Changsha, China, October 11-14, 2003.

Session Chair, "Life Cycle Assessment (LCA) ", 4th Asia Pacific Conference on Sustainable Energy and Environmental Technologies, Mie, Japan, May 8-10, 2003.

Invited Panelist,

- *Empowering the Philippines through Science and Technology Education: Responding to the Challenges of the Globalization*, Tokyo, Japan, September 21, 2002.

Professional Organization Memberships

- International Society of Sustainability Professionals since Feb. 3, 2009
- American Institute of Chemical Engineers since March 1, 2009
- American Association for the Advancement of Science (AAAS) since Feb. 2009
- Forest Products Society since January 19, 2009
- International Society for Industrial Ecology (ISIE), USA
- Greening of Industry Network (GIN), North America
- American Centre for Life Cycle Analysis (ACLCA), USA
- Network for Science and Innovation for Sustainable Development (AAAS), USA
- Institute for Operations Research and Management Sciences (INFORMS), USA Network for Emerging Leaders in Sustainability (NELS), National Academies' George and Cynthia Mitchell Endowment for Sustainability Science, Washington D.C, USA.
- Research Network for Business Sustainability, Canada
- FONA (Research for Sustainability), Germany
- US Green Building Council

Research Supervision

Undergraduate Honor

Undergraduate Students:

- Rachel Bowman (NSF Summer REU Student) " Dept. of Chemical Engineering, Western Kentucky University, Topic: LCA of Wood-based Bio-ethanol and OSB
- *Nikolas Tokas*, Dept. of Chemical and Biological Engineering
Topic of Capstone Project: *Environmentally Conscious Process Design of Potato-Derived Polylactide* (Advisor)
- *Heather Leach*, Department of Ecological Economics
Honor Project Topic: *Sustainable Building and Its Impacts* (Co-advisor with *Mark Anderson and Claude Junkins*)

Master Student

Binod Neupane, School of Forest Resources

Research Topic: *Coupling LCA and GIS for Biodiversity and Land Use Assessments of Forest Resources for Biofuels Production*

PhD student

Shashi Dhungel, School of Forest Resources

Research Topic: *Modeling the Production Potential and Environmental Impacts of Bio-fuels from Forest Resources*

Postdoctoral Researcher (July 1 –November 30, 2008)

Dr. Gurbakhash Bhandar, Forest Bioproducts Research Initiative (FBRI) Research Topic: Life Cycle Assessment of Forest-based Bio-ethanol

SCHOOL/CAMPUS/COLLEGE SERVICE

- Involvement in FBRI Theme 1 Group led by Bob Wagner since July 1, 2008.
- Involvement in Planning Committee, Intent to Plan: Forest Bioproducts Research Institute, since December 15, 2008.

INDUSTRIAL EXPERIENCE

July 1995 – June 1996: Purefoods Corporation as an **ISO 9000 Consultant (Part-time)** in Marikina, Philippines.

May 1994 – May 1995: Acel Precision Plastics Pte. Ltd. as a **Quality Manager/ISO 9000 Representative** in Singapore.

January – May 1994: Dynamic Group of Companies as a **Quality Engineer** in Bangkok, Thailand.

June 1990 –April 1992: Purefoods Corporation as a **Quality Assurance Supervisor** in Marikina, Philippines.

Teaching Course Details

University of Maine, School of Forest Resources, Maine, USA

- currently offering a new course in **Industrial Ecology and Life Cycle Assessment** for students in the business, economics, natural science and engineering departments.

- developing a new course in Dynamic System Modeling for Sustainability Decision and Policy Making

Brock University, Faculty of Business, Canada

Operations Management – Core course covering operations strategy, product & process selection, project management, service operations, waiting line analysis, inventory management, aggregate planning, supply chain management, enterprise resource planning (ERP), environmental operations management, ISO 14001, materials requirements planning, statistical quality control, total quality management, and learning curves.

Data Analysis, Data Management and Business Modeling – Core course covering statistics, probability, regression analysis, forecasting, linear programming, integer programming, transportation modeling, decision analysis under risk, decision analysis under uncertainty, simulation and modeling & database management.

Classes taught at Brock University Classes taught at Brock University

Semester	Course Title	Number of Sections	Enrolment
Winter 2008	Operations Management	3	210
	Data Analysis, Data Management and Business Modeling	2	120

Fall 2007	General Operations Management	1	30
	Data Analysis, Data Management and Business Modeling	2	120
Winter 2007	Operations Management	2	120
	Data Analysis, Data Management and Business Modeling	3	180
Fall 2006	Operations Management	1	55
	Data Analysis, Data Management and Business Modeling	2	120

Carleton University, School of Business, Canada

Introduction to Management Science – Core course covering linear programming (Simplex method and MS EXCEL Add-in), integer optimization, transportation, transshipment, assignment problems, network flow models, project management, multi-criteria decision making, decision analysis, simulation.

Business Simulation and Modeling – Core course covering fundamental simulation concepts, MS Excel Add-in, ARENA simulation software package, modeling basic operations and inputs, modeling detailed operations, statistical analysis, conducting simulation studies, probability distributions.

Classes taught at Carleton University

Semester	Course Title	Number of Sections	Enrolment
Summer 2006	Introduction to Management Science	1	55
Winter 2006	Simulation Methods in Business	1	30

De La Salle University, Department of Industrial Engineering, Philippines

Production & Operations Management – Core course covering production planning, process selection & analysis, statistical quality control, total quality management, inventory management, layout planning, scheduling, facility location & project management.

Operations Research 1 - Core course dealing with the fundamental concepts of linear programming (linear model formulation, duality theory and sensitivity analysis); formulation and solution of mathematical programming models such as transportation models, network models, dynamic programming models, integer linear programming models and multi-criteria decision making models.

Operations Research 2 - Core course dealing with fundamental concepts of stochastic process and decision making under uncertainty. Topics covered include decision theory, game theory, queuing, Markov and stochastic inventory control in solving real-life problems.

Probability and Statistics - Core course covering data descriptive analysis, discrete random variables and probability distributions, continuous random variables and probability distributions, sampling and sampling distributions, hypothesis testing, simple regression, multiple regression, goodness-of-fit test, analysis of variance.

Simulation Systems – Elective course dealing with the basic concepts and techniques of simulation. It covers the fundamentals for generation of random numbers from distribution functions, event-oriented and time-oriented simulation, systems dynamics, simulation applications and simulation software packages such as ARENA and STELLA.

Engineering Economics - Core course dealing with the basic concepts and techniques on analysis useful in evaluating the worth of engineering and business projects in relation to their cost. It covers fundamental accounts, interest and money-time relationships, depreciation and valuation, methods of economy studies, comparison of alternatives, with and without the effects of income taxes and replacement studies.

Classes taught at De La Salle University

Trimester	Course Title	Number of Sections	Enrolment
3 rd Trimester (1995 – 1996)	Production & Operations Management	1	50
	Simulation Systems	2	80
2 nd Trimester (1995 – 1996)	Operations Research 2	1	45
	Engineering Economics	1	50

1 st Trimester (1995 – 1996)	Operations Research 1	1	50
	Probability & Statistics	2	100