Amit Kumar, PhD, P.Eng.

Position: Associate Professor; NSERC/Cenovus/Alberta Innovates Associate Industrial Research Chair in Energy and Environmental Systems Engineering; Cenovus Energy Endowed Chair in Environmental Engineering

Contact Information: Department of Mechanical Engineering, University of Alberta, Edmonton, Alberta, Canada, T6G 2G8; E-mail: Amit.Kumar@ualberta.ca; Tel: +1-780-492-7797; Admin Office: +1-780-492-3712; Website: http://www.energysystems.ualberta.ca/

Education

PhD - Mechanical Engineering, University of Alberta, Edmonton, Canada - 2004
MEng, 2000, Energy Technology, Asian Institute of Technology, Bangkok, Thailand - 2000
BTech (Hons), 1997, Energy Engineering, Indian Institute of Technology, Kharagpur, India - 1997

Appointments

- Sept. 2012 – Present, NSERC/Cenovus/Alberta Innovates Associate Industrial Research Chair in Energy and Environmental Systems Engineering, University of Alberta, Edmonton, Alberta, Canada
- Sept. 2012 – Present, Cenovus Energy Endowed Chair in Environmental Engineering, University of Alberta, Edmonton, Alberta, Canada
- July 2011 – Present, Associate Professor (tenured), Department of Mechanical Engineering, University of Alberta, Edmonton, Alberta, Canada
- August 2005 – June 2011, Assistant Professor, Department of Mechanical Engineering, University of Alberta, Edmonton, Alberta, Canada

Research Interests: Energy and environmental modeling; life cycle assessment; techno-economic assessment; renewable and non-renewable energy sources

Summary of Supervision Experience Current/Past: Total - 100**;** Direct supervision: 11 PhD, 42 Master's, 12 RAs, 11 PDFs, and 20 undergraduate students (UG). Co-supervision: 3 Master's and 1 UG.

Summary of Student's Examination Committees: 82 examination committees (38 MSc; 44 PhD examination committees).

Publication and Presentations: 56 peer reviewed journal publications; 2 book chapters; 190 conference presentations and publications (33 invited); 53 technical reports.

Research funding: More than C$6 million; more than 30 different funding agencies including industries and government.

Awards and Media Mentions: 7 awards; 20 media mentions

Research Networks – International and National (as member/theme lead): 4

Key Expert Review Panels International/National: European Commission (HORIZON 2020, FP7); National Science Foundation, USA; Natural Sciences and Engineering Research Council of Canada (NSERC).

Chair/Moderator/Organizer Conference and Workshops: More than 30

Publications *(underline indicates graduate students, undergraduate student, research assistants or postdoctoral fellows)*

Book Chapters

1. Olateju, B., Kumar, A. Clean Energy Based Production of Hydrogen – An Energy Carrier. *In:* Yan J. (Ed.). *The Handbook of Clean Energy Systems*, John Wiley & Sons, Ltd., Chichester, U.K., forthcoming (*invited*).
2. Kumar A., Sarkar S. Biohydrogen production from bio-oil. *In:* Pandey A., Larroche C., Gnansounou E., Ricke S.C., Claude-Gilles D. (Eds.). *Biofuels: Alternative Feedstocks and Conversion Processes*, Elsevier Inc., Amsterdam, The Netherlands, 2011, 481-497 (*invited*).

Selected Recent Refereed Journal Publications

1. Nimana B., Canter C., Kumar A. Energy consumption and greenhouse gas emissions in upgrading and refining of Canada's oil sands products, *Energy*, 2015 (in press).
2. Verma A., Kumar A. Life cycle assessment (LCA) of hydrogen production from underground coal gasification (UCG) with carbon capture and sequestration (CCS), *Applied Energy*, 2015 (*in press*).
3. Nimana B., Canter C., Kumar A. Energy consumption and greenhouse gas emissions in the recovery and extraction of crude bitumen from Canada's oil sands, *Applied Energy*, 2015, 143: 189-199.
4. Subramanyam V., Paramshivan D., Kumar A., Mondal, A. Using Sankey diagrams to map energy flow from primary fuel to end use, *Energy Conversion and Management*, 2015, 91: 342–352.
5. Ali B., Kumar A. Development of life cycle water-demand coefficients for coal-based power generation technologies, *Energy Conversion and Management*, 2015, 90: 247-260.
6. Rudra S., Rosendahl L., Kumar A. Development of net energy ratio and emission factor for quad-generation pathways, *Energy Systems*, 2014, 5: 719-735.
7. Rahman M.M., Canter C., Kumar, A. Greenhouse gas emissions from recovery of various North American conventional crudes, *Energy*, 2014, 74, 607-617.
8. Thakur A., Canter C.E., Kumar A. Life cycle energy and emission analysis of power generation from forest biomass, *Applied Energy*, 2014, 128, 246-253.
9. Miller P., Kumar A. Techno-economic assessment of renewable diesel production from canola and camelina, *Sustainable Energy Technologies and Assessments*, 2014, 6, 105-115.
10. Olateju B., Monds J., Kumar A. Large scale hydrogen production from wind energy for upgrading of bitumen from oil sands, *Applied Energy*, 2014, 118 (1), 28-56.
11. Miller P., Kumar A. Development of emission parameters and net energy ratio for renewable diesel from canola and camelina, *Energy*, 2013, 58 (1), 426-437.
12. Olateju B., Kumar A. Techno-economic assessment of hydrogen production from underground coal gasification (UCG) with carbon capture and storage (CCS) for upgrading bitumen from oil sands, *Applied Energy*, 2013, 111, 428-440.
13. Kabir M.R., Kumar A. Comparison of the energy and environmental performances of nine biomass/coal co-firing pathways, *Bioresource Technology*, 2012, 124, 394-405.
14. Olateju B., Kumar A. Hydrogen production from wind energy in western Canada for upgrading bitumen from oil sands, *Energy*, 2011, 36(11), 6326-6329.
15. Kabir M.R., Kumar A. Development of net energy ratio and emission factor for biohydrogen production pathways, *Bioresource Technology*, 2011, 102(19), 8972-8985.
16. Sultana A., Kumar A. Development of energy and emission parameters for densified form of lignocellulosic biomass, *Energy*, 2011, 36(5), 2716-2732.

Andres Clarens
http://cee.virginia.edu/andresclarens/

a. Professional Preparation

University of Virginia	Chemical Engineering	B.S. 1999
University of Michigan	Environmental Engineering	M.E. 2004
University of Michigan	Environmental Engineering	Ph.D. 2008

b. Appointments

2014-present	Associate Professor, Civil and Environmental Engineering, University of Virginia
2008-2014	Assistant Professor, Civil and Environmental Engineering, University of Virginia
2002-2007	Research Assistant, Civil and Environmental Engineering, University of Michigan
2001-2002	Environmental Engineer, Tetra Tech, Fairfax, VA
1999-2001	Environmental Engineer, United State Peace Corps, Dominican Republic

c. Publications

(i) Five most closely related to proposal project

- Middleton, R. S., Clarens, A. F., Liu, X., Bielicki, J. M., and Levine, J. S. (2014). CO_2 Deserts: Implications of Existing CO_2 Supply Limitations for Carbon Management. Environmental Science and Technology, *48*(19), 11713-11720.
- Tao, Z. and A.F. Clarens (2013) "Estimating the carbon sequestration capacity of shale formations using methane production rates" Environmental Science and Technology. *47 (19), pp 11318–11325.*
- Wang, S., T. Zhiyuan, S. Persily, and A.F. Clarens (2013) "CO_2 adhesion on hydrated mineral surfaces" Environmental Science and Technology. *47 (20), pp 11858–11865.*
- Wang, S., I. Edwards, and A.F. Clarens (2013) "Wettability phenomena at the CO_2-brine-mineral interface: Implications for geologic carbon sequestration" Environmental Science and Technology. *47 (1) 234–241.*
- Wang, S. and A.F. Clarens (2012) "The effects of CO_2-brine rheology on leakage processes in geologic carbon sequestration" Water Resources Research. *48, W08516.*

(ii) Five other significant publications

- Clarens, A.F., E.P. Resurreccion, M.A. White, L.M. Colosi. (2010) "Environmental Life Cycle Comparison of Algae to Other Bioenergy Feedstocks" Environmental Science and Technology. 2010, 44, (5), 1813-1819
- Clarens, A.F., H. Nassau, E.P. Resurreccion, M.A. White, L.M. Colosi (2011) "Environmental Impacts of Algae-Derived Biodiesel and Bioelectricity for Transportation" Environmental Science and Technology. 45 (17), 7554–7560
- Liu, X., A.F. Clarens, L.M. Colosi. (2012) "Algae biodiesel has potential despite inconclusive results to date" Bioresource Technology. 104, 803-806

- Clarens, A. F., K. F. Hayes, S. J. Skerlos "Feasibility of Metalworking Fluids Delivered in Supercritical Carbon Dioxide." Journal of Manufacturing Processes. 2006, 8(1) 47-53.
- Clarens, A., A. Younan, P.E. Allaire "Feasibility of Gas-Expanded Lubricants for Increased Energy Efficiency in Tilting-Pad Journal Bearings." ASME - Journal of Tribology. July 2010

d. Synergistic Activities

- Carbon dioxide leakage from deep sequestration sites - Developing fundamental knowledge in the means by which carbon dioxide rises through deep and shallow aquifers as a means by which to estimate and predict significant leakage pathways for storage of CO_2 in the deep subsurface.
- Algae-based CO_2 Sequestration and Bio-based feedstock research - Evaluating the use of algae-based bioenergy processes to remediate existing environmental challenges. Life cycle assessment tools are being used to identify leverage points in the algae production process and study specific ways in which to improve the overall environmental profile of the system. A recent focus has been on wastewater streams to remove estrogenic contaminants and take up nutrients.
- GELs: Gas Expanded Lubricants for energy efficiency - Working to create entirely new concept for delivering tunable mixtures of lubricants and gas a moderate pressures to rotating machinery as a method to improve energy efficiency and reduce lubricant consumption.
- Faculty Advisor, Engineering Students Without Borders (2009-present) Advised student-led group managing multiple national and international service projects using an annual operating budget of $25,000. Continuation of work performed during graduate school as founder of local Engineers With-out Borders chapter.
- University Teaching Fellow (2010-11) - Selected as one of six junior faculty members University wide to engage in intensive year-long pedagogical training program that included redesign of a course and the creation of novel teaching content and tools.

e. Collaborators & Other Affiliations

(i)Collaborators

Lisa Colosi	U. of Virginia	James Rhodes	UC - Davis
Jeffrey Fitts	Princeton	Brian Smith	U. of Virginia
James Lambert	U. of Virginia	Mark White	U. of Virginia
Catherine Peters	Princeton	Fu Zhao	Purdue

(ii) Graduate and Postdoctoral Advisors Kim Hayes, University of Michigan (M.S.E. Advisor); Steven Skerlos, Kim Hayes, Gregory Keoleian, Walter Weber, Jonathan Bulkley, University of Michigan (PhD. Advisors)

(iii) Thesis Advisor and Postgraduate-Scholar Sponsor

MS – 0 (current), 3 (graduated); PhD – 5 (current); 4 (graduated)
Current: Brian Weaver (PhD), Bo Liang (PhD), Tao Zhiyuan (PhD), Lyu Xiaotong (PhD), Rodney Wilkins (PhD)
Graduated: Shibo Wang (PhD), Eleazer Resureccion (PhD), Alec Gosse (PhD), Xiaowei Liu (PhD)

H. SCOTT MATTHEWS
PROFESSOR
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING /
DEPARTMENT OF ENGINEERING AND PUBLIC POLICY
DIRECTOR OF RESEARCH, GREEN DESIGN INSTITUTE
CARNEGIE MELLON UNIVERSITY
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PROFESSIONAL PREPARATION

- BS, Computer Engineering and Engineering and Public Policy, Carnegie Mellon, 1992
- MS, Economics; Carnegie Mellon, 1996
- Ph.D., Economics; Carnegie Mellon University, 1999

APPOINTMENTS

- Aug 2010 – Present: Professor, Civil & Environmental Engineering / Engineering & Public Policy
- Aug 2006-2010: Assoc. Professor, Civil & Environmental Engineering / Engineering & Public Policy
- Aug 2002-2006: Asst. Professor, Civil & Environmental Engineering / Engineering & Public Policy
- Jan. 2000-Present: Director of Research, Green Design Institute
- July 2000-July 2002: Research Assistant Professor, Carnegie Mellon University, Pittsburgh, PA
- Jan. 1999-June 2000: Associate Head, Department of Engineering and Public Policy, Carnegie Mellon

PRODUCTS - MOST RELEVANT

1. "Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use", National Research Council, 2009 (member of committee).
2. H. Scott Matthews, Chris T. Hendrickson, and Deanna Matthews, Life Cycle Assessment: Quantitative Approaches for Decisions that Matter (Textbook & Educational Resources), lcatextbook.com, 2014.
3. Ping Chen, Corinne Scown, H. Scott Matthews, James H. Garrett, Chris T. Hendrickson, "Managing Critical Infrastructure Interdependence through Economic Input-output Methods", ASCE Journal of Infrastructure Systems, Volume 15, Issue 3, pp. 200-210 (September 2009).
4. Chung-Yan Shih, Corinne Scown, H. Scott Matthews, James Garrett, Lucio Soibelman, Keith Dodrill, and Sandy McSurdy, "Data Management for Geospatial Vulnerability Assessment of Interdependencies in US Power Generation", ASCE Journal of Infrastructure Systems, Vol. 15, No. 3, September 2009.
5. H. Scott Matthews, Lester Lave, and Heather MacLean, "Life Cycle Impact Analysis: A Challenge for Risk Analysis", Risk Analysis, Vol. 22, No.5, pp. 853-860, 2002.

OTHER SIGNIFICANT PRODUCTS

1. Rachel Hoesly, Mike Blackhurst, H Scott Matthews, Jeffery F. Miller, Amy Maples, Matthew Pettit, Catherine Izard, Paul Fischbeck, "Historical Carbon Footprinting and Implications for Sustainability Planning: a Case study of the Pittsburgh Region", Environmental Science & Technology, 2012, *46* (8), pp 4283–4290, DOI: dx.doi.org/10.1021/es203943q
2. Yeganeh Masayekh, Paulina Jaramillo, Constantine Samaras, Chris T. Hendrickson, Michael Blackhurst, Heather Maclean, and H. Scott Matthews, "Potentials for Sustainable Transportation in Cities to Alleviate Climate Change Impacts", Environmental Science & Technology, 2012, *46* (5), pp. 2529–2537, DOI: 10.1021/es203353q

3. Cliff Davidson, Chris Hendrickson, and H. Scott Matthews, "Sustainable Engineering: A Sequence of Courses at Carnegie Mellon", International Journal of Engineering Education, Vol. 23, No. 2, pp. 287-293, 2007.
4. Chris T. Hendrickson, Gyorgyi Cicas, and H. S. Matthews, "Transportation Sector and Supply Chain Performance and Sustainability", Transportation Research Record No. 1983, 2006.
5. Jon Koomey, H. Scott Matthews and Eric Williams, "Smart Everything: Will Intelligent Systems Reduce Resource Use?", Annual Reviews of Energy and the Environment, Vol, 38, pp. 311-343, 2013, DOI: 10.1146/annurev-environ-021512-110549

SYNERGISTIC ACTIVITIES

- Development of Economic Input-Output Life Cycle Assessment (EIO-LCA) Dataset and Internet Model, http://www.eiolca.net/, 1999-present.
- Development of Green Design Educational Modules, 1998-present (http://gdi.ce.cmu.edu)
- Center for Sustainable Engineering – Head of Educational Module Submission and Dissemination
- IEEE Technical Committee on Sustainable Systems and Technology (formerly TC Electronics and the Environment), Committee Chair (present), Finance Chair (2001-2011), Conference Chair (2004, 2009), Program Chair (2006).
- *Journal of Industrial Ecology* – Associate Editor

COLLABORATORS & OTHER AFFILIATIONS (at Carnegie Mellon unless noted)

Burcu Akinci, Brad Allenby (ASU), Rob Anex (Wisconsin), Ines Azevedo, Mario Berges, Melissa Bilec (U. Pittsburgh), Michael Blackhurst (UT-Austin), Lori Bruhwiler (NOAA), David Dzombak, Paul Fischbeck, James Garrett, W. Michael Griffin, Mohd Hassan (Malaysian Govt), Troy Hawkins (Enviance), Chris Hendrickson, Arpad Horvath (Berkeley), Paulina Jaramillo, Vikas Khanna (Pitt), Jon Koomey (Stanford), Matt Kocoloski (TVA), Amy Landis (ASU), Lester Lave, Reid Lifset (Yale), Joe Marriott (NETL), Deanna Matthews, Heather MacLean (Univ. of Toronto), Aweewan Mangmeechai (Thailand), Jennifer Mankoff, Eric Masanet (Northwestern), Yeganeh Mashayekh (Penn), Francis McMichael, Jeremy Michalek, Kim Mullins (Minnesota), Rachael Nealer (UCS), Stefan Schwietzke (NOAA), Lucio Soibelman, Mili-Ann Tamayao (U of Philippines), Aranya Venkatesh (ExxonMobil), Radisav Vidic (Pitt), Heather Wakeley Healey (TRC Inc.), Eric Williams (RIT)

GRADUATE/THESIS ADVISORS: Dennis Epple, Chris Hendrickson, Lester Lave (Chair), all CMU.

THESIS ADVISEES (all CMU unless noted): Aweewan Mangmeechai (PhD 2009), Chung Yan Shih (PhD 2009), YuShan Anny Huang (PhD 2009), Matt Kocoloski (PhD 2010)*, Mario Berges (PhD 2010), Chris Costello (PhD 2010), Michael Bigrigg (PhD 2011), Michael Blackhurst (PhD 2011)*, Sharon Wagner (PhD 2011), John Matsumura (PhD 2012), Ranjani Theregowda (PhD 2012), Mohd Nohr Azman Hassan (PhD 2012), Brinda Thomas (PhD 2012), Marco Vincenzi (PhD 2012), Aranya Venkatesh (PhD 2012), Kim Mullins (PhD 2012)*, Amy Nagengast (PhD 2012)*, Catherine Izard (PhD 2013), Enes Hosgor (PhD 2013), Yeganeh Mashayekh (PhD 2013), Derrick Carlson (MS 2009, PhD 2013), Stefan Schwietzke (PhD 2013). Total Graduated Students: 40. Asterisks note students also supervised as post-docs. Total post-docs: 9.

Bruce A. McCarl
University Distinguished Professor and Regents Professor
Department of Agricultural Economics
Texas A&M University

Professional Preparation

University of Colorado	Business Statistics	B.S., 1970
Pennsylvania State University	Management Science	Ph.D., 1973

Appointments

2008-present	University Distinguished Professor, Texas A&M University
2002-present	Regents Professor, Texas A&M University
1985-present	Professor, Agricultural Economics, Texas A&M University
1982-1985	Professor, Agric. and Resource Econ., Oregon State Univ.
1980	Visiting Professor, Agric. and Res. Econ., Oregon State Univ.
1979-1982	Associate Professor, Agricultural Economics, Purdue Univ.
1973-1978	Assistant Professor, Agricultural Economics, Purdue Univ.

Publications (Selected from 250+ journal articles)

Chambwera, M., G. Heal, C. Dubeux, S. Hallegatte, L. Leclerc, A. Markandya, B.A. McCarl, R. Mechler, and J. Neumann, "Economics of Adaptation", *IPCC WG II Contribution to The Fifth Assessment Report, Climate Change 2013: Impacts, Adaptation and Vulnerability*, Forthcoming Cambridge University Press, 2014.

Attavanich, W., B.S. Rashford, R.M. Adams, and B.A. McCarl, "Land Use, Climate Change and Ecosystem Services", *Oxford Handbook of Land Economics*, edited by Joshua M. Duke and JunJie Wu, forthcoming, 2014.

Attavanich, W., B.A. McCarl, Z. Ahmedov, S.W. Fuller, and D.V. Vedenov, "Climate Change and Infrastructure: Effects of Climate Change on U.S. Grain Transport", *Nature Climate Change*, on line at doi:10. 1038/nclimate1892, 3, 638-643, 2013.

McCarl, B.A., X. Villavicencio, X.M. Wu, and W.E. Huffman, "Climate Change Influences on Agricultural Research Productivity", *Climatic Change*, 2013.

Aisabokhae, R.A., B.A. McCarl, and Y.W. Zhang, "Agricultural Adaptation: Needs, Findings and Effects", Handbook on Climate Change and Agriculture, Edited by Robert Mendelsohn and Ariel Dinar, Published by Edward Elgar, Northampton, MA, pp 327-341, 2011

Publications (Other)

Zhang, Y.W., A.D. Hagerman, and B.A. McCarl, "How climate factors influence the spatial distribution of Texas cattle breeds", *Climatic Change*, Volume 118, Issue 2, 183-195, 2013.

Joyce, L.A., D.D. Briske, J.R. Brown, H.W. Polley, B.A. McCarl, and D.W. Bailey, "Climate Change and North American Rangelands: Assessment of Mitigation and Adaptation Strategies", *Rangeland Ecology & Management*, 66, 512-528, 2013.

McCarl, B.A., "Some Thoughts on Climate Change as an Agricultural Economic Issue", *Journal of Agricultural and Applied Economics*, vol 44 no 5, 299-305, 2012.

Mu, J.E., B.A. McCarl, and A. Wein, "Adaptation to climate change: changes in farmland use and stocking rate in the U. S", *Mitigation and Adaptation Strategies for Global Change*, doi:10. 1007/s11027-012-9384-4, 2012.

McCarl, B.A., "Vulnerability of Texas Agriculture to Climate Change", *Impact of Global Warming on Texas*, Chapter 6, Second Edition, edited by Jurgen Schmandt, Judith Clarkson and Gerald R. North, University of Texas Press, ISBN: 978-0-292-72330-6, 2011.

Synergistic Activities

Member NAS America's Climate Choices Study, Limiting Panel.
Member Texas Water Development Board Climate Change Panel.
Member of EPA team appraising emissions rules for stationary sources
IPCC Lead Author on economics of adaptation and summary for policy makers on 2013 report
IPCC Mitigation Chapter Lead Author and participant in 2007 Nobel Peace Prize.
Associate Editor, Climatic Change

(v) **Collaborators and Other Affiliations**

(a) *Collaborators*: D. Adams, R. Adams (Oregon State U), W. Parton, D. Ojima, K Paustian (Colorado State U), B. Murray (Duke), W. You , G. Davis (Virginia Tech), P. Smith (Aberdeen), R. Sands (PNNL), J. Smith (Stratus), C. Rosenzweig (Columbia), B. Sohngen(Ohio State), J. Reilly (MIT), S. Rose, EPRI, R. Alig, USDA, J. Baker (Duke), S. Ohrel, J. Creason (EPA), C. Chang, C. Tso, C. Chen (Taiwan), U. Schneider, N. Koleva (U of Hamburg), C. Peacocke (Ireland), R. Chrisman (U. Washington), C.C. Kung (China), R.D. Sands (USDA ERS), Fri, R. (RFF), M. Brown (Georgia Tech), D. Arent (NREL), A. Carlson (UCLA), M. Carter (New York), L. Clarke (PNNL), F. de la Chesnaye (EPRI), G. Eads (RFF), G. Giuliano (USC), A. Hoffman (Michigan), R.O. Keohane (Princeton), L. Lutzenhiser (PSU) , M.C. McFarland (DOW), M.D. Nichols (CARB), E.S. Rubin (Carnegie), T. Tietenberg (Colby), J. Trainham (RTI), L. Geller, A. Crane, T. Menzies, and S. Freeland (NAS), Chambwera, M. (INDP), G. Heal (Columbia), C. Dubeux (Brazil), S. Hallegatte (World Bank), L. Leclerc (Canada), A. Markandya (Spain), R. Mechler (IIASA), J. Neumann (IEC), B.S. Rashford (Wyoming), W. Attavanich (Thailland), Z. Ahmedov (Amer Express), R. Johansson (USDA) W.E. Huffman (Iowa State),Wang, W.W. (Illinois), X. Villavicencio (Ecuador) W.E. Huffman (Iowa state), Aisabokhae, R.A (Dupont, Nogeria)., Y.W. Zhang (IIASA), A.D. Hagerman (USDA, APHIS), Joyce, L.A.(USDA, F.S.), J.R. Brown (New Mexico), H.W. Polley (USDA), D.W. Bailey (New Mexico), Mu, J.E. (Oregon state), A. Wein (USGS)

(b) *Graduate and Postdoctoral Advisors*: G. Kochenberger (Colorado). No postdoctoral Advisors.

(c) *Graduate Students (Ph.D.)*: T. Spreen (Florida), H, Baumes, T. Tice (USDA) C. Chen (Taiwan), L. Elbakidze (Idaho), U. Schneider (Hamburg), M. Kim (Nevada), J. Apland (Minnesota), R. Klemme (Wisconsin), A. Naing (UNDP), D. Barnett (AFDB), Y. Cai (MIT), W Attavanich (Thailand)

Total Supervised: 74 PhD and 19 MS.; presently advising 8 PhDs .