

M. Nazmul Karim

Holder of the Michael O'Connor Chair II
Professor and Head
Artie McFerrin Department of Chemical Engineering
Texas A&M University
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EDUCATION

- B.S. Bangladesh University of Engineering and Technology
Chemical Engineering (First in Order of Merit, first Honors Graduate of
the University in Chemical Engineering), 1972
- M.S. University of Manchester Institute of Science and Technology
(UMIST), Control Engineering, U. K., 1974
- Ph.D. University of Manchester Institute of Science and Technology,
Chemical Engineering, U.K., 1977

PROFESSIONAL EXPERIENCE

- 2012- present Holder of the Michael O'Connor Chair II
Professor and Head, Artie McFerrin Department of Chemical
Engineering, Texas A&M University, College Station, TX
- 2012- present Department Head, Chemical Engineering Program, Texas A & M
University at Qatar.
- 2004- August, 2012 Professor and Chair, Department of Chemical Engineering, Texas Tech
University, Lubbock, TX
- 2010- August, 2012 Whitacre Endowed Department Chair in Chemical Engineering, Texas
Tech University
- 1999- 2004 Professor, Department of Chemical Engineering, Colorado State University
- 1993- 1999 Professor and Associate Department Chair (re-elected by the faculty) Department
of Chemical and Bioresource Engineering, Colorado State University
- 1995 Visiting Professor, Department of Chemical and Process Engineering,
University of Newcastle, England (six months)
- 1994-95 Visiting Professor, International Center for Cooperative Research in
Biotechnology, Osaka University, Japan (six months)

- 1993-94 Professor of Chemical Engineering, Department of Agricultural and Chemical Engineering, Colorado State University
- 1987 Distinguished Visiting Professor, Department of Chemical Engineering, Technical University of Denmark, Lyngby, Denmark (six months)
- 1987 Visiting Professor, Laboratory of Automation, Helsinki University of Technology, Espoo, Finland (six months)
- 1986 Tenure Granted, Associate Professor, Department of Agricultural and Chemical Engineering, Colorado State University
- 1984-86 Associate Professor, Department of Agricultural and Chemical Engineering, Colorado State University
- 1980-84 Assistant Professor, Department of Agricultural and Chemical Engineering, Colorado State University
- 1978-80 Assistant Professor, Control Engineering, University of Texas of the Permian Basin, Odessa, Texas
- 1977-78 Research Associate, Department of Chemical Engineering, University of Alberta, Edmonton, Alberta, Canada
- 1977 Research Faculty, Dynamics and Control Laboratory, Department of Chemical Engineering, Twente Technical University, Enschede, Holland
- 1973-77 Part-time Lecturer, Department of Chemical Engineering and Control System Centre, UMIST, Manchester, United Kingdom
Special Demonstrator, UMIST Pilot Plant (Computer Control of Chemical Processes), Manchester
- 1972 Lecturer, Department of Chemical Engineering, Bangladesh University of Engineering and Technology, Dhaka.

ADMINISTRATIVE EXPERIENCE

***Department Head, Chemical Engineering, and Texas A & M University
(September 1, 2012 – present):***

As Head of the Artie McFerrin Department of Chemical Engineering, I am responsible for one of the largest chemical engineering departments in the country. We offer BS, MS,

and PhD programs in chemical engineering. The Department also houses Mary Kay O'Connor Process Safety Center, (MKOPSC) and through the Department, the MKOPSC offers Masters of Safety Engineering degree. The Department also houses the interdisciplinary MS program in Biotechnology. In FY 2015, the total dollar amount of research awards was \$15.6M. In 2015, the Department published over 240 journal papers; it translates to 8 journal papers/ faculty. In 2014 the faculty graduated 21 PhDs. The typically the Department graduates between 150-160 undergraduates per year. The total number of faculty is 36 with 30 tenure-track and six non-tenure-track faculty. I am very much involved in fund raising for the Department. In 2013 we raised \$2.1M, and in 2014 we raised approximately \$6.5M, and in 2015 we raised over \$4M. Additionally, I was able to obtain ~ \$14M from the Chancellor's Research Initiative program at TAMU to attract the best and the brightest individuals to Chemical Engineering. In this initiative we attracted to Texas A & M, people such as Professor Chris Floudas from Princeton (NAE) and Professor Stratos Pistikopoulos from Imperial College, London (Member of Royal Academy of Engineers). I recruited a total of 11 tenured/tenure-track faculty in the last 3 years. I am also the Department Head of Chemical Engineering of our branch campus at Qatar (TAMU-Qatar). It has a BS and MS program. Typically we graduate between 20-30 BS and 10-15 MS students per year.

The Department is ranked 16th in the US News and World report (graduate program, public schools). In 2015 the UG program in Chemical Engineering was ranked 14th among the public schools. We are poised to become one of the top ten chemical engineering programs in the country.

Department Chair, Chemical Engineering, Texas Tech University (August 1, 2004 August 31, 2012):

As a chair of the Department I was responsible for all aspects of running the Chemical Engineering Program. The Department had fourteen faculty members when I left in 2012. I recruited seven new faculty members since the fall of 2005. These new faculty members became productive; the research expenditure increased from \$1.63M to approximately \$5.3 M during the last seven years. The research awards increased from ~ \$1M to \$3.25M in the last seven years. The number of graduate students increased from 33 to 60; with 58 PhDs in the program. The undergraduate enrollment increased from 145 (2004) to ~300 (2011). The faculty productivity, evaluated by number of refereed journal papers increased from 2 per faculty in 2004 to 4 per faculty in 2007-2011. The Departmental laboratory space increased from 6000 sq ft to approximately 11,500 sq ft. The undergraduate laboratory was renovated and new lab experiments were installed. The Department went through a successful ABET visits in the fall of 2005 and again in 2011. The Department received six-year accreditations. I developed a plan for a \$14M campaign for adding four endowed professorships, graduate fellowships, and undergraduate scholarships.

Co-Director, Process Control and Optimization Consortium at Texas Tech University (1995- 2012):

The Process Control and Optimization Consortium (PCOC) at Texas Tech University was formed over 16 years ago to serve the needs of industry in advanced process control research and development. There were 11 industrial members. The PCOC organized two industrially relevant workshops per year topics of which were selected by the members; these were typically very industrially relevant. The fees provided by the industrial members typically funded PhD students of the Co-Directors of the Consortium.

Associate Chair, Department of Chemical and Bioresource Engineering (1993 - 1999), Colorado State University:

The Department of Chemical and Bioresource Engineering at Colorado State University was joined department combining Chemical Engineering, and Agricultural Engineering programs. By the Departmental policy, if the Chair was from one program, then the associate chair was chosen (by faculty vote) from the other program. I was elected associate chair twice during the six year tenure. The main responsibilities of the chair was to run the Chemical Engineering program, academically, revise and implement under-graduate and graduate curriculum, form Industrial Advisory Council, run the faculty and student advisory council, help the chair make decisions about promotion and tenure, assist in faculty evaluations (if requested by a faculty), develop five year strategic plans for the Chemical Engineering program, gather data, and write the ABET report, help recruit high quality faculty and graduate students, talk to prospective undergraduate applicants and their parents, help with placement of students, and many other day to day matters pertaining to running an engineering program.

Director, Advanced Industrial Bio-processing Short Course (1983- 2004):

As Director of this short course, I coordinated the topics and the contents of this highly acclaimed short course. I selected experienced speakers with a healthy balance between academic and industrial experience. Close to 150 biotech companies with market capitalization of \$1M to \$100B, have sent there employees through this short course. The short course, which included theoretical as well as hands-on experience for the participants, enjoyed “repeat business” from many highly successful modern Biotech companies.

Member, Board of Director, Colorado Bio-processing Center, Colorado State University (1993 -2003):

I was on the Board of Directors for the Colorado Bio-processing Center. The duties of the board included overseeing and reviewing industrial research operation of the Center and assisting with future goal setting.

Acting Co-Director, Colorado Institute for Research in Biotechnology (CIRB) (1989-90):

I was the acting director of CIRB, substituting for Dr. Vince Murphy, who was on

sabbatical during this time. The responsibilities were to attend the Colorado Advanced Technology Institute (CATI), a governor appointed entity, meetings, and provide feedback to CATI about future priorities in Biotechnology for the state. The duties also included participating in seed-funding provided by CIRB.

PROFESSIONAL, SCIENTIFIC, AND HONORARY SOCIETIES

AIChE (USA): **Fellow**

AIChE (USA): Director, Fuels and Petrochemical Division (2011-2014)

: Programming Chair, Fuels and Petrochemical Division, 20014-2015.

Instrument Society of America (ISA) (senior member) (1979-92)

American Chemical Society (member)

Society of Industrial Microbiology (member)

PROFESSIONAL ORGANIZATION ACTIVITIES (past 25 years)

Instrument Society of America Representative, Program Committee, American Control Conference, 1986-91

Member, Long Range Planning, Education Division, ISA, 1985-91

General Chairman, ISMM International Symposium on Computer Applications in Design, Simulation and Analysis, February 1-3, 1988, Honolulu, Hawaii

Member, Education Awards Committee, American Automatic Control Council,

1989 Chairman, Education Awards Committee, American Automatic Control

Council, 1990 Member, Eckmann Awards Committee, American Automatic

Control Council, 1990

Member, Program Committee, American Control Conference, 1989, 1990

Chairman, Session on Estimation Methods and Optimization in Biochemical Engineering, American Control Conference, June 21-23, 1989, Pittsburgh, Pennsylvania

Chairman, Session on Intelligent Systems and Advanced Control Strategies in Biotechnology, American Control Conference, June 21-23, 1989, Pittsburgh, Pennsylvania

Chairman, Two Sessions on Control and Optimization of Biochemical Processes, American Control Conference, May 23-25, 1990, San Diego, California

Chairman, Session on Process Identification: Recent Developments, American Control Conference, May 23-25, 1990, San Diego, California

Chairman, Session on Estimation, Optimization, and Control of Bioprocesses, AIChE Annual Meeting, November 1990, Chicago, Illinois

Co-Chairman, Fifth International Conference on Computer Applications to Fermentation Technology, March 29-April 1, 1992, Keystone, Colorado

Chairperson, Session on Biosensors and Bioprocess Control, AIChE Annual Meeting, November 1994, San Francisco, California.

Member, International Program Committee, The 6th International Conference on Computer Applications in Biotechnology, May 14- 17, 1995, Garmisch- Partenkirchen, Germany.

Chairman, Session on Advanced (Intelligent) Control of Bioprocesses. The 6th International Conference on Computer Applications in Biotechnology, May 14- 17, 1995, Garmisch-Partenkirchen, Germany.

Chairman, Session on Supervisory Control and Fault Detection for Biotechnological Production Processes, 13th World Congress of IFAC (International Federation of Automatic Control), June 30- July 5, 1996, San Francisco, CA

Co-Chairman, Session on Modeling of Biotechnical Processes, 13th World Congress of IFAC (International Federation of Automatic Control), June 30- July 5, 1996, San Francisco, CA.

Co-Chairman, Session on Bioprocess Development and Bioprocess Engineering, The 9th Annual Colorado Biotechnology Symposium, October 8, 1996, Fort Collins, CO.

Co-Chairman, Session on Advances in Process Control, AIChE Annual Meeting, November 10 - 15, 1996, Chicago, IL.

Chairman, Session on Identification and Estimation II, Special Workshop on Multiple Model Approaches to Modelling and Control, Norwegian University of Science & Technology, Trondheim, Norway, September 29-30

Member, International Program Committee, The 7th International Conference on Computer Applications in Biotechnology, May 31-June 4, 1998, Osaka, Japan

Co-Chair, Session on Knowledge Engineering Approaches for Bioprocess Operation. The 7th International Conference on Computer Applications in Biotechnology, May 31-June 4, 1998, Osaka, Japan

Member, International Program Committee, DYCOPS-5, June 8-10, 1998, Corfu, Greece.

Member, International Program Committee (Biotechnology), IFAC' 99, Beijing, China, July 5-9, 1999.

Chair, Session on Advanced Modeling for Bioprocess Engineering, IFAC' 99, Beijing, China, July 5-9, 1999.

Co-chair, session on Bioprocess Development and Bioprocess Engineering, *13th Annual Colorado Biotechnology Symposium*, Fort Collins, CO, Sept 14, 2000.

Member, International Program Committee, CAB-8, Quebec City, Canada, June 24-27, 2001.

Chair, Session on Optimization, The 8th International Conference on Computer Applications in Biotechnology (CAB-8), Quebec City, Canada, June 24-27, 2001.

Co-chair, Session on Analysis and Control of Biological Systems, AIChE Annual Meeting, November 2001, Reno, NV.

Chair, Session on Modeling, Analysis, and Control of Complex Bioprocesses, XV IFAC World Congress, Barcelona, Spain, July 21 – 25, 2002.

Chair, Tutorial Session on Bioprocess Control, American Control Conference. 2003, Denver, CO, June 4-6.

Co-Chair, Advances in Sensors, Optimization and Control for Biological Systems, AIChE Annual Meeting, San Francisco, CA, November 2003,

Chair, Session on Biofuels, Energy Sustainability Summit, Texas Tech University, Lubbock, TX, September, 2006.

Co-chair, Session on Biodiesel, AIChE Spring Meeting, Houston, TX, April, 2007.

Chair, Tutorial Session on Advanced Process Control, AIChE Spring Meeting, Houston, TX, April, 2007.

Chair, Session on Data Based Modeling, Process Control and Analysis, Biochemical Engineering XV, Quebec City, Canada, July 15-19, 2007

Member International Program Committee, International Conference on Biotechnology Engineering 2007 ICBioE'07, Kuala Lumpur, Malaysia, May 2007

Member, International Program Committee, Computer Applications in Biotechnology (CAB) 2007, Cancun, Mexico, June 2007.

Chair, Session on Biofuels, European Congress of Chemical Engineering- 6 (ECCE-6), Copenhagen, Sept 2007.

Chair and Organizer, Session on Control and Optimization in Refining I, AIChE Spring Conference, New Orleans, LA, Tuesday, April 8, 2008.

Co-chair, Session on Control and Optimization in Refining II, AIChE Spring Conference, New Orleans, LA, Tuesday, April 8, 2008.

Organizer of **six symposiums** for the fuels division of ACS on Clean Energy, Fuels and Chemicals from Biomass, the 235th National Meeting, New Orleans, LA, April 6-10, 2008.

Chair, Session on Biofuels and Sustainability, AIChE Spring Meeting, San Antonio, TX, March 21-25, 2010.

Chair, Session on Model Predictive Control, AIChE Spring Meeting, San Antonio, TX, March 21-25, 2010.

Co-Chair, Session on Biodiesel and Renewable Fuels, AIChE Spring Meeting, Hyatt Regency, Chicago, IL. Monday, March 14, 2011.

Chair, Session on Advanced Control and Applications I, AIChE Spring Meeting, Hyatt Regency, Chicago, IL. Tuesday, March 15, 2011.

Chair, Session on Advanced Control and Applications II, AIChE Spring Meeting, Hyatt Regency, Chicago, IL. Wednesday, March 16, 2011.

Chair, Session on Advanced Process Control. AIChE Spring Meeting, Houston Hilton and George Brown Convention Center, Houston, TX, April 1-5, 2012.

Chair, Session on Biofuels. AIChE Spring Meeting, Houston Hilton and George Brown Convention Center, Houston, TX, April 1-5, 2012.

Chair, Session on Biological Systems II, 2012 International Symposium on Advanced Control of Chemical Processes, Furama Riverfront Hotel, Singapore, July 10-13.

Co-Chair, Keynote Session 3, 2012 International Symposium on Advanced Control of Chemical Processes, Furama Riverfront Hotel, Singapore, July 10-13.

Chair and co-chair, two sessions on Advanced Process Control. AIChE Spring Meeting, Grand

Hyatt, San Antonio, TX, April 28- May2, 2013.

Chair, Session on Biofuels. AIChE Spring Meeting, Grand Hyatt, San Antonio, TX, April 28-May2, 2013.

Chair, Session on Biofuels, Biocatalysts, and Renewable Sources. AIChE Spring Meeting, Hilton Riverside, New Orleans, LA, March 30 – April 3, 2014.

Chair and co-chair, two sessions on Advanced Process Control. AIChE Spring Meeting, Hilton Riverside, New Orleans, LA, March 30 – April 3, 2014.

Chair, Session on Unconventionals – Bioproducts, AIChE Annual Meeting, Marriott Marquis Atlanta, Atlanta, November 16-21, 2014.

Co-Chair, Session on Conversion of Biomass to Chemicals via Catalytic Reactions and Processes, AIChE Annual Meeting, Marriott Marquis Atlanta, Atlanta, November 16-21, 2014.

Chair, Session on Unconventionals - Hydrogen and Fuel Cells, AIChE Annual Meeting, Marriott Marquis Atlanta, Atlanta, November 16-21, 2014.

Programming Chair, AIChE Annual Meeting, 2014-2016: Fuels and Petrochemical Division.

Co-Chair, Session on Alternative Fuels and Enabling Technologies I, AIChE Annual Meeting November 8-13, 2015, Salt Lake City, UT.

Co-Chair, session on Catalytic Biofuels Refining, AIChE Annual Meeting November 8-13, 2015, Salt Lake City, UT.

Co-chair, two sessions on Advanced Process Control and Optimization (I and II). AIChE Spring Meeting, April 13, 2016, Hilton Americas, Houston, TX

EDITORIAL BOARD OF PROFESSIONAL JOURNALS:

- Editorial Board, Journal of the Industrial Microbiology and Biotechnology

AWARDS AND DISTINCTIONS

- Finalist (runner up), Fulbright Distinguished Chair in Renewable Energy, Chalmers University, Sweden, 2008.
- Best Teacher Award, Colorado State University, 2004 – 2005
- Elected, Fellow, American Institute of Chemical Engineers, 2001
- Abell Faculty Research and Graduate Program Support Award (Best Research Award in

the College), College of Engineering, Colorado State University, 1997

- Member, Third World Academy of Sciences (Lectureship), Trieste, Italy, 1994- present
- Distinguished Visiting Professor, International Center for Cooperative Research in Biotechnology, Osaka University, Osaka, Japan, 1994/95
- BBSRC (Biotechnology and Biological Sciences Research Council) Visiting Research Fellow (U.K.), 1995
- Award of Excellence: Engineering Dean's Council Award (for Chemical Engineering), Colorado State University: 1985, 1988, 1994.
- Instrument Society of America, Outstanding Division Honorable Mention Award, 1987
- Halliburton Education Foundation: Award of Excellence, Colorado State University, 1982.
- Commonwealth Technical Assistance Award (United Kingdom), 1972-76

LANGUAGE PROFICIENCY

- English, Bengali (native), Urdu, Hindi, some Spanish

RESEARCH INTERESTS

- Modeling and Control of Biochemical and Biomedical Systems
- Metabolic Engineering
- Mammalian Cell Culture Process for Therapeutic Bio-molecules
- H1N1 virus removal and vaccine production
- Biotechnology for Renewable Resources (Bio-Fuels)
- Multiple Neural Networks and Radial Basis Functions for Process Control
- Nonlinear Model Based Control and Its Application in Chemical and Biotechnology Based Industries
- Nonlinear PCA and PLS Methods for Fault Detection in Chemical Engineering and Biotechnology
- Appropriate Technology Transfer to Underdeveloped Countries

CONSULTING EXPERIENCE

1. United Nations Industrial Development Organization, Vienna, Austria (Petrochemical/Refinery Control, Bahia Blanca, Argentina), July-August, 1983
2. Woodward Governor Company, Fort Collins, Colorado (Digital Control System), December, 1984
3. Coors BioTech Products Company (Computer Aided Fermentation), January, 1986
4. Schering Corporation, Bloomfield, New Jersey (Optimization of Fermentation Processes), March, 1989
5. Los Alamos National Labs, Los Alamos, New Mexico, April, 1994
6. Golden Technologies Company, Inc., Golden, Colorado, May, 1994
7. Golden Technologies Company, Inc., Johnstown, Colorado, June, 1994

8. ECOPETROL, Colombian National Oil Company, Bucaramanga, Colombia, 1996
9. AMGEN, Thousand Oaks, California, 1997
10. Genetic Institute, Andover, Massachusetts, 1997, 1998
11. Byproduct Enhancement Technology Corporation, Fort Collins, CO, 2000 - 2004
12. Genentech, South San Francisco, CA, 2000
13. Aventis Pasteur, Toronto, Canada, 2000 - 2002
14. Medivance Inc, Louisville, CO, 2000 – 2002
15. US Army, Aberdeen Proving Grounds, Maryland 2003.
16. Crystal Fuels, Lubbock, Texas, 2006

CONTRACTS AND GRANTS

Federal Sources:

National Science Foundation

Recently completed and current projects in bold

17. Design of a Packed-bed, Continuous-flow Fermentation Process Tailored for Cellulosic Ethanol Production. National Science Foundation; 2011- 2014, \$329,881 (Co-PI).
16. EAGER: Peptide affinity membranes for binding influenza viruses: H1N1 and H5H1. National Science Foundation; 2009- 2014, \$300,000 (PI).
- 15. Computational and Experimental Studies of Cellulose Degradation for the Production of Biofuels, National Science Foundation; (2009-2012); \$300,000 (Co-PI).**
14. REU in Chemical Engineering Using Colorado Bioprocessing Center, National Science Foundation; (2002- 2005); \$221,065; Co-PI.
13. Proposal Planning Visit to Bangladesh: Arsenic Removal From Drinking Water; National Science Foundation (2001 -2002); \$6,350; PI
12. Research Experience for Undergraduates; National Science Foundation (1998-99); \$10,000; PI
11. Integrated Engineering Systems and Control Laboratory. National Science Foundation; (1996-98): \$180,000; Senior Personnel.
10. Research Experience for Undergraduates; National Science Foundation (1994-95); \$10,000; PI
9. Research Experiences for Chemical Engineering Undergraduates in Bioprocessing; National Science Foundation (1996-02): \$350,000; Co-PI
8. Metabolic Manipulation of *Taxus sp.* Cell Cultures for Taxane Production. National

- Science Foundation (1996-98): \$121,136; Senior Personnel
7. Model Based Control of Dissolved Oxygen at Low Concentrations and in Shear Sensitive Fermentations; National Science Foundation (1996-2000): \$274,061; PI
 6. Research Experience for Undergraduates; National Science Foundation (1994-95): \$10,000; PI
 5. Research Experience for Undergraduates; National Science Foundation (1993-94): \$9,250; PI
 4. Recurrent Neural Networks and Micro-Genetic Algorithms for Estimation and Optimization: Application to Bioprocesses; National Science Foundation (1992-94): \$185,613; PI
 3. Process Control of Solid Substrate Fermentation; National Science Foundation (1989-91): \$100,008; Co-PI
 2. Starter Culture Production Using Fluidized Bed Technology; National Science Foundation (1986-88): \$91,000; Co-PI
 1. Modeling and Control of Fermentation Processes; National Science Foundation (1983 - 86): \$ 178,259 (includes \$15,000 matching from CSU); PI

Department of Energy

4. **University Coalition for Fossil Energy Research, Lead University = - Penn State University, Funding – DOE Source - National Energy Technology Laboratory; TAMU PI: Chris Floudas (M. N. Karim Co-PI); total funding \$20M for four years.**
3. Biomass Resource Assessment in the State of Colorado; DOE (1988-89); \$38,016; PI
2. Biosolubilization of Coal; Idaho National Engineering Laboratory; DOE; (1987-90); \$81,000; PI
1. Fed-batch Processing to Increase Enzymatic Bioethanol Process Titer, National Renewable Energy Laboratory; DOE; 2003-2005 (PI); \$80,000; PI

National Institute of Standards and Technology (NIST):

2. **Biomanufacturing Science and Technology Consortium to Advance US Manufacturing of Biopharmaceuticals; NIST (6/2015- 5/2017); \$499,928 (role: Co-PI)**
1. Characterization of and Separation of Extra-cellular Enzyme of Lignite Biosolubilization;

NIST; (1988-89); \$6,500; PI

National Institute of Health:

1. Modeling and Control of Anticoagulant Drug (Heparin) Therapy, NIH/BRSG; (1982): \$2,700; PI.

US Department of Agriculture:

7. Bioprocessing of Agricultural Raw Materials for Added Value, USDA, Colorado Agricultural Experiment Station; (2000 - 2003); \$235,971; PI
6. Bioprocessing of Agricultural Raw Materials for Added Value. Colorado Agricultural Experiment Station; (1997-2000); \$193,000; PI.
5. Bioprocessing of Agricultural Raw Materials for Added Value. Colorado Agricultural Experiment Station; (1994-97); \$193,430; PI.
3. Biotechnology Based Processes for Adding Value to Agricultural Raw Materials.
2. USDA-ARS; Colorado Agricultural Experiment Station; (1991-93): \$212,050; Co-PI
1. Value Added Crop Processing; USDA-ARS; (1981-1990): \$50,000/year; Co-PI

US Agency for International Development:

1. Preferential Degradation of Lignin in Water Hyacinth Using White Rot Fungi for Animal Feed Production; US Agency for International Development (1990-94); \$150,000; PI.

State Sources:

Colorado:

9. Optimization of Ethanol Production Using Recombinant Microorganisms; Colorado Institute for Research in Biotechnology (CIRB) and BETC; (2000 - 2001); \$40,000
8. Neural Network and Multivariate Statistical Analysis of Biotechnology-Based Industrial Data; Colorado Institute for Research in Biotechnology (CIRB); (1998-99): \$15,000; PI
7. Microbial Analysis and Correlation of Product Quality in a High Fructose Corn Syrup Production Plant Using Principal Component Analysis; Colorado Institute for Biotechnology (CIRB) and Golden Technology Inc; (1996-97); \$35,000; PI

6. Waste Stream Neutralization: Application of Neural Networks; CCHE Excellence Award in Water Resource Education; (1993-94): \$2,700; PI
5. Concepts; Colorado Commission for Higher Education (CCHE); Excellence Award in Water Resource Education; (1992-93); \$5,000; PI
4. Neural Networks in Bioprocess Estimation: Experimental Studies; Colorado Advanced Software Institute; (CASI); (1992-93); \$3,000; PI
3. Optimization of Fed-Batch Microalgae Fermentation; Colorado Advanced Technology Institute (Colorado Institute for Research in Biotechnology); (1990); \$10,000; PI
2. Measurement and Regulation of Fermentation Critical Parameters; Colorado Advanced Technology Institute (CATI); (1984 -85); \$13,305; PI
1. Computer-Aided Design in Chemical Engineering Using Aspen-Plus; College of Engineering; CSU (1982): \$10,000 PI.

Texas

1. One-step cellulosic ethanol production, \$150,000 (direct cost only); (June 2008 – Jan 2011); Texas Higher Education Coordinating Board 2007 Norman Hackerman Advanced Research Program; PI

Industrial Sources:

11. Process Control and Optimization Consortium (PCOC); Industrial Consortium; Texas Tech University, ~ \$50,000/year (September, 2005- August 2012)
10. Data Analysis of Fed-batch Fermentation Using Neural Networks; Aventis Pasteur, Canada; (2000 - 2002); \$80,000/yr; PI
9. Neural Network and Multivariate Statistical Analysis of Industrial Chromatographic Data; Genetic Institute, Andover, MA; (1998-99); \$10,000; PI
8. UNCF-Merck Science Initiative (1998-2000); \$40,000 (research support for Laurent Simon's Ph.D.); PI
7. Cytec Industries, Stamford, CT; (1995-97); \$25,000 (research support for Hugh Graham's Ph.D.); PI
6. Media Development Cooperation; Irvine Scientific Company, San Diego, CA; (1997-98); Amount: undisclosed);PI
5. Materials Transfer Agreement; Genetic Institute, Andover, MA (1998); (Amount: undisclosed); PI

4. Materials Transfer Agreement; NexStar Pharmaceutical Co, Boulder Colorado (1997); (Amount: undisclosed); PI
3. Analysis of Odor in High Fructose Corn Syrup Production; Golden Technologies Company, Johnstown, CO; (1995-1996); \$21,000; PI
2. Instrumentation and Computer Control of a Distillation Column; Chevron, Denver, CO; (1982); \$7,500; PI.
1. Data Acquisition & Computer Control of a Distillation Column; Hewlett Packard Company, Loveland, CO; (1982); \$35,000 (equipment grant); PI.

International Sources:

6. Metabolic Engineering and Modeling of Recombinant Microorganisms for Cellulosic Biofuels Production FLAD, Portugal, (October -December, 2010): Euro 5,000.
5. Effect of Metal Ions on the Growth Kinetics of Escherichia coli. Collaborative Research with Friedrich-Alexander-University Erlangen-Nurnberg, Germany (1997-98): \$2,500.
4. Model Predictive Bioprocess Control Using Real-Time NARX and Dynamic Neural Network Approach, BBSRC Visiting Fellowship, U.K. (1995): \$50,000
3. Visiting Professorship, ICBiotech, Japanese Ministry of Culture and Education (MONBOSHU); (1994-95); \$45,000
2. Visiting Professor, Chemical Engineering Department, DTH, Lyngby, Denmark, (January-June, 1988); Stipend for six months : \$40,000.
1. Online Expert System for Biochemical Processes; Finnish Academy (July-December, 1987): \$10,000

Qatar Foundation:

1. **Enhanced Monitoring of Environmental and Chemical Processes. QNRF. Total: \$876,053; Co-PI, M. Nazmul Karim's share: \$221,750 (2015-2018).**

Texas A & M University Sources:

1. **Michael O'Connor Chair (2012- present); \$2M. Endowment income ~ \$80,000/year.**

RESEARCH SCHOLARS SUPERVISED/MENTORED

1. Dr. Maria Andersen (DTH, Lyngby, Denmark, 1988)
2. Ms Marjut Pokkinen (Helsinki Technical University, Finland, 1987)
3. Mr. Pauli Sipari (Helsinki Technical University, Finland, 1989)
4. Dr. Paul Nott (University of Newcastle Upon Tyne, UK, 1995)
5. Dr. Maja Ignova (University of Newcastle Upon Tyne, UK, 1995)

6. Dr. Gy-Seop Oh (Osaka University, Japan, 1994/95; CSU 1997/98)
7. Dr. William Collins (Trinity University, San Antonio, Texas, 1993/94)
8. Dr. Linda Henk (Colorado State University, 1995-present)
9. Dr. Rani! Wickramasinghe (Colorado State University, 1998-)
10. Dr. John Sargantanis (Colorado State University, 1997-98)
11. Ms. Sigrid Schreiber (Universitat Erlangen-Nurnberg, 1997-98)
12. Dr. Manuel Fillon (University of Toulouse, France, 1999-2000)
13. Dr. Yonghong Tan (Gulin Institute of Electronics and Electrical Engineering, 2001-2002)
14. Dr. Ismael Mancilha (Brazil, 2001- 2002).
15. Dr. Ryan Senger (Colorado State University; Jan 2005- March 2006)
16. Dr. Binbing Han (Tsinghua Uniuersity, China; (2005-2007)
17. Dr. Peiyong Qin (Associate Professor, Beijing Institute of Chemical Technology, China; May 2010- 2012t)
18. Dr. Alim Dewan (Washington State University; June 2010 – August 2015)

Ph.D. EXTERNAL EXAMINER

1. Dr. David Hogensen, " Adaptive Multivariable Receding-Horizon Control: Application to a Distillation Column,' University of Colorado, Boulder, Colorado (1986)
2. Dr. Xia-Chang Zhang, "Aspects of Modeling and Control of Bioprocesses: Application of Conventional and Functional Approach," Helsinki Technical University, Finland (1995)
3. Dr. F. C. Christo, "Neural Networks in Combustion Simulations," University of Sydney, Australia (1996)
4. Dr. B. McKay, " Studies in Data-Based Modelling," University of Sydney, Australia(1997)
5. Dr. M. Bozorg, "Robust Control: Structured Uncertainties in Linear Systems," University of Sydney, Australia(1997)
6. Dr. Arto Visala, "Modeling of Nonlinear Processes Using Modified Wiener-type NN-Models and Multi-model Structures," Helsinki Technical University, Finland (1997)
7. Dr. Mitchell Lever, "Cellulose to Ethanol Conversion with On-site Cellulose Production using Solid-state Fermentation," Murdoch University, 2010.

External (International) Evaluator for Promotion and Tenure:

1. Hong Kong University
2. Bangladesh University of Engineering & Technology
3. International Islamic University of Malaysia
4. University of Newcastle Upon Tyne, UK
5. University College, London, UK
6. University of Hawaii
7. University of Connecticut
8. University of Utah

External (International Evaluator for Degree Program Review):

Biotechnology and Biochemical Engineering, International Islamic University of Malaysia,
Kuala Lumpur

JOURNAL REVIEWER:

1. AIChE J
2. Biotechnology & Bioengineering
3. Biotechnology Progress
4. Automatica
5. International J. of Control
6. I & EC Research
7. Computers & Chemical Engineering
8. J. of Process Control
9. Scanning
10. IEE Proceedings
11. J Industrial Microbiology and Biotechnol
12. J Hydrogen Energy
13. J Society of Industrial Microbiology

PROPOSAL REVIEWER

1. National Science Foundation
2. US Department of Agriculture
3. Department of Energy
4. National Research Council, UK
5. Australian Science Research Council
6. Petroleum
7. Research Council Katholieke
Universiteit Leuven, Belgium
8. Qatar National Research Fund

**IMPORTANT REFEREED JOURNAL PUBLICATIONS OF
PROFESSOR M NAZMUL KARIM (most recent at the top)**

(Google Scholar lists 216 refereed papers and conference proceedings; h-index -29)

- 101 Majdi Mansouri, Mohammed Z, Raoudha Baklouti, Mohamed Nounou, Hazem Nounou, Ahmed Ben Hamida and Nazmul Karim. 2016. Statistical Fault Detection of Chemical Process - Comparative Studies, *Journal of Chemical Engineering & Process Technology*, 7: 282. doi:10.4172/2157-7048.1000282.
- 100 Chiranjivi Botre , Majdi Mansouri , Mohamed Nounou , Hazem Nounou, M. Nazmul Karim. 2016. Kernel PLS-based GLRT method for fault detection of chemical processes. *Journal of Loss Prevention in the Process Industries* 43, 212-224.
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1. Peiyong Qin, Song Hu, Yu Guan, Liming Xu, M. Nazmul Karim, and Tianwei Tan. 2015. Recovery of ethanol via vapor phase by PDMS membrane with excellent performance. Industrial & Engineering Chemistry Research
2. Dewan, Alim; Kerls, Marci; Karim M. Nazmul. 2015. Integrating fermentation and photosynthesis in a microbial fuel cell to produce electricity and biofuels. Energy & Fuels.
3. Xinghua Pan, Sudheer Jinka, Vinitkumar Singh, Seshadri Ramkumar, M. Nazmul Karim. 2015. Development of cellulose fiber monolith with anion exchange and pseudo-affinity functionalization for influenza virus separation. Materials Science and Engineering: C.
4. Xinghua Pan, Weiting Tang, M. Nazmul Karim. 2015. Dual Unscented Kalman Filter for Natural Gas Pipeline Leak Detection: Non-isothermal Modeling and Effect of Thermal Properties. Computers and Chemical Engineering.

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2. James B Riggs and M. Nazmul Karim. Chemical and Bioprocess Control (International edition), Prentice Hall (ISBN: 13:978-0-13-713-798-5), December, 2007.
1. James B Riggs and M. Nazmul Karim. Chemical and Bioprocess Control (3rd edition), Ferret Publishing, Lubbock, Texas (ISBN: 0-9669601-4-9), 2006.

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1. Karim, M. N., and G. Stephanopoulos. Modeling and Control of Biotechnical Processes, Pergamon Press (ISBN No.: 0-08-041710-8), 1992.

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11. Srinivas Karra and M. Nazmul Karim. "Oscillation Root-cause Detection and Quantification Under Multiple Faults." In Detection and Diagnosis of Stiction in Control Loops. Springer-Verlag London, 2010. (Mohieddine Jelali and Biao Huang eds); Chapter 12; pages 267- 293.
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181. Raftery, J. P. and M.N. Karim. "Sustainable Production of Liquid Fuels." in Proceedings of the 12th International Symposium on Process Systems Engineering and 25th European Symposium on Computer Aided Process Engineering. Krist V. Gernaey, Jakob K. Huusom and Rafiqul Gani (Eds.), 31 May – 4 June 2015, Copenhagen, Denmark; Computer Aided Chemical Engineering, Vol.37, pages 55-61, 2015
180. Pan, X. and M. N. Karim. 2015. Modeling and Monitoring of Natural Gas Pipelines: New Method for Leak Detection and Localization Estimation. Proceedings of the 12th International Symposium on Process Systems Engineering and 25th European

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179. M. Nazmul Karim, Young Faculty Forum Invited Talk, AIChE Annual Meeting November 8-13, 2015, Salt Lake City, UT.
 178. Chiranjivi Botre, Maria Stefany Angarita Gomez, Majdi Mansouri, Mohamed Nounou, Hazem Nounou and M. Nazmul Karim. Fault Detection and Diagnosis in Batch and Fed-Batch Bioreactor System Using PCA, PCR, PLS with GLR Method, paper No: 244s. AIChE Annual Meeting November 8-13, 2015, Salt Lake City, UT.
 177. Jonathan P. Raftery, Maria Carolina Ordoñez Franco, Tejasvi Jaladi and M. Nazmul Karim. Optimal Control of a Fed-Batch Bioreactor for Maximized Carotenoids Productivity, paper No: 427f. AIChE Annual Meeting November 8-13, 2015, Salt Lake City, UT.
 176. Xinghua Pan and Nazmul Karim. Unknown Input Observer-Based Nonlinear Model Predictive Control, paper No: 244g. AIChE Annual Meeting November 8-13, 2015, Salt Lake City, UT.
 175. Xinghua Pan and M. Nazmul Karim. 2014. The Development of Cellulose Monolith with Anion Exchange/Pseudo-Affinity Functionalization for the Separation of Influenza Virus (Poster Paper No: 415f), AIChE Annual Meeting, November 16-20, 2014, Atlanta, GA.
 174. Xinghua Pan and M. Nazmul Karim. 2014. A Methodology for Leak Detection in Natural Gas Pipelines Under Different Consumer Usage Patterns, (Paper No: 587c), AIChE Annual Meeting, November 16-20, 2014, Atlanta, GA.
 173. Jonathan P. Raftery and M. Nazmul Karim. 2014. Economic Viability of Consolidated Bioprocessing As Compared to Separate Hydrolysis and Fermentation for the Production of Biochemically Derived Ethanol from Biomass (Paper No: 569o), AIChE Annual Meeting, November 16-20, 2014, Atlanta, GA.
 172. Jonathan P. Raftery and M. Nazmul Karim. 2014. A Methodology for the Optimization of a Biomass to Bioethanol Production Plant Utilizing Biochemical Pathways. Proceedings of the 8th International Conference on Foundations of Computer-Aided Process Design – FOCAPD 2014, Mario Eden, John D. Siirola and Gavin P. Towler (Editors) , July 13-17, 2014, Cle Elum, Washington, USA.
 171. Jonathan P. Raftery and M. Nazmul Karim. 2014. Viable Alternatives for Biofuels using Biochemical Pathways. Proceedings of the 8th International Conference on Foundations of Computer-Aided Process Design – FOCAPD 2014, Mario Eden, John D. Siirola and Gavin P. Towler (Editors) , July 13-17, 2014, Cle Elum, Washington, USA.
 170. Xinghua Pan, Wei ting Tang, M. Nazmul Karim. 2014. Dual Unscented Kalman Filter For Natural Gas Pipeline Leak Detection: Non-isothermal Modeling and Effect of Thermal Properties. AIChE Spring Meeting, Hilton New Orleans, LA, March 30-April 3, 2014. Paper No: 81c.
 169. Jonathan Raftery and M. Nazmul Karim. Optimal Design of a Bioethanol Supply Chain Utilizing a Biochemical Production Pathway via an MILP Model. AIChE Annual Meeting, Hilton San Francisco Union Square, San Francisco, CA, November 3-8, 2013, paper No: 240l.

168. Xinghua Pan, Sudheer Jinka, Seshadri, Ramkumar, M. Nazmul.Karim, Vinitkumar Singh. 2013. Development of fiber enhanced dual-modal cellulose monolith for influenza virus separation. AIChE Annual Meeting, Hilton San Francisco Union Square, San Francisco, CA, November 3-8, 2013, paper No: 650e.
167. Zheng Li and M. Nazmul Karim. 2103. Modeling Dataset Selection in Multivariate Statistical Process Control. AIChE Spring Meeting, Grand Hyatt, San Antonio, TX, April 28-May2, 2013. Paper No 76a.
166. Alim Dewan, Marci Kerls and M. Nazmul Karim. 2012. Integrating Photo-Bioreactor and Fermentor to Produce Biofuels and Bioelectricity. AIChE Annual Meeting, Convention Center, Pittsburgh, PA, October 28- November 2, Paper No 254d.
165. Alim Dewan, Siva A. Vanapalli and M. Nazmul Karim. 2012. Population Dynamics of Microalgae. AIChE Annual Meeting, Convention Center, Pittsburgh, PA, October 28- November 2, Paper No 115c.
164. Weiting Tang and M. Nazmul Karim. . 2012. An Efficient Method for Leak Detection and Isolation in Natural Gas Pipelines Using Dual Unscented Kalman Filter. AIChE Annual Meeting, Convention Center, Pittsburgh, PA, October 28- November 2, Paper No 373b.
163. Weiting Tang and M. Nazmul Karim. 2012. An Efficient Method for Leak Detection and Isolation in Natural Gas Pipelines Using Dual Unscented Kalman Filter. AIChE Annual Meeting, Convention Center, Pittsburgh, PA, October 28- November 2, Paper No 373b.
162. Weiting Tang and M. Nazmul Karim. 2012. Dual Unscented Kalman Filter for Leak Detection and Location in Natural Gas Pipelines. AIChE Annual Meeting, Convention Center, Pittsburgh, PA, October 28- November 2, Paper No 598e.
161. Zheng Li and M. Nazmul Karim. 2012. A New Framework for Online Optimization of Recombinant Protein Production in FED-Batch Fermentation Processes. AIChE Annual Meeting, Convention Center, Pittsburgh, PA, October 28- November 2, Paper No 744c.
160. Marci Kerls, Alim Dewan and M. Nazmul Karim. 2012. Simultaneous Biofuel and Electricity Generation Using CO₂-Neutral Microbial Fuel Cell. AIChE Spring Meeting, Tuesday, April 3, 2012, Houston Hilton and George Brown Convention Center, Houston, TX.
159. Ronald C. Hedden, Lan Ma, Jun Zhao, Seunghyun Ryu and M. Nazmul Karim. 2011. Polymers for Biomass Energy Conversion: Porous Scaffold Materials for a Continuous-Flow, Immobilized-Cell Fermentation Process. AIChE Annual Meeting, Minneapolis Convention Center, Minneapolis, MN, October 20, Paper No 750a.
158. Zheng Li and M. Nazmul Karim. 2011. Optimal Control of Fed-Batch Fermentation Process Using Modified Iterative Dynamic Programming. AIChE Annual Meeting, Minneapolis Convention Center, Minneapolis, MN, October 19, Paper No 595h.
157. Weiting Tang, M. Nazmul Karim. 2011. The Square-Root Unscented Kalman Filter for Leak Detection and Location In Natural Gas Pipelines. AIChE Annual Meeting, Minneapolis Convention Center, Minneapolis, MN, October 19, Paper No 476d.
156. Weiting Tang and M. Nazmul Karim. 2011. The Square-Root Unscented Kalman Filter for Leak Detection and Identifying Location of Leaks In Natural Gas Pipelines. Poster session on Systems and Control, AIChE Annual Meeting, Minneapolis, MN, November 19, paper no: 622i.

155. Zheng Li and M. Nazmul Karim. 2011. Optimal Control of Fed-Batch Fermentation Process Using Iterative Dynamic Programming. Poster session on Applied Mathematics and Numerical Analysis, AIChE Annual Meeting, Minneapolis, MN, November 19, paper no: 621j.
154. Alim Dewan, Jihye Kim, Swastika S. Bithi, Marci Kerls, Siva A. Vanapalli and M. Nazmul Karim. 2011. Single-Cell Growth Kinetics of Algae, *Chlorella vulgaris*. AIChE Annual Meeting, Minneapolis Convention Center, Minneapolis, MN, October 19, Paper No 538b.
153. Peiyong Qin and M. Nazmul Karim. 2011. Preparation and Characterization of the Peptide Modified Regenerated Cellulose Membrane for Binding H1N1 Virus. AIChE Annual Meeting, Minneapolis Convention Center, Minneapolis, MN, October 19, Paper No 538b.
152. Srinivas Karra, Brian Sager and M. Nazmul Karim. A Comprehensive Multi-Scale Modeling of Heterogeneities in Mammalian Cell Culture Process. Proceedings of the 21st European Symposium on Computer Aided Process System Engineering- ESCAPE 21. (Editors: E.N. Pistikopoulos, M. N. Georgiadis and A. C. Kokossis) Elsevier B.V. 2011. pages 1311-1315.
151. Weiting Tang and M. Nazmul Karim. Multi-Model MPC for Nonlinear Systems: Case Study of a Complex pH Neutralization Process. Proceedings of the 21st European Symposium on Computer Aided Process System Engineering- ESCAPE 21. (Editors: E.N. Pistikopoulos, M. N. Georgiadis and A. C. Kokossis) Elsevier B.V. 2011. pages 622-627.
150. Seunghyun Ryu and M. Nazmul Karim, Biobutanol Production In Recombinant *Escherichia coli* BL21, AIChE Spring Meeting, Monday, March 14, 2011: 1:30 PM, Room: McCormick , Hyatt Regency, Chicago, IL.
149. Weiting Tang and M. Nazmul Karim, Multi-Model MPC for a Complex pH Neutralization Process, AIChE Spring Meeting, Tuesday, March 15, 2011: 2:30 PM, Room: McCormick , Hyatt Regency , Chicago, IL.
148. Suma Peri, Rajesh Khare, and M. Nazmul Karim. 2010. Computational Studies of Free Energy Calculations of Cello-Oligosaccharide Adsorption on a Cellulose Crystal Surface. AIChE Annual Meeting, Thursday, November 11, 2010: 10:20 AM 255 A Room , Salt Palace Convention Center, Salt Lake City, UT, Paper No: 602f.
147. Weiting Tang and M. Nazmul Karim. 2010. Extended SBX-RCGA Neural Network-Based Multi-Model Predictive Control for pH Neutralization Process. AIChE Annual Meeting, Tuesday, November 9, 2010, Hall 1, Salt Palace Convention Center, Salt Lake City, UT. Poster Paper No: 369i.
146. Ronald C. Hedden, Jun Zhao, Lan Ma, Seunghyun Ryu and M. Nazmul Karim. 2010. Continuous-Flow, Packed-Bed Fermentations: New Scaffold Materials and Reactor Design Issues. AIChE Annual Meeting, Wednesday, November 10, 2010 1:30 PM 255 A Room , Salt Palace Convention Center, Salt Lake City, UT. Paper No: 449d.
145. Weiting Tang and M. Nazmul Karim. 2010. Extended SBX-RCGA Neural Network-Based Multi-Model Predictive Control for Wastewater Neutralization Process. AIChE Annual Meeting, Tuesday, November 9, 2010, 10:30 AM 250 B Room, Salt Palace

- Convention Center, Salt Lake City, UT. Paper No: 197g.
144. Seunghyun Ryu and M. Nazmul Karim. 2010. Production of Biofuels Using Genetically Engineered *Escherichia coli*. AIChE Annual Meeting, Tuesday, November 9, 2010 4:35 PM 251 A Room , Salt Palace Convention Center, Salt Lake City, UT, Paper No: 341e.
 143. Srinivas Karra and M. Nazmul Karim. 2010. Integrated Performance Assessment and Model Validation for Model Based Predictive Control Applications. AIChE Spring Meeting, Monday, March 22: 8:30 AM, Bonham D, Grand Hyatt San Antonio, TX, Paper No: 15b.
 142. Suma Peri, Rajesh Khare and M. Nazmul Karim. 2009. Calculation of Free Energy Involved in Saccharification of Cellulose Using Molecular Dynamic Simulations. AIChE Annual Meeting, Friday, November 13: 10:35 AM Cheekwood B, Gaylord Opryland Hotel , Nashville, TN, Paper No: 678f)
 141. Srinivas Karra and M. Nazmul Karim. 2009. Robust Predictive Control Strategies for Glycemic Regulation in Insulin Dependent Diabetes Mellitus Patients. AIChE Annual Meeting, Wednesday, November 11: 9:24 AM, Nashville, TN, Paper No: 373d.
 140. Ketan Khare, Seunghyun Ryu and M. Nazmul Karim. 2009. Effect of Surfactants On Lignin Toxicity in One-Step Ethanol Production, AIChE Annual Meeting, Wednesday, November 11: 2:40 PM Nashville, TN, Paper No: 390g.
 139. Srinivas Karra, M. Nazmul Karim. 2008. Troubleshooting of Oscillatory Control Loops, paper 131c, Control and Optimization in Refining II, AIChE Spring Conference, New Orleans, LA, Tuesday, April 8.
 138. Suma Peri, M. Nazmul Karim and Rajesh Khare. May, 2008. Free energy of separation of glucose oligomers in water, 30th Symposium on Biotechnology for Fuels and Chemicals, New Orleans, LA, May (poster).
 137. M. Nazmul Karim and Seunghyun Ryu. 2008. One-step cellulosic ethanol production, Clean Energy, Fuels and Chemicals from Biomass Symposium, the 235th ACS National Meeting, New Orleans, LA, April 6-10.
 136. Seunghyun Ryu and M. Nazmul Karim. 2008. Improve Hydrolysis Rate by Displaying Multi-Complex of Cellulolytic Enzymes and Produce Ethanol in a One-Step Process, AIChE Annual Meeting, Philadelphia, PA, November.
 135. Srinivas Karra and M. Nazmul Karim. 2008. Alternative Model Structure with Simplistic Noise Modeling for Linear Processes Subjected to Non-Stationary Disturbances, AIChE Annual Meeting, Philadelphia, PA, November.
 134. Srinivas Karra and M. Nazmul Karim. 2008. Multi-Scale Modeling of Chinese Hamster Ovary Cell Cultures, AIChE Annual Meeting, Philadelphia, PA, November.
 133. M. Nazmul Karim and Binbing Han. 2007. Ethanol Production From Waste Sweet Potato Using Recombinant *Zymomonas mobilis* Strains, paper 342e, AIChE Annual Meeting, Salt Lake City, UT, November 4-9.
 132. Srinivas Karra and M. Nazmul Karim. 2007. Modeling of Individualistic Mammalian Cell Behavior Towards Environmental and Physiological Changes Using Population Balances, paper 147d, AIChE Annual Meeting, Salt Lake City, UT, November 4-9.
 131. Suma Peri, M. Nazmul Karim, and Rajesh Khare. 2007. Mechanism of Cellulose Degradation- Free Energy Calculations for Separation of Cellulose Chains Using

- Molecular Modeling Techniques, paper 132g, AIChE Annual Meeting, Salt Lake City, UT, November 4-9.
130. Srinivas Karra and M. Nazmul Karim. 2007. Model Based Identification and Compensation For Hysteresis, Stiction and Varying Valve Dynamics Due to Process Disturbances, paper 605e, AIChE Annual Meeting, Salt Lake City, UT, November 4-9.
 129. Seunghyun Ryu and M. Nazmul Karim. 2007. Display of Cellulolytic Enzymes on The Surface of Escherichia coli (LY01) and Zymomonas mobilis, paper 515ac, AIChE Annual Meeting, Salt Lake City, UT, November 4-9.
 128. Srinivas Karra, Suma Peri, Rajesh Khare and M. Nazmul Karim, "Problems and Opportunities in Starch and Lignocellulose-based Ethanol Production ", in Biochemical Engineering XV: Engineering Biology from Biomolecules to Complex Systems, July 15–19, 2007 Quebec City, Canada.
 127. Ryan Senger, Srinivas Karra, and M. Nazmul Karim, "Optimization of Fed-batch Parameters and Harvest Time of CHO Cell Cultures for a Glycosylated Product with Multiple Mechanisms of Inactivation ", in Biochemical Engineering XV: Engineering Biology from Biomolecules to Complex Systems, July 15–19, 2007 Quebec City, Canada.
 126. Suma Peri, Srinivas Karra, Y.Y. Lee, and M. Nazmul Karim, " Modeling for Optimization of Enzymatic Hydrolysis of Cellulose", in 10th International IFAC Symposium on Computer Applications in Biotechnology, June 4-6, 2007, Cancun, Mexico., also in Proceedings; pages: 129-134.
 125. Srinivas Karra, M. Nazmul Karim, and Binbing Han, "Predictive Control of Blood Glucose Concentration in Type-I Diabetic Patients using Linear Input-Output Models", in 10th International IFAC Symposium on Computer Applications in Biotechnology, June 4-6, 2007, Cancun, Mexico; also in Proceedings; pages: 147-152.
 124. Binbing Han and M. Nazmul Karim. 2007. Cytotoxicity of Aggregated Fullerene C60 Particles on CHO and MDCK Cells, paper 402f, AIChE Annual Meeting, Salt Lake City, UT, November 4-9.
 123. Khogeer Ahmed S, and M. Nazmul Karim. New Approach for Addressing Environmental Effects through Multi-Objective Multi Refinery Optimization, paper 137c, AIChE Spring National Meeting, April 23-27, 2006.
 122. Khogeer Ahmed S, and M. Nazmul Karim. New Techniques for Meeting New Product Spec and Products Demand under Catastrophic Failure through Multi-Objective Multi Refinery Optimization, paper 175a, AIChE Spring National Meeting, April 23-27, 2006.
 121. M. Nazmul Karim. Problems and Opportunities: Lignocellulose-based Ethanol Production I; Session: Cellulosic Here and Now, Bioenergy Texas, Lubbock, Texas, October 2006.
 120. M. Nazmul Karim. Problems and Opportunities in Corn and Lignocellulose-based Ethanol Production, plenary lecture, Energy Summit, Texas Tech University, Sept 2006.
 119. M. Nazmul Karim. Problems and Opportunities: Lignocellulose-based Ethanol Production II; Session: Cellulosic Ethanol Future, Bioenergy Texas, Lubbock, Texas, October, 2006.
 118. C. Tsantili, M. Nazmul Karim, and Maria I. Klapa. Quantifying the Metabolic Capabilities of Engineered Zymomonas Mobilis for Ethanol Production from Hexoses

- and Pentoses Using Linear Programming Analysis, paper 451u, AIChE Annual Meeting, San Francisco, CA, Nov 12-17, 2006.
117. Srinivas Karra and M. Nazmul Karim. Model Based Predictive Control of Blood Glucose Concentration in Type-I Diabetic Patients, paper 243c, AIChE Annual Meeting, San Francisco, CA, Nov 12-17, 2006.
 116. Srinivas Karra, Ryan S. Senger, and M. Nazmul Karim. Model Based Control of Wastewater Neutralization, paper 359e, AIChE Annual Meeting, San Francisco, CA, Nov 12-17, 2006.
 115. Srinivas Karra, Ryan S. Senger, and M. Nazmul Karim. Fuzzy Steady State Decomposition Based Multi Model Control of Nonlinear Processes Applied to pH Control, paper 302v, AIChE Annual Meeting, San Francisco, CA, Nov 12-17, 2006.
 114. M. Nazmul Karim, Binbing Han, Hugh Graham, and Srinivas Karra. Flocculation Enhanced Centrifugation and Microfiltration of Escherichia Coli Lysate, paper 438i, AIChE Annual Meeting, San Francisco, CA, Nov 12-17, 2006.
 113. Binbing Han, M. Nazmul Karim, Peiyong Qin, Zhen Chen, Cuixian Chen, Jiding Li, and Srinivas Karra. Characterization of the Gelation Process in the Preparation of Ppesk Asymmetric Ultrafiltration Membrane, paper 144c, AIChE Annual Meeting, San Francisco, CA, Nov 12-17, 2006.
 112. Suma Peri, Srinivas Karra, Y. Y. Lee, and M. Nazmul Karim. A Comprehensive Kinetic Investigation of Enzymatic Hydrolysis of Cellulose, paper 270d, AIChE Annual Meeting, San Francisco, CA, Nov 12-17, 2006.
 111. Karim, MN and Senger, RS. 2005. Variable site-occupancy classification of N-linked glycosylation using artificial neural networks. ACS National Meeting, March 13 -17, San Diego, CA (invited talk)
 110. Khogeer, AS, and M. N. Karim. 2005. Nonlinear analysis of catastrophic failure effects on multi-objective intra-refinery optimization. AIChE Spring Meeting, April 10-14, Atlanta, GA.
 109. Hodge DB, Karim MN, Farmer J, Schell DJ, McMillan JD. 2005. High-Solids Enzymatic Saccharification of Cellulose, Poster, 27th Symposium on Biotechnology for Fuels and Chemicals, May 1-4, Denver, CO.
 108. Karra, S., Karim, MN, and Senger, RS. Predictive Control of Blood Glucose Concentration in Type- I Diabetic Patients in Presence of Unmeasured Disturbances, Poster: area 10b, AIChE Annual Meeting, October 30 – Nov 4, 2005, Cincinnati, OH.
 107. Senger, R. and Karim, M. Nazmul. 2005. Optimization of Fed-Batch Parameters and Harvest Time of CHO Cultures for a Glycosylated Product with Multiple Mechanisms of Inactivation, Biochem Engineering XIV, July 10-14, Harrison Hotsprings, British Columbia, Canada.
 106. Senger RS, Karim MN. 2004b. Neural network-based prediction of variable site-occupancy of N-linked glycosylation. 9th Computer Applications in Biotechnology Conference (CAB). Nancy, France, 2004.
 105. Senger RS, Karim MN. 2004a. Neural network-based identification of r-tPA production in CHO cells. Proceedings of the 9th Symposium on Computer Applications in Biotechnology Conference (CAB). Nancy, France, 2004.

104. Hodge D, Karim MN. 2004. Study of Clustering Algorithms for 2-D PAGE Dynamic Protein Expression Profiles. Proceedings of the 9th Symposium on Computer Applications in Biotechnology, March 28- April 1, Nancy, France.
103. Hodge DB, Karim MN, Mohagheghi A, Baker JO, Schell DJ, McMillan JD. 2005. Factors Affecting Scale-up of High Solids Saccharification from Shake Flasks to Stirred Tank Reactors, Poster, 27th Symposium on Biotechnology for Fuels and Chemicals, May 1-4, 2005, Denver, CO.
102. Hodge DB, Mohagheghi A, Schell DJ, Karim MN, and McMillan JD. 2004. A Fed-Batch Reaction Approach to Enable High-Solids, AIChE Conference, Austin, TX, Nov. (paper no: 33e)
101. Senger RS, Karim MN. 2004. Development of data-based models for glycosylation characterization of polypeptide sequences. AIChE Conference, Austin, TX, Nov, (poster paper, no: 452f).
100. Khoeger, A, and MN Karim. 2004. Effects of catastrophic failure on multi objective refinery optimization. AIChE Conference, Austin, TX, Nov, (poster paper, no: 425j).
99. Hodge, D., M. Nazmul Karim, and Reardon, K. 2003. Hierarchical Cluster Analysis to Detect Coordinated Protein Expression in Metabolically Engineered *Zymomonas mobilis*, American Control Conference 2003, Denver, CO, June 4-6.
98. M. Nazmul Karim. 2003. Data-Driven Approaches to Modeling and Analysis of Bioprocesses (keynote tutorial presentation), American Control Conference 2003, Denver, CO, June 4.
97. Karim, M. Nazmul and Alex Hernandez-Soto. 2003. Inhibitory Effects of Acetic Acid and Furfural on Ethanol Fermentation by Recombinant *Zymomonas mobilis* C25, paper 423b, AIChE Annual Meeting, San Francisco, CA, November.
96. Khoeger, Ahmed, S., and M. Nazmul Karim. 2003. Multi-objective Intra-Refinery Optimization, paper 426b, AIChE Annual Meeting, San Francisco, CA, November.
95. Senger, R. S. and M. Nazmul Karim. 2003. Glycosylation Prediction Using Multiple Artificial Neural Networks, paper 107an, AIChE Annual Meeting, San Francisco, CA, November.
94. Hodge, D., K. Reardon, and M. Nazmul Karim. 2003. Data Analysis of Proteome Expression in Metabolically Engineered *Zymomonas mobilis*, paper 107am, AIChE Annual Meeting, San Francisco, CA, November.
93. Yonghong Tan, and M. Nazmul Karim. 2002. Smith Predictor Based Neural Controller with Time-Delay Estimation, XV World Congress of the International Federation of Automatic Control, Barcelona, Spain, 21- 26 July.
92. David Hodge and M. Nazmul Karim. 2002. Nonlinear MPC for Recombinant *Zymomonas mobilis* Fed-batch Ethanol Fermentation, XV World Congress of the International Federation of Automatic Control, Barcelona, Spain, 21-26 July.
91. Senger, R, and M. N. Karim. 2002. Effects of Media Composition and Shear Stress in r-tPA Production and Glycosylation from CHO Cell Culture, paper 330f, AIChE Annual Meeting, Indianapolis, IN, November.
90. Hodge, D., K. Reardon, and M. N. Karim. 2002. Proteome Expression Analysis of the Consequences of Metabolic Engineering in *Zymomonas mobilis*, paper 311d, AIChE

- Annual Meeting, Indianapolis, IN, November.
89. Simon, Laurent and M. Nazmul Karim 2001. Model predictive control of apoptosis in mammalian cell cultures, Escape-11, Denmark, May 27-30.
 88. Simon, Laurent and M. Nazmul Karim. 2001. Real-time generalized predictive control of DO in a shear sensitive mammalian cell culture process, 8th International Conference on Computer Applications in Biotechnology (CAB-8), Quebec City, Canada, June 24-27.
 87. Senger, Ryan, and M. Nazmul Karim. 2001. Effect of shear stress on recombinant tissue plasminogen activator protein (r-tPA) production and glycosylation, AIChE Annual meeting, Reno, NV, Nov 4-9, Paper (poster) 3001.
 86. Um, B-H. and M. Nazmul Karim. 2001. Modeling of surfactant and solid concentration effectiveness on the enzymatic hydrolysis of various acid pretreated corn stover, AIChE Annual meeting, Reno, NV, Nov 4-9, Paper (poster) 300j.
 85. Simon, Laurent and M. Nazmul Karim. 2001. Modeling and understanding of starvation induced apoptosis in CHO cells, AIChE Annual meeting, Reno, NV, Nov 4-9, Paper 302g.
 84. Karim, M. Nazmul, and Y. Tan. 2001. Neural network based Smith Predictive Control for nonlinear systems with time-varying time delays, AIChE Annual meeting, Reno, NV, Nov 4-9, Paper 286i.
 83. Hodge, David and M. Nazmul Karim. 2001. Modeling and predictive control of recombinant *Zymomonas mobilis* fed-batch fermentation using hybrid neural network model, AIChE Annual meeting, Reno, NV, Nov 4-9, Paper 283f.
 82. Simon, Laurent and M. Nazmul Karim. 2000. Identification and control of dissolved oxygen in Hybridoma cell culture under shear sensitive environment, AIChE Annual Meeting, Los Angeles, CA, Nov 12-17, Ref. Number: 294f.
 81. Simon, Laurent and M. Nazmul Karim. 2000. Control of apoptotic cells in bioreactors: A role for Kalman Filters, AIChE Annual meeting, Los Angeles, CA, Nov 12-17, Ref. Number: Poster 279ac.
 80. Karim, M. Nazmul, Nicola Fletcher, Julian Morris, and Elaine Martin. 2000. Monitoring and optimization of industrial fed-batch fermentations, 13th Annual Colorado Biotechnology Symposium, Fort Collins, CO, Sept 14.2.
 79. M. Nazmul Karim and Andrew Spasoff. 2000. Analysis of macro-heterogeneity of t-PA in CHO cell culture, AIChE Annual Meeting, Los Angeles, CA, Nov 12-17, Ref. Number: 279bg.
 78. Simon, L. and M. N. Karim. 1999. Growth-phase Classification Using Back-propagation and Probabilistic Neural Networks, 14th World Congress of IFAC, Beijing, July 5-9 (also in the refereed Proceedings: 0-7d-02-3: pages 463-467)
 77. Eikens, Bernd, M. Nazmul Karim, and L. Simon. 1999. Neural Networks and First Principle Models for Bioprocesses, 14th World Congress of IFAC, Beijing, July 5-9 (also in the refereed Proceedings: N-7a-12-4: pages 367-372)
 76. Miller, M., L. Henk, M. N. Karim and J.C. Linden. 1999. Production of Enzymes Using Solid Substrate Fermentation and Spent Brewers Grains. Poster Session, paper # 18, 12 Annual Colorado Biotechnology Symposium, September 14, Boulder, CO.
 75. Fillon, M. and M. N. Karim. 1999. Assisted Design of Bioprocess Models. Poster Session,

- paper # 17, 12th Annual Colorado Biotechnology Symposium, September 14, Boulder, CO.
74. Simon, L. and M. N. Karim. 1999. Control of Starvation-induced Apoptosis in CHO Cells. Poster Session, paper # 16, 12th Annual Colorado Biotechnology Symposium, September 14, Boulder, CO.
 73. Weber, A. and M. N. Karim. 1999. Adaptation and Neural Network Modeling of CHO Cells Grown in Serum Free and Animal Component Free Media, paper # 255f, 1999 AIChE Annual Meeting, LA, October 31- November 5.
 72. Fillon, M., Z. Bustamante, and M. Nazmul Karim. 1999. Data Analysis for Metabolic Pathway Determination of Bacillus thuringiensis HD-73 Fermentation, paper # 249e, 1999 AIChE Annual Meeting, LA, October 31- November 5.
 71. Karim, M. N. and A. Spasoff. 1999. Effects of Protein-Free Medium on Recombinant Protein Glycosylation Heterogeneity, paper # 241m, 1999 AIChE Annual Meeting, LA, October 31-November 5.
 70. Fillon, M. and M. Nazmul Karim. 1999. Assisted Data-Based Design of Bioprocesses, paper 224e, 1999 AIChE Annual Meeting, LA, October 31- November 5.
 69. Simon, L. and M. N. Karim. 1999. Modeling and Control of Starvation Induced Apoptosis in Mammalian Cell Culture Process, paper # 208n, 1999 AIChE Annual Meeting, LA, October 31-November 5.
 68. Henk, L., M. Nazmul Karim, J.C. Linden, and M. Miller. 1999. Production of Cellulase and Xylanase Using Solid State Fermentation, paper # 60c, 1999 AIChE Annual Meeting, LA, October 31- November 5.
 67. Phisalaphong, M., M. Nazmul Karim, and J. C. Linden. 1999. Kinetic Studies of Paclitaxol Production in Batch and Semi-Continuous with Total Cell Recycle Taxus canadensis Cultures, 1999 AIChE Annual Meeting, LA, October 31- November 5.
 66. Karim M. N. and C. L. Odor. 1998. Data Replacement Techniques as Applied to Industrial Data (paper 240 g), AIChE Annual Meeting, November 15 - 20, Miami Beach, FL.
 65. Karim, M. Nazmul, J. C. Linden, and M. Phisalaphong. 1998. Statistical Approaches to Studying Taxol Production and Metabolic Manipulation of Texas sp. Cell Culture (paper 297e), AIChE Annual Meeting, November 15 - 20, Miami Beach, FL.
 64. Karim, M. Nazmul and S. Sarosa. 1998. Neural Network Cross Combination: A Solution for Process Identification on Industrial Data (paper 225f), AIChE Annual Meeting, November 5-20 Miami Beach, FL.
 63. Karim, M. Nazmul and C. Sun. 1998. Multi-model Approach to Control pH in Complex Wastewater Neutralization Process (paper 223 e), AIChE Annual Meeting, November 15- 20, Miami Beach, FL.
 62. Weber, A. and M. N. Karim. 1998. Neural Network Analysis of Batch and Fed-batch Cultures from CHO Cells in Serum-free and Animal-Component-free Media, Poster Session IIA, paper # 6, 11th Annual Colorado Biotechnology Symposium, September 22, Fort Collins, CO.
 61. Simon, L. and M. N. Karim. 1998. Comparison of Probabilistic and Back-propagation Neural Networks for Growth Phase Classification, Poster Session IIA, paper # 2, 11th

- Annual Colorado Biotechnology Symposium, September 22, Fort Collins, CO.
60. Karim, Nazmul and Catherine Odor. 1998. Data-based Diagnostic Tools as Applied to the Industrial Production of High Fructose Corn Syrup, Session 2: paper # 5, 11th Annual Colorado Biotechnology Symposium, September 22, Fort Collins, CO.
 59. Karim, M. Nazmul. 1997. Status review of application of Neural Network/PCA in bioprocessing. Invited talk, BIOCHEMICAL ENGINEERING X. May 18-23, 1997 Kananaskis, Alberta, Canada.
 58. Puente, C. and M. N. Karim. 1997. Principal Component Analysis for process fault detection in batch fermentations (paper A002), Invited talk, 2nd International Symposium on Bioprocess Engineering, Mazatlan, Mexico, September 8-11, 1997.
 57. Odor, C. and M. N. Karim. 1997. The application of Chemometrics to the microbial analysis and correlation of product quality in a high fructose corn syrup production plant, The 10th Annual Colorado Biotechnology Symposium, September 23, 1997, Boulder, Colorado.
 56. Batt, S., K. Andrud and M. N. Karim. 1997. Characterization of a xylose-fermenting recombinant *Saccharomyces cerevisiae*, The 10th Annual Colorado Biotechnology Symposium, September 23, 1997, Boulder, Colorado.
 55. Karim, M. Nazmul. 1997. Multi-model approach to identify a fed-batch fermentation process, Special Workshop on Multiple Model Approaches to Modeling and Control, Invited talk, September 29-30, Norwegian University of Science & Technology, Trondheim, Norway.
 54. Puente, C. and M. N. Karim. 1997. Quality monitoring and fault detection in *Bacillus thuringiensis* batch fermentation (paper: 235e), AIChE Annual Meeting, November 16-21, Los Angeles, CA.
 53. Karim, M. N. and C. Odor. 1997. Application of Chemometrics for monitoring product quality in a high fructose corn syrup production plant (paper:214o), 1997 AIChE Annual Meeting, November 16-21, Los Angeles, CA.
 52. Luo, W., M. N. Karim, A. J. Morris and E. B. Martin. 1996. Control relevant identification of a pH waste water neutralization process using Adaptive Radial Basis Function Networks, ESCAPE-6, Rhodes, Greece, May.
 51. Al-Duwaish, H. and M. Nazmul Karim. 1996. New Methodology for identification and control of plants with input or output nonlinearities, ESCAPE-6, Rhodes, Greece, May.
 50. Nott, P. J. K. , M. N. Karim and A. J. Morris. 1996. Fault and contamination detection in a continuous bakers yeast fermentation, ESCAPE-6, Rhodes, Greece, May.
 49. Saucedo, Victor M. and M. Nazmul Karim. 1996. On-line optimization of stochastic processes using Markov Decision processes, ESCAPE-6, Rhodes, Greece, May.
 48. Ignova, M., G. C. Paul, C. R. Thomas, J. Glassey, A. C. Ward, G. A. Montague and M. N. Karim. 1996. Towards intelligent process supervision: industrial penicillin fermentation case study, ESCAPE-6, Rhodes, Greece, May.
 47. Sargantanis, I.G., S. Valentinotti, and M. N. Karim. 1996. Model based DO control for product quality improvement in aerobic fermentations, 13th World Congress, IFAC, June 30 - July 5, San Francisco, CA (also in the proceedings (refereed), Vol. N (p413- 418).
 46. Karim, M. N. , A. J. Morris, P. J. Nott, and E. B. Martin. 1996. Application of Neural

- Networks in identification of faults in bioprocesses, 13th World Congress, IFAC, June 30 - July 5, San Francisco, CA (also in the proceedings (refereed), Vol. N (p419- 424).
45. Batt, S. S., S. Dolberg, M. N. Karim, and J. C. Linden. 1996. Optimization of conditions for ethanol production from xylose using a recombinant *Saccharomyces cerevisiae*. The 9th Colorado Biotechnology Symposium, October 8, Fort Collins, CO.
 44. B. Eikens and M. Nazmul Karim. 1996. Fermentation monitoring and modeling with Self-Organizing Maps. The 9th Colorado Biotechnology Symposium, October 8, Fort Collins, CO.
 43. B. Eikens and M. N. Karim. 1996. Parameter estimation and control using continuously Adapted Radial Basis Function Networks, 1996 AIChE Annual Meeting, November 10-15, 1996, Chicago, IL.
 42. Sargantanis I. G. and M. N. Karim. 1996. Variable structure and time delay determination with NARX models: application to Dissolved Oxygen control, 1996 AIChE Annual Meeting, November 10-15, 1996, Chicago, IL.
 41. Saucedo, V.M., S. Valentinotti, M. N. Karim, and H.W. Collins. 1995. Sixth International Conference on Computer Applications in Biotechnology, Garmisch-Partenkirchen, Germany, May 14-17.
 40. Oh, G.S., B. Eikens, T. Yoshida, and M. N. Karim. 1995. Sixth International Conference on Computer Applications in Biotechnology, Garmisch-Partenkirchen, Germany, May 14-17.
 39. Al-Duwaish, J., M. Nazmul Karim, and V. Chandrasaker. 1995. A new method for the identification and control of Hammerstein Model. Proceedings of the 29th Annual Conference on Information Sciences and Systems, Baltimore, Maryland., March 22-24. pp. 668-673.
 38. Saucedo, Victor M., and M. Nazmul Karim. 1995. Infinite horizon Markov Chain optimization of a fed-batch recombinant ethanol fermentation. American Control Conference, Seattle, WA, June.
 37. Sargantanis, J. and M. N. Karim. 1995. Study of the production of Beta Lactamase using aqueous-two phase systems. AIChE Annual Meeting, Miami Beach, Florida. November 12-17. Paper 215f.
 36. Saucedo, V. and M. N. Karim. 1995. Markovian and NDP representations of a fed-batch fermentation in a real-time optimization scheme. AIChE Annual Meeting, Miami Beach, Florida, November 12-17. Paper No. 169g
 35. Karim, M. N., S. Valentinotti, and J. Sargantanis. 1995. Adaptive pole placement PID type controller for control of Dissolved Oxygen concentration in fermentations. AIChE Annual Meeting, Miami Beach, Florida, November 12-17. Paper No. 179g.
 34. Eikens, B., and M. N. Karim. 1994. Real-time control of a waste neutralization process using radial basis functions. ADCHEM '94 Conference, Kyoto, Japan, May 25-27. Also in the proceedings: pp. 132.
 33. Saucedo, V., B. Eikens, and M. N. Karim. 1994. Identification techniques for a recombinant fed-batch fermentation for ethanol production. First Mexican Congress in Biotechnology, Cuernavaca, Mexico, June.
 32. Eikens, B., and M. N. Karim. 1994. Identification of a waste-water neutralization process

- using neural networks. International Conference on Neural Networks, San Diego, June 5-9 25-130.
31. Proell, T., and M. N. Karim. 1993. Real-time design of an adaptive nonlinear model predictive controller. 12th World Congress of International Federation of Automatic Control (IFAC), Sydney, Australia. 18-23.
 30. Hilaly, A. K., M. N. Karim, and J.C. Linden. 1993. Studies on real-time optimization of a fed-batch recombinant Escherichia coli fermentation. 12th World Congress of International Federation of Automatic Control (IFAC), Sydney, Australia. 18-23.
 29. Rivera, S. L., and M. N. Karim. 1993. Use of micro-genetic algorithms in bioprocess optimization. 12th World Congress of International Federation of Automatic Control (IFAC), Sydney, Australia. 18-23.
 28. Proell, T., and M. N. Karim. 1993. Comparison of ANN and NARX based MPC for a real-time pH control system (1471). Presented at the AIChE National Meeting, November 7-12, 1993, St. Louis, Missouri.
 27. Rivera, S. L., P. A. Ioannou, and M. N. Karim. 1993. Inverse nonlinear control of a bioprocess using recurrent high order neural networks (147h). Presented at the AIChE National Meeting, November 7-12, 1993, St. Louis, Missouri.
 26. Rivera, S. L., and M. N. Karim. 1993. On-line model parameter estimation of a bioprocess using genetic algorithms (145d). Presented at the AIChE National Meeting, November 7-12, 1993, St. Louis, Missouri.
 25. Proell, T., and M. N. Karim. 1992. On-line identification, model structure reduction and control using NARX models. Proceedings of the American Control Conference, Chicago, Illinois. June 24-26, pp. 117-123.
 24. Rivera, S. L., and M. N. Karim. 1992. Use of recurrent neural networks for bioprocess identification in on-line optimization by micro-genetic algorithms. Proceedings of the American Control Conference, Chicago, Illinois. June 24-26, pp. 1931-1933.
 23. Rivera, S. L., and M. N. Karim. 1992. Application of neural networks in bioprocess state estimation. Proceedings of the American Control Conference, Chicago, Illinois. June 24-26, pp. 495-499.
 22. Proell, T., A. Hilaly, and M. N. Karim. 1992. Optimization and control of an industrial scale multivariable nonlinear microalgae fermentation. Proceedings of the 3rd IFAC DYCORS '92, College Park, Maryland. April 26-29, pp. 117-123.
 21. Hilaly, A. K., M. N. Karim, and J.C. Linden. 1992. Comparative study of optimal productivity in batch, fed-batch and continuous xylose fermentation by a recombinant Escherichia coli. Presented at the 1992 AIChE National Meeting, November 1-6, Miami Beach, Florida.
 20. Proell, T., and M. N. Karim. 1992. Intelligent nonlinear control system design based on real-time identification and control of nonlinear systems. Presented at the 1992 AIChE National Meeting, November 1-6, Miami Beach, Florida.
 19. Sargantanis, J., and M. N. Karim. 1992. Application of Kalman filter and adaptive control in solid substrate fermentation. Proceedings of the 22nd Annual Biochemical Engineering Symposium, April 25, Ames, Iowa, pp. 67-78.
 18. Saucedo, V.M., M. N. Karim, and S. Karim. 1992. On identification of dynamical systems

- using Volterra series: application to a recombinant Escherichia coli fermentation. 5th Annual Colorado Biotechnology Symposium, Fort Collins, Colorado. September 22.
17. Sargantanis, J., and M. N. Karim. 1992. Control in Solid Substrate Fermentation. 5th Annual Colorado Biotechnology Symposium, Fort Collins, Colorado. September 22.
 16. Saucedo, V.M., and M. N. Karim. 1992. Identification of dynamic systems using Volterra series: application to recombinant fermentations. Presented at the AIChE National Meeting, November 1-6, Miami Beach, Florida.
 15. Sargantanis, J., M. N. Karim, V.G. Murphy, and R. P. Tengerdy. 1991. Parametric sensitivity studies of Rhizopus oligosporus solid substrate fermentation. Proceedings of the 21st Annual Biochemical Engineering Symposium, April 20, Fort Collins, Colorado, pp. 131-140.
 14. Proell, T., A. K. Hilaly, M. N. Karim, and D. Guyre. 1991. Optimization and control of an industrial large scale multivariable nonlinear microalgae fermentation. Presented at the AIChE National Meeting, Los Angeles, California. November 17-22.
 13. Hilaly, A. K., M. N. Karim, T. Proell, and D. Gyure. 1991. Comparison of different optimization schemes in an industrial scale microalgae fermentations. Proceedings of the 1991 American Control Conference, Boston, Massachusetts. June 26-28.
 12. Rivera, S. L., and M. N. Karim. 1991. Microgenetic algorithms and recurrent neural networks for real-time process optimization. Presented at the AIChE National Meeting Los Angeles, California. November 17-22, 1991.
 11. Hilaly, A. K., M. N. Karim, and J.C. Linden. 1991. Regulation of cell metabolism for optimal ethanol production by a recombinant Escherichia coli. Presented at the AIChE National Meeting, Los Angeles, California. November 17-22, 1991.
 10. Rivera, Sheyla L. and M. Nazmul Karim. 1990. Simulation and real time application of dynamic programming for fermentative ethanol production. Presented at the ECB 5, Copenhagen, Denmark. July 8-13 (in the proceedings).
 9. Szoychen, M., V.G. Murphy, and M. N. Karim. 1990. Microbial gold recovery. Presented at the 5th European Congress of Biotechnology, Copenhagen, Denmark. July 8-13 (in the proceedings).
 8. Hilaly, A. K., M. N. Karim, J.C. Linden, and S. Lastick. 1990. Structured mathematical modeling of xylose fermentation. Proceedings of the 20th Annual Biochemical Engineering Symposium, Manhattan, Kansas.
 7. Hilaly, A. K., M. N. Karim, and J.C. Linden. 1990. Modeling and optimization of xylose fermentation using recombinant E. coli containing Zymomonas mobilis genes. Presented at the 5th European Biotechnol. Congress, Copenhagen, Denmark. July 8-13 (in the proceedings).
 6. Rivera, S. L., and M. N. Karim. 1990. Simulation and real time application of dynamic programming for fermentative ethanol production. Presented at the 3rd Annual Colorado Biotechnol. Symp., Fort Collins, Colorado. September 18.
 5. Hilaly, A. K., M. N. Karim, and D. Gyure. 1990. Optimization of industrial fed-batch and continuous fermentations. Presented at the 3rd Annual Colorado Biotechnol. Symp., Fort Collins, Colorado. September 18.
 4. Hilaly, A. K., M. N. Karim, J.C. Linden, and S. Lastick. 1990. Metabolic structured

- modeling of xylose fermentation. 1990. Presented at the ACS meeting, Washington, DC. August 26-31.
3. Hilaly, A. K., M. N. Karim, D. Gyure, and P. Barnhart. 1990. Optimization of industrial fed-batch and continuous fermentations. Presented at the AIChE Annual Meeting, Chicago, Illinois. November 11-16.
 2. Hilaly, A. K., M. N. Karim, and J.C. Linden. 1990. Structured modeling and optimization of xylose fermentation using recombinant E. coll. Presented at the AIChE Annual Meeting, Chicago, Illinois. November 11-16.
 1. Ryoo, D., V.G. Murphy, M. N. Karim, and R. P. Tengerdy. 1990. Adaptive control of solid substrate fermentation with Rhizopus oligosporus. Presented at the AIChE Annual Meeting, Chicago, November 11-16, 1990.

SHORT COURSES, AND PLENARY AND INVITED LECTURES

Short Courses Organized:

5. Rafiqul Gani, Iqbal Mujtaba and M. Nazmul Karim. 2008. Course on Integrated Chemical Product-Process Design, Department of Chemical Engineering, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh; December 27-28.
4. Karim, M. N. 1995. Bangladesh Council for Scientific and Industrial Research, Dhaka, Bangladesh, December 26, 1994-January 6. Sponsor: Third World Academy of Sciences, Trieste, Italy.
3. Karim, M. N. 1986. Organizer and Speaker, Short Course on Process Control and Optimization of Fermentation Processes, Estes Park, Colorado, April.
2. Karim, M. N. 1986. Speaker, Short Course on Industrial Bio-processing, Pingree Park, Colorado, June.
1. Karim, M. N. 1985-2004. Course Director and Speaker, Short Course on Industrial Bioprocessing, Estes Park (1986-88), Keystone (1989-90), Breckenridge (1990-92), Fort Collins (1993), Estes Park(1994 - present), Colorado.

Keynote/Plenary Lectures:

8. M. Nazmul Karim. 2014. Identification, Control, and Monitoring of Complex Chemical and Biochemical Systems, Plenary Lecture, ACODS 2014, March 13-15, IIT Kanpur, India
7. Karim, M. Nazmul. 2013. Biofuel from Waste Agricultural Product and Lignocellulosic Biomass. Plenary III. AgriControl 2013, The 4th IFAC Conference on Modelling and Control in Agriculture, Horticulture and Post-Harvest Industry, 28–30 August, Aalto University School of ELEC, Espoo, Finland

6. Karim, M. Nazmul. Invited Closing Lecture. 2011. Renewable Biofuels: Third Generations Concepts. ICChE 2011. 3rd International Conference on Chemical Engineering, BUET, Dhaka, Bangladesh. Dec 29, and 30, 2011.
5. Karim, M. Nazmul. Invited Plenary Lecture. 2008. Renewable Biofuels: Can we afford it? ICChE 2008. 2nd International Conference on Chemical Engineering, BUET, Dhaka, Dec 31- Jan1, 2008/2009.
4. Karim, M. Nazmul (Invited Plenary Speaker). 2003. ICChE 2003, Bangladesh: FIFTY YEARS OF CHEMICAL ENGINEERING EDUCATION AND PROFESSION, BUET, Dhaka, December.
3. "Global and Local Neural Network Models in Biotechnology," The 1st Colombian Conference on Neurocomputing, Bogota, Colombia, February, 1995.
2. "Computer Control of Bioreactors with Aid of Knowledge Engineering," Annual Chemical Engineering Congress of the Japanese Chemical Engineering Society, Nagoya, September 27-29, 1994.
1. "Neural Network Models in Biotechnology," The 9th NRCT, NUS, DOST-JSPS Joint Seminar on Biotechnology (theme: Biotechnology for Economy and Pollution Control), Khon Kaen, Thailand, October 12-15, 1994.

Invited Lectures:

83. M. Nazmul Karim. 2015. Sustainable Production of Renewable Liquid Fuels: Can we make it work? Biological and Agricultural Engineering Department, Texas A&M University, September 16, 2015.
82. M. Nazmul Karim. 2015. Sustainable Production of Renewable Liquid Fuels: Is It a Myth? Department of Chemical Engineering, University of Tennessee. April 21, 2015.
81. M. Nazmul Karim. 2014. Viable Alternatives for Biofuels using Biochemical Pathways. FOCAD 2014. Suncadia Resort, Cle Elum, Washington, July 13-17, 2014.
80. M. Nazmul Karim 2014. Bioprocess Control: Experiences and Applications. IIT- Bombay, Mumbai, India, January 7, 2014.
79. M. Nazmul Karim. 2014. Bioprocess Control: Experiences and Applications. Madras Institute of Technology, Chennai, India, January 3, 2014.
78. M. Nazmul Karim. 2014. Identification, Control, and Monitoring of Complex Chemical and Biochemical Systems. IIT-Madras, Chennai, India, January 2, 2014.
77. M. Nazmul Karim. 2014. Bioprocess Control: Experiences and Applications Identification, Control, and Monitoring of Complex Chemical and Biochemical Systems, Golden LEAF Biomanufacturing Training and Education Center, and Chemical Engineering, NC State University, Raleigh, NC. October 11, 2013.
76. M. Nazmul Karim. 2011. Desert Bio-fuels. Institute of Chemical Engineering and High Temperature Chemical Processes (ICE-HT) and Foundation for Research and Technology, Hellas (FORTH) University of Petras, Patras, Greece, June 3, 2011.

75. M. Nazmul Karim. 2011. Renewable Biofuels: can this be done economically? Department of Chemical Engineering, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh, January 4, 2011.
74. M. Nazmul Karim. 2010. Cellulosic Biofuels Production using Recombinant *E. coli*. Centre for Process System Engineering, Imperial College, London, UK, December 16, 2010.
73. M. Nazmul Karim. 2010. Cellulosic biofuels: One step process for bioethanol and biobutanol production, Biochemical Engineering Department, University College London, UK. July 6.
72. M. Nazmul Karim. 2010. Metabolic Engineering for bioethanol and biobutanol production from cellulosic biomass. Department of Bioengineering, University of Minho, Braga, Portugal. June 29.
71. M. Nazmul Karim. 2010. One Step Biofuels: Is it feasible? XXXIX Annual Meeting of the Brazilian Society for Biochemistry and Molecular Biology (SBBq), Convention Center of Hotel Rafain, Foz do Iguaçu, Paraná, Brazil, May 18 to 21, 2010. (Invited Keynote Lecture).
70. M. Nazmul Karim. 2008. Sustainable Biofuels. 2008. Department of Chemical Engineering, Technical University of Denmark, July 18.
69. M. Nazmul Karim and S. Karra. 2008. Modeling, Identification, and Control of Complex Systems, CHEMPOR 2008, Braga, Portugal, Sept 4-6. (Keynote lecture).
68. M. Nazmul Karim. 2008. Biofuels and Sustainability. Department of Biochemical Engineering, University College, London, UK, July 10.
67. M. Nazmul Karim. 2008. Renewable Biofuels: One step ethanol production. School of Chemical, and Advanced Materials, and Process Engineering, University of Newcastle Upon Tyne, UK, July 15.
66. M. Nazmul Karim. 2008. One step ethanol production. Department of Chemical Engineering, Manhattan College, New York, NY, September 10.
65. M. Nazmul Karim. 2008. Cellulosic Ethanol: Is it feasible? Department of Chemical Engineering, Columbia University, New York, NY, September 12.
64. Karim, M. Nazmul. 2007. Biofuels: Myth or reality, Keynote talk, European Congress of Chemical Engineering- 6 (ECCE-6), Copenhagen, Sept.
63. M. Nazmul Karim and Binbing Han. 2007. Ethanol Production from Waste Sweet Potato Using Recombinant *Zymomonas mobilis* Strains, invited presentation, European Congress of Chemical Engineering- 6 (ECCE-6), Copenhagen, Sept.
62. Karim, M. Nazmul. 2005. Macro-heterogeneity and variable site-occupancy classification of N-linked glycosylation, Department of Physics and Optics, and Biomedical Engineering Institute, University of North Carolina, Charlotte, NC, Dec 8.
61. Karim, M. Nazmul. 2005. Variable site-occupancy classification of N-linked glycosylation using artificial neural networks, Department of Mechanical and Chemical Engineering and Energy and Environmental Studies Program, North Carolina AT State University, Greensboro, NC, Dec 9.
60. Karim, M. Nazmul. 2004. Application of data based modeling for recombinant fermentation. University of Kansas, Lawrence, KS, April.

59. Karim, M. Nazmul. 2004. Proteomic data analysis for recombinant *Zymomonas mobilis* fermentation, Texas Tech University, June.
58. Karim, M. Nazmul (Invited Plenary Speaker). 2003. ICChE 2003, Bangladesh: FIFTY YEARS OF CHEMICAL ENGINEERING EDUCATION AND PROFESSION, Dhaka, December.
57. Karim, M, Nazmul. 2003. Modeling Complex Biological Systems: Data-Driven Approaches to Analyze Recombinant Fermentations, September, University of Missouri Rolla.
56. Karim, M. Nazmul . 2003. Some Experiences with Bioethanol Production, University of Nevada, December.
55. Karim, M. Nazmul. 2003. Advanced Process Control Applications: Case Study of Recombinant *Zymomonas mobilis* fermentation for ethanol production, University of Nevada, Reno. September.
54. Karim, M. Nazmul. 2003. Modeling Complex Biological Systems: A Data-Driven Approach to Analyze Proteomic Data for Recombinant Fermentations, University of Maryland, College Park, September.
53. Karim, M. Nazmul. 2003. Intelligent mobile sensors for under water use. US Army Aberdeen Probing Grounds, MD, November.
52. Karim, M. Nazmul. 2002. Biochemical Engineering Research and Education. National Science Foundation, February.
51. Karim, M. Nazmul (Invited lecture).2000. Neural Networks and Other Data Based Modeling in Biotechnology Industries. Aventis Pasteur, Toronto, Canada, April 28.
50. Karim, M. Nazmul. (Invited lecture). 2000. Data based modeling and analysis of fermentation processes: case study of industrial therapeutic protein separation, University of Newcastle Upon Tyne, UK , July 18.
49. Karim, M. Nazmul. (Invited lecture). 2000. Neural Networks and PCA Methods in Industrial Biotechnology, Genentech, Inc., South San Francisco, CA, May 22.
48. Karim, M. N. and B. Eikens. 1998. Identification of a Fermentation with SOM. The 7th International Conference on Computer Applications in Biotechnology, Osaka, Japan, May 31- June 4.
47. Karim, M. N. 1998. Biotechnology: Industrial Perspective. Invited Lecture, Primer Dia de la Biotecnologia, ITESM, Campus Monterrey, Mexico, April 25.
46. Karim, M. N. 1998. Data Based Modeling of Bioprocesses: An Overview. Kansas State University, January.
45. M. Nazmul Karim. 1997. Status Review of Application of Neural Network/PCA in Bioprocessing. BIOCHEMICAL ENGINEERING X. May 18-23, 1997 Kananaskis, Alberta, Canada
44. Karim, M. N. 1997. Application of Neural Networks and PCA Analysis in Biotechnology Industries, Special Seminar, Amgen, San Francisco, CA , July 9.
43. Karim, M. N. 1997. Application of ANN and PCA/PLS Methods in Biotechnology Based Industries, Genetic Institute, Andover, MA, August 8.
42. Karim, M. Nazmul. 1997. Multi-model Approach to Identify a Fed-batch Fermentation Process, Special Workshop on Multiple Model Approaches to Modeling and Control,

- Norwegian University of Science & Technology, Trondheim, Norway, September 29-30
41. Karim, M. Nazmul. 1997. Application of Data Based Approaches to Bioprocess Industries. Department of Chemical Engineering, Norwegian University of Science & Technology, Trondheim, Norway, October 1.
 40. Karim, M. Nazmul. 1995. Higher Order Recurrent Neural Network and Genetic Algorithm Applications in Biotechnology: Some Experiences. Nagoya University, Department of Biotechnology, January 23.
 39. Karim, M. Nazmul. 1995. Instrumentation and Optimization of Bioprocesses. Osaka University, ICBiotech UNESCO Program.
 38. Karim, M. Nazmul. 1995. Neural Network Models in Biotechnology: Some Experiences. Department of Chemical and Process Engineering, University of Newcastle, Newcastle Upon Tyne, United Kingdom, April 28.
 37. Karim, M. Nazmul. 1995. Data-Based Approach to Modeling Bioprocesses. Department of Chemical Engineering, University College, London, United Kingdom, May 25.
 36. Karim, M. Nazmul. 1995. Global and Local Neural Network Modeling in Biotechnology Department of Chemical Engineering, UMIST, Manchester, United Kingdom, June 15.
 35. Karim, M. N. 1994. Accountability in education: faculty performance and teaching evaluations. Special address to the faculty of Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh, May 31, 1994.
 34. Karim, M. N. 1994. Methodologies for performance evaluation in research and educational institutions. Bangladesh Center for Scientific and Industrial Research (BCSIR), Dhaka, Bangladesh, June 1, 1994.
 33. Karim, M. Nazmul. 1994. Advanced Process Control: Applications to Industrial Processes. Okayama University, Department of Information Services, October 3.
 32. Karim, M. Nazmul. 1994. Neural Network Based On-line Control of a Waste Neutralization Process. Okayama University, Department of Information Services, October 3.
 31. Karim, M. Nazmul. 1994. Neural Network Models in Biotechnology. The Institute of Physical and Chemical Research (RIKEN), October 31-November 1.
 30. Karim, M. Nazmul. 1994 Neural Networks and Knowledge Based Systems in Biotechnology. Tokyo University, Department of Biotechnology, October 30.
 29. Karim, M. Nazmul. 1994. Neural Network Models in Biotechnology. Osaka University, Department of Biotechnology, December 2.
 28. Karim, M. Nazmul. 1994. Bioreactor Control Using Knowledge Based Systems. Oita University, Department of Applied Chemistry, December 5.
 27. Karim, M. Nazmul. 1994. Neural Networks in Biotechnology for On-line Control and Optimization. Kyushu Institute of Technology, Department of Biotechnology, December 7.
 26. Karim, M. Nazmul. 1994. Neural Network Based Model Predictive Control for a pH Neutralization Process. Kumamoto University, Department of Mechanical Engineering, December 8.
 25. Karim, M. Nazmul. 1994. Neural Network Models in Biotechnology. Singapore National University, Department of Chemical Engineering, December 21

24. Karim, M. N. 1993. Biotechnology centers: American experience (what is valid for underdeveloped countries?). Keynote Address, Opening Ceremony, Center of Excellence in Biotechnology, Dhaka University, Dhaka, Bangladesh, January 4.
23. Karim, M. N. 1993. Biotechnology centers for developing countries. Division of Agriculture and Food Engineering, Asian Institute of Technology, Bangkok, Thailand, January 13.
22. Karim, M. N. 1993. Structured modeling and optimization of a recombinant Escherichia coli fermentation for ethanol production. Division of Agriculture and Food Engineering, Asian Institute of Technology, Bangkok, Thailand, January 13.
21. Karim, M. N. 1992. Neural networks and genetic algorithms for bioprocess estimation and control, FAL, Brunshwieg, Germany, June 15.
20. Karim, M. N. 1992. Advanced control concepts in chemical engineering: some examples. Los Alamos National Laboratory, Los Alamos, New Mexico, Fall 1992.
19. Karim, M. N. 1992. Optimization of recombinant Escherichia coli fermentations. Department of Chemical Engineering, University of Michigan, Ann Arbor, Michigan, October.
18. Karim, M. N. 1992. Modeling and control of recombinant Escherichia coli fermentation. Department of Chemical Engineering, University of Florida, Gainesville, Florida, November.
17. Karim, M. N. 1992. Structured modeling and optimization of a recombinant Escherichia coli fermentation for ethanol production. International Center for Cooperative Research in Biotechnology, Osaka University, Osaka, Japan, December 22.
16. Karim, M. N. 1992. Biodegradable polymers from waste products. Polymer Division, Asahi Chemical Company, Kurashiki, Japan, December 24.
15. Karim, M. N. 1991. Neural networks in bioprocess estimation. Department of Chemical Engineering, Arizona State University, Tempe, Arizona, December 1991.
14. Karim, M. N. 1990. Expert systems for biotechnology. The Technical University of Hamburg-Harbor Biotechnology Center, July 14.
13. Karim, M. N. 1990. Solid substrate fermentation: estimation and control, FAL, Brunshwieg, Germany, July 15.
12. Karim, M. N. 1990. Expert systems for biotechnology: real time applications. Laboratoire des Sciences du Chimique, CNRS-ENSIC, Nancy, France, July.
11. Karim, M. N. 1990. Use of singular value analysis for bioprocess optimization. EPFL, Lausanne, Switzerland, July 23.
10. Karim, M. N. 1990. Extended Kalman Filters in the estimation of biological parameters: Case Study-Solid Substrate Fermentation. A CPAC (NSF Center of Excellence) Invited Seminar, University of Washington, Seattle, Washington, November 30.
9. Karim, M. N. 1990. Expert systems in biotechnology. Invited Lecture, Colorado School of Mines, Colorado, Spring 1990.
8. Karim, M. N. 1988. Biotechnology at Colorado State University. Invited Speaker, Department of Chemical Engineering and Department of Biotechnology, Denmark's University of Technology, Lyngby, Denmark, March 10.
7. Karim, M. N. 1988. Separation and optimization of strongly non-ideal fermentative

- products. Invited Speaker, Department of Chemical Engineering, University of Trondheim, Norway, June 27.
6. Karim, M. N. 1988. Real-time expert systems in fermentation. Invited Speaker, Department of Chemical Engineering, University of Trondheim, Norway, June 27.
 5. Karim, M. N. 1988. Process control and optimization in biochemical engineering. Invited Speaker, The Technical University of Hamburg-Harborg, West Germany, July 4.
 4. Karim, M. N. 1988. On-line expert system applications to biotechnology: some initial experiences. Invited Speaker, The Technical University of Hamburg-Harborg, West Germany, July 5.
 3. Karim, M. N. 1988. Real-time expert systems in fermentation environment. Invited Speaker, Department of Biotechnology, E.T.H., Zurich, Switzerland, July 13.
 2. Karim, M. N. 1987. Invited Seminar Speaker, Department of Chemical Engineering, Washington State University, Pullman, Washington, March.
 1. Karim, M. N. 1987. Advanced process control applications to biotechnology. Invited Speaker (three lectures), Department of Chemical Engineering, Helsinki University of Technology, Espoo, Finland, October-November.

MAJOR COURSES TAUGHT

Graduate

Advanced Process Control
 Mathematical Modeling and Numerical Analysis for Chemical Engineers
 Linear Multivariable Systems (for the College of Engineering)
 Linear Programming (for the College of Engineering)
 Automation of Biotechnological Processes
 Fundamentals of Biochemical Engineering
 System Identification
 Adaptive Control
 Graduate Seminar

Undergraduate

Process Control
 Process Control Laboratory
 Bioprocess Control
 Control Systems (for Mechanical Engineering)
 Introduction to Thermodynamics
 Chemical Engineering Thermodynamics
 Unit Operations Laboratory
 Computer Programming
 Fundamentals of Biochemical Engineering
 Bio-separations
 Chemical Process Analysis
 Undergraduate Senior Seminar

Numerical Methods for Chemical Engineers
Chemical Concepts for Environmental Engineering
Heat Transfer
Material and Energy Balance
Senior Seminar
Freshman Seminar

SHORT COURSES DEVELOPED

Advanced Industrial Bioprocessing (1983-2004): *Principles and Practice of Bioprocessing System.* This yearly short course has been attended by engineers and scientists from over 140 major biotechnological companies in the US, Canada, and overseas. This course recognizes the diversity of the field of biotechnology by providing a foundation in basic engineering principles as well as relevant concepts from biochemistry and microbiology. The course provides as much immediately useful information as possible, and emphasizes industrial application and practice of bioprocessing system, and validation of these industrial processes. The course is designed to promote maximum interaction and individual development. The participants have opportunity for hands-on experience at the Colorado Bioprocessing Center.

Automation of Biotechnological Processes:

This short course was offered in Finland in 1985 and 1987 and in Denmark in 1988. This course has also been offered in Monterrey Tech., Mexico, in June 1990 and December 1991 and in Centro de Investigacion y de Estudios Avanzados del IPN, Mexico City, Mexico, in November 1991 and 1992 and also in Celaya (IPN), Mexico in August, 1996. This course was also offered at the Chemical Engineering Department of Budapest Technical University, Budapest, Hungary, in April-June 1992 as part of an International Exchange Program between Hungary and USA.

Automation of Pulp and Paper Technology:

This short course was offered in Finland in 1987, 1989 (January), 1990 (January), 1991 (January), 1992 (January), 1993 (January), and 1994 (May) through the Linkage Program of the Helsinki Technical University. Professor Karim is the only invited visiting professor for the Linkage Program in Pulp and Paper Automation Technology and has a standing invitation to offer this short course every year.

Advanced Control Short Course:

This course is developed for industrial participants interested in learning the fundamentals of modern control theory. This course is developed from the user's point of view. This course has been offered at the Bureau of Reclamation, Denver, Colorado, in the summer of 1989. This course was also in the Universidad Nacional del Sur, Bahia Blanca, Argentina, in July/August of 1983, under a UNIDO program.

Advanced Biotechnology Short Course:

This course was developed for Bangladesh Council for Science and Industrial Research in

1994. It was sponsored by the Third World Academy of Sciences (Trieste, Italy). The two-week short course was offered in December 1994-January 1995 in Dhaka, Bangladesh.

Advanced Short Course on Neural Networks for Process Control in Petroleum

Industries: This course was developed for petroleum industries, and was offered in March, 1996 in ECOPETROL, Colombian National Petroleum Company, Bucaramanga, Colombia.

MAJOR COMMITTEES

(at Colorado State University)

21. University Faculty Council (Senate) (1996-1999, 2001-2002)
20. Chair, Departmental Faculty Advisory Committee (1993-99)
19. Diversity Committee for the Department (1993-99)
18. Chair, Departmental Ph.D. Committee (1988 -1999)
17. Chair, Chemical Engineering Graduate Screening Committee (1993-99)
16. Member, University Equal Opportunity Council (1992-94)
15. College of Engineering Computer Committee (1986 -90).
14. College of Engineering Faculty Awards Committee (1986 -89)
13. University Guest Scholars Committee (1989 - 91)
12. Member, CSU Minority Caucus (1990-91)
11. Chair, College of Engineering Students Affairs Committee (1990-92)
10. Member, University Benefits Committee (1990-92)
9. Departmental Code Committee (ad hoc) (1993- present)
8. Member, Board of Directors, Colorado Bio-processing Center (1996-2004)
7. University Scholastic Standards Committee (1998 -2004)
6. College of Engineering Strategic Planning Committee (2000 - 2002)
5. Departmental ABET Coordinator (2000-2001).
4. Departmental Tenure and Reappointment Committee (2000 -2004)
3. Departmental Continuous Improvement Committee (chair, 2001 -2004)
2. Departmental Committee on Graduate Policy (2001 -2004)
1. Departmental Committee on Development (2001 -2004)

(at Texas Tech University)

5. Member of Mechanical Engineering faculty search in Bioengineering (2004 - 2005)
4. Member of the Bio-Task Force, College of Engineering (2004- present)
3. Member of the Energy Summit Organizing Committee, September, 2006.
2. Member, Executive Committee, College of Engineering (2004 – present)
1. Member of the Whitacre Chair Search, Mechanical Engineering (2010-2011)

(at Texas A & M University)

2. Member, IT Steering Committee, College of Engineering, TAMU (2015-present)
1. Member, Search Committee for the Dean and CEO of TAMU Qatar campus (2014-16)

LIST OF Ph.D. STUDENTS SUPERVISED

Students	Research Area	Year	Current Employer
1. Mahmoud Wali (first Ph.D. student in Chemical Engineering at CSU)	Optimum Separation Sequence for Acetone/Butanol Fermentation Products	1986	Associate Professor, King Abdul-Aziz University, Saudi Arabia
2. Ahmad Hilaly	Structured Mathematical Modeling and Optimization of Xylose Fermentation by a Recombinant <i>Escherichia coli</i>	1992	Director of Research, ADM Corporation, Decatur, IL
3. Sheyla Rivera	Neural Networks and Micro-Genetic Algorithms for State Estimation and Optimization of Bioprocesses	1992	Senior Process Control Engineer, Frito-Lay, Dallas, TX (previously assistant professor, Stevens Institute of Technology, Hoboken, NJ)
4. Thomas Proell	Model Predictive Control Based on Nonlinear Autoregressive and Neural Network Models	1993	Director, Novartis, NJ.
5. Hussain Al-Duwaish	Identification and Control of Dynamical Nonlinear Systems Using Feedforward Neural Networks and Multilayer Autoregressive Moving Average Model	1995	Professor, Electrical Engr, King Fahd University, Dhahran, Saudi Arabia
6. Victor Saucedo	On-Line Optimization of Fed-Batch Fermentations Using Markov Decision Processes	1995	Senior Process Control Engineer, Genentech, CA
7. Noushin Mijalili (co-advisor)	Analysis of Taxol Productivity in Suspension Cultures of <i>Taxus caspidata</i>	1995	Univ. College, London
8. J. Sargantanis	Model Based Control with Variable Structure Application to Dissolved Oxygen Control for beta-lactamase Production	1996	City of Athens Waste Water Dept., Greece

9. Bernhard Eikens	Neural Network Modeling and Control: Case Studies in Chemical Engineering	1996	President UPM North America 999 Oakmont Plaza Drive, Westmont, Illinois, 60559
10. Hugh Graham	Flocculation and the Colloidal Properties of <i>Escherichia coli</i>	1997	Ryu
11. Muenduen Phisalaphong (co-advisor)	Metabolic Manipulation of <i>Taxus canadensis</i> for taxol production	1999	Associate Professor, Chulalongkorn University, Thailand
12. Laurent Simon	Neural Network Based Control of a Bioprocesses: Application to Apoptosis in Mammalian Cell Culture	2001	Associate Professor, NJIT, Newark, NJ
13. David Hodge	Optimization of High Solids Lignocellulosic Biomass Conversion for Ethanol Production	2005	Associate Professor Michigan State U, East Lansing, MI
14. Ryan Senger	Understanding the effects of heterogeneous glycosylation of t-PA in diabetic patients	2005	Associate Professor, Virginia Tech, Blacksburg, VA
15. Ahmed Khogeer	Multi-objective Optimization of Refineries for Environmental and Catastrophic Failures	2005	ARAMCO, Saudi Arabia
16. Chris Betts (co-advisor)	Closed loop identification	2008	Cutler Technology Corporation, San Antonio, TX
17. Srinivas Karra	Modeling, Identification and Control of Complex Systems - A New Paradigm	2009	ExxonMobil, Houston, TX
18. Seunghyun Ryu	Biofuel Production Using Genetically Engineered <i>Escherichia coli</i>	2010	Post-doc. U Tennessee
19. Suma Peri (co-advisor)	Computational Studies of Cellulose Degradation for Production of Biofuels	2011	ExxonMobil, Houston, TX

20. Weiting Tang	Modeling, Estimation, and Control of Nonlinear Time-Variant Complex Processes	2013	Baker Hughes, Houston, TX
21. Zheng Li	Identification, Control, and Monitoring of Complex Chemical and Biochemical Systems	2013	Genentech, San Francisco, CA

Also, co-advised Dr. Eduardo Nebot, PhD graduate of Electrical Engineering from Colorado State University, 1988. Currently serving as a Professor of Aerospace, Mechanical and Mechatronics, and the Director of *Australian Center for Field Robotics*, University of Sydney.

M.S. THESIS SUPERVISED: ~50

UNDERGRADUATE RESEARCH SUPERVISED: 40

CURRENT PhD STUDENTS:

1. Xinghua Pan, 5th year
2. Jonathan Raftery, 4rd year
3. Liang Chao, 3rd year student (co-advisor)
4. Chiranjivi Botre, 2nd year student
5. Melanie DeSessa, 2nd year student
6. Alexander Sobel, 1st year student
7. Mohammed Ziyen Sheriff, 1st year student (co-advisor)

CURRENT MS STUDENTS:

1. Tejasvi Jeladi, 2nd year student (graduated August, 2016)

CURRENT UNDERGRADUATE RESEARCHER/INTERNS:

1. Yuxin Wang, Tianjin University, China (Spring, 2016)
2. Dingyi Wang, Tsinghua University (Summer, 2016)