

May M. Wu, Ph.D.

Argonne National Laboratory
9700 South Cass Avenue, Bldg. 362
Argonne, IL 60439
phone: 630/252-6658, fax: 630/252-3443
e-mail: mwu@anl.gov

Professional Experience

ARGONNE NATIONAL LABORATORY, Argonne, IL

2004 –

Environmental Scientist, Center for Transportation Research

- Performed life cycle assessment for Brazil grown sugar cane – derived ethanol to be used in US transportation.
- Examined Well-to-Wheels (WTW) energy and environmental effects using GREET model to address life cycle of corn-based butanol as an alternative to gasoline and effect of co-product acetone.
- Conducted study to evaluate various process fuel options for corn ethanol plant and their WTW impacts on fossil fuel use and GHG emissions.
- Participated Office of Biomass Program in DOE's analytical 30x30 effort to address US bio-energy future which resulted in a life cycle analysis of corn-stover- and forest wood residue-derived ethanol to be used as E85 in vehicles to displace petroleum gasoline.
- Assessed energy and emission benefits for ethanol, Fisher-Tropsh diesel, and dimethylether that produced from cellulosic feedstocks switchgrass via biochemical and thermochemical processes.
- Joined a multi-disciplinary and inter-divisional LDRD project team to develop an energy system model for the state of Illinois resulting continue funding.
- Investigated a fuel production pathway of hydrogen generation from sub-bituminous coals via coal gasification for GREET.
- Conducted life cycle and/or Cradle-to-Gate analysis of farming machinery, agricultural lime production and application, petroleum acetone, and steel refining process.
- Supervised post doc in a team environment.
- A member of Energy System Division emergency response team.

NALCO CHEMICAL COMPANY, Naperville, IL

1998 – 2003

Senior Research Microbiologist

2000 – 2003

- Successfully developed a surfactant based on-line low-toxic biofouling control program for reverse osmosis membrane in a team effort to reduce CIP of a 30MM market resulting two US patents.
- Initiated communication, which led to a collaboration research effort with Degremont and CIRSEE, evaluated Bioactive filtration in industrial water resulting a Nalco Global Research Award (2000, Nalco).
- Investigated various polymer techniques for biofouling prevention in water, co-developed a unique polymer formulation that demonstrated 40% improvement in biofouling prevention in pilot cooling tower resulting two invention disclosures.
- Developed methodology to analyze and monitor microbial activity in membrane bioreactor in a team effort to screen polymer product for flux enhancement and provided technical support.

Senior Microbiologist

1998 – 2000

- Formulated, characterized, and tested a heat stable biocide emulsion to target biofouling in cooling system surface, resulting a patent and a Nalco Global Research Award (1998, Nalco).
- Discovered a method for biocide emulsion dose control in water system to eliminate biocide under- or over- dose resulting in an invention disclosure.

ARGONNE NATIONAL LABORATORY, Argonne, IL

1994 – 1997

Postdoctoral Fellow, Special Term Appointment

- Developed methodology and conducted test to monitor and control a succinic acid fermentation process with a proprietary microbial strain to develop a process for production of chemicals from biologically derived succinic acid. Received R & D 100 Award (1997)
- Evaluated various potential non-toxic film forming corrosion inhibitors for microbially influenced corrosion control in oil-gas production and storage field.
- Participated development of fuel cycle energy use and greenhouse gases an emission model to evaluate corn ethanol as alternative fuel for state of Illinois.
- Designed a laboratory hydraulic automated testing apparatus to simulate a year of cleaning-in-place (CIP) operation in few weeks to investigate long term membrane stability, established protocol, conducted test with project team.
- Conducted R&D targeting at recovery and recycle of chemicals from process waste stream using electro dialysis membrane in a pilot scale ED unit sponsored by chemical companies.

MICHIGAN BIOTECHNOLOGY INSTITUTE/MICHIGAN STATE UNIVERSITY 1989 – 1994

East Lansing, MI

Research Assistant

- Developed a monitoring and control technology based on trace gas (H₂ and CO) monitoring in Upflow Anaerobic Sludge Blanket (UASB) Reactor for early detection of process upset. Conducted statistical time series analysis.

SHANGHAI MUNICIPAL ENGINEERING DESIGN INSTITUTE, Shanghai, China 1983– 1986**Process Manager**

- Principle process design for water treatment plant. Responsible for site survey and evaluation, proposal submitting, and coordinate with structural, electrical, architectural design.

Process Design Engineer

- Water treatment plant design. Participated ten plus projects in China.

Publications and Presentations**Journal Articles**

M. Wang, M. Wu, and Hong Huo, Life-Cycle Energy and Greenhouse Gas Emission Impacts of Different Corn Ethanol Plant Types, *Environmental Research Letters*, Vol 2, pp024001 (2007)

M. Wu, Y. Wu, M. Wang, Energy and Emission Benefits of Alternative Transportation Liquid Fuels Derived from Switchgrass: A Fuel Life Cycle Assessment, *Biotechnology Progress*, 22, pp1012-1024, 2006

M. Wang, C. Saricks, M. Wu, Fuel Ethanol Produced from US Midwest Corn: Help or Hindrance to the Vision of Kyoto? *Journal of AWWA*, Vol.49, pp756-772, July 1999

May Wu, Robert Hickey, A Dynamic Model Including Reactor Hydraulics, Degradation and Diffusion for UASB Reactors, *J.Environmental Engineering*, Vol.123, No.3, 1997

May Wu, Robert Hickey, N-Propanol Production During Ethanol Degradation Using Anaerobic Granules, *Water Research*, Vol.30, No.7, pp1686-1694, 1996

May Wu, Craig Criddle, Robert Hickey, Mass Transfer and Temperature Effect on Substrate Utilization in Brewery Granules, *Biotechnology and Bioengineering*, Vol.46, 1995

Publications in Published Refereed Proceedings

Michael V. Enzien, Dan H. Pope, May M. Wu and Jim Frank, Nonbiocidal Control of Microbiologically Influenced Corrosion Using Organic Film-forming Inhibitors, *NACE international Annual Conference*, paper No. 290, Houston Texas, Mar.1996

May Wu, Robert Hickey, Thomas Voice, Hydraulic Characteristics of a UASB Reactor with Brewery Granules, *Proceedings of 47th Purdue Industrial Waste Conference*, West Lafayette, IN, 1992

Technical Reports and Argonne Reports

M Wu, M Wang, H. Huo, Fuel-Cycle Assessment of Selected Bioethanol Production Pathways in the United States, ANL/ESD/06-7, Nov.7, 2006

M. Wu, Y. Wu, M. Wang, Mobility Chains Analysis of Technologies for Passenger Cars and Light-Duty Vehicles Fueled with Biofuels: Application of the GREET Model to the Role of Biomass in America's Energy Future (RBAEF) Project, ANL report, May, 2005

May Wu, Role of bisulfite in reverse osmosis membrane biofouling monitoring and control with Biosensar, *Nalco research report*, Sept. 2003

Co-author, Technical Evaluation of Superbrom, *Nalco research report*, 2001

M. Wang, C. Saricks, M. Wu, Fuel-Cycle Fossil Energy Use and Greenhouse Gas Emissions of Fuel Ethanol Produced from US Midwest Corn, Center of Transportation Research, Argonne National Laboratory, *Research Reports to DCCA of IL*, 1998

Invited Talks

M. Wu and M. Wang, Energy and Greenhouse Gas Emissions, Fifth International Starch Conference, June 3-6, 2007, Urbana, IL

M. Wu and M. Wang, Life-cycle Analysis of Biofuels – A System Approach, International Symposium of Fueling Change with Renewable Energy, April 26-27, 2007, Urbana, IL

Seminar

M. Wu and M. Wang, Life Cycle Assessment of Biofuel in Transportation – Well-to-Wheels Analysis, Presented at Automotive Bio-Energy Seminar at University of Illinois at Urbana-Champaign, Mar. 29, 2007

Presentations

M. Wu, M. Wang, H. Huo, Fuel Cycle Assessment of Corn-based Butanol, Presented at The 29th Symposium on Biotechnology for Fuels and Chemicals, Denver, CO, April 29-May 2, 2007

M. Wang, M. Wu, and H. Huo, Life Cycle Energy and Greenhouse Gas Results of Fischer-Tropsch Diesel Produced from Natural Gas, Coal, and Biomass, *Presented at SAE Government/Industrial meeting*, Washington DC, May 14-16, 2007

M. Wu, M. Wang, H. Huo, Fuel Life Cycle Assessment of Bioethanol Produced from Corn Stover, *Presented at InLCA/LCM 2006*, Washington DC, Oct. 2006

M. Wu and M. Wang, Energy and Greenhouse Gas Emissions Impacts of Fuel Ethanol, *Presented at Corn Utilization and Technology Conference*, Dallas, TX, June 7, 2006

M. Wu and M. Wang, Energy and Greenhouse Gas Emission Results of Fuel Ethanol, *Presented at BioEnergy Workshop*, Purdue University, West Lafayette, IN, Feb., 2006

M. Wu, M. Wang, Energy and Emission Benefits of Cellulosic Biofuels, *Presented at FEW 2005*, Kansas City, Mo., June 2005

Five Technical presentations in Nalco Global Microbial Conference during 1998-2001

6+ technical posters in Nalco Research Technical Symposium during 1998-2003

J. Frank, E. St. Martin, D. Pope, J. Lin, M. Wu, Aspects of the Biocatalysis of Corrosion, presented at *Biocatalysis-98*, Puschina, Russia, June 13-18, 1998

Patents

Method of controlling biofouling in aqueous media using antimicrobial emulsions (US6096225)

Method of monitoring biofouling in membrane separation systems (US6699684)

Method for locating hidden microorganism contaminated surfaces in industrial water systems (US6818417)

Education

Ph.D., Environmental Engineering and Environmental Toxicology, Michigan State University - East Lansing, Michigan

M.S., Civil and Environmental Engineering, North Carolina State University - Raleigh, North Carolina

B.E., Civil and Environmental Engineering, Tong-Ji University - Shanghai, China