



Dr. Chum conducts research on the sustainability of biomass and biofuels in the global context. She has developed technologies for the conversion of biomass and a variety of organic wastes into fuels, including hydrogen, chemicals, electricity, and high value materials. She directed analytical chemical research and the development of standards and reference materials for biomass. To these and other fields she has contributed more than 110 papers, is a co-inventor of 20 patents, and has lectured and participated in seminars and conferences worldwide. She participated in the development of the Office of Science and Technology Policy's National Environmental Technology Strategy, released in 1995.

Dr. Chum is a Fellow of the American Association for the Advancement of Science, of the International Academy of Wood Science, of the Cellulose and Renewable Materials Division of the American Chemical Society, and of the American Chemical Society. She served as a member of the Hydrogen Technical Advisory Panel from 1998 to 2003. She received the Individual Trail Blazer Award in Green Engineering, presented by HENAAC Inc. and Green Technology Magazine, in 2006. She has served on several Advisory Boards of universities and organizations and represented NREL in the Council for Chemical Research. She served in the Office of Industrial Technologies' Industry of the Future Program, representing NREL on the Laboratory Coordinating Council and chairing this Council in 1997. She was an Associate Editor of the Clean Processes and Products journal (Springer) and Editor of CHEMTECH (ACS).

#### Professional Experience

Trained in physical and industrial chemistry, Dr. Chum has worked in bioenergy and renewable energy since 1979 at the Solar Energy Research Institute (SERI), now the National Renewable Energy Laboratory (NREL), leading research and development branches, divisions, and centers in industrial technologies and bioenergy since 1992. Prior to joining SERI/NREL, she was Assistant Professor of Physical Chemistry at the University of Sao Paulo, Brazil, for 8 years, and was a Visiting Scientist at the Heyrovsky Institute of Polarography, Prague, Czechoslovakia, and at the Chemistry Department of Colorado State University.

Dr. Chum's contributions address various fields of research, including inorganic and organic chemistry, analytical chemistry, physical chemistry, electrochemistry, applied microbiology, materials science, paper and wood science, chemical engineering, energy and fuels, polymer science, forestry, agricultural engineering, and environmental science and technology.

#### International Contributions

Dr. Chum has led or contributed to numerous international research activities in the fields of renewable energy and sustainability. Her international contributions include:

- Coordinating lead author of the Bioenergy chapter of the [Intergovernmental Panel on Climate Change \(IPCC\) Special Report on Renewable Energy and Climate Change Mitigation](#) (2009-2011).
- Panel member on the Committee for U.S.-Chinese Cooperation on Electricity from Renewable Resources (2009-2010). Report generated by the binational committee.
- Biofuels, bioenergy, and sustainability implementation activities since 2007 for DOE/NREL as part of the Bilateral U.S.-Brazil R&D activities of the Memorandum of Understanding (MOU) to Advance Cooperation in Biofuels; the bilateral MOU includes collaboration on the sustainability of biofuels.
- Governance Chamber member of the Roundtable on Sustainable Biofuels, based in Lausanne, Switzerland.

- Technical contributor to the Global Bioenergy Partnership, GHG and Sustainability Task Forces.
- Identification of gaps and opportunities for intergovernmental collaboration in biomass and hydrogen R&D.
- Development of methodologies to address technological issues in technology transfer (including contributing author participation in IPCC report).
- Taxonomic analysis of Brazilian competencies and actions to further fuel cell development in Brazil, working with Brazilian researchers from universities, research institutions, and industry. From these activities the Brazilian government subsequently started the Brazilian Fuel Cell Program (Pro CaC, Programa Brasileiro de Sistemas de Células a Combustível).
- Instrumental in implementing the Bilateral US-Brazil Hydrogen Program for DOE and USAID.
- Development of the "Brasilia Statement Directives and Action Plan for Solar, Wind and Biomass Renewable Energy Development in Brazil" in 1995.
- Field implementation of the U.S.-Brazil program on rural electrification in 1992, which contributed to the current Brazilian government program "Luz para Todos."

### Education

- Ph.D. 1972 University of São Paulo, São Paulo, Brazil (Physical Chemistry)
- B.S. 1968 University of São Paulo (Chemistry with Industrial Specialization)
- B.S. 1968 University of São Paulo (Chemical Education)

### Professional Activities

- American Association for the Advancement of Science (AAAS)
- American Chemical Society (ACS)
- American Solar Energy Society (ASES)
- Editorial Board Revista Brasileira de Bioenergia
- Visiting Committee Member, Department of Chemical Engineering, Colorado School of Mines, Golden, Colorado
- Advisory Board, Center for Sustainable Solutions, University of Michigan, Ann Arbor, Michigan