J. A. Dumesic

The author presented on this page has recently published his ***10th article*** *in Angewandte Chemie in the last 10 years:*
"Engineering Catalyst Microenvironments for Metal-Catalyzed Hydrogenation of Biologically Derived Platform Chemicals": T. J. Schwartz, R. L. Johnson, J. Cardenas, A. Okerlund, N. A. Da Silva, K. Schmidt-Rohr, J. A. Dumesic, *Angew. Chem. Int. Ed.* **2014**, *53*, 12718–12722; *Angew. Chem.* **2014**, *126*, 12932–12936.

James A. Dumesic

Date of birth:	August 13, 1949
Position:	Michel Boudart Professor of Chemical and Biological Engineering, and Steenbock Chair of Engineering, University of Wisconsin–Madison
E-mail:	jdumesic@wisc.edu
Homepage:	http://jamesadumesic.che.wisc.edu/
Education:	1971 BS University of Wisconsin–Madison 1972 MS Stanford University 1974 PhD supervised by Michel Boudart, Stanford University 1975 Postdoctoral research with Albert Cassuto, Centre de cinétique physique et chimique 1976 Research fellow with Vladimir Goldanskii, Institute of Chemical Physics, Moscow
Awards:	**2008** Heinemann Award, International Federation of Catalysis Societies; **2009** William H. Walker Award, American Institute of Chemical Engineers; **2011** Michel Boudart Award for Advancement in Catalysis, North American Catalysis Society and European Federation of Catalysis Societies; **2012** George A. Olah Award in Hydrocarbon or Petroleum Chemistry, American Chemical Society; **2014** elected to the National Academy of Sciences
Current research interests:	Kinetics of catalytic processes; conversion of renewable biomass resources to fuels and chemicals; synergies between heterogeneous and biological catalysis; synthesis of heterogeneous catalysts with atomic-level precision
Hobbies:	Riding (and taking care of) horses

My favorite composer is … Richard Wagner. I really enjoy the orchestrations in his operas.

If I could be any age I would be … my current age. I always feel that we are doing our best work at the present time.

My biggest inspiration is … Dr. Haldor Topsøe. This man had a vision for synergies between industrial and academic catalysis research, and for the importance of fundamental research. He combined this vision with a tireless drive to use catalysis to make the world a better place.

My favorite time of day is … the morning. I like to get into the office early each morning to get some things accomplished before I become distracted by countless stimuli during the rest of the day.

My favorite way to spend a holiday is … to be near any body of water, either a lake or the ocean.

The secret of being a successful scientist is … to have confidence in your vision. I remember being at a seminar presented by Dr. Haldor Topøse in the chemical engineering department at Stanford in 1972. He was asked by Professor Boudart to comment on the secret to success in research, and he answered in one word: arrogance.

My science "heroes" are … Professor Michel Boudart at Stanford and Professor Robert B. Bird at Wisconsin. Professor Boudart was a tireless mentor to his students (including myself), postdocs, and colleagues, and Professor Bird serves as a mentor, inspiration, and friend to generations of chemical engineers and chemists around the world.

The most important thing I learned from my students is … to stay young at heart. I see each of my students having fun as they learn and experience new things in their careers, and I try my best to keep up with them.

The principal aspect of my personality is … to be persistent. Most of our best research has come from staying in a research area for a sufficient period of time that it becomes possible to know what has already been done in that area, to make the obvious mistakes, and then hopefully to innovate.

The natural talent I would like to be gifted with … is the ability to write well. My students and I go through countless drafts before we believe that our papers are ready to be submitted for publication.

When I was eighteen I wanted to be … a chemical engineer. I really enjoyed chemistry and mathematics in high school. My father went to the library (before the internet!) and found that the combination of chemistry and mathematics was instrumental in chemical engineering. Thus, I moved from Milwaukee to Madison to study chemical engineering in the top department in the USA.

My favorite book is … *Infinite Jest* by David Foster Wallace. This complicated (and long) book shows his creative mind at work.

Chemistry is fun because … each day I feel we are going to make a big discovery.

Looking back over my career, I … believe that we have taken a rather fundamental approach in our attempts to address important challenges in the design, synthesis, characterization, and study of heterogeneous catalysts for relevant chemical processes.

My first experiment in university was … the electroless coating of copper onto a glass tube to make an electrode for an electrochemical set-up in the laboratory of Professor Tom Chapman at the University of Wisconsin. This experience was my first exposure to surface chemistry and catalysis, and it led me apply for admission to graduate school at Stanford University to work for Professor Michel Boudart.

Has your approach to publishing your results changed since the start of your career?

During the early stages of my academic career, I tended to have each of my graduate students work on a separate research project, the time-span of which was about five years. More recently, I have tended to have groups of three or four students/postdocs work on larger projects that require a broader research approach. These projects evolve over a shorter period of time and often require active collaborations with other research groups. This change in approach has been driven partially by changes in ways that research is currently funded. More importantly, it has been enabled by the outstanding collection of friends and colleagues with whom I have the opportunity to collaborate on a continuing basis.

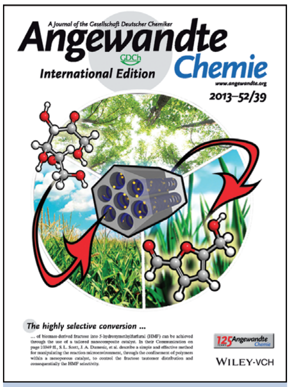
What do you think the future holds for your field of research?

Research in heterogeneous catalysis has evolved to become a highly interdisciplinary enterprise, including, for example, computational chemistry, advanced techniques for catalyst characterization (often involving measurements with the catalyst under controlled and/or reaction conditions), and methods for the synthesis of new materials with control at multiple length scales. Moreover, techno-economic analyses are being used to evaluate the broader impacts of new catalysts and/or catalytic processes that are being developed by this integrated approach to catalysis research. Accordingly, the field of heterogeneous catalysis is positioned to make impacts in such areas as the sustainable and environmentally benign production of fuels and chemicals needed by society.

My 5 top papers:

1. "Hydrogen from catalytic reforming of biomass-derived hydrocarbons in liquid water": R. D. Cortright, R. R. Davda, J. A. Dumesic, *Nature* **2002**, *418*, 964–967.
   Our first paper on the aqueous reforming of sugars and polyols to produce H_2 and CO_2.
2. "Integrated Catalytic Conversion of γ-Valerolactone to Liquid Alkenes for Transportation Fuels": J. Q. Bond, D. M. Alonso, R. M. West, D. Wang, J. A. Dumesic, *Science* **2010**, *327*, 1110–1114.
   An integrated catalytic system to achieve the title reaction by catalytic decarboxylation over a solid-acid catalyst to produce butenes, followed by butene oligomerization over a subsequent solid-acid catalyst to produce branched C_{4n} alkenes.
3. "Stabilization of Copper Catalysts for Liquid-Phase Reactions by Atomic Layer Deposition": B. J. O'Neill et al., *Angew. Chem. Int. Ed.* **2013**, *52*, 13808–13812; *Angew. Chem.* **2013**, *125*, 14053–14057.
   We show in this highly collaborative work how atomic layer deposition of an alumina overcoat can be used to stabilize copper nanoparticles against leaching and sintering under liquid-phase reaction conditions for hydrogenation of furfural at 400 K.
4. "Targeted chemical upgrading of lignocellulosic biomass to platform molecules": J. S. Luterbacher, D. M. Alonso, J. A. Dumesic, *Green Chem.* **2014**, *16*, 4816–4838.
   We present an overview of chemical processing strategies for conversion of lignocellulosic biomass to platform molecules that serve as intermediates for the production of fuels and chemicals.
5. "Nonenzymatic Sugar Production from Biomass Using Biomass-Derived γ-Valerolactone": J. S. Luterbacher, J. M. Rand, D. M. Alonso, J. Han, J. T. Youngquist, C. T. Maravelias, B. F. Pfleger, J. A. Dumesic, *Science* **2014**, *343*, 277–280.
   Solvent effects can be used to achieve the acid-catalyzed conversion of lignocellulosic biomass (e.g., corn stover, wood) with high yields to produce sugars that are suitable for subsequent biological conversion.

DOI: 10.1002/anie.201411477



The work of J. A. Dumesic has been featured on the inside cover of Angewandte Chemie:
"A Tailored Microenvironment for Catalytic Biomass Conversion in Inorganic–Organic Nanoreactors": R. Alamillo, A. J. Crisci, J. M. R. Gallo, S. L. Scott, J. A. Dumesic, *Angew. Chem. Int. Ed.* **2013**, *52*, 10349–10351; *Angew. Chem.* **2013**, *125*, 10539–10541.