

## Biosketch

Eric McFarland studied Nuclear Engineering and received B.S. and M.S. degrees from U.C. Berkeley, and his Ph.D. from the Massachusetts Institute of Technology. He simultaneously studied medicine and received his M.D. from Harvard and completed post-graduate training in general surgery. McFarland joined the Nuclear Engineering faculty at MIT where his research moved from nuclear science to use of nuclear phenomena for non-destructive materials and chemical analysis. In 1991 he moved to the faculty of the University of California, Santa Barbara in the Chemical and Nuclear Engineering Department where he is presently a Professor. McFarland has always worked closely with industry on problems related to energy and chemical production and he has held management positions in several companies related to his University research. During several leaves of absence, he has given service to industry including as a director of Symyx Technologies and as CEO of Gas Reaction Technologies. McFarland recently returned to UCSB from a two-year position as the founding Director of the Dow Centre for Sustainable Engineering Innovation and Dow Chemical Chair of Chemical Engineering at the University of Queensland, Australia.

## Present Research Interests

McFarland's research activities are focused on coupling fundamental processes at surfaces with novel material systems to enable economically and environmentally sustainable production of chemicals and power in real industrial processes. In particular, his group is working on use of new catalysts and materials for decarbonizing fossil fuels and producing chemicals without carbon dioxide. His group is also investigating novel nuclear reactor designs to reduce cost and increase safety and allow the opportunity for coupling chemical production with power production. McFarland teams with colleagues using state-of-the-art theoretical methods to guide and interpret experimental work using advanced theory and to develop conceptual process models to evaluate the technoeconomic potential of new processes making use of the chemistry.

Research Areas: Reaction Engineering, Catalysis, Conceptual Process Design, Technoeconomics, Nuclear Processes, Sustainable Energy

## Selected Publications

1. D.C. Upham, E.W. McFarland, "Halogen Mediated Oxidative Dehydrogenation of Propane Using Iodine or Molten Lithium Iodide," *Catalysis Letters*, vol. 146, pp. 744-754, 2016.
2. S. Mubeen, Y. S. Jun, J. Lee, and E. W. McFarland, "Solid Suspension Flow Batteries Using Earth Abundant Materials," *Acs Applied Materials & Interfaces*, vol. 8, pp. 1759-1765, Jan 2016.
3. N. Singh and E. W. McFarland, "Levelized cost of energy and sensitivity analysis for the hydrogen-bromine flow battery," *Journal of Power Sources*, vol. 288, pp. 187-198, Aug 2015.

4. N. Singh, D. C. Upham, R. F. Liu, J. Burk, N. Economou, S. Buratto, E.W.McFarland, "Investigation of the Active Sites of Rhodium Sulfide for Hydrogen Evolution/Oxidation Using Carbon Monoxide as a Probe," *Langmuir*, vol. 30, pp. 5662-5668, May 2014.
5. E. W. McFarland, "Solar energy: setting the economic bar from the top-down," *Energy & Environmental Science*, vol. 7, pp. 846-854, Mar 2014.
6. E. W. McFarland and H. Metiu, "Catalysis by Doped Oxides," *Chemical Reviews*, vol. 113, pp. 4391-4427, 2013/06/12 2013.
7. E. McFarland, "Unconventional Chemistry for Unconventional Natural Gas," *Science*, vol. 338, pp. 340-342, October 19, 2012 2012.
8. A. H. Zhang, S. L. Sun, Z. J. A. Komon, N. Osterwalder, S. Gadewar, P. Stoimenov, E.W. McFarland, "Improved light olefin yield from methyl bromide coupling over modified SAPO-34 molecular sieves," *Physical Chemistry Chemical Physics*, vol. 13, pp. 2550-2555, 2011.
9. J. Chou, S. Y. Zhang, S. L. Sun, and E. W. McFarland, "Benzene formation at 70 degrees C by coupling of propylene on supported Pd nanoclusters," *Angewandte Chemie-International Edition*, vol. 44, pp. 4735-4739, 2005.
10. E. W. McFarland and J. Tang, "A photovoltaic device structure based on internal electron emission," *Nature*, vol. 421, pp. 616-618, Feb 2003.
11. B. Gergen, H. Nienhaus, W. H. Weinberg, and E. W. McFarland, "Chemically induced electronic excitations at metal surfaces," *Science*, vol. 294, pp. 2521-2523, Dec 2001.

#### Honors and Awards

**2013-2015** Dow Chemical Professor of Chemical Engineering, University of Queensland  
**1990-1995** NSF Presidential Young Investigator  
**1992** Am. Nuc. Soc. Special Award for Outstanding Advances in Nuc. Tech.  
**1989-91** Edgerton Assistant Professorship  
**1981-82** NIH Grad. Fellowship  
**1980-81** University of California Regent's Fellowship  
**1980** graduated Summa Cum Laude  
**1980** Nuclear Engineering Department Citation for First in Department  
**1980** graduated Summa Cum Laude  
**1980** elected Tau Beta Pi (Engineering Top 5%)  
**1979** Stephen Bechtel Scholarship for top engineering junior