MICHAEL S. WONG, PhD

EDUCATION AND TRAINING

California Institute of Technology	Chemical Engineering	BS	1994
Massachusetts Institute of Technology	Chemical Engineering Practice	MS	1997
Massachusetts Institute of Technology	Chemical Engineering	PhD	2000
University of California, Santa Barbara	Chemistry Postdoctoral training		2000-2001

PROFESSIONAL APPOINTMENTS

Assistant Professor	Rice University	2001-2007
Associate Professor		2007-2010
Professor		2010-present
Department Chair		2014-present
Patel Endowed Chair		2020-present

Professor of Chemical and Biomolecular Engineering*, of Chemistry (2002), of Civil and Environmental Engineering (2012), of Materials Science and NanoEngineering (2013)*

LEADERSHIP AND SERVICE APPOINTMENTS

American Institute of Chemical Engineers South Texas Section, ***Director***	2022-2023
AIChE Nanoscale Science and Engineering Forum (NSEF), ***Chair, Vice Chair, Second Vice Chair, Director of Communications, Past Chair***	*2005-2012*
ACS Division of Catalysis Science & Technology (CATL) ***Past-Chair***	2018-2019
Councilor	2020-2023
North American Catalysis Society (NACS), ***Board of Directors***	2021-2022
Southwest Catalysis Society (SWCS), ***Past Chair***	2009-2011
ACS Society Committee on Publications (SCOP), ***Member***	2022-2023
ACS ES&T Engineering, ***Topic Editor***	2022-2023
Applied Catalysis B: Environmental, ***Editorial Board Member***	2012-present
U.S. Army Science Board (The ASB is a Federal Advisory Committee that reports to the Secretary of the Army and Secretary of Defense), ***Member***	2018-2021
NSF-ERC NEWT (Nanotechnology Enabled Water Treatment) Center, ***Research Thrust Leader***	2014-present

RESEARCH BACKGROUND AND INTERESTS

My research program broadly addresses chemical engineering problems using the tools of heterogeneous catalysis and materials chemistry. A key program objective is to develop scientific principles and engineering approaches that improve our ability to manage our natural resources sustainably (water, hydrocarbons), *e.g.*, clean-water catalysis. The Catalysis and Nanomaterials Laboratory (grants exceeding $20MM, 170+ publications, 20+ pending/issued patents, 300+ presentations, 1 startup company) works in the thematic area of nanotechnology. My *Google scholar* h-index is >60, and total citations are >14K. I am Research Thrust Leader in the NSF-funded NEWT (Nanotechnology Enabled Water Treatment) Engineering Research Center, based at Rice. I serve as Topic Editor for *ACS ES&T Engineering*, *Appl. Catal. B Env.* editorial board member, and formerly an Army Science Board member.

SELECTED HONORS AND AWARDS

Fellow of the American Institute of Chemical Engineers	2022
Presidential Award for Mentoring, Rice University	2021
Meritorious Civilian Service Medal, Department of the Army	2021
Tina and Sunit Patel Professor in Molecular Nanotechnology Endowed Chair	2020
Southwest Region ACS Award (highest honor given by ACS region)	2019
William M. McCardell Professor in Chemical Engineering Endowed Chair	2019-2020
Joe W. Hightower Award, ACS – Greater Houston Section	2018
Fellow of the American Chemical Society	2018
SWCS-NACS Excellence in Applied Catalysis Award	2015
AIChE South Texas Section Best Fundamental Paper Award	2009, 2012, 2020, 2022
AIChE South Texas Section Best Applied Paper Award	2006, 2011, 2013, 2022
Smithsonian Magazine's "37 Under 36" Young Innovator Award	2007
MIT Technology Review's TR35 Young Innovator Award	2006
AIChE Nanoscale Science and Engineering Forum Young Investigator Award	2006

CURRENT RESEARCH EFFORTS

Engineering Research Center for Nanotechnology Enabled Water Treatment Systems (NEWT); NSF ***Senior Personnel***	08/2015-07/2025
Understanding the Role of Potassium in VAM Production through in situ Monitoring; Celanese Chemical ***PI***	07/2018-12/2022
CLES-EM: Clean, Lean, and Efficient Synthesis of Energetic Materials in Sciences for Lethality and Protection and Materials Research; DOD Army Research Laboratory ***PI***	06/2021-05/2026
Chemical-free light-driven destruction of per- and polyfluoroalkyl substances (PFAS) using non-toxic boron nitride (BN); DOD/EPA ***PI***	05/2022-04/2023
Highly Efficient Solar Water-Splitting Using 3D/2D Hydrophobic Perovskites with Corrosion Resistant Barriers; DOE ***co-PI***	10/2019-09/2022

SELECTED PUBLICATIONS (170+ published, #citations)

1. M. O. Nutt *et al.*, "Designing Pd-on-Au Bimetallic Nanoparticle Catalysts for Trichloroethene Hydrodechlorination," **Environ. Sci. Technol.** 39, 1346-1353 (**2005**). (link)
2. R. K. Rana *et al.*, "Nanoparticle Self-Assembly of Hierarchically Ordered Microcapsule Structures," **Adv. Mater.** 17, 1145-1150 (**2005**). (link)
3. S. Asokan *et al.*, "The Use of Heat Transfer Fluids in the Synthesis of High-quality CdSe Quantum Dots, Core/Shell Quantum Dots, and Quantum Rods," **Nanotechnology** 16, 2000-2011 (**2005**). (link)
4. M. O. Nutt *et al.*, "Improved Pd-on-Au Bimetallic Nanoparticle Catalysts for Aqueous-phase Trichloroethene Hydrodechlorination," **Appl. Catal. B. Env.** 69, 115-125 (**2006**). (link)
5. P. R. LeDuc *et al.*, "Towards an *in vivo* Biologically Inspired Nanofactory," **Nature Nanotech.** 2, 3-7 (**2007**). (link)

6. K. N. Heck *et al.*, "Observing Metal-catalyzed Chemical Reactions *in situ* using Surface-enhanced Raman Spectroscopy on Pd-Au Nanoshells," **J. Am. Chem. Soc.** 130, 16592-16600 (**2008**). (link)
7. W. Zhou *et al.*, "Identification of Active Zr WO_x Clusters on a ZrO_2 Support for Solid Acid Catalysts," **Nature Chem.** 1, 722-728 (**2009**) (link)
8. J. Yu *et al.*, "Self-assembly Synthesis, Tumor Cell Targeting, and Photothermal Capabilities of Antibody-coated Indocyanine Green Nanocapsules," **J. Am. Chem. Soc.** 132, 1929-1938 (**2010**). (link)
9. N. Soultanidis *et al.*, "Relating n-Pentane Isomerization Activity to the Tungsten Surface Density of WO_x/ZrO_2," **J. Am. Chem. Soc.** 132, 13462-13471 (**2010**). (link)
10. L. A. Pretzer, *et al.*, "Hydrodechlorination Catalysis of Pd-on-Au Nanoparticles Varies with Particle Size," **J. Catal.** 298, 206-217 (**2013**). (link)
11. M. D. Blankschien *et al.*, "Light-triggered biocatalysis using thermophilic enzyme–gold nanoparticle complexes," **ACS Nano** 7, 654-663 (**2013**). (link)
12. L. Chen *et al.*, "Ring-locking Enables Selective Anhydrosugar Synthesis from Carbohydrate Pyrolysis," **Green Chem.** 18, 5438-5447 (**2016**) (link)
13. S. Guo *et al.*, "Insights into Nitrate Reduction over Indium-Decorated Palladium Nanoparticle Catalysts" **ACS Catal.** 8, 503-515 (**2018**). (link)
14. P. Westerhoff *et al.*, "Low Risk Posed by Engineered and Incidental Nanoparticles in Drinking Water" **Nature Nanotech.** 13, 661-669 (**2018**) (link)
15. K. N. Heck *et al.*, "Catalytic Converters for Water Treatment" **Acc. Chem. Res.** 52, 906-915 (**2019**). (link)
16. C. A. Clark *et al.*, "Highly Defective UiO-66 Materials for the Adsorptive Removal of PFOS" **ACS Sustainable Chem. Eng.** 7, 6619 (**2019**). (link)
17. C. A. Clark *et al.*, "Mechanistic Insights into pH-Controlled Nitrite Reduction to Ammonia and Hydrazine over Rhodium" **ACS Catal.** 10, 494-509 (**2020**). (link)
18. C. L. Conrad *et al.*, "Fit-for-Purpose Treatment Goals for Produced Waters in Shale Oil and Gas Fields" **Water Res.** 173 (**2020**). (link)
19. L. Duan, B. Wang, *et al.*, "Efficient Photocatalytic PFOA Degradation over Boron Nitride" **Environ. Sci. Technol. Lett.** 7, 613 (**2020**). (link)
20. Y. Xu *et al.*, "Heavy Oil Viscosity Reduction at Mild Temperatures Using Palladium Acetylacetonate" **Fuel** 294, 120546 (**2021**) (link)

SIGNIFICANT PATENTS (20+ issued and pending patents)

1. "Multimetallic Nanoshells for Monitoring Chemical Reactions," US Patent No. **8,605,280** (2013) (link)
2. "Tungstated Zirconia Nanocatalysts," US Patent No. **8,455,392** (2013) (link)
3. "Synthesis of Ultrasmall Metal Oxide Nanoparticles," US Patent No. **9,061,268** (2015) (link)
4. "Converting Nanoparticles in Oil to Aqueous Suspensions," US Patent No. **9,321,021** (2016) (link)
5. "Method of Decreasing the Viscosity of Heavy Oil Downhole," US Patent Application Publication No. **US2017/0349808** (2017) (link)