

**WILLIAM A. GODDARD, III****California Institute of Technology:**

Charles and Mary Ferkel Professor of Chemistry, Materials Science, and Applied Physics

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**Personal Statement**

Goddard has been a pioneer in developing methods for quantum mechanics (QM), force fields (FF), reactive dynamics (RD), molecular dynamics (MD), and Monte Carlo (MC) predictions on chemical, catalytic, materials, biochemical, and nanoscale systems. He is actively involved in applying these methods to ceramics, semiconductors, superconductors, thermoelectrics, metals alloys, polymer, proteins, nuclei acids, bucky tubes, graphene, and materials under extreme conditions. The goal of Goddard research has been to make the methods sufficiently accurate that the need for experimental validation can be severely restricted to the predicted best systems. This required improving the QM, particularly for nonbond or van der Waals binding while also improving the methods for matching the FF to QM, for describing reactive systems. His methods use hierarchical approaches to couple between the electronic states of QM and macro scale systems. His group [the Materials and Process Simulation Center (MSC)] has a critical mass of expertise in all these areas to improve the methods and apply simulations to the problems of interest.

**Awards and Honors:**

Elected Member of National Academy of Science (1984)

Elected Member of International Academy of Quantum Molecular Science (1988)

Winner American Chemical Society Award for Computers in Chemistry (1988)

Awarded Feynman Prize for Nanotechnology Theory (1999)

Awarded Richard Chase Tolman Prize from the Southern California Section of the ACS (2000)

Awarded Honoris Causa Philosophia Doctorem, Chemistry, Uppsala U., Sweden, January 2004

Awarded American Chemical Society Award for Theoretical Chemistry (2007)

Elected Fellow of the Royal Society Chemistry (2008)

Awarded NASA Space Sciences Award for Space Shuttle Sensor (2009)

Elected Fellow of American Academy of Arts and Sciences (2010)

**Current Research Funding:** National Science Foundation, National Institutes of Health, Department of Energy, Defense Advanced Research Projects Agency, Army Research Office, Office of Naval Research, Environmental Protection Agency, FENA-MARCO-SRC, Chevron, Dow-Corning, Dow-Solar, Ford Scientific Labs, Samsung

**Research publications:** Over 898, see <http://www.wag.caltech.edu/publications/papers/>