



# The Nature of Water

MARCH 6TH & 7TH, 2023  
MLK JR. BUILDING, WEST PAULEY BALLROOM, 2ND FLOOR  
2495 BANCROFT WAY, BERKELEY, CA 94720

## PROFESSOR RICHARD N. ZARE

*Marguerite Blake Wilbur Professor of Natural Science  
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Stanford University*



### BIOGRAPHY

A pioneer in the use of lasers to study chemical reactions at the molecular level, Marguerite Blake Wilbur Professor Richard N. Zare pursues diverse theoretical and experimental interests in physical chemistry and nanoscale chemical analysis. The Zare lab has made a broad impact in analytic chemistry with development of laser-induced fluorescence to study reaction dynamics, and seminal contributions to understanding of molecular collision processes. The group continues to invent tools and measurement techniques to study phenomena from reaction in microdroplets to drug delivery.

Born in 1939 in Cleveland, Ohio, Professor Zare trained in chemistry and physics at Harvard University (B.A. 1961, Ph.D. 1964). His doctoral study under Professor Dudley Herschbach explored photodissociation dynamics. After faculty positions spanning chemistry at the Massachusetts Institute of Technology, chemistry, physics and astrophysics at the University of Colorado, and chemistry at Columbia University, he joined the Stanford chemistry faculty in 1977. He has taught introductory chemistry classes every year since. As a Howard Hughes Medical Institute Professor since 2006, Professor Zare has also developed a course introducing undergraduates to hands-on interdisciplinary research, combining physics, and biology to explore how living systems use molecular interactions with light, photosynthesis, and more. Professor Zare served as chair of the Department of Chemistry from 2005 to 2011, and has helped to guide scientific policy as the chair of several national and international science boards. His dedication to research and teaching has been recognized in many awards, including the National Medal of Science, the Wolf Prize in Chemistry, and the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. Among other honors, Professor Zare is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Philosophical Society. He has also received 13 honorary doctorates.

Current research in the Zare lab explores wide-ranging questions in physical and analytical chemistry, from the study of elementary chemical reactions to chemical analysis of extraterrestrial materials. The major focus of these efforts is chemical analysis on the nanoscale. The team has devised tools and techniques to examine molecules in extremely tiny volumes - the volumes characteristic of what is found in heterogeneous structures in mineral samples or in the contents of cells and subcellular compartments. Group members have also made contributions to the chemical analysis of liquid samples separated using a capillary format by electrophoresis or electrochromatography. Some "firsts" include the use of cavity ring-down spectroscopy to analyze trace species in solution, development of detectors for capillary electrophoresis based on the techniques of laser-induced fluorescence, and CCD imaging, and the use of mass spectrometric imaging of tissue samples by means of desorption electrospray ionization.

### TALK TITLE

**Water  
Microdroplet  
Chemistry**

### QUOTE

*"Water is so common yet so mysterious; you might think that after all these years of studying water that we would know everything about water, but we are still discovering surprises!"*

Professor Richard N. Zare

#### SPECIAL THANKS TO



MOLECULAR FRONTIERS

