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# ACS Award in Analytical Chemistry

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Courtesy of Richard van Duyne

Van Duyne

Scientific discovery usually follows the group method for assembling a jigsaw puzzle: Lots of people each find a small piece. But sometimes scientists make revolutionary discoveries that trigger tidal waves of research. That's the case with **Richard P. van Duyne**, the Charles E. & Emma H. Morrison Professor of Chemistry at Northwestern University, regarding his contributions to the field of Raman spectroscopy.

In a series of journal papers that van Duyne began publishing in 1977, the spectroscopist described his research group's observation that roughened silver surfaces could strongly enhance Raman scattering of molecules adsorbed on them. The studies led to the now well-established surface-enhanced Raman spectroscopy (SERS) method for probing molecules, a technique that can provide a signal enhancement factor of more than 10 billion relative to solution-phase measurements.

Royce W. Murray, a chemistry professor at University of North Carolina, Chapel Hill, describes van Duyne's Raman work as "one of those seminal scientific contributions that changed the landscape of other workers' thinking and plans for research."

Allen J. Bard, a chemistry professor at the University of Texas, Austin, sums up the lasting effects of van Duyne's work by noting that 30 years ago, Raman spectroscopy was one of the least sensitive and least used analytical tools. "Today," Bard says, "it is the most sensitive form of molecular spectroscopy and a widely used method." He adds that van Duyne's research in SERS has, "in no small measure, been the catalyst for this renaissance."

In addition to his groundbreaking advances in SERS, a field that boasts nearly 10,000 research papers in physics, materials science, and all chemistry disciplines, van Duyne has made key contributions in resonance Raman spectroscopy, Raman and scanning-probe microscopy techniques, chemical and biological sensing, and art conservation science. He has also developed novel methods for elucidating the structure and function of biomolecules on surfaces. Van Duyne has also made critical contributions in nanoparticle optics and nanosphere lithography, an inexpensive and highly parallel technique for producing a large variety of nanoparticle structures and arrays in the 10–100-nm range.

Van Duyne, 64, completed an undergraduate degree in 1967 at Rensselaer Polytechnic Institute and earned a Ph.D.

degree from the University of North Carolina, Chapel Hill, in 1971. That was the year he began his academic career at Northwestern, where he has mentored nearly 70 graduate students and postdoctoral researchers.

Van Duyne has published some 250 articles in scholarly books and journals and has served on the advisory boards of several publications including the *Journal of Physical Chemistry*, *Accounts of Chemical Research*, and *Annual Reviews of Physical Chemistry*.

Van Duyne is the recipient of numerous awards and honors. For example, he was elected to the American Academy of Arts & Sciences and was recognized with the Earle K. Plyler Prize for Molecular Spectroscopy, the L'Oreal Art & Science of Color Prize, a National Science Foundation Creativity Extension Award, and the Ellis R. Lippincott Award.

Van Duyne will present the award address before the Division of Analytical Chemistry at the fall ACS national meeting in Boston.

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