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## ACS Award In Analytical Chemistry

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**Nicholas Winograd**, 66, the Evan Pugh Professor of Chemistry at Pennsylvania State University, is receiving this year's award in recognition of his 40-plus years of research in surface science and secondary ion mass spectrometry (SIMS).

"Nick Winograd is the quintessential surface analytical chemist," says Richard P. Van Duyne, a longtime friend and a chemistry professor at Northwestern University. They met as freshmen at Rensselaer Polytechnic Institute, where they both did undergraduate research with David Aikens and graduated in 1967. "Winograd is especially noted for his ability to merge advanced theoretical principles with novel experimental approaches to create powerful analytical methods," Van Duyne says.

Winograd traces his love of instrumentation back to the oscilloscope kit his mother gave him in ninth grade. His tinkering led to a variety of construction projects and a ham radio license. "My research now is the same as it was then, in many ways," he says. "The toys are just bigger."

Winograd raced through graduate school at Case Western Reserve University in less than three years, working on electrochemistry with Theodore Kuwana and earning a Ph.D. in 1970. From there, he moved to Purdue University as an assistant professor.

Purdue was already a powerhouse in instrumentation development, and the university had acquired an electron spectroscopy for chemical analysis (ESCA) prototype from Hewlett-Packard. "My work in electrochemistry utilized solid electrodes, and the results were generally not reproducible, presumably due to some undefined chemistry," Winograd says. "I got the bright idea of trying to elucidate that chemistry with ESCA, but the surface chemistry so enamored me that I never looked back."

But ESCA was not as selective as Winograd would have liked. After hearing about Alfred Benninghoven's surface mass spectrometry experiments, Winograd collaborated with R. Graham Cooks, also at Purdue, to write a proposal to add the appropriate instrumentation to ESCA. "It was successful, and I have enjoyed working with SIMS immensely ever since," Winograd says.

Winograd "recognized that essential fundamental information required to perform credible surface analysis using SIMS was totally lacking," Van Duyne says. "Rather than continuing along an empirical path, he combined forces with Barbara J. Garrison to create a detailed molecular dynamics computer simulation model that could be employed to provide an atomic view of molecular desorption."

Winograd credits Garrison, a computational chemist to whom he has been married since 1978, as one of his major influences. "She is a deep thinker who kept me from making very many mistakes and gave me plenty of ideas." In 1979, they moved to Penn State, where they have been since.

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Winograd  
 Credit: Courtesy of Nicholas Winograd

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In recent years, Winograd has turned to biological applications of SIMS. "I'm really focused on trying to get a 3-D mass spec image of a single biological cell, with enough interesting chemical information to yield some new biology," he says. "In the beginning, it was a pipe dream really—not enough sensitivity and lots of other problems. Today, with new instrumentation and new ion beams, we are closer than ever to getting something meaningful."

Winograd will present the award address before the ACS Division of Analytical Chemistry during the fall national meeting in Philadelphia.

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