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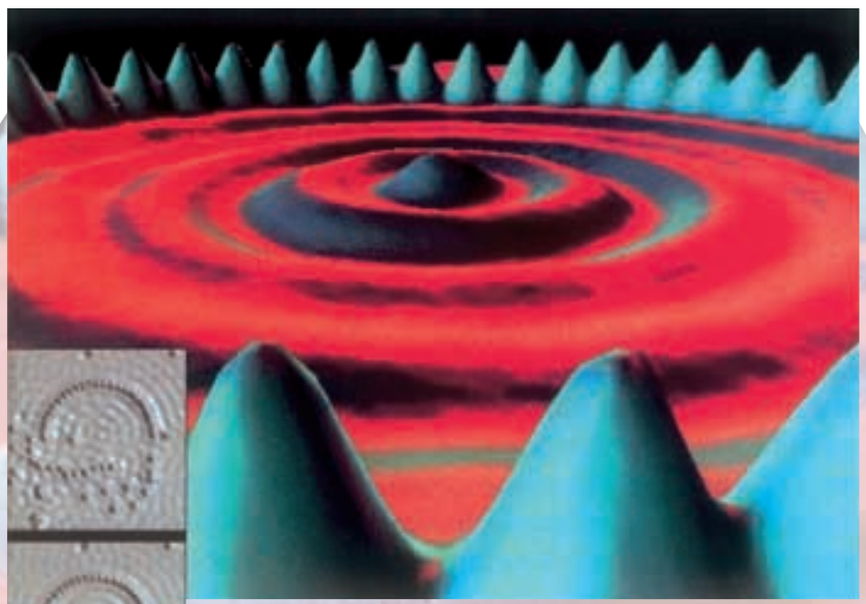
# Nanotechnology: Israel Moving Small Fast






Nanoscience and nanotechnology (NST) is all about ultrasmall devices – a nanometer is just one-millionth the diameter of a human hair – with potentially ultra-big payoffs. That is why the U.S. Government's National Nanotechnology Initiative pumped $270 million into the area in 2000, and $500 million in 2002. Other foreign nanotechnology investments soared from $316 million in 1997 to $835 million in 2001. How is Israeli academia doing in this area? Surprisingly well, albeit on a much smaller scale.

Israeli scientists were quick to recognize the importance and potential of nanoscience and technology (NST). For example, the scanning tunneling microscope, STM, a basic NST tool, was invented only in 1982, leading to a Nobel Prize in 1986. But by 1989, with the help of the Israel Science Foundation (ISF), Prof. E. Gileadi already had one! By the time he had his first results, two years later, Profs. Y. Manassen and D. Mandler already had ISF-funded STM and electrochemical microscope research grants (respectively); and Prof. G. Haase had his first STM-related ISF grant by 1994. Similarly, Prof. I. Willner's and A. Shanzer's pioneering ISF-sponsored work on biosensors and molecular switches also dates back over a decade. In fact, Willner and other early NST-related scientists (such as Profs. Uri Banin and Ron Tenne) have received multiple ISF-related research project and/or equipment awards over the past decade. That is, although the ISF is a completely "open" grants competition, which never identified NST as a priority area, it provided the crucial framework and support which enabled Israeli researchers to "self-assemble" a world-class community of scientists doing basic research in this area.

According to a recent study of ISF nanotechnology projects, conducted by Dr. I. M. Asher, a science policy advisor at the Israel Academy of Sciences and Humanities, the ISF has, over the last five years alone (1997-2001), funded 30 clearly NST-related individual research projects at a total cost of about $3 million. A roughly equivalent amount was spent on NST-related ISF Centers of Excellence; and over $2 million, on major NST-related equipment systems. This $8-9 million of ISF funding helped build and maintain a growing, and constantly evolving, cadre of highly competitive NST researchers. The most recent five years has seen considerably more sophisticated and device-relevant research. However, given the ISF mandate, they still represent comparatively basic advances of comparatively wide and long-term impact (see accompanying Research Notes article). All 30 projects represent established excellence, as determined by external peer review (rather than emerging new startups).

Surprisingly, over half of the ISF's new NST grantees for 1997-2001 were found to be located in Chemistry departments; Materials Science came in a distant second. That is, Israel, quite appropriately, seems to be using its world-class