# Making and Wiring−up Molecular−Scale Devices with a Self−Direct

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# A Step Toward Making and Wiring−up Molecular−Scale Devices with a Self−Directed Growth Process

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Our understanding of and control over molecular adsorption on silicon has advanced very significantly in the last several years. It is now possible to provide a microscopic picture of structure and bonding in covalently attached molecule−silicon surface systems. This detailed understanding of adsorbate−surface structures was entirely lacking when the first wave of enthusiasm for molecular devices crested roughly 20 years ago. While many ideas for molecule−scale devices have been put forward in the past, the tools − both synthetic and analytical − to pursue those ideas did not exist. Now, the control necessary to begin exploring ways to incorporate organic function into existing technologies or, eventually, to make new molecule−scale devices is within reach [1]. Experimental and modeling methods have emerged that effectively extend the resolution of STM to see the details of adsorbed molecule structure and bonding. In the next several years it is now realistic to expect structures and concepts dreamed about for decades to begin to be realized. This talk will focus on a self−directed growth process for creating molecular nanostructures on silicon [2].

*[1]* "Controlled Molecular Adsorption on Si: Laying a Foundation for Molecular Devices", R.A. Wolkow, Annual Review of Physical Chemistry, 50, 413−41, 1999.

*[2]* "Self−Directed Growth of Molecular Nano−Structures on Silicon", G.P Lopinski, D.D.M. Wayner and R.A. Wolkow, Nature 406, 48 (2000).