Bionanotechnology – challenges and opportunities

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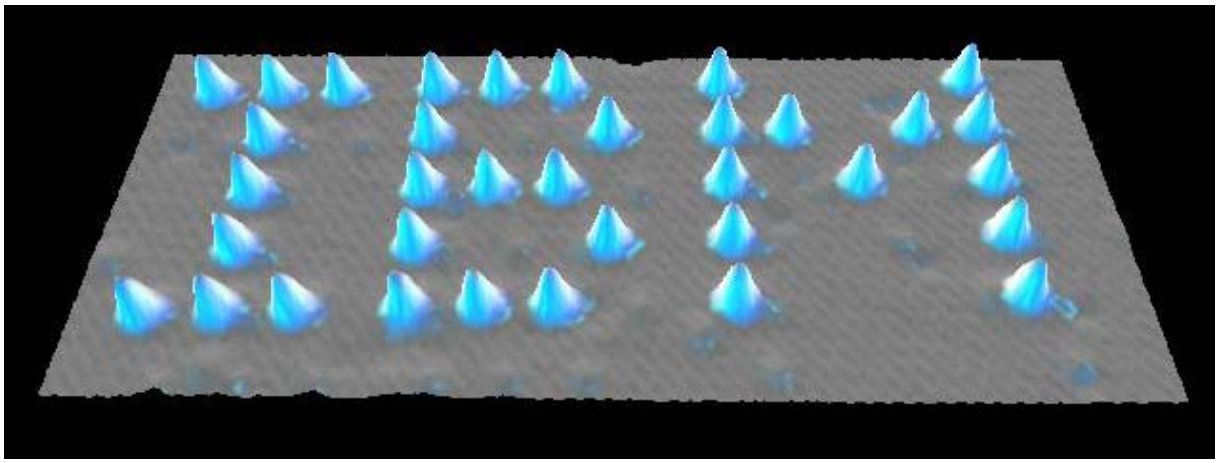
The development of scanning probe microscopy techniques such as scanning tunnelling and atomic force microscopy [1,2] boosted research regarding single atoms and single (bio-) molecules. New microscopy methods not only allow for imaging of (living) surfaces with unprecedented resolution, but also for the mechanical manipulation of matter on the nanoscale. A famous example from the 1980s stems from IBM, when 35 single atoms were used to “write” the company name on an atomically flat surface (see figure).



Current techniques allow for the probing of single biomolecule interactions in real time [3]. Bionanotechnological investigation of such building blocks of life can give valuable insight to important aspects of the functioning of organisms. However, the phenomenon of life comprises more than can be learnt from performing microscopy. For a fundamental understanding and sound specification of life and its laws, global approaches based on, e.g. emergent properties on the systems level and beyond have to be developed.

References:

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