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► **COVER:** 'Nanoworld' by George Marshall, inspired by the Review on p674.


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Microscopy is a fundamental tool of microbiologists. The field of microbiology was born in 1676 when Antonie van Leeuwenhoek first observed microorganisms through a single-lens microscope, and increasingly powerful microscopes have since provided microbiologists with more and more insight into the microorganisms they study. On page 674, Yves Dufrêne reviews how atomic force microscopy (AFM) is heralding a new form of microbiology — nanomicrobiology. AFM has enabled microbiologists to examine and manipulate membrane proteins, to map surface properties and receptor sites, and to measure cellular interactions. Nanomicrobiology has already opened new avenues of research and will have important implications for many microbiological fields, argues Dufrêne.

Moving from the 'micro' to the 'macro', Jeroen Raes and Peer Bork propose on page 693 that a higher level of systems biology — eco-systems biology — can improve our understanding of community function. Technological advances that enable us to probe the 'parts list' of systems and of ecosystems, and to examine the connectivity and the temporal and spatial context of these different parts may eventually allow us to model complete microbial ecosystems.

Finally, Marvin Whiteley and colleagues revisit the idea of the host as a growth medium for pathogens on page 657. Despite more than 200 years of research, the *in vivo* physiology and metabolism of most human pathogens is still inadequately understood. In this Review, Whiteley and colleagues examine how the availability of *in vivo* carbon sources affects pathogens by focusing on four general virulence-related phenotypes. The authors propose that host carbon metabolic pathways might represent ideal targets for antibiotic development.