

BIOMIMETIC NANOTECHNOLOGY: A POWERFUL MEANS TO ADDRESS GLOBAL CHALLENGES

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Abstract

One of the fascinating aspects of nanotechnology is that on the nanometer scale all the natural sciences meet and intertwine. Physics meets life sciences as well as engineering, chemistry, materials science and computational approaches, which altogether communicate and are closely linked. This inherent interdisciplinarity of nanotechnology offers enormous potential for fruitful cross-fertilisation in specialist areas.

A prominent research areas at the meeting place of life sciences with engineering and physics is biomimetics. Biomimetic nanotechnology is a continuously growing field that deals with knowledge transfer from biology to nanotechnology. Investigations of animated Nature on the nanoscale have wide-ranging implications for the understanding of processes in healthy and health impaired living beings and ecosystems and yield novel approaches in engineering and medicine. Biomimetic nanotechnology is a field that has the potential to drive major technical advances. It might substantially support successful mastering of major global challenges.

The Millennium Project was commissioned by the United Nations Secretary-General in 2002 to develop a concrete action plan for the world to reverse the grinding poverty, hunger and disease affecting billions of people. The Millennium Projects states 15 Global Challenges: sustainable development, water, population and resources, democratisation, long-term perspectives, information technology, the rich-poor gap, health, capacity to decide, peace and conflict, status of women, transnational crime, energy, science and technology and global ethics. For some of the 15 global challenges, biomimetic nanotechnology might provide relevant contributions that will be presented in more detail in the lecture.

REFERENCES

Gebeshuber I.C. et al. *A gaze into the crystal ball - biomimetics in the year 2059*
Proc. IMechE Part C: J. Mech. Eng. Sci. 223(C12) (2009) 2899-2918
(invited article for the 50st anniversary issue)

Gebeshuber I.C. and Majlis B.Y. *New ways of scientific publishing and accessing human knowledge inspired by transdisciplinary approaches*
Tribology - Surfaces, Materials and Interfaces, accepted

Gebeshuber I.C., Gruber P., Drack M. and Majlis B.Y. *3D corporate tourism: A concept for innovation in nanomaterials engineering*
International Journal of Materials Engineering Innovation, Special Issue
, 'Nanomaterials: Recent Advances, Trends and Challenges', invited article, submitted