

**NanoŠmano vs. wetPONG -
Experiences in Outreach and Education
at the BioNanoInterface**

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Introduction

The scientific and technological endeavours currently being conducted on the scale of a few nanometers have led to a merging of disciplines from biology, physics, material science and engineering. At the nanometerwide interface of technological artefacts to living systems various phenomena occur that needs a broader approach for understanding, manipulation and utilization. To be able to conduct such transdisciplinary research projects new ways of communication and collaboration are now being established, which also need to be founded on new methods in education for young scientists. While these future hybrid-devices are being promised to lead to magnificent improvements in the quality of life, sustainability or market potential, they also raise fears and misconceptions in the general public. We will try to conclude from personal experiences in the framework of the hackteria network (1) and in educational projects with students in life sciences, game-designers, artists, hackers and children, how these issues can be approached. During these transdisciplinary collaborations we have developed new concepts, which include hands-on, interactive experimentation combining technology and living systems, methods of cultivating creativity across disciplines and public dissemination of Bio- and Nanotechnology.

NanoŠmano - Šmal Matter

In the second edition of the 'NanoŠmano' project (the first phase, dubbed 'NanoŠmano, NanoPunk and the Hacking of Future', was presented at Kapelica Gallery in September 2010) we were starting a new investigation into the physical and aesthetic potential of various materials at nanoscale. The workshop, featuring artists, hackers and

scientists, aimed to present the potentials of creative use of nanomaterials in critical and playful artistic processes. It offered an interesting opportunity for visitors to go hands-on with the mythologised and mystified field of nanotechnology as it leaves the shrines and bunkers of technology labs, and get a sense of scale, which is increasingly becoming an invisible layer in which our bodies are wrapped.

The temporary lab was located in the city centre of Ljubljana, Mestni trg 15, and pulled out of the traditional gallery environment in order to bring group exploration closer to accidental visitors; we believe the world of nanomaterials is a topic that could and should interest everyone (1).

wetPONG

wetPONG, Platform for Hybrid-Games, Micro- and Nanotechnology and Life Sciences, introduces a creativity approach to project based learning (PBL) in microfluidics using a game concept, inspired by computer games, and the use of open-source software and hardware. It has started during a semester course, WS08/09, for the bachelor in life science technologies at the University of Applied Science Northwestern Switzerland (FHNW).

Project based learning is an approach for classroom activity that emphasizes learning activities that are long-term, interdisciplinary and student-centered (2). It can best be defined as instruction relating questions and technology relative to the students everyday lives to classroom projects. Students form their own investigation of their own group, which allows them to develop valuable research skills. The students engage in design, problem solving, decision making, and investigative activities. It allows students to work in groups or by themselves and allows them to come up with ideas and realistic solutions or presentations.

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References:

- (1) Hackteria | Open Source Biological Art at <<http://hackteria.org/>>
- (2) Barron, B.J.S. et al. "Doing with Understanding: Lessons from Research on Problem- and Project-Based Learning", *Journal of the Learning Sciences*, **1998**, 7, 271-311.