

WELCOME TO THE FABULOUS WORLD OF FABRICATION

by Naas Zaayman

If you are ready to explore your inner creativity and innovative thinking, enter the wonderful world of AMTS Fabrication Laboratories, better known as FabLabs, which the Department of Science and Technology is establishing in various locations throughout South Africa, including the Innovation Hub.

What exactly is a FabLab?

"FabLab" is the abbreviation of Fabrication Laboratory, a group of off-the-shelf, industrial-grade fabrication and electronics tools, wrapped in open-source software and programs written by researchers from the Center for Bits and Atoms of the Massachusetts Institute of Technology (MIT).

FabLabs give users around the world the ability to conceptualise, design, develop, fabricate and test almost anything locally. The engineering capability for design and fabrication at micron length and microsecond time scales opens up numerous possibilities for innovative solutions to common problems. Since local communities themselves foster this innovation, it can lead to sustainable solutions.

FabLabs are believed to provide thriving incubators for local micro-businesses and have been set up with amazing results in places as diverse as rural India, inner-city Boston and Ghana.

The Department of Science and Technology (DST), under the auspices of its Advanced Manufacturing Technology Strategy (AMTS), has already established three FabLabs in South Africa: two in Tshwane (at the Innovation Hub and Soshanguve) and one in Cape Town. Two more FabLabs are currently being commissioned in Bloemfontein and Potchefstroom, with additional labs being planned for Polokwane and Kimberley.



More about FabLabs

FabLabs focus on empowering people, which means that FabLab users have to do it themselves. All the machines and software are available free of charge, but the user has to learn how to use them. FabLabs use open-source software to design and form the interface between the design software and the machines. The Draw application of Open Office and CAM.py, an open-source cam package developed by Prof. Neil Gershenfield of the Center for Bits and Atoms at MIT, are being used at the moment.

An international FabLab forum is available, where users can ask other FabLab users technical questions. The web address is <http://fab.cba.mit.edu/forum>.

The Innovation Hub's FabLab focus

The focus of the FabLab at the Innovation Hub is research. At present, four collaborative research projects are under way in collaboration with MIT. The biggest (physically) is a house, the size of a wendy house, that will be built using sections manufactured in the Innovation Hub's FabLab. On the electronics side, research is being done into Thin Client, a system that will give people access to the Internet via a normal television screen connected to a host computer with the Thin Client system.

→ Participants from the University of Pretoria's Upper Science Programme.

A third project, Dot Fab, is a software project aimed at creating a software design tool that can represent any "Fabbable" hardware. The last project involves research into micro-fluidics making use of the FabLab vinyl cutter.

The Innovation Hub's FabLab is conducting research into technologies that can be transferred to all the other South African FabLabs.

Although all the FabLabs are open to everyone and are fully equipped, each has a specific focus. The focus of the Soshanguve FabLab is on community-based projects; Cape Town focuses on arts and crafts; while the Innovation Hub focuses on research.

What's on at the Innovation Hub's FabLab

- *Community-based projects.* Students at the University of Pretoria's Faculty of Engineering, Built Environment and Information Technology undertake a compulsory community-based project as part of their undergraduate training. They can choose between various fields, including the use of FabLab facilities



→ Participants from UP's Teacher Mentorship Programme

to manufacture a community product. Students work together in teams and some very innovative ideas have been conceptualised, designed and manufactured at the Innovation Hub's FabLab. For more information on the community-based project module, go to www.up.ac.za/ebit/community.html.

- **Teacher mentorship programme.** About 40 teachers from previously disadvantaged schools in Mamelodi and Atteridgeville that form part of the University of Pretoria's teacher mentorship programme visited the FabLab in 2006. This visit formed part of a workshop during which the working of the Epilog Laser was explained to the teachers. Participants had the opportunity to see the Epilog Laser in action. During the demonstration, the individual parts of six three-dimensional objects were cut out of perspex. Each teacher received a set, which they could use as classroom props when explaining mathematical formulas related to volumes.
- **UP with Science programme.** During two-hour sessions on Saturdays, the

University of Pretoria's UP with Science initiative introduces school learners in grades 10 to 12 to FabLab technologies and presents them with the opportunity to manufacture something in the lab. For more information on the UP with Science programme, go to www.up.ac.za/upwithscience/info/learners.htm.

- **Other users.** Nicholas de Beer, a learner in Grade 4, refined his Potty Training Assistant in the Innovation Hub's FabLab and won a gold medal at the Northern Gauteng Science Expo, held on 1 September 2006, while Albert Smook manufactured his Pivotal Pool Cleaner Assistant in the Innovation Hub's FabLab and won an award in the SABS Design Institute Prototype Competition. 📍

The AMTS FabLabs are open to the public. For more information, go to www.fablab.co.za

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→ Nicholas De Beer, Science Expo Golden Medal Winner



→ Participants from UP's Teacher Mentorship Programme



→ Albert Smook's prototype that received an SABS Design Institute Prototype Award