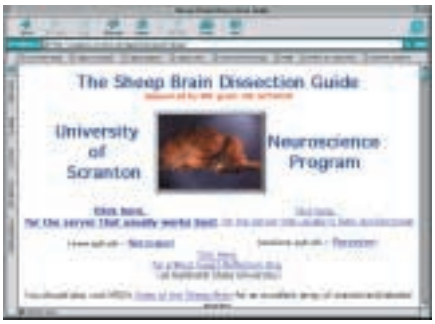
ON THE NET

Dissecting on the Internet

The art and science of the scalpel is learned through long hours of study and hands-on dissection. Starting with the lowly frog, students learn the basics of anatomy by practising on the real thing. But the Internet may change that. It now offers a "virtual" way to slice and dice everything from your favourite amphibian to the human body.

One of the first sites developed was The Interactive Frog Dissection (**teach.virginia.edu/go/frog/**). Launched 7 years ago, it is aimed at high school level students and offers photos, illustrations and short videos of actual frog dissections. There are also some interactive sessions that ask the student to choose the right incision points.



Staying with frogs, the Lawrence Berkeley National Laboratory has created The Virtual Frog Dissection Kit (**www-itg.lbl.gov/frog**). Students can interactively dissect a digital frog named Fluffy, create movies and play the Virtual Frog Builder Game. It challenges users to reconstruct a frog from the nerves up — a twist on the normal dissection process.

But frogs are only one of the virtual creatures available for bloodless dissection. Students can also tackle the wonders of a cow's eye (**www.exploratorium.edu/learning_studio/cow_eye/index.html**) or delve into the marvels of a sheep's brain at the University of Scranton (**academic.uofs.edu/department/psych/sheep/**). The Berkeley High School offers whole-cat dissection (**www.bhs.berkeley.k12.ca.us/departments/Science/anatomy/cat/index.html**), while over at the Virtual Pig Dissection site (**mail.fkchs.sad27.k12.me.us/fkchs/vpig/**) students can cut into an electronic hog.

Of course, the ultimate training ground for medical students is the human body, and the Internet serves up a wealth of virtual cadavers. The Virtual Autopsy at Leicester University (**www.le.ac.uk/pathology/teach/va/**) is aimed at the pre-clinical medical student. Pupils have 12 autopsies to perform, and are asked to determine the cause of death in each case.

At the high end of these online offerings is the Visible Human Project at the National Library of Medicine (**www.nlm.nih.gov/research/visible/**). Developers here have been building a complete digital database of human anatomy since 1989. The result is a virtual male and female data set built from actual CT, MRI and cryosection scans. Access to the entire database requires a licence, but some online samples are available. — *Michael OReilly*, mike@oreilly.net

Universities becoming a breeding ground for businesses

Professor Michael Sefton and his student Michael May were looking at something that looked a lot like the inside of a pomegranate — polymer beads surrounded by a network of blood vessels. The 2 chemical engineers had been studying the effects of polymer coatings on cells when they noticed that blank polymer capsules — those without a cell inside — promoted the development of blood vessels in laboratory animals.

Rimon Therapeutics is the spinoff company that emerged from that serendipitous bit of research at the University of Toronto, May told a recent U of T workshop on the commercialization of university research. They hope to be able to generate blood vessels in other tissues, including the heart, explained May, Rimon's president. Sefton is chief scientific officer for the company, which now has 7 employees and is involved in preclinical trials.

Rimon is but one of the growing number of spinoff companies formed since 1990, when the university loosened its ownership claims on research conducted there and agreed to give more benefit to the inventors. Last year, 6 new companies emerged, a figure that doesn't include spinoffs from research at the university's 11 affiliated hospitals.

But creation of these companies also creates the potential for conflict, especially with respect to the student–professor relationship, participants told the workshop. Peter Munsche, the U of T's assistant vice-president of technology transfer, noted that when graduate students are involved with research linked to a spinoff company, it "can have an effect on their thesis. You have to ensure that the possibility of delay in publication of theses [because of confidentiality concerns] is kept to a minimum."

As well, students can find their own work being diverted by the company's needs, and confidentiality in the laboratory can create problems. "Can your thesis supervisor also be your employer?" he asked. "The role of student and that of employee, or co-owner, are different, and we need to understand that and be alert. Also, the interests and values of a company and a university are different."

Novosight Inc. has found one potential solution. Fourth-year students who elect to use a machine invented and patented by Lianne Ing, a PhD student in chemical engineering and president of Novosight Inc., and her supervisor, Professor Stephen Balke, have to sign a confidentiality agreement, which also states that any research they do that contributes to improving the machine will be recognized. — *Ann Silversides*, Toronto