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After-school programmes

PhD students, postdocs and even senior scientists are taking continuing-education courses to improve their scientific 'hard skills' or branch out beyond the lab.

Robert Rentsch had a look around to see what's on offer.

Rod MacKinnon was already an established lab head when he decided he needed to learn more about crystallography. In 1995 he went back to school at the Cold Spring Harbor research laboratory (CSHL) on Long Island, New York. Together with 22 fellow scientists, ranging from PhD students and postdocs to principal investigators like himself, he enrolled in a two-week course in macromolecular crystallography. The training paid off: three years later, MacKinnon became the first scientist to use crystallography to resolve the structure of an ion channel. In 2003 he won the Nobel Prize in Chemistry for this work.

MacKinnon's experience may not be typical for the scientists participating in the postgraduate training courses that are offered by a handful of institutes around the world. But it shows that scientists can benefit from acquiring new skills at any stage of their career. Courses range from two to six weeks in length and focus on the latest tools and technologies in a specific field. Classes are kept relatively small, usually about 20 people, providing students with the opportunity to get hands-on experience in well-equipped labs between lectures and even conduct their own mini-projects.

"You could really work as much as you liked," says Olivier Keech, a 26-year-old protein researcher at the Umeå Plant Science Centre in Sweden, who last year participated in the two-week course on proteomics held at the CSHL.

"If you wanted to do your own experiments at two in the morning there was no problem finding some people happy to help you and machines ready to use," adds Keech. He says that he has benefited from the course, and now uses the methods he learnt there in his day-to-day work.

The courses feature "a lot of high tech, like mass specs and robots", says David Stewart, the CSHL's director of meetings and courses. And it left a big mark

on Keech. "Everything was perfectly organized, from food to the invited speakers," he says.

To rustle up the \$3,500 fee and pay for their travel, many students have to do some fundraising. Keech obtained one third of the money from a Swedish grant, another third from a CSHL stipend and the rest from his home institute.

Another hotspot for such courses is the Marine Biological Laboratory (MBL) in Woods Hole, Massachusetts. The courses and lectures here include all the latest methods used in laboratory biology, with a focus on microbiology and neuroscience.

Putting theory into practice

Anke Borgmann, who is doing a PhD in neurobiology at the University of Cologne, Germany, had clear expectations before she booked her flight to Massachusetts. "I studied biology and mathematics, and I was keen to learn how to use my theoretical maths knowledge for my thesis in biology in a gainful way," she says.

The MBL course Borgmann took in computational neuroscience more than met her wishes. "It really changed a lot for me," she says. "Before, I had only read in papers the names of people such as Bard Ermentrout or Larry Abbott. Imagine what it is like to meet them face-to-face?"

In the final week, when students were applying what they had just learnt to their own projects, Borgmann remembers working sessions lasting late into the night. But that was fun, she says, not a burden. And so was the faculty dinner, where she had the chance to meet all the professors, assistants and fellow students in a relaxed atmosphere. "I don't think I would have found something comparable in Germany," she says.

Most courses such as those offered by the CSHL, the MBL or the Jackson Laboratory in Maine are heavily oversubscribed. Only about a quarter of applicants are accepted each year. Course leaders say that personal



Olivier Keech: could get help in the lab at 2 a.m.

motivation and the degree to which the applicant would benefit from the training count more than experience and a glossy CV.

In Europe, some of the most notable training courses are those offered by the European Molecular Biology Organization (EMBO). Yannick Schwab, a junior scientist at the Institute of Genetics and Molecular and Cellular Biology in Strasbourg, France, last year attended a two-week EMBO course on electron microscopy in cell biology in the small town of Ceské Budejovice, Czech Republic. Schwab had just been offered a short-term position in Strasbourg on a project aimed at implementing electron microscopy in immune-cell labelling studies.

"It was exactly what I needed at this point," he says. "I now spend 95% of my time using the techniques I learnt in the course." Having experienced teachers available all day to answer questions was a big advantage, says Schwab. "I learnt all the tricks which otherwise would take you 20 years of learning by mistakes."

Sharing new-found knowledge

EMBO is keen that participants should pass on their newly acquired skills to others at their home institutes, as Schwab has been busy doing in Strasbourg. He gives briefings at the local electron-microscopy facility.

EMBO's courses are not limited to Europe. Other recent microscopy courses were held in Santiago, Chile, in 2003, and in Cape Town, South Africa, last year — among many others on its world programme.

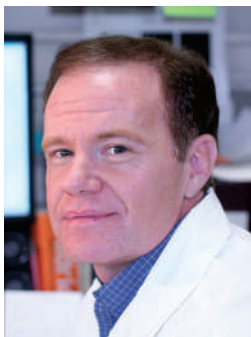
A mixture of European and international participants, mostly postdocs and PhD students, attend the EMBO courses, which are free, except for travel costs. A letter describing personal motivation is important for a successful application, says Gareth Griffith, group leader of the EMBO cell-biology programme.

Those who want to keep up work while digging into something new might head to England, where the University of Oxford's part-time bioinformatics programme leads to a certificate in one year, a diploma in two or a master's degree in three. Participants, mostly professionals, are usually sent by their employers, but individual scientists are also part of the programme. They come from a variety of backgrounds: biology, mathematics or computer science. And most of the coursework can be done from home — participants need only be in Oxford for three or four weeks per year. The course, however, comes at a price. The three-year MSc programme costs European citizens £17,500 (US\$30,500), and those from elsewhere £24,300.

Tom Chittenden, a postdoc at Dartmouth Medical School in Hanover, New Hampshire, has just graduated from the three-year programme. He admits it was difficult balancing his job with the training. "Luckily, I had a very understanding boss," he says. "When writing my thesis last summer I almost faced a nervous breakdown. But now that I'm done it opens a lot of doors to me."

Public-health officials and researchers who want to learn new analytical methods could try a course offered by Imperial College London. It teaches state-of-the-art computer modelling using data from real events, such as the 2003 outbreak of SARS in Hong Kong or the current spread of avian flu.

Although modelling involves a lot of maths and



Tom Chittenden: hard to balance job with training.



Katherine Moortgat: going from idea to IPO.

statistics, there is no need to be afraid, say Peter White, the course organizer, who notes that most people on the course don't do maths at all in their jobs. "We use easy-to-learn modelling tools that do the number stuff for you," he says. The next course will be held this September.

Scientists seeking a bigger career switch into finance, consulting or entrepreneurship have a growing number of business schools interested in tailoring or creating MBA programmes for them. Interesting examples have evolved in the California biotech hubs of San Diego and San Francisco, where business skills are in demand.

"Biotech started on our doorstep, so it's no wonder we get excellent speakers from industry," says Katherine Moortgat, director of the Center for Bioentrepreneurship at the University of California, San Francisco (UCSF).

In one of the centre's classes aimed at budding entrepreneurs, called "Idea to IPO... and Beyond", industry leaders explain the nuts and bolts of building a successful business. Team projects and internships provide hands-on experience. Students write business plans and, at the end of the three-month course, pitch their ideas and results to a panel of venture capitalists.

In San Diego, a group of scientists, still working in their day jobs, meets every other week on Fridays and Saturdays as part of the 24-month 'flexMBA' programme offered by the University of California, San Diego (UCSD). Most applicants for the \$36,000 programme already hold a PhD in science or technology and have a few years of professional experience.

"This is no simulation. It's real work and real stuff," says JoAnne Starr, assistant dean of MBA programmes at UCSD's Rady School of Management. Two of the workshop projects have already received internal funding by companies and a third is in the process of raising venture capital.

Start-ups and job offers

Niall O'Donnell, who did a PhD in protein biochemistry at Oxford and a postdoc at UCSD, will graduate from this programme later this year. "I was really wet behind the ears before. I knew nothing," he says. Recently he got a job offer from a venture-capital firm in Palo Alto, California, partly because he was involved in creating two start-ups during his studies. He has no worries about going home one day. "In Britain you get no job with a PhD nowadays, but with an MBA that looks different," he says.

Similar programmes are being established in other parts of the world as well. Danube University in Krems — Austria's first postgrad-only university — has recently started a two-year part-time MBA. It was inspired by successful schemes such as those offered at the Kellogg School of Management in Chicago and the Keck Graduate Institute in Claremont, California. A new Master of Bioscience Enterprise programme will also start later this year at the University of Auckland in New Zealand.

Whether in the States, in Europe or the southern hemisphere, training can be an inspiring break from scientific routine. And if you're lucky it can be great fun as well. Keech has happy memories of his course at Cold Spring Harbor. "After work we certainly went to the pub for a few drinks," he says. ■

Robert Rentzsch recently completed an internship in Nature's Munich office.