

Cornelius Gross: from the classroom to the laboratory

The majority of young scientists working in research have only ever been that – scientists. But **Vienna Leigh** reports how one group leader at the European Molecular Biology Laboratory started his career at the front of a classroom – and feels that his science benefits as a result.



Cornelius Gross

These days, Cornelius Gross works with mice to determine the causes of human personality traits and psychiatric disease, but at the start of his career, his day-to-day job involved dealing with much bigger animals – high-school students, to be exact.

Unlike most scientists who work in or lead basic research groups, as he does at the European Molecular Biology Laboratory (EMBL) Mouse Biology Unit in Monterotondo, Italy, Cornelius started his working life as a teacher, moving into laboratory work much later. “Though I still loved research when I finished my PhD, which was in *Drosophila* [fruit fly] genetics and protein biochemistry at Yale University [USA], I wasn’t keen to stay in the laboratory,” explains American-born Cornelius. “I think that was mainly because I felt I hadn’t had many personal life experiences or seen much of the ‘real’ world.

“So I started looking around for a job which would challenge me as a person, and one which would allow me to get immediate feedback on my performance, unlike research.”

Before long, Cornelius found himself in front of a science class of 15 to 17-year-olds at Landmark High School, a small experimental public school in Manhattan, for two years. “Our school was unusual, since all the students were poor. There were only four white children in the school, which had 450 students in total, and 90 percent of them were first-generation immigrants, mainly from Caribbean countries,” he says. “Since it was an experimental school, the principal had lots of leeway to design the curriculum as she wanted. Nearly all decisions were put to the vote of the teaching staff.”

Being an inexperienced teacher in such an environment, Cornelius seemed to have his work cut out for him – but he feels that being a teacher of science, rather than any other subject, made it easier. “Science is a fantastic subject, because nearly all students can relate to it and become engaged in it,” he says. “The experimental parts, in particular, really appeal to students who perform badly or are unmotivated. Several students who had done nothing all year in their other classes performed outstandingly when faced with an experimental task.”

However, it was by no means easy. “I had to develop and produce all my curriculum materials myself – I rarely used textbooks,” he explains. “Parents were frequently absent from the children’s lives, and if they were around, they often failed to appear at teacher-student-parent meetings – although the students would turn up, nonetheless!”

Despite the hardships, though, Cornelius was able to draw much personal satisfaction from the experience. “All my success stories derived from personal tutoring of difficult students. One in particular, who clearly had learning disabilities, took up a lot of my time, but helping him was very rewarding,” he recalls. “He was a Haitian student whose mother had remained in Haiti. His father was very strict, so I found myself mediating between the student and his father. In the end, I think I managed to help each of them to appreciate the other.”

“After leaving the school, I was able to travel to Haiti to see the student’s mother and take an autobiographical video that he made for her. He hadn’t seen her for seven years, but a few years later he was able to return to see her himself, in part because of my instigation.

“Another student was a precocious loner who hardly showed up at school, and when she did she usually came just to talk to me – she saw me as a confidant, someone she could talk to about her difficult life, which included experiences as a prostitute. She was half African-American with a German mother, and she idolised

Image courtesy of EMBL Photolab



Nazi paraphernalia and ideas; she made everyone hate her by shouting racist slogans, and no one wanted her in their class. I remember giving her a cartoon book about Freud, which she loved, and she wrote a great report about Freud with ideas derived from the book.

“Those are the experiences that remain most clearly in my mind, although there were many less vivid, but equally satisfying encounters.”

Cornelius never lacked ideas for experiments and assignments. “I taught with a mixture of lectures, group activity and individual research. At the time there were no such activities available for groups of my students’ age and skill level, so I created lots of experimental projects. They helped the students discover things, rather than teaching them what has already been discovered,” he says.

A Haitian beach

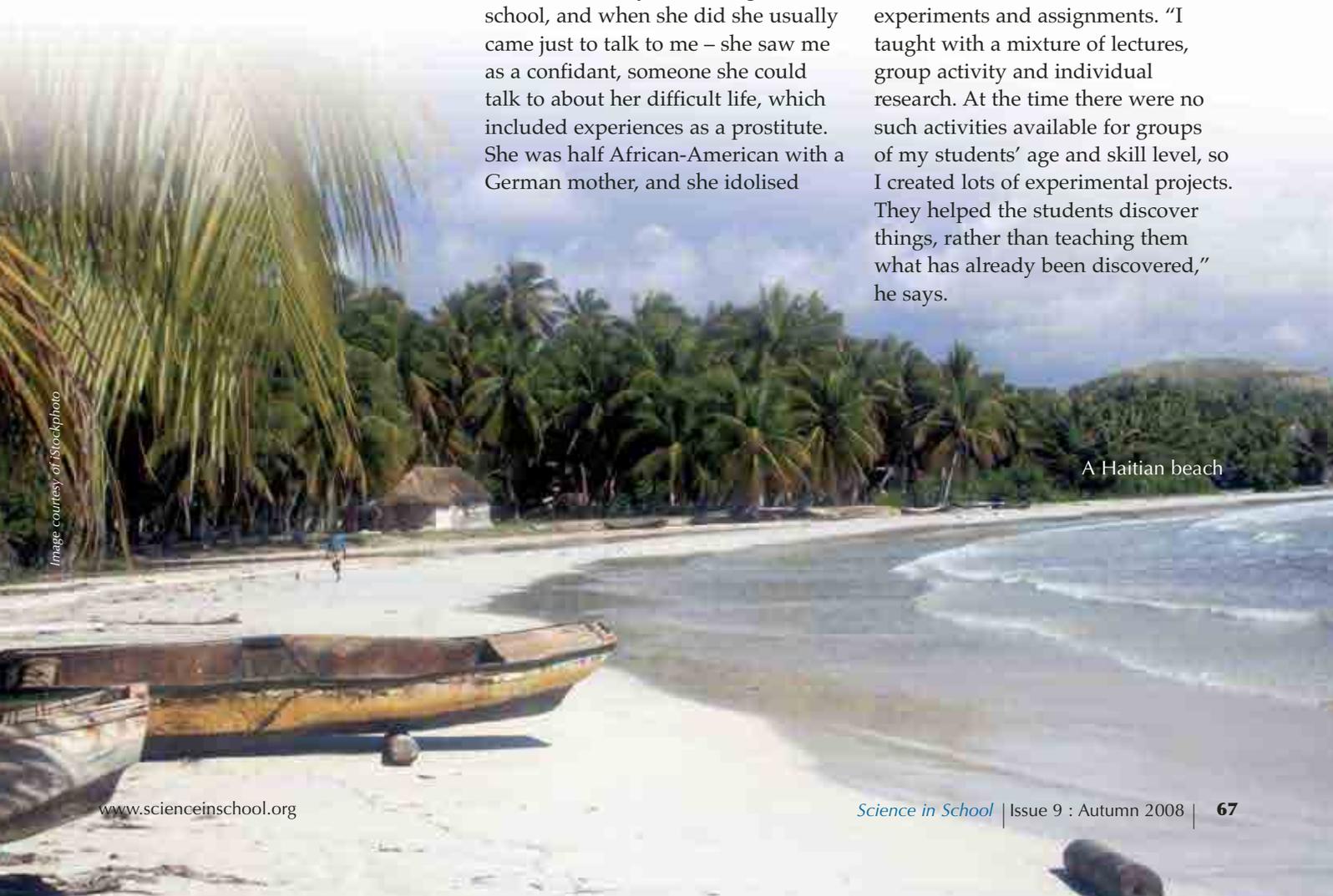


Image courtesy of iStockphoto

“One involved a ‘prisoner’s dilemma’^{w1} module where the students had to develop their own algorithm and play against classmates. In another activity, we looked at the chemistry of commonly used drugs including cocaine and heroin, using gumdrops as the drugs and drawings of the synapse to explain their target sites.”

It was one such project that led to him eventually leaving the classroom and returning to research. “One day I read Peter Kramer’s landmark book about antidepressants, *Listening to Prozac*, which inspired me to devise a module about neurobiology. We had many visiting speakers and made a model of the areas of the brain using coloured clay. We also read Oliver Sacks’ [neurologist and author of *The Man who Mistook his Wife for a Hat*, among others] stories about brain injuries. The students thought I was a total nerd, but they loved it.

“All this re-awoke my interest in research, and in neurobiology in particular, which wasn’t really something I’d done before – I’d studied biophysics before my PhD. So, soon afterwards I left the school and joined a neurobiology lab to determine the serotonin receptor that mediates the antidepressant effects of Prozac. We actually succeeded, and published this in *Science* in 2003 [Santarelli et al, 2003].”

Now Cornelius runs a lab of ten people and is sure, despite his positive teaching experiences, that research is the right job for him. “I love the creativity and freedom in science,” he says. “I feel very fortunate to be a scientist and to be able to run my own lab and be independent. It has just the right mixture of solitary thinking and people management on a small scale.”

His two years as a teacher, though, equipped him with special skills he’s very grateful for to this day. “Teaching requires excellent people-management skills. I learned to be

light-hearted, eccentric and playful as a way to deflect conflict and engage students,” he says. “Being a group leader in science is much the same. Several scientific results have been surprising and made me extremely proud of the people in my lab, just as I was proud when those underachieving kids really got engaged in science and came through with projects.

“Recently, for example, a young researcher in my lab had the idea to look at the body temperature of a group of mice that had been dying for no apparent reason. She found extremely dramatic and unexpected drops in temperature that are now the basis of an article that was published in *Science* [Audero et al, 2008]. The thing I remember the most was the smile on her face when she presented the data to me. Seeing such satisfaction is enough to keep me going for many months!”

References

- Kramer PD (1994) *Listening to Prozac: Psychiatrist Explores Antidepressant Drugs and the Remaking of the Self*. London, UK: Fourth Estate. ISBN: 9781857022841
- Sacks O (1986) *The Man who Mistook his Wife for a Hat*. London, UK: Picador. ISBN: 9780330294911
- Santarelli L et al (2003) Requirement of hippocampal neurogenesis for the behavioral effects of antidepressants. *Science* **301**: 805-809. doi: 10.1126/science.1083328
- Audero E et al (2008) Sporadic autonomic dysregulation and death associated with excessive serotonin auto-inhibition. *Science* **321**: 130-133. doi: 10.1126/science.1157871

Web references

- w1 – For more information about the prisoner’s dilemma, see:
The Wikipedia page on the prisoner’s dilemma:

http://en.wikipedia.org/wiki/Prisoner's_dilemma

An interactive game about the prisoner’s dilemma:
<http://serendip.brynmawr.edu/playground/pd.html>

Resources

For an example of a move in the opposite direction, see the story of Paul Matthews, who moved from the lab into the classroom:

Leigh V (2008) Paul goes back to the classroom. *Science in School* **8**: 63-65. www.scienceinschool.org/2008/issue8/paulmatthews

For more information about the work of Cornelius Gross’s research group, see: www-db.embl.de/jss/EmblGroupsOrg/g_177?sP=1

