



Weaving science into the culture of Uruguay

Zenzile Brooks

Science appreciation presents a special challenge in Uruguay. The Uruguayan culture has historically been rich in reading, writing, dance, and music. Aside from agriculture and economics, science and technology were noticeably missing from this diverse cultural stage. However, in the last few decades, the role of science has blossomed. In 2006, the Uruguayan government established an annual “Science and Technology” week, which showcases various scientific activities throughout the country.

In response both to Uruguay’s Science and Technology week and to a lifelong science outreach commitment, Laura Fornaro, a professor at the Universidad de la República in Montevideo, together with her colleagues developed a series of interactive outreach projects which introduce science to the larger community. Maria Eugenia Pérez, a PhD candidate in Fornaro’s group, said, “We want to make children

more conscious about what they have to choose in their lives.” Uruguayan children will be citizens in a society where science and technology are only recently viewed as cultural issues, and where science and technology are often misunderstood by legislators. Fornaro recalls one politician who mentioned to her his doubt that the element uranium existed in a region with “black,” or radioactive, sands. Fornaro replied, “It’s not an opinion!” A more scientific age is dawning in Uruguay, and the work of Fornaro and her colleagues are preparing future citizens for this new society.

The first project, “Materials which Surround Us,” introduced children and schoolteachers to the scientific aspects of materials in their everyday lives by allowing them to perform guided experiments such as growing crystals. The success of this first project inspired two more projects. The second project, “Materials and Solar Energy,” consisted of a guided discussion of classic



materials types and their evolution, and an activity with solar cells under the sun. The third project, “Materials in Our House,” allows children, schoolteachers, and parents the opportunity to explore a small-scale model of a house that contains several examples of important scientific materials. The materials in the tiny house are linked, in the classroom, with larger demonstrations and experiments about these materials. The projects, funded by the Agencia Nacional de Investigación e Innovación, are presented as 1–4-hour workshops consisting of lectures, open dialogue, demonstrations, and interactive experiments held in classrooms and cultural centers.

Fornaro’s research focuses on a complex field in materials science: materials for radiation detectors. Her outreach projects, however, take a more broad and accessible approach to materials science. This more general approach is key to the success of the outreach projects. Fornaro asserts that for outreach projects such as “Materials in Our House,” “you cannot begin from radiation detectors. You have to begin from something that people understand. The house is a place where you can find a lot of materials that people understand.”

Regarding the success of the outreach projects, the proof is in the pudding—or rather, the bus schedule. Fornaro recalls performing “Materi-





als which Surround Us,” a two-hour workshop, in a small city in the middle of the country: “In Uruguay, the school time is four hours. We were [there] the complete four hours. . . . The parents came for the children to go [home]—and remained there! We only finished when the bus—the only bus by day that was in the city—[came] for the children.” In another “Materials in Our House” workshop, an eager young boy devoured the lesson, correctly identified all the materials in the house, and then identified the silicon in a wafer that was brought to him. At the same workshop, an elderly man sipping a Mate, a traditional South American beverage, enthusiastically plodded through the demonstrations as he absorbed information and spouted question after question.

The empowerment induced by Fornaro’s projects does not stop with the children, teachers, and families who attend the workshops. The students and academics who perform the workshops also undergo a transformation. Pérez said, “Sometimes, you have more enthusiasm for doing [your research] when you know that other people will like it.” As Pérez is conducting the workshops, she wonders whether she is “working with children [who] in a few years will be [her] students at the university. That is really motivating, for sure.” By performing the workshops,

Pérez became a more motivated, and therefore a more invested and successful, graduate student and researcher.

This effect fits with Fornaro’s philosophy on teaching, research, and outreach; she sees the three activities as closely related. “If you are a good researcher, you will [perform] better outreach. I’m completely sure. And if you are a good researcher, you will do better teaching,” she said. Moreover, said Fornaro, outreach is a duty of any researcher. “[There is] no sense if you only research, and you don’t think [of] your country or population. . . . If you are researching in some place, and nobody knows what you do, then what you do is not useful for society,” Fornaro said.

Given the success of these outreach projects, Fornaro and her colleagues have exciting plans for future outreach work. One project design takes “Materials in Our House,” and scales it up to human-scale. Rather than simply walk around a small-scale model of a house, Fornaro dreams of outfitting an actual house with materials and scientific demonstrations. Participants could walk in the house and experience the role that science plays in their daily lives.

Throughout the course of the projects, the team learned some important lessons for researchers or educators interested in undertaking similar projects. One important lesson is the time com-

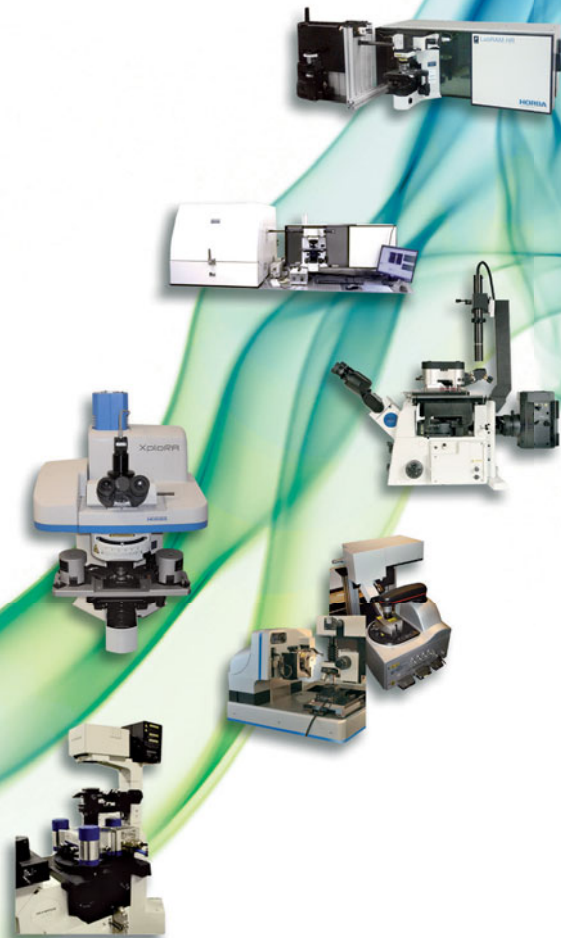
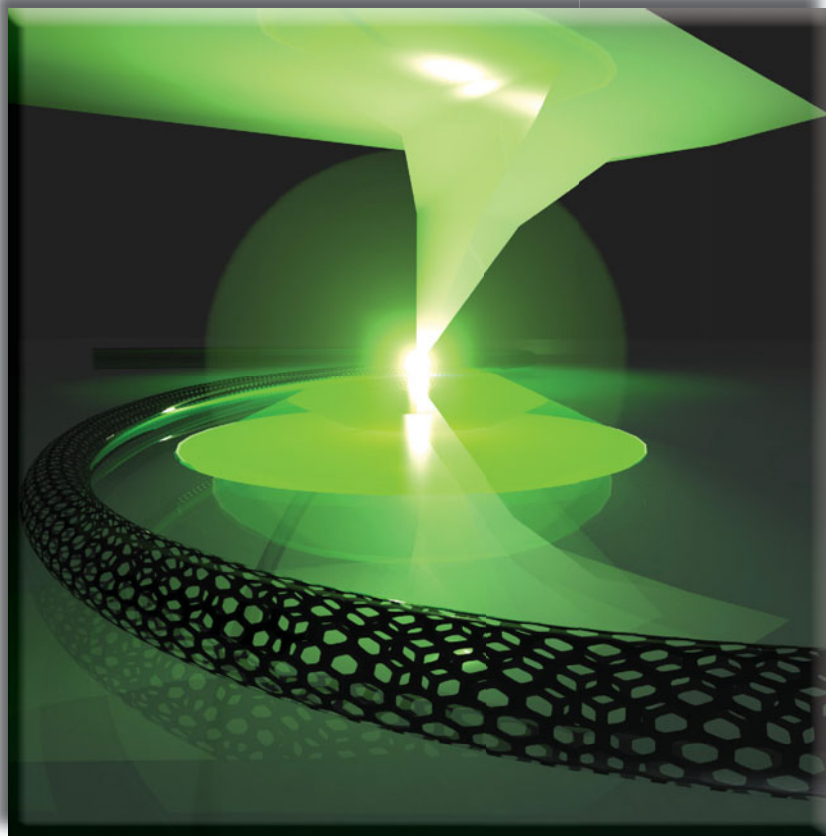


mitment needed for developing even a simple workshop. “These activities are really time-consuming,” said Pérez. A second lesson is the coordination of funding from a particular agency. Even though the group would like to develop and run multiple workshops at once, some funding agencies require the completion of one project before requesting funding for another.

Despite these minor hurdles, the projects still reach their goals of spreading science appreciation throughout the country. “At the end, the most important thing you have—and I think it’s almost the only thing you have—is the satisfaction [of seeing] children liking science. That is what we get at the end of the activity,” said Pérez.

Thus, despite the careful planning and hard work that must precede every workshop, the outcome of every workshop brings Uruguay a step closer to a society whose cultural fabric contains a vibrant thread of science.

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¹ Deckert-Gaudig, T., Kämmer, E. and Deckert, V. (2012), J. Biophoton., 5: 215-219. doi: 10.1002/jbio.201100142

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