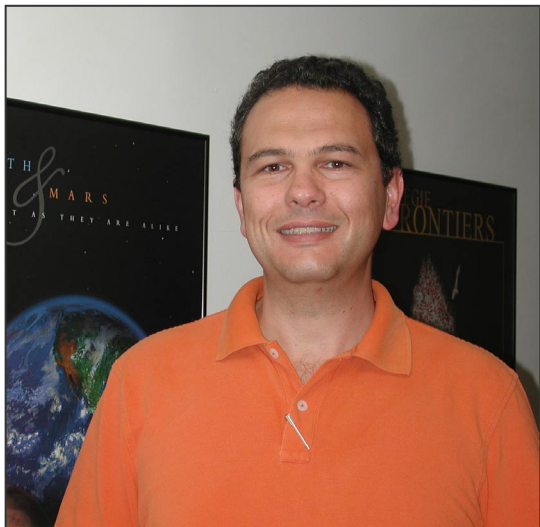


PROFILES OF SCIENTISTS IN EDUCATION AND PUBLIC OUTREACH

This profile is based on excerpts of an interview with Dr. Isidoros Doxas, about his involvement in Education and Public Outreach (E/PO). Dr. Cherilynn Morrow of the Space Science Institute (SSI) designed the interview questionnaire. SSI's Preston Dyches edited the responses in May, 2003.



Current professional position:

I'm a senior research associate at the Center for Integrated Plasma Studies (CIPS) at the University of Colorado at Boulder. My PhD is in plasma physics, and I work in magnetospheric physics and nonlinear dynamics.

Description of Isidoros' featured E/PO role:

It changes from year to year, depending on funding. Right now I'm the PI on a project that tries to motivate the standard electricity and magnetism curriculum for both the high school and freshman college levels using space weather. For example, the standard way to teach induction is to hold a wire that carries current over a magnetic needle and watch the needle move. In our approach, we can motivate by explaining how the Birkeland currents were discovered; Birkeland saw that the needle was moving and deduced that there are currents flowing in the ionosphere. Teaching the subject in this way is maybe a little more relevant. It's teaching by application. The wire and compass is a clean experiment, but it doesn't really do much to excite students.

We have developed a Java applet that shows how the reading from a magnetometer changes as it passes under the Birkeland currents. The project is based here at CIPS and it's funded by the Magnetospheric Physics Division of the National Science Foundation. It's being developed to go into the Solar System Collaboratory, which was a project that I've been heading for the past eight years.

We also have developed some questionnaires that probe understanding of different concepts having to do with electricity and magnetism.

How he balances E/PO efforts with other professional activities:

Right now, I spend about a third of my time working on education. I try to pick projects that are substantial enough that you can put your scientific research into them. For instance, we're putting state of the art models into the space weather applet – so we're using part of our research as an E/PO component. This sort of thing is increasingly important to funding agencies.

Challenges to his E/PO involvement:

Time and money! If you have those things, you can do pretty much anything you want.

You obviously can't be as productive in two fields as someone who only works in one. You run the risk of being considered an education person by the scientists and a scientist by the educators, but you do what you can.

The most important positive impact of his E/PO work:

I am happy to provide a higher level of scientific sophistication to the education products or activities with which I'm involved. Just because the products are for kids doesn't mean they have to be childish. Not that they are factually wrong, but they can be too simplistic at times.

What he gets out of his participation:

I get a better understanding of the material. There's no substitute for trying to explain exactly, with great precision, how things work to help you understand them yourself. If you can explain to a high school student how the magnetosphere works with an accurate simulation that keeps you from having to wave your hands and draw cartoons, you learn a lot too. You have to know the physics that describe the system pretty well if you are going to write a computer program that simulates it.

Isidoros' words of wisdom about E/PO:

If you want maximum exposure for your discipline, you need to get your work into places like textbooks. If you manage to get a couple of pages on space weather in a textbook that is read by a million students across the country, that gives your field great exposure.

Also, if you're going to go into E/PO, you should be serious about it and not just dabble on the side. If you're really going to do E/PO work, it should be approached as something you do as part of your career.

The Solar System Collaboratory:

<http://solarsystem.colorado.edu/>