

Editorial: Teaching Something New— Nanoscience

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American Journal of Undergraduate Research
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Many of us who are engaged in mentoring undergraduate researchers also spend a good deal of time teaching—and thinking about what new topics we might teach. The pressure to redraft our courses and syllabuses varies across our different disciplines, but we all likely think about new topics and course additions every now and then.

Though it can be a challenge to create a new course in our own disciplines—especially when we must entrain some of our colleagues to help—the challenges are often greater when we step outside our departmental boundaries. The difficulty of agreeing on ways to approach a topic and what to emphasize can be surprising—some perspectives are never questioned when we deal with our disciplinary colleagues.

After nearly 20 years, I still remember my and my fellow physicists' surprise when we sat down to talk about the possibility of a common introductory physics+chemistry course with chemistry colleagues. This discussion took place at an elite private US college with a lot of financial resources, even so the differing emphases of the chemists and physicists about what was important ended the cross-department discussion after the very first meeting.

I've had several successful and rewarding interdisciplinary collaborations since that first shock. So I am, in fact, an optimist about interdepartmental collaborations—but experience has taught me not to discount the natural challenges to collaboration, especially when the topic is new and untried.

These experiences were in my mind this past year as a chemistry colleague and I embarked on a new curricular path. We had been talking about an introductory nanoscience course for more than a year. He had taken an off-campus research sabbatical to gain some lab experience with

nano-techniques and nano-materials. We had written a grant for some new equipment to a private foundation—the Roy J. Carver Charitable Trust—and had been fortunate enough to be funded. With Carver's help we had the equipment to offer an introductory course (lecture and lab)—*if* we could agree on a curriculum.

Our goal was to attract a mixture of chemistry and physics undergraduates, ideally at level of sophomore or junior majors [2nd or 3rd year students in 4-year degree programs]. We wanted our course to be accessible to our prospective students early enough in their undergraduate careers so that they would have time to take more 'nano' courses if they got hooked. This meant a restricted set of prerequisite courses—we agreed on only one year each of general physics and general chemistry, after much discussion.

As I write this, my colleague (Dr. Duane Bartak) and I are finishing our second week of what we admit is very much an experimental course. We have the mixed audience of physics and chemistry majors that we desired. Happily, it is turning out to be fun, but he and I are still learning from each other and struggling with how to present new content. This is not only a new course for our students but also for each of us.

What comes next, if this semester's lessons are encouraging? More colleagues, from more departments, I hope. The nanoscience and nanotechnology areas are inclusive by their very organization. Dr. Bartak and I are gaining some hard-won perspective this year, and it will help us and other colleagues work to expand the nanoscience/nanotechnology curriculum. The willingness to come back to a next meeting, to look for supplementary approaches, is what will guide us toward a new inter-departmental curriculum.