



iBioSeminars: A Personal Perspective

The goal of iBioSeminars and its companion iBioMagazine is to record talks by leading biologists and make them available to students and scientists throughout the world for free.

This project, which I founded in close association with the ASCB in 2006, is going strong, and I would like to introduce you to this valuable resource and present it as a case study for launching a project with minimal resources and bootstrapping it to a higher level. And finally, I would like to convey the creativity and intellectual excitement of such educational



Ron Vale

outreach activities. There is no shortage of opportunities in education, and I hope that this column might spark ideas and interest from some of the readers of this *Newsletter*. I welcome your ideas and comments on the ASCB Facebook page (www.facebook.com/AmerSocCellBio) and will respond during the month of June.

Those not familiar with iBioSeminars and iBioMagazine may want to have a look at the websites. iBioSeminars features full-length scientific talks by leading scientists. It is available at www.ibioseminars.org. iBioMagazine offers short videos (<15 min) on the human side of science—how discoveries were made, how careers develop, what scientists do outside of the lab, science and society, and more. It is available at www.ibiomagazine.org.

Limitations of the Lecture Circuit

In the scientific world, those at privileged institutions tend to collect more resources and have more opportunities. The majority of institutions around the world do not possess the funds to fly in seminar speakers or the cachet to compete for the limited travel time of top scientists. Thus, there is a growing disparity—some institutions have become so saturated with seminars that attendance is problematic, while other institutions rarely, if ever, have visits from leading scientists. We, as scientists, have a moral imperative to communicate our work as broadly as possible, and the current lecture circuit is not fully achieving this mission.

I became acutely aware of this situation when I traveled to India in 2006 to give a seminar at a leading institute. It was a terrific trip, and I had an opportunity to meet many people face-to-face (and indeed it inspired me to spend a sabbatical in India). However, I realized that I had flown a great distance at significant cost to present my science to only 100–150 students and scientists. When I returned from India, I began to consider ways in which the Web might be able to augment the lecture circuit by having scientists give their talks in a way that would be freely accessible through the Internet.

But with increasing free access to journals, do seminars matter? I believe that seminars continue to play an important role in how we communicate and educate, since they convey different and important information that cannot easily be gleaned from reading a paper or review. A lecture conveys not only data but how a scientist thinks about a problem, the personality of the scientist, the path of discovery (which is often rearranged and sterilized in a paper), new ideas (including those that are too speculative to make it into papers), and integration of information from several papers from a lab or several labs.

Advocates, Mentors, and Bootstrapping

There are two models of developing an idea. One is to conceive of the grand vision and, at the onset, get all of the funds in place to realize it (e.g., a large government grant or venture capital funds). However, investors will often demand considerable evidence that the idea is going to work. The other way is to bootstrap through small steps, each one more manageable and less expensive than the grand vision.

iBioSeminars proceeded using the latter model, and it offers a case study of how one can accomplish more than one might imagine with minimal financial resources but with personal energy, goodwill, and a few key advocates. When I presented the idea of iBioSeminars to Haile Debas, the former Chancellor and at the time Director of Global Health Sciences at the University of California, San Francisco (UCSF), he immediately saw the project's potential

The American Society for Cell Biology

8120 Woodmont Avenue, Suite 750
Bethesda, MD 20814-2762, USA
Tel: 301-347-9300
Fax: 301-347-9310
ascbinfo@ascb.org, www.ascb.org

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and offered start-up funds of \$2,000 to pilot a few lectures. We wanted to film scientists in a more intimate setting than the back of a lecture hall, so with Matt Epperson of the Education Technology Service department at UCSF, we configured a “chroma key” studio (the technique used by the weather people on television) and recruited four scientists (Julie Theriot, Joe DeRisi, Toto Olivera, and myself) as the first test cases. We also decided to use a format different than that of the standard university seminar, since those tend to include only minimal introductory material. Therefore we developed iBioSeminars so that each seminar has a separate introduction of about 30 minutes (Part 1) that is accessible to students or scientists outside of the field, followed by one or two research talks (Parts 2 and 3).

With a proof-of-principle of four recorded seminars in hand, our next step was to film more and distribute them. Enter a new set of advocates for the project—Mary Beckerle and Bruce Alberts, who were on the International Affairs Committee at the ASCB. They saw great potential for the project and advocated its association with the ASCB. Through their and others’ support at the ASCB, an initial group of lectures was put on the ASCB website. At about the same time, Peter Bruns, who directed the Grants for Science Education at Howard Hughes Medical Institute (HHMI), encouraged me to apply for a grant to support iBioSeminars, which was funded initially at \$35,000/year (a big leap from \$2,000!) and then several years later at \$100,000/year along with additional technology support and filming resources from HHMI. Importantly, the ASCB and HHMI were (and remain) vital intellectual partners and supporters of the project, helping to brainstorm ideas for its development.

One hundred thousand dollars per year supported a bare bones (but enthusiastic) team of people working part-time. Each lecture requires a considerable amount of work, including communicating with the speaker, editing slides in advance, working with the speaker in the studio, editing the talk, and posting the talk and associated content (e.g., teaching tools, subtitles) on the website. Nevertheless, in 4.5 years we were able to complete 64 iBioSeminars lectures, launch iBioMagazine and record 49 videos for it, start English and Spanish subtitling, and begin meaningful partnerships in India, China, and

Chile on using the lectures in those countries.

Beginning in September 2011, our funding transitioned to the National Science Foundation (NSF) and the National Institute of General Medical Sciences (NIGMS) in a rare partnership grant between the two agencies. With this grant, we hired a full-time director (Sarah Goodwin) and video technician (Isaac Conway), thus expanding the scope of what we can tackle. At the time of writing this article, we have 80 iBioSeminars and 70 iBioMagazine videos posted on the sites. There have been approximately two million downloads from our websites in the past two years. The talks are also posted on YouTube (>500,000 views) and iTunes U (currently we are in the top 10 of the Science Great Collections), and we have over 4,500 subscribers.

We are continuing to produce iBioSeminars, seeking to expand our breadth into new areas such as ecology and animal behavior. We also aim to produce around 30–40 iBioMagazine videos per year. (See our most recent, fun issue of iBioMagazine, in which we feature videos of what scientists do outside of the lab, including ascending Everest and playing a duet with Emanuel Ax!) In addition to our UCSF studio, we are now filming at HHMI headquarters (Chevy Chase, MD), the Marine Biological Laboratory (Woods Hole, MA), and the European Molecular Biology Laboratory (Heidelberg, Germany), and we are grateful to these institutions for their support.

Inverting the Classical Teaching Model: Using iBioSeminars for Education

Bolstered by the positive feedback that we have received from teachers, we are making a concerted effort this year to develop resources and a new Web interface that will allow our material to be used more easily in educational settings.

In the vast sea of educational material available on the Web, what does iBioSeminars have to offer? We feel that we can uniquely offer 1) access to the world’s top biologists; 2) rich content that describes the process of doing science and making discoveries, including how scientists ask questions, perform experiments, and come to conclusions; 3) a library of cool stories that reveal the human side of our profession, including the serendipity behind famous discoveries, how careers developed

from humble beginnings, and the many passions of scientists beyond collecting data. For the current and upcoming “YouTube generation,” these stories can be both instructional and motivational, providing another window into biology that is not conveyed by textbooks or scientific articles.

We are planning material that will be geared toward two audiences: Introductory Biology will target high school seniors and beginning undergraduates, and Advanced Biology will primarily target upper-year undergraduates. We are working with high school and college teachers to select and edit this material, which will be available (early in 2013) on a new iBioEducation portal on our website.

We are also aiming to produce complete courses. Jon Scholey at the University of California, Davis, is directing an upper-level cell biology course based entirely on iBioSeminars lectures; we will make the material used for this course available on our iBioEducation portal because it will be a good prototype for other courses. Our biggest project in 2012 is to produce a course on the Principles and Practice of Light Microscopy (with applications for the life sciences). There is an enormous desire to learn about light microscopy, but there are few courses on this subject worldwide and only limited student enrollment. We will produce an advanced course of more than 40 lectures and a beginning course of approximately 12 lectures. We are filming these lectures in the iBioSeminars studio style but also filming demonstrations at the microscope to make the course as practical as possible. This premier course will feature many of the world leaders in light microscopy.

iBioSeminars and iBioMagazine are not substitutes for learning biology through a teacher and classroom. Rather our goal is to provide great material that a teacher and student can use to augment classroom learning and that might be hard to find in textbooks. Students can watch Martin Chalfie’s 14-minute talk on the discovery of the green fluorescence protein. Or they can hear Robert Tjian talk about transcription, Melissa Moore explain RNA splicing, or Jack Szostak describe how he thinks life evolved on Earth. After students listen to a talk on their own time, class time can be used to discuss the lecture or go through follow-up questions or articles. This idea of “inverting” education by assigning a lecture on the Web and then using class time to extend the lecture by discussing it with the

teacher or doing assignments with peers is being promoted by Sal Khan, the founder of the education online resource called Khan Academy. (See Khan’s talk on TED: www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html.) Teachers are using iBioSeminars in this manner already, and we hope to make this easier through our upcoming iBioEducation Web portal.

Deriving Satisfaction from Education

Over the years, I have come to see the scope of education as much broader than delivering lectures to a large classroom. Education is about communicating knowledge, excitement, skills, and advice in many different ways and through diverse venues to many different audiences. In this broad view of education, there are styles, niches, and forms of gratification for almost everyone, providing one is willing to invest effort and learn.

In developing iBioSeminars, I learned that educational outreach provides many of the same satisfactions as scientific research: It requires creativity, exploration of new ideas, and an ability to envision outcomes and develop feasible paths for execution. Like science, educational outreach activities are intellectually fascinating and challenging with regard to converting ideas to practice. My day job as a research scientist certainly keeps me busy, but education has a high “fun factor.” iBioSeminars also provides intriguing challenges that are different from those of research, has distinct rewards, and complements my pure scientific research in interesting ways.

One of the aspects that I most enjoy about iBioSeminars is that it is never static; our team is constantly thinking of ways to improve and innovate. I also meet interesting and passionate people through education who I would not encounter through my research program. Just like research, education requires work, but there is also personal gratification. Making a scientific discovery is thrilling, but it is tremendously satisfying to learn that a teacher from the Sudan subscribes to iBioSeminars or to receive an email from an iBioSeminars user who says, “Really amazing site. Just discovered. Love it totally. I am going to spend many hours listening and reading and informing myself here. Thanks a LOT!”

It took me a long time to come around to

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the idea that I could enjoy and do useful work in education and that it is not incompatible with my research program. And I worry that senior scientists may be steering young people away from educational activities too vigorously by telling them that “it won’t count” and “that teaching is time away from research.” Young people are altruistic and willing to learn many things. As senior scientists, it is our job not only to lead them to scientific publications, but also to help them find balance in their lives and to teach them to take on challenges of many sorts and use their talents as broadly as possible. ■

Comments are welcome and should be sent to president@ascb.org.

Minisymposium, continued from page 1

new ideas and approaches for cell biologists who are studying regeneration and regenerative medicine.

The Graduate Student/Postdoc–Initiated Minisymposium competition was introduced for the first time this year as an opportunity for young scientists to become more involved with the ASCB and the ASCB Annual Meeting. Proposals were reviewed by members of the ASCB Council and the 2012 Annual Meeting Program Committee. The ASCB received 36 proposals, many of them top quality, and the reviewers had a difficult time selecting the winner.

Roberts-Galbraith is a third-year postdoctoral research fellow in Phillip Newmark’s lab. She received her PhD at Vanderbilt University and worked in the lab of Kathleen L. Gould. She is a Jane Coffin Childs fellow, has been an ASCB member for six years, and has served as a mentor for other young scientists. Thorne is a third-year postdoctoral research fellow in Lani Wu and Steven Altschuler’s lab. He received his PhD from Vanderbilt University Medical Center and did his research in Ethan Lee’s lab. He has received many awards for his work and holds a patent on a cancer-targeting drug. The two co-chairs met in graduate school, where they were encouraged to join the ASCB and attend the Annual Meetings. “At Vanderbilt, in the Department of Cell and Developmental Biology, there was a strong commitment to the ASCB among the faculty,” says Thorne.

The co-chairs complement each other well

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Rachel Roberts-Galbraith



Curtis Thorne

since they approach the topic of regeneration from different backgrounds and perspectives—from emerging model systems to systems biology. Roberts-Galbraith studies molecular mechanisms of nervous system regeneration using the amazing regenerative properties of planarians. Thorne’s work focuses on high-content imaging and quantitative single-cell imaging approaches to investigate cellular plasticity and heterogeneity of colonic stem cells. Thorne says, “As we discussed our current projects with each other, we realized we are addressing many of the same fundamental questions but from very different approaches.” Roberts-Galbraith adds, “[However,] because of the nature of our training, we both view ourselves as approaching questions in developmental and regeneration biology from a cell biological perspective.” “Rachel and I both feel that the field of cell biology is at the core of most questions in modern biology and we take this perspective in our own research,” says Thorne. This view is what led them to submit an application to co-chair the first ever Graduate Student/Postdoc–Initiated Minisymposium at the 2012 ASCB Annual Meeting.

Creating opportunities for young scientists to get involved with the Society and to share their excitement about cell biology is a priority of the ASCB. The 2012 Graduate Student/Postdoc–Initiated Minisymposium competition proved very successful, and the ASCB hopes to offer this competition again for 2013. ■

—Alison Harris, Meeting and Abstracts Manager