



## Conversation with the Dean

*James Madara, MD, was appointed dean of the University of Chicago Biological Sciences Division in July 2002. Here he shares with John Easton his thoughts about the division and its future. Photography by Markus Giolas.*

**You have had a very distinguished research career and an established and highly productive laboratory. What made coming to Chicago as dean of the biological sciences more appealing than continuing your own research?**

This may shock many of my peers, but I really enjoy administrative things, so on a personal level, this was a logical next step. Particularly appealing about Chicago was the opportunity to build distinctive interactive programs, to cross boundaries from the biological to the physical sciences. That seemed much more real here than at many universities. Everyone wants to cross these boundaries but most institutions are not culturally or anatomically positioned to do so. This place has the unusual combination of real and proven strengths with modest size that is required to pull this off.

### **What was your impression of the university before coming in?**

From the outside, it's a highly visible place that has a reputation for being intensely focused on scholarship. As I got to know it, I was somewhat surprised to learn that it is very modest in size. I think that contributes, in a way, to the intensity and the culture of cross-disciplinary interactions by forcing faculty to build critical mass in novel ways.

### **Now, as an insider, do you have a different view?**

A couple of things have become increasingly clear. The first is how intimate and interactive this campus already was. Faculty from the biological, social and physical sciences, including Argonne National Laboratory, were all in touch with each other to some extent, although still not working together as closely and frequently as we might like.

Second, on the clinical side, there is a remarkable blend between the hospitals and the division. No one can tell exactly where the hospitals end and the division begins. Here again, however, there was a real opportunity to better coordinate activities from the top down. That turned out to be quite easy, and we've had terrific interactions with the hospital administration.

The third thing I noticed was that there was substantial deferred maintenance, especially of research facilities, which needed a good deal of immediate attention. This is particularly important in biological science where the technology is moving so rapidly that it requires absolutely first-rate laboratories to remain competitive at the highest levels.

### **What have you concentrated on most in your first year, and where do you see that going?**

We had lost some influential faculty in the preceding few years and needed to fill those gaps, not just quickly but with the right people, as well as to build strength in new areas. That was a challenge, of course, but it was a real opportunity to set a tone, not only in terms of administrative and scientific qualities, but also personal qualities. I think our tighter working relationship with the hospitals has been a real boost for recruiting, especially in the clinical departments.

Recruitment has also gone well on the science side. For example, Martin Weigert, the Hillman Professor of Life Science at Princeton and a member of the National Academy, just accepted a position here and will arrive this summer. It may take a bit longer, but we have the opportunity for some real growth in the biological sciences as well. We have obtained resources and a mandate to bring in 30 new research faculty.

At the same time, I think science is moving in a new direction, away from the "pure" specialties such as microbiology or biochemistry or particle physics and toward something in between, often using the tools of the physical sciences to unravel

and even manipulate the extraordinary complexity of biological systems. We have an advantage and are moving to exploit it. Our inter-actions with the physical sciences, on campus and at Argonne, already have been quite productive and are about to accelerate. For example, we just appointed Steve Kent director of the Institute for Biophysical Dynamics, which brings together scientists from the biological and the physical sciences. Both divisions have identified resources that will contribute to that institute, the central university has contributed portions of additional faculty slots, and construction of what will be the largest research facility on campus is well underway. Thus we have the means to translate our dream into something truly remarkable.

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**These sound like bold plans that require a lot of resources at a time when endowments are shrinking and federal funding is limited. Where will you find the support and collaborators for such ambitious projects?**

Sometimes a deficiency can be an advantage, as long as one carefully picks and chooses. This campus lacks engineering, so when we need that kind of support we get to pick and choose from places that emphasize engineering. Alternatively, we could build bits of engineering here but do so without the stilted historical structures embedded in engineering schools.

We are currently developing a program in computational neuroscience, for instance, that pulls together resources from the physical, biological and social sciences on this campus, with computational support from Argonne and bioengineering from the Illinois Institute of Technology.

We already have some understanding of how single neurons work, but this group will take the next step, learning how groups of neurons function together as a system. Such efforts utilize behaviorists from psychology, computational scientists from physical science, engineering from IIT plus neuroscientists, all working together as a group. That's where science is headed. We can accomplish all of this by careful picking and choosing, even in financially unfavorable times.

**A key element of the kickoff for the university's current fund-raising campaign was an emphasis on adapting the tools of the physical sciences to solve biological problems. Is that the future of biology?**

It's not just the future; it's the present. There's a real urgency in the biological sciences now that we have the tools to move rapidly. One way of expressing that is to compare what we could do when I set up my first lab with what people do now. In those days, not all that long ago, we could look at one human gene over a period of three days or so. Now, we can analyze 20,000 human genes in an afternoon. So the mass of data that one can now produce in biological sciences requires that we have strong computation.

The way most universities are organized has kept the classical disciplines of science somewhat apart from each other. We want our school to lead a type of biology that is not only innovative but that also has a particular cross-disciplinary focus, so that when one hears of biological science innovatively crossing boundaries of physical science, computation, medicine and such, one might think, "That sounds like something that would happen at Chicago."

**What does it take to capitalize on that?**

It takes imagination, deep understanding of a wide range of scientific questions and investigational tools available to answer them, and top-flight facilities. It takes a strong infrastructure. Obviously it takes first-class scientists who are thinking outside of their own disciplines. It also takes the use of very simple systems such as plants and worms and flies, as well as mice, which used to be thought of as so distant from humans. In the past 50 years, perhaps the most important observation in biology is the recognition of the shared continuity of principles of life across species that are quite different. It means that what had been considered very basic biological science — work with fruit flies for example — needs to be translated for applications in the clinical departments. And clinical departments need to think about human disease in a context of what these very basic biologists are learning.

**As knowledge multiplies and people become more and more specialized, how do you build the kinds of bridges internally that would enable people with such different interests to connect?**

How one builds bridges internally is first to recruit faculty with a bias that allows these connections to happen, then to pay attention to structures that enable building such bridges. Our division has a classic departmental structure, but we also have a committee structure, so that a pathologist and a rheumatologist and a neuroscientist who study the immune system can get together as a unit even though they may be coming from different departments. So these kinds of blurrings of departmental walls by structural techniques is an important aspect of building internal bridges. Fortunately, this approach is embedded in our history.

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**How's the BSD doing financially?**

We're doing quite well. That's why we have hopes of reaching out and doing things, like getting additional space beyond the Interdivisional Research Building. This is a tribute to the faculty. The research faculty is doing well in a scientific sense in recovering costs and attracting dollars from the National Institutes of Health and like sources. The clinical faculty is doing a terrific job. They are under severe financial pressure from the national year-to-year cuts in Medicare, the malpractice insurance crisis, and on other fronts felt everywhere in this nation. Yet they seem to run harder and jump higher every year, with a continuous focus on high quality of patient care. It is the dean's responsibility to provide services, facilities and environments that our faculty richly deserve.

**The university has been known for ages as the home of the physician-scientist, yet it seems that reputation has become more and more difficult to maintain.**

It becomes more difficult but it also becomes more important. If we are going to build bridges between basic science and clinical departments, we had better have a cadre of people who understand both. They are fundamental. So this will continue to be a place that produces and treasures physician-scientists.

**How do you nurture that? How do you make it a desirable career track?**

Through exposure: When bright, scholarly people with an interest in clinical medicine are exposed to modern-day biology, they get hooked at high frequency. It's a captivating area to work in for someone interested in health care. We are fortunate in having plant biology, paleontology and the like embedded in the BSD. These systems provide additional richness to biology and directly relate to human health in ways that would not have been imagined even 15 years ago.

Departments that want to encourage physician-scientists, however, must understand that there are some modest costs to this effort. There is less efficiency of clinical service delivery on one hand, and a 12 to 15 percent gap between the costs of doing research and grant funding. But if universities ever decide to ablate this effort due to this cost-centered view, truly academic biomedical centers will disappear.

**Are you going to keep your laboratory?**

I do have a lab. I'm spending less time there than I would like. I hope once I get on this bucking horse fully, I will be able to carve out a bit of time to spend there. It's important for me. It's a release. It also enables me to sample the product that we serve in terms of research facilities.

**What do you want alumni to know about where their alma mater is now and where it is going?**

There are challenges, and there will always be challenges, but frankly the most important thing has been here all along — the right culture. This is an institution where scholarship is valued above all else, where there is a bias for cross-disciplinary interaction, and where collegiality is recognized and even cherished. Techniques improve, trends come and go, the funding environment is in constant flux, organizations evolve, passing through moments of glory and struggle, but an institution's culture is its most important asset and the most difficult thing to change. So the big thing we have, the other things we are addressing, and I think we will all be pleasantly surprised by what's to come.



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**We have a new research facility under construction, not to mention a new children's hospital, new connections with outside institutions, at least one entirely new department, and the promise of 30 new basic science faculty. The impression is that you must have driven a really hard bargain as part of your package. How did you manage that?**

Don Randel, our president, is a captivating person who has remarkable breadth. Although not trained as a biologist, he has a deep appreciation of biological questions and the contribution that answering them has on society. It was less me driving a bargain than it was a collaboration to see what was needed to further strengthen this field on our campus. Don made it very clear that all divisions must be forward-looking and moving, be uniformly strong, and utilize the natural advantages of campus size, density and mix. In the BSD, we will be implementing this vision.