

# Big Thinking At Small Universities

Numerous factors, large and small, come into play when one is deciding where to pursue a research career. Here, faculty members and deans size up their decision to work at a smaller institution and the issues that they face. **By Jacqueline Ruttimann Oberst**

Five years ago **Aaron Miller** had a big decision to make. He was flourishing as a staff scientist at the National Institute of Standards and Technology (NIST) in Boulder, Colorado, where he wrote and worked on large research grants. However, with a third kid on the way and aging parents, he felt his hometown calling. Luckily for him one of his old physics professors at Albion College, the small college where he and wife completed their undergraduate studies and near both their families, was retiring and he had the opportunity to apply. He got the job and has never been happier—proof positive that when it comes to research institutions, sometimes smaller is better.

Miller is not alone. Many professors choose to teach and perform research at “small” research universities or colleges—often at huge sacrifices such as longer hours and lower pay. But for them, it’s their dream job.

## DEFINING SMALL UNIVERSITIES: BIGGER THAN A BREADBOX?

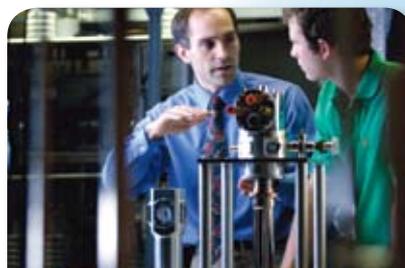
Ask most people what constitutes a small university or college and you may get as many answers as there are schools. Some choose to define these institutions by their total number of students, others by the number or existence of graduate programs.

Smaller research colleges and universities are informally characterized as those that are not “research 1” universities, nomenclature bestowed by the Carnegie Classifications of Institutions of Higher Learning in 1994 to those institutes who give high priority to research, award 50 or more doctoral degrees each year, and annually received \$40 million or more in federal support. This category was renamed in 2000 to “doctoral/research universities-extensive” to “avoid the inference that the categories signify quality differences.” The foundation changed the classification again in 2005 and plans another update later on this year, yet despite these series of changes, the defunct term still gets tossed around in academic circles.

Instead of this catch phrase, **Kevin Schug**, an assistant chemistry and biochemistry professor at the University of Texas at Arlington, likens smaller universities and colleges to “an old system in football in which you had 1A teams and several 1AA teams—they’re a little step down, but they’re not division 2 or 3.”

The majority of people, however, would likely agree that a school with an annual research and development budget around or under \$50 million is a good cut-off point. This article identified four such universities and colleges: Albion College, The University of Texas at Arlington, Binghamton University, and Harvey Mudd College to explore the differences between small and large universities.

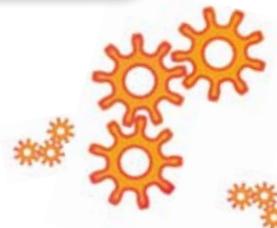
“At a smaller university, professors tend to go into niches where they’re not directly competing with big groups.”



Aaron Miller (left) with student Brian Still



Susan Conner



## THE FEW, THE PROUD: WHY THEY COME

Why do research professors opt to come to these smaller schools where funding is limited?

“It’s often because they had a great experience at small schools in undergraduate school,” offers **Susan Conner**, provost of Albion College, a small private college in Michigan solely consisting of 1,700 undergraduate students and an annual research and development (R&D) budget of \$630,000. “They had faculty with a huge passion for their research and teaching. They’re actually trying to get back to that kind of experience,” she adds. “We’re not a stepping stone to something else for them.”

This certainly was the case for **Roger Albertson**, an assistant biology professor at Albion College. **continued on p. 1380 »**

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Diversity 2 (online only)—October 1

Top Employers Survey—October 8

## FACULTY 2



"For me, it became not do I have what it takes, but what is my true passion and how can I best contribute to this world."

—Roger Albertson

"A community college teacher saw things in me that I didn't see in myself. He helped shape my character," he says. As such Albertson was looking for a way to give back. He sensed, however, that many primary investigators consider it "a step down for people who can't make it in a 'research 1' school." But after much introspection and recognizing his own aptitude for teaching and relating to the students, Albertson concluded that, "for me, it became not do I have what it takes, but what is my true passion and how can I best contribute to this world?"

Another reason, states **Pamela Jansma**, dean of the College of Science at The University of Texas at Arlington, a mid-size university comprising around 30,000 undergraduate and graduate students and an annual R&D budget of \$52 million, is that "people choose to come if they felt the environment was less stressful in terms of the pressure to raise external funding and publish."

Schug shares this same sentiment. "When successful in obtaining grants, it's easier to become a bigger fish in a smaller pond," he says. "With success comes respect a little bit earlier, especially in a school our size."

**Gerald Sonnenfeld**, vice president for research at Binghamton University, another midsized university with around 15,000 graduate and undergraduate students and an annual R&D budget of \$44.5 million, offers a quality versus quantity argument. "The quality of what we do here I would put up against any other university," he says. "It's just we don't do it in as many areas as a larger university would do."

Supporting this argument is **Wayne Jones**, an inorganic and materials chemistry professor and department chair at Binghamton University. "Larger universities are more rigid and have lots of infrastructure and lots of redundancy," he says. "This is different at smaller universities where one has to struggle to get the critical mass to do research. However, this shortage provides lots of opportunities to do interdisciplinary research, which, in my opinion, is where the most exciting science can be found."

For others, the choice is one of pride explains **Kerry Karukstis**, former president of the Council on Undergraduate Research and chemistry professor at Harvey Mudd College, a private California college with 750 undergraduates and annual R&D expenses of \$2.3 million, "For faculty at undergraduate institutions, the choice is deliberate: For us, there is no greater honor than to have the accolade 'teacher-scholar' associated with our name."

### FUNDING: ONE SIZE FITS ALL?

When it comes to research funding, institutional size does not matter, according to Conner. "Everybody's pretty much in the same pot," she says. To increase a university's funding chances from this limited supply, she adds, "You want some faculty who have

grant experience because they know how to write grants and can mentor others from their experience. Also, successfully obtaining grants creates a track record, thus enabling researchers to obtain even more grants."

Most faculty members in the sciences receive startup funds ranging from \$10,000 to \$70,000 to start up their lab. However, once settled, the faculty members must venture forth and accumulate their research nest egg. These foragings typically involve federal institutions such as the U.S. Departments of Energy and Defense, the National Institutes of Health (NIH), and the National Science Foundation (NSF).

Among the highly sought-after grants are the NIH's Academic Research Enhancement Award (AREA) and the NSF's Research Undergraduate Institute (RUI) grant. Both are extremely competitive and selective; only the top 10 to 15 percent of applications receives funding. Even more daunting: These grants, while offered solely to undergraduate institutions, do not distinguish smaller universities from larger and more research-experienced institutions.

"We're out there competing with everybody," comments **Robert Drewell**, an associate professor of biology at Harvey Mudd College.

The funding situation forces institutions to be creative and seek other sources of support from foundations like the Howard Hughes Medical Institute (HHMI) or private companies. The American Chemistry Society's Petroleum Research Fund, for example, lends a hand to many faculty researchers at Albion. Similarly, The Welch Foundation provides funding for the chemistry and physics departments at The University of Texas at Arlington. Situated near IBM's hometown, Binghamton's research allowance partially stems from the electronics companies in the area.

### MORE FOR LESS: WORKLOAD BALANCE

For most professors teaching is their full-time job—they do research solely on a part-time basis.

Although the teaching load varies from college to college, ranging from one to three classes and/or laboratories per semester, for the most part, undergraduate professors have the summer off from their teaching duties. This is the period during which the bulk of their research gets done.

Some, however, multitask during the semester.

"Since there's not much time to do research during the semester I usually bring it into the teaching labs," says Albertson. It also serves another purpose for him: to identify which undergraduate(s) would like to work in his lab and do research for academic credit.

Choosing an undergraduate student as a research assistant—as well as a research project—can be tricky, notes **Alex Weiss**, professor and associate chair of physics at The University of Texas at Arlington.

"They have a different way of working," Weiss says. "Doctoral students provide a lot of ideas, go to the literature themselves, and contribute to the direction of research—they are not just hands-on. Undergraduates and masters students are mostly doing the research under the director supervision of the professor—the amount of research done this way is limited."

As such, he adds, "at a smaller university, professors tend to go into niches where they're not directly competing with big groups. One can't jump on the bandwagon since [continued on p. 1382 »](#)

FACULTY 2



“People choose to come if they felt the environment was less stressful in terms of the pressure to raise external funding and publish.”

—Pamela Jansma

one doesn't have the resources to beat out the MITs, Caltechs, and Cornells. You have to pick your research topics carefully.”

Because teaching is given first priority in smaller research universities, some institutions struggle with encouraging professors to obtain external grants while maintaining their teaching requirements. Most universities reduce the teaching loads for those professors who bring in a significant amount of research funding by either lowering the number of classes they have to teach per semester or allowing the professor to “buy out” of their teaching requirement. In the latter option, teachers use part of their grant money as their teaching salary, thereby allowing the university to use the teaching salary it would normally pay these professors to hire class lecturers.

**SAFETY IN NUMBERS: COLLABORATIONS**

Balancing research and teaching can be tricky for university professors, regardless of whether they're from big or small universities.

Aaron Miller, an associate professor in the Department of Physics at Albion, succinctly sums up the research/teaching balance conundrum: “How do you stay up in your field when you can only put a quarter of your year into it?” he says. “That's the real challenge.”

Typically, Miller says, professors perform side projects that are less relevant to the scientific community and maintain collaborations with larger universities and corporations for more high-profile research. Miller, for instance, does contractual work at larger institutions such as Northwestern University, University of Virginia, and NIST-Boulder (the latter at half the salary he used to get when he worked there full-time).

The tools needed for research can also be lacking in smaller research universities, thus further encouraging collaborations. Albertson conducts a portion of his summer research with his collaborators at the University of California Santa Cruz so that he can use their confocal microscope—an expensive piece of equipment that his school does not have. Similarly, while Schug has mass spectrometry instrumentation in his laboratory, the University currently lacks a core mass spectrometry facility. Core facilities are key infrastructure components, and when they are missing, forward progress in some research areas can be impeded.

“Collaborations are a way for people at smaller places to get around the scale problem,” says Weiss.

Despite working fewer hours on their research and with fewer people—typically a handful of undergraduates and graduate students—most of the professors felt that their publication rate would not vary whether they were in a larger versus smaller university.

Some, however, felt that in the publish or perish environment of research, there is safety in numbers.

**FEATURED PARTICIPANTS**

**Albion College**  
www.albion.edu

**American Chemical Society**  
www.acs.org

**Binghamton University**  
www.binghamton.edu

**Council on Undergraduate Research**  
www.cur.org

**Harvey Mudd College**  
www.hmc.edu

**Howard Hughes Medical Institute**  
www.hhmi.org

**National Institutes of Health: Academic Research Enhancement Award Grant**  
www.grants.nih.gov/grants/funding/area.htm

**National Institute of Standards and Technology**  
www.nist.gov

**National Science Foundation**  
www.nsf.gov

**Northwestern University**  
www.northwestern.edu

**The Carnegie Classification of Institutions of Higher Education**  
classifications.carnegiefoundation.org

**The Welch Foundation**  
www.welch1.org

**U.S. Department of Energy and Defense**  
www.energy.gov

**University of Texas at Arlington**  
www.uta.edu

**University of Virginia**  
www.virginia.edu

“Without continued collaborations, I would not get many publications at all,” says Miller.

Still many point out that despite the slower pace and limited supplies and time, the quality of the research is the same regardless of the quantity of papers produced.

Yet, Karukstis points out, “Our work is published in the same peer-reviewed journals.”

**CONCLUSION: GOOD THINGS COME IN SMALL PACKAGES**

“There are pluses and minuses to working in a small institution,” says Weiss.

Some, like Jones, feel that it is a call of duty, “Right now the United States struggles getting more students interested in pursuing careers in science,” he says. “The key going forward is to find ways to get more students excited and interested in science and engaged in the process of discovery. It will take all types, sizes, and shapes of universities to sustain our technology work force and solve the next generation of problems.”

Certain intangibles need also to be considered.

“The quality of life issue was a major decision for us,” says Miller. “That's hard to weigh but it's significant. We were looking for a way to get back to a small environment where we can be highly involved in our kids' educations, but can still be involved in doing some world-class research.”

For Miller, and many other faculty members, their decision to pursue a career at a smaller research university was an easy one.

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