

# Meet the local heroes

You do not have to be a top 10 academic or research institution to have a high-class tech-transfer programme, as three very different US universities show

By **Victoria Slind-Flor**

Diane McLean has bragging rights for a machine that removes fish bones; Mike Alder is singing the praises of a new sparkling yoghurt dairy product; and one of Jacob Maczuga's hot technologies is a process for peeling shrimp.

Each of them heads up a technology transfer office at an American university. McLean runs the programme for the University of Alaska system from her office in Fairbanks and Alder is at Brigham Young University (BYU) in Provo, Utah, along the Wasatch Front mountain range. For his part, Maczuga spent a number of harrowing months operating out of a Starbucks coffee shop in a Dallas suburb last year, but is now back home on New Orleans' Canal Street, leading the recovery of Tulane University's tech-transfer programme from the ravages of Hurricane Katrina.

Technology transfer offices became a standard feature of academic life following the 1980 passage of the Bayh-Dole Act, which gave universities control of inventions created through government-funded research. Most frequently, the biggest state universities, the Ivy League schools and the technology institutes such as Caltech and MIT make the headlines for the technologies they develop and the increasingly large revenues they generate.

The University of Alaska, BYU and Tulane do not fall into those categories. But all three have confronted special challenges that have made them – and their offices – local heroes of a certain kind. Their tech-transfer offices may not be in the top 10 of the Association of University Technology

Managers' annual technology licensing survey, but each is making significant contributions to the university, as well as the local community and its economy.

## Way up north something is stirring

McLean is the tech-transfer officer for the entire University of Alaska system. The university, which was founded in 1917, now covers the entire 586,412 square mile state, with three university campuses in Anchorage, Fairbanks and Juneau, and 12 community colleges. Some of the community colleges are in remote areas, such as the tail end of the Aleutian Islands out in the Bering Sea. One campus is in Kotzebue, an Inupiat Eskimo settlement surrounded by 11 far-flung Eskimo villages to which post-secondary educational services must also be provided.

Since its inception, the University of Alaska has been the beneficiary of many federal programmes. It is a land-grant, sea-grant and space-grant institution, which means it benefits from special federal funding intended to develop technological competencies in such areas as agriculture, conservation of natural resources, aerospace and aeronautics. About 35,000 of the state's 650,000 residents are enrolled in the University of Alaska system.

In Alaska, many of the university's courses have unusual dimensions because of the climate and the far-flung wildernesses within the nation's largest state. And one of its special missions is to offer high-quality educational courses so the state's top-tier high school graduates will not leave to attend other universities "outside" in "the lower 48", as Alaskans term the rest of the country.

McLean – who says she is “just a bureaucrat and administrator” – has lived in Alaska since 1974 and began her career with the university system in 1980. In 1984 she started working for the university’s vice chancellor for research. Although Juneau is the state capital and Anchorage is Alaska’s largest city, it makes sense for her office to be at the Fairbanks campus, which is the only PhD-granting institution in the state. “It started out as a school of agriculture and mines in the early 1900s and grew into a full-fledged academic research university,” she says.

#### Range of technologies

That fish-boning machine of which McLean is so proud was developed for the university’s Fisheries Industrial Technology Center, located in Kodiak. Alaska’s offshore fisheries bring in about 75% of the wild fish caught for human consumption in the US and generate US\$3 billion every year. But despite the many health advantages fish consumption provides, many people will not eat fish because they dislike the tiny pin bones that often lurk even in the finest fish fillet. But processors who use the university-developed PinBone Wizard can simply draw a fillet across the top of the machine and clear the bones without damaging the delicate tissue.

McLean says this machine helps smaller fishers bring their catch directly to market without having to turn it over to a large processor. The technology was developed by the machine shop at the university’s Geophysical Institute. McLean is presently working to develop a start-up around the machine. Other university-developed technologies include an acoustical device used to diagnose rot inside standing timber or utility poles; an organic polymer that can limit freezer burn on long-stored frozen food; and a road-surfacing material that uses vegetable oil to give greater resistance to degradation caused by cold temperatures.

University of Alaska innovations also include mapping software that can help track climate change, a technology that can monitor geophysical changes and underground nuclear tests by picking up extremely low-frequency sound; and a software that removes noises from electronic signals. The US Department of Defence has funded research at the university for the development of a system that will track a patient’s vital signs from the moment of trauma all the way to the final medical destination. This system, McLean says, can be transmitted through any available media and was developed through the university’s department of journalism.

#### More to come

Ahead, she expects the Geophysical Institute to bring in many new inventions. Dr Buck Sharpton, the university’s new vice chancellor for research, holds a joint appointment with the institute and is leading its participation in the International Polar Year of 2007-2008. This project will bring an intense scientific scrutiny to polar regions, with an eye to such important issues as global warming. “The Geophysical Institute covers everything from the centre of the earth to the centre of the sun,” says McLean. “That’s pretty much what the University of Alaska does, too.”

According to the US Patent Office database, the university presently has 18 issued patents and one published application. McLean, who says there are several more pending applications, sometimes files a provisional application herself. But for the most part, she depends heavily on two non-Alaska intellectual-property specialty firms, Needle & Rosenberg of Atlanta and Seattle’s Christensen O’Connor Johnson Kindness.

“We have a couple of small licences out right now,” McLean says, but they are not royalty-bearing. “They’re simply out there to support nascent industry.” But she expects a lot more licensing activity in the near future. The tech-transfer office at the university is still young and McLean acknowledges that a big part of her job is selling the faculty on the merits of working with her. She knows people tend to underestimate her university and its technology just because Alaska is so far from the rest of the country. “We’re not all things to all people, but we have a lot of breadth and a lot of depth,” she says. “I don’t think the people ‘outside’ realise what a jewel we have here.”

#### The sweet taste of success

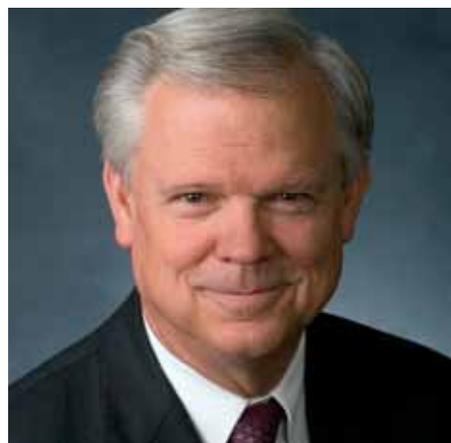
Down in the lower 48, Mike Alder directs technology-transfer operations at a sectarian school owned and operated by The Church of Jesus Christ of the Latter Day Saints (LDS), commonly known as the Mormons. The school was named for one of the historic LDS leaders, Brigham Young, and most of its 28,000 students and many of its faculty and staff – including Alder – are LDS members.

The church affiliation is not incidental to the tech-transfer office’s operations. The stated mission of BYU is “to assist individuals in their quest for perfection and eternal life” and, according to the university’s mission statement, “BYU’s



*Diane McLean*  
University of Alaska

*We have a lot of breadth and a lot of depth*



*Mike Alder*  
Brigham Young University

*Students who want to come here are the cream of the crop*

## The tale of the tape

Name of institution: **University of Alaska**  
 Established: **1917**  
 Type of institution: **State-run land-grant university**  
 Enrolment: **35,000 students**  
 Tech-transfer office: **Office of Technology Transfer**  
 Director: **Diane McLean**  
 Title: **Director of Intellectual Property and Licensing for the University of Alaska**  
 Issued US patents: **18\***  
 Published US patent applications: **1\***

Name of institution: **Brigham Young University**  
 Established: **1875**  
 Type of institution: **Church-owned private university**  
 Enrolment: **28,000 students**  
 Tech-transfer office: **BYU Technology Transfer Office**  
 Director: **Mike Alder**  
 Title: **Director**  
 Issued US patents: **122\***  
 Published US patent applications: **18\***

Name of institution: **Tulane University**  
 Established: **1834**  
 Type of institution: **Private university**  
 Enrolment: **20,600**  
 Tech-transfer office: **Office of Technology Transfer and Business Development**  
 Director: **Jacob Maczuga**  
 Title: **Associate Vice President, Technology Transfer and Business Development**  
 Issued US patents: **114\***  
 Published US patent applications: **5\***

\* The numbers of issued US patents and published applications are from the USPTO database accessed 15th November 2006

faculty, staff, students, and administrators should be anxious to make their service and scholarship available to The Church of Jesus Christ of Latter-day Saints in furthering its work worldwide." In 1875, when Brigham Young founded the academy that eventually became the university, he said it was to "avoid the pernicious atheistic influences that are found in so many of the higher schools of the country".

The LDS church opposes abortion in all but exceptional circumstances and has a very stringent code of behaviour for members that includes a ban on all tobacco, alcohol and caffeine, and it recommends only the "sparing" consumption of meat. So there are naturally some areas of research that BYU avoids, such as those involving human embryonic stem cells.

Mormons' dietary habits and strong family orientation may account for the interest in the BYU-developed sparkling yoghurt. Utah, which has the nation's largest per-capita family size, leads in the consumption of ice cream, and Jello is the state's official snack. The sparkling yoghurt, which came from the university's food-sciences department, will definitely be another child-oriented food product.

"Most adults, when they hear about it, say it sounds awful," says Alder. "But young adults and kids are excited. This could become something important." He won't name the licensees, but predicts that in a year, sparkling yoghurt will be "on every shelf in every store in the country".

Although BYU does grant PhDs in a number of areas, these programmes are not the school's priority, says Alder. "The emphasis is on high-class undergraduate education," he explains. The church, which claims a worldwide membership of 12.5 million, he says "is large enough that the [Mormon] students who want to come here are the cream of the crop". Most faculty members spend most of their time teaching undergraduates rather than conducting research.

### Spin-out state

So how is it that Alder has been able to oversee seven start-ups spun off from university technology since he arrived on 1st June 2006? And why are there now 57 BYU spin-offs operating in Utah? One reason is the LDS connection, says Alder. "One of the benefits of being a church-owned school is that we have alumni who are very interested in doing something with the tech-transfer office from time to time." And many of them stay close to home – and the church's Salt

Lake City headquarters – after graduation.

A list of companies to which BYU technology is licensed does indeed contain a lot of local Utah names: Sonic Innovations Inc of Salt Lake City; Environmental Modeling Systems Inc of South Jordan, Utah; Moxtek Inc of Orem, Utah (acquired by Japan's Polatechno Co); Thrombodyne Inc of Salt Lake City; MegaStir Technologies of Bountiful, Utah; Procerus Technologies of Vineyard, Utah; Palmar Technologies of Provo, Utah; and IsoTruss Structures Inc of Brigham City, Utah.

Many of the technologies are surprisingly sophisticated, coming from a school with such a strong undergraduate emphasis. Johnson & Johnson is the licensee for a BYU-developed drug used to treat hairy cell leukaemia, a rare cancer. That drug has gone off patent for cancer treatment, but Alder says BYU researchers are looking at other possible indications, including multiple sclerosis.

A new Provo-based start-up known as Cosmas has taken a licence for a method of producing high-quality nanoparticles. This technology, says Alder, has the potential "to become the general store for the nano industry, making uniform pure nanoparticles that are much less expensive to manufacture". A BYU-developed small-molecule antibiotic that looks like it could have the potential to kill the virus causing AIDS has been licensed to Ceragenix Pharmaceuticals Inc of Denver, Colorado.

Alder says BYU has many remarkable new technologies he is in the process of licensing. One is a bio-detector that can rapidly detect hazardous materials, pollutants and chemicals. Another allows for perfect balancing of the acoustics in a home or car.

### High ranking

Alder came to BYU from Redmont Venture Partners LP, of Birmingham, Alabama and replaced Dr Lynn Astle, now retired, who headed the tech-transfer office for the previous 14 years. It was during Astle's tenure that BYU received a high ranking in the Milken Institute's University Technology Transfer and Commercialisation Index. The study, which was released in mid-2006, gives BYU 7th place, behind only MIT, Caltech, Stanford and the universities of California, Florida and Minnesota. The high ranking came from its number of start-ups per million dollars of research expenditures and its relatively high licensing income per patent issued. The university beat out all others in the US for number of start-ups per

million and came in 10th place with its licensing income of US\$694,417 per patent issued between 2000 and 2004.

Additionally, BYU topped all universities surveyed in the number of invention disclosures per million dollars of research expenditures, with 5.63 per US\$1 million.

According to the US Patent and Trademark Office database, BYU has 122 issued patents and 18 published applications. Alder says the office received 62 invention disclosures last year and, by October 2006, had received 40 more. The fact that inventors receive 45% of whatever the tech-transfer office brings in from licensing activities has inspired many more BYU scientists to connect with it. If they choose to turn that 45% back into their research, they can have it matched dollar for dollar by the university. Just over a third make that choice.

Alder does not file on every invention disclosure, but does say yes to a significant number. "I report to the assistant vice provost for research. He told me that the income from the licensees is nice, but the key element here is to serve the faculty. We want to make sure they feel like we are working for them," he says. He sends much of his IP work to local firms headquartered in Salt Lake City, mainly Thorpe, North & Western; Madson & Austin; and Kirton & McConkie. He also turns to the Salt Lake City offices of Phoenix's Snell & Wilmer and Stoel Reeves of Portland, Oregon.

However, in a current high-profile dispute with Pfizer Inc, the university has turned to an out-of-state BYU alumnus, Leo Beus of Phoenix firm, Beus Gilbert. This case, filed in federal court in Salt Lake City, is a contract dispute over a research agreement connected with the Cox-2 enzyme, which the university claims was discovered by biochemistry professor Daniel Simmons. According to court papers, BYU is alleging that Monsanto – now merged into Pfizer – wrongly advised Simmons he should not attempt to patent his discovery. This litigation is only in preliminary stages.

Alder says BYU recently settled an undisclosed dispute with a group that was infringing some of the university's software. But for the most part, BYU is slow to head for the courthouse. "The church is not looking to litigate. It's the last thing they want to do. But if somebody is being dishonest or abusive, then we stand up for what is right," he explains.

#### Beating back the flood

Tulane is not looking to get involved in a lot

of litigation either, says Jacob Maczuga of the university's Office of Technology Transfer and Business Development. For the last year, survival has been the name of the game for this New Orleans university hard-hit by Hurricane Katrina and the subsequent flood that inundated much of the city.

One of Maczuga's licensing officers was a casualty of the storm. His house was near one of the levee breaks and was covered with 12 feet of water. He decamped New Orleans for dryer land and now Maczuga is looking for a replacement.

Tulane's Associate Vice President, Technology Transfer and Business Development, as Maczuga is officially titled, ended up in Dallas, running the licensing programme from a table in a Starbucks coffee shop with a cell phone and a laptop computer. He did not lose his home, but the university closed down for the entire autumn semester and researchers were scattered in all directions. The lower floors of the Tulane Hospital and Medical school were awash, and the entire School of Medicine had to relocate to Baylor College of Medicine in Texas through to July 2006. Even the mail was not delivered in the city of New Orleans for months.

One of Maczuga's biggest problems initially was paying the IP lawyers who were prosecuting Tulane patents. Many of the licensees pay royalties on a quarterly basis and all their cheques that would have helped pay legal fees essentially turned into masses of soggy paper at the university mail room. When the university did reopen, Tulane President Scott Cowen had to make many difficult and often unpalatable choices for its long-term survival. More than 2,500 employees were laid off and the school once known as the Harvard of the South eliminated 27 of its 45 doctoral programmes, as well as most of its engineering programmes. The school also closed down the all-woman Sophie Newcomb Memorial College.

#### Peptide patents

For many years, Dr Andrew V Schally was Tulane's scientific marquee name. Winner of the 1977 Nobel Prize for medicine, Schally's discoveries related to the brain's production of the peptide hormones. He is the named inventor on 23 US patents, all assigned to Tulane. According to the Biosciences Workgroup Report of the Bring New Orleans Back Commission, one of Schally's peptide-related inventions has brought in licensing revenues of US\$52 million, while another generated US\$6.4 million.



Jacob Maczuga  
Tulane University

*When you get a patent for somebody you raise their expectations*

While Tulane has many peptide-related patents, others cover a wide range of technologies including biomedical research tools, vaccines, industrial processes, chemical compounds and nanotechnology. Tulane has also patented shrimp-peeling technology. "It is not necessarily representative of our capabilities but regionally relevant," Maczuga says. Louisiana is the US's leading shrimp-providing state.

Surprisingly, for a university located in the heart of the United States' oil patch, there's virtually no activity relating to the petroleum industry. Maczuga blames that on Tulane University Law School's excellent clinical programme in environmental law. "They go after the petroleum industry quite aggressively and win. This sours relationships we might form with the oil and chemical industries locally."

Tulane hands a generous portion of its technology-licensing revenues back to the inventors. The office takes 15% off the top, and of what's left, 50% goes to the inventor, 15% to the inventor's lab and 35% to the school. Licensing revenue for 2005 was US\$8 million and in the 2004 survey conducted by the Association of University Technology Managers, Tulane ranked 28th in gross licensing income.

#### Tight rein

But lest the office's resources be squandered by too many would-be academic entrepreneurs, Maczuga keeps a tight rein on the number of patent applications that can be filed. "We work closely with the faculty to explain why sometimes we don't want to patent, that there might not be a significant market opportunity or the invention might not be novel. When you get a patent for somebody you raise their [sometimes unrealistic] expectations that they will have a house in the mountains, a house at the beach and a brace of Porsches."

In 2005, the office filed 18 applications on 39 invention disclosures. "The applications are filed when there is a specific business opportunity that can be brought to bear, not to make old Dr So and So happy by letting him get a patent so he can hang it on his wall," Maczuga says. In spite of this hard-nosed attitude, Maczuga says his office has a mainly good relationship with the faculty. "I've worked in universities where, if you asked the faculty members about the tech-transfer office, you'd get 30 minutes of expletives. I don't think you'll find that here." And that Milken Institute study tends to

support Maczuga's wariness of patent filing. The school was ranked eighth in licensing income per patent issued, with a rate of \$1,058,474 per patent.

Most of Tulane's patent work goes out of state, mainly because so much of the technology relates to medical devices or pharmaceutical products and requires special expertise. Some of the firms that get Tulane's IP work include Finnegan, Henderson, Farabow, Garrett & Dunner, Jones Day, Howrey and Boston's Clark & Elbing. To date, Tulane's technology programme has been relatively litigation-free. Maczuga says there was one dispute in 2000-2001, but under settlement terms, he cannot even name the other party. He takes the preventive approach. "We do a lot of work determining freedom to operate."

Ahead he sees many challenges relating to New Orleans' post-Katrina recovery. "We have a tremendous brain drain because we educate students and they realise there are no opportunities here in Louisiana. So they leave. It's increasingly important for us to create opportunities for them," Maczuga says. Housing and education in New Orleans remain a big problem, but "we will continue to work as a university," he says. The medical school has come back from Texas, the clinics are starting to open again. "The people we've trained have the entrepreneurial zeal to turn this around. You can say *'oy ves mir'* or you can make something happen. The people here at Tulane are resilient enough to make something happen." ■

[Vsind-flor@iam-magazine.com](mailto:Vsind-flor@iam-magazine.com)