Going Global
In health, fundraising and technology, the University of Washington knows no limit

By John Draper

DANIEL Enquobahrie wanted to make a difference. Yet, having grown up in Ethiopia, where he later attended medical school in his country’s capital, Addis Ababa, he knew that combating even common infectious diseases such as tuberculosis and malaria was problematic.

“There was a lack of medications,” Enquobahrie says. “There were diseases related to the unavailability of clean water. Diseases related to malnutrition, inappropriate pregnancy care. All of these were compounded by the fact that resources were inadequate, as Ethiopia was a developing country.”

Despite the less-than-ideal conditions for a health professional, Enquobahrie was happy with his rural practice. In fact, he’d probably still be there today if his girlfriend (and now wife) hadn’t moved across the world to Seattle, where his life, too, would take a fortuitous turn at the University of Washington (UW).

The university since the mid-1960s has been a powerhouse in medical research, a nucleus for satellite research organizations and spin-off companies. It has developed into a major technology hub, where, in its Turing Center, engineering professor Oren Etzioni is trying to teach machines to translate languages. Its oceanography department is embarking on a multimillion-dollar underwater project, headed by professor John Delaney, that will allow scientists to monitor seismic and volcanic activity on the floor of the Pacific Ocean. And the university happens to be one of the most successful among public and private institutions at fundraising and endowment procurement. If it was resources Enquobahrie wanted, the university had plenty.

Enquobahrie graduated with a master’s degree in public health this year and is currently pursuing his doctorate in epidemiology. His timing was ideal, as the university last year announced it was creating a Department of Global Health, a joint venture of the university’s schools of medicine and public health and community medicine. The department will be the first in the nation. It will concentrate on building interprofessional educational programs, collaborative research, professional service in public health policy and practice, and medical care to establish sustainable improvements in global health.

The department will further identify and evaluate health problems and health inequities in underserved populations and will develop and implement innovative interventions that may reduce the proliferation of disease. There will be a research arm of the department that will...
work on infectious diseases, injury control, nutrition, the delivery of health care systems, and reproductive, maternal and child health. It will also build on existing research programs such as the origin and prevention of malaria, tuberculosis and hepatitis C.

ORGANIC GROWTH

The department was seeded by a $30 million grant from the Bill and Melinda Gates Foundation. UW officials estimate that the department could attract as much as $100 million in grants and contracts once it is fully operational.

The new department represents a consolidation of numerous, organically developed global health initiatives that have sprung up in and around the university. Many of them will likely operate under the global health department, which, while getting approval from the school’s board of regents, is still under construction and is looking for a chairman.

“Seattle has become a worldwide center of global health somewhat quietly,” says UW Medical School Dean Paul G. Ramsey. “Many of our faculty and students have research teaching and service-health-related programs in Africa, South America, Asia and other areas around the world. Fogarty International AIDS Research and Training program has been operating here since the early ’80s.”

One of the pre-existing programs slated to be brought into the new department is the Multidisciplinary International Research Training [MIRT] program, which Enquobahrie took part in. MIRT sends students around the world to perform health-related, population-based research and training in developing countries. Last year, Enquobahrie spent a month in Tbilisi in the Republic of Georgia, where he conducted research on emergency cardiology patients to evaluate factors associated with risk and severity of coronary heart disease.

For years, UW has brought students such as Enquobahrie to the forefront of global health through international partnerships. But the creation of the department has helped integrate efforts “in a truly interdisciplinary fashion,” says Daren Wade, who operates the Global Health Resource Center, one of the pre-existing programs that fall under the new department.

ENCOURAGING INVOLVEMENT

The new department may also encourage student involvement. Take, for example, UW student Molly Robertson, who is pursuing a master’s degree in public health.

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Wordplay

University of Washington professor embarks on daunting language translation challenge

WHY Oren Etzioni is a professor at the University of Washington (UW) is not the biting question. Most universities would be proud to have him on their roster, seeing as he is continually pushing the boundaries of computer science.

The real question is, why is he not out becoming the next Bill Gates?

Even while remaining a college professor, he’s amassed a pretty impressive entrepreneur’s résumé. He is the founder of three companies he created while a professor at the UW’s Department of Computer Science and Engineering, including Farecast Inc. — a company that utilizes data-mining techniques to predict prices in the travel industry. Etzioni is also a venture partner for the Madrona Venture Group. His other startups are Netbot Inc., which was acquired by Excite Inc. in 1997, and ClearForest Corp. At Netbot, Etzioni helped conceive and design the Internet’s first major comparison-shopping agent. ClearForest is an international leader in text mining. Years ago, he left the university briefly to become the chief technology officer for Go2Net Inc.

Not bad for a guy who didn’t touch his first computer, a Radio Shack TRS 80, until age 14 — and then only out of boredom. “I had just moved from Israel to New York with my dad. I was in culture shock. For a mathematically inclined nerd such as myself, it was the perfect diversion to play with the computer,” he says.

But he makes a point of making sure his duties with these startups only take a modicum of his time. For most of his workday, he’s dutifully working to make the UW even more well known as an international leader in computer science.

“If my goal was to maximize compensation, I would definitely be in the private sector. But having spent a year as the CTO of a public company and having worked with startups, I know that, while it’s exciting and dynamic, there’s no substitute for me for the intellectual stimulation of research and teaching,” he says.

His research is just part of the university’s computer science and engineering department, an institution ranked among the top 10 in the country and on the cutting edge of many disciplines. There are those working on micro- and nanoscale electronic devices that will provide a variety of services to builders of the next generation of electronic devices. Others are designing computer chips based on light waves (photonic), rather than silicon and wires, that will greatly improve the speed of computing and communications devices.

ENTER THE TURING CENTER

Etzioni’s current research project is under the auspices of the Turing Center, a
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multidisciplinary research facility at the UW that investigates problems surrounding natural language processing, machine learning, Internet search and the “semantic web,” which scientists say is an effort to make the meaning of content on the Internet readable by computers.

The center was established in 2005 with a multimillion-dollar gift from Seattle entrepreneur Jonathan Pool.

Says Pool of the creation of the Turing Center, “Ever since the third grade I’ve been puzzled by the way people deal with the Tower-of-Babel problem: the fact that the world is awash in diverse languages, and yet it’s becoming a global community where most people want to communicate and collaborate. So, do we just choose a world language — an existing one or an invented one — and let the others die out? Try to make most people bilingual?”

To tackle this problem, Etzioni is working on software that will take any written electronic language and automatically translate it into any other language. He calls the project “panlingual translation,” the complexity of which is daunting. Linguists tell us there are

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6,000 languages spoken around the globe; that makes for 36 million separate language-translation pairs (e.g., English to Japanese, Russian to Mandarin Chinese, Swahili to Spanish, etc.). “We want to enable anyone in the world to electronically communicate with anyone else in the world,” Etzioni says.

MACHINE READING

“There’s a long history of ‘automatic translation’ or ‘machine translation,’ dating back to the Cold War effort in the ’50s. There’s the famous story of the government spending a lot of money for an effort to automatically translate English into Russian and back. They sent the message ‘This spirit is willing but the flesh is weak.’ It came back, ‘The vodka’s good but the meat’s rotten,’” he says.

Etzioni explains that these days the U.S. government is concentrating on the one-dimensional task of Chinese and Arabic translations. For Etzioni, translating all languages means having to make the software easier to use. To facilitate that, he and his peers have come up with the concept of controlled languages. In this method, one inputs a set of assumptions about syntax and semantics into the software before the translation starts.

“There’s a lot of ambiguity in language. We don’t hear the ambiguity because our minds are so facile and [are] automatically interpreting what is said based on word choice, tone, context, nonverbals, our history with the speaker, etc. The classical example is ‘Time flies like an arrow.’ There are many, many interpretations a computer can find for that sentence. But if you can go in beforehand and tell the system, ‘This word has this meaning,’ then your translation problem becomes more manageable.” This controlled language is what The Boeing Co. uses in its technical manuals, Etzioni says.

The project has just started. There’s still much to do. But one doesn’t need to be Etzioni to see the enormous business applications of panlingual translation. Commerce is about communication between seller and buyer, for instance. And commerce today is global.

Etzioni comments, “Let’s put it this way – we have the largest imaginable market for this technology: everybody in the world. If we can succeed in even a modest way, the potential for commercialization and value creation is enormous.”

— John Draper
Under Achiever
Professor dedicates life to below-the-sea research

JOHN Delaney can’t get much lower in his career. When he started, at the University of Virginia, he taught geology and consulted with mining companies, working with geology on land. Then he got to the University of Arizona to start his Ph.D. program in economic geology. That led him to a camping trip inside some volcanoes during a six-month expedition to the Galápagos Islands.

He was hooked. Delaney wrote a thesis that examined how the volatile gases in sea-floor basalt – a volcanic rock – behave when bottled up by the sea’s crushing pressure. Not long after joining the faculty at the University of Washington (UW), he went down in ALVIN, the deep submergence vehicle, and saw submarine volcanoes for the first time. He found beer-bottle-brown glass that had been formed from undersea eruptions. He saw fantastic animals living near the scorching heat of undersea hot springs.

“I knew I wanted to devote my life to studying underwater volcanoes,” says Delaney, now a professor of oceanography at the UW.

His work began revolving more and more around the Juan de Fuca plate, a relatively small and accessible chunk of the planet’s crust rife with regular temblors, active volcanoes and thriving communities of tube worms and microbes.

Now Delaney is backing an ambitious plan to place a cable on the Juan de Fuca plate off the coast of Washington, Oregon and British Columbia. The cable will carry power and data to and from instruments connected to it. Scientists on shore will use the cable and the Internet to direct instruments and robots remotely.

The project, dubbed NEPTUNE – for Northeast Pacific Time-Series Undersea Networked Experiments – would revolutionize the way scientists monitor the ocean, the seafloor and even the sub-seafloor.

A DRAMATIC UNDERTAKING
NEPTUNE, led by the UW, will compete for $150 million to build the infrastructure. This funding is part of the National Science Foundation’s Ocean Observatories Initiative.

Although Delaney is not a stranger to Herculean projects (he once led an expedition to haul massive “black smoker” chimneys off the seafloor), this is of another magnitude altogether. Some features of the project include:

• 1,600 miles of cable
• takes place 3,000 meters undersea
• equipment laid in place by ships on the surface and robots under the waves

There will be tens of thousands of sensors, instruments and robots working on NEPTUNE. Seismometers will measure seafloor seismic activity; cameras will capture images of erupting underwater volcanoes; moorings loaded with sensors will describe the characteristics of ocean currents; flow meters will observe the superheated fluids coming out of a hydrothermal vent; and sensors will measure the pressure of fluids circulating through the rocks beneath the seafloor.

NEPTUNE is the largest oceanographic project the UW has ever been associated with, one worth the effort, Delaney says.

The network, he says, could be used to study the ocean’s ability to absorb greenhouse gases and
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seafloor stresses that lead to earthquakes and tsunamis. It would be possible to monitor U.S. and Canadian fish stocks, as well as ocean conditions, which may improve weather forecasting. Volcano-loving microorganisms living at the seafloor under intense temperature and pressure could be the source of new medicines and help us learn about life on this planet and elsewhere.

**THE SKY’S THE LIMIT**

As important as the oceans are, the tools scientists have at hand for understanding them are inadequate to the task. Ships, for example, can only be in one place at one time, satellites can’t detect things deep in the ocean and instruments operating remotely on moorings are useful only as long as their batteries keep working.

President Bush has included $150 million for a regional observatory like NEPTUNE in his proposed budget, which now must be approved by Congress. The $150 million would be spread over six years, starting in 2007. The money is part of the proposed funding of $310 million for the National Science Foundation’s Ocean Observatories Initiative and comes from funds specifically designated for the creation of powerful new research tools and infrastructure.

The UW will compete to become the “implementing organization” for NEPTUNE.

“The University of Washington’s leadership role in NEPTUNE and the observatory’s proximity to the Puget Sound region signal an opportunity for Seattle to emerge in the coming decade as a global hub for real-time earth and ocean science,” says Delaney.

Scientists in Canada have already received funding for their portion of the cable. “They go into the water late next year,” he says.

**TECHNOLOGY AVAILABLE**

The cable site is close to the two nations that are the primary investors in NEPTUNE. The United States and Canada each possess the technological infrastructures and port facilities required to build, operate and maintain an ocean observatory of this size.

One thing that makes NEPTUNE stand out from current methods of studying the ocean is that it will supply information 24 hours a day, 365 days a year.

“There are many episodic events – eruptions of underwater volcanoes, earthquakes, massive storms, tsunamis – that cause major changes in the ocean and seafloor environments. We cannot predict when these events will occur, and we do not now have the capability of capturing data related to these events,” Delaney says.

Robotic underwater vehicles plugged into NEPTUNE will be programmed to either respond automatically to investigate episodic events or will be commanded from shore to do so. Data will be transmitted in real-time or near real-time to scientists and laboratories on land for analysis.

Delaney says, “NEPTUNE is at the forefront of a transformation in the sciences that is opening a new era of discovery. Extensive and intelligent networks of sensors established within remote and hostile environments, whether a submarine geological fault system on Earth or a robotic colony on Mars, are enabling entirely new approaches to scientific exploration and discovery.”

—John Draper

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Intricate Wealth

The University’s multifaceted endowment is its sparkling jewel

ISN’T a 20 percent return on investment something that happened back in the dot-com days, never to be seen or heard from again? Who in the world wouldn’t, say, eat a handful of earthworms for that?

Of course, it might help the little wigglers go down if you are managing $1.7 billion in endowment funds. And it helps, too, if you are the University of Washington (UW), with steady sources of income and professional fund managers who know their way around a spreadsheet.

The managers are, after all, just doing their job. Which is to make the UW’s endowment make money. But they are also doing a heck of a job at it. A 20 percent return (which is, technically, the endowment’s increase in market value plus dividends less manager fees) would delight most average Joe and Jane investors. The entire Dow Jones Industrial Average during the past year, ending March 31, saw only a 6.8 percent increase in value (and that was before its hemorrhaging in the spring of ’06). The NASDAQ Composite Index gained 17.8 percent; the Standard & Poors 500 earned 10.4 percent.

An “endowment” is defined simply as a “gift of money or property to a specified institution for a specified purpose.” The rub is in the details. Endowments are direct or indirect, large or small, immediate or pledged. Put thousands of them together over time, and the job of keeping track of their growth (or decline) gets huge.

The UW’s endowment funds are used university-wide. In fiscal 2005, for instance, endowment distributions were as follows: faculty support, 48 percent; student support, 31 percent; program support, 13 percent; and unrestricted, 8 percent.

THE PERPETUAL FUND

Known in financial circles as a “perpetual fund,” an endowment can be compared to a mutual fund. The UW’s Consolidated Endowment Fund (CEF), which holds the bulk of the school’s endowment funds, is a commingled fund of individual endowments, generally arriving at the UW as gifts from individuals, foundations or corporations. Each individual endowment maintains its own identity and owns units in the fund. Although the CEF is still many times smaller than many mutual funds, $1.7 billion is still $1.7 billion.

It is managed by about seven people, led by chief investment officer Keith Ferguson, who joined the group in January 2005. Those officers are largely involved in strategy development, portfolio research and analysis, supported by a back-room staff and Ph.D.s in statistics, as well as by general advice from industry leaders/alumni who sit on the Board of Regents. The actual buying and selling of securities is done by outside managers.

Despite their ivory tower image, the half-dozen-plus endowment folks at the UW are not at all unique in the bigger picture. A comparison to other major public and private universities shows that UW, in fact, lacked the increase in market value of endowment assets achieved by a number of other U.S. schools.

Based on a slightly different fiscal year (ending June 30), monster endowments at private Ivy League Schools such as Harvard, Yale and Stanford, which have been in place for many more years than the UW’s fund, are as much as 17 times larger than the CEF and achieved returns of 15 percent to 23 percent, with Stanford taking top honors, according to an annual study by the National Association of College and University Business Officers (NACUBO).

But the UW’s 13.2 percent gain (based on a fiscal year ending June 30) is no paltry performance compared to the national college and university average one-year return rate of 9.3 percent, figured for all 746 U.S. and Canadian schools that participated. And, among the top schools in the Pacific Northwest, “U Dub” was topped only by Seattle Pacific University, at 28.4 percent, and Centralia College, with 16.8 percent.

SPU’s enormous growth during that year “was the result of both strong investment returns and endowment fundraising success,” explains Gordon Nygard, vice president and treasurer of the SPU Foundation.

Among public universities across the country, the UW’s endowment assets stood 10th at the end of 2004, a separate NACUBO study shows.

“We have taken cash, realized and unrealized gains and losses. That number is the
total return,” explains UW Treasurer V’ella Warren. “That is how we value investments. That is the NACUBO number.”

FOR THE LONG TERM

So what’s the secret? Do the funds managers at the UW have some insider track that most of the rest of the investing world lacks? According to Warren, the answer is in the nature of the investment. The endowment funds are invested for a long term, which can generally draw a higher return than short-term investments.

What’s more, Greg Sheridan, the UW’s associate vice president for constituency programs (fund-raising), warns that the 20 percent return for the year ending March 31 can be misleading. “You have to be careful of what you can do with year-to-year comparisons. Like businesses doing quarterly profit reports, that [return for the March 31 year] is not a sustainable business plan,” he says.

Warren, too, likes the longer-term approach. “Over a 10-year period [also] ending March 31, the return was 11.6 percent. Our expected return on an endowment is 10 to 12 percent over the long term.”

The decline this past spring in the markets should bring an end to the CEF’s impressive results for last year. “We don’t get 20 percent every year. … The market will be declining in May. At the end of the year, we don’t expect to get 20 percent,” predicts Warren.

Is the endowment a key source of income for the UW? Yes and no. “It is important to us because it provides us a margin of excellence, allows us to do things we couldn’t do otherwise,” says the UW treasurer. But on the flip side, endowments at Ivy League colleges (and at oil-income-supported Texas schools and the University of Michigan) can provide from 20 percent to 40 percent of revenues. “Those endowments are very indicative of how they support themselves,” she says.

That higher rate of return, however, points to the difference between the endowment’s 20 percent return and the 7.9 percent return on a second group of UW investments, identified as “other” investments, including nonendowed gifts, reserve balances and cash. Warren notes that these investments are largely in bonds (66 percent) and cash.

That group amounts to about $1 billion, bringing total investments management by the university to $2.7 billion. The second group essentially amounts to operating money, money that Warren identifies as “opportunity money.”

It is used for more immediate needs than the endowment. “Some of the money is very short term,” she explains. “For example … when students pay tuition, that will be invested for a very short time before it is used to pay out expenses related to the education of that student.

“It will be invested maybe a month, maybe two months, maybe a few weeks. You clearly cannot put it into equity [stocks] and still be comfortable you can pay the salary of the faculty. That’s ‘opportunity money’ – money paid to us for a particular purpose.”

LOCAL AND NATIONAL FUNDING

As a state university, the UW also gets part of its total $3 billion in revenues from the state, which generally contributes 10 to 11 percent of revenues. For 2005, that total stood at $323.4 million. State money cannot be invested, by law, and is held by the government until the school needs it.

Federal funding comes mostly in the form of research grants, with the UW near the top among public universities. Much of that funding goes to health and life sciences, including biotech.

The school is currently raising money through its second major fund-raising campaign, led by William Gates Sr., who is a UW Regent, 1950 graduate of the UW law school and father of Microsoft chairman and former chief software architect Bill Gates. The campaign’s goal: raise $2 billion over eight years, which started July 1, 2000. Already, it has raised $1.7 billion, or 85.3 percent of that goal. Corporations contributed the largest chunk: $372.5 million.

In the long run, though, it is the endowment that should always be there, the university’s secure backbone. Much of what the UW accomplishes depends on the good will and preferences of its donors. “You are looking at a huge university here. You have to make sure it [the endowment] goes to what the donors want,” says Warren.

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