Partnerships Spur INNOVATION

By Christopher Connell

IRELAND IS CONNECTING WIDELY ABROAD TO ENHANCE SCIENTIFIC, TECHNOLOGICAL, AND ECONOMIC ADVANCEMENT

SOFTWARE ENGINEER YUANSONG QIAO'S SUPERVISOR AT THE CHINESE ACADEMY OF SCIENCES, a fulcrum for the country's research and development and vehicle for launching high-tech enterprises, offered a suggestion. The president of Ireland's Athlone Institute of Technology (AIT) had recently visited the Beijing academy and AIT now was looking for someone to lead a computer networking project at the ambitious institute in the Irish midlands. "It could be good. Have a look," he told Qiao.

Qiao did look and liked what he saw. Nine years later, the PhD researcher is still at AIT's Software Research Institute, where he spearheads a €1.2 million project that is helping Irish companies innovate in the digital media space funded by Enterprise Ireland, a state agency with a mission of helping Irish businesses achieve global success. Qiao now speaks English with a trace of an Irish accent but still gets to converse in Mandarin with numerous other researchers and graduate students from China in AIT's labs. For a country with 4.6 million people on an island smaller than Cuba, that makes sense, he thinks, because "Ireland needs technical people. The population is too small to push technology forward on their own. They need some foreign people."

BRICs and Mortarboards

That is precisely what Ireland has been doing over the past decade and more intensively since 2010, with a phalanx of state agencies engaged in pushing Ireland's seven national universities and 13 institutes of technology to extend their reach and attract more international students and

scientists to study and work on Irish campuses. A special emphasis has been placed on expanding ties with researchers in China, India, and Brazil—the "BRICs" minus Russia—three of the largest and fastest emerging economies in the world and countries with which Ireland is eager to do more business, academically and commercially.

Science Foundation Ireland (SFI) awarded €5 million to consortia of higher education institutions for workshops and collaborations with researchers in Brazil, China, and India as well as Japan, with a preference not for basic science but projects that can attract external funding and ultimately pay off in the marketplace.

Ciara Cotter, an SFI senior executive for enterprise and international affairs, said, "We wanted to mobilize the higher education institutions in Ireland to join up to target specific markets with their combined strengths rather than a piecemeal approach."

Nanotechnology researchers Aidan Quinn and Mary Manning at University College Cork's Tyndall National Institute are collaborating with Professor Asis Mazumdar of Jadavpur University in West Bengal, India, on low-cost, solar-powered water treatment systems for rural communities in a €2.2 million "ECO-India" project jointly funded by the European Commission and the Indian Department of Science and Technology. "Solving the current problems in India will also position Europe as a leading actor in meeting future water and wastewater needs—a market expected to be worth €94 billion by 2017," Quinn said at a project launch.

The quality of Ireland's universities and their graduates was a main attraction for the pharmaceutical companies and later technology giants that have built headquarters or major hubs

there, starting with Pfizer in 1969 and, much later, Apple and Google. Now the possibility of landing internships with high-tech companies as well as learning in English both are major lures for international students in science, technology, engineering, and mathematics (STEM) fields.

Fortuitously for Ireland's interest in Brazil, hundreds of Brazilian science majors have chosen to spend their Science Without Borders year abroad on Irish campuses, courtesy of the Brazilian government initiative to send 100,000 students abroad. Among them was Gabriela Andrade, 23, now back finishing her bachelor's degree in geology at Universidade Federal do Espírito Santo (UFES) in Vitória, Brazil, after a year at Trinity College Dublin. Studying abroad was a lifelong dream, but one she did not think possible before *Ciência Sem Fronteiras.*

"Actually, I hadn't thought about Ireland. I'd always thought about going to the U.S. or London. Two friends had studied English in Dublin, but that was the only thing I knew about Ireland—and the band U2, of course," she said. Research online convinced her to set her sights on Trinity, Ireland's oldest and top ranked university.

Taoiseach (Prime Minister) Enda Kenny and flag-bearing International Student Ambassadors at an April 2014 event at Farmleigh House, the state guest house.

The quality and content of her geology courses was similar to what she would have taken back home, which itself provided an important lesson. "We have this inferiority complex that everything abroad is better than what we have here. To me it was really good to see that even though I was going to this amazing university, one of the best in the world, my course here in Brazil is as good." She also went on geology field trips to County Sligo in Ireland's west and to Greece. There were 60 Brazilians at Trinity in her cohort, and 97 this academic year.

Fabian Boylan, professor of pharmacy and one of three Brazilians on the Trinity faculty, said the "magic" of Science Without Borders was not "that the students are going to have something special they wouldn't have at home. But it's a different way of teaching. It's an experience, living in another culture, and studying with people from everywhere in the world."

Overall, Ireland was expecting 1,500 Brazilians from this initiative, which ends in 2015, including hundreds diverted to Irish campuses after universities in Portugal could not accommodate them. Before construction of the temporary pipeline, there were only 36 full-time students from Brazil attending Irish public institutions, said Gerry

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O'Sullivan, head of international programs for the Higher Education Authority (HEA).

O'Sullivan said the quality of Irish higher education "has played a big part in boosting our country's position as a global economic player,"

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albeit a small one. Brazil, India, and China "have advanced in the last 10 years as major international players, but they have their own economic and societal challenges. We can help by sharing our expertise and knowledge," he said.

Eleven percent of the international students enrolled in Ireland's 37 public higher education institutions in 2012–2013 hailed from China, more than any country other than the United States. Among them was Jia Wang, who is finishing her doctoral degree in human rights law at the National University of Ireland (NUI) Galway's highly regarded Irish Centre for Human Rights.

Wang, who is writing her dissertation on the Khmer Rouge Tribunal in Cambodia and aspires to work to "improve human rights and promote the humanitarian concerns in the official and civil life in China," said she was drawn to Ireland by its "built-in international perspective" and "rich experience in foreign affairs and international diplomacy."

International enrollments at NUI Galway have surged from barely 1,000 a decade ago to 2,922 this past spring. "NUI Galway has always been a globally connected university with an internationalist mindset," said Dean of International Affairs Brian Hughes, who noted that Galway is Ireland's most multicultural city, with non-Irish nationals making up a fifth of the population.

"We see internationalization as an all-embracing reality for our institution" that extends far beyond student recruitment, revenue generation, or new business development, Hughes said. "[T]he principle of global connectedness drives our faculty, our students, and the entire academic enterprise."

A Global Excellence Scholarship from the Irish government helped lure Ashutosh Bagla to University College Dublin (UCD), where he finished freshman year at the top of his class in the College of Agriculture. UCD calls itself "Ireland's Global University" and counts more than 5,500 international students among its 30,000 students.

Bagla, 20, a food science and agribusiness major from Kanpur in Uttar Pradesh, India, was also selected as one of Education in Ireland's five dozen International Student Ambassadors, who blog about their experiences and field questions on Facebook from students around the world considering study in Ireland. They also met Taoiseach (Prime Minister) Enda Kenny and then Minister for Education and Skills Ruairi Quinn (Jan O'Sullivan succeeded him in July 2014).

"Attracting international students is a good way to develop the country's economy," said Bagla, son of a factory owner and grandson of an industrialist. "All the international students have a very good experience here. When they go back home, they are always going to advertise Ireland in their country." The students also provide an immediate €1 billion annual boost to the economy, according to Enterprise Ireland.

Trinity opened a Global Room in November 2013 to host international events and, in the words of then-Vice President for Global Relations Jane Ohlmeyer, to serve as "a symbol of Trinity's dedication to becoming a global educational hub." The new space includes a wall of plasma screens with wireless headsets that allow students to watch 300 international television stations. The college's popular Science Gallery recently secured a 50 million rupee (€645,000) grant from the Indian state of Karnataka to open a branch museum in Bangalore.

Ana Terres, a microbiologist who directs research support at Dublin City University, said the SFI-backed Brazil consortium has opened doors to "a country where we really didn't have a lot of things going on." With Ireland and the rest of Europe still trying to climb out of recession, "we had to think outside the box," said Terres. Brazil, India, and China "are no longer poor and have a huge amount of talent. Why not collaborate?"

Sharon O'Brien, a professor in Dublin City University's (DCU) School of Applied Language and Intercultural Studies and an expert on the technology of machine translation, got two small SFI grants to collaborate with Fabio Alves of Universidade Federal de Minas Gerais in Belo Horizonte, Brazil, on what professional translators

Yuansong Qiao (center) pictured with researcher Shuaijun Zhang and AIT technology gateway manager Anthony Cunningham demonstrating 3D sensing in action at AIT's Software Research Institute. The sensor is being developed for potential use in remote training, such as gym programs or dance routines.

can add to machine-translated texts. She already has one postdoctoral fellow from Brazil and is hoping in the future to "see a lot more PhD students coming from Brazil to DCU."

SFI's India consortium says that there are currently in excess of 30 formal agreements between its Irish participants "and a spectrum of collaborating Indian institutions including the best universities and academic labs and several industrial partners." There, too, the expressed aim is to "create a cadre of young Indian science and technology researchers who will have a lasting connection to Ireland."

Technical Institutes Make Their Mark

Ireland's technical institutes are playing their part in reaching out to Brazil, India, and China. The institutes, which began in 1970 as two-year schools turning out technicians for industrial jobs, have evolved into comprehensive institutions that award advanced degrees and conduct robust research programs. They are also in the midst of consolidating into technological universities with tens of thousands of students and even larger research enterprises.

AIT software engineering lecturer Enda Farrell is one of three AIT professors teaching students at East China Institute of Technology in Nanchang in 3-plus-1 programs that offer the possibility of an AIT honors degree if the students go to Athlone for a fourth year of study. Chinese students may not have heard of AIT before, but that is no impediment, he said. Apart from such places as Oxford, Cambridge, and MIT, "they won't have heard of any of the other colleges either. And there's an appetite for international education in China." Once they get to Athlone, they may stay as Yuansong Qiao did.

"China has been a major market for AIT since 2001," said Mary Simpson, AIT's director of international relations. Athlone, with 20,000 people, has become "quite a cosmopolitan town. The students very much enjoy the lifestyle and the lower cost of living," she said. With Dublin just 90 minutes down the motorway, "we're like a little suburb now."

James Clarke, a U.S.-born electrical engineer in Waterford Institute of Technology's (WIT) telecommunications software group, forged extensive ties with researchers in India through a cybersecurity project he coordinates for the European Commission (EC). "It's really put WIT

on the map," said Clarke, who is looking to the EC and the government of India for more funds to keep the work going.

"Research is a big agenda for us," said John Joe O'Farrell, WIT's international development and recruitment officer. Research groups in convergent technology, nanotechnology, and the built environment also have partners in India, and WIT is hosting a conference there that O'Farrell hopes will result in more postdoctoral fellows "coming over to work in our labs." He added that it remains challenging to work with some Indian institutions because "they are not necessarily fully aligned (nor) equally as resourced, but there is a lot of possibility there."

Donal McAlister, international affairs manager at IT Carlow, where 8 percent of the 6,000 students are international,

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said Carlow has found success in China by forging partnerships with universities not in metropolises such as Beijing and Shanghai "but second tier cities like Zhengzhou , the capital of Hunan province, or Guilin in the south."

"Essentially what you need in China is a very good contact on the ground to make the introductions. It's not that you're making big marketing noise in China. It's a very narrow communications channel," McAlister said. "Outside of those particular partners we work with, hardly anyone knows about Carlow. But within those partners, a lot of people know us. We regularly visit and we've had a huge exchange of students over the years." **IE**

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