trans•disciplinarity (n)

A research strategy that crosses boundaries to create new disciplines and new solutions.

Transdisciplinarity is a clunky term, but a simple idea: It means a single research effort undertaken by people from different areas of expertise. For Jack Miller, the word transports him back half a century to Cambridge University, where the new chemist spent two years before returning to Canada with a second PhD after his name.

Cambridge may be a place of prestige and Nobel prizes, but 1960s England was a place of cramped, pre-Second World War buildings. New facilities were just coming on stream. Miller arrived to an environment where renowned scholars spent their days sharing space to teach, do research, even have lunch. It was transdisciplinarity before anyone coined the word.

"The biology, physics, biochemistry and chemistry departments were a stone's throw from each other," he recalls. "Plus these guys all had lunch together down at the pub. It was an interface of state-of-the-art researchers in all these different disciplines. They were the first molecular biologists. Today that's a discipline with its own name, but at that time it was just a physicist doing biology, a biochemist doing physics, a chemist doing biology, and a zoologist doing chemistry."

Jack Miller is a chemistry professor who pioneered collaboration between disciplines.

Brock received $843,500 from the federal government to create BioLinc, a business incubator established specifically to help the university partner with regional supporters to create new bio-manufacturing businesses in southern Ontario.
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Miller soon realized this “culture of proximity” was a key ingredient to Cambridge’s potion for intellectual success.

“Where I was, it was biologists and chemists talking at lunch, talking at work. They’d put the chemists’ molecular model together with the biologists’ knowledge of biology and the physicists’ knowledge of crystallography.

“This is how, a decade before, they came up with the double helix. They discovered the code for molecular genetics — DNA!”

Miller returned to Canada and a career as a chemistry professor at Brock University in St. Catharines. He became dean of graduate studies and vice-president of research; Brock became a place where much of its research was of the transdisciplinary variety.

In 2009 the professor emeritus was coaxed out of retirement to help assign the work spaces in a new advanced facility at Brock. It was a crucial task: The Cairns Family Health and Bioscience Research Complex was designed to be a transdisciplinary environment, so it mattered who was working next to whom.

The Cairns Complex houses 35 researchers and more than 100 graduate students. It has psychologists working near biologists, chemists alongside physiologists, and so on. People work in spacious labs among different faculty members and their students. Even the lounges are shared spaces.

Gary Libben, a psycholinguist who is also Brock’s Vice-President of Research, says it’s all about breaking down barriers and combining existing disciplines to create new ones.

“We have an ocean full of things to learn about,” says Libben, “and maybe a bathtub of things we already know. In my own field, we don’t expect the human mind to give up its secrets to just psychologists, or just linguists, or just computer scientists or just people who work on human development. The mind is just too complex.”

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TRANSDISCIPLINARITY AT BROCK

BIOLOGIST Gary Pickering leads a team of 19 researchers from different backgrounds — and universities — studying the effect of climate change on the grape and wine industry, which contributes nearly $1-billion a year to Ontario’s economy.

THE DEPARTMENT OF CHILD & YOUTH STUDIES ranges from developmental psychology to neuroscience, criminology and sociology. Professors routinely collaborate on files that go beyond their own disciplines, including a current project on rights for persons with intellectual disabilities.

COMMUNITY HEALTH SCIENCES associate professor Dan Malleck runs history courses that combine health studies with humanities. He says students learn not only different medical issues, but “how different disciplinary perspectives affect the way we perceive the world. Students benefit from experiencing how these different views operate.”

POLITICAL SCIENCE professor Leah Bradshaw teaches programs that embrace literature and arts. “These programs attract precisely the kind of student that we need in a globalized, complex and integrated world,” she said. “Students who seek out interdisciplinary graduate programs are among the brightest and the most creative.”

ORGANIC CHEMIST Jeffrey Atkinson, biologist Jeff Stuart and neuroscientist Cheryl McCormick will pool their knowledge to study compounds that could limit the damage to tissue caused by stroke and heart attack. Stuart and Atkinson co-supervise a student in biological sciences, and Atkinson says this “is an excellent opportunity for me to learn the essentials of the biological system I am helping to moderate.”

ECONOMIST Steven Renzetti is leading a major federally-funded study, involving more than 20 Canadian and international researchers, to examine a large range of issues regarding Canada’s water supply, including how we use it and how the constantly rising demand for water creates the potential for conflict in Canada and globally.