



Brittany Williams (B.Sc. '07) transfers fungi isolated from polar bear fur to new media in the Mycology Research Laboratory.

PASSING THE TORCH:

Faculty and New Research Labs Provide Hands-On Experience for BU Students

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Over the past number of years, the landscape of research activities at Brandon University has changed and grown. Five Canada Research Chairs have been recruited and new appointments in a variety of departments have brought new research agendas to the campus. The University's commitment to building research capacity has also led to the establishment of a number of new research laboratories created to enhance the research experiences of both faculty and students. Funding from the Canada Foundation for Innovation, the Province of Manitoba and private corporations have combined to provide more than \$3.5 million over the past six years to support the enhancement of existing laboratories as well as the creation of entirely new research facilities at Brandon University.

Within the research laboratories, BU researchers and their student research assistants are studying important issues that touch us all: the impact of climate change on the animals and plants that populate our planet; the diseases and parasites that affect humans the world over; the make-up of

the mineral resources around us; and developing innovative artistic and poetic productions in new media.

The University recently celebrated the grand opening of several new research laboratories on campus. One of these, the University's Environmental Science Laboratory in the John R. Brodie building on campus, is headed by Dr. David Greenwood and Dr. Terence McGonigle, who teach in BU's new Biology department. In his research, Dr. Greenwood investigates climate change through millions of years of earth history by studying fossil plants, insects and pollen. Dr. McGonigle explores how roots interact with mycorrhizal fungi in field soils to acquire the minerals that are essential to plant growth. The new Environmental Science Laboratory provides the microscope and analytical tools to allow Drs. Greenwood and McGonigle to collect this data on climate change and soil-plant relationships for presentation at international conferences and for publication in peer-reviewed scientific journals.

Drs. Greenwood and McGonigle have hired student research assistants to work with them. Last year Karla Stouffer, a Zoology major, held a Natural Sciences and Engineering Research Council Undergraduate Summer Research Award with Dr. Greenwood working in the labs on fossil pollen extracted from 64 million year old coal from near Deloraine and Turtle Mountain in southwest Manitoba. Project student Ashley Greenley works with Dr. McGonigle in the lab for analysis of samples from tundra with support from the Canadian Northern Studies Centre and Brandon University. Greenley is investigating the relationship between soil conditions and the mycorrhizae of the tundra, a question of ever-increasing significance given our need to understand the way that Canada's vast northern field communities may be modified by ongoing environmental change.

Stouffer's experience is not unique. At Brandon University, undergraduate students are gaining valuable research and career-specific experience by working one-on-one with highly qualified faculty members on a variety of research projects. Thanks to several external and internal grants, BU offers its students a number of opportunities to engage in research over full-time (summer) or part-time (school year) employment.

The Laboratory for Applied Research in Resource Geology (LARG), overseen by Dr. Hamid Mumin and Dr. Simon Pattison, is a state-of-the-art petrographic and analytical research facility that provides a focal point for Geoscience Research at Brandon University, and for university, government and industry collaborations. Research is conducted on the geology, mineralogy and chemistry of mineral and energy resources in various locations across Canada and internationally. About 100 senior students, research assistants and collaborators have benefitted from training and use of these facilities since their inception in 2001.

In 2002 nearly \$1 million was used to enhance the University's Nuclear Magnetic Resonance (NMR) facility with the purchase of a spectrometer console and a superconducting magnet. For a number of years this facility was used by Dr. Ronald Dong and his Physics students to study the physical properties of liquid crystals and biological molecules. Dr. Dong retired from BU in 2007 and Dr. Bryan Hill is now responsible for the lab. Dr. Hill's research is focused on Synthetic Organic Chemistry, whereby he and his student research assistant modify organic molecules with the intent of developing novel compounds that will have applications in everyday life. Some compounds might be medicines (to improve health), or catalysts (to improve the environment), or exotic materials (to be used in the latest gadget). His interests are more specifically in the development of novel compounds that might cure disease.

Dr. Mark Berry, Associate Professor in the Chemistry department and Dr. Bernadette Ardelli, Assistant Professor of Biology, are conducting their research in two of the newest CFI-funded research laboratories at BU. In the Cell Biology and Neuroscience Laboratory, Dr. Berry's research is focused on the brain. He is specifically interested in studying the normal control mechanisms governing how nerve cells function. This is of potential relevance to various psychiatric and neurologic disorders such as schizophrenia, mood disorders and drug abuse/addiction. He is also interested in the mechanisms by which cells die, which has potential relevance to neurodegenerative disorders such as Parkinson's disease, Alzheimer's disease, stroke and also to the development and treatment of cancers. Dr. Berry currently has two BU undergraduate honours students working with him in the lab.

Dr. Ardelli's research in the Functional Genomics Laboratory utilizes functional genomics to study the effects of drugs on parasites, in particular the mechanism of drug resistance and action. Functional genomics is a sub-discipline of molecular biology that uses the data produced from genome projects (projects that have determined the sequence of all of the genes of an organism) to elucidate gene function and interactions. Dr. Ardelli and her five student research assistants are studying the processes of transcription and translation and how protein-protein interactions are affected by drugs.

Across campus, on the first floor of historic Clark Hall, is BU's Poetry Video Laboratory. This lab is part of Dr. DI Brandt's five-year Canada Research Chair project, entitled "School for Eco-poetic Experiments (SEE)." The purpose of the lab is to develop multimedia poetry practices as a way of exploring and disseminating poetry and eco-poetic thinking in a broad interdisciplinary and public cultural context as we head into the critical stage of the current environmental crisis. The lab includes production facilities for graphic and audio-visual production and website design, and facilitates the use of these media in conjunction with performance and other innovative and dialogic forms of poetry and poetic production. Cory McMURACHY, a fourth-year BU Fine Arts student, provided research and technical assistance in website design during the past two years. Mr. Derek Gunnlaugson, a local multimedia artist and technician, is the technical manager of the lab and audio-visual tutor. The lab has been used for courses in poetry, taught by Dr. Brandt and multimedia visual arts, taught by Professor Kevin DeForest, as well as several tutorials for BU professors in new media production, and has been utilized by 12 students in Creative Arts to create original multimedia works, many of which have been presented at a national graduate student conference and featured in a national literary magazine.



Chemistry student Clare McConkey inserts her sample into the 400MHz Nuclear Magnetic Resonance Spectrometer for analysis.



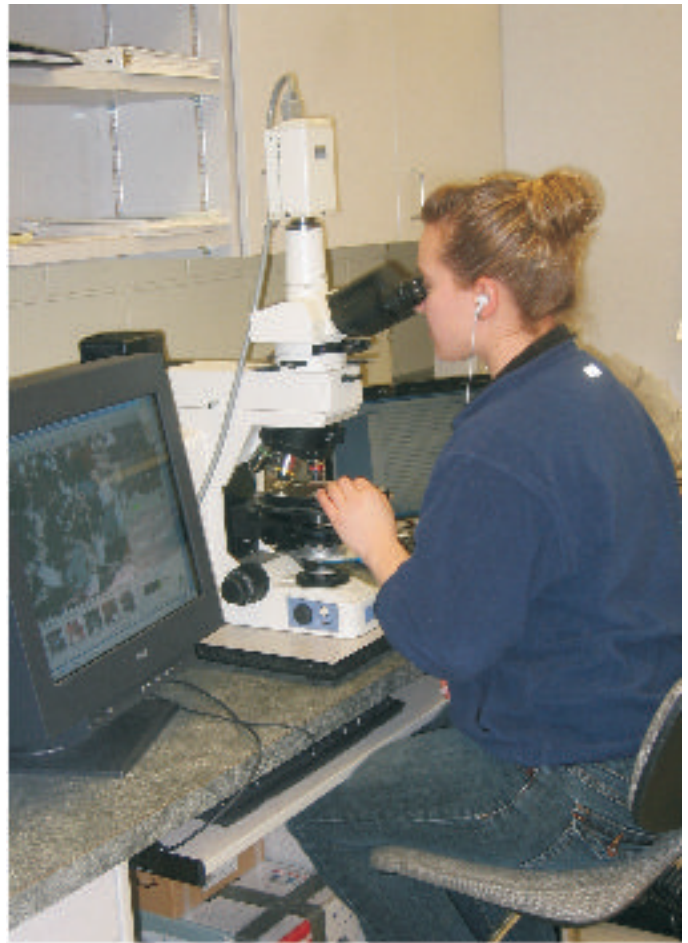
Kai Choy, (B.Sc. '06) checks the nodes of the High Performance Computing Cluster. Mr. Choy graduated from BU in 2006 and went on to the Master's of Physics degree program at the University of Alberta.

Canada Research Chair and Biology Professor Dr. Wendy Untereiner works in BU's Mycology Research Laboratory with her students and research technicians studying fungal systematics, fungal ecology and fungal physiology. Since it opened in 2002, seven research assistants, four holders of NSERC Undergraduate Student Research Awards (USRAs) and two honours students have worked in the Mycology Research laboratory. Currently, Christopher Lowen, a fourth-year Zoology student and Brittany Williams, (B.Sc. '07) work in this laboratory; they will soon be joined by Kyle Froese, a third-year Zoology student and recipient of a 2008 NSERC USRA. Mary-Jane Orr, (B.Sc. '07), who conducted research in this laboratory under Dr. Untereiner's supervision between 2005 and 2007, is now a M.Sc. student at Purdue University.

In the past few years more than 10 BU students have conducted research with Canada Research Chair and Professor of Physics Dr. Margaret Carrington and other BU researchers in her high performance cluster computer research laboratory. Students have worked with Dr. Carrington and others on research in non-equilibrium field theory, field theory at high temperatures and large densities, quantum computing, black hole dynamics, the surface mapping of stars and other computationally intensive areas of the sciences.



Derek Gunnlaugson, technician, assists students in the development of electronic multimedia art works in the Poetry Video Laboratory.



Geology student Jenna Phillips examines a thin section of sedimentary rock using a state-of-the-art microscope with digital imaging capability in the Laboratory for Applied Research in Resource Geology as part of her B.Sc. Honours Thesis project.

Canada Research Chair and Anthropology Associate Professor Dr. Mary Malainey conducts her research in the Archaeological Residue Analysis Laboratory located below the John E. Robbins Library in the George T. Richardson Centre. With her research assistant Timothy Figol (B.A. '02), she draws on techniques associated with chemists and engineers to recover information from Late Precontact Aboriginal pottery from Western Canada and other artifacts. Dr. Malainey's research involves the identification of the former contents of precontact Aboriginal pottery as part of an overall functional assessment of the vessels. She also analyzes residues from ancient cooking rocks (used in stone boiling), grinding tools and cooking pit soil to identify the foods that were prepared. Dr. Malainey works closely with professional archaeologists and has analyzed residues from many different parts of North America as well as North and South Africa and Central Europe.

With funding from external granting agencies, private corporations, and generous alumni and friends, the University has succeeded in building and maintaining state-of-the-art research laboratories that are providing BU researchers and students with valuable experience studying a variety of issues that affect our communities. We invite you to learn more about all of Brandon University's CFI-funded research laboratories as well as other interesting research happening at BU by visiting our campus, and by viewing a wealth of research stories and photos online at:

www.brandonu.ca/administration/vpacademic/research.