

TRINITY WESTERN UNIVERSITY



FACULTY OF
NATURAL &
APPLIED SCIENCES



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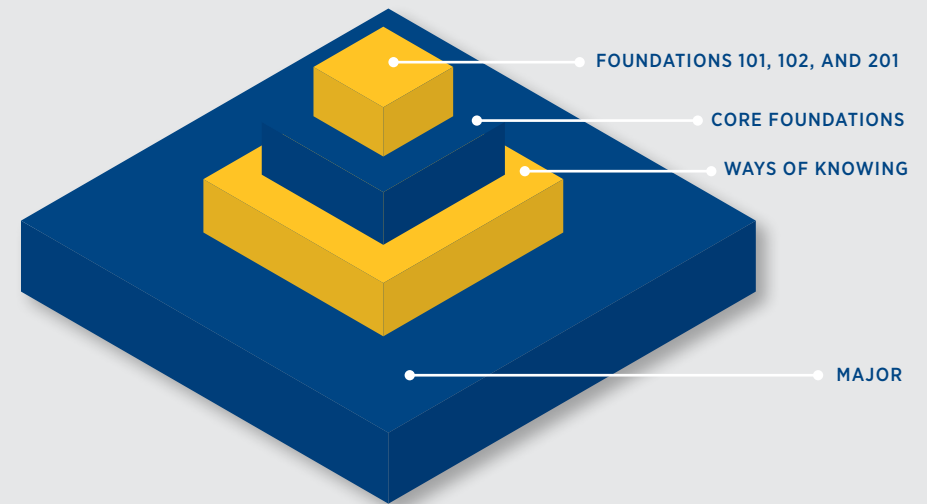
LIBERAL ARTS CORE

TWU offers you a liberal arts education because we believe that the world needs innovative thinkers to solve the problems of today and the problems that don't exist yet. Our liberal arts core curriculum gives you the opportunities and experiences you need to prepare for the kind of life that makes an impact, addressing society's deepest needs with Christian compassion and wisdom.

Your educational experiences at Trinity Western University create a structure of this holistic preparation for your life. Your major represents the largest part of the structure, and the liberal arts core curriculum is at its centre. Moving from the centre outward, each group of courses that you take in the core curriculum impact and influence the ones you take in your major, preparing you for the workplace and for life.

FOUNDATIONS 101, 102, AND 201

Every TWU student takes Foundations 101, 102, and 201 because these courses provide a way of becoming part of the TWU community, thriving during your time here and beyond, and exploring different ways of knowing about the world.



CORE FOUNDATIONS

For Core Foundations, you will choose courses in the areas of Academic Research and Writing, Logical and Ethical Reasoning, Religious and Spiritual Thought, and Scientific Method and Lab Research.

WAYS OF KNOWING

The Ways of Knowing are six broad areas with many courses to choose from in each one: Aesthetic + Performance, Cultural + Linguistic, Experiential + Embodied, Historical + Archival, Quantitative + Computational, and Social + Global.

For more information, visit twu.ca/liberalartscore.



RICK SUTCLIFFE

Professor of Mathematics and Computing Science
Interim Dean, Faculty of Natural and Applied Sciences

EVER NOTICE THAT THE SHAPE OF A HURRICANE RESEMBLES A GALAXY?

You can see that same spiral pattern in a pine cone, or in flowers, or in shells on the beach. The universe is full of pattern, mystery, and symmetry. Creation calls out to us every moment: see God's hands at work in the beauty of the world around us, in the unimaginably large, and in wonders we can hold in the palms of our hands.

Our need to know and understand our universe is, well, universal: we all want to know what's out there, how it works, and why it is the way it is. God made us to be inquisitive, to seek out answers to mysteries, to find providence in our natural environment. This joyful exploration is the heart of what you'll find in the sciences at TWU. The professors here are passionate scientists. They care deeply about fluorine chemistry, kestrel falcons, how glaciers move, and many, many other fascinating facets of the world around us. I'm often swept away by their excitement for what they do; in 30 years of teaching, I don't think I've ever worked with colleagues who care so much about what they study.

But that's only part of the story. One of the joys of science is that unravelling the beauty around us also shows us how to care for it. We are here as stewards. Creation often groans under the burdens we place on it. We need to learn how to care for crops endangered by invasive species. We can convert waste forest byproducts into renewable nanomaterials. We use nature as a model to build technologies that do less harm. And our stewardship equally can be turned to our own selves. We are learning how to identify and hopefully some day cure brain cancer. We're exploring how waste water can help us trace COVID outbreaks. We understand better every day how to use pattern recognition to decrease the risk of crime. God's creation isn't just beautiful: it carries within it the road map to its, and our, wellbeing.

At TWU, you will work with faculty and classmates to explore how you can be amazed at nature, and find out how you can be part of the unfolding of God's plan for the world. We'd love for you to join us in this transcendent adventure

For more information, please visit www.twu.ca/fnas.



ALUMNI PERSPECTIVES

“My Honours Biology degree gave me the skills and smarts to do cancer and diabetes research at TWU—and to work as a hospital clinic lab technician in Tanzania—while also training me to scientifically discover the world as God’s creation.”

DR. AREND STRIKWERDA, 2011,
completed his medical degree at Western University in 2016

Becoming a student of our Biology program will allow you to engage your curiosity and use your degree to meaningfully contribute to society. Emerging diseases, environmental sustainability, and genomics are just a few topics that you will investigate. At TWU, you will be prepared for a career in the health sciences, research, or education, with solid training in science and ethics from a Christian worldview.

Our Biology faculty are experts in their fields who integrate research, love for teaching, and Christian faith in the classroom. As a Biology student, you will have the opportunity to work with faculty on cutting-edge research in cell biology and genetics, ecology and environmental biology, and applied and medical microbiology. This valuable research experience, coupled with our rigorous curriculum, can lead you to high-profile medical, dental, veterinary, and graduate programs around the world.

For more information, visit www.twu.ca/biology.

OUR BIOLOGY PROGRAM OFFERS

- A major in Biology leading to a BSc (Honours) degree specializing in:
 - Cell and Developmental Biology Emphasis
 - Biochemistry and Molecular Biology Emphasis
 - Ecology Emphasis
 - General Biology Emphasis
- A major in Biology leading to a BSc degree
- A concentration in Biology
- A minor in Biology

RESEARCH IN BIOLOGY

TWU’s Biology faculty are conducting solution-focused research. Karen Steensma’s research aims to advance ecological sustainability, Dr. Anthony Siame is studying cyanobacteria for use in bioremediation and biofuel production, Dr. Laura Onyango is determined to circumvent antibiotic resistance, Dr. Dennis Venema’s lab focuses on developmental biology studies, and Dr. Karen Lo is collaborating with others in the field to explore novel ways of strengthening the human immune system.

AFTER GRADUATION

Graduates of the Biology program are well prepared to continue their studies toward degrees in the health sciences, including human medicine, veterinary medicine, pharmacy, and physiotherapy. Graduates of the Honours program are also well prepared to excel at master’s and doctoral studies in the life sciences. Our Biology graduates can go on to other vocations, such as teaching, research, and environmental fields.

ALUMNI PERSPECTIVES

“Taking biotechnology courses enabled me to become aware of ever-increasing advances in the life sciences. Also, the biotechnology practicum gave me practical laboratory skills I can proudly put on my resumé.”

EUNHAN KOH, 2019

Biotechnology—creating technology or products from cellular and biomolecular processes, often DNA technology—is one of the fastest growing and innovative scientific sectors. You will learn about the use of biotechnology in areas such as health care, veterinary medicine, agriculture, and the environment.

Biotechnology students study the science behind breakthrough discoveries that revolutionized gene editing, stem cell research, green energy, and big data in personalized medicine. They learn in the classroom and lab, as well as in a chosen field alongside biotechnology experts. With a Biotechnology degree students gain the knowledge, expertise, ethical framework, and contacts necessary to achieve a successful career in the life sciences. Our Biotechnology degree not only fast-tracks you for careers in life science, it also meets standard entry requirements for medical school and other professional schools.

For more information, visit www.twu.ca/biotechnology.

AFTER GRADUATION

Our Biotechnology grads are employable in diverse areas such as health care, veterinary medicine, agriculture and “green” science. Practicums and co-ops equip students with skills and knowledge that make them job ready. Our program is also excellent preparation for students seeking graduate studies in science and includes pre-health sciences that prepare students for admission to various professional schools (i.e., medicine, dentistry, veterinary medicine, and physical therapy).

OUR BIOTECHNOLOGY PROGRAM OFFERS

- A Major in Biotechnology leading to a BSc degree
- An Honours Program in Biotechnology leading to a BSc (Honours) degree
- A Multidisciplinary BSc degree in Biotechnology and Chemistry
- A concentration in Biotechnology and minor in Business Administration leading to an Interdisciplinary BSc degree

OPPORTUNITIES IN BIOTECHNOLOGY

The Biotechnology program incorporates two practicums and two co-ops. Co-op placements are usually offered in the summer months, but may also be available during Fall or Spring semesters and consist of 12 to 16 weeks of full-time employment. Practicums take place during the semester, giving students hands-on experience while earning credit hours.

Biotechnology is an applied degree in the Department of Biology. It provides students with opportunities to work onsite alongside science faculty or offsite with professionals within the Life Science sector. Practicum or work opportunities on campus are available in diverse areas such as bioremediation, developmental biology, cancer therapy, immunology, antibiotic resistance, green chemistry, environmental studies and bioinformatics.

ALUMNI PERSPECTIVES

“Through the research I conducted during my undergrad, I was able to develop skills in research that aren’t normally accessible until grad school, which stood out during my application to grad school. The lab experience at TWU both in research and courses was really hands-on, and was a great part of studying chemistry at TWU.”

JOSIAH NEWTON, 2017

Chemistry is known as the central science, because it interacts with all other sciences, and it explains the world around us. A degree in chemistry can lead to a career in environmental science, nanotechnology, materials chemistry, sustainable and green chemistry, biotechnology, or a medical discipline.

Through our degree program, you will acquire theoretical principles and the laboratory skills you need for a career in chemistry, or a related career in which chemistry is an asset or requirement. As part of your chemistry studies, you may make aspirin in your introductory chemistry lab or test the pond water for compounds important in water quality.

You will learn how to synthesize molecules, determine molecular structures, understand the physical basis of chemical bonding, and learn how a metal works either when forming a mineral structure or in a catalytic enzyme. Each class deals both with key principles and real-world applications. You will be trained by faculty who are experts in their individual fields and eager to share that expertise by mentoring students.

For more information, visit www.twu.ca/chemistry.

OUR CHEMISTRY PROGRAM OFFERS

- A major in Chemistry leading to a BSc (Honours) degree*
- A major in General Chemistry leading to a BSc degree
- A major in Chemistry, with an emphasis on Life Sciences, leading to a BSc**

**Accredited by the Chemical Institute of Canada; ideal for students going on to pursue further studies in chemistry.*

***Ideal for pre-med students and careers in biochemistry.*

RESEARCH IN CHEMISTRY

Research exploration in Chemistry at TWU includes the synthesis of organo-fluorine compounds with a range of uses from medicine to rocketry, development of novel nano-materials, analysis and applications of natural surfactants from *Sapindus saponaria*, and organo-metallic catalysis. We are developing a departmental emphasis in sustainably sourced materials chemistry.

AFTER GRADUATION

Graduates of our Chemistry program are well prepared to continue on to graduate degrees to pursue academic or industry careers. Others obtain advanced degrees in medical, pharmaceutical, and dental schools. Career possibilities are endless—laboratory technicians, managers, or business owners in environmental, agricultural, and medical settings. Some graduates combine chemistry and a love for education by teaching in elementary, high school, and university laboratories. A few are even in Christian ministry. Our program provides students with a solid education that prepares you for many possibilities.

ALUMNI PERSPECTIVES

“The courses I took at TWU helped me gain the skills needed for the job as a web developer. Through my liberal arts education, I experienced a sampling of many different fields, which helped me decide my career path. I was exposed to opportunities that wouldn’t have been possible at a different university.”

ANDREW CHELL, 2011

Our Computing Science program prepares you to be a technological leader with a global perspective. Our graduates are creative problem solvers, lifelong learners, and highly adaptable leaders in our rapidly changing world.

In addition to studying fundamental computing science topics, our students choose from a variety of elective courses, including: artificial intelligence, software engineering, computer graphics, databases, programming languages, computer networking, and virtual reality.

We encourage our students to engage in undergraduate research with their Computing Science professors. These research projects often result in students presenting their work at international conferences. Past students have co-authored papers with their professors and published their findings in peer-reviewed journals, providing them with valuable experience and identifiable skills.

Through our program, our students gain expertise in their area, as well as character development, as they learn to navigate between technology and society from a distinctly Christian worldview.

For more information, visit www.twu.ca/cs.

OUR COMPUTING SCIENCE PROGRAM OFFERS

- A major in Computing Science leading to a BSc
- A concentration
- A minor

RESEARCH IN COMPUTING SCIENCE

Many of our undergraduates work closely with TWU’s award-winning faculty, exploring a number of areas of computing. These students develop valuable skills by delving deeply into topics in a wide range of fields, such as bioinformatics, programming languages, mobile apps, and computational criminology. Such cutting-edge research addresses real-world problems and often results in publications, international conference presentations, and software applications.

AFTER GRADUATION

Graduates of our Computing Science program often start working in the industry before graduation. Some of our graduates also choose to continue their studies toward a master’s or PhD degree. Computing science expertise leverages a variety of career paths: software developer, systems manager, support specialist, trainer, software engineer, technical writer, software tester or supporter, or entrepreneur. Our graduates stand out as confident, competent professionals.

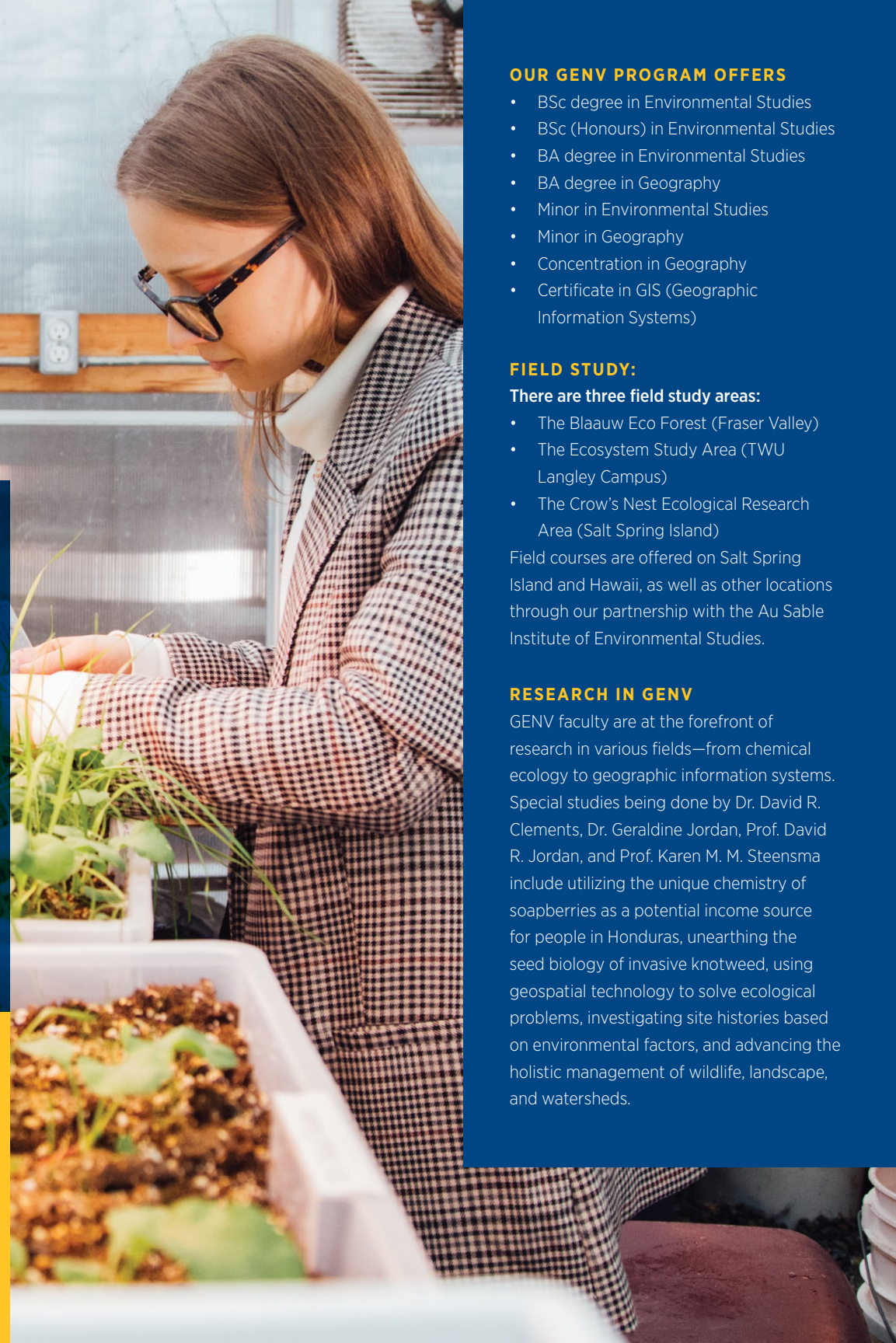
As a student in the Geography and Environment Department (GENV), you will examine some of the most significant issues facing our planet and its inhabitants, including climate change, species extinction, habitat fragmentation, urbanization, poverty, and development. Our campus's close proximity to freshwater, mountain, saltwater, and island habitats, as well as urban, rural and agricultural areas means that you will gain a wealth of hands-on experience in environmental stewardship and management and community development practices. Our Geographic Information Systems (GIS) lab and expertise provides up-to-date skills training in GIS.

Graduates of our GENV programs have numerous career opportunities, including: senior environmental manager, city planner, GIS technician, agricultural mapping assistant, fisheries officer, marine science assistant, forester, environmental consultant, plant nursery inventory specialist, research associate, and elementary school educator.

For more information, visit www.twu.ca/GENV.

AFTER GRADUATION

Graduates of our GENV program may pursue graduate work in a variety of areas, including wildlife biology, marine biology, botany, zoology, urban and regional planning, geographic information systems (GIS), resource management agroecology, and veterinary science. GENV graduates access a large spectrum of career options, working as environmental consultants, ecological researchers, wildlife biologists, fisheries biologists, marine biologists, urban planners, GIS specialists/technicians, invasive species specialists, veterinarians, international development workers, missionaries, park interpreters, conservation enforcement officers, sustainability managers, and NGO workers.



OUR GENV PROGRAM OFFERS

- BSc degree in Environmental Studies
- BSc (Honours) in Environmental Studies
- BA degree in Environmental Studies
- BA degree in Geography
- Minor in Environmental Studies
- Minor in Geography
- Concentration in Geography
- Certificate in GIS (Geographic Information Systems)

FIELD STUDY:

There are three field study areas:

- The Blaauw Eco Forest (Fraser Valley)
- The Ecosystem Study Area (TWU Langley Campus)
- The Crow's Nest Ecological Research Area (Salt Spring Island)

Field courses are offered on Salt Spring Island and Hawaii, as well as other locations through our partnership with the Au Sable Institute of Environmental Studies.

RESEARCH IN GENV

GENV faculty are at the forefront of research in various fields—from chemical ecology to geographic information systems. Special studies being done by Dr. David R. Clements, Dr. Geraldine Jordan, Prof. David R. Jordan, and Prof. Karen M. M. Steensma include utilizing the unique chemistry of soapberries as a potential income source for people in Honduras, unearthing the seed biology of invasive knotweed, using geospatial technology to solve ecological problems, investigating site histories based on environmental factors, and advancing the holistic management of wildlife, landscape, and watersheds.

ALUMNI PERSPECTIVES

“My studies at TWU have profoundly impacted me both intellectually and spiritually. I felt supported and encouraged by my professors in all the courses I took. Because of my math degree at TWU I am able to approach problems and find solutions with a deeper critical lens and a greater appreciation for how Christianity and science interact.”

LEWIS VAN DYK, 2020

If you love numbers and want to deepen your understanding of God's creation through the beauty of numbers, then our mathematics department is the place for you. Mathematics is the language and enabler of science and technology, providing us with the necessary tools for analyzing economic trends, forecasting weather, doing research in the social sciences and other disciplines, and making informed business decisions.

As a student of mathematics, you will explore the many disciplines of pure and applied mathematics—logic, number theory, calculus, algebra, topology, analysis, modelling, and numerical methods. A degree in mathematics can lead you to many different careers options, including K-12 teacher, university professor, scientific researcher, civil engineer, statistician, software developer, and economist.

For more information, visit www.twu.ca/math.

OUR MATHEMATICAL SCIENCES DEPARTMENT OFFERS

- A major in Mathematics, Computing Science, or Mathematics with Computing Science
- A concentration or minor in the above
- Pre-Engineering and transfer programs

RESEARCH IN MATHEMATICS

TWU faculty are using mathematics to address some of the world's great challenges, such as tackling climate change and uncovering urban crime patterns. Research opportunities exist in pure, applied, and computational mathematics. For example, you could work alongside your professor in modelling ice sheet dynamics, studying biological pattern formation, or using topology (the study of shapes and how they deform) to improve robotic mobility.

AFTER GRADUATION

TWU graduates from our Mathematics program are well prepared for a variety of quantitative vocations. Our graduates have gone on to careers in finance, economics, accounting, and actuarial science, as well as other professions involving data science and statistics. Other career opportunities await in the technology sector such as coding and software development, or in the education sector in both teaching and administration. Our students are well placed to enter top graduate programs including research-based graduate degrees in a variety of mathematical and computational disciplines.



Our Faculty of Natural and Applied Sciences offers a variety of pre-professional programs to help you gain acceptance into vocation-specific schools. Some science students do double majors and obtain both a BA and a BSc.



PRE-DENTISTRY

Our Pre-Dentistry program is a set of required courses needed for entry into dentistry schools across Canada. Normally, pre-dentistry students are required to complete three academic years toward a baccalaureate degree—which include courses in the humanities and social sciences—before applying to dentistry schools. Specific requirements for dental schools may also include biology, chemistry, math, english, and physics.



PRE-ENGINEERING AND TRANSFER PROGRAMS

The core science, math, and computing courses in the program will challenge you to think critically and find practical solutions to real-life problems. The class sizes are small and taught by expert faculty, ensuring you will be well-prepared for admittance into engineering schools around the province and across the country. In particular, we have a formal transfer agreement with UVic that allows TWU students to compete on an equal footing with its own students for placement into their chosen engineering field.



PRE-MEDICINE

Our Pre-Medicine program includes the basic sciences needed for entrance to medical school. Within the pre-medicine requisites, you will learn about cell biology, biochemistry, and organic chemistry. We offer several courses in our pre-medicine program that will help you gain acceptance into local medical schools and schools across North America and Europe.



PRE-PHARMACY

Our Pre-Pharmacy program acts as a well-rounded preparation for pharmaceutical studies. You will take a set of required science courses—like cell biology, biochemistry, and organic chemistry—needed for entry into the Faculty of Pharmaceutical Sciences at the University of British Columbia.



PRE-VETERINARY

The pre-veterinary program helps to fulfill required coursework for admission into competitive schools, such as the Western College of Veterinary Medicine in Saskatchewan and other veterinary schools in Canada, the United States, and abroad. As a pre-veterinary student, you will take a variety of courses, including biology, chemistry, and mathematics, as well as English courses and other core courses needed to complete a degree. In addition, you will be advised on how to incorporate extensive hands-on experience working with animals in veterinary clinics and other settings.

For more information, visit www.twu.ca/preprofessional.



Build an outstanding academic profile with hands-on research experience and collaborative laboratory studies with the Faculty of Natural and Applied Sciences (FNAS) at Trinity Western University.

Get far more out of your undergraduate science degree than anywhere else:

- Work closely with professors who are specialists and experts in their field.
- Take advantage of travel studies and conduct cross-cultural research with your peers.
- Get unique opportunities to contribute to studies being published in scientific journals.
- Participate at various science research conferences—interacting with other researchers, learning from experts, and even presenting your own findings.
- Explore Teacher's Assistant (TA) positions and other on-campus employment opportunities in science.
- Get involved in community partnership events such as science fairs, camps, and school presentations, gaining valuable experience and exposure.
- Innovate and launch your own projects with support from your professors.

The TWU difference in the Faculty of Natural and Applied Sciences allows you to discover and pursue your passion while earning a degree with unlimited professional potential.



Trinity Western University believes in helping you put your studies into action. Get hands-on experience in the sciences not just in the classroom but in the field via practicums and internships offered through GENV and Biotechnology.

The Department of Geography and Environment (GENV) offers internships that allow you to volunteer 120 hours for local environmental organizations and develop sought-after, employable skills while earning university credits. Conservation organizations, zoos, environmental consulting companies, mining companies, veterinarians, salmon enhancement societies, native plant nurseries, local governments, and endangered species breeding organizations have all been part of these internships.

The Department of Biotechnology offers multiple practicums (BIOT 100 – BIOT 400) focusing on experiential and embodied inquiry. In addition to credit hours, you will gain marketable skills in careers within life science. Lower-level biotechnology practicums involve wet-bench laboratory work in clinical, academic, and industrial settings, while upper-level practicums can even be tailored to your own interests in health sciences, veterinary medicine, business, biotech companies, and environmental science.



The Ecosystem Study Area contains tributaries of Langley's Salmon River, a second-growth forest, and McMillan Lake. Together these habitats boast 60 acres and a wide variety of species from fish and reptiles to birds and mammals. Science classes conduct lab work, and the GENV department hires student assistants for trail maintenance and research.



The Blaauw Eco Forest, located east of Fort Langley in the Fraser Valley, spans 50 acres and consists of a second-growth forest with many large cedars, firs, bigleaf maples, cottonwoods, and bog species. Home to coyotes, deer, amphibians, reptiles, and 60+ species of birds, it also features an interpretive trail. Numerous science lab classes are conducted here, and GENV hires student assistants for maintenance and research.



The Crow's Nest Ecological Research Area is located near Fulford on Salt Spring Island, B.C. Spanning 72 acres, the site has one of Canada's rarest ecosystems and is vegetated by both Douglas fir forests and Garry oak meadows. Since 2000, Trinity Western University has been conducting restoration and research on the property. This field site features three cabins for overnight stays, storage buildings, a cook shelter, and a composting toilet.



The Faculty of Natural and Applied Sciences offers travel studies during the month of May each year, alternating between Salt Spring Island, B.C., and Hawaii. Both locations allow you to complete two three-credit courses within one month while living in community with faculty and staff course leaders. The Salt Spring Island travel study includes courses in plant ecology and marine biology, and also provides extensive opportunities for hiking and beachcombing, meeting experts in the field, and doing special projects. The Hawaii travel study includes one course in tropical botany and one in coral reef biology, both of which involve studying in the field hiking, snorkelling, and learning many field study techniques.

As a Trinity Western University student, you can also take field courses for credit from the Au Sable Institute of Environmental Studies offered in Michigan, Illinois, and Washington, as well as Costa Rica and India.

For more information, visit www.twu.ca/travelstudies.



HOW TO APPLY

Trinity Western accepts applications year-round. To meet the priority application deadline, complete both your admissions and financial aid applications by March 1.

1. Apply for admission online at www.twu.ca/apply.
2. Send the most recent updated copy of your grades.
3. Apply for financial aid at www.twu.ca/awards.

As soon as we receive your transcripts, we'll evaluate your application. Your Admissions Counsellor will contact you once a decision has been made. (Note: You can email us a clear, easy-to-read scan or photo of your interim grades. Your official, final transcript must be mailed from your school in a sealed envelope.)

Contact Us




Our admissions team is ready to answer any questions you have about TWU. Once you apply, you'll be assigned a specific counsellor to help you along every step of the way.

UNDERGRADUATE ADMISSIONS OFFICE

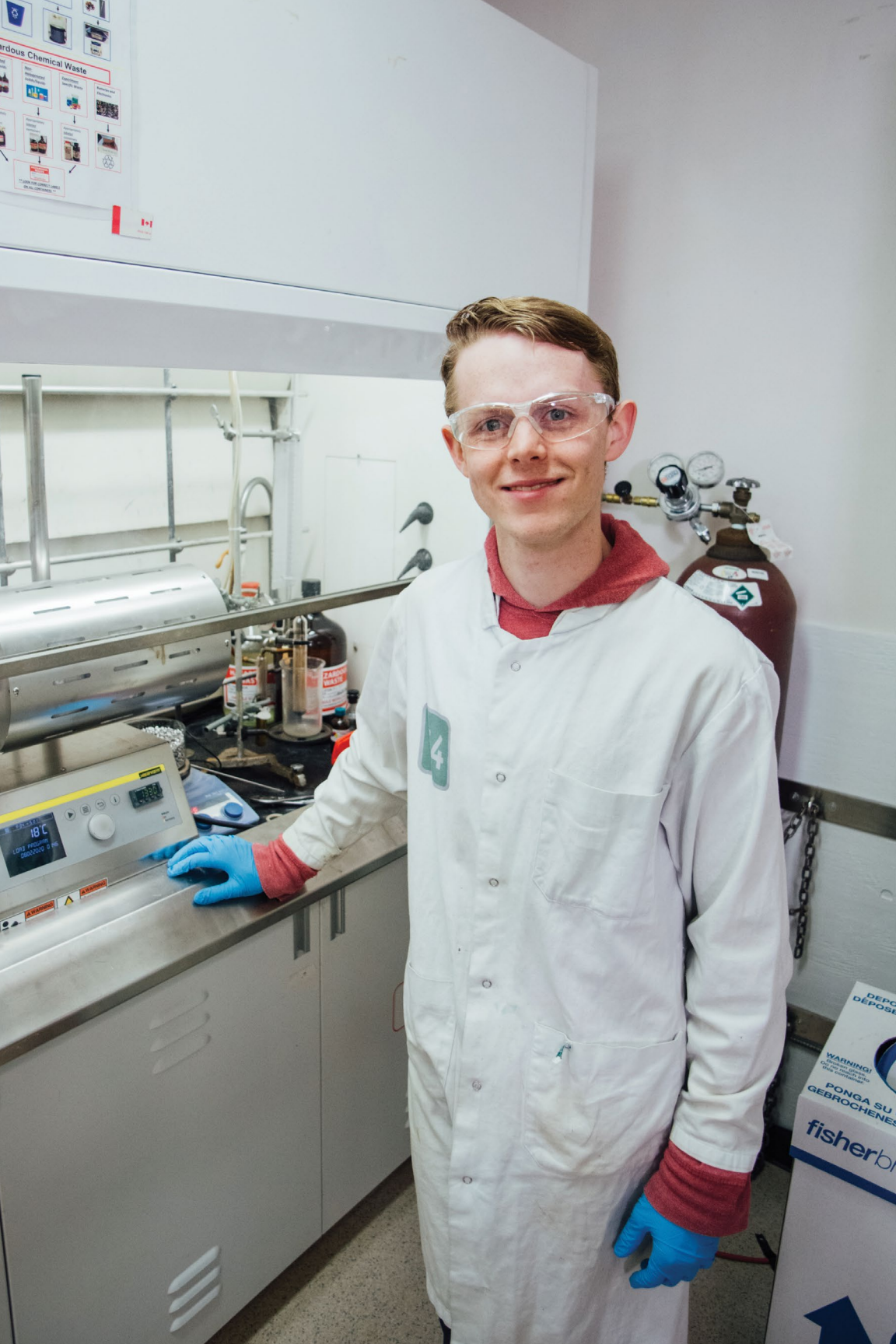
t: 604.513.2019 or 1-888-GO-TO-TWU

www.twu.ca/undergraduate

SOCIAL

-  [Facebook.com/trinitywestern](https://www.facebook.com/trinitywestern)
-  [Twitter.com/trinitywestern](https://twitter.com/trinitywestern)
-  [Instagram: trinitywestern](https://www.instagram.com/trinitywestern)

Trinity Western University admits students of any race, colour, creed, nationality and ethnic origin to all the rights, privileges, programs and activities generally accorded or made available to students at the school. It does not discriminate on the basis of race, colour, creed, nationality or ethnic origin in administration of its educational policies, admissions policies, scholarship and loan programs and athletic and other school-administered programs.



IT'S NOT
JUST
WHAT YOU
DO, IT'S
WHO YOU
BECOME





FACULTY OF NATURAL
& APPLIED SCIENCES