



**UTM Career Centre**  
**[www.utm.utoronto.ca/careers](http://www.utm.utoronto.ca/careers)**  
**Phone: 905.828.5451**  
**Room: SE3094**

# Biochemistry: The Chemistry of Life

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## I. Introduction

It is oftentimes difficult as a student to see the career options associated with a particular major besides those that are typically portrayed in the media. For biochemistry students, these careers usually involve research or med school. However, it is the aim of this package to provide students with an overview of the typical and alternative career options available to biochemistry students, in addition to ways to prepare for the different career paths.

Although the focus of this package will be on biochemistry majors, it also has applications for chemistry majors as well, which are indicated by an asterisk (\*) next to the job description. More information for chemistry majors can be obtained from the UTM Career Centre website under the 'Careers by Major' section located within the 'Explore Careers' tab.

## II. Career Options for Biochemistry Majors

Studying chemistry or biochemistry can put you on the path to a successful career. The field of chemistry has specific disciplines that include organic, inorganic, physical and analytical chemistry. Biochemistry, on the other hand, is a very broad discipline that investigates the chemical nature of life. It includes the study of the structure, chemical processes and development of biological systems in organisms at the molecular level.

Whereas the UTM chemistry program emphasizes the physical principles behind chemical processes, the UTM biochemistry program focuses on the biological aspects of the very same processes. Both programs develop foundations in chemistry, physics and mathematics with biochemistry placing an additional emphasis on biology.

The practical applications of biochemistry can be seen on a daily basis in the world that surrounds you. The clothes you wear, the foods you eat and the medicines that keep you healthy have all been touched by these two disciplines. Biochemists work in a variety of career fields, including medicine, agriculture, manufacturing and basic research.

In the subsequent sections, the skills gained by biochemistry majors while pursuing their undergraduate degree will be outlined, followed by direct career opportunities, which includes careers that require the analytical and quantitative skills acquired by biochemistry majors, and then more career options including careers that are potentially available to all natural science majors including

chemistry, biology, molecular biology, biotechnology, and biochemistry who have related experience or coursework. This section will be followed by suggested ways to break into these general fields and how to prepare for them. As some biochemistry majors may consider careers requiring further education beyond an undergraduate degree (although many do not require biochemistry specifically as a prerequisite) including law, medicine, international affairs and hospital administration, the further education section will outline some of the post secondary options available. The package will conclude with a list of UTM Career Centre services that would be beneficial to biochemistry majors.

### III. Skills Gained by Biochemistry Majors<sup>1</sup>

#### SPECIFIC KNOWLEDGE SKILLS

- Knowledge of the structural and biological functions in living organisms at the molecular level and their relation to medical/environmental concerns in addition to health/safety protocols
- Synthesis of solutions and products to manage scientific/environmental problems that are of interest to society, medicine, and industry
- Understanding of protocols and methods to manipulate and alter genetic material in order to make improvements
- Analyzing materials and products to determine potential concerns
- Ability to critically make observations of chemical interactions
- Knowledge of health and safety protocols, products, and materials
- Understanding of reactions and chemical interactions, and ability to utilize this knowledge for identification of potential risks and hazards
- Collect, analyze, evaluate, interpret, and communicate technical and scientific data
- Comprehension of the scientific process with a basis in formulating and testing hypotheses and ideas

#### TRANSFERABLE SKILLS

##### **Research and Communication Skills**

- Ability to recognize and retrieve a wide array of relevant information and resources
- Compiling and organizing information and ability to adapt to different situations and circumstances
- Preparing comprehensible, original, and informative displays for diverse audiences

- Ability to develop reports, presentations, and materials using current technology

### **Analyzing, Organizational, and Problem Solving Skills**

- Learning, understanding, and interpreting information and knowledge, and applying to new circumstances
- Ability to prioritize and effectively manage time, data and resources in order to meet deadlines
- Capability to make informed decisions utilizing problem solving skills and assessing all possible options
- Effectively analyzing, assessing, and interpreting ideas, reports and opinions

### **Teamwork and Management Skills**

- Ability to work effectively as part of a team through understanding your role in the team and the objectives of the group
- Adept at identifying, planning and contributing to the aim of the project
- Contributing to a project from beginning to end including making decisions, completing tasks, and ensuring desired outcomes are achieved

## **III. Direct Job Opportunities**

Note: This is not an exhaustive list as there are many other careers available. Many careers require additional experience or education.

Biochemists can be found in a variety of work environments - in industry, medicine, agriculture/other environmental settings, and education, in addition to non-scientific areas. The role of biochemists in industries such as food and beverage processing, health, biotechnology, pharmaceuticals, agriculture, and environmental protection involve the development and manufacturing of new and existing products, quality control and safety. Many areas of everyday life including medical products and diagnostics, food and food safety, crop improvement, and forensic science owe their start or development to biochemists.

### **(1) Food and Beverage Processing<sup>2,8</sup>**

The food processing sector is geared towards upgrading food processing/preservation technologies, improving food quality, and adding value to raw agricultural materials through quality assurance, packaging, and biotechnologies. Some examples of careers in this area include:

### **Micro Laboratory Technician**

Through utilizing the skills developed during your undergraduate degree, students are involved in preparing the laboratories daily activities including equipment start-up and lab disinfection while also providing support for the Lab Sample Analysis System through the collection, preparation, and data entry pertinent to tested samples. The experience obtained during coursework allows students to conduct microbiological analyses for pathogenic microorganisms from both food and environmental sources. The completion of a post-graduate degree/diploma allows students to carry out audits to assess the condition of equipment and manufacturing processes, in addition to leading audits and investigations of unacceptable tests results.

### **Food and Flavor Chemist\***

Using knowledge of the properties of proteins, fats, starches, and carbohydrates, as well as micro components such as additives and flavorings, determines how each works in a food system. Through the application of critical thinking and problem solving skills, create different approaches to use ingredients or synthesize new ingredients, such as fat or sugar replacements, while utilizing natural and artificial ingredients to develop flavors in food products. Graduate degree in food science is helpful for advanced positions.

## **(2) Health, Biotechnology, Pharmaceuticals<sup>3,8</sup>**

This sector plays an important role in preventative health care. Whether screening patients for susceptibility to disease and providing vaccinations against the onset of disease, improving diagnostic tools to help doctors and researchers detect disease and design targeted treatments for patients, or minimizing the occurrence of side effects through understanding of a person's genetic makeup, the health, biotechnology, and pharmaceutical industry improves your health by using and understanding your genetic code to fight diseases. Some examples of careers in this area include:

### **Clinical Research Coordinator Assistant\***

Through implementation of undergraduate laboratory skills or experience, will perform clinical and study procedures as per study protocol and may include allergy testing, vital signs measurements, pulmonary function testing, subject consenting, explanation of study drug administration, and review of study documentation or case report. Required to comply with standard operating procedures, including maintenance and calibration of clinical equipment, and utilize organizational skills to prepare study binders, source documents, logs, and tracking forms. Will also communicate with the Principal Investigator, and Ethics Review Boards with respect to subject issues.

### **Chemical Technician\***

This designation may include any facet in the chemical process industry from basic research to field work. Undergraduate courses and experience prepare students for operation of equipment and instrumentation, setting up apparatus for chemical reactions, preparing compounds, monitoring production, quality control, and collection and analysis of synthesized samples. Students may also utilize analytical chemistry skills to determine the composition of materials, working in either a lab or in the field.

### **(3) Agriculture and Environment<sup>4,8</sup>**

In order to improve the efficiency of chemical and physical processes, the chemical transformations of these reactions must first be understood. Whether it is development of energy policies, codes and regulations, or developing more energy efficient and cleaner technologies, the natural resource industry is involved in buildings and communities, clean fossil fuels, bio energy, renewable, industrial processes, oil sands and transportation sectors. Some examples of careers in this area include:

#### **Environmental Chemist\***

Involves the quantitative and qualitative analysis of the effect of water, air and soil pollution, while also coming up with new ways to manufacture green materials that are not dependent on limited natural resources and their development methods. Field work may require the collection and testing of samples from contaminated locations. Depending on the level of responsibility within the company, may work with environmental regulators to incorporate environmentally friendly methods into industry and ensure compliance through testing. The majority of employment opportunities are in government agencies or consulting firms who are interested in maintaining and managing the environment.

#### **Water Resources Manager\***

Through an understanding of environmental regulations for water treatment plants that purify drinking water or wastewater that is returned into rivers and oceans, the water resource manager will oversee the proper implementation of policies and procedures. Using sample collection and testing skills obtained in undergraduate labs, will operate water treatment systems and monitor community water. Occasionally, may also communicate with neighboring communities for water rights, and public interest groups for water resources proposals. Major area of employment is in the state or local governments or private water supply companies.

#### (4) Education<sup>2,8</sup>

The education industry has employment prospects in a wide array of areas at all levels, from elementary school through post secondary education, to academic advisors and corporate trainers. If you love science and want to inspire others to be independent thinkers, then you might enjoy a career involving science education. Employment involving the instruction of others usually involves further education at a teachers college or training courses within a company. Some examples of careers in this area include:

##### **Science Educator (i.e. Educational Institution, Museum, Science Centre)\***

Involves utilizing your scientific knowledge to develop and implement clear, concise, and tailored science education programs. Depending on the setting, would organize and carry out workshops, tours, field trips, demos, or prepare printed material for a variety of areas including, but not limited to the structure of molecules, types of reactions, and applicability of biochemistry to the real world. May give educational presentations and run science education programs in schools and community centers. Employment opportunities are possible in museums, science centers, planetariums, and programs sponsored by government agencies such as the National Science Foundation.

##### **Corporate Trainer\***

Utilize skills developed during laboratory classes or through company courses to organize and run individual, group, and classroom training for employees on topics having a scientific focus such as techniques and standard operating procedures. Students may also require a good knowledge of languages to write training manuals, handouts, procedures and other supplementary training materials. Other duties may involve creation and administering of tests to assess the competency of employees.

### III. More Career Options

Note: This is not an exhaustive list as there are many other careers available. Many careers require additional experience or education.

Biochemists have extremely marketable skills including leadership, communication and writing, creativity, and problem solving skills. This section outlines additional opportunities for students in biochemistry. Entry into these careers usually requires additional experience obtained through internships, volunteer experience, or relevant coursework in addition to completion of a biochemistry degree.

## (1) Advertising/Marketing/Sales<sup>5,6,8</sup>

This industry incorporates the development and implementation of marketing and advertising campaigns to promote the sales of products in a wide variety of areas; however this section will focus on the promotion and sales of chemical products and services. Managers are responsible for planning, organizing, directing, controlling, and evaluating the activities of companies and departments involved in commercial, industrial, wholesale, and e-business sales, marketing, advertising and public relations. There are employment possibilities in commercial, industrial, wholesale establishments, marketing and public relations consulting companies, and by government departments having a scientific focus. Some examples of careers in this area include:

### **Customer Service Representative\***

Through the use of various media or in person contact, customer service representatives handle customer inquiries concerning scientific and technical products and services, and manage and resolve customer complaints.

### **Green Marketing Analyst\***

Using the knowledge of biochemical molecules and their interaction with the environment, analysts will generate new or improved ways to incorporate environmentally conscious products onto the market. Analyses of sales data and consumer spending habits will also be performed while working in conjunction with other marketing team members and graphic designers.

### **Pharmaceutical Sales Representative\***

Utilizing your scientific knowledge about chemical interactions and toxicology, will advertise and sell a pharmaceutical company's products to physicians, hospitals, and pharmacists. Sales representatives may also involve conducting sales meetings, giving presentations, and maintaining up to date knowledge about employer's products. Sales experience is helpful.

## (2) Business<sup>2,4,8</sup>

This sector encompasses employment in various areas from administration to management and everything in between. It involves planning and developing new methods for operations and analyzing information, in addition to supervising the staff responsible for that information. Some examples of careers in this area include:

### **Health Information Administrator**

In hospitals, clinics, rehabilitation centers, insurance companies, and nursing homes, health information administrators will utilize their basic knowledge of



biochemistry and their organizational skills to plan, develop, and maintain systems for managing health records that abide by current medical, ethical, and legal requirements. This occupation also requires the management of medical records personnel, patient and institutional data, and maintenance of confidentiality of such information.

### **Quality Control Analyst\***

Utilizing the sample analysis skills developed in undergraduate laboratory classes, analysts will inspect, test and analyze sampling procedures on raw materials and finished products, and record test results. Employed in a variety of settings, quality control analysts ensure that results are obtained properly, safely, and in accordance with standardized regulations. May also be required to develop and implement quality control standards for laboratories to follow.

### **Regulatory Affairs Specialist**

Enforce compliance with government and industry laws and regulations regarding manufacturing and marketing of health care products such as pharmaceuticals, medical equipment, biotechnology products, and nutritional supplements. By understanding the chemistry behind products, will be able to assist in obtaining Health Canada approval for products, and to conduct clinical studies. May also advise project managers and review technical documents. Position requires post graduate diploma.

## **(3) Corporate Communication<sup>5,8</sup>**

Involved in assisting private sector, public sector, and non-profit organizations in explaining their actions, policies and services having a scientific basis effectively to customers, clients, the public, and employees using various media; involves determining the target audience and the best way to get the information across. May also include assistance with the departmental budget and evaluating the effectiveness of past communication delivery methods. Some examples of careers in this area include:

### **Public Relations Specialist\***

Write articles for internal publication such as within a medical, pharmaceutical, or other company having a chemistry or biology basis, write press releases, arrange speaking engagements, and assist in fundraising activities. Work in a variety of settings: companies (especially scientific, pharmaceutical or biotech), government, non-profit, and education.

### **Technical Writer\***

Utilize your writing skills and knowledge of laboratory equipment and their operation to write technical materials, such as manuals for laboratory equipment, appendices, or operating and maintenance instructions.

### **Web Designer\***

Through knowledge of computer applications, imaginative and appealing websites for scientific or technical companies in addition to websites for scientific information are created that accommodates the clients' requirements. Creativity is incorporated through selection of layout, colour, text, and images. The website may be updated/maintained site as needed, and using the scientific knowledge obtained through undergraduate studies, can contribute to content of websites.

## **(4) Environment and Outdoors<sup>4,8</sup>**

The environment is continuously changing, especially as a result of human influences such as the use of pesticides and the running of power plants. The environmental changes are therefore monitored through collection of physical samples for laboratory analysis and scientific research, and results used to assist in developing policies and programs concerning environmental management. Wildlife species are also observed to determine population trends and assess protection requirements. Some examples of careers in this area include:

### **Alternative Energy Specialist\***

Using an understanding of thermodynamic principles including efficiency and performance, and some engineering knowledge, alternative energy specialists will design new systems utilizing renewable energy sources such as solar panels and wind turbines that will replace traditional machinery; may also act as in association with utility companies. Entry-level technician jobs are available and some companies such as General Electric offer training programs for university students.

### **Environmental Science and Protection Technician\***

The environment is monitored through laboratory and field tests while investigating sources of pollution, including those sources that may affect public health. Some samples that may be collected are water, soil, gases, and animal/plant matter, and upon testing, action will be taken where required.

### **Recycling Coordinator\***

Utilizing the knowledge of chemical reactions and interactions, recycling and hazardous waste programs are designed and applied in conjunction with city governments or private companies. Public campaigns may also be carried out concerning recycling issues to ensure responsiveness to common problems and

concerns. Reports for the status of recycling program in terms of success and finances may also be prepared.

## (5) Government<sup>7,8</sup>

The government is largely involved in the application and enforcement of law, public policy and regulations. Biochemistry graduates with an interest in government can work in conjunction with businesses involved in scientific testing or development to ensure they meet standards and help get new products approved, or develop/modify programs which set the standards. Some examples of careers in this area include:

### **Environmental, Health and Safety Manager\***

Utilize an understanding of the chemical, biological or pharmaceutical products and law to develop programs and processes for companies having a scientific basis to ensure compliance with federal, state, and local laws. Requires an in depth knowledge and awareness of environmental regulations; may also act in concert with environmental regulators from government agencies.

### **Patent Examiner\***

Patent examiners are involved in the review of scientific patent applications to determine whether they should be approved through assessment of compliance with regulations, determining the scope of the invention claimed by the inventor, researching similar prior inventions claimed in patent application, and communicating findings. Work for Canadian Intellectual Property Office.

### **Legal Assistant\***

Utilizing knowledge of biochemistry allows for assistance in management of lawyer's practice by researching past legal precedent and facts, and preparation of legal documents for cases relating to pharmaceuticals, scientific techniques, or protocols. Also, routine legal and administrative duties including correspondence and management of files may be required. Usually requires completion of a legal assistant/paralegal certificate/diploma program.

## (6) Human Services<sup>2,8</sup>

The human services industry comprises a broad range of services and facilities provided by public, semi-public, and private agencies. The roles of biochemists in this area are vast and can involve providing biological, chemistry or pharmaceutical-based knowledge to adult care facilities, group homes, mental health facilities, homeless and other types of shelters, or to provide testing of samples in any of these facilities. Some examples of careers in this area include:

### **Child Life Specialist**

Involves utilizing your knowledge of drugs, diseases, and disorders to act as an advocate and information source for children and collaborate with medical teams to determine the best options available in terms of treatment or next steps. Through the completion of additional education in counseling, child life specialists will alleviate the stress of hospitalization for children and their families through play therapy and other kinds of counseling.

### **Community Organizer**

Community organizers are highly involved in the community to help identify social problems and establish community groups to solve them. Biochemistry majors in this area can focus on problems involving drug and chemical abuse given their knowledge of the symptoms of exposure outlined on Material Safety Data Sheets for these substances. They can also assess the strengths and weaknesses of existing resources and propose changes in association with government agencies, nonprofit organizations, and other community groups.

### **Patient Advocate**

By representing the interests of patients/consumers in healthcare settings, patient advocates will explain medical procedures, services and policies, help to alleviate patient concerns and problems, and act as an advocate for patients with health care staff. Occasionally, they would also provide resources, information, and referrals to patients and their families.

## **(7) International<sup>5,8</sup>**

International affairs involves mediating interactions between foreign countries and Canada or the US. This mediation can be in the form of coordinating settlements, analyzing reports, buying and selling goods, or relaying knowledge to supervising officials. Some examples of careers in this area include:

### **Foreign Services Officer**

Utilizing their knowledge of biology and chemistry, foreign services officers analyze and report on agricultural trends such as food production and pesticide usage, pharmaceutical developments, and health issues. They are able to assess the benefits of biochemical products and identify export markets, negotiate international agreements, and interpret policies and interests for foreign governments, leaders, and the public.

### **Import/Export Agent**

Through an understanding of the needs of domestic and foreign sellers and buyers, import/export agents coordinate settlements concerning scientific based products

and services. They also act as trade representatives in these interactions and oversee delivery and shipping, in addition to handling any customs concerns and taxes.

### **Intelligence Officer**

An intelligence officer is a member of the armed forces, police officer, or civilian intelligence agency who specializes in the collection, interpretation, and analysis of information and intelligence pertaining to biochemical areas such as international exchanges (food, natural resources), or weaponry (biological warfare) and provide advice to their government or other organization.

## **(8) Media/Publishing<sup>5,8</sup>**

Professional writing can take form in a variety of areas in many different genres. Biochemistry majors with a passion for writing or publishing may choose to enter fields where they can be involved with scientific journals, textbook editing, science-based television shows or internet websites. Some examples of careers in this area include:

### **Copy Editor\***

Through utilizing excellent language skills and biochemistry knowledge, scientifically based manuscripts are reviewed for grammar and style usage. Copy editors may also develop style guides, supervise freelance staff, and handle author queries.

### **Science Writer\***

Using an understanding of chemistry and biology, scientific writers explain and describe scientific concepts and terminology in clear, simple language. This type of writing can be included in textbooks, instruction manuals, documentary scripts, grant proposals, and public relations or medical writing. Employment areas are frequently in companies, government agencies, nonprofit organizations, or freelance.

### **Scientific/Environmental Journalist\***

The inquisitive mind of a journalist is applied to conducting research, reading background information, and interviewing scientists and experts to write about issues of scientific and environmental interest. Topics can include presence of pesticides in natural water sources, new pharmaceuticals, and gene therapy. Employment areas are frequently for magazines, newspapers, media companies, nonprofit organizations, or freelance.

## IV. Preparing for a Career in Biochemistry

The biochemistry major provides a strong background for employment in a number of different areas. Depending on your interests and career goals, which may change during your undergraduate career, there are some fundamental skills in addition to those acquired during coursework that can be developed. In addition, practical experiences can be obtained during your undergraduate degree that are applicable to a majority of areas.

Interpersonal and communication skills are vital in any job that you choose, as you'll likely spend some time writing or making verbal presentations, and interacting with many different types of people. So, it would be useful to take at least a few courses where you are required to do a lot of writing and engage in community/volunteer work that demonstrates your communication and interpersonal skills. Computer skills also always seem to be in demand, so taking computer courses or teaching yourself computer skills on your own is a good idea.

Although coursework imparts you with some hands on experience in biochemistry, it may be limited and other sources of experience are required. At UTM, there are many opportunities available to enhance your undergraduate experience that includes, but is not limited to:

### (a) UNIVERSITY CLUBS & ASSOCIATIONS

A student organization or club is a way to demonstrate your interest in a particular field and is a great way to gain relevant experience, especially when involved in executive and director roles. Often, campus clubs liaise with industry professionals which you can utilize to expand your networking contacts. A brief sample of campus clubs is listed below:

- UTM Pre-Med Club
- UTM Erindale Biology Club
- UTM Erindale Chemistry Club
- UTM VIDA Club

For more information about the clubs available at all three U of T campus bodies, visit: <http://ulife.utoronto.ca/>.

### (b) RESEARCH OPPORTUNITY PROGRAM (ROP)

Students take part in a full year research project with a U of T professor during the school year or summer while also receiving a 1.0 course credit. Through this program, you will gain hands on, practical experience and knowledge that can be applied to careers or to future graduate studies. For more information or for project descriptions visit <http://www.utm.utoronto.ca/428.0.html>.

#### (c) INTERNSHIPS AND EXPERIENTIAL LEARNING

Many of the fourth-year UTM courses have opportunities for unpaid internships with professors or industry professionals. Students have the opportunity to obtain real-world experience while expanding on the theoretical knowledge obtained during undergraduate courses, and making important networking contacts. A non-exhaustive list of available opportunities includes chemistry research (CHM489), and forensics, biology, and environment internships. For a complete list and more information on internships and experiential learning opportunities visit:

<http://www.utm.utoronto.ca/500.0.html>

#### (d) WORK STUDY POSITIONS

The Work Study program provides part-time employment for OSAP eligible students during the school year while offering a means to obtain practical experience related to your field of study. This program allows students the chance to explore academic fields and potential career areas which may include conducting research, performing administrative duties, and/or carrying out technician duties such as setting up apparatus for chemical reactions and preparing compounds. For more information about Work Study positions and eligibility visit

<http://www.adm.utoronto.ca/fa/workstudy.htm>.

#### (e) SUMMER LABORATORY POSITIONS

Many UTM professors hire students to work on research projects during the summer. Most professors prefer hiring students with whom they are familiar or have excelled in their class as they are already aware of that student's abilities and interests. If there is a professor you are interested in working with, ask them directly if they are looking for some assistance with their research. A listing of professors and their contact information is available through the departmental websites:

<http://www.utm.utoronto.ca/index.php?id=303>.

#### (f) SCIENCE OUTREACH

Science Outreach offers hands on science and engineering workshops to students grades K-8 across Ontario. It is a student-driven, not-for-profit organization at the University of Toronto which offers both volunteer and employment opportunities. For more information about the organization and how to get involved visit:

<http://www.ecf.utoronto.ca/~sciout/explore/workshops.html>

(g) NATURAL SCIENCES & ENGINEERING RESEARCH COUNCIL OF CANADA (NSERC) RESEACH OPPORTUNITY

NSERC supports the development of highly qualified Canadians in the natural sciences and engineering through a number of scholarships and fellowship programs. These programs are intended to stimulate the interest of undergraduate students in research; provide financial support to graduate students and postdoctoral fellows engaged in advanced studies and research; and assist recent recipients of doctoral degrees in adding to their research experience. For more information visit:

[http://www.nserc-crsng.gc.ca/Students-Etudiants/index\\_eng.asp](http://www.nserc-crsng.gc.ca/Students-Etudiants/index_eng.asp)

(h) PROFESSIONAL ASSOCIATIONS/INSTITUTES

- Canadian Society of Biochemistry, Molecular & Cellular Biology (CSBMCB)  
This is a national membership society for professional biochemists. Check out the postings in the Jobs section and the Links part of the site.  
<http://www.csbmcb.ca>
- International Union of Biochemistry and Molecular Biology (IUBMB)  
This is a website of an international society for biochemists.  
<http://www.iubmb.org>
- Canadian Society of Clinical Chemists (CSCC)  
This is a national society for clinical biochemists. Learn about the role of clinical biochemists under Academy, and about the Clinical Biochemistry certification process.  
<http://www.csc.ca>
- American Chemical Society (ACS)  
Become a student affiliate of the ACS and participate in a wide range of programs and activities that enhance your undergraduate experience and help to prepare you for a successful career.  
[www.acs.org/](http://www.acs.org/)
- National Science Foundation (NSF)  
The NSF is an independent US government agency responsible for promoting science and engineering through research programs and education projects.  
[www.nsf.gov/](http://www.nsf.gov/)
- Job Futures: Physical Science Professionals  
<http://www.jobfutures.ca/noc/211.shtml>



Below is a sample of the types of positions that have recently been posted with the Career Centre for graduating students or recent graduates. To access full-time opportunities (for up to two years after graduation), you must first attend an orientation. Drop by or call us at 905-828-5451 for more information.

- *Chemist*, Health Canada-Drug Analysis Service, Scarborough, ON
- *Associate Analyst*, Ineterface Biologics, Mississauga, ON
- *Clinical Research Coordinator Assistant*, Cetero Research (Allied-Research International), Mississauga, ON
- *Presenter-Science Education*, Ontario Science Centre, Toronto, ON
- *Editorial Assistant*, Journal of Clinical Biochemistry, Toronto, ON
- *Quality Control Analyst-Level 1*, NPS Pharmaceuticals, Mississauga, ON

## V. Further Education

Although entrance into many of the occupations mentioned throughout this package can be accomplished with a BSc and experience, an advanced position having more responsibility usually requires further education. This education may include graduate, professional, or post-graduate programs. Further education can help in achieving your career goals as it often provides you with real world experience that cannot always be obtained through undergraduate education alone. Examples of such experience may include mentorship by a professional in the industry, co-op components included in some of the programs, or participation in research projects.

Upon completion of a BSc in biochemistry, you have the option to study biology, chemistry, biochemistry, or another related field at a Master and/or PhD level, attend certain professional schools to obtain accreditation in that area, or enroll in post-graduate diploma programs that often have a co-op component. Outlined below is a general guide for the job levels available with each type of university degree. In addition, listed below are Ontario Universities which offer programs in biochemistry<sup>8</sup> [however, there are programs available in other provinces and in other related areas as well], and Ontario post-graduate diploma programs in areas relating to biochemistry<sup>9</sup>. Further information on programs in Ontario can be found at the UTM Career Centre website under the Further Education section, at <http://www.petersons.com/> for graduate program information, and at <http://www.ontariocolleges.ca> for post-diploma program information.

Undergraduate degree: sufficient for entry-level positions such as lab coordinator, research assistant, product testing or analysis, technical sales, or service representative

Master's degree: sufficient for most applied research positions, industrial work, and some community college teaching.

Ph.D. degree: required for university teaching and advanced positions in management, and research and development.

School	Program	Website
<i>MSc/PhD UNIVERSITY PROGRAMS</i>		
McMaster University	Biochemistry	<a href="http://www.mcmaster.ca/">http://www.mcmaster.ca/</a>
McMaster University	Chemical Biology	<a href="http://www.mcmaster.ca/">http://www.mcmaster.ca/</a>
Queens University	Biochemistry	<a href="http://www.queensu.ca/">http://www.queensu.ca/</a>
University of Ottawa	Biochemistry/Biochimie	<a href="http://www.uottawa.ca/">http://www.uottawa.ca/</a>
University of Toronto (St. George)	Biochemistry	<a href="http://www.utoronto.ca/">http://www.utoronto.ca/</a>
University of Western Ontario	Biochemistry	<a href="http://www.uwo.ca/">http://www.uwo.ca/</a>
University of Windsor	Biology and Chemistry	<a href="http://www.uwindsor.ca/">http://www.uwindsor.ca/</a>
<i>POST-GRADUATE DIPLOMA PROGRAMS</i>		
Centennial College	Biotechnology Technician-Industrial Microbiology	<a href="http://www.centennialcollege.ca/">http://www.centennialcollege.ca/</a>
Sheridan College	Environmental Control	<a href="http://www1.sheridaninstitute.ca/">http://www1.sheridaninstitute.ca/</a>
Seneca College	Pharmaceutical Regulatory Affairs and Quality Operations	<a href="http://www.senecac.on.ca/">http://www.senecac.on.ca/</a>
The Michener Institute	Diagnostic Cytology	<a href="http://www.michener.ca/">http://www.michener.ca/</a>
The Michener Institute	Genetics Technology	<a href="http://www.michener.ca/">http://www.michener.ca/</a>

\*Information current as of May 2009; for more information visit [CareerCruising.com](http://CareerCruising.com) and [OntarioColleges.ca](http://OntarioColleges.ca)

For more information on careers requiring further education, please visit our library or speak to a Career Counsellor.

## VI. Career Centre Services

The UTM Career Centre offers many services and resources to aid with your career planning. These include:

### INDIVIDUAL COUNSELLING APPOINTMENTS:

If you're unsure about your career direction or need some insight on the career opportunities available to you, then book an individual counselling appointment and speak with a professional Career Counsellor. Individual

appointments can also be used to receive feedback on personal statements for graduate/professional school applications.

## RESUME/COVER LETTER TOOLKIT & RESUME CRITIQUES

Whether it's your first time writing a resume, or you would like to polish up your existing one, the online resume and cover letter toolkit assists you in creating an effective resume and cover letter, tailored to your job area of interest. After using the toolkit, you can book an individual 30 minute resume critique appointment with one of our Career Centre staff.

## EMPLOYMENT SERVICES

If you're graduating this year or are a recent grad, the Career Centre has available to you programs that will help in your job search. The Graduating Student Employment Service (GSES) for students in their final year of university and The Recent Graduate Employment Service (RGES) for recently graduated students connects you with employers looking to hire university graduates, while also preparing you for accessing jobs in the hidden job market. The Career Centre also offers all students access to postings for summer employment, part-time/temporary, on campus and volunteering opportunities. Register for a Career Centre account by going to our website and clicking on 'Job Postings'.

## WORKSHOPS

Many workshops are held throughout the year that may assist you in defining your career path and make informed career choices. Some workshops that may be of interest to you include:

- Your B.S.c Under The Microscope
- The Road To Graduate School
- Is Teaching in your Future?
- Law School Information Session
- Getting Into Medical School
- Networking Workshop
- Effective Interviews Workshop
- Resume And Cover Letter Workshop

For more information on any of these workshops visit the Career Centre website. Our events calendar has upcoming workshops listed.

## EVENTS

Throughout the Fall and Winter academic terms the Career Centre holds many career fairs, employer recruitment sessions, career and industry panels,

networking events and more. For more information, visit the Career Centre website under Events. Some annual fairs that may be of interest to you are:

- Summer Job Fair (January)
- Career Expo (October)
- Professional Schools Fair (October)
- Get Experience Fair (September)

#### EXTERN JOB SHADOWING PROGRAM

Explore a career by meeting with professionals in that area for one to four days. Extern participants are given the opportunity to observe their sponsor and other staff members as they carry out their daily activities, tour the sponsors establishment and facilities, and meet with the sponsor to discuss their career and industry. More information on Extern is available on our website in the Explore Careers section.

#### ALUMNI CAREER CONNECTIONS PROGRAM

Gather valuable, industry-specific information from UT Mississauga alumni professionals through an informational interview or an informal one-on-one mentoring. Check our website for more details.

#### CAREER RESOURCE LIBRARY

Information about careers and career planning, professional schools, effective work search methods, employer directories, information interview contacts, work/study abroad information, and more are available at the Career Centre. Computers are available for student use where you can access the internet, job postings, and the Canadian electronic career guide, Career Cruising.

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