



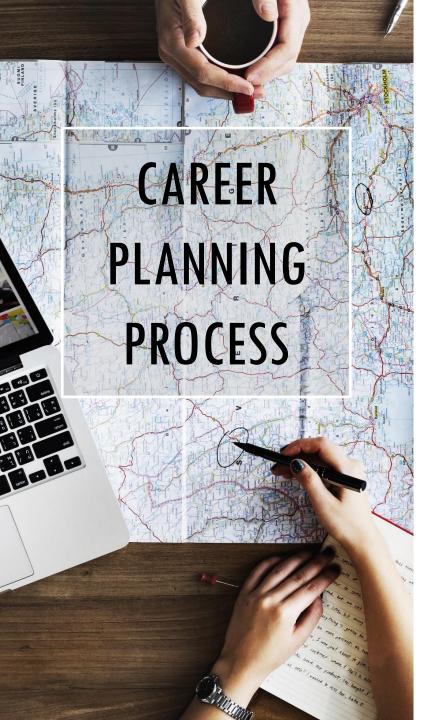
WE HELP STUDENTS:

- LEARN ABOUT OCCUPATIONS & INDUSTRIES
- EXPLORE SELF & MAKE CAREER DECISIONS
- Plan Career & Education Pathway
- FIND MEANINGFUL WORK & VOLUNTEER ROLES
- REACH THEIR CAREER & EMPLOYMENT GOALS











Know yourself

Gather career information

Gain experience

Decision Making

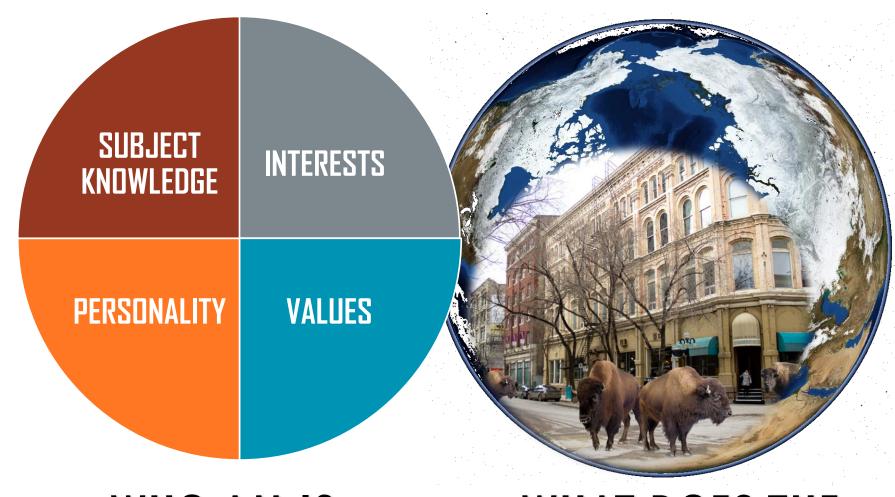
Choose an Occupation(s)



Select an educational pathway

Goal Setting

Implementing a success plan



WHO AM I?
WHAT MATTERS TO ME?

WHAT DOES THE WORLD NEED?

National Occupational Classification

CANADA'S "OCCUPATIONAL **ENCYCLOPEDIA**"

Hierarchy and structure

National Occupational Classification > Hierarchy and structure

Filter items:

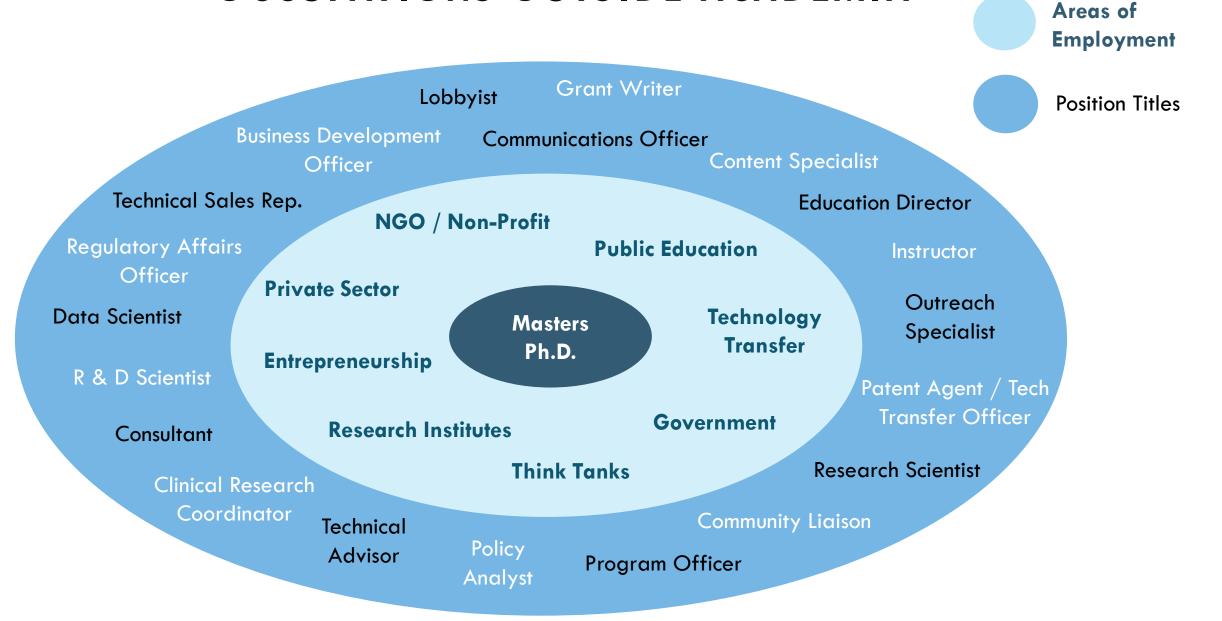
Expand all

Search Canada.ca

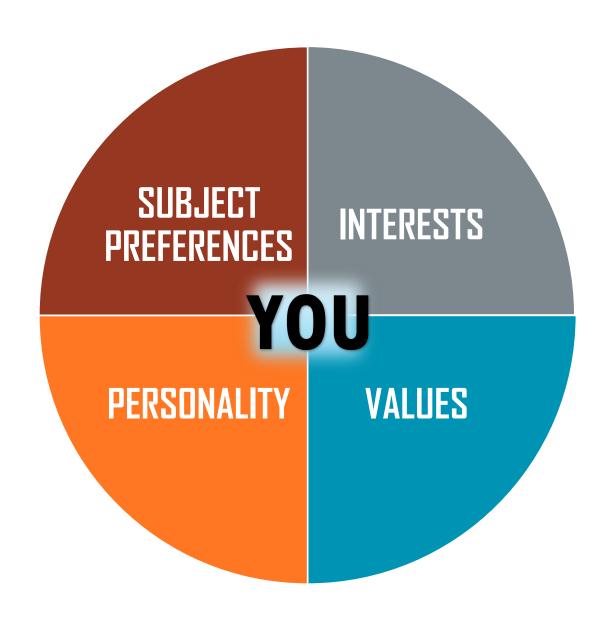
Collapse all

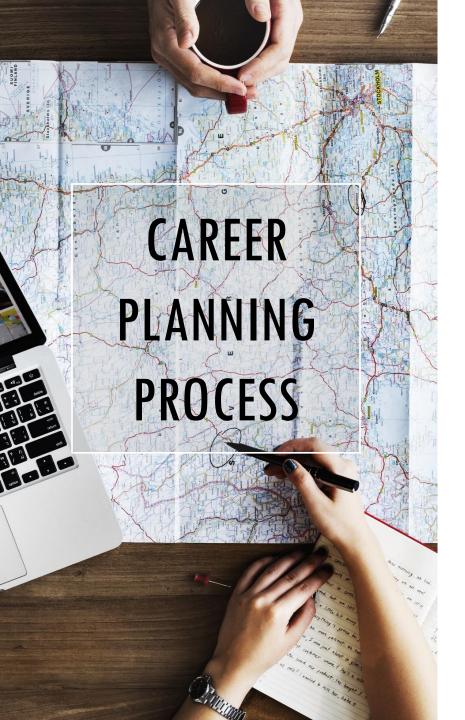
- Management occupations
- Business, finance and administration occupations
- Natural and applied sciences and related occupations
- Health occupations
- Occupations in education, law and social, community and government services
- Occupations in art, culture, recreation and sport
- Sales and service occupations
- Trades, transport and equipment operators and related occupations
- Natural resources, agriculture and related production occupations
- Occupations in manufacturing and utilities

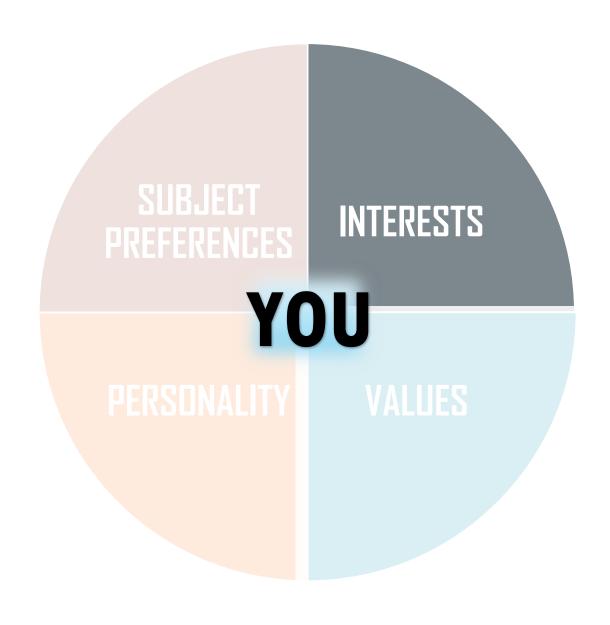
OCCUPATIONS OUTSIDE ACADEMIA













THINGS

INVESTIGATIVE (THINKERS)



PEALISTIC DOEPS knowledgeable, curious

Practical, hands-on, tangible work

Research-oriented,

(RENORS) Expressive, creative, visual

Structured, COMENTONAL organized, careful

Influential, energetic, sociable, leader

Helping, empathetic, communicative, friendly

SOCIAL MELPERS

ENTERPRISING (PERSUADERS)

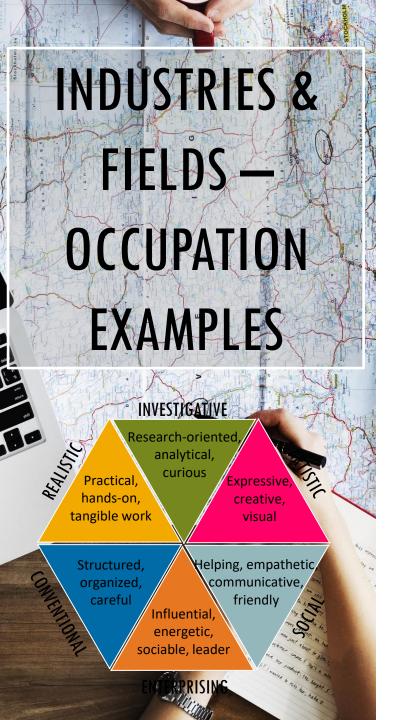


Round table introductions:

- 1. First Name
- 2. Department / Area of study
- 3. Your estimated Holland Code
- 4. Current occupational goals/ideas

4 minutes





PROFESSOR/INSTRUCTOR

Social Investigative

R&D SCIENTIST

Investigative Realistic

POLICY ANALYST

Investigative Enterprising

DATA ANALYST

Conventional Investigative

TECHNICAL SALES REPRESENTATIVE

Enterprising Conventional

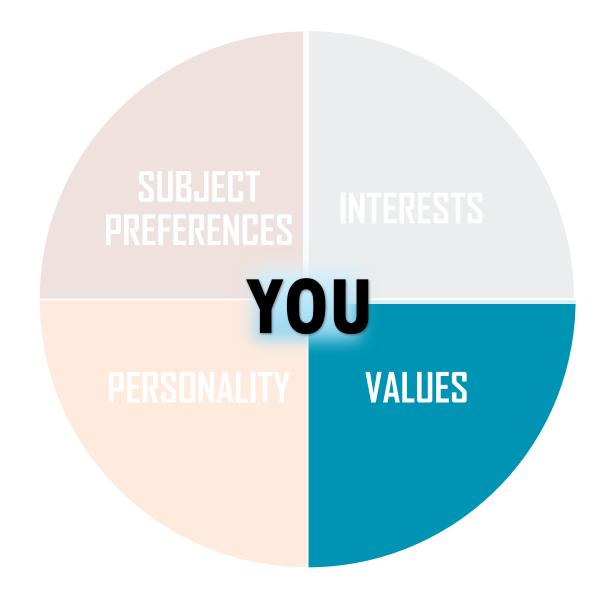
SCIENTIFIC WRITERS

Artistic Investigative

REGULATORY AFFAIRS
SPECIALIST

Conventional Enterprising





YOUR VALUES: WHAT MOTIVATES YOU TO WORK?

HELP OTHERS

Provide direct support to people individually or in groups.

WORK UNDER PRESSURE

Be involved in work with time limitations or little margin for error.

PUBLIC CONTACT

Frequently interact with the public or community.

ADVANCEMENT

Grow and move into positions of higher pay and responsibility.

SECURITY

Have a high likelihood that my job is secure and normally in steady demand.

JOB TRANQUILITY

Have peaceful work with minimal pressure or stress.

CHANGE & VARIETY

Have frequently changing tasks, settings or other factors.

COMPETITION

Compete to win or be compared against others.

LOCATION

Live and work where I want. (E.g. a specific location or urban vs. rural, etc.)

ADVENTURE

Work in an exciting or risky job where I may deal with hazards or uncertainty.

WORK WITH OTHERS

Be involved in teamwork or work with others to achieve shared goals.

INTELLECTUAL STIMULATION

Complete work with a high degree of mental activity in the form of problem solving, analyzing, researching or continuous learning.

STRUCTURE & PREDICTABILITY

Complete work that predicable, with a high level of structure or routine.

HIGH EARNINGS

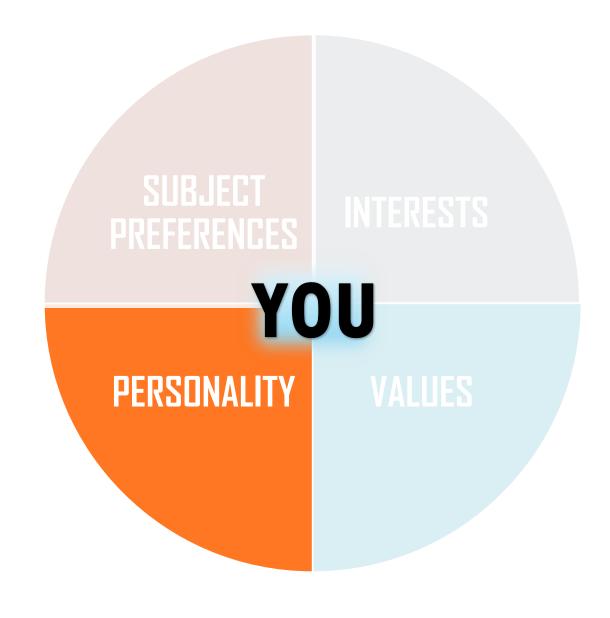
Earn a high salary and have the ability to purchase desired luxuries or accumulate wealth.

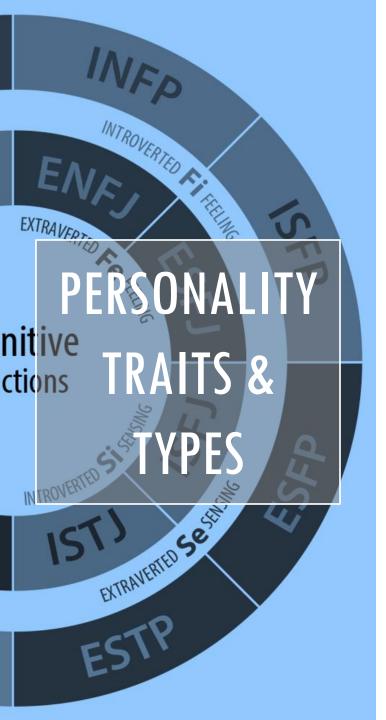
ARTISTIC CREATIVITY

Utilize one or several art forms to express ideas.

33

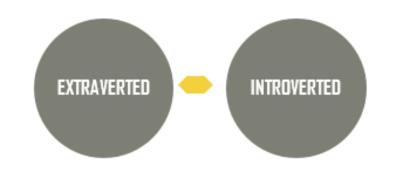


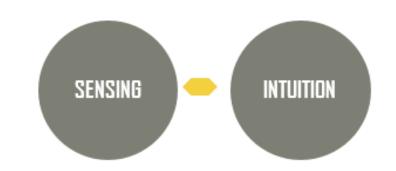




HOW YOU INTERACT WITH THE WORLD

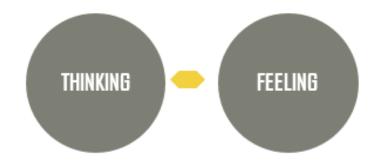
HOW YOU EVALUATE INFORMATION

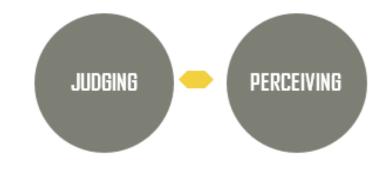


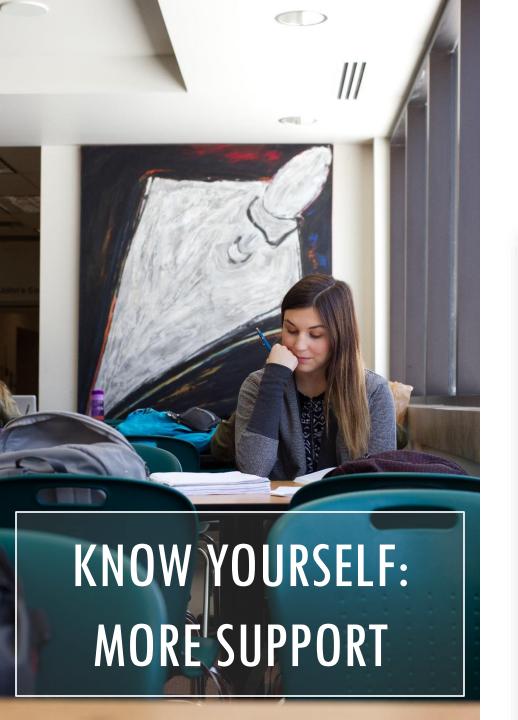


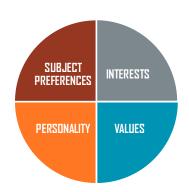
HOW YOU MAKE DECISIONS

HOW YOU TACKLE LIFE OR WORK PROJECTS











✓ TRY ONLINE ASSESSMENTS TO START

THE CAREER PLANNER ONLINE

umanitoba.ca/career-services/career-planning

Iden

pref

DUR FAVOURITE ASSESSMENTS: Personality, Interests & Values





YOUR INTERESTS

The Holland Code can by used to connect occupations to an indix measure your interest level in 6 areas then generate a list of care interests to yours. The idea is that if you are similar to people wh

MyNextMove

<u>MyNextMove</u> is a free web-based assessment tool that provides your Holland Code and a list of corresponding occupations. All labour market information is American.

www.mynextmove.org/explore/ip

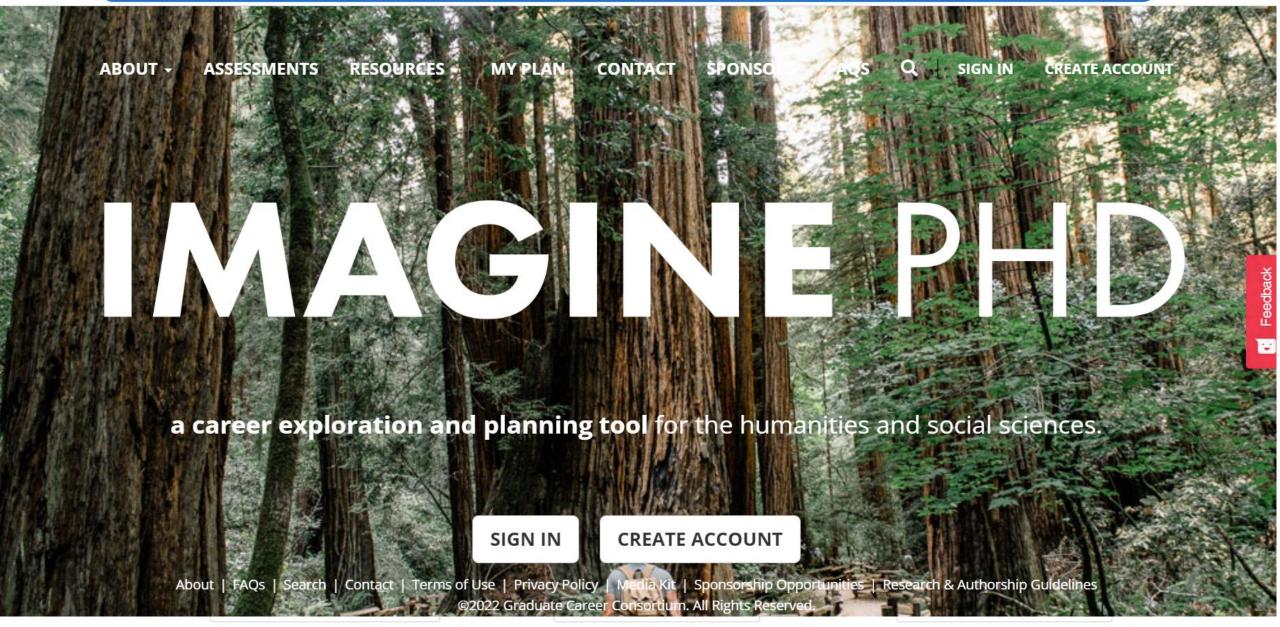
The Holland Code assesses your interests according to six dimens

























CONTACT US | ABOUT myIDP **SCIENCE CAREERS** LOG ON I





You have put a lot of time and effort into pursuing your PhD degree. Now it's time to focus on how to leverage your expertise into a satisfying and productive career. The Individual Development Plan (IDP) concept is commonly used in industry to help employees define and pursue their career goals. In 2003, the Federation of American Societies for Experimental Biology (FASEB) proposed an IDP framework for postdoctoral fellows in the sciences. AAAS/Science joined forces with FASEB and experts from several universities (see authors below) to expand on that framework. The result is myIDP - a unique, web-based career-planning tool tailored to meet the needs of PhD students and postdocs in the sciences.

myIDP provides:

- Exercises to help you examine your skills, interests, and values
- A list of 20 scientific career paths with a prediction of which ones best fit your skills and interests
- A tool for setting strategic goals for the coming year, with optional reminders to keep you on track











LIFE & PHYSICAL SCIENCES

- · Application Scientist
- · Regulatory Affairs Officer / Manager
- Technology Transfer Officer/Manager
- Technical Sales Rep
- R & D Scientist
- Principal Scientist/Investigator
- Clinical Research Coordinator
- Product Development Manager
- Product Marketing Manager
- Technical Advisor / Consultant
- Benchmark Analyst
- Patent Agent
- Technical Writer/Editor
- Science Writer
- Cannabis QC Tech (*MSc, PhD is an asset)
- Medical / Clinical Science Liaison
- Research & Technical Services Specialist



MATHEMATICAL SCIENCES (including, Physics, Statistics, Engineering, Computer Science)

- Data Scientist/Analyst
- Research Development Officer

Career Services

Career planning

Explore occupations

Volunteering during COVID-19

Employment resources for students

Career fairs

Career Mentor Program

UM Café: Ten Thousand Coffees

Co-ops and internships

Connect with and recruit students

Wage Subsidies for Employers









Note those titles you are familiar with / that may align with your current goals.

Note any NEW titles that you may wish to explore.

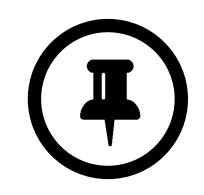
4 minutes







LINKEDIN



JOB POSTINGS



ALUMNI NETWORK



FIRST-HAND EXPERIENCE

(work & volunteer)



CAREER MENTOR PROGRAM



UM OCCUPATIONS LIBRARY



About U of M Admissions Community

Home / Career Services / Career planning / Explore occupations

Explore occupations

Lawyer, teacher, doctor, nurse. How many occupations can you name? What the heck does an occupational therapist do anyway? How about a valuator, conservator, arborist or orthoptist?

Good career decisions require good information-about your personal traits and preferences and about the world of work. Career Consultants can get you started by helping you to identify and articulate your skills, aptitudes, values, personality traits and interests as they relate to career choice.

Information about the world of work is everywhere-not just in libraries and career centres. Even television shows can influence your views of specific occupations. Government departments, sector councils and professional associations publish great labour market information. Personal contacts are extremely valuable, often providing "up-close and personal" views of occupations. Mentoring and job shadowing programs can help you develop professional networks. Don't forget to speak with teachers, professors, friends and relatives!

We've provided information on approximately two hundred occupational options. Thousands more exist! Be creative. Remember-good research can lead to more informed and satisfying career decisions!



Α

Accommodation Service Manager

Accountant

Actuary

Aerospace Engineer

Agricultural Representative, Consultant, Specialist

Agriculture, Food and Biological Systems Engineer

Career planning

Explore occupations



Admissions

Academics

Home / Career Services / Career planning / Explore occupations (Occ List)

University Professors & Lecturers and College Instructors

Learn about this occupation - including typical duties, education required, salary and outlook information, job boards and more.

University professors (4011) are employed by degree-granting schools to teach and produce works of art or conduct research and publish their research findings. College, technical and vocational instructors (4021) provide instruction to adults in a wide variety of subject areas including vocational, technical, business or services training, trades, academic upgrading, university transfer courses and university degree program courses. (alis)

those below, you may find relevant career information and job search resources st and specialist pages relevant to your discipline (e.g. Biologist, Historian). cupational index to also explore those pages

Does this

Holland Code

Investigative Enterprising

What is a Holland Code?

What is the job like?

Occupational profile

Find detailed information about the occupation, including typical duties and working conditions, in the links below:

- National Occupational Classification (NOC) Canadian occupational d
 - University Professors and Lecturers 27
 - College and other Vocational Instructors ☑
- OCCinfo by alis Alberta-based occupational information ☑

What are the educational requirements or degree options?

Education

University Professors are required to have a doctoral degree in the field of specialization. A master's degree in the field of specialization is required for university lecturers. University professors who are also practitioners in their field must have appropriate licenses or certification. (NOC)

Other links

These external resources may provide you with additional information about the occupation and opportunities to build experience.

- #GradGoals online guide for University of Manitoba Master's and PhD students
- University of Manitoba Graduate Students Association (UMSGSA) ☑
- Grad Steps: Professional Development Workshops University of Manitoba
- Centre for the Advancement of Teaching & Learning University of Manitoba
- University of Manitoba Faculty Association 2
- Academics Without Borders 2
- Inside Higher Ed. news articles and career advice 2
- Article: College professors reveal what they love (and hate) about their jobs BusinessNewsDaily.com &
- University Affairs Canada's magazine on higher learning, providing career advice and industry info @
- Article: What I wish I knew as an early-career professor @
- Canadian Network for Innovation in Education
- Academica Forum Canadian post-secondary news and insights @
- Science Careers magazine North American-focused articles and career advice from the American Association for the Advancement of Science (AAAS) 2
- Individual Development Plan (myIDP) career exploration and planning tool for graduate students in natural and applied sciences 🗗
- Imagine PhD- career exploration and planning tool for the humanities and social sciences (North America) [2]
- Times in Higher Education (THE) provides global data, insight and &career advice &
- Canadian Association of Graduate Studies ☑
- Academic Matters magazine from the Ontario Confederation of University Faculty Associations &
- Cheeky Scientist Blog resources and profiles of PhDs working in industry/non-academic positions &
- Profile and Labour Market Outcomes of Doctoral Graduates from Ontario Universities (pdf) Higher Education Quality Council of Ontario 2
- UBC PhD Career Outcomes Report a University of British Columbia survey of 3,805 PhD students to learn about their career trajectory
- Employed and Engaged: An Overview of the 10,000 PhDs Project

Related occupations?

Related occupations

- Post-Secondary Teaching & Research Assistants

 (NOC)
- Teachers (Primary & Secondary School)

LOG OFF | CONTACT US | MY ACCOUNT | ABOUT myIDP | SCIENCE CAREERS



Previous Step



Next Step

Overview

Overview Summary Personal Information

Assessment

Skills Assessment Interests Assessment Values Assessment

Career Exploration

Consider Career Fit

Read About Careers

Attend Events Talk to People

Choose a Career Path

Create Plan

Career Advancement Goals Skill Goals

Project Goals

Implement Plan

Mentoring Team

Print & Export

Completion Certificate

Read About Careers

Quick Tips Resources My Notes

The table below lists the same career paths as on the prior "Consider Career Fit" page, again ordered by degree of match to your skills and interests.

Click on each "Read More" link to find resources associated with each career path.

Career Path	
Science policy: Public affairs/government affairs staff at scientific societies, foundations, government entities, or think tanks	Read More
Public health related careers: Public health program analyst or evaluator; epidemiologist; biostatistician; medical informaticist	Read More
Science education for non-scientists: Education or public outreach specialist such as at a science museum or scientific society	Read More
Support of science-related products: Technical support specialist; field application specialist; product development scientist or engineer	Read More
Teaching-intensive careers in academia: A primarily teaching faculty position in a research university, liberal arts college, community college	Read More
Research in industry: Discovery or preclinical researcher; manager of a research team or facility	Read More
Science education for K-12 schools: Classroom teacher; curriculum developer; science specialist	Read More
Combined research and teaching careers: Faculty at a liberal arts college or university whose job includes both research and major teaching responsibilities	Read More
Science writing: Science, medical, or technical writer or journalist; science editor; science publisher	Read More
Drug/device approval and production:	Read More



Advocacy

SAVED FOR FUTURE EXPLORATION

Back to All Job Families

Advocacy includes work that supports and engages decision makers on behalf of individuals, groups and/or communities. Roles exist in a range of sectors including Non-Profit/NGOs, Government/Politics, Higher Education, and Freelance/Independent opportunities.

PhDs with jobs in this family have titles that include:

Associate General Secretary for the National Council of Churches
Senior Coordinator for the Higher Education Quality Council of Ontario
Director at Toronto City Women's Alliance
Policy Advocate at International Center for Research on Women
Dept. Director at Trust Africa



Job Bar

Job search 🗸

Job Bank >

Electrical, Ele

Find key facts ar in this field. This

DO RECENT G

This prograr **EMPLOYED**

UNEMPLOYED

NOT LOOKING

All fields of **EMPLOYED**

ARE GRADUA



University of Manitoba

Winnipeg, MB - 92,917+ alumni - 111,745 followers

Where imagination and action collide.

Visit website ☑

Home About Life Jobs Alumni Ads

92.837 alumni Search alumni by title, keyword or company (Previous Next) Where they live + Add 80,133 | Canada 43,036 | Winnipeg, Canada Area 5,620 | United States 4,692 | Toronto, Canada Area

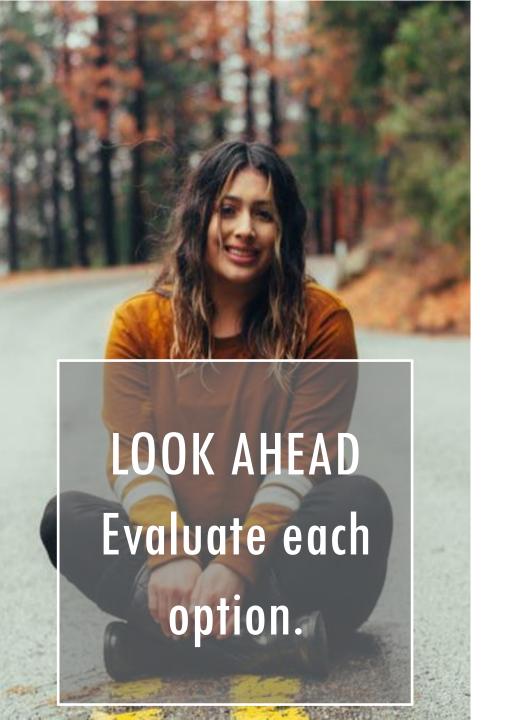
Wher Show more ~

UBC Faculty of Graduate & Postdoctoral Studies **UBC PhD Career** Outcomes Graduates from 2005-2013 **UBC Vancouver Campus**

「元の公子」。 「新して万里子を開



THE UNIVERSITY OF BRITISH COLUMBIA













Admissions

Academics

Research

Student Supports

Community

About U of M

Q

Home / Career Services / Career planning / Career Compass: Graduate Studies

Career Compass: Graduate Studies

Map out your career pathway from the start of your academic journey!

Engage in opportunities to support your career success, while learning about the knowledge, skills and attributes that employers are seeking!

This guide is intended to support graduate students in their career planning. Though useful for all graduate students, there is significant guidance for Master's and PhD students in thesis or research-focused programs. Students in all programs, including terminal or professional programs are also encouraged to utilize other resources provided by Career Services, your academic department and relevant professional associations. <u>Career Services' occupational library</u> is a hub for many of these resources.

To use this tool, click on the titles below to expand each section. **Graduate Studies at UM** includes an outline of skills students can expect to gain during their studies. **Sample Jobs** provides a listing of occupational titles that graduates might choose to pursue. **What do employers want?** highlights the top ten skills and qualifications for jobs requiring graduate-level education. Within the sections **Getting Started**, **Intermediate Steps**, **Final Steps**, tips and resources are organized within four subsections:

- 1. Personal and Professional Development,
- 2. Career Planning Tips,
- 3. Work & Volunteer Experience,
- 4. Community & Research Connections.

Career Services

Career Month

Career planning

• Explore occupations



KNOW WHERE YOU'RE GOING? PLAN WITH THE END IN MIND!





What skills, knowledge and industry exposure do **you have** already?



Competencies do Knowledge to gain?

Industry exposure & networking



Your career goal

What skills, knowledge and experience does the occupation or industry require?



PLAN FOR SUCCESS. DESIGN WITH THE END IN MIND!

Industry Knowledge

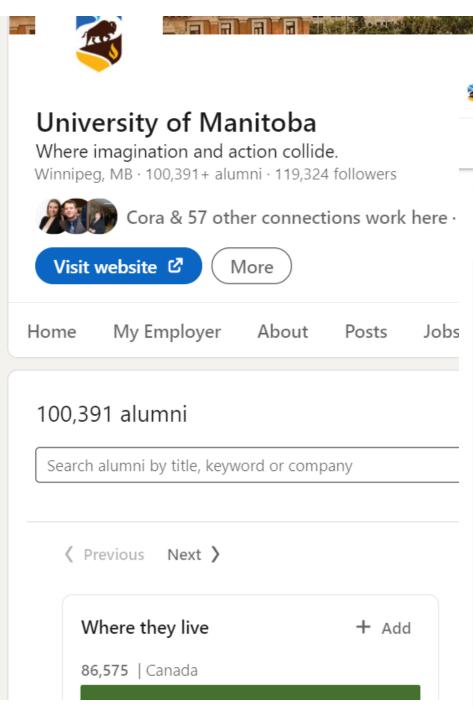
Report writing and written communication

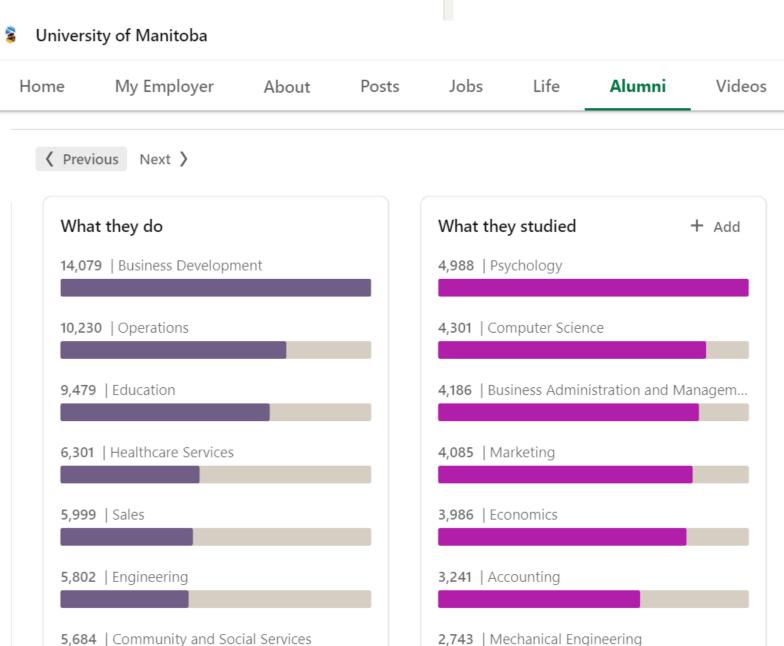
Teaching and supervision

Administration

Laboratory Skills
Customer Service

Melanie, M.Sc. in Chemistry **Biotech - R&D Scientist*** Clinical Research Coordinator ** TA, Research Assistant and GSA Executive Lab Technologist (summer job – biotech company), Cashier (part-time job – grocery retailer)



















Senior Data Scientist at City of Winnipeg



Senior Data Scientist

City of Winnipea May 2019 - Present · 1 yr 8 mos Winnipeg, Canada Area

Every day learning more about, and making connections among, governance, data strategy, data science, innovation, and more.



Research Assistant

Addictions Foundation of Manitoba, The Apr 2005 - Mar 2007 · 2 vrs Winnipeg, Canada Area



Manitoba Liquor & Lotteries

12 yrs 3 mos



Nov 2015 - May 2019 · 3 yrs 7 mos Winnipeg, Canada Area

- As a leader on the project team implementing the Manthan Re Operations, I tested that data flowed correctly to the new system the legacy systems to the new system, and guided users through
- I transformed numerous reporting processes, creating extensive



Manitoba Centre for Health Policy

5 yrs 8 mos

Statistical Analyst, Strategy & Business Development

Mar 2007 - Nov 2015 · 8 yrs 9 mos Winnipeg, Canada Area

 While I am trained in advanced analytics techniques, I also pror core issues. I created Strategic Gaming's slot machine occupancy changes between time-stamped events indicated when play had work, slot occupancy became a standard gaming performance m



May 2004 - Apr 2005 - 1 yr Winnipeg, Canada Area

 The Manitoba Centre for Health Policy (MCHP) has an amazing data infrastructure, and while I had limited direct access to the data, I was quite aware of the concepts and methods that made it so successful. Documentation has such a high priority and quality that the MCHP Concept Dictionary and Glossary for Health Services Research are generously shared worldwide. ... see more

I managed data export processes from administrative databases to facilitate data analysis.

After teaching myself to use Stata statistical software, I investigated data from three national

surveys, applied sample weights, and produced descriptive analyses and logistic regressions. I also

evaluated the Methadone Intervention & Needle Exchange program, analyzed data from ...see more

Research Assistant

Sep 1999 - May 2004 · 4 yrs 9 mos Winnipeg, Canada Area



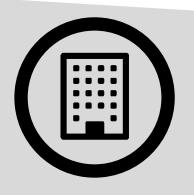




LABOUR MARKET



SECTORS



ORGANIZATIONS



JOB TITLES







Admissions

Home / Career Services / Career planning / Explore occupations (Occ List)

University Professors & Lea and College Instructors

Learn about this occupation - including typical duties, education outlook information, job boards and more.

University professors (4011) are employed by degree-granting schools to teach and produce works of art or conduct research and publish their research findings. College, technical and vocational instructors (4021) provide instruction to adults in a wide variety of subject areas including vocational, technical, business or services training, trades, academic upgrading, university transfer courses and university degree program courses. (alis)

In addition to those below, you may find relevant career information and job search resources on the scientist and specialist pages relevant to your discipline (e.g. Biologist, Historian). Revisit the occupational index to also explore those pages.

Occupational profile

Find detailed information about the occupation, including typical duties and working condition

- National Occupational Classification (NOC) Canadian occupational descriptions ☑
 - University Professors and Lecturers ☑
 - College and other Vocational Instructors ☑
- OCCinfo by alis Alberta-based occupational information &
 - University Professors and Lecturers includes video ☑
 - College, Technical and Vocational Instructors ☑
- O*NET Online U.S. resource for occupational descriptions and information ☑

Labour market information

Labour market information informs users of supply and demand for specific occupations and sectors. It includes such things as salary and job outlook information. These resources support informed career decision making and job search efforts.

Resources

- Trend Analysis: Job Market Reports (Winnipeg Region) Gov. of Canada Job Bank ♂

 - College, Vocational and Technical Instructors <a>™
- Occupational Outlook Handbook Job outlook for the U.S.
- Comparing the average salaries of Canadian professors in 2018 Maclean's magazine 2
- Article: Why Canada's professors are the best (best-paid, that is) Toronto Star news 2
- Faculty Compensation Survey American Association of University Professors 2
- Number and salaries of full-time teaching staff at Canadian universities (partial), 2019/2020 The Daily from Statistics Canada ♂

Professional Associations

Professional associations may organize events and provide directories, job postings, career and labour market information. Student membership opportunities may also be available: engage, learn and network!

- Canadian Association of University Teachers (CAUT) ☑
- American Association of University Professors (AAUP) [2]

Directories, Industry Associations, and Sector Councils

These resources provide industry news, labour market information and a list of potential employers. Remember, there are usually multiple industries worth exploring.

- Universities Canada member universities <a>™
- Colleges and Institutes Canada member directory 2
- Listing of private vocational institutions in Manitoba Government of Manitoba
- National Association of Career Colleges listing for Canada 2
- International Association of Universities 600+ members across 120 counties 🗗
- Association of American Universities (U.S.) 🗗
- Association of American College & Universities (U.S.) member institutions &
- National Association of Independent Colleges and Universities (U.S.) ☑

Job Boards









> View more student profiles

Graduate Studies at UM

Getting Started

Intermediate Stages / The Halfway Mark

miterinediate Stages / The Hanway Mark

Final Steps

Sample Jobs

What do employers want?



Alumni stories



- 1. View the Work & Volunteer + Community Connections sections of compass within the **Getting Started** section.
- 2. Find one or more new suggestions, tips or resources relevant for **you**.
- 3. Share at your table. Also share another success planning step you plan to take this year.

5 minutes





Graduate Studies alumni may find work in wide range of industries and areas, including universities and colleges, research institutes, government departments and agencies, non-profit organizations, policy think tanks, museums and science centres, and private sector companies. The following competencies* are highly sought after by employers:

- 1. Communication skills: Writing and editing of reports, positions papers, briefing documents; oral communication including negotiation and liaison; ability to communicate complex information to those external to discipline
- 2. Expert knowledge: Scientific, subject or topic specific knowledge
- Research skills and research coordination: Research design, management or coordination of research projects, working with protocols
- 4. Teamwork: Ability to work collaboratively in multifunctional teams
- 5. Presentation and teaching skills: Ability to present in regulatory settings
- 6. Leadership and supervision: Ability to self-start and/or lead, guide, influence, motivate and engage others
- Analytical and problem solving skills: Ability to analyze, synthesize and interpret data and ideas; ability to think deeply to develop innovative solutions
- 8. Project management and organizational skills: Ability to multitask, dissect projects in manageable tasks, handle competing demands and manage multiple projects simultaneously
- 9. Partnership development and stakeholder engagement
- Sound judgement and decision making: Ability to make independent and evidence-based decisions and maintain tact,
 diplomacy and confidentiality

Note that "prior industry experience" and "years of experience in similar position" was also required for many positions. In addition to attaining skills through your graduate education, students are encouraged to engage with their industry of interest

Career Services

Career planning

Explore occupations

Volunteering during COVI

Employment resources fo

Career fairs

Career Mentor Program

UM Café: Ten Thousand C

Co-ops and internships

Connect with and recruit s

Wage Subsidies for Emplo





CAREER PLANNING IS CRUCIAL.



MOTIVATES YOUR STUDIES



FOCUS YOUR TIME & TARGET YOUR EXPERIENCES



CAREER SERVICES

474 UNIVERSITY CENTRE



OUR WEBSITE

umanitoba.ca/career-services



RESUMÉ LEARNING CENTRE

Drop-in times, appointments + e-mail feedback



Attend career events + wrkshps

Umconnect.umanitoba.ca



APPOINTMENTS Front desk — 204-474-9456



Career Mentor Program Sept - Apr









Home / Career Services / Career fairs / UM Career Fair

UM Annual Career Fair

Tuesday, January 16, 2024 | 2 p.m. - 6:30 p.m. Wednesday, January 17, 2024 | 9:30 a.m. - 2 p.m.

1st and 2nd floor (Campo, GSA Lounge, Marshall McLuhan Hall, MPR)
UMSU University Centre
65 Chancellor's Circle

Career Services

Plan Your Career

Job Search & Volunteer Resources

Equity, Diversity & Inclusion Resources

Resources for Indigenous Students

Resources for International Students

Career Mentor Programs

UM Café: Ten Thousand Coffees



Course Modules - Free in 2023/24 for UM students!

Register for <u>ALL</u> using your UManitoba email address.

Passcode: umanitoba_courses



Technical Skills Courses

- Scientific Report Writing Fundamentals
- Good Laboratory Practice (GLP) Fundamentals
- Good Manufacturing Practice (GMP) Fundamentals
- Quality Assurance / Quality Control (QA/QC) Fundamentals
- Good Clinical Practice (GCP) Fundamentals

Skills for Success Courses

- Bio-economy Fundamentals
- Reading Fundamentals
- Writing Fundamentals
- Numeracy Fundamentals
- Document Use Fundamentals
- Communication Fundamentals
- Collaboration Fundamentals
- Problem Solving Fundamentals

