

We recognize and acknowledge that McMaster University meets and learns on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the "[Dish With One Spoon](#)" wampum, an agreement amongst all allied Nations to peaceably share and care for the resources around the Great Lakes.

## INSPIRE 3EL3 – Perspectives in Science: Behind the Scenes 2021 Spring Term

### Instructors:

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### COURSE DETAILS

**Class Time and Location:** Tuesdays & Thursdays in May from 10:30am-1:30pm; link on Avenue

For the Spring 2021 term, most McMaster undergraduate courses, including this one, will be held online. Please see the Avenue to Learn site for the course at the beginning of the term for access information. The student-led lectures will also be held online. Course evaluations that were previously held in-person will now also be conducted online. Again, please see the Avenue to Learn site for details at the start of the term.

### COURSE DESCRIPTION

There are many perspectives to understanding the world, and science provides a method for society to objectively build knowledge. However, scientific papers and textbooks are written by humans who have their **own perspectives, biases and agendas**; often, the **behind the scenes story** is even more interesting.

While exploring an eclectic mix of fascinating topics with short modules from working scientists, we will explore the **history, philosophy, controversies and applications of science**.

In this course, students will gain an expanded view of the nature of scientific research, in-depth knowledge of **contemporary research questions** that scientists at McMaster University are exploring, and become informed and **critical consumers of science** in the media.

### VIRTUAL COURSE DELIVERY

**To follow and participate in virtual classes it is expected that you have reliable access to the following:**

- A computer that meets the performance requirements [found here](#).
- An internet connection that is fast enough to stream video.

- Computer accessories that enable class participation, such as a microphone, speakers and webcam when needed.

If you think that you will not be able to meet these requirements, please contact [uts@mcmaster.ca](mailto:uts@mcmaster.ca) as soon as you can. Please visit the [Technology Resources for Students page](#) for detailed requirements. If you use assistive technology or believe that our platforms might be a barrier to participating, please contact [Student Accessibility Services](#), [sas@mcmaster.ca](mailto:sas@mcmaster.ca), for support

## **COURSE OVERVIEW AND ASSESSMENT**

**Course Schedule** – Every Tuesday and Thursday in May from 10:30am-1:30pm

### **Course Topics**

#### **1. What is science? With Dr. Joe Kim and Dr. Constance Imbault (May 4<sup>th</sup>, 2021)**

In this module, we will cover the history and philosophy of science. What is the scientific method? And how do your own individual biases and perspectives impact the type of science you choose to do? We'll also talk about the practical implications and issues of the science of learning, and the differences between doing research in the lab and in the classroom. **Assignment: what type of student is past/present/future you?**

#### **2. Getting messy with qualitative thematic analysis with Dr. Kate Whalen (May 6<sup>th</sup>, 2021)**

Sometimes we want to know *what*, and other times we want to know *why* and *how*. As a past quantitative researcher, I liked the feeling of certainty and confidence from working with numbers to understand what is going on. But I concluded each research project wanting to know why the problem or phenomenon existed the way it did. I began exploring the world of qualitative research to help answer my 'why' questions. It was messy, it was uncomfortable, and it was the most interesting research I had ever done. In this course, you will get messy as you learn how to conduct qualitative thematic research and analysis on a topic of your choosing. Topics include: study design, interviewing, transcription, coding, analysis, and reporting. **Assignment: Create a qualitative research question, 5-10 interview questions, and a shot reflection on your perception of qualitative research.**

#### **3. Exercise Myths and Nutritional Nonsense: Fighting the Good Fight with Dr. James McKendry (May 11<sup>th</sup>, 2021)**

Information and communication technologies (ICT) – that is, computers, software, and, most notably, the internet – have evolved exponentially since the beginning of the information age. As a result, individuals have access to an almost unlimited amount information at the touch of a button, which can be both a blessing and a curse. In the hands of those with refined critical thinking skills and a healthy skepticism, the ease of access to a wealth of information is an incredibly powerful tool. However, in an era of misinformation and “fake news”, filtering out the sense from the nonsense has become increasingly challenging. Exercise and nutritional science are two fields within which the spread of misinformation is particularly rife. Anybody that has exercised or eaten food before assumes they are an expert, and the “it worked for me” mentality often lacks any scientific grounding. To further exacerbate this issue, social media personalities that are paid to promote products (i.e., workouts and supplements) and “influencers” spreading unsubstantiated claims have exploded. While this multi-faceted problem may never be fully languished, empowering individuals with an arsenal of intellectual skills (e.g., critical thinking and

objectivity) and encouraging scientists to engage in effective knowledge translation around exercise and nutrition research will, at least, go some way to ceasing the spread of misinformation. The purpose of this brief course will be to provide individuals with a behind-the-scenes tour of controversial topics in exercise and nutritional science; specifically, focusing on the origins of the misunderstanding and how science – some of which I have performed, and often without hiccups – can be applied to dispel many of the popular myths that permeate society.

#### 4. Nature vs. nurture in the wild with Dr. Cayleigh Robinson (May 13<sup>th</sup>, 2021)

How do animals survive in extreme environments? How does the environment we experience (from the food we eat to the temperature outside) impact how our bodies function? What about the environment we experienced when we were little? In this module we learn about the short and long term consequences of adverse environmental conditions on animals and how scientists study them. We will discuss how comparative physiologists try to unravel the impacts of genetics, developmental environment and adult environment on complex traits like exercise performance and metabolism in wild animals. You will also learn about the specific challenges associated with designing experiments and the importance of model organisms. We will examine several case studies including fish who walk on land and mice who live on mountains. **Your assignment will be to design an experiment on space travel for NASA using an extreme animal model.**

#### 5. A bird's eye view of field ornithology and animal behaviour research with Dr. Leanne Grieves (May 18<sup>th</sup>, 2021)

Birds have captured the awe and imagination of humans for thousands of years. Some of the earliest known human art features these enigmatic and captivating animals. Birds have inspired both historic and modern designs for powered flight and other remarkable feats of engineering. We are instantly attracted to birds' bright colours, beautiful songs, and remarkable powers of flight. It's not surprising that today, birds are one of the most well studied animal groups in the world. But what is surprising is how much we still have to learn about them! My goal is to understand the quietest secrets of nature's showiest inhabitants: I am interested in the role of *smell* in the social behaviour of birds. In this course, I will provide an overview of what we know about smell in birds, and what we still have to learn. Then, you'll join me on a virtual field tour of my research at the Long Point Bird Observatory in Port Rowan, Ontario. You'll get a bird's eye view of how researchers catch birds, what it's like to work inside a bird banding laboratory, and how researchers like myself safely handle and collect samples from wild birds. We'll round off the course with plenty of time for Q & A, in which I'll endeavour to answer all of your bird-related questions, smelly and otherwise! **Your assignment will be to watch birds and develop a hypothesis about a behaviour you observe!**

#### 6. Behind the 'trees': how we identified tree species in tropical forests using drone images and artificial intelligence with Dr. Camile Söthe (May 20<sup>th</sup>, 2021)

Estimating forest diversity is a key step for anyone working with forest conservation. Traditionally, we measure forest diversity through forest inventories. However, particularly in tropical environments, the great number of tree species distributed over multiple strata makes this a challenging task. Motivated by that, my research explored the use of images acquired by drones and machine learning models to identify tree species in tropical forest areas, avoiding time and costs spent with fieldwork. In this lecture, you will

hear about the obstacles faced in each step of this research, from image acquisition to the final tree species maps. As a bonus, you will fly with me on the Google Earth Engine platform and see how we can easily access global satellite data. **Assignment: How do you explain the spectral response of the leaves you photographed?**

### **7. The Highs and low of field-based Science Rodrigo Narro Pérez (May 25<sup>th</sup>, 2021)**

Science is often thought of as being only done in the lab or through experiments but this is far from the truth. In this module, students will explore the unique aspects and considerations of 'doing science' that is based on field work with an emphasis in the earth and environmental sciences. In this module students will be exposed to how to make field notes, what is considered when doing field work, field equipment, the differences between field work in Canada and International field work, travelling and how to expect the unexpected when you're thousands of kilometres away from home or McMaster.

### **8. Getting into flow with Dr. Jeremy Marty-Dugas (May 27<sup>th</sup>, 2021)**

What does it mean to live a good life? This question has been central to the study of flow, or being 'in the zone'. Perhaps you've experienced flow while playing sports, or an instrument, or maybe even while daydreaming. During flow, we are so deeply focused on the task at hand that everything else--our worries, fears, and even time--seems to fade into the background. This feeling of concentration is often enjoyable and has a number of positive associates, such as better task performance and greater mental well-being. So how does this experience come about? How can we experience flow more often, or leverage it to improve our performance on important tasks? Despite decades of research, there are number of conceptual and measurement issues which plague research on 'the zone'. In this class, we'll discuss the experience of flow and use it as a case study for how we research subjective experiences more generally. **At the end of this module, students will be asked to create a research tool of their own to assess a subjective experience of their choice. The assignment asks students to describe the concept they are interested in, the goal of their measure, and the sample items (questions) they would use to assess this concept.**

## **COURSE EVALUATION/REQUIREMENTS**

**ASSESSMENT STRATEGY.** As is the case with most INSPIRE courses, there will be no tests or exams in this course.

- 1. Module Assignment (8 assignments x 10% = 80%):** Each module will have a different assignment. A document outlining the instructions for each assignment will be posted on Avenue.
- 2. Final Paper (20%):** At the end of the term, you will submit a final paper talking about what you have learned about science. In this paper, we expect you to reflect upon you learning. Full instructions will be posted on Avenue.

## **ADMINISTRATIVE POLICIES AND PROCEDURES**

**E-mail Policy:** E-mails must originate from a valid McMaster account, and be sent to the instructor's McMaster email. Please do not use the Avenue messaging function. You must use your McMaster email

account to message the instructor. Any email originating from another provider will be deleted (we cannot confirm that the email has come from you).

***Students With Accommodations (SAS)***. Please discuss your accommodations with the instructor early in the term so that accommodations can be in place before they are needed.

### **REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK**

[McMaster Student Absence Form \(MSAF\)](#): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

### **ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES**

Students with disabilities who require academic accommodation must contact [Student Accessibility Services \(SAS\)](#) at 905-525-9140 ext. 28652 or [sas@mcmaster.ca](mailto:sas@mcmaster.ca) to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [Academic Accommodation of Students with Disabilities](#) policy.

### **ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)**

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

### **COURSES WITH AN ON-LINE ELEMENT**

**Some courses may** use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

### **ACADEMIC INTEGRITY**

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

**It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the

various types of academic dishonesty please refer to the [Academic Integrity Policy](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

**The following illustrates only three forms of academic dishonesty:**

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

## **INCLUSIVITY AND ACADEMIC INTEGRITY**

The University values integrity, inclusiveness and teamwork, and strives to support the personal and collective growth of the McMaster student community.

These values are foundational to ensuring campus environments – both in-person and virtual – are conducive to personal wellbeing and academic success.

## **AUTHENTICITY / PLAGIARISM DETECTION**

In this course, we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

## **CONDUCT EXPECTATIONS**

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities \(the "Code"\)](#). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

## **COPYRIGHT AND RECORDING**

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

### **EXTREME CIRCUMSTANCES**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.