MURC | MULTIDISCIPLINARY UNDERGRADUATE RESEARCH CONFERENCE

How to Write an Abstract

MURC 2021 | students.ubc.ca/murc

First, what is an abstract?

An abstract is generally a short, concise paragraph ranging from 200-500 words that provides the reader with an overview of your project. For MURC, the abstract word limit is 250 words, which is fairly typical for most conference submissions. This is an opportunity for you to capture the interest of the reader and create a strong impression. Your abstract is where you can really showcase the significance and implications of your research and convince the audience to read further into your study. It usually includes a brief summary of background research, methods used in the study, the results and the implications of the results.

Structuring your abstract:

1. *What is the significance of my study?*
    - What does my study contribute to the field?
    - You can also explain the rationale for why you conducted your study

2. *Background/hypothesis*
    - What is your study trying to address?
    - What is your problem and knowledge gap?
    - This can be thought of as the question your study aims to help answer

3. *Methods*
    - How did you try to answer this question/address this problem?

4. *Results*
    - What did you find?
    - NOTE: if you are doing a theoretical project in which you have not obtained results, you can include your expected results in this section. E.g. "We expect to see…"

5. *Implications/discussions*
    - What are the implications of your results in the context of your field?
    - Why is your study important/why does your research matter?

Tips:

- Create a concise title that is interesting and descriptive of the research.
- Express the importance and relevance of your research in a concise manner
- Use, describe and explain relevant keywords for your topic
- Make sure you are writing for your intended audience - MURC is a conference catered towards undergraduates and is for a **generalist audience**, meaning that research must be able to be understood by and presented for people with no background in the subject matter.
- Have someone proofread your abstract - look to attend the abstract writing workshops hosted by the Centre for Writing and Scholarly Communication (CWSC) as well as the Peer Review workshop being held in January!

- If you would like further review of your abstract, you can sign up for office hours with the Workshops and Presentations portfolio of the MURC 2021 planning committee! The sign up link will be up on the website in January!
- If you have any further questions feel free to reach out and email us at murc.researchpresentations@ubc.ca

Things you should Avoid:

- Avoid going into too much detail about statistical methods
- Don't use too much jargon or field specific language
  - If there are terms essential to your project, be sure to clearly define them and their relevance – as they would be part of the relevant keywords
- Including reference citations
- Exceeding the allotted word count (250 words in the case of your MURC abstract)

Modified from:
Koopman P. (1997). How to Write an Abstract. Retrieved from: https://users.ece.cmu.edu/~koopman/essays/abstract.html

Example Abstracts:

Background
Knowledge gap
Hypothesis
Methods
Expected results
Implications of findings

Sample Abstract from Undergraduate Theoretical Research Projects:

- In an abstract for a theoretical project, there is a greater emphasis on background and methods, as these projects have no current results.

Example 1:

Amyotrophic lateral sclerosis (ALS) is characterized by the progressive degeneration of motor neurons, with the most common mutation in familial ALS occuring in the *C9orf72* gene. In the central nervous system, astrocytes are glial cells critical to maintaining homeostasis and trophic support for motor neurons. Astrocytes switch to a reactive pro-inflammatory state during ALS pathogenesis, losing their supportive neuronal functions. Astrocytic pro-inflammatory cytokines, or immune signalling molecules, have been implicated in ALS, although their specific role in disease onset is currently unknown. We hypothesize that astrocytes exist in a pro-inflammatory state during early disease pathogenesis. We will use transgenic zebrafish, with astrocytes labeled by a green fluorescent protein. To model the ALS-like phenotype in zebrafish, we will introduce the *C9orf72* gene mutation. To examine the reactivity of astrocytes during early pathogenesis, we will use live imaging techniques to characterize their reactive morphology. To investigate the inflammatory state, we will isolate astrocytes using fluorescence-activated cell sorting (FACS) at three time points during early disease pathogenesis. We will quantify levels of pro-inflammatory and anti-inflammatory cytokines to determine the inflammatory state of astrocytes at each time point. We expect to observe that astrocytes will be in a reactive morphology during early stages of ALS pathogenesis and will present a predominantly pro-inflammatory phenotype. These results will elucidate the inflammatory profile of astrocytes underlying pathogenesis which may provide novel insights regarding initiating factors in ALS. Future research may lead to therapeutic strategies targeting the pro-inflammatory state of astrocytes during early stages of motor neuron degeneration.

Imani Farahani N, Li M, Morris J. (2018) *A Proposed Study Investigating the Inflammatory State of Astrocytes During Early Onset of Amyotrophic Lateral Sclerosis (ALS)*. Poster presented at: 2018 UBC Multidisciplinary Undergraduate Research Conference (MURC)

Example 2:
Professionals in healthcare, early education, and domestic (HEED) careers are important for the functioning of society. However, in North America, HEED careers are assigned lower status and paid significantly less than their counterparts in science, technology, engineering, and mathematics (STEM). In a sample of 19,425 students from 48 countries, the current research aims to document and explain cross-national variation in the extent to which people support paying HEED careers as much as STEM careers. We focus specifically on the relationships of both individual and cultural values on people's attitudes towards STEM and HEED pay differences. On the individual level, communal values describe the personal desire to foster relationships and care for others. On the country level, collectivism refers to a cultural value that focuses on building communities and maintaining harmony. Whereas previous research has found that on the individual level, North American individuals who endorse communal values are more likely to be supportive of higher HEED pay, little research has examined the relationship between cultural values and the perception of HEED pay. We are interested in understanding the extent to which individual and country-level values shape our attitudes towards higher pay for HEED professionals. Our first hypothesis is that individuals who personally endorse communal values will be more likely to think HEED professionals deserve higher pay. We further hypothesized that countries with higher collectivism scores will also be more likely to support higher HEED pay. With this cross-cultural approach, we hope to improve our understanding of pay differences across cultures.

Yuen, A., Block. K., & Schmader, T. (2020). *Are some careers worth higher pay? Predicting cross-country differences in pay equality between HEED and STEM careers.* Poster presented online at the 2020 UBC Multidisciplinary Undergraduate Research Conference (MURC)

Example 3:
Background: To address emerging trends in introducing mobile robots to human-populated environments, ensuring safe and intuitive interaction between the robots and humans is becoming a growing need. While many previous studies have explored interactions with upright pedestrians, far fewer have investigated that for wheelchair users, who already face higher safety risks in public environments. Since the dynamic behaviour of wheelchairs is also atypical to that of foot pedestrians, accurate detection of wheelchairs is crucial to improve interactions and avoid collisions. Furthermore, extracting the orientation of wheelchairs can aid in predicting their direction and trajectory of travel, which has never been attempted before in prior literature. Mobile robots are further required to respond to dynamic obstacles with minimal latency, therefore any onboard algorithms should operate in real-time. The objective of this research will be to develop a real-time wheelchair detection and orientation classification algorithm using 2D scanners, a common sensor equipped on mobile robots.
Methodology: The range data from the laser sensor is pre-processed using a density-based clustering technique to identify clusters of data points that represent "object candidates". A machine learning classifier is trained to recognize objects as wheelchairs at different orientations. Labelled ground truth

data is collected through experimentation for the purpose of evaluating the performance (computation time and accuracy) of the algorithm.
Implications: This research will establish basis for a real-time perception of wheelchairs users and influence control schemes that promote safer interactions between robots and wheelchair users.

Bo, J. (2020). *Detection of Wheelchairs Using Laser Scanning Sensors for Mobile Robotics*. Online oral presentation at the 2020 UBC Multidisciplinary Undergraduate Research Conference (MURC)

Sample abstract from a published paper

The ability of insects to learn and navigate to specific locations in the environment has fascinated naturalists for decades. The impressive navigational abilities of ants, bees, wasps and other insects demonstrate that insects are capable of visual place learning 1– 4, but little is known about the underlying neural circuits that mediate these behaviours. *Drosophila* melanogaster (common fruit fly) is a powerful model organism for dissecting the neural circuitry underlying complex behaviours, from sensory perception to learning and memory. *Drosophila* can identify and remember visual features such as size, colour and contour orientation 5,6. However, the extent to which they use vision to recall specific locations remains unclear. Here we describe a visual place learning platform and demonstrate that *Drosophila* are capable of forming and retaining visual place memories to guide selective navigation. By targeted genetic silencing of small subsets of cells in the *Drosophila* brain, we show that neurons in the ellipsoid body, but not in the mushroom bodies, are necessary for visual place learning. Together, these studies reveal distinct neuroanatomical substrates for spatial versus non-spatial learning, and establish *Drosophila* as a powerful model for the study of spatial memories.

Ofstad, T., Zuker, C., & Reiser, M. (2011). Visual place learning in drosophila melanogaster. *Nature*, 474(7350), 204-U240. doi:10.1038/nature10131

Other resources with tips to help improve your abstract:

How to Write an Abstract

Guidelines for Abstract Preparation

Tips That Will Make Your Abstract a Success

Do’s and Don'ts for Abstracts