What is MURC?

- MURC 2019 is the 16th iteration of the conference
- For undergraduates to showcase research projects and receive feedback
- Network and exchange ideas with other researchers
- Explore other active areas of research
- Build communication and presentation skills
- ~180 posters & ~ 85 oral presentations; over 460 presenters
Adjudicator’s Roles and Takeaways

- Evaluate multidisciplinary research projects
- Analyzes students’ project and rationale critically
- Provides constructive feedback and guidance
- Give back to the research community
**MURC 2019 Overview**

- **8 AM - 9 AM**: Presenters & Attendees Check-In
- **9 AM - 9:45 AM**: Keynote
- **9 AM - 9:20 AM**: Adjudicators check-in
- **10 AM - 12:30 PM**: Wave 1, Break, Wave 2
- **12:30 PM - 2 PM**: Lunch & Panel
- **2 PM - 4:30 PM**: Wave 3, Break, Wave 4
- **5 PM - 6:30 PM**: Award Reception

**Session Times**
- **Morning Session**: 8 AM - 12:30 PM
- **Afternoon Session**: 2 PM - 6:30 PM
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00AM – 8:45AM</td>
<td>Registration for Presenters and Attendees</td>
<td>Centre for Interactive Research on Sustainability (CIRS) Rm. 1250</td>
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<tr>
<td>9:00AM – 9:45AM</td>
<td>Opening Remarks and Keynote by Dr. Benjamin Cheung</td>
<td>Ponderosa Commons: Oak House Ballroom Rm. 1001, 1002, 1003, 1008, 1215</td>
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<tr>
<td>10:00AM – 11:10AM</td>
<td>First Wave of Poster Presentations</td>
<td>Ponderosa Commons: Oak House Ballroom Rm. 1001, 1002, 1003, 1008, 1215</td>
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<td></td>
<td>First Wave of Oral Presentations</td>
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<tr>
<td>11:20AM – 12:30PM</td>
<td>Second Wave of Poster Presentations</td>
<td>Ponderosa Commons: Oak House Ballroom Rm. 1001, 1002, 1003, 1008, 1215</td>
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<td></td>
<td>Second Wave of Oral Presentations</td>
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<tr>
<td>12:30PM – 2:00PM</td>
<td>Lunch Break</td>
<td>Ponderosa Commons: Oak House Ballroom Rm. 1001, 1003</td>
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<td>Graduate Student Panels</td>
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<tr>
<td>2:00PM – 3:10PM</td>
<td>Third Wave of Poster Presentations</td>
<td>Ponderosa Commons: Oak House Ballroom Rm. 1001, 1002, 1003, 1008, 1215</td>
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<td></td>
<td>Third Wave of Oral Presentations</td>
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<tr>
<td>3:20PM – 4:30PM</td>
<td>Fourth Wave of Poster Presentations</td>
<td>Ponderosa Commons: Oak House Ballroom Rm. 1001, 1002, 1003, 1008, 1215</td>
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<td>Fourth Wave of Oral Presentations</td>
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<td>4:30PM – 5:30PM</td>
<td>Break and Photobooth</td>
<td>Ponderosa Commons: Oak House Foyer</td>
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<tr>
<td>5:00PM – 6:30PM</td>
<td>Awards Reception</td>
<td>Ponderosa Commons: Oak House Ballroom</td>
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MURC 2019 Floor Plan

Ponderosa Commons
Oak House
Picture Guide
Poster Presentation - Logistics

- Presenters will deliver a ~5 mins overview of project
- Adjudicators have ~3-5 mins for follow-up questions + clarification
- Evaluation rubrics included in Adjudicator Package *(Check-in)*
- Drop-off finished rubrics at **Ask Me Booth** at Oak House foyer
Deciphering the Presenter ID

- Each presentation assigned a unique **Presenter ID**
- Includes information about: stream, wave, and type

1PHW001

4 Streams
- HW – Health and Wellness
- IS – Individual and Society
- SC – Sustainability and Conservation
- IT – Innovation and Technology
Oral Presentation - Logistics

- Presenters will deliver **10 mins** overview of project
- Adjudicators have **5 mins** for follow-up questions + clarification *(immediately after each presentation)*
- Room hosts will enforce the time limit to ensure fairness
- Evaluation rubrics included in Adjudicator Package *(Check-in)*
- Room hosts will **collect ALL rubrics** completed in the Room
## Research Project

<table>
<thead>
<tr>
<th>Category</th>
<th>1-3</th>
<th>4-7</th>
<th>8-10</th>
<th>Total/10</th>
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<tbody>
<tr>
<td><strong>Demonstrating project significance and knowledge gap</strong>&lt;br&gt;Are connections between the project and existing research clearly illustrated in the context of the knowledge gap?</td>
<td>• Significance of the project is sometimes clear&lt;br&gt;• Knowledge gap is presented with insufficient rationale</td>
<td>• Significance of the research is addressed but lacks complete development&lt;br&gt;• Knowledge gap is presented with mostly sufficient rationale</td>
<td>• Significance of research and its real world applications are clearly addressed&lt;br&gt;• Knowledge gap is expertly presented with robust rationale</td>
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<tr>
<td><strong>Clarity of Method</strong>&lt;br&gt;Are you able to make sense of the methods? Are the methods appropriate to address the research question?</td>
<td>• Research methods are sometimes easy to follow with some ambiguity&lt;br&gt;• Some methods provide marginal appropriate detail and parameters</td>
<td>• Research methods are easy to follow with little ambiguity&lt;br&gt;• Methods provide sufficient appropriate detail and parameters</td>
<td>• Research project methods are very easy to follow with no ambiguity&lt;br&gt;• Methods provide comprehensive appropriate detail and parameters</td>
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<tr>
<td><strong>Support of Claims by Findings</strong>&lt;br&gt;How does the evidence support their findings?</td>
<td>• Some findings contribute to conclusion(s)&lt;br&gt;• Some findings are easily identifiable and understandable</td>
<td>• Most findings contribute to conclusion(s)&lt;br&gt;• Most findings are easily identifiable and understandable</td>
<td>• All findings contribute to conclusion(s)&lt;br&gt;• All findings are easily identifiable and understandable</td>
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<tr>
<td>Category</td>
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<td>4-7</td>
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<tr>
<td><strong>Poster Aesthetics &amp; Layout</strong></td>
<td>- the poster lacks aesthetic appeal and organization</td>
<td>- The poster has some aesthetic appeal but there remains room for improvement; decent organization</td>
<td>- The poster is aesthetically appealing to the eye; organization is clear and easily comprehensible</td>
<td>- Good balance between writing and images/graphics</td>
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<td>- Lack of balance between images/graphs and text</td>
<td>- Adequate balance between writing and images/graphics</td>
<td>- Images are impactful and add value to the poster</td>
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<tr>
<td></td>
<td>- Images may be impactful and add some value to the poster</td>
<td>- Some images are impactful and add value to the poster</td>
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<tr>
<td><strong>Organization of Poster and Talk</strong></td>
<td>- Poster does not compliment talk well; asynchronous</td>
<td>- Poster mostly compliments talk; Flow and pacing of talk is average; comprehensible but remains room for improvement</td>
<td>- Poster compliments talk very well</td>
<td>- Flow and pacing of talk is excellent; easy to comprehend</td>
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<td></td>
<td>- Flow and pacing of talk is poor; difficult to comprehend</td>
<td>- Poster demonstrates sufficient logical and chronological organization</td>
<td>- Poster demonstrates excellent logical and chronological organization</td>
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<tr>
<td></td>
<td>- Poster demonstrates poor logical and chronological organization</td>
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<td></td>
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<tr>
<td><strong>Question Answering</strong></td>
<td>- The presenter is unable to provide a satisfactory answer</td>
<td>- The presenter attempts to answer all questions and does so adequately; however, they do not answer in as much detail as required for clear comprehension</td>
<td>- The presenter directly answer all questions in detail and demonstrates excellent knowledge in their subject area</td>
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<td></td>
<td>- For the questions that they answer, the response is brief, lacks detail, and/or does not directly answer the question</td>
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For MURC staff

Overall Score (out of 60)
Determining the population distribution of invasive mussels *Mytilus galloprovincialis*, *Mytilus edulis*, native mussel *Mytilus trossulus* and their hybrids in Vancouver ecosystems and markets.

**Introduction**

- **Which mussel species are present in BC's coastal systems?**
  BC's waters are home to three native species, the *Mytilus trossulus* and *M. edulis* sub-races. Two invasive species, *M. galloprovincialis* and *M. edulis*, have been introduced by way of aquaculture (Hancock et al., 2017).

- **What are our research questions?**
  We used PCR to determine the population distribution of three of those species in four sites: the Tugboat area, the Maritime Market Pier, Freshwater Creek, and Tugboat area. We also examined samples from Freshwater Creek to see if any hybrids were present.

- **What did we do?**
  Methods are similar to those used to assess the impact of invasive species. We examined the impact of invasive species on native species and used statistical analysis to determine the species' impact. We also used PCR to determine the species' hybridization status.

**Methods**

- **Convenience Sampling**
  Collected 12 mussels from the three populations:
  - **Hamburg**
  - **Market Pier**
  - **Local Seaford Market**

- **Data Collection**
  - Carbonate storage/pH (pH) of each replicate
  - Radial and gel electrophoresis on mussel tissue and edge linear
  - Red gel electrophoresis to determine the species' hybridization status.
  - Calculate 95% CIs for statistical analyses of size.

**Results**

- **Between field sites, there is no significant difference in mussel size.**
  - For between field sites and market size, it is significantly different.
  - In no significant difference between mussel size and species.
  - There were no hybrid species present.
  - Only *M. trossulus* and *M. edulis* were found at the market size (25% mixed).

**Discussion**

- **Analysis of the Results**
  - Figures 1 shows that at:
    - **Jingle-Beach Pier**, both invasive *M. edulis* and native *M. trossulus* are present, which suggests that there is a potential for the presence of hybrids and for *M. edulis* to displace *M. trossulus*.
    - **Maritime Market Pier**, only *M. trossulus* is present, indicating that the *M. galloprovincialis* has displaced *M. trossulus*.
    - **Local Seaford Market**, only three of the samples were actually confirmed to be *M. galloprovincialis* out of the twelve tested, suggesting that more samples were being misidentified.

- **Conclusions**
  - Displacement of native suggests that the location can lead to habitat destruction for at-risk species such as *Gibilaris* (Hancock et al., 2018).

**Conclusion**

- **Population distribution at**
  - **Jingle-Beach Pier**
    - Two mussels were identified, both *M. edulis* and one *M. trossulus* were present.
  - **Maritime Market Pier**
    - No *M. trossulus* were present, representing the only species found.
  - **Local Seaford Market**
    - Despite being described as "Gibilaris", six *M. trossulus* three *M. galloprovincialis* and two *M. edulis* were identified.

- **No hybrids were identified in any of the locations.**

- Further research along the coast of Vancouver is needed to confirm the presence of invasive mussels in Vancouver waters.

**Acknowledgements**

- We would like to acknowledge the University of British Columbia (UBC) for the opportunity to take Biology 352 and for providing us with the resources to conduct this study.
- Special thanks to Professor Colin Gordon for her guidance and feedback.
- We would also like to thank the local Shellfisheries for their support and preparation of our supplies, and Professor Angelo Caramello for allowing us to conduct our research.
**Introduction**

Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease characterized by the progressive degeneration of motor neurons. There are two known forms of the disease:

- **Spinalon**: when ALS occurs in an individual without familial history of ALS
- **Familial**: arises in individuals in whom there is a history of ALS in one or both parents, caused by genetic mutations

- C9orf72 is a protein encoding gene. Its proteins are abundant in human cells and rodent neurons. Mutations in the gene have been found to cause ALS².

ALS is a non-collaborative autoimmune disease, mutation damage in other cells can contribute to a subclinical way to disease initiation and development.

- The central nervous system (CNS) is composed of two main cell types: motor cells and neurons. Astrocytes are the most abundant non-neuronal cells found in the CNS.

**Methods**

- All samples were analyzed using quantitative reverse transcription polymerase chain reaction (qRT-PCR) with FluoTest fluorescent probe and qRT-PCR strips.
- During ALS disease progression, astrocytes—a subset of supportive glial cells, switch to a reactive state, losing their supporting functions  to neurons which is characterized by:
  - A change in morphology (shown in Fig. 2)
  - A change in molecular expression patterns shifting from a non-reactive state to a reactive state

Cytokines are cell signaling molecules involved in mediating inflammatory responses in the body. Binding to the inflammatory environment can lead to the release of cytokines.

We hypothesize that astrocytes exist in an anti-inflammatory state during early disease progression.

**Specific aims**

1. To characterize astrocyte morphology at specific time points (48 hpf, 60 hpf, 72 hpf).
2. To identify both anti- and pro-inflammatory cytokines to determine inflammatory phenotype of astrocytes.

**Predicted Results**

- Previous studies have shown that the C9orf72 model is observed to have an ALS-like phenotype with reduced motor functions at 48 hpf.
- We hypothesize that specific astrocyte cytokines (IL-6, IL-1β, TNFα) will be upregulated at time point 1. We predict that the anti-inflammatory cytokine (IL-10) will increase during later stages of pathogenesis in response to a pro-inflammatory environment.

The results of the ELISA analysis are used to further interpret the inflammatory phenotype of astrocytes. We anticipate the reactive morphology of astrocytes to be observed at time point 1.

**Implications**

Further understanding the inflammatory state of astrocytes during different stages of disease would elucidate the role of astrocytes during disease pathogenesis. This may allow for novel therapeutic intervention at early stages of disease. A more precise understanding the inflammatory state of astrocytes during early and late stages of ALS may provide critical insight into one if the specific role in disease onset and progression.

**References**


**Acknowledgements**

We would like to thank our mentor, Jessica Morris, for helping us develop our research model, providing critical feedback and support throughout this project. We would also like to thank the executors at UBC for providing us with the opportunity to participate in this undergraduate research program.
1. Project significance

- Is the knowledge gap clearly presented?
- Is the connection to the bigger context illustrated?
- Are the objectives of the project clearly outlines?
2. Clarity of Methods

- Are the methods easy to follow?
- Are the principles behind the main techniques of the study clearly outlined?
- Are the independent, dependent and control variables clearly stated?
3. Quality of Results

- How well are the findings presented?
- Do the findings clearly support the final conclusions?
- Are the limitations of the study clearly pointed out?
- Are the main objectives of the study answered?
- Did they fill in the knowledge gap?
3. Quality of Results Cont.

**Results**
- Between field sites, there is no significant difference in mussel size.
- Size between field sites and market site is significantly different.
- There is no significant difference between mussed size and species.
- There were no hybrid species present.
- Eight specimens mislabelled at the market site (72% mislabelled).

**Discussion**

**Analysis of the Results**
- Figure 4 shows that at:
  - Jericho Beach Pier, both invasive *M. edulis* and native *M. trossulus* are present, which suggests there is a potential for the presence of hybrids and for *M. edulis* to displace *M. trossulus*.
  - Maritime Market Pier, only *M. edulis* is present in all of the successful DNA sample runs, suggesting that the *M. edulis* has displaced *M. trossulus*.
  - Local seafood market, only three of the samples were actually confirmed to be *M. galloprovincialis* out of the twelve expected, suggesting that mussel samples were being mislabeled.

- Displacement of native suggests that the location can lead to habitat destruction for at-risk species such as salmon (Rankin et al., 2004).

**Conclusion**

**Population distribution at:**
- Jericho Beach Pier
  - We were not able to conclude that any *M. galloprovincialis* were present.
  - A mix of five *M. edulis* and six *M. trossulus* were present.
- Maritime Market Pier
  - Six *M. edulis* were present, representing the only species found.
- Local seafood market
  - Despite being advertised as “Gallus,” six *M. trossulus*, three *M. galloprovincialis* and two *M. edulis* were identified.

No hybrids were identified in any of the locations.

Further research along the coast of Vancouver is needed to confirm the presence of invasive mussels in Vancouver waters.

Further research of local Vancouver seafood markets is required to determine if vendors are properly labeling and selling mussel species.

**Predicted Results**

Previous studies have shown that the Cbx972 model is observed to have an ALN-like phenotype with reduced motor functions at 48 hpf. Therefore, we anticipate the highest expression of pro-inflammatory cytokines (IL-6, IFN-γ, TNF-α) to be at time point 1. We predict that the anti-inflammatory cytokine (IL-10) will increase during later stages of pathogenesis in response to a pro-inflammatory environment.

The results of the ELISA analysis are used to further interpret the inflammatory phenotype of astrocyte. We anticipate the reactive morphology of astrocytes to be observed at time point 1.

**Implications**

Further understanding the inflammatory state of astrocytes during different stages of disease would elucidate the role of astrocytes during disease pathogenesis. This may allow for novel therapeutic intervention at early stages of disease. A more precise understanding the inflammatory state of astrocytes during early and late stages of ALS may provide critical insight into one it’s specific role in disease onset and progression.
4. Audio/Visual Presentation

- Is there a good use of visual/audio?
- Are the visuals truly representative of the data?
- Did they enhance your understanding of the project?
5. Communication & Audience Engagement

- How well were you able to follow the presentation?
- Were there overuse of jargons?
6. Question Answering

- Questions are asked after each presentation.
- Were they able to clearly answer your questions?
Oral Presentation Example

http://3mt.grad.ubc.ca/videos-images/2018-finalists/
## Research Project

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<th>Category</th>
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<tbody>
<tr>
<td>Interdisciplinary Aspect</td>
<td><strong>To what extent does this project integrate various disciplines? Is it truly an interdisciplinary project?</strong></td>
<td><strong>1 – 2 fields represented in the project</strong></td>
<td><strong>2 or more fields represented in the project</strong></td>
<td><strong>2 or more fields clearly represented in the project</strong></td>
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<td><strong>Incorporation of methods from a different field in the project</strong></td>
<td><strong>Ideas from two disciplines are present but not necessarily clearly tied together</strong></td>
<td><strong>New idea formed from two or more disciplines that is novel to both disciplines it represents</strong></td>
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**For MURC staff**

<table>
<thead>
<tr>
<th>Overall Score (out of 10)</th>
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**This prize is to acknowledge a project that clearly shows interdisciplinary aspects in the concept and design of the overall aim. Most projects may fall in the “1-3” category but it does not mean that the project is not of merit, simply that it is not interdisciplinary. A project that shows strong interdisciplinary aspects will stand out in that sense, thus, is likely not that common. This rubric is simply a guide to finding those kinds of projects.**
Final Notes

- Enjoy the experience, have fun, and ask lots of questions!
- Conference Outline available on the MURC Website (https://students.ubc.ca/career/career-events/multidisciplinary-undergraduate-research-conference/present-murc)
- Adjudicator assignments will be released before Mar. 14th (Thursday)
Thank you for volunteering as adjudicators for MURC 2019!

QUESTIONS?

EMAIL US AT MURC.RESEARCHPRESENTATIONS@UBC.CA