

STAND UP FOR SCIENCE

POSTER MAKING SESSION ON THURS, MARCH 6, AT 5:30 PM SCOTT BIO. RM 101

SUPPORT STEM

RALLY AND MARCH FRIDAY, MARCH 7 AT 12:00 PM LSC PLAZA

SCIENCE FOR EVERYONE



STAND UP FOR SCIENCE 2025

Friday, March 7, 2025
12:00 PM - 2:30 PM
Walk Out - Rally - March

SCIENCE IS FOR EVERYONE

Join us!
Colorado State University
Lory Student Center Plaza
Fort Collins, CO



STAND UP FOR SCIENCE 2025

POSTER MAKING & MEET-UP EVENT

FREE!
MARKERS
CARDBOARD
& SNACKS
PROVIDED



SCIENCE IS FOR EVERYONE

THURSDAY MARCH 6, 5:30-7:00PM
SCOTT BIOENGINEERING BUILDING, RM 101

We will be making posters & sharing ideas to support each other and advocate for education, STEM, and our futures.
Everyone is welcome!

**Recruiting Leadership & we
have a conference coming
up!**

April 12th in Boulder!



Why posters?

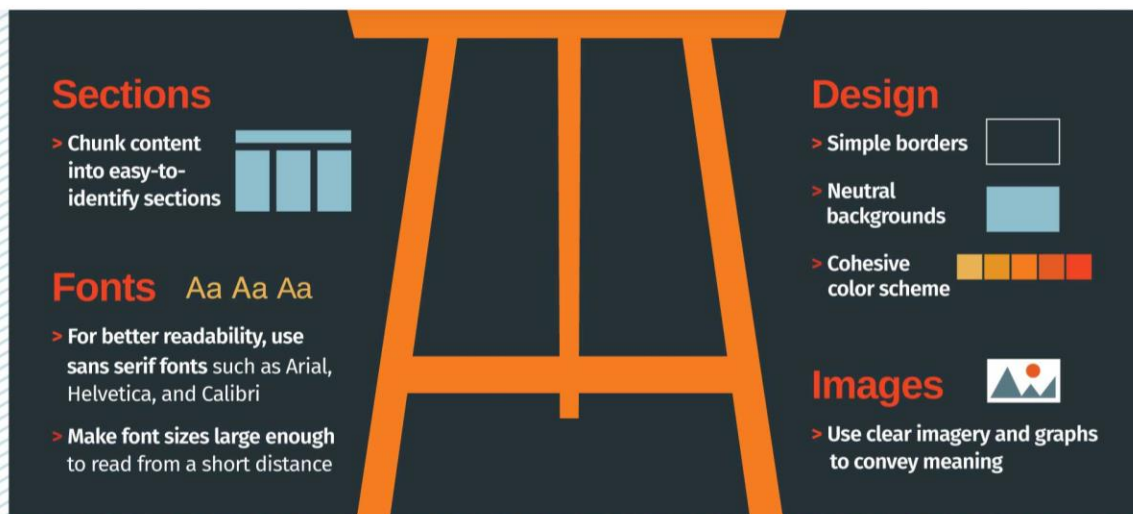
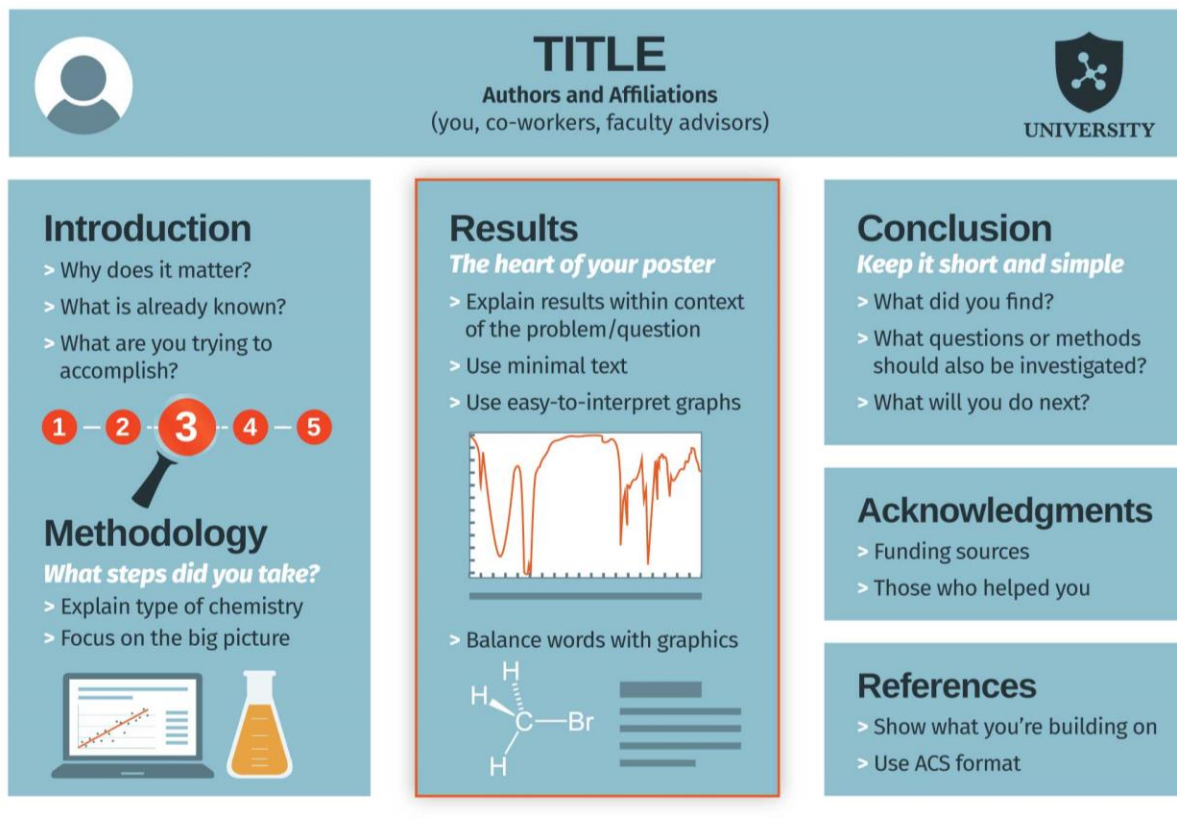
Who is your audience?

What is your goal?


What is your field?

The anatomy of a poster


- Start *early*
- Do many drafts
- Get feedback from your professor and collaborators *early*
- List all authors and receive their approval
- Understand confidentiality & publishing issues
- List all funding sources and affiliations (dept.)
- Consider a QR code




LAYOUT: Which way will the person's eye travel?



**MORAN
MIRABAL
GROUP**



**SUPER-RESOLUTION IMAGING OF
NATIVE CELLULOSE NANOSTRUCTURE**
Mouhanad Babji, Ayodele Fatona, Jose Moran-Mirabal*
Department of Chemistry & Chemical Biology | McMaster University, Hamilton, ON, CA



**McMaster
University**

INTRODUCTION

Cellulose Structure

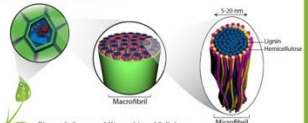


Figure 1. Structural Hierarchy of Cellulose.

- Cellulose - a β-1,4-D-glucose polymer - constitutes the largest component of Earth's biomass.
- Heavily used in the production of lumber, paper, foods, biocomposites & other biomaterials.
- Organized into compact microfibril bundles
- Amorphous regions of cellulose are disordered; accessible by enzymes & prone to chemical modifications
- Crystalline regions are highly ordered and are more difficult to modify and hydrolyze.
- Understanding the nanostructure of cellulose is critical for the improvement of the efficiency of industrial processes.

Figure 2. Glucan Chain Disorders

Super-Resolution Imaging

- Resolution of conventional fluorescence microscopy is diffraction-limited to ~200 nm

$$R = \frac{\lambda}{2NA}$$

Equation 1. Abbe's Diffraction Limit

- Direct stochastic optical reconstruction microscopy (dSTORM)

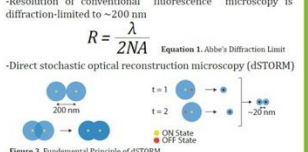


Figure 3. Fundamental Principle of dSTORM

METHODS

Cellulose Sample Preparation & Imaging

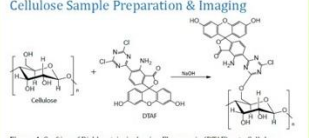


Figure 4. Grafting of Dichlorotriazinylamino Fluorescein (DTAF) onto Cellulose




Figure 5. Cellulose Sample Preparation for dSTORM

- Buffer optimization experiments explored the effect of changes in pH and cysteamine (MEA) concentrations on localization uncertainty (resolution) (Figure 8).
- DTAF was grafted onto cellulose at two different concentrations (3:1 and 1:1 of cellulose:DTAF).

Data Analysis

- Single-molecule localizations performed by ThunderSTORM (ImageJ plugin).
- Patterns of labeling noticed (Figure 7)
- Spacings were measured for both 3:1 and 1:1 cellulose:DTAF samples (Figure 6 & 9).

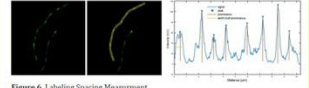


Figure 6. Labeling Spacing Measurement

RESULTS & DISCUSSION

Fluorescence **dSTORM**

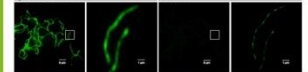


Figure 7. Resolution Improvements Offered by dSTORM

- Buffer system robust to changes in pH and [MEA]
- Smaller spacings observed in 1:1 cellulose:DTAF sample
- unlabeled spaces could suggest areas of crystalline cellulose

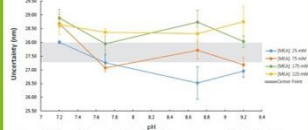


Figure 8. Effect of Changes in pH and MEA Concentration on dSTORM Resolution

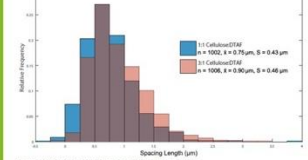




Figure 9. Labeling Spacings on Cellulose Microfibrils

- 1:1 Cellulose:DTAF: $\mu = 100.2, \sigma = 0.75 \mu\text{m}, S = 0.43 \mu\text{m}$
- 3:1 Cellulose:DTAF: $\mu = 100.8, \sigma = 0.90 \mu\text{m}, S = 0.46 \mu\text{m}$


ACKNOWLEDGEMENTS

The Moran-Mirabal Group
Mouhanad Babji
Ayodele Fatona
Henry Fatah






**MORAN
MIRABAL
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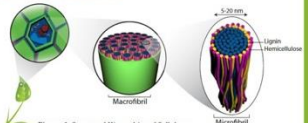


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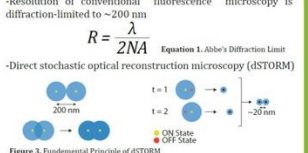


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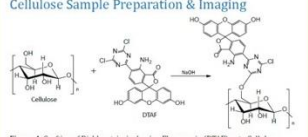


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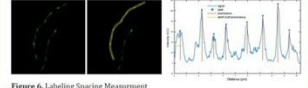


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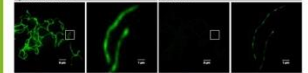


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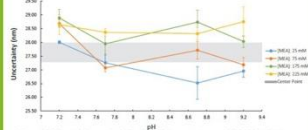


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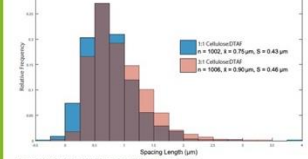



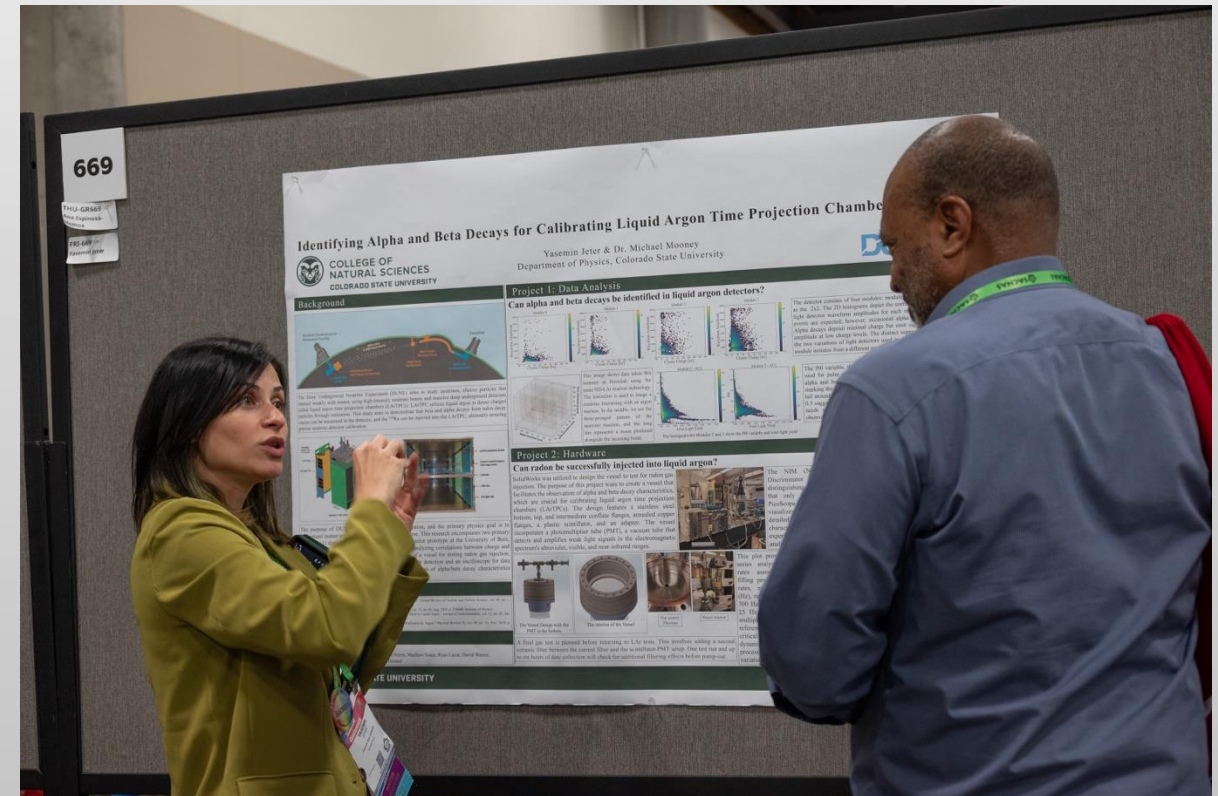
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ACKNOWLEDGEMENTS

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Mouhanad Babji
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Henry Fatah





INTRODUCTION: Why should we care?

- Sell it!
 - Societal implications
 - Ultimate goals
 - How cool is this????!!!!
- Funnel Down Approach
 - What is the goal of the field?
 - What is the goal of your group?
 - What is your specific project?
 - *Why do you personally find this interesting?*



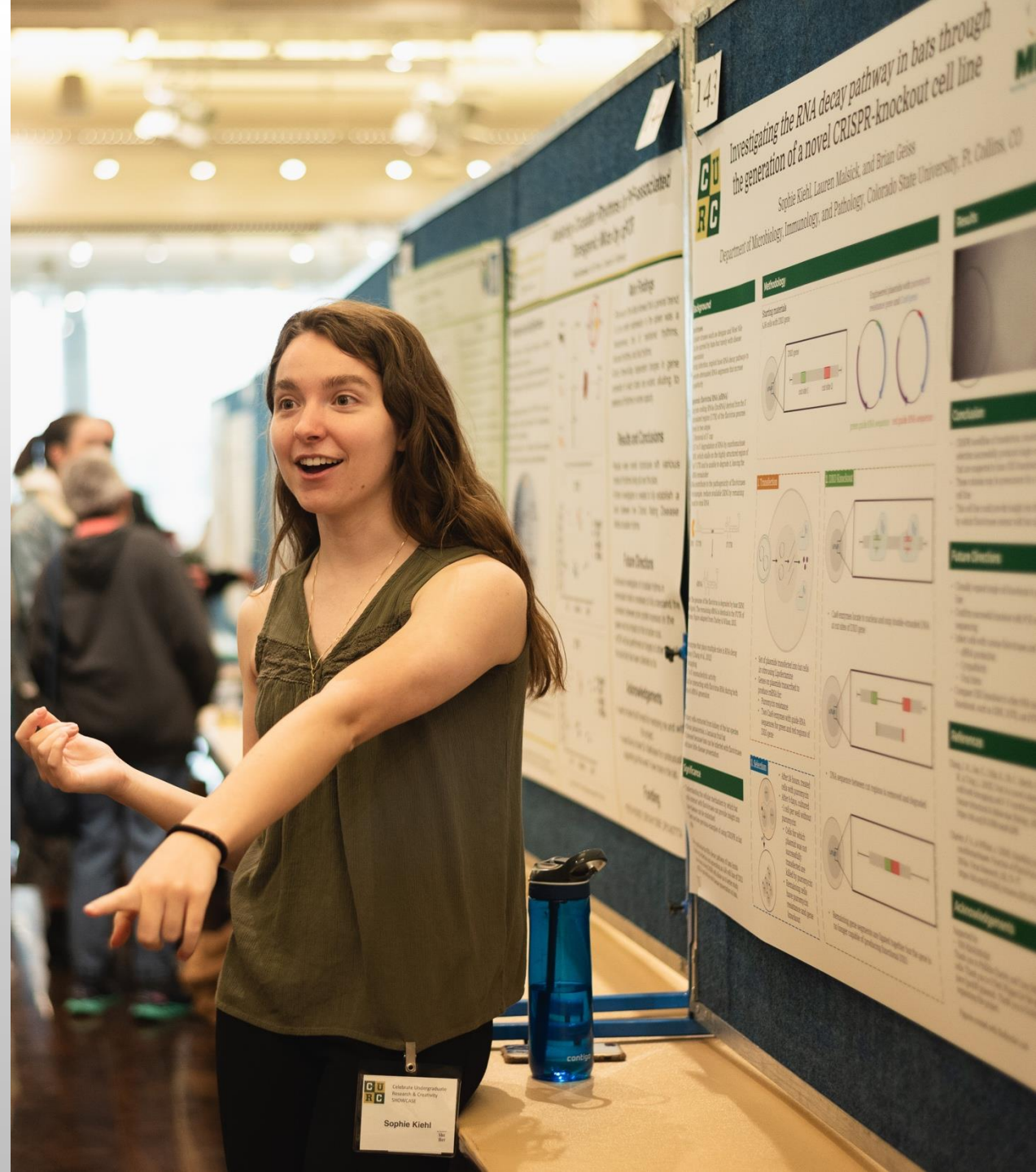
RESULT Mini-stories: The QARC Approach

- **Question**: What is the question?
 - Use a question mark
- **Approach**: What is the approach?
 - Explain the methods
- **Result**:
 - What did you MEASURE?
 - What did you FIND?
 - What are your CONTROLS?
 - What are the AXES?
- **Conclusion**: state clearly what you learned
 - “Therefore...”



TALKING

- Be mindful of your audience
- Let it be a conversation
- Stop and think
- Don't ever lie – just be honest that you don't know
- It's often loud & cramped
- Shoes & water



Be creative!

Share your joy!

Climate change and maternal food security during pregnancy in rural Uganda: Increasing challenges for maternal-infant health
Julia M. Bryson,^{1,2} Kaitlin Patterson,¹ Lea Berrang-Ford,^{1,3} Shoaib Iwasa,^{4,5} Didacus B. Namanya,^{4,6} Sebastian Twesigomwe,⁷ Charity Kesande,¹ James O. Ford,^{1,4} Indigenous Health Adaptation to Climate Change Research Team,⁴ Sherilee L. Harper^{1,4,8}

INTRODUCTION
Food insecurity is expected to increase globally due to climate change,¹ with Indigenous groups facing increased barriers to adaptation.² Pregnant women and particularly sensitive to food insecurity, as antenatal undernutrition is linked with poor maternal-infant health outcomes.³ Addressing climate change, food insecurity and maternal-infant health issues will require innovative policy and inter-sectoral interventions that understand community needs and promote local knowledge and collaboration.

OBJECTIVE
This study aimed to characterize the pathways through which climate change influences food insecurity during pregnancy and maternal-infant health in Indigenous and non-Indigenous communities in rural sub-Saharan Africa.

COMMUNITY PARTNERS
Approximately 700 people in Karamoja District, Uganda, are Indigenous Bakwa, who were forced from their traditional lands in 2009. Food insecurity is challenging in local communities, especially for the Bakwa.^{4,5}

DATA COLLECTION & ANALYSIS
8 focus group discussions (4 Indigenous Bakwa + 4 non-Indigenous Bakwa communities). Discussion topics included food security during pregnancy and perceived impacts of climate/weather on nutrition and pregnancy outcomes over time. Data were interpreted using thematic analysis⁶ coded in NVivo⁷ to characterize climate change into a function of exposure, sensitivity, and adaptive capacity.⁸

RESULTS
Four food security was a common problem during pregnancy that had a bidirectional relationship with antenatal health issues (Fig 2). Food insecurity was perceived to be increasing over time due to changes in climate. Food insecurity during pregnancy was reported as more severe for Bakwa women. Women indicated that improved food security would help them better handle environmental exposures while pregnant.

CONTRIBUTIONS TO THE CURRENT STATE OF KNOWLEDGE
Many women perceived food security to be the most important determinant of antenatal health for mothers and infants. Women identified direct impacts of changing climate on both agriculture and maternal health, decreasing food security during pregnancy. Indigenous women had reduced adaptive capacity to climate change, contributing to larger food security challenges while pregnant.

PRACTICAL IMPLICATIONS
Policies that promote women's adaptive capacity to climate change may be required to reduce the burden of food insecurity on maternal-infant health.⁹ Interventions should consider the inseparable Indigenous mothers face regarding food security, health, and adaptive capacity for climate change.

ISSUES
Fig 3. Map of Karamoja District, Uganda, showing the location of the study sites. The map highlights the location of the study sites in relation to the district boundaries and the location of the study sites in relation to the district boundaries.

UNIVERSITY OF GUELPH **UNIVERSITY OF ALBERTA** **HEALTHY COMMUNITIES**

HERD: Inuit Voices on Caribou
David Bonin,¹ Ashlee Curstoll,² Anna Bunce,³ Don Gill,⁴ Glen Cook,⁵ Michelle Wood,⁶ Jim Shiwak,⁷ Jack Shiwak,⁸ Chris Furgal,⁹ Chris Furgal,⁹ Victoria Edge,¹⁰ The Inuit Health Community

INUIT LEADERSHIP
Supporting the advancement of Inuit leadership, governance and adherence to Inuit research processes, this project is led by Inuit from the Nunavut and Nunatsiavut regions. A Steering Committee is guiding this project, with members from the Nunavut Government, Nunatsiavut Community Council, Inuit organizations, and academic researchers.

CONTEXT
In Labrador, Canada, Inuit from the Nunatsiavut and Nunatsiavut regions have sustained a deep reliance with caribou for generations. This relationship has been challenged in recent years, as caribou herds have experienced precipitous population declines, including a 99% decline of the George River Caribou Herd since 2003, which resulted in a total hunting ban in 2019.¹

LOCATION
This research took place in 11 communities across two Inuit regions, the Nunatsiavut and Nunatsiavut regions.

GOAL
In partnership with Inuit from the Nunavut and Nunatsiavut regions, this project characterizes the ways in which changing caribou populations impact the health and wellbeing of Inuit through the co-production of community-based, research-informed, participatory documentary film work.

METHODS
This project is informed by decolonizing² and community-based participatory research frameworks, including 88 in-depth interviews, 12 focus groups, and participatory video editing.

PARTICIPANTS
A total of 88 participants were video-interviewed, ensuring a diversity of ages, regions, experiences with caribou, and gender equity. Photos displayed with participant consent.

ANALYSIS
A video-based qualitative analysis was carried out, whereby video-interviews were used as the data. The coding and analysis capabilities in two video-editing softwares were utilized: Lumacraft Builder³ and Final Cut Pro X⁴. Codes were applied to a source that was linked to a video clip.

RESULTS
Inuit across the Nunavut and Nunatsiavut regions explained how caribou are an important element of Inuit identity, cultural continuity, and overall wellbeing. The changes in caribou populations are resulting in losses to cultural knowledge, alterations to Inuit perceptions of self, and concern about the future of caribou-caribou relationships. While Inuit are adapting to the caribou population changes in a variety of ways, the loss of caribou is a significant challenge.

CONTRIBUTION
Provides important data on Inuit-caribou relationships in Labrador. Advances the use of audio-visual research methods in Inuit research.

"It's almost like the caribou was the reason, and everything else happened after."

"My family ate caribou just about every day, twelve months of the year"

"Caribou meant everything for me... it brought happiness to everything"

"Big part of who we are, our identity is taken away, like so many other things"

"[Now] children don't even know what caribou tastes like"

"You can never replace the caribou"

UNIVERSITY OF GUELPH **UNIVERSITY OF ALBERTA**

Community-driven environment and health surveillance in the Canadian Arctic
Alexandra Smetitsky,¹ Dr. Ashlee Curstoll,² Anna Bunce,³ Don Gill,⁴ Glen Cook,⁵ Michelle Wood,⁶ Jim Shiwak,⁷ Jack Shiwak,⁸ Chris Furgal,⁹ Chris Furgal,⁹ Victoria Edge,¹⁰ The Inuit Health Community

Research Goals
1. Understand the current state of environment and health surveillance in the Arctic.
2. Identify and address gaps in environment and health surveillance in the Arctic.
3. Develop and implement a community-driven environment and health surveillance system in the Arctic.

Methods
1. Literature review
2. Focus group discussions
3. Community-based participatory research
4. Participatory video editing

Next Steps
1. Finalize and implement the community-driven environment and health surveillance system in the Arctic.
2. Evaluate the system and address any challenges.
3. Share findings and lessons learned with other Arctic communities.

Introduction
As a result of climate change, communities in the Canadian Arctic are experiencing rapid environmental and health changes. This project aims to understand the current state of environment and health surveillance in the Arctic, identify and address gaps, and develop and implement a community-driven environment and health surveillance system in the Arctic.

Impacts
This project will provide important data on the current state of environment and health surveillance in the Arctic, identify and address gaps, and develop and implement a community-driven environment and health surveillance system in the Arctic.

Contact Information
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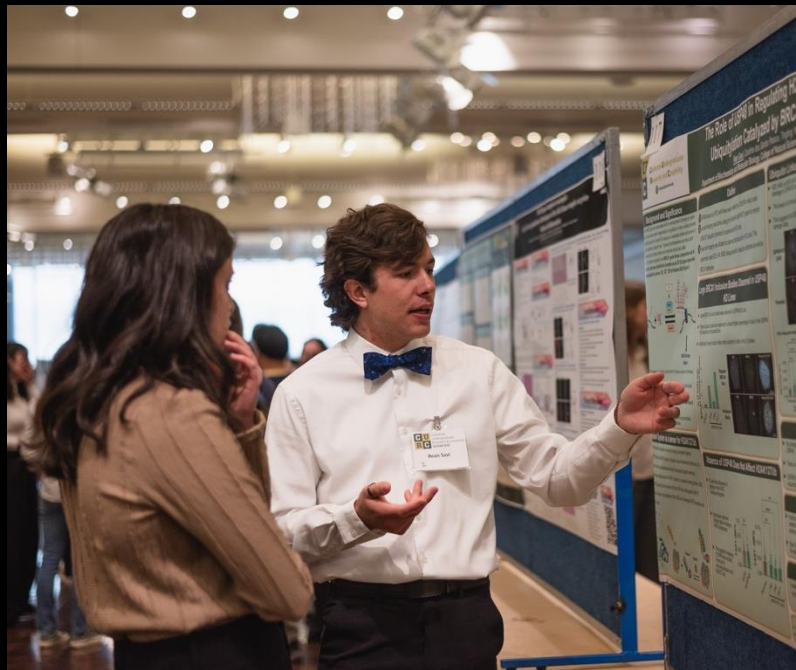
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Presenting Research

- Introduce yourself confidently
- Keep presentation and transition consistent
- Maintain eye contact with audience or look right above their heads
- SILENCE is better than “uhhh” or “ummmmm”
- Speak more slowly to avoid saying um
- Don't fill with fluff like “great question”
- Allow things to pop up not to distract them
- BE EXCITED, not trying to say “smile”

Presenting Research

- Introduction
- Consistency
- Attention
- PACING
- Be Genuine
- Distractions
- Passion!



Additional Resources

- PLoS: Ten simple rules for a good poster
- Fourwaves: How to make a scientific poster
- NIH (National Institutes of Health): Poster guide
- Pre-made poster layouts
- Telling scientific stories