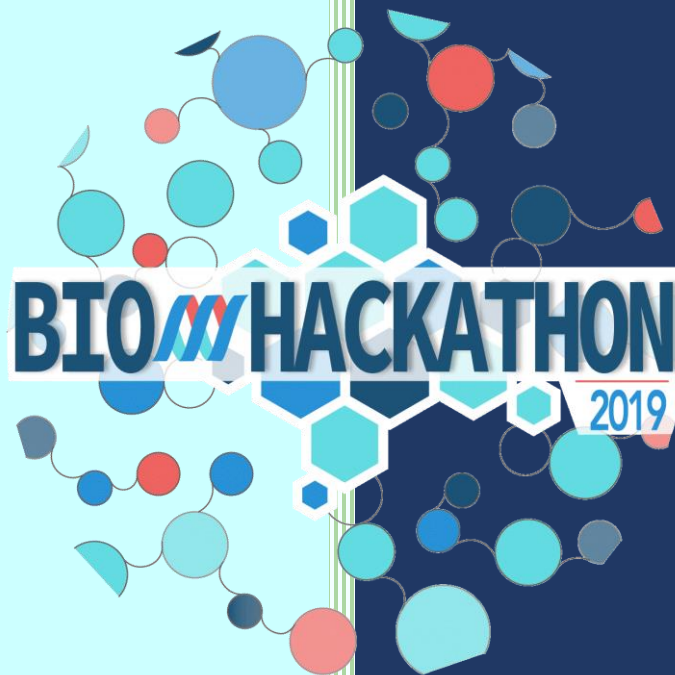




2019

Annual Bio-Hackathon and Summer School



Centre for Bioengineering and Biotechnology

University of Waterloo

7/1/2019



NSERC-CARETE
Annual Bio-Hackathon & Summer School
June 4-6, 2019



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NSERC-CREATE Bio-Hackathon

About

The Annual Bio-Hackathon and Summer School is part of NSERC-CREATE program in *Training in Global Biomedical Technology Research and Innovation* for Graduate Students at the University of Waterloo. This program is the first “Needs-First” Bio-Hackathon for in which trainees work in an interdisciplinary teams, discover unmet needs by directly interact with end-users and stakeholders in the patient, medical, biotechnology industry communities, develop the needs statement, and ideate potential solutions. They present their final “Needs Statement”, solution and design at the final pitch competition.

Program Overview:



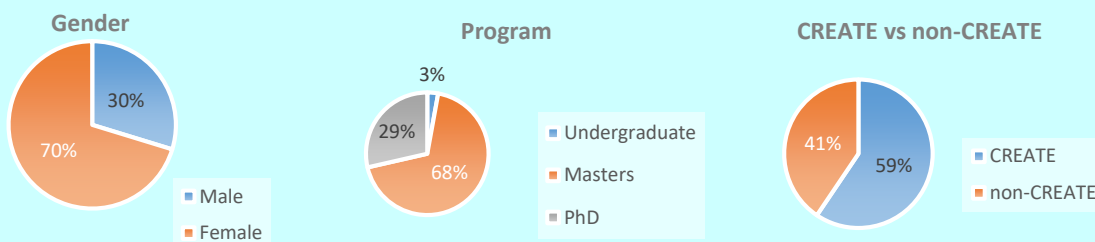


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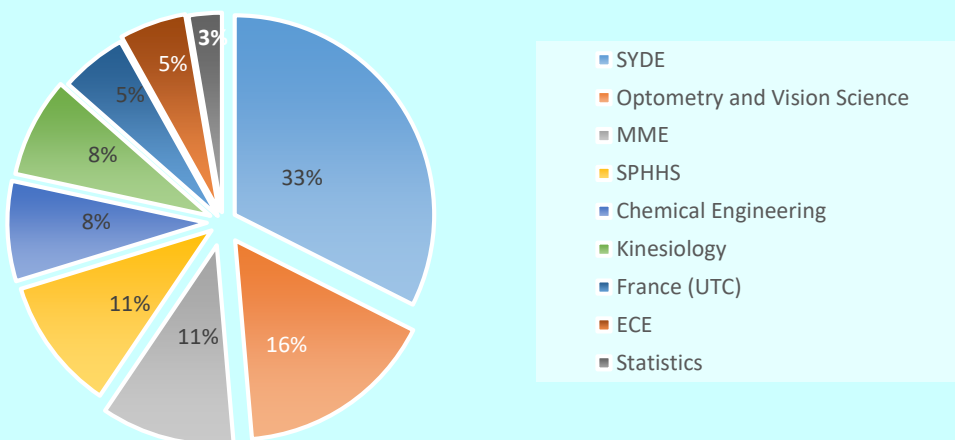


Agenda					
	Day 1-June 4		Day 2-June 5		Day 3-June 6
9:00-9:30	Welcome + Kick off "My experience as a middle-aged new cancer patient" by <i>Scott Leatherdale</i>	9:00-10:30	Needs Analysis and Screening	9:00-12:00	Concept Evaluation and Development
9:30-11:00	3M Talks	10:30-12:00	Brainstorming techniques	12:00-1:00	Lunch
11:15-12:15	Team Building Activity	12:00-1:00	Lunch	1:00-2:00	Pitch Practice
12:15-1:00	Lunch	1:00-4:00	Panel Discussion (Needs Validation)	2:00-2:30	Presentation Upload
1:00-4:00	Interdisciplinary Collaboration	4:00-4:30	Break	2:30-3:00	Refreshments Break
4:30-6:30	Intro to Design + Needs Finding and Assessment	4:30-6:30	Solution Working Session	3:00-5:00	Remarks+ Final Pitch Competition
6:30-8:00	Working Dinner with Teams	6:30-8:00	Working Dinner with Teams	5:00-5:45	Judge Deliberation and Reception Cocktail
				5:45-6:00	Final Results Announcement
				6:00-7:00	Social Networking Depart

Statistics of the Event



Discipline Diversity



Summary

- Total of 37 participants
- 8 teams of 4-5 (Interdisciplinary)
- **Theme:** Post Cancer Care
- **Biodesign Training sessions** (Needs Finding, Team building, Concept Evaluation, ...)
- **Identifying unmet needs panel discussion** by SickKids, GRH, CCCARE
- **Industry involvement:** mentors, judges, and event sponsorship
- **2 Winning teams**

Keynote Speaker

My experience as a middle-aged new cancer patient

An inspiring talk by Dr. Scott Leatherdale about his personal journey as a cancer patient, discussing challenges any individual faces going through cancer in personal and professional life.



Dr. Scott Leatherdale is a Professor and CIHR-PHAC Chair in Applied Public Health Research in the School of Public Health and Health Systems at the University of Waterloo. His work focuses on advancing a systems science approach to cancer prevention, developing and evaluating population-level health policies across multiple risk factor domains, and creating research infrastructure to facilitate large population studies in chronic disease prevention. His work is purposefully designed to actively engage numerous stakeholders at multiple-levels (regional, provincial, national), and is designed to have an impact on improving the health of large segments of the Canadian population. The core foundation project for his current program of research is the COMPASS System; a prospective cohort study following 70,000+ Canadian youth to evaluate how ongoing and real-world changes to programs, policies, or built environment resources surrounding youth impact multiple cancer-related health behaviours and mental health outcomes over time. Dr. Leatherdale was the inaugural winner of the CIHR-IPPH Trailblazer Award in Population Health Solutions.

Panel Discussion

Identifying Unmet Post Cancer Care Needs



Needs Identified by Canadian Retinoblastoma Research Advisory Board (CRRAB)

Retinoblastoma is a childhood eye cancer, which can have lifelong effects on vision and well-being, including risk of developing second cancers later in life.

- Priority: What second cancer screening is optimal for heritable retinoblastoma survivors?
- Priority: How to provide culturally competent social, emotional and psychological support to retinoblastoma patients, survivors, parents and families (at diagnosis and beyond)?



Needs Identified by Grand River Regional Cancer Centre

- Exercise post-cancer to prevent discharging deconditioned patients
- Weight and nutrition assessments only occur at beginning of cancer process. While the nutrition tool is validated, there is no evidence regarding how often a patient should be reassessed.



Needs Identified by CCCARE (Center for Community, Clinical and Research Excellence)

Strong evidence suggests that regular exercise can prevent colon, prostate, and breast cancer. Exercise also is safe during and after cancer treatment.

Training Sessions

Overview:

Communication and Presentation	Needs Finding and Assessments	Team Building and Collaboration	Design Ideation and Concept Development
<ul style="list-style-type: none"> Communicate your Research to a General Audience 3M Thesis Pitch Presentation techniques 	<ul style="list-style-type: none"> Design Process (Identify, Invent, Implement) Needs Statement: "A way to address (Problem) in (Population) that (Outcome)" 	<ul style="list-style-type: none"> Five aspects of a good team Team diversity Destructive VS productive conflict Multi-, Inter-, & Transdisciplinary Team charter 	<ul style="list-style-type: none"> Decision matrix and developing concepts Effect of 'design fixation', encouraging meta cognition and awareness in design Rules of Idea Generation Constraint Reversal C-Sketching

Interdisciplinary Collaboration



Facilitator: Katie Plaisance

Learning Objective: Understand how diversity improves team outcomes. Differentiate between productive and destructive conflict. Recognize the importance of psychological safety and develop a team charter.

"Collaboration, it turns out, is not a gift from the gods but a skill that requires effort and practice."

– Douglas B. Reeves

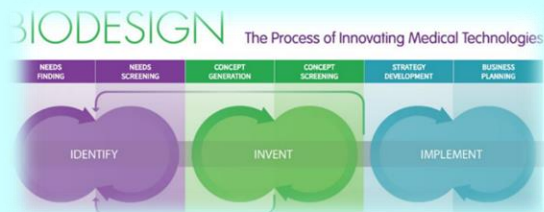


Intro to Design / Needs Finding & Assessment

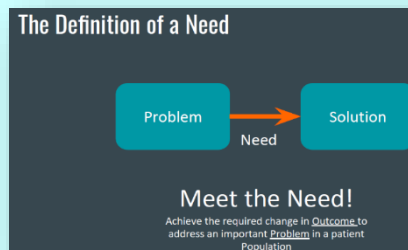
**WATERLOO
ENGINEERING**

Facilitators: Tom Willet and Maud Gorbet

Mentor: Lora Giangregorio



Learning Objective: Overview of the design process. Needs finding: Elements of Needs Finding and process; Needs Statement definition and development.



Needs Analysis and Screening

Facilitators: *Tom Willet, Maud Gorbet*

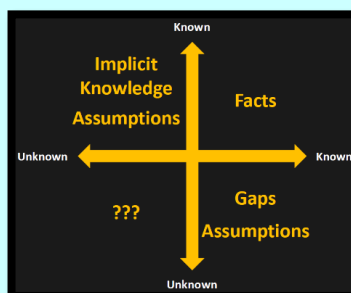
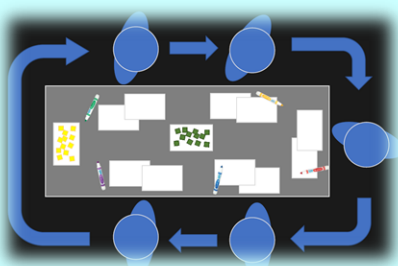
Mentor: *Thanh Vuong*

Learning Objective: The goal of Needs Analysis, screening/selection process. Use of critical thinking, analysis, validation to select a need to work on. Needs specification generation.

Ideation Techniques



Facilitator: *Rob Gorbet*



Learning Objective: The place of ideation in the design process. Practice several specific ideation techniques.

Solution Working Session

Facilitators: *Catherine Burns, Tom Willet, Maud Gorbet*

Learning Objectives: Through application of ideation generate 3 Solution Concepts for their Need. Document concepts on slides.

Concept Evaluation and Development



Facilitator: Oscar Nespoli

Mentor: Jen Boger

Learning Objectives:

- Teach the practical and effective use of the decision matrix for selection and developing concepts
- Demonstrate the importance of selecting a useful datum
- Demonstrate the effect of 'design fixation', encouraging meta cognition and awareness in design
- Identify technical contradictions and removal of such using a separation principle
- Communicate accurately and effectively

Communicate your Research to a General Audience



- **Facilitator:** Valerie Walker
- **Learning Objective:** Techniques of giving an effective presentation to an educated but non-specialist audience through storytelling.

Team Building Activity



- **Facilitator:** Kira Bruschke
- **Learning Objective:** Building up a team dynamic, effective teamwork, and communication

Pitch Practice



Facilitator: Emily Peat

Deliverable: Ensure that the required components are in the presentation file, and practice for the final competition presentation.



Teams Introduction

First Place Winners:

Lymfreedema

- Paula He, MSc, Kinesiology
- Cederick Landry, PhD, MME
- Emma Tung, MSc, Kinesiology
- Catherine Wang, Undergraduate, Statistics



Lymfreedema

Second Place Winners

Detect-A-Dot

- Martine McGregor, PhD, MME
- Kawtar Ghiatt, MSc, SYDE
- Ibrahim Ben Daya, PhD, SYDE
- Lori Pollit, MSc, Optometry and Vision Science
- Larissa Ugaya Mazza, SPHHS



Teams (Alphabetical Order)

Cander

- Amanda Nova, MSc, SPHHS
- Nargess Heydari, PhD, SYDE
- Jonathan Rasmussen, MSc, Chemical Engineering
- Fairuz Hoque, MSc, SYDE
- Daniel Dapaah, PhD, SYDE



Inside Out

- Abdollah Pil Ali, PhD, ECE
- Arlene Oetomo, MSc, SPHHS
- Joanne Qiao, MSc, Optometry and Vision Science
- Zahra Haghpahan, MSc, SYDE



LiveWork

- Andrew Smiles, MSc, SYDE
- Matteo Ponzano, PhD, Kinesiology
- Sadaf Mohsenkhani, SYDE
- Tatiana Bevilacqua, PhD, SPHHS



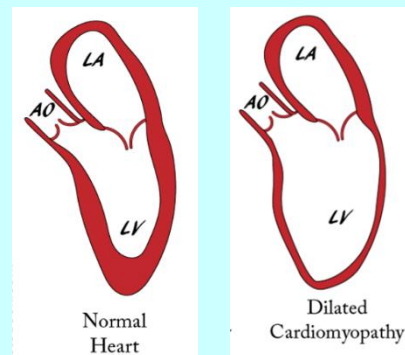
PlateUp!

- Julia Goyal, PhD, MME/SPHHS
- Nijani Nagaarudkumaran, MSc, Optometry and Vision Science
- Jun Ahn, MSc, ECE
- Surya Neti, MSc, SYDE
- Yutong Jin, MSc, Optometry and Vision Science



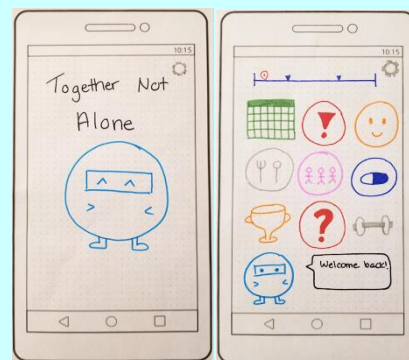
Rural Heart Health Monitoring

- Fan He, MSc, SYDE
- Sabrina Mattiassi, MSc, Chemical Engineering
- Aravind Ravi, MSc, SYDE
- Fatimata Ndiaye Sarr, Graduate Student, SPHHS
- Alan Yee, Optometry and Vision Science



Social Accountability

- Robin Murdok, MSc, MME
- Vivian Chan, MSc, Optometry and Vision Science
- Yirou (Chris) Li, MSc, SYDE
- Dana Toameh, MSc, SYDE



Gallery



Photography by: David Wulff and Matthew Robichaud

Organizational Committee



Catherine Burns, Professor,
Systems Design Engineering
and Executive Director, Centre
for Bioengineering and
Biotechnology, University of
Waterloo



Thomas Willett, Assistant
Professor, Systems Design
Engineering, and Biomedical
Engineering Program,
University of Waterloo



Maud Gorbet, Associate
Professor, Biomedical
Engineering, Interim Chair,
Systems Design Engineering,
University of Waterloo



Oscar Nespoli, Continuing
Lecturer, Mechanical and
Mechatronics Engineering,
University of Waterloo



Rob Gorbet, Associate
Professor and Chair,
Department of Knowledge
Integration, University of
Waterloo



Katie Plaisance, Associate
Professor and Associate
Chair, Knowledge Integration,
University of Waterloo



Lora Giangregorio,
Associate Professor,
Department of Kinesiology,
University of Waterloo



Jennifer Boger, Assistant
Professor, Systems Design
Engineering, University of
Waterloo



Parisa Hamilton, Project
Coordinator, Centre for
Bioengineering and
Biotechnology, University of
Waterloo-**Bio-Hackathon**
Coordinator

Guest Facilitators



Kira Bruschke,
 Graduate Career
 Advisor, Centre for
 Career Action,
 University of
 Waterloo



Valerie Walker, Writing
 and Multimodal
 Communication
 Specialist, Writing and
 Communication Centre,
 University of Waterloo



Emily Peat,
 Undergraduate BETS
 and E Co-op Advisor,
 Conrad School of
 Entrepreneurship and
 Business, University of
 Waterloo



Sarah Howard,
 Graduate Student
 Experience Specialist,
 Graduate Studies and
 Postdoctoral Affairs,
 University of Waterloo

Synaptive

Thanh Vuong, Head of Intellectual
 Properties at Synaptive Medical

Competition Judges



**Matthew James
 Borland,** Lecturer,
 Systems Design
 Engineering, University
 of Waterloo



Josh Richmond, Vice
 President, R&D,
 Surgical Systems,
 Synaptive Medical



Carla Girolametto,
 MA, MSc, CCRP-
 Director Research,
 Innovation & Clinical
 Trials, Grand River
 Hospital



Synaptive

Zach Weston, Manager,
 Performance, Waterloo
 Wellington Local Health
 Integration Network



**Office of Research
 and Innovation**
 Grand River Hospital

**Waterloo
 Wellington
 LHIN**

Panelists

GRAND RIVER HOSPITAL



Carla Girolametto: MA, MSc,
CCRP-Director Research,
Innovation & Clinical Trials



Hanna Stracey: MN,NP-
Nurse Practitioner



Margaret Mayer: MScN, NP,
CONC- Nurse Practitioner-
Hematology

SickKids®



Helen Dimaras: PhD,
Scientist, The Hospital for
Sick Children Steering
Committee member, The
Canadian Retinoblastoma
Research Advisory Board



Ivana Ristevski: BComm, Parent in
Research, The Hospital for Sick
Children Retinoblastoma Champion
and Steering Committee member,
The Canadian Retinoblastoma
Research Advisory Board



Richelle Badelliyanage: BSc,
Retinoblastoma Champion
and Steering Committee
member, The Canadian
Retinoblastoma Research
Advisory Board

Centre for Community, Clinical & Applied Research Excellence



Caryl Russell: Director of UW
Fitness, UW WELL-FIT cancer
exercise programs

Volunteers



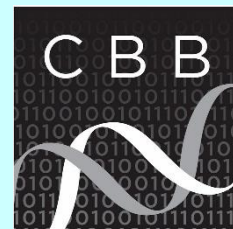
Matthew Robichaud, Master Student, System Design Engineering, University of Waterloo

Bio-Hackathon Mentor



David Wulff, PhD Candidate, Chemical Engineering, University of Waterloo

CBBSAT Ambassador 2018



Hanaan Deen, Program Support Assistant, Centre for Bioengineering and Biotechnology, University of Waterloo

SCIENCE

Max Wu, Undergraduate Student, Biotechnology, Science, University of Waterloo

NANOTECHNOLOGY ENGINEERING

Yashveer Soni, Undergraduate Student, Nanotechnology Engineering, University of Waterloo



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Acknowledgements

Organizer: Centre for Bioengineering and Biotechnology (CBB)

We would like to acknowledge support from **NSERC-CREATE**, Training in Global Biomedical Technology Research and Innovation at the University of Waterloo. [CREATE Funding 401207296]

Sponsors

Centre for Bioengineering and
Biotechnology (CBB)



Contact: cbb@uwaterloo.ca
@WaterlooCBB

NSERC- Collaborative Research and
Training Experience Program
(CREATE)



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Kitchener, ON, N2H 5L6
Canada



StarFish Medical Headquarters
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Canada

Synaptive

Synaptive Medical
555 Richmond Street West
Suite 800 Toronto, ON
M5V 3B1
Canada



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International Partners



French-Canadian BIOMEDInnov
Program



Link: <https://uwaterloo.ca/bioengineering-biotechnology/partnerships/international-partners/france>



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Testimonials

We asked our participants

*If you can take **ONE lesson** home from the Bio-Hackathon what would it be?*

They replied:

“How not to go from solution to need.”

“Networking. People there were really kind and willing to collaborate and exchange knowledge and experiences. I really loved this.”

“Everyone comes with strengths. Effective teams utilize everyone's strengths rather than expecting everyone to be good at the same thing.”

“We're all capable of developing solutions to big problems, no matter if we're students or industry professionals!”

“It is a great experience and there was a lot to learn! “

“Importance of first identifying a need. “

“There are struggles for cancer patients even after they are cancer free.”

“To succeed all member of the team need to be on the same page.”

“Importance of creating safe place in team for productive collaboration.”

“There is more than one perspective to any challenge, try and find several before trying to solve it.”

And many more...



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Contact us



To learn more about the Annual Bio-Hackathon and summer school program

Visit: <https://uwaterloo.ca/bio-hackathon-summer-school/>

Contact: Cbb.hackathon@uwaterloo.ca



To learn more about CREATE program or Centre for Bioengineering and Biotechnology

Visit: <https://uwaterloo.ca/bioengineering-biotechnology/nserc-create>

Contact: cbb@uwaterloo.ca

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