Seneca APPLIED RESEARCH

How Seneca Polytechnic is Cultivating Innovation in Microfarming

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Presentation Outline

- Defining Microfarming
- Seneca Centre for Innovation in Microfarming (SCIM)
- Overview of Select Partnered Initiatives
- Project Highlight: Urban Agriculture Enterprise Support Program

> A microfarm is where the farmer thinks, plans and farms in square metres rather than hectares.

- Vernon Gibbard
Microfarmer

Limited Space

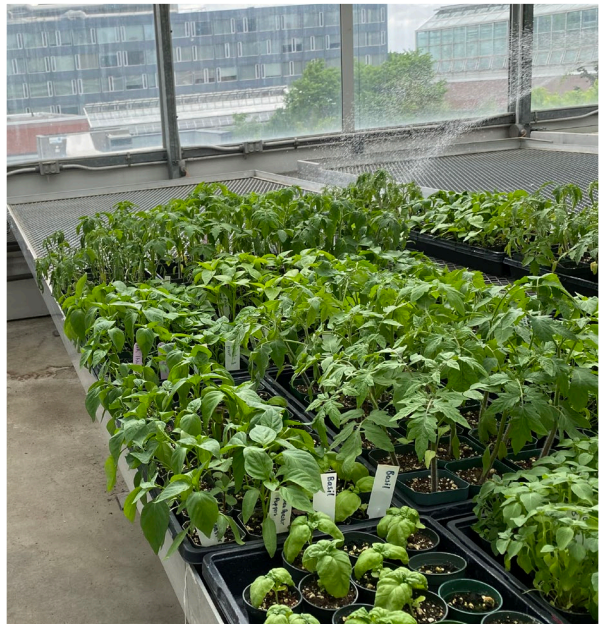
Efficiency

Sustainability

Local Food

Microfarming can include…

- CEA
- Vertical Farms
- Hydroponics
- Urban Farms



- Rooftop Farms
- Community Farms
- Campus Farms
- Greenhouses

Why is Seneca doing microfarming?

- Industry draw
  - In GTA, 82 agritech startups (2022-23)
- Federal and provincial priorities
  - Funding programs growing in number
- Established partnerships
  - 13% of active collaborative projects
- Campus locations
  - Urban and peri-urban sites, including farmland

Environmental Benefits of Microfarming

Supports stormwater management

Regulates temperature and mitigates urban heat island effect

Reduces greenhouse gas emissions

Supports habitat creation for local biodiversity

Promotes sustainable and efficient growing practices

Social Benefits of Microfarming


Improves food security and access


Fosters community cohesion and unity


Promotes health and well-being


Provides education and training opportunities


Preserves cultural heritage and traditions

Economic Benefits of Microfarming


Utilizes underused spaces producively


Generates employment across the micro farming chain


Enhances productivity and efficiency


Increases demand for local product


Increases demand for agricultural technology

How is Seneca cultivating microfarming?

- Doing innovative farming
- Creating networks for collaboration
- Training the next generation of farmers

Seneca Centre for Innovation in Microfarming (SCIM)

MISSION

To provide the infrastructure, expertise, and support for multi-disciplinary research in areas related to small-scale agriculture, agri-food, and environmental innovation.

OBJECTIVES

Bringing together life sciences, data science, community services, environmental science, engineering, sustainability, and landscape management.

Supporting **experiential learning,** opportunities for **collaboration**, and testing **space for farming** innovation

Main Areas of Research

Advanced farming technologies

- Novel food production technologies
- Smart farming
- Automation and robotics
- Crop protection
- Renewable energy
- Nutritional value improvement

Community-based farming

- Optimizing financial or business productivity
- Enhancing community access to local food
- Growing culturally appropriate food

Circular agriculture

- Processes and products in agricultural waste reduction
- Upcycling of agricultural byproducts
- Remediating and improving soil health

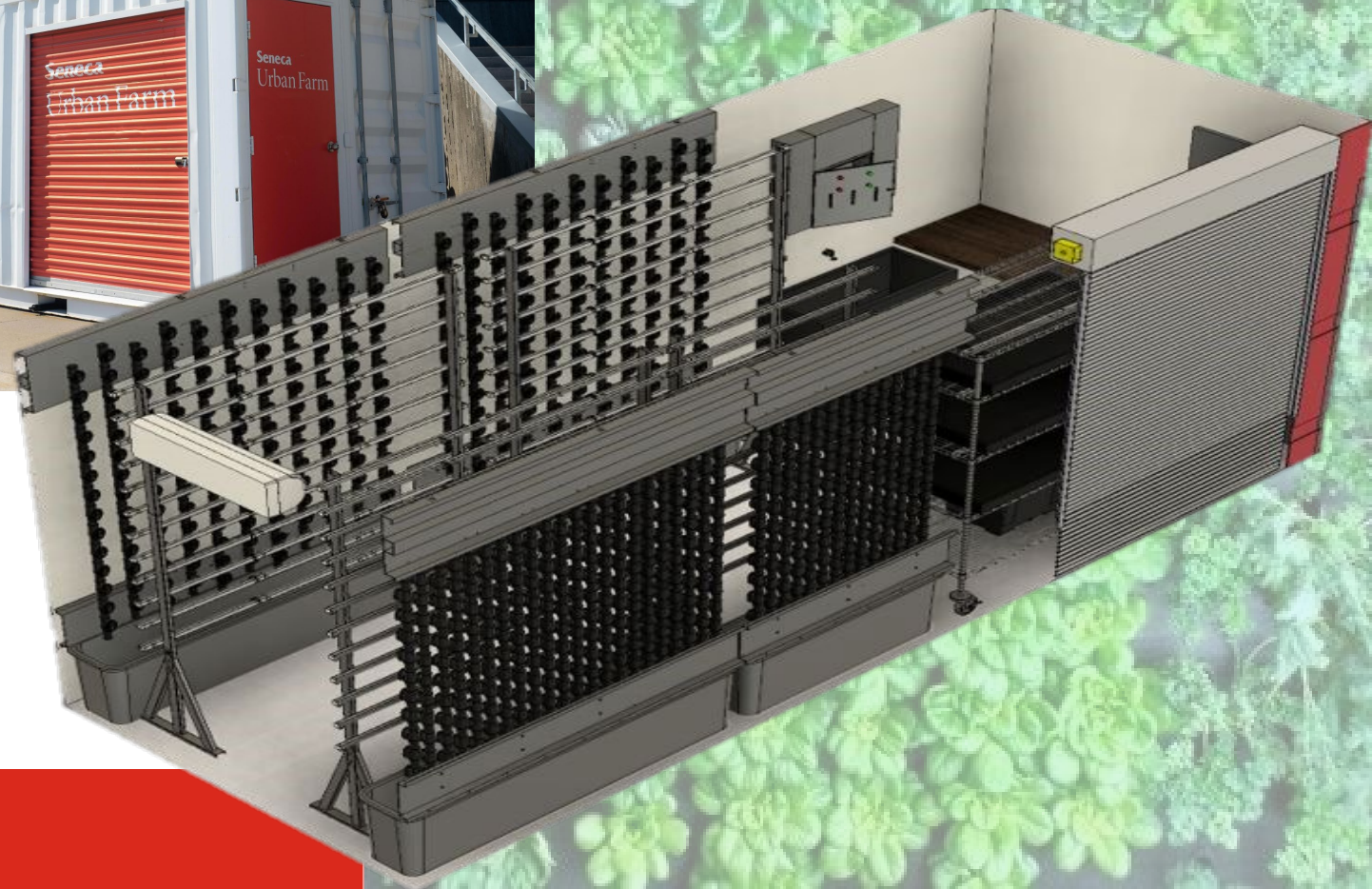
Facilities

- Shipping container farm
- Parking structure rooftop farm
- Outdoor research farm

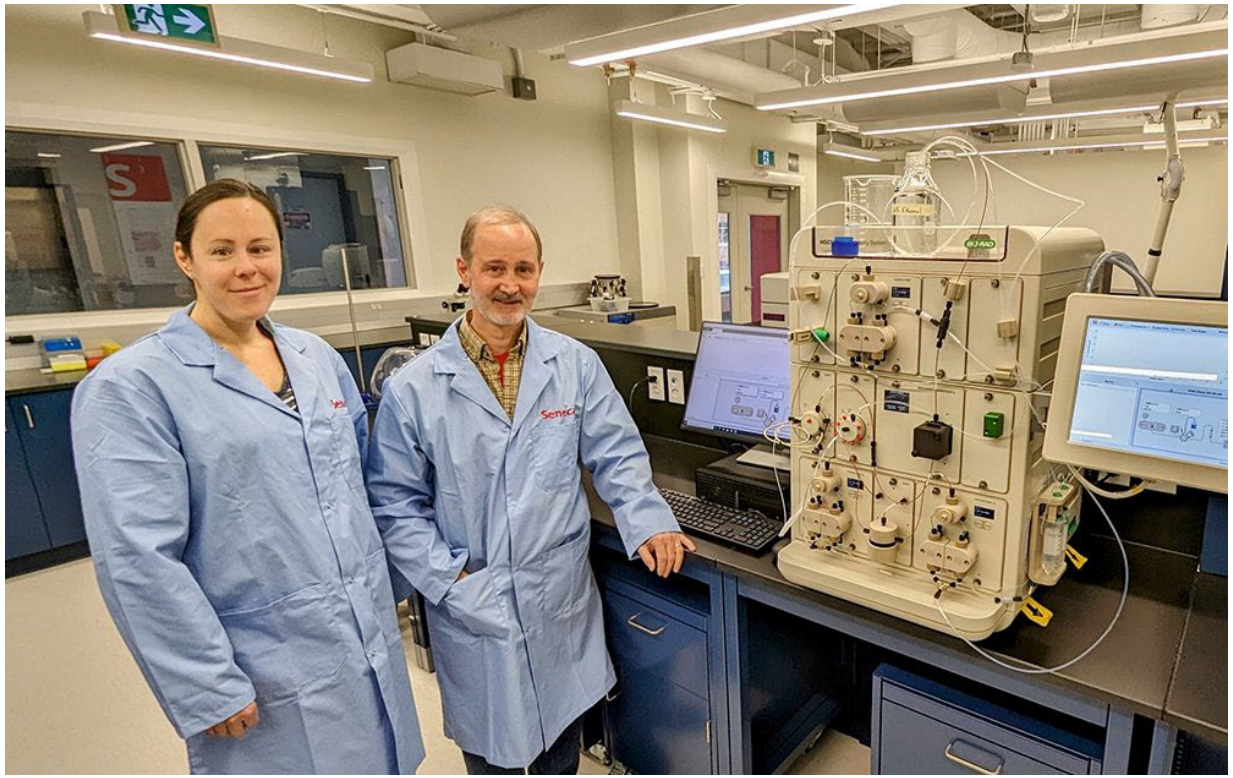
The Seneca Farm

First piece of Controlled Environment Agriculture equipment dedicated for research at Seneca.

Beginning in the Spring of 2024, the farm will also be providing leafy greens to our Newnham campus cafeterias, supplying our salad bar and other menu items with fresh, hyper local produce.



Technical Facilities



- Laboratory
  - Plant extraction and analytical chemistry
  - Mushroom propagation and growth
  - Energy in urban agriculture
  - Microbiology laboratory
- ICT Equipment
  - Data processing
  - Data collection
  - IoT and sensor design

Expertise and Networks

Small-scale and urban farming research is an active but fragmented space

Networks

AgroParis

Campus Farm Network

Toronto Urban Growers

Toronto Region Conservation Authority

York Region Food Network

York Region Circular Economy Working Group

Institutions

Durham College

Toronto Metropolitan University

OCAD University

University of Guelph

University of Toronto Scarborough

University of Toronto St. George

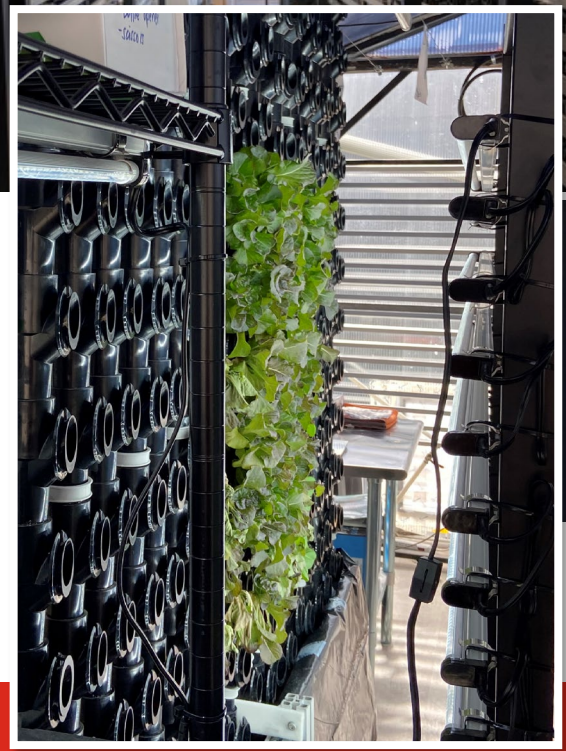
Partnered Initiatives

Partnered with companies on externally funded Applied Research

From advanced farming technologies through to community initiatives to circular agriculture

Utilizing complementary strengths at Seneca and within partners, to build thriving research program

Advanced farming technologies



Balancing growth inputs against the yield and nutrient content in Controlled Environment Agriculture

Dr. West Suhanic

Testing novel vertical farming technologies and processes on growth and nutrition quality

NSERC CRSNG

JUST VERTICAL

FLOVERGIA SYSTEMS

Community-level farming

The Seneca Urban Farm

Partnered with Office of Sustainability, Campus Food Services, and the Student Federation to providing fresh hyper-local produce to the cafeteria and to the Student Federation Food Bank

Infrastructure for testing and demonstrating innovative hydroponic technologies

Community-level farming

Feasibility of Micro-Insurance for Urban Agriculture

As the benefits and advantages of urban farming in Canada become increasingly clear, so do the various risks facing farmers and producers who seek to create and develop their own urban agriculture businesses (e.g., municipal policies, lack of financial support, etc.). Dr. West Suhanic, Professor, School of Financial and Accounting Services, is leading a team of student researchers investigating how to mitigate such risks through the creation of business models for the provisioning of microinsurance to economically vulnerable groups like urban farmers. This project aims to create the case that a micro-insurance product for urban farmers is feasible and, with this reduced risk, facilitate the creation of a microinsurance product by providing this information to insurance providers.

Toronto Urban Growers

Funded through the AgriRisk Initiatives microgrant program

Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada

Circular Agriculture

Investigating Compost Metagenomics

Dr. Frank Merante, Monica Wong, Jim Cooper, and George Clark of the School of Biological Sciences and Applied Chemistry

Evaluating the micro-organism populations in compost, and using bioinformatics to understand how different compost inputs and conditions can drive chemical parameters in the compost itself.

NSERC CRSNG

VCYCENE™

Circular Agriculture

<u>Pilot growing mushrooms on waste muslin textiles</u>

Dr. Frank Merante – *School of Biological Sciences and Applied Chemistry*

Sabine Weber – *School of Fashion*

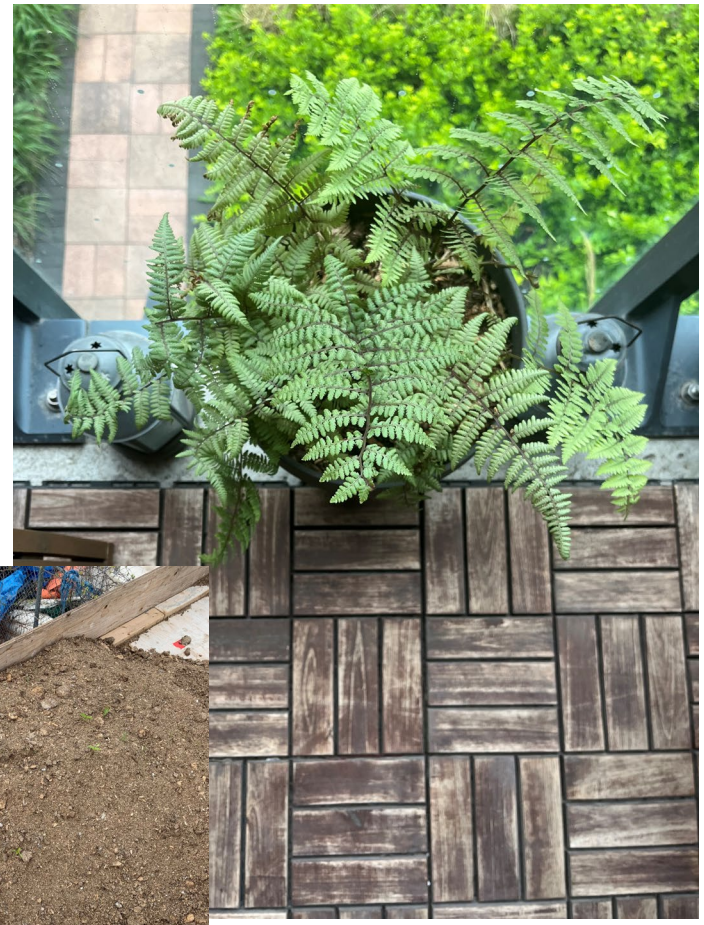
FASHION TAKES ACTION FTA

Circular Agriculture

Evaluating the optimal mix of recovered construction waste as plant grown material

George Clark – *Biological Sciences and Applied Chemistry*

RYZOME



Training

Agritech training for the next generation of farmers

Cedar Leithead – *Teaching & Learning*

Hands-on training for community members and high-school students in advanced agritech and agriculture.

Collaborating on offering summer camps, community nights, and networking events and opportunities.

All programs are free and open for registration!

BOREAL FARMS

STEM MINDS

Canada

EMPLOYMENT ONTARIO

Ontario

Project Highlight:

Urban Agriculture Enterprise Support Program

Toronto Urban Growers

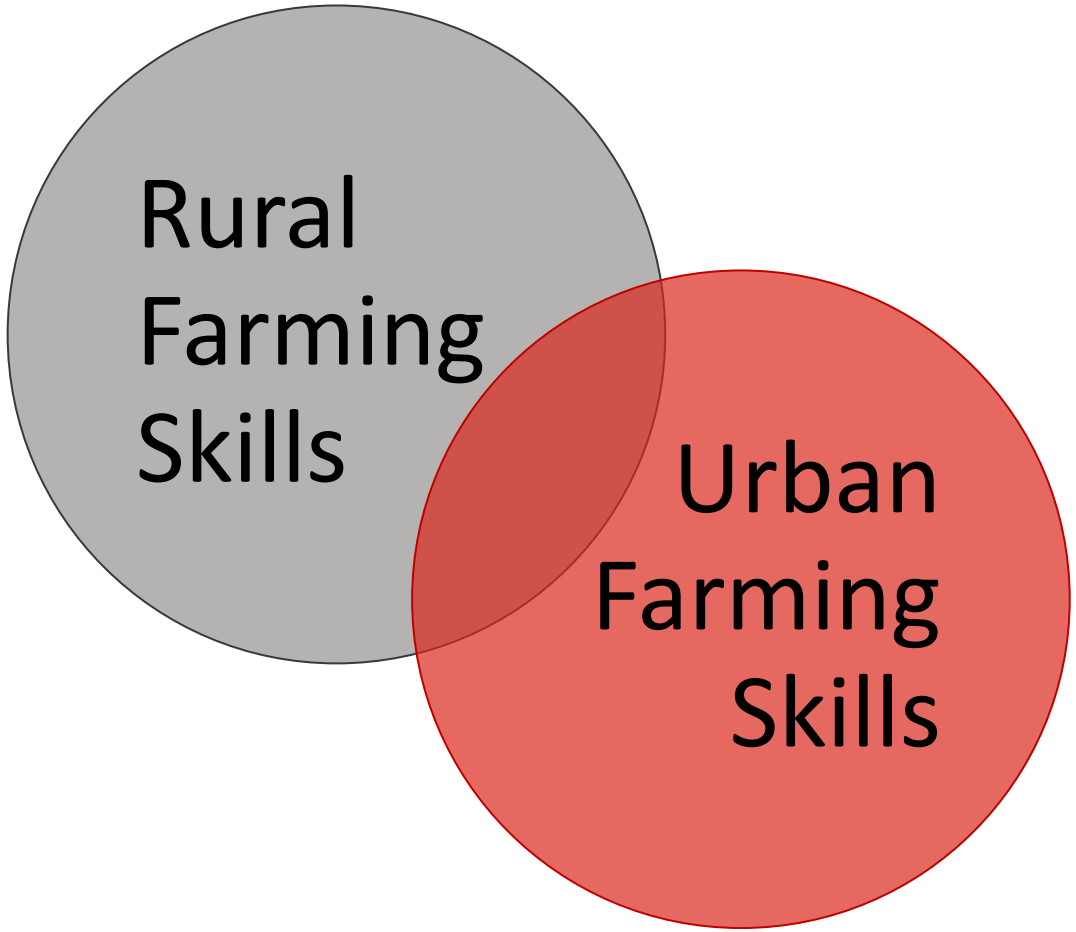
WEST NEIGHBOURHOOD HOUSE
Formerly St. Christopher House

GreenestCity
eat · grow · share

Toronto Metropolitan University

NSERC CRSNG

Why develop an urban farming training program?



- Greenest City identified the need for training in green jobs
- Lack of scale- and context-appropriate knowledge
- Traditional agriculture education programs focus on rural areas
- Urban farming has different scale and context

Developing an urban farmer training program

Online Survey

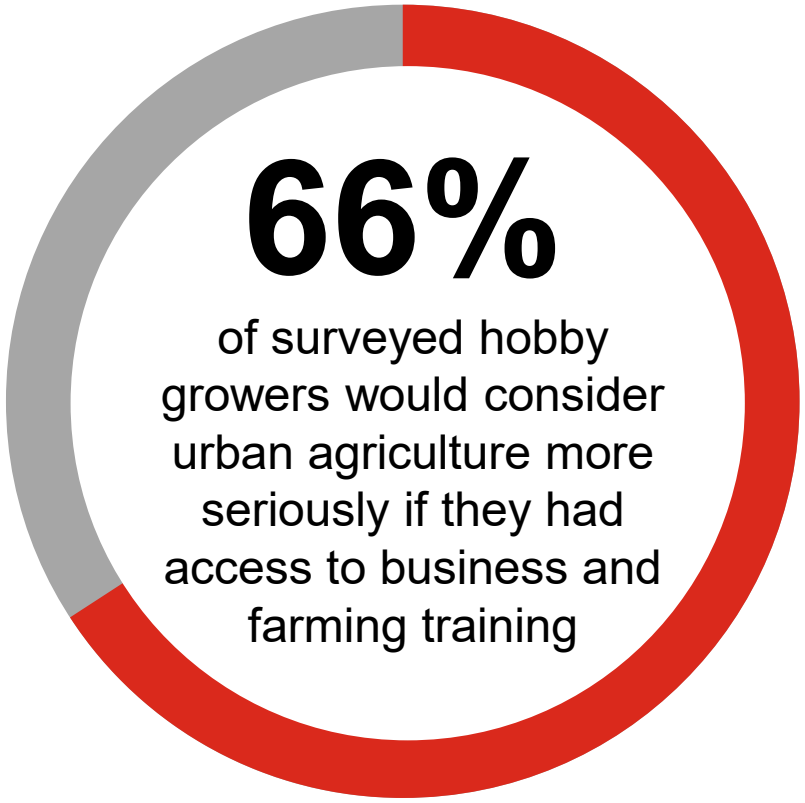
- Are people interested in urban farming training?
- What are they interested in learning?

Farmer Interviews

- What are the best practices in urban farming?
- What are the knowledge and training gaps in urban farming?

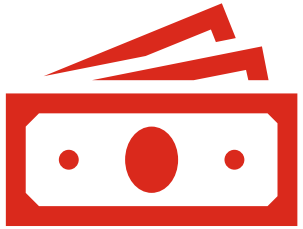
Training Program Development

- How do we fit it all in one training program?
- How do we cater to varying experience levels and interests?



What do people want to learn about?

Land Access & Access Agreements



Getting Financial Support

Growing in Non-traditional Spaces

Toronto Urban Farmer Training (TUFT)

WHAT

- 8 module online training program
- Additional module on CEA
- Online resources and live discussions
- Guest urban farmers
- Networking opportunities

FOR WHO

- Current and aspiring urban farmers
- Varying experience levels

TUFT covers topics on:

Values	Planning and Starting a Business
Accessing Space	Production
Business Management	Resourcing

Delivering TUFT

First Delivery

- 56 registered participants
- 34 average attendees per module
- 4.5 out of 5.0 average module rating

Second Delivery

- 53 registered participants
- Attendance and feedback data to be tabulated

Future of TUFT

- Exploring pathways to continue delivery
- Follow and provide support to graduates
- Collecting additional feedback from graduates

Natalie Richter

TUFT Graduate

Natalie is building research, collaboration, and a company around developing education programs to support young adults with autism utilizing the mental health benefits of farm work to build skills and build a business.

“TUFT introduced me to the Urban Farming community. The program pushed me to reach out to the various community gardens that we now volunteer at. It also made me realize that urban farmers are our type of people. They are naturally inclusive - particularly when Ben is doing the same work as everyone else. He has had more conversations with fellow farmers than in most environments he's been in.”

Jer Campbell

TUFT Graduate

Jer's Garden is social enterprise that grows food for sale and for donation to support community need and mutual aid.

Distributed agriculture model with landshare deals with landowners. In 2022, Jer farmed about 10,000 sq.ft. of farming space.

Crosby Gitigaan

TUFT Graduate

Afro-Indigenous-led company at Malvern Urban farm that grows culturally relevant and hard-to-find Indigenous crops, and provides education on helping to restore the earth we grow on.

Passionate about teaching and sharing knowledge on Indigenous food and food systems

CROSBY
GITIGAAN

TUFT recognized by OMAFRA

- Honorable Mention for Excellence in Agricultural Education
- Recognition that microfarming is a growing and important sector to the Province

Future of SCIM

- Expanding infrastructure
- Incorporating training programs
- Leveraging networks for collaborative projects
- Hosting community-building events

Thank you

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Other funding sources

Seneca APPLIED RESEARCH

- In addition to NSERC, Mitacs and internal funding, where else can funding come from?

SSHRC

- SSHRC Engage
- SSHRC Partnership Grants (smaller size, or larger)
- NSERC-SSHRC Sustainable Agriculture Research Initiative

Provincial Ministries

- Ontario Ministry of Agriculture, Farming, & Rural Affairs (OMAFRA)
  - Ontario Agri-food Research Initiative (OAFRI)
- Ontario Ministry of Colleges & Universities
  - Skills Development Fund

Federal Ministries

- Employment & Social Development Canada (ESDC)
  - Longitudinal study on Work Integrate Social Enterprise II (specific call)
- Agriculture & Agri-Food Canada (AAFC)
  - AgriRisk Iniatiatives
    - Micro-Grants
  - Sustainable Canadian Agricultural Partnerships
    - Agri-Science