

Characterization @ UBC – Drawing together community across the University of British Columbia

T. Ben Britton^{1*}, Ismail El Baggari², Anette von der Handt³, Mark Martinez⁴,
Renelle Dubosq⁵, M. Haroon Qaiser¹ and Joey Yeap¹

1. University of British Columbia, Department of Materials Engineering, Vancouver, British Columbia, Canada
2. University of British Columbia, Department of Physics & Astronomy, Vancouver, British Columbia, Canada
3. University of British Columbia, Department of Earth, Ocean and Atmospheric Sciences, Vancouver, British Columbia, Canada
4. University of British Columbia, Department of Chemical and Biological Engineering, Vancouver, British Columbia, Canada
5. University of British Columbia, Department of Earth and Environmental Sciences, Kelowna, British Columbia, Canada

* Corresponding author: ben.britton@ubc.ca



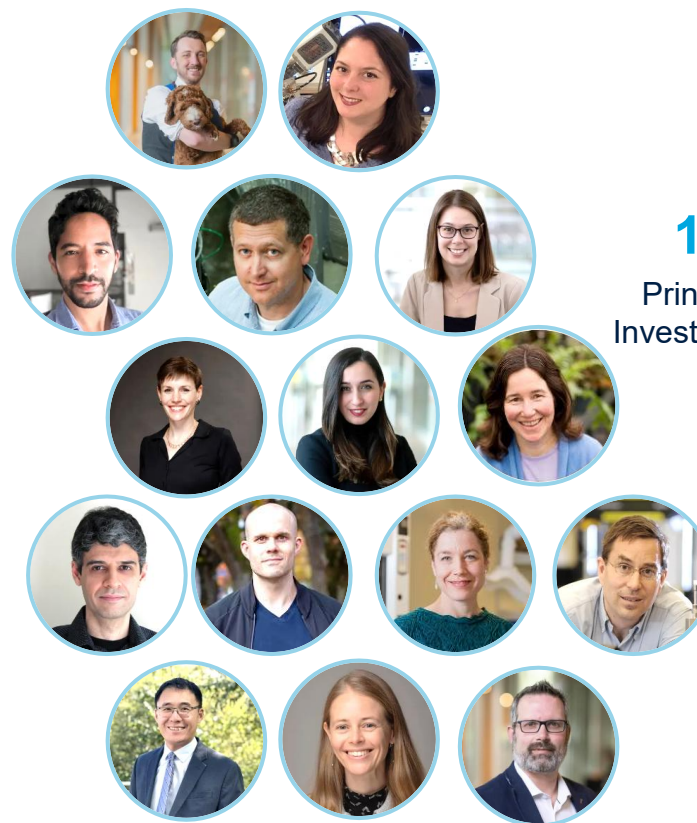
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Characterization @ UBC
Research Excellence Cluster

characterization.ubc.ca

Introduction

- Shared core facilities @ UBC for Advancing Materials Characterization
- mm to nm length scales explored
 - 2D, 3D, and *in situ*
- X-ray, optical, and electron microscopy methods
- Development of new techniques & solving a range of real-world engineering and scientific challenges



\$ 46.59 M

Total financial investments

2

UBC Campuses, Vancouver and Okanagan

15

Principle Investigators

46

Major Items of Equipment

9

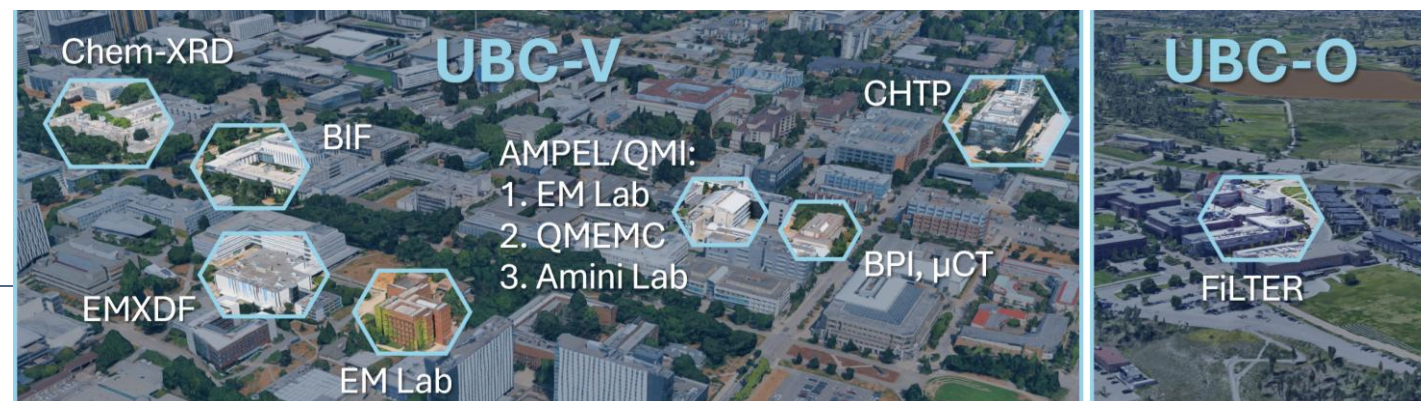
Facilities

4

Canada Research Chairs

14

Staff/managers other than PIs

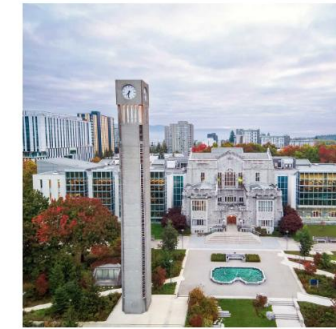


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Why bother?

- University of British Columbia is a global research powerhouse, with a huge education and societal impact
- Over decades we have had incremental, yet major, investments in equipment and the establishment of a range of shared/core and local facilities
 - e.g. via Canadian Foundation for Innovation + British Columbia Knowledge Development Funds (CFI/BCKDF)
- Equipment gets harder to sustain, as funding is constrained
- So - we want a broad and accessible research infrastructure ecosystem to:
 - Build community
 - Break down access barriers
 - Mobilize know-how/knowledge
 - Understand capacity & gaps



UBC-Vancouver



UBC-Okanagan

1,064

research projects with industry partners

1,378

research contracts and agreements with government and non-profits

\$4.19 billion

UBC's [annual consolidated budget](#) for 2026/27



\$936.40 million

research funding for 10,120 projects
296 companies spun off from UBC research



Over 435,000

alumni in 145 countries
20,662 faculty and staff

59,688

Total undergraduate students

12,412

Total graduate students

72,100

Total students

7,308

Faculty total both campuses

13,354

Staff total both campuses

20,662

Faculty and staff total both campuses

Opportunity: Grants for Catalyzing Research Clusters (GCRC)

*"A research excellence cluster is defined as a **network of researchers spanning multiple disciplines** at UBC that supports the **formation and maturation of interdisciplinary teams.**"*

- Jointly created by the *Vice-President, Research & Innovation* and the *Provost & Vice-President Academic*
- **Highly competitive** funding process –
 - \$100k funding in Y1; renewable for up to \$500k in total; 5 years max. **Up to 15 PIs.**
- **Aim/ scope** –
 - Foster partnerships and collaborations;
 - Develop new research questions, directions, and themes in research creation;
 - Address key societal and cultural problems that transcend traditional boundaries;
 - Offer training opportunities for trainees;
 - Ensure the integration and implementation of EDI within a range of planned activities.



Why now?

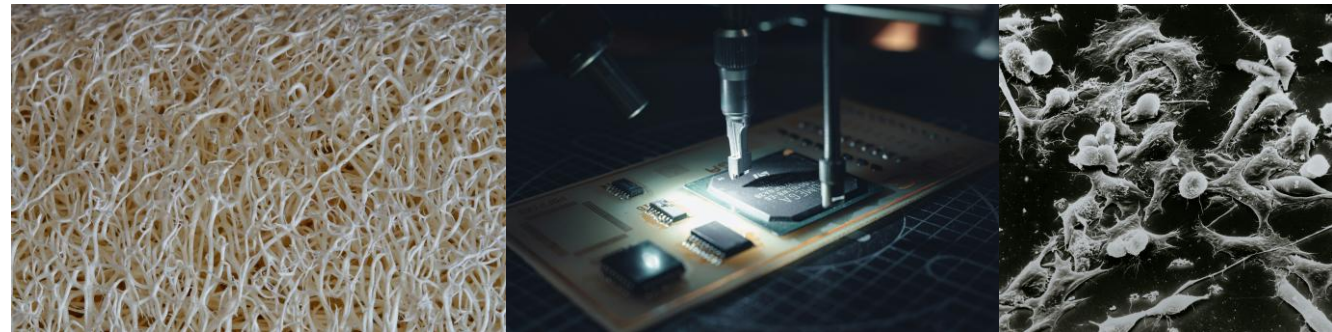


- **Lifecycle-linked strategic domains in B.C.**

- Clean energy technologies (e.g., battery & net-zero materials)
- Critical minerals for clean technologies
- Bio-materials and bio-products across their use and degradation cycles
- Bio- and cell- imaging
- Quantum materials

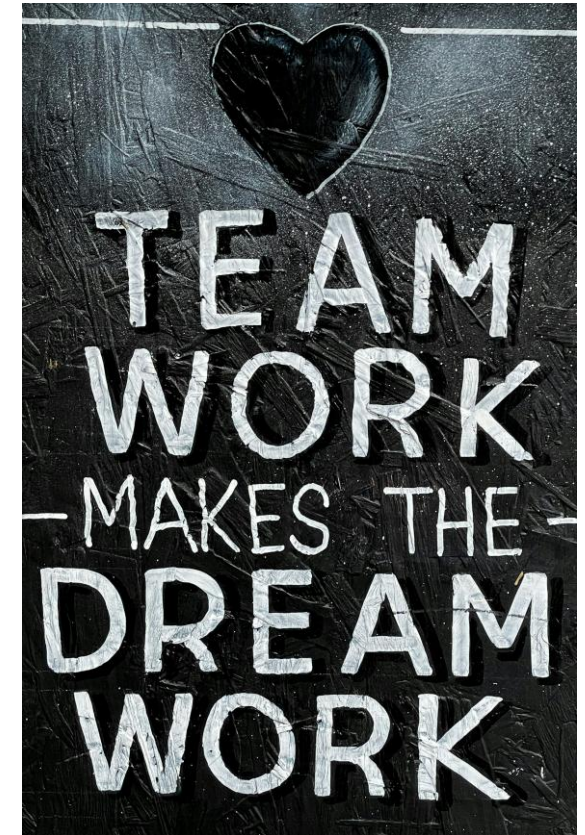
- **Materials through their lifetime**

- Raw material/mineral extraction
- Refining and processing
- Manufacturing
- Operation / service conditions
- End-of-life and recycling



Grantspersonship – Intentional Proposal Buildout

- Identify priority facilities & capabilities
- Build a core PI leadership team & management group
 - Engage a broader, interdisciplinary network across both campuses.
 - Coordinate proposal development via targeted outreach, shared documents, & regular meetings.
 - Refine goals collaboratively and adapt as opportunities emerge (esp. when we renewed)
- Focus on sustainable, capacity-building activities



Building the Team

- Goals:
 - Engage facilities + good people
 - Critical mass to share decision making + brainstorm
 - Support established + emerging academics @ UBC
- Wider engagement:
 - 5x management PIs
 - 10x PIs – delivery of content, key decisions, grant writing
 - 9x Facilities + their teams
- Additional Engagement/Team Building
 - 50% FTE Project Manager (Joey Yeap)
 - Graduate Work learn/Academic Assistant (Haroon Qaiser)
 - 1x Semester Undergraduate Work learn

Management Team



Ben Britton
Materials Engineering



Ismail El Baggari
Physics and Astronomy



Anette von der Handt
Earth, Ocean and
Atmospheric Sciences



Mark Martinez
Chemical and
Biological Engineering



Renelle Dubosq
Earth and
Environmental Sciences

Other PIs



Nancy Ford
Oral Biological and
Medical Sciences



Warren Poole
Materials Engineering



Alannah Hallas
Physics and Astronomy



Kiana Amini
Materials Engineering



Lacey Samuel
Botany



Alireza Nojeh
Electrical and
Computer Engineering



Jian Liu
Mechanical
Engineering



Chad Sinclair
Materials Engineering

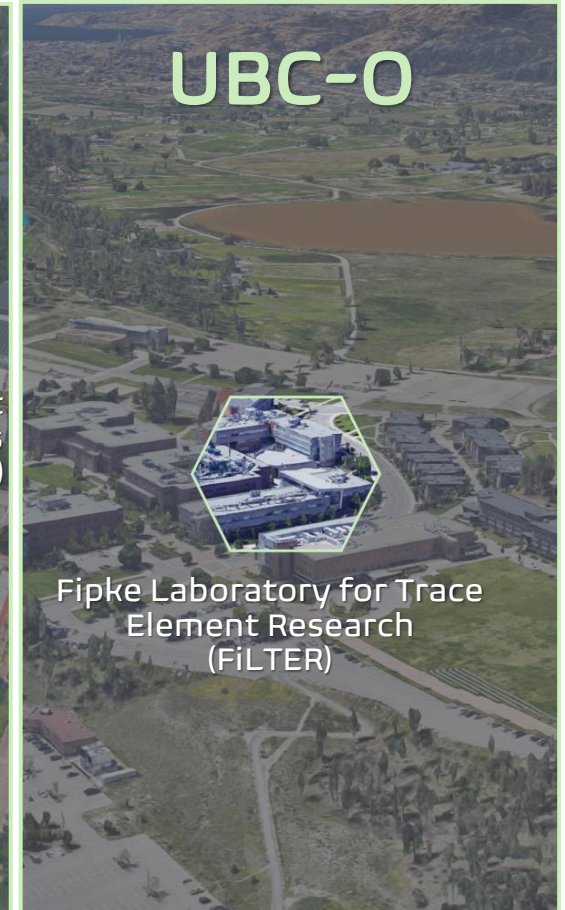
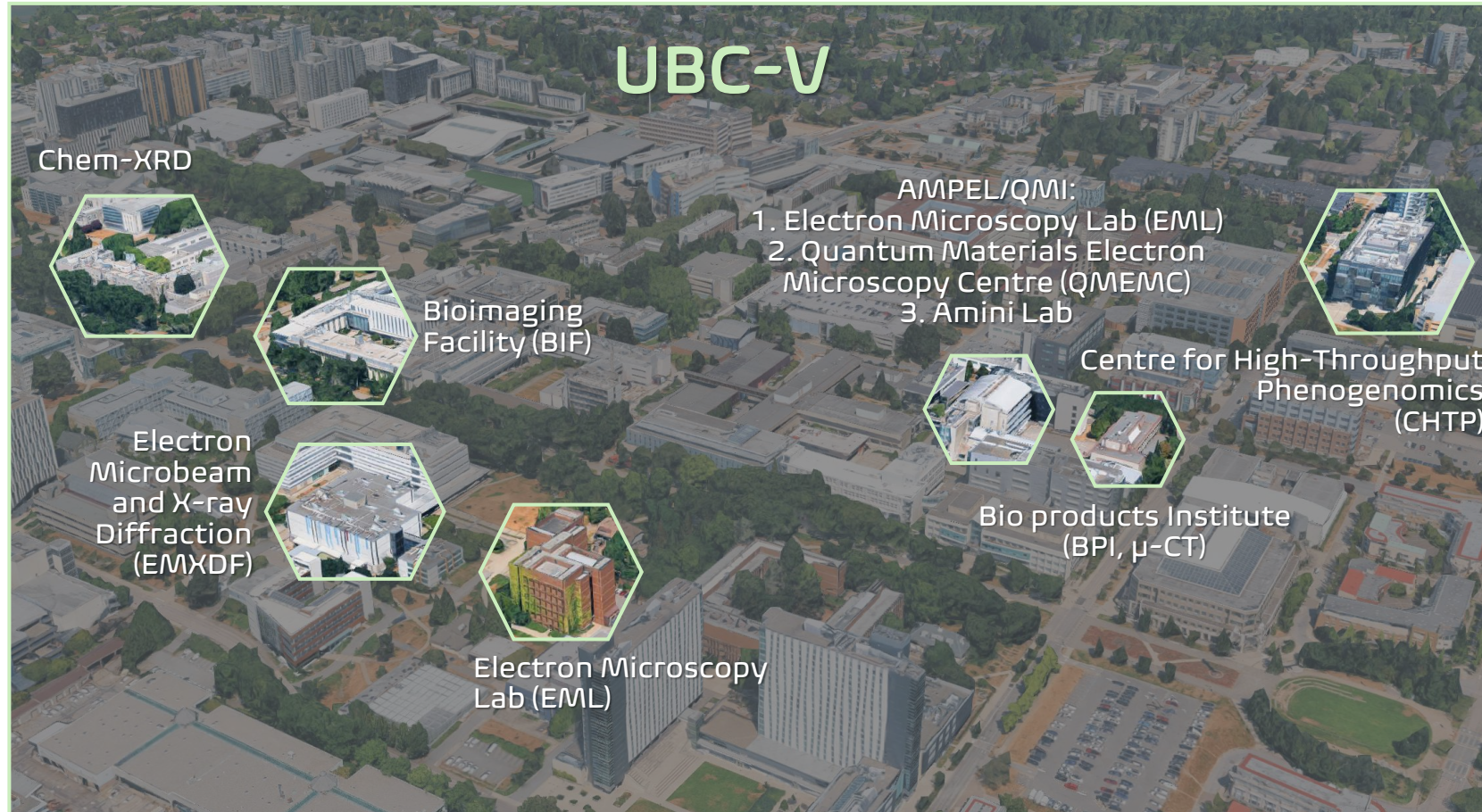


Eva Nichols
Chemistry



Matt Tarling
Earth, Ocean and
Atmospheric Sciences

Facility Engagement



Major Activities (so far...)

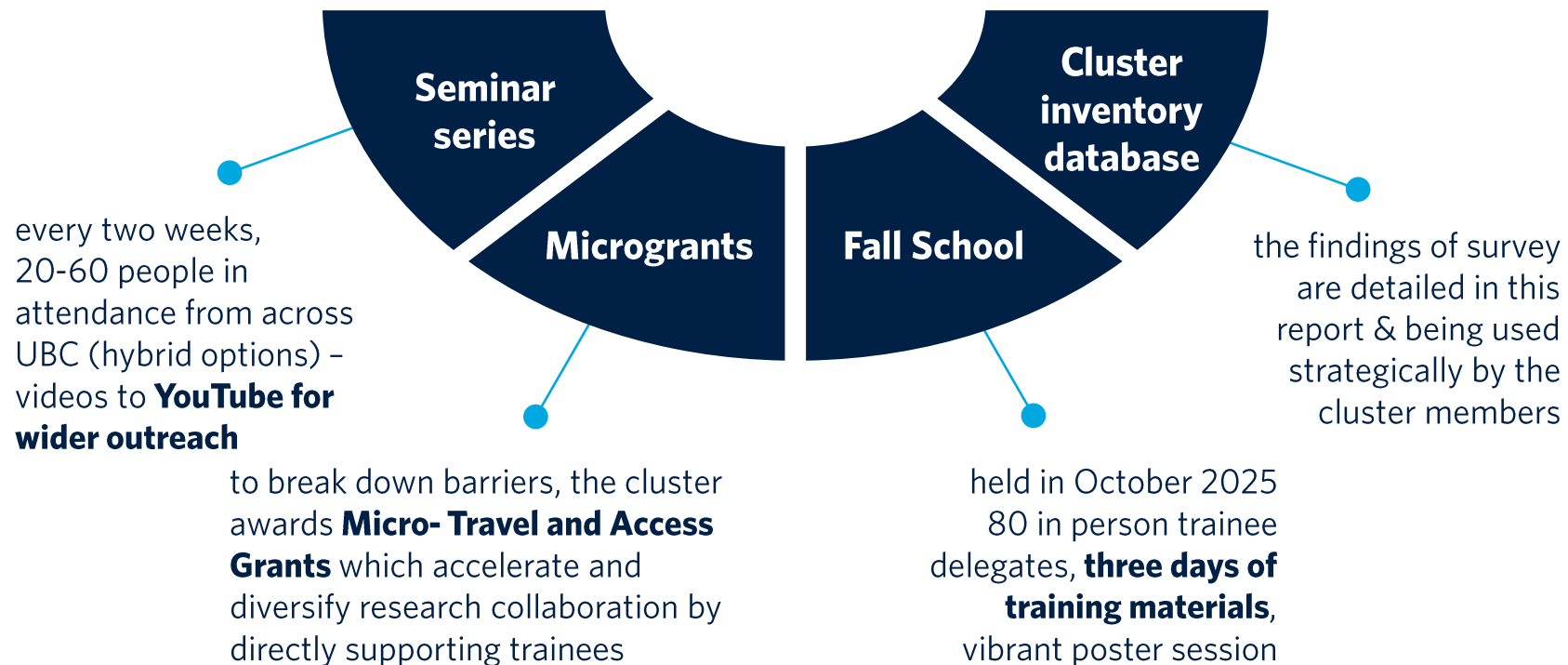


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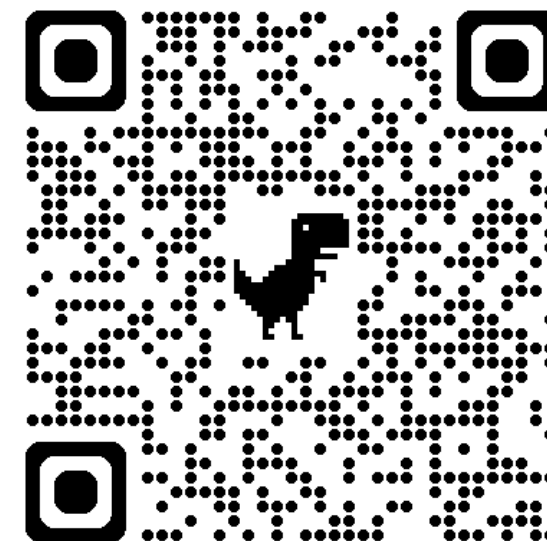
Breaking barriers and widening access to characterization community, cementing of expertise and innovation at UBC



Seminar Series

- Regular Seminar Series
 - Engaged all PIs in year 1
 - Introduction to techniques/approach, and some new research
 - 24 organised/scheduled
- Evolving to add in future virtual + special seminars
- Seminars are offered hybrid (for UBC-O folks)
 - YouTube upload too

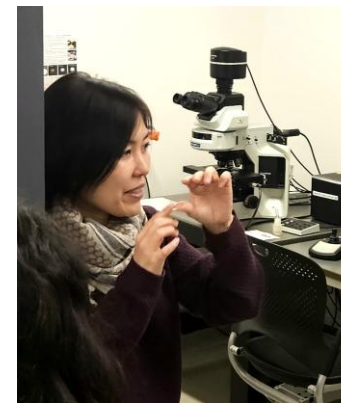
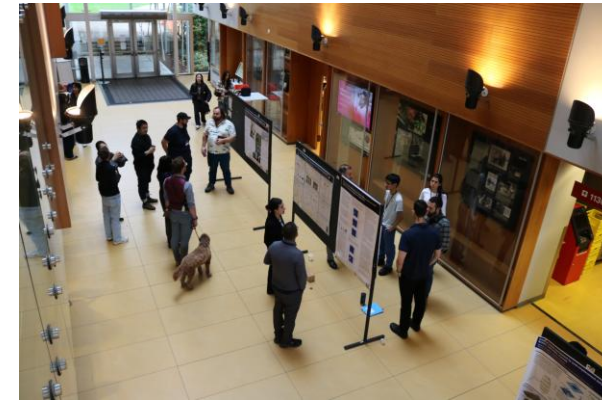
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<https://www.youtube.com/@CharacterizationUBC>

Fall Training School

- Trainee-facing activity
 - Teach and showcase a variety of expertise research and advanced characterization topics
 - Across and beyond UBC
- 3-Day training mid semester (October)
 - Electron, optical, X-ray + more
 - Sample prep., data handling, PIs meeting
- Invited specialists, local expertise, panels, poster session
- Free for delegates (UBC + cluster members)
 - 2025: 80+ delegates, 20+ instructors
 - Also engaged locally – UVic, SFU trainees



Annual Report



Read the report!



Introduction to the survey

This report provides a comprehensive overview of the specialized characterization infrastructure within the University of British Columbia's Characterization@UBC research cluster. It draws upon structured interviews and a systematic survey of the cluster's facilities, with a particular focus on electron microscopy, microanalysis, and X-ray diffraction/tomography. Additional details on related advanced techniques are also included.

The resulting database encompasses data captured from 9 facilities housing 46 major pieces of advanced characterization equipment. These facilities are overseen by a network of 15 Principal Investigators (PIs) and 14 dedicated research staff, who manage operations either directly or through designated technical personnel. With cumulative investments exceeding \$46 million, the infrastructure is supported through a diverse portfolio of funding sources, including CFI-JELF, CFI-IF, BCKDF, UBC matching funds, and private donations. Geographically, these facilities are distributed across UBC's Vancouver and Okanagan campuses, spanning 8 departments and multiple research hubs.

- The purpose of this report is threefold:
- (1) to clarify the current landscape of UBC's characterization capabilities;
 - (2) to highlight the distinctive strengths that underpin our research excellence;
 - (3) and to identify strategic opportunities for enhancing our offerings.

We hope that this information can serve as a foundation for future infrastructure investments, training grant applications, and collaborative research initiatives aimed at strengthening UBC's position as a leader in basic and applied scientific research.

Summary of findings

1. Equipment types, cost and year of investment

The data is presented in five-year increments, with capital spend shown for each period, reflecting the timing and scale of equipment investments across facilities within the cluster. Here, we can observe significant recent investment in characterization equipment which is motivated by community need, as well as innovative avenues of research at UBC.

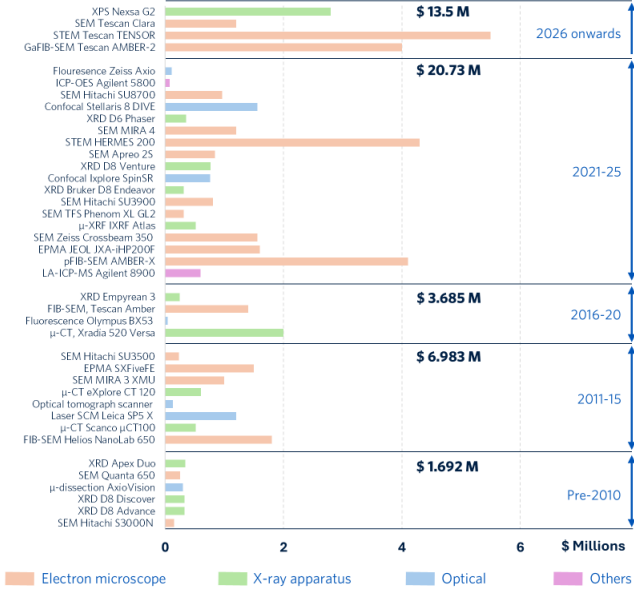


Figure-4: Equipment within facilities associated with the cluster, separated into 5-year timelines, colored by equipment type. Note that these figures reflect the overall cost of the instrument.

Other activities

- Affiliate Membership
 - Opportunity to grow beyond the 15 PIs
 - Extend reach – also beyond UBC
 - Relies on sustained engagement + gains material benefit
- Micro-grants (for cluster members + their groups)
 - \$20k per year - \$500-1000 per award - to access new facilities + travel for applicants
- Workshops/clinics
 - 2-3x per year, explore expertise development or target area (e.g. characterization + net-zero)
- Round-robin
 - Instrumentation comparison and validation
 - Inspire multi use analysis approaches
 - Provide accessible example use cases/application notes
- Micrograph competition
 - Partner with other groupings across campus to support a micrograph competition
 - Provide permanent exhibit of microscopy on campus for others to see



Micrograph competition exhibit – permanent display

Find out more
event.fourwaves.com/msc2027



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2027 Microscopy Society of Canada Meeting

The University of British Columbia, Vancouver, Canada



June 14

3rd International Workshop on Applications of 4D STEM

June 15

Characterization @ UBC summer school

June 16-18

MSC-SMC annual meeting/conference

Find out more:
characterization.ubc.ca

Characterization @ UBC



- Coordinated UBC characterization ecosystem with strong investment in people and equipment
- Connects siloed facilities under a broad umbrella
- Value to the community:
 - **Lowers access barriers:** supports training, builds user base, and enables interdisciplinary projects
 - **Build partnerships:** Maps capabilities and gaps to guide better, lifecycle-aware investments for clean energy, critical minerals, quantum, biomaterials, and bio-/cell-imaging
- What comes next:
 - **Ideas/proposals → implementation:** shared governance, harmonized access, and coordinated technical support.
 - **Infrastructure mapping + support:** Sustain and upgrade key instruments, pilot new techniques
 - **Relationship build:** Grow industry, government, and academic partnerships.

If you'd like to collaborate, compare facility strategies, or explore exchanges and joint proposals, please talk to us after the session or email

