

Program Proposal: Master of Biomedical Visualization and Communication

Faculty of Arts, University of British Columbia

Updated January 2025

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1. Executive Summary

The Master of Biomedical Visualization and Communication (MBMVC) at UBC is a professional degree program designed to equip students with the necessary skills to excel in biomedical visualization and communication roles in industry. This innovative program emphasizes interdisciplinary collaboration, human-centered design, and advanced storytelling techniques, preparing graduates to meet the evolving demands of the field.

Unique Features and Competitive Advantages

- **Competency-Based Curriculum:** Focused on core competencies such as biomedical sciences, design thinking, visual storytelling, and interdisciplinary collaboration.
- **Project-Based Learning:** Emphasizes real-world projects and collaborations with community partners, culminating in a capstone project.
- **Proven Pedagogy:** Builds on the success of UBC's Certificate in Biomedical Visualization and Communication, which has shown strong demand and positive outcomes.
- **Strategic Positioning:** Fills a geographic gap by offering a program in western North America, serving students from the western provinces of Canada and attracting international students from Asia.
- **Industry Readiness:** Prepares students for certification as Board Certified Medical Illustrators (CMI) and equips them with future-ready skills.
- **Accreditation:** The MBMVC program will meet all standards and guidelines to be a CAAHEP accredited medical illustration program, enabling graduates to pursue licensure and careers as certified medical illustrators if they wish.
- **Work Integrated Learning:** Option for students to enrol in a co-operative education (co-op) work term to gain industry experience during the summer term.

Alignment with UBC's Strategic Goals

- **Interdisciplinary Education:** Integrates multiple disciplines, facilitating problem-focused learning.
- **Competency-Based Learning:** Aligns with UBC's strategic emphasis on learning outcomes and competencies.
- **Practical Learning:** Incorporates project-based, work integrated, and experiential learning frameworks.
- **Community Collaboration:** Engages with community organizations and local First Nations, aligning with UBC's goals for public relevance and co-creation with communities.

- **Indigenous and EDI Focus:** Includes mandatory courses with an Indigenous focus and emphasizes equity, diversity, and inclusion (EDI) in all aspects of the curriculum.

Potential Impact on the Field and Community

The MBMVC program is poised to make a significant impact on the biomedical visualization field by producing highly skilled professionals capable of addressing complex biomedical challenges through innovative and collaborative solutions. The program's emphasis on EDI ensures that graduates are prepared to create visualizations that are accessible and representative of diverse populations, ultimately contributing to improved healthcare communication and outcomes.

Overview of the Program & Projected Timeline

The MBMVC program spans 20 months (5 terms), with the first cohort starting in September 2027 and graduating in April 2029. The program structure includes foundational courses in the first year, followed by specialized and project-based learning in the second year. Enrollment is projected to start with 24 students per cohort, with plans to increase to 30 students in subsequent cohorts.

By positioning itself as a leader in the field of biomedical visualization and communication, UBC's MBMVC program is set to become a hub for innovation, collaboration, and excellence in education.

2. Overview of the Program & Projected Timeline

2.1. Program Name and Degree Offered

The Master of Biomedical Visualization and Communication (MBMVC) is a professional degree program designed to equip students with the necessary skills to excel in biomedical visualization and communication roles in industry. Upon successful completion, students will be awarded a Master of BMVC degree.

2.2. Program Objectives and Goals

The primary objectives of the MBMVC program are to develop integrated skills in interdisciplinary collaboration, co-creativity, and design, essential for entering the biomedical visualization and communication field. The program is competency-based, emphasizing a human-centred design approach. Specific goals of the MBMVC program include:

- **Biomedical Sciences:** Build a strong foundation in science literacy, core principles of physiology and molecular environments, and understanding the structure and function relationships within the human body.
- **Human-Centred Design:** Instil a design thinking mindset, art fundamentals, visual design fundamentals, iterative design, agile methodologies, and user experience.
- **Storytelling:** Enhance skills in visual storytelling and other storytelling modalities with an emphasis on empathy and diverse ways of knowing.
- **Interdisciplinary Collaboration:** Foster the ability to co-create effectively within interdisciplinary teams on biomedical visualization and communication projects.

2.3. Target Audience

The MBMVC program is targeted at students aspiring to enter the biomedical visualization field, including recent graduates and individuals seeking a career change. We expect a significant number of our students to pursue careers in medical illustration and thus, have designed the MBMVC curriculum to meet the [Commission on Accreditation of Allied Health Education Programs \(CAAHEP\)](#) standards for [Medical Illustration Programs](#), which prepares students to challenge the [Board Certified Medical Illustrator examination](#) administered by the [Association of Medical Illustrators \(AMI\)](#).

2.4. Program Structure

The MBMVC program spans 20 months (5 terms) where a cohort follows an integrated competency-based curriculum.

Year One focuses on building the mindset and foundational skills required for biomedical visualization and communication.

Year Two emphasizes the project-based application of these skills and mindsets, along with specialization in specific content areas and opportunity to pursue individual interests through elective courses.

2.5. Enrolment Projections

Total seats per cohort:

- Cohort 1: 24 students
- Cohort 2: 24 students
- Cohort 3+: 30 students

Breakdown of cohort:

- 70% domestic
- 30% international

Other considerations:

- One scholarship position for an Indigenous student

2.6. Proposed Tuition Model

Domestic/Year	Domestic Total	Intl./Year	Intl. Total	Total Credits
\$30,000	\$60,000	\$55,000	\$110,000	54

Comparable Graduate Degree Programs

The proposed tuition model is based on the following comparator program tuition models, including the five comparable medical illustration graduate programs in North America and the project-based Master of Digital Media program at the Centre for Digital Media which is most similar in curriculum and program format.

Program Details	Total Tuition	Class Size per Year	Total Credits
<u>Master of Digital Media (MDM)</u> Centre for Digital Media Vancouver, BC, Canada	<u>Domestic: \$41,632 CAD</u> <u>Intl.: \$71,345 CAD</u>	60	51
<u>Master of Science in Biomedical Communication (MScBMC)</u> University of Toronto Toronto, ON, Canada	<u>Domestic: \$23,900 CAD</u>	18	17 half-course equivalents (equivalent to 51 credits)
<u>Master of Science in Medical Illustration (MSMI)</u> Augusta University Georgia, USA	<u>In-State: \$27,540 USD</u> (\$37,507.41 CAD) <u>Out of State: \$72,385 USD</u> (\$98,582.94 CAD) <u>Intl.: \$73,765 USD</u> (\$100,462.40 CAD)	9	63
<u>Master of Fine Arts in Medical Illustration (MFAMI)</u> Rochester Institute of Technology New York, USA	<u>\$147,755 USD</u> (\$201,231.23 CAD)	n/a	59
<u>Master of Arts in Medical and Biological Illustration (MBI)</u> Johns Hopkins University Maryland, USA	<u>\$125,700 USD</u> (\$171,193.97 CAD)	7	73
<u>Master of Science in Biomedical Visualization (MSBMV)</u> University of Illinois at Chicago Illinois, USA	<u>In-State: \$51,900 USD</u> (70,683.91 CAD) <u>Out of State: \$86,465 USD</u> (\$117,758.85 CAD)	20	59

*Tuition totals as of July 2024, currency conversion rate of 1 USD/1.36 CAD

Set at a total investment of \$60,000 CAD, the UBC MBMVC program will be appealing to domestic students, whose only other Canadian option for a comparable graduate degree program is the MScBMC program at the University of Toronto. The MScBMC program accepts only 18 students from an applicant pool of over 120. While the University of Toronto's total domestic tuition is considerably less than the proposed tuition for the MBMVC program, the MScBMC is a Master of Science degree. In contrast, the MBMVC will be a professional degree program featuring project- and place-based learning opportunities, which require more resources to deliver.

The MBMVC program will be significantly more appealing to Canadian applicants compared to the four comparable programs in the United States, which range from \$100,000 to \$200,000 CAD in total for out-of-state/international students. Conversely, the proposed tuition total of \$110,000 CAD will be an attractive investment for international students compared to the American programs.

By aiming to enrol 70% domestic and 30% international students per cohort, we expect the MBMVC program to be revenue-generating and capable of accommodating at least one fully subsidized scholarship for an Indigenous student.

2.7. Admission Requirements

Admissions to the MBMVC program will follow the [UBC master's program admission minimum requirements](#) plus the following MBMVC program-specific requirements:

Bachelor of Science preferred, other fields accepted with completion of the following foundational biological science pre-requisite courses:

- Introductory biology
- Physiology and/or anatomy
- Biochemistry and/or organic chemistry
- At least one 300- or 400-level course from one of the following subject areas: embryology, histology, cell biology, molecular biology, pharmacology, genetics, immunology, or pathology

Letter of intent outlining the applicant's goals for the program and beyond, with evidence of a changemaker mentality.

Visual portfolio showcasing skills in visual communication and drive to excel in the field of biomedical visualization and communication. The skills that will be assessed in the visual portfolio include:

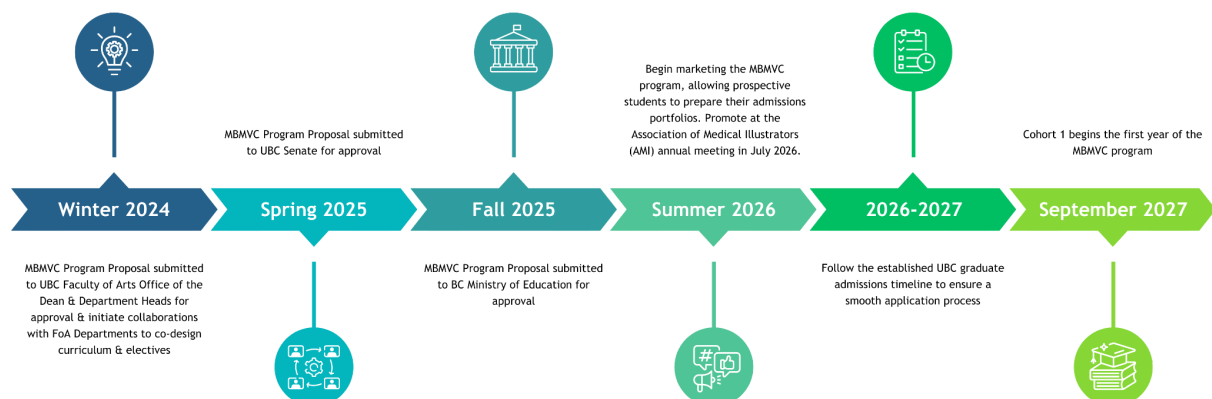
- Observation and rendering

- 5-10 sketches that demonstrate ability to capture form and detail from life (not photographs)
- 3D spatial awareness
 - 1 rendered illustration of basic shapes in 3D space
 - 1 3D model of a simple object
 - Written reflection on workflow for both 3D portfolio pieces
- Storytelling
 - Sequential narrative of a memorable story, *or*
 - Storyboard of a process, *or*
 - A reimagined infographic
 - Written reflection on workflow for the storytelling piece
- Evidence of brainstorming and ideation for all submitted portfolio pieces
- Media exploration and motivation for all submitted portfolio pieces
- Passion projects (optional)
 - Any additional projects representing skills in sculpture, dance, photography, UX/UI design, animation, etc.
 - Medical illustrations will not be scored on the merit of their quality, but only on the process, ideation, technique, storytelling, and motivation. A maximum of one medical illustration may be submitted if the application feels it is necessary for accurate assessment of their visual design skills.

Invitation to interview will be based on the letter of intent and visual portfolio.

2.8. Projected Timeline

The anticipated start date for the first MBMVC cohort is September 2027, with the first cohort graduating in April 2029. The key anticipated milestones leading up to program launch are as follows (repeated below):



Winter 2024: MBMVC Program Proposal submitted to UBC Faculty of Arts Office of the Dean & Department Heads for approval & initiate collaborations with FoA Departments to co-design curriculum & electives.

Spring 2025: MBMVC Program Proposal submitted to UBC Senate for approval.

Winter 2025: MBMVC Program Proposal submitted to BC Ministry of Education for approval.

Summer 2026: Begin marketing the program, allowing prospective students to prepare their admissions portfolios. This will include promotion of the MBMVC program at the annual meeting of the Association of Medical Illustrators (AMI) in July 2026.

2026-2027: Follow the established UBC graduate admissions timeline to ensure a smooth application process.

September 2027: Cohort 1 begins the first year of the MBMVC program.

2.9. Key Features

The MBMVC program offers several unique features designed to enhance student learning and industry readiness:

Project-Based Learning: Engages students in real-world projects and collaborations with community client partners, culminating in a capstone project.

Portfolio Development: Graduates will leave the program with a robust portfolio and documented competencies that showcase their skills and knowledge.

Proven Pedagogy: The MBMVC program builds on the success of the Certificate in Biomedical Visualization and Communication offered through UBC Extended Learning, a part-time fully online 1-year program, which served as a pilot program to demonstrate the need and interest in this field. As of 2024, the BMVC Certificate is in its fourth year of offering and has been recognized by the Association of Medical Illustrators (AMI).

Option for Co-op Work Term: We are collaborating with the Arts Co-op Program and intend to offer MBMVC students the option to take a co-op work term in the summer between Year 1 and Year 2 to gain valuable industry experience.

Below are testimonial excerpts from BMVC Certificate alumni ([read the full interviews here](#)).



“

One of the most exciting and cool things about the program was the different experiences, perspectives and knowledge students brought into the program. We learned so much, not just from the instructors, but from the students.”

Cat, Biomedical Visualization and Communication student



“

The BMVC program provided an opportunity to bust down barriers between art and science, and invited different expressions and perspectives. It’s everything I could have dreamed of. I’m excited about making a difference in the lives of others.”

Milo, Biomedical Visualization and Communication student



“

One of the greatest assets of the program is the people. The instructors are so open to all of the students’ backgrounds. They’re very supportive and encouraging, and available to guide your learning.”

Rebecca, Biomedical Visualization and Communication student

3. Context within UBC and the Biomedical Visualization Field

3.1. Current Trends in Biomedical Visualization and Communication

As humans, we are fascinated by our bodies, their components, and how they work. While we have explored, documented, and visualized human and comparative anatomy for thousands of years, medical illustration accelerated during the Renaissance with the work of Leonardo da Vinci and Andreas Vesalius, who combined their skills in art and anatomy to create detailed and accurate anatomical drawings. Over the centuries, the profession has evolved significantly with advancements in technology and techniques. Traditional hand-drawn illustrations have given way to digital media, 3D modelling, animation, simulation, and virtual reality.

Today's medical illustrators are not only skilled artists but also proficient in the latest visualization technologies. Their scope of work encompasses creating educational materials, surgical guides, and patient communication tools, as well as contributing to medical research and publications. As technology continues to advance, medical illustrators play a critical role in translating complex biomedical concepts into visual formats that are accessible and understandable to diverse audiences. There are increasing opportunities for cross-disciplinary collaboration on visualization projects, integrating diverse fields such as medicine, engineering, and the arts. Additionally, there is a growing emphasis on equity, diversity, and inclusion (EDI) in visualizations, ensuring that biomedical content is accessible and representative of diverse populations.

The industry faces a notable gap in professionals skilled in interdisciplinary collaboration and equipped with future-ready skills. As emerging media technologies such as artificial intelligence (AI) and virtual reality (VR) evolve, the required competencies in biomedical visualization are shifting from traditional skills to more adaptive and innovative approaches. According to Souki Mansoor, filmmaker and Creative Director and Creator Community Specialist at OpenAI, the key intangible skills needed for success in the 21st century as a creative include curiosity, adaptability, discernment, collaboration, and generativity, as opposed to purely focusing on “hard”, technical skills that are dependent upon the state of technology at any given time. The MBMVC program aims to address these gaps by fostering these essential skills and competencies in its graduates.

3.2. Competitive Landscape & UBC's Unique Positioning

There are five accredited medical illustration graduate degree programs in North America, all located in the eastern half of the continent. The University of Toronto offers the only Canadian program, accepting just 18 students per year from over 120 applicants. Most of the programs have remained unchanged for decades, with only one new program emerging in the last 30 years—the MFA in Medical Illustration at Rochester Institute of Technology which began in 2022.

UBC is no stranger to medical illustration and has its own unique legacy in biomedical visualization. After studying medical illustration at Johns Hopkins University and working at McGill, Nan Cheney became UBC's first medical artist in 1951 until her retirement in 1962. Cheney was prolific during her time at UBC, and her [original illustrations](#) are commemorated in the Life Sciences Centre at UBC Point Grey campus. We hope to build on Cheney's legacy by establishing UBC as a nexus for a new generation of medical illustrators and infuse Vancouver's growing biomedical tech industry with highly trained professionals who are prepared to collaborate on transdisciplinary projects.

In particular, UBC is uniquely positioned to offer the MBMVC program due to the success of its existing Certificate in Biomedical Visualization and Communication (BMVC). Offered through UBC Extended Learning and developed by an interdisciplinary team from the Faculties of Medicine, Arts, and Engineering, this BMVC Certificate program has demonstrated a significant demand for advanced education in this field.

Currently in its fourth year, the BMVC Certificate program has seen increasing enrollment, with 34 students in the 2024 cohort up from 21 graduates in 2021. Each year, several students express interest in pursuing careers in medical illustration, with alumni being accepted into the University of Toronto's BMVC program and many expressing interest in the proposed MBMVC program at UBC. This growing interest underscores the need and demand for an advanced degree program in this field.

The most recent BMVC Certificate information sessions in May 2024 and August 2024 attracted 282 and 168 attendees, respectively, many of whom inquired about the prospect of a master's program specifically for medical illustration at UBC. Geographically, existing accredited medical illustration graduate degree programs are concentrated in the eastern part of North America, with the closest program to the west being in Chicago. A program at UBC will serve the western provinces of Canada and attract international students from Asia, where no such programs currently exist.

The MBMVC program at UBC will distinguish itself from comparable programs by focusing on interdisciplinary collaboration and future-ready competencies through a project-based curriculum. While preparing graduates to become certified medical illustrators, it will also equip them to navigate the evolving landscape of biomedical visualization and communication.

3.3. Alignment with UBC's Strategic Goals

The MBMVC program aligns with several of UBC's strategic goals and initiatives:

- **Interdisciplinary Education:** The program is inherently transdisciplinary, facilitating integrative, problem-focused learning ([UBC Strategic Plan Strategy 14](#)).
- **Competency-Based Learning:** The program focuses on learning outcomes and competencies, supporting UBC's goal of program redesign ([UBC Strategic Plan Strategy 12](#)).
- **Practical Learning:** The curriculum includes project-based, place-based, and experiential learning frameworks ([UBC Strategic Plan Strategy 13](#)).
- **Community Collaboration:** Students will work with community organizations, including local First Nations, to identify relevant biomedical problems and co-create design solutions ([UBC Strategic Plan Strategies 16 and 20](#); [UBC Indigenous Strategic Plan Actions 18 and 16](#)).
- **Indigenous and EDI Focus:** The program includes a mandatory elective with an Indigenous focus and completion of the Indigenous Cultural Safety (ICS 23 24) course, with one fully funded Indigenous student scholarship ([UBC Indigenous Strategic Plan Actions 16 and 28](#); [UBC StEAR Framework Goal 3.3](#)). The curriculum also emphasizes EDI, anti-racist, and liberatory approaches to learning ([UBC StEAR Framework Goal 2.2](#)).

3.4. Community & Industry Support

The MBMVC program has garnered support from key industry figures, including endorsements from former Association of Medical Illustrators (AMI) presidents Jill Gregory (2023) and Todd Buck (2024). These endorsements highlight the industry's recognition of the program's potential to address existing gaps and elevate the field of biomedical visualization.

The capstone projects from the BMVC Certificate program have yielded strong partnerships with community client partners, such as UBC Midwifery, local physicians, the Western Canadian Children's Heart Network, UBC School of

Biomedical Engineering, and the American Association for Anatomy. These collaborators are committed to supporting the MBMVC program and continuing their involvement. Additionally, former BMVC Certificate students have expressed their keen interest in giving back to the program in various capacities, including through alumni mentorship and as future project client partners.

4. Competency-Based Curriculum

4.1. Competency-Based Curriculum Overview

The UBC Master of Biomedical Visualization and Communication (MBMVC) program is designed to equip graduates with the skills and knowledge necessary to excel in a continuously evolving industry. This competency-based curriculum is informed by the [Canada Skills for Success framework](#) (Government of Canada, 2021), [Project-Based Learning competencies](#) (Pennefather, 2022), [First Peoples Principles of Learning](#) (First Nations Education Steering Committee, 2007), [Liberatory Design](#) (Anaissie et al., 2021), the [UBC Indigenous Strategic Plan](#), the [UBC Strategic Equity and Anti-Racism Framework](#), and other pertinent frameworks. By integrating these diverse approaches, the curriculum emphasizes human-centred design, ethical practices, and critical reflection, preparing students to be innovative leaders in biomedical visualization and communication.

This curriculum is designed to address the dynamic nature of the biomedical visualization field, where interdisciplinary collaboration and keeping pace with technological advancements is inevitable. By focusing on ten core competencies and their respective enabling competencies, the MBMVC program ensures that students develop both foundational and advanced skills, with documented evidence of their competency that will be immediately transferable to industry. This approach fosters lifelong learning, adaptability, and the ability to create meaningful, empathetic, and inclusive biomedical communications. The curriculum's emphasis on iterative design, critical thinking, and collaborative problem-solving will enable graduates to navigate and contribute to the industry's growth and evolution effectively as biomedical visualization and communication changemakers. All core and enabling competencies are stated in an active, verb tense to reflect the need for an ongoing commitment to practice and develop these critical competencies to be successful in a constantly evolving industry.

4.2. Core Competencies & Enabling Competencies

1. Critically Engaging with Science

- a. **Mastering Core Biomedical Principles:** Develops a conceptual understanding and strong foundation in core principles of biomedical sciences to create accurate, evidence-informed biomedical visualization and communication projects.

- b. **Adapting Science Communication:** Adapts scientific communications in various modalities to meet the needs of intended audiences without compromising on accuracy or messaging.
- c. **Cultivating Critical Curiosity:** Maintains a continuous, critical curiosity in all aspects of researching and designing biomedical visualization and communication projects. Rigorously sources accurate, evidence-informed, and ethical scientific information, and questions norms to improve clarity and effectiveness for the intended audience.

2. Communicating

- a. **Articulating Ideas Clearly:** Consistently conveys complex biomedical concepts clearly and effectively in verbal, written, and visual modalities.
- b. **Storytelling in All Modalities:** Uses oral, written, and visual storytelling to communicate effectively.
- c. **Presenting Information Confidently:** Presents ideas, work, and questions confidently to peers, instructors, and stakeholders with and without visual aids.

3. Collaborating

- a. **Engaging in Interdisciplinary Collaboration:** Works effectively with professionals, industry, and community partners from various disciplines to achieve common goals in biomedical visualization and communication projects.
- b. **Building Interpersonal Relationships:** Develops strong interpersonal skills to work harmoniously with others, shifting between teaching and learning roles as needed.
- c. **Creating Brave Spaces:** Cultivates environments that enable vulnerability, compassion, and courageous discussions.

4. Problem Solving

- a. **Analyzing Complex Problems:** Breaks down complex problems into manageable components to understand underlying issues.
- b. **Synthesizing Information:** Integrates diverse information to form well-reasoned conclusions and recommendations.
- c. **Implementing Solutions:** Develops and applies effective solutions to biomedical visualization challenges, using a prototyping mindset that embraces failure and focuses on continuous learning.

5. Reflective Thinking

- a. **Engaging in Self-Reflection:** Regularly reflects on learning and experiences to gain insights and continuously improve.
- b. **Seeking Feedback:** Actively seeks and incorporates feedback to improve work.
- c. **Adapting to Insights:** Adapts approach based on reflective insights, ensuring ethical and empathetic practices.

6. Co-Creating

- a. **Generating Innovative Ideas:** Collaboratively brainstorms to develop creative solutions for biomedical visualization and communication projects.
- b. **Applying Design Thinking:** Uses design thinking principles to co-create solutions with collaborators.
- c. **Designing With and By, Not For:** Adopts a “design with” and “design by” approach, involving users in a human-centred design process.

7. Managing

- a. **Managing Priorities and Productivity:** Prioritizes tasks and manages time efficiently to meet deadlines in biomedical visualization and communication projects.
- b. **Balancing Workloads:** Balances multiple responsibilities and maintains productivity.
- c. **Applying Project Management Tools:** Uses project management tools and techniques to strategically plan biomedical visualization and communication projects.

8. Self-Regulating & Co-Regulating

- a. **Managing Emotions:** Develops strategies to regulate emotions in stressful situations, ensuring self-care to maintain wellbeing that coexists with creativity.
- b. **Supporting Peers with Compassion:** Contributes to a relational learning environment rooted in empathy and shared successes.
- c. **Cultivating Creative Conditions:** Establishes the conditions necessary for meaningful and generative work by articulating values, setting boundaries, and listening to other voices.

9. Leading & Following

- a. **Demonstrating Leadership:** Exhibits leadership qualities in team settings, guiding and motivating others.

- b. **Practicing Followership:** Understands when to take a supportive role and follows the lead of others.
- c. **Making Informed Decisions:** Uses critical thinking and evidence-based information to make decisions.

10. Diverse & Expansive Ways of Understanding

- a. **Integrating Multiple Perspectives:** Engages with multiple ways of understanding to create human-centred designs informed by diverse cultural, social, and experiential settings.
- b. **Acknowledging Historical Contexts:** Understands the legacy impact of colonialist, racist, ableist, sexist, and other historically harmful practices, especially in the field of biomedical visualization and communication.
- c. **Ensuring Inclusivity in all aspects of Visualization and Communication:** Accurately represents diverse and inclusive depictions of health, wellness, and the human body in biomedical visualization and communication projects.
- d. **Promoting Change Through Design:** Approaches biomedical visualization and communication projects with an open heart and open mind, challenges normative assumptions, and aims to empower people and communities.

4.3. Competency Expectations of MBMVC Students

We acknowledge that students enter the MBMVC program with diverse experiences and backgrounds, each bringing a unique skillset that enhances our collaborative learning environment. Incoming students are not expected to be proficient in these core competencies at the outset; instead, they will build proficiency as they engage with the curriculum. Students will be assessed on these competencies at regular intervals throughout the program, with opportunities for individualized mentorship support to address any gaps in their existing and growing skillsets. Upon graduation, students will have had ample opportunity to practice and achieve proficiency in these competencies, supported by clear, documented evaluations related to their program deliverables. This structured yet flexible approach ensures that all graduates are well-prepared to meet the demands of the biomedical visualization and communication industry. For more information about assessment and evaluation of student competency, see Section [6. Assessment & Evaluation](#).

5. Curriculum Overview

The MBMVC program will span 2 years (20 months) and will require a total of 54 credits to graduate. This is a project-based curriculum with a strong focus on team collaboration and effective communication. The courses will be informed by an experiential learning approach, drawing from project-based learning, place-based education, and constructionist pedagogies, with integration across all core BMVC courses. In addition to the core BMVC courses, students will take elective courses, one of which must have an Indigenous-focus.

5.1. Year 1, Term 1 (12 credits)

BMVC 511. Design Fundamentals for Biomedical Visualization

Required, 3 credits. Co-requisite: 512.

This course equips students to create impactful visuals for science communication by teaching them to utilize basic shapes and lines to convey information and emotion. In "Making Marks," students will assess drawings based on clarity and impact. "Media & Mediums" covers evaluating different media types used in biomedical information, and "Design Fundamentals" focuses on mastering layout, composition, and art fundamentals. Additionally, "UX and Design Thinking" and "Changemaking in BMVC" help students develop a design mindset and understand their role in biomedical communication. All class assignments will use Adobe InDesign, Illustrator, and equivalent tools to ensure students gain practical skills essential for the remainder of the program.

BMVC 512. Managing Creative Collaboration for Biomedical Projects

Required, 3 credits. Co-requisite: BMVC 511.

This course focuses on maximizing collaboration and creative teamwork in biomedical visualization. In "Creative Collaboration and Media: Working Together Creatively and at a Distance," students will share their creative processes and brainstorm ideas to enhance remote workflows. "Aligning Core Values" and "Solving Problems for Others Collaboratively" delve into negotiating rules of play and identifying heuristics for group work. "Designing Solutions Rapidly for Others" emphasizes rapid prototyping in human-centered design, while "Listening as an Essential Collaborative Tool" and "Managing Group Projects at a Distance" highlight

the importance of listening and agile project management. Additional topics include individual and peer creativity retrospectives, rapid prototyping with role play, presenting and gathering feedback, re-thinking design approaches, and evaluating ideas. Each week, students will engage in practical assignments to apply these concepts and refine their collaborative skills.

BMVC 513. Storytelling for Biomedical Communication

Required, 3 credits.

This course delves into the art and science of storytelling to enhance biomedical visualization and communication. In "Ways of Knowing," students will understand diverse ways people process and retain information and learn to leverage these differences to create effective communication, particularly for minority and discriminated populations. "Listening and Sharing Stories" emphasizes the role of listening in storytelling, exploring how it can amplify or minimize meaning and its potential consequences. "Ethics" and "Trust and Truth" cover the responsibilities of professionals in the field, focusing on ethical communication, trust-building, and sourcing. The course also includes "EDIDA" (Equity, Diversity, Inclusion, Decolonization, and Anti-Racism), helping students recognize biases and advocate for change and equity in healthcare communication. "Intro to Comics" introduces graphic medicine, teaching students to combine text and image to enhance empathy and understanding in biomedical contexts. Additionally, students will explore "Audio Storytelling and Other Mediums," "Power and Changemaking," and "Storyboarding," gaining practical skills and insights to create compelling and ethical biomedical narratives.

BMVC 514. Foundations of Body Design for Biomedical Visualization

Required, 3 credits.

This course provides a comprehensive foundation in the anatomical and physiological principles essential for biomedical visualization. Students will begin with the "Core Principles of Physiology," gaining an in-depth understanding of the body's functions and mechanisms. The "Intro to Histology and Cell Biology" segment covers the microscopic structure of tissues and cells, crucial for creating accurate biomedical visuals. The "Systems Course" ties these concepts together, exploring the major bodily systems and their interactions. Through this course, students will develop a solid base in body design, essential for creating precise and effective biomedical visualizations.

BMVC 514 satisfies the Commission on Accreditation of Allied Health Education Programs (CAAHEP) accredited medical illustration program standards for one of minimum four biomedical science courses.

5.2. Year 1, Term 2 (15 credits)

BMVC 521. Advanced Studies in Anatomical Science for Biomedical Visualization

Required, 6 credits. Co-requisite: BMVC 522.

This course offers a comprehensive overview of human structure and function through both lecture and lab components, focusing on dissection-based learning. Students will develop keen observation skills and a three-dimensional understanding of the human body. The hands-on approach allows for an in-depth exploration of anatomy, enhancing the ability to visualize and accurately depict human structures. This course is a corequisite with the Applications and Design Sprints in BMVC course, ensuring that students can immediately apply their anatomical knowledge to biomedical visualization projects.

BMVC 521 satisfies the CAAHEP accredited medical illustration program standards for an advanced course in human anatomy with cadaver dissection.

BMVC 522. Applications and Design Sprints in the Biomedical Visualization and Communication MakerLab

Required, 6 credits. Co-requisite: BMVC 521.

This course provides a makerspace environment where students apply principles of anatomy and physiology from BMVC 521 to creative problem-solving in teams. Emulating a Google scrum mindset, group huddles allow students to share progress and ideas collaboratively. Emphasizing teamwork over individual work, the course ensures that students explore a variety of mediums and tools through facilitated provocations and maker challenges. Peer feedback and elevator pitches further enhance learning, pushing students to refine their biomedical visualization skills.

This course is designed to be held in an educational makerspace. The HIVE (Hackspace for Innovation and Visualization in Education) is undergoing initial steps to hopefully transition into an educational makerspace to support this course and others in the Faculty of Arts.

BMVC 523. Molecular Environments for Biomedical Visualization

Required, 3 credits.

BMVC 523 is a collaborative course that we propose to be developed in partnership with the Department of Cellular and Physiological Sciences (CAPS). This course provides an in-depth understanding of how molecular environments function, emphasizing the three-dimensionality and dynamic nature of these environments. Students will explore various molecular biology techniques for visualization, such as cryo-electron microscopy, to gain insights into the complexities of molecular structures and their interactions. The course will cover the latest advancements in molecular visualization technologies and their applications in biomedical research and communication.

Open to both MBMVC and CAPS students, BMVC 523 fosters interdisciplinary learning and collaboration, equipping students with the skills and knowledge to effectively visualize and communicate intricate molecular environments. By the end of the course, students will have a comprehensive understanding of molecular visualization techniques and their practical applications in the biomedical field.

BMVC 523 satisfies the CAAHEP accredited medical illustration program standards for one of minimum four biomedical science courses.

5.3. Year 1, Summer (3-6 credits)

BMVC 530. Biomedical Visualization and Communication Skills Studio

Elective, 3 credits. Equivalency, BMVC Co-op Work Term.

This summer-only course offers a unique opportunity for student-led and organized learning, featuring morning huddles with instructors and UBC HIVE staff available for support. Students will identify their own learning needs and make arrangements to upskill in one or two specific areas throughout the semester, culminating in at least one portfolio project. The Skills Studio includes a Medical Illustration stream, granting students access to the body donor lab and organized trips to the local operating room to sketch surgeries. This immersive experience is designed to enhance practical skills in biomedical visualization through focused, hands-on learning.

**Students who enrol in a co-op work term will be exempt from BMVC 530.*

Elective #1

Students will take one 3-credit elective course during the summer term from the list of recommended electives (Appendix B) or another elective with program/department approval.

**Students who enrol in a summer co-op work term will defer this elective to Year 2, Term 2 to meet graduation credit requirements and/or CAAHEP medical illustration requirements.*

BMVC Co-op Work Term.

Optional, 3 credits. Equivalency, BMVC 530.

We are exploring the possibility of offering a 4-month co-op work term in collaboration with the Arts Co-op Program for students to gain hands-on experience working in the biomedical visualization and communication industry. Few accredited medical illustration programs offer co-op programs and instead favour thesis projects. By including the option for a co-op work term, MBMVC students will have the opportunity to gain paid industry experience and network within the biomedical visualization and communication field. Additionally, international students who choose to take a co-op work term will be eligible for a co-op work permit while in Canada on a student visa, which will make the UBC MBMVC program attractive to prospective international students.

**Students who do not enrol in a summer co-op term must enrol in BMVC 530 and Elective #1.*

5.4. Year 2, Term 1 (12 credits)

BMVC 531. Applied Place-Based Project in Biomedical Visualization and Communication

Required, 3 credits.

BMVC 531 is a hands-on course where students have the opportunity to work on a project of interest that can be included in their creative portfolios. Students will work in small teams of 2-3 and will be required to consider the needs of the wider

community in their choice of project focus. All teams must engage with local community organizations in the BC Lower Mainland to identify challenges and design innovative biomedical visualization and communication solutions. Emphasizing place-based education and human-centred design principles, students will engage directly with community partners, practicing the ethos of "design with and by" rather than "design for."

Throughout the course, students will work closely with diverse community partners, such as the Musqueam First Nation, Vancouver Coastal Health Authority, local hospitals (including BC Women's and Children's Hospital and Vancouver General Hospital), and residents and supporting non-profit organizations in Vancouver's Downtown Eastside. These partnerships will enable students to apply their skills in biomedical visualization and communication to real-world problems, creating impactful and contextually relevant solutions that benefit the community.

By the end of the course, students will have developed a deep understanding of community-engaged design processes and gained valuable experience in collaborating with various stakeholders to address complex biomedical challenges.

NSCI 311. Advanced Neuroanatomy

Required, 3 credits.

This course covers the functional neuroanatomy of the human brain. The course will use a "flipped classroom" format where students are expected to review didactic material in the form of videos and e-tutorials prior to the in class session. Students will be given instruction in advance which materials to prepare and when. In class sessions will be synchronous and in person. The course will also include two neuroanatomy lab sessions.

NSCI 311 satisfies the CAAHEP accredited medical illustration program standards for one of minimum four biomedical science courses.

As per UBC Graduate and Postdoctoral Studies [master's requirements](#), undergraduate courses numbered 300-49 may account for no more than 20% of the course credit requirement. Since the MBMVC program is 57 credits, NSCI 311 is 1 of up to 3 undergraduate courses students may take for credit towards graduation.

Electives #2 & #3

Students will take two 3-credit elective courses during this term from the list of recommended electives (Appendix B) or another elective with program/department approval. These electives can be used to satisfy the requirements for either one course with an Indigenous-focus or one biomedical sciences course (in addition to the BMVC core science courses for a total of four).

In Year Two, students may take electives from the BMVC special interest courses (see [section 5.6](#) for more details).

5.5. Year 2, Term 2 (12-15 credits)

BMVC 541. Capstone Project in Biomedical Visualization and Communication

Required, 9 credits.

BMVC 541 is the culminating course of the MBMVC program, where students integrate all the skills and competencies developed throughout their preceding terms. In this course, students will collaborate with a client partner to identify, design, and develop a working prototype of a biomedical visualization or communication solution addressing a real-life problem.

The course emphasizes the collaborative design process, requiring students to co-create within interdisciplinary teams. Through this experience, students will apply their knowledge in a practical, impactful project, honing their ability to work effectively with diverse stakeholders.

Critical reflections are an integral part of the course, reinforcing experiential learnings and ensuring students can articulate their design decisions and process. By the end of BMVC 541, students will have a comprehensive, real-world project in their portfolio, demonstrating their ability to address complex biomedical visualization challenges through innovative and collaborative solutions.

BMVC 542. Professional Practice for Biomedical Visualization and Communication

Required, 3 credits.

This course equips students with the essential skills and knowledge needed to transition into the professional realm of biomedical visualization and communication. Students will learn how to effectively utilize LinkedIn and social networking platforms, craft compelling resumes and portfolios, and navigate legal and ethical considerations such as copyright, contracts, and pricing. Through exploration of various work settings, including freelancing, agency work, and in-house positions, students will gain insight into the diverse opportunities available in the field. Practical exercises such as mock interviews and presentation skills workshops will prepare students for job searching and professional interactions, ensuring they are well-prepared to embark on their careers in biomedical visualization and communication.

*Elective #1

Students may take one 3-credit elective course during this term from the list of recommended electives (Appendix B) or another elective with program/department approval if they were enrolled in a summer co-op work term. This elective can be used to satisfy the requirements for either one course with an Indigenous-focus or one biomedical sciences course (in addition to the BMVC core science courses for a total of four).

In Year Two, students may take electives from the BMVC special interest courses (see [section 5.6](#) for more details).

5.6. Biomedical Visualization and Communication Electives

In addition to the core BMVC courses with enrolment limited to MBMVC students, we plan to develop BMVC elective courses in collaboration with other Departments in the UBC Faculty of Arts that are open to both MBMVC and other graduate students in Arts. The following courses have been proposed, although we are open to collaborating with other departments to create new interdisciplinary courses.

Ethics in Biomedical Visualization

Elective, 3 credits.

A co-located graduate level course exploring the history of biomedical visualization and medical illustration through a bioethics perspective. We propose that this course be developed in collaboration with faculty in the Department of Philosophy who specialize in bioethics.

Comics in Health

Elective, 3 credits.

A co-located course created in collaboration with the School of Creative Writing open to MBMVC and MFA in Creative Writing students.

Advanced Storytelling for Biomedical Communication

Elective, 3 credits.

A co-located course created in collaboration with the School of Journalism, Writing, and Media, open to MBMVC and Master of Journalism students.

5.7. Additional Curricular Requirements

In addition to the above core curriculum and electives, MBMVC students will be required to participate in the following activities to ensure their learning experience is grounded in community and reconciliation:

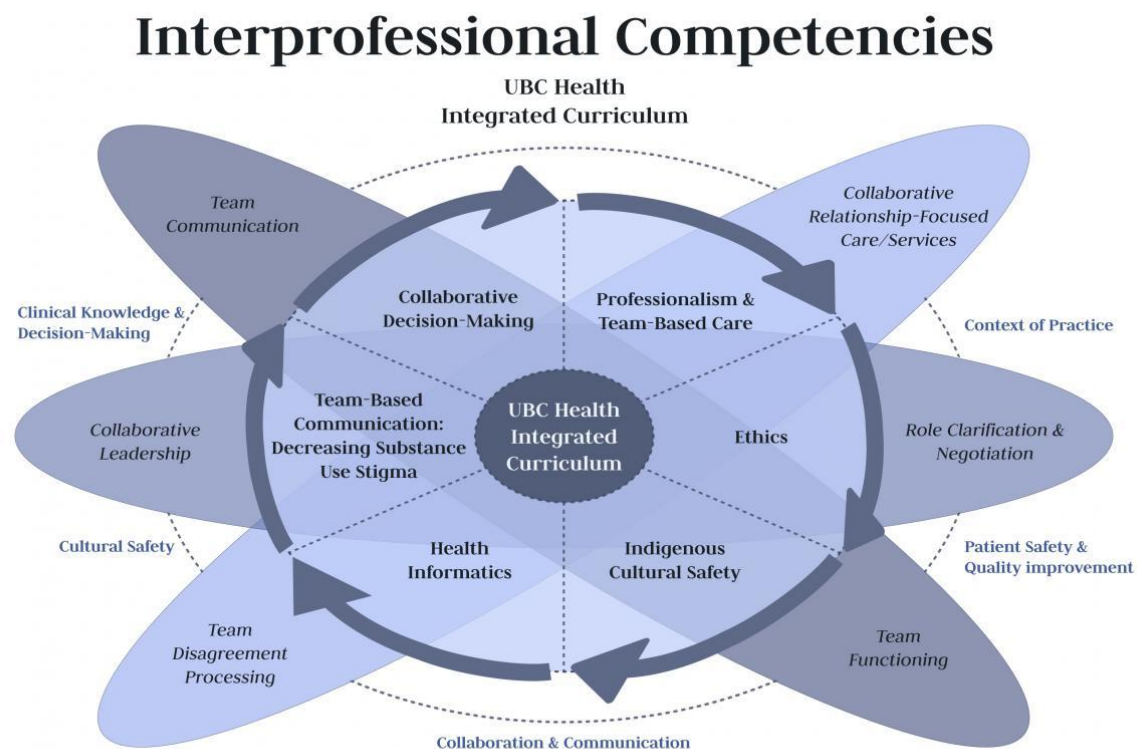
UBC 23 24 Indigenous Cultural Safety



The Centre for Excellence in Indigenous Health developed an [Indigenous Cultural Safety \(ICS\) Program](#) that is required for all allied health professions students at UBC to “provide quality, culturally safe care, ultimately leading to improved health outcomes for Indigenous peoples” (CEIH, 2024). While biomedical visualization specialists and medical illustrators do not provide direct patient care, their work has a significant impact on the knowledge systems and attitudes of the healthcare field. We feel that it is critical for all MBMVC students to complete the UBC 23 24

ICS program to develop intercultural competency, understand the history and legacy of residential schools, and build respect for Indigenous ways of knowing regarding health and wellness. UBC 23 24 ICS is part of the [UBC Health Integrated Curriculum](#) ([see below](#)); however, we feel that intentionally distinguishing the Indigenous cultural safety component of the Integrated Curriculum is critical for meaningful reconciliation as we endeavour to educate and train future biomedical visualization and communication specialists who will have a direct impact on how health and scientific information is communicated in our society and healthcare systems.

UBC Health Integrated Curriculum



The [UBC Health Integrated Curriculum](#) is an interprofessional module program required for the following 14 allied health professions programs at UBC:

- Audiology
- Clinical Psychology
- Dental Hygiene
- Dentistry
- Dietetics
- Genetic Counselling
- Medicine

- Midwifery
- Nursing
- Occupational Therapy
- Pharmacy
- Physical Therapy
- Social Work
- Speech-Language Pathology.

Students engage in a series of interprofessional workshops and online modules designed to build team-based, collaborative competencies. The goal of the Integrated Curriculum is to establish and enhance collaborative approaches to healthcare in British Columbia, ultimately leading to improved patient health outcomes, better population health, and reduced costs for healthcare systems. The key domains covered in the Integrated Curriculum include:

- Patient-centred care
- Role clarification
- Team functioning
- Conflict management
- Collaborative leadership
- Interprofessional communication
- Indigenous Cultural Safety.

Medical Illustration is considered an allied health profession. Although biomedical visualization and communication specialists do not provide direct patient care, they often work closely with clinicians, hospitals, and health authorities to create accurate and effective communications and visualizations. These visualizations have a direct impact on how biomedical information is shared and perceived. It is critical for MBMVC students to participate in collaborative, interprofessional learning activities with students in the 14 allied health professions programs at UBC. This interaction encourages transparency regarding the scope of practice for all professions and supports the development of future team-based competencies.

UBC Body Donation Program Memorial Service

In Year One, MBMVC students will complete [BMVC 521](#), an advanced anatomy dissection course where they will practice careful observation and dissection skills to build a comprehensive understanding of the 3-dimensional structure and function of the human body. This course depends on the [UBC Body Donation Program](#), which allows community members to donate their bodies after they have passed for health professions students to learn from in the UBC Anatomy Lab. Through their generosity, donors become one of anatomy students' most impactful

teachers, not only as specimens to learn from but also by providing the opportunity to ground students' understanding of the body in respect, dignity, professionalism.

Each fall, the medical undergraduate students organize and host a memorial service to express gratitude for the body donors. The families of the donors are invited as special guests to this memorial service to share stories, music, and other offerings in honour of their loved ones. The MBMVC program is built on human-centred design, empathy, and storytelling and we expect our students to approach this opportunity to learn from body donors in BMVC 521 and other educational resources with gratitude, empathy, and respectful curiosity.

In Year Two, the MBMVC students will participate in the annual memorial service to complete the circle started by the donor's gift.

6. Assessment & Evaluation

6.1. MBMVC Assessment & Evaluation Overview

The MBMVC program employs a learner-centered assessment approach that emphasizes continuous feedback and critical reflection. Assessments are designed to be formative, providing students with ongoing opportunities to receive feedback, self-assess, and adjust their learning strategies. Key components of the assessment system include:

- **Skills Passport:** Students maintain a Skills Passport, a portfolio-based system that tracks their progress in developing core and enabling competencies. This passport includes evidence of their work, feedback received, and reflections on their learning journey.
- **Regular Feedback:** Students receive regular, constructive feedback from instructors, peers, and industry partners. This feedback is used to inform their iterative design processes and continuous improvement.
- **Self and Peer Assessments:** Students engage in self-assessment and peer assessment activities to develop critical reflection skills and enhance their understanding of the competencies.
- **Community-Based Project Courses:** Students complete project courses including a place-based project course and a final capstone project that integrate multiple competencies and apply their learning to real-world biomedical visualization challenges. These projects are evaluated based on predefined criteria aligned with the core and enabling competencies.
- **Reflection Journals:** Students maintain reflection journals to document their learning experiences, insights, and growth over the course of the program. These journals are reviewed periodically to support reflective thinking and self-regulation.

This competency-based curriculum and assessment model ensures that graduates of the MBMVC program are well-prepared to meet the demands of the biomedical visualization and communication industry, equipped with the skills, knowledge, and mindset to excel and adapt in a continuously evolving field.

6.2. Skills Passport & Competency-Based Grading

The Skills Passport is a new system of assessment implemented in the BMVC Certificate program in 2024 based on feedback from students and instructors. The aim is to provide continuous, structured opportunities for competency-based

assessment that also allows students to focus on their individual professional and personal goals within the BMVC program.

Overview of the Skills Passport

The Skills Passport encompasses 13 foundational skills required to demonstrate proficiency in biomedical visualization and communication at a certificate level.

1. Participation
2. Rules of Play & Collaboration
3. Upskilling & Self-Guided Learning
4. Human-Centred Approach to Design
5. Ideation & Drafts
6. Accountable & Documented Use of Generative AI
7. Application of Research
8. Integration of Feedback
9. Pipeline & Project Management
10. Presentation
11. Science Literacy
12. Clarity of Science Communication
13. Clarity of Visualization

Since the BMVC certificate program is a complete/incomplete, non-credit program, there were previously no mechanisms to ensure the quality of our graduates or to document the progression of their skills clearly. The Skills Passport system was inspired by the BC education system, which has adopted a proficiency scale of Emerging, Developing, Proficient, and Extending. BMVC has iterated upon this scale to use a garden analogy that encourages continuous learning and detaches assumptions of value from student creations:

Seed (i.e., Emerging): A “seed” rating means this is an area you aren’t familiar with yet. You’re beginning to explore this skill and now you need to focus on “watering it” going forward if you want to see it grow.

Sprout (i.e., Developing): A “sprout” rating means you’ve been watering this skill and putting in noticeable effort to improve. You’re starting to see some progress, and there is also still room to become more proficient and comfortable with this skill.

Bloom (i.e., Proficient): A “bloom” rating means you can do this skill! You’ve watered and tended to this skill enough that you have become competent and skilled in this category. There is clear evidence of your ability in your BMVC creations.

Garden (i.e., Extending): A “garden” rating means you have fully integrated this skill into your creative process. This skill is well-established in your toolkit, and you’re comfortable and confident in knowing when and how to apply this skill in different scenarios.

Graduation Requirements

To graduate with the BMVC Certificate, students must achieve the following:

- A minimum of 8 out of 13 skills rated as Bloom or Garden.
- A maximum of 5 out of 13 skills rated as Sprout.
- No skills rated as Seed.

This structure provides flexibility in which skills students choose to focus on, allowing for individualization in skill proficiency. The requirement of no Seed ratings ensures that students make an effort to build competence in all 13 categories, regardless of their personal goals.

Mentorship and Competency Assessment

Students participate in one-on-one mentorship meetings at the end of each term to co-construct criteria and determine their level of competency in each skill. These meetings offer students the opportunity to:

- Critically reflect on their learning.
- Relate skills back to specific and tangible deliverables/projects.
- Articulate their goals with the guidance of a mentor.

Pilot Program Outcomes

The BMVC Certificate Skills Passport serves as a pilot for a competency-based grading system in MBMVC, and initial results have been positive. Students report feeling that they receive more individualized mentorship and have a better grasp of what is expected of them to succeed in the program. The instructional team gains a clearer understanding of student strengths and weaknesses, enabling them to develop more effective support strategies to help students build skills and address gaps.

Application to the MBMVC Program

This Skills Passport will inform how we approach competency-based grading in the MBMVC program. We have adapted the BMVC Certificate Skills Passport into our [proposed MBMVC competency-based curriculum](#) to focus on core and enabling competencies informed by Canada Skills for Success and project-based learning rather than the more narrow skills outlined in Skills Passport. While the basic

principles will remain the same, additional work will be done to ensure that the competency-based grading system aligns with UBC graduate studies assessment standards as well as the standards & guidelines for CAAHEP accredited medical illustration programs and industry standards. Our goal is to create an effective and fair assessment system that continues to provide personalized feedback and fosters student growth, ensuring that MBMVC graduates are well-prepared for their professional careers.

6.3. Graduate Outcomes Reporting

To ensure an accurate understanding of how our graduates fare after completing the MBMVC program, we will regularly collect data on various graduate outcomes. This data will include certification and licensure test results, employment rates, employer satisfaction, and the success of graduates as they begin their practice. We will use these outcome measures to iterate and improve the format and delivery of the MBMVC curriculum.

As a learner-centered program that values iterative design and continuous learning, it is crucial that the MBMVC program itself embodies ongoing reflection and improvement based on feedback. This approach ensures that our students and graduates receive the support and learning environment they need to be successful.

In compliance with the CAAHEP standards and guidelines for accredited allied health professions programs, graduate outcomes will be publicly posted on the program website.

7. Support & Resources Required

7.1. Instructional & Administrative Personnel Required

To ensure the successful implementation and operation of the Master of Biomedical Visualization and Communication (MBMVC) program, we will need to hire a dedicated instructional and administrative team. This team will be crucial in delivering high-quality education, providing strong mentorship, and maintaining the program's rigorous standards. The following positions are projected with relevant considerations:

Assistant / Associate / Full Professor of Teaching (Medical Illustration Focus)

Qualifications:

- Background in biomedical visualization and communication.
- Master's degree from an accredited medical illustration program (CAAHEP).
- Board Certified Medical Illustrator (CMI) or in the process of achieving this designation.
- Strong mentorship skills.

Courses Taught/Co-Taught:

- BMVC 511, BMVC 522, BMVC 530, BMVC 531, BMVC 541, BMVC 542
-

Assistant / Associate / Full Professor of Teaching (Biomedical Sciences Focus)

Qualifications:

- Background in anatomy education with the integration of visual media.
- Background or strong interest in science communication.
- Strong mentorship skills.
- Experience with interdisciplinary collaboration and experiential learning.

Courses Taught/Co-Taught:

- BMVC 514, BMVC 521, BMVC 523, BMVC 530, BMVC 531, BMVC 541
-

Lecturer (UX/UI Focus)

Qualifications:

- Industry experience in user experience (UX) and user interface (UI).
- Strong background in design thinking.
- Ability to mentor students effectively.

Courses Taught/Co-Taught:

- BMVC 511, BMVC 522, BMVC 530, BMVC 531, BMVC 541
-

Postdoctoral Teaching Fellow (Biomedical Sciences Focus)

Qualifications:

- Experience in anatomy education.
- Interest in science communication.
- Interest in the integration of educational technology and emerging media in anatomy education.

Courses Taught/Co-Taught:

- BMVC 514, BMVC 521, BMVC 523, BMVC 530
-

Director, MBMVC Program

Qualifications:

- Must have a Certified Medical Illustrator (CMI) designation or be in the process of obtaining this designation at the time of application.
- Master's degree from an accredited medical illustration program.
- PhD preferred but not required.

Other Considerations:

- The Director, MBMVC role may be held by the Assistant/Associate/Full Professor of Teaching (Medical Illustration Focus) faculty position.
-

Senior Program Administrator

Responsibilities:

- Program administration and student advising.
 - Curriculum and learning experience design for both MBMVC and Certificate in BMVC programs.
 - Outreach and collaboration with community partners.
-

Senior Instructional Designer

Responsibilities:

- Design of learning materials.
 - Proficiency with learning management systems and other educational technologies.
 - Coordination and creation of resources for both the MBMVC and Certificate of BMVC programs.
-

Makerspace Manager

Responsibilities:

- Supervision of the MBMVC makerspace facility (see [section 7.2 for details](#))
- Experience with emerging media and software (i.e., virtual reality headsets, 3D printers, Adobe Creative Cloud, Unity, etc.)
- Strong problem-solving and mentorship skills
- Facilitation of interdisciplinary workshops and ideation sessions

This team will be integral to the development and delivery of the MBMVC program, ensuring that students receive the highest quality education and support throughout their studies. By hiring individuals with specialized skills and backgrounds in medical illustration, biomedical sciences, user experience, and educational technology, we will create a robust support structure that fosters student success and program excellence.

7.2. Facilities & Technology Required

Dedicated Offices for Instructional & Administrative Personnel:

- Director, MBMVC Program
 - Senior Program Administrator
 - Assistant / Associate / Full Professor of Teaching (Medical Illustration Focus)
 - Assistant / Associate / Full Professor of Teaching (Biomedical Sciences Focus)
-

Inclusive Educational Makerspace

A dedicated, permanent space for project-based learning and collaboration. This makerspace will be essential for BMVC 511, BMVC 522, BMVC 530, BMVC 531, and BMVC 541, although students will have access to the makerspace for the duration of the MBMVC program.

- Equipped with no-tech, low-tech, and high-tech maker materials such as computers, 3D printers, photogrammetry scanning equipment, craft supplies, textiles, simple robotics, traditional art supplies, and digital painting tablets.
- Several tables for student teams to engage in round-table activities and an open space for VR experiences.
- Video conferencing and accessibility capabilities.
- Secure storage to lock and protect in-progress biomedical projects when the space is not in use.
- Dedicated staff to support students, staff, and faculty with facilities, instructional design, collaborative ideation, rapid prototyping, and research & testing.
- Opportunities for paid student work-learn positions.

We propose that the HIVE (Hackspace for Innovation and Visualization in Education) transition into an interdisciplinary educational makerspace that serves the wider Faculty of Arts, and rebrand to become the “Hub for Innovation, Visualization, and Experimentation”. This new HIVE makerspace will directly support the values identified in the new Arts Strategic Plan: curiosity, innovation, collaboration, and accountability. A second proposal for the future of the HIVE is forthcoming.

Adobe Creative Cloud Licensing & Other Software

The Adobe suite is considered industry-standard software for biomedical visualization and communication specialists. The MBMVC program would require the following:

- Adobe Creative Cloud licenses for all MBMVC students while enrolled in the program.
 - Adobe Creative Cloud licenses are also required for the Professor of Teaching (Medical Illustration Focus), Lecturer (UX/UI Focus), and Senior Instructional Designer positions.
 - Adobe Creative Cloud, Cinema 4D, Reality Capture, and ZBrush licenses for all computers in the inclusive MBMVC makerspace to support various design and visualization tasks.
-

Gross Anatomy Lab Access & Donor Bodies

BMVC 521 in Year 1, Term 2 is a full dissection-based anatomy course and requires coordination with the UBC gross anatomy lab and body donation program. This is essential for hands-on anatomical learning and understanding of the human body, which is critical for biomedical visualization.

- Access to the UBC gross anatomy lab and six donor bodies (four students per body) per cohort for the BMVC 521 dissection course.

8. Conclusion

The Master of Biomedical Visualization and Communication (MBMVC) program at UBC is designed to address the growing need for skilled professionals in the biomedical visualization field. With its competency-based curriculum, project-based learning approach, and strong alignment with UBC's strategic goals, the program offers a unique and valuable educational experience.

Program Strengths

- **Innovative Curriculum:** A comprehensive curriculum that integrates core competencies, practical learning experiences, and interdisciplinary collaboration.
- **Strategic Positioning:** Fills a geographic gap in medical illustration programs, attracting a diverse student body from Canada and internationally.
- **Community and Industry Support:** Strong backing from industry leaders, community partners, and alumni, demonstrating the program's relevance and potential impact.

Alignment with UBC's Strategic Goals

The MBMVC program supports UBC's goals of promoting interdisciplinary education, competency-based learning, and community engagement. By incorporating Indigenous perspectives and emphasizing equity, diversity, and inclusion, the program aligns with UBC's commitment to fostering a respectful and inclusive academic environment.

Potential Impact

Graduates of the MBMVC program will be well-prepared to excel in the biomedical visualization field, contributing to advancements in healthcare communication, education, and research. Their work will enhance the understanding of complex biomedical concepts, improve patient outcomes, and support the development of innovative healthcare solutions.

In conclusion, the MBMVC program represents a significant step forward for UBC in establishing itself as a leader in biomedical visualization education. By leveraging UBC's strengths, resources, and strategic vision, the MBMVC program will produce graduates who are ready to make meaningful contributions to the field and the broader community.

Appendix A. Sample Course Syllabi

Appendix A includes two sample course syllabi for the MBMVC program: BMVC 511 and BMVC 514. We have chosen to showcase these courses because they are both integral to Year 1, the foundational year where students develop key mindsets and skills before applying them in project-based learning courses.

BMVC 511 is a design-based course that focuses on developing visual storytelling, design thinking, and creative problem-solving skills. This course is crucial for establishing a strong foundation in design principles that will be applied in various biomedical visualization projects throughout the program.

- [View the BMVC 511 sample syllabus here.](#)

BMVC 514 is a biomedical sciences course that provides students with an in-depth understanding of human anatomy, physiology, and molecular biology. This course ensures that students acquire the scientific literacy and foundational knowledge necessary for creating accurate and effective biomedical visualizations.

- [View the BMVC 514 sample syllabus here.](#)

By including these two syllabi, we aim to provide a comprehensive overview of the complementary disciplines taught in the MBMVC program. BMVC 511 and BMVC 514 represent the intersection of design and biomedical sciences, demonstrating how these foundational courses prepare students for interdisciplinary collaboration and innovative solutions in biomedical visualization and communication.

Appendix B. MBMVC Core Competency Mapping by Course

The following table outlines the MBMVC core competencies for each course in the core curriculum.

Term	Course	Critically Engaging with Science	Communicating	Collaborating	Problem Solving	Reflective Thinking	Co-Creating	Managing	Self-Regulating & Co-Regulating	Leading & Following	Diverse & Expansive Ways of Understanding
Year 1, Term 1	BMVC 511	X	X			X					X
	BMVC 512		X	X	X	X	X	X	X	X	X
	BMVC 513		X	X	X	X			X	X	X
	BMVC 514	X		X	X		X				X
Year 1, Term 2	BMVC 521	X	X	X	X	X	X	X	X	X	
	BMVC 522	X	X	X	X	X	X	X	X	X	X
	BMVC 523	X			X						X
Summer	BMVC 530		X		X	X	X	X			
	Elective #1	<i>*Students must complete critical reflections to identify core and enabling competencies achieved in chosen elective and applications to their goals in MBMVC</i>									
Year 2, Term 1	BMVC 531	X	X	X	X	X	X	X	X	X	X
	NSCI 311	X	X	X	X		X			X	
	Elective #2	<i>*Students must complete critical reflections to identify core and enabling competencies achieved in chosen elective and applications to their goals in MBMVC</i>									
Year 2, Term 2	BMVC 541	X	X	X	X	X	X	X	X	X	X
	BMVC 542		X			X		X	X	X	
	Elective #3	<i>*Students must complete critical reflections to identify core and enabling competencies achieved in chosen elective and applications to their goals in MBMVC</i>									

Appendix C. Recommended Elective Courses

This appendix provides a list of existing UBC courses that may align with the interests and individual goals of MBMVC students, supporting their educational and professional development. As per UBC Graduate and Postdoctoral Studies master's requirements, undergraduate courses numbered 300-499 may account for no more than 20% of the course credit requirement. Given that the MBMVC program consists of 54 credits, and students are required to take NSCI 311, they may take up to two additional 300 or 400 level courses for credit towards graduation.

In alignment with the UBC Indigenous Strategic Plan Action 16, students must take at least one elective with an Indigenous focus. This requirement ensures that all academic programs, including the MBMVC, incorporate substantive content that explores Indigenous histories and identifies how Indigenous issues intersect with the field of biomedical visualization and communication. Additionally, students must take one additional science course to meet the CAAHEP standards for accredited medical illustration programs, for a total of 5 science courses including BMVC 514, BMVC 521, BMVC 523, and NSCI 311.

The following list of potential electives is preliminary and subject to discussions with department heads and course directors to explore the possibility of MBMVC students enrolling in these courses with permission. This collaborative approach aims to ensure that the elective courses selected not only enhance the MBMVC curriculum but also provide meaningful learning experiences that align with the students' professional aspirations.

Course	Title	Description
AMNE 301	The Technical Terms of Medicine and Biological Sciences	Acquaints the student with the Greek and Latin elements from which most specialized terms of modern medicine are constructed. Intended primarily for students planning to enter the medical, pharmaceutical, or biological sciences.
ANTH 427	Topics in Medical Anthropology	Anthropological perspectives on health, illness, and disability as represented by classic and contemporary research in selected topics in medical anthropology including disease and human evolution, illness and human ecology, culture and epidemiology, ethnomedical systems, the relationship between folk and biomedicine and the cultural construction and social organization of health care, illness and

		disability.
ANTH 428	Medicine, Technology, Culture, and Society	A medical anthropological perspective on medical science, technology, translational research, and clinical practice, in laboratory, clinic, family, social, and cultural contexts. Topics include explanatory models of health, acute and chronic illness, disability; social and cultural dimensions genetics; clinical interaction.
ANTH 429	Global Health in Cross-Cultural Contexts	Includes examination of the social and cultural dimensions of specific life-threatening emerging and re-emerging infectious diseases, the political economy of health, cultural interpretations of illness and healing, medical pluralism, therapy management, and the cultural construction of efficacy.
BIOL 425	Biomechanics	An analytical approach to the study of skeletal mechanics and animal locomotion. Selected topics in the structure and properties of biological materials, the functional design of skeletons for locomotion, and the fluid mechanics of swimming and flight.
CAPS 390	Introduction to Microscopic Human Anatomy	Organ system development, structure and function at the microscopic level.
CAPS 421	Cell Biology and Human Disease	Outlines major discoveries and current advancements that are revolutionizing our understanding of subcellular structures and function in health and disease, such as cancer.
DSCI 320	Visualization for Data Science	Analysis, design, and implementation of static and interactive visual representations; visualization literacy; data communication; exploratory Data Analysis; application of theoretical principles to visualization development.
GRSJ 310	Gender, Race, Social Justice and Health	Interdisciplinary introduction to gender and health issues using selected theoretical frameworks.
INLB 451	Decolonizing Indigenous Health and Wellness	The colonial determinants of Indigenous Peoples' health and wellness. The governance of land in relation to health. Experiential,

		intensive land-based course designed and delivered in collaboration with academic faculty and Indigenous community partner(s).
KIN 468	Indigenous Health and Wellness	The complex social, cultural, historical, and economic factors that shape health and wellness within Indigenous communities will be explored through extensive blended learning and experiential learning opportunities.
LFS 340	First Nations Health and the Traditional Role of Plants	This Interprofessional Health and Human Service (IHHS) course covers the First Nations medical systems and medicinal plants. Bridging the traditional with modern sciences.
MEDG 419	Developmental Origin of Human Disorders	Genetic and epigenetic determinants of development from conception to birth. Topics include development of the neural tube, face, heart, endoderm, blastocyst, embryonic stem cells, gastrulation, genomic imprinting, placental complications, chromosomal abnormalities and prenatal diagnosis. Discussions based on published research articles.
PCTH 500	Molecular Aspects of Drug Action at the Membrane Level	Lectures, discussions and assigned reading on actions of drugs on ion channels, receptors and intracellular processes and the methodologies used including electrophysiology, fluorescence measurements, molecular neurobiology and microdialysis. Given in even-numbered and alternate years.
PHIL 333	Bio-Medical Ethics	Moral problems in contemporary business and professional practice, general moral theory, the law, and policy formation. Corporate social and environmental responsibility, employee rights, preferential hiring and affirmative action programs, conflicts of interest, advertising, whistle blowing and self-regulation.
SPPH 302	Topics in Health Informatics for Health/Life Sciences Students	Basic literacy in health informatics. Innovative approaches to healthcare implementation, access to care, and data utilization.

SPPH 404	Indigenous Health: Historical Impacts and Contemporary Approaches	This course covers an epistemological approach that considers the social determinants of health and Indigenous spiritual-environmental and cultural perspectives and approaches to health and wellness.
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Appendix D. Community Support for the MBMVC Program

To demonstrate existing support for the creation of the Master of Biomedical Visualization and Communication (MBMVC) program at UBC, we have begun to collect letters from our interdisciplinary and global network of collaborators, community client partners, and former Biomedical Visualization and Communication (BMVC) Certificate students.

As of July 31st, 2024, we have included letters of support from the following individuals below:

- Rebecca Ellison, BVMC graduate (2021 cohort)

The following individuals have also agreed to contribute letters of support for the MBMVC program in the coming months, to be included in the next iteration of this program proposal document:

- Leonard Shapiro, Cape Town University, South Africa
- Dr. Jon Cornwall, Otago University, New Zealand
- Jennifer Wolter, BMVC graduate (2023 cohort)

July 28, 2024

To Whom It May Concern,

The BMVC program came as both a surprise and delight to me during a very challenging time as Covid-19 locked me out of my professional opportunities. Having previously worked as an occupational therapist and then an artist-in-residence, discovering the BMVC program was truly a gem. I immediately knew I had found my tribe when I was introduced to a cohort of individuals who shared my passion for integrating science and the arts. My respect for the coordinators, instructors, and professors of BMVC is immense, as they embody this passion deeply and teach in ways that bring research, anatomy, physiology, design, visual art and multimedia alive.

The BMVC program helped me understand numerous design strategies to simplify complex medical and health concepts, making them accessible to diverse audiences through accurate, well researched, anti-racist, finely crafted visuals and engaging copy. The program's focus on design thinking, user research, and regular critiques offered a safe place to challenge and elevate skills in a variety of media. This, along with the capstone project, solidified my skills in project management, client relationships, rigour, and process documentation.

These skills have served me well in my current role as a healthcare service designer. Through BMVC, I was introduced to a new love of healthcare comics. I have integrated graphic medicine into my work, contributed to a multidisciplinary book on using comics for healthcare professionals and conducted successful workshops on visual exploration while processing pregnancy loss. I continue to seek opportunities to incorporate biomedical visualization and communication into my daily work with healthcare clients.

Additionally, I have devoted time to mentoring many BMVC students in subsequent cohorts, helping them find their unique paths in the biomedical world. The prospect of a Master's program is exciting, as it will further equip students and provide academic credibility in biomedical forums. The Master's level will allow students to delve more deeply into theory, methodology, research, and practice, honing their skills in specific areas of interest and practice.

This opportunity is greatly needed in Western Canada. To maintain diverse student cohorts, it is vital to offer high-quality programs across Canada. The restrictive nature of having only Eastern Canadian and American schools means many qualified students lack the financial ability to relocate eastward to pursue their studies. Therefore, a Master's program in Western Canada would be instrumental in providing these students with the opportunities they seek, enriching the Canadian presence of these important skill sets in an age of ever-present media misinformation regarding health and science.

Regards,

Rebecca Ellison, BMVC 2021