Department of Chemistry, University of Victoria, Victoria, BC, Canada

Strategic Plan 2024-2029– Approved – January 9, 2024

Mission:

The Department of Chemistry fosters world-class research and outstanding chemical education, building on the strengths of students, faculty, staff and alumni to enhance local, national and global communities.

Vision:
To become the best mid-sized chemistry department in Canada based on the diversity and inclusiveness of its environment, the quality of its graduates, and research impact.

In order to achieve this vision, the Department will focus on the following grand goals in the next five years:

- Recruitment of high quality and diverse faculty, staff, and students.
- Provide an inclusive environment that will allow all members to thrive and excel.
- Modernize the undergraduate and graduate programs and the delivery of contents while providing opportunities for experiential learning and community engagement.
- Provide the conditions for faculty members to develop high-impact research programs in the forefront of modern chemistry.

Context

The Department of Chemistry at the University of Victoria is a research-intensive unit that provides excellent programs and training for undergraduate students, graduate students and Post-doctoral Fellows. The research activities are funded by external grants from a variety of agencies including, the Natural Sciences and Engineering Research Council (NSERC), the Canada Research Chairs (CRC), the Canadian Institutes of Health Research (CIHR), the Canada Foundation for Innovation (CFI), the BC Knowledge Development Fund (BCKDF), the Michael Smith Foundation for Health Research (MSFHR), multiple Genomics and Cancer Research Foundations, and the Petroleum Research Fund (PRF). Grants in excess of $4M per year support research resulting in high impact scientific discoveries that are published in leading peer-reviewed journals.

The Department excels in fundamental chemical research, much of which encompasses the spectrum of all other science disciplines. The Department has identified Health, Energy and Materials as the three strategic research areas of emphasis that will have the greatest societal impact. Many researchers in the Department have established expertise and demonstrated impact through their contributions in these three areas which include: new therapeutic molecules, complex bio-molecular systems and surfaces, control and study of dynamic molecular systems, chemical and bio-analytical devices for health diagnostics and imaging, catalysis and materials for environmental sustainability, design and fabrication of new functional materials, and new molecular strategies and building blocks for sensors and devices. In summary, considering the Canadian context, the Department is relatively small in a mid-sized university that punches way above its weight in terms of research excellence.

The current high-level research activity has been built over the last 20 years. A transformation of the research environment was achieved through the judicious recruitment of research-active faculty members, including seven Canada Research Chairs and a Canada 150 Research Chair, in complementary areas related to materials science, catalysis, nanotechnology, energy and health. The faculty members hired since the early 2000's brought in more than $20M in funding for state-of-the-art infrastructure acquisitions which enabled additional research activities and collaborations. As a result of these efforts most members are now involved in industrial partnerships that led to a 100% increase in the total amount of external research funds over the past 10 years. The increased activity has directly benefited the Department's graduate program. For instance, the graduate student enrolment reached a historical high of 90 students in 2021. The number of Post-doctoral Fellows has increased from 2 in 2015 to 22 in 2021!

The undergraduate program was also modernized through an extensive curriculum review and a mechanism for constant monitoring of the curriculum delivery was implemented. This new system allows for more responsive and dynamic adjustments to course contents and considers the needs and impact of changes to the overall delivery of programs. The Department has also incorporated successful initiatives for community engagement into the undergraduate program in the creation of CHEM 405/505 (Professional Development and Societal Engagement for Chemists) which includes labs in collaboration with industrial partners. The Chemistry for the Medical Sciences program has allowed the number of declared students in chemistry programs to double and the research experience courses (x9x) have allowed hundreds of undergraduate students to practice and learn in state-of-the-art research environments.

The Department of Chemistry has also been a leader at UVic for initiatives related to equity, diversity, and inclusion (EDI). The Chem EDI committee was among the first to form at the department level. The Department also help the implementation of the procedures for the UVic EQHR Equity Review and was the first department to be assessed in terms of EDI. The Chem EDI committee promotes several initiatives over the course of a year and is among the most active of the EDI committees in the Faculty of Science.

The bottom line is that the Department has significantly evolved in all indicators for research and teaching excellence in the last 20 years. We also are providing a welcoming and inclusive working environment for faculty, staff, and students. Despite the accomplishments indicated above, comparative indicators for research output, funding level, and the national and international reputation between chemistry departments in Canada and abroad show that we are still rated below our real potential. The challenge is not only to keep improving in terms of excellence and innovation in research and teaching over the next few years, but also to bring our reputation on par to its true capabilities. The wave of retirements and replacements (potentially 8-9 faculty members over the next 5-7 years) provides an opportunity to refocus the Departmental goals. The new hiring wave will bring in new research directions, more infrastructure and additional teaching capacity. The potential changes that can be implemented with this strategic plan in the next five years will be exciting, but they will also be accompanied by several challenges. The most obvious is to attract top-level researchers, instructors, staff, and students while improving the diversity balance and representation. New faculty members and research groups require resources in the form of departmental support and space. Currently, the

university is adapting to new financial realities in a post-pandemic world which can lead to uncertainties and instabilities. Although the Department has done well by finding alternative revenue streams through the sale of lecture books and laboratory manuals, it is important to be prepared to adapt to economic hurdles as a vision is implemented. The faculty replacement process will momentarily affect the workload distribution which should reverberate in our capacity to implement new initiatives. This strategic plan then needs to be surgical to focus on a few relevant and feasible initiatives.

Strategic Plan:

The path to fulfill the mission and the vision within the context stated above is to consider a few efforts that are either essential or that will generate a large impact. We are a department that can already be proud of our current level of excellence in teaching and research. However, the strategy is to go beyond "business as usual" in the next five years and improve the learning, teaching and research experiences for all members. This will be accomplished by targeting five (interconnected) priorities: *Communication, Internal Support, Community Engagement, Infrastructure, and Program delivery*.

Communication: A priority is to focus on increasing our reputation and visibility. In other words, we will aim at making our reputation compatible with the real level of excellence of the Department. We need to create mechanisms to effectively communicate our achievements to improve recruitment (students, faculty, and staff) and to help with development initiatives.

Internal support: This priority is to provide proper information, mentorship and support to all members. This includes improving services to undergraduate and graduate students. For instance, proper support and mentorship to new faculty, and good technical support to grad students should be part of the priority. Recruitment initiatives focused on minorities should also be paired with support systems to help them to succeed in an academic environment.

Community Engagement: This priority is to support opportunities for members to interact with the community, including industrial partners. The work environment is quickly changing and becoming more diverse. It is then important to expose our students to modern methods and to multipronged approach to problem-solving. To achieve that, it is important to understand the relevance of the chemical problems for a particular group and to communicate effectively with people of diverse background. In that sense, interaction with the outside world (industry, communities) during the formative years of a chemist (undergrad or grad student) is now more important.

Infrastructure: The research and teaching activities are supported by facilities that include the NMR facility, the mass spectrometry facility, glass blowing infrastructure, and the electronic/instrument shop (including support for lasers, optics and imaging). All these facilities and shops are managed and maintained by staff with first-class expertise. This priority is to ensure resource are provided to those facilities to benefit all members.

Program delivery: This priority is to provide a mechanism for support of teaching innovation, curriculum development, and to explore potential new programs. The teaching excellence in the

Department is widely recognized. We have already implemented a system for annual curriculum discussion, a dynamic process that allow constant curriculum evaluation. Societal and behavioral changes in the student population require the implementation of innovative approaches for course delivery, assessments, and accommodations. A concerted effort to enable those should be implemented.

Specific Initiatives:

In the context of the mission and vision above, members of the Department and other stakeholders provided input to formulate the following strategic initiatives:

1) To have a comprehensive discussion about the hiring plan and then implement a series of hires that will shape the direction of the Department for the next 20 years.

Why: The demographics of the faculty members is such that a large number of people will retire close to each other. This happened in the 2000's and led to 9 consecutive hirings between 2001 and 2007. There are also potential staff retirements that will need to be addressed.

What: We need a comprehensive discussion about the scientific directions. What is next for chemistry and how the Department can be positioned for the future? The hiring plan needs to also consider the teaching requirements and any other discussion about the academic needs of our students. Onboarding and mentorship for new faculty should be evaluated and more structure should be provided, if necessary. The hiring plan should consider the potential for the Department to set EDI goals (e.g. a commitment to set a target for minority composition (women, black, indigenous, LGBTQ).

How: Faculty meeting discussions in Fall 2023 to develop and approve a plan. The Chair should be in constant discussion with the Dean to ensure the retirement positions remain in Chemistry and that a proper plan to accommodate the Canada Research Chairs are in place.

Metrics: Successful renewal of personnel. Structured mentorship system for new faculty implemented.

2) To implement a professional communication strategy with focus on social media, outreach, and connection with alumni and the community. To promote more social and recognition activities to improve the work and learning environment within the Department.

Why: We live in a digital globalized world and the communication channels with students and potential recruits are constantly changing. It is also important to maintain stable communication with alumni and partners to develop long lasting relationships that can be transformed into gifts and donations. From the EDI perspective, it is important to have regular events that celebrate the success of our students and bring the UVic community together.

How: A new position of communication specialist is proposed. This new position will also help with community engagement, as described in #6 below.

Metrics: Monitor the recruitment indicators. Use EDI surveys to gauge the Departmental environment. Monitor rankings and reputation metrics.

3) To explore new programs that could emulate the success of the Chemistry for the Medical Sciences program, including the potential for microcredentials. Follow the guidelines for CSC accreditation in potential new programs, if appropriate.

Why: As the central science, chemistry plays a fundamental role in several sectors of industry. It is our mission to provide our students with the best tools and programs that will give them an advantage in the market. The Department has a strong focus on materials and energy and strong ties with the Centre for Advanced Materials and Related Technology (CAMTEC). The relationship could be explored for a new program in materials science. Microcredentials are modalities that provide additional training to chemical professionals. Their implementation has been heavily encouraged by UVic and the BC government.

How: The Undergraduate Studies Committee (USC) will study potential new programs that are within our expertise and the needs of modern chemists. We will work with professional associations, such as the Association of Chemical Professionals of BC (ACPBC) to find out what are potential options of microcredentials that we could offer within our expertise.

Metrics: New programs and microcredentials implemented. Evaluation of those programs.

4) To support the management of the current departmental facilities and formulate a sustainability plan that enables high-efficiency use of the services provided.

Why: The Department of Chemistry supports 4 facilities: glassblower, NMR, mass spec and instrument shop. These facilities host advanced instrumentation and technical expertise that are essential for both our research and teaching mission. It is important to make sure these essential facilities are supported and they provide services at the proper level.

How: Implementation of yearly evaluation and reports, implementation of a ticketing system, regular meetings of the Facilities Advisory Committees. Work on plans to maintain and upgrade current infrastructure.

Metric: Annual survey among grad students, faculty, and staff about the quality of the services.

5) To provide better integration between the lecture, lab and the community into our programs.

Why: Chemistry is an experimental science. A well-rounded chemistry program requires a strong experimental program that provides basic skills. However, the program should also be dynamic, multidisciplinary and provide opportunities for problem solving.

How: Encourage stronger collaboration between the faculty and Senior Lab Instructors assigned to a particular course. Organize annual laboratory course discussions and review. Explore

potential new experimental courses involving the community (industrial partnership). Explore new resources and set up a plan for instrument replacement.

Metrics: Evaluation of the quality of program through regular surveys.

6) To continue providing our undergraduate students with experiential learning and community engagement opportunities.

Why: It is important for students to be exposed to real problems and to interact with the community. Learning about the diversity of people and problems should be an integral part of our program.

How: Providing more support to CHEM 405/505. The Department communication expert could coordinate the interactions between partners and communities with the potential to reach out to indigenous and remote communities. Provide sustainable experimental support (SLI/TA) to CHEM 405. Evaluate the 39x and 49X offerings. Request more administrative resources for the co-op program.

Metric: Satisfaction survey among students and community partners.

7) To organize outreach activities and improve interactions with high schools. Create avenues to attract students from minority and indigenous communities.

Why: Our indicators show that most of our undergraduate students are from BC, however several students in BC communities do not see University as a reasonable path.

How: Publicity and Undergraduate Recruitment Committee to coordinate regular Pro-D days targeting high school teachers. Explore the possibility of bringing students and teachers from low resources communities. Improve the departmental interaction with other outreach groups across UVic/BC. Explore avenues to support students from minority groups who join the Department.

Metric: Analyzing the recruitment metrics in terms of number, quality and origin of undergraduate students.

8) To reassess our Graduate program and training.

Why: The graduate population in the Department has increased. At the same time, the faculty renewal in the next few years will change the research characteristics of the Department. The grad program needs to adapt to those changes.

How: Teaching training: organize progressive TA assignments and provide tools for grad students to excel in teaching; provide more resources to CHEM 505; evaluate and assess the Grad curriculum and courses. Find mechanisms to keep graduate stipends competitive nationally.

Metric: Survey among graduate students.

9) Usage of space and plan to renew and maintain current infrastructure.

Why: The influx of new faculty members and the expansion of new research groups will stress space distribution. The future of the infrastructure of faculties who will retire needs to be discussed.

How: Comprehensive discussion and policies regarding lab sharing, office sharing and space assignment should be carried out. The potential change in required resources and infrastructure from new faculty should be an integral part of the discussion of future directions.

Metric: Optimized distribution of space and shared research equipment.

10) Support for Innovative Teaching Initiatives

Why: The Department is recognized by the excellence of our teaching program. Several innovations are created through the initiative of each Instructor. However, a more organized approach to discuss and disseminate those initiatives and resources should allow for more efficient implementation, particularly by new researchers, Sessional Instructors, and faculty.

How: Create data banks and road maps for teaching innovation. Provide resources and support for innovative initiatives. Establish a coordinator for teaching innovation and initiatives within the curriculum committee.

Metric: Improved course evaluations. Survey of former students.

Alignment of the Department plan with other UVic Strategic Initiatives

The strategic goals and initiatives indicated in this proposal aligns well with the main initiatives across the university. For instance, the 2022-2027 Faculty of Science Strategic Plan establishes strategic initiatives in “Education and Research Training” and “Research and Partnership” that heavily overlap with our goals. Those includes renewed efforts to improve recruitment and retention at all levels, improve infrastructure for teaching and research and offer more opportunities for community engagement. The Aspiration 2030 plan from the Vice-President Research focused on 5 aspirations (“Research Environment”, “Research Community”, “Commitment to Indigenous Scholarship”, Global Engagement” and “Societal Impact”) that match our commitment to improve communication, outreach, industrial partnership and research infrastructure. In terms of research areas, our strengths in Health, Materials and Energy align with the university’s priorities in sustainability (Climate and Sustainability Action Plan) and support the current efforts to increase UVic’s stand in medical sciences and health.

The implementation of the initiatives suggested in this plan should certainly increase the status of the Department nationally and internationally as it will guide us through this transformative and exciting time of renew.