

Internal Memorandum

To: M. Catherine Bolton, Vice-Provost, Teaching and Learning

From: André Roy, Dean of Arts and Science

Date: 16 FEB 2015

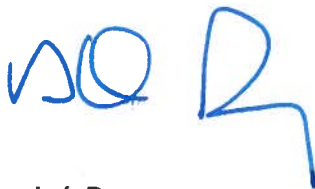
Re: Department of Physics Implementation Plan

Dear Dr. Bolton,

Please find enclosed the finalized Implementation Plan for the Department of Physics as part of the academic appraisal process in the Science sector of the Faculty of Arts and Science. This Plan was duly discussed with the Department Chair.

As mentioned in the Concordia University Academic Program Appraisals Manual, 5th edition revised, the Faculty and Department will follow-up on this Plan in two years when prompted by your office.

Sincerely,



André Roy
Dean of Arts and Science

cc. Truong Vo-Van, Chair of the Department of Physics

Implementation Plan: The Department of Physics

When this appraisal was initiated, the Department of Physics offered undergraduate (Major in Physics, Specialization in Physics with options in Pure/Computational Physics or Biophysics) and graduate (MSc and PhD) programs including an undergraduate Co-operative program to foster research across a wide range of sub-specializations ranging from theoretical and fundamental to experimental and applied, with a particular emphasis on nanophysics and biophysics. Moreover, the Department provided basic knowledge and instruction in fundamental concepts in physics to students in other sciences and engineering. The complement of faculty and staff responsible for delivering these academic and research programs included 12 tenure-track faculty members (including one Concordia Research Chair), 1.5 technical staff members, one laboratory supervisor and a department assistant. In addition to classrooms, undergraduate teaching laboratories, and individual research laboratories, the Department also maintained affiliations with the Centre for Research for Molecular Modeling (CERMM), the Centre for NanoScience Research and the Interuniversity Centre for Subatomic Physics.

Within its Department Objectives, the Physics Department expresses its commitment “*to preparing students for careers or advanced study in the theoretical, applied, and biological aspects of physics.*” In this context, students acquire a comprehensive grounding in all branches of physics, including mathematics, classical mechanics, electricity and magnetism, waves and optics, quantum mechanics and modern and theoretical physics through a combination of classroom study and hands-on training. The faculty members in the Department of Physics pride themselves on helping students to solve problems and understand the material and work to provide a high-quality educational experience and train students to think critically and innovatively. In addition, both undergraduate and graduate students are exposed to research expertise in areas as diverse as nanoscale and mesoscopic physics, supersymmetry, light-induced electron transfer and pigment-pigment and pigment-protein interactions, theoretical and experimental EPR, quantum wires and superlattices, and optical properties of thin films and inhomogeneous materials. Specifically, as the Department moves forward it is working to advance in two strategic orientations for research and training: biophysics and nanophysics.

Research success within the Department is evidenced by the provincial and national funding awarded to faculty members and by their success in publishing in quality international peer-reviewed journals. Further opportunities for continued research success are evident from the recent hires of dynamic new faculty members and the world-class instrumentation and facilities in the Science Pavilion and the recently-completed PERFORM Centre. To continue the development and advancement of the Department of Physics, a number of suggestions have been put forward through this appraisal process. These suggestions can be grouped into four broad but interrelated areas: undergraduate education, graduate education, recruitment and retention, and the direction of the department. The Faculty of Arts and Science has reviewed

the Department Appraisal Committee, External Examiners and University Appraisal Committee reports and provides the following comments on these recommendations.

Undergraduate education

The Department needs to invest attention into both curriculum development and how its courses are delivered.

Recommendation 1: The department already has initiated an in-depth curriculum mapping and review exercise and as a result of this has modified its core, Major and Specialization programs and added Honours options (with concentrations in Physics and Biophysics). In the Autumn of 2016, the Department will assess the success of the revamped Major, Specialization and Honours options in terms of student enrolment and retention. At the same time the viability of the Professional Experience Option and the Co-op program will be evaluated.

Recommendation 2: As suggested by the external examiners, the Department should expand its outreach to students outside of physics by offering liberal science courses to non-physics students. The promotion of these courses can be linked to the development of online courses within the department as proposed by the University Appraisal Committee. By the Autumn of 2015, the Department will present to the Dean a plan for adding online and liberal science courses to its course offerings. This will fit the Faculty's priorities for increasing the range of educational experiences available for students in the Faculty of Arts and Science.

Recommendation 3: The Department will continue to encourage its faculty members to work with the Centre for Teaching and Learning (CTL) to improve the quality of their course delivery. In addition, the Department should look to the common course outline template available from CTL and explore what is in place in other departments to optimize the development of a common course outline. The Faculty supports the Department Appraisal Committee recommendation to encourage presentations within the department to promote teaching methods and improvement. This can be implemented immediately with the assistance of CTL.

Graduate education

Graduate education happens both in the classroom and through mentoring by supervisors and advisory committees in a research environment.

Recommendation 4: In terms of classroom teaching, the Department already is broadening the course options for both PhD and MSc students by modifying degree requirements to include a larger selection of courses. In this context, the Department should continue to explore the

feasibility of inter-departmental collaborations in course offerings. By the end of 2015, the Department should have approached the appropriate departments and initiated discussions to explore available possibilities.

Recommendation 5: The Faculty supports the External Evaluators' recommendation that graduate students be encouraged to take advantage of all available opportunities for soft skills development at the graduate level. The Department should consult with their students to see what skills they need and consult with the School of Graduate Studies to try to implement opportunities in these areas. This should be initiated immediately.

Recommendation 6: In terms of research mentorship, the Faculty supports the recommendation of the University Appraisal Committee that the Department develop a common set of guidelines for graduate supervision and ensure that all students and research supervisors are aware of these guidelines and their responsibilities. Discussions should begin immediately and the School of Graduate Studies consulted as needed.

Recommendation 7: As proposed by the External Evaluators, the Faculty recommends that the role of the supervisory committee be formalized and that regular meetings are scheduled to provide guidance to students. This can be implemented immediately and the School of Graduate Studies consulted as needed.

Recommendation 8: To encourage graduate student enrolment and to benefit current students the Department must promote existing funding opportunities and work with the School of Graduate Studies to improve funding packages for graduate students. This should be initiated immediately.

Recommendation 9: As suggested by the External Evaluators, the Department should increase the number of regularly scheduled colloquia, seminars and journal clubs to develop the intellectually community within the graduate population. This could be implemented for the 2015-16 academic year.

Recruitment and retention

Although both undergraduate and graduate enrolments have shown a general increase over the last few years, additional efforts should be made to increase registration and to optimize retention. The development by the Physics Department of a new program of awards for undergraduate students in Physics, the presentation of these awards and the publicization of the awards ceremony represents a strong commitment by the Department in this regard.

Recommendation 10: The Faculty appreciates the increasing enrolment levels at both the undergraduate and graduate levels in the last few years, but efforts must continue to make the

community aware of the quality and uniqueness of programs in the Department of Physics. Regular contact with the Faculty Communications Officer by the Physics Departmental Chair, Undergraduate Program Director, Graduate Program Director or Communications Officer (as appropriate) must be maintained to ensure the Department's public presence and participation in Faculty activities. Similarly, the newly developed Physics Department website must be kept current to publicize physics and the Department. In addition, the Physics Department newsletter and other information should continue to be sent to students regularly through email. In terms of further promoting the Department, faculty members are visiting CEGEPs and collaborations have been initiated between certain CEGEPs and the Department. A departmental brochure is available and faculty are presenting their research regularly at scientific meetings where they can promote both their programs and research. These initiatives should be encouraged and continued.

Recommendation 11: To ensure the smooth progression of students through their programs the Department has mandated that all undergraduate students see an academic advisor each year and has worked toward a defined course sequence for students that is available on the departmental website. In the summer of 2015 the academic advisors will report to the department what effects these changes have had on student retention and success and explore how these practices can be improved. The academic advisors should consult with Student Academic Services and the School of Graduate Studies to explore best practices for academic advising at both the undergraduate and graduate levels.

Recommendation 12: In terms of retention and student advancement, the Department has initiated a regular series of meetings with students to explore research topics as well as to discuss career options and to hear from successful alumni. To enhance the student experience, the Department is encouraged to begin immediately to expand the number of available research opportunities for undergraduate students and to advise undergraduate students about the possibilities for scholarship support. In addition, the Department should continue to work with the physics students to develop a Physics Club and, as recommended by the External Evaluators, establish a Physics Help Centre. Discussions should begin immediately with the Deputy Provost about this recommendation.

The direction of the Department

The changes that the Department already has made in their undergraduate programs strengthens both the Physics and Biophysics programs and highlights the direction of the Department. In addition, after this appraisal process was begun the Physics Department made two faculty hires in the area of Medical Physics Imaging. These two hires fall in the general area of Biophysics

and more specifically in the area of Biomedical Physics. This also is an indication of the direction that the Department hopes to follow.

Recommendation 13: As recommended by both the External Evaluators and the University Appraisal Committee, the Department should develop a detailed rationale to support their requirements for future development and hiring. This plan should focus on not only research and teaching objectives, but also space needs in terms of research space, and teaching (laboratory space) and common space (*e.g.*, for graduate students or a Physics Club). In addition, this plan should consider both the facilities and equipment needs in terms of research and undergraduate teaching. These issues will become even more pressing if enrolments continue to increase. Once the rationale has been developed the Department should bring it to the Faculty for discussion.