Expectations Regarding Tenure and Promotion

Department of Mathematics and Statistics
Faculty of Arts/Faculty of Science and Engineering
(Approved by the Department’s Council on November 28, 2006, and amended on April 24, 2007)

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1. **GENERAL DEPARTMENTAL EXPECTATIONS APPLYING TO ALL RANKS AND SECTIONS**

1.1 Professional Contribution and Standing (Scholarship)

The pattern of dissemination of research, as well as the milestones of scholarly achievement, are somewhat different in mathematics and statistics from those in many other disciplines. Monographs and published books are not as highly regarded as indicators of achievement as they are in the humanities and social sciences. Most mathematicians prefer to publish their research, as it is done, in articles in scholarly journals rather than to wait to publish a large body of work as a monograph. Even in the publication of articles, conventions in mathematics do not agree with those of other fields. Order of authorship, for example, is usually alphabetical and so has no bearing on the relative contributions of each author, unlike the conventions that have evolved in many of the physical and biological sciences.

It is expected that candidates will carry out high quality research, will publish it in highly reputable, peer-reviewed journals, and will disseminate it further through presentations at internationally recognized conferences. Non-refereed conference proceedings are not given the same weight as refereed journal publication. In evaluating published work, referees always ask if a submission is correct and well written. But the key question is always whether the work is interesting. What is valued is the introduction of new ideas — ideas that change how we think about a subject or a class of mathematical objects, or which allow problems to be solved that were previously thought to be intractable.

Novelty that is merely formal or purely technical is not valued so highly. Rather it is criteria like originality, depth, and impact that are primary. This is hard to judge for people outside the specialized areas of investigation, so great weight is placed in the tenure and promotion process on the evaluations by external referees, who should be recognized experts in the field, and as far as possible, at arm’s length from the candidate.

Among the expectations of the department is that its members compete for external funding. One indication, though by no means perfect, of a mathematician’s or statistician’s professional standing has been provided by the size of their NSERC discovery grant. Since the NSERC grant selection committee consists of experienced researchers from across the country, who rely on the opinions of selected referees as well as their own experience, their opinions have usually been considered reliable. A tenure and promotion file will normally compare the candidate’s grant with other grants from the same committee. In Pure Mathematics that is normally GSC 336 (Pure and Applied Mathematics A). In Applied Mathematics this is normally GSC 337 (Pure and Applied Mathematics B). In Statistics it is normally GSC 14 (Statistical Sciences). Note that comparisons between different committees are inappropriate, because of differences in research costs between disciplines. It should be noted that, while NSERC funding is the norm in this department, other sources of research funding may be appropriate benchmarks in the cases of certain researchers.

1.2 Teaching

Courses are expected to have substantial academic content, striking a balance between challenging the students to excel and setting goals that are reasonable and appropriate for the level of the
students in the course.

Most courses in the department are delivered in lecture format. In such courses it is particularly important that the presentation be clear and well organized, that concepts be well motivated, that examples be relevant to course material, that the instructor speak loudly and clearly, and that good blackboard (transparency, PowerPoint) technique be used. The pace should be set so that students can reasonably absorb material in class. Material should be presented in a way that engages and stimulates the students.

Evaluation (e.g. tests, quizzes, assignments) should be set at an appropriate level. Students should have sufficient evaluation to help them learn the material, and to allow them to fairly judge their progress in the course. Students should receive sufficient feedback about their work (e.g. through the availability of either graded assignments or solutions) to allow them to evaluate how well they are mastering the course material. Assignments and tests should be challenging. At the same time, most students should have a reasonable expectation of decent performance on tests, given sufficient preparation. Tests should be of a length that students are not under unreasonable time pressure. Test questions should have a range of difficulty, to allow all students to demonstrate their level of understanding.

Instructors should endeavour to create an atmosphere in the classroom that fosters learning. Active participation should be fostered, with students encouraged to raise issues of concern, and to both ask and respond to questions. Within reason, instructors must be accessible to student questions and inquiries, via questions in class, office hours and, if appropriate, by e-mail. Students should feel welcome to approach the instructor in these ways.

Instructors should be sensitive to the level and background of the students in a class. The approach appropriate for an advanced departmental honours class will differ from that appropriate for a large introductory service course, to students with modest mathematical training. Instructors should be sensitive to the diversity of students within the classroom, and to the differences in learning styles between students. Students should be treated in a professional, respectful, and non-intimidating manner.

Course directors must supervise course TAs to ensure that their work is both correct, and that they deal with students in a professional and helpful manner.

The course infrastructure must be well organized, with adequate information available to students about the syllabus, references, and adequate notice of assignments and tests.

Supervision of graduate students is a valued part of a faculty member’s duties. A fresh PhD graduate could not reasonably be expected to be a principal thesis supervisor though, so it is recognized that supervisory duties would not necessarily figure into a candidate’s early activities at York. After a candidate has been at York for a number of years, they would be expected to demonstrate willingness and interest in supervising PhD students, and in being engaged in the activities of the graduate program.

Candidates should demonstrate willingness to participate in activities outside the classroom that support teaching. These may include, but are not limited to: supervision of graduate student seminars or projects, participation in comprehensive examinations or thesis examining committees, supervision of undergraduate research projects, offering reading courses as the need arises, mentoring and advising students, mentoring postdoctoral fellows and junior faculty in teaching activities, maintaining and improving the departmental curriculum, and engaging in pedagogical
Teaching will be evaluated by comparing a candidate’s teaching evaluation scores with departmental courses generally, and in courses similar to those taught by the candidate. If a teaching dossier is available, it will be assessed. Letters will be solicited from students commenting on teaching performance. Colleagues will attend selected lectures and will write letters commenting on teaching performance.

1.3 Service

In Precandidacy, departmental service expectations are modest, and would consist of service on committees, and a willingness to participate actively in the life of the department. As a candidate moves towards and into candidacy, it would be expected that they demonstrate competence and willingness to carry out service obligations, including chairing committees, or carrying out more substantial tasks on behalf of the department. Service to the university or to the profession is encouraged, in addition to service to the department. But competence or high competence in service can be achieved based solely on departmental service. The kind of outstanding contribution to service that would earn a ranking of excellence in service would be unusual in an untenured candidate, who would normally be encouraged to focus on teaching and research at the beginning of their career. That kind of outstanding contribution would be more commonly seen among tenured faculty.

2. EXPECTATIONS SPECIFIC TO THE SECTION OF PURE MATHEMATICS

2.1 Research in Pure Mathematics

Along with the general departmental expectations already described, certain considerations in the category of Professional Standing are unique to Pure Mathematics. These include a strong record of publication in top rate journals and presentation of research at internationally recognized meetings.

Pure mathematicians prove theorems, which are judged by the depth, impact and originality of the ideas introduced, and to a secondary degree, by the elegance and difficulty of the arguments involved. The motivation for work in pure mathematics is often to understand some class of mathematical objects or techniques in a deep and profound way. Often this is accomplished by solving difficult and novel problems that force one to develop such deep conceptual understanding.

It is typical for an article in mathematics to be between 10 and 30 pages in length. Many of the deepest results appear in articles of even greater length. A good publication record for a pure mathematician may be publishing a couple of high quality articles per year. But in fact, production varies widely across the discipline, depending on the individual and the area of specialization. Many fine researchers are very prolific, producing handfuls of articles each year, while others have had great influence with a relatively small body of work. Some individuals publish incrementally, so there might be a sequence of articles reflecting the evolution of an idea. Others prefer to delay publication till insights have matured. Both are respectable approaches, and the difference highlights the inadequacy of simple article-counting. Creativity and the depth of ideas...
remain the prime consideration in assessing research contributions.

In the hierarchy of mathematics journals, it can be argued that a small number of general journals occupy the top spots. However, many first rate mathematicians choose instead to target a specific audience by submitting their work to more journals specializing in particular areas of mathematics. Either pattern is acceptable, the emphasis being on the quality of the work itself.

In earlier eras most articles had single authors, but that is no longer the case. Credit for work is not diluted by joint authorship, and indeed, collaboration is encouraged. Nevertheless, tenure and promotion committees will look for evidence that the candidate has an independent and ongoing research program.

### 2.2 Minimum Standards for Tenure and Promotion to Associate Professor

A central question in evaluating the scholarly work of a candidate for tenure and promotion to Associate Professor is whether or not the candidate has established an independent research program. There is an expectation that candidates will have advanced beyond just engaging in research to initiating and directing the course of research.

Further indicators of active scholarship are supervision of graduate students, supervision of Masters or undergraduate research projects, editorial activities, seminar participation, and a variety of other activities. Some of these, notably graduate supervision, are dealt with at greater length in the teaching section.

In evaluating applicants for tenure and promotion to Associate Professor it must be kept in mind that first grants from NSERC to junior researchers tend to be more at a generic level, so are less informative indicators of research quality. With the current NSERC model of five year grants, this means that a high percentage of tenure candidates will still be on their first grant at the time of the tenure decision, making the grant level both out of date and relatively uninformative in these cases. A further confounding factor is that grant levels now reflect more accurately than in the past the researcher’s support of “highly qualified personnel”, the term by which NSERC refers to graduate students and postdoctoral fellows. Since tenure candidates are less likely to have a record of supervising PhD students, this also biases their grants downward. However, lack of an NSERC research grant is viewed as a negative indicator requiring explanation.

The service expectations of junior faculty are not very demanding and faculty in Pure Mathematics are not encouraged to apply for promotion on the basis of excellence in service. The following table lists the three possible minimal scenarios for tenure and promotion.

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<th>Scenario</th>
<th>Scholarship</th>
<th>Teaching</th>
<th>Service</th>
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<tr>
<td>A</td>
<td>Excellence</td>
<td>Competence</td>
<td>Competence not demonstrated</td>
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<tr>
<td>B</td>
<td>Competence</td>
<td>Excellence</td>
<td>Competence not demonstrated</td>
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<tr>
<td>C</td>
<td>High competence</td>
<td>High competence</td>
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The following explains the minimum requirements for ratings of “competence”, “high competence” and “excellence” in the three categories considered in the evaluation of tenure and promotion files.
Scholarship

- Competence would be deemed to have been achieved by candidates who have had at least two articles accepted in refereed journals (not conference proceedings) work on which was initiated after arriving at York. Some level of funding by an external agency such as NSERC might also be seen as an indication of competence. The letters from external referees commenting on the candidate’s work should not show a consistent pattern of negative remarks.
- High competence would be signaled by a steady rate of publication in refereed journals of the equivalent of two substantial articles per year. A higher than minimal level of funding from an agency such as NSERC might also be seen as an indication of high competence. A rating of high competence requires positive letters from external referees.
- Excellence requires all the same indicators as high competence along with evidence of international recognition. Letters from external referees should contain an indication of the candidate’s high standing among mathematicians of the same generation working in the same field.

Teaching

- Competence would be witnessed by statistical data on teaching not significantly lower that the departmental mean, the adjudicating committee would also expect to see more positive letters from students and colleagues than negative.
- High competence would require statistical data on teaching close to the departmental mean or higher. The file would be expected to contain no more than a few isolated negative letters from students and colleagues.
- Excellence would require statistical data on teaching significantly higher than the departmental mean for comparable courses. Evidence of curricular development, involvement with undergraduates on projects or other extracurricular activities or supervision of graduate students is also to be expected. Letters from colleagues and students must be very strong.

Service

- Competence requires a record of at least some service activity each year along with positive supporting letters from colleagues.
- High Competence could be achieved by meeting the same standards as “competence” along with some service at the Faculty or University level that normally entails leadership in service beyond the norm, such as chairing a committee and developing new initiatives.
- Excellence would require a level of service significantly higher than that of “High Competence”.

2.3 Minimum Standards for Promotion to Professor

Various paths can lead to consideration for promotion to the rank of Professor. One possible profile is that of a relatively young Associate Professor who has established a leadership role at the centre of an active research group in the department. This profile would include a widely recognized international reputation in the field. Another possible profile would portray a dedicated teacher whose achievements in this area extend beyond the classroom and are widely recognized and well documented. But a third possibility also exists, that of a candidate for promotion to Professor who is somewhat closer to the end of a career that has achieved a balance between a steady output of mathematical research, excellent teaching and a strong record of active and productive
service. For such candidates, establishing a balanced career may have required achieving only the minimum standards in each of the three categories on which they are judged. This in no way lessens their value to the department or the university; indeed, some may argue that it actually increases it. It will be instructive to describe what the minimum standards applied to a balanced career may be, so that this can used as a starting point in appraising candidate’s with different profiles. Candidates expecting to advance to the rank of Professor emphasizing their strength in either research or teaching will be expected to document achievements considerably more than the minimum in this area, while allowances may be made for deficiencies in some other area.

Scholarship
To achieve the rank of Professor a candidate is expected to have sustained a steady rate of publication, over an extended period of time, at least at the same rate and level of quality as that required for “high competence” at the Associate Professor level. The Adjudicating Committee can expect to see at least some papers in first tier journals such as *Transactions of the American Mathematical Society*, *Advances in Mathematics* or *Canadian Journal of Mathematics*, but should not expect to see articles in elite journals such as *Annals of Mathematics* or *Inventiones Mathematicae*. By this stage of the candidate’s career, funding from an agency such as NSERC can be expected to be at a level considerably higher than the minimum. Letters from external referees should contain an indication of the candidate’s standing among mathematicians of the same generation working in the same field. These letters should be able to point to some significant achievement in the candidate’s research program.

Teaching
By this stage of the candidate’s career any deficiencies in teaching style and technique should have been identified and addressed. Therefore statistical data on teaching of comparable courses should be at least as high as the departmental mean. Evidence of curricular development, involvement with undergraduates on projects or other extracurricular activities or supervision of graduate students is also to be expected. Letters from students and colleagues should reflect a mature, successful and effective teacher.

Service
Since junior faculty are not required to share an equal load of service duties, senior faculty are expected to compensate in this area. Anyone aspiring to the rank of Professor should have assumed a leadership role in several different service contributions. Service beyond the department, or even beyond the university, is also expected. Letters on service should be more than neutral restatements of fact.

3. EXPECTATIONS SPECIFIC TO THE SECTION OF APPLIED MATHEMATICS

3.1 Research in Applied Mathematics

Research in applied mathematics may have much in common with research in pure mathematics. In other words, applied mathematicians may prove deep theorems and strive for theoretical insights. They may work towards profound understanding of important concepts and ideas. But applied mathematicians may equally well be driven by questions of the importance of the application itself, either to industry, or to other fields of scholarly research. In other words, while ap-
plied mathematicians may prove theorems, they may also do important and valuable work that is theorem free. For example, the resolution of sophisticated modeling problems, or carrying out intensive numerical computations. Ideally the complete body of work of a candidate will contain a mix of theoretical and applied insights.

The spectrum of journals favoured by applied mathematicians is likely to be even broader than those in pure mathematics. In particular, it will not be unusual for applied mathematicians to publish some fraction of their work in journals from outside mathematics.

By its very nature, applied research may be even more collaborative and team oriented than in pure mathematics. There may often be collaborations with researchers outside mathematics. There may be work carried out with input from the industrial sector. However, the standard by which research will be evaluated is the presence of substantial and interesting work in peer reviewed scientific journals. Consulting work carried out for industry may be viewed positively, but it does not replace the need for public and peer reviewed publication.

In the Applied Mathematics Section, we recognize that there can be a wide diversity of professional contributions both within mathematics and in collaboration with other disciplines. Here are some examples of the range of diversity of recognized professional contributions:

- original mathematics, as well as transfer of existing mathematical methods to solve significant problems in other disciplines, are both recognized forms of original and significant contribution. Regardless of what balance between these types of contribution is found in the file, the evaluation will be based on the originality, creativity, and impact of the work.

- diverse patterns of publication: ranging from a focus on highly competitive conferences, though a progression from conference presentations to refereed papers, to an emphasis on direct publication in refereed journals. Regardless of the publication pattern adopted by the candidate, the evaluation will focus on the quality of the publications, including the standards and expectations of the chosen publication outlets.

- diverse patterns of authorship, ranging from single-authored papers, through small collaborations, to large collaborations. Rather than focusing on a particular style of authorship, the committee will seek evidence for broad factors, such as the ability to independently set and advance a research agenda, and if appropriate, the ability to work well as part of a research team.

- diverse ways of recording relative contributions, including: alphabetical order; order of relative contribution; or patterns focusing on graduate students first, grant holders last, and others by order of contribution.

- diverse forms of funding: NSERC, CIHR, SSHRC, contracts, roles as principal investigators, to listed collaborators, or consultants.

The evaluation of professional contributions should support, even encourage interdisciplinary, multi-disciplinary, and trans-disciplinary contributions as well as contributions to the solution of industrial problems. This diversity presents a range of options within which a candidate will choose the specific pattern that best supports his or her scholarly work. It is not expected that each candidate display this diversity, but it is anticipated that the resulting contributions will normally be subject to timely peer review.

In some circumstances, external contracts might limit the peer review of the associated professional contributions, or might delay peer review while the partner pursues patents or related development. It is expected that at least some of the professional contributions will be submitted for peer review, and that contracts will normally provide for a level of public documentation that can be peer reviewed over time, and that the scope and impact of these contributions will be assessed by appropriate external reviewers.
The evaluation of a file values knowledge from several disciplines and areas of applications, and recognizes the possibility of novel contributions where the novelty may lie sometimes in other disciplines, sometimes in new methods of mathematics and statistics, and sometimes in connection and application of mathematical and statistical methods.

This diversity makes it essential for the candidate (via CV and Personal Statement) and the file assembly committee to place the professional contributions and standing into an appropriate context (or contexts) for the specific patterns recognized in the relevant areas of application.

In all cases, the professional contribution and standing must be documented through peer adjudicated contributions, and through external letters solicited for the file. This diversity may also require additional external letters, to cover the range of contributions. It is also appropriate for file assembly to seek input from collaborators to confirm both the individual contribution and the culture of the fields where the contributions are occurring.

3.2 Minimum Standards for Tenure and Promotion to Associate Professor

In general, the Teaching criteria are uniform across the sections, with overall documentation on mathematical processes of problem solving, applications, and modeling. Where appropriate, documentation should address the interdisciplinary material and diverse students groups in specific courses. Recognition will be given, were it is relevant, to the incorporation of material from multiple sources into interdisciplinary and multi-disciplinary teaching, and from industrial and applied problems into courses for Applied Mathematics majors and graduate students.

Teaching in the Applied Mathematics Section can involve the specific challenges of service teaching and even upper level courses with students from several disciplines, with distinct motivations and different backgrounds. Where relevant, particularly for courses with students from several disciplines, it will be important to document from these several disciplines the impact on the course design, assessment, and preparation of students.

In graduate supervision, it is recognized that faculty may be involved in joint supervisions with faculty from other graduate programs, both for graduate students in the Mathematics and Statistics Graduate Program, and for graduate students in other programs, or in interdisciplinary programs. While not expected of all members of the Applied Mathematics Section, such interdisciplinary supervision adds strength to our programs and its impact should be recognized and documented.

It is possible that the graduate supervisions of a candidate may primarily be in other programs. Where the initial hiring was interdisciplinary, this will be viewed as normal.

Many aspects of service are common to all sections. The following are some specific areas that may receive particular emphasis in the Applied Mathematics Section.

In applied mathematics, contributions may legitimately be made to several graduate programs, as well as to interdisciplinary graduate programs, in terms of service and teaching. Moreover, service contributions may also be made to the development of interdisciplinary undergraduate programs, and coordination of courses with multiple programs. From time to time, this will even
include undergraduate teaching in other programs, and liaison with other undergraduate programs.

In the area of practicum supervision, and of industrial mathematics, the department recognizes the keen importance of development of such contacts, as well as the substantial time required to support true work with industry. Where this supports student internships, placements, and case study problems for courses and workshops, this will be documented and valued as an important service contribution to the department and to the university. Where this leads to industrial research and development contributions, these will also be documented as professional contributions.

In cases of collaborations across disciplines, or with industry, the file assembly committee should seek input on service from relevant people in these areas.

The following guidelines will assist with the assessment for the normal file recognizing that the variety of profiles will also generate exceptions to these ‘benchmarks’.

**Scholarship**
- Normally, Competence would be deemed to have been achieved by candidates who have had at least three articles accepted in scholarly journals or refereed conferences of comparable standing or other equivalent dissemination appropriate to the form of research (e.g. government contracts and public dissemination). At least some of this should represent work done since appointment to York University. Some level of funding by an external agency or external contracts might also be seen as an indication of competence. The letters from external referees commenting on the candidate’s work should not show a consistent pattern of negative remarks.

- Normally, High Competence would be signaled by a total of at least five substantial peer contributions published in refereed journals or refereed conferences of comparable standing, together with evidence of a continuing independent research program. Again, equivalent dissemination may be appropriate for specific forms of contract and research. There should be clear evidence of independent work, and the ability to initiate and direct a research program. This could be demonstrated through the presence of a significant number of single-authored papers, or through a number of distinct contributions through an analysis of the relative contribution to multi-authored papers. Some of these five contributions, and collaborations where relevant, should be based on recent research, initiated subsequent to receiving a PhD. A higher than minimal level of funding from one or several external funding agencies might also be seen as an indication of high competence. A rating of high competence requires positive letters from external referees.

- Normally, Excellence requires all the same indicators as high competence along with evidence of international recognition. Letters from external referees should contain an indication of the candidate’s high standing among researchers of the same generation working in comparable areas of applied mathematics.

**Teaching**
- Competence would be witnessed by statistical data on teaching not significantly lower than the departmental mean. The adjudicating committee would also expect to see more positive letters from students and colleagues than negative.
- High competence would normally require statistical data on teaching close to the
departmental mean or higher for comparable courses. The file would be expected to contain no more than a few isolated negative letters from students and colleagues. The type of courses taught by the candidate should be taken into account, paying attention to whether courses are required, optional, or interdisciplinary, as well as the level of the course and the preparation of the students for the course.

- Excellence would normally require statistical data on teaching significantly higher than the departmental mean. Evidence of curricular development, involvement with undergraduates on projects or other extracurricular activities, or supervision of graduate students is normally to be expected. Letters from colleagues and students must be strong in context.

**Service**

- Competence requires a record of at least some service activity within the department each year, along with positive supporting letters from colleagues.

- High Competence could be achieved by meeting the same standards as “competence” along with additional service with other units in interdisciplinary work, or at the Faculty or University level, or exceptional special contributions at the departmental level.

- Excellence would require a level of service, with impact, significantly higher than that of “High Competence”.

### 3.3 Minimum Standards for Promotion to Professor

**Scholarship**

By this stage of the candidate’s career, funding from agencies and contracts can be expected to be at a combined level considerably higher than the minimum. Letters from external referees should contain an indication of the candidate’s international standing among mathematicians, or interdisciplinary workers of the same generation working in the comparable fields. These letters should be able to point to some significant achievement(s) in the candidate’s research program and its impact in the field(s).

In some cases, we recognize the possibility that the impact of a research project may be illustrated by its target readers (e.g., through recommendation of policy to various levels of governments and organizations) and potential users (e.g., through novel software and algorithm development directly adopted by the industrial partners). This impact will also be documented through external referees, and the diversity of contributions may require more than the normal number of external referees to document the full contributions.

Respecting the evolving professional profile of mature scholars, and the academic freedom to follow ideas into multiple disciplines, it is possible that the primary graduate supervisions of a candidate for promotion to Professor may lie in one, or several, other graduate programs. This level of collaboration, integrated into the larger profile of the Applied Mathematics Section, and the Graduate Program in Mathematics and Statistics will be recognized as a source of strength to the University. The measure of eminence and contributions will be to the University and the larger profession, not restricted to the current foci of the Department of Mathematics and Statistics.

**Teaching**

The general discussion on Teaching in Section 3.2 applies also to this subsection. By this stage of the candidate’s career, simple deficiencies in teaching style and technique should have been
identified and addressed. However, we also encourage continuing professional development, and experimentation with new teaching strategies, technologies, modes of delivery and pedagogies. The statistical data on teaching should be at least as high as the departmental mean. Evidence of curricular development, continuing professional development, involvement with undergraduates on projects or other extracurricular activities (such as modeling competitions) or supervision of graduate students in any related graduate programs is also to be expected. Letters from students and colleagues should reflect a mature, successful and effective teacher.

Contributions to the development of service courses for specific applied areas will be recognized as significant both to teaching and to service. More generally, development of new joint or interdisciplinary programs and packages of service courses for students applying mathematics will be documented as service, while designing, implementing and teaching specific new courses in these programs will be primarily documented as contributions to teaching.

It is recognized that the willingness to learn new areas of application, and collaborate in the supervision of students with interdisciplinary interests can be a time-consuming task, which is documented in teaching and supervision, at a stage some years before any potential peer reviewed original contributions may arise. It is therefore appropriate to document this supervision under teaching contributions, while also including resulting publications under professional contributions and standing.

Service
The general discussion on Service in Section 3.2 applies also to this subsection. Since junior faculty are not required to share an equal load of service duties, senior faculty are expected to compensate in this area. Anyone aspiring to the rank of Professor should have assumed a leadership role in several different service contributions. Service beyond the department, or within other programs contributing to collaborations, or even beyond the university, is also expected. Letters on service should be more than neutral restatements of fact and confirm the impact of the contributions.

4. EXPECTATIONS SPECIFIC TO THE SECTION OF STATISTICS

4.1 Research in Statistics

There are three broad types of research in statistics: theory, methodology and applications. Theory can be further subdivided according to its mathematical depth. The strongest statisticians tend to publish research in all categories but, in academic settings, a higher value is attached to theory and methodology than to applications. It goes without saying that faculty members are expected to disseminate their results by publishing them in recognized journals and giving presentations in conferences or other settings.

The desirability of a journal depends on the type of research. The leading journal in mathematical statistics is the *Annals of Statistics*. Three journals would be considered top-tier in theory and methodology: the *Journal of the American Statistical Association*, *Biometrika*, and the *Journal of the Royal Statistical Society (Series B)*. Despite its name, *Biometrika*, is unqualifiedly a statistical journal founded 100 years ago by Karl Pearson and edited during the last century by many of the most eminent statisticians of their time. Some journals published by national societies would be considered second-tier but nevertheless very prestigious. The leading national journals are the *Scandinavian Journal of Statistics* and the *Canadian Journal of Statistics*. These journals publish
both mathematical theory and methodology.

Statistics research of very high quality is also published in journals aimed at specialized audiences in sub-fields of statistics such as multivariate methods or reliability, and in areas of application such as econometrics, epidemiology, biometrics, medical statistics or psychometrics. The journal *Biometrics*, for example, is widely read by statisticians because most of its results are of broad interest and importance. Other journals, such as *Communication in Statistics*, are considered less prestigious but are often selected by authors when they hope to publish results rapidly.

### 4.2 Minimum Standards for Tenure and Promotion to Associate Professor

Research in statistics can range from the very theoretical to the very applied. Research can be oriented towards the solution of long-standing problems or towards the exploration and solution of new problems. The criteria for judging the quality of published work is very much the same as in pure or applied mathematics and these are the novelty, depth and applicability of the results. The emphasis on any of these three criteria may be slightly different depending on the type of work considered but, as in pure or applied mathematics, the standard by which research will be evaluated is the presence of deep, innovative and interesting work which moves the discipline forward, published in peer reviewed journals. Some journals are, of course, more prestigious than others and there is agreement on a general ranking of these journals by the whole statistical community. Such rankings get published every so many years and can be consulted as a guideline for judging the quality of a journal.

Consulting work adds to the richness of experience of faculty members but cannot be considered as a scholarly contribution to the discipline. However, publications with novel statistical content arising from consulting work will, of course, be considered in terms of their contribution to statistical scholarship.

It is desirable that the list of publications of a candidate to tenure and promotion demonstrate his/her ability for independent work. The minimum ideal number of publications depends somewhat on the quality and length of the publications as well as the number of co-authorships.

Overall, it will be the task of the Adjudication Committee to interpret and explain the importance of the candidate’s various contributions.

#### Scholarship

- Competence would be deemed to have been achieved by candidates who have had at least three articles accepted in scholarly journals. Some level of funding by an external agency such as NSERC might also be seen as an indication of competence. The letters from external referees commenting on the candidate’s work should not show a consistent pattern of negative remarks.
- High competence would be signaled by a total of at least five substantial statistics papers published in refereed journals together with evidence of continuing research. Some of these five papers should be clear proof of independent work. There should be clear evidence of independent work, and the ability to initiate and direct a research program. This could be demonstrated through the presence of a significant number of single-authored papers, or through an analysis of the relative contribution to multi-authored papers. Some of these five papers should be based on recent research, initiated subsequent to receiving a PhD. A higher than minimal level of funding from an agency
such as NSERC might also be seen as an indication of high competence. A rating of high competence requires positive letters from external referees.

- Excellence requires all the same indicators as high competence along with evidence of international recognition. Letters from external referees should contain an indication of the candidate’s high standing among statisticians of the same generation working in the same area of statistics.

**Teaching**

- Competence would be witnessed by statistical data on teaching not significantly lower than the departmental mean. The adjudicating committee would also expect to see more positive letters from students and colleagues than negative.
- High competence would require statistical data on teaching close to the departmental mean or higher for comparable courses. The file would be expected to contain no more than a few isolated negative letters from students and colleagues. The type of courses taught by the candidate should be taken into account since it is much more difficult to obtain high ratings in introductory classes, which are compulsory for the students, than in small higher level specialized courses.
- Excellence would require statistical data on teaching significantly higher than the departmental mean. Evidence of curricular development, involvement with undergraduates on projects or other extracurricular activities or supervision of graduate students is normally to be expected. Letters from colleagues and students must be very strong.

**Service**

- Competence requires a record of at least some service activity within the department each year, along with positive supporting letters from colleagues.
- High Competence could be achieved by meeting the same standards as “competence” along with either some service at the Faculty or University level or exceptional special contributions at the departmental level.
- Excellence would require a level of service significantly higher than that of “High Competence”.

**4.3 Minimum Standards for Promotion to Professor**

**Scholarship**

To achieve the rank of Professor a candidate is expected to have sustained a steady rate of publication, over an extended period of time. The rate of publication after promotion to Associate Professor is expected to be greater than before promotion since, by that time, the candidate should have acquired expertise in one or more areas of statistics. However, quality and originality are more important hallmarks of professional contribution than sheer quantity of publications and a number of the papers should be published in top journals. The most widely recognized top journals in Statistics overall include The Annals of Statistics, The Journal of the American Statistical Association (JASA), Biometrika, the Journal of the Royal Statistical Society, Series B. Note that excellent papers are sometimes published in second-tier journals. In this case, the citations may be an indicator of the impact of the paper. It must also be recalled that Statistics is at the interface of several fast moving disciplines such as genomics, machine learning, medicine and many other areas. In each of these areas, there are highly respected statistical journals and it
will be the duty of the Adjudicating Committee as well as that of the referees to indicate which of
the venues where the candidates has published belong to this category. By this stage of the
candidate’s career, funding from an agency such as NSERC can be expected to be at a level
considerably higher than the minimum. Letters from external referees should contain an
indication of the candidate’s standing among statisticians of the same generation working in the
same field. These letters should be able to point to some significant achievement in the
candidate’s research program. Competence, high competence and excellence will be decided on
the level at which each of the preceding criteria have been satisfied.

Teaching
By this stage of the candidate’s career any deficiencies in teaching style and technique should
have been identified and addressed. Therefore statistical data on teaching should be at least as
high as the departmental mean. Evidence of curricular development, involvement with
undergraduates on projects or other extracurricular activities or supervision of graduate students
is also to be expected. Letters from students and colleagues should reflect a mature, successful
and effective teacher.

Service
Since junior faculty are not required to share an equal load of service duties, senior faculty are
expected to compensate in this area. Anyone aspiring to the rank of Professor should have
assumed a leadership role in several different service contributions. Service beyond the
department, or even beyond the university, is also expected. Letters on service should be more
than neutral restatements of fact.

5. Procedures

All procedures follow the Senate Tenure and Promotions Documents. This document lists
elaborates particularly on procedures that may be specific to the Department of
Mathematics and Statistics.

5.1 Departmental Tenure and Promotion Coordinator (T&P Coordinator)

At the request of the Chair of the Department, one member of the Department acts as
T&P Coordinator. Each year the Chair provides the T&P Coordinator with a list of files
that need to be prepared, with their time lines. Together with the candidates’ Sectional
Directors, the T&P Coordinator ensures that File preparation Committees and
Adjudicating Committees are staffed and meet their deadlines.

5.2 File Preparation Committees (FPCs)

Each candidate has a three-person FPC. One of its members is the candidate’s designate.
The other two are assigned by the Director of the candidate’s (home) section, in
consultation with the T&P Coordinator. Candidates are permitted to veto any FPC member suggested by the Sectional Director. Each member of the FPC takes responsibility for one of the three subfiles (Professional Contribution and Standing, Teaching, Service). Selection and solicitation of reviewers proceeds in strict accordance with Senate guidelines.

5.3 Adjudicating Committees (ACs)

Each Section has its own AC, normally consisting of six faculty members and two students (one undergraduate, one graduate), and normally chaired by the Sectional Director. At least two members of each FPC in the Section will sit also on the AC; the candidate’s designate on the FPC is not precluded from membership of the AC. In years with several FPCs in the Section, and in particular when there are candidates whose fields of interest do not follow the usual patterns in the Section, it may be necessary to allow for the formation of more than one AC in the Section, but at least five of their members must be common to all ACs in the Section.

The Chair of the AC is responsible, in consultation with the T&P Coordinator, for drafting any communications, most notably the report to the candidate, sent by the committee. The T&P Coordinator ensures that approved files be forwarded to the Faculty and Senate Committees.

6. DEPARTMENTAL EXPECTATIONS FOR CANDIDATES IN THE ALTERNATE STREAM

6.1 General expectations

The responsibilities of members of the Alternate Stream are set out by the Senate in the Alternate Stream Document.

... the main responsibility of faculty in the Alternate Stream is teaching. In addition, it is expected that these individuals will participate in related activities in the undergraduate program, such as serving on committees and engaging in administrative work including, perhaps, the supervision of other persons engaged in teaching.

Their responsibilities differ from those in the Professorial Stream in that they are not expected to do research as stated by the Senate.

... these individuals should be advised that the requirements for advancement in the Alternate Stream will not normally be met by basic research. Of course, any research related to the Alternate Stream member’s course work will be considered with his/her teaching performance.

Teaching by a member of the Alternate Stream is evaluated according to the teaching criteria set out in the section General Departmental Expectations in Teaching Applying to all Ranks and Sections except for the paragraph that deals with supervision of graduate students. Service of members of the Alternate Stream are evaluated according
to the criteria set out in the section *General Departmental Expectations in Service Applying to all Ranks and Sections*. As such, the full range of service, including program development and contributions to academic administration are open to members of the Alternate Stream, as well as work beyond the department or beyond the university. More details on the expectations for promotion to Associate Lecturer and Senior Lecturer are set out below

### 6.2 Expectations for Promotion to Associate Lecturer

For promotion to Associate Lecturer, the Senate requires *attainment of a level of distinction as a superior teacher* as well as *a competent level of service to the University*. In the terms set out in the sections on the Professorial stream, this translates into Excellence in teaching and Competence in service.

Excellence in teaching begins with challenging students to reach a high standard that raises their knowledge of mathematics as well as their mathematical maturity. It continues with a pedagogy that enables students to grow mathematically towards the course goals. It concludes with assessments that confirm that a large majority of students have been successful in meeting the challenge to reach this standard. Excellence in teaching produces course evaluations with ratings that are significantly higher than the departmental mean. Evidence of curricular development, involvement with undergraduates on projects or other extracurricular activities is also expected. Letters from colleagues and students must be very strong.

Competence in service requires a record of active and significant service each year along with evidence detailing these contributions. This service may be at the Departmental, Faculty, Senate or University level.

### 6.3 Expectations for promotion to Senior Lecturer

According to Senate regulations:

> the rank of Senior Lecturer denotes an individual whose contribution and value to the University transcends the normal expectations of a senior faculty member in the Alternate Stream.

The Senate regulations also note.

> The great majority of faculty could remain at the rank of Associate Lecturer and promotion to the rank of Senior Lecturer would occur only for those faculty who distinguish themselves by “unusual accomplishment”.

We accept these as the continuing ‘normal’ circumstances but recognize that individual cases may support document of a wider range of contributions that represent the “unusual accomplishments” of this individual.

Teaching and service are the primary responsibilities of members of the alternate stream. Excellence in teaching has been required for tenure and remains an expectation for promotion to Senior Lecturer. The balance of teaching and service will be determined by individual choices and the needs of the sections. So, exceptional contributions in service
and in combinations of teaching and scholarship are all possible aspects that can contribute to achieving the standard for promotion to Senior Lecturer in the Department of Mathematics and Statistics.

Superior teaching begins with classes for which strong student engagement and learning can be documented. This achievement should be supported by statistical data as well as letters from students and colleagues. Superior teaching requires innovative highly effective pedagogical methods and classroom performance as determined by colleagues based on evaluation of teaching materials as well as class visits. Teaching awards are indicators of superior teaching. However, the department recognizes that not all superior teachers receive awards.

In addition, there should be important contributions to teaching beyond the classroom. This may include curricular or pedagogical development, authorship of influential and widely used texts or a leadership role on important committees or panels charting the future of certain aspects of teaching mathematics. Research activity related to the material taught or pedagogy used is also evidence of superior teaching.

Significant contribution in service is usually demonstrated by active participation and leadership in Departmental, Faculty, Senate and wider University Community activities. For example, chairing a departmental committee is a significant service. Service also includes responsible performance in administrative positions.

Some activities are relevant to both teaching and service. One example is the development and implementation of a new course. These activities may be considered as contributions in both areas.

Since junior faculty are not required to share an equal load of service duties, senior faculty are expected to compensate in this area. Anyone aspiring to the rank of Senior Lecturer should have assumed a leadership role in several different service contributions. Service beyond the department, or even beyond the university, is normally also expected. Letters on service should be more than neutral restatements of fact, but should document the effectiveness and impact of service.

While it is clear that there is no expectation, or requirement, that Alternate Stream faculty members will make specific professional contributions, where such contributions are evident in the documentation provided by the candidate, they should be further documented and included for the larger file for promotion to Senior Lecturer.

### 6.5 Procedures

The procedures for selecting a File Preparation Committee and their assembling of the candidate’s file on teaching and service are the same as in the Professorial stream. The procedure for selecting an Adjudicating Committee, and for adjudication of the file, is also the same as in the Professorial Stream. The adjudication criteria, however, are those of the Alternate Stream as outlined above.
File Preparation

The File Preparation Committee will follow the procedures for evaluating teaching and service outlined in the Alternate Stream Document. In particular, teaching will be evaluated for both content and presentation, as well as contributions to teaching and learning outside the classroom. Evaluation of service will be made by letters of colleagues and/or supervisors detailing the activities and contributions of the candidate in each activity. Where requested by the candidate, professional contributions will also be documented.

Recommendation of the Adjudicating Committee

In the case of a candidate for promotion to Associate Lecturer, the Adjudicating Committee first votes (using the rankings of Excellence, High Competence, Competence, or Competence Not Demonstrated) separately on teaching and service. Then it makes a decision for either tenure and promotion, tenure without promotion, delay or rejection. The criteria of Excellence in teaching and Competence in service, as described above, must be met for the Adjudicating Committee to recommend promotion to Associate Lecturer.

In the case of a candidate for promotion to Senior Lecturer, the Adjudicating Committee does not vote separately on teaching and service. It directly decides for either promotion, delay or rejection. Superior teaching accomplishments and significant service contributions, as described above, must be met for the Adjudicating Committee to recommend promotion to Senior Lecturer.

In all cases, the Adjudicating Committee writes a report to the Dean with its decision and detailed reasons for that decision. A copy of the report is placed in the candidate’s file, and a copy is sent to the candidate.

7. ADVANCEMENT TO CANDIDACY (PROCEDURES)

For Advancement to Candidacy, the FPC will normally be chaired by the Director of the home section of the candidate and have the Chair of the Department and the Departmental Tenure and Promotion Coordinator as its other members. The Chair of the FPC assembles the file, which will normally contain the candidate’s CV, statistics based on teaching evaluations, a letter from the Chair of the Department, with a recommendation to the AC, and possibly letters from colleagues who visited the candidate’s classes. The AC of the candidate’s home section votes on Advancement to Candidacy by secret ballot. The Chair of the AC writes a report to the candidate, which contains the AC’s recommendation. Appeals procedures and all other procedures must follow Senate regulations.