

University of Iowa College of Public Health

Department of Biostatistics
Performance, Promotion,
and Tenure Guidelines for
Tenure Track Faculty

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Note: This document is intended to be used as a set of guidelines only. It supplements, and does not replace, the current University of Iowa Operations Manual. Collegiate procedures for the promotion review process are detailed in the College of Public Health Guidelines on Promotion and Tenure.

Department of Biostatistics Mission Statement

The overall mission of the Department of Biostatistics has four primary components. The first component is to provide exemplary education, training, and mentoring for students in the Department of Biostatistics, the College of Public Health, and the University of Iowa. The second component is to conduct and disseminate outstanding disciplinary methodological research that advances the practice of Biostatistics and related fields. The third component is to collaborate with other investigators, especially from the College of Public Health, the University of Iowa, and the State of Iowa, to conduct and disseminate interdisciplinary applied research that has a meaningful impact on the biomedical and public health sciences. The fourth component is to serve and promote the Department of Biostatistics, the College of Public Health, the University of Iowa, and the State of Iowa, as well as professional associations, organizations, and communities both within and outside of the discipline.

General Principles

Biostatistics has evolved from the broader field of Statistics, and is properly viewed in the general domain of STEM (science, technology, engineering, and mathematics) disciplines. Academic biostatisticians use their expertise to not only advance Biostatistics, Statistics, and related fields, but also to advance other empirically oriented sciences, especially those in biology, medicine and public health.

Faculty in Biostatistics are routinely involved in two kinds of teaching:

- i) disciplinary teaching of biostatistical methods, concepts, computation, programming, applications, and theory to Biostatistics graduate students;
- ii) cross-disciplinary teaching of biostatistical methods, concepts, computation, and applications to non-Biostatistics graduate students, undergraduate students, and others outside of the field, often referred to as “service” teaching.

Faculty are expected to demonstrate excellence in either or both types of teaching, depending on the nature of their course assignments. This expectation is elaborated upon in the next section.

Faculty in Biostatistics are expected to demonstrate excellence in two kinds of research:

- i) research that advances the discipline of Biostatistics or related fields (Statistics, Data Science, etc.) through methodological, computational, or theoretical innovation, often referred to as “methodological” research;
- ii) research that applies existing techniques for study design, data analysis, and analytical interpretation in collaborative interdisciplinary investigations, often referred to as “interdisciplinary” research.

This expectation is also elaborated upon in the next section.

Several important differences should be noted between scholarship and research activities in the Department of Biostatistics and other departments in the College of Public Health.

- i) Methodological research endeavors generally involve fewer investigators and necessitate a considerable investment of time and innovation. Such contributions are therefore produced less frequently than those based on interdisciplinary research.
- ii) Biostatistics faculty may develop esteemed scholarly reputations without necessarily being the principal investigator on grants; however, evidence of leadership is important for promotion.
- iii) Biostatistical interdisciplinary research occurs not only in public health, but also across the health sciences and in other disciplines, such as psychology, sociology, ecology, geography, law, engineering, etc.

The combination of disciplinary and cross-disciplinary teaching and research is important to recognize in the promotion and tenure process.

Biostatistics faculty typically receive their doctoral degrees in Biostatistics or Statistics. Some Biostatistics faculty may have moved to a Department of Biostatistics either from a Department of Statistics or from a clinical department in a biomedical research environment (e.g., a College of Medicine, a nonprofit academic medical center, etc.). In either case, the academic record for such faculty may be very different from those who were trained and started their careers in a Department of Biostatistics. For faculty having made such a transition, a guiding principle is that they should not be penalized for time spent in their previous professional environment when being considered for promotion in the Department of Biostatistics. This principle is expanded upon at the end of the document.

The University of Iowa Operations Manual and the College of Public Health Faculty Handbook provide information on the criteria for promotion that are not repeated here. The following guidelines are to give specificity to these criteria and interpret them in the context of the Department of Biostatistics.

Performance Expectations

Teaching

Both disciplinary and cross-disciplinary teaching are an integral part of the mission of the Department of Biostatistics. Faculty are expected to demonstrate excellence in either or both types of teaching, depending on the nature of their assignments.

The following provides the key indicators of teaching performance for Biostatistics faculty.

1. Student evaluations, based on both ratings and comments.
 - a. Student evaluations are important, but are subject to biases and other shortcomings. For example, they tend to be less favorable for required versus elective courses, for larger versus smaller classes, and for service courses versus disciplinary courses. Moreover, evaluations completed via online portals can be heavily impacted by nonresponse bias, and might primarily reflect the perspectives of those with strong opinions about the course (either favorable or unfavorable). Therefore, in interpreting student evaluations, limitations should be taken into account. When possible, evaluations for an instructor of a course should be compared to evaluations of other instructors for the same course, taught during previous semesters. However, given the long history of excellent teaching in the department, scores below the mean do not always indicate poor teaching. The evaluations of a candidate for promotion will also be compared with the evaluations of faculty members at or above the rank to which promotion is being considered, and should be similar to those of higher rank. Evaluations are expected to be consistently strong or to show a record of improvement over time.
 - b. The distribution of ratings from student evaluations is more informative than summary statistics such as medians or means. Comments are also helpful.
 - c. In service classes, especially those at the introductory level where the audience is large, occasional negative ratings and/or comments are commonplace and should not be unduly emphasized in the promotion process unless they reflect a recurring issue or problem.
2. Peer evaluations of teaching.

For candidates for promotion, such assessments should be approximately equivalent to those of faculty at the rank to which promotion is being considered.

Evaluations should also be consistently excellent or show a record of improvement over time.

3. Teaching awards or other formal recognition of teaching excellence.
4. Professional development activities in teaching through participation in workshops at the University of Iowa and at professional conferences and meetings.
5. Successful mentoring of student research.
 - a. Candidates for promotion from assistant to associate professor are expected to devote less effort to mentoring student research than faculty members with tenure. Establishing a research agenda in the first few years of the career of a junior faculty member should be prioritized over advising doctoral dissertations. Junior faculty, however, should contribute to mentoring student research to the extent appropriate, for example, by serving as a member of a doctoral student's dissertation committee, by supervising MS preceptorships, by supervising undergraduate research projects, and/or by serving on exam and dissertation committees for non-Biostatistics students.
 - b. For promotion from assistant to associate professor, serving as an adviser of a PhD dissertation is not a requirement. However, a junior faculty member should be in a position to start advising a doctoral student towards the end of the probationary period. Doctoral advising before that time is laudable and meritorious, but should be undertaken with caution.
 - c. Candidates for promotion from associate professor to full professor are expected to participate in student research mentoring by supervising MS preceptorships, serving on dissertation committees for Biostatistics students, and serving on exam and dissertation committees for non-Biostatistics students. However, candidates are also required to have successfully advised the dissertation of at least one doctoral student (or co-advised as the primary mentor) through the final acceptance of the document.
 - d. At the time of initial appointment to the University of Iowa, some temporary reduction in teaching may be granted to facilitate the transition. Apart from such initial reduction, candidates for consideration for tenure are expected to have followed the collegiate and departmental norm of teaching two semester-long courses per year. Once tenure has been granted, however, the post-tenure effort allocation policy allows for more flexibility, and a tenured associate professor being considered for promotion to full professor may have deviated from the norm in teaching effort.

Scholarship/Research

Faculty in Biostatistics are expected to maintain a scholarship agenda that involves both disciplinary methodological research and interdisciplinary applied collaborative research. As with other academic Biostatistics units at peer institutions, a record of substantive and sustained contributions representing both types of research is required for the granting of tenure in the Department of Biostatistics.

Methodological research advances the discipline of Biostatistics or Statistics through methodological, computational, or theoretical innovation. Such research does not generally need to involve the collection and primary analysis of data and is not necessarily focused on the health sciences. Methodological research often involves the development of novel statistical or computational techniques for the analysis or modeling of data, or for the design of experimental or observational studies. It may also involve the improvement of the practice of Biostatistics, such as the development of better methods of teaching, consulting, or conducting clinical studies. Methodological research is generally published in journals thematically focused on Biostatistics, Statistics, and related fields, but may occasionally appear in more applied journals. Published papers and/or software may take years to materialize. The peer-review publication process for methodological papers tends to be slow relative to most applied sciences, because refereeing such work may necessitate evaluating computing algorithms, mathematical derivations and/or proofs, etc.

Methodological publications in journals focused on Biostatistics, Statistics, and related fields generally have fewer coauthors than is the norm for many of the applied disciplines represented in a College of Public Health. Only investigators who have played a substantive role in the research are listed. Authorship order is usually based on either of the following conventions: (1) for projects involving a student collaborator (e.g., a doctoral advisee or graduate research assistant), the student is often granted first authorship with the faculty mentor appearing last; (2) for projects not involving a student collaborator, the authors are often ordered in accordance to the extent of their involvement. If there is potential for the order of authorship to be misleading with respect to their contributions, a candidate for promotion is encouraged to provide an explanation and description of the role that they played in such manuscripts.

Creative scholarship in Biostatistics can take several forms other than traditional peer-reviewed papers. In particular, published software should be recognized and valued. When distributed through an open source platform (such as R), statistical software has the potential to meaningfully advance the discipline, especially if the software is heavily used and well maintained. The combination of published software accompanied by a peer-reviewed publication that describes the methodology and the use of the software can result

in widespread exposure for both contributions.

For candidates for promotion from assistant to associate professor, methodological contributions that go beyond the PhD thesis are required. A reasonable goal would be 4 to 6 such publications, depending on the quality and impact. These contributions could be based on extensions of the dissertation research or on new directions. If the number of contributions is minimal, the publications would need to be of very high quality and high impact. In general, at least some of the publications should be first authored, unless independence and innovative leadership can be otherwise established. Among associate professors, the number of additional methodological publications may vary greatly, depending on the emphasis and leadership in interdisciplinary work. Nevertheless, some minimal amount of methodological research (e.g., 3 or 4 peer-reviewed publications since becoming an associate professor) would still be expected for promotion to full professor.

Interdisciplinary research is applied research that arises through collaborations with other fields. Determining the most appropriate statistical techniques to use in designing a study and in analyzing or modeling data is a scientific research activity that requires leadership, expertise, and innovation. Biostatistical leadership in collaborative research does not typically lead to first authorship, but may lead to being second or third author in many cases.

Leadership in interdisciplinary research can also facilitate national and international recognition, which is often indicated by invitations to speak at non-statistical scientific conferences and workshops, invitations to organize scientific sessions, refereeing and editorship activities for non-statistical journals, and participation on peer-review panels of non-statistical research proposals.

Because biostatistical leadership may not be readily apparent in a junior faculty member's dossier, the Departmental Executive Officer (DEO), in consultation with the candidate and the Departmental Consulting Group (DCG), may request reference letters from collaborators that specifically focus on the candidate's biostatistical leadership. Ideally, these letters would be included in the dossier at the time of its submission. Such collaborators may be asked to comment on the candidate's contributions to the collaborative research endeavors (for example, their role in writing grant proposals), the independence of their research contributions, and the impact of their contributions to the field in which the collaboration occurs.

Junior faculty are encouraged to focus their interdisciplinary efforts in a small number of areas so that they can gain a deeper understanding of the underlying science, which should improve the quality and the relevance of their statistical contributions. This is

not required, however, and may not always be feasible or warranted.

For candidates for promotion to associate professor, a reasonable goal would be 6 to 10 interdisciplinary publications, depending on the level of leadership reflected by the work.

Summary and Key Indicators: The ultimate reflection of performance in research is a national or international reputation for advancing the state of knowledge in the field. Different individuals possess different strengths and weaknesses, and have different focal areas of methodological and applied expertise. Such diversity is desirable.

In the promotion process, it should be recognized that the evaluation of research quality and impact is highly subjective, even among those with expertise in the topic area. Based on peer-review publications, the following may be viewed as key indicators of performance for research and scholarship for Biostatistics faculty.

1. External reviews

- a. The intent of external promotion and tenure reviews is to provide an objective evaluation by individuals who are experts in the candidate's areas of research. These evaluations should play a major role in the promotion and/or tenure process, especially if the candidate's methodological research expertise is not represented among the departmental faculty involved in the decision.
- b. As a general rule, evaluations by frequent coauthors, former thesis advisors, former colleagues, or close friends are to be avoided. Evaluations by experts who have not had such relationships with the candidate should be sought.
- c. Although external reviewers can and do comment on performance in the areas of teaching and service, their assessments of the candidate's contributions to knowledge in the field are primarily important.

2. Citation frequency

Although imperfect, one objective measure of research impact is citation frequency. Given the lag between the publication of a paper and citation accumulations, in general, it would be inappropriate to set any specific quantitative expectation for citation frequency for candidates for promotion from assistant to associate professor. Nonetheless, some indication of increasing citation frequency helps to demonstrate scholarly achievement.

3. Journal reputation

The quality of a published paper should be judged primarily by content, which is

sometimes reflected by the overall prestige of the journal where the publication appears. However, certain caveats apply. First, highly selective journals are often hesitant to publish work unless it pertains to a topic where the current level of disciplinary interest is substantial. Second, quality publications may appear in respected journals that are not broadly perceived to be in the top tier. Third, truly innovative papers that challenge conventional practice are sometimes difficult to publish in highly selective journals, but over time may have a large impact.

4. Authorship order

- a. For methodological publications, solo authored and first authored papers serve as a reflection of independence and/or innovative leadership. First authored papers from graduate advisees, where the faculty member served as a mentor and helped to define and direct the research, should be given comparable weight. Faculty who collaborate with graduate students on methodological contributions are encouraged to allow the students to serve as first author on the resulting publication, provided that the work invested by the student warrants such recognition. Faculty are also strongly encouraged to work with their doctoral advisees to publish at least one paper based on the dissertation research.
- b. For collaborative interdisciplinary publications, first authored papers (albeit rare) generally demonstrate a mastery of the content area, as well as leadership. Biostatisticians often serve as second authors on collaborative papers where the statistical aspects of the research are substantive, and the biostatistician played an essential role in designing the study and/or analyzing the data. In disciplines where the last author is reserved for the senior author, this role often reflects expertise and leadership in conceptualizing and guiding the study. However, because interdisciplinary publications often feature a large number of authors, biostatisticians who play a crucial role in the research may appear virtually anywhere in the author list.

5. Research funding

- a. External research funding is an essential element of the fiscal health of the Department of Biostatistics and the College of Public Health. Funding for methodological research is scarce (especially through the NIH or the CDC); consequently, funding as a principal in or co-principal investigator is not required for a biostatistician. However, the pursuit of such funding is quite laudable and is strongly encouraged. The award of a grant that funds methodological research indicates that the research is both novel and important, and that it has been favorably reviewed by peers. Such awards

should therefore be highly valued in the promotion process. Most of the funding that comprises the portfolio for a Biostatistics faculty member will be based on serving as a co-investigator on collaborative research grants. Biostatisticians should play a key scientific leadership role on research projects. The most relevant quantitative measures of funding for Biostatistics faculty relate to (i) the total faculty effort and (ii) funding procured to support Biostatistics graduate research assistantships. Leadership roles on funded research projects are required for promotion to full professor and can be demonstrated by serving as a biostatistical co-investigator who is integrally involved in the research and serves as an essential member of the team. Examples of substantive leadership roles would be serving as a director of a biostatistical core for a major project, or serving as the long-term biostatistician for an interdisciplinary team that has a successful track record of procuring large grants.

- b. Candidates applying for tenure and promotion from assistant to associate professor should have met the expectation of offsetting 50% of their salary through external research funding. Ideally, this should be done within the first three years of the appointment. Once the 50% level is achieved, the candidate should try to maintain this level for each fiscal year.
- c. Candidates for promotion from associate to full professor should consistently meet or exceed the departmental and collegiate expectation of offsetting 50% of their salary through external research funding. Note, however, that the post tenure effort allocation policy allows for deviation from the departmental norm for tenured faculty. If funded effort is increased then classroom teaching effort and service expectations may be decreased appropriately, or vice-versa.
- d. Although funding as a principal or co-principal investigator on a grant is not required for promotion to any rank, it is noteworthy and supports the case for promotion.

6. Invited presentations at meetings, conferences, or departmental colloquium / seminar series.

7. Research awards or other formal recognition of research excellence.

Finally, as stated earlier, published software should be recognized and valued in the assessment of methodological research contributions. A common avenue for dissemination is to publish a package in an open source platform (with R being the most widely known and used). Another avenue for distribution is to make the software available for public use via a website or a development platform (such as GitHub). The development and maintenance of a software package, a program, or an application is a

time-consuming process that requires innovation and skill, and such endeavors often lead to substantive advancements in the discipline. However, since software is often used without appropriate citation, other indicators of impact should also be taken into consideration.

Quantifying the impact of published statistical software can be challenging, but several metrics are available. If accompanied by a publication, the best measure is typically the number of times the publication has been cited. However, software is often used without being cited, so other indicators of impact should also be taken into consideration. In particular, the number of times the software has been downloaded and the frequency with which the software is listed as a dependency by other packages are both imperfect albeit useful measures (e.g., Depends/Imports/Suggests, for CRAN packages). Likewise, other distribution platforms often provide their own measures of software impact (e.g. "stars" on GitHub). Invited presentations or demonstrations to discuss the software also serve as a meaningful reflection of impact and utility.

Service

Because of the cross-disciplinary nature of Biostatistics, professional service for a biostatistician is cross-disciplinary as well as disciplinary, and may include service to public health, other health sciences, and related disciplines.

Candidates for promotion from assistant to associate professor with tenure are expected to demonstrate effective service at the departmental and collegiate level. As faculty members progress throughout their careers, an increasing commitment to service should be evident at the university and the national/international level. Candidates for promotion from associate to full professor are expected to demonstrate effective service at the local level (i.e., departmental, collegiate, university) and at the national/international level.

Service effectiveness is challenging to evaluate, but perhaps the best indicator is demand: a faculty member who is asked to serve in several service capacities is likely fulfilling the obligations of these roles responsibly and successfully. The following are key indicators of service performance for Biostatistics faculty.

1. Service on departmental, collegiate, or university committees.
2. Service as a peer reviewer for a disciplinary or cross-disciplinary journal.
3. Service as a reviewer of NIH/CDC/NSF/NSA/VA grant proposals.
4. Service on the editorial board of a scientific journal.
5. Service as a journal editor.
6. Service on committees for a scientific or professional organization.

7. Service as an officer of a scientific or professional organization.
8. Service as a session organizer at scientific meetings.
9. Participation on boards or task forces at the community, regional, national or international level.
10. Service to the State of Iowa.

Tenure and Promotion

In general, the award of tenure is a much more momentous decision than the approval of a promotion for a candidate with tenure. For candidates for promotion from assistant to associate professor, the tenure decision is tied to the promotion decision.

For faculty initially appointed as an untenured associate or full professor, the performance expectations for tenure at that rank would be equivalent to the expectations for promotion to that rank. Specific performance criteria during the candidate's probationary period at the University of Iowa are difficult to specify, as individuals may vary greatly in their experience before their UI appointment. An individual who had been primarily in a clinical research position elsewhere may have an extensive record of interdisciplinary collaborative research, but may not have had the opportunity to demonstrate excellence in methodological research or teaching, which would be required for the granting of tenure at the University of Iowa. In contrast, an individual with a research record of primarily methodological research and teaching elsewhere may need to demonstrate excellence in interdisciplinary collaborative research at the University of Iowa for the granting of tenure. An individual who has held a position where the amount of funded effort is high is unlikely to have a prolific record of methodological research.

Candidates with post-doctoral research experience prior to their appointment at the University of Iowa, either as a post-doctoral scholar or as a faculty member elsewhere, will often have publications based on research that was conducted during that appointment. While such prior publications add to the candidate's overall body of research and should be considered as part of the evaluation, additional publications during the probationary period at the University of Iowa typically would be necessary to provide evidence of an ongoing high level of research productivity, which is required for promotion and tenure. An important exception would be if a candidate at the associate professor level was being considered for tenure alone, having been appointed at the associate level for their initial University of Iowa appointment. In this case, the time from appointment to promotion might be very short, and the candidate's research record might be primarily based on research done elsewhere.

For candidates for promotion from associate professor to full professor, research done since the appointment as associate professor provides evidence of an ongoing high level of research productivity and will serve as the primary basis for further promotion to full professor. For promotion to full professor, the balance between methodological and interdisciplinary research may vary widely among individuals. The majority of the research may be in either one or the other domain, or may be evenly balanced between the two. In either case, evidence of leadership is required. As explained previously, leadership in the discipline of Biostatistics may be demonstrated in several ways, and not only through first authorship of papers or being a principal investigator on grants. First authorship on a substantial number of publications is therefore not required for the discipline of Biostatistics in order to demonstrate “Continued artistic or scholarly achievement of high quality, accompanied by unmistakable evidence that the candidate is a nationally and, where applicable, internationally recognized scholar or creative artist in the chosen field.” as articulated in the University of Iowa Operations Manual, [Section III.10.4 \(as of June 2020\)](#). Promotion to full professor does require unmistakable evidence that the candidate is a nationally recognized scholar in the field of Biostatistics. Similarly, principal or co-principal investigator status on grants is not required. If the candidate has pursued primarily interdisciplinary collaborative research, then biostatistical leadership may be reflected in being the lead biostatistician on grants.

Professional Transitions to Biostatistics

Biostatistics faculty are expected to be engaged in both collaborative interdisciplinary research and methodological disciplinary research. As with other academic Biostatistics units at peer institutions, a record of substantive and sustained contributions representing both types of research is required for the granting of tenure in the Department of Biostatistics at the University of Iowa.

Some Biostatistics faculty may have moved to a Department of Biostatistics either from a Department of Statistics or from a clinical department in a biomedical research environment (e.g., a College of Medicine, a nonprofit academic medical center, etc.). In either case, the criteria for promotion may be very different from those in a Department of Biostatistics. It is important to understand these distinctions when evaluating a candidate for promotion or tenure who has made such a transition.

Departments of Statistics (as well as Mathematical Sciences, Mathematics, and Computer Science) typically do not require collaborative interdisciplinary research, and tenure and promotion is often granted entirely on the basis of teaching and methodological disciplinary research. In fact, some of these departments do not

value applied collaborative research and actively discourage faculty from undertaking it.

A faculty member in a clinical department or in a biomedical research environment will likely have an extensive record of interdisciplinary collaborative research. Since external funding expectations are generally high for such positions, the record of research supported by grants or contracts will likely be substantial. However, such faculty may have had limited opportunities to conduct methodological research or to teach traditional classes.

For faculty having made a transition from another type of appointment, a guiding principle is that they should not be penalized for time spent in their previous professional environment when being considered for promotion in the Department of Biostatistics. Their record should be evaluated bearing in mind the different activities and expectations in their previous position.
