Statement #1: Best Practices in Recruitment, Retention, Development, and Evaluation of Faculty in College and University Mathematical Sciences Departments

Student enthusiasm for, and success in, the mathematical sciences begins with the recruitment of a diverse faculty committed to excellent teaching, active engagement through broadly defined scholarship, and service to their institution and larger mathematical community. Such faculty should be engaged and supported in their professional development and evaluated in a transparent and equitable manner.

This statement is guided by the original Guideline Statement #1, written in 2017, but updated to reflect the MAA's focus on justice, equity, diversity, and inclusion as well as increased attention to the importance of having a supportive department culture.[2] We describe best practices in terms of recruitment, development, and evaluation of faculty members and believe that if these best practices are put into practice, then faculty members are more likely to be retained. MAA members come from a wide variety of academic institutions with different foci, curricula, and governing regulations, thus not all faculties and departments can implement every best practice but this document will provide food for thought.

As was written in Statement #6, "the MAA recognizes that Black, Indigenous, and Latinx/Hispanic people, women, and individuals who have disabilities have been historically excluded from mathematics in the United States and as such are vastly underrepresented in the field. In this statement, we will use the terms "underrepresented" and "underserved" to refer to faculty from the aforementioned groups." We also use the term "department" as a catch-all term when "program" or "division" might be used at an individual institutions.

Types of Faculty Positions

There are varying types of faculty positions and titles for those positions, ranging from adjuncts who teach just one course, to tenured professors at the highest rank. Some faculty are employed for just one semester, others for decades, but all deserve to be members of a well-functioning department that encourages and supports active professional development. Much of what follows applies to entire departments and their wide range of faculty members, while some will be more pertinent to those who are required to go through some form of formal evaluation (e.g. tenure).

In most mathematical sciences departments, the majority of advanced courses should be taught by faculty members who have disciplinary expertise and bring continuity, a sense of community, and institutional knowledge to a program. According to the **2015 CBMS survey**, roughly 70% of

advanced-level mathematics courses were taught by tenured or tenure-eligible (TTE) faculty, the majority of whom are full-time.

As institutions face financial strain, the hiring of non-TTE faculty has become more common. The 2015 CBMS survey shows that in calculus-level courses, the use of TTE faculty declined by 15% since the 2010 survey, while the use of non-TTE faculty increased by 48%. The reality is that non-TTE faculty are so vital to most institutions that their well-being and professional development must be carefully considered.

Recruitment

The mathematical sciences are in constant need of being strengthened by individuals from the broadest possible pool of talent. This is best accomplished when those teaching mathematics are drawn from a diverse pool and are committed to supporting students of all backgrounds.

Recruiting strategies may differ depending on the type of open faculty position, but in all cases it is critical to have a transparent, deliberative process that seeks to recognize and redress biases. Special efforts should be made to recruit and hire members of underrepresented groups. Human resources departments and DEI (Diversity, Equity, and Inclusion) officers should be consulted when available, and committees must familiarize themselves with institutional policies around hiring practices.

The following best practices for the hiring process are adapted from an **MAA Focus article** [A].

- *Determine departmental priorities.* Before conducting a search, members of the department should determine what their priorities are. Will the search be for the best possible scholar in a particular field, an experienced and effective teacher, a skilled practitioner of high impact practices, a leader in DEI initiatives, or something else?
- *Form a search committee.* Every application should be read by at least two people to help prevent conscious or unconscious bias. Hiring an adjunct who will teach just one course probably only requires a committee of two, but hiring a tenure-track faculty member will need a bigger commitment even if that necessitates having committee members from outside of the department.
- *Establish decision-making processes.* Before any applications are read, the search committee should establish protocols for evaluating applicants, and for making decisions or recommendations about hiring.
- *Advertise and engage widely to get a diverse pool of candidates.* Mathjobs.org continues to be of primary importance, but potential applicants get information from the National Association of Mathematicians, Association for Women in Mathematics, Society for Advancement of Chicanos & Native Americans in Science, Lathisms, Mathematically Gifted and Black, TODOS, and Math Alliance.
- *Interrupt biases*. Positive and negative biases can enter the recruitment and hiring process at any stage, both consciously and unconsciously. Committee members should regularly take part in equity training, reflect on what biases they might have, and assess how they might be giving an advantage to some applicants over others. It is crucial to follow the established protocols and rubrics so that committee members focus their attention on agreed upon priorities and desired qualifications.

- *Negotiate equitably.* It is widely reported that men negotiate for higher salaries and better starting packages than women, and white people negotiate for more than people of color (see [He], [K], [B]). However, some research shows that when women are explicitly told that wages are negotiable, differences with men disappear [Le]. Thus, to combat inequity in negotiations we recommend being forthright with all candidates about what people in similar positions have both successfully and unsuccessfully negotiated in the past. Additionally, most institutions have data on average salaries in comparison to their peer institutions; this data can be helpful for job applicants at every stage of the process.

Faculty Development

Mathematics departments should proactively provide all faculty with robust opportunities for professional development in teaching, scholarship, and service. Department members–with tenured faculty taking the lead–are responsible for creating an atmosphere where professional growth and innovation are encouraged and celebrated. As faculty have diverse needs and may therefore face different barriers to pursuing growth, departments should broadly and creatively consider the forms that support might take, including financial compensation, time (in the form of course release), and mentorship. Whenever possible, appointments of non-TTE faculty should be for at least two years to give individuals adequate time to develop their scholarship, teaching, and other aspects of their career before having to apply for jobs again. Mentoring junior faculty–both formally and informally–should be seen as the work of the entire department. Particular attention must be given to the development of faculty from underrepresented groups.

The categories of teaching, scholarship, and service not only intersect, but are defined differently at individual institutions. The best practices below can be adjusted to fit varied situations.

Teaching

- In documents concerning teaching practices (including Guideline Statement #3 and Guideline Statement #4), quality teaching is often described as a complex endeavor requiring considerable expertise. Faculty must be equipped to implement a variety of research-informed pedagogical practices that promote deep mathematical thinking in an equitable and inclusive environment while addressing students' unique needs.
- Courses assigned to early-career faculty should be selected with their input and chosen in such a way as to support their pedagogical development and eliminate undue burden. New faculty should be limited to at most two preparations per term during their first few semesters, when possible.
- In order to best serve diverse learners, faculty should be encouraged to experiment with a variety of research-informed pedagogical techniques in the classroom without fear of repercussions. Departments might encourage faculty to document the results of their efforts and share their experiences to promote a culture of pedagogical innovation and continuous improvement.
- Department members should be available to observe one or more class periods if a colleague would like informal feedback about their pedagogical practices and innovations. Using established rubrics can help guide productive conversations.

- Department leaders should establish regular conversations about pedagogy to communicate the value of teaching to all department members. Junior and senior faculty members can help each other stay current with new developments in teaching and find joy in their work.
- Departments and universities should provide all faculty with ongoing structured opportunities to further develop pedagogical expertise.
- When possible, financial support should be made available, and the process for obtaining it transparent, for new faculty to attend intensive programs (e.g. Project NExT, MAA webinars, mini-courses, etc.) designed to support the launch of their career.
- Departments should provide graduate assistants with substantial training prior to teaching, ongoing formative monitoring of their classroom work, and opportunities to develop their philosophy of teaching and pedagogical knowledge.
- Faculty members should employ accessibility standards and use support resources on campus (e.g. advising centers, teaching centers).

Scholarship

- Departments should help all faculty, especially junior faculty and those from underrepresented groups, to identify internal and external funding sources to support research, travel to conferences, grant-writing, and other scholarly activities.
- Departments should be aware of additional challenges faced by caregivers that make scholarly travel difficult, undesirable, or impossible. To the extent possible, departments may ameliorate some of these issues by, for example, valuing participation in virtual conferences or financially supporting child care while attending conferences.
- The department should work to ensure that library holdings, journal subscriptions, and technology are adequate to meet the research needs of its faculty.
- Course releases can provide early-career faculty with the time and freedom to initiate and develop their research program. Sabbaticals at regular intervals are important for helping faculty members enhance their teaching and scholarly interests.
- Department chairs and senior faculty should learn about junior faculty members' research and be intentional about helping them make connections to colleagues doing relevant work and expand their professional network.
- Senior faculty could invite new faculty to collaborate on research, publications, grant-writing, or presentations to scaffold their scholarly development.
- Departments should invite VITAL (Visitors, Instructors, Teaching assistants, Adjuncts, and Lecturers) faculty members to openly discuss their career plans with the intent of providing appropriate support and mentorship. VITAL faculty who seek a permanent tenure-track position might benefit from teaching development and/or opportunities to work on scholarly activity and service, based on their long-term career goals. They should be invited to relevant professional opportunities at the institution.

Service

- Senior faculty should share some of the experiences they have had with service on campus (at the department, college, and university levels) as well as externally so that new faculty quickly become aware of the variety of service opportunities–such as refereeing and reviewing, organizing sessions at conferences, serving on committees through professional societies, and collaborating to host regional and national conferences–and the extent to which they should serve.

- Conversations with a department leader or trusted mentor will help new faculty envision where they might contribute to their institutional and professional communities, possibly leading to nominations for elected committees.
- Expectations for faculty service as academic advisors varies between institutions, including whether academic advising even falls within faculty purview. Universities should provide development opportunities to faculty with advising responsibilities, and those who attend should be lauded. Experienced faculty should proactively share helpful advising materials and offer mentorship to faculty who are new to advising responsibilities.

Evaluation

All faculty members, whether full- or part-time, TTE or not, stand to benefit from having regular conversations with their peers about the nature of their professions. For most faculty members, this means discussing teaching, reflecting on scholarship, and articulating service to the institution and to the profession. Often, these conversations are formalized in evaluations of non-TTE faculty, formative pre-tenure reviews for tenure-track faculty, and summative evaluations of tenure dossiers. However, revisiting the areas of teaching, scholarship, and service should be done on a regular basis for all faculty, even outside of these formal periods of review. Such conversations are for the purpose of assistance via formative feedback and can center on the aspects of the job that are the most important, most difficult, or most in development for the faculty member. They also serve as a method of building a culture of transparency and respect, which can help with the overall climate of the department.

Ultimately, formative evaluation should be about growing professionally. Thus, ways in which the informal conversations surrounding one's academic position can occur are rooted in the professional development ideas detailed above. For example, inviting a colleague to observe your class and having a conversation about it afterward or having a lunch meeting with colleagues to talk about teaching methods are informal formative teaching feedback methods. Discussing professional goals with your colleagues or sharing scholarship success and difficulties are formative ways to gather evaluation about scholarship and service.

The following recommendations are primarily for when a formal review takes place:

- For transparency, the department and institution should clearly communicate in writing the expectations for performance to the faculty member upon hire. Expectations should be continually articulated to junior faculty and VITAL faculty by experienced faculty mentors and department chairs.
- Whenever feedback about a faculty member's performance is given, it should be delivered in a constructive way, cultivating improvement and alignment with the mission and goals of the department and institution. Feedback is most useful when given by someone familiar with the work of the faculty member. For a formal review, such as a pre-tenure review or tenure decision, feedback should be given in writing and the faculty member should be given a chance to respond to the feedback.
- Faculty members should not be reviewed or evaluated on elements that were not articulated as part of their contract. For example, part-time faculty who are not expected to perform institutional service should not be evaluated on such.
- When seeking a letter of recommendation from someone outside of the faculty member's institution, the person requesting the letter should be clear about what is

expected in the letter. In particular, if there is a facet of the individual's portfolio that the letter should focus on, or if there are particular values or traits that should be discussed, these should be communicated to the letter writer.

Teaching

- Excellence in teaching can be demonstrated in many ways, for example including developing high quality curricula or teaching materials, teaching using student-centered methods, sample student work, presentations at conferences, and professional development [Re]. See also Guideline Statement #4 and #6.
- While some consideration can be placed on student course evaluation data, the responses themselves should only be a small part of the evaluation of a faculty member's teaching due to known biases introduced by such instruments [C]. Instead, more weight should be placed on how a faculty member responds to student feedback.
- Faculty members should be encouraged to try pedagogical approaches which are new to them and not be penalized if those approaches need improvement after the first time they are implemented. Clear communication between faculty members and those doing the evaluation can help in such a situation.
- Another way to gain direct evidence of teaching excellence is through observation. Each teaching faculty member is encouraged to be observed in the classroom (or online, if teaching virtually) at least once per academic year by someone with an interest in helping the faculty member become a better teacher. This can be a colleague in the mathematical sciences, a professional in a center for teaching and learning, or other appropriate individual. After the observation, a discussion between the faculty member and the observer should take place about positive aspects and areas for improvement [FI].
- Faculty members should document their efforts to develop their pedagogy such as attending teaching workshops, conferences, and training programs.

Scholarship

- Scholarship in the mathematical sciences has no universal definition. Rather, the circumstances surrounding the expertise of the faculty member, the ways in which they can make a contribution to the mathematical community, the institutional context, the mission and goals of the department, and many other factors play a role in determining how scholarship should be evaluated. In light of this, departments are encouraged to embrace a wide range of scholarly activities as they align with the needs of the department, institution, and mathematical community [J]. Besides publications in peer-reviewed mathematical journals, examples of ways that faculty members can demonstrate scholarship in their area include research on mathematics teaching and learning, synthesis of existing scholarship, collaboration with the K-12 community, developing standards for content and teaching, expository writing, and development of curricula [Re].
- To build a culture of transparency, expectations surrounding scholarship should be clearly communicated upon hire. Continuing feedback about scholarly activity is important for faculty, especially junior faculty.
- Tenure-track faculty should be given annual feedback on their performance relative to scholarly production (if scholarship is expected).

- Faculty members whose scholarly activity is not congruent with the expectations of the department or institution should be informed of this long before any punitive action occurs. Scholarship is a process that takes time to develop and even longer if to be reviewed by peers. It is unreasonable to expect a faculty member to pivot their scholarship in a short period of time.

Service

- Faculty members should consult with their chair or appropriate figure to discuss what types of service will promote professional growth and engagement which is congruent to the mission and needs of the department and institution.
- It is the responsibility of the faculty member to accurately convey the type and magnitude of their service to those who are in a position to evaluate them. For instance, those serving on national committees should detail the amount of time such an assignment takes and the work involved.

Concluding Remarks

Given the aforementioned best practices for recruitment, professional development, and evaluation, we emphasize that faculty satisfaction is highly related to their experiences of collegiality from department colleagues (see [D], [Ha], [Ro]). Generally, a workplace climate "affects employee recruitment, adjustment, productivity, stress, and commitment" [Li]. Since there has been a great focus on campus climates that tend to student, faculty, and staff needs, mathematics departments should inquire into their existing department climate using climate surveys that are widely available online. While there is no simple way to define department climate, the following definition for a department climate can be adopted: *"The atmosphere or ambiance of an organization as perceived by its members. An organization's climate is reflected in its structures, policies, and practices; the demographics of its membership; the attitude and values of its members and leaders; and the quality of personal interactions"* [Fi]. Research indicates the important role that department climate plays on faculty success, satisfaction, engagement and retention (see [Ro], [S]) and we encourage mathematics departments to explore some major principles that impact faculty members' lived experiences. These principles include, but are not limited to: transparency, equitable support, respect, accessibility, inclusivity, belonging, and community building in general [Fi]. As these principles affect faculty retention, professional development, and evaluation, it is recommended that departments perform regular audits of their climate to gauge how their faculty members experience the intellectual, social, emotional, and physical environments in the department. Notes

1. This is a revision of the original Statement 1 approved by MAA in September 2017. Written by the following members of CFD: Edward Aboufadel, Connie M. Campbell, Minerva Cordero, Timothy Flowers, Debra Lynn Hydorn, Tyler J. Jarvis, Herbert E. Kasube, Perla L. Myers, Benedict K. Nmah, Emily E. Puckette, and Jennifer Quinn.
2. Best Practices statements are the descendents of the 1993 Guidelines for Programs and Departments in Undergraduate Mathematical Sciences, published by the MAA. Some of the language in the current statement is borrowed from the 1993 document, its 2003 revision, or original best practices statements.

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