

Formal Mentorship Plan for Graduate Students and Junior Faculty in the Organic Chemistry Area

Preamble

This document defines the values, goals, and practices embraced by the senior faculty members in the Organic Chemistry Area regarding the mentoring of their own graduate students as well as a formal plan to help their junior colleagues properly mentor their students and create a productive and positive laboratory climate. This plan will complement the Departmental plan that has already been initiated and adopted by the Organic Chemistry Area. The document is divided into four sections: (1) Values of the Organic Chemistry Faculty Regarding the Success and Mental Health of their Students, (2) Goals of the Mentoring Plan, (3) Professional and Social Activities in the Organic Chemistry Area, and (4) Junior Faculty Mentoring Plan. This organization flows logically because our values inform our goals, and our goals inform the activities that achieve those goals for both students and junior faculty alike.

1. Values of the Organic Chemistry Faculty Regarding the Success and Mental Health of their Students

We believe that the primary responsibilities of a research professor in a top-ranked department are to create *new science* and *successful new scientists* in equal measure. We believe that the most important product of our activities that will have the greatest long-term impact is the cohort of our students who populate the various sectors of the enterprise and advance the mission of chemical science.

1.1. Values of the Organic Chemistry Faculty Regarding the Success of Their Students

The success of our students in evolving from novices to professionals by contributing to chemical knowledge and then by contributing to the chemical enterprise is the principal core value of the area. Additional important values are to maintain the highest ethical standards in the execution and reporting of research, to practice the highest standards of experimentation, to be fearless in tackling difficult problems and to maintain a critical outlook in testing hypotheses. The principal metric of success is the placement of the great majority of our students in the best possible positions aligned with their abilities and chosen career paths, be they academic, industrial, governmental or any of a number of non-traditional careers.

1.2. Values of the Organic Chemistry Faculty Regarding the Mental Health of Their Students

Graduate study in any scientific discipline, particularly experimental science, is by its nature very difficult. Exploring the unknown requires both an emotional resilience to failure, and the ability to learn from failure. Thomas Edison famously said, "I have never failed, I have only learned 1,000 ways not to do something." Students entering our graduate program have a wide range of capacities to deal with and learn from failure and many have never been confronted with these challenges. Insofar as the Organic Chemistry Faculty are fully committed to the success of all our students, we are equally committed to help our students navigate the stresses associated with graduate studies. We also recognize that other stresses arise from unbalanced student/mentor interactions and student uncertainties about progress toward completion of their Ph.D. The Organic Chemistry Faculty are committed to maintaining an open and transparent communication with our students regarding expectations and goals, and encourage the students to be open and transparent in articulating their concerns to enable resolutions to be formulated.

2. Goals of the Mentoring Plan

2.1. Mentoring of Graduate Students

The primary goals of the mentoring plan are for their graduate students to: (1) find the educational experience rewarding, productive and enjoyable, (2) realize their maximum potential, (3) emerge from their graduate studies as independent scientists, (4) be competitive in the job market for their chosen professional ambitions, and (5) be enthusiastic ambassadors of the Organic Chemistry program at Illinois before and after graduation.

2.2. Mentoring of Junior Faculty

The primary goals of the mentoring plan for junior faculty, first and foremost, are to have them embrace the goals and values of the Organic Chemistry area. In addition it is our responsibility to show them how to: (1) create a welcoming, dynamic environment, (2) be committed to the success and well-being of their students, (3) nurture creativity and independence and (4) advocate for their students for awards, recognition, and employment opportunities.

3. Professional and Social Activities in the Organic Chemistry Area

3.1. Professional Activities Toward Student Success

3.1.1. Area Activities

3.1.1.1. Student Run Activities

The Organic Chemistry Area has implemented myriad activities to foster the professional development of our graduate students. We sponsor a full-day retreat called the Beak-Pines Allerton Conference. *This conference is fully organized, planned and run by a committee of graduate students representing the Organic Chemistry Area.* It comprises short talks by representatives of each research group, two poster sessions, breakfast and lunch on a Saturday in November at the Robert Allerton House. It is an opportunity for the students to develop presentation skills, interact with students and faculty from other groups, and celebrate the first class research done in this area. In addition, two prizes of \$1,000 and \$500 are awarded to the two best talks which the students can use to travel to a conference of their choice.

The Organic Chemistry Area also sponsors a biennial symposium called Frontiers in Organic Chemistry. *This symposium is fully organized, planned and run by a committee of graduate students representing the Organic Chemistry Area.* The five symposium speakers are selected, invited, hosted, introduced, and shepherded by the student committee. The committee members also have a symposium dinner with all of the speakers.

3.1.1.2. Lectureships

The Organic Chemistry Area hosts the annual Marvel Lectureship which brings to our campus an internationally renowned organic chemist to spend 2-3 days with us, present two lectures and interact with students and faculty. The extended time is intended to allow *a large number of students to present their work to a world expert* in the field and perhaps discuss postdoctoral opportunities. A selection of students from our groups host two lunch meetings with the visitor.

The Organic Chemistry Area hosts the R. C. Fuson Visiting Professorship which brings to our campus a rising star (usually under 40) in organic chemistry to spend 2-3 days with us, present two lectures and interact with students and faculty. Students interesting in pursuing academic careers are particularly keen to discuss the challenges of academic life with a young faculty member. Again, a selection of students from our groups host two lunch meetings with the visitor.

The Organic Chemistry area currently has nine industrially-sponsored lectureships (3M, AbbVie, Amgen, Bristol-Myers-Squibb, Genentech, Janssen, Lilly, Merck, Novartis). These lectureships involve a mini-symposium comprising a speaker selected by the Organic Chemistry Faculty and

a representative from the sponsoring company. These mini-symposia allow *students to see work done in the chemical industry* and also gives them the opportunity to meet with and present to the industry representative and to learn about industrial careers. This opportunity complements the many activities the School of Chemical Sciences Career Office makes available to our graduate students to advance their careers.

3.1.1.3. Travel Awards.

To enable students to meet peers and outside mentors and perhaps future employers, the Organic Chemistry Area sponsors the R. C. Fuson Travel Awards that currently provides \$1,500 to each of six students annually to attend the conference of their choice. The students are selected by an *ad hoc* committee of faculty on the basis of abstracts of their accomplishments and résumés.

The Organic Chemistry Area also sponsors the Pines Travel Awards to enable advanced graduate students to *return to their undergraduate institutions* to present their research and also discuss their overall graduate experience with students and faculty. We find that this activity is an effective mechanism to reward success and also recruit new generations of graduate students.

More recently, the Organic Chemistry Area has instituted sponsorship of conference travel by awarding *each graduate student \$500* upon successfully passing their candidacy examination in their third year. We are planning in increasing the amount as the fund grows.

3.1.1.4. Incentivizing Creativity.

Although the formulation and defense of an Original Research Proposal (ORP) is a Department-wide requirement for a Ph.D., the Organic Chemistry Area incentivizes excellence by awarding a \$500 prize for the most outstanding proposal call the Vanderveer Voorhees Award. The student's name is also inscribed on a plaque displayed in Roger Adams Laboratory. It is worth noting that other areas in Chemistry have recently modified the ORP mechanism (the students meet in person with their committee rather than just getting anonymous proposal feedback).

3.1.2. Individual Activities.

All of the faculty in the Organic Chemistry Area are passionately committed to the professional development and success of our students. We meet with our students individually on a regular basis to monitor progress and provide constructive feedback. We hold group meetings and subgroup meetings on a regular basis to foster the development of presentation skills, problem solving skills, teamwork, best practices, ethics and safety. We sponsor conference travel from grant funds so they can experience the community of chemists and begin networking. We arrange internships in companies to enable real life experience in the industrial sector. We advocate for our students in award nominations and especially for employment with recruiters or with colleagues in other institutions for postdoctoral positions.

3.2. Professional Activities Toward Student Mental Health

3.2.1. Diffusing the Hierarchical and Dependent Relationship between Trainees and Faculty – Area Activities.

The Organic Chemistry Faculty recognize the challenges involved in monitoring the climate in our groups, and the challenges for individual students who might be struggling with mental health concerns. These challenges arise in part because of the traditional hierarchy in graduate programs in which students are understandably reluctant to approach their mentor with such problems if they feel that they will not be taken seriously and/or it will be deleterious to their career. Although this dynamic is a challenge even beyond the Department or UIUC, the Organic

Chemistry Faculty are in a good position to address this challenge owing to: (1) the proximity of our laboratories, and (2) our scientific interconnectedness that enables us to provide meaningful mentorship on all aspects of the graduate experience (career advice, conflict resolution, group climate, mental health, etc.) to our students. As such, many organic colleagues are in a position to share responsibility for the success and well-being of all of our students. Such a more distributed model is a marked departure from our traditional faculty-trainee dynamic, but we already serve on the committees of our colleague's students and engage them informally due to our co-localization in RAL. We have already begun to take steps in this direction. For example we recently implemented summer lunches during which faculty members in the organic area take our colleagues 3rd year students to lunch, to get to know them better before the preliminary examination. We will continue to expand such efforts in multiple ways, most notably by explicitly encouraging our students to engage with their committee members starting in their very first year. Our expectation is that the students will be able to form at least one (and ideally more) close relationship with a faculty member *other than their research advisor*. We realize that the faculty-student imbalance exists in these relationships, so our activities will be complementary to other non-faculty sounding boards within the department (e.g., Assistant Director of Graduate Diversity and Program Climate, Dr. Lloyd Munjanja) and, in the aggregate, provide students with multiple opportunities to discuss success, wellness, and mental health.

3.2.2. Diffusing the Hierarchical and Dependent Relationship between Trainees and Faculty – Individual Activities

The Organic Chemistry Faculty realize there are students in every group who need additional, *highly individualized* attention, and we now recognize the importance of early intervention with students having mental health issues. The challenge is having mechanisms in place to identify these students, which is why the regular discussions with students around wellness and mental health (see above) are so critical. We also explicitly encourage our students to discuss any nascent concerns about wellness with Dr. Lloyd Munjanja. Perhaps most importantly, all of the Organic Chemistry Faculty are committed to having an up-to-date grasp on the issues in their own laboratory – this involves all of us spending more time with our students, so that we can identify issues earlier and so the students can get to know us better and be more comfortable discussing these issues with us.

3.3. Social Activities

3.3.1. Area Activities

The Organic Chemistry Faculty believe that a sense of community is an effective way to build a positive environment and culture, and as such we have undertaken multiple community-building activities. These include: (1) a summer gathering of the Organic Chemistry Area students and faculty at a local restaurant, (2) a celebration in downtown Champaign after our annual Beak-Pines Allerton conference, and (3) an Organic Area Laboratory Olympics in which teams from each group participate in friendly competition in multiple sports. The Olympics has been highly successful with over 80 students and faculty participating. These activities have become an important and popular part of our culture.

3.3.2. Individual Activities

All of the Organic Chemistry Faculty sponsor group social activities to celebrate successes or to simply enjoy the company of our students in a nonprofessional setting. Some of these activities include attending professional sporting or cultural events in Chicago, going to amusement parks, outings to local parks in Illinois or Indiana or overnight camping trips to more distant locations. Even hosting a group picnic at our houses has tremendously beneficial effects on the students'

enjoyment of their graduate experience.

4. Junior Faculty Mentoring Plan

All of the activities described in the previous section for mentoring our graduate students apply equally to the mentoring of junior faculty in the area, both the *area* items (one-on-one meetings, student discussions with committee members, clear expectations, encouraging participation in social events), and the *individual* items (vigilance regarding the mental health of each of our students, spending more time with each student). As colleagues, we will share best practices in wellness, laboratory climate, and mental health, and we expect to continue to learn much from each other and collectively become better mentors.

For mentoring to be effective we must be in regular contact with both the junior faculty member and their students and by doing so advise them on mentoring issues that occur in every laboratory. Importantly, if more challenging situations arise, they can be identified early on so that they can be corrected before they become systemic. We will implement a three-pronged and regularly iterated approach, consisting of: (1) meeting with the junior colleague, (2) providing a range of mechanisms for his/her students and postdocs to openly provide feedback, and (3) providing documented feedback, advice, and guidance to the junior colleague with a low threshold for initiation of early remediation activities if needed.

4.1. Meeting with the Junior Colleague

Each junior faculty member will be paired with a senior faculty mentor in the Organic Chemistry Area as part of the new departmental junior faculty mentoring plan, now adopted by the Area, which also allows our young faculty to select two additional formal mentors, including those outside the Area and even outside the department. These three mentors meet regularly with young faculty over the first year, leading discussion topics such as managing difficult personnel situations and writing grants. Within the Organic Chemistry Area, the Area mentor and mentee will schedule bimonthly meetings to discuss personnel management in the junior colleague's group. Meeting early on as the assistant professor's nascent group takes shape will allow for best practices to be implemented from the outset. Key discussion points include establishing: (1) work expectations, (2) scientific ethics guidelines, (3) intragroup climate guidelines for professional behavior, (4) communication mechanisms between the advisor and students, (5) personal time off policies, (6) laboratory safety guidelines, (7) group meeting schedules and guidelines, etc. The senior faculty mentor will take notes at these meetings to be compiled and discussed as outlined in the third prong below. The junior colleague will be encouraged to create a Group Policies document in close collaboration with the students/postdoctoral researchers to clearly formalize the key points listed above and others believed to be pertinent to that group.

4.2. Meeting with the Students

Although routine formal and informal interactions with our junior colleagues will be very helpful, we recognize that to truly understand the inner workings of the laboratory and its climate we need to speak directly with the students, on a regular basis and in a format where they feel as comfortable as possible. We intend to have a 'mentorship lunch' meeting with group members at least two times a year, once in the fall semester and once in the spring semester. These meetings will bring together a senior colleague with several students. To allow every lab member to be able to participate, as many senior colleagues as needed will meet with three to four students in the junior colleague's group (e.g. two senior faculty for a group size of six to eight). This program is similar to the department's 'brown bag lunches' of faculty with group's of graduate students outside of their own research groups. The junior colleague will know about these meetings, and afterwards they will be encouraged to discuss group management issues in

one of the regularly scheduled bimonthly meetings with the senior colleague. If challenging issues are identified, additional colleagues and/or the Department Head will be brought into the discussion as needed.

Moreover, we recognize that students may be reluctant to speak openly with other faculty about problems they may be encountering in interactions with their thesis advisor. Accordingly, in these regularly scheduled meetings, the senior faculty member will encourage students to seek the counsel of one of their thesis committee members in private, of our Director of Graduate Studies, Prof. Wilfred van der Donk, or of our Assistant Director of Graduate Diversity and Program Climate, Dr. Lloyd Munjanja. We have carefully reviewed our mechanisms for gaining feedback, and learned from our recent experience that these three mechanisms in particular have been effective in learning what our students have to say, including those students who may be uncomfortable talking directly with their advisor or Area faculty. We believe that providing students with a number of mechanisms will help address their concerns in a confidential manner and will be instrumental in allaying their fears that they are at the mercy of their thesis advisor and have no recourse to redress conflicts.

4.3. Feedback to Junior Colleague

As the final prong, once-a-year all the senior faculty in the area will meet to discuss the climate and mentoring in each of the junior faculty member's laboratories. At this meeting the first two points above will be summarized and discussed. Soon thereafter, the junior faculty member will meet with the senior faculty mentor to discuss any helpful feedback that was received and any recommendations for improvement. We will also use a low threshold for the initiation of remediation activities if needed, to get way out in front of any deficiencies that may start to arise *long before the time comes for third year review* or similar formal review mechanisms. The impact of such remediation activities will be closely monitored through additional meetings between the junior faculty member and their senior mentor, as well as with the students and post-docs via the various mechanisms outlined above. A report will be also written by the senior faculty that summarizes our view of the climate/mentoring that eventually will be included in their 3rd year review and in the final assessment on their mentorship as part of the tenure evaluation process. This step was missing in the past, and the Department Head will meet with the junior faculty member to discuss these matters during the third year review.