Mission:
to provide multidisciplinary training in synthetic organic chemistry, structure-based drug design, molecular mechanisms of drug action and chemical toxicology in preparation for careers in the pharmaceutical industry, regulatory agencies and institutions of higher learning.

Objectives:

1. Recruit outstanding graduate applicants with exceptional potential to excel through graduate education.
   a. Recruiting - We have developed a complete recruiting program that features a recruiting weekend that allows us to identify excellent “matches” between graduate applicants and our program faculty. We feel this has been key in reducing attrition and time to degree.
   b. Outreach - We are currently developing an outreach program that will engage local universities in the Midwest to improve recruiting of high qualified students to our program. This will involve faculty and student presentations given at local and regional Colleges and Universities.

2. Engage students to be decision makers and advocates for the discipline of medicinal chemistry.
   a. Retreats - We have implemented a yearly student retreat that is organized by a committee of faculty and students. The program is designed by the committee to expose students to new ideas, concepts, and career options in the field of medicinal chemistry. The retreat is attended by students and postdoctorals (and outside invited speakers). The first two retreats focused on career options and included speakers from government, industry and academia, some of whom were past graduates of our program. Our strategic plan includes the design and development of a science retreat for incoming students that will expose them to state of the art drug discovery techniques and methods.
   b. Seminar Program - Our students interact with outside speakers on a regular basis. Each semester the Department of Medicinal Chemistry hosts between seven and ten eminent academic and industrial scientists to present their research. Students participate in a round table lunch discussion with the invited speakers. Each year, the students also select an invited speaker to be invited by the Department as part of the seminar series.

3. Train students for successful careers in the field medicinal chemistry.
   a. Didactic curriculum - We have established a curriculum revision committee to evaluate the changing needs of our entry level students and the demands for training by employers. One of our primary goals is to ensure our students are prepared to make the transition from the classroom to the research lab within their first year of studies. To this end, we have revised our procedures by which students select an advisor to effectively better match students with advisors and
place them in a lab by February of the first year. Our didactic curriculum is also changing to bring practical experience to the students earlier in their training. We recently added a recitation-based course in organic mechanisms that ensures our students have the prerequisite tools for both lab work and advanced courses in chemistry. We have added a fellowship writing workshop that develops critical writing skills for student success in both writing grants and scholarly papers and articles.

b. Laboratory Training and mentorship – All students select an advisor during the winter of the first year of the graduate program. Students are mentored by faculty to develop an independent research project from which hypothesis driven research evolves.

c. Interdisciplinary Studies – All students are given the opportunity to participate in the Chemical Biology Interest Group (CBIG) which brings together faculty and students from multiple disciplines to present collaborative research on a monthly basis. Graduate students are also eligible to participate in the Chemical Biology Training Grant sponsored by NIH that is co-administered with the Department of Chemistry.

4. Evaluate and assess student scholarship to assure competency in disciplinary training.

a. Examinations - Our program has made strategic changes to student examinations to ensure efficient completion of coursework and lab work leading to a PhD. We have revised our preliminary written exam (for the PhD) format and completion date to the last week in June of the first year. The changes have allowed students to make the transition from the classroom to the laboratory more efficiently to begin making progress towards their research-based degree. It also allows us to identify deficiencies early and make appropriate adjustments to get students back on track to earning a degree in a reasonable timeframe. Students are also encouraged to complete their oral exam by the Spring of year 2 (with an ultimate deadline of July 1).

b. Seminars- To monitor student progress after the first year, and to build presentation skills, our students are required to present seminars in their second and third years which are evaluated by the graduate faculty as well as individual thesis committees. Although the second year seminar has traditionally been on an outside topic, we have modified this policy to allow students to present work related to their research. This can be of great value to the student and advisor in evaluating progress and adjusting the current project plan for success. Our strategic plan includes an evaluation of the current examination schedule and potential changes that may provide a more efficient completion of the oral exam.

c. Thesis Defense – All are mentored throughout the process of completing their thesis project through regular meetings with their thesis committee. Students are required to present and defend their original work through a public seminar and by passing the thesis committee examination.

5. Develop communication skills through dissemination of research results and teaching.

a. Student Presentations - We provide several opportunities for students to present their research. One unique opportunity is participation in an annual Medicinal
Chemistry Meeting-in-Miniature known as the MIKI Conference. This conference, which is organized and run by students from the four participating schools: Minnesota, Illinois, Kansas and Iowa, provides the students the chance to present their research in oral or poster presentations. In addition, we have used funds from both the Department and the College’s GA Travel Fund to increase our students’ participation at national and international scientific conferences. Our progress in this can be seen by the fact that in 2010 only 13 of our 39 students gave such presentations, while in 2011 the number increased to 22/43 and in 2012 it increased further to 32/45.

b. Teaching Assistantships – Students receive mentorship in teaching through teaching assistantships that are allocated through the College of Pharmacy and the Department of Medicinal Chemistry.

6. Support student scholarship through fellowships and research assistantships.
   a. Research Assistantships - Our program provides excellent financial support of our students to complete their training. All students are supported at a level that is commensurate to a .5 RA appointment as long as they are making adequate progress in their degree program. Although we employ a variety of means to provide this support, the majority of our students are supported as RAs on faculty research grants. In FY13, out of 46 students 24 were supported primarily by this method and another 11 were partially supported by this means.
   b. Fellowships - Our students also have been successful in obtaining outside fellowships and awards. Since 2011, 18 of our students have received awards or fellowships, including four Doctoral Dissertation Fellowships, three Bighley Fellowships, two American Heart Association Awards, an American Foundation for Pharmaceutical Education Fellowship, and an ACD Medicinal Chemistry Division Fellowship. Additionally, five students have been appointed to the NIH Chemistry-Biology Interface Training grant with Chemistry and Biochemistry. Several of our students have also been supported through industrial internships.

Assessment

1. Publications – All students are expected to publish scholarly work in peer reviewed journals. Both quality of journal (impact factor) and number of publications in peer reviewed journals will be evaluated for all students completing the graduate program. [Note: It is common for publications to appear after graduation in the field of medicinal chemistry due to delays imposed through patent protection of intellectual property.]
2. Presentations – All students are expected to give presentations of their scholarly work at conferences and meetings. A higher value is placed on oral versus poster presentations as well as invited versus contributed presentations.
3. Conference Participation – All students are expected to participate in scientific conferences to present scholarly work related to their graduate studies.
4. Leadership – All students are expected to demonstrate leadership skills. Leadership can be defined in many ways including research project management, elected offices held, appointed positions held, and entrepreneurship.
5. **Time to Degree and Attrition** – All students will be monitored for time to complete the Ph.D. and M.S. degrees and attrition.

6. **Awards, Fellowships, Grants** – All students are expected to seek funding through fellowships or grant opportunities to support their training. Faculty mentors are also expected to advise students in the preparation of applications and to identify students for award nominations. A higher value is placed on international and national awards.

7. **Professional Development** – All students are expected to take the next step in their career path upon completion of the Ph.D. or M.S. In medicinal chemistry, the majority of students will accept positions in the pharmaceutical industry or continue their training through postdoctoral studies in academia. A lesser number of students go on to graduate studies in business and law where significant opportunities exist for professionals with a background in drug design and discovery. In evaluating the placement of our graduates, all career paths are considered equal and evaluated on their own merit.

8. **Prestige of Faculty Mentors** – The quality of the graduate program is also a reflection of the faculty. All faculty are expected to actively publish in peer reviewed journals and maintain well-funded, vigorous research programs to support graduate education.

9. **Student Self-Assessment** – Upon completion of the Ph.D. or M.S., all students will be asked to complete a self-assessment of their experience in the graduate program in medicinal chemistry.