CANDIDATE STATEMENT (SUMMARY)
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INTRODUCTION

Six years ago, I began my search for a faculty position in organic chemistry. My undergraduate experience led me to value the educational quality, undergraduate focus, and close student-faculty interaction afforded by a small residential liberal arts college. My undergraduate research opportunities made clear to me the benefits of student-faculty research in the recruitment, retention, and preparation of future chemists. My graduate and postdoctoral work increased my desire to pursue cutting-edge research. As I set out to find my future professional home, I sought an institution where I could combine all of the aspects that made my undergraduate, graduate, and postdoctoral experiences special and valuable. Inside and outside of the classroom I wished to work closely with undergraduate students to guide their study of chemistry and their development as independent learners. In the research laboratory I wanted to pursue work of value to the scientific community while sharing the experience with students. In the broader campus and professional communities I desired opportunities to share my ideas and talents. I had a clear sense of the type of professor that I wanted to be and the type of position that would be most compatible. I was pleased to accept Colgate’s position.

I am happy at Colgate University. I feel fortunate to be at an institution where organizing lectures, designing a course, helping a student, planning experiments, showing a student how to conduct an experiment, writing a grant proposal, writing a paper, reading the literature, serving on a committee, attending lectures, and cheering at a game are all considered to be valuable activities. I appreciate that teaching and research are equally important, and that both are well-supported. The variety and quality of teaching, research, and service opportunities that I have experienced at Colgate would be difficult to match at most institutions. I have worked to make an impact in the present, while establishing a solid foundation for a productive long-term career. The following pages summarize my philosophy and approaches to teaching, my research interests and accomplishments, and my service contributions.

TEACHING

I have enjoyed the opportunity to work with students in a variety of classroom and laboratory settings... …My approaches in each of these settings have been guided by the goals and principles summarized in the following sections. My development as a teacher and my contributions to course development will also be discussed.

Goals. My efforts in the classroom and laboratory are guided by three central goals. (1) Students must obtain disciplinary knowledge and skills to support their further study and vocational aspirations. (2) Students must obtain solid study skills, academic discipline, critical thinking abilities, and other good habits of mind that will support their independent, life-long learning. (3) Students must experience the joy of learning and discovery.

Principles. Supporting these central goals are an additional set of principles that direct my specific methods and approaches. (1) Teaching and learning are cooperative. A cooperative classroom dynamic increases the effectiveness of the teacher by maximizing the effort and enthusiasm of the students. (2) Most students can understand and enjoy challenging material. High expectations, humanely implemented, can inspire students to reach new heights of understanding and academic satisfaction. (3) The laboratory environment is crucial for engaging chemistry students. Efficiency demands that certain topics be covered in a lecture format, but many of the best opportunities for learning and discovery occur in high-quality instructional laboratory settings and through meaningful student-faculty research. (4) All students are important. A knowledge of chemistry can benefit all students—not just those destined for graduate study or employment in chemistry. ... (5) An instructor’s approaches need to be flexible. Core SP, introductory chemistry, organic chemistry, and advanced students all have different abilities, interests,
and needs. ... (6) Students learn by example. It is important that faculty provide a proper example of engagement, curiosity, discipline, and hard-work.

General Approaches. I strive to foster an instructive, challenging and supportive environment consistent with the goals and principles outlined above. Each class period is valuable to me, so I am prepared for the day’s coverage and I make full use of the period. Interactions outside of class are important to me, so I make certain that I am available to the students. ... I present the students with challenging assignments and exams, and I support them in meeting these challenges. I provide guidance consistent with the level of each class so that students are encouraged to gain independence in their studies over time.

Specific Methods. My specific methods draw from the general approaches discussed above with consideration given to the particulars of each class. The required coverage of General Chemistry and Organic Chemistry and their enrollments of generally >30 students render these classes appropriate for a traditional lecture approach. ... Advanced Organic Chemistry and my Core SP course have smaller enrollments and fewer external constraints on content. Thus, these courses are appropriate for a wider suite of approaches. ... Within instructional laboratory settings, I have the opportunity to work closely with individual students. In addition to fielding procedural questions, I encourage students to think about what they are doing, what their observations mean, and how the laboratory connects to the rest of the class. ... In the student-faculty research lab, I frequently work alongside the students so that I am available to answer questions, generate discussion, and provide instruction by example. ...

Development and Evaluation of My Teaching. I began at Colgate with a clear set of goals and guiding principles, but without much actual classroom experience. ... My efforts to translate my general goals and principles into actual practices can be divided into four general areas: classroom management, course content, presentation, and student learning. My development in each area has been guided by my perceptions, student performance, discussions with students, SET form comments, and discussions with colleagues.

(i) Classroom Management. Classroom management has been a strength. I am an organized person by nature, so I tend to design and conduct my courses in a structured way that is attractive to many students. The organization signifies to the class that our activities are purposeful. SET form comments attest to the organization, clarity of expectations, and fairness of my courses. ...

(ii) Course Content. The challenge of developing course content has varied with each course. ... Not everything I have tried has been successful, and I am not hesitant to make significant changes. My first (advanced organic chemistry) class was asked to write a research paper based on a literature survey. Sadly, this assignment proved to be uninspiring and it failed to encourage critical reading of the literature. The assignment was promptly replaced with the preparation of a grant proposal to the fictitious Organic Chemistry Research Awards Program (OCRAP). The students were required to prepare a proposal, and critically review each others’ proposals. The assignment culminated with the “funding” of ~30% of the proposals (funded proposals were awarded additional credit). To add to the drama, students were notified via official letters sent through campus mail. This new assignment has been more effective and better received. ...

(iii) Presentation. My primary aim is to accurately and thoroughly present the subject matter in an organized and accessible way. As these objectives are realized, I give further attention to improving matters of style. ... SET form comments consistently attest to strengths in the key elements of organization, thoroughness, and accessibility, and they are more mixed in regards to matters of style. Occasional criticisms include a fast pace, a boring delivery, and suboptimal discussions. Some of the criticism has been fair. The fast pace of my first Organic Chemistry II class (spring 2002) appropriately attracted SET form comments. The fast pace arose from a well-intentioned desire to reserve time for coverage of the organic chemistry of biologically significant molecules in deference to students interested in biology and/or medicine. I now judiciously insert the bioorganic chemistry topics amongst the core coverage of the organic functional groups. ...

(iv) Student Learning. Student learning has been strong according to SET form comments and objective measures such as combined and standardized final exams. ...
Course Development and Revision. I have developed and twice taught a new Core SP course on the science and potential implications of nanotechnology. The course is being offered as an FSEM in the fall of 2005. ... I have also worked with other chemistry faculty to revise portions of the laboratory components of Organic Chemistry I and II, and Instrumental Methods. Many of these revisions were the result of curricular projects funded through the National Science Foundation’s Course, Curriculum, and Laboratory Improvement program (NSF CCLI).

Student-Faculty Research. My teaching activities extend into the research laboratory where students are involved in nearly all aspects of my research projects. My research students have the opportunity to make important contributions to meaningful research projects while also gaining exposure to advanced concepts, mastering advanced experimental methods, gaining familiarity with the scientific literature, and learning how to approach scientific questions. Student-faculty research provides an excellent venue for students to experience the joy of learning and discovery. The role of students in my research activities will described in more detail in the following section on research.

Summary. I have made progress in applying my core principles on teaching to realizing my central goals. I have been successful in establishing a cooperative classroom environment where students feel motivated and comfortable seeking assistance. I have been able to set high expectations without overwhelming most students. ...

My goals, principles, and approaches in the classroom and laboratory are in keeping with the high-quality education that Colgate strives to make available to its students. ... I am committed to the students and to my responsibilities as a teacher.

RESEARCH

Interests. I am an organic chemist who is interested in the study of methods for making a variety of molecules with properties that are of interest to us and to others. Organic chemists study molecules that contain carbon atoms (organic molecules). ...

The organic molecules of particular interest to me are collectively known as porphyrinic macrocycles. Such macrocycles are prevalent in nature, where they are responsible for four key functions: small molecule binding, light harvesting, catalysis, and electron transport. For example, the red pigment in blood (heme) that reversibly binds oxygen and carbon dioxide, the green chlorophyll pigments in plants that absorb light from the sun and initiate photosynthesis, and the coenzyme vitamin B\textsubscript{12} are all derivatives of porphyrinic macrocycles. ...

After beginning my position at Colgate, I was interested in shifting my efforts towards studies of syntheses and properties of porphyrinic macrocycles with structures that are altered in some way relative to the prototypical structure of porphyrin. Such alterations give rise to macrocycles with diverse and complementary properties. ... To illustrate our efforts, four projects initiated and completed while I have been at Colgate are summarized below. Following these sections are descriptions of ongoing projects. ...


Role of Students in My Research Activities. Students are involved in most facets of the work in my laboratory, and their contributions are integral to the progress of our projects. To date, twenty-three students have been involved in my research group. The modular nature of the research facilitates the design of meaningful projects for year-long senior research, intensive summer research, and single semester research experiences. I strive to pursue lines of research that are of broad scientific interest, that are worthy of publication and funding, that contribute to the education of the students, and to which students can make meaningful contributions. Three of my group’s four publications involve student coauthors (seven different students), and two students have presented work at ACS national meetings.

Summary. I view research as an important scholarly endeavor and as a natural extension of my teaching. To achieve both ends, I am committed to pursuing meaningful projects with the full involvement of students. My efforts to establish the laboratory infrastructure, involve students, develop a diverse project pipeline, obtain external funding from a variety of sources, and bring multiple projects to
presentation and publication demonstrate my commitment and abilities. We are moving in a good
direction, and we are positioned to make further progress.

**SERVICE**
(omitted)

**SUMMARY**
I came to Colgate University with the goals of becoming an excellent teacher, establishing a
recognized student-faculty research program, and becoming a valued member of the Colgate community.
I have made significant strides in each of these areas. I have tangible accomplishments in teaching,
research, and service, and I have positioned myself for sustained progress. I am looking forward to the
next phase of my Colgate career.