



**M.G. Finn, Ph.D.**  
Professor and Chair, School of Chemistry & Biochemistry  
Professor, School of Biological Sciences  
Chief Scientific Officer, Children's Healthcare of  
Atlanta Pediatric Technology Center

February 3, 2022

Awards Selection Committee  
GT Center for the Enhancement of Teaching and Learning

RE: Nomination of Dr. Neha Garg for the 2022 Junior Faculty Teaching Excellence Award

To Whom It May Concern:

I am delighted to nominate **Assistant Professor Neha Garg** for the CTL/BP Junior Faculty Teaching Excellence Award. Since her arrival in the fall of 2017, Dr. Garg has established an internationally recognized research program on mechanistic understanding of bacterial pathogenesis and host-microbiome interactions and recently received an NSF CAREER award to support her efforts. Dr. Garg has also greatly enhanced the versatility of our curriculum by developing new and innovative coursework as well as improving the content and delivery of a key foundational class. I have received rave reviews of her teaching from our School's Teaching Effectiveness committee and also directly from my own students and others in the department. Prof. Garg is an exemplary junior faculty member who teaches with empathy and inspires our students with her enthusiasm and clarity in delivery, accessibility, and attention to personalized learning.

Dr. Garg has taught the essential undergraduate core course in analytical chemistry, Quantitative Chemical Analysis (CHEM 2214), long feared by students as one of the "weed-out" courses in our curriculum. While the class is properly a rigorous one, such angst is not our intention, and Dr. Garg has succeeded brilliantly in both lowering the psychological temperature while maintaining high standards and modernizing the subject matter. She has received multiple *Thank a Teacher* notes from our students in testament to her effectiveness in presenting a very demanding course that requires close coordination between lecture and laboratory components. (I was delighted to recently see one of these notes framed and displayed on her office wall – a nice reminder of the kind of difference we can make as instructors.)

Dr. Garg's dedication to continuous improvement in her teaching is reflected in her CIOS scores that have risen to from 4.3 to 4.8, an outstanding score for CHEM 2214. One of her distinguishing characteristics is her "*Teaching with Empathy*" approach which allows her to reach both masterful and struggling students alike. Her care and respect for her students is very apparent as the core of her approach and her success.

During her first semester at Georgia Tech, Prof. Garg developed a new graduate-level special topics course (CHEM 8823) in cutting-edge chemical biology analytical techniques (genetic engineering, fluorescence microscopy, flow cytometry, mass spectrometry, DNA sequencing, phage display and others), to rave reviews from students and colleagues alike. The course, which includes practical sessions at our instrument core facilities, is now a must for a wide swath of entering graduate students and is also taken by students outside of our department, including those in Civil Engineering, Biomedical Engineering, Biological Sciences, and others. Dr. Garg's marriage of the classroom teaching of fundamental theory behind these advanced techniques with practical training via our state-of-the-art core facility infrastructure is remarkable. The core facilities, located in the Engineered Biosystems Building and the Parker H. Petit Institute for Bioengineering & Bioscience building, are both under the administrative oversight of IBB. Prof. Garg worked closely with IBB staff to provide the students access to the most current and advanced instrumentation in the field.

Dr. Garg also went above and beyond to make this course far more useful for the first-year Ph.D. students than merely a quick introduction to the facilities. She designed the course structure such that students first learn the fundamentals and applications of advanced techniques employed in a research setting across chemistry and biology majors (covering the why, when, what, and where of these bioanalytical

methods), followed by introduction and hands-on use of instrumentation, data acquisition, and data analytics (how and who). Students analyze the data they collect during the visit to core facilities and answer homework questions designed by Prof. Garg, requiring them to remotely access data analysis workstations in the core facilities. The result is both increased knowledge among our trainees and increased confidence, both vital as they initiate their own research. Emerging from this course, they understand data analytics in fundamental and practical ways, and have access to advice from our expert staff in the core facilities. Students are often shy when they start their research and overcoming the communication barrier with the experts serves them and their research laboratories well. Lastly, exams require the students to present and critique published literature on these techniques, offer alternative techniques, and design the use of these techniques in their own research.

In-depth surveying and assessment showed that graduate students benefitted greatly from this course in pushing their own research to the next level. This type of course was not part of our curriculum before – I am rather embarrassed to admit this, since its value became abundantly clear after Dr. Garg created it. Our students come from highly diverse backgrounds and levels of experience, and the practice of biomolecular research requires a wide variety of techniques and core knowledge. This course has gone a long way toward bringing our students up to a very competent standard, and we have now incorporated it in our core curriculum, as CHEM 6273. Access to such advanced instrumentation and knowledge of the underlying principles is not available at most undergraduate institutions, which is why our students have struggled in their formative years at GT. Prof. Garg will next adapt this material into “minimester” short-course offerings for our advanced undergraduates, so that they do not emerge with similar deficiencies in their preparation, even if they have not had a chance to do research while on our campus. Such offerings to our undergraduates will better arm them to pursue STEM careers in chemistry, biochemistry, biology, chemical biology, molecular biology, and related fields, and will improve their applications for advanced programs. Her graduate curriculum knits multiple fields together in the Georgia Tech spirit, and sets up our graduate students for success in their own research.

Prof. Garg strives to create a classroom environment that is founded on accessibility and personal connection. Her CIOS survey comments reflect that she sought midterm feedback from students and incorporated that feedback during the instruction, something that highlights dedication, care, and commitment to improve. She also provides educational opportunities outside of the classroom as one of the very few junior investigators who has had ten undergraduates in her laboratory at this very early stage of her research and teaching career. Two of her undergraduate mentees were awarded our very prestigious, Petit Undergraduate Research Scholar award and three students who have graduated so far have gone to medical school. It is not common for new research groups to undertake so many undergraduates under their wing, but Dr. Garg and her team have undoubtedly excelled at it, highlighting how much she values developing Georgia Tech’s human capital.

Dr. Garg is the kind of instructor that comes along only rarely, whose passion for advanced learning is matched only by her ability. I strongly urge her consideration for the Junior Faculty Teaching Excellence Award to honor a young teacher who cares and succeeds in outstanding fashion.

Sincerely,



M.G. Finn, Ph.D.  
Professor and Chair, School of Chemistry and Biochemistry  
James A. Carlos Family Chair for Pediatric Technology

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## Statement of Teaching Philosophy and Instructional Effectiveness

### Overview.

My teaching philosophy has evolved from my appreciation that every student is unique and driven in their own way, deserving of an environment that allows personalized growth: academically, mentally, and socially. This evolution began when I was in 6<sup>th</sup> grade and tutored kids in grade 1 and continues to evolve to this date. Through the years, I have learnt that to truly excel, students need a) a safe learning environment where they feel respected and understood (teaching with empathy), b) an approachable instructor to not only motivate and guide them, but also to challenge them, c) develop appreciation of why continuous learning is important, d) avenues for teamwork, and e) have access to materials to sustain and evaluate their learning. My evolution as a teacher has been driven through my experiences as an educator and through my understanding of life as a scientist. In the manner a biological cell responds to an environmental stimuli, a student responds to stimuli provided in the classroom environment. In the manner an organism learns to adapt to the habitat it lives in, and that every organism adapts differently, every student grows in the classroom differently. The growth rate of an organism in their habitat depends on access to specific nutrients needed by the organisms in that habitat. For example, some cells can photosynthesize and fix carbon generating glucose, while others can't. Similarly, growth of a student in the classroom depends on the academic nutrition they individually need and receive. Lastly, as synergistic interactions driving symbiosis between life forms enable multiple organisms to mutually benefit, synergy between different students and teamwork lays the foundation for collective success in classroom learning. Below, I describe how a personalized and an empathetic approach is the foundation of my teaching and how I strive to achieve the points a-e mentioned above.

### Teaching Principles

The primary objective of my teaching activities is to educate students with the fundamentals of biological chemistry. Specifically, I envisage directing my teaching efforts towards introducing students to physical and chemical properties of (bio)molecules, providing students with the skill set to appreciate the role of chemical biologists in the post-genomic era, and to nurture critical thinking required and independence in young scientists. The accomplishment of this objective demands for me to be an effective educator first. Below, I describe my teaching principles through examples to continually grow as an educator. I revel in the responsibility associated with teaching and the motivation it provides for continuous learning.

I teach Quantitative Analysis (CHEM 2214), which is taken by our sophomores and is one of the most feared course requiring understanding the fundamentals of general chemistry with an ability to solve mathematical problems. This class has historically received lower CIOS scores than our normative data with scores as low as 2.4. Thus, I had the real opportunity to hone my teaching philosophy and learn to be an effective educator applying the principles exemplified below.

**A safe learning environment where students feel respected with an approachable instructor.** I applied various strategies to empathize with the fear that students come into the classroom for CHEM 2214 and turn it to an advantage to connect with them. I believe in first impressions and strive to connect with the students in the very first lecture developing that

connection throughout the course to motivate student participation and dampen the fear of taking this class. Thus, I start my first lecture with a statement “I understand that you all have heard about the difficulty-level of this course and may be nervous about taking it. I want all of you to know that I am aware and I am here for all of you to navigate this fear, to guide you through difficult problems, to motivate you to try challenging problems, and to work with you to improve content delivery on my part.” I then begin by providing and discussing a flowchart to follow in order to succeed in the classroom and a print out of this flowchart is provided to every student to take home with them. I then walk them through different resources they have access to for asking questions, enhance their learning, and providing continuous anonymous feedback to me for improved delivery of content. One of this resource is Piazza wherein students can ask questions anonymously and take part in peer-led discussions to enhance their learning without feeling “judged”. I ensure students know in the very first lecture that either I or teaching assistants (TA) will respond to their anonymous questions within 2 hours. I was excited to see that as we progressed, student saw value in connecting via Piazza and fellow students responding faster than I or TAs did. I also ensure that students are aware of the 3-hour review sessions, which are hosted by myself and TAs jointly before every exam (outside of lecture hours) and that they will be asked to fill a survey for their availability to attend these review sessions. We also poll the students for their availability to hold a boot camp comprising of three “Things to Know for CHEM 2214” sessions outside of lecture hours to ensure all students, including middle and bottom tier students, have the fundamentals of General Chemistry needed to succeed in this course. Description of these resources puts their fear at ease, creates a supportive environment from the very beginning, and they are ready to learn knowing that their instructor cares for their learning, is aware that students find this class exceptionally challenging, and is available. Many of these strategies described in this section were suggested by having undergraduates as TAs and my willingness to learn from them.

**Personalized delivery through feedback.** I believe every delivery of the material has to be tailored to the students taking the course in a given semester. One way to achieve this goal is through knowing which students are doing well and which ones are struggling, while learning their first names early on. I achieve this through weekly end-of-class quizzes for points and grading the first few quizzes myself rather than having my teaching assistants grade them. Learning names of high-performing and struggling students early on allows me to engage them equally during discussions. I then seek early anonymous feedback from students as a Start-Stop-Continue exercise seeking ways they think their ability to solve problems can be enhanced. I email struggling students with “bcc” to specifically point them towards submitting feedback, without disclosing any names in the email list. This strategy has indeed paid off several times. As an example, one of the students asked for an infographic for every challenging concept that students struggle with. Upon discussion with the class via Piazza, we converted this request into a group assignment for bonus points. We asked students to group into teams of four, assigned each team with an infographic to generate for a challenging concept, and then had each student in the group solve a challenging problem following their infographic. This assignment was voluntary and each student was given 20 bonus points (0.5% of total points) for submitting the infographic. All student-generated infographics and problems were shared with the entire class. We received 100% participation from class. Thus, the outcomes of this exercise was multi-fold. First, we generated **avenues for teamwork while allowing independent work.** Second, we created materials that all students could use to **advance their learning.** Third, we motivated students to **take ownership of their own learning.** Fourth, we motivated them to **solve challenging problems,**

**instilling confidence to apply their knowledge without the fear of losing points.** Last but not the least, I learnt as an educator how I can keep learning to **develop creative solutions that allow me to find a balance between spoon-feeding students and challenging them** to take ownership of their learning in a productive way. Four years of teaching at Georgia Tech has provided lessons in humility, and the appreciation that *teaching is never a one-way process*. So, now, I seek two feedbacks to engage students, an early feedback at the end of first month and a mid-term feedback. I then generate a bulleted slide based on the feedback provided. I discuss this slide in the class, providing strategies to incorporate student feedback to ensure students are aware that the feedback is taken seriously and is not a mere exercise. *The comments in CIOS surveys reflects that students appreciate such personalized delivery:* “Dr. Garg had us fill out a mid-semester survey and she may be the only professor I have ever had to seemed to take that seriously. The comments she got and discussed with us, you could tell she was making an effort to work on which I honestly appreciated and made me enjoy the course more.” and “I think she's a very good professor who cares genuinely about her students' learning. She is constantly finding ways to improve the course, which I appreciate.”. I have also received multiple “Thank a Teacher” notes for this course through CTL. I have received emails from students appreciating the incorporation of feedback. Two of these unsolicited emails are highlighted here: “I just wanted to say thank you for all the work you put in to responding to our feedback on Piazza. The study guides are very helpful, and it really feels like you care about our success in this course and as a student in general at Tech. I have not seen another professor be this responsive, and it really makes me thankful for everything you are doing.- Sydney Ayers, CHEM2214, FALL 2020”. “I just wanted to let you know that I love your teaching and I love what you are doing for us. It's hard to find teachers that go out of their way to help students and I really appreciate that you do this. ***I came into this class expecting it to be really hard because that's what people have said about it. But, you've made this class fun and understandable.***- Mithuna Kanthaswamy, CHEM2214, FALL 2020”.

I also seek feedback from my peers to improve delivery of content. With the advice from my peers, I plan on using polling tools such as turning point in my next delivery to further enhance student engagement at all levels (recommended by Dr. Pamela Pollet). I am also learning about use of contemporary learning technologies including student-centered ‘flipped classroom’ model that I aim to apply in both theoretical and laboratory coursework in Spring of 2022 (employed and recommended by Dr. Carrie Shepler). As didactic classroom teaching increasingly gives way to web-based resources, I have ***adapted my teaching resources for a virtual classroom*** and maintain frequent virtual and personal contact with the students with ***channels for continuous feedback***. By adopting these strategies, the students can help us make the learning experience better for them as we teach ourselves the nuances of ‘e-learning’. In summary, my teaching philosophy relies on continuous improvement through active incorporation of student and peer feedback.

**Relatable content to keep students motivated.** Students **fear** statistics in CHEM 2214. One way, an instructor can remove this fear is via making materials relatable. Since my second delivery of this course, I now use examples from my own research projects to make the material relatable, understandable, and to emphasize the importance of learning statistics, which is used in every domain of life from understanding errors in pre-election polls to understanding human biology. We start with a hypothesis that we are testing experimentally in my research, explaining the significance of my scientific question, and how it will help patients suffering from the disease being

investigated. Student feedback shows that they don't fear statistics now as much as they thought they would and I have been able to recruit >10 undergraduates to pursue research in my laboratory. **Two of these undergraduates have received one of the most prestigious awards at Georgia Tech supporting undergraduate research, namely Petit Undergraduate Research Scholar Award** to pursue research projects in my laboratory (Paxton Threatt and Nadine Abrahamse). Many of these students have co-authored publications with me (list given below). To note, one of the students, Gabriel Foster who secured a B in my CHEM 2214 class and initially struggled with statistics, is now excelling in applying statistics to his data acquired in my laboratory and recently published a paper (Journal of Natural Products, 2022, ASAP). As an Assistant Professor, I am humbled to be motivating and educating our future STEM workforce.

**Curriculum development at Georgia Tech.** In terms of curriculum development, successful marriage of theoretical learning and its direct application to research is something I wanted to achieve. When I started my faculty position at Georgia Tech and was asked to create a graduate level course work, I asked myself- what sort of curriculum would have helped me in my first year of graduate school aimed at advancing my research acumen? Students often find it difficult to select course work in their first year of Ph.D and feel overwhelmed in research having to learn a wide spectrum of techniques needed to succeed in their research projects. So, I envisioned creating an interdisciplinary course teaching techniques at the interface of chemistry and biology which would be useful to first year graduate students with diverse backgrounds. Techniques covered should be relevant to contemporary research, such as flow cytometry to profile single cells, mass spectrometry to catalog metabolic output, next-generation genome sequencing to identify genomic potential of cells, and confocal microscopy to visualize cells. A major strength of this course should be to close the knowledge gap between students of diverse backgrounds in their understanding of fundamentals of advanced techniques, portfolio of techniques available, and the decision making in selecting a technique. Keeping this in mind, I developed a graduate level special topics course where I teach cutting-edge techniques at the interface of chemical biology starting with introduction of structure and function of biomolecules (DNA, RNA, and proteins), followed by basic techniques such as electrophoresis, recombinant DNA technology and ramping up to advanced techniques such as phage display, fluorescence microscopy, flow cytometry, mass spectrometry, and DNA sequencing. Teaching these contemporary techniques without exposure to the instrumentation and hands on practical experience limits usefulness of such a course. Incorporating hands on access to instrumentation is an arduous task and requires use of instruments that cost multimillion dollars. This challenge required me to devise a creative solution. Thus, to incorporate useful hands-on experience, I included practical sessions at our state-of-the art instrument core facilities (flow cytometry, mass spectrometry, molecular evolution, and fluorescence microscopy core). These core facilities house multiple advanced instrumentations and are run by trained research scientists with detailed knowledge of data acquisition, analysis, and applicability. To further enhance the usefulness of practical experience, I designed homework assignments where students were challenged to analyze data collected during the visit to core facilities. Visiting core facilities, gaining hands-on experience on the instruments and data analysis strategies also enabled students to not only learn applications of these techniques, but also enabled them to evaluate their own research interests while getting familiarized with the infrastructure available at Georgia Tech. The scientific method used in the development of this material is at the center of my teaching philosophy for graduate students: understand, plan, train, and execute. Instead of following the concept of traditional exams, where students have to memorize the material and answer questions based on their understanding and

memory, we use a presentation-style examinations. Here, students work in groups, and present published literature on application of techniques taught. Students highlight the hypothesis being tested, explain the technique being tested, usefulness of this technique and limitations, and finally, propose alternative or complementary techniques that the authors could have used to test their hypothesis.

This curriculum has multiple outcomes in holistic graduate student training, each of which contributes to development of our future research workforce, their assimilation and future success in industrial, governmental, and academic research enterprises and success of Georgia Tech's research enterprise at the level of department and the institute.

Upon completion of this course, students

- Outcome 1: Appreciate the complexity of biological systems and breakdown this complexity into understandable concepts.
- Outcome 2: Develop fundamental understanding of modern analytical instrumentation and their applications.
- Outcome 3: Apply this understanding to design improvements in these techniques broadening their applications.
- Outcome 4: Employ modern analytical methods in their own research. To encourage use of these methods and develop innovative methods, Georgia Tech has invested millions of dollars in instruments that are available to use via our shared user management system across multiple schools. Through this course, students develop familiarity with the instruments and their capabilities.
- Outcome 5: Understand and critically evaluate published literature.
- Outcome 6: Develop oral presentation skills with instructor feedback and peer evaluation.
- Outcome 7: Foster long-lasting relationship with experts running Georgia Tech's instrument infrastructures.
- Outcome 8: Ability to bridge fundamental knowledge across multiple disciplines involving chemistry, biology, and engineering.

**In conclusion**, my teaching philosophy is based on four tenets: (i) employ empathy and personalized delivery, (ii) encourage critical thinking and application of efforts via the scientific method, (iii) provide information in a manner that is useful, and (iv) inculcate appreciation for the inherent beauty of biological and chemical systems. I am a dedicated and thoughtful instructor and mentor, one who recognizes the role of teachers in student development, and one who is cognizant of the contemporary classroom challenges and opportunities.

## Teaching Assessments

### *Course Instructor Opinion Survey (CIOS) scores and student feedback*

The CIOS scores for the two courses I have taught both at the graduate level (CHEM 8823, now promoted to our core curriculum CHEM 6273) and at the undergraduate level (CHEM 2214) are tabulated below. The scores reflect excellence in instruction as quantified by Georgia Tech's CIOS survey metric with scores always higher than 4. The most recent scores in Spring and Fall of 2021 have reached the highest possible score of 5.0, motivated by my continued efforts in improving my teaching effectiveness based on student and peer feedback. I do not see a score of 5 as completion of my learning to be an effective educator, but outcome of appreciation that teaching is not a one-way process and I will continue to learn from student feedback and from my peers.

Table 1. CIOS scores

Semester/Year	Course Number	Title	Enrollment	CIOS score
Fall 2017	CHEM 8823	Analytical Chemistry	11	4.70
Fall 2018	CHEM 8823	Analytical Chemistry	11	4.90
Spring 2019	CHEM 2214	Quantitative Analysis	45	4.32
Fall 2019	CHEM 2214	Quantitative Analysis	52	4.00
Fall 2020	CHEM 2214	Quantitative Analysis	45	4.70
Fall 2020	CHEM 2214R	Quantitative Analysis Recitation	45	4.79
Spring 2020	CHEM 8823	Analytical Chemistry	8	COVID, no survey
Spring 2021	CHEM 8823	Analytical Chemistry	10	5.0
Fall 2021	CHEM 6273	Analytical Chemistry	10	5.0

**Evaluation for CHEM 2214:** Student comments from the evaluation for the undergraduate course CHEM 2214, were provided in the section titled "Personalized delivery through feedback" and pasted below for ease of access.

"Dr. Garg had us fill out a mid-semester survey and she may be the only professor I have ever had to seemed to take that seriously. The comments she got and discussed with us, you could tell she was making an effort to work on which I honestly appreciated and made me enjoy the course more." and "I think she's a very good professor who cares genuinely about her students' learning. She is constantly finding ways to improve the course, which I appreciate." I have also received multiple "Thank a Teacher" notes for this course through CTL. I have received emails from students appreciating the incorporation of feedback. Two of these unsolicited emails are

highlighted here: “I just wanted to say thank you for all the work you put in to responding to our feedback on Piazza. The study guides are very helpful, and it really feels like you care about our success in this course and as a student in general at Tech. I have not seen another professor be this responsive, and it really makes me thankful for everything you are doing.- Sydney Ayers, CHEM2214, FALL 2020”. “I just wanted to let you know that I love your teaching and I love what you are doing for us. It's hard to find teachers that go out of their way to help students and I really appreciate that you do this. ***I came into this class expecting it to be really hard because that's what people have said about it. But, you've made this class fun and understandable.***- Mithuna Kanthaswamy, CHEM2214, FALL 2020”.

**Evaluation for CHEM 8823:** That the course objectives were realized for CHEM 8823, now CHEM 6273 was reflected in the CIOS evaluation comments where students wrote:

CIOS FALL 2017:

“This course offered a broad survey of analytical techniques used in chemical and biomedical research. It introduced equipment and assays and gave the opportunity to delve deeper in techniques that I found most relevant to my research. Thanks to this class and introductions made by Dr. Garg to Core Facilities Managers, I was able to introduce and optimize an entirely new assay which will greatly benefit one of my projects”- student in Prof. M.G. Finn’s Laboratory.

CIOS Fall 2018.

1. I really enjoyed the shared lab tours. These live demos really helped with my networking and understanding of the concepts we were learning in the course.
2. Learning a wide range of topics that actually helped me understand my research interests better.
3. The content taught helped me with reading and understanding literature better.
4. The breadth of techniques covered in this class were very helpful.
5. Also, I think the homework did a good job of measuring understanding of concepts while requiring critical thought. Finally, all the lectures were tied in with examples that helped understand how techniques are used.

**These student comments truly reflect my vision while designing this graduate class.** This course has become popular that students from departments such as Bioengineering and Civil Engineering also enrolled in spring 2020.

Comments on my DOTE **evaluation by Prof. Raquel Lieberman** “The material was contemporary science that is relevant to many of our graduates (I plan on recommending this class strongly to my new grad students!)” further suggested that this course is valuable for first year graduate students and result in their improved assimilation in our research program. The student appreciation and learning in this course is reflected in my CIOS scores of 4.7 in first delivery, which further improved to 4.9 during second delivery and a score 5.0 in the last two deliveries (Table 1). In the most recent peer reviews submitted to DOTE committee, **Dr. Pamela Pollet wrote** “The lecture was very well paced, the material was clear with personal and relatable insight. I cannot think of suggestions to increase the effectiveness, the lecture was outstanding” and **Dr. Amanda Stockton wrote** “The instructor is already quite effective, so it is

hard to come up with further suggestions. One that I might make, if required, is to perhaps give a little more time between "any questions about this?" and moving along. In a remote format it takes some time to formulate the question and then type it out or unmute, and easy to then just say, "eh, that question wasn't that important" once the instructor has moved along. Other than that, it is hard to come up with ideas for increased effectiveness. The use of real data examples to understand deeper concepts clearly engaged the students and helped reinforce learning outcomes." Learning from this feedback, I plan on using a stopwatch to force me to wait before I move on to next question.

### **Impact outside the classroom**

I apply multiple strategies to positively impact undergraduate training outside of the classroom. I have mentored 10-undergraduates in my laboratory over the last four years, helped students with their personal statement for medical school, and mentored students to apply for undergraduate research awards such as PURA and Petit Undergraduate Research Scholar Award. Two of my students **have received the Petit Undergraduate Research Scholar Award**. Five of my undergraduate students **have published research articles** with my group (see below). In addition, I have hosted 2 students via **Georgia Techs REU program** in Chemistry and Aquatic Chemical Ecology.

Outside of Georgia Tech, I have participated in Science.Art.Wonder program in 2019 (<https://sciartwonderatl.wixsite.com/sawatl>) that pairs student artists with scientists to allow them to explore the scientific world through visual art. I attended art exhibit with an undergraduate student who I was partnered with to sketch a partnership between human lung and its bacterial inhabitants. Together, we explained the science behind the sketch to high school students who visited the sketch at the exhibit.

Publications with undergraduate students (undergraduate student names are in **bold** and are underlined).

1. Metabolomics approaches to dereplicate natural products from coral-derived bioactive bacteria.  
Deutsch JM, Mandelare-Ruiz P, Yang Y, **Foster G**, **Routhu A**, Houk J, Flor YTDL, Ushijima B, Meyer JL, Paul VJ, Garg N.  
Journal of Natural Products, 2022, ASAP
2. Metabolomic profiling of *Burkholderia cenocepacia* in synthetic cystic fibrosis sputum medium reveals environment-specific production of virulence factors.  
Jaiyesimi OA, McAvoy AC, **Fogg DN**, and Garg N.  
Scientific Reports, 2021; 11:21419
3. Differences in cystic fibrosis-associated *Burkholderia* spp. bacteria metabolomes after exposure to the antibiotic trimethoprim.  
ACS Infectious Diseases, 2020; 6(5):1154-1168  
McAvoy AC, Jaiyesimi O, **Threatt PH**, **Seladi T**, Goldberg JB, da Silva RR, Garg N.

The Georgia Tech's dedicated educational outreach and research center, Center for Education Integrating Science, Mathematics and Computing (CEISM), establishes partnerships between industry, educational and political leaders, academic professionals in the state's major universities, and hundreds of school administrators and teachers to ensure

that PreK-12 students are best prepared to receive education in the STEM disciplines. Through the CEISMC's outreach activities, I will participate in the Georgia-Intern Fellowships for Teachers (GIFT) program and have recruited Paul Duke STEM high School via CEISMC for this purpose. The GIFT program provides fellowships to middle and high school teachers to receive research training in laboratories at Georgia Tech for a period of 7 weeks. With teacher's support, this research experience is offered to the students in the following years to conduct research activities in the same laboratory via the R.E.A.L program. Furthermore, teachers create new lesson plans, after school activities or summer camp activities based on their research experience. The participating students present their work at local, state or national science and engineering fairs. Thus, this program allows teachers and students to gain exposure to research undertaken at Georgia Tech in close partnerships with graduate students, postdoctoral fellows, and faculty. Using the GIFT program, I will host a teacher and 2 students from the Paul Duke STEM High School to help develop a summer research program that will be offered at the school in the following 4 years in my laboratory supported by my NSF CAREER award. Through these experiences and partnerships, I will continually learn to engage and motivate students of diverse age-groups and diverse backgrounds in STEM.



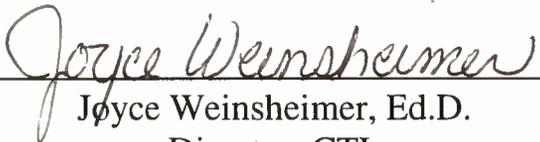
**Georgia Tech Center for Teaching and Learning**

**Neha Garg**

**THANKS  
FOR BEING A  
GREAT TEACHER!**

*In appreciation of your teaching style and dedication to helping students learn in  
Chemistry 2214  
April 11, 2019*

**THANK A TEACHER PROGRAM  
Center for Teaching and Learning**

  
Joyce Weinsheimer, Ed.D.  
Director, CTL

April 11, 2019

Neha Garg  
Chemistry and Biochemistry/02000

Dear Neha Garg:

Congratulations! In recognition for your excellence in teaching, you have been chosen to receive a *Thank a Teacher* certificate. Please see the enclosed thank you note, which highlights your efforts and the positive impact you have on your students.

*Thank a Teacher* is a program sponsored by the Center for Teaching and Learning (CTL). The program, which began in November 2005, provides students with an opportunity to give feedback to outstanding teachers, advisers, and mentors. By encouraging students to recognize the individuals who are making a difference in their education, we hope to continue to strengthen the learning environment here at Georgia Tech and provide instructional staff with the kudos they deserve.

Many instructional staff keep copies of the certificates and notes they receive through *Thank a Teacher* as evidence of their impact on students. These notes are unsolicited, and you are welcome to use them to support your nomination for a campus teaching award or to illustrate what students value about your teaching.

Thank you for the work you do with students and for the many contributions you make to their learning.

Sincerely,



Joyce Weinsheimer, Ed.D.  
Director, Center for Teaching and Learning

**Copy of your Thank A Teacher Email**

**April 11, 2019**

**Your Name:** Anonymous

**Instructor Name:** Neha Garg

**Title of the course:** Chemistry 2214

**The semester/year of the course:** Spring 2019

**Campus Address of Instructor:** Chemistry and Biochemistry/02000

**What would you like to tell instructor?** Dear Dr. Garg,  
Thank you for putting in so much effort to make Quantitative Analysis enjoyable.  
You really care about your students, and your dedication has made QA far exceed  
my expectations. Thank you so much for a great semester!

**Neha Garg**

**Thank you for being an excellent teacher!**

In appreciation of your teaching style and dedication to helping students learn in

*Chemistry 2214  
November 09, 2020*

**Georgia Tech** Center for  
Teaching and Learning

2020 Thank a Teacher Program Award Recipient

*Joyce Weinsheimer*

Joyce Weinsheimer, Ed.D., Director of CTL

# Thank a Teacher Note

**To:** Neha Garg

**From:** Lydia Kenney

**Date:** November 09, 2020

**Course Title:** Chemistry 2214

**Semester/Year:** Fall 2020

**Note:**

I wanted to take a minute to thank you for your hard work and willingness to change to make the course better. Your kindness and dedication to your students is something I will not forget, and it has made this difficult semester a little bit easier. Thank you for pushing us to do our best and for preparing us for our careers in chemistry. Thank you for being such a great role model.

February 2, 2022

Dear committee,

I am delighted to be writing in support of Prof. Neha Garg's nomination for the 2022 CTL/BP Junior Faculty Teaching Excellence Award. As I detail below, Prof. Garg's excellence in instruction create the very best learning environment for our undergraduate and graduate students. For an award that recognizes "excellent teaching and educational innovation that junior faculty bring to campus", I cannot think of no one more deserving.

Prof. Garg's teaching responsibilities are at the intersection of our analytical and biochemistry courses. For the purposes of this letter, I reviewed CIOS data on Dr. Garg's instruction since she joined GaTech (Fall 2017-Fall 2021), during which she taught multiple sections of both undergraduate and graduate courses. At the undergraduate level, Dr. Garg has been teaching quantitative analysis (CHEM 2214). This is a major-required course with an enrollment of about 50 students. The course is coupled with a laboratory component, which is taught by general faculty colleagues. As a result, the course requires effective collaboration to integrate learning across the lecture and the laboratory. Prof. Garg's CIOS scores on "teaching effectiveness" range from 4.3 to 4.8. These are outstanding and meet the medians for the College of Sciences and Institute for comparably sized classes.

Prof. Garg also teaches the graduate course, analytical biochemistry (CHEM 8823/6273). This course, which started as special topic course (CHEM 8823) and is now a permanent course (CHEM 6273), is a new course that was both developed and taught by Prof. Garg. Student assessments of Prof. Garg's teaching in this course are superb and illustrate how her efforts resonate particularly well with graduate students. Her scores range from 4.7 to 5.00 (with 50-100% response rate). It should be highlighted that the last two semesters (Spring and Fall 2021), the CIOS scores of Prof. Garg were 5.0.

As the Director of Teaching Effectiveness (DOTE) in the School since 2021, I have had the pleasure of observing firsthand Dr. Garg's teaching as well as coordinating other peer evaluations of her work in the classroom. When I attended her class, Dr. Garg provided an outstanding lecture: it was engaging, calibrated and insightful. The slides were extremely well designed and clear. Dr. Garg used technology very efficiently to promote participation from both her in-person students and her online students. This was all seamless and impressive! Dr. Garg used students' first name, call on students specifically with encouragements and empathic comments like, "I am putting you on the spot here but

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do not worry I am looking for your thoughts...", "I know you may not know the answer as you probably did not use such column before, I am interested on how would you think about it.". Overall, her deliberate and thoughtful approach provided a relax, non-threatening environment, almost like a conversation. This was not only my opinion; across the board, peer assessments of Prof. Garg's teaching are glowing:

- "Clarity of explanations, relevant and interesting examples, clear demonstrated expertise, and approachability are at the top of this instructor strengths"
- "Prof Garg ability to relate to the students' experience was effective in promoting engagement during in-class exercises."

In summary, I've had the good fortune of seeing several exemplary teachers in action, whose talent and commitment to teaching excellence have been recognized with prestigious Center for Teaching and Learning Awards. By any measure, Dr. Garg as a junior faculty is of the same caliber. The CTL/BP Junior faculty Teaching Excellence would be well-deserved recognition of her rank in that group, and of the tremendous impact her teaching has on our undergraduate and graduate students. I hope she garners strong consideration.

On behalf of the DOTE Committee,



Pamela Pollet  
Director of Teaching Effectiveness



School of Chemistry and Biochemistry

William J. Howitz, Ph.D.  
Organic Chemistry Laboratory Coordinator  
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February 6, 2022

Dear Members of the Award Selection Committee,

I am writing to express my support for Assistant Professor Neha Garg's nomination for the CTL/BP Junior Faculty Teaching Excellence Award. In my role as a member of the School of Chemistry and Biochemistry's Teaching Effectiveness Committee, I had the pleasure of observing Professor Garg's teaching this past fall term. I found her quality of instruction to be standout in the way she interacted with her students and the way she delivered the course material.

Although the class I observed was residential, Professor Garg provided students the option of attending virtually. Instructing in a HyFlex modality is not a trivial undertaking because you need to be able to effectively engage two distinct populations of students simultaneously. Professor Garg managed this with aplomb, never neglecting the students attending virtually and allowing them the space to answer questions and contribute to the class discussion. The level of student-instructor interaction was great throughout the class and speaks to how engaging Professor Garg is as an instructor.

I believe that the level of engagement Professor Garg elicited from her students was made possible by her methodical and carefully scaffolded delivery of course content. She introduced material starting from fundamentals, regularly defining new and unfamiliar terms, and then transitioned to application of the basic concepts. For example, in the class I observed on the topic of mass spectrometry, she took the time to discuss how the natural abundance of isotopes can influence the appearance of a mass spectrum, a graph of the distribution of ions in a sample. She began by introducing examples of common isotopes and then explained how the abundances could be used to mathematically predict the distribution of ions for a specific sample. Professor Garg took this one step further by then sharing an online mass spectrum prediction software that her students could use outside of the classroom in their research endeavors. Her choice to show students how to rationalize what a mass spectrum should look like before introducing the prediction software was strategic because it ensures students can not only use the tool, but can explain how it works. Throughout the class, Professor Garg also included examples of mass spectra for familiar compounds, including well-known proteins, to give students a chance to analyze and apply the concepts they were learning. Including these real-world examples had a tremendously positive impact as most of the questions students asked pertained to this level of application rather than clarification of the fundamental concepts.

Given all of Professor Garg's strengths and capabilities as an educator, I believe she is very deserving of the CTL/BP Junior Faculty Teaching Excellence Award. Her approach to teaching

serves as a great example for the faculty in our department from which to learn and grow. I am happy to give Professor Garg my most enthusiastic support.

Sincerely,

A handwritten signature in black ink, appearing to read "William J. Howitz". The signature is fluid and cursive, with a prominent initial "W" and a long, sweeping tail.

William J. Howitz, Ph.D.  
Organic Chemistry Laboratory Coordinator  
School of Chemistry and Biochemistry  
Georgia Institute of Technology

January 28, 2022

Dear CTL/BP Junior Faculty Teaching Excellence Award Committee,

I am honored to support the nomination of Dr. Neha Garg for the CTL/BP Junior Faculty Teaching Excellence Award. In the Fall of 2020, I was in Dr. Garg's Quantitative Analysis (CHEM 2214) class as a sophomore at Georgia Tech. Quantitative Analysis is one of the first truly challenging chemistry courses students take. It is the first lecture and lab course in which the students independently solve chemistry problems and complete experiments. With the reputation of this course, I was nervous when I logged on to the video call on the first day of class, as this was also during the height of the COVID-19 global pandemic. Dr. Neha Garg not only handled the switch to online classes swiftly but made it easy for her students to communicate with her, encouraged us to succeed, and constantly worked to improve her teaching.

Dr. Neha Garg went above and beyond to connect with students during the Fall 2020 semester. It was a scary and stressful time for everyone, and she made sure to let us know that she was here for us and wanted us to succeed no matter the circumstance. She made herself available to students during a time when walking into her office was no longer an option. This effort on her part showed me how much she cares about every single one of her students.

Dr. Neha Garg taught Quantitative Analysis by strategically introducing concepts, carefully crafting an efficient way to access resources, and encouraging students. She used real world examples of chemistry concepts and really made me believe that I could pursue a career in STEM, specifically in chemistry, at a time when my mental health and self-confidence struggled.

Her enthusiasm for the subject of chemistry fueled my own, and I am so grateful to have had the opportunity to be in her class.

The defining characteristic of Dr. Neha Garg was her constant work to improve herself, her classroom, and the experiences of her students. I remember the first exam of the course did not go well for me or my classmates, and instead of just going through the motions of the course, Dr. Garg took the time to go back over the content that we were not confident in. At the same time, she openly asked for and welcomed constructive criticism to make our learning experience better. Her humility and desire to be better is what makes Dr. Garg one of the best professors I have had in my college career. I believe that professors at Georgia Tech and around the world could learn a lot from Dr. Neha Garg, and I strongly believe that she is deserving of the CTL/BP Junior Faculty Teaching Excellence Award.

Sincerely,

A handwritten signature in black ink that reads "Lydia Kenney". The signature is written in a cursive, flowing style.

Lydia G. Kenney  
Undergraduate Student  
Georgia Institute of Technology  
[lkenney3@gatech.edu](mailto:lkenney3@gatech.edu)  
*Pronouns: she/her/hers*

February 5, 2022

Dear Faculty Awards Committee,

It is my greatest honor to write this letter in support of Dr. Garg's nomination for the Junior Faculty Teaching Excellence Award. I had the pleasure of taking CHEM 2214 (Quantitative Analysis) with Dr. Garg during Fall 2020.

Dr. Garg is such a wonderful professor. Her teaching method is such that no student was left behind. This course had an extensive amount of content due to it being the first major-related chemistry course that Chemistry and Biochemistry students take. However, I was never overwhelmed when learning from Dr. Garg. She broke down each topic into smaller, easy-to-process topics. Additionally, she guided us through practice questions to ensure we understood the topic before moving on to the next. Dr. Garg came to each class extremely well prepared. The lecture slides she provided were always clear and concise. It could be seen from her teaching that she really loved teaching and loved the content she taught. Additionally, Dr. Garg came to each class with an excited and cheerful attitude that was contagious to me as a student. It motivated me to truly learn the concepts and subsequently love them. The course was challenging, but her teaching made the course as exciting as it was difficult. No other course I have taken thus far in college compares to the quality of education offered in Dr. Garg's class.

Dr. Garg is extremely compassionate; she truly cares for the education and well-being of her students. I took her class during the pandemic when we were all having a hard time, but her caring and understanding nature made the semester more bearable. Unlike many professors, she does not believe that her job is done after her teaching is done. She goes the extra mile to establish a solid student-teacher relationship. She is always trying to find ways to make her students feel more comfortable and supported. She goes out of her way to personally ask for feedback from students to see what can be improved in order to make each student feel more comfortable. Dr. Garg's learning environment is such that I always felt welcome to ask questions when I was confused or needed extra help. I never felt judged, and I truly felt that she cared for my education. Dr. Garg's caring personality, approachability, and teaching method made her class something I looked forward to every day.

I sincerely wish that I had taken her class face-to-face, as I would have had the pleasure to get to know her in person. She has truly made an impact on my life. Having the opportunity to learn from her is such a great honor, and I am extremely grateful for it. I cannot think of anyone more deserving of this award than Dr. Neha Garg.

Sincerely,



Mithuna Kanthasamy  
Undergraduate – School of Chemistry & Biochemistry  
[mkanthasamy3@gatech.edu](mailto:mkanthasamy3@gatech.edu)

February 6, 2022

Dear Faculty Honors Committee,

My name is Nadine Abrahamse, and I am a biochemistry student graduating in May 2023. It is with pleasure and honor that I write to you in my support for Dr. Neha Garg for her nomination of the Junior Faculty Teaching Excellence Award. I have had the pleasure to be a student in her CHEM 2214 Quantitative Analysis class in fall of 2020, as well as work alongside her and her graduate students in her research lab. It was Dr. Garg's passion and enthusiasm about the subject that won me and several other students over, as well as motivating me to join her lab in December 2021.

I took her class in the fall semester of 2020, the very first semester that was completely remote. Everything was very new to everyone, but somehow, Dr. Garg taught me more than I had ever learned in any class I had attended in person. Her quantitative analysis class was the first higher level chemistry class I had taken in college, but my nerves were quickly eased after a couple of classes. Dr. Garg has a manner of explaining difficult concepts that makes them perfectly simple to understand. This math-heavy chemistry class has many complicated equations, making me think that the tests would rely on my memorization of these formulas. However, Dr. Garg set everything up so we would be tested on our abilities to apply the chemical concepts learning in class, giving me a much better set of skills that I have used frequently since. In the unprecedented time of COVID-19, Dr. Garg was extremely flexible and happy to help anyone that came to her. She listened to the feedback from the students and adapted quickly to meet our needs.

When I became an Petit Undergraduate Research Scholar, I left the research lab I had been working in for a year for Dr. Garg's lab. She was extremely welcoming, and in my short experience in the lab, has great concern for our safety and well-being. Quantitative analysis perhaps may not be what I have chosen to focus on in my research, but the skills I have built up from that class have helped me further along than I had thought, all through Dr. Garg's incredible teaching.

Everything Dr. Garg has done has furthered my interest and my education in chemistry. She has encouraged me to pursue my curiosities in research programs, leading me to her lab. Her understanding nature and willingness to listen to the concerns of students has brought many of them great success. It is Dr. Garg's ability to create a perfect learning environment that brings me to say that she is the perfect candidate for the Junior Faculty Teaching Excellence Award. If there is anything else I can provide to help her further, please contact me at [nabrahamse3@gatech.edu](mailto:nabrahamse3@gatech.edu).

Sincerely,

*nadine abrahamse*

Nadine Abrahamse  
Georgia Institute of Technology  
B.S. Biochemistry 2023