Application Details

Manage Application: CTL/BP Junior Faculty Teaching Excellence Award - 2018

Award Cycle:	2018
Internal Submission Deadline:	Friday, February 2, 2018

Application Title:	Kacher
Application ID:	002144
Nominator's First Name:	Naresh
Nominator's Last Name:	Thadhani
Nominator's Title:	Professor and Chair
Nominator's Primary Organization:	College of Engineering, School of Materials Science and Engineering
Nominator's Email Address:	naresh.thadhani@mse.gatech.edu
Nominator's Phone Number:	404-894-2651
Nominee's First Name:	Josh
Nominee's Last Name:	Kacher
Nominee's Title:	Assistant Professor
Primary Organization(s):	MSE - Materials Science and Engineering
Nominee's Email Address:	josh.kacher@mse.gatech.edu
Submission Date:	Tuesday, January 30, 2018

Naresh Thadhani
Professor and Chair

Materials Science and Engineering
Georgia Institute of Technology
771 Ferst Drive
Atlanta, Georgia 30332-0245
PHONE 404•894•2651
FAX 404•894•9140
Email naresh.thadhani@mse.gatech.edu

Memo to: CETL/BP Junior Faculty Teaching Excellence Award Committee
From: Naresh Thadhani, Professor and Chair, MSE
Date: January 29, 2018
Subject: Nomination of Prof. Josh Kacher, for CETL/BP Junior Faculty Teaching Excellence Award

Dear Awards Committee:

I am delighted to nominate Prof. Josh Kacher for the CETL/BP Junior Faculty Teaching Excellence Award in recognition of his passion and joy for teaching, and his sustained record of teaching excellence. Let me highlight some of Prof. Kacher's key accomplishments, which in my opinion, exemplify the type of outstanding instructor who is richly deserving of this high honor of recognition for which the CETL/BP Junior Faculty Teaching Excellence Award has been created.

Prof. Kacher joined the Materials Science and Engineering faculty in the Fall of 2015 and has been an excellent addition for his stellar teaching performance both inside and outside of the classroom. He has excelled in almost any teaching situation, having taught classes ranging in size from roughly 30 to 100, and ranging in level from introductory, to advanced undergraduate, to graduate. Students consistently give him high rankings (average CIOS score for overall effectiveness of 4.5). He has been able to succeed in so many diverse situations because he genuinely cares about creating an active, participatory learning environment where students feel his passion for the subject. This aspect of his teaching stands out clearly in his CIOS scores: students give him an average score of 4.8 for his enthusiasm. After his first year of teaching Transport Phenomena, one of the most difficult undergraduate core classes, enrollment in this class jumped from 33 to 81 students, attesting to the high opinion they hold of his methods.

One of Prof. Kacher's biggest teaching accomplishments to date has been his complete overhaul of our School's Transmission Electron Microscopy (TEM) course. This is a graduate level course that, while primarily geared towards MSE students, is taken by students from multiple different science and engineering departments. Prof. Kacher reinvented this course, making it much more practical and hands-on, and immediately applicable to students' many varying research projects. As part of this redesign, he set up a system whereby every student would have the opportunity to personally use a TEM and look at their own sample. He met individually with many of the students to help them perform analysis. Since Prof. Kacher has taken over the class, the Institute-wide usage of the microscopes has almost doubled, and many of the staff scientists who run the microscopy center are either taking the class or asking to sit in on the lectures.

The ability to instruct classes of many sizes and scales, and to varying audiences is even apparent online, where Prof. Kacher is regularly developing and disseminating teaching content. His YouTube channel archives TEM footage rarely available to most instructors, and demonstrates principles that are typically taught through dry descriptions. For a side project, its reach is considerable—many of the videos have thousands of views already, and professors from around the campus and the country have begun incorporating his materials into their classes. Outside the classroom, Prof. Kacher has also been very active in getting undergraduate students involved in meaningful research experiences. He now advises 7 undergraduate students, whose work has been recognized with PURA, internal research scholarships, and a prestigious Navy Research Laboratory internship. Perhaps most impressive is that one of his undergraduate research students, currently in her sophomore year, won first prize for best oral presentation in her symposium at the annual ASTM conference even though she was competing against graduate students. Prof. Kacher also supports many other undergraduate student researchers through his involvement in the Materials Innovation and Learning Laboratory (MILL), an open-access research lab geared towards undergraduate exploration and learning. There, he has worked as a faculty adviser with research teams testing the material properties and behavior of commercial products, and is active in building up the lab's experimental capabilities.

Prof. Kacher has achieved these accomplishments while simultaneously thriving in his research. He has been recognized early on in his tenure at Georgia Tech, with prestigious early career awards from the Department of Energy, the Office of Naval Research, and The Materials Research Society. Besides his seven undergraduate research assistants, his group consists of five graduate students (one co-advised), and it continues to grow. As an instructor, his enthusiasm, adaptability, and commitment to mentoring students in research and exploratory contexts have made him an invaluable addition to our School of Materials Science and Engineering. Professor Kacher is a true embodiment of what the CTL/BP Junior Faculty Teaching Excellence Award represents and I wholeheartedly recommend him for the recognition.

Yours Sincerely,

Naresh Thadhani

Reflective Teaching Statement

Teaching for me has been the most rewarding and challenging aspect of being a faculty member at Georgia Tech. Some of the most enjoyable times that I have had as a professor have been in my office with students from my class reviewing challenging concepts from the subjects we covered in class.

CLASSROOM INSTRUCTION

Since joining the faculty at Georgia Tech over two years ago, I have had the opportunity to teach a variety of classes, ranging in both size (33-91 students) and level (introductory, advanced undergraduate, and early graduate level). Although the mechanics of teaching can be very different depending on the class, I have tried to apply three governing principles: 1) I should be an active participant in the learning process rather than a passive distributor of information, 2) students learn best when allowed to teach and learn from each other, and 3) the subject the students are learning should provide them a new lens through which they can understand and interact with the world around them. That is, the application of the course material to engineering and life should be demonstrated early and often to the class.

Actively participating in the learning process: A major challenge in teaching, especially when class sizes get large, is knowing how the individuals in the class are progressing and what questions they have. It can be intimidating for students to raise their concerns in front of their peers for fear of embarrassment. I try to address this challenge by being an active participant in the students' learning process.

While teaching transport phenomena my first time, I noticed an unfortunate trend in the students' homework assignments. Some of the homework assignments being turned in were clearly copied directly from solution manuals available online. Homework was no longer providing a good assessment of the students' understanding of the material, inhibiting both my ability to assign fair grades to the class and how well I knew the level of the class's understanding of the material. To address this problem, I revamped the class homework assignment and grading system. The students were given two options when turning in homework. They could either turn in their assignment as usual and receive a grade reflective of how well they completed the problems, or they could write at the top of the assignment that they spent more than 5 hours on the homework assignment and receive full credit. With the second option, they were also required to describe where they got stuck in the assignment and what concepts they were not understanding.

To introduce the new homework system, I dedicated a portion of a class to having a discussion on how the students felt about the fairness of the new system and what questions or concerns the students had. The change in the system made an immediate impact on classroom progress. I began each lecture reviewing difficult concepts that many in the class had brought up in their homework assignments and could meet individually with students that were struggling beyond the rest of the class. The system change also refocused the purpose of homework from anxiety over making simple, mathematical errors to testing their knowledge and ability to apply physical principles learned in class to engineering applications. This allowed the students to take additional risks in attempting to solve the problems without resorting to secondary sources for

the solutions. The end-of-semester CIOS comments reflected the students' appreciation of the new system with statements such as, "I really loved how we went over concepts we didn't understand from the homework after we got it back. I think this made all the difference for me."

At the graduate level, I teach a class on transmission electron microscopy where the smaller class size and the students' more advanced level allow me to participate much more directly in the learning process. The class is structured around a semester long project where each student is expected to make a sample relevant to their research and characterize it in a transmission electron microscope at the end of the semester. I began the semester with one-on-one meetings with each student in the class to assess their research lab situation and how the class material could be best tailored to them. In addition, I had an open-ended offer to all students in the class that I would personally assist any of them on the microscope once they had a sample ready. This offer extended into the summer, past the completion of the class, and allowed many of the students to make far more progress in their research than they would have been able to without more direct guidance. This aspect of the class, spending individual time on the microscope with me, was listed by multiple students as the best aspect of the class in the CIOS evaluations.

Applying principles in engineering and in life: One of the most important aspects for me in teaching is to ensure that all the principles taught in the class can be both academically and intuitively applied, ideally with the two feeding into each other. By academically applied, I mean that students must be able to address a problem they would find in a research or engineering setting using mathematical and scientific principles taught in the class. This is accomplished in class largely through traditional means such as tailored homework assignments, quizzes, and tests. By intuitively applied, I refer more towards being able to look around yourself and apply the principles being taught in class to every day interactions and occurrences. That is, the class should provide the students a new lens through which they can develop a deeper understanding and appreciation of the world around them.

I try to encourage students to develop an intuitive understanding by regularly bringing in real-world examples of the principles we are learning in fun and engaging ways. For example, in my first semester at Georgia Tech, I taught the introduction to materials science class. This class included students from almost all engineering departments, many of whom were not excited about being forced to take a materials science class. One way that I engaged the class and encouraged them to apply materials science principles in their everyday lives was to begin each lecture with a short YouTube video. In general, these video clips were lighthearted such as a couple of Russians in Siberia demonstrating the frigid winter temperatures by throwing boiling water into the air and watching it freeze, or we would analyze movie clips and talk about what Hollywood gets wrong (such as a villain in a James Bond movie instantly freezing when being sprayed with liquid nitrogen). After watching the clips, we would spend five minutes of class time discussing them together. The videos would act to introduce the topic we were to discuss that day and allowed them to already be applying what they were learning before any principles were taught.

In a junior-level core class on transport phenomena (heat transfer and mass diffusion), the tighter focus of the class material facilitated a more prolonged approach. As we learned new principles,

we frequently would discuss a relatively simple concept--a pizza stone used in baking was my go-to in my first year teaching the class--and continually reanalyze the problem in light of what we had learned. We discussed the different material properties that would need to be considered when selecting the ideal material for a pizza stone and how we would analyze the heat transfer principles involved. These discussions provided the students with a break from more rigorous derivations and let them apply what they were learning to a real-life problem. It was very rewarding to learn that the next semester, the students that I had taught requested pizza stones as their design project!

Allowing students to teach students: I cannot remember many lectures from my own undergraduate experience, but I do remember working with other students to learn the material. I have tried as much as possible to encourage this type of learning in my own classes in both formal and informal ways. For example, in my transport phenomena class this semester, students were given the opportunity to give five minute presentations in class on any topic they wanted to, as long as they could relate it to principles of heat or mass transfer. The presentations were entirely voluntary, but to encourage students, they could use the presentation to replace one homework grade. The students ended up giving many well-prepared presentations on topics that I never would have thought of (my personal favorite was the principles of heat transfer as applied to chocolate processing!).

Along with these more structured opportunities, I fill my classes with many more informal opportunities for students to teach and learn from each other in daily classes. For example, I commonly pause classes and give students time to discuss a principle or application or work through example problems in small groups. The groups would then send one student to the front to work through the problems for the class. This made the students much more comfortable to think through problems themselves and help each other without feeling isolated.

EXTENDING LEARNING BEYOND THE CLASSROOM

Undergraduate research: My own learning rate rapidly accelerated once I started doing laboratory research and I have tried as much as possible to extend this opportunity to undergraduate students. I currently advise seven undergraduate students in my lab (along with 4.5 graduate students). One of the most important principles when advising the students is to let them have ownership of their own projects rather than just be an assistant to a graduate student. I spend time with each of them in weekly one-on-one meetings to hear their research updates, and they all regularly present their research in group meetings. This has resulted in multiple undergraduate students excelling in their research, with three of them being awarded PURA grants to support their research. More impressively, one of them, as a sophomore, presented her research on fatigue crack initiation at the ASTM conference and took first prize for best oral presentation in her symposium even though she was competing against graduate students.

My undergraduate students are also a key component of reaching out to local high school teachers. Over the summer, I have hosted high school science teachers through Georgia Tech's NSF PRIME program. These teachers spend the summer developing a lesson plan that combines fundamental science principles with art. They worked closely with me and with my

undergraduate students to run corrosion experiments, relating material composition to corrosion rates in different environments. Together, we compiled a lesson plan titled “hopeless pennies,” establishing a fun, informative, and interesting project that the teachers could then bring back to their high school classrooms.

REPRESENTATIVE CIOS COMMENTS

MSE 6110 – Transmission electron microscopy (graduate level, primarily MSE but taken by students from other departments as well)

- The instructor is an extremely well educated, and well spoken. The instructor conveys the course material in a way that is unparalleled.

- Dr. Kacher's greatest strength was **his energy and enthusiasm** for the subject as well as his wealth of knowledge on the course material.

- It was a very practical course and **I could immediately apply it to my research!**

- I enjoyed the project aspect of the course and having the opportunity to see a TEM and connect the classroom theory to the actual system.

- He was easy to approach and established a very friendly environment in the class. You could tell how much he is into the course subject and he had a good hand on the experimental sides of the subjects.

- **Above all, you could tell he enjoys being in the class.** I just want to thank him for his great job this semester. Keep it up prof. Katcher.

- Even though this was the professors first time teaching the course, there is no doubt in my mind that **having anyone but Professor Kacher teach this course would be a mistake.**

MSE 320 – Transport Phenomena (advanced undergraduate course taken by MSE majors)

- (from RateMyProfessor): Kacher makes Transport fun. With YouTube videos, demonstrations, in-class discussions, not only did we move at a very reasonable pace (every lecture has a review from the previous lecture), it was quite enjoyable to be in this class with him. All his lectures are super clear, with all info laid out. Teaches from the book. Exams very fair.

- **I really loved how we went over concepts we didn't understand from the homework after we got it back. I think this made all of the difference for me.** In addition, all concepts, equations, variables, etc. were laid out very clearly at the beginning of each new chapter. I could always refer back to my notes and remember what was going on. We also moved at a great pace, by reviewing new concepts from before in each lecture. Reinforcing the difficult and unusual topics with each lecture and each homework assignment was extremely helpful.

- Atmosphere in the room was pleasantly light-hearted, which opened up personal confidence for two-way communication. Often the atmosphere in a classroom is so quiet and scary that I don't even want to ask questions in class.

- **I liked how you consistently connected the material to the real world**, keeping things in perspective and encouraging us to use our physical intuition.

- I enjoyed when your more philosophical side showed re. the nature of science and life in general. **There were times when you would connect the class material to a general life lesson, which I thought was charming and made your course stand out**. Students love that kind of thing, even though it may not always be apparent from their reactions at the time.

- Dr. Katcher is a very engaging lecturer and provides great notes and background information

- I personally LOVED the material - really cool stuff, so the whole class was great for me. Dr. Kacher's fun and engaging approach to teaching was also really refreshing - loved the in-class breaks and student interaction. Tests were very fair.

- Dr. Kacher is an excellent lecturer! I learned a lot from his class just by taking notes and listening to everything he said. **He is good at engaging students and making the material interesting**. He was helpful meeting 1on1 as well.

- Enjoyed when **he connected what we were learning to real world applications by showing us videos**. It makes me more interested in learning the material when I see a concrete application.

- **He genuinely cared about his students**. Presented material in such a way that it made sense instead of having to go back and reteach myself from the book.

- He was approachable and likable by students. He gave breaks during class so we could rest our brains a little and have a little fun with students presentations to show some real world examples of topics

- **He is amazing in office hours**. Dr. Kacher is good at meeting the student where they are and helping them build a foundation for the new material they are learning. I probably learned the most in this class when I had conversations with Dr. Kacher in his office

MSE 2001 – Introduction to Materials Science (early undergraduate class taken by most engineering students)

- Professor was **very passionate** about the course material.

- Probably had the best mse professor that was teaching (i spoke to friends in other sections that were very displeased).

- The best aspect of the course was the in-class quizzes. They were an excellent measure of our understanding of the previous day's material and were good ways of checking attendance while also preparing for the exams.

- **He really actually cares about the students**. He also seems like he actually wants to be there teaching us basic material science (which unfortunately is all too uncommon). He was very enthusiastic about teaching us.

- Dr. Kacher is extremely well versed in this subject, could easily answer questions and explain it in a manner so that we could understand. **He was patient, flexible, happy, caring, enthusiastic and willing to go the extra mile to help us out**. Considering this was his first semester teaching I think he did an excellent and extremely fair job. I don't hate MSE the way many kids who take the course end up. I'm pursuing a certificate in biomaterials and Dr. Kacher provided a great platform for me to pursue my studies from. I'm very thankful I had him as my professor.

- Honestly, I'm sure you'll get alot of haters here, but you can't listen to the noise, really did an excellent job teaching the course considering this was your first year, really brought alot of **energy and enthusiasm** to the classroom, identified well with students (if a little awkwardly, but we love you all the same)

- Enthusiasm for the subject at hand. It was obvious that the professor thoroughly enjoyed what he wass teaching and enjoyed the profession. The way he tought, was also unique (in my opinion from talking to people in other classes). **He tried to include videos about materials or material phenomena to help entice us with learning the subject.**

- **His greatest strength was in talking about the abstract nature of materials and in asking us to do frequent thought-experiments about what would happen to these materials under different conditions, pulling in real-world examples from the news/YouTube that displayed these phenomenon**, engaging the students in learning.

- Dr. Kacher is **extremely passionate** about his metals. When on the subject you can tell he's in his zone. Very knowledgeable in the material science in general, and is always willing to answer questions in class. I recall one

time like 5 questions were asked back to back and he didn't even break a sweat. he just answered them fully one by one until everyone was satisfied. Also he smiles. And sometimes he's funny. Like once a day at least he makes me laugh. Which is important, it puts a nice atmosphere in the air.

- Asked the class questions every day that were memorable and useful. For example, something like "Do you think diffusing carbon gas into iron would weaken or strengthen the iron?" Then the student would answer, and Prof would follow up with "why?" If the student was wrong, Prof would often ask another question to guide us toward the right answer. I enjoyed this class. Thank you, Dr. Kacher!

CHRISTOPHER L. MUHLSTEIN
Associate Professor

SCHOOL OF MATERIALS SCIENCE AND ENGINEERING
Georgia Institute of Technology
771 Ferst Drive
Bunger Henry Building, room 121
Atlanta, Georgia 30332-0245

PHONE 404•385-1235 FAX 404•894•9140
email christopher.muhlstein@mse.gatech.edu

January 28, 2018

RE: Support for Josh Kacher's CTL/BP Junior Faculty Teaching Excellence Award Nomination

Dear Selection Committee,

I am pleased to have this opportunity to share with you why I think that Josh Kacher is an exceptional candidate for the CTL/BP Junior Faculty Teaching Excellence Award. I have been a faculty member for more than 15 years and am a member of the first cohort of Provost Teaching and Learning Fellows. I have observed Josh in the classroom and served with him on various committees in the School of Materials Science and Engineering. He has achieved a remarkable balance and success in research, teaching, and service. I hope that you will agree that it is time to recognize him for his contributions in the classrooms at Georgia Tech.

Josh Kacher's promise as a world class researcher has been recognized in his recent early career awards from the Office of Naval Research and the Department of Energy Office of Basic Energy Science. For some faculty it is difficult to draw direct connections between their state-of-the art research and teaching. Sometimes the concepts are too advanced for an undergraduate class, and in other cases there may not be enough time. So, I was particularly struck by Josh's lectures on transmission electron microscopy. His lectures are carefully crafted, and blend a range of teaching modes. His approach requires more effort and preparation on his part, but it insures that students can be successful in his class- regardless of what style of information transfer works best for them. Within a single lecture the content is delivered in digital slides, whiteboard-based derivations, and even Socratic interchanges with the students. One of the reasons he engages students so effectively is that he manages to make seamless connections between state-of-the art research in materials characterization and microscopy while teaching a class on its fundamental concepts. All of this prepares them to *apply* the concepts to their own hands-on research project for the class. I wish I had been able to take his class when I was a graduate student.

Even at this early stage in his career, Josh is an effective teacher. I hope that you will agree that the links that Josh Kacher creates in the classroom between research and students should be celebrated.

Sincerely,

Christopher L. Muhlstein

January 8, 2018

To the Junior Faculty Teaching Excellence Award Board:

I am writing to express my support for Dr. Josh Kacher's nomination for the CTL/BP Junior Faculty Teaching Excellence Award. The semester I spent in his MSE 3210 class demonstrated Dr. Kacher's exceptional teaching skills, deep empathy for students, and innovative classroom structure and organization. In my six semesters at Georgia Tech, I have found few other faculty - junior or otherwise - who embody this unique recipe for student success and are so deserving of the Board's recognition.

Amid my undergraduate job search, laden with HR pamphlets and interviews, I have found the word "passion" to be overused to the point of attenuation. However, with Dr. Kacher, there is no better word to describe the driving force behind one of the best teachers at Georgia Tech. His passion pushes him to excellence before setting foot in the lecture hall: class presentations have a logical flow that yield beautifully-organized notes. His ability to simplify complex concepts reveals his unique combination of material mastery and creative thinking.

This passion for teaching, combined with his strong communication skills, makes for an engaging classroom experience. Dr. Kacher is a gifted public speaker, and has a great sense for his audience. Class after class, he accomplishes the impressive feat of making a ninety-minute transport phenomenon lecture interesting. He understands the importance of connecting abstract concepts to the real-world. Dr. Kacher routinely shares videos and anecdotes to reinvigorate the class. He readily shares the limelight, providing students the opportunity to present personal topics on heat transfer. This approach imparted engineering knowledge about chocolate, Bugatti Veyrons, hurricanes, and spacecraft re-entry! Some professors have had to enforce a "No Cellphone" rule to keep the class's attention; in Dr. Kacher's lecture hall, no enforcement is necessary. His teaching style is engaging, interactive, and consequently, effective.

Beyond these scholastic strengths, the most outstanding thing about Dr. Kacher is his approachability. This connection was evident from the very first day of class. Dr. Kacher broke down the traditional barriers between professor and student: "You can call me Josh." While most students (myself included!) struggled with this, preferring variations such as "Professor Josh" and "Dr. Josh," this down-to-earth gesture demonstrated the respect he has for his students. With such a likeable professor at the helm, our class was far more willing to question, challenge, and interact with the material during class. All the way through to the end-of-the-semester slog, Dr. Kacher is energetic, empathic, and humble.

His humility appears time and time again. In class, when asked to slow down, Dr. Kacher was careful to meticulously explain the solution. When asked to provide more workable examples, Dr. Kacher came to the next lecture with original heat transfer problems – based on his years spent living abroad in frigid Russia! After the first exam, Dr. Kacher asked a lecture hall of judgmental undergraduates for improvements and suggestions. The most collective complaint was for a better dry-erase marker. Truly, there was little that

we felt he could improve. His openness to our suggestions and critique, combined with his immediate efforts to adapt, illustrate his constant drive to improve his teaching.

All the unique elements in his classroom stem from a deep sense of empathy for his students. This fall semester was an abnormally chaotic one for the Georgia Tech community. Dr. Kacher was quick to put precedence on the real-life tragedies, and offer flexible scheduling to affected students. This is what elevates Dr. Kacher beyond “mere” teaching excellence to true community citizenship. He is a model professor, mentor, and leader. I cannot recommend him enough for this award.

Best regards,

Carolyn Stanek

Carolyn Stanek
Junior, Material Science & Engineering

Dear Selection Committee,

I am writing this letter with great pleasure and respect for Joshua Kacher as a candidate for the CTL/BP Junior Faculty Teaching Excellence Award. As a student, I have had the pleasure of learning with Dr. Kacher during Fall 2017 in his MSE 3210 Transport Phenomena class, and he has also acted as my research adviser in his lab. Dr. Kacher is a driven, organized teacher who develops inspiring relationships with his students by sharing his enthusiasm for learning and science by challenging his students academically. He also develops his research advisees by encouraging leadership skills and by having them head own research projects. I give the highest recommendation for this award due to Dr. Kacher's role in nurturing the education of students at Georgia Tech.

Before taking Dr. Kacher's Transport Phenomena class, I was beginning my senior year of college. I vividly remember on the first day of lecture how he introduced the class with an interesting question: where would you freeze to death the quickest, in outer space, in an ice bath or in a blizzard? He allowed the class a few minutes to confer what the correct answer would be. After the alloted time, he turned our attention to the screen where he played a video from a movie where an astronaut in outer space cracked his helmet and immediately froze to death. He asked the class what we thought that the answer was, and most of the students answered outer space. Dr. Kacher turned to teach us about the three major modes of heat transfer: convection, conduction and radiation. He told us that in outer space that heat is only lost solely by radiation, so the class and Hollywood was wrong. After a few weeks of lecture of learning the fundamentals of heat transfer, we returned to the question. The students were able to mathematically and intuitively prove that one would freeze to death the quickest during a blizzard due to the coupled effects of heat loss from the body through radiation and convection. Dr. Kacher's course was one of the highlights of my Georgia Tech experience and I credit him for making a fun, interactive and engaging experience.

I have personally benefited from working with and learning from Dr. Kacher. I have implemented the knowledge of initial and boundary conditions that I gained from his class in my other courses at Georgia Tech. I also used my knowledge gained of mass transfer to design experimental methods for senior design. 3M is hoping to design a test method in order to simulate water coming up from underneath an adhesive material for Spring 2018 project. I was able to write a competitive bid to 3M that proposed experimental methods that implemented the fundamentals of mass transfer. Dr. Kacher has taught me vital material that I will implement and always value in industry.

Under Dr. Kacher's lab, I feel as though I have grown and learned more here during my time doing research than anywhere else at Georgia Tech. I began my work for Dr. Kacher last semester, and I have spent my time developing leadership, networking and scientific skills. Dr.

Kacher and his graduate students are some of the brightest people I have met on campus. I learn more about materials and research methods everytime I talk to them. The work that I do with Dr. Kacher turns the textbook concepts from class into real-life scenarios where I need to implement experimental methods and critically analyze materials in order to determine material mechanical properties, mechanisms of deformation and characteristics. Dr. Kacher and his students are passionate about viewing materials from a fundamental point in order to determine the very nature of materials so that materials might be better understood.

Dr. Kacher has been driven to develop his skills as a professor. As a fairly new professor at Georgia Tech, Dr. Kacher has put an emphasis on student feedback for reforming his lecture style in order to improve the learning experience for his students. It was a genuine pleasure taking Dr. Kacher's class because he made the class interesting by having enthusiasm for the material, encouraging in class discussion, employing effective teaching styles, and challenging yet encouraging critiques. His passion for research and the sciences also inspire his research advisees to push forward and dig deeper into their projects. Dr. Kacher taught his researchers and students to always approach engineering problems from a fundamental mindset in order to be real-world scientists or industry-ready designers that would highly respected on the globalscale.

Now, after four years of studying at Georgia Tech, I can say that Joshua Kacher has been one of the best professors that I have experienced. And on behalf of all of the students that have had the pleasure of learning from his class, I can say that Joshua Kacher is a greatly qualified and deserving candidate for the CETL/BP Junior Faculty Teaching Excellence Award.

Sincerely,

Amy Clark
B.S. Materials Science and Engineering

To the CETL Awards Committee:

I have the privilege to write this letter recommending Dr. Kacher for the CTL/BP Junior Faculty Teaching Excellence Award. I have known Dr. Kacher for a little over a year both as a professor and a mentor. In this brief time Dr. Kacher's passion, respect, and wit have made a strong impression not only on me but many other students as well.

Some professors see teaching as an additional duty that interferes with their laboratory work. After the first few lectures in Dr. Kacher's Transport Phenomena class, it was quite clear to me that he did not see teaching this way. Even though the class is among the most challenging courses in the school of Materials Science, it remains one of my favorite to this day. He was always finding new ways to keep class interesting, whether it was bringing in liquid nitrogen to demonstrate an aspect of thermal conductivity or showing the class YouTube videos to illustrate heat capacity.

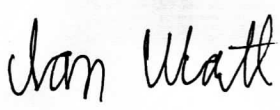
Dr. Kacher excels as a teacher because he is able to keep the attention of students and is able to explain topics in a succinct manner. Of all the professors I have taken classes from, Dr. Kacher is likely the most entertaining. He constantly made our class laugh by telling jokes about heat transfer, which is not easy. When he wasn't telling jokes, he was explaining a new topic or working out a problem. He showed us how to set up any problem, no matter how complex, so that we could solve it. It is rare to find someone who can so effortlessly keep a class' attention for fifty minutes and make sure that everyone has a strong grasp of the material.

Several times throughout the semester Dr. Kacher asked my class what he could be doing better as a teacher and if there was anything is particular students were finding difficult. Many students told him that they struggled with his homework and that despite spending many hours a week they were unable to finish it. Instead of ignoring this fact, he decided that we should not spend more than five hours on a single homework assignment. He established that if we could not finish the homework within that time, we could tell him when we turned it in and still receive credit. While this may seem trivial, it showed that Dr. Kacher was determined to become a better teacher and willing to try new ways to achieve that goal.

In addition to knowing Dr. Kacher as a teacher, I had the pleasure of working with him on a Learning and Discovery (L&D) project for the Materials Innovation and Learning Laboratory (MILL). Out team focused on the characterization of consumer products and Dr. Kacher served as our advisor. Whenever we met with him and explained our plans he always provided us with constructive criticism that helped us move forward. His insights always helped us make connections and see potential problems before they occurred. He always pushed us to try new things and showed us how to learn from our mistakes. Without his advice, our team would have accomplished a lot less.

I can think of no better candidate for this award than Dr. Kacher. He fully dedicates himself to both the Materials Science and Engineering department and his students. He pushes those around him to be more inquisitive and to not give up. His constant encouragement and aid have influenced me as both a student and a person. I am truly grateful to have gotten to know Dr. Kacher and to get the chance to write this letter as a small token of my appreciation.

Sincerely,



Ian Watt

4th Year MSE Undergraduate Student