

Application Details

Manage Application: Undergraduate Educator Award - 2018

Award Cycle: 2018

Internal Submission Deadline: Friday, February 2, 2018

Application Title: Pai

Application ID: 002261

Nominator's First Name: Susan

Nominator's Last Name: Margulies

Nominator's Title: Chair

Nominator's Primary Organization: COE BME

Nominator's Email Address: susan.margulies@gatech.edu

Nominator's Phone Number: 404 385-5038

Nominee's First Name: Balakrishna

Nominee's Last Name: Pai

Nominee's Title: Director, Instructional Laboratories

Primary Organization(s): BME - Biomedical Engineering

Nominee's Email Address: balakrishna.pai@bme.gatech.edu

February 2, 2018

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

RE: Nomination of Dr. S. Balakrishna Pai for the 2018 Undergraduate Educator Award

Dear Members of the Award Selection Committee:

It gives me great pleasure to write this letter in support of the nomination of Dr. Pai for the Undergraduate Educator Award.

Dr. Pai is involved in the undergraduate curriculum research and teaching in the department. He is currently involved in the instruction of the senior required laboratory course “Quantitative *Engineering Physiology II*.” Dr. Pai has structured the course to allow the students to conduct project-driven research. This is accomplished by students proposing strategies to tackle biomedical problems such as cancer and perform hands-on experimentation. This innovative pedagogical approach has created a superior learning experience for the students as evidenced by Dr. Pai receiving the Innovation and Excellence in Laboratory Instruction Award.

The novel course instruction structure of BMED 3610 has received very positive responses from students. With near-perfect CIOS survey scores and glowing open-ended students’ responses, Dr. Pai received the Class of 1940 Course Survey Teaching Effectiveness Award in 2017.

Beyond his leadership in BMED 3610 instruction, Dr. Pai contributes to various BME undergraduate educational programs, and also serves on the BME Undergraduate Curriculum Committee and Undergraduate Awards Committee. For example, he has facilitated multiple semesters of BMED 1300 “*Problems in Biomedical Engineering*” (now BMED 2250). He also works with teams that need resources and guidance for their prototype/assay development in BMED 2250 and Capstone Design. Additionally, Dr. Pai serves as a research mentor for undergraduates, judging student proposal presentations, senior thesis reviewer/reader and participation in summer research programs. He also does outreach activities for high school students.

With extensive experience in the biomedical field, Dr. Pai makes every effort to impart his knowledge and expertise to students by means of innovative teaching approaches. The student organization awards (GT BME Society – Above and Beyond Award and BME SAB – Outstanding Commitment to Teaching Award) are a testament to his passion and efforts for creating an exemplary learning experience for students.

Award Selection Committee
February 2, 2018
Page 2

It is with great enthusiasm that I nominate and support Dr. Balakrishna Pai for the Undergraduate Educator Award.

Sincerely,



Susan S. Margulies, Ph.D.
Georgia Research Alliance Eminent Scholar in Injury Biomechanics
Wallace H. Coulter Chair
Wallace H. Coulter Department of Biomedical Engineering
Georgia Institute of Technology and Emory University

Undergraduate Educator Award

Contents

Reflective Statement on Teaching 1

“Quantitative Engineering Physiology II” (BMED 3610 course) 2

 Development of BMED 3610 2

 Learning Benefits for Students 3

 Data on Research Innovation by Students 4

 Student Enthusiasm to Continue Research for Publication 4

 Benefits beyond Graduation 4

Instructor Efforts to Provide Student Learning Experience..... 5

 Served as a Faculty Reviewer/Reader for Many Undergraduate Theses: 6

Illustration of Teaching Excellence 6

 Information from CIOS Surveys 6

 CIOS Scores 7

 CIOS Survey Excerpts of Student comments on Course and Instructor 8

 Thank-A-Teacher..... 9

 Awards and Honors 11

 Funding Procurement..... 11

Undergraduate Mentoring During Summer 12

Outreach Activities 12

Membership on Committees..... 12

Conference Attended 12

Publication 12

Reflective Statement on Teaching

Teaching has been my passion throughout my career. I have noticed over the years that a better learning experience comes from student involvement. My teaching strategies, therefore, involve empowering students in the class in problem solving. The Quantitative Engineering Physiology II, an independent research course, which I teach, provides opportunities to introduce

pedagogical strategies that allow students to propose their own projects and perform hands-on experimentation. In a biomedical engineering field, this also opens up avenues for the students to learn in-depth on a specific problem and engineer strategies for solution. To achieve these goals, the course has been designed to impart a number of attributes that would be useful beyond graduation. In addition to making sure the students receive the necessary course material, certain essential elements are embedded in the curriculum, which are as follows:

- Development of an entrepreneurial mindset to foster curiosity, critical thinking and analytical skills.
- Master problem solving skills by hypothesis driven experimentation.
- Improving communication and writing skills.
- Successfully perform in a collaborative environment by working in teams.
- Creating value for oneself and the field.

To achieve the above objectives in a laboratory course, I have made certain that the students have access to the latest technologies at their disposal. I have made efforts to acquire cutting-edge instruments to perform the proposed experiments. I also make sure that I am accessible to the students to answer their questions or teach them novel techniques. This teaching philosophy formed the foundation for building the BMED 3610 course. The course is offered during Spring, Summer and Fall semesters. During Spring and Fall semesters, there are on an average of 120 students enrolled during each semester. This translates into approximately 25 to 30 teams performing independent projects.

“Quantitative Engineering Physiology II” (BMED 3610 course)

Development of BMED 3610

BMED 3610 is a required laboratory course in the Wallace H. Coulter Department of Biomedical Engineering. This course curriculum provides a unique learning environment where students solve biomedical problems working in groups (no more than 5), thereby providing the students with the opportunity to acquire skills that are invaluable as they advance in their careers. This is a research-based senior course (large class) where the students come up with a research proposal in a biomedical field, at present on cancer, and conduct experiments using cell culture model systems to validate their hypothesis. This course provides students with opportunities to develop novel strategies by performing hands-on experimentation in a collaborative environment, analyze the acquired data and develop communication and writing skills. Additional elements of the course are: a) students authoring their own protocols and not following predefined procedures, b)

ability to carry out and gain expertise in current techniques/technologies in the field and c) providing students with opportunities to identify potentially translatable technologies to biomedical problems. The identification of critical elements in a biomedical problem, strategizing interference approaches for disease state and experimental validation, helps to develop an entrepreneurial mindset in students which is critical for their future success in the real world.

Learning Benefits for Students

Innovative curricular design of BMED 3610, provides the students with a greater learning experience by allowing students to engineer strategies for intervention of a biomedical problem. Such a pedagogical approach is rare in a research-based curriculum. In the majority of research-based or lab courses, students have to learn a set of techniques following a standard protocol. In contrast to this traditional style of teaching, the new structure in BMED 3610 shifts the focus to students developing their own research strategies in a problem-based project-oriented learning environment. This problem-based project-driven design has several merits. The students get an opportunity to develop concepts, design strategies and perform hands-on research to test their hypothesis. During this process, not only do students gain valuable experience performing experimentation, they also develop other skills essential in any career: critical thinking, analytical approach, presentation of data and writing skills. The proposals that students put forth are formatted similar to an NIH grant proposal, but on a smaller scale. It includes background, motivation, hypothesis, specific aims, research strategy, expected outcomes, alternative approaches, timeline and relevant references (bibliography). There is constant interaction of the instructor with the students for providing needed information, expertise and resources analogous to a grad student-advisor relationship. At the end of the semester, the study results are discussed in a poster presentation. The students also write individual reports of their finding, mirroring a draft manuscript that researchers prepare for publication.

In contrast to traditional lab courses, BMED 3610 instruction provides a better learning environment. The weekly lectures provide the necessary background information followed by discussion and experimentation in the lab. The formulation of proposal allows the students to critically assess the current state of a biomedical problem and propose a testable research

strategy. Conducting experiments using appropriate techniques/technologies also allows mastering the methodologies relevant to research in the field. Novel findings also have the potential for Intellectual Property (IP) as well as for publication in a research journal.

Results on the course performance have provided very encouraging information both on the learning and research fronts. Majority of the students have submitted outstanding reports of their findings and made presentations of their data with great enthusiasm during the poster presentations.

Data on Research Innovation by Students

Several unique observations were made during the past semesters. Students performed a wide array of projects to interfere with the major pathways observed in the genesis of cancer. The projects involved using specific small molecules either individually or in combination, molecular strategies such as siRNA application and key receptor binding assays. All the aforementioned approaches will ultimately interfere with pivotal “circuits” (Signaling pathways) of cancer. The multitude of strategies employed allowed the students to learn an array of techniques such as drug screening, drug synergy/antagonism, cell migration assays, Western Analysis, flow cytometry and immunofluorescence to assess the mechanism of action of anti-cancer therapy.

Student Enthusiasm to Continue Research for Publication

Several students who have generated novel data are continuing their research to further support their findings on novel strategies to treat cancer. These findings will be submitted for publication in peer-reviewed journals. Four projects have been completed and the students are preparing manuscripts for submission to peer-reviewed journals.

Benefits beyond Graduation

Students who have graduated have expressed that taking the BMED 3610 course has helped them to successfully perform in their new work environments. During the course, they learnt important skills such as collaborative work in a team environment to overcome hurdles encountered and employ innovative strategies to accomplish the goals of the projects they have undertaken. Thus, learning experience derived from this course is of great value beyond graduation when the students enter into careers of their choice.

Instructor Efforts to Provide Student Learning Experience

Several positive outcomes are achieved by this innovative laboratory instruction. The major ones are: a) meeting the demands for undergraduate research by providing opportunities to tackle a research project; b) providing students with a learning and research experience that mirrors what research professionals do; c) empowering students with skills such as developing concepts, designing strategies for problem solving and execution in a collaborative environment which are important attributes needed in their future careers. Additionally, the proposed pedagogical approach would help tremendously those who want to pursue graduate school. BMED 3610 serves as a “bridge” between undergraduate and graduate curriculum helping students to transition with confidence as well as perform well at the graduate level. *The course also provides every undergraduate in the BME department an opportunity to engineer a strategy and test it out with hands-on experimentation. The students also develop the entrepreneurial mindset and skillsets needed to tackle biomedical problems in the real world. Kern Entrepreneurial Engineering Network (network of 31 engineering schools) encourages faculty to incorporate in engineering curricula strategies for entrepreneurial mindset development. KEEN’zine has recently published an article on BMED 3610 highlighting how the course allows the students to develop the entrepreneurial mindset and necessary skillsets for success. Link for the article is: <http://online.fliphtml5.com/zyet/ykie/#p=30>*

Every effort is made to make sure that all the students excel in the course. I work with students that need additional guidance on any aspect of the course including going over the course material as well as demonstrations in the lab.

Additional Courses/Programs Contributed to:

- Mentoring undergraduates in research (BMED 4699).
- Research guidance for PURA (BMED 4698).
- Conducting summer program in engineering physiology and molecular biology for Peking University (PKU) senior BME undergraduates to gain hands-on experience in current strategies in the field.
- Research guidance for BMED 3610 students who continue their project beyond the semester. Currently 4 groups have completed their work and are preparing manuscripts for submission to peer-reviewed journals.

- Facilitating multiple semesters of BMED 1300.
- Guiding and working with teams in my area of expertise for their final prototype development in BMED 2250 as well as in Capstone.
- Judging proposal presentations in BMED 3600.

Served as a Faculty Reviewer/Reader for Many Undergraduate Theses:

“On demand multi-drug release using cleavable chemistry” -by Alishah Merchant

“Expression of heat shock proteins in the presence of oxidative stress in the SOD1-G93A Amylotrophic lateral sclerosis mouse model” - by Kamren Bernhardt

“Assessing the stiffness of the Achilles tendon using Laser Doppler Vibrometry” -by Dong Bo Choi

“Immobilization of immunoglobulin G Antibodies using Janus microparticles” -by So Yun Han

“In Vivo study of brain tumor migration via electrospun nanofiber implants” - by Jae Sung Cho

“Morphology change of optic nerve sheath (ONS) in idiopathic intracranial hypertension (IIH) patients (pre-and post-CSF drainage” -by Chansu Kyle Kim

“Potential therapy against glioblastoma using motile nanocarrier expressing TRAIL and Azurin” -by Malvika Sanghvi

“A biophysical model of endothelial cell behavior during cerebral cavernous malformation” - by Daeun Park

“Development of poly ethylene glycol hydrogel system for delivery of interleukin-10”-by Huijie Jiang

Illustration of Teaching Excellence

Information from CIOS Surveys

The CIOS survey reports for the past semesters have been very positive with perfect to near perfect teaching effectiveness scores. More importantly, there was a unanimous consensus among students, as seen from the comments, that BMED 3610 offered a unique learning environment where the students had the freedom to propose a strategy as well as to perform

hands-on experimentation to validate their strategy. The Instructor Overall Effectiveness Score for 2016 and 2017 are given below:

CIOS Scores

Course (Six sections)	Semester	Year	Total Students	Percent Responded	Average Score (6 sections)
BMED 3610	Fall	2017	111	80	4.88
BMED 3610	Summer	2017	10	90	4.90
BMED 3610	Spring	2017	127	77	4.98
BMED 3610	Fall	2016	113	82	4.90
BMED 3610	Summer	2016	15	80	5.00
BMED 3610	Spring	2016	119	90	4.95

Total Students for 2016 and 2017: 495

CIOS Survey Excerpts of Student comments on Course and Instructor

Question: Course best aspect	Dr. Pai is the best professor I have had the pleasure of working with for so many reasons. In particular, it is very evident that he cares about the students and really worked incessantly to teach proper lab experimentation technique and analysis. I have never had a professor make himself as available as Dr. Pai did for us this semester. Whenever we needed him, he was there. He not only helped a great deal, but he made sure we understood what we were doing, which was the most valuable part. I loved taking this class.
Question: Course best aspect	That we got to learn the techniques while doing a novel project
Question: Course best aspect	Dr.Pai was a great teacher and very helpful in facilitating learning.
Question: Course best aspect	The course provided expensive materials to the students which helped gain experience that could not be otherwise gained
Question: Course best aspect	Being able to propose and create your own experiment as well as the independence conducting the experiments.
Question: Course best aspect	Hands on and practical experience
Question: Course best aspect	Getting to do hands-on lab work from the very beginning of the semester was a really cool experience, especially with no prior cell experience
Question: Course best aspect	If you have never participated in research, this is totally different from anything that you've ever done before. It was awesome to do such hands-on projects.
Question: Course best aspect	Learning concrete skills.
Question: Course best aspect	It was great to learn about science and biology in a lab setting. I have not had the chance to take many bio labs.
Question: Course best aspect	Getting to learn what it was like to be in research but not be overwhelmed while doing so!
Question: Course best aspect	I loved it! The lab experience was great. I got to learn so many new techniques and methods to learning about cancer cells.
Question: Course best aspect	The hands on lab experience in completing our own proposed experimental aims.
Question: Course best aspect	Exposure to cell culture
Question: Course best aspect	The capacity to get hands-on with a lot of these processes in cell culturing. Learned so much from the capacity to work on these things that I had only read about in the past. Also, the journal club and opportunity to do novel experimentation is an incredible opportunity

	Question: Other overall comments	Dr. Pai was awesome. He took the time to speak with students and learn their names. He was very understanding and always willing to help.
Pai	Question: Instructor greatest strength	Extremely kind and approachable. Very wise and an overall very effective professor.
Pai	Question: Instructor greatest strength	Nicest Professor!
Pai	Question: Instructor greatest strength	Dr. Pai was one of the best instructors I have had at my time at Tech. I have learned so much in this class.
Pai	Question: Instructor greatest strength	Very clearly cares for his students and is personally invested in helping them succeed
Pai	Question: Instructor greatest strength	Dr. Pai is the best professor for a course I've had in all my 4.5 years at Tech. He is kind, smart, and sensible. Most teachers in the BME department seem like they're there for research and only teach a class as a required secondary aspect to their job. Not Dr. Pai. If Dr. Pai does official research, I wouldn't even know, because he makes it seem like his main purpose for being at Tech is our class. His course is well designed, and his administration of it is just as good. He is extremely helpful when he is in lab, since his cell-culture techniques are just as top notch as his theoretical knowledge.
Pai	Question: Instructor greatest strength	Very kind, approachable, supportive; also seems to know a LOT and always has great suggestions for making an experiment better or potentially more successful, eg. when giving feedback after presentations
Pai	Question: Instructor greatest strength	His feedback and advice during pre-lab presentations and proposals
Pai	Question: Instructor greatest strength	Dr. Pai is one of the most kind and caring professors I have ever gotten the opportunity to meet at Georgia Tech. He is always willing to meet and work through problems and always knows exactly what to say to calm you down. He is definitely the best professor I have had in the BME department and I wish I would have had the chance to meet him earlier.
Pai	Question: Instructor greatest strength	Dr. Pai is incredibly helpful and invested in his student's well being and is just amazing.
Pai	Question: Instructor greatest strength	Interaction with students. Everyone loved him. He was an amazing!

Thank-A-Teacher

I have received 15 Thank-A-Teacher notes. A few excerpts are given below:

UNDERGRADUATE RESEARCH SPRING 2013

Thank you so much for taking in a little Freshman with no lab experience and giving me an amazing opportunity to try something completely new. I am so glad that I am working for you.

You are always so understanding and helpful whenever I am needing assistance. I really look forward to working with you for many semesters to come. Thanks again.

BMED 1300 SPRING 2015

You are such an encouraging teacher and mentor! I have never felt uncomfortable coming to you for help on classwork or just with life. You have enhanced my college experience and have boosted my morale in the hard times that come with being a BME student at Tech. Thank you for everything, Dr. Pai.

BMED 3610 SPRING 2016

Thank you so much for helping us through our entire final project for BMED 3610. I know you came in on weekend and holidays and skipped lunches so that we could get everything done and I really appreciate that! You're the best!!

BMED 3610 SUMMER 2016

Thank you for always inspiring us to research more, think harder, and question further. You always find time for students, always meeting their needs to help them reach their goals. Thank you for helping us find new interests, passions and opportunities; and thank you for going above and beyond what is necessary to teach in order to help shape the engineers, physicians, and researchers of tomorrow.

BMED 2250 FALL 2016

Thank you for helping our team and giving us advice for our BMED 2250 project!

BMED 3610 FALL 2016

Thank you so much for all your help and guidance this semester. It was a unique opportunity for me to learn how to detect knowledge gaps then design and conduct experiments in order to fill them. I really appreciate all your feedback and help, especially throughout module 5 when we had setbacks in the wound healing assay and in learning how to do the western blot. You are very dedicated into helping us learn and get the most out of this experience, which definitely doesn't go unnoticed.

BMED 3610 SPRING 2017

Thank you so much for your dedication to us students. I have never met a teacher that spent so much extra time helping students (even if it meant skipping lunch). I am learning so much in this class and it is because of all the extra time that you put in to help my teammates and me. This has been my favorite BME class taken thus far. Thank you again for all that you are doing.

BMED 3610 FALL 2017

Thank you for not only being a great mentor but also professor to my team for 3610. Through all our challenges with our project, you were there to give us support and advisement. In addition, you helped guide us to solutions that we have not realized prior to speaking with you. Your enthusiasm for mentoring shone through, and we very much appreciated how quickly you responded to our questions.

I have also been a mentor for students who were lagging behind in my class and have encouraged them to get ahead. I am happy to mention that they turned out to be successful at the end of the semester. Similarly, I have worked with students who had personal problems. Working one-on-one with them, I have been successful in helping them categorize their priorities. With this approach, I have seen them succeeding and becoming productive individuals.

Awards and Honors

- Class of 1940 Course Survey Teaching Effectiveness Award
- Above and Beyond Eagle Award by BMES-GT Society
- Innovation and Excellence in Laboratory Instruction Award
- Outstanding Commitment to Teaching Award by BME-SAB

Funding Procurement

Grant	Description	Amount
Technology Fee Instrumentation 2016-2017	Flow cytometry, Cell counter, Nanodrop, Nikon microscope	\$92,795
Technology Fee Instrumentation 2017-2018	IR-imager, Electrospinning unit	\$87,025
Coulter Equipment Endowment	Real-time PCR QuantStudio QIAcube	\$55,000
Coulter Research	Student stipend	\$1,500
Giglio family foundation-2017	Stipend and research supplies-breast cancer research	\$4,500
Giglio family foundation-2018	Stipend and research supplies-breast cancer research	\$7,500

Additionally for the Fall 2017 semester, one student was awarded PURA funding to work on prostate cancer inhibition.

Undergraduate Mentoring During Summer

In addition to the Peking University program, I have mentored multiple summer undergraduate programs:

1. Summer Undergraduate Research Experience (SURE).
2. National Nanotechnology Infrastructure Network(NNIN) .
3. China Undergraduate Research Exchange (CURE).

Outreach Activities

During the semester as well as during the summer, I have mentored high school students from various schools in the Atlanta area.

I also provided lab tours and served as a judge for the final presentation of students in the Talent Identification Program at GT during the summer of 2016.

Membership on Committees

BME Undergraduate Curriculum Committee
BME Undergraduate Awards Committee
BME Reappointment, Promotion and Evaluation Committee
Georgia Tech Chemical and Environmental Safety Committee
Georgia Tech Biological Materials Safeguards Committee

Conference Attended

KEEN Engineering Unleashed, Annual Winter Conference, January 4-6, 2017. Jacksonville, Florida

Publication

Pai , S. B. Fighting the Big C with the 3C'S. In: A Handbook for EML. KEEN'zine, published by KEEN Engineering Unleashed, 2017, pages 30-33. Link: <http://online.fliphtml5.com/zyet/ykie/#p=31>

January 26, 2018

Dear Awards Committee,

I am writing this letter to provide my enthusiastic support for Dr. Bala Pai for the Undergraduate Educator Award. I have been a colleague of Bala's for several years and have observed his work both during my time as the Associate Chair for Student Learning and Experience and as a fellow instructor in the Wallace H. Coulter Department of Biomedical Engineering. It is because of his excellence in teaching, his impact on multiple diverse kinds of students, his dedication to pedagogical innovations, and his accessibility to students, that I believe he is deserving of this award.

First, let me describe the engineering laboratory course he developed, for which he has previously won the Innovation and Excellence in Laboratory Instruction Award. Virtually every engineering major has laboratory courses that teach students how to carry out experiments to generate data needed to solve a problem. Students learn how to carry out many of the common procedures employed by scientists in their discipline. For biomedical engineering, this would likely include gel electrophoresis, western blots, polymerase chain reaction, and ELISAs, to name a few. Unfortunately, in many laboratory courses, students are taught these procedures as if they were cooking recipes, largely out of context from why these procedures might be needed for real-world applications. Not in Bala's class. What makes Bala's class so special is that he challenges and empowers his students to find their own problem to investigate. Very few constraints are placed on the students. Last semester, the only constraint was that their problem needed to be about cancer. This is extremely motivating to students because they are given a lot of choice about what problem to solve, what to learn, and they are doing actual research on a real-world significant health issue that affects millions of people around the world. This freedom could be overwhelming for some students, but Bala carefully structures his course to position his students for success. Student evaluations of his teaching effectiveness are stellar. The response rate on his end of course evaluations routinely exceed 75% and his "instructor effectiveness" scores almost always range from 4.8 to 5.0. One student recently said of his course: "The ability to take our own interests into account was the best aspect of this course. The choosing and creation of experiments that were centered around our interests further motivated me to do more in the class. Also the TAs and Professor were a joy to work with. Always helpful".

But Bala's contributions to our students' education extend far beyond the course he designed and teaches. I can only give a small glimpse into his contributions due to having to keep this letter to one page in length, but given the time and space I could write a book. Here we go: Bala routinely mentors undergraduates who are doing research in one of our professor's labs, for which they earn depth credit. Every summer, he conducts a program in engineering physiology and molecular biology for students who are visiting from Peking University, to give them hands-on experiences in current strategies used by researchers. He provides research guidance for students who have finished taking his course but wish to continue their work so that they can get it published in a peer-reviewed journal. Currently he is working with four such groups of students. Many times he has served as a faculty reader for undergraduates who are submitting a thesis for the Research Option program. He helps students taking other courses by judging project proposals submitted in our physiology course (BMED 3600), or by guiding teams working on our sophomore level design course (BMED 2250). Bala does not teach either of these courses – he just wants to help. On top of all these things, Bala often mentors high school students from various local schools, he works to procure funding to buy instrumentation for our labs, and he contributes to the department and Georgia Tech by serving on multiple different committees, including our undergraduate curriculum committee, our undergraduate awards committee, Georgia Tech's chemical and environmental safety committee and Georgia Tech's biological materials safeguards committee.

In short, Bala is a passionate, creative, and dedicated educator. I endorse his nomination for the Undergraduate Educator Award with the strongest possible enthusiasm.

Sincerely,



Joe Le Doux, Ph.D.
Wallace H. Coulter Associate Chair for Student Learning and Experience
Georgia Institute of Technology and Emory School of Medicine

To Whom It May Concern:

I am honored to write this letter in support of Dr. S. Balakrishna Pai's nomination for the Undergraduate Educator Award. I have known Dr. Pai for almost two years, as both a professor in class and a research advisor. He is deeply committed to pushing the frontier of cancer research and nurturing students' understanding and appreciation for the STEM field. His unceasing ability to convince students to pursue their class research projects after completing the course further attests to his promotion of student's education both inside and outside of classrooms. I highly recommend that his persistent positive impact on undergraduate students' learning be recognized by receiving the Undergraduate Educator Award.

I believe any educator can define a curriculum that covers mandatory material for a course and find a means to evaluate students' learning of it. A good educator, such as Dr. Pai, goes above and beyond this definition of educator. He decided to have his cellular lab class focus on cancer research because he understands that students are more engaged and thus learn better when the material they are taught is applicable and relevant. Everyone hears about the importance of cancer research, and he shows students that even in a mandatory undergraduate class, they can make an impact on such a heavy subject. This drives students to learn the lab techniques well and promotes independent, critical, and creative thought from the students as they design their own cancer research experiments and follow through with them in his class. Dr. Pai teaches them to be well-rounded researchers who have the lab skills and foundational biological knowledge, and who understand how to critically review peer-reviewed literature, how to design experiments, how to run the statistical analysis for the results, how to present all the information, and so much more. This professor consistently makes himself both approachable and available to discuss both course material with students and their own progress and goals. Dr. Pai drives students to pursue their dreams whether they are in industry, academia, or medicine, and he supports them every step of the way. It was in his class that I discovered my interest in medical research, and from there shifted my post-graduation goals. He has supported my cancer research over the last year by advising me when I was unsure of my next steps and by advising my path with graduate school applications and my scheduling to give myself enough time in academics, extracurricular activities, and work. Dr. Pai promotes growth of every student because he is aware that he is molding the next generation, and he wants it to overcome all the obstacles it may face.

As mentioned earlier, education goes beyond teaching pre-defined material and establishing grading criteria. It is about training the next generation to pick up the flag and carry it further than it has been before, to promote innovation, progress, and growth. Dr. Pai does not just teach a lab class so that BME students can say they have had some cell lab experience on applications; he teaches a class that dives deep into the relevance of cancer and the plethora of ways research can address such a current and terrifying issue. He also offers the use of his lab to student's working on projects outside of his class and willingly advises them throughout their projects. He gets involved. He starts off every conversation asking how students are doing because he knows their mental health and complicated lives matter. He recommends breaks between research investigations because constant stress suffocates creativity and passion, and he states that both are necessary to be a successful researcher. Dr. Pai explains the how's and whys' of what we should know and understand. This non-tenured undergraduate professor has one of the biggest impacts on GT BME students simply because he does not see his title as an

educator as being his job, but his purpose, and one with which he plans to make a lasting impression, no matter how small.

Therefore, I strongly support Dr. Pai's nomination for the Undergraduate Educator Award without any reservations. It has been a continued pleasure to learn from him and further my research under his advisement for over a year, and it is my sincerest hope that you will choose him for the Undergraduate Educator Award this year.

Sincerely,

Olivia Lodise
Undergraduate Biomedical Engineering Student – Class of 2018
Georgia Institute of Technology
olodise@gatech.edu
404-375-2386

Dear Undergraduate Educator Award Committee,

I have known Dr. Pai for 7 years now, since I was a freshman at Georgia Tech back in 2011. I have interacted with him in his capacity as an instructor and mentor both in and out of the classroom. During my undergraduate career at Georgia Tech, I have come to know Dr. Pai very well, and I believe he is well-deserving of the Undergraduate Educator Award.

Dr. Pai is an excellent educator, and he goes above and beyond to help his students. When I took his class BMED 3610, Dr. Pai made it very clear that he was available and wanted to help every group succeed in the lab course. My group and I met with Dr. Pai multiple times throughout the semester as we developed our research project, and thanks to his class I have learned skills such as proposal writing and research development that have carried on in my professional career as a veterinarian-scientist.

Not only is Dr. Pai an excellent instructor, but he is also a genuine mentor to his students. Dr. Pai was my research mentor during my time at the Bellamkonda lab. As a freshman, it was my first exposure to research, and I was not feeling confident about myself. Dr. Pai always checked in with me to see how I was doing not just professionally, but personally too. When I was undecided about summer plans, it was Dr. Pai who encouraged me to apply for PURA. That summer I was awarded the grant, and I worked on an exciting neuroengineering research project and began to gain confidence in my skills as a researcher. Dr. Pai also proved to be a mentor I could look to for advice as I decided to pursue veterinary medicine, an uncommon career path for biomedical engineering majors, in my junior year. Dr. Pai was very supportive and connected me with veterinarians he knew. Through these contacts, I learned about opportunities in the veterinary field that could blend my background in BME, and I decided to pursue a career in lab animal medicine and comparative medicine research. Dr. Pai's support and encouragement had great influence on my decision to pursue a career in science, and thanks to him, I will be the first in my family to earn a doctorate degree.

I personally have benefitted so much from working with and learning from Dr. Pai, and I can think of no better person than him for the Undergraduate Educator Award. I sincerely hope that his efforts as a teacher and mentor will be recognized through this award.

Sincerely,

Gerina (Greena) Kim

January 28, 2018

To Whom It May Concern:

I enthusiastically support Dr. Balakrishna Pai for the Undergraduate Educator Award. My name is Monali Shah, and I am a recent graduate from the Biomedical Engineering department. I had the pleasure of meeting Dr. Pai through his participation on the Undergraduate Curriculum Committee for BME, and then as my professor for Quantitative Engineering Physiology Lab II. In addition, he has served as my mentor throughout the past few semesters, providing me with career advice and ensuring I achieve my goals. I believe that Dr. Pai is the best candidate for this award based on his inspiring teaching abilities and compassion for his students. He is an icon of guidance and leadership for students, and I am honored to write this letter in support.

As the Director of Instructional Laboratories, he excelled at his role. His instructional style immediately stood out from other professors I have had on campus. His passion to see his students succeed was evident from the first day of class. Dr. Pai viewed his course as a time for interactive discussions and problem based learning, allowing all students to pursue a wet-lab project they were passionate about, ensuring us that the “sky was the limit” when it came to innovation. As a student, I was always engaged and able to gain a deeper understanding and appreciation for the subject. Even though I had limited cell physiology background compared to other students, Dr. Pai was willing to meet with me multiple times outside of class, and explain the topics taught until I understood them. Furthermore, Dr. Pai was always interested in student learning. His involvement in the Undergraduate Curriculum Committee proved his mission to improve student learning. Moreover, his active participation with the Student Advisory Board’s faculty-student events showed how much he valued getting to know his students, and spend time with them outside of class. Dr. Pai was also awarded the Outstanding Commitment to Teaching Award, Innovation and Excellence in Laboratory Instruction Award, and the Above and Beyond Eagle Award to highlight his involvements with the BME department and students.

As a mentor, Dr. Pai has always been very considerate of my interests as a student. He gave me excellent advice with programs I wanted to pursue after graduation, and even helped me network with faculty members who would be able to assist me further. His optimistic attitude helped me decrease my stress levels and he constantly motivated me to continue my studies and be the best student I can be. I know I can speak on behalf of all his students when I say he was undoubtedly the most compassionate and inspiring professor who deeply cared for his students to be successful. I am confident Dr. Pai is qualified and deserving of this honor, and I hope that this letter and this award can show how much us students appreciate him!

Sincerely,



Monali Shah

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