NOMINATION PORTFOLIO

UNIVERSITY SYSTEM OF GEORGIA
2020 FELTON JENKINS, JR. HALL OF FAME FACULTY AWARDS

DONALD R. WEBSTER
KAREN AND JOHN HUFF SCHOOL CHAIR & PROFESSOR
CIVIL AND ENVIRONMENTAL ENGINEERING
GEORGIA INSTITUTE OF TECHNOLOGY

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October 28, 2019

Board of Regents of the University System of Georgia
270 Washington Street, SW
Atlanta, GA 30334

Dear Members of the Board of Regents Awards Committee:

It is my great pleasure to nominate Dr. Donald Webster for the *University System of Georgia Felton Jenkins Jr. Hall of Fame Faculty Award*. As a professor of Civil and Environmental Engineering at Georgia Institute of Technology, Dr. Webster has truly transformed how core engineering undergraduate courses can be delivered effectively. I am delighted to introduce Don Webster to you as a candidate for this prestigious award.

Dr. Webster has been a member of the Georgia Tech faculty since 1997. He is passionate in his desire to help students learn, and over the years, he has actively pursued innovative ways to enhance student learning. His initial experiments involved using technologies to shift class experience from a traditional lecture to a collaborative, interactive learning environment where he transformed each student's role from passive listener to active problem solver. More details of Dr. Webster's innovations that ultimately led to a flipped class model and to improve student learning will be described in the letters that follow.

As noteworthy as his teaching innovations is the fact that Dr. Webster assesses his efforts—and then disseminates his findings so that other educators can benefit from what he has learned. As illustrated in his vita, Dr. Webster has given numerous presentations in both conference and workshop venues, and he has published his findings in peer-reviewed journals and in an invited volume by MIT. His colleagues have taken notice of his success, and as a result, he is a mentor who has inspired and supported many in their approach to teaching. Indeed, Georgia Tech President Emeritus G. Wayne Clough describes how he sought out Don Webster when he returned to teaching part-time in 2015 after serving as secretary of the Smithsonian: "Don was one of the faculty I sought out to help me 're-acclimate' to teaching because he had a reputation as one of the best teachers and researchers on campus."

The letters from students invited to support Dr. Webster's nomination for this award highlight how he has been a resource, advisor, and mentor to them as well as a teacher. Students note that his "flipped" class approach gives them a chance for interaction on a regular basis with Dr. Webster, which "makes him seem more approachable, and therefore makes students more likely to seek his help if they are struggling." Steven McLaughlin, Dean of the College of Engineering, also highlights in his letter how Dr. Webster has advocated for students in a

Rafael L. Bras
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number of the administrative roles he has held over the years in the School of Civil and Environmental Engineering. In addition, Dr. Webster's efforts to connect with students who are traditionally underrepresented in engineering have been particularly successful; for example, eight of his fourteen current and former Ph.D. students are women. Don Webster's goal to diversify the next generation of engineering education leaders is also taking shape; his Ph.D. students are becoming faculty members at institutions such as the University of Georgia, University of South Florida, West Virginia University, Cal Poly State University, and Georgia Tech.

Given his long-term commitment to students and his excellence in teaching, Don Webster has received significant recognition for the impact of his efforts. At the Institute level, he has been the recipient of the *British Petroleum Junior Faculty Teaching Excellence Award*, the *Eichholz Faculty Teaching Award* (for outstanding instruction in core courses), the *Class of 1934 Outstanding Innovative Use of Educational Technology Award*, and the *Class of 1940 Course Survey Teaching Effectiveness Award* (twice). He has also received a number of student-selected awards for his teaching excellence. It is also noteworthy that Dr. Webster was the co-Principal Investigator of the first National Science Foundation Integrative Graduate Education and Research Training grant received by the Institute, which brought 3.5M to create an interdisciplinary graduate program focused on chemical communication in the ocean by aquatic organisms.

With the greatest enthusiasm, I recommend Professor Donald Webster for the *University System of Georgia Felton Jenkins Jr. Hall of Fame Faculty Award.* Dr. Webster's student-centered focus on education and the innovations that he has created, assessed, and disseminated have been outstanding. He has been an outstanding teacher and mentor to both his students and his colleagues. Please give him your highest consideration for this award.

Sincerely,

Rafael L. Bras
Provost and Executive Vice President for Academic Affairs

Georgia Tech | College of Engineering
Office of the Dean

October 23, 2019

Faculty Awards Selection Committee
University System of Georgia

Dear Members of the USG Faculty Awards Selection Committee,

It is a pleasure to support the nomination of Dr. Donald Webster for the *University System of Georgia Felton Jenkins, Jr. Hall of Fame Faculty Award*. As you will see in the supporting documentation, Dr. Webster is widely recognized as an exceptionally talented educator who has dedicated his professional endeavors to innovating and improving undergraduate and graduate education at Georgia Tech.

Dr. Webster has a record of outstanding instruction since he arrived at Georgia Tech more than two decades ago. As an early-career faculty member, he won the Institute-wide British Petroleum Junior Faculty Teaching Excellence Award among other awards. In recent years, he has been highly successful in elevating the student-learning environment in required engineering mechanics courses by effectively deploying emerging technologies. The course format can be described as a blended or "flipped" classroom in which students watch brief asynchronous lecture videos in advance so classroom time can be used to create an interactive learning environment. Students work with a partner and with the support of Dr. Webster and teaching assistants to address problem solving exercises. The student experience is transformed from the relatively passive act of taking notes to a fully-engaged experience with real-time scaffolding to support student learning. In recognition of his innovative teaching excellence, Dr. Webster has won a number of Institute-wide teaching awards in the past several years. Perhaps most notably, he won the 2014 Eichholz Faculty Teaching Award, which recognizes faculty who provide outstanding teaching to students in core and general education undergraduate courses. Dr. Webster was the first member of the College of Engineering at Georgia Tech to receive this prestigious award.

Dr. Webster has become a dedicated evangelical for the techniques and advantages of the blended classroom approach. Via a series of publications in partnership with researchers at the Center of 21st Century Universities, he has shown that student achievement, engagement, and perceptions in the blended classroom are significantly improved. Remarkably, the percentage of students withdrawing or receiving an F or D grade is reduced by half compared to traditional lecture courses. This indicates that the blended classroom format provides a pathway to success for students who otherwise might struggle in these demanding engineering mechanics courses. The publications have appeared in peer-reviewed engineering education journals and an invited volume published by MIT Press. Further, Dr. Webster has presented the results of these studies at numerous conferences in recent years. On campus, he has partnered with the Center of Teaching and Learning to present at workshops for faculty and Ph.D. students seeking to employ similar techniques in their classrooms. Numerous faculty members have followed in his footstep in the School of Civil & Environmental Engineering and across the Institute. He was invited to serve on the Commission on Creating the Next in

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Education by Provost Bras and chaired two of the working groups addressing Future Learner Needs and Whole Person Education. Beyond campus, he was invited to the National Academy of Engineering's Frontiers of Engineering Education Symposium in 2016. He also was invited to address the Department Heads of the Big10+ Civil and Environmental Engineering programs on innovative engineering education techniques. This fall, he is an invited panelist at the Future of Civil and Environmental Engineering Education Frontiers Forum hosted by MIT. It is clear that Dr. Webster has had an enormous impact beyond his own classroom.

At the gradate-level Dr. Webster was a key member of the team (lead-PI from the College of Engineering) that brought the first NSF-sponsored Integrative Graduate Education and Research Training (IGERT) grant to Georgia Tech in 2001. The team developed an interdisciplinary Ph.D. program addressing chemical sensing among aquatic organism by blending the areas of Biology, Civil & Environmental Engineering, Earth & Atmospheric Sciences, and Chemistry. The program served as a foundation of the current interdisciplinary Ph.D. degree program in Ocean Sciences & Engineering at Georgia Tech. Dr. Webster has been an outstanding advisor of graduate students as well. Eight of his fourteen former and current Ph.D. students are women, a group that is traditionally underrepresented in engineering. Further, the overwhelming majority of his Ph.D. students have become faculty members at institutions such as University of Georgia, University of South Florida, West Virginia University, Cal Poly State University, and Georgia Tech. He has demonstrated excellence in efforts to diversifying the next generation of engineering education leaders.

Finally, Dr. Webster has held a number of administrative roles in the School of Civil & Environmental Engineering and used these positions advance student achievement and experiences. As Associate Chair for Undergraduate Programs, he worked with the faculty to bring innovative curriculum advances, create undergraduate research opportunities, create study abroad experiences, and diversify the student body. These activities include co-authoring the proposal to the BOR in 2006 to start the B.S. degree program in Environmental Engineering, which is a vibrant program with more than 200 students enrolled today. Currently, in Fall 2019 undergraduate student body in Civil & Environmental Engineering is 52% women; the first time the program has included more women than men since inception in 1898. Further, more than 64% of the undergraduate students have a study abroad experience. At both the undergraduate and graduate levels, Dr. Webster established the CEE Student Advisory Councils to facilitate communication with students broadly across the School. In past year-and-a-half as School Chair, he has continued to lead efforts to improve the student experience, one example of which is to develop opportunities for students to develop entrepreneurial competencies in an engineering context.

The impact of Dr. Webster's educational activities in the classroom and labs has been astounding. Dr. Webster would be an outstanding choice as the recipient of the 2020 *Felton Jenkins, Jr. Hall of Fame Faculty Award*. I hope that you will give this nomination careful consideration.

Sincerely,

Steven W. McLaughlin
Dean and Southern Company Chair

Georgia Institute of Technology
Office of the President Emeritus

Faculty Awards Selection Committee
University System of Georgia

Dear Members of the Faculty Awards Selection Committee:

I am pleased to submit this letter in support of the nomination of Dr. Donald R. Webster, Karen and John Huff School Chair and Professor, School of Civil and Environmental Engineering, for the Felton Jenkins, Jr. Hall of Fame Faculty Awards. Don was hired as a faculty member at Georgia Tech in 1997 when I was president. Over the years his tenure and mine overlapped, I came to know of him and his work. He was one of those unique faculty who demonstrated the ability to succeed at the highest levels in both research and teaching. After retiring from Georgia Tech and serving as secretary of the Smithsonian, I returned to Georgia Tech in 2015 as a part-time faculty member. Don was one of the faculty I sought out to help me "re-acclimate" to teaching because he had a reputation as one of the best teachers and researchers on campus.

The Felton Jenkins, Jr. Hall of Fame Faculty Awards are based on three components, a strong commitment to teaching and student success, advancing student abilities for critical thinking and problem solving, and innovative use of technology. When I read these criteria, I thought of Regent Jenkins, who I knew when I was president of Georgia Tech. Felton was the kind of person who cared deeply about students, their success and helping them grow intellectually and personally. I cannot think of any faculty member I have known who better fits these expectations than Don Webster.

Before I speak directly to the outstanding work Don has done as a teacher, it is useful to note that he is a nationally recognized expert in environmental fluid dynamics. His work has grown to include bio-inspired design where he is a leader in learning from nature and understanding how humans are changing natural systems. In 2016 the New York Times wrote a feature article about his remarkable work in understanding how climate change is impacting the chances for survival of an enchanting creature known as a sea butterfly. Sea butterflies "fly" through the water using wings that extend from their shells. These tiny creatures are critical to the survival of almost all sea creatures, including giant whales that depend on them for food. Don showed sea butterflies are at risk because their shells are being eroded by acidification of the oceans. This work illustrates Don's perceptiveness, ability to cross disciplines, and creative use of mathematics to understand one of nature's wonders. He applies these talents in similar ways to his teaching.

It does not take my endorsement to demonstrate that Don is a great teacher. Beginning in 2001 he received the British Petroleum Junior Faculty Teaching Excellence Award, but that was just the beginning. Over the years of his career he has won just about every award possible for

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outstanding teaching at Georgia Tech: The Outstanding Teaching Award for the School of Civil and Environmental Engineering (2004), the Eichholtz Faculty Teaching Award in 2014 (the top award for Georgia Tech faculty), and the Class of 1934 Outstanding Teaching Award for Innovative use of Technology in 2015 (an institute-wide award). He also was chosen by the School of Civil and Environmental Engineering to serve terms as the Associate Chair for Undergraduate Programs and Associate Chair of Graduate Programs where he championed good teaching practices.

Why has Don won so many teaching awards and recognitions? Underlying it all, he is passionate about teaching and he cares about students and their success. But beyond this he has become a leader in the use of new approaches to student learning and shown a willingness to take the time to entirely change the way he uses the classroom. He was one of the first to use the "flipped classroom" approach where he uses technology to provide the students with reading materials ahead of the class, and then uses the classroom as a place for open dialog, discussion, and individual learning.

Not content with just doing this, Don has documented by surveys, data and evaluations how effective the flipped classroom process is, and published papers in a number of professional journals to share his findings. Don has also has served as a mentor for other faculty at Georgia Tech who have an interest in the flipped classroom approach, along the way becoming a role model for young faculty who are working to improve their teaching.

Most recently Don was appointed as Chair of the School of Civil and Environmental Engineering and he is bringing his passion for students and student learning to his new job. The School is working on a new strategic plan and student success will be at the center of it.

It is an honor for me to provide this letter in support of Don Webster for the Felton Jenkins, Jr. Hall of Fame Faculty Award. Having known Regent Jenkins and his love of students and teaching, I can say without hesitation Don Webster is the kind of person this award seeks to recognize.

Sincerely yours,

G. Wayne Clough
President Emeritus, Georgia Institute of Technology

College of Engineering

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October 25, 2019

Faculty Awards Selection Committee
University System of Georgia

RE: Nomination of Dr. Donald Webster for the Felton Jenkins, Jr. Hall of Fame Faculty Award

Dear Committee Members:

Don Webster could have said, "No" when we invited him in August of 2012 to be the one in the Georgia Tech College of Engineering (COE) to experiment with flipping his fluid mechanics class. As a veteran with consistently high Course-Instructor Opinion Survey (CIOS) scores, his pedagogy in this class seemed to be working quite well. At least the students perceived it to be so. Perhaps, however, it was Don's long familiarity with the course content and its difficulties rather than the CIOS scores that caused him to consider the offer to ''flip'' a high visibility course in the College. So, he agreed. In preparation, he visited the Problem-Solving Studio (PSS) developed in the biomedical engineering department to get a feel for what the class side of flipping would look like. As suggested, he contacted the authors of a paper to get a copy of an externally developed and validated Concept Inventory test designed to measure the mastery of concepts essential to fluid mechanics. Then over the term, he created short 8-10 minute mini-lectures in an application called Tegrity for students to watch prior to coming to class. This was a tedious, time-consuming and challenging task even for a professor having deep familiarity with the course content. A significant number of decisions needed to be made. How to chunk the material into small learning nuggets, how to stage his lectures so students could not just hear him, but see what he was doing, how to organize and arrange class time such that it would build on the mini-lectures. You might liken this work to taking down a house and rebuilding it with the same pieces but in a different style.

In January 2013, he was ready to go with his Beta version of the course. In that term, he learned a lot through observation and data collection. He saw how working on separate sheets of paper sabotaged his desire for students to interact and collaborate. He saw how allowing a top student to work alone as requested, robbed him of a class asset. He developed strategies for interacting with the students as they worked that facilitated deeper thinking and engagement with the material. He learned interactive strategies from his graduate student TAs as well. He marveled at how the flipped environment offered him unprecedented visibility to the difficulties students were having, problems of which he had been unaware in a lecture format. Midway, he administered critical incident surveys to find out when students felt most and least engaged. These were very revealing. One student confided that she had thought that she could never do well in the course, but was building her confidence by working with other students and interacting with the instructors in class. Overall the feedback was very positive. At mid-term, he noticed something important. There was almost a ten-point difference on the mid-term test between those coming to the class and working problems, and those who were not coming. When he passed this on to the class, suddenly class attendance shot up.

By summer, he was ready to conduct a controlled educational experiment to test the efficacy of the flipped classroom. In this experiment, he discovered that the summer students who overall had lower GPAs performed better on an identical final exam, compared to the fall 2012 group who had higher GPAs overall. Dr. Webster continued to take this feedback control approach to his implementation of flipping, where he tuned his delivery and problem sets to best meet student needs. By combining quantitative data collection with large numbers of students effected, Don has quantifiably demonstrated that his students are mastering the difficult material of fluid mechanics at a much higher level.

Dr. Webster has subsequently expanded his flipped repertoire to another core undergraduate mechanics class, rigid body dynamics. He has also continued to evangelize this approach to other faculty at Georgia Tech through lectures and mini-workshops with great success. Don's new role as the School Chair of Civil and Environmental Engineering will give him a bigger platform to advocate for innovative teaching. Of particular importance is Don's publishing his impressive results in three different (one currently under review) peer-reviewed engineering education journals. In these articles, he reported on controlled educational studies in both medium and large classes to determine whether this pedagogical approach could actually scale. Much to his satisfaction, he found when he doubled the class size from 40-80, he was able to maintain the same learning gains as achieved with fewer numbers.

Don Webster deserves the Felton Jenkins, Jr. Hall of Fame Faculty Award for three reasons. First, he took on the challenge of redesigning an important College of Engineering course to promote greater student engagement and faculty-student interaction. If he could demonstrate the value of this educational experiment in a high visibility COE course, then this could be the watershed event for stimulating other faculty to try similar innovations. Secondly, he took a scientific approach to flipping a classroom. He worked closely with an educational researcher both in the design of the course and in the collection of data necessary to do regression analysis, so that the results were not just anecdotal but solidly quantitative. Thirdly, he has been an evangelist for flipping, giving well-attended research talks on his educational experiment that have been a catalyst for others to try a similar pedagogy. We strongly endorse his nomination.

Sincerely,

Laurence J. Jacobs
Professor & Associate Dean
for Academic Affairs

Wendy C. Newstetter
Assistant Dean for Educational
Research & Innovation

CONDENSED CURRICULUM VITAE

DONALD R. WEBSTER

I. EARNED DEGREES

Ph.D., 1994 Mechanical Engineering, University of California at Berkeley
M.S., 1991 Mechanical Engineering, University of California at Berkeley
B.S., 1989 Mechanical Engineering, University of California at Davis
Professional Engineer License #031772 State of Georgia

II. EMPLOYMENT HISTORY

Georgia Institute of Technology, Civil & Environmental Engineering
- Karen and John Huff School Chair (2018 – present)
- Associate Chair for Finance and Administration (2013 – 2018)
- Associate Chair for Graduate Programs (2012 – 2013)
- Associate Chair for Undergraduate Programs (2007 – 2012)

Georgia Institute of Technology, Civil & Environmental Engineering
- Professor (2009 – present)
- Associate Professor (2003 – 2009)
- Assistant Professor (1997 – 2003)

University of Minnesota, Aerospace Engineering and Mechanics, Visiting Assistant Professor (non-tenure track) (1995 – 1997)
Stanford University, Mechanical Engineering, Postdoctoral Research Affiliate (1994 – 1995)
University of California at Berkeley, Mechanical Engineering, Graduate Research Assistant, Lab Instructor, Teaching Assistant (1989 – 1994)

III. HONORS AND AWARDS (SELECTED)

Fellow, ACC Academic Leaders Network, 2019
Sustaining Fellow, 2018; Fellow, 2015, Association for the Sciences of Limnology and Oceanography (ASLO)
AEES Outstanding Faculty Award, 2018
Inclusive Leaders Academy, 2018
Class of 1940 Course Survey Teaching Effectiveness Award, 2017, 2015
Thank a Teacher Certificate (CTL), 2017, 2016, 2014, 2013, 2012, 2012, 2011, 2010, 2009, 2009, 2008, 2008, 2007, 2007, 2005
Invited participant in National Academy of Engineering Frontiers of Engineering Education Symposium, 2016
Class of 1934 Outstanding Innovative Use of Education Technology Award, 2015
CEE Leadership in Use of Educational Technology Award, 2014
Eichholz Faculty Teaching Award, 2014
University Leadership Program (ULP), 2008-2009
CEE Excellence in Service Award, 2008
CEE Outstanding Teacher Award, 2004
British Petroleum / CETL Junior Faculty Teaching Excellence Award, 2001
CEE Outstanding Interdisciplinary Activity Award, 2000

IV. Research, Scholarship, and Creative Activities (Educational Articles Only)

A. Refereed Publications and Book Chapters

1. Webster, D.R., R.S. Kadel, and W.C. Newstetter (2019) What do we gain by a blended classroom? A comparative study of student performance and perceptions in a fluid mechanics course. *International Journal of Engineering Education* (in press).
2. Webster, D.R. (2019) Flippin' Engineering Mechanics! Observations of Student Achievement and Engagement In *Regents' Teaching Spotlight on Engaged Student Learning,* in press.
3. Webster, D.R., R.S. Kadel, and A.G. Madden (2019) Blended dynamics – Does size matter? In *Blended Learning in Practice: A Guide for Practitioners and Researchers* (eds. A.G. Madden, L. Margulieux, R.S. Kadel, and A.K. Goel), MIT Press, pp. 213- 245.
4. Webster, D.R., D.M. Majerich, and A.G. Madden (2016) Flippin' fluid mechanics - Comparison using two groups. *Advances in Engineering Education* 5(3) (20pp).

B. Conference Presentations with Proceedings

1. Webster, D.R., R.S. Kadel, and W.C. Newstetter (2018) Flippin' fluid mechanics – Improved student performance and perceptions. *Ocean Sciences Meeting*, Portland, OR, February 2018.
2. Webster, D.R., R.S. Kadel, and W.C. Newstetter (2017) Flippin' fluid mechanics – Comparison of blended classroom vs. traditional lecture. *DFD17 Meeting of the American Physical Society*, Denver, CO, November 2017. Also *Bulletin of the American Physical Society* 62(14): 478.
3. Webster, D.R., D.M. Majerich, and J. Luo (2014) Flippin' fluid mechanics – Quasi-experimental pre-test and post-test comparison using two groups. DFD14 Meeting of the American Physical Society, San Francisco, CA, November 2014. Also Bulletin of the American Physical Society 59(20): 485.
4. Webster, D.R., and D.M. Majerich (2014) Flippin' fluid mechanics – Improved student engagement and learning via web-based applications. Ocean Sciences Meeting, Honolulu, HI, February 2014.
5. Webster, D.R., and D.M. Majerich (2013) Flippin' fluid mechanics – Using online technology to enhance the in-class learning experience. DFD13 Meeting of the American Physical Society, Pittsburgh, PA, November 2013. Also Bulletin of the American Physical Society 58(18): 491-492.

IV. Educational Activities

A. Individual Student Guidance

A1. Mentorship of postdoctoral fellows

3 completed and 1 current

Former post-docs currently employed at Ford Motor Co.; University of Gothenburg [Senior Lecturer]; and Philips Research North America

A2. Ph.D. Students

9 completed, 4 current, and 1 ABD

Former Ph.D. students currently employed at Cal Poly State University [Professor]; Georgia Tech [Professor]; University of Georgia [Associate Prof.]; West Virginia University Institute of Technology [Associate Prof.]; Colorado State University [Professor of Practice]; Army Corps of Engineers, Portland, OR; University of South Florida [Assistant Prof.]; University of Michigan [post-doc]; Army Corps of Engineers, Duck, NC

A3. M.S. Students

15 graduated with thesis and 2 special topics students

A4. Undergraduate Research Students

52 total for one or more semesters

B. Course Development

CEE 6293 Hydrodynamic Stability and Turbulence: I developed a new advanced graduate course on flow instability and turbulence. Given the importance of turbulence in most environmental, oceanographic, and engineering applications, this material is an excellent addition to the School's curriculum. The course is unique from offerings in other Schools because of the environmental flow emphasis. The course has drawn students from the Schools of Biomedical, Civil, Environmental, Mechanical, Aerospace, and Chemical Engineering, as well as the Schools of Biological Sciences and Chemistry & Biochemistry and the Institute of Paper Science and Technology.

CEE 6263 Fluid Mechanics of Organisms: As part of the Signals in the Sea Program (funded by NSF IGERT) I developed a new lecture course focusing on teaching fluid mechanics to biology and chemistry graduate students and biological applications to engineering graduate students. The course fits into a series of courses developed with the Schools of Biology and Chemistry & Biochemistry designed to educated students at the interface of chemistry, ecology, fluid dynamics, and sensory biology. Of particular interest is the transport of chemical and hydrodynamic signals in aquatic environments.

C. Pedagogy Development

Flipped Classroom: Starting in January 2013, I conducted a teaching intervention to transform the traditional mode of instruction in junior-level Fluid Mechanics and sophomore-level Dynamics courses. The idea is to use emerging online technologies to shift the in-class experience from a traditional lecture to a interactive learning environment. Prior to class, students watch short (average 10 minutes) video lectures (recorded via Tegrity software) that include topical presentations and example problem solving exercises. During class, students work in teams of two to actively solve applied problems. The instructor and assistants are present to provide "just-in-time" tutoring. The number of team problems assigned during the semester exceeds 100. Further, an online Quiz (4-5 problems) is assigned each week to gauge student advancement. The online system (WileyPlus) generates unique problem parameters for each student. A web app is employed to organize all online course elements for straightforward student access.

VI. SERVICE

A. PUBLIC AND COMMUNITY SERVICE (SELECTED)

"What is an Engineer?" presentation at Career Day at E. Rivers Elementary, 2017

"What Do Engineering Professors Do?" presentation to kindergarten classes at E. Rivers Elementary, 2013

Lab tour for Exploring Engineering Academy, high school summer program, 2007

Presentation to Pre-Engineering Technology (PET) Bridge Program for African-American high school students interested in engineering, 2000, 2003

Lab Tours for PReCollege Engineering Program

B. INSTITUTE CONTRIBUTIONS (SELECTED)

Teaching Effectiveness Task Force, 2017 – 2018

Commission on Creating the Next in Education, 2016 – 2018

Chair of Discovery Group: Future Learner Needs

Co-Chair of Ideation Group: Whole Person Education

Steering Committee, Ocean Sciences & Engineering Graduate Program, 2015 – 2017

Institute Committee for Review of SACS Accreditation Materials, 2013 – 2014

Academic Senate and General Faculty Assembly, 2007 – 2010

Institute Undergraduate Curriculum Committee, 2004 – 2007

Reflective Statement on Teaching

Donald R. Webster
Karen and John Huff School Chair & Professor
Civil and Environmental Engineering
Georgia Institute of Technology

While employed as a non-tenure-track faculty member at the University of Minnesota, I had the opportunity to teach my first courses as an instructor. It was a profound experience in my life that has shaped my professional career ever since. I was not yet committed to pursuing an academic career. The experience in the classroom opened my eyes to the potential impact that my educational efforts could have for students. I found that I had a natural talent to explain complex engineering topics in a manner that students could digest and understand. I discovered that I could inspire them to learn how to develop critical thinking, to become independent, and to build confidence to address tough challenges. I was hooked! For me, the pleasure of impacting and lifting student's trajectories is incomparable.

My experiments in classroom instruction grew from a fundamental desire to inspire student's learning paths. Despite what most people would view as good success in the classroom to that date, by the late 2000's I had become quite frustrated with what I viewed as a highly ineffective cycle in the classroom. I would assign homework problems from the textbook each week (i.e., a traditional approach) and many of the students would either not do the assignment or not complete it with independent thought. After the exams, the students would complain that the exam problems were much more difficult than my examples in lecture and the homework problems. The underlying problem was that the course format wasn't providing the scaffolding needed to support learning a difficult subject and the students were often not doing the problem solving tasks to master the material.

A number of concepts emerged that ultimately led to developing the blended or "flipped" classroom approach for my fundamental engineering mechanics courses: 2nd-year-level "Dynamics" and 3rd-year-level "Fluid Mechanics". I credit my colleague, Dr. Wendy Newstetter, for educating me about many of these topics and for encouraging their application in engineering mechanics courses. The first is the idea to manage the cognitive load of students while they are learning. Cognitive science has long posited that learning depends on 1) the acquisition of schemas and 2) the transfer of those schemas from controlled to automatic processes (e.g., Sweller 1994). A schema plays a crucial role in how to approach and solve a problem. A schema allows the expert problem solver to recognize a problem statement as belonging to a particular classification of problem types, which in turn requires a specific set of steps and procedures. Novices lack such schema, and I purposely designed the blended classroom course to help students develop them.

The second piece to the puzzle is the concept of task difficulty. Jonassen and Hung (2008) propose two general factors contributing to task difficulty: complexity and structuredness. Complexity characterizes what is known in the problem and is impacted by four features: 1) the breadth of knowledge required, 2) the mastery level of that knowledge, 3) the intricacy of the problem-solving procedures, and 4) the complexity of the relationships among the parts. Structuredness, on the other hand, has been delineated as the degree to which elements in the task are known or knowable, predictable or unpredictable, and fixed or dynamic. Five parameters have been identified as characterizing task structuredness: 1) intransparency, 2) heterogeneity of interpretations, 3) interdisciplinarity, 4) dynamicity, and 5) the legitimacy of competing alternatives. A detailed analysis of a subject such as fluid mechanics reveals that it is overloaded with difficulty. The engineering educational community has long taken the approach to reduce the task difficulty by decomposing the technical topics into manageable components and simplifying the student exercises. This is effective to some extent for many students, but subject difficulty remains a huge challenge for many.

Fortunately, Chi and Wylie (2014) describe a framework that can serve a guide to designing learning environments. The ICAP framework defines levels of student engagement based on their behaviors. In reverse order, Passive (P) engagement is receiving information without doing anything beyond listening; active (A) engagement is characterized by some kind of motor movement or physical manipulation; constructive (C) engagement is when the student generates or produces an output of some kind; interactive (I) engagement is when two students engage in constructive dialogue around a product, in which turn-taking is evenly distributed. The hypothesis is that the modes translate into differential learning achievement from minimal understanding, to shallow, to deep, and finally to deepest. Each level builds on the previous, so that for the interactive mode, students co-construct a product through discussion and achieve a deeper learning outcome.

My design of the blended classroom is based on the idea that an interactive learning environment in the classroom sessions will help students manage the cognitive load associated with learning a very difficult subject. Support elements include digital media such as my brief lecture videos, an online textbook platform, and a meticulous organized course website. These elements support a classroom in which students work in teams of two to interactively solve problem-solving exercises with the additional in-person support from me and the teaching assistants. As we have documented in our recent publications, the outcome is a statistically significant increase in student achievement, engagement, and perceptions. The course format is highly flexible to meet students where their understanding currently resides. Advanced students can move through the content quickly. Struggling students can move more slowly, easily ask for more help in the classroom, and even circle back through the materials as needed. It took a significant change in my mind-set to cede control of the classroom, but the end effect is a process that almost seems "magical" in terms of the "light bulbs" illuminating for the students. Of course, it is anything but magic. Success is driven by having the right materials and people available at the right time and place to support the student learning process. Beyond the student gains, one of the things that I love about the course format is that the end outcome of employing new technologies is to create a classroom with more human interactions, one in which students, teaching assistants, and the instructor actually talk to each other and interactively exchange ideas.

<u>References</u>

M. T. H. Chi and R. Wylie, The ICAP framework: Linking cognitive engagement to active learning outcomes, Educational Psychologist, 49(4), pp. 219-243, 2014.

D. H. Jonassen and W. Hung, All problems are not equal: Implications for problem-based learning, The Interdisciplinary Journal of Problem-based Learning, 2, pp. 6-28, 2008.

J. Sweller, Cognitive load theory, learning difficulty, and instructional design, Learning and Instruction, 4(4), pp. 295-312, 1994.

Flippin' Engineering Mechanics! Observations of Student Achievement and Engagement

Donald R. Webster
Georgia Institute of Technology

Donald Webster joined the faculty at the Georgia Institute of Technology in 1997 and is currently the Karen & John Huff School Chair and Professor in the School of Civil & Environmental Engineering. Dr. Webster's research expertise lies in environmental fluid mechanics focused on the influence of fluid motion and turbulence on biological systems. Dr. Webster is a Sustaining Fellow of the Association for the Sciences of Limnology and Oceanography and has won numerous awards including the Class of 1934 Outstanding Innovative Use of Education Technology Award, the Eichholz Faculty Teaching Award, and the British Petroleum Junior Faculty Teaching Excellence Award.

Goal of Activity

The goal of this activity is to improve learning outcomes for core undergraduate engineering mechanics students by transforming the classroom experience from a traditional modeling-and-mimicry pedagogy into an active and engaging learning environment. But, what do "active" and "engaging" mean? Michelene Chi and co-authors developed a taxonomy for learning engagements. In this framework, the categories of engagement describe observable behaviors in students. Interactive (I) engagement occurs when two students engage in constructive dialogue around a product, in which turn-taking is evenly distributed; constructive (C) engagement occurs when students generate or produce an output of some kind; active (A) engagement occurs when students exhibit some kind of motor movement or physical manipulation; and Passive (P) engagement occurs when students receive information without doing anything beyond listening. Chi and her colleagues believe that these categories not only demonstrate a spectrum of learning modes but also form a hierarchy of learning achievement from minimal understanding (P), to deep understanding (I) because higher levels of student engagement correlate with higher levels of student outcomes. The framework is typically referred to as ICAP, an acronym consisting of a letter for each level of engagement and achievement in descending order.

A common (or "traditional") engineering mechanics lecture course format typically can be described as active (A) in that students are taking notes and participating in discussion. Further, students often have constructive assignments outside of the classroom consisting of problem-solving exercises. The challenge is to see whether such a course can be transformed into an interactive (I) learning environment, one that elevates student engagement and achievement.

Description of the activity

The pedagogy described here has been implemented in a series of engineering mechanics courses, including Engineering Dynamics and Fluid Mechanics. These courses are considered foundational subjects in most undergraduate engineering curricula. They are rigorous and challenging courses that blend fundamental physical principles, applied calculus, material properties, and other technical subjects to address engineering applications.

By employing strategic technological elements in the course design, an interactive learning environment can be created. The approach follows what typically is referred to as a blended or "flipped" classroom. As described below, this pedagogical approach requires a significant shift in the roles and activities of the students and instructor.

Prior to arriving for the classroom session, students watch online video lectures that consist of short (10 minute) introductions to the content and sample problem-solving exercises. During the classroom session, students are given problem-solving exercises on the daily subject. The instructor often starts one exercise on the board and then releases the students to work in teams of two to complete a series of exercises of increasing difficulty. The instructor and assistants roam the room talking to the student teams and answering questions. The interactive nature of the classroom comes through the communication and negotiation within the student pairs and with the instructors. The team size of two students was selected in order to facilitate the conversations. Students do not receive credit for successfully completing the problems beyond credit for attendance and participation, a decision that has the net effect of focusing the students' attention on learning rather than completing the assignment. The instructor's handwritten solutions are posted after class on the course website, so the students can "close the loop" on aspects that remain unclear to them.

Students are given weekly online quizzes that assess their achievement of the learning objectives of the weekly content. The online system generates unique input parameters for each individual student so that no two students have the same numeric answer. Students receive immediate feedback on the correctness of their submissions, and they can receive credit for any of three attempted submissions. After submitting either the correct answer or the third incorrect answer, students gain access to the handwritten problem solution (and cannot submit additional answers for credit). The instructor and assistants are available for in-person or online "office hours" help in the period leading up the quiz submission deadline. On roughly a four-week cycle, exams are given (in class) that consist of hand-written problem-solving exercises. A comprehensive final exam is given at the end of the semester, again consisting of problem-solving exercises. The instructor manually grades all exams to assess student achievement of the problem-solving skills and other learning outcomes.

Reflection on how this activity meets the author's goal

The instructor was highly motivated to assess the effectiveness of the pedagogy and collected significant data to quantify student achievement, engagement, and perceptions. These data include mid-semester opinion surveys, end-of-semester standardized course and instructor opinion surveys, pre-semester and post-semester concept inventory exams, standardized engagement surveys, and exam scores.

In all cases, course assessment reveals significant gains in student achievement, engagement, and perceptions in the blended classroom format. Specific comparisons conducted include 1) a comparison of parallel offerings of a traditional section and a blended section during the same semester (with common exams); 2) a comprehensive longitudinal comparison of student achievement and perceptions over a 15-year period in classes taught by the same instructor in both course formats; and 3) a comparison of a relatively small blended section with 37 students to a much larger blended section of 82 students (with the same instructor).

The results of these studies are remarkable. Students universally reached higher achievement of the learning outcomes in the blended classroom in the parallel-section study as well as in the multi-year comparison with the same instructor. Student surveys reveal significantly greater enthusiasm, stimulation, self-perception of how-much-learned, perception of the value of the course activities, and the overall effectiveness of the course and instructor in the blended classroom format. The blended classroom format also yielded a significantly lower withdrawal/failure/deficient (WFD) rate, indicating that struggling students are more able to remain in the course and achieve success. Students in the larger blended class performed as well as, or better than, students in the much smaller blended section. They also showed a similar level of engagement and a similar, or even more positive, perception of the course effectiveness in the larger blended section, indicating that the course format defies conventional wisdom about declining engagement and satisfaction with increasing class size. In summary, the blended-classroom approach can be remarkably effective in notoriously challenging engineering mechanics courses.

October 19, 2019

Selections Committee
Regents' Awards for Excellence in Teaching
University System of Georgia
Atlanta, GA 30334

Dear Selection Committee Members:

My name is Austin Schoech and I am a graduate of Georgia Institute of Technology's School of Civil and Environmental Engineering. Having known Dr. Webster for the better part of my undergraduate career, I write to you today to express my utmost support for his nomination of this prestigious award. I simply cannot think of a professor more deserving for his efforts both inside and outside the classroom.

I had the fortune of taking Dynamics and Fluid Mechanics with Dr. Webster two years into school. If those sound like complex, unwieldy engineering classes, it's because they are. These classes serve as the foundation for our curriculum, but because they're often the first true civil engineering courses that students take, it's not uncommon for them to struggle. Recognizing that this is largely due to the different paces at which students absorb such new concepts, Dr. Webster elected to teach these in a "flipped classroom" format. This innovative teaching model meant that students would watch his recorded lectures outside of class and solve problems collaboratively in class. Not only did this require additional work for him to record the lectures each week, but also to engage with us each day by working through the individual issues or gaps in our understanding.

He pioneered this class for us and I believe that I can speak on behalf of my fellow students when I say that the extra effort was invaluable. Instead of memorizing a few methods to get the solution, Dr. Webster ensured we knew the reasoning behind each step and how to apply them to other scenarios. He even shared with us findings of his research, which explored how animal life in rivers and streams were impacted by the different hydraulic movements we were studying. This may have been a minute gesture by him, but for the first time as an engineer I was able to genuinely trust that our concentration can (and will) impact the world outside of a classroom. This is a sentiment that I will be forever grateful to Dr. Webster for.

Nevertheless, his impact did not stop after those two classes ended. Him and I managed to stay connected throughout the remainder of my time as a student, with him continually checking in on my progress, asking for feedback on teaching methods, and eventually helping to guide my career path after school.

I must also add that I'm not the least bit surprised that he was chosen to lead the School of Civil and Environmental Engineering as our school chair. His prowess and dedication as a teacher are second to none and I am thrilled he'll have to opportunity to carry out this same passion from a position of such great influence. I simply would not be where I am as a student, engineer, or individual if not for his direction during my undergraduate career.

For that, I could not overstate how deserving Dr. Webster is for this award.

Sincerely,

Austin Schoech

CBRE | Project Manager
Georgia Institute of Technology | Masters in Real Estate Development (2019)
Georgia Institute of Technology | Bachelors of Science in Civil Engineering (2016)

University of Michigan
Center for the Study of Complex Systems
Department of Physics
Ann Arbor, MI 48109

October 24, 2019

Aaron C. True, Ph.D.
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Members of the Regents Committee,

It is my great pleasure to write this letter in support of Professor Don Webster at the Georgia Institute of Technology for his nomination to the Felton Jenkins, Jr. Hall of Fame Faculty Award. First as an undergraduate engineering student, and then as a Ph.D. student in his lab, Professor Webster's strong commitment to effective pedagogy and professional mentorship altered my life trajectory in the most positive sense.

There are numerous anecdotes stemming from a 10-year working relationship with Professor Webster that clearly convey his strong commitment to teaching and student success, from the undergraduate through the graduate levels. In the Fall of 2006, I met Professor Webster while taking his undergraduate Fluid Mechanics course. I followed this course in the Spring of 2007 with his Hydraulic Engineering course because of how much I appreciated his clear lectures, his approachable demeanor through ample office hours and prompt email correspondence, and rigorous but fair homework and examinations. Without exaggeration, Professor Webster was one of my top three faculty instructors in terms of the clarity of presented content, clear and open communication, and willingness to advocate for student success. These traits are, in large part, why I elected to pursue a National Science Foundation Research Experience for Undergraduates (REU) program under him in the summer of 2007.

The very existence of the REU program is itself a testament to Professor Webster's commitment to engaging undergraduate students in research experiences and setting them up for future success. The program was an interdisciplinary one, broadly covering Aquatic Chemical Ecology and composed of faculty members in engineering, biology, ecology, and chemistry. Through its duration, the REU program gave tens, if not hundreds, of undergraduate student valuable research experiences and no doubt launched many into research careers in a variety of disciplines. This was certainly the case for me, as the project I worked on in the summer of 2007 then received renewed NSF support and translated directly into my masters and doctoral research projects under Professor Webster. Had it not been for my very positive interactions and experiences under his teaching and research mentorship, it's highly unlikely I would have continued into a graduate program under his advisement or even pursued a PhD at all. Thus, I can say without exaggeration that my life trajectory was altered in the most positive sense.

The wonderful experiences I had as an undergraduate working with Professor Webster carried over directly into graduate school, both in teaching and in research mentorship. In the Fall of 2007, I took his graduate Fluid Mechanics course and the following Spring took his graduate Hydrodynamic Stability & Turbulence course. In both, his clear presentation of rigorous course content and eagerness to directly engage with students were foundational for my future success in graduate school and into my early research career. That same Fall, he encouraged me to present my work from the previous summer's REU program at an upcoming national research conference, arguably the start of my academic career.

One of the most enriching aspects of my own graduate school experience was the opportunity to teach and mentor numerous undergraduate students as a teaching assistant, lecturer, and research advisor. My foundational experiences seeing students engage on a deeper level and avail themselves of new opportunities came as a teaching assistant in his undergraduate Fluid Mechanics, Statics & Dynamics, and Hydraulic Engineering courses and as an advisor to 10 undergraduate researchers. Professor Webster encouraged me to pursue these opportunities, demonstrating his commitment to producing the next generation of teachers and mentors committed to student success.

While working as a teaching assistant under Professor Webster, I witnessed firsthand his commitment to innovative and effective pedagogy through his development of, and advocacy for, the "flipped classroom" model. In this model, students watch prerecorded lectures at home and work through intensive problem sets in groups during lecture hours under the supervision of the instructor and teaching assistants. This model has been shown to significantly improve student engagement and knowledge retention and is highly recommended by students in these courses. Not only did Professor Webster help bring this model to Georgia Tech and engineering education at large, but he actively publishes statistical studies comparing the flipped classroom model to the classical lecture-centric model to quantify the benefits mentioned above.

A word I have used repeatedly when describing Professor Webster is "advocate." In my own experience, he was and is one in the fullest sense of the word. Throughout graduate school he advocated for my future success repeatedly, from start to finish. He advocated for my academic success through his clear instruction and direct engagement. He advocated for me in my relationships with my thesis committee during my qualifying exams, thesis proposal, and defense. He advocated for my future success as a researcher by encouraging me to avail myself of opportunities to travel and present my work and build collaborations. For example, in the summer of 2009, he supported my collaboration with a researcher in Israel, paying for me to ship my entire experimental apparatus there, and supporting me for the duration of the work I did there. This eventually produced my first high-quality publication. He advocated for my development as an effective teacher and mentor through the experiences described above and through his nomination of me for the Bill Shutz Graduate Teaching Assistant Award. He advocated for my first postdoctoral position by reaching out to a colleague who was searching for a PhD student and suggesting a postdoc instead. And last but certainly not least, he continues to advocate for me in my search for my own tenure-track faculty position by forwarding job postings and writing prompt and supportive reference letters.

In short, you would be hard-pressed to find a faculty member more committed to student success and more deserving of this award!

Sincerely,

Aaron C. True, Ph.D.
Research Fellow
Experimental Complex Systems
Department of Physics
University of Michigan

October 18, 2019

To Whom It May Concern:

I am honored to write this recommendation for Dr. Don Webster in support of his nomination for the Felton Jenkins, Jr. Hall of Fame Faculty Awards. Dr. Webster changed my life. I realize that may sound extreme, but there is no better way to explain his impact on me as a student and engineer. He is one of the few exceptional professors that I have encountered during my time as a student at Georgia Tech.

I first met Dr. Webster during the fall of 2016 in his dynamics course. It was the fall of my third year and I had just changed my major to environmental engineering and was still feeling unsure of my decision. Walking in to Dr. Webster's course, my first course in the School of Civil and Environmental Engineering, every doubt I had instantly faded. He is a professor that inspires confidence in his students. He made me feel smart, valuable, and important as a student, but also as a person.

When registering for courses for the spring of 2017, I was thrilled to find out that I had the opportunity to take another class taught by Dr. Webster. I was able to take his fluid mechanics course that spring. I knew I would have a great semester and be successful in this notoriously difficult class since I had Dr. Webster behind me.

Dr. Webster uses a flipped classroom style of teaching. I was doubtful of this innovative teaching technique at first. I thought it was a lazy way of teaching to just make students watch lecture videos before class and give them problems to work on during class. Dr. Webster proved me wrong. This teaching style was incredibly effective and truly allowed his students to master the content in a way I have never witnessed before.

By not spending the entire class period lecturing, I was also able to interact with Dr. Webster on a more personal level than I had ever experienced with another professor. He would walk around the room, providing help when needed. This style of teaching allowed everyone in the class to become comfortable asking questions. Dr. Webster makes his students feel respected and like they are the most important aspect of his life.

As a member of the Georgia Tech mock trial team, I had to miss Dr. Webster's class a couple times each semester to travel to competitions. Dr. Webster was more than willing to meet up with me outside of class to keep me up to speed on the class material. More importantly, though, he took a genuine interest in my life outside of the classroom. Upon returning, he would always ask me how the team did at our tournaments. Dr. Webster goes above and beyond with his commitment to his students

When younger students ask for advice about which professor to take for dynamics, fluids, or any other course for that matter, I make sure to recommend Dr. Webster. He makes going to class not only beneficial, but also enjoyable. The impact Dr. Webster has left on me will stay with me throughout my career and I feel lucky to have had him as a professor.

Sincerely,

Megan Miller

October 23, 2019

To whom it may concern:

I highly recommend that Dr. Donald Webster be honored with the 2020 University System of Georgia Regents Felton Jenkins, Jr. Hall of Fame Faculty Award. I had the pleasure of taking two courses with Dr. Webster during my time as a Civil Engineering undergraduate student at the Georgia Institute of Technology. In Dynamics in 2013 and in Fluid Mechanics in 2014, Dr. Webster's unique flipped classroom format enhanced and enriched the student learning experience in two major stages: first, by providing thorough conceptual exposure to new material, and second, by reinforcing that material with extensive in-class practice.

Unlike a traditional theory-based course format in which lectures are typically conducted in person according to a set schedule, Dr. Webster's flipped classroom empowers students to learn on their own time through a series of pre recorded lecture videos. The videos are broken down into theoretical and example-based segments. This allows students ample opportunity to take notes and familiarize themselves with new concepts, and to immediately see those concepts put into action by following along with step-by-step examples.

At this stage, the major advantage of the flipped classroom format is the degree to which students are able to precisely control their interaction with course concepts. We were able to (and often did) pause and rewind videos for clarification or to catch any missed details during an initial viewing.

Perhaps the most important aspect of the flipped classroom is the second stage, which takes place during the scheduled lecture period. Dr. Webster provides several example problems which are representative of the level of difficulty and rigor which students are expected to complete successfully during exams. Dr. Webster selects one problem and solves it in front of the class at the beginning of the hour, making frequent references to statements, concepts and formulae present in his lecture videos. And then he lets his students loose on the rest.

Working in teams, students are tasked with taking the information presented in the lecture videos and applying it to exam-level problems. Multiple course TA's are present at every class meeting to provide assistance and answer questions along with Dr. Webster himself. For a full hour, two to three times a week, students are expected to deconstruct, analyze and solve problems.

During my time as an undergraduate engineering student, I completed many technical courses which were rigorous and challenging. Even now, nearly five years after graduation, Dr. Webster's courses are set apart in my memory as ones which armed students with knowledge acquired at their own pace and guided the application of that knowledge into tangible, problem-based experience. No other class offered the same level of practice tackling real examples without sacrificing essential exposure to critical concepts. No other professor demonstrated such a deep understanding of how to best wield innovative technological tools to directly benefit student learning.

Dr. Webster also stood out as a professor who was particularly willing to make time for his students. He actively encouraged attendance at his scheduled office hours and consistently made time outside of those hours to meet with students one-on-one, myself among them. His seemingly endless kind and steady patience, coupled with the belief that no concept is inaccessible to any of his students, makes him an exceptionally approachable professor and an excellent steward of learning.

I am confident that Dr. Webster is the most fitting recipient for this award.

Very truly yours,
Diane Jlelaty, P.E.

SUMMARY OF COURSE INSTRUCTOR OPINION SURVEY

Undergraduate Courses

Qtr/Sem Taught	*Course No.* *Course Name*	*No. Enrolled*	*No. Respond.*	*Median Score for "Instructor: Overall Effectiveness"*
Fall 2019	CEE2040 Dynamics	78	-	-
Spring 2018	CEE2040 Dynamics	69	63	4.9 / 5
Spring 2017	CEE3040 Fluid Mechanics	59	53	4.9
Fall 2016	CEE2040 Dynamics	57	54	4.9
Spring 2016	CEE2040 Dynamics	83	75	4.8
Fall 2015	CEE2040 Dynamics	70	40	4.5
Spring 2015	CEE2040 Dynamics	82	48	4.7
Spring 2014	CEE3040 Fluid Mechanics	39	28	4.9
Fall 2013	CEE2040 Dynamics	37	22	4.9
Summer 2013	CEE3040 Fluid Mechanics	24	16	4.8
Spring 2013	CEE3040 Fluid Mechanics	39	25	4.9
Fall 2012	CEE3040 Fluid Mechanics	29	18	5.0
Spring 2012	CEE2040 Dynamics	48	31	4.7
Spring 2012	CEE3040 Fluid Mechanics	22	11	5.0
Fall 2010	CEE3040 Fluid Mechanics	67	33	4.8
Spring 2010	CEE2040 Dynamics	44	30	4.8
Fall 2009	CEE3040 Fluid Mechanics	39	21	5.0
Fall 2008	CEE3040 Fluid Mechanics	60	22	4.7
Fall 2007	CEE3040 Fluid Mechanics	65	34	4.9
Summer 2007	CEE3040 Fluid Mechanics	36	6	4.8
Fall 2006	CEE4200C1 Hydraulic Engineering	14	6	4.9
Fall 2006	CEE4200C2 Hydraulic Engineering	19	13	5.0
Fall 2006	CEE4200C3 Hydraulic Engineering	16	8	4.7
Fall 2006	CEE4200C4 Hydraulic Engineering	14	7	4.9
Summer 2006	CEE3040 Fluid Mechanics	24	11	4.8
Spring 2006	CEE3040 Fluid Mechanics	75	43	4.3
Fall 2005	CEE4200C1 Hydraulic Engineering	18	9	4.4
Fall 2005	CEE4200C2 Hydraulic Engineering	14	8	4.8
Fall 2005	CEE4200C3 Hydraulic Engineering	11	5	4.3
Fall 2004	CEE4200C1 Hydraulic Engineering	15	5	5.0
Fall 2004	CEE4200C2 Hydraulic Engineering	15	10	4.7
Fall 2004	CEE4200C3 Hydraulic Engineering	16	6	5.0
Spring 2004	CEE4200C1 Hydraulic Engineering	18	15	4.7
Spring 2004	CEE4200C2 Hydraulic Engineering	17	10	4.7
Spring 2004	CEE4200C3 Hydraulic Engineering	20	8	4.7
Spring 2004	CEE4200C4 Hydraulic Engineering	16	9	4.9
Summer 2003	CEE4200C1 Hydraulic Engineering	15	10	4.9
Summer 2003	CEE4200C2 Hydraulic Engineering	18	12	4.8
Fall 2002	CEE3040 Fluid Mechanics	64	31	4.7
Summer 2002	CEE3040 Fluid Mechanics	32	19	4.8
Spring 2002	CEE4200C1 Hydraulic Engineering	20	9	4.9
Spring 2002	CEE4200C2 Hydraulic Engineering	20	11	4.8
Spring 2002	CEE4200C3 Hydraulic Engineering	18	10	4.7
Summer 2001	CEE4200C1 Hydraulic Engineering	20	12	4.5
Summer 2001	CEE4200C2 Hydraulic Engineering	20	10	4.7
Fall 2000	CEE4200C1 Hydraulic Engineering	16	10	4.8

Fall 2000	CEE4200C2 Hydraulic Engineering	10	5	4.3
Fall 2000	CEE4200C3 Hydraulic Engineering	9	4	4.8
Fall 2000	CEE4200C4 Hydraulic Engineering	3	2	4.5
Summer 2000	CEE4200C1 Hydraulic Engineering	15	9	4.6
Summer 2000	CEE4200C2 Hydraulic Engineering	13	8	4.3
Spring 2000	CEE4200C1 Hydraulic Engineering	11	6	4.3
Spring 2000	CEE4200C2 Hydraulic Engineering	16	9	5.0
Spring 2000	CEE4200C3 Hydraulic Engineering	5	3	4.8
Spring 2000	CEE4200C4 Hydraulic Engineering	13	5	4.7
Winter 1999	CE 3061B Fluid Mechanics Laboratory	18	15	4.8
Winter 1999	CE 3061A Fluid Mechanics Laboratory	23	22	4.5
Fall 1998	CE 3061C Fluid Mechanics Laboratory	17	15	4.4
Fall 1998	CE 3061A Fluid Mechanics Laboratory	14	14	4.6
Spring 1998	CE 3061D Fluid Mechanics Laboratory	21	21	4.3
Spring 1998	CE 3061A Fluid Mechanics Laboratory	17	13	4.8
Fall 1997	CE 3063 Fluid Mechanics II	54	29	4.2
Average for Undergraduate Courses		29.3	18.3	4.7 / 5

Graduate Courses

Qtr/Sem Taught	*Course No.* *Course Name*	*No.* *Enrolled*	*No.* *Respond.*	*Median Score for "Instructor: Overall Effectiveness"*
Fall 2017	CEE6293 Hydrodyn Stab & Turb	14	13	5.0 / 5
Fall 2014	CEE6251 Fluid Mechanics	15	13	5.0
Spring 2014	CEE6293 Hydrodyn Stab & Turb	15	10	4.9
Fall 2011	CEE6251 Fluid Mechanics	25	17	4.9
Spring 2011	CEE6293 Hydrodyn Stab & Turb	14	8	4.9
Fall 2009	CEE6251 Fluid Mechanics	22	12	4.8
Spring 2009	CEE6293 Hydrodyn Stab & Turb	11	9	5.0
Fall 2007	CEE6251 Fluid Mechanics	14	10	4.9
Spring 2007	CEE6293 Hydrodyn Stab & Turb	9	8	4.8
Fall 2006	CEE6263 Fluid Mech of Organisms	11	8	5.0
Fall 2005	CEE6251 Fluid Mechanics	15	8	5.0
Spring 2005	CEE6263 Fluid Mech of Organisms	14	9	4.8
Spring 2005	CEE6293 Hydrodyn Stab & Turb	11	9	5.0
Fall 2003	CEE6251 Fluid Mechanics	13	11	4.9
Spring 2003	CEE6293 Hydrodyn Stab & Turb	12	9	4.6
Fall 2002	CEE6263 Fluid Mech of Organisms	19	15	4.8
Fall 2001	CEE6251 Fluid Mechanics	19	14	4.2
Spring 2001	CEE6293 Hydrodyn Stab & Turb	20	12	4.9
Fall 1999	CEE6251 Fluid Mechanics	10	10	4.7
Spring 1999	CE8103N Flow Instabilities & Turb	19	19	4.7
Winter 1998	CE8103L Flow Instabilities & Turb	5	5	-
Average for Graduate Courses		14.6	10.8	4.8 / 5