

Table of Contents

Hudachek-Buswell, Mary - #2991 - CELS program at Willis Road Elementary School.....	1
Nomination Package.....	2

Application Summary

Competition Details

Competition Title: 2019 Education Partnership Award

Category: Institutional Awards - CTL

Award Cycle: 2019

Submission Deadline: 02/01/2019 at 11:59 PM

Application Information

Submitted By: Mary Hudachek-Buswell

Application ID: 2991

Application Title: CELS program at Willis Road Elementary School

Date Submitted: 01/30/2019 at 1:03 PM

Personal Details

Applicant First Name: Mary

Applicant Last Name: Hudachek-Buswell

Email Address: hudachek@cc.gatech.edu

Phone Number: (678) 438-1519

Primary School or Department

College Of Computing

Primary Appointment Title: Lecturer

Application Details

Proposal Title

CELS program at Willis Road Elementary School

Nomination Packet
Georgia Tech’s Center for the Enhancement of Teaching & Learning
Education Partnership Award
Dr. Mary Hudachek-Buswell, LeAnne Cheatham, Ruchi Banerjee

Table of contents

Cover Sheet and Signature Page	Page 2
Description of the excellence and impact of the Educational Partnership	
• CELS Program and Development	Page 3
• CELS Lessons Rubric, Links, References	Page 6
Partnership statements	
• Dr. Mary Hudachek-Buswell, College of Computing, Georgia Institute of Technology	Page 8
• LeAnne Cheatham, Willis Road Elementary School, Coweta County School System	Page 9
• Ruchi Banerjee, Undergraduate Student, College of Computing, Georgia Institute of Technology	Page 11
Letters of support	
• Monica Sweat: Director of Division of Computing Instruction, College of Computing	Page 12
• Jennifer Whetstone: Principal, Willis Road Elementary School	Page 13
• Tim Brown: Undergraduate Advisor, College of Computing	Page 14
• Bill Leahy: Former Director of Division of Computing Instruction, College of Computing	Page 16
• Lori Thompson, Instructional Coordinator, West Georgia Regional Service Agency, State Department of Education	Page 18



Dr. Mary Hudachek-Buswell
 College of Computing
 Georgia Institute of Technology
 801 Atlantic Drive, Room 122
 Atlanta, GA 30332-0280
hudachek@cc.gatech.edu
 678-438-1519

January 21, 2019

Dear Members of the CETL Awards Committee:

Please accept this nomination packet for the CETL Education Partnership Award. I am submitting this packet on behalf of LeAnne Cheatham, Ruchi Banerjee and myself.

The Academic Partnership we formed had its roots back in 2015. We formalized our partnership with the creation of the Computing and Engineering with LEGOs and Scratch Program, CELS Program, in 2017. We have worked very hard to acquire the robotics and develop the materials over the two years. We believe we have created a sustainable computer science and engineering program that is now being used in other schools.

Please find our signatures and affiliations below.

A handwritten signature in purple ink that reads "Mary Hudachek-Buswell".

Dr. Mary Hudachek-Buswell, Lecturer, College of Computing, Georgia Institute of Technology

A handwritten signature in black ink that reads "Ruchi Banerjee".

Ruchi Banerjee, Undergraduate Student, College of Computing, Georgia Institute of Technology

A handwritten signature in black ink that reads "LeAnne Cheatham".

LeAnne Cheatham, REACH Elementary Teacher, Willis Road Elementary School
 Thank you for considering our partnership for the CETL award.

Sincerely,
 Mary Hudachek-Buswell



CELS Program Description and Development

Mary Hudachek-Buswell, LeAnne Cheatham, Ruchi Banerjee
Education Partnership

Background

The necessity of computer science education in the curriculum at the K-5 level is well known [1,2]. Currently, many higher education institutions are doing outreach in the form of an annual hour of code or a single workshop or a summer camp. These outreach programs extend to only a small segment of the population, most of which targets the middle and high school levels. In spite of these efforts, no real gains have been achieved in creating diversity in, or increasing the number of students, pursuing computer science. To truly broaden participation in computing, computer science, as a discipline, needs to be implemented in all levels of public education, including the elementary grade level. Work has been done to develop computer science standards [3], and research continues to develop best practices in the computing learning process [4]. We are introducing a sustainable, three-year computing and engineering program for third, fourth, and fifth grade students at a rural elementary school. The program we are implementing is called *Computing and Engineering with LEGO® and Scratch, CELS*.

The evolution of CELS came from the vision of a professor, the fearlessness of an elementary teacher, the passion of an undergraduate student, and the collective perseverance of three women to bring computing to children at Willis Road Elementary School, WRES. After years of doing “Hour of Code” events at WRES, it was clear that we were not making progress towards computing literacy. With no K-5 computing curriculums to model after, we met in the summer of 2017 to create an outline for our own computing academic program. The guiding principles of the CELS program design were sustainability, ease of implementation by the teachers and elementary students, and the flexibility to let any student enter the robotics lessons at their grade level and participate. Drawing from the knowledge, experience, and resources at Georgia Tech, the CELS program is intended to bring computing and robotics to live in the WRES classrooms

for three years. CELS focuses on exposing the students to computing and engineering concepts in a graduated manner with each grade level.

Design

CELS is designed for third, fourth, and fifth grade students. CELS lessons are based upon the Scratch programming language and LEGO® WeDo construction kits. Scratch is a block, media-rich programming language that allows one to design and share programs in the form of stories, movies, games and manipulate robots. LEGO® WeDo kits are used in problem-based learning. The kits feature working motors and sensors that allow one to build, explore, and study machines and mechanisms. Each of the grade levels have seven distinct robotic CELS lessons from the other two grades. It was essential to have the lessons progress in conceptual difficulty with each grade. These graduated lessons allow the CELS Program to span three years and the students to have continually exposure to computing and engineering concepts. The plan is for a CELS lesson to be completed over a three to four week period. The lessons require a multiple day, time span in order for the lesson to be complete. The CELS three-year program addresses the first key principle, sustainability.

There are three introductory lessons all grade level students complete to understand the Scratch programming environment, and the engineering components to the LEGO® robotic kits. Any grade level student can complete these three introductory lessons and be able to enter into their respective grade level lessons with ease. The introductory lessons allow student entry and participation in the program, another guiding principle in the design.

The CELS lessons had to be designed for ease of implementation by the teachers and students, or else the lessons would not be used. This design principle was the most difficult. One of the governing factors in the design of the lessons was that Willis Road Elementary School is in a Google Reference District. The school is to use Google docs, sheets, forms, slides and drawings within a Google drive environment. Each lesson has four components to it. The first component is a visual slide presentation on the computing and engineering concepts. These slides also contain steps the students are to complete on paper such as drawing the engineering mechanism, and pseudo code for their Scratch program script. The lessons encourage multimedia documentation such as photos, videos and sound recordings. The second component is the LEGO® robot diagram building instructions. The third component is a reflection form the students fill out. The reflection form is a Google Form that the student fill out online for the teacher. The teacher can access all their students' responses in a single spreadsheet. The last component is the Scratch program script to operate the robot. Three program scripts in various degrees of difficulty are written for each robot build for the teachers to reference when assisting the students. The lessons also include any images or sounds the students may incorporate into their Scratch program scripts. As lessons are created, they are modified as we discover things that may not be clear to the students. The lessons are designed so that the teacher is a facilitator and learns in tandem with the students.

Implementation

The CELS Program officially launched in early 2018, after robotic kits and laptop computers were procured for the CELS classroom labs. A lesson has two students work together with a

single computer and robot kit. The pair of students complete the lesson and all tasks together. Every lesson the pair of students have assigned roles for the robot build and Scratch program script. The students switch roles in the next lesson to ensure that a student is not left out. The role switch continues throughout all the lessons to allow the students to be comfortable in all roles. The CELS lessons are “on the job” computing and engineering training for the teachers. The teachers are not necessarily trained on Scratch or the robot kits. The teacher completes the lesson prior to releasing it to the students. Armed with fresh knowledge on that particular robot build and computer program, the teacher can easily take on the role of a facilitator. LeAnne Cheatham dove into the facilitator role beautifully. As Ms. Cheatham encountered questions or problems, she would reach out to me via text, email, or social media. There was more than one occasion where she would call and put me on speaker phone to talk with the students. At the end of the academic year in May 2018, the elementary students were well on their way to understanding computing and engineering topics.

When outlining which robot build a grade level would do, it became clear that we had to find more robotic builds. I located an open source, teacher resource blog group titled, Wedobots. We have incorporated some of their robot designs into the CELS program. Most of the complex Wedobot robots are saved for the fifth grade students due to the advanced nature of the builds. However, there were some fun ones I wanted the other grade levels to enjoy. As part of the CELS program, We bring a group of Georgia Tech CS students down to visit and work with the elementary students each semester. The Georgia Tech students serve as mentors to the students and encourage their work on the robots. We felt it was important that the elementary students had GT students to look up to and aspire to be one day.

Impact and Future

The CELS program impacts third, fourth, and fifth graders at WRES over a three year span. The program is new, and we are venturing into untested waters. We created a pre-assessment that each elementary student in the CELS program takes at the start of the academic year and again at the end of the academic year. This pre-assessment is for WRES use only so they can measure the benefit and knowledge growth of the students. We are starting the process of the Collaborative Institutional Training Initiative (CITI) course, and filing an application with the IRB at Georgia Tech to gather data on the elementary student performance in the program. The data will allow us to properly evaluate the CELS program effectiveness. We feel this data is extremely important to the success of the program, and measuring its impact.

There are plans for a robotic build competition to take place at the end of each academic year. The robotic build competition will be among the fifth grade students. The competition is modeled after the College of Computing’s Junior Design Expos. The fifth graders are to showcase their robot and the Scratch program script that operates their robot. Dr. Hudachek-Buswell, Ruchi Banerjee and other GT students will attend the competition as judges and judge each robot build. The fifth grade students will have to provide a live demonstration of the robot and poster of the robot. Feedback will be provided to all the students who participate in the competition.

We have added one other school to the CELS program, Fayetteville Elementary School, FES, in Fayette County. FES is a title 1 school with an 85% minority student population. FES has their own robotics equipment and just needed the CELS lessons. We are watching how they implement the program. FES is a test on scaling with no involvement to see how the CELS lessons endure in this type of implementation. The Coweta County School System and West Georgia Regional Education Service Agency have requested access to our CELS program. GT legal has given us approval to distribute our program files to other schools. We are currently preparing our files so that they can be delivered electronically to other schools in Coweta County. We have not committed to providing personal support to the other schools. We are actively investigating how to properly scale the CELS program to other schools.

Links:

Crane lesson instructions,

https://drive.google.com/open?id=10w_X4uT7k0Zqz8QmVj5qZCNMdhMnGXNg

Crane reflection form,

<https://drive.google.com/open?id=1eEC4Phd2mVdK18ugKSmFZrHyXRKiz5I47G9tZI0Cy4o>

Crane code,

https://drive.google.com/open?id=16L9yoO8nDuB7L3_nUakKmvXqzW5saY69

Crane robot build LEGO® instructions,

https://drive.google.com/open?id=1DwTpG65eGX_OC4h9xpXII3bmfS_6BT5f

Airplane Build WRES Video

<https://drive.google.com/open?id=176e9aUI4Ee6jc2VbALqbUcKTHb-AU0EE>

Crane Build WRES Video

https://drive.google.com/open?id=1hF5M68bhgaU3w_s80-pr3-Bnkm8ZO14Y

CELS Lessons Rubric																			
Build #	Build	Third Grade	Fourth Grade	Fifth Grade	Observation, Reasoning, Teamwork	Tools to gather information	Communicate explanations	Scientific inquiry	Conduct investigation	Fair testing	Motion & energy	Cam	Lever	Pulley	Gear	Compound gearing	Friction	Sensor Tilt	Motion Sensor
1	Dancing Birds		4		X	X	X	X	X	X	X			X	X		X		
2	Smart Spinner		5		X	X	X	X	X	X	X		X		X	X	X		X
3	Drumming Monkey	5			X	X	X	X	X	X	X	X			X		X		
4	Hungry Alligator		3		X	X	X	X			X			X					X
5	Roaring Lion	1			X	X	X	X			X		X					X	
6	Flying Bird	3			X	X	X	X			X	X	X					X	X
7	Goal Kicker	6	1		X	X	X	X	X	X	X								X
8	Goal Keeper		2		X	X	X	X	X	X	X			X	X				X
9	Cheerful Fans		6		X	X	X	X	X	X	X			X	X	X	X		X
10	Airplane Rescue	2			X	X	X	X			X							X	
11	Giant Escape			1	X	X	X	X			X			X	X	X			X
12	Sailboat Storm	4			X	X	X	X			X		X		X			X	
13	Crane			2	X	X	X	X			X	X	X	X		X		X	
14	Ferris Wheel			3	X	X	X	X			X				X	X			X
15	Car			4	X	X	X	X			X	X		X	X	X	X		X
16	Sea Lion	7			X	X	X	X			X	X		X	X				
17	X Wing		7	5	X	X	X	X			X		X		X	X			
18	Turbine			6	X	X	X	X			X				X	X			
19	Helicopter			7	X	X	X	X			X				X	X	X		

References

- [1] Guzdial, M., “Education: Teaching computing to everyone.” *Communications of the ACM*, vol. 52, no. 5 pp. 31-33, 2009.
- [2] Wilson, C., Sudol, L.A., Stephenson, C., Stehlik, M. *Running on Empty: The Failure to Teach K-12 Computer Science in the Digital Age*. ACM, CSTA, 2012.
- [3] Seehorn, D., Carey, S., Fuschetto, B., Lee, I., Moix, D., O'Grady-Cunniff, D., Owens, B., Stephenson, C., and Verno, A. *CSTA K-12 Computer Science Standards, Revised 2017*. Technical Report. ACM, New York, NY, USA.
- [4] Webb, D., Repenning, A., and Koh, K. 2012. “Toward an emergent theory of broadening participation in computer science education.” *Proceedings of the 43rd ACM Technical Symposium on Computer Science Education*. New York, NY, USA, pp. 173-178, 2012.



Dr. Mary Hudachek-Buswell
 College of Computing
 Georgia Institute of Technology
 801 Atlantic Drive, Room 122
 Atlanta, GA 30332-0280
hudachek@cc.gatech.edu
 678-438-1519

January 17, 2019

Dear Members of the CETL Awards Committee:

The Willis Road Elementary School, WRES, Computing and Engineering with LEGO® and Scratch, CELS, program has been one of the most rewarding projects with which I have been involved during my career as an educator. In 2017, the educational partnership was formally formed, and our mission was to broaden participation in computing and engineering at WRES. LeAnne Cheatham was as passionate about bringing computing to WRES students, as she was fearless in implementing an innovative program. We both knew that we needed assistance with developing the CELS program, and Ruchi Banerjee became the face of CELS to WRES students. I am in awe of the dedication both these women have for the CELS program. We are entering into our third year of the CELS program.

The first hurdle in CELS program was acquiring the robotics. I had to find funding for the purchase of the LEGO® Wedo kits. I approached Yamaha Motor Manufacturing Corporation in Coweta County, and was successful in obtaining one-third of the funds. Georgia Tech's Constellations Center for Equity in Computing donated the remaining two-thirds of the funding to purchase the robots. Coweta County School System purchased the necessary laptops to code the robots. With the equipment acquired, I turned my attention towards developing the lessons.

I researched robotic builds with the Wedo kits, and basic engineering principles associated with the robotics. I found open source robot builds which I incorporated into the CELS program. I created the CELS Lessons Rubric detailing robot build, grade level, and associated engineering principles. After meetings and discussions on the delivery methods and materials Mrs. Cheatham would need, I began drafting and laying out the framework for the lessons. It was important that the lessons contained the same file usage so that the students would become familiar with how the lessons were orchestrated so they could focus on computing and engineering principles. Ms. Banerjee reviewed every lesson, and all files in the lesson. Ms. Banerjee would build and code the robots testing our lessons. In time, I have turned over part of lesson development to Ms. Banerjee.

Ms. Banerjee, other GT CS students, and myself travel down to WRES every semester to observe, assist, and work with the WRES students. The connection between WRES students and Ms. Banerjee, along with other GT students, is inspiring to see. WRES students want to be engineers and computer scientists at Georgia Tech just like Ms. Banerjee. I feel it important to note that throughout our partnership none of the three partners received any additional pay, fees, or funds. We are dedicated to seeing the CELS program become sustainable. We are pleased that the Coweta County School System is promoting and showcasing the CELS program at WRES at the state department of education.

It has been a privilege to work with LeAnne Cheatham and Ruchi Banerjee on such a worthwhile project. Thank you for considering our education partnership for the CETL award.

Sincerely,
 Mary Hudachek-Buswell



Willis Road Elementary School

430 Willis Road
 Sharpsburg, GA 30277
 (770) 304-7995
 (770) 304-7999 - Fax
Mrs. Jennifer Whetstone - Principal
Dr. Waikiki Upshaw - Assistant Principal

January 17, 2019

Dear CETL Awards Committee,

As the teacher of gifted children at Willis Road Elementary I am constantly searching for opportunities to provide real-world authentic experiences for my students. This often proves difficult due to lack of funding. Willis Road Elementary School, WRES, is a Coweta County public school serving 700 students in grades PreK-5. It is located in the southeastern, rural part of the county. WRES has a large population of Hispanic students, 13%, with 26% of all students in minority populations. Over 38% of the students are economically disadvantaged. There is a 15% mobility rate in our student population. WRES does *not* receive any Title I funding. With these constraints, we must be creative in providing unique opportunities for our students.

I never dreamed that a simple exchange of pleasantries with a school guest, Dr. Mary Hudachek-Buswell, would be the inception of an ongoing partnership which would develop an innovative program for our students. She immediately saw the need for coding and computer science experiences for students. Within a matter of months, we organized our first coding day where all students in 3rd - 5th grades had a one hour block to explore the world of computer science. Dr. Mary, as she is affectionately known to WRES students, was the driving force that made this day happen. She secured loaner LEGO® kits and laptops from Georgia Tech College of Computing. She also brought a dozen undergraduate teaching assistants to assist WRES students with their first endeavor in building and coding. The day was amazingly successful and exceeded all of our expectations. The connection between the Georgia Tech students and WRES students was electrifying. This one day shattered stereo-typical engineer persona in the eyes of my students. They quickly realized that coding and engineering had no boundaries based on background, race, or gender, but only on their willingness to work hard and take chances to learn new concepts. Students were now beginning to see themselves as future Georgia Tech students and engineers.

After reflecting on the events of the day, Dr. Mary immediately realized the urgency to make this a more sustainable program that would have a greater impact by providing ongoing building and coding opportunities for students. Thanks to Dr. Mary and Ruchi Banerjee, WRES gifted students are now immersed in building and coding through the CELS Program on a weekly basis.

Students are exposed to engineering and coding concepts they would not have been exposed to until middle or even high school without this program. The critical thinking and productive struggle that the students encounter on a weekly basis is evident in student actions. Students are creating apps and coding outside of the classroom - just for fun! Due to exposure to advanced concepts, students are making connections to the real world. One group of curious students researched where and how worm gears and crown gears are found and used in their world.

As the program has evolved I have been afforded the opportunity to extend lessons even more. After the first lesson focusing on gears and the concepts of gearing up, gearing down, and gear ratios I quickly realized that students did not understand it. I related gear ratios to multiplication facts. Students first watched an informational video lesson that highlighted gears. Students quickly realized that if Gear A had 40 teeth and Gear

B made 2 rotations while Gear A only made one rotation then Gear B had 20 teeth. ($20 \times 2 = 40$). As reinforcement for not only this engineering concept, but also multiplication facts I made flashcards with pictures of gears and a number on each one. Students would “gear up” with a partner and explain the gear rotations in relation to each other along with multiplication fact. This really instilled the concept and students absolutely loved this activity. Another example of extending the lessons was the incorporation of a virtual field trip to Toyota Research Institute in Michigan with a focus on coding for artificial intelligence (AI) and how it is utilized with various automated vehicles. This virtual experience was an excellent way for students to make the connection of coding/programming in the classroom with actual application in current vehicles and future vehicles in their world. The latest extension to the CELS Lessons has been the unlikely connection to classic novel, *Hatchet*. Students have been challenged to write pseudocode that would save 13 year old Brian from a painful airplane crash. The conversations about the logical thinking were beyond my expectations! Students were able to articulate that the code would have to start with an event (Pushing the emergency button) and that conditional code lines for the next event. The CELS Program has truly ignited a passion in my teaching of these 21st century learners in a manner that will hopefully foster a passion in them for programming and coding.

As I am constantly evaluating my instruction to improve student performance, I am working with Dr. Mary and Ms. Ruchi to explore ways that I can implement coding into our lower grade levels as a way to supplement the current CELS Program. We believe that growing the CELS Program will spark an earlier interest with even our youngest students. Fostering critical thinking and creativity in the young minds of gifted learners is so important. If we challenge them sufficiently today we will prepare them for unparalleled greatness throughout their K-12 educational experience as well as their post-secondary education as a Georgia Tech Yellow Jacket!

Just as I was given this opportunity to learn along with the students, I believe it is equally important that I share this experience with other teachers. Currently I am mentoring Mrs. Faith North, who is new to the WRES Reach Program and CELS. Mrs. Lori Thompson, a former colleague, and I have also shared this concept of teaching elementary students about computer programming via the CELS Program at the Coweta County Innovation Summit in May, 2018. Mrs. Thompson and I teamed up with Dr. Mary Hudachek-Buswell to present at the West Georgia Regional Educational Service Agency STEM Conference in September, 2018 on this innovative concept of teaching coding to elementary students.

My goals are to continue expanding the program further by sharing with colleagues at various regional conferences as national conferences. By sharing our experience, I am hopeful that more elementary school teachers will be willing to step outside their comfort zone to provide a truly, engaging and unique 21st learning experience for their students.

All of this is a direct result of the partnership that Dr. Mary Hudachek-Buswell, Ms. Ruchi Banerjee and Georgia Institute of Technology have created with Willis Road Elementary School. We are so grateful for this enthusiastic passion and look forward to a growing a sustainable partnership for years to come.

Sincerely,

LeAnne Cheatham
 Willis Road Elementary School
 Teacher of the Gifted/REACH Teacher
 Science Olympiad Team Coach & Academic Bowl Coach

January 17, 2019

Ruchi Banerjee, 3rd Year Undergraduate Student
Georgia Institute of Technology
(480)-297-2965, ruchi.banerjee@gatech.edu

Dear CETL Awards Committee,

Since 2017, I have been involved in the design, construction and execution of a three-year scaffolded approach to implement a computing and engineering program within elementary schools. When Professor Hudachek-Buswell approached me about her idea to develop this program, I was extremely excited! As a third year Computer Science student at Georgia Tech, I have experienced and worked in many types of settings. From programmer to teaching assistant to researcher, my varying approaches to learning and teaching have shown me the importance of interdisciplinary collaboration as a means to success. We have used computing and teamwork to build this program in the hopes that young students can use the disciplines of math, programming, and logic and reasoning to understand novel concepts.

My involvement in this project revolves around two main goals. The first is to serve as an active role model and representation of the computer science community. Seeing a female college student from a field that is largely male dominated will change children's perspectives of who an engineer is. With this different point of view, young students (especially young girls) will be more eager to pursue engineering as a career without the fear of gender limitations. My second responsibility is to create quizzes, help put lessons together, and clarify or explain more about various computer science and engineering concepts to the students and teachers in person or via video calls. The main objective with the quizzes and lessons is to create material which requires children to develop peer-to-peer relationships and use their combined knowledge with the help of outside resources (PowerPoint slides, teachers, the Internet) to achieve the robotic builds. Forming such relationships builds character and knowledge in the students.

Throughout the past year, Professor Hudachek-Buswell and I have had opportunities to visit classrooms involved with the project and I am so pleased with their progress! Each visit, the children are even more excited to see what they will be building and learning next. Witnessing the eagerness of the students and the positive effect the program has had on them strengthens my own passion for computer science and motivates me to better myself as a leader and role model. One thing that stuck with me through this whole process was that the excitement and interest on these children's faces came as a result of a genuine interest to learn rather than from Georgia Tech's reputation. This program has shown me how incorporating activities such as robotic builds and programming in elementary schools can spark and facilitate a passion in STEM careers.

Sincerely,
Ruchi Banerjee



To Whom It May Concern:

My name is Monica Sweat, and I'm the Director of the Division of Computing Instruction (DCI) within the College of Computing at Georgia Institute of Technology. It is my pleasure to provide this letter of strong support for Dr. Mary Hudachek-Buswell, a Lecturer in DCI, for the CETL Education Partnership Award. I was her mentor when she began her outreach to Willis Road Elementary School in 2015. I watched her relationship with the teachers, the elementary school, and GT students grow into a something larger through the Computing and Engineering with LEGO and Scratch (CELS) curriculum. When I became the Director of DCI in 2018, I supported her continued work on the project. Her work on CELS is exemplary, and she motivates those around her to participate in public education.

Dr. Hudachek-Buswell, as an experienced computer science educator, developed the CELS program with the intent of providing computing education opportunities to underrepresented groups. She is an excellent faculty member for her outreach efforts, and she inspires our students to participate in computer science education. The benefits to the elementary school and its students are clear, but what may be even more remarkable is the long-lasting effect on the GT students. I have watched vans full of GT students take off on their educational mission at the elementary school. The GT students' excitement at this opportunity to give back is profound.

The WRES educational partnership and CELS program now extends to other schools. Dr. Hudachek-Buswell presented the CELS program at West Georgia Regional Education Service Agency conference to other educators. She is preparing a proposal for a panel at the Association for Computing Machinery's Special Interest Group on Computer Science Education, the premier organization in this field. Additionally, Dr. Hudachek-Buswell is preparing to file with Georgia Tech's IRB to conduct research on the CELS program.

Dr. Mary Hudachek-Buswell did not wait for computer science or engineering education to be offered in the elementary classroom. She put both disciplines in the elementary classroom with her CELS curriculum. Her development of this innovative, interdisciplinary program is outstanding. She saw a need at a rural elementary school and immediately became involved in that community. Dr. Hudachek-Buswell is a wonderful example of education partnership at its best, and I cannot think of a more deserving faculty member.

Thank you,

A handwritten signature in black ink that reads "Monica Sweat".

Monica Sweat

Director

Division of Computing Instruction

Director of Undergraduate TA Program

sweat@cc.gatech.edu

January 7, 2019

This is a letter of recommendation in support of Mary Hudachek-Buswell's nomination for a CETL Education Partnership Award.

I was the Director of the Division of Computing Instruction in the College of Computing and I hired Mary and was her supervisor when she started the project with the Willis Road Elementary School.

Mary is a tireless advocate for increased representation of women and minorities in education.

She has traveled to Washington, DC to meet with member of congress and their staffs in support of this advocacy.

She regularly attends the Grace Hopper Celebration, the world's largest gathering of women technologists where she plays an active role.

She is one of the most enthusiastic teachers I have ever known.

She came to me one day and told me of the Willis Road Elementary School and conversations she had with teachers and administrators about the need to do something about computer education for the students in that school.

I told her she had my full support.

She developed a curriculum, enlisted some of our Undergraduate Teaching Assistants, found funding from both inside and outside Georgia Tech and made this happen.

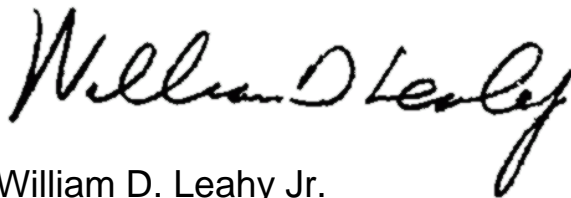
In a word, I was simply amazed at the amount of time and effort she was willing to put into such a worthwhile project. And all this while teaching her normal full time load of very large introductory Computer Science classes.

I retired at the end of 2017 but I stay in touch with the College of Computing and when Mary asked me to write a letter in support of receiving this award I was delighted.

During my 20 years at Tech I worked with CETL on a number of different projects and think the work they do is very important and fruitful. The opportunity for CETL to recognize Mary's work and contribution is simply wonderful and I sincerely hope she wins this award.

I would be happy to supply any additional information desired.

Sincerely,

A handwritten signature in black ink that reads "William D. Leahy Jr." The signature is written in a cursive style with a large, sweeping initial 'W'.

William D. Leahy Jr.
Senior Lecturer Emeritus
Division of Computing Instruction



Willis Road Elementary School

430 Willis Road
Sharpsburg, GA 30277
(770) 304-7995

(770) 304-7999 - Fax

Mrs. Jennifer Whetstone - Principal
Dr. Waikiki Upshaw - Assistant Principal

January 2, 2019

Dear Education Partnership Awards Committee,

I highly recommend Mrs. LeAnne Cheatham for The Teacher Partner-Education Partnership Award from Georgia Tech Center for Teaching and Learning. During her teaching career, Mrs. Cheatham has served as both a regular education and gifted teacher. She never hesitates to serve in a leadership capacity participating in our School Improvement Leadership Team, serving as a county REACH (gifted) representative, and taking initiative in innovative learning opportunities for our students, such as the Georgia Tech CELS Program. Additionally, this year, she is serving as a new teacher mentor to her fellow gifted teacher, who is new to our school system.

We were recently selected by the Georgia Department of Education Division of Teacher and Leader Support and Development as a featured Georgia All-Stars For Learning school. This is a wonderful accomplishment for our school and the partnership we have with Georgia Tech. The STEM work our gifted students and Mrs. Cheatham do through the CELS program will be featured by the state department on the Georgia All-Stars For Learning Series II project. Mrs. Cheatham has proudly represented Willis Road Elementary at Coweta County meetings and professional learning conferences and classes. She has effectively and successfully utilized the knowledge gained from these opportunities to continually grow and improve her classroom instruction in ways that support the success of each student she serves. Mrs. Cheatham is a fabulous candidate and has the support of her instructional school leaders.

Jennifer Whetstone, Ed.S.

Principal

Willis Road Elementary School

jennifer.whetstone@cowetaschools.net



College of Computing
 Atlanta, Georgia 30332-0280 U.S.A.
 PHONE 404-894-3152
 FAX 404-894-9846
<http://www.cc.gatech.edu>

Georgia Tech
 College of Computing
 801 Atlantic Drive
 Atlanta, GA 30332

January 17, 2019

To whom this may concern,

My name is Tim Brown, Academic Advisor in the College of Computing at Georgia Tech. I am writing on behalf of Ruchi Banerjee. Please accept this correspondence as documentation of my support in providing the highest recommendation for her to receive the Educational Partnership award.

The internationally acclaimed College of Computing at Georgia Tech attracts some of the most talented individuals that the world has to offer. Ruchi has managed to position herself as a star among stars. Her academic performance to date is exemplary and has garnered her institutional recognition for the entirety of her time spent here thus far.

Furthermore, Ruchi has earned the esteem and respect of her peers, faculty, and staff. Dr. Mary Hudachek-Buswell and I have observed her efforts and jointly have decided to advocate her as a recipient of the Educational Partnership award. Ruchi stands out amongst her peers as she is constantly lending a helping hand and providing leadership in their academic efforts.

Ruchi's passion for community and helping others has inspired her to help implement and develop the Computing and Engineering with Lego and Scratch (CELS) program. This program is highly visible to the faculty and staff of the Computer Science department as we frequently witness students perusing the halls and working on various projects. From a staff perspective, seeing the physical embodiment of their projects rouses our curiosity. Student impact is undeniable, though the level of student enrichment is difficult to quantify or measure empirically. The students are very engaged in their activities and are often excited to share the details of their work with anyone who is willing to listen. The program is very well organized and has very challenging learning outcomes. It also provides students with an avenue to see different pathways for success, especially in the STEM fields.

Involvement within the CELS program has allowed Ruchi to display some of her best qualities. She is highly intelligent, adaptable, and personable. She is an example of success in a STEM field and she definitely is a role model. Minority students and young women see her and aspire to achieve in similar ways that she has been able to do thus far.

This award would be the culmination of a lot of hard work and recognition of a job well done. Furthermore, it would be a celebration of the possibilities of the future and how this new generation is contributing to improving this dynamic world. For those reasons and many others, I hope that Ruchi



College of Computing
Atlanta, Georgia 30332-0280 U.S.A.
PHONE 404-894-3152
FAX 404-894-9046
<http://www.cc.gatech.edu>

receives this award, and that this composition will sway any reader to endorsing her in the same manner that we have here. I know the selection committee has an impossible task in regards to selecting an individual from a deserving field, but please regard Ruchi as the top choice. Thank you for your time and consideration.

Warmest Regards,

A handwritten signature in black ink, appearing to read "Tim Brown". The signature is stylized with a long, sweeping horizontal stroke at the end.

Tim Brown



99 Brown School Drive
Grantville, Georgia 30220

Dear Georgia Tech Education Partnership Award Panel:

It is my greatest pleasure to recommend Mrs. LeAnne Cheatham, Dr. Mary Hudachek-Buswell, and Ms. Ruchi Banerjee for the Georgia Tech Education Partnership Award.

My experience with the development and implementation of the CELS Program is unique. I was originally Mrs. Cheatham's co-teacher when the first sparks of this idea emerged. We sat side-by-side with Dr. Hudachek-Buswell as we dreamed big. We talked about how we could touch of the lives of students and impact both their present and future lives.

Through the work of these women, I have personally experienced the impact the CELS Program has on expanding the future of engineering. Twin young women immediately come to mind as some truly impacted by the collaboration. Kaleigh and Kylee are sisters with two very different dreams. They both love science, but thanks to the CELS Program and the involvement of Mrs. Cheatham, Dr. Hudachek-Buswell, and Ms. Banerjee, they have been able to pinpoint career paths. One wants to be an aerospace engineer and the other wants to focus on textile engineering.

Kaleigh and Kylee are only the beginning of what teaching our youngest children the concepts of computer science can achieve. There are countless others. We have experienced special needs students who struggle to read dig deeply into engineering and design. Students who have extreme social and emotional delays have been able to find success through the CELS Program.

The last three years of development seem to be only the beginning of what should be a long-standing, growing partnership between The Georgia Institute of Technology faculty and students and The Coweta County School System teachers and students. This program has the potential to be developed into a growing framework of teaching computer science to children from all backgrounds.

Most Sincerely,

Lori C. Thompson
Instructional Professional Learning Coordinator
West Georgia Regional Service Agency