

Portfolio

Felton Jenkins Jr. Hall of Fame Faculty Award

Dr. Beulah Narendrapurapu

Georgia Southern University

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November 17, 2022

Dear Selection Committee,

It is with great pleasure that I recommend Dr. Beulah Narendrapurapu for the Regents' Teaching Excellence Awards-Felton Jenkins Jr. Hall of Fame Faculty Award. Dr. Narendrapurapu's commitment to teaching best practices and student success is evident in her involvement in innovative teaching strategies and learning processes. As an integral part of the Department of Chemistry's faculty, Dr. Narendrapurapu contributes to our students' academic success by consistently seeking pedagogical innovations and pursuing professional development opportunities.

One of Dr. Narendrapurapu's many contributions to our university is her development of supportive materials for teaching and learning success implemented in course CHEM 1310, Chemistry for Engineers, which she has coordinated since 2017. Using POGIL (Project Oriented Guided Inquiry Learning) activities, she fosters an active learning environment that is student centered and student empowering. Dr. Narendrapurapu also employs teaching techniques such as flipped classrooms and interactive tools to increase student engagement, information retention, and effective assessment.

Dr. Narendrapurapu is also actively involved in efforts to increase student accessibility to learning materials, and received a USG Affordable Learning Georgia grant for her work with open educational resources. Her efforts to improve student learning outcomes and access to information resulted in the creation of open access textbooks, guides, and self-assessments to incentivize metacognitive reflection among her students.

Dr. Narendrapurapu's dedication to successful student learning, better educational experiences, and professional growth is also reflected in her willingness to participate in multiple committees within the university more broadly, and in the Department of Chemistry, specifically. Her notable contributions include her work in her department's Open House and Publicity Committee, and on the Ad-hoc Committee for Student Ratings of Instructions.

I firmly believe that Dr. Beulah Narendrapurapu is a strong candidate for this award, and her tireless work advocating for improvements in student experience, open access materials, and teaching best practices demonstrate the extent of her commitment to higher education. She is a remarkable teacher and scholar, and a dedicated colleague whose work ethic and multi-project involvement demonstrate her academic and professional merits.

Thank you for your consideration of Dr. Beulah Narendrapurapu for the Regents' Teaching Excellence Awards-Felton Jenkins Jr. Hall of Fame Faculty Award. If you have further questions, please feel free to contact me.

OFFICE OF THE PROVOST AND VICE PRESIDENT FOR ACADEMIC AFFAIRS
P.O. BOX 8022, STATESBORO, GA 30460

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Sincerely,

A handwritten signature in black ink, appearing to read 'Carl L. Reiber'. The signature is fluid and cursive, with the first name 'Carl' being more prominent than the last name 'Reiber'.

Carl L. Reiber, Ph.D.
Provost & Vice President for Academic Affairs



P.O. BOX 8064
STATESBORO, GEORGIA 30460-8064
TELEPHONE (912) 478-5681
FAX (912) 478-0699
<http://cosm.georgiasouthern.edu/chemistry/>

November 27, 2022

Felton Jenkins, Jr. Hall of Fame Faculty Awards Committee

Dear Awards Committee Members,

I am writing this letter in support of **Dr. Beulah Narendrapurapu's** nomination for the Felton Jenkins, Jr. Hall of Fame Faculty Award. I have known Dr. Narendrapurapu since she was hired in the department as a visiting instructor in the Fall of 2013. She was subsequently hired as a lecturer in the department in the Fall of 2015. Since that time, she has been promoted to the rank of Senior Lecturer. Dr. Narendrapurapu is a very accomplished educator and scholar in the area of Teaching and Learning. I believe that she will be an excellent choice for this award based on her commitment to our students and our program.

Dr. Narendrapurapu has mainly taught in our first year, 1000 level courses and is the coordinator of our Comprehensive General Chemistry (CHEM 1310) course which was developed as a one semester course for engineering majors with topics from our Principles of Chemistry sequence needed for future engineers. More recently, she volunteered to teach our senior level Quantum Mechanics course when the faculty member who taught that course retired. Dr. Narendrapurapu also developed and teaches our online CHEM 1310 lecture/lab course. These courses have ranged in size from 48 students to 200 students. Dr. Narendrapurapu is well liked by her students and her Student Ratings of Instruction are always at or near the top of the department.

Dr. Narendrapurapu is always working to optimize her teaching and student outcomes and is a leader in the department on implementing new modes of instruction and technologies in the classroom. She is a strong proponent of Active Learning by incorporating concepts of Guided Inquiry, Flipped Classroom, and Project Oriented Guided Inquiry Learning (POGIL) into her courses. She has developed interactive study guides and animations to help students better understand complicated topics. Dr. Narendrapurapu was awarded an Affordable Learning Georgia Textbook Transformation Grant that supported her efforts to develop a free online textbook with videos and end of chapter problem sets specific for the one semester CHEM 1310 course. She recently completed a continuation grant from ALG which allowed her to develop self-assessment quizzes for the online textbook. In addition to educating our students, Dr. Narendrapurapu has also been very active in providing training to faculty and graduate students in the areas of active learning and student engagement, and inclusive teaching practices.

In summary, it is clear to me that Dr. Narendrapurapu has established herself in a short time as a leader in the department and college in the area of teaching and learning. I therefore enthusiastically recommend Dr. Beulah Narendrapurapu for the Felton Jenkins, Jr. Hall of Fame Faculty Award.

Sincerely,



John C. DiCesare
Professor and Interim Chair

November 28, 2022

Dear Selection Committee,

I am happy to write a letter of recommendation for Dr. Beulah Narendrapurapu for the Felton Jenkins Jr. Hall of Fame Award after her most recent recognition winning the Georgia Southern University Teaching Excellence Award.

I've been teaching alongside Dr. Narendrapurapu, currently in a Senior Lecturer position, since 2013. I've had the pleasure of watching her career take off as she learns how best to utilize her many talents.

I coordinate the CHEM 1211/1212 program in Statesboro and first met Dr. Narendrapurapu when we hired her as a Visiting Lecturer. Her attention to detail and mastery of the classroom led us to hire her in a permanent position as soon as we were able. Dr. Narendrapurapu established classroom excellence early in her career and developed an interest in chemistry education and began to take on education-based research projects.

Dr. Narendrapurapu worked with me to develop a large-scale intervention project for CHEM 1211. We called it a Chemistry Study Mixer and it was designed to prevent students from dropping the class, especially if they only needed a bit of extra help and encouragement. We held a huge evening study session right before mid-terms. Dr. Narendrapurapu recruited faculty volunteers and supplemental instruction leaders to divide the large group up into smaller groups that were arranged according to topics in the class. We created worksheets for these groups and turned a large lecture hall into a massive intensive study and tutoring session for students. Feedback from students was very positive. Faculty and student leaders also appreciated the effort to get students caught up at a critical time of the semester. Dr. Narendrapurapu was instrumental in making it happen. She created many of the worksheets, organized faculty and students, and worked with me to evaluate the effort.

In 2017, Dr. Narendrapurapu became the coordinator of the Chemistry course for Engineers, CHEM 1310, and she used that role to create meaningful change for students taking the course. Traditional course materials were designed for a two-semester course

rather than a one semester course, so she obtained an Affordable Learning Grant and created a free online text for students using Libguides. Her new textbook is reviewed well by the students and used as a role model for the company Springshare that develops software used by Libguides management. Because of Dr. Narendrapurapu's attention to detail and keen technology skills, it is no surprise to me that her work would be so well received.

Dr. Narendrapurapu is an early adopter of classroom technology. I observed her classroom five years ago where she was annotating work with an electronic pen in a large lecture hall and using personal devices for classroom response. Since the pandemic many of us have learned to use educational technology, but five years ago, a lot of this stuff was new. Many of us continue to learn about new teaching technology from her.

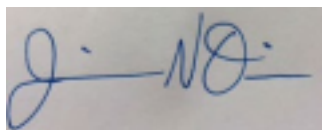
Once she created new course materials for CHEM 1310, she started the process of evaluating these materials and how students are using them. She has presented her work in the SoTL community and it is ongoing. Dr Narendrapurapu is active in the SoTL community and this project is one of her largest to date.

Dr. Narendrapurapu has an extremely thoughtful classroom presence. She utilizes best practices for teaching and learning and has high expectations for student participation. In observing her classroom, I have seen students who are ready and willing to go to work. It takes a lot of groundwork to create a lively classroom environment and it's clear that Dr. Narendrapurapu can do that.

Dr. Narendrapurapu enjoys the classroom environment and is well suited for it. She demonstrates energy and enthusiasm for course material and has clear command of the space in the room. Those are essential skills for holding the attention of a large group of students.

Dr. Narendrapurapu is well liked by her students. She is kind, yet firm, and very thorough. In summary, I believe she is an excellent choice for the Felton Jenkins Jr. Hall of Fame Award and I am honored to throw my full support behind her application.

Sincerely,



Jessica Orvis
Associate Professor of Chemistry
Georgia Southern University

November 28, 2022

Letter of Recommendation

It gives me great pleasure to write this letter in support of Dr. Beulah Narendrapurapu's nomination to the Felton Jenkins Jr. Hall of Fame Award. I have known her since the Fall 2013 during my time at Georgia Southern University (GaSou) both as a Postdoctoral researcher and then as a Lecturer in the Department of Chemistry and Biochemistry. Below is the testimony of how great colleague, leader, and teacher-scholar she is and why she deserves this honor.

From a personal point of view as a new faculty in GaSou, I used to have several teaching moments and she was one of the "go-to" persons. She will listen to me patiently and it will eventually follow in-depth conversations about modifications in teaching style and 'getting to know' students. This helped to develop a different outlook and I can instantly connect to her "solutions" as she speaks genuinely from the perspective of students' well-being. Beulah has an extensive teaching experience in General Chemistry courses and execute interactive teaching techniques. I have a fond memory of her teaching style through "bottom-up" approach, so talking with her always gives me new ideas and perspectives. In the Fall of 2016, she first developed an animation on "[Flipping Tiles](#)" to understand the concept of Integrated rate laws, a topic typically taught in Chemical Kinetics for CHEM 1212K (Principles of Chemistry II) and CHEM 1310 (Comprehensive Chemistry for Engineers) courses. In this animation, she created a simulation as an analogy of tiles flipping upside down that will help to discover the relationship between the concentrations of a reactant over the course of time which will help in determining the reaction order. I enjoyed this simulation and adopted this dynamic activity in one of my CHEM 1212K courses. This activity received positive feedback from students about the clarity of the animation and their understanding of the concept. Over time, she has modified some aspects of this assignment to assess the best modes of presenting the activity and assessing knowledge retention of the concept in her CHEM 1310 course. Her current study on this topic focuses on the efficacy of animation to retaining in-depth concepts rather than a superficial memorization of formulas/equations for applications in problem-solving. She also plans to study what timing and method of the content delivery, such as, pre-lecture assignment or lab assignment helped the students to understand and also recall the knowledge.

Beulah is the program coordinator for the Engineering chemistry course. She created CHEM 1310 online course which is a crucial step during the COVID-19 pandemic that supported the faculty who were teaching that course in a hybrid or completely online instructional design. She is also in charge of the lab course for CHEM 1310. Each semester she trains TA/GTAs, edits the lab manuals (annual), creates course content, and is responsible for labs (prep duties, etc.). I see her sincerity, time dedication, and immense passion for the task she undertakes.


Recently, we collaborated on a project with Beulah as a lead (PI) that was funded by the University System of Georgia's Affordable Learning Georgia (ALG). The project was based on textbook transformation, where we created an open online text resource for engineering chemistry courses (CHEM 1310). While working on the project, Beulah kept a tap on the deadline for grant submission and complied with our individual ideas into a focused goal. With the help of GaSou's library liaison, we created an [open educational resource library guides](#) (lib guides) for the students enrolled in that course. Leading from creating the website, incorporating text materials, and developing individual end-of-chapter questions, I have noticed Beulah's enthusiasm for the project. Her innovative ideas to evaluate the student's learning process through worksheet preparation kept me motivated and involved during this journey. She is extremely hardworking, and her incredible organizational skill stimulated her towards successful completion of the project in Spring 2020.

Completion of this project is a proud moment as we were able to bring down the cost of taking this course ~\$140 per individual (\$74,200 overall) which is the average price that students paid for resources in the past. We have also disseminated our study in 2020 SoTL Commons conference and had been accepted for the BCCE conference supposed to be held in 2020 (the conference was canceled later due to COVID-19). Beulah, has taken taken this project further to create [self-assessments](#) for each chapter in CHEM 1310 libguides textbook. She has acquired supplemental funding as a continuation grant from ALG to support her work.

Beulah's passion for teaching is dominantly visible. Pre-COVID, each semester the Chemistry department hosted a mid-term "study mixer workshop". She co-led, coordinated, and created worksheets for several topics that were assigned for review. She seamlessly incorporates daily life examples (baking, cooking) to bridge the gap between learning chemistry and its application through problem-solving in dimensional analysis and stoichiometry. This aligns with her teaching philosophy that is: "*to foster reasoning skills, I allow students to be in an environment of discovery*".

I believe Beulah's dedication towards teaching, caring for students' learning, passion towards education, and sincerity to the profession has made her a complete teacher-scholar, which every student looks forward to. Anything that is new in technology will spark her ideas to blend into her lecture component. Her academic accomplishments, compassionate and supportive attitude towards a colleague, diligent and intellectual thinking on making the learning process dynamic, and all these qualities unequivocally make her a precious member of the institution and a great academic citizen.

Sincerely,

A handwritten signature in cursive script that reads "Sebanjana Ghosh". The signature is written in black ink and is positioned below the word "Sincerely,".

Curriculum Vita

Education

- **Ph.D. (2013)**, *The University of Georgia*
- **M.S. (2008)**, *Indian Institute of Technology Bombay*
- **B.S. (2006)**, *Osmania University*

Teaching Experience, Georgia Southern University

- **Coordinator, Comprehensive General Chemistry (CHEM 1310) course** (since 2017)
- **Senior Lecturer, Chemistry** August 2021 – current
- **Lecturer, Chemistry** August 2015 – July 2021
- **Visiting Instructor, Chemistry** August 2013 – July 2015

Courses Designed/Taught

- **Designed Comprehensive General Chemistry (CHEM 1310)— Online course**
Created a ready-to-teach online course with gradebook and LMS integrations so the course can be taught by any instructor assigned for the course. Created 17 hours of teaching videos, worksheets, discussion topics and assessments.
- Taught labs and lectures for the following courses: Comprehensive General Chemistry (CHEM 1310), Introduction to Quantum Chemistry (CHEM 3502), Principles of Chemistry-I (CHEM 1211K), Principles of Chemistry-II (CHEM 1212K), Survey of Chemistry-I (CHEM 1511), Conversations with Professors (FYE 1000)

Teaching Strategies and Technology skills

- Proficient in **Guided Learning, Flipped Classroom** and **Game-based learning** instructional models, using Desire2Learn Learning Management system
- Student engagement/assessment Tools: *iClicker, polleverywhere.com, Zoom polling, google forms, kahoot, chem101, quizziz social media- Facebook and GroupMe discussions*
- Online learning platforms: *Mastering chemistry, Achieve, OWL*
- **Video recording tools:** *Kaltura, Yuja, PowerPoint Video Maker, ExplainEverything, ipad screen recording, PenAttention* pointer program for teaching on a tablet.

Scholarship of Teaching and Learning (SoTL) Projects

- (PI) Designed five animations for visualizing concepts in CHEM 1212 and 1310 courses.
- (co-PI) Designed and Studied Chemistry Study Mixer for CHEM 1211 course — a large scale intervention program conducted by 10+ faculty and student volunteers before the withdrawal deadline.

- (PI) Studying the effectiveness of Flipping Tiles Animation in increasing student understanding of integrated rate law equations in CHEM 1310 course.
- (PI) Designing and studying cost-effective alternative resources for CHEM 1310 course

Awards and Recognitions

- University Award for Excellence in Teaching, Georgia Southern University, 2022

Grants/Awards Funded

- **\$8400: Affordable Learning Georgia (ALG) Continuation Grant Round 20, 2021**, “*Creating Self Assessments for existing OER Libguide Textbook in Comprehensive General Chemistry, CHEM 1310 course*”, Beulah Narendrapurapu (PI), Deborah Walker, Dawn Cannon-Rech, Jeffrey Mortimore.
- **\$18,500: Affordable Learning Georgia (ALG) Textbook Transformation Grant-Round 14, 2019**, “*Complete Organization of Textbook and Study Materials Through a Cost-effective Alternative for Comprehensive General Chemistry Course (CHEM 1310) for Engineering Majors*” Beulah Narendrapurapu (PI), Debanjana Ghosh, Arpita Saha, Collaborators: Leah Williams, Nikki Cannon-Rech.
- **\$4375: USG STEM Initiative Funding: Active Learning or Teaching Innovation Grant, 2019**, “*Self-Tracking Assessment and Reflection Study (STARS) study in General Chemistry and organic courses*”, Shainaz Landge, Jessica Orvis; D. Ghosh and Beulah Narendrapurapu (co-PI).
- **\$2000: Instructional Development Award, 2015**, “*Developing Need Based Animations in General Chemistry Courses*”, Beulah Narendrapurapu and Jing Sun.

Workshops Led

- “*Online Workshop: Active Learning and Student Engagement*”, **Georgia Southern University, 2021**, Tricia Brown, Beulah Narendrapurapu.
- **COSM, 2021**, “*Online Workshop: Inclusive Teaching for Peer-Teachers in the Classroom & Laboratory*”, Sponsored by [HHMI-IE3LC](#) grant, Beulah Narendrapurapu, Ria Ramoutar, James Carter.

Oral/Panel Presentations

- **Scholarship of Teaching and Learning (SoTL) Commons Conference, Savannah, GA 2020**, “*Textbook Transformation Journey: From Traditional to No/Low-cost Materials*”, Debanjana Ghosh, Beulah Narendrapurapu, Arpita Saha, Leah Williams
- **Open-ed Southern Symposium (Virtual), 2021**, “*Supporting the Journey: Adapting Library Services to Support the Entire Process of OER Implementation*”, Dawn Cannon-Rech, Jeffrey Mortimore, Beulah Narendrapurapu and Deborah Walker.
- Panel Member, New-Faculty Orientation, Georgia Southern University, 2022
- Panel Member, Open Education Week: OER Heroes- Panel Discussion, GASou, 2021

Poster Presentations

- **University System of Georgia Teaching and Learning Conference (Virtual) 2022**, “*Creating Open-source Self-Assessment Quizzes on Libguides in General Chemistry Course for Engineering Majors*”, Beulah Narendrapurapu, Dawn Cannon-Rech, Jeffrey Mortimore and Debbie Walker,
- **Scholarship of Teaching and Learning (SoTL) Commons Conference, Savannah, GA, 2022**, “*Assessment of Visual Analogy for teaching Chemical Kinetics Concepts in General Chemistry Courses- a Pilot Study*”, Beulah Narendrapurapu and Kania Greer,
- **Scholarship of Teaching and Learning (SoTL) Commons Conference, Savannah, GA, 2020**, “*Textbook Transformation Journey: From Traditional to No/Low-cost Materials*”, Debanjana Ghosh, Beulah Narendrapurapu, Arpita Saha, Leah Williams, Dawn Cannon-Rech, Jeffery Mortimore
- **Interdisciplinary STEM Teaching & Learning Conference, Savannah, GA, 2018**, “*Effectiveness of Homework Intervention in Impacting Scientific Reasoning Skills as Measured by the Classroom Test of Scientific Reasoning*”, Beulah Narendrapurapu and Jessica Orvis
- **SoTL Commons Conference, Savannah, GA, 2017**, “*Using Visual Analogies for Increasing Application of Mathematical Knowledge in STEM Disciplines*,” B. S. Narendrapurapu and J. Sun
- **SoTL Commons Conference, Savannah, GA, 2016**, “*Design of An Intensive Study Session for “At-Risk” Students in Chemistry*,” B. S. Narendrapurapu and J. Orvis

Examples of Service

- Chemistry and Biochemistry Departmental committees: Diversity Equity and Inclusion Committee, Publicity Committee, Web-Master for chemistry website, Open House Committee, General Chemistry ad-hoc and assessment committees, Lecturer search and review committees, Hospitality Committee.
- Member, University *ad hoc* committee for Student Ratings of Instruction
- Served as a reviewer for ACPA23 conference, NSF, SoTL Commons Conference, GURC, GSU Teaching and Learning Conference, CEMITURE (Summer REU selections), CSEPuB labs peer-review, Journal of Chemical Education.

Examples of Professional Development

- *Course: Motivating Learners Starting Strong*, University System of Georgia (USG) 2021
- *Course: Teaching Online Course and Design Practicum*, Faculty Center (FC) 2020
- *Workshop: Leading and Living Inclusively*, American Chemical Society (ACS) 2020
- *Virtual Summer Symposium: Chemistry Games*, AACT 2020
- Faculty Learning Community (FLC) workshops: *Open Educational Resources (5-weeks, 2018)*, *Workshop: Small Change, Big Difference (5-weeks, 2019)*

Teaching Philosophy

I strongly believe that learning is akin to a crystal growing in a beaker. Like a crystal, learning builds on pre-existing knowledge in a bottom-up fashion. My role as a teacher is to “seed” the learning process by carefully selecting strategic examples, familiar facts and logical patterns and then providing proper level of guidance to allow students to develop a fundamental understanding of the subject. When guided this way, students can analyze information, construct arguments and make connections. These skills are indispensable in scientific thinking, and my overarching goal is to encourage students to develop these analytical skills rather than passively receive information.

To start off, I plan a detailed timeline of learning goals, assignments, homework and exams, and hold students accountable. From writing on PowerPoint slides on a tablet in large classes to traditional chalk-board style teaching in small classes, I use different teaching tools based on the need. I also tailor learning goals, teaching methods and assessment methods to suit the class size and the student body. With an understanding of where my students stand in terms of prior chemistry knowledge and the goal towards which they are heading, I set high expectations and take active steps to lead and challenge students in the direction of achieving the learning objectives.

My teaching strategy is simple: “plan the learning goals and choose the appropriate teaching method.” If my learning goal is to foster reasoning skills, I allow students to be in an environment of discovery. One teaching method I use is the Guided Inquiry method where students discover a chemistry concept through snippets of information followed by questions that force them to process information deeply and build on it. For example, in Principles of Chemistry II class, instead of telling students how to make a buffer solution, I provided enough information to allow students to realize that a buffer should have large amounts of both weak acid and weak base components. Additionally, I reminded them of the “common-ion effect” and with this information, students came up with examples of buffer solutions. When students discovered the concept on their own, they were confident and were prepared to apply it. I have found the method also enhances class-participation and discussion.

To teach problem solving skills, I consider it extremely important to model my thinking process to the students. Instead of providing a procedure to solve a problem, I encourage students to analyze the information, identify the key question, make sense of the situation, recognize relevant concepts and develop strategies for solution. After solving a problem, I want my students to stop and reflect and make sense of the answer. I also encourage sharing of ideas, and openness to multiple problem-solving strategies. Solving real-world problems involves such thought and collaboration, and so, I strive to provide such skills so that students become fluent thinkers.

I believe when challenged, students can come up with interesting questions and solutions. For instance, I left students with a difficult problem on balancing reagents in a chemical reaction. While the problem can be solved using trial-and-error, one student was curious whether a mathematical model could be used. With a little help, the student was able to develop an interesting alternative that involved matrices.

When it comes to teaching abstract concepts, I employ visual and verbal analogies. Recently, I designed animations for concepts such as vapor pressure, rate laws and Le Chatelier's principle. Since introductory chemistry courses are crucial in shaping how students perceive chemistry, I make sure to incorporate fun activities and demonstrations into my lectures. I taught the concept of chemical equilibrium using an activity in which two groups of students throw paper-wads to visualize a state of equilibrium (taken from an article published by Jessica Orvis and Jeff Orvis in *The Journal of College Science Teaching*). The activity addressed students' misconceptions of the concept in an entertaining and memorable way.

I believe effective teaching must include meaningful assessment - both formative and summative. I employ iClickers for formative assessment of student understanding of material. To consolidate the understanding, I assign homework and suggest practice problems. I employ self-tests with feedback to help students gauge their learning. I remind students that feeling frustrated is a natural part of learning and encourage them not to give up. I build a platform for assistance by offering review sessions, promoting supplemental instruction, and inviting students to see me during my office hours.

I am conscious of always refining my teaching. I have learned a great deal from my colleagues and from professional workshops, and I am enthusiastic about learning more. I consider it important to reflect on my own teaching and to be open to suggestions. From time to time during the semester, I collect student feedback on my teaching or about an activity, anonymously, using google forms. While retaining elements of my teaching that are beneficial to students, I adjust my teaching based on student feedback.

I strongly believe that I have a responsibility in my role as a teacher to train my students to appreciate scientific methodology, in the same way my teachers instilled this appreciation in me. Lastly, I believe in setting a positive atmosphere for learning. I respect my students while holding them to high standards. When the students and teacher establish a relationship of mutual respect, teaching and learning become rewarding for all involved.

Examples of Teaching Artifacts and Student Success Projects

I. Teaching Artifacts

(a) Teaching with Visual and Experiential Analogies

Much of general chemistry concepts involve visualization of concepts and my role as an instructor is to think creatively to present students with best possible analogies and visual representations to drive home the concepts. As part of this endeavor, I have designed five short animations for the following chemistry concepts: flipped tiles visual analogy, reaction rate animation, animations for visualizing energy transfers in calorimetry, phase change and Lechatelier's principle. For example, to teach chemical kinetics concept, which is related to speed of chemical reactions, I designed the flipping tiles animation as a visual analogy. In the animation, square shaped tiles are used to simulate reactants and products; a tile flipping (turning) over represents a reactant molecule converting to a product molecule. Students visualize how many tiles flip over as a function of time to visualize different mathematical equations that govern various types of reaction kinetics. This animation helps students to develop a deeper understanding of what the mathematical equations represent and delve beyond mere "plugging and chugging" into the equations to calculate answers.

In addition to designing new visual analogies, I have used game-based analogies that already exist in the literature. For example, my colleagues, Jessica Orvis and Jeff Orvis published an active learning and fun activity that involves throwing paper wads in the classroom to teach the concept of chemical equilibrium in Principles of Chemistry II (CHEM 1212 course). After reading about this activity in the literature, I readily employed this "experiment" in my classroom. Students formed two groups and paper wads were distributed to one or two of the groups. When the timer started, students threw a paper wad in their hand to the other side and continued to do so with any paper wads that landed next to them. After a set amount of time, students counted paper wads on each side. This experiment was repeated a couple of times and students noticed that the number of paper wads on each side was nearly same after a certain time. The experiment was repeated at various conditions to drive home the equilibrium concept and also eliminate commonly held misconceptions. Students experience the concept of equilibrium by becoming a part of the "experiment".

(b) Guided Learning worksheets to facilitate active learning:

For chemistry topics where relevant I designed and used Project Oriented Guided Learning (POGIL)-style worksheets. On the POGIL-style worksheet, enough information is

presented and students explore the concept by answering questions on the worksheet. I design the worksheet questions to guide student's inquiry. For example, while teaching the concept of "buffer solutions", instead of providing students with information on what a "buffer solution should contain, I design worksheet questions that allow students to arrive at the conclusion on what a buffer should be composed of by themselves. In this style of learning, students become synthesizers of information rather than mere receivers of information.

II. Projects aimed at promoting student success

(a) CHEM 1211 Study Mixer Project

I am a co-leader of the Study Mixer, a two-hour intensive study session for CHEM 1211K conducted every Fall semester with the help of a dozen chemistry faculty and a large number of student assistants. The project is motivated to address the high DWF percentage in CHEM 1211K course and aims to provide extra help at the right time to some students who need encouragement before making a decision to withdraw from the course. The idea started with the suggestion of a faculty member teaching the General Chemistry courses. From Spring 2014 to 2019 I have been led the study session every Fall semester along with Ms. Jessica Orvis. I have shared responsibility for planning the format of the Study Mixer, recruiting faculty volunteers, advertising the Study Mixer, creating and distributing worksheets, organizing food and drinks, delivering study advice at the beginning of the session and helping out with session topics. The Study Mixer received a positive response from the students. Over the semesters, student participation and interest increased. Most recent study mixer (before the COVID pandemic) received an attendance from 70 to 100 students.

(b) Affordable Learning Resources for CHEM 1310 course

Through funding from Affordable Learning Georgia (ALG) textbook transformation grant (\$18,500), I led a project that led an robust major-oriented LibGuide as a replacement for the existing textbook materials for the lecture portion of the Comprehensive General Chemistry course (CHEM 1310) course. The course is a one-semester General Chemistry course for Engineering Majors and most textbooks written for the course are written for a two-semester sequence. We curated content from OpenStax Chemistry Textbook and supplemented it with you-tube videos for concepts and end-of-the-chapter problem sets. I recently also received funds (\$8400) to create self-assessment quizzes for the chapters in the LibGuide. The project led to an annual student cost-savings of \$86,112.

Letter of Support

Neha Aggarwal

Nashville, TN 37212

November 30, 2022

Georgia Southern University
Department of Chemistry and Biochemistry
1332 Southern Dr.
Statesboro, GA 30458

To Whom It May Concern:

It is with exceeding pleasure that I write supporting Dr. Beulah Narendrapurapu for the Felton Jenkins Jr. Hall of Fame Faculty Award. I had the privilege of learning general chemistry under Dr. Narendrapurapu's engaging and structured teaching as a dual-enrolled student during my 11th grade at Statesboro High School. At the conclusion of my fall semester with Dr. Narendrapurapu in CHEM 1145 (Principles of Chemistry I), I did not hesitate at all to enroll in her CHEM 1146 (Principles of Chemistry II) section the following semester, so that I could continue my longitudinal education in chemistry with the most skilled, nuanced, and dedicated chemistry professor I had encountered.

Prior to Dr. Narendrapurapu's class, I had never before learned general chemistry in a comprehensive college style; I had only an aspiration to pursue the health sciences. Thus, I desired a chemistry education that would cement my interest in the field and provide a solid foundation for my science education moving forward. Dr. Narendrapurapu's teaching did not only that for me, but more. Her lectures were structured similarly to a pyramid of blocks: she established the foundations for each topic and gradually built up to the more challenging, less intuitive, and more calculation-heavy topics. It was this technique that was an undercurrent to her lectures that I and many of my peer classmates appreciated so much, as it allowed for the time and space to ask the questions that mattered, that probed the core of the concept and that could elasticize students' intelligence in the area rather than submit them to rote memorization. She interspersed lectures with brief demonstrations that were equally interesting and concept-illuminating, with interactive activities such as equating students in the classroom to particles reaching a state of dynamic equilibrium, with group work that allowed for student collaboration, and with practice questions that effectively tested students' knowledge before moving forward with more advanced material. She treated each of these techniques not as assessments that would normally worry students, but rather as learning resources that could allow her to gauge the class's progress and identify problem areas in the class's understanding of course material.

In addition to her brilliant teaching, what I value so much about Dr. Narendrapurapu as a professor is her commitment to her students learning the course material, as well as her willingness to grapple with more advanced topics in chemistry outside of curricular boundaries for students who are either curious or craving some more intellectual challenge. Before exams or amid difficult homework, Dr. Narendrapurapu held study sessions outside of regularly scheduled

class in which she directly addressed students' questions about an exam study guide or problems in the textbook. This allocation of time outside of her schedule to have one-on-one conversations with students about gaps in their knowledge just shows her immense dedication to her students, breaking the barrier between professors and students for the sake of genuine learning. One of my favorite interactions with Dr. Narendrapurapu was after a class session concerning stoichiometry, as she had just given the class a complex problem involving balancing reagents in a chemical reaction, and I was curious as to whether a mathematical model could be used to find coefficients. Even though she had just finished with her last class of the day, she stayed with me to work through my proposal, and we ended up with an interesting alternative to problem solving. Students gravitate toward professors with her level of clarity in teaching and her dedication to students' success.

I thus wholeheartedly support favorable consideration of Dr. Narendrapurapu for the Award. I feel privileged to have had my first exposure to chemistry through her conscientious, careful, and exceedingly effective teaching. If you have further questions, I will be happy to answer them through email or phone.

Sincerely,
Neha Aggarwal
MD student, Vanderbilt University
Email: [REDACTED]
Phone Number: [REDACTED]

Supporting Documents for Evidence

- Snapshot of (a) Flipping tiles animation and (b) the related worksheet I designed to teach the concept of “reaction order and integrated rate laws”. The following evidence shows one of the outcomes of the Faculty Development Award I received. I developed 5 animations as part of the project by hiring graphic design students. One of the animations, called “Flipping Tiles” animation has become the focus of my Scholarship of Teaching and Learning (SoTL) study. I designed worksheets for incorporating the animation as part of a lab activity, a pre-lab activity and as a pre-lecture worksheet.

Flipping Tiles Animation: <https://www.youtube.com/watch?v=9IZHoLoTCSQ>

Reaction rate Animation: <https://www.youtube.com/watch?v=o-E4XXtDNv8>

LeChatelier’s Principle: <https://www.youtube.com/watch?v=M71ZSTuh5kY>

Flipping Tiles Animation Worksheet:

- Shown below is a snapshot of pre-lecture video schedule I created and posted on D2L. The pre-lecture videos are used to help students become familiar with the content that will be elaborated in the lecture and also to facilitate a flipped classroom style instruction for some topics. I used iClicker as an instrument to hold students accountable for coming prepared to lectures. For CHEM 1310 course- which is a one semester course for a typically two semester material, this strategy was necessary to enable students to be prepared for lectures, so they absorb the content better.

Fall 2021 - Comprehensive Gen Chemist... BNU Beulah Sugandhini Narendrap.

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Pre-lecture Videos Schedule

Watch the assigned pre-lecture videos before each class. Class will begin with an iClicker quiz based on Videos. Take notes while watching videos. You may refer to your notes during the iClicker quizzes.

Week of	Tuesday	Thursday
Aug 16	Chapter-1 Pre-lecture Videos (watch and take notes on chapter slides). (27 min) Review Classification of Matter and Properties (Slides 1-11) 2) (4 min) Significant digits (Slides 15-17) 3) (8 min) Metric Prefixes (Slides 22-25, 27)	1) (7 min) Unit Conversions using Dimensional Analysis
Aug 23	1) What is an atom? (12 min) 2) Theories about atomic structure. (5 min) 3) Isotope notation (7 min)	1) Ionic vs covalent compounds (9 min) 2) Study: "Chapter-2 Worksheet for Lecture" posted under Content > Chapter slides, worksheets and videos > Chapter-2: Atoms, Molecules and Ions. Complete topics I and II (pages-1 and 2) on the worksheet. Refer to Textbook chapter page while studying the worksheet. Print the worksheet and bring it to class. During class, we will work on last page of the worksheet.
Aug 30	<ul style="list-style-type: none"> mole concept and conversion factors (required to watch only the first 12 min) percent composition (4 min) Print Chapter-3 Worksheet and bring to class. Print a periodic table from this document and bring to class	<ul style="list-style-type: none"> What is Molarity? (9 min)
Sept 6	Introduction to Balancing Equations (13 min, required) Balancing Equations Practice (15 min- optional)	----

Courses

Beulah Nar...

Active (0) Archived (7)

Create New Course

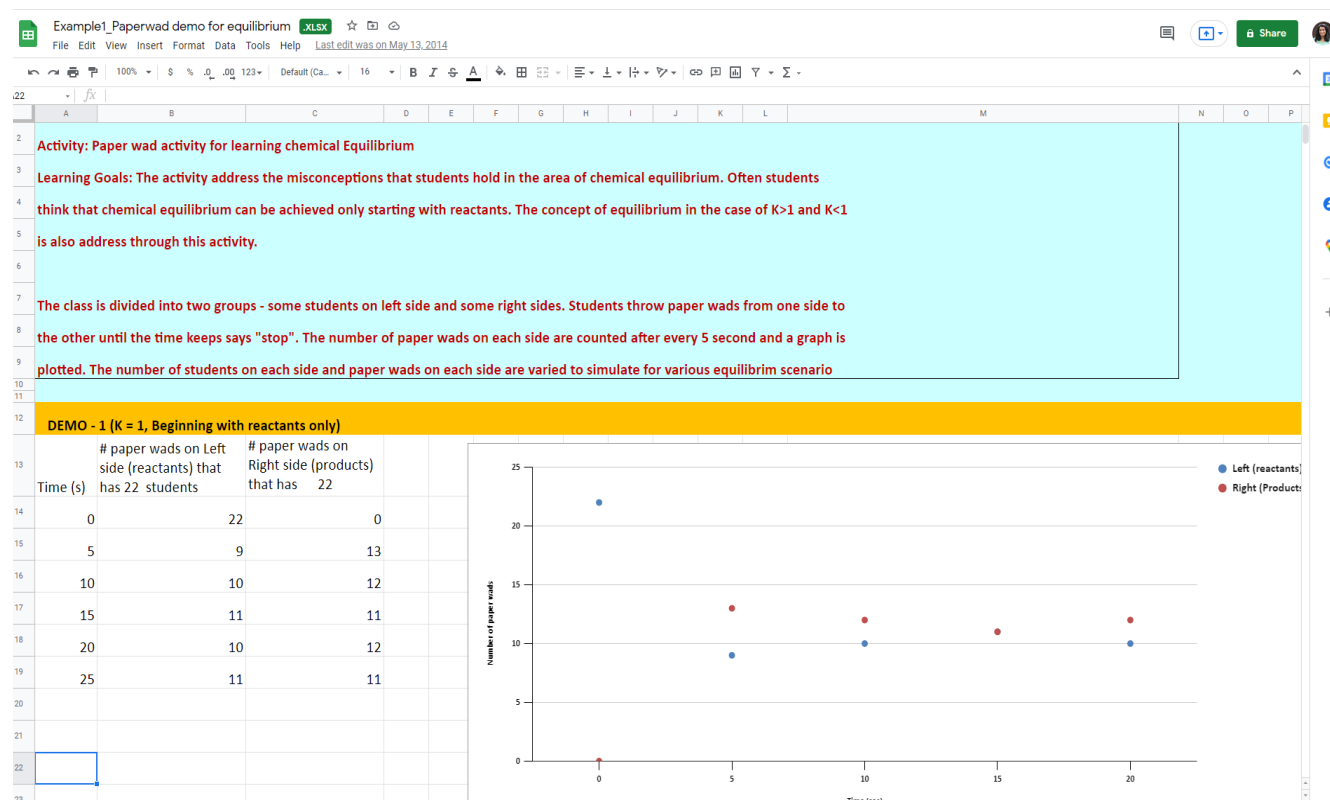
Delete Unarchive

<input type="checkbox"/>	Course Name	Course ID	Term	Start Date	End Date	Meeting Times
<input type="checkbox"/>	CHEM 1310 Sum...	CHEM1310SUM19	Summer 2019	5/15/2019	6/21/2019	M 11:00 AM, Tu 1...
<input type="checkbox"/>	CHEM 1310 Fall...	CHEM 1310	Fall 2019	8/18/2019	12/12/2019	Tu 3:30 PM, Th 3:...
<input type="checkbox"/>	CHEM 1310 Spr...	Not Specified	Spring 2020	1/14/2020	5/31/2020	Tu 2:00 PM, Th 2:...
<input type="checkbox"/>	CHEM 1212 Spr...	Not Specified	Spring 2020	1/14/2020	5/31/2020	Not Specified
<input type="checkbox"/>	Narendrapurap...	CHEM 1310 B	Fall 2020	8/12/2020	12/12/2020	Tu 3:30 PM, Th 3:...
<input type="checkbox"/>	CHEM 1310A Spr...	Narendrapurapul...	Not Specified	1/12/2021	5/8/2021	Tu 8:00 AM, Th 8:...
<input type="checkbox"/>	CHEM1310 Nare...	Not Specified	Not Specified	8/5/2021	12/8/2021	Tu 9:30 AM, Th 9:...

Student Comments about pre-lecture videos from my course evaluation (Spring 2022):

The pre lecture videos were a good idea to help students familiarize themselves with the content.

3. Data from active learning “throwing paper-wads” activity for equilibrium concept. The activity was [published by my colleagues](#) in the Journal of College Science Teaching. I implemented this activity in my CHEM 1212K classroom to teach the concept of equilibrium. The activity enabled experiential learning and addressed any misconceptions. I included this evidence to show my eagerness in implementing teaching strategies I learn about in the Literature.



4. Compilation of videos created for teaching CHEM 1310 during pandemic, and for CHEM 1310 online course: youtube.com/channel/UCjTB3X72rhjBJVJHrwtbT3w

5. Below are links to OER LibGuide developed as part of the ALG grant for the CHEM 1310 general chemistry course for engineering majors. This resource currently serves at the Textbook for the course. The links to the textbook and more-recently developed ancillary materials as part of the textbook are provided below. This evidence is included to show my commitment to develop quality major-related resources for a one-semester general chemistry course as most of the current textbooks were written for a two-semester general chemistry sequence.

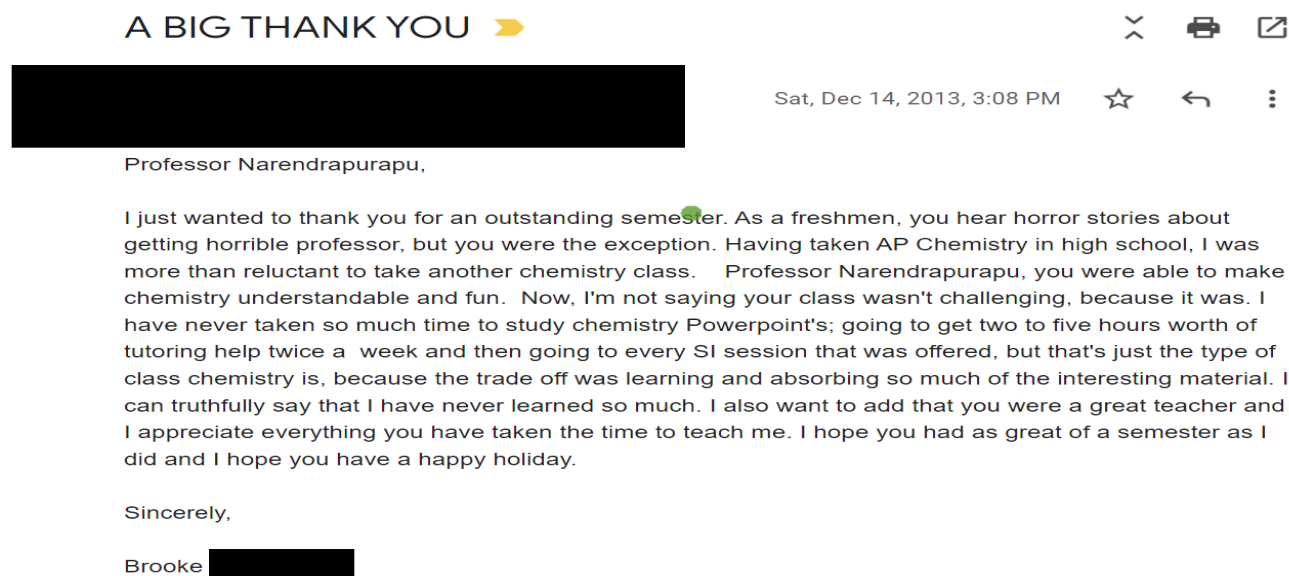
CHEM 1310 LibGuide Textbook: <https://georgiasouthern.libguides.com/chem1310>.

Self-assessment questions: <https://georgiasouthern.libguides.com/c.php?g=943952&p=9104519>

6. Student comment on CHEM 1310 online course that I designed and taught, demonstrating my commitment to teaching online and creating a student-centered online course that can be easily navigated.

The instructor was very understanding and never ignored emails. This course was the most well organized one I have been a part of in terms of schedule and clearly breaking up the weeks objective or material. The instructor would help with technical difficulties and knew the material well enough to answer any questions.

7. A thank-you note sent by a student in CHEM 1211 course. This evidence shows that students appreciated my efforts while being challenged.



8. The following evidence shows samples of presentations of my SoTL work at conferences:

- <https://digitalcommons.georgiasouthern.edu/sotlcommons/SoTL/2016/34/>
- <https://digitalcommons.georgiasouthern.edu/sotlcommons/SoTL/2022/69/>

9. Link to sample syllabus: evidence showing how the syllabus was elaborated during the pandemic phase so students can know what the course entails before the course begins.

<https://tinyurl.com/3t32hd7v>

10. Links to some Guided Learning worksheets I designed. The worksheets show an environment of discovery where students explore the concept through guided questions and daily life examples: <https://tinyurl.com/jnwzk8c3>