There are many gratifying aspects in studying mathematics, including solving challenging puzzles, developing critical thinking skills, and learning to tackle applied problems. Unfortunately, many students never experience these joys because they do not identify themselves as a "math person." This mindset likely stems from years of boring lectures, unclear formulas to memorize, and little motivation on why they should care about math. *My goal as a teacher and mentor is to invite all of my students to be mathematicians by creating supportive student-centered learning communities that focus on students' needs, passions, and interests.* I rely heavily on metacognitive principles and technology to achieve this.

Students will hesitate to engage in class if they do not feel welcome. This may happen if they come from another major, do not understand the formulas we use, or come from a population that is traditionally underrepresented in mathematics. I prioritize making my classroom inclusive for all of my students by creating and maintaining a supportive learning community. This process begins before the first day of class and is maintained throughout the semester. The week before class begins, I email all of my students to welcome them into my class and ask them to bring an item from home to share on the first day. We spend the first half of the first day sharing our items with everyone and getting to know each other a little more. Afterwards, we reflect on what qualities make for a supportive community. I ask students to recall any previous teams, groups, or classes they participated and felt supported in, as well as what qualities these groups share. Students break out in small groups and discuss with their peers. Afterwards, we come back together and create course policies on how we will interact with each other throughout the semester. We refer back to these policies often throughout the semester. A sampling of my current course policies includes "everyone should communicate clearly, a positive attitude should be maintained by all, and everyone should have a role to play."

Throughout the semester, I encourage my students to grow as learnders and mathematicians through metacognitive activities. Metacognition is informally defined as "thinking about thinking," where students analyze their thought processes over time to aid their future learning. During the 2019-20 academic year, I won a Professional Development Award from the NC State Office of Postdoctoral Affairs to develop innovative metacognitive classroom activities. One such activity is a muddiest point exercise: during the final 2-3 minutes of class, I ask students "what was the most difficult concept from today's class." The Poll Everywhere software allowed all 180 of my students to anonymously reply. From this exercise, Students recall what has been discussed, how well they understand the topics, and what they need to study later on. It also helps me cater future lectures to my their needs. I depict a word cloud from this exercise in Figure 1, from which I understood that many students found the chain rule and tangent lines difficult. Other metacognitive activities that I use include post-exam reflection guides to assist students in exam-taking and discussing the growth and fixed mindsets to help students see that struggling is a valuable part of the learning process.

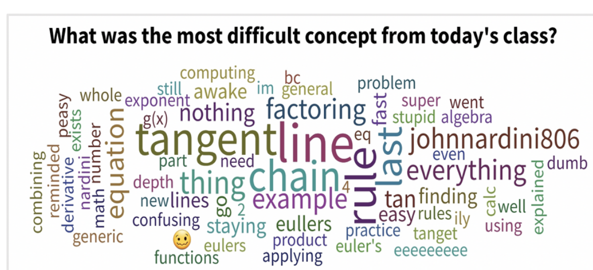

Figure 1: A word cloud from a muddiest point exercise in a Calculus I Course.

The muddiest point exercise that I described above helps me cater class material to general class needs. I also find that students are empowered when they actively contribute content for the class. When teaching a small proofs-based course, I invite each student to give one "Mathematician of the Day" presentation, where they research a mathematician of their choosing, design Powerpoint slides, and present some interesting facts about this person during the first few minutes of class. In the Fall 2020 semester, our class learned about how Vera Šnajder became the first Bosnian to publish a research article, Florence Nightingale pioneered the pie chart, and Oliver Heaviside first re-formulated Maxwell's Equations. I often refer back to these examples during class discussions by using the Heaviside function as a counterexample or presenting pie charts to summarize information. In doing so, I connect our class material to my students' interests.

I use many nonconventional examples to help my students see mathematical concepts in everyday topics and objects. To motivate the relationship between position, velocity, and acceleration in calculus classes, we begin by watching Usain Bolt run the 100-meter dash. I find that phrases such as "Usain-Bolt's acceleration is negative after 9.4 seconds, so we know he is slowing down" help students understand course topics better than mundane phrases such as "the second derivative is negative, so the function is negatively accelerating." Other examples I like to include a home-made demonstration of Newton's law of cooling based on the yogurt-making process and suggesting that Archimedes found the circumference of a circle by peeling a cucumber as finely as possible. These examples show my students that I also have hobbies that they can relate to, such as sports and cooking, which I find helps us form relationships outside of mathematical discussion.

My professional career started as part of an interdisciplinary team of undergraduates, and this experience was fundamental in my decision to attend graduate school and continue pursuing research. I prioritize mentoring undergraduate research to help students transition into mathematics-focused careers and learn how their mathematical skills can solve real scientific problems. I mentored four undergraduates in a weeklong research workshop examining the performance of different machine learning methods in learning differential equation models from noisy data. These students were exposed to current research problems and learned how topics they had seen in math courses are useful for studying biological, physical, and social problems. These students also gained experience disseminating their work to a broad audience by writing a summary of their results and presenting their work to professors and other students at the end of the workshop. After one of these students told me about their interest in pursuing graduate school in math biology, I introduced them to some local researchers. These researchers invited this student to participate in a math biology workshop, which confirmed this studentâs desire to continue researching in math biology. This student is now applying for PhD programs, and I am excited to see them develop as a math biologist.