



UNC  
GREENSBORO

Department of  
Mathematics & Statistics

116 Petty Science Building  
317 College Avenue, Greensboro, NC 27412  
336.334.5836 Phone 336.334.5949 Fax  
<http://www.uncg.edu/mat/>

Tom Lewis  
Associate Professor of Mathematics  
University of North Carolina at Greensboro  
Department of Mathematics and Statistics  
130 Petty Science Building  
tllewis3@uncg.edu

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Chancellor Gilliam,

Have you ever had someone brag to you that they cannot read? Have you ever had someone show real interest when you say you are a teacher to only have them back away as if you have the plague when you answer their follow-up question about which subject you teach? I routinely have complete strangers tell me they hated math or pridefully say they can't do math and walk away (sometimes with additional expletives for fractions, trig, algebra, or geometry). Too many people are hindered by unfortunate and unnecessary baggage regarding their mathematical journey. I have only ever found one way to keep the conversation going with a math-phobic stranger. I simply tell them about my research. I don't know if it is my passion rooted in my research or the idea that math simply is not what they were taught that it is, but suddenly they realize they are talking with a professional mathematician, not a pre-judged math teacher, and they have questions. Nobody knows what we do because it doesn't look anything like standard math curriculum. I have never casually met somebody that claims to be a mathematician in the general public. The curiosity of those we meet breaks down a wall.

We have all had math teachers during formative years that can have a lasting impact for good or bad. Our students at UNC Greensboro and members of our community are re-introduced (or often introduced for the first time) to the wonder, beauty, and utility of math thanks to our graduate program filled with aspiring and seasoned research mathematicians and statisticians. We have a passion and a culture that opens doors for students. Our goal is to move students away from wanting to take the shortcut and watch the movie, but instead be driven to dig in and read the book while we together build the quantitative reasoning cornerstone of their liberal arts education. The [provost's recommendation](#) regarding our computational math PhD program and the dean's recommendation regarding our MA program will dismantle that culture, and the recommendations will not achieve their stated goals.

I am the old and the new calculus coordinator at UNCG. **This letter provides my perspective with regards to challenges we have faced and successes that should give us all hope.** The calculus pathway is the notable exception with regards to DFW rates and an assumed motivation for the provost's goal to institutionally prioritize student success at the service level independent of the APR review process for our programs. The letter will shed some light on the importance of our complete academic portfolio with regards to student success and the tremendous impact our GTAs have in the calculus classroom working alongside our faculty and strengthening the team. The letter is not a numbers argument. I am proud of what we have accomplished, and I wish we had more time to showcase it after the unexpected announcement at this very late stage of the APR process throughout which I believed our graduate program was safe thanks to the excellent faculty in the Department of Mathematics and Statistics that embody the teacher-scholar (-mentor-servant) model and the vital role our complete academic portfolio

plays for each student at UNCG.

My wife, Dr. Beth Lewis, designed our unique calculus support course in Spring 2019, and she and I reworked calculus based on her vision starting in Fall 2019. She would tell you it was our vision because we talked about calculus night and day starting in Fall 2018 and then somehow more than night and day thanks to the need to go online during the pandemic in Spring 2020. The most radical ideas were hers, and I helped with logistics. She even won the [2021 UNCG Online Award for Excellence in Online Education](#) for her innovative work. However, my wife decided to leave her visiting position at UNCG at the end of Spring 2021. At that moment I no longer had the passion to continue the work she and I were doing together so I stepped down from coordinating and enjoyed a much needed break. We celebrated the birth of our third daughter in Summer 2021 and were able to spend more time as a family during my FMLA in Fall 2021. The two years I did not coordinate were always going to be a challenge because of the scale of the revisions Beth and I had made and still planned to make when she decided, with my full support, to depart from UNCG. Of note, the GTAs played a major role in making the transition as smooth as possible because Beth and I had trained them with our vision and they voluntarily went above and beyond working with the new faculty coordinator and the new lecturer, knowing the scale of the challenge on this side of the pandemic. UNCG is forever in their debt.

There has been a national crisis in teaching calculus for my entire career and long before. We also have no idea how to deal with the fallout of the pandemic. It is heartbreaking. The situation is alarming, and neither teaching college nor research university has solved it. UNCG was actually highly proactive when it came to our mathematics pathway for STEM majors. When reading the AP News article, [College students are still struggling with basic math. Professors blame the pandemic](#), I was proud to see that the things schools are doing in a panic on this end of the pandemic UNCG had in place prior to 2020, with the only exception being summer camps in math which we were planning when Covid changed the rules. We were ahead of the curve, but now the entire game is an unknown to us. A faculty member at a school in the UNC System with enrollment growth lamented to me that the level of preparation of the incoming students varies more than in the past, creating concerning issues for them with regards to student success at scale and the feared impact on graduate rates.

I promise you that I am doing everything I can to increase student success in calculus, including earning my Association of College and University Educators (ACUE) Certificate in Effective College Instruction so that I am more informed regarding the current education climate. Most of my time on campus is gathering feedback from the calculus instructors and brainstorming new ways to move forward with several of my colleagues (this includes several faculty, GTAs, and CASA) as we identify issues that never existed before. In many ways, our intuition for how to teach does not match the current students that we serve because we are in unprecedented times. Some of our tried and true techniques are now bad habits. The ‘best practices’ in the article speak towards math foundations issues, an issue we have dealt with quite purposely for years as we strive to meet students where they are knowing they have the potential to succeed. I believe the challenges go far beyond gaps in background because there has been an entire cultural disruption.

After an extensive review of calculus and student performance by our undergraduate studies committee in Spring 2023 and participation in an NSF grant focusing on support courses, we made major changes in calculus and the support course that went into effect Fall 2023 when I took over as the coordinator. We improved last semester, but not anywhere close to the scale of our efforts. Two groups of students stood out as highly successful using the revised course design in Fall 2023: students that scored near the top of the diagnostic test and the (more at-risk) students that passed the support course. The students that passed the support course had an 82% pass rate in calculus. When considering that the grades in the support course are purely effort driven with only formative assignments to earn a grade of P, it shows that the course design combined with the revisions to calculus can help students earn a passing grade while maintaining the rigor in calculus needed for students that continue in the STEM pathway. I will be presenting results at the upcoming Spring 2024 MAA Southeastern Sectional meeting.

We are updating our placement criteria and working with CASA while improving upon our new course design. We are looking at ways to steer more students towards the support course because it has had the highest impact for the students that likely are the most at-risk population we serve in the STEM pathway. We are looking into ways to incorporate trauma-informed pedagogy strategies after observations we have made that were similarly observed by advisors in CASA. We are increasing the transparency of our learning objectives and assignments with an emphasis that moves away from higher-stakes testing. We are also experimenting with novel ways to naturally incentivize calculus students to more meaningfully utilize the Math Help Center. I'm encouraged because the pictures below highlight what our calculus efforts look like in their current state (taken Fall 2023 with permission of the students working with Dr. Maxine Guzmán). The numbers do not tell the entire story.



I cannot emphasize strongly enough that our GTAs are a vital part of the solution at UNCG. Students see graduate students as both peers and teachers, allowing them to identify more closely with a GTA and similarly aspire to meet challenges. GTAs naturally help the undergraduate students believe they can struggle and succeed more than an accomplished professor that has more barriers to cross simply due to their position. We achieve upward mobility in STEM by letting students see themselves in a new way and embracing them as part of our community. I have better relationships with students in my classes when I also have a GTA in the class. I rely on GTAs for feedback when I coordinate. Mentoring GTAs on teaching makes me a better teacher and much more purposeful in my course design. Our doctoral program is atypical in the math community due to its size and mission at a regional research institution. We attract a different type of GTA, and they excel at teaching. This is evidenced in the student evaluations I read for our graduate students and the conversations I have with students in the calculus support course (where I am a cheerleader, mentor, and coach instead of an instructor that must evaluate their performance). The following are just a sample of comments one of our PhD alumni received from UNCG students before securing a tenure-track position at a university with a mathematics undergraduate degree:

- “One of the best teachers I have had in college thus far. [They] explain everything very well and know how to teach and get the attention of [their] class. [They] make sure you understand the material well.”
- “I hate math, but this was a good class.”
- “Very energetic, passionate, and funny. The type of teacher that makes people enjoy going to school.”
- “Math is hard for some of us. But i really appreciate the extra mile our professor would go for us. I definitely felt respected as a student in his class.”
- “[They] are an absolutely incredible professor. [They] utilized humor to get [their] points across, and [they] are always willing to answer any question. ... I've been in [their] office for hours at a time asking questions about homework or tests, and [they] let you work out problems on the board so [they] can help you. I definitely recommend this professor.”

The Department of Mathematics and Statistics promotes a culture that is vital to student success at UNCG, and this stems from our passion for our mathematics and statistics research (at the level needed to support a graduate program that has a reputation for excellence) and our desire to share in our joy

(apart from the last week). Research and the opportunity to work with graduate students that join UNCG as pupils and leave as peers fuel our passion for mathematics and statistics, and it is this passion that helps us reach students in our service courses. I personally had no plans to teach math until midway through my doctoral studies; I had planned to go into industry and collect a paycheck. UNCG and its graduate program gave me a mission and an opportunity I could not refuse. I am proud of what we have built, and I think its value to UNCG far exceeds (and at times directly contradicts) the reasons given for discontinuation. Having been in the weeds working on our STEM pathway at the service level while helping build our computational math graduate program as the first numerical analyst hired by UNCG (see [UNCG Research Magazine: Awards Add Up](#)), I also cannot fathom how the desired outcomes stated will ever be realized by the recommendations. The provost has stated that the decision is not a reflection of our quality. Unfortunately, it is contrary to my calling and how I found my way to UNCG. I stand united with my department and its [context statement](#). I hope the administration will work with us on a path forward without first sacrificing a vital part of our identity and a true success story for UNCG that is deeply intertwined with the noteworthy student success wins that we have had.

Sincerely,



Thomas L. Lewis

2014-2015 MAA (Mathematical Association of America) Project NExT (New Experiences in Teaching) Fellow

2016-2017 Candace Bernard and Robert Glickman Dean's Professorship in the College of Arts & Sciences

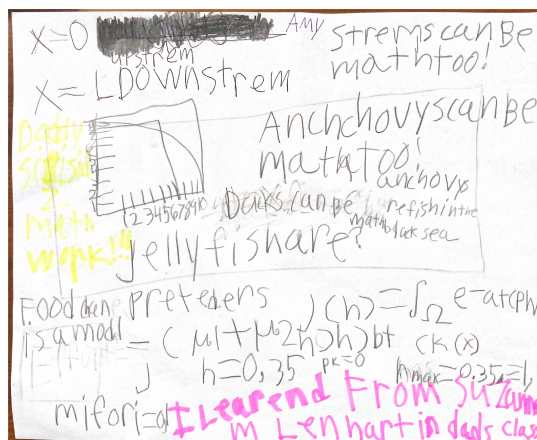
2017-2018 UNCG College of Arts & Sciences Teaching Excellence Award – Junior Faculty Tenure-Track

Co-PI: Conference, “The 35th Southeastern Atlantic Regional Conference on Differential Equations,” 2015, NSF DMS - Applied Mathematics, Award Number 1536101. \$24,000.

PI (single): Research, “Narrow-Stencil Numerical Methods for Approximating Nonlinear Elliptic Partial Differential Equations,” July 2021 – June 2024, NSF DMS - Computational Mathematics, Award Number 2111059. \$119,972.

Former Co-PI: Research, Joint with PI Yi Zhang, “Novel Discontinuous Galerkin Methods for Deterministic and Stochastic Optimization Problems with Inequality Constraints,” September 2021 – August 2024, NSF DMS - Computational Mathematics, Award Number 2111004. \$114,944.

Co-PI: Research, Joint with PI Aaron Rapp, “A New Approximation Method for Hamilton-Jacobi Equations,” May 2022 – April 2023, VI NASA EPSCoR. \$36,342.06.



Artwork by Amy Lewis, Age 7, during a virtual presentation by distinguished Professor Suzanne Lenhart on math biology research.