Nicholas R. Baeth, Mathematics
1978 − 2021

Nick Baeth loved life. He loved his family, he loved his students, he loved academia, and he loved mathematics. He worked with boundless energy and an indomitable spirit.

Nicholas Ryan Baeth was born in Libby, Montana in 1978 and moved with his family to the Seattle, Washington area when he was 13. Nick met Katherine "Katie" Peloza in junior high school and dated her while completing a double major in mathematics and computer science at Pacific Lutheran University. Nick and Katie were married the summer after they graduated in 2000. In 2015 Nick and Katie welcomed a son George Henry William Baeth into their family.

Nick studied representation theory with Roger Wiegand at the University of Nebraska – Lincoln and earned his Ph.D. in Mathematics in 2005. He then taught at the University of Central Missouri where he earned tenure in 2010 and was promoted to full professor in 2015. In the process, Nick earned a teaching award, several research awards, and a Fulbright Fellowship. He used his Fulbright to visit Karl Franzens Universität in Graz, Austria, where he began a highly productive research collaboration.

In 2018 Nick left his tenured professorship to join F&M's faculty as a tenure-track assistant professor. In his letter of application, Nick wrote that he wanted "to teach at a diverse and welcoming institution that values a true liberal arts education along with student and faculty research." He let us know he was willing to give up tenure and his rank for the chance to join an "academic community where close interaction between students and faculty is the norm," where "students and faculty are engaged in cooperative educational experiences both in and out of the classroom."

In a very short time, Nick made himself into an indispensable colleague by embracing the shared work of the Math Department. He organized and spoke at the Department's colloquium with the Millersville University Mathematics Department. He worked with F&M's Quantitative & Science Center (Q&SC) to hire and train math tutors. He helped to start a Department newsletter. He pushed us to revise our major. His impact was deep, profound, and (we hope) lasting.

Nick immersed himself in the life of the College. As Q&SC Director Ellie Rice noted, he "worked thoughtfully, carefully, and deeply with the team of tutors who support math courses during the challenging, improvisational, early days of the pandemic. He addressed frustration with humor, calm, and dogged hard work." Maria Mitchell wrote of her "great admiration for Nick's many talents and deep commitment to improving life at F&M," which included "his close reading of the Faculty Handbook and assistance in drafting language for forthcoming motions," especially what the Faculty Evaluation Task Force refers to as the "Nick Baeth" paragraph. Rachel Anderson-Rabern wrote that on the Common Hour Committee Nick "was the sort of colleague that made service feel fun and meaningful. He was thorough, positive, pragmatic, and hilarious."

Already an award-winning teacher, when Nick came to F&M he decided to reinvent his teaching style. To focus his classroom on student learning, he abandoned class-long lectures and restructured his courses to increase student engagement. He wrote hundreds of worksheets and used them to turn his classes into a mixture of group work, short lectures, and question and answer sessions.

Students embraced Nick's teaching. They filled his evaluations with the adjectives patient, approachable, understanding, caring, kind, helpful, selfless, tireless. They wrote about how much they learned from him. They were impressed at his availability and at how fast he graded their work. They loved that he cared about the non-academic parts of their lives and regularly checked in on how they were doing. A graduating math major wrote, "He is exactly what I could have asked for in a professor and F&M should do everything they can to keep him here forever."

A measure of Nick's teaching skill was his ability to upend the process. Ryan Trainor described a talk Nick gave about the Borel-Cantelli Lemma[1] to Hackman research scholars in summer 2020.

> Nick and I had decided to demonstrate some aspects of good and bad research talks; Nick gave a perfectly straight-faced talk that began with several minutes of pretending not to know how to share his screen, after which he launched into an incomprehensibly dense presentation titled "The probabilistic tendencies of certain fixed strings occurring either within infinite strings or within infinite collections of finite strings of appropriately long length." It remains the best "worst" talk I have ever seen.

We agree with Ryan that "only someone deeply aware of good pedagogical practices could subvert them so effectively."

Christina Weaver, Nick's Department Chair for most of his time at F&M, wrote, "Nick was unbelievably selfless in his professional life." His selflessness and dedication shone through especially during the pandemic year, when Nick went above and beyond. He improved his courses when he adapted to the module system. He taught a six-course overload. He effectively taught a seventh (uncompensated) course, because he offered a third meeting time for his two sections of Algebra to accommodate the time difference for his students in China. His dedication benefitted his students, the Department, and the College.

In what turned out to be Nick's final semester, he advised a Diplomath research team and taught more than 60 students, including 40 math majors in a required 300-level course, Abstract Algebra. When he got sick, Nick refused to stop teaching. When his cancer no longer allowed him to walk to campus, he got rides. When he was too sick to teach in person, he taught by Zoom. When the pain kept him awake at night, he graded homework. He taught the last Algebra class of the semester two days before his death.

Nick's passion for teaching was only rivaled by his passion for mentoring student math researchers. In his second semester at F&M, he led a small directed reading in factorization theory, a topic rarely taught at the undergraduate level. He supervised four Hackman research scholars in summer 2020; his paper with them will appear in the research journal Communications in Algebra. He partnered with Annalisa Crannell to envision and create the "Diplomath Research Corps" and led his own Diplomath research teams during each of the past four semesters.

Annalisa Crannell remembered Nick's contributions to the genesis of Diplomath.

> A few years back, Nick and I agreed that we would work together to build a robust student research program in math here at F&M. Nick was a driving force behind envisioning such a program. He was tireless and passionate, and we've both loved watching the Diplomath program come into being. He has changed what we do with our students.

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[1] A special case of the lemma is the infinite monkey theorem (a monkey typing an infinite number of keystrokes would eventually type the complete works of Shakespeare).

Nick's full research program was deep, productive, and influential. We asked two experts in his field to comment on Nick's influence and legacy. Scott Chapman and Jim Coykendall offered the following tribute.

> Nick's work in mathematics made him highly visible both nationally and internationally. He has published in a number of subfields of commutative algebra including factorization theory, general monoid theory, and module theory. His research papers have been highly cited; since his 2005 Ph.D. thesis, MathSciNet records that his 31 publications have been cited 181 times by 100 authors (Google Scholar credits him with 372 citations of which 238 are since 2016). Additionally, he was a highly sought colleague and collaborator – in a field where collaboration is often difficult, he has written papers with 32 distinct individuals. These raw numbers belie an incredibly energetic, prolific, and respected mathematician (which is greatly magnified by his youth).
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> Beyond these raw numbers, there are several aspects of Nick's research program that are important to note. The first is that the trajectory of his research was uniformly upward. He started with strong papers in module theory that appeared in high-tier journals, and as he matured, his publication rate grew (as did the scope and the visibility of his publications). Additionally, Nick had some very strong and well-received collaborations; in particular, his work with the research group in Graz, Austria gave rise to several very influential and pioneering papers in factorization theory.
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> Throughout his career, Nick published in some of the top research journals in mathematics. Additionally, five of Nick's papers have appeared in the journal Involve, which specifically targets student research participation. This is a notable and very impactful hallmark of Nick's career; he was well-known for his abundant and fruitful work with students. Successful work with undergraduate research combined with cutting-edge research in mathematics seldom go hand in hand, but Nick excelled in both, and this made him almost singular in the mathematical community.
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> Nick's commitment to research, while maintaining his focus on undergraduate education, made him a showcase member of the mathematical community. Additionally, he was a leader by example and action. Through him, many young mathematicians were introduced to mathematics and mathematical research. To his more senior colleagues, he was a shining example of our mathematical future, as well as the personification of the "complete" mathematician. He was dedicated to his craft and devoted to his students. His life and career stand as an inspiration to us all and he will be sorely missed.

In addition to the paper coauthored with F&M students, Nick left behind three submitted papers and several ongoing collaborative projects that are expected to bear fruit in the years to come.

Nick also left behind a final exam for his Abstract Algebra course. The Math Department waived the exam (scheduled for a week after his passing) and sent a copy to his students. In response, several students invited their classmates to work on the final exam together "to honor him and his efforts in teaching us and show him what we've learned." They understood that "he wrote a final exam to encompass everything he hoped we learned this semester." Their most fitting tribute was to gather and work on his exam on the Saturday night of final exam week.

When Nick Baeth left on December 11, 2021, the mathematical community lost an inspirational leader; Katie lost her life partner; George lost a devoted father; and Franklin & Marshall College lost a valued colleague, an inspiring mentor, and a beloved teacher.

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A celebration of Nick's life will be held on April 2nd at 11 am Eastern at Franklin & Marshall College. The event will be streamed live.

Donations may be made to George's college savings account. Details will be forthcoming.

Nick's obituary is at www.debordsnyder.com/nicholas-ryan-baeth.

We invite friends, family, and colleagues to post memories of Nick to padlet.com/fandmcollege/baeth.