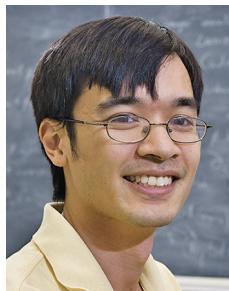


of the wave equation, I did not recognise it at all, and was unable to say anything interesting about it.

At this point, I was saved by a stroke of pure luck as the questioning then turned to my other topic of analytic number theory. Only one of the examiners had an extensive background in number theory, but he had mistakenly thought I had selected algebraic number theory as my topic, and so all the questions he had prepared were not appropriate. As such, I only got very standard questions in analytic number theory (e.g., prove the prime number theorem, Dirichlet's theorem, etc.), and these were topics that I actually did prepare for, so I was able to answer these questions quite easily. The rest of the exam then went fairly quickly as none of the examiners had prepared any truly challenging algebra questions.

After many nerve-wracking minutes of closed-door deliberation, the examiners did decide to (barely) pass me; however, my advisor gently explained his disappointment at my performance, and how I needed to do better in the future. I was still largely in a state of shock—this was the first time I had performed poorly on an exam that I was genuinely interested in performing well in. But it served as an important wake-up call and a turning point in my career. I began to take my classes and studying more seriously. I listened more to my fellow students and other faculty, and I cut back on my gaming. I worked particularly hard on all of the problems that my advisor gave me, in the hopes of finally impressing him. I certainly didn't always succeed at this—for instance, the first problem my advisor gave me, I was only able to solve five years after my PhD—but I poured substantial effort into the last two years of my graduate study, wrote up a decent thesis and a number of publications, and began the rest of my career as a professional mathematician. In retrospect, nearly failing the generals was probably the best thing that could have happened to me at the time.

My write-up of my general exams experience is still available online. I have been told that it has been a significant source of comfort to the more recent graduate students at Princeton.



Terence Tao

Credits

Author photo is courtesy of Reed Hutchinson/UCLA.

My Journey from Slippery Rock to Duluth

Joseph Gallian

My journey from Slippery Rock State College in Pennsylvania in 1966 to the University of Minnesota Duluth in 1972 had quite a few twists and turns. In 1966, I received TA offers from Minnesota, Kansas, Purdue, and Michigan State. About a week before the deadline for accepting offers, I selected Minnesota. A few days later, Kansas called to ask me if I would be willing to come to KU on a five-year NASA Fellowship. I was delighted to accept.

Because the Rock was almost exclusively a school for the preparation of K-12 teachers, my course work there did not adequately prepare me for graduate-level courses. Instead, I took courses intended for juniors and seniors. Fortunately, I had a charismatic abstract algebra teacher named Lee Sonneborn for both semesters. I was so enthralled with that course that I took an independent study course in permutation groups and participated in a weekly seminar on infinite group theory. By the middle of my second semester, I decided to do a PhD thesis on infinite groups under Sonneborn. This plan abruptly changed a few months later when Sonneborn moved to Michigan State. Disappointed, but not deterred, I decided that I would do a thesis with Dick Phillips, who was another infinite group theorist participating in the infinite group theory seminar. But it was not to be. In the fall of 1967, Phillips told me that he would be going to Michigan State the next year.

The departure of both of my potential thesis advisors prompted me to apply to grad school at Michigan State, Utah, Illinois, and Notre Dame, all of which had infinite group theorists. When I received a three-year fellowship from Notre Dame, I accepted. Shortly after arriving at Notre Dame, I approached the infinite group theorist about working with him. As luck would have it, he told me that this was his final year at Notre Dame. The next best option was to work with Warren Wong, who was one of hundreds of people working on the classification of finite simple groups. Wong agreed to take me on, but he said he would be on sabbatical the next year in New Zealand and I was welcome to join him there. This did not appeal to me and my wife, so I declined. That left me with three options: transfer, abandon group theory, or do a thesis with Karl Kronstein, whose only publication was on representations of finite groups, a subject about which I knew nothing. I opted for the last.

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In the summer of 1969, Kronstein gave me a research paper on a new concept called the “breadth of a finite p -group” to study. The paper had some nice results and an appealing conjecture that Kronstein thought could be attacked using group representations. After six months of learning some representation theory and trying to apply it to the breadth problem, I had made no progress. I was so discouraged that I called the Slippery Rock department head about the possibility of leaving Notre Dame with just a master’s degree and teaching there. He said he could not promise anything but encouraged me to stick it out at Notre Dame. I also talked to Kronstein about finishing the master’s degree and getting a job. He told me that it was not unusual for people to make little progress in the first six months of thesis work. I ended up compromising by not giving up on a PhD, but giving up a representation theory approach to the breadth problem. In short order, I began to make substantial progress on the problem, and I even came up with an unrelated problem of my own that led to published results that generalized several well-known theorems on finite p -groups.

From then on, everything went smoothly until I applied for jobs in January 1971. Prior to 1971, Notre Dame PhDs had done well on the job market, but two things converged in 1971 to change employment opportunities dramatically. During the 1960s, the U.S. responded to the Cold War and the Russian success in putting satellites and people in space by pumping an enormous amount of funding into graduate study in STEM fields (indeed, my KU and ND fellowships were part of this). At the same time, men could avoid the military draft for the Vietnam War while in college. These had the effect of funneling large numbers of people into PhD programs. Although everyone knew a bad job market was coming, it was not clear exactly when and how hard it would hit. The effect on me was that the 25 or so job applications I sent out in January did not generate a single response. So, it appeared I would be an unemployed new PhD in the fall of 1971. To my great relief, Notre Dame offered me a one-year postdoc.

In December of 1971, I sent job applications to 145 schools. By March, only four had expressed some interest, and none of these four offered me a job interview. In May, Notre Dame once again rescued me by offering another one-year postdoc. To this day, I shudder to think of how my career would have gone without those postdocs.

A few weeks later, I received a call from the University of Minnesota Duluth saying that a person who had just accepted a position there decided to stay where he was, and they asked if I was still interested in their job. I said that I was sure that Notre Dame would be happy to release me from the postdoc if I received an offer (which I confirmed the next day). About a week later, I interviewed at UMD and, a month later, accepted an offer. Forty-six years later, I am still teaching, writing, and engaging students in research.

In hindsight, I cannot imagine any of those other 144 schools being a better fit for me. I do not believe in destiny, but I do believe that good fortune often prevails when you keep up the struggle!



Joseph Gallian

Credits

Author photo is courtesy of William Higgins.

