



# Mental Health in the Mathematics Community

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*Note: The opinions expressed here are not necessarily those of Notices.*

On March 7th, 2019, Kelly Catlin—a three-time cycling world champion, winner of a silver medal in the 2016 Summer Olympics, and Stanford graduate student pursuing a masters in computational and mathematical engineering—died by suicide.

Her death is an absolute tragedy. The world has lost an amazing individual who pushed the boundaries of what humans are capable of in realms both physical and intellectual. She also reminds us of the mental health crisis that is quietly raging in our classrooms, our students' dormitories, and our own offices. To hear of a graduate student's death by suicide leaves us shaken, but not surprised.

Mental illness is a widespread problem, but it has a uniquely devastating presence in the university [1–4]. In a recent international study of 2,279 masters and PhD students, 39 percent were evaluated as having moderate to severe depression, compared with 6 percent of the general population [5]. Multiple studies [5,6,7] have also shown that rates of depression and anxiety in graduate students who are women, people of color, or LGBTQ are higher than among those students who are not. This makes individuals

in these groups, who are already underrepresented in STEM programs and consequently STEM careers, at increased risk. Failure to address mental health problems in the university makes addressing inequality in society at large harder to do.

Even within the university, rates of mental illness vary by department. A 2014 Berkeley survey of graduate students indicated that 64 percent of students in the arts and humanities met a threshold for depression, compared with 43–46 percent of students in science and engineering and 28 percent of business students [6]. The Berkeley report also measured the top 10 predictors for graduate student well-being, which put career prospects as the number one predictor. Unfortunately, we find it discouraging that another study found that 43 percent of interviewed faculty had at least a mild mental disorder, even when 92 percent of those interviewed held permanent positions [8].

To our knowledge no study has focused on mental health in the mathematics community specifically, and thus we are left with anecdotal evidence and subjective analysis. Below we provide some of our own perspectives on mental health in mathematics—a narrative of our own struggles with mental illness and recommendations for how we as a community might do better. Our goal is that perhaps, in another universe, Kelly Catlin—and others lost to their conditions—may have instead finished her studies and gone on to pursue further intellectual achievements.

## An Analysis of Our Community

If we examine the constellation of cultural images of mathematicians, we need not go too far to encounter examples of mental illness. John Nash, who was portrayed by Russell Crowe in Ron Howard's film *A Beautiful Mind*, had his career

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interrupted for many years by a schizophrenic breakdown. Kurt Gödel starved himself to death out of fear of being poisoned. Alexander Grothendieck went into isolation for over two decades. However, in these cultural images, we make mental illness into a sort of superpower that imparts a competitive edge in creative work [9]. This glorification is deeply problematic and creates a culture where intense, exhaustive work—often done in isolation—is praised at the sacrifice of an individual’s well-being. Moreover, a “survival of the fittest” mentality tends to prevail in our departments with the idea that people who aren’t cut out to be mathematicians will eventually leave.

Although the above individuals are exceptional mathematicians, their illnesses did not empower them to do great things. Yes, anecdotally, the mathematical community tends to have a higher percentage of neurodiverse individuals, but co-occurring depression, anxiety, trauma, and mood disorders create a community with a disturbingly high attrition. Often stress is the primary factor that precipitates or exacerbates mental illness, of which there is no shortage in our careers—from undergraduate school through tenured professor.

Beginning graduate school in mathematics often means stepping into a world without clear structure in place for success. The familiar metrics for evaluation used as an undergraduate with graded homework is replaced with more open-ended study and formulation of potential research projects. The role of the advisor can be variable and the quality of one’s results is often marked by subjective social signaling, which can make us hyper-aware of criticism or outright dismissal as we progress through postdoctoral work and faculty life.

Collaboration in mathematics is also a thorny subject. Generally speaking, mathematicians tend to only have a few collaborators, which can lead to feelings of isolation. This can be contrasted with the applied sciences where a lab can help provide social support. Of course, collaborative work in the sciences can also lead to abusive power structures where multiple professors appear as co-authors on a paper written mostly by a single graduate student.

Many of the above sources of stress are endemic to an academic career, with no easy alleviation, but there is at least one thing that can be easily dismantled: the stigma of struggling with a mental illness. Stigmatizing not only increases the stress, but also raises the threshold to seek and get help. Our hope is that by starting a dialogue about mental health in the mathematics profession, we can help people feel okay with asking for help and seeking what they need to lead fuller, happier, and more productive lives.

## Our Own Experiences

At the Joint Mathematics Meetings 2019, we organized a panel discussion on mental health in the mathematics profession. In addition to the authors—Mikael Vejdemo-Johansson and Justin Curry, both tenure-track faculty

with diagnosed mental illnesses under treatment, and Julie Corrigan, who was unable to continue her graduate studies due to insufficient support for managing her chronic PTSD—the panel also hosted Kate Farinholt, the Executive Director of NAMI Maryland (the National Alliance on Mental Illness) [10]. On the panel, we talked about our lived experiences with mental illness, and thoughts and ideas on how we would like our colleagues to support us. Between us, the authors represent three different types of mental health problems: chronic mood disorder, maintained enough to survive in academia; situational depression, with an identifiable trigger; and anxiety that did not meet sufficient accommodations. Below we have included each of our stories.

**[Mikael]** I have always suffered from mood swings. When I first started dating my wife, she suggested I seek help, and helped me through the process. It is difficult for me to articulate, or even remember, my moods, so the first time I called in to a psychiatric clinic, I couldn’t say much more than “sometimes I get sad.” The day after, she sat down with me and we wrote out a cheat sheet together: how sad, how often, what impact does it have on me, on my family. I called back to the clinic, and using the cheat sheet I was immediately started on outpatient medication and therapy.

Through therapy, and through sheer experience, I have now built up an awareness of my moods and mood swings. I can recognize many of the warning signs, and I know some of the ways that a meltdown can be triggered. As with very many mental health care routines, regular food and good sleep are very important to keep me in balance. I have found it difficult to think of how my workplace could possibly provide accommodations for me—and the ones I have thought of are connected to this: I need my schedule to allow for a meal break, and I need my schedule to allow me to keep my sleep routines in check.

I first started deliberately talking openly about my mental health when I saw my hackerspace/makerspace community step up and build support systems and boost visibility for depression and mental illness in the wake of a sequence of high profile suicides. I joined the visibility boosting activities—and posted a text on my personal website [11] about my mood disorder and how it feels to live with it. I posted the link on Twitter, and it was read by Ian Gent, a Professor of Computer Science at the University of St Andrews, where I had just finished a postdoc year. Ian emailed me and told me about his experiences with depression—and seeing how we had worked side by side for a year, sharing coffee breaks and lunch breaks, without either of us having any idea of what the other one was going through sparked us to start work on visibility in academia and in mathematics. We founded a group blog [12], and I started looking for ways to build in mathematics what I saw them build in the hackerspace/makerspace community.

Looking for things that have helped me, some concrete ones come to mind. Getting help recalling the structure and extent of my mood swings was critical in getting help to begin with. Through many years and with help from therapists and family I have learned to recognize my moods and my triggers so that I am able to stave off problems or remove myself from difficult situations. Medication has worked to some extent, though with a lot of fine tuning and experimentation. My department and my chair accommodating a schedule that helps me to maintain food and sleep routines has been immensely helpful.

Since that conversation with Ian Gent, I have been deliberately radically open with my mental health. Nearly all my colleagues across several years of postdoc-ing and these past years on the tenure track know of my diagnosis. I have not noticed any bias or hostile reactions. Admittedly, this could be because I am oblivious, or because I have been lucky in whom I interact with. One effect I have noticed is that people open up to me. I bring up my diagnosis in class—and my students talk to me about their issues and how to best handle their course work and stress. I talk about my diagnosis and mental health with colleagues or at conferences—and I am approached by others carrying loads and never having had someone to talk to who would understand.

**[Justin]** Although I have probably struggled with episodes of depression my entire life, I didn't really seek expert help until I was a graduate student. My six years as a PhD student were filled with some extreme highs and some deep lows. I was extremely close to my dad, who had recurrent bladder cancer that went through multiple courses of treatment throughout my graduate career, starting with radical surgery to remove his bladder in 2010, chemotherapy and radiation to treat metastatic cancer from 2011 to 2012, and concluding with his death in October 2013. As an only child with divorced parents, making trips home to care for my dad, in addition to all the challenges of earning a PhD, was a major source of stress; this was only barely made manageable with the incredible support of my advisor, Robert Ghrist, as well as my close friends.

One of the problems with mental illness is that you often don't know what's going on with you.

In 2011, I was away at a conference when I learned that my father's cancer had metastasized to a nearby lymph node. For a few days, I heard a constant whispered thought, "metastasis," which precipitated a deep shift inside of me. This was a shift that marked the transition from a relatively upbeat, happy existence to one filled with struggle and suffering. I would at random times be affected by a bodily sensation, like someone was pinning me down in a chair from which I could not get up. Over the next year or two I began to experience extremes in emotion: oscillating between despair and almost a divine sense of hope and transcendent optimism when my research started to take off. I started to see a therapist in 2012 and began taking

medication (Zoloft) in 2013, as prescribed by my primary care physician.

At first, Zoloft imbued me with an almost hyperactive level of energy: I couldn't sleep without taking Benadryl before bed, I would have nervous ticks with my hands and heard a rushing in my ears, but side effects aside, it was worth it because I was able to finally write up my thesis. Medication enabled me to speed through my last year of grad school when I was applying for jobs and when my dad died. There was definitely a conscious sense of keeping myself together so that I could graduate, which I did in May of 2014.

I fell apart shortly after starting my postdoc at Duke. Many of my prior social support systems disintegrated and, for the first time, I was no longer a student. For my first year, I was left with the uninspiring task of writing up journal versions of my thesis results. This was nearly impossible as I felt chronic fatigue—even doing one hour of work a day felt exhausting. I kept a couch in my office so that I could nap frequently. Life felt like such a struggle that I began to conclude that not existing would be easier than existing, which is a form of suicide ideation. I didn't have active plans to end my life, but if I were to not wake up one day, then that seemed like a preferable outcome. Remarkably, I didn't think I was depressed, so it took me a while before I started to see a therapist again. Luckily I connected with a good cognitive behavioral therapist and started to wean myself off of Zoloft. Off of Zoloft, I started to feel inspired to do math again, but would also experience extreme ranges in emotion depending on circumstances in my personal life.

I think a lot of my depression was precipitated from the sheer exhaustion of writing my thesis and caring for my father. I started to shirk my responsibility as a postdoc and took up exercise as a passion. I fell in love with movement: weight lifting, gymnastics, and yoga especially. In 2017 I enrolled in a yoga teacher training program led by Nina Be and Bart Westdorp at Global Breath Studio in MindBody Centering Yoga. By discussing my traumas in a supportive group setting, I benefited from more in those three months than I did in several years of therapy. Reading foundational texts in yoga philosophy provided me with a new framework for living. I also learned skills for managing my energy more effectively.

Since starting my tenure-track job at Albany, I feel that some of my old energy levels are returning as well as a new sense of purpose and responsibility to mathematics. Teaching can be draining, but directing my own research program and having students to discuss research with brings me joy. I still feel fatigued at times, and I used part of my start-up funds to buy a Thai massage mat so that I can rest whenever I feel run down. My friends, many of whom I met through yoga, provide me with a valuable support system that I can lean on when I'm feeling down. I contemplate going back on medication sometimes, but I

feel good about the self-care techniques that I'm currently using to manage my depression.

**[Julie]** PTSD makes it difficult to separate reality both from inventions of the mind and from echoes of the past. One time I stopped attending a class without withdrawing because the octave of a gentleman's voice who sat two seats behind me reminded me vividly of the aggressive and threatening arguments my parents had before their divorce. The sensation of an impending screaming match, of which I had the misfortune of being physically in the middle of, was so overwhelming that I couldn't approach the classroom door without hyperventilating. It took two semesters until I was even able to get close to that general set of classrooms without feeling an overwhelming sense of dread. I didn't withdraw because I was past the deadline to do so without the professor's signature. That meant, in the middle of my panic episodes, finding the strength to go to my professor, explain why I was dropping, and ask for their permission. That is not only dealing with the anxiety from my past traumas, but also from the spiralling thoughts of: "How exactly do I explain this without sounding like I'm lying? How do I ask my professor to sign a withdrawal form so I don't just fail because an impulse in my head won't let me go near the classroom? Who do I ask for help in telling my professor? How do I get help in resolving this problem so that it doesn't affect my academic career?"

It's hard to say when I had my first PTSD episode. I remember having issues "controlling my anger" that started when I was 11, but my father recounts times from as young as 5 or 6 where I would become inconsolable when we went to leave the house, but calmed instantly the second I was in the car. What I was experiencing wasn't even identified as panic attacks until I was 19, in 2006. I started seeing doctors and therapists whose diagnoses ranged from being emotional, to having anxiety, to even suggesting epilepsy or OCD. I have had my bloodwork done more times than I can remember to check for thyroid issues or any other physically evident misnomers that could cause my apparent irrationality. I've tried all the Benzos and SSRIs.

Eventually, I landed on a mixture of beta-blockers (propranolol) and sedatives along with healthy living and exercising to help me manage my anxiety during the day and cure my insomnia. It helped, but it was always just cheap duct tape over a foundation crack. The cocktail, along with therapy and exercise, definitely helped curb the day-to-day issues over time, but the severe lack of self-worth, insecurity, fear of being abandoned, judged, abused, et cetera, would, and still do, surge in full force from time to time.

When I was able to work up the courage to approach my professors about my constant "sick" days or peculiar needs, I was often met with eye rolls, scoffs, or a general lack of compassion. I often heard things like: the syllabus is the syllabus, every student needs to be held to the same standards, maybe this isn't for me if I can't handle the workload. At the time I wasn't properly diagnosed. My various therapists and

doctors all attributed my symptoms to Generalized Anxiety Disorder, which many people do suffer from, but that diagnosis didn't exactly come with a pamphlet on my legal rights and a list of possible reasonable accommodations. My university's Disability Student Services department told me that all they could do for me was give me extra test time or a copy of lecture notes. How does extra test time help me work out what to do when I can't go to class because I woke up unable to leave my house?

When I could make it to class, it was incredibly difficult to sit still for the whole lecture time. Thanks to technology, having my textbooks on a tablet eased the strain of having to be focused in one place for 50+ minutes by making the internet available as a distraction. My professors did note my "lack of attention," though, and it became a hurdle for me to ask for support when I needed extensions after days of rolling panic attacks prevented me from completing my homework. I dreaded having to discuss my poor test scores after freezing up whenever my professor walked behind me during an exam; the severe anxiety that I was being silently judged made me unable to recall information or sometimes even finish the test.

PTSD affects your ability to separate reality from invention. I highly doubt, and even doubted at the time, that my professor was looking at my work so far thinking, "Hrm, she sucks. That's completely wrong. Her attempts are laughable." That's just what my PTSD was telling me was happening because of the trauma from the abuse I suffered growing up and that continued into my late 20s. It sounds reasonable and rational in the moment, even though, in retrospect, I may see it as obviously absurd.

The stress of the studies exacerbated my condition, increasing the difficulty of me handling it on my own. I did have friends and peers who were understanding and supportive, but it wasn't enough. I needed support from my university, from the administration, from the field of mathematics. I always felt competent, but my disability didn't allow me to show my competency in the way that I was expected to by the community. I felt like I was being judged by my professors and peers for being lazy, unattentive, unfocused, and simply not that good at mathematics. The overwhelming insecurity being fed by my past and ongoing abuse made it impossible for me to bolster my own ego enough to continue on. Thus, I left the academic world behind with only my bachelor's degree completed.

The next several years were still a struggle for stability even outside academia. Mathematics didn't cause my disorder, it was just a field unwilling to accommodate the way I needed to learn and demonstrate my knowledge. Leaving academia, however, meant physically returning to the abuse from my family.

After a particularly traumatic series of events in 2016, I made a call to check myself into a treatment facility outside of Santa Fe, NM called the Life Healing Center. I came to the realization that I was spiralling severely and knew



if I did not seek serious help, I would likely kill myself. During my time there, I was forced to explore the past, acknowledge the abuse from my family, and realize that I had c-PTSD<sup>1</sup> from years of trauma that stemmed from extreme, systemic family dysfunction. I was set on a course for recovery. I started seeking proper treatment in terms of trauma therapy and have found myself improving year after year. I now use CBD<sup>2</sup> for the day-to-day anxiety and keep up with yoga, healthy eating, and therapy to help me learn to love myself and feel valuable. I do still have issues with self-worth, insecurity, and feeling accomplished, but as I build a more stable life and continue in my treatment, it gets better every year.

## So What Can We Do?

Mental illness causes us to lose mathematicians at all stages of their career. A few die from their mental illnesses like Kelly Catlin. Some are forced to leave the field, taking all their potential with them. This happens at the beginning of careers, like with Julie Corrigan, but also to prominent mathematicians who have made a significant mark. For example, Andreas Floer, the namesake of Floer Homology, died from his depression at the age of 34 [13]. In this section we provide some of our own thoughts on how to address mental health issues in the mathematics community.

The first step towards any actionable change is knowledge. Before we can lobby institutions or organizations for support, we must promote awareness of mental health issues as individuals. Many faculty are aware of reasonable accommodations that are made for students with physical and sometimes learning disabilities, but we often forget that those who struggle with mental illness should have analogous reasonable accommodations, as promised by the Americans with Disabilities Act. Due to the unseen nature of most psychiatric disabilities, accommodations often feel abstract or are seen as a ploy to get out of the heavy workload that all students and faculty feel. To be clear, reasonable accommodations are not about changing the net amount of work; they are about providing support so that each person can achieve the same goal in their own time and in their own way. Existing resources such as [14] provide detailed recommendations for promoting inclusivity and access for faculty with mental illnesses. If you find that you are in need of an accommodation, you can try talking to your mentor, supervisor, HR, or even a union representative to advocate on your behalf.

However, many members in our community might not even be aware that their struggles are of legitimate concern and require professional help. Not being able to perform in a way that other people appear to be performing can create further anxiety and depression, which fuels withdrawal and makes it difficult to go out and seek help. This is why we feel that it is important to normalize the discussion around

mental illness. We need to normalize seeing therapists and psychiatrists, mentioning your depression, mentioning that a situation is making you anxious or impacting your disability. Just as you might get a yearly physical, seeing a therapist at least once a year to have a conversation about your mood or outlook on life should be standard practice. Moreover, taking psychiatric medication shouldn't be regarded as any different than managing your blood pressure with medication. If you are currently seeing a therapist or taking medication to manage a mental illness, consider opening up to colleagues and students about your experiences—doing so can mark you as a “safe person” to talk to when times are tough and help normalize the conversation inside our community.

In addition to encouraging one another to seek professional help, we as a community can take further steps towards promoting wellness and life satisfaction in our community. Too often we valorize over-working at the expense of our own physical and mental health. Maintaining personal hygiene, getting enough sleep, and cooking yourself regular meals are fundamental to life and should be treated as such. Spending time outdoors, exercising, meditating, or socializing can all provide much needed resets to your mood or mental state. Having hobbies or a notion of self separate from work can help insulate ourselves from depression when work isn't going well. Make self-study and journaling a regular part of your life and read up on any issues you might be having. There are many books written on how to manage most mental disorders, with techniques and coping strategies that you can learn and adopt. Mental illness doesn't have to be a life sentence, many people recover and go on to live content, meaningful lives.

Even with a perfect community, supportive and promoting balance, there will be more tragedies. Mental illnesses change the way we perceive the world: inhibiting our ability to recognize and internalize affection from others, our ability to see value in ourselves; causing us to withdraw, and to believe ourselves not worthy of help. Suicide, when it occurs, is not the selfish act many take it for, but a desperate attempt to end suffering—for oneself, but also for friends and family. By raising visibility and removing stigmatization, we can at least help pave the way for when our community members start reaching out.

Our hope in writing this article is to start a community-wide conversation, so that instead of suffering in silence and isolation, our community members will reach out, ask for, and get support from the rest of us. As such, we are in the process of creating a support network,<sup>3</sup> so that our community members can reach out to peers who not only combat mental illnesses, but do so knowing the ins-and-outs of academia and of mathematics in particular.

<sup>1</sup> Complex Post-Traumatic Syndrome

<sup>2</sup> Cannabidiol

<sup>3</sup> We have started trying to gather enough people to start a mailing list. You can sign up here: <https://mailman-mail5.webfaction.com/listinfo/mda-info>

We will organize another panel discussion at the Joint Mathematics Meetings in Denver 2020.

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