

Spaces for All: The Rise of LGBTQ+ Mathematics Conferences

Anthony Bonato, Juliette Bruce, and Ron Buckmire

In the early morning hours of June 28, 1969, police violently targeted LGBTQ+ people at the Stonewall Inn, and that led to the beginning of what has become known as the Stonewall Uprising. These actions, led by trans women of color, marked a crucial turning point in the LGBTQ+ rights movement in the United States and internationally. In honor and remembrance of these events, as well as the struggles and successes of all LGBTQ+ people, June is commonly known as LGBTQ+ Pride Month in the United States, Canada, and other countries. In celebration of this year's Pride Month, we are happy to discuss a particular aspect of the growing visibility of LGBTQ+ mathematicians.

1. Introduction

Mathematicians and the general public often imbue mathematics with an air of objectivity, believing that “math is just math,” and that “it doesn't matter who does the math.” However, *people* do mathematics, and the characteristics of the people who comprise the mathematics community have great significance. This fact has become increasingly salient as the principles of equity, diversity, and inclusion have become more prominent in mathematical circles.

We focus on one aspect of identity that is enormously significant to many mathematicians, while frequently

invisible in the mathematics community: being LGBTQ+. In particular, this article focuses on the rise of gatherings of mathematicians aimed at promoting and supporting LGBTQ+ mathematicians. Further, we discuss the rationale and importance of such events, and how such events might evolve in the future.

The mathematics community organizes meetings to facilitate collaboration, networking, and the exchange of ideas on specific research topics. All people, regardless of identity, are ostensibly able and invited to attend. However, due to the long-standing effects of historical discrimination and underrepresentation, coupled with organizational inertia, these gatherings are not always welcoming to all members of the mathematics community. For these and other reasons, mathematicians have organized research conferences for decades to promote the participation of underrepresented groups.

For example, both the Association for Women in Mathematics (AWM) and the National Association of Mathematicians (NAM) frequently organize and sponsor research events at the annual Joint Mathematics Meetings (JMM). Speakers at these events organized by AWM and NAM are usually women or African-American, respectively, with the audience consisting of an overrepresentation of mathematicians who are typically underrepresented among other attendees at the JMM, namely, women and people of color.

There have long been independent research symposia organized by and for underrepresented mathematicians. Arguably the most well-known of these is the Conference of African-American Researchers in the Mathematical Sciences (CAARMS), which was founded by William B. Massey (then AT&T Bell Labs now Princeton

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University), Raymond L. Johnson (University of Maryland, College Park), and James Turner (then Ohio State University now Virginia Tech) in 1995; CAARMS has been organized annually every summer since [1]. NAM has held its Faculty Conference on Research and Teaching Excellence at various Historically Black Colleges and Universities most years since 1994 [2]. AWM Research Symposia have been held every odd year since 2011. The Infinite Possibilities Conference is specifically geared towards female mathematicians of color and has been held approximately biennially since 2005 [3]. A research conference for Hispanic, Latino, and Latina mathematicians called “Latinx in the Mathematical Sciences” was held in 2015 and 2018, and is scheduled to be held at the Institute for Pure and Applied Mathematics on March 3–5, 2022. The prestigious Blackwell-Tapia Prize has been awarded every two years at a conference aimed at underrepresented minority researchers in mathematics since 2002 [4]. This is not an exhaustive list of such events, but we include it here to provide the reader with some sense of the activity in this area.

Until recently, to our knowledge, there were no mathematics research conferences devoted to LGBTQ+ mathematicians analogous to those discussed above. Later in this article, we discuss recent developments in the representation of LGBTQ+ individuals in the mathematics community. However, before that, we provide context for the increased visibility of LGBTQ+ mathematicians by describing some of the recent legal, societal, and political developments that have impacted LGBTQ+ people.

2. Progress and Challenges

In recent years, LGBTQ+ people have made significant advances in equality under the law, and experienced increasing cultural and social acceptance. For example, in the summer of 2020, the United States Supreme Court issued a ruling in *Bostock v. Clayton County* extending some employment protections for LGBTQ+ people nationwide [5]. However, many of these recent advances are tenuous, and numerous barriers, both legal and societal, remain and actively disadvantage LGBTQ+ people [6]. For example, while the US Supreme Court invalidated all remaining sodomy laws in the country in 2003 [7], there are still eleven states that currently have (and refuse to remove) unenforceable statutes on the books that criminalize same-sex sexual relations.

On a broader scale, twenty-nine countries have legalized marriage equality. However, at least seventy countries worldwide have national laws targeting or criminalizing LGBTQ+ individuals [8]. For example, in 2013, Russia—the site of the 2022 International Congress of Mathematicians—enacted legislation making it illegal to provide information to minors that portrays being

LGBTQ+ in a positive light. This includes providing counseling or therapy to LGBTQ+ children and teens [9].

Furthermore, many countries—including the United States—have laws and policies that stigmatize, criminalize, or harm transgender and non-binary people. For example, many places still make it challenging to update identity documents, such as driver’s licences and passports, if they allow such changes at all. Transgender and non-binary people, especially trans women of color, also face a much greater chance of violence, especially from the police [10]. Even within academia transgender and non-binary people often face discrimination and harassment. For example, finding gender-neutral restrooms can often be difficult on many campuses [11]. As another example, some health insurance plans offered by universities and colleges fail to provide coverage for many aspects of gender-related healthcare needed by some transgender and non-binary people [12, 13]. Such lack of accessibility to healthcare often leaves some transgender and non-binary academics with the horrible choice of (i) delaying much needed medical care, (ii) going into massive medical debt, or (iii) leaving academia.

More specific to the mathematics community, recent studies have shown that LGBTQ+ people in STEM fields face significant hurdles. A national longitudinal survey conducted in the United States found that LGBTQ+ students in STEM had lower retention rates than their non-LGBTQ+ peers. The same study showed these disparities persisted despite the finding that LGBTQ+ STEM students are more likely to engage in undergraduate research [14]. Another recent study found LGB people were underrepresented among faculty members in STEM [15] (transgender or other members of the LGBTQ+ community were not referenced in this study).

The challenges and discrimination faced by LGBTQ+ people in STEM can be seen more directly in interviews with LGBTQ+ academics [16]. For example, as one interviewee stated, “I get subtle microaggressions such as, ‘But you’re too pretty to be gay!’ and questions that are too personal, such as, ‘When are you going to stop experimenting and start dating men again?’ Black queer women are sometimes forced to fit into boxes and hide aspects of our identity. There are so many issues facing Black people, that we don’t always have the time or energy to get into being queer, too.”

3. The Landscape So Far

Since its founding, Spectra, the association for LGBTQ+ mathematicians, has organized several informal and formal events for LGBTQ+ mathematicians and our allies. Spectra draws its roots back to a gathering at the 1995 Joint Mathematics Meetings (JMM) in San Francisco [17]. Since



Figure 1. LGBTQ+Math Day took place on November 18, 2020.

then, Spectra has continued to be a frequent organizing presence at the Joint Meetings, often holding social gatherings where LGBTQ+ mathematicians can meet and enjoy each other's company. Spectra sponsored JMM panels on issues related to LGBTQ+ members of the mathematics community. These panels include:

- Supporting Transgender and Non-binary Students, 2020 JMM in Denver, CO.
- Spectra Town Hall Meeting: Identifying Workplace Best Practices for LGBTQ Mathematicians, 2019 JMM in Baltimore, MD.
- Out in Mathematics: Professional Issues Facing LGBTQ Mathematicians, 2018 JMM in San Diego, CA.
- Out in Mathematics: LGBTQ Mathematicians in the Workplace, 2015 JMM in San Antonio, TX.

Given the desires and needs discussed in Section 1, it is no surprise that over the last few years, events aimed specifically at LGBTQ+ mathematicians have evolved beyond panels and informal social gatherings. The last few years have seen many conferences and workshops aimed at providing LGBTQ+ mathematicians space to share their work, network, and develop collaborations. A non-exhaustive list of such past and future conferences includes:

- LG&TBQ - (*June 2019*): A five-day conference organized by Autumn Kent (she/her/hers, University of Wisconsin, Madison) and Harry Bray (he/him/his, George Mason University), fostering collaboration and community among LGBTQ+ mathematicians working in geometry, topology, and dynamical systems.
- LGBTQ+Math Day - (*November 2020*): A one-day event highlighting LGBTQ+ people in mathematics organized by Anthony Bonato (he/him/his, Ryerson University), Michelle Delcourt (she/her/hers, Ryerson University), and Lisa Jeffrey (she/her/hers, University of Toronto).

- Trans Math Day - (*December 2020*): A one-day conference, held virtually due to the COVID-19 pandemic, for transgender and non-binary people in the mathematical community organized by Juliette Bruce (she/her/hers, University of California, Berkeley).
- Queer and Trans Mathematicians in Combinatorics Conference - (*June 2021*): A three-day conference for queer and trans mathematicians in combinatorics organized by Rachele Bouchat (she/her/hers, Indiana University of Pennsylvania), Aram Dermenjian (he/him/his, York University), Ray Karpman (they/them/theirs or she/her/hers, Otterbein University), and Mike Zabrocki (he/him/his, York University). Those who do not identify as LGBTQ+ may attend.
- Spec($\overline{\mathbb{Q}}$) - (*July 2022*): A three-day conference organized by Juliette Bruce (she/her/hers, University of California, Berkeley), Renzo Cavalieri (Colorado State University), Tyler Kelly (he/him/they/them, University of Birmingham), and John Voight (Dartmouth College) to celebrate and promote research advances of LGBTQ+ mathematicians in algebraic geometry, arithmetic geometry, commutative algebra, number theory, and related fields.

The rise of conferences aimed at supporting and celebrating LGBTQ+ people is not limited to mathematics. For example, seminar series such as LGBTQ+ STEMinar and LGBTQ+STEM emerged to highlight LGBTQ+ communities throughout science, technology, engineering, and mathematics (STEM). Many disciplines within STEM are ahead of mathematics when it comes to events and initiatives promoting LGBTQ+ people. LGBTQ+ STEMinar, for example, has been running annually since 2016, and the success and impact of LGBTQ+STEM was recently recognized by the Royal Society.

These conferences were extremely popular, with the organizers often surprised by the number of people interested in their event. For example, Trans Math Day—an event only open to transgender and non-binary people in mathematics—had over 80 registered participants, with 28 talks. Similarly, LGBTQ+Math Day, which we will discuss in further detail in the next section, reached the maximum 500-person limit for Zoom registration.

More important than the audience's size were the effects of these conferences on both the organizers and participants. Being surrounded by many other LGBTQ+ mathematicians has frequently been described by participants as a moving and transformative experience. For example, numerous junior participants at Trans Math Day noted how this was the first time they were able to see themselves

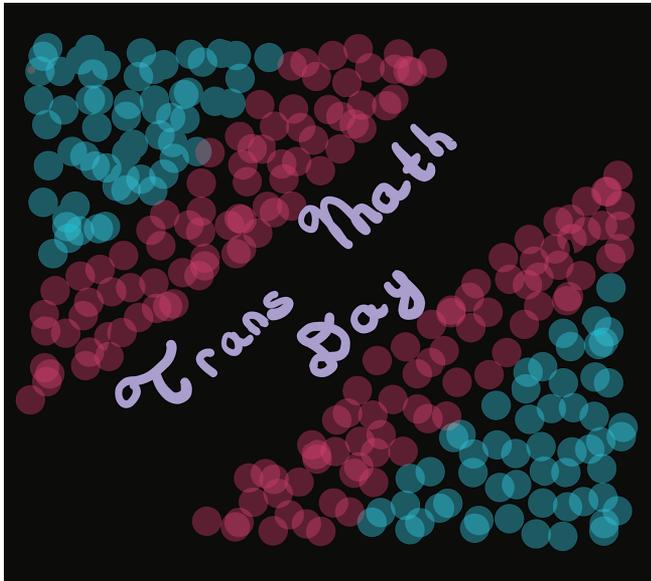


Figure 2. The inaugural Trans Math Day occurred on December 5, 2020, as a space to build community, mentor networks, and potential collaborations amongst transgender and non-binary mathematicians.

reflected in more senior math faculty. “I heard and read so many comments at Trans Math Day saying how many participants didn’t know that there are so many trans and non-binary mathematicians out there. Events like this are so important for us to flourish, because so many of us feel isolated,” said Sean Sather-Wagstaff¹ (they/them/theirs, Clemson University) who attended both Trans Math Day and LGBTQ+Math Day.

4. LGBTQ+Math Day

LGBTQ+Math Day took place on November 18, 2020. What began as an idea discussed over coffee with colleagues in 2019 materialized into a one-day conference, with invited speakers along with a panel discussion. The meeting was co-chaired by Anthony Bonato and allies Michelle Delcourt at Ryerson University and Lisa Jeffrey at the University of Toronto. While the original plan was to have the day in-person at the Fields Institute in July, the COVID-19 pandemic lockdown moved the date and the event was rescheduled to be held over Zoom. The organizers chose November 18 to coincide with LGBTQ+STEM Day, the international day dedicated to the work and barriers of LGBTQ+ people working in STEM.

Hosted by the Fields Institute and co-sponsored by Ryerson University, LGBTQ+Math celebrated the life and work of LGBTQ+ mathematicians. Why have such a day? While LGBTQ+ mathematicians are slowly becoming

¹Sean Sather-Wagstaff along with others appearing in the article agreed to have their names or words used.

more prominent in the mathematical community, they often remain invisible. Visibility is an essential issue for underrepresented groups such as LGBTQ+ folks for several reasons. An essential feature of a vibrant mathematics culture is diverse representation; we want our instructors and colleagues to reflect the diversity we see in our culture. We want LGBTQ+ people to be at the proverbial table, having our voices heard.

Visibility is also critically important to the next generation of mathematicians, as it helps to normalize their experiences and gives them a network of sympathetic colleagues and possible role models. LGBTQ+ people working in mathematics must know that they are not alone.

An important tenet is that inclusion requires deliberate action. As the saying goes, “Diversity is a fact. Inclusion is a choice.” While the organizers chose speakers and panelists who identify as LGBTQ+, they encouraged those who did not identify as LGBTQ+ to be participants. That decision reflects two sides of the same coin: on the one side, we need better representation for LGBTQ+ mathematicians, and on the other, we need the support of allies to make progress.

LGBTQ+Math Day was advertised broadly, in the AMS inclusion/exclusion blog, through e-mail blasts, podcasts, and social media. While the response was overwhelmingly positive, there were a small number of negative reactions. One tweet responding to an announcement of the day declared that “gay people cannot do math.” While such posts can be dismissed as coming from random trolls, many LGBTQ+ mathematicians have heard similar comments first- or second-hand. Such comments underscore the very reason why LGBTQ+Math Day occurred in the first place. While the conference ran smoothly with no disruptions, the organizers and Fields Institute staff took extra precautions to provide and ensure a safe space.

There were over 150 participants for the day. The Fields Institute Director Kumar Murty gave opening remarks, followed by David Cramb, Dean of the Ryerson Faculty of Science. Talks began after that, starting with Ron Buckmire, who spoke of his research in applied mathematics and numerical analysis. He described his experiences as a gay, Afro-Caribbean mathematician, and discussed how his multiple identities had (or had not) affected his diverse career path as activist, administrator, educator, and (US government) employee.

Emily Riehl (she/her/hers, Johns Hopkins University) spoke on interweaving ∞ -category theory and homotopy theory. Having her do so remotely in front of a chalkboard was a lovely surprise, and many appreciated her doing so while wearing an Australian Rules football guernsey with appropriately rainbow-hued socks (not pictured). Juliette Bruce began her talk by noting that where she lives and



Figure 3. Emily Riehl speaking at LGBTQ+Math Day.

works—Berkeley, CA—is close to Compton’s Cafeteria in San Francisco, where 51 years ago, in the face of transphobia, police violence, and state violence, one of the first actions in the modern LGBTQ+ movement was led by a group of trans women of color [18, 19]. She went on to speak about her work combining high throughput and high-performance computing to study the syzygies of algebraic varieties.

The final talk was by Anthony Bonato, who spoke on his research on complex networks and graph searching. He described his journey as a gay mathematician, the need for more role models, and the evolution of LGBTQ+ rights in Canada and beyond. He also called on LGBTQ+ mathematicians to come out if they feel safe to do so.

After each talk, the speakers and participants entered breakout rooms to chat with participants. There were technical questions and more personal ones, like what you would expect in a coffee break at an in-person research conference. The impromptu discussions mixing mathematics and queerness helped elevate the sense of sharing, listening, and community building.

After the talks, Imogen Coe (she/her/hers, Ryerson University) moderated a panel that included Buckmire, Bruce, and Riehl, along with Brian Katz (he/him/his, California State University Long Beach) and Robin Gaudreau (they/them/theirs, graduated McMaster University). Panelists answered questions from Coe and the audience. There was a sharing of frank, personal stories woven with their professional experiences in the academy and beyond.

LGBTQ+Math was, by our reckoning, a success. There was a tangible sense of community building and an intentional safer place for queer mathematicians, which is all too rare in our conferences. There were several students and early-career participants. Many participants spoke excitedly about the number of non-binary participants.

Others discussed the challenges they experienced being out or contemplating coming out. After the day ended, the

organizers received several messages with incredibly positive reactions to the conference. Videos of talks from the conference may be found on the Fields Institute’s YouTube channel. The URL for the conference is <https://math.ryerson.ca/~abonato/LGBTQ/>.

5. Future Work

We are excited to see the ways that events like LGBTQ+Math Day, Trans Math Day, and the others highlighted throughout this article continue to evolve. If there is one thing that we are certain of it is the amazing ability of the LGBTQ+ community—often led by the most marginalized among us, trans women of color—to build and create new types of spaces and events: spaces and events where the existing hegemony and existing power structures can be questioned. These are *spaces for all* where LGBTQ+ people can find community. As one participant at Trans Math Day (Theresa Simon, she/her/hers, University of Bonn) noted, “It was great to see that there is a real possibility of building a trans community in mathematics after having been under the impression that there are only very few of us. I hope we will not let this opportunity pass us by, as community is especially important for those of us who are still in the closet and/or early in their career.”

The rise of events like those highlighted above showcases the growing desire of LGBTQ+ mathematicians to no longer check their identities at the department door. It is a sign that when we as LGBTQ+ people bring all of ourselves and our identities to the mathematical community it is not only better for us, but better for the math community as a whole.

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Anthony Bonato



Juliette Bruce



Ron Buckmire

Credits

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