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 know 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

Anthony Bonato (he/him/his) is a professor of mathematics at Ryerson University. His email address is abonato@ryerson.ca.
Juliette Bruce (she/her/hers) is an NSF postdoctoral fellow at the University of California, Berkeley. Her email address is juliette.bruce@berkeley.edu.
Ron Buckmire (he/him/his) is a professor of mathematics and associate dean for curricular affairs at Occidental College. His email address is ron@oxy.edu.

For permission to reprint this article, please contact: reprint-permission@ams.org.

DOI: https://doi.org/10.1090/noti2288

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 Rachelle 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.
- N (N)- *(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

'JHVSF 5IF JOBVHVSBM 5SBOT .BUI %BZ PDDVSTJFE PO %FDFNCFS BT B TQBDF UP CVJME DPNNVOJUZ NFUUFS OFUXPSLT BOE QPUFOUJBM DPMMBCPSBUJPOT BNPOHTU USBOTHEQETS BOE OPO CJOBSZ NBUIFNBUJDJBOT

SFþFDUFE JO NPSF TFOJPS NBUI GBDVMUZ JOMDMVTJPO CMPH UISPVHI TP NBOZ DPNNFOUT BU 5SBOT .BUI %BZ TBZJOH IPX NBOZ QBSUJDJQBOUT EJEO U LOPX UIBU UIFSF BSF TP NBOZ TUBOT BOE OPO CJOBSZ NBUIFNBUJDJBOT PVU UIFSF &WFOUINJLF UIJT BSF TP JNQPSUBOU GPS VT UP þPVSJTI CFDBVTF TP NBOZ PG VT GFFM JTPMBUFE w TBJE 4FBO 4BUIFS 8BHTUBGG $MFNTPO 6OJWFSTJUZ XIP BUUFOEFE CPUI 5SBOT .BUI %BZ BOE -(#52 .BUI %BZ

-(#52 .BUI %BZ

-(#52 .BUI %BZ UPPL QMBDF PO /PWFNCFS 8IBU CFHBO BT BO JEFB EJTDVTTFE PWFS DPGGFF XJUI DPM MFBHVFT JO NBUFSJBMJ[FE JOUP B QPQVMBS EBZ PO GFSTPDF XJUI JOWJUFE TQFBLFST BMPOH XJUI B QBOFM EJTDVTTJPO 5IF NFFUJOH XBT DP DIBJSFE CZ "OUIPOZ #PBUT BOE BMMJFT .JDIFMMF %FMDPVSU BU 3ZFSTPO 6OJWFSTJUZ BOE -TB 1PSGSFZ BU UIF 6OJWFSTJUZ PG 5PSPOUP 8IJMF UIF PSJHJOBM QMBO XBT UP IBWF UIF EBZ JO QFSTPO BU UIF 'JFMET *OTUJUVUF JO +VMZ UIF $07*% QBOEFNJD MPDLEPXO NPWFE UIFF BOE UIF FWFOU XBT SFTDIFEVMFE UP CF IFME PWFS ;PPN 5IF PSIB OJ[FST DIPTF /PWFNCFS UP DPJODJEF XJUI -(#52 45&. %BZ UIF JOUFSOBUJPOBM EBZ EFEJDBUFE UP UIF XPSL BOE CBS SJFST PG -(#52 QFPQMF XPSLJOH JO 45&.)PTUFE CZ UIF 'JFMET *OTUJUVUF BOE DP TQPOTPSFE CZ 3Z FSTPO 6OJWFSTJUZ -(#52 .BUI DFMFCSBUFE UIF MJGF BOE XPSL PG -(#52 NBUIFNBUJDJBOT 8IBWF TPMJE BOE EBZ 8IJMF -(#52 NBUIFNBUJDJBOT BSF TMPXMZ CFDPNJOH

4FBO 4BUIFS 8BHTUBGG BMPOH XJUI PUIFST BQQFBSJOH JO UIF BSUJDMF BHSFFE UP IBWF UIFJS OBNFT PS XPSET VTFE

NPSF QSPNJOFOU JO UIF NBUIFNBUJDBM UFO SFNBJO JOWJTJCMF 7JTJCJMJUZ JT EFSSFQSFTFOUFE HSPVQT TVDI BT -(#52 SFBTPOT "O FTTFOUJBM GFBUVSF PG B W UVSF JT EJWFSTF SFQSFTFOUBUJPO XF DPMMFBHVFT UP SFþFDU UIF EJWFSTJUZ XBOU -(#52 QFPQMF UP CF BU UIF QSPWF PVS WPJDFT IFBSE

7JTJCJMJUZ JT BMTP DSJUJDBMMZ JNQ BUJPO PG NBUIFNBUJDJBOT BT JU IFMQ FYQFSJFODFT BOE HJWFT UIFN B OFUXPS MFBHVFT BOE QPTTJCMF SPMF NPEFMT JOH JO NBUIFNBUJDT NVTU LOPX UIBU UI "O JNQPSUBOU UFOFU JT UIBU JODMVTJ BDUJPO "T UIF TBZJOH HPFT i%JWFSTJ JT B DIPJDF w 8IJMF UIF PSHBOJ[FST DIP FMJTUT XIP JEFOUJGZ BT -(#52 UIFZ FOD EJE OPU JEFOUJGZ BT -(#52 UP CF QBSU TJPOSFþFDUT UXP TJEFT PG UIF TBNF DP OVFE CFUUFS SFQSFTFOUBUJPO GPS -(# BOE PO UIF PUIFS XF OFFE UIF TVQQPSU QSPHSFTT

-(#52 .BUI %BZ XBT BEWFSUJTFE CSPB JODMVTJPO FYDMVTJPO CMPH UISPVHI BOE TPDJBM NEEJB 8IJMF UIF SFTQPO JOHMZ QPTJUJWF JUFSF XFSF B TNBMM JFSF &WFOUINJLF UIJT BSF BDUJPOT 0OF UXF FU SFTQPOEJOH UP B UIF EBZ EFDMBSFE UIBU iHBZ QFPQMF DB TVDI QPTUT DBO CF EJTNJTTFE BT DPNJO NBOZ -(#52 NBUIFNBUJDJBOT IBWF IFBS NFOUýSTU PS TFDPOE IBOE 4VDI DPN UIF WFSZ SFBTPO XIZ -(#52 .BUI %BZ PDD QMBDF 8IJMF UIF DPOGFSFODF SBO TNP UJPOT UIF PSHBOJ[FST BOE 'JFMET *OT B QPQVMBS EBZ PO GFSTPDF 5IFSF XFSF PWFS QBSUJDJQBOUT GS *OTUJUVUF %JSFDUPS VNBS .VSUZ HBW MPXFE CZ %BWJE $SBNC %FBO PG UIF 3 4DJFODF 5BMMT CFHBO BG UFS UIBU TI NJTF X+P TOPLF PG IJT SFTFBSDI JO BQ BOE OVNFSJDBM BOBMZTJT)F EFTDSJC BUF EBUF BOE UIF B HBZ "GSR $PSJCCFBO NBUIFNBUJDJBO JTNVMUJOMF JEFOUJUJFTIBE PSIBEO DBSFFS QBUI BT BDUJWJTU BENJOJTUS HPWFSONFOU FNQMPZFF

&NJMZ 3JFIM TLF FS IFST +PIOT)PQ TOPLF PO JOUFSDISBUF UIF MJGF BOE UIFPSZ)BWJOH IFS EP TP SFNPUFMZ JO XBT BWF TVDI B TVSQSJTF BOE NBOZ BQQ XIJMF XFBSJOH BO "VTUSBMJBO 3VMFT G BQQSPQSJBUFMZ SBJOCPX IVFE TPDLT #SVDF CFHBO IFS UBML CZ OPUJOH UIBU