SERVICE STATEMENT

MATTHEW KROESCHE

1. Introduction

In my time at Texas A&M University, it has been a priority of mine to pour into the wider mathematical community around the Brazos Valley and even throughout the state of Texas. It has been so rewarding to be involved in so many different ways through coaching, volunteering, and contributing. Wherever my academic career takes me in the future, I would love to continue being involved in outreach and service opportunities.

2. Coaching

Math contests have been a big part of my life ever since I was in middle school. Throughout college, both in my undergraduate and graduate years, I've remained continuously involved in the contest math scene in Texas. Most notably, I've served as a coach for the Texas American Regions Mathematics League (ARML) team every year since 2016, and I've organized Texas teams to compete at HMMT (a tournament hosted alternately at Harvard and MIT) since 2017. More recently, I've also begun coaching Texas teams to compete at the Princeton University Math Contest (PUMaC).

The work of coaching has many different aspects. For teams that I organize, it includes getting to know the students and assessing their skills, and then placing them on different teams in order to give our top team a strong chance at winning the tournament. It also includes logistical details, such as travel arrangements to and from the contest, and making sure everyone gets where they need to be during the actual contest weekend. Another very important ingredient is helping the students to prepare by providing practice materials and organizing group practices when applicable. This has included hosting mock contests such as FARML (Fake ARML), writing team selection materials, and putting together practices where students can practice team rounds as a group.

I also remained active as a coach throughout the virtual years of the COVID-19 pandemic, where in-person math contests effectively ceased to exist throughout the better part of two years. In the course of doing this, I organized many group events over the Zoom platform, and also put together teams to compete at virtual contests. It was a very different experience from in-person contests, but it was still very worthwhile.

3. Volunteering

I've volunteered at many different math and science events, both in the Bryan-College Station area and throughout the state of Texas. Each one has been a different opportunity to encourage students and teachers to excel, and strengthen the community at large.

Most notably, from 2018 to 2023 I organized an unofficial MATHCOUNTS practice event in Austin to help students prepare for the MATHCOUNTS Texas chapter and state meets. This included coordinating the venue for the contest, writing problems, fiding other people willing to help out, and inviting schools and

students to participate.

Apart from that, I've volunteered multiple times to proctor at the Texas A&M high school mathematics contest, and to help run both the integral and derivative bees. I've also volunteered at the Texas MATHCOUNTS state meet, where I've served as both a proctor and a grader in the past, and in the past I have also served at the Texas Regional Science Bowl and Junior Science Bowl events. Also, in 2019, I was a counselor for the two-week Summer Math Research Training (SMaRT) camp at Texas A&M University.

Volunteering has been an incredibly fulfilling way for me to give back to the community. I plan to continue helping with events like these, hopefully both as a volunteer and an organizer, whenever possible in the future.

4. Problem Writing

I've also been very active as a math problem creator. Throughout the years I've contributed my problems to many different contests. Most significantly, I've served a three-year term as a MATHCOUNTS question writer from 2021 to 2023. I've also contributed many problems to the Austin Math Circle Practice MATHCOUNTS (which I also organized) and to Texas A&M events such as the high school math contest and the integral bee. Other problems of mine have also been used for mocks and practice materials for Texas teams I coach, and one of them even found its way onto the American Regions Math League (ARML 2018, Individual Round #6).

Posing good math problems is often a challenge. The ideal goal is to create something that hasn't quite been done before – although this can be difficult because of just how many math contests exist in the world. I strive to create problems that will challenge students to think in new and clever ways, rather than just applying standard formulas and techniques. Some of my original math problems that I am most proud of are linked from my website: `https://hukilau17.github.io/`.

5. Conclusion

It's been a great joy for me to be connected in so many ways to so many different students, parents, teachers, and coaches, all over the state. I am excited to see what the future holds as I continue to seek out involvement in these circles, wherever my career path leads.

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