Arkansas Math Discovery Day: A Community Partnership

Matt Clay

Sharing my passion for mathematics outside of a classroom is deeply rewarding. I never get tired of watching the satisfaction on someone's face as they fold an origami cube; cut a Möbius band down the middle without separating it; or gain a sudden, joyous insight during an explanation of Hilbert's Hotel. As observed by Bill Thurston, "The real satisfaction from mathematics is in learning from others and sharing with others."[1] Francis Su also recognizes why involving everyone in mathematics is so important for our discipline—and is inherently satisfying—in his book, *Mathematics for Human Flourishing*.

Hosting a successful community outreach event requires a lot of preparation. Designing stimulating activities and creating demonstrations are what most faculty members excel at and enjoy doing. A community partner that has experience with large public events and the ability to connect with all sectors of the community across demographic lines can greatly enhance the event and increase its impact for all involved. Let me share how we teamed up to host a large community outreach event, Arkansas Math Discovery Day. I'll walk through how it all came together, what worked well, and what we learned for next time.

What is Arkansas Math Discovery Day?

Arkansas Math Discovery Day[2,3] is a community outreach event organized by the Department of Mathematical Sciences at the University of Arkansas in partnership with the Fayetteville Public Library. This year, it was on April 19, during Math and Stat Awareness Month, and this was the second such event after its inception in 2024.

The event featured over 20 booths with hands-on activities where community members could explore and interact with different math concepts. Most of these were created and run by a member of our department, including faculty, graduate students, or undergraduate students. One booth illustrated large language models using plastic cups and beads that were trained by visitors to play Notakto. There was also a booth on billiards and the legacy of Maryam Mirzakhani, a booth explaining the mathematics behind the game Spot It![4] with instructions for participants to create their own game, and a print out of the first million digits of π inviting visitors to locate their own birthdate. A "Math Fun Zone" had several math manipulatives (e.g., Zome tools[5], Geo-Gami[6], Curvahedra[7], Aperiodic tiles[8]) for self-guided exploration. Participants who visited at least eight booths or solved one of our challenge problems could enter to win a prize. The event this year drew over 500 participants of all age levels and mathematical backgrounds.

Finding a birthday in π. (Image credit: Novo Studio)

1. https://mathoverflow.net/questions/43690/whats-a-mathematician-to-do/44213#44213
2. https://amdd.uark.edu/
3. https://www.faylib.org/event/12928554
4. https://www.spotitgame.com/
5. https://www.zometool.com/
6. *Geo-Gami: The Art of Making Geometrical Shapes from Paper* by Katherine Gleason
7. https://curvahedra.com/
8. https://en.wikipedia.org/wiki/Einstein_problem

Arkansas Math Discovery Day was inspired by the well-known Celebration of Mind[9] events. Our department hosted a Celebration of Mind event beginning in 2012. Participation slowly faded until the COVID-19 pandemic, when it ended. While there are several important differences between these two events, the central idea of sharing mathematical gems with the community is the same. Since faculty already had experience with Celebration of Mind, many easily understood the vision for Arkansas Math Discovery Day.

Partnering to Realize A Shared Vision

In both the planning and execution of Arkansas Math Discovery Day, we partnered with the Fayetteville Public Library. (It was helpful that my wife works at the Fayetteville Public Library, so someone on the inside knew exactly what we were proposing!) The library's Youth Services Department quickly got on board, and planning kicked off in April 2023, a full year before the first hosting in April 2024.

The first step was to create a shared vision of this event that worked for both of us. We needed a name that would pull in the community, one that would let them know what the event was about ("Math") and let them know that this is an event for everyone ("Arkansas," "Discovery"). The library's experience hosting community events helped with crafting a concise and inviting description, much better than anything our department would have come up with on our own.

We then worked on identifying responsibilities.

1. *Advertising:* We provided photos and graphics that the library used to create posters for promoting the event. Flyers (physical and digital) were sent to area schools and spread through the library's communication channels. We also promoted the event on a local radio show[10].
2. *Layout:* The library worked with us to arrange the booth layout while considering items like electrical outlets, doorways, and space requirements.
3. *Activities:* While our department was responsible for most booths, the library did provide two additional activities. One was for preschoolers (ages 3– 5) so that the event provided content for all families. As the library routinely provides programming to this age level, they were much better equipped at selecting age-appropriate activities. The second activity, based on Micromouse competitions, was paired with the Fayetteville Library's Center for Innovation and had participants program robotic cars to navigate a maze.

The day before Arkansas Math Discovery Day, the library had the space ready, and we brought over supplies to set up the booths. While this event is a major undertaking for our department, the library is used to hosting much larger events and had everything under control.

Hands-on fun with Zome tools. (Image credit: Novo Studio)

On the day of the event, the library staff made sure volunteers had what they needed. The library supplied pencils, markers, scissors, and origami paper. Signs posted throughout the building guided members of the community to the event, and staff were stationed in key places to direct participants. The library staff distributed a list of math-themed materials available at the library, answered patron questions, handed out evaluation forms, and kept a headcount of visitors.

After the event, the library staff assisted in the takedown. The prizes remained at the library for the winners to pick up. The library provided us with the final headcount of the event along with summaries of the feedback on the evaluation forms.

What Went Well

Partnering with the Fayetteville Public Library came with big benefits for both sides. For our department, three major advantages stood out.

1. *Location & Facilities:* The Fayetteville Public Library is a well-known and frequented spot in town, conveniently located with easy parking. While students and faculty are comfortable navigating university spaces, they can feel intimidating to the general public, and parking on campus is never easy. The library, on the other hand, has the space, the experience, and the friendly atmosphere that makes large-scale events like this a success. Having the prizes held there made it simple for winners to pick up afterwards.
2. *Community Network:* The library has an extensive community network. Through email announcements, social media, school flyers, and online family forums, they reached a far wider audience than we could have on our own.

9. https://www.gathering4gardner.org/celebration-of-mind/
10. https://www.kuaf.com/show/ozarks-at-large/2025-04-18/math-day-2025-includes-robots-art-plus-your-birthday

3. *Trust & Reach:* The library is known for providing excellent and diverse programming for all ages. This helped bring in attendees who might not have come if we'd promoted the event alone. Many families visit the library every weekend, trusting that there will always be something fun to do—on this weekend in April, that something was Arkansas Math Discovery Day!

There were other benefits the library provided, such as creating the additional preschool activities and compiling the math-themed materials list. Both would have been extremely difficult for our department to do well but contributed to the success of Arkansas Math Discovery Day.

In return, our department provided content and programming that helped the library in its mission of strengthening the Fayetteville community, increasing literacy and providing free access to knowledge. Our booths and activities were designed to interest school-aged children through adults. These stimulated conversations about math literacy and promoted lifelong learning. We provided the content, materials, and volunteers, so the event had minimal cost for the library to host, especially given its draw, impact, and unique focus.

Other community groups contributed to our success. Fayetteville Public School played a major role in promoting the event and organizing a booth. Their participation added credibility. A message of support from a school administrator to a teacher or parent carries more weight than one from our department. Their booth featured information for families on math curricula, student support, and classroom technology, and had stimulating number literacy activities. Students at the event enjoyed the surprise of seeing familiar faces from their school at the library. Engagement from the school district was a new feature of Arkansas Math Discovery Day, and it greatly enhanced the reach of the event.

Other community groups who organized booths included faculty from the Department of Computer Science, teachers from a local private high school, the Mu Alpha Theta Math Club at the Fayetteville Public High School, a regional after-school math club, a robotics club from the University of Arkansas, and a local artist that creates math-themed sculptures.

Having this mix of community groups involved with Arkansas Math Discovery Day highlights the fact that this event is for everyone. One of the evaluation forms for the event specifically commented on how they enjoyed seeing the wide range of ages of volunteers running the booths—it was not just faculty from the university. Even though this was an event hosted by the university, the broad participation sent a clear message: *Anyone* can be a "math person."

Over 500 participants engaging in dialog about mathematics and expressing joy, wonderment, and satisfaction demonstrated the success of the partnership between our department and the library. Early strategic planning was key, and trust in each other's strengths allowed us to formulate a vision for the event that would be beneficial for both partners and have the most impact on the community. Holding regular meetings kept everyone on task and involved in each other's work, and it helped to maintain open communication so that we could seek out help from each other as needed.

How We Built on Our Discovery Day's Success

There were many improvements made between the first and second years of Arkansas Math Discovery Day, and more are planned for next year's event. Most of these involve internal communication. Some of the booths (both from our department and from the community) were late specifying their needs, and this caused some strain on the library staff. For example, figuring out how to safely have a booth on the mathematics of mixing fluids—*that actually had mixing fluids*—in a space where open containers of liquid are not allowed would have been easier to accommodate if the library did not find out about it on the morning of the event. Other times, booth organizers contacted the library directly about their needs, which led to confusion as many of these requests were items that the department was responsible for providing. For next year, in addition to the deadlines set between the department and library, we plan to set and clearly communicate deadlines with the booth organizers to reduce the number of last-minute requests.

Additionally, while we aim for all booths to be accessible to everyone, some activities are naturally better suited for specific age groups. Next year, we plan to indicate which are the best starting points for elementary-aged kids, helping families navigate the event more easily.

As mathematicians, researchers, and educators, it's our responsibility to share our passion and make math inviting to all. Community outreach events are an incredible one way to accomplish this, but they involve skills that are unfamiliar to many faculty and access to a network that most departments do not have. Fortunately, there are people and organizations in your community that can assist with both. Getting community groups or a community partner to participate in the planning and execution can be beneficial to all involved and lead to an impactful event that serves the community.

Arkansas Math Discovery Day is a joy—a joy that is magnified by working with the Fayetteville Public Library and members of my community.

Matt Clay is a mathematics professor at the University of Arkansas and is currently the Chair of the Department of Mathematical Sciences. *Matt Clay thanks co-organizers Edmund Harriss, Jeremy Van Horn-Morris from the Department of Mathematical Sciences and Gina Clay from the Fayetteville Public Library, and all of the many volunteers for their help with Arkansas Math Discovery Day.*