Presenting Mathematical Poetry Across Disciplinary Lines

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Abstract

In the United States, April is National Poetry Month as well as Mathematics and Statistics Awareness Month. The author gave an invited mathematical poetry reading/talk online on April 23, 2021, jointly sponsored by the mathematics department, English department, and writer's workshop program of a public research university in the central United States. This paper shares specific opportunities and challenges of such a joint presentation, as well as discusses a post-presentation anonymous feedback survey completed by $n = 12$ (of 18) attendees.

Opportunities

With growing interest in interdisciplinary research and STEAM (adding "Arts" to "Science, Technology, Engineering, Mathematics"), there are many opportunities for fruitful cross-disciplinary collaborations and projects between the mathematical sciences and arts such as poetry. The *Journal of Mathematics and the Arts* had a focus issue on mathematical poetry in 2014. In an IRB-approved student-randomized experiment [15], college introductory statistics students did a few percentage points better on an exam item if they had received a poem inserted in their otherwise identical associated content reading in their learning management system. Poetry has also been used by mathematics teachers at the middle school [2] and high school [10] levels. Despite such potential productive synergies, it is often viewed as unusual that I have published 55 STEM-centered poems [14] and given two mathematical poetry talks/readings jointly sponsored by mathematics and English (or creative writing) departments. This paper discusses the more recent [13] of these presentations, held via Zoom on April 23, 2021 for the University of Nebraska Omaha to celebrate both Mathematics and Statistics Awareness Month [17] and National Poetry Month [18].

Challenges

By simultaneously targeting individuals from STEM and humanities backgrounds, I faced several challenges, including: (1) prerequisite knowledge, (2) time, and (3) cultural expectations. To keep content accessible yet interesting to both subgroups, I tried to minimize mathematical and poetic jargon. I generally avoided poems requiring sustained technical knowledge of college mathematics unless I could convey the essence of the math background in a self-contained sentence or two before starting the poem. For example, I opened with my poem "The Point of Inflection" after describing an inflection point not in terms of second derivatives but simply as a point where the direction of curvature changes, connected to the graphs of cumulative COVID cases attendees had surely seen in the media. The hardest judgment call on math prerequisites was with my poem "L'Hospital," which incorporates many connections to L'Hôpital's Rule for resolving indeterminate forms [11]. Because the mathematics colloquium series is advertised as "aimed at undergraduate students who are in calculus or higher mathematics courses," I included it. When I referred to a poetry term (such as haiku, sestina, or free verse), I defined it. When I shared my poem "Systematic Sample of a Children's Song" [12], I supported both groups by explaining both the statistics term ("systematic sample") and how the poem could be viewed as a type of erasure or found poetry.

For the one-hour time slot to include lecture, reading, chat window questions, and discussion, I decided to focus more on what makes poetry mathematical than on what makes mathematics poetic. Finally, I had to navigate different cultural expectations because mathematics colloquium audiences are used to focusing on visual content while a poetry reading audience typically just listens to the poet. Figure 1 shows how I split the difference so that attendees could decide how much to look at or simply just listen. With an online talk, every seat is good, so slides worked better than they would have in a physical classroom.
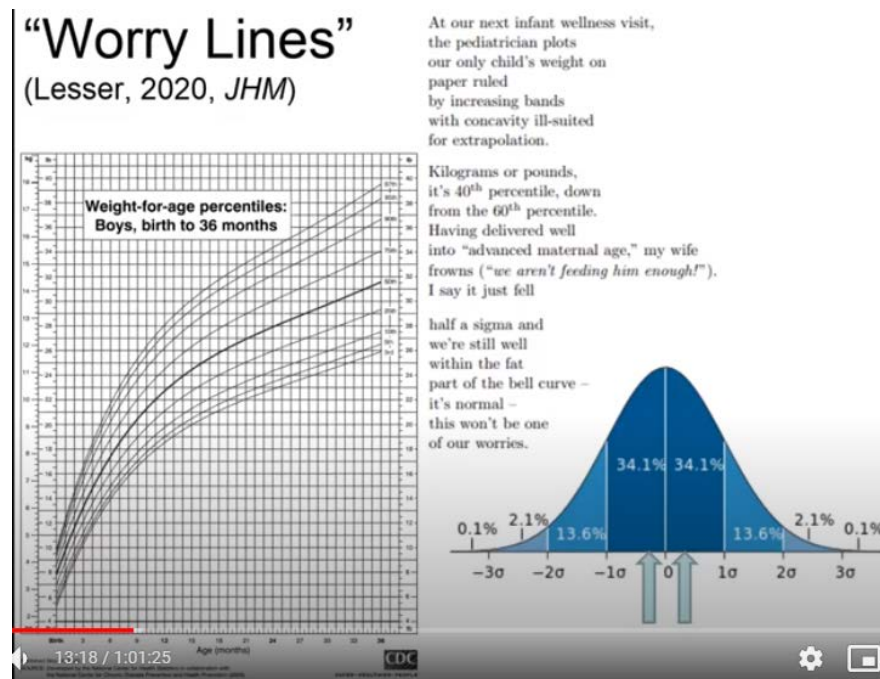
Figure 1: *Screenshot showing how mathematical background accompanied each poem's text.*

Approach

The academic announcement of the presentation included links to resources [1] and to my poetry [14]. The presentation included my posing a half-dozen chat window questions (such as "name one way poetry and math differ," "name one way poetry and math concur," "name one parallel between doing poetry and doing math," etc.) interspersed to increase engagement in the online platform (Zoom). I opened by sharing my background/trajectory and reading four of my mathematical poems. I then explored ways in which mathematics and poetry differ and are similar, how both are beautiful, and how there are parallels in their process. I then went on to share quotations [9] from famous mathematicians and/or writers and examples of how mathematics/statistics can help writers [12]. Finally, I shared sources (see the bottom of [1]), types, and classroom uses for mathematical poetry. The line between "talk" and "reading" blurred as I shared example poems from each of three main (not necessarily exhaustive or mutually exclusive) categories of mathematical poetry [5]: (1) poetic structure inspired or informed by math, (2) math language or imagery applied to something non-mathematical, (3) math as a poem's major subject. I also noted that some have identified additional categories for equation or visual mathematical poetry [16].

Results and Reactions

By presenting such a rare intersection to a diverse, mixed audience, I felt it was important to gather honest reactions. To that end, I gave a Google Forms anonymous survey at the end of the presentation. With four required fixed-choice questions and three optional short-answer questions, it was designed to be completed in just a few minutes. Taken by 12 of the 18 attendees, the feedback survey was not intended to yield generalizable knowledge, but simply to help fine-tune the presentation and offer a vehicle for my reflection. When asked what inspired their attendance, the most common responses by far were curiosity about the intersection of math and poetry (75%), interest in mathematics (67%) and interest in poetry (42%). Of the 12 respondents, six rated their interest in mathematics as higher than, four as equal to, and two as less than their interest in poetry.

Because I assumed most attendees would be new to the realm of mathematical poetry, my talk tried overviewing "a little of everything" and when I asked which parts attendees found interesting, I received: parallels between poems and math (75%), parallels in the creative process (58%), identifying types of math poetry (58%), poems by the presenter (50%), poems by others (50%), educational uses of math poetry (25%), and bibliography resources for math poetry (25%). This breakdown suggests that most attendees came to reflect on the big picture of both realms hand-in-hand more than simply to be entertained by hearing poetry or to learn how to use it in the classroom. On average, attendees whose math interest was as strong or stronger as their poetry interest found almost twice as many aspects of the presentation of interest. One interesting pattern is that the greater the attendee's interest in mathematics relative to poetry, the more likely they were to express interest in the actual poetry presented. While this at first sounded counterintuitive (that is, wouldn't poets more desire hearing more poems?), it might be that mathematicians had more desire for examples because they had less prior experience with poetry in general. This feedback on priorities is helpful because the main suggestion for improvement mentioned in survey responses was to decrease the pace or density. I now know to try removing the poems not essential to the talk's key points so the rest of the presentation and poetry has more room to "breathe." Viewing the presentation as more talk than poetry reading might also motivate me to read (with any needed permission) more examples by other poets.

I continue to reflect on some of the attendees' questions, whether they raised them in the open-ended part of the feedback survey or during the 10-minute discussion segment at the end of the talk. A couple of attendees were curious to hear more about process, about how mathematics sparks poetry [6] or the less obvious direction of how poetry helps in doing math! While I cannot say poetry has led me to create new mathematics, it has helped me better or more concisely explain some aspects of mathematics and I have a few poems such as "Test for Normality," "Confounded," or Figure 1's "Worry Lines" [12], where I certainly had to do a calculation on the side to make sure the poem's particular numbers would be correct.

Another person wondered if I have written a proof that rhymes. I answered that I have not but that I was aware that Euclid's first proposition had been made into a poem [4] and that Tartaglia's solution to the cubic equation was presented in 1539 to Cardano as a poem with triple rhyme scheme and tercets so it would not be altered [19]. Another person raised the question whether it took more creativity to write a poem or to do a mathematics problem or proof and, not surprisingly, consensus was not reached.

Another question asked was whether there are visual artists who incorporate mathematics in their artwork. I responded that there have been Joint Mathematics Meetings poetry evenings that included visual artists displaying such work, as can be seen from the programs of the 2016 and 2017 meetings [8]. I also used the opportunity to make sure all attendees were aware of the Bridges conference [3]. Clearly, this huge variety of questions attendees asked reflects the great diversity in their backgrounds and interests that might have been expected from a presentation sponsored jointly by academic units in different colleges, and therefore reflects the challenge of engaging and satisfying all interests.

Summary and Conclusions

While readers of this paper are welcome to view the recorded presentation [13] and make their own assessment of its success or potential, I do have some tentative observations to offer. I believe the topic itself proved quite interesting and worthy to all attendees; there was no shortage of questions and lively discussion across areas. However, to keep the presentation focused and not rushed in the time window available, it is important to make some decisions about tailoring to the audience. While there was no way to know in advance the distribution of backgrounds of those who ended up attending, this could be ascertained quickly with an informal poll at the start of the presentation that could inform real-time decisions at a few key places where I could decide among a few different examples. As mentioned earlier, I would also read fewer poems and read them a bit more slowly to (as one attendee put it) "let the language land more fully." (Of course, those viewing the recording can pause it to reflect more on a particular part.)

While it would have been simpler to speak to just one department, I believe that the conversation at the end was much richer, reflective, and wide-ranging by having both groups there and that attendees had

the opportunity to broaden their view of each other's disciplines (by including items like the poem "Like Poetry, Mathematics is Beautiful" [7] and the quotations from writers, philosophers, and mathematicians that all saw the deep integration of the realms). Also, at least one academic unit may have more readily agreed to co-sponsor the event than to be its sole host, and as a result, additional students were able to be exposed to something they would not normally encounter. And knowing the audience would be diverse and broad inspired me to make more connections to the real world, to specific Poet Laureates, etc. One of the initial chat window questions I posed was "Name someone (living or dead, that we haven't named yet) who is both a mathematician AND poet." The fact that the audience of mathematicians and poets, of students, staff, and faculty, could name only a couple of people showed the great potential for exploring the realm of mathematical poetry. I hope to realize more of that potential in future iterations.

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