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## Moving Between Inner and Outer Worlds

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## POETRY FOLDER



### *Moving Between Inner and Outer Worlds*

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My poetry seeds were sown in college in Susan Wood's upper-division poetry seminar at Rice University. Two decades later, I began letting mathematics interact with my poetry (as it already had been doing with my songs). I've been blessed to have my mathematical poetry read on a regional NPR station, performed at JMM and Bridges readings, and published in diverse venues, including: *Talking Writing*, *The Mathematical Intelligencer*, *BorderSenses Literary Magazine*, *Journal of the Association of Mexican American Educators*, *Intersections: Poetry with Mathematics* (JoAnne Growney's blog), and *Journal of Humanistic Mathematics*.

As with many writers' paths, my early poems and songs were quite personal and literal as I gradually learned how the particulars of experience could more artistically depict or engage larger realms of meaning. This idea of progressing from the innermost (grouping) follows conventional mathematical order of operations, and we acknowledge both connections by opening this poetry folder with a quintet of poems that are more explicitly autobiographical – first conjecture, inspiration, teaching, or struggle with mathematics, or using its language as a vehicle to process the health challenge of a family member (before we knew she would be okay). This is followed by a quintet of poems that focus outward, reflecting on ideas from statistics/mathematics (education) more philosophically than personally.

I value both types of poems because some mathematical thoughts spark poetry better expressed with a certain kind of distance, while others call for elements of personal narrative. Georg Cantor stated “the essence of mathematics is in its freedom” and John Tukey noted “the best thing about being a statistician is that you get to play in everybody's backyard.” For me, these quotes also apply to poetry, which has proved a delightful vehicle to translate among these (and other) realms as I find new ways to move between my inner and outer worlds, taking many a turn for the verse. Perhaps some poems approach a dimension where (like Klein bottles) inside and outside merge.

–LAWRENCE LESSER (Lesser@utep.edu), El Paso, Texas, USA.

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This folder begins with a quintet of poems that are more explicitly autobiographical – first conjecture, inspiration, teaching, or struggle with mathematics, or using its language as a vehicle to process the health challenge of a family member (before we knew she would be okay). In particular, *Discovery* relates the first mathematical conjecture I remember making. *Business Statistics* was inspired by the first college course I taught as instructor of record. *Julia* is about my paternal grandmother. *L'Hospital* relates an indeterminate situation not readily resolved. *The Zero* draws from Mayan civilization and an experience of struggle in college math.

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#### DISCOVERY

I stumble  
upon the sum  
of the first  
cubes  
always a square. As a middle-schooler,

did I discover  
a true, new result  
and, if so,  
will people value  
the “Lesser Theorem”?

Dad unsure  
of originality,  
we visit  
Dr. Peaceman,  
an engineer friend

whose *CRC* reveals  
pages of  
identities yielding validation,  
and awe of how much  
further the frontier.

---

BUSINESS STATISTICS

The first stats course I taught meant business:  
the book had index numbers and time series,  
the coordinator had us aim for a 2.5 GPA,  
and some students would leave once  
the lecture finished what was on the test.

Prizing practicality,  
a standing ovation marked my mid-term arrival  
to replace a lecturer who formally proved the formula  
for a union's probability when a  
simple diagram sufficed.

After my lecture on graphical pitfalls, a student already  
outdressing and outearning me asked were they to do this  
in the business world, making me see  
I could no more ensure moral practice than control  
how they use fire.

---

JULIA

*for Julia Louise (Shanblum) Lesser, 1907-1981*

Julia set  
in motion my journey  
in mathematics.  
For a quarter-century, my grandmother  
taught math with distinction  
in the public schools  
of Fort Worth.  
Driving up to Colorado for my first professorship,  
Dad and I stop at her grave,  
reflect on how

Julia set  
a tone, left a legacy.  
In our family of  
complex dynamics,  
a tiny perturbation  
could yield big changes.  
Surely the enrichment  
gems she'd mailed me over my youth  
made such a shift in my intellect.  
A perturbation no less important was how

Julia set  
aside gender roles.  
She was an athlete in her youth and later  
coached baseball teams of each gender.  
A former student wrote my dad,  
"Your mother taught the girls we could be  
savvy in math right alongside the boys...  
your mother opened up the ordered universe for us. I can still see  
the chalk flying when she hit the board  
in a frenzy of excitement."

---

L'HOSPITAL

With health, it's all  
How you group  
The operations, the functions  
Of the body  
Fracturing into a fraction  
Calling for  
L'Hospital.

There, confusion reigns beyond change of shift:  
One nurse writes "NPO";  
Another says, "Sure, you can eat."  
And each person who enters  
Starts by asking about  
Allergies, surgeries, and family history.  
Each test a bottleneck  
Of waiting for the one  
Who can authorize, organize, supervise, analyze,  
And then advise, often  
Only leading to needing another  
Sample or image.

So far, it's indeterminate. What's still possible  
Is anything from zero to infinity:  
False positive,  
Life-changing disease,  
Or anything between.

Now a friend asks  
How it's going.  
My tongue  
Finds no one  
Word to sum up  
How pain's controlled but not  
The fear, the frustration with  
L'Hospital  
That I pray  
(Being  
Between  
All and  
Nothing) is nearing  
Closure,  
Not making rounds  
Like  $\lim_{x \rightarrow \infty} \frac{x}{\sqrt{1+x^2}}$ .

---

THE ZERO

May a  
shell reveal  
value  
of place, a place like  
Yucatán lowlands,  
Sierra Madre highlands,  
the maize we navigate,  
or the pyramid  
we climb to offer enemy  
heart?

Zero  
(like the modal Putnam score),  
said my blue book  
from a three-question midterm  
with mean in the teens  
in sophomore honors calculus  
taught by a brilliant scholar  
with zero  
people skills. I lacked  
heart

to argue for the 7  
I deserved.  
Not nothing,  
that zero made me  
doubt  
my newly-chosen math major.  
Now (after degrees from two math departments),  
I tell my students what can  
be done with  
heart.

---

As mentioned up front, the second quintet of poems is grounded in the outer world of mathematics, without an explicit personal view. In particular, *Availability Heuristic* reflects on how our thinking is influenced by what most readily comes to mind. *Polymath Aftermath* is an etymological reflection.  $P(A|A) = 1$  was inspired by worldly examples of post hoc analysis or confusing the direction of causation or conditioning. (The middle verse refers to the *Bible Code* popularized by Michael Drosnin's so-named books and analyzed in 1994 and 1999 papers in *Statistical Science*.) *The Algebra Teacher Writes In Verse* was inspired by thinking about a one-to-one function's inverse as playing a movie in reverse. *Triangle* has triangular numbers of letters in each row.

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#### AVAILABILITY HEURISTIC

We don't readily see  
ourselves  
as replaceable, exchangeable objects,  
arbitrary members of a population.

We're thinking: without loss  
of generality, let the person be  
me who today matches a birthday,  
wins the lottery or falls in love.



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POLYMATH AFTERMATH

Some fear our field  
'cause the time  
after divorce, death, or  
destruction  
is called the  
aftermath,  
though math could've spared  
failures like Challenger  
or Tacoma Narrows Bridge.

Shifting from  
numbers to words,  
*aftermath* turns out  
to be a nonnegative word  
rooted in agriculture:  
The after-mowing,  
the second crop or new plant growth  
after the harvest.  
And the original meaning of mathematics

entails broader learning,  
includes more  
sciences.

Let's embrace  
the *beforemath*,  
before math  
went narrow  
and aftermath  
went negative.

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$$P(A|A) = 1$$

Sportscaster bragged all night  
'Bout the one prediction he got right:  
“The more they’ve scored, the more they’ve won.”  
Probability of  $A$  given  $A$  is 1.

Writer made his Bible a find-a-word:  
“TWIN”, “TOWERS”, and “PLANE” converged  
When he let computers run.  
Probability of  $A$  given  $A$  is 1.

“Fear breeds fear, war breeds war”  
Said the call-in poll on Channel 4:  
Father’s legacy to son.  
Probability of  $A$  given  $A$  is 1.

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THE ALGEBRA TEACHER WRITES IN VERSE

Triple  $x$ , then add 5,  
Then divide by 2.  
Label that answer  $y$  –  
Now let’s flip the view:  
Double  $y$ , take off 5,  
Third makes déjà vu!

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TRIANGLE

I

SEE

WE HAVE

TRIANGULAR

NUMBERS, OBTAINED

FROM NATURAL NUMBER SUMS.

TWENTY-EIGHT IS PERFECT TO STOP ON

(FOR EACH EVEN PERFECT NUMBER IS TRIANGULAR).