Science and Poetry: Crossing the Divide

Clearly a divide separates the disciplines of science and poetry… The divide is as real as a rift separating tectonic plates or a border separating nations. But a border is both a zone of exclusion and a zone of contact where we can exchange some aspects of our difference, and, like neighboring tribes who exchange seashells and obsidian, obtain something that is lacking in our own locality.

—Alison Hawthorne Deming

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For the last thirteen years, I have taught in the English department at Vanier, but, true confession: I was a teenage science student.

I remember Friday nights at a desk surrounded by wobbly pillars of textbooks, my dreams populated by huge, roaming integral signs; for a time, the number 4 was, for me, inexplicably but undeniably *red*. After completing a DEC in Pure and Applied Science, I went on to study mathematics at McGill: three more years of a mind swimming with vector spaces, Babylonian number systems, Möbius functions, and (shh!) discrete geometry.

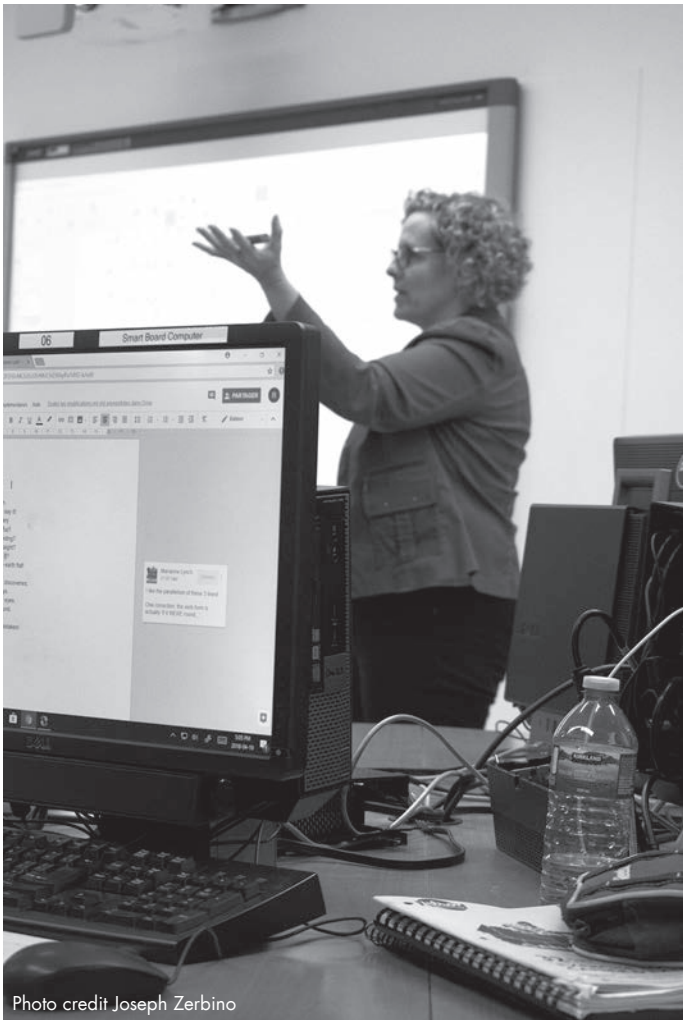
Small wonder, perhaps, why I feel an affinity and sympathy with our students in the sciences and technologies who are so often overwhelmed by the information and procedures they must absorb in short semesters. Moreover, as students try to master calculus, organic chemistry or digital circuits, there is rarely time for creative expression.

To challenge this reality, I created "Rhymes with Relativity," a B-block course aimed at students in science and technology programs. The English B-Block course is meant to address a student's program while still focusing on the literary text; it is frequently the last English course a student takes in CEGEP, and for science and technology students, it is often the last literature course they will ever take. As such, it is an ending, but, like any border, it is also a beginning.

In this class, students explore both poetic language and their own subject areas by reading poetry with themes of science and technology, written both by scientists and by poets inspired by science and technology. Students also *write* poems: about scientific concepts or theories; about technological innovations or processes; about the impact of science and technology on all our lives. "Rhymes with Relativity" seeks to offer alternative ways of processing information, alternative ways of understanding concepts, and an alternative outlet for intellectual and creative energy. The result so far has been inspiring and beyond my initial expectations, and I would like to share the methods and some examples of the work with the Vanier community—perhaps to inspire others to think across their own disciplinary 'divides.'

The Hunting of the Science Poem

After completing a B.Sc. in math, the 'natural' next step for me was an M.A. in English Literature and doctoral studies in Humanities. I was not done with math and science, however; my graduate work focused on the origins of modern science and texts from the 17th century onwards that explore natural philosophy and the scientific method. This includes letters, essays, plays and, yes, poetry. In 1611, John Donne writes that "new philosophy calls all in doubt … 'Tis all in pieces, all coherence gone." A century later, Alexander Pope ironically instructs us to "Go, wondrous creature! mount where science guides, / Go, measure earth, weigh air, and state the tides."



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Well-known scientists such as chemist Humphrey Davy and mathematical physicist James Clerk Maxwell were prolific poets. In the 19th century, Edgar Allan Poe calls out science as a "Vulture, whose wings are dull realities," mathematician Charles Dodgson, better known as Lewis Carroll, produces playful verses about the mathematics necessary to capture the infamous Snark, and Walt Whitman extols the beauty of the locomotive—"Type of the modern! emblem of motion and power! pulse of the continent!" In the early 20th century, the science and technology of war are evident in Wilfred Owen's graphic description of the effects of mustard gas, while e. e. cummings warns us that "Progress is a comfortable disease" and that "a world of made / is not a world of born."

Students in my class are given a selection of these canonical poets and texts from past centuries; however, many readings are drawn from more recent times and more recent concerns: atomic power and atomic annihilation; environmental deterioration and global warming; space exploration and industrial decay; genetic manipulation and the extinction of species. The themes are not always doom and gloom; there are love poems, limericks, even lyrical meditations on the Fibonacci sequence.

Zones of Contact

The content of the course sets up what Deming identifies as the"zone of contact," where students can come to exchange their own understanding of science and technology for an understanding of poetry's imaginative and emotional impact. Initially, students can be anxious about this borderland, hesitant to offer up their interpretation. There are, after all, fewer hard-and-fast rules for poetic analysis than, say, for integration by parts; there are rarely unique solutions, no infallible tests of validity to run.

And yet poetry, more than most literary genres, is often highly formalized and rule-bound. Science and technology students, accustomed to the strict rules and procedures in their program courses and labs, seem to find comfort and reassurance in the formal features of poetry: the rhyme schemes and metrical patterns, the precision of a sonnet's *volta*, the repetition of a villanelle's refrain. Recognizing these features helps students find their way into a poem: they learn the language and terminology necessary for communication with this neighboring tribe.

To further understand poetic rules, forms and terms, students put them into action. Students regularly and repeatedly write poems, in class and on their own; these begin as journal exercises that focus on imitating a form or concretizing a technique. These creative exercises give students ownership of poetic forms and literary techniques in practical ways. Students come to recognize and appreciate the complexity of seemingly simple creations, and they also develop the tools and skills to access, make sense of, and find meaning in 'difficult' or complex poems.

The exercises are also an opportunity for playfulness, creativity, imagination. Early last semester, students were asked to write a piece in which they took on the voice of an inanimate object, ideally something they had studied or that they might use in a lab situation. One student took on the voice of a chipped test tube, depressed at its impending fate; another wrote as an electron, jealous of its high and mighty rival, the proton; while a student in Animal Health gave the rectal thermometer the appropriately flinty voice of the battle-hardened soldier. After this writing exercise, literary terms like personification, imagery, conflict and persona are no longer abstractions, but practical tools that the student can recognize more easily and can use with greater confidence in their own writing.

A Voice of their Own

Another goal of these creative exercises is for students to find a voice of their own. They are encouraged to draw on their program courses for inspiration and to introduce their outside interests, their concerns, maybe their future goals. There is freedom of choice, yet they are also given objective parameters for each exercise. For example, when students take on the sonnet, they are given some leeway with the very strict structural rules of this form; their central goal may be to develop a distinct change of direction after eight lines—the *volta*, or turning point, of the Petrarchan sonnet. Though it may seem counter-intuitive, the "scanty plot of ground" of such activities generates great possibilities for students to explore their own ideas without what Wordsworth describes as "the weight of too much liberty."[1]

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At times, the parameters are far more mathematical than poetic. Students are asked to create a Fib, a poem that follows the rules of the Fibonacci sequence: $x_n = x_{n-1} + x_{n-2}$ (the first 7 non-zero terms of the sequence are 1, 1, 2, 3, 5, 8, 13). A Fib may have the exact number of syllables per line corresponding to the sequence: for example, two 1-syllable lines, a 2-syllable line, then 3 syllables, 5, 8, and finally a 13-syllable line. But students are also invited to create their own mathematical rule: one student recently varied the pattern to describe the jellyfish life-cycle. Another wrote about pi—and pie—in lines of syllables that correspond to the first ten digits of pi. A third examined the ubiquity and irony of patterns in nature by following a pattern that *seems* geometric (2^n), but only for a few terms. [See examples of student work at the end of the article.]

Seashells for Obsidian

Over time, the drafts developed through class exercises come to center on a specific topic or theme, unique to each student. One student might focus on the technological innovations in professional sports; another explores the chemistry of love; yet another constructs a critique of animal experimentation through poems on animals famously exploited for scientific purposes.

To assemble the final portfolio, the major summative evaluation for the course, students select five to eight poems, representing a variety of poetic forms. Each piece is edited and polished in a guided process where the class is divided into small groups whose members share their creative drafts face-to-face, but also online, on platforms such as

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Google Docs. This allows for an ongoing and dynamic collaboration and interaction between student and teacher, student and text, and most importantly between students themselves.

Building on the observation skills so important in science, students regularly provide written feedback to one another, following guidelines that help them to become careful readers and kind collaborators. The tone of this feedback is closely monitored: students always begin by commenting positively on a striking feature in their classmate's writing; subsequently, they identify sections that they find confusing or unclear, and they then provide concrete suggestions.

The final task for students combines self-reflection and objective analysis, with similarities to the description of method one finds in a lab report: students describe their own writing process, systematically explain the thematic and topical links that tie their poems together, and identify and analyze the key poetic devices that add to the impact of their work. In the end, students are not evaluated on raw creative talent or the sublime beauty of their poems, but rather on an analysis—not unlike the typical English essay—that is nonetheless anchored in their own creative choices and experiences.

The "Rhymes with Relativity" course provides a forum where students have the time, space, and tools to explore and experience creative writing. As a teacher, I have the opportunity throughout the semester to read, to comment, to discuss, to suggest—but in the end, I can also evaluate each student on objective criteria. For their part, students have the time to think and experiment, to create and scratch out, to blunder and (once in a while) to soar—and to find something they might not know they were lacking.

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Student Poetry

"Nature"
D. Lopez

Nature
Is full
Of many interesting patterns.
We see the exponential growth of a population,
We see recursion in the arrangement of seeds that form perfect spirals on a sunflower's head.

But sometimes, we see faces on Cydonia that are not there. We find flower petals that do not follow the dance of the Fibonacci sequence. We hear total silence speak.

Jellyfish
X. van Maldo

Soft,
Bright,
Graceful,
Alien.
Moving up and down
Along the blue ocean's current.
Blooming off from a polyp, the flowers move away.
The young ones become a nebula and find a mate.
As their cycle comes to an end,
The seeds were planted
That soon form
Polyps
Once
More.

Water Cycle
M. Gheta

One
Wet
Little puddle
Disappears into thin
Air, rising up, up, away.
The puddle no longer a puddle, simply particles;
Far apart, detached, distant, distinct; simply specks, solitary wanderers, searching the vast skies.
Until frigid territories are attained, too cold to face as a lone particle.
They reassemble, condense; cotton candy in the sky.
Soon released as dripping droplets,
The puddle particles
Unified anew
As
One.

Supernova
B. Hamilton

The death of a star is cataclysmic;
Violent expansion, almost artistic
In nature. Bursts of colour and bright heat
Exploding forth in space with Godlike speed.
A captivating scene that aches the heart
With beauty terrible in its splendour.
Atoms and elements are torn apart
A death the Universe keeps forever.

Are not all deaths destructive as a star's?
A person or creature meets its final fate
Shockwaves reverberate through time and space
Sending earthquakes to all who were a part
Of their life. A black hole sinks into place.
For all who exist, a supernova awaits.

Sonnet
J. Gadoury

Does glory make up for all the damage?
Though resilient, fighters are mortal.
Careers lasting years, pain becomes normal.
One day, the brain will fight too, to manage
The trauma. Our joints begin to crumble,
Our fists no longer solid, now they shake.
Old age will not hide the punches you take.
No Jungle left in which you can Rumble.

You will not be remembered for your pain,
Your legacy highlights only the times
When your head was held high in victory
Or defeat. Time flies, memories remain.
Or so you thought, while still in youth and prime;
But when dementia strikes, those too, will flee.