CONSILIENCE

Field Notes Volume 1: 2023

Perceptions

CONSILIENCE

Field Notes

Volume 1

Perceptions

To all those who perceive themselves to be
other than that which they are told they must be...

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Editorial

Hello, Dear Reader, and welcome to Perceptions: our first issue featuring poetry and art from the Consilience team.

Perception:
1. the ability to see, hear, or become aware of something through the senses.
2. the way in which something is regarded, understood, or interpreted.

Definition by Oxford Languages [1]

Consilience Journal was created as an integration of perceptions, concerned that, individually, neither the sciences nor the arts are fully equipped to offer '*a fully realised perspective of the world in which we live.*' [2]

'Good scientists are not like ants (mindlessly gathering data) or spiders (spinning empty theories). Instead, they are like bees, transforming nature into a nourishing product.'

Madeline M. Muntersbjorn citing Frances Bacon [3]

Humans often define ourselves by outcome, overriding the accumulated inputs necessary to arrive there. Perception is both an awareness and an interpretation: inspiration invokes ideas; the sensory stimulating the cognitive. Muntersbjorn suggests: '*Scientists use induction to transform literate experience into an understanding of causal processes.*' [4] At Consilience, we take the inductive process of art – poetic and visual – to transform our literate experience: a compilation of textual, observational and philosophical

inputs. In science, as in art, there is the hazard of misperception. Mitigations include rigorous checks of methodology and data; conscientious review of narrative to uncover bias; openness of thought.

'In our increasingly online existence, opening up our perspective means trying to pop our filter bubble and break out of our echo chamber.'

Bobby Duffy, *The Perils of Perception* [5]

Consilience's online presence has allowed us to reach a global audience of thousands, inspiring ancillary work around the world, both online and in physical classrooms and museums. Offering practitioners of all disciplines a platform dedicated to filtering concepts through both the scientific and the artistic lens, Consilience encourages an inclusive process that '*explore[s] the liminal spaces between the disciplines and their interconnectedness.*' [6]

This holds true for our team. Writers, researchers, artists, academics, communicators and more work together to express themselves through the art and science of publication. Whether flavouring the personal perspectives of our reviews or guiding our collaborative editorial process, the diverse voices of our volunteers lie subtly within the matrix of Consilience Journal.

Here, they are overt. In this issue, we explore the 'architectural whimsy' of bees and the eternality of water; we follow the geological significance of basalt 'shams', the uses and mythology of obsidian; we displace the ocean with the moon. We follow handprints of the past, and interstellar

scents, illuminate cultures of a polar landscape and the physical manifestation of consciousness. We process the emotive nature of science, the shifting hues of depression, the rewritten narratives of abuse, the desire to shed labels that restrict us and the superpositions of the roles we acquire as humans. We follow Physicists in Love (with their subject!) and the Uncertainty Principle of relationships; we flirt with our research. We pretend to be deadly, and, under the right light, visible. We will lure you in with vibrant promises of nectar... but only if you are able to perceive them.

'We are getting to the end of visioning
The impossible within this universe,
Such as that better whiles may follow worse,
And that our race may mend by reasoning.'

Thomas Hardy, *We Are Getting to the End* [7]

The Consilience Team

1. 'Perception' Oxford Languages
https://www.google.com/search?q=perceptions+definition 23.09.22

2.Sam Illingworth,
https://twitter.com/ConsilienceJrnl/status/1247865142794215432

3. Muntersbjorn, Madeline M. "Francis Bacon's Philosophy of Science: Machina Intellectus and Forma Indita." Philosophy of Science 70, no. 5 (2003): 1137–48. https://doi.org/10.1086/377395.

4. Ibid.

5. Bobby Duffy, The Perils of Perception (Atlantic Books, 2018) p242

6. Ibid.

7. 'We Are Getting to the End' Thomas Hardy
https://www.poetry.com/poem/36611/we-are-getting-to-the-end 23.09.22

Consilience

Field Notes
Volume 1

Perceptions

NORTHERN LIGHT
Midnight sun at Åbisko

A world overexposed

polarised

scarred by a glacial longing for heat and life

it will be a day-month before the sun
yields the sky to her sister, the moon

a place with many tongues but little use for talk

the kind of light you cannot hide from
or define by absence

a land that spews and swallows

a town built on iron is sinking
its church re-built, its birches re-rooted
two miles closer to sunrise

that lends a thin watchfulness
to this latitude

in the supermarket
homewares are shelved with knives and lures

between aisles of milk
a cubicle shrouded in a shower curtain
hides porn and weak beer

that reveals all shapes

this is a land of pious hunters
where women look south

the sun glances the horizon
to arc back
caught in a loop

here are moss and lichen
older than me, greyer than me

my shadow never leaves me
growing and receding
like the swell around a boat

flowers never close
there is no rest for the bees
and I worry about owls

light's story clothes the land
the way the sun sings the water

looking across Torneträsk
where mountains bend to cup the lake
in the hollow scoop of Lapporten

refracting the past
in waves and corpuscles

there are bones beneath the lake
pressed silently between stones
by ice, by gods, by folk

where blood was offered
on platforms of pale birch

only red light reaches me
there is no green horizon
no blue moment

deep below the surface
fragments and diatoms
speak of time without time
of slow tides of ice

Abigail Flint

The Science

This poem is one part of a sequence that draws on both cultural and scientific perceptions of landscape and light. It contrasts perceptions and experiences of the arctic landscape (left hand side) with perceptions of light during the polar summer (right hand side) and explores the interplay between the two. It draws on scientific understandings, such as theories of light and approaches to understanding environmental histories, alongside cultural and experiential understandings. The sinking town referred to is Kiruna, which is slowly subsiding into mines dug for iron-ore. By 2040 the whole town and its population will have been relocated two miles east of its current location.

The first part of the sequence (In Jokkmokk with Linnaeus) was published by Corbel Stone Press in Reliquiae Volume 9 No 2 (November 2021) and reflects on experiences and understandings of the Aurora Borealis – another type of Northern Light.

the persistence of water

present before the beginning of the Earth
    you were among the first to arrive
forming oceans and then lakes and rivers

but always the last to leave
    quickly during evaporation
but remaining
    held down by gravity
until the Sun engulfs the world
movement complemented by wind
    you break down mountains
but build up forests

and carry the children of pollution as
    constructed chemicals of humanity
the detritus of commercial longings
  conveyed to places
where the hydrological cycle
  explores crevices of rock and

accumulations of ice
  that convey a story
using a language of accumulated layers
  understood by interpretation
 but often forgotten during an epoch
  when glaciers gradually disappear
 and rivers lose water to satisfy
    the thirsty expectations of agricultural lands

yet despite our basic human expectations
    water is always pulled by gravitational forces
into aquifers and dams
    water hoarded by rock in reservoirs
to be eventually released to streams
    flowing into oceans under the gradient
of land that continued to rise
    long after ice sheets retreated

you are a part of us
    and we do not exist without you
so we try to survive
  and write poems personifying processes
a thirst for knowledge and water that cannot be quenched
  until the last moment of life
a part of us always becomes a part of you
  new beginnings added to a number of new beginnings
a cycle that started with an accretion of particles
  in a universe filled with stars

Nicholas J. Kinar

The Science

Water was on Earth shortly after the formation of the planet (Wilde et al., 2001) and will remain until the Sun's energy is of sufficiently high magnitude to evaporate all surface water (Leconte et al., 2013). Despite the oceans holding 97.5% of water on Earth, only 2.5% exists as freshwater (Oki and Kanae, 2006) required to sustain human life, plants, animals and ecosystems. The movement of water has created Earth's landscapes (Wiens, 2002) and is also stored within natural and artificial reservoirs that affect societies and cultures (Johnston, 2013). The human body is also mostly comprised of water (Sheng and Huggins, 1979) that is a part of the hydrological cycle. Despite the relative scarcity of water and the sacredness of water in the context of most civilizations, some human endeavors have resulted in pollution of water. Despite pollution conveyed by water into aquifers, rivers, streams, and the ocean, the physics of the universe ensures that water continues to be redistributed by the hydrological cycle. Although human beings have written philosophical musings and poems related to water, the hydrological cycle will continue beyond the timespan of any individual human life and actions of water conservation and security will influence future life.

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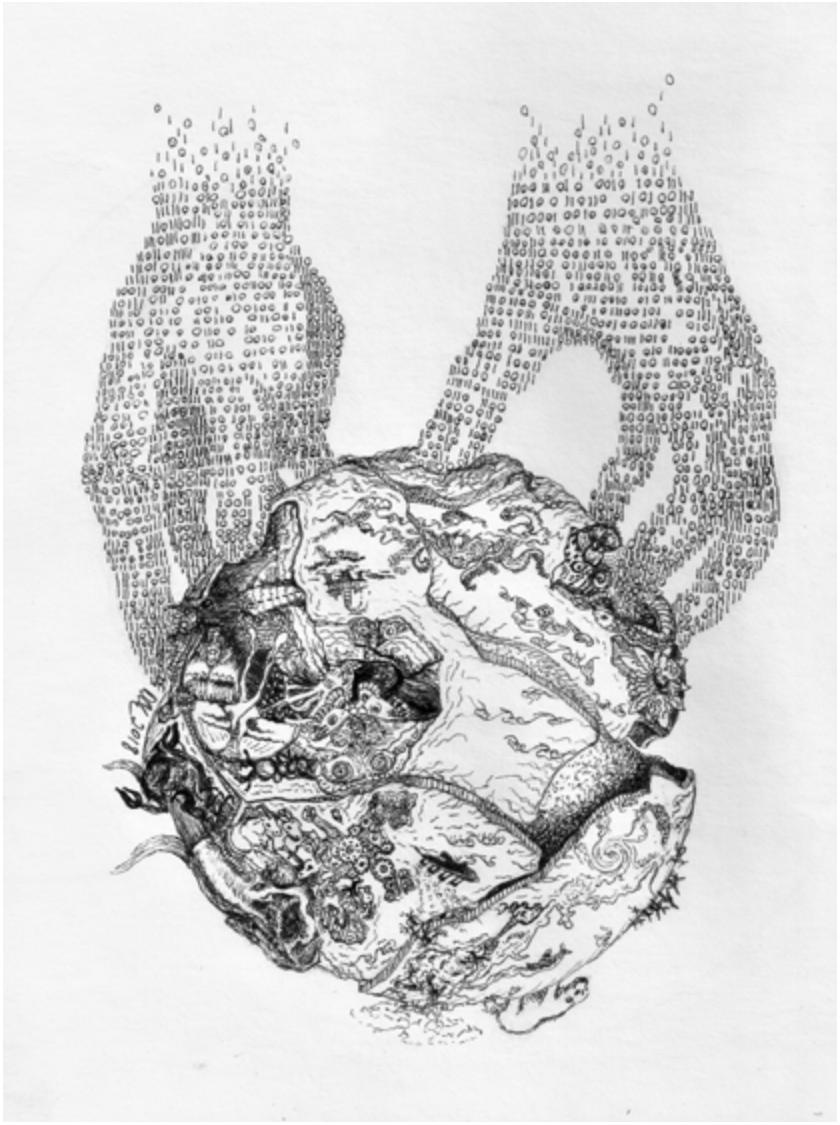
Faults Shifted



by debora Ewing

The Science

'Faults Shifted' is also the name of a poem by Peter Kidd, late founder of Igneus Press, inspired particularly by the lines: '

> *be still*
> *something is changing*
> *distribution changes hands*
> *concepts get flipped*
> *this time, though, we begin with motive*

cracks in the globe are depicted reasonably close to where we find fault lines in our earth. illustrations decorating each continent try to lend further information about that area: tropical flora and fauna over South America; industrial parts over Western Europe, the pipes of the Sibelius monument in Finland. Look for the Woolly Mammoth Skull!

Digital hands are on the verge of letting the earth slip out of grasp - this is a reminder for us to realize the resources we hold and apply them wisely. An oil spill and floating pollution are also represented.

Perception, or lack of it, is literally destroying our earth. It will take a long time, and we won't see its demise, but we must train ourselves to be aware and recognize the damage we cause for short-term gains.

To read about the process behind the making of Faults Shifted: https://www.debnation.com/2018/12/work-in-progress-let-poets-and-ravens.html
Kidd, Peter. "Faults Shifted." The Sleep of Reason, Igneus Press, 2019, Buy the book: https://www.igneuspress.com/?s=sleep+of+reason

Pillow basalt

Tell me that the Earth is not a nesting bird.
Convince me to reword the sentiment of sediment on this mattress.

Explain what else these round packages of magmatic stuffing might be
but fluffed feather shams sewn from the grey fabric of an ancient blue sea.
Why say that they form when a flood too hot gets quenched by one too cold
when you can liken them to Persephone come home from the Underworld?

At the middle of the ocean or the edge of a coast, they become
again like Spring as they spring from the

Earth's deepest, coagulating wound
with Hades' multiheaded hound
bellowing from deep below:
no,
no,
no.

It's a circus down there,
towards the Core,

a never-ending show of backflips
and other subaerial tricks, on the upswing of which rocky gymnasts reach fingertips
upwards towards the crust. There, their predecessors lie dead but free
under the weight of liquid life and piled up into rolling Hermae

that we can lay our heads upon as we trace each
vertebra of an unknown submarine backbone—

this or the other gash that parts a sea or rifts an island—
look at the resting lava mingled with mud and sand
woven like a confetti yarn prayer shawl.
Wrap yourself in it all

to dream of deep time
and never wake.

Mandy Abel-Zurstadt

The Science

Pillow basalts are spherical formations of basalt that cool when lava flows into water. They occur most frequently at midocean ridges and hotspot volcanoes such as the islands of Hawai'i where magma is extruded onto the surface as the end result of convection which drives it up through the mantle. In landlocked areas, they are an indicator of an ancient presence of water.

Displacement

My heart these days,
a rather delicate funnel of logic

So I focus on distilling essence
until there is a fully formed
pure mineral of observation
minus the feeling

The day unravels like string
loosening around a finger
the blood rushing back like the sun
following an eclipse

I take myself down to the shore one evening,
and try to measure loss

extrapolating from Archimedes

If we dropped the moon
into the sea, a moon's worth of water would
be spilled
but into where?

Sunayana Bhargava

The Science

'Displacement' is a meditation on the ways we often cannot help but align and imbue scientific concepts with emotions, blurring fact with feeling. The extrapolation of Archimedes' famous principle to the moon is intended to offer the possibility that reality is not only shaped from measurement but also a less tangible "delicate logic" that is harder to quantify.

cairns

does a stone provoked
dream of hurling itself
or lean into sedentary nature
moss-gatherer, farmer of lichen

Christof – tell me – when cortices meld
neatly tucked like fitted sheets
are you disappeared into your wife
or can you still see her face

if I prick, does it bleed
and as plasma seeks entropy
without a sensation of pressure loss
will you know you're alive

grass decapitated grows mindlessly
or does it choose – each blade a koan
continuing its path, rescinding
chlorophyll for deeper roots

does one consciousness stack on top
for a better view of the horizon
while the other sinks into peat
with lost heads of watery sedge

we provoke so that we feel
because experience is measure
and if none react then we are lost
complacent is insentient

it's nothing to do with you, really
just hold still a little longer while
I climb over – won't hurt much
and I'll show you the turtles

debora Ewing

The Science

'cairns' addresses the philosophical problem of defining consciousness. Christof Koch proposes an integration of systems: that the entire brain is conscious, not the individual nerve cells, and that individuality dissipates as systems integrate (and gives melding brains with his wife as an example in this video: https://m.youtube.com/watch?v=luGE5e2_xKM)

Next, the poet considers the "hard problem" of physical manifestation, individual cells in her own body, and how their processes might contribute to consciousness.

Zen philosophy and the World Turtle theory, or infinite regression, shows how humans have wondered for ages. The poem introduces intention – a process – as a possible answer to the question, "What is consciousness?" The title of the piece, cairns, alludes to the tradition of stacking rocks to guide other travelers along a path.

Ghost print

image and poem by Steve Smart

The absence of hand summons
a splay-finger tunnel through
the suck-and-blow of ancient lifting -
touch at a remove calling,
recalling then's hold to now.

Gone, but stroke the rock face,
handshake then and comeback,
scent musks touched, grace
the bride-cheek, the deer-flank,
a belly-full of swung heat.

Backhand ochre spattered
pray calls all the choruses,
retouch then and then again,
all before men to all since then,
touch and hear and shout back
grab the spread starfish, pull
heart back and up and out
from the ocean's echoed black.

Yell the latent long-dead
met in stencil space
met in touched shape,
met in hold me, touch me,
hold on, holdfast
hold us all now
hold here, feel here
our palms' heart beats
our hands' heat,
hold now and then,
and be and be.

The Science

Both the artwork and poem 'Ghost print' were inspired by the image and story of a scientific investigation of a piece of cave art, believed to be the oldest discovered at the time, dated to over 64,000 years ago.

The work was by a team led by a researcher called Hoffman at the Max Plank Institute, and was published in Science in 2018 (https://science.sciencemag.org/content/359/6378/912/). They used a uranium-thorium dating technique on the walls of the Maltravieso cave in (Cáceres) Spain. Complex image processing was also used by the research team to recover greater detail of the ancient hand-stencil image from the rock. My piece is a response both to the sophistication of the analytical techniques used, and also to the powerful emotional draw of the original ancient artwork - assumed to be the work of a Neanderthal person, not a modern human (see also my poem). The hand-stencil calls for a response.

The digital image is a montage of several elements, some graphic, mostly photographic. These include a fish-eye image of the artists own hand reaching to a summer sky over thirty years ago, a hand stencil made this year, photographs of two different kinds of stone, and a spherically distorted image of original numerical data from the scientific paper itself. Most of these images were acquired photographically, and all were then brought together in Photoshop. Steve likes to think of this piece as an art-science collaboration spanning 64,000 years, two different sub groups of human, and many different technologies, but also, and fundamentally, it is about the simple act of holding hands. It was made during a COVID lock-down at a time when touching hands with strangers felt like something we might not be able to do again for a long time.

unseen

when I was a child
fish would sprout out of the spring well
not rushing to swim
they huddled in waves stopping to contemplate
to learn and experience

repeatedly drawing the world around them
swirling into playful new axons

and days were years life flowed so slowly

in the infinite and deep
river of time
on standing waves or strong currents
electric fish
jump

into the water of the moment

following an ongoing stream of events
that unfurls one after the other
from past
through the present
floating into the future

today
down in time
where the river joins the sea
I see
adult fish passing by fast

seldom stopping
to contemplate
following the familiar paths that we drew in our brain

and a month is a day
the reality old acquaintance
has become invisible

Itzia Ferrer

The Science

'unseen' was inspired by how time perception changes with age. According to research, this can be attributed to physical changes in the aging human body. As tangled webs of nerves and neurons mature, they grow in size and complexity, leading to longer paths for signals to traverse. These phenomena cause the rate at which new mental images are acquired and processed to decrease with age. Additionally, during childhood, the working memory, attention, and executive function are all undergoing development at the neural circuit level. Their neural transmission is, in effect, physically slower compared to adults. This, in turn, affects how they perceive the passage of time. By the time we are adults, our time circuits are done wiring, and we have learned from experience how to correctly encode the passage of time.

To learn more about this topic, read: https://www.scientificamerican.com/article/why-does-time-seem-to-speed-up-with-age/

Or for a more in depth study:
https://www.cambridge.org/core/journals/european-review/article/why-the-days-seem-shorter-as-we-get-older/2CB8EC9B0B30537230C7442B826E42F1

My Superposition

Please don't measure me.
Please, don't judge.

I'm not just a teacher,
nor simply a mother,
nor merely a chemist
(...and clearly no poet).

But rather, a fragile
superposition.

You make me collapse
when you ask what I am.
Your labels, they limit.
Your models are faulty.

To forcibly fit me
within your equations,
you truncate, approximate
boundless potential.

To naively claim
that you thoroughly grasp,
you perturb, you abridge
my functional basis.

Yet when will you realize
that what you perceive
is not really me,
but a random projection?

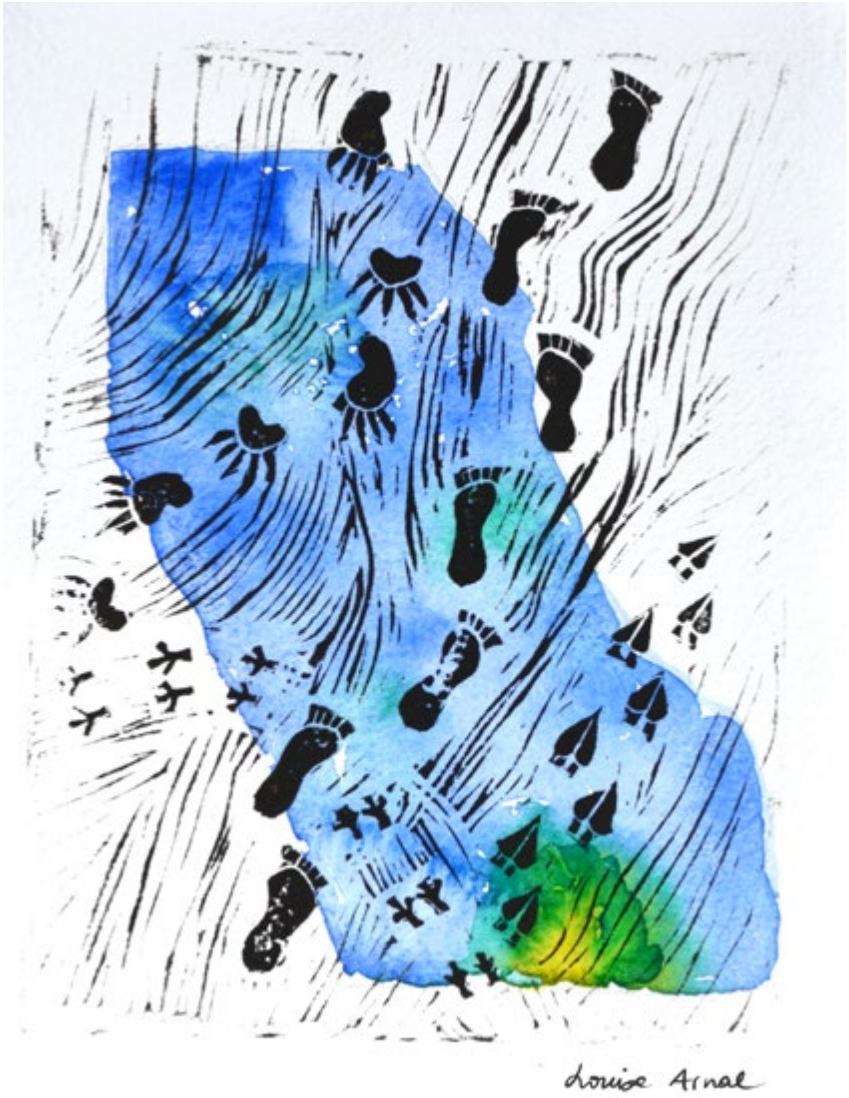
'Cause when you're not looking,
I'm all I can be:
An ethereal wave
of ambitions and dreams.

Mala L. Radhakrishnan

The Science

In one common interpretation of quantum mechanics, a system can simultaneously exist in multiple, sometimes contradictory states simultaneously until it is measured, at which point it randomly "collapses" into only one state, with the other possibilities ceasing to exist. The observer can never directly perceive what had been the original superposition (or simultaneous existence) of states. In this way, the act of perceiving a system fundamentally changes it irreversibly and inexplicably. This poem extends this idea metaphorically to our multidimensional characteristics human beings. In addition to its philosophical mysteries, quantum mechanics has mathematical mystery as well, because physical and numerical approximations are required to represent nearly every quantum mechanical system of interest.

The Origin of Groundwater



by Louise Arnal

The Science

This art piece combines watercolour and linoprint, and was created in conversation with groundwater scientists, inspired by maps of the Western Canada Sedimentary Basin. A water drop spends a large part of its life underground, travelling through a network of aquifers for up to tens of thousands of years. Groundwater is an important part of everyday life and is an essential source of drinking water in some areas. But this invaluable resource is under immense pressure from water contamination and freshwater depletion. Scientists map the flow of groundwater to understand its journey underground and predict changes in its quality, as illustrated by the colours in this piece (from brackish – yellow - to fresh water – blue -).

This piece is part of a book entitled Deep Time, which was created for the Virtual Water Gallery science-art project.

infatuated physicists

The only thing that exists
is what we measure

The world
follows a
probable pattern

When I look at you
I measure you
listening to the wind
I'd like to open up a bit
again
there is something
that hasn't been discussed

Everyone tells me
do it three times
and if it's still the same
it's correct

I'd like to add a little thing
This expansion
is not reproducible

Samuel Eberenz

The Science

'infatuated physicists' is a selective word protocol of a discussion among students and young scientists in the field of the self-acclaimed "exact sciences". Listening to an ongoing discussion, I wrote down the statements that struck me – and rearranged them later to form this poem. Removed from their labs, the young researchers gathered in a transdisciplinary summer school to reflect upon the topic of reproducibility and replicability. In this out-of-the-ordinary setting, they perceived themselves caught in an exciting, yet challenging loop of reflection (and some were clearly infatuated). While the moment, context and individual reverberations of this conversation certainly are not, some natural phenomena are perceived to be reproducible. However, in practice, the standards and approaches to ensure reproducibility in experiments are often based on disciplinary tradition and individual perception rather than a fundamental critique of methodology #ReplicationCrisis.

The solid sky begins to run

The solid sky begins to run
slowly at first, a silent violet drip
down its time-tender canvas
fresh brushes still discovering
nascent pallet thrills – sorrow joy
grief passion embarrassment relief –

but the bias shifts, phases to blue
the colours blend and bleed
an unzipped symphony bending needs
and the canvas stretches. Thin,
flat white bargains for fuchsia numbers
one by one, the brushes lose their hairs.

Gales assail blind hallways
– misfortune and misdeeds –
ripping paint chips with frightful speed
the canvas convolutes, resolves into two
one you can see one you don't
both rendered ecru and taupe…

But this world pleads for colour
mycelial stitches repairing tessellating skies
multi-modal rainbows returning after their rains
run rivers of paint in Escher-ine reverse
penitent hyphae nodding polyphonic prayers
convincing the galaxies to spiral again

tripping along a fractaled path fearless
chromatophores aglow, gardening
sowing seeds of peace and equanimity
in soils prepared with care, seeds opening to life
we dare to rise resurrected from the desert
of un-living – now free as spores.

Dr Leslie Almberg

The Science

Clinical early-onset depression colours a person's experience of the world around them and can make it difficult to perceive the world correctly or enjoy life on a daily basis. When coupled with traumatic experiences, individuals are often left feeling completely hopeless with little sustained relief from pharmaceutical selective serotonin and norepinephrine reuptake inhibitors (SSRIs/SNRIs), which allow feel-good neurotransmitters to remain readily available within the brain. The recent revival of research into psilocybin-assisted therapy indicates it could be a viable alternative to depression treatments by breaking the brain out of negative ruts in a way standard medical therapies typically do not.

I've lied

I've lied
about you so often
to myself that the truth
about you has become a truth
I can no longer separate
from all the other truths
stored and ordered in the
neurons of my mind.

The surge of happiness that
I feel when I think about you
is certainly no lie,

your appearance
certainly is.

I live in the bliss of
self-inflicted ignorance.
Happier in my illusions
instead of sad with reality.

Doryn Herbst

The Science

Children who experience abuse may use coping strategies which are beneficial in the short term but which may cause mental health issues later in life.

Increased activity in the region of the brain called the amygdala may prepare to "fight or flight", literally or figuratively hide from threat. However, this state may persist even when the response is no longer appropriate and cause anxiety.

Children may rewrite "the script", blaming themselves for the abuse rather the responsible adults who are then perceived as being less threatening.

To reduce overwhelm, altered brain structures may lead to a phenomenon known as an Overgeneral Memory where some events are not remembered in detail. Later, individuals may not be able to construct a clear and strong image of the "self".

Uncertainty as a Principle

The correlation between what you say
and what I understand is
like two sides of an equation
that change the very moment
we try and find a solution

I am afraid to love.
I don't want any more baggage
means to me
There is hope. I can heal you.

Between the measurement of hurt—
as I say that I don't expect anything
but wait for your calls and
check for responses to my casual texts

vs

the probability of the outcome—
as I pore over images of the newly married
you, same beaky nose, same half-crooked smile,
the extra 'happy' layers on the stomach

I hold on to you.
I let you go.

A deceptive integration links
the two sides of this equation
with loneliness and love as unknown variables.

Jonaki Ray

The Science

'Uncertainty as a Principle' is inspired by Heisenberg's Uncertainty Principle that postulated that the position and velocity of an object cannot be measured, exactly, at the same time, even theoretically. This happens due to the wave-particle duality of particles, and an accurate measurement in one observable leads to uncertainty in the other one. I applied this concept to how we perceive relationships, and how what we feel as real because we observe it, is actually a perception. In a way, that parallels what poetry is all about – hence this poem.

Autobiography of artefact no. 1966,1001.1

Shape: Circular
Dimensions (mm): 185 x 195 x 12.8–13.6
Weight (g): 882

...Good condition, some superficial scratching on the surfaces; two labels on one face.

...the mirror was next held
by John Dee, who searched for spirits
within it, wound it in silk and stored it away,
then went to his grave without—

If you look into a mirror
in a dark room you see a stranger
and if you look into a obsidian mirror—

Obsidian, depending on its origin,
has different properties—

Thus a larger mirror shaped: square; lost: gloss

.

Yet obsidian can also become
a blade, surgical or sacrifical,
divine a crusade's generation,
any obsidian can be ground to powder—

If you wish to see the future
replace your left foot with a mirror
and perch atop—

If you have a steady hand
you may provide a weapon—

Mirror drop

.

Obsidian as a powder
has two principal applications
which depend not on origin but—

Applied to cataracts
it will remove cataracts—

If you have cataracts

.

Do not ingest powdered obsidian
or attempt to sleep upon
a bed of crushed obsidian
unless you wish to make of yourself—

All sacrifices are not
created equal, some
may suffer more—

Considering pain's attractive force
rendering objects as time collapses—

mirror · blade · powder
·

What type of story should unfold
in a cedar box reflecting
on *fatum's* long etc.
different slates for different fates—

but I'm not slate though

flat · polished · black

Allegra Biava

The Science

In 2021, researchers confirmed the Aztec origin of an obsidian mirror famous for belonging to sixteenth-century English astrologer John Dee, who used it to summon spirits. The idea of using a dark mirror to "see" spirits reminded me of the strange-face-in-the-mirror illusion – that odd visual experience that occurs when you look at your face in a mirror while in a dark room and see a stranger, or, for some, a monster, an animal, a loved-one, or the dead. (Interestingly, this experience may be attenuated in depressed patients, and more intense in patients with schizophrenia.) I then fell down the rabbit-hole of the uses and history of obsidian in Mesoamerica, the lost origins of items appropriated by European colonists, and the fantastic symbolism of Aztec iconography, where the left foot of Tezcatlipoca, the "Lord of the Smoking Mirror," and "Master of Fate", is replaced with an obsidian mirror. In thinking about perception, identity, origin, and fate, I thought the best way to tie these aspects together was in an autobiography that was mostly about what could have been.

References:
A 'spirit mirror' used in Elizabeth I's court had Aztec roots
https://www.nature.com/articles/d41586-021-02701-5

The mirror, the magus and more: reflections on John Dee's obsidian mirror
https://www.cambridge.org/core/journals/antiquity/article/mirror-the-magus-and-more-reflections-on-john-dees-obsidian-mirror/38D4BFEA2CB-9766973791029C2EE1289

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https://www.jstor.org/stable/827900

Strange-face-in-the-mirror illusion https://www.researchgate.net/publication/46280355_Strange-Face-in-the-Mirror_Illusion

Visual Perception during Mirror-Gazing at One's Own Face in Patients with Depression https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4258311/

Fatum: The Latin word for fate is "fatum," which literally means "what has been spoken." https://www.merriam-webster.com/dictionary/fatidic

Normal Speculations

poem and image by Erin Kavanagh

The Science

This iPhone piece offers an interplay between the physics and philosophy of reflection, bouncing that back at the audience to make their own perception complicit in the abstraction. Whilst there is only one Barbie doll in the image, four are seen from different orientations stemming from that single, unstable, distal stimulus. This triggers a partial optical illusion. The use of an iPhone plays into our social obsession with viewing both thoughts and things through a hand-held lens, the use of a child's toy underpins our passive innocence within the process, and the haiku form reflects what is perceived with words.

When I finally get a good look at you

I expect to see your tails tangled
taut in microfuge tube. I want you
perfused with my reagents, let them cling to your parts
and send them down unnatural paths.
I imagine that your heart must also thrum.
I want your shell ripped apart and precociousness
exposed. I want you shivering
under spell of tricaine[1] sweet stream pressurized.
I want the curves of your coloboma[2] circumscribed.

Under the illumination of dissecting microscope
your bare body clenches and curls.
I reach deep into the fluids
and swirl.

In this spot-lit fluorescent laboratory, no
shame
not yours, nor mine
confounds
my topography;
in thrill I confront my screen,
etching borders along the apically polarized cells[3],
carving out hope
your rescued[4] retina
might have seen me too.

Dylan Randall Wong

The Science

This poem portrays the voyeuristic impulses of the developmental biologist, who introduces disturbances into the developmental pathways of model organisms (organisms with similar biological structures and processes as humans) and gleefully observes the sometimes grotesque results of their perturbation. In this poem, zebrafish – Danio rerio – are the model organism under examination, since their embryos are transparent and their embryos develop rapidly, which makes their developmental processes easy to study.

The specific study of zebrafish retinal development described in the poem comes from my Summer 2020 research project in the Cerveny Lab at Reed College. The experiment described involved observing stem cell polarity in a specific region of mutant, wild-type (i.e., normal) and chemically-altered retinae. To accurately observe the microscopic details, the embryo chorions ("shells") are (gently) torn apart to expose the embryos to the environment, then they are immersed in tricaine mesylate to prevent them from moving while under the microscope. Embryos are also 'fixed' (sacrificed) to freeze them at particular developmental stages. The deep costs of this work must be weighed against its benefits: basic research on Danio rerio has supported tremendous medical advancements, such as potential stem cell therapies to repair a wide range of eye diseases.

1. Tricaine mesylate is a chemical compound used to anesthetize or euthanize fish for research purposes.
2. Ocular coloboma is a rare condition in fish (and humans) where a hole appears in a structure of the eye, which can cause vision problems.
3. Cell polarity refers to the asymmetric arrangement of proteins to certain areas within the cell membrane. See https://www.reed.edu/biology/cerveny/images.html for examples of confocal microscope images of zebrafish eyes.
4. Synthetic rescue is the process by which a genetic mutation is nullified in its interaction with a second (synthetically introduced) genetic mutation.

Hors d'univers

In the pungent medley of our solar system,
interstellar clouds filled with atoms
host a palette of scents,

of bitter almond in Jupiter's layers,
rum and raspberries in the Milky Way,
sweet frosty notes of Enceladus' glaze.

The Moon reeks with gunpowder and gas,
blackened barbecue steak wafts from Mars,
Neptune leaves nothing to the nose.

When astronauts take a walk,
floating particles cling to their suits
and hitch a ride to the base.

In the re-pressurisation chamber,
they blend with oxygen to unleash
a tangy celestial feast.

Yet we would die if we tried
to take unadulterated whiffs of outer space
to savour the breath of dying stars.

Zed Sehyr

The Science

What does outer space smell like? When astronauts return from space walks and remove their suits and helmets, they experience strange but familiar scents, often described as "smoky", "gassy" or "metallic". While we cannot have a direct olfactory experience of outer space, scientists have emulated interstellar odours via spectroscopy, which allows them to analyse the light from stars and objects in space and associate them with corresponding chemicals, e.g., cyanide gives a whiff of bitter almonds on Jupiter. A theory suggests that it's the polycyclic aromatic hydrocarbons – the star making compounds – which, when combined with air during re-pressurization, may be responsible for the unique tang of space. This poem is about how we engage our senses (olfactory, gustatory), imagination and scientific knowledge to make sense of our environment.

Apian Architecture

Geometers, these stingless bees,
bite acidic, defend a colony
that stretches vertically—
not to be boxed in,
smoked sleepy,
or stunned:

building honeycombed majesty,
hexagons as holding places—
architectural whimsy spiraling.

Nest in hollowed out maples—
nuzzled in unions where branches
meet trunks—or else in cracks
between rocks.

Hives
grow
crystalline.

Worker bees
follow
algorithms
embedded
deep
in genes:

this
waxy
spiral
reaches
to sky,
soars
Fibonacci.

These bees as architects
make marks on drafting paper,
quick pencil sketches
before the rising of wings.

Kim Fahner

The Science

Kim Fahner became fascinated by photographs of spiral shaped bee hives while researching for a series of bee poems that she is working on. There are about 2,000 different species of Australian native bees. The one that intrigues her is the Tetragonula carbonaria bee, which doesn't have a stinger, but does use an acidic bite to defend itself if necessary. These stingless bees build their hives in spirals that reach vertically: they aren't boxed in. "Apian Architecture" is a poem that responds to the theme of perception in that it speaks to the idea of bees as metaphorical architects of wonder and community. They move between worlds as messengers, too, in symbology and legends around the world, so Kim was drawn to that idea—of how bees are both scientific and mythopoetic in their movements through human history.

Humanimal

by Keith Bloody Mary

The Science

What happens when humans start to push the perceived boundaries between humans and other species through bioengineering? In 2019, the Japanese education and science ministry overturned a ban on bringing animal-human hybrids to term (Cyranoski, 2019). In light of genetic advances, it is pertinent to critically investigate the ideas we have of humans and non-humans before hybrids become a reality. The choices we make about genetic engineering now, will affect the health, agency, and rights of future organisms, which include humans, non-humans, and hybrids alike.

This year, York University published a paper that suggested that cephalopods have emotions and called for the UK to consider amending animal welfare legislation (De Wall and Andrews, 2022). As humans seek to merge their stem cells with non-human animals, how can we move forward in an affirmative ethical way (Braidotti, 2019) that benefits all types of animals?

Humanimal blurs the real and metaphoric edges between human and non-human organisms. How does our narrative change when we merge limbs, hair and suckers and how does this alter the understanding we have of ourselves and non-humans? What would it be like to reach out to other organisms, not just with our hands but with our tentacles too.

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Brined as an Unspecified Base

Today I will be saline,
  slough rough salt from dry lips
and bathe in a river of no one.

  I shall float past unnamed trees,
  pass through cell membranes and aquatic gills
as easy as an open door.

I shall sieve myself whole
  through the net of your narrative,
transparent beneath the weft of water,
  wrap my torn body together with ionic love.

    Today I will not nourish
    the sodium semantics in your mouth,
    leave granules of self solidified
    to a sharp crust
      or scatter your photon rays
    to fit a hope that feeds you
      and
    all your reflections.

  I will not measure my refractive bend
      against your conclusion.

    Tomorrow
      you may split me
    evaporate my anions
  label them toxic
  and draw all trace of my base parts
    in fresh acid.

Today I rest my hydrophilic feet
  within a wash of clarity:

  dissolved nothing

      floating free.

Leila Howl

The Science

Salt and brine are terms used commonly to describe sodium chloride, or table salt, and its solution in water; salinity describes the concentration of a salt solution. Yet scientifically speaking, salts and their solutions (brines) encompass myriad chemical salts and their varied and vibrant solutions – colourful, toxic, useful in many different ways. This nuance is often lost against the linguistic monotone of everyday use.

This poem uses the structure and terminology of saline solutions, their formation and separation, to explore the effects of simplistic assumptions and their pressure on those who don't fit neatly within the assumed norms social narratives prescribe for us. The requirement to constantly and repeatedly define and defend ourselves against arbitrary racial, sexual, gendered and socio-economic definitions – among many others – can be exhausting and at times intimidating. This poem is a tribute to the process of simply allowing us to be as we are, outside of definition.

with the (birds)?

(wading) through a bog of dead cells—
a bog tinged red with media—
wading towards some distant point
swallowed by horizons that slant upwards
like that bowl (i i used to eat porridge out of)

i am seen but cannot see ahead through the reeks
and scraggled trees, nor hear above the wind-rustle
and the birdcalls that haunt and die on the breeze:
singing heeeee-la-la-la! heeeee-la-la-la! hek--hek--hek

—never seen but out of corner of eye (i i)—

with the (cells) dumped around me,
dumped with alcohol on lips (kidneys; cervix ix)
down to this drain trap, i wade through
the decay of bygone moss and children and mothers
toward some distant goal, towards what is now a goal
with a Name that has somehow lost its meaning

in this bog of deadwomans' cells, sweet melodies perish
into mere sounds repeating forgotten Names:
(heeeee-la-la-la! heeeee-la-la-la! hek--hek--hek)
sound the birds as they mourn and weep in this valley of tears

and me: alive and wading, (wading), ((wading)),
toward some distant point
beyond this bowl
beyond this mere

—all the while singing with the (immortals)—

the sound of my own Name
strange to my ears

Shaylee Kieffer

The Science

This allusion-rich poem grows from the idea of immortalized cell lines such as HeLa cells, derived from the cervical cancer of Henrietta Lacks in the 1951 (cells obtained without consent), and HEK293T cells, derived from human embryonic kidney cells of an aborted female fetus from the 1970s. These cells are so ubiquitously used in laboratory settings that their origins are sometimes forgotten, and often glossed over. The ethical impact of using these cells is an ongoing debate, but their positive impact on science is undeniable. These include the polio vaccine, the COVID-19 mRNA vaccines, innovations in drug therapeutics, and development of in vitro fertilization techniques. The ever-expanding understanding of both basic cellular biology and of diseases such as cancer is based largely in these cell types.

Clades Colliding

wings in the darkness
violent entangle – BUZZ!
an absent hornet

Andrew Holmes

The Science

Batesian mimicry is where a harmless species imitates a more dangerous species to deter predators. An example of this mimicry can be found in the nonvenomous scarlet kingsnake (Lampropeltis elapsoides), which closely resembles the highly venomous Eastern coral snake (Micrurus fulvius).

Greater mouse-eared bats (Myotis myotis) are predated on by nocturnal owls such as barn (Tyto alba) and tawny owls (Strix aluco). Recent research led by Danilo Russo at the University of Naples Federico II in Italy has revealed that the bats have an unusual defence mechanism against their avian foe. When seized, the bats emit a loud buzzing sound that mimics the distress noise of stinging bees and wasps, in particular the European hornet (Vespa crabro).

Not only does the buzzing sound structurally resemble the sounds of the stinging insects, but it also produces an avoidance reaction in the owls. The harmless bats fool hunting owls into releasing them should they be caught. The behaviour is a fascinating and unusual instance of a mammal copying an insect to fool a bird.

You can read more about the study here: https://doi.org/10.1016/j.cub.2022.03.052

Unseen Flowers

Creeping over grasslands,
your jagged boundaries
shimmer in the breeze.
Silvered, downy leaves
hover tellingly over
writhing reds and
blooming blonds.
Hidden in plain sight
your true radiance
awaits,
a siren's call to those
with palettes
more discerning
than the limits
of our ken.

Sam Illingworth

The Science

'Unseen Flowers' is inspired by recent research, which has found that different substances in the petals of flowers create a 'bulls-eye' for pollinating insects. These patterns are only detectable in the ultraviolet part of the electromagnetic spectrum and are thus invisible to humans. By studying silverweed (a perennial flowering plant in the rose family) growing at different elevations in southwestern Colorado, researchers were able to understand the roles of the various UV-absorbing chemicals in the plants' petals and how these chemicals work to aid in pollination and, thus, reproduction.

Biographies of Poets and Artists

Mandy Abel-Zurstadt is a geoscience graduate student currently living and studying in Washington state. Her academic interests are rooted in environmental stewardship and science communication. Between coursework, they pursue projects that marry geoscience concepts and creativity through both nonfiction and reality-informed fiction. You can follow her at @MAbelZurstadt on Twitter.
poem

Leslie Almberg's background in volcanology propels her work as a science educator and curriculum designer for the Australian Science Olympiads. She imbues her teaching with the arts and her creative writing with science, snug in the most overlapping segments of life's Venn diagrams. Follow her @AspienBlue on Twitter for byte-sized doses of science-steeped poetry.
poem

Louise Arnal is a postdoctoral researcher at the Coldwater Lab in Canmore (Canada) where she forecasts the water flow in Canadian rivers. Louise is also an artist and loves merging science and art to explore and communicate water-related topics to a wide audience. Most recently, she created and is the lead curator of the art-science project called Virtual Water Gallery (www.virtualwatergallery.ca). You can connect with Louise via her website (https://sciartfloods.wordpress.com), Twitter or Instagram (@ArnalLouise).
artwork

Sunayana Bhargava is a poet and astrophysicist based in France. She spends her days trying to understand the origin of the largest objects in the cosmos. Outside of research she is interested in increasing accessibility to both art and science in as many ways as possible. You can usually find her outside looking for the sunniest park bench to sit on.
poem

Allegra Biava works in the public health sector and is returning to creative writing after a very long hiatus, writing poetry that reflects her interests in health, biology, and cognitive science. In her free time, she is translating Mark Strand's Reasons for Moving into French, and loves to play the piano (and beta test classes on Coursera). She has been a reviewer at Consilience since 2021, and is delighted to have this chance to contribute.
poem

Keith Bloody Mary. For over a decade, Keith Bloody Mary has been working with analogue collage. Taking parts of other people's photographs and fusing them together to make something that is often extremely odd allows Keith Bloody Mary to play out the role of Dr Frankenstein with none of the responsibility that comes with genetically engineering hybrid creatures. She has worked collaboratively with science researchers and is a researcher herself; engaging in practice as research, using collage processes to critically reflect on human perceptions of the 'natural' world.
artwork

Sam Eberenz has been able to experience the unique beauty of Antarctica and subpolar biodiversity hotspots named Inaccessible, Gough, South Georgia – while dropping expendable bathythermographs and taking water samples

to document the incessant warming and acidification of the Circumpolar Current. As a PhD student, Sam developed risk models that help us estimate the costs of weather and climate extremes. The shadows cast on our shared future by the factual pharos of climate change are much longer than he could ever imagine. Community and exchange give me hope and orientation, words and sun beams are my foothold. Poetry published in armarolla, experimenta, Pavillon Tribschenhorn, Consilience Journal.
poem

debora Ewing. Artist, writer, all-around ruiner of peace for the greater good, debora Ewing stands at a crossroads of her own making. A few of her favorite things are language, bogbodies, and over-educated dad jokes. Find debora's work at Jerry Jazz Musician, Dodging the Rain, Beyond Words, Shot Glass Journal, and Plainsongs, among others. She blogs at Igneus Press and digresses at debnation.com. Follow @debsvalidation on Twitter and Instagram.
poem artwork

Kim Fahner lives in Sudbury, Ontario, Canada. Her new book of poems, her fifth, is called Emptying the Ocean (Frontenac House Press, October 2022). Kim is the Ontario Representative of The Writers' Union of Canada (2020-24), a member of the League of Canadian Poets, and a supporting member of the Playwrights Guild of Canada. She may be reached via her website at www.kimfahner.com
poem

Itzia Ferrer is a PhD in Neuroscience by training and a scientific communicator at heart. She finds in poetry a way to express her passion for science, genetics, and the brain along with making current research findings more accessible. You can find out more about her by visiting her website and connecting with her on Twitter @itziaferrer.
poem

Abigail Flint is a landscape archaeology/history researcher and poet. Her poems have been published in poetry journals including: Ink Sweat and Tears, Atrium, The Interpreter's House, Popshot Quarterly, Spelt, The Ekphrastic Review, Reliquiae, and anthologies. She incorporates poetry into her research as both a research method and a way of sharing findings and engaging audiences. Most recently a poem, written for the University of Manchester's Stories of Discovery project, was included in Sheffield Weston Park Museum's exhibition (27 May 2022- 15 January 2023) of the life of the antiquarian Thomas Bateman and the Bateman Collection, Brought to Light. Twitter: @DrAFlint
poem

Doryn Herbst, a former scientist in the water industry, Wales, now lives in Germany and is a deputy local councillor. Her writing considers the natural world but also themes which address social issues. Doryn has poetry in Fahmidan Journal, CERASUS Magazine, Fenland Poetry Journal, celestite poetry and more.
poem

Andrew Holmes is a research staff developer for Prosper and former academic with a background in animal welfare and conservation. He runs The Sciku Project, sharing and exploring science through haiku (science haiku = sciku).

When not writing sciku he writes about board games for Meeple Mountain and entertains his kids. You can connect with him on Twitter @AndrewMHolmes and @thesci-kuproject.
poem

Leila Howl writes and edits across a range of formats, and particularly enjoys reading and writing work that incorporates scientific elements after teaching Science for a number of years. She now runs a gaming store in the West Midlands. Her poetry has been included in Poetry Birmingham Literary Journal and Under the Radar, among others. Having contributed to Consilience as an editor and reviewer since its launch, she is thrilled to now contribute her work as a poet.
poem

Sam Illingworth is an Associate Professor at Edinburgh Napier University and the founder of Consilience. His research and practice revolve around using poetry to develop dialogue between scientists and non-scientists. You can find out more about his work via his website www.samillingworth.com or connect with him on Twitter @samillingworth.
poem

Erin Kavanagh is an interdisciplinary scholar, poet, artist and archaeologist. With a background in Geoscience and Philosophy, her research is concerned with intersections within and about the space-between - with a particular focus on the relationship between fact and fiction. This is examined through Deep Mapping, SciArt, Geomyth, and Experimental Poetry/Art as Method.
Based in West Wales, her work is site-specific, multi-modal and hydro-centric. You can find out more at www.geomythkavanagh.com and Twitter @geomythkavanagh.
poem artwork

Shaylee Kieffer is a PhD student at National University of Ireland, Galway, where she is working towards her doctorate in Biochemistry, with a focus on DNA damage. She is interested in the intersection of art and science, and often uses poetry throughout her day in lab, both as a means of communication and a stress relief.
poem

Nicholas J. Kinar is a hydrologist, poet, and photographer who is an editor and reviewer for Consilience and ConciliARTe. You can connect with him at https://twitter.com/kinarnicholas where shares a Hydrology Paper of the Day with a global community.
poem

Mala Radhakrishnan loves chemistry so much she is made up entirely of atoms and molecules. She is a superposition (professor, computational scientist, mother, musician, etc.) and does not wish to be labelled as any one thing. She has published two books of chemistry-themed poetry, Atomic Romances, Molecular Dances and Thinking, Periodically.
poem

Jonaki Ray is a poet and editor in New Delhi, India. Honours for her work include Pushcart and Forward Prize nominations, as well the 2019 Iceland Writers Retreat

Alumni Award and First Prize in the 2017 Oxford Brookes International Poetry Contest, ESL. Her poetry collection, Firefly Memories, is forthcoming from Copper Coin in 2022.
poem

Zed Sehyr is a research scientist at San Diego State University, California, studying the relationship between language and the brain. She is also a Lecturer in Linguistics and the winner of "Love This: Non-personal Love Poetry" 2021 competition. Her poetry focuses on nature, humanity, and cosmos through a scientific lens.
poem

Steve Smart is a poet and artist living in Angus, not far from Dundee, Scotland. Places his poems have appeared include Atrium, Firth, The Poetry Shed, The Writer's Café, The Curlew, Ink, Sweat and Tears, Poet's Corner, Poetry Scotland and others. Steve's work is varied and eccentric. As well as ecological themes, Steve is interested in memory and technology, both working and dysfunctional. artsci.co.uk/sds
poem artwork

Dylan Randall Wong is an incoming PhD candidate in Clinical-Community Psychology at the University of South Carolina. He is based in Columbia, South Carolina, but Singapore is his home. His scientific poetry aims to highlight the aesthetic, emotional and humanistic qualities of scientific work, especially in the health sciences - but in this poem, he steps back in time to his days hunched over the developmental biology lab bench, tinkering with cells, genes, chemicals and live fish bodies. ***poem***

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