



Australasian
Association
of Writing
Programs

TEXT SPECIAL ISSUES

Number 64 October 2021

ISSN: 1327-9556 | <https://textjournal.scholasticahq.com/>

Science calligrams: A contemporary science communication perspective

Michael J. Leach

To cite this article: Leach, M.J. (2021). Science calligrams: A contemporary science communication perspective. In J. Wilkinson, C. Atherton & S. Holland-Batt (Eds.) *Poetry Now*. TEXT Special Issue 64.

Monash University

Michael J. Leach

Science calligrams: A contemporary science communication perspective

Abstract:

Visual poetry (vispo) sits across a spectrum between visual art and poetry, offering a means of multimodal communication within the one artform. The calligram – a vispo subtype whereby the shape of text reflects the text’s semantics – may be well suited to communicating scientific topics. This is because science is complex, experimental, and observational: it involves graphs, diagrams, morphology, microscopic images, chemical structures, and more. Contemporary books containing science calligrams include *Crystallography* (1994) and *The Xenotext: Book 1* (2015) by Christian Bök. Throughout these collections, Bök displays intricate calligrams based on chemical structures, astronomy, and fractals. Recently, I have shared my own science calligrams through various outlets including exhibitions, journals, and a chapbook. In this scholarly article, I describe science calligrams in the contemporary context with reference to both my own pieces and works by poets who have inspired me. I explore how science calligrams draw upon scientific concepts and images to communicate science to the general public. In doing so, I argue that blending science, poetry, and visual art may reveal innovative creative directions for contemporary poets, help sustain vispo as a genre, and contribute to the interdisciplinary field of science communication.

Biographical note:

Michael J. Leach is a pharmacoepidemiologist, biostatistician, and poet with a keen interest in science communication. He lives on unceded Dja Dja Wurrung Country and works as a Senior Lecturer at Monash University School of Rural Health. Michael’s poems reside in *Rabbit*, *Cordite*, *Meniscus*, *Otoliths*, *Unusual Work*, *Plumwood Mountain*, *Medical Journal of Australia*, *The Mathematical Intelligencer*, *Antarctic Poetry Exhibition*, and elsewhere. His visual poetry has been awarded first prize in the *UniSA Mental Health and Wellbeing Poetry Competition* (2015) and a commendation in the *Hippocrates Prize for Poetry and Medicine* (2021). Michael’s debut poetry collection is a chapbook of science poems entitled *Chronicity* (2020).

Keywords: Poetry, interdisciplinarity, science communication, visual poetry

Visual poetry (vispo), as noted by critics such as Willard Bohn and Mary Ellen Solt, refers to verse that is intended to be viewed in a static form, such as on the page or in a gallery (Bohn, 2011, p. 13; Solt, 1970, p. 7). Vispo is one of three types of concrete poetry, the others being phonetic (sound) poetry and kinetic (moving) poetry (Solt, 1970, p. 7). Visual poems feature conspicuous typographical elements including patterns, shapes, and varied fonts (Greene & Cushman, 2016, p. 388). They are typically intended to be eye-catching, emphatic, and meaningful on both visual and verbal levels. All visual poems sit somewhere on a spectrum between literature and visual art (Bohn, 2011, p. 15), offering means of multimodal communication within the one artform. As words and images appeal to one's intellect and intuition respectively (p. 160), they may combine within vispo to produce 'insights and aesthetic experiences that few other genres can equal' (p. 162).

Vispo's long and complex history has been discussed by contemporary literature scholars including Bohn (2001) and Caldwell (2014). The earliest known visual poems were produced by Greek bucolic poets such as Simmias of Rhodes, whose wing-shaped poem is thought to have been inscribed on a statue circa 300 BC (Theocritus, 1912). Following its emergence in antiquity, vispo declined over time ahead of a resurgence in the Renaissance, through poets such as George Herbert, author of a visual poem ('Easter Wings') that was inspired by Simmias's wing-shaped poem (Bohn, 2001, p. 16; Caldwell, 2014). The genre then fell into neglect again for centuries before re-emerging in various waves and manifestations during the 20th century (Bohn, 2001, p. 16). Influential visual poets of the 20th century – including Guillaume Apollinaire, Ezra Pound, Filippo Marinetti, and the Dadaists – have shaped the evolution of contemporary vispo (Caldwell, 2014). Caldwell (2014) attributes the fluctuating popularity of vispo both to repeated cultural crises, whereby more 'conventional' poetry has been temporarily questioned and reshaped by experimental poets, and also to a comparative lack of critical attention. The latter explanation may reflect the need for vispo critics to possess expertise in both literature and visual art. The vast output of 20th century vispo may be related to the concurrent development and widespread adoption of new technologies such as the typewriter, newspapers, advertising, and poster art (Caldwell, 2014).

Now, two decades into the 21st century, vispo is in the midst of another major revival (Bohn, 2011, p. 14). Indeed, Bohn highlights that vispo 'is proliferating at such a rapid rate ... that it is impossible to keep track of all the recent developments' (2011, p. 14). Bohn attributes this proliferation to the fact that 'we live in a visual society, where instantaneous messages are the norm' and 'the written word ... has continually lost ground to the visual techniques associated with advertising' (p. 14). In our increasingly technological society where attention spans are arguably shortening, vispo has the capacity to catch the eye and to efficiently convey information. Another potential explanation for the rise of vispo is the fact that, in the new millennium, 'Computers, digital cameras and video, and user-friendly digital software have made the interlayering of text and image a more viable option' (Bennett, 2012 p. 200). In contemporary Australia, the rapid proliferation of vispo is evident across outlets such as

Otoliths, *Cordite Poetry Review*, the *Medical Journal of Australia*, and *Australian Poetry Journal*, the latter featuring visual poems by influential poets (e.g. Richard Tipping, Amarilys Quintero Ruiz, Alex Selenitsch, II.O. and Jill Jones) in its #concrete issue (Lea, 2013). Collections by individual visual poets have also been published in Australia. Recent examples include Jessica L. Wilkinson's biographical *Music Made Visible* (Vagabond Press, 2019); Chris Mansell's highly constrained *101 Quads* (Puncher and Wattmann, 2020); and my science-themed collection *Chronicity* (Melbourne Poets Union, 2020). Vispo is as interdisciplinary as poetry generally in that it can address any topic, including scientific topics – the focus of this article.

Science poetry is an ever-growing genre internationally, including in the Australian context, where science poems have appeared in journal issues, poetry collections, anthologies, literary events, multimedia experiences, public displays, and exhibitions (Leach & Rayner, 2019). As evident across the 33 science poems selected by Tricia Dearborn for the 'Science' issue of *Rabbit*, Australian poets who engage with science include Alicia Sometimes, Dominique Hecq, Ian Gibbins, and myself (Wilkinson, 2020). Dearborn's essay within this same issue discusses the connections between science and poetry, including the fact that both 'focus on conciseness, condensed-ness and precision' as well as 'describing ... how the world works' (Dearborn, 2020, pp. 116-117). In showing five examples of her own free-verse science poems, Dearborn highlights the importance of accurately used scientific terminology and 'the beauty of science' (Dearborn, 2020, p. 120). She also notes that her use of science can be 'practical, material, descriptive, and sometimes metaphorical' (p. 120). Poetry's toolkit of devices, including metaphor, rhyme, rhythm, and repetition, offers a means to thoughtfully yet playfully convey complex scientific concepts to audiences.

Vispo can make use of the standard poetic devices as well as its distinguishing feature – striking or meaningful visual appearance – to communicate scientific concepts and ideas. While examples of vispo about science exist, the visual science poetry subgenre has previously been neither formally described nor studied. I propose in this article that vispo may be well suited to communicating science. This is because science is complex, experimental, and observational. When following the scientific method through to the reporting and communication of results, scientists often draw upon visual representations such as graphs, diagrams, morphology, microscopic images, chemical structures, and more. In scientific publications, figures complement text and rapidly convey information. In a similar vein, I believe that combining words with images through vispo may help to communicate science to the general public. This is consistent with Dearborn's belief that 'Poetry that engages with science has something to offer even those who are science-averse, or simply unfamiliar with that world' (2020, p. 126). I posit that science poetry, including visual science poetry, may contribute to contemporary Science Communication (SciCom) as defined below:

The use of appropriate skills, media, activities, and dialogue to produce one or more of the following personal responses to science (the vowel analogy)

Awareness, including familiarity with new aspects of science

Enjoyment or other affective responses, e.g. appreciating science as entertainment or *art* [my emphasis]

Interest, as evidenced by voluntary involvement with science or its communication

Opinions, the forming, reforming, or confirming of science-related attitudes

Understanding of science, its content, processes, and social factors

SciCom may involve science practitioners, mediators, and other members of the general public, either peer-to-peer or between groups. (Burns et al., 2003, p. 191)

The AEIOU of SciCom encompasses the well-established complementarity of art and science, which has previously been discussed in relation to poetry (Leach & Rayner, 2020). Poetry could contribute to each SciCom outcome by acting as an arts-based adjunct to more conventional modes (e.g. oral presentations). With regard to science awareness, the ability to attract public attention is considered particularly important in contemporary SciCom, as this helps to facilitate engagement with scientific content (Rigutto, 2017). American poet Karl Young supports a case for visual science poetry by stating that ‘the more advanced our science becomes, the more we need all the resources of the combined arts to understand it’ (2012, p. 206). In addition to aligning with the five SciCom outcomes, visual science poetry may contribute to the continued growth and recognition of the vispo genre:

At present, with computer technology dependent on a combination of words and images, visual poetry has an opportunity to become a stable frame for interaction of numerous variations as long as it presents itself and holds a full and functional range of contexts, from artistic to social, historical to *scientific* [my emphasis]. If it defines itself as a limited set of isolated tricks, it will probably go through another period of eclipse, as an identified and identifiable mode or genre. (Young, 2012, p. 203)

Blending science with vispo has the potential to be mutually beneficial for both fields. On the one hand, poetic explorations of science may attract new readers to vispo (or poetry in general) and promote the continued relevance of poetry as a contemporary artistic medium. On the other hand, poetry’s toolkit of devices, and vispo’s appearance on the page (or other medium), offer avenues for communicating and understanding complex scientific concepts.

Drawing upon a previously published definition of science poems, visual science poetry may be defined as any visual ‘verse in which the author has correctly used scientific terminology, concepts, principles or knowledge to provide an analytical view of the world or surrounding universe’ (Leach & Rayner, 2020, n.p.). As the word ‘correctly’ implies, scientific knowledge, research or collaboration are needed to ensure appropriate use of words and images in visual science poetry. I propose that, in visual science poems aimed at communicating scientific

information to the general public, it would be best to clearly connect words to images through the use of the calligram – a vispo subtype whereby the shape of text directly reflects the text’s semantics. The calligram was popularised in the early 20th century by Apollinaire (e.g. *The Tie and the Watch* [1980, p. 79]) and continues to appear in contemporary poetry. While calligrams are characterised by comparatively clear connections between words and images, many visual poems produced worldwide since the 20th century have featured symbolism, analogism, and intentional ambiguity (Bohn, 2011). This is a point of distinction within the broad vispo genre. I propose that science calligrams may contribute to SciCom while widening the scope of vispo. For the remainder of this article, I will focus on the calligram rather than vispo more broadly.

Historically, examples of science calligrams can be seen in two frequently anthologised and relatively accessible pieces composed in Portuguese by Brazilian poet Augusto de Campos during the 1950s (Williams, 1967). The first example presents words related to human birth and development in the shape of an egg (Williams, 1967). This untitled composition ...

... celebrates the incredible potential of the human egg, which miraculously develops into a fetus and eventually into a baby. The egg’s circular shape is reflected not only by the visual design but also by two additional objects: the ball of yarn and the uterus in which the fetus is growing. (Bohn, 2011, p. 120)

The visual appearance of this poem helps to spark the reader’s associations between different biological images, from an egg and cell division through to the act of childbirth, thereby evocatively communicating the essence of ‘life-making’.

A further science calligram by de Campos, entitled ‘*Terremoto*’ (Portuguese for ‘Earthquake’), is closely related to the preceding example. Combining words such as ‘egg’, ‘ball of thread’, ‘sun’, ‘star’, ‘thermometer’, and ‘death, this sprawling poem visually suggest a constellation (Williams, 1967). De Campos describes it as a ‘generative poem ... with cosmic and existential hints. A kind of ‘portable cosmogony’ in cross-word form’ (Williams, 1967). Bohn notes that this piece ...

... covers the entire gamut of human existence, from the moment of conception to the moment of death. ... The arrangement of the words on the page mirrors that of the stars in the heavens. (Bohn, 2011, p. 127)

There are also contemporary examples of science calligrams. Some examples of contemporary science calligrams from Canada, England, New Zealand, and Australia will be shown and described in this article, alongside potential strengths and limitations of this poetry subgenre. The chosen examples are not representative of all science calligrams. In this article, I focus on my own science calligrams addressing contemporary issues such as the Covid-19 pandemic and climate change, alongside pieces by poets who have inspired my work.

Bestselling and award-winning Canadian poet Christian Bök has produced numerous science calligrams throughout his career, most notably across the collections *Crystallography* (1994)

and *The Xenotext: Book 1* (2015). In an interview, Bök describes the vispo in his debut poetry collection:

Crystallography is definitely, definitely an extension of what Eugen Gomringer in the world of visual poetry might call a ‘constellation’ – words arranged artfully into a rigorous structure across the field of the page. My book consists of conceptual fragments, all configured into a crystalline latticework of correlated, figurative devices. (Voyce, 2007, n.p.)

Figure 1 shows a science calligram called ‘Opal’, which is representative of the recurring latticework appearance highlighted by Bök. This poem uses the names of constituent elements to represent the chemical structure of opal, whose formula is $\text{SiO}_2\cdot\text{H}_2\text{O}$. ‘Opal’ consists of one silicon atom connected to two oxygen atoms as well as a water molecule: two hydrogen atoms and one oxygen atom. The shape of this poem recalls the crossword-like structure of de Campos’s ‘*Terremoto*’ (Williams, 1967). Irrespective of Bök’s intentions, ‘Opal’ aligns with the AEIOU of SciCom (Burns et al., 2003, p. 191) through, for example, insights that contribute to understanding the composition of a particular gemstone and aesthetic value that may provide enjoyment to readers/viewers. While some may question the aesthetic value of ‘Opal’, others may appreciate the purity and elegance of the poem’s words and structure. The same can be said of crossword-shaped pieces published by Bök in *The Xenotext: Book 1*, specifically within his poetry sequence, ‘The Nucleobases’. The first poem in this sequence is ‘Adenine’ (Figure 2), chemical formula: $\text{C}_5\text{H}_5\text{N}_5$. All five poems in ‘The Nucleobases’ – along with the rest of the collection – provide background information for Bök’s bold bioart experiment aimed at creating ‘a beautiful, anomalous poem, whose ‘alien words’ might subsist, like a harmless parasite, inside the cell of another life form’ (Bök, 2015, p. 150). The transmission of this background information through poetry, including vispo, constitutes a form of arts-based SciCom. In addition to these crossword-shaped poems, *Crystallography* includes vispo that reflects the appearance of fractals in nature. For example, by approximating the form of a Sierpiński triangle, Bök’s poem ‘A-Fractal’ (Figure 3) illustrates the central idea of fractals – the recurrence of smaller versions of an image within one larger version of that image. The ‘A’ provides the triangular shape required for a Sierpiński triangle while suggesting the idea of repetition in both science and language, beginning with one of the most common words and letters in English. This fractal poem makes a novel contribution to the field of SciCom, arguably more so in regard to enjoying science. It is noteworthy that the titles of all three Bök poems featured here are quite literal, acting like captions of figures in scientific publications.

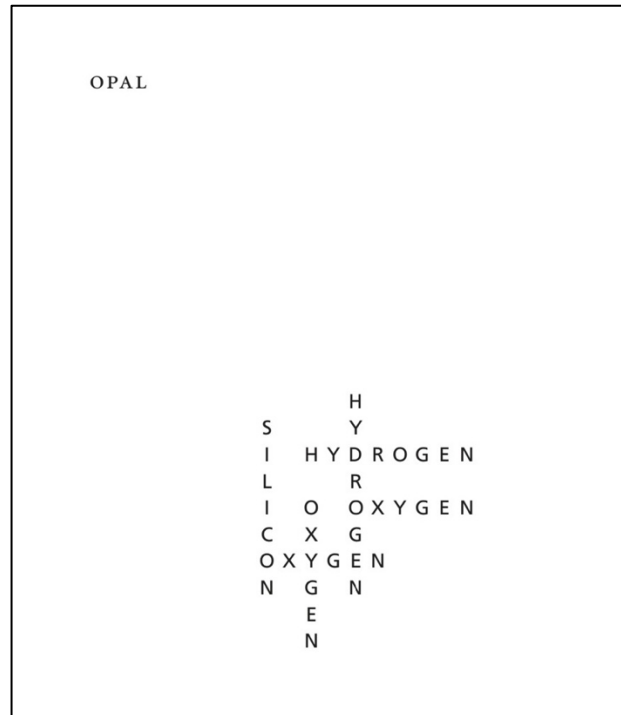


Figure 1. The science calligram 'Opal' (Bök, 2013, p. 96) [reproduced with permission]

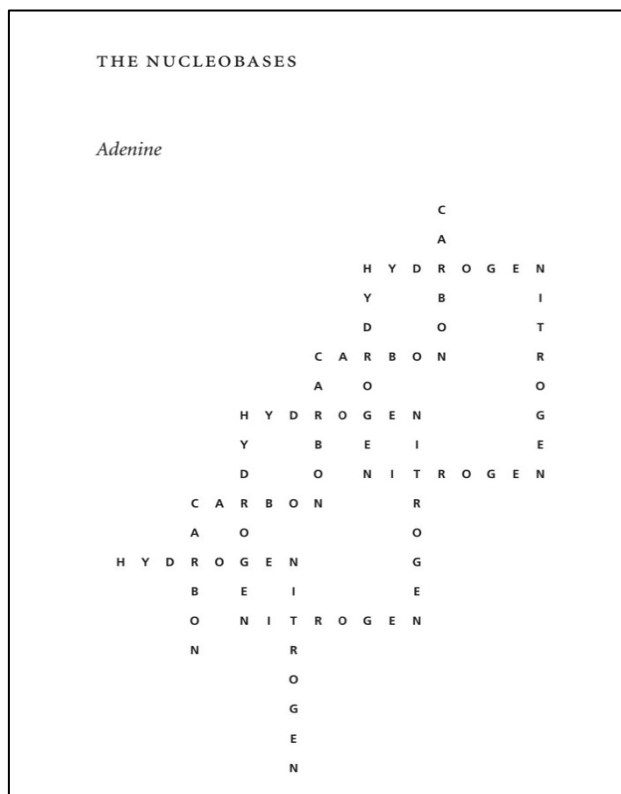


Figure 2. The first half of the science calligram 'Adenine' (Bök, 2015, p. 86) [reproduced with permission]

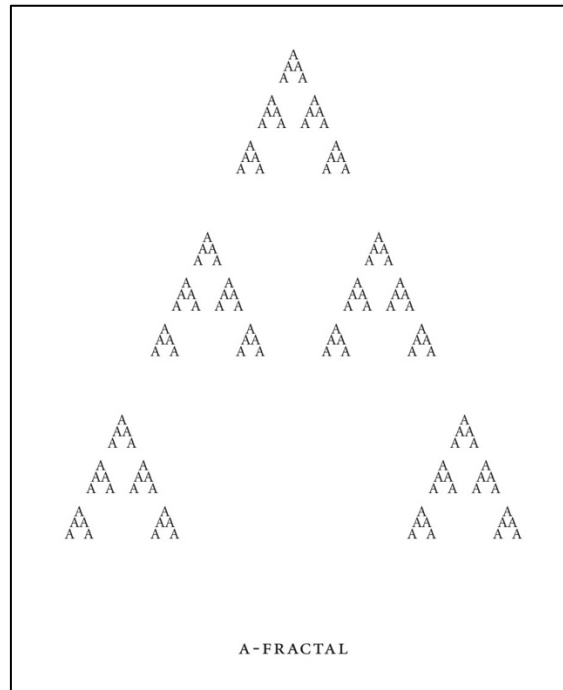


Figure 3. The science calligram 'A-Fractal' (Bök, 2013, p. 21) [reproduced with permission]

In England, further examples of science calligrams have been published on a website called *Poetry in Data* (Stone, 2018). This outlet focuses on the presentation of scientific information through both poetry and data, including graphs and diagrams. To date, most of the pieces on *Poetry in Data* were composed by the website's founder, Manchester-based technical analyst and poet James Stone. Stone has been experimenting at the intersection of poetry and data as he believes 'both have a high density of meaning per bit of information' (Stone, n.d., n.p.). His poetic output encompasses vispo reflecting multifarious scientific shapes. These include the constellation Orion; timelines of geologic time and extinct species; diagrams of fertilisation, slime mould development, light entering the eye and subatomic particles; and graphs of global sea levels, number of Facebook users, migrant mortality, escape velocity by planet, insect biomass, and stress versus strain. Stone coined the term 'datapoems' when referring to his compositions. By way of example, Stone created a piece about global sea levels – entitled 'Mercury Rising' (Figure 4) – by sourcing data from the US Environmental Protection Agency, plotting the data in a run chart, and placing the words of a haiku above the near-linear line representing rising global sea levels (Stone, 2017). Stone (2017) says of this datapoem:

'Mercury Rising' refers to both increasing temperatures and the planet Mercury, which is inhospitably hot. Mercury is also the messenger of the Gods, and the poem is intended to communicate a warning. The 3 lines of the haiku cover record-breaking temperatures becoming the norm, drought and floods wiping out humanity, and our future regret. Visually, I wanted the poem to feel like it had run out of time and space by the end, reflecting our increasingly cramped world and the possibility that it may already be too late to act.

Poetry in Data poems such as ‘Mercury Rising’ have been shared online through dedicated Instagram (Poetry in Data, n.d.[a]) and Twitter (Poetry in Data, n.d.[b]) accounts, which had 919 and 1,613 followers respectively at the time of writing. Social media accounts provide useful and far-reaching platforms for the public communication of science through multimodal text such as vispo (Rigutto, 2017).

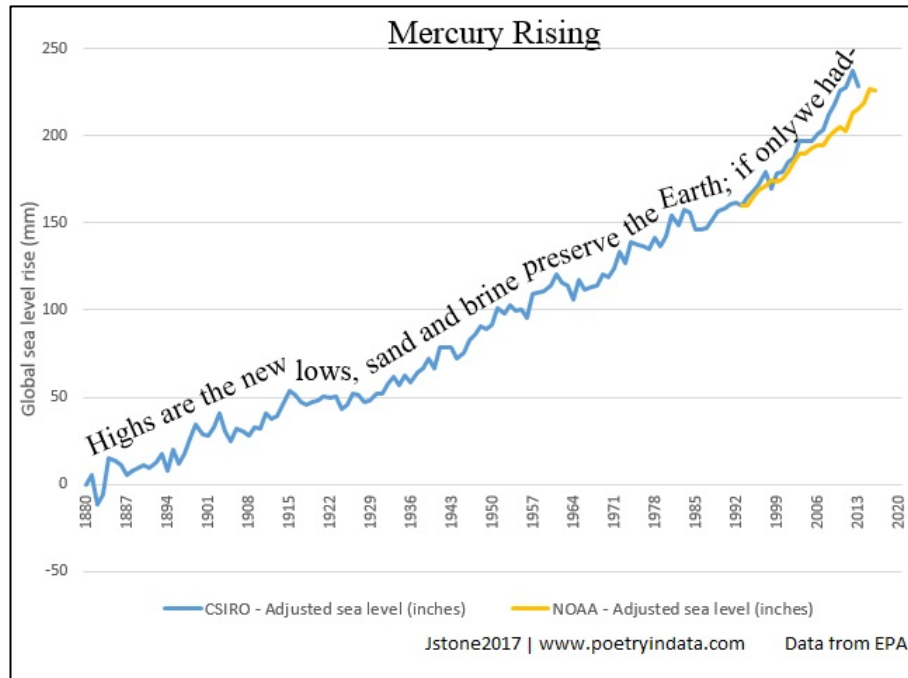


Figure 4. The visual haiku ‘Mercury Rising’ (Stone, 2017) [reproduced with permission]

Internationally, science calligrams have appeared in an anthology of winning and commended entries to the 2021 Hippocrates Prize for Poetry and Medicine. Most notably, Aotearoa New Zealand-based physician-poet Sophia Wilson won the ‘Health Professional’ category of this international competition with her science calligram ‘The Body Library’ (Figure 5). This solid-form poem takes the shape of a jar – one containing human remains preserved for display. Wilson says of her calligram:

‘The Body Library’ is a mélange of memories of the anatomy and pathology museums at Sydney University. I recall in particular the enormous sense of privilege, the bizarreness of human body parts being presented and objectified in this way, and the relief of exiting the hallowed rooms into daylight. (The Hippocrates Initiative, 2021)

The shape of ‘The Body Library’ provides a receptacle while the words themselves visualise that receptacle’s contents. The receptacle is simultaneously a single jar and many jars, its contents changing from one morbidly fascinating specimen to another as the reader moves through the poem. This provides a highly visual sense of what it is like to visit an anatomy and pathology museum, thereby raising questions about the ethics of displaying body parts for those studying science and medicine. The receptacle may also be interpreted as an urn for holding

the cremated remains of the body parts and, thus, circumventing objectification. In terms of the public communication of science, Wilson's calligram has achieved considerable global reach.

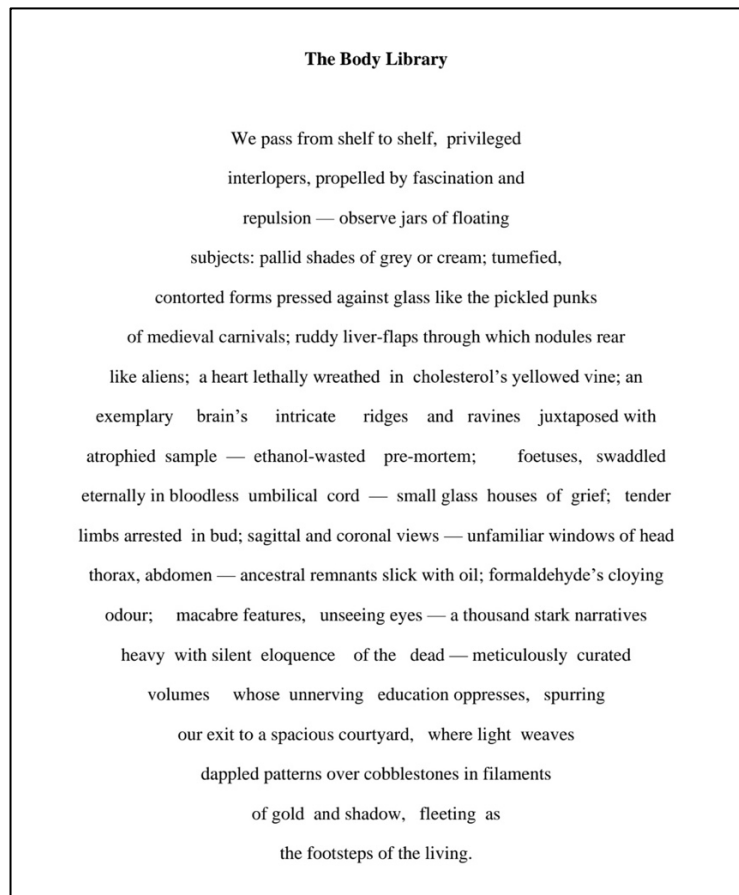


Figure 5. The science calligram 'The Body Library' (Wilson, 2021, p. 3) [reproduced with permission]

In Australia, science communicator-poet Rachel Rayner and myself (Leach & Rayner, 2020) did not find any vispo in a review of 100 science poems published across 12 contemporary Australian anthologies, including volumes within *The Best Australian Science Writing* and *Science Made Marvellous* series. Within our paper, Rayner and I highlighted some science calligrams that we previously published internationally. These poems include our limerick (Figure 6) describing and visualising the Feynman diagram (Figure 7) of a subatomic particle called the Higgs boson – a piece that, like Stone's visual haiku (Figure 4), rearranges the lines of a traditional poetic form into a scientific image. The rhyme inherent in the limerick form may assist with the recollection of scientific information, while the Feynman diagram shape may aid comprehension of that information. Rayner and I also stated some potential reasons for the lack of anthologisation of visual science poetry in Australia: that visual science poems are too niche, that 'editors had a preference against using them (potentially due to typographical challenges or publishing constraints), or [that] none were worthy of anthologisation' (Leach & Rayner, 2020, n.p.). Another possibility is that few or no visual poems were submitted or known to editors of the 12 reviewed anthologies. Irrespective of the reason(s) for this gap, I

have been inspired by international poets to endeavour to fill this gap through the creation and publication of science calligrams in the Australian context.

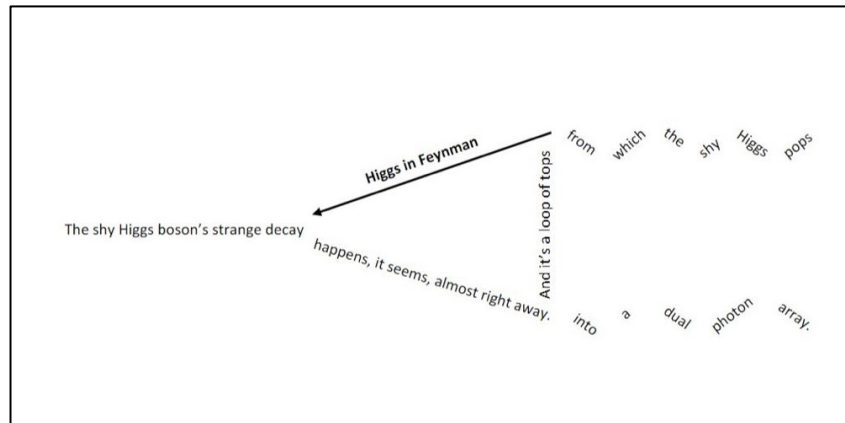


Figure 6. The collaborative science calligram 'Higgs in Feynman' (Rayner & Leach, 2019, n.p.)

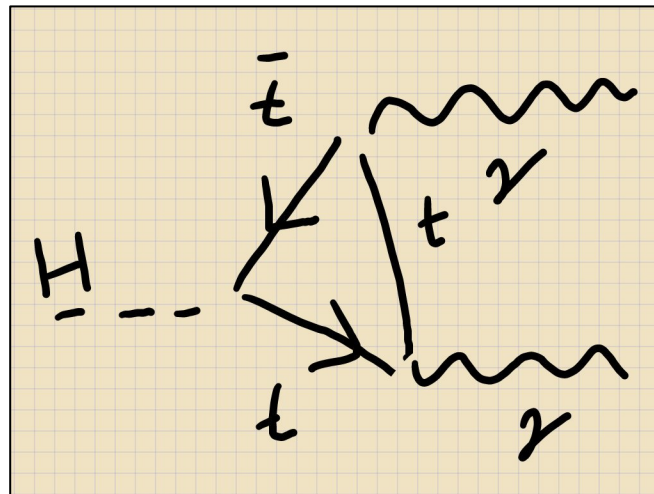


Figure 7. Sketch of a Feynman diagram by Rachel Rayner [given to the author]

During the Covid-19 pandemic, I have contributed 28 poems to the *What I did last week (WIDLW)* art exhibition held by Creative Communities, City of Greater Bendigo, in my hometown of Bendigo, Victoria. The exhibition's pieces have appeared both online and across five print anthologies disseminated to all 175 contributing local artists (City of Greater Bendigo, 2021). As such, *WIDLW* has provided opportunities for me to regularly communicate science to members of the general public who reside in a socio-economically disadvantaged regional area of Australia. Most of my 28 *WIDLW* pieces are science calligrams aimed at both furthering my experimental poetry practice and communicating contemporary scientific topics to those with less knowledge of science.

Some of my science calligrams from the *WIDLW* project are datapoems in the shapes of graphs, including a piece called 'Reflecting' in the shape of an epidemic curve of new Covid-19 cases Australia-wide (Figure 8). Inspired by Stone's innovative work, I composed this poem by

sourcing the epidemic curve of new Covid-19 cases (as at May 8, 2020) from the Australian Government Department of Health (2020) website before overlaying textboxes in which to type words of poetry. This calligram reflects on Australia's first wave of Covid-19 before ending with a slight visual rise and verbal warning about a second wave – a public health catastrophe that materialised in my home state of Victoria soon after the publication date of May 11, 2020. This visual poem constitutes an example of risk communication, which is considered a particularly important branch of SciCom. 'Reflecting' has been republished on the British website *Poetry and Covid* (Leach, 2020d), expanding from a local audience to an international one.

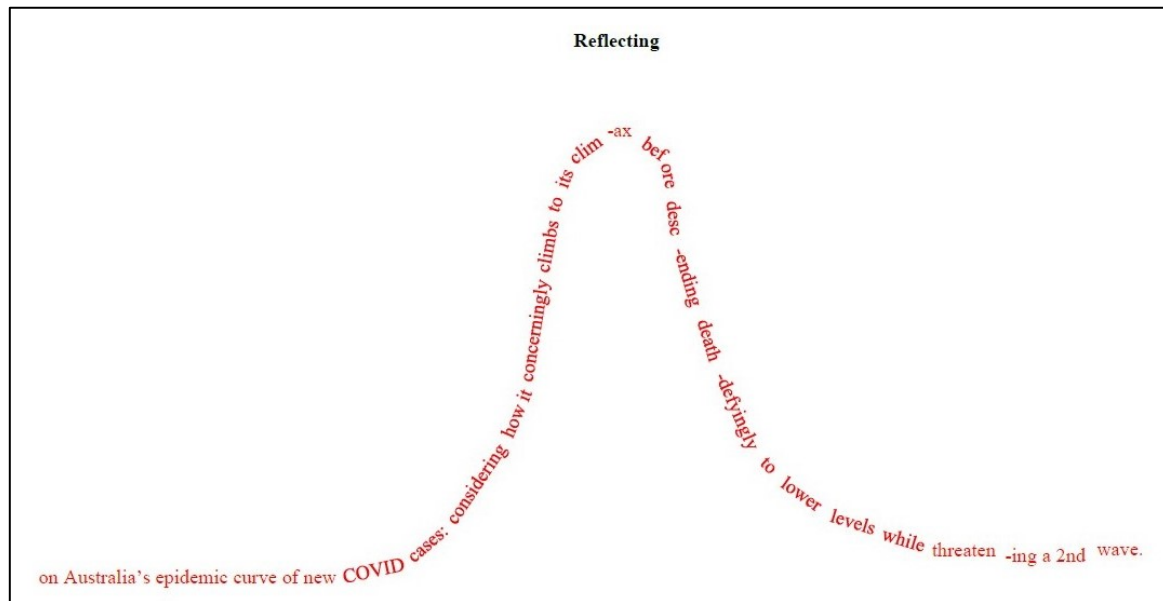


Figure 8. The science calligram 'Reflecting' (Leach, 2020d)

Continuing with the Covid-19 topic, a further example of my calligrams from the *WIDLW* project, namely 'The Shape of the Virus', visualises and describes the SARS-CoV-2 virion that causes Covid-19 (Figure 9). 'The Shape of the Virus' has a direct focus on SciCom, including scientific terminology. The spikes surrounding the circle are called 'spike gps', as indicated by the words forming the spikes. These words act like labels for a figure in a scientific paper while, at the same time, repeatedly alerting readers to the danger of spiked objects and 'spikes' in Covid-19 cases. For the sake of clarity, the definition for the acronym 'gp' (i.e. 'glycoprotein') is provided near the top of the circular part of the virion-shaped poem, alongside a description of what a spike glycoprotein does. By virtue of its instantly recognisable shape and its content, 'The Shape of the Virus' has the potential to attract public attention and convey scientific information. This piece has also been republished in the United Kingdom in *Poetry and Covid* (Leach, 2020d).

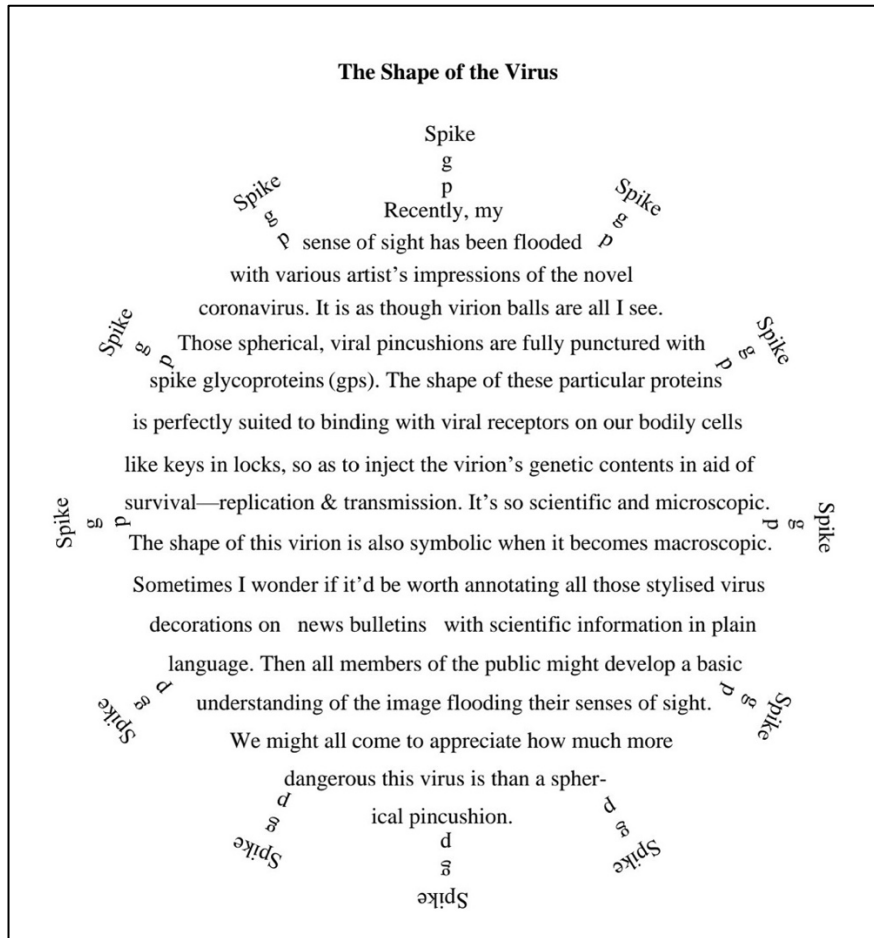


Figure 9. The science calligram 'The Shape of the Virus' (Leach, 2020d)

Returning to the global warming issue raised in 'Mercury Rising' (Figure 4), my environmental science calligram from the *WIDLW* project, namely 'The Australian Anthro-po-seen' (Figure 10), addresses the serious impact of climate change on an iconic yet threatened Australian animal: the koala. This solid-form piece combines research undertaken using various sources with the morphology of the koala, which was reproduced from a photograph. This poem's familiar shape is intended to catch the eye. Part of the effect of the piece depends on a concept described by French philosopher Michel Foucault (1983, pp. 24-25): the words of a visual poem disappear when one views the full shape of that poem, while the full shape of a visual poem disappears when one reads that poem's words. When one reads the words of the koala-shaped poem, the image of the koala effectively disappears. This reflects the threat to koala survival highlighted in scientific detail by the poem's words. Koalas have started to disappear due to human-induced climate change, having been assigned a conservation status of 'vulnerable' by the International Union for Conservation of Nature and Natural Resources (2020). Given its title is so general, this poem can be considered representative of all Australian species that are starting to disappear, not only the iconic koala species. The koala-shaped piece – along with Stone's 'Mercury Rising' – contribute to another important branch of SciCom: climate change communication. I have shared my koala-shaped poem and a selection of other science calligrams through my Instagram account, where they have reached a wider audience

than they would have if only featured in their original outlets (Leach, 2020b). This has led to positive feedback from followers, including award-winning poet Alicia Sometimes (Leach, 2020b), and helped me to achieve the desired outcomes of SciCom in terms of the AEIOU of science (Burns et al., 2003, p. 191). In October 2021, 'The Australian Anthro-po-seen' will be republished by Litoria Press in *Poetry for the Planet: An Anthology of Imagined Futures*, expanding the reach of this calligram-based climate change communication.

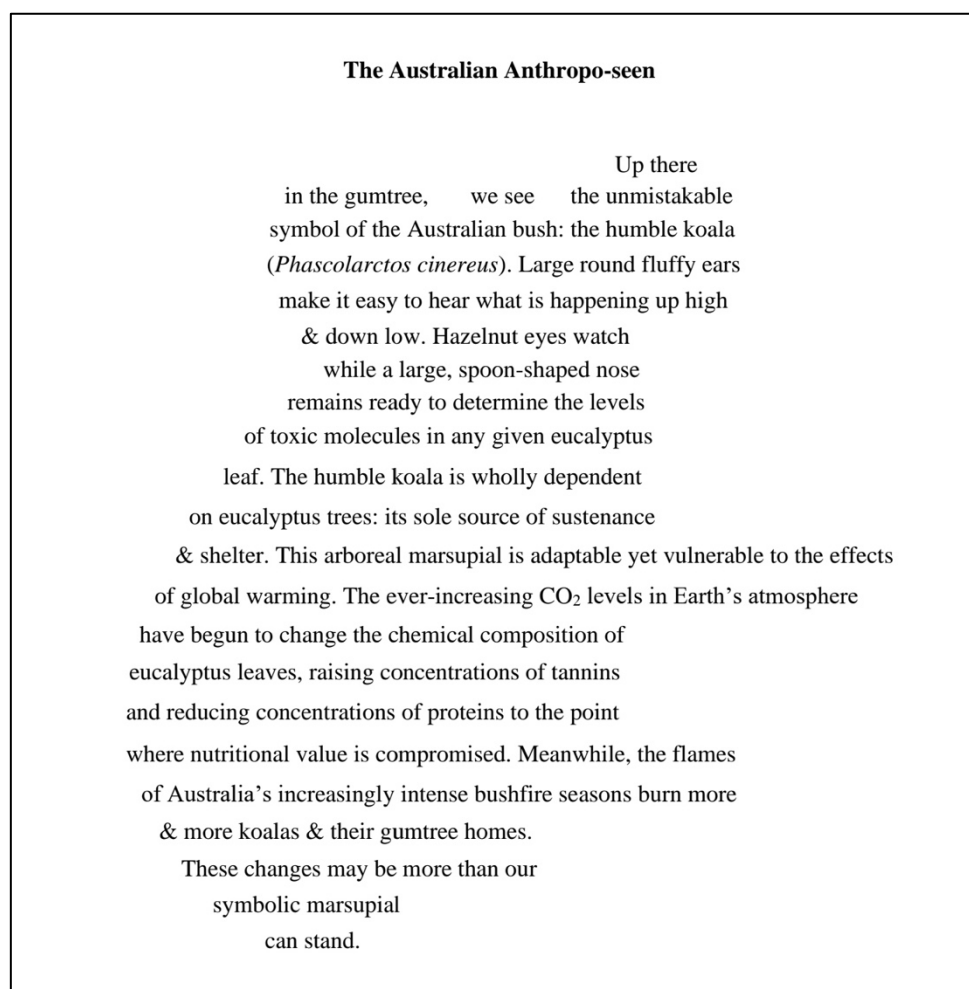


Figure 10. The science calligram 'The Australian Anthro-po-seen' (Leach, 2020a)

As alluded to earlier in this article, one ought to be mindful of the inherent limitations of science calligrams. The many synonyms for, and definitions of, vispo have, according to Young (2012, p. 203), gone some way towards preventing the development of a unified literary genre. This same issue affects the science calligram subgenre. Another point raised by Young is that vispo 'seems dismissed too brusquely' as an unserious set of gimmicks in that it 'has been categorically excluded from serious consideration for decades' (2012, p. 204). Further limitations of science calligrams are the need for visual literacy and the potential for typographical or publishing challenges. When preparing vispo for print publication, famed US poet e e cummings worked closely with his innovative 'personal typesetter', S. A. Jacobs, who was considered essential to cummings's poetry (Rumble, 2013). Such collaborations and

specialised typographical skills are required for contemporary vispo, including science calligrams, to be effectively produced and published in print. For example, the science calligrams in my collection *Chronicity* were translated from an A4 Word document to A3 chapbook pages by the experienced and talented designer, Libby Austen (Giannoukos, 2020). When one is sharing science calligrams online, however, certain typographical issues may pose few or no problems relative to publishing in print. Another limitation is that visual poems lose part of their effect when read aloud. However, the visual appearance of a poem can be brought out in interesting ways during readings, through pauses, intonations, hand gestures, etc. A limitation specific to science calligrams is the potential for complex subject matter. Poets could overcome this limitation by researching scientific topics and/or collaborating with scientists. With respect to SciCom, those composing science calligrams could incorporate clear links between visual and verbal elements, and/or provide an explanatory statement with each piece. The ‘Vita Explicata’ section of *The Xenotext: Book 1* (Bök, 2015, pp. 149-156), Stone’s (2018) *Poetry in Data* website, and the full contents of the *Anthology of Concrete Poetry* (Williams, 1967), exemplify the use of explanatory statements. One could also consider including a glossary of scientific terms or footnotes with numbered definitions.

Despite these limitations, there are potential benefits to the composition of science calligrams over and above those of poetry more broadly (e.g. self-expression and catharsis [Goldsworthy, 2017, p. 7]). First, the initial and lingering visual impact of such pieces may help to engage people in science, particularly with regard to awareness and enjoyment, while also engaging the public in poetry. This can occur through a range of formats and settings, including printed books, websites, classrooms (Braun, 2009, p. 110) and, perhaps most notably in the field of SciCom, social media platforms such as Instagram (Rigutto, 2017).

Second, provided there are reasonably clear and meaningful connections between visual and verbal elements, science calligrams may enhance the public understanding of science in much the same way as infographics (Smith et al., 2011). Given some degree of interpretation is always required when reading and viewing a science calligram (e.g. is Figure 5 a jar or an urn?), such pieces may be celebrated for provoking the imagination and encouraging us all to be deeper thinkers. In addition to seeking poetry feedback through writing groups and courses, one may use social media accounts to assess each science calligram’s number of ‘likes’ and types of comments (Rigutto, 2017), with a view to gauging effectiveness and continually improving poetic practice as well as SciCom. Given the limited evidence base (Rigutto, 2017), however, there is a need for much more research into the effectiveness of visual SciCom approaches.

Third, it has been suggested by vispo practitioners that the act of creating aesthetically pleasing visual poems can be therapeutic – a relaxing and zen-like experience (Ledbetter et al., 2014). This is consistent with the health profession of art therapy, which focuses on the visual. Again, there is a need for research in this area.

Fourth, while there may be barriers to publishing science calligrams in books or some journals, there is greater potential for inclusion in exhibitions of visual art. In addition to contributing the science calligrams shown in Figures 8-10 to the *WIDLW: Online Exhibition*, I have contributed my science calligrams ‘Longitudinal’ and ‘The Plight of the Adelie Penguin’ to physical and virtual art exhibitions (Leach, 2019; Leach, 2020c). A prime example of a physical exhibition dedicated to vispo is Australia’s *Born to Concrete* exhibition, which featured vispo by the likes of Ruth Cowen, Sweeney Reed, and H.O. (Heide Museum of Modern Art, 2011).

Fifth, scientific images offer new and interesting creative possibilities for contemporary poets. Poetry has become increasingly dependent on innovation, experimentation, and interdisciplinary explorations and collaborations to remain a viable 21st century artform. The fusion of science, poetry, and visual art has much to offer each field. Bök has highlighted the intriguing possibilities of (visual) science poetry: ‘I am still amazed that poets insist on writing about their divorces, when robots are taking pictures of orange, ethane lakes on [Saturn’s largest moon,] Titan ...’ (Bök, 2012). While there is certainly nothing wrong with writing poetry about events in one’s personal life, there are also creative possibilities to be found in the sciences of ourselves, our world, and the surrounding universe. One could even combine the personal with the scientific as Dearborn did in her collection *Autobiochemistry* (UWA Publishing, 2019). This collection includes a striking fan-shaped poem about the lived experience of perimenopause, within which different means of cooling (e.g. a paper fan and Dearborn’s partner’s breath) are listed (Dearborn, 2019, p. 96).

In the contemporary world, there is scope for the creation of science poems in which text and shape combine to illuminate scientific topics. In this article, I have argued that the integration of visual elements into science poetry could offer new creative opportunities for poets while rendering scientific content more accessible to the general public. From a contemporary SciCom perspective, science calligrams could be used as an arts-based adjunct to the conventional modes that are currently employed in the day-to-day work of science communicators worldwide. Science calligrams with clear, meaningful links between verbal and visual elements have the potential to contribute to the public awareness of, enjoyment of, interest in, opinions about, and understanding of, scientific topics (Burns et al., 2003, p. 191). These hypotheses could be tested through novel social research studies conducted in online or offline settings. In the present and future ages of rapidly evolving technologies, infectious disease pandemics and catastrophic climate change, the potential for vispo about science may be greater than ever before. Such interdisciplinary work could be mutually beneficial for the field of SciCom and vispo as a literary genre.

Acknowledgements

I would like to acknowledge the following poets and artists for providing permission to reproduce their wonderful works in this article: Christian Bök, James Stone, Sophia Wilson, and Rachel Rayner. I also acknowledge the two anonymous reviewers of this article for their helpful feedback, the guest editors

of this issue of TEXT (Jessica L. Wilkinson, Cassandra Atherton, and Sarah Holland-Batt), and the curator of the *What I did last week: Online exhibition*, Rohan Phillips.

References

- Apollinaire, G. (1980). *Calligrammes: Poems of Peace and War (1913-1916)*. University of California Press.
- Australian Government Department of Health. (2020). *Coronavirus (COVID-19) current situation and case numbers*. <https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert/coronavirus-covid-19-case-numbers-and-statistics>
- Bennett, C.M. (2012). An examination of the forces behind visual poetry in the past decade. In N. Vassilakis & C. Hill (Eds.), *The Last Vispo Anthology: Visual Poetry 1998-2008* (pp. 199-202). Fantagraphics Books.
- Bohn, W. (2001). *Modern Visual Poetry*. University of Delaware Press.
- Bohn, W. (2011). *Reading Visual Poetry*. Fairleigh Dickinson University Press.
- Bok, C. [@christianbok]. (2012, September 9). *I am still amazed that poets insist on writing about their divorced, when robots are taking pictures of orange, ethane lakes on Titan...* [Tweet]. Twitter. <https://twitter.com/christianbok/status/244482142632038401>
- Bök, C. (2013). *Crystallography*. Coach House Books. (Original work published in 1994).
- Bök, C. (2015). *The Xenotext: Book 1*. Coach House Books.
- Braun, P.A. (2009). The effects of reading nonfiction aloud on the vocabulary acquisition of middle-school students. *Dissertations*, 9. <https://digitalcommons.nl.edu/diss/9/>
- Burns, T., O'Connor, D. J. & Stocklmayer, S. M. (2003). Science communication: A contemporary definition. *Public Understanding of Science*, 12(2), pp. 183-202. <https://doi.org/10.1177/09636625030122004>
- Caldwell, G. (2014). Visual poetry – crisis and neglect in the 20th century and now. *Axon: Creative Explorations*, 4(1). <https://www.axonjournal.com.au/issue-6/visual-poetry%E2%80%94crisis-and-neglect-20th-century-and-now>
- City of Greater Bendigo. (2021, n.d.). *What I did last week: Online exhibition*. Bendigo Venues & Events. <https://www.bendigoregion.com.au/arts-culture-theatres/what-i-did-last-week-online-exhibition>
- Dearborn, T. (2019). *Autobiochemistry*. UWA Publishing.
- Dearborn, T. (2020). The science of poetry. *Rabbit: a journal for nonfiction poetry*, 31, 116-126.
- Foucault, M. (1983). *This Is Not a Pipe*. University of California Press.
- Giannoukos, T. (2020, n.d.). *Two new poetry series: MPU and the year of the pandemic*. Australian Book Review. <https://www.australianbookreview.com.au/features/book-talk/464-book-talk/7222-two-new-poetry-series-mpu-and-the-year-of-the-pandemic-by-tina-giannoukos>

- Goldsworthy, P. (2017). Foreword. In H.T. Johnson (Ed.), *Shaping the Fractured Self: Poetry of Chronic Illness and Pain* (pp. 7-8). UWA Publishing.
- Greene, R. & Cushman, S. (2016). *The Princeton Handbook of Poetic Terms*. Princeton University Press.
- Heide Museum of Modern Art. (2011, n.d.). *Born to concrete: The Heide collection*.
<https://www.heide.com.au/exhibitions/born-concrete-heide-collection>
- International Union for Conservation of Nature and Natural Resources. (2020, n.d.). *Phascolarctos cinereus*. <https://www.iucnredlist.org/species/16892/166496779>
- Lea, B. (Ed.). (2013). *Australian Poetry Journal: #concrete*, 3(2). Australian Poetry Ltd.
- Leach, M. (2019). *The Plight of the Adélie Penguin*. Antarctic Poetry Exhibition.
<https://www.antarcticpoetry.com/michael-leach-adelie-penguin>
- Leach, M. (2020a, September 21). The Australian anthropo-seen. *What I did last week: Online exhibition*. <https://www.bendigoregion.com.au/arts-culture-theatres/what-i-did-last-week-week-26>
- Leach, M. [@m_leach]. (2020b, September 21). *The Australian anthropo-seen* [Photograph] [Instagram post]. Instagram. <https://www.instagram.com/p/CFZV1FFjFBB/>
- Leach, M. (2020c). Longitudinal. In G. Brand (Ed.), *Ways of Seeing in Healthcare, ANZAHPE Conference 2020*.
https://anzahpe.org/resources/Documents/Conference/BOOK_Ways%20of%20seeing_ANZA_HPE_FINAL_pages.pdf
- Leach, M. (2020d, n.d.). *Viral Sequence*. Poetry and Covid.
<https://poetryandcovid.com/2020/07/19/viral-sequence/>
- Leach, M. & Rayner, R. (2020). The demographics and characteristics of contemporary Australian science poetry. *Axon: Creative Explorations*, 10(1). <https://www.axonjournal.com.au/issue-vol-10-no-1-may-2020/demographics-and-characteristics-contemporary-australian-science-poetry>
- Ledbetter, A., Magendie, K. & White, A. (2014, October 29). *Morning coffee*. [Video]. YouTube.
<https://www.youtube.com/watch?v=4HAYgPwRcuY>
- Poetry In Data [@poetryindata]. (n.d.[a]). *Posts* [Instagram profile]. Instagram.
<https://www.instagram.com/poetryindata/>
- Poetry in Data [@poetryindata]. (n.d.[b]). *Tweets* [Twitter profile]. Twitter.
<https://twitter.com/poetryindata>
- Rayner, R. & Leach, M. (2019). *Higgs in Feynman*. FIVE:2:ONE.
<http://five2onemagazine.com/higgs-in-feynman-collaborative-poetry-by-michael-leach-and-rachel-rayner/>
- Rigutto, C. (2017). The landscape of online visual communication of science. *Journal of Science Communication*, 16(2).
https://jcom.sissa.it/sites/default/files/documents/JCOM_1602_2017_C06_en.pdf
- Rumble, W. (2013). The Persian typesetter: S.A. Jacobs, E.E. Cummings, and the Golden Eagle Press. *The Journal of the E.E. Cummings Society*, 20, pp. 37-45.

- Smith, L., Smith, J.K., Arcand, K., Smith, R.K., Bookbinder, J. & Keach, K. (2011). Aesthetics and astronomy: Studying the public's perception and understanding of imagery from space. *Science Communication*, 33, pp. 201-238.
- Solt, M.E. (1970). *Concrete Poetry: A World View*. Indiana University Press.
- Stone, J. (2017, August 15). *Mercury rising*. Poetry in Data. <http://poetryindata.com/science/mercuryrising/>
- Stone, J. (2018, n.d.). *Poetry in Data*. <http://poetryindata.com/>
- Stone, J. (n.d.). *About*. Poetry in Data. <http://poetryindata.com/about/>
- The Hippocrates Initiative. (2021, n.d.). *2021 FPM-Hippocrates Prize Health Professional Winners*. <http://hippocrates-poetry.org/the-hippocrates-prize/2021-hippocrates-prize/2021-hippocrates-prize/2021-fpm-hippocrates-prize-4.html>
- Theocritus. (1912). *The Greek Bucolic Poets / with an English Translation by J. M. Edmonds*. W. Heinemann.
- Vassilakis, N. & Hill, C. (Eds.). (2012). *The Last Vispo Anthology: Visual Poetry 1998-2008*. Fantagraphic Books.
- Voyce, S. (2007). The xenotext experiment: An interview with Christian Bök. *Postmodern Culture*, 17(2). <http://pmc.iath.virginia.edu/issue.107/17.2voyce.html>
- Wilkinson, J.L. (2020). *Rabbit: a journal for nonfiction poetry*, 31.
- Williams, E. (Ed.). (1967). *Anthology of Concrete Poetry*. Something Else Press, Inc.
- Wilson, S. (2021). The Body Library. In M. Hulse & D. Singer (Eds.), *The Hippocrates Prize 2021: Winning and Commended Poems* (p. 3). The Hippocrates Press.
- Young, K. (2012). A sphere and a line. In N. Vassilakis, & C. Hill (Eds.), *The Last Vispo Anthology: Visual Poetry 1998-2008* (pp. 203-206). Fantagraphic Books.