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Peer-Reviewed Article

Exploring the history of digital poetry from 1950 to Augmented Reality Poetry

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Abstract
This article offers a comprehensive overview of digital poetry, tracing its development from the late 1950s through to contemporary augmented reality applications. It begins by highlighting early stochastic texts generated by Theo Lutz, contextualizing them within the mathematical aesthetics championed by Max Bense. Funkhouser explores how digital poetry evolved into multi-modal formats, integrating text, visuals, and sound to create both kinetic and static works. Notably, the lecture examines key influences from non-digital movements like Dada and Concrete Poetry, and discusses the impact of hypertext, gaming culture, and networked writing on digital poetics. The presentation emphasizes that digital poetry invites imaginative reader participation and challenges conventional poetic forms, exemplified by works such as Jason Nelson's interactive poetry games and Ranjit Bhatnagar's Pentametron. Funkhouser concludes by reflecting on how digital tools have redefined poetic practices, offering new modes of expression and collaboration in a networked era
Keywords: Digital Poetry, Augmented Reality, Electronic Literature, Poetry

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Résumé
Cet article propose un aperçu complet de la poésie numérique, retraçant son développement depuis la fin des années 1950 jusqu'aux applications contemporaines de réalité augmentée. Il commence par mettre en lumière les premiers textes stochastiques générés par Theo Lutz, les replaçant dans le contexte de l'esthétique mathématique défendue par Max Bense. Funkhouser explore l'évolution de la poésie numérique vers des formats multimodaux, intégrant texte, visuels et son pour créer des œuvres à la fois cinétiques et statiques. L'article examine notamment les influences clés de mouvements non numériques tels que le Dadaïsme et la Poésie Concrète, et discute de l'impact de l'hypertexte, de la culture du jeu vidéo et de l'écriture en réseau sur la poésie numérique. La présentation souligne que la poésie numérique invite à une participation imaginative du lecteur et remet en question les formes poétiques conventionnelles, illustrée par des œuvres telles que les jeux de poésie interactifs de Jason Nelson et le Pentametron de Ranjit Bhatnagar. Funkhouser conclut en réfléchissant à la manière dont les outils numériques ont redéfini les pratiques poétiques, offrant de nouveaux modes d'expression et de collaboration dans une ère connectée.

Mots-clés : Poésie numérique, Réalité augmentée, Littérature électronique, Poésie

1.0. INTRODUCTION

From its roots to the present, in this talk I introduce and explore digital poetry—a genre (or formulation) of literary, visual, and sonic artistry unknowingly launched by poets who began to experiment with computers in the late 1950s.[i] My first book on the subject, *Prehistoric Digital Poetry: An Archaeology of Forms, 1959-1995*, offers a detailed history of its foundation, and I will introduce the overarching parameters of the genre from this touchstone.

Before saying anything else about the topic, I wish to share a quote from an unlikely source, Nathaniel Philbrick's book *Why Read Moby-Dick?* In a chapter titled "Poetry", Philbrick writes, "Good poetry is not all about lush and gorgeous words. It's about creating an emblematic and surprising scene that opens up new worlds" (73). He was writing about Herman Melville's prose, but I believe the sentiment also pertains to digital poetry. Digital poetry, beyond revealing to us truths about the materiality and possibilities of language, has expanded to encompass virtual worlds, such as Second Life and Minecraft, where we begin to visualize imaginary words, bodies, and presentations of language. Additionally, senses of surprise offered up in many examples of digital poetry, both in form and content—not knowing what formations of language the program is going to issue next—should be recognized and celebrated as one of the genre's great attributes. Lastly, a relationship with print and electronic does exist. I would be remiss not to point out that digital poetry unquestionably has roots in unconventional non-electronic writing, such as Stéfane Mallarmé's "Un **coup** de dés jamais n'abolira le hasard", Permutation, Concrete, Visual, and Process Poetry, and, in certain examples, Dada.

Impersonal—yet objective—communication dominates many works of digital poetry. While not always clear in presentation or coherent, it is a capacious and inviting endeavor genre of art that accommodates a wide range of approaches and predilections. The unexpected dynamics seen in digital poetry, with its unconventional combination of modalities, is capable of quickly transforming its audience's mindset, as poetry and literature have done since its condition as an oral form. Today we use a mouse and keyboard to jar our senses rather than turning a page. Here's a chart outlining the historical technical and aesthetic circumstances of the genre itself. Let's take a moment to review it, since this typology pertains to what occurs in digital poetry.

2.0. TEXT GENERATORS, VISUAL AND KINETIC POETRY

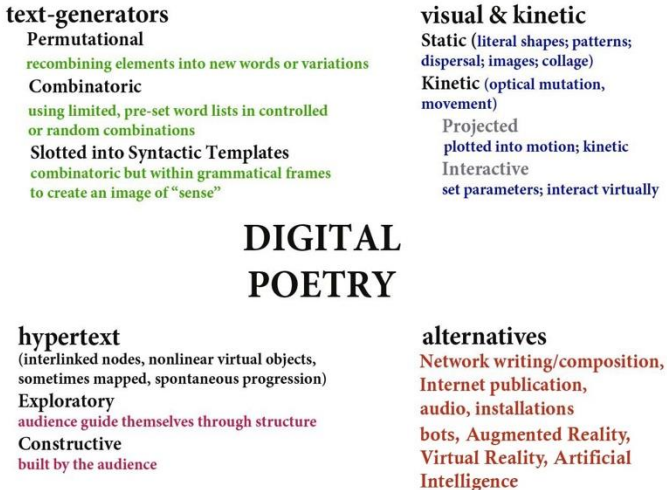

Figure 1: Chart outlining the historical technical and aesthetic circumstances of Digital Poetry Genres

Text generators were initiated in 1959,[ii] Visual and Kinetic works began appearing in the mid-1960s,[iii] Hypertext in the mid-1980s),[iv] and numerous alternative formulations have appeared since the late 1990.[v]

The point I make in *Prehistoric Digital Poetry* is that the groundwork for *most* of the genre was established before the WWW existed; works produced subsequently are hybrids, often falling into these lineages in multiple ways. Digital poetry has grown to become not a singular "form," but rather a conglomeration of forms that now constitutes a genre containing heterogeneous components. Computer programs that write sonnets or haiku, videopoems, interactive sound poems, hypertexts, and so on, despite their stylistic differences, all qualify as digital poetry—which

evolved across decades and invites writers to explore a variety of computerized techniques.
I will present a few examples, even some of my own digital poems—as an introduction to engaged practices. Audiences who engage with these projects most often encounter medial changes in language and language-based communication through computers and digital networks: creative, experimental, playful and also critical language art involving programming, multimedia, animation, interactivity, and communication is on display. My second book on the subject, *New Directions in Digital Poetry*, includes a series of 24 case studies at its core, bookended by contextual chapters that explain how the advent of the Web marks the moment at which the distinct areas of digital poetry begin to merge together as hybrid systems of communication that mine expressive possibilities held by computers and networks.

To classify the works in this talk I'll borrow a simple qualification scheme discussed in *New Directions in Digital Poetry*. In a talk presented at the International Festival of E-Poetry in 2009, Slovenian scholar Janez Strehovec introduced the concept of an "elevator pitch poetics", in which the delivery of poetic material takes no longer than an elevator ride—an idea that makes certain sense when we consider the audience for poems on the network include people consuming the work on mobile devices or in fragments as opposed to sitting with a work with time for deep attention or concentration.

Of course, not every digital poem conveniently fits in to the elevator pitch scheme, including one brilliant work that was delivered quickly but takes time to read and fully absorb, Ranjit Bhatnagar's *Pentametron*. *Pentametron* is a web app that uses the network to construct sonnets in iambic pentameter. Specifically, it uses an algorithm that arranges rhyming couplets drawn from Twitter posts. This is a perfect moment to reflect on what digital poetry isn't. Many of you are probably familiar with traditional sonnets, such as Shakespeare's most famous, Sonnet 18, which begins,

Shall I compare thee to a summer's day?
Thou art more lovely and more temperate…

It will be immediately clear to anyone using *Pentametron* that the digital poems it creates are a distant cry from those by the heroes of English literature. Because the source is Twitter, naturally the language is far less refined (if not outright crude).

3.0. DIGITAL POETRY

Digital Poetry, in this and many instances, is awkward, borrowing and expanding from convention, yet making utter sense in today's uber-texted world. Devices like this can compile lines without regard to overall, linear meaning, but are compiled by a computer program that reads words phonetically and arranges them into songs of a new sort. It's a lyrical toy recognizes and respects the forms, and then uses technology of the networks to use its sensibilities in a very contemporary way. One here does not expect eloquence, and often encounters verse of a new sort—a type of classical poetry composed from a cross-section of cultural discourse.

Let's explore some other examples of "elevator pitch" poems.

Here are three pieces from Dan Waber's *Strings*, which originally appeared on the *Electronic Literature Collection*, Vol. 1. In works such as "argument", we as readers are presented with information and become involved with the imaginative construction of meaning based on the author's presentation of a single, moving line. The author presents a series of brief, fluid animations that provide practically instant gratification, illustration, and point for a skimming reader, who quickly absorbs the author's projection and assign their own meaning. These works, despite being simple and direct, can contain straightforward or variable meaning. The postmodern sensibility of making it the reader's responsibility to determine meaning is certainly on display in this work, as it is in many digital poems.

Jody Zellen's *Spine Sonnet* employs Dadaist methods. Zellen created two versions of the piece, one for the Web, and one as an iPhone app; at present only the app is functioning, and the work is documented on the Web. The website randomly juxtaposes the spines of 14 books from Zellen's library each time the page is refreshed to create, coincidentally, a sonnet (albeit one very different from Shakespeare or even *Pentametron*). Like many contemporary works of art, this work engineers a re-assembly of information into poetry. The app version is strictly textual; it uses an arrangement of fonts and colors but not images—which perhaps gives it a more poem-like appearance. Other i-apps are more instrumental, or language play-things, like Jörg Piringer's *abcdefghijklmnopqrstuvwxyz*, which enables the user to create an experimental sound and visual poem.

Digital poetry is not an advertisement. Our primary response to any title should be to think about the content and experience; works are not presented to inspire audiences to buy something. Jhave Johnston is a Canadian poet and videographer. Among his plentiful works, many of which accessible on the Web via glia.ca, is a series titled *Muds* (2009), "palpitating word poems" in which he joins graphical objects with text (and, alternatively, makes text into objects) using software. Let's look at one called "Truth". The vigorous (often linear) spectacle Dr. Johnston immediately, viscerally creates plasticity with his tools here and in works such "unity Axioms" (from the *Softies* series), are uniquely powerful. Language, fluid and elastic, is given another layer with which to play, mean, and affect. Digital poetry's often fluid states prevent us from considering works as being plastic. Yet because they never harden, works of digital poetry always maintain *plasticity* in presentation on the WWW. They exist in a state of being moulded, receiving shape, made to assume many forms–often seeking qualities that depict space and form so as to appear multi-dimensionally. Another of Johnston's Web applications, *Zero Whack*, devises imaginary books, with titles and blurbs, at the user's command.

Although many densely prepared examples exist, desire for spectacle and brevity in digital poems is evident. In either instance, the 'writer' provides landscape for the reader–the writer must stimulate on the surface, and beneath and beyond it. Thus, refreshing language and appearance of a work at a reasonable pace help authors keep an audience's attention. Given the attention span and sometimes temporal constraints of the average WWW or mobile device user, artists often benefit from making works that do not fluster, and can be read in small chunks. Further, authors may gain advantage by taking into account that much of the potential audience may absorb content on smaller screens, such as mobile phones. Content layered for profundity, depth or viewer transformation on the desktop may not effectively translate to a mobile device. Given this scenario, an applied 'elevator pitch' poetic approach makes much sense. With so little time to deliver perceptive content, the value of immediate insight, imagistic impression (verbal and/or visual) and reflection cannot be understated. Grand musings, elegant descriptions, deep development over time and variable metaphorical exposures may, for certain users, be reliquaries from literatures and poetries past.

In digital poetry, we often confront speculative and hyper-attentive spectacles, spectacles of words and their mediated cohorts (images, sounds, links) looking to correspond with past and future senses of writing. One of the things we also see in some of these examples is the author connecting their work with book or print culture—although doing so is certainly not the concern of all practitioners.

Now we'll take a few minutes to look, at least briefly, at pieces that do require more time to explore and process. Tactics and techniques of surprise and seduction over both short and long periods can purposefully construct and scale digital poetry to marvellous heights. A balance of immediate and prolonged stimulation may be presented simultaneously. Opposing a straightforward approach, many works unquestionably engage oblique strategies, and as digital poems layer and expand, adding poetic depth, they may especially appeal to someone

whose sensibilities have been trained to appreciate discursion.

Rather than associate with print culture, Jason Nelson has at points situated his work within gaming culture. Digital poetry games, however, are not reminiscent of those found on xBox. Nelson is a provocative practitioner, who has made interactive cube poems, as games, and, most recently, as a mysterious textual exchange conducted via google docs on the network. One of many interactive works I have admired is "I made this, you play this, we are enemies", which proposes a type of conflict between writer and reader, but in the end becomes, in my view, a vehicle for creativity. Nelson's work is often about making, and this particular case is an example of how a writer can, in her or his own hand, provocatively build on structures presented in the culture-at-large.

Digital poetry is not Pixar, Hollywood, or even Sundance (at least yet), though cinematic works are being created, some featuring audio tracks and some featuring subtitles.[vi] As filmic as they are, they usually ask us to read, and sometimes to be willing and able to receive the content in non-linear sequences. Non-linear styles require considerably more attention on the type of the reader, and as a result is able to present something more complicated in its layering of sophisticated materials.

Before concluding, I will focus on some collaborative works by Stephanie Strickland. First, a slightly older collaboration Strickland did with Paul Ryan and Cynthia Larson Jaramillo titled *slippingglimpse*. In the work, Strickland splices together Ryan's videos of seaside water movement and text, superimposed and arranged on the screen according to the video's water surface patterns. Textual content here reflects ephemeral natural movement. The author writes on water, and asks the viewer to hold it–physically—a double impossibility, yet on a literal scale, one that a digital illusion upholds. We register the text that appears onscreen in slow motion to grasp the poem's intentions, a possibility well within a viewer's range given the work's design. In this title, processes of viewing are not especially demanding; we can see how Strickland recycles words, ideas, and verbal arrangements with others, and, how permutation and mediation that treat language elicit recombinant energy and extend the initial statements or concepts. Another piece, a collaboration with Nick Montfort, *Sea and Spar Between* is, write its authors, "a poetry generator which defines a space of language populated by a number of stanzas comparable to the number of fish in the sea, around 225 trillion". The words in the poem originate in Emily Dickinson's poetry and from *Moby-Dick*. This work looks and performs completely differently than what we've seen as it shapes its endless poem. The poems, as readers will find on display in every screen of the work, are completely readable fusions of the Dickinson and Melville's works, which can be appreciated on literary and aesthetic registers. This "mash-up" style, as always, creates unexpected output, and reflects the hybrid traits of digital poetry in general.

Full-fledged introductions to digital writing are presented in the four Electronic Literature Collections, produced by the Electronic Literature Organization. Available online, the editors of these anthologies identify more than fifty general categories of electronic literature and digital poetry, based on style of work, software and programming used, or other demographic markers. These anthologies contain fundamental types of works, and also innovations such as "geolocative" works, as in J.R. Carpenter's "Entre-Ville" (ELC Vol. 2), which uses Google Maps to propel the narrative, and documentation of Augmented Reality (or AR) works, such as Caitlin Fisher's *Andromeda*. These two forms in particular—works making use of GPS, or mapping of some sort, or combine hardware, software, place, or combine virtual and physical objects—are capably delivered via mobile phone. Another extremely interesting example of AR poems, which relied on QR codes rather than GPS, are Amaranth Borsuk and Brad Bouse's *From Page to Screen*, which was created with Flash (and thus is not available at present). Fortunately, the work has been at least partly documented; here is a demonstration of the book prepared by Scott Rettberg. AR, along with Artificial Intelligence, are

among the latest exciting developments in the field. Expressive devices perpetuate and expand, at times complicating the act of reading, but in the end holding a payoff for those who are open to receiving poetic language delivered through new modalities and devices. Performance artist Judd Morrissey has also made extremely compelling AR works.

My research on AI poetry is still in progress, so for now I will say only that there are a number of online apps that anyone can experiment with, such as PoetryGeneratorAI, Poem of Quotes AI Poetry Generator, Verse by Verse, Bored Humans AI Poetry Generator, Paraphrasing Tool Poem Generator, and Poem Portraits. If you wish to read some good AI poetry, I would highly recommend taking a look at Jhave's *ReRites*, a project in which he spent a year training neural nets to write poems, and then extensively edited the output he created. From my perspective, thus far human intervention on AI output brings the best results.

Considering the overall trajectory of digital poetry, we clearly see demonstrated the flexibility of computerized poetry, in which careful arrangements of elements and negotiations between factors (sometimes randomized) become the forces that determine its qualities. Many examples come into existence somewhere between chaos and order, deconstructing human language to find new meanings. Literary and cultural routines are subverted by the computers, software, and programming that provide viewers with interpretable content.

In examples presented above, and throughout the field as a whole, we see authors who are not confined to perform in a singular manner. The many compositional possibilities indeed encourage variety. Language is not rejected by digital poetry, though words become one of several possible types of meaningful transmission to its audience. Sometimes this combination of peripatetic modalities, variety, discrepant contents and surprise can produce unsettling effects in this period where we acclimate to unfamiliar forms of expression. Contemporary readers should not be fearful of embracing something new, or looking at possibilities for literature from all angles, and should enjoy the process. Plasticity and difficult consequences brought on by digital poetry and the superabundance of possibilities inherent in the genre need not lead to frustration. Poetical celebration with exuberance, excess and surprise, conducted through media dynamics, has the capability to enthrall once the organic functionality of the work is identified and understood.

As I was beginning my research on, and practice of, digital poetry—after a decade or more of dedicating my life to poetry—one of my big influences and inspirations was an issue of the journal *Visible Language* focusing on "New Media Poetry". In it, I came across a quote in Ernesto Melo e Castro's essay "Videopoetry,"

> Poetry is always on the limit of things. On the limit of what can be said, of what can be written, of what can be seen, even of what can be thought, felt, and understood. To be on the limit means often for the poet to be beyond the frontier of what we are prepared to accept as being possible. (140)

This perspective gave me a certain type of foundation, impetus, and permission to proceed in the field of digital poetry.[vii] I have done so in several ways, often using anagrams, textual processing, and "sampling" to create output. Much of it I see as falling into a post-Fluxus lineage, and I can also safely say that the production of these literary works contains quite a bit of mathematical effort.

I made quite a few Animated flash poems, or "text-movies". The first ones were homages to my daughters. I also made one for Yoko Ono (see "Hidden Messages"). After the 2008 election, the Associated Press commissioned me to create digital poems for the occasion of Barack Obama's ascendency to the Presidency; *Babushka Macaronies* is one of three3 I prepared.

I have worked on numerous other projects, many of which you can access via my homepage or other locations. Some were made using Flash, including much longer animated works, and some of my most progressive creative research as a digital poet exists

only onstage, where MIDI software allows me to control visual and textual media as I play guitar. Some of my experiments are documented on my YouTube page (http://www.youtube.com/ctfunkhouser).

For me, computers and digital systems and networks have altered the disciplinary sense of what poetry can be, and intimate what literary dynamics may contain in the future (if not how it will be presented to readers). I am now learning, through Waliya about research and practice in African Electronic Literature via the Multilingual African Electronic Literature Database & African Diasporic Electronic Literature Database, which are a very exciting development (Waliya 55-64). I look forward to learning through it.

4.0 CONCLUSION

The purpose of this lecture has been to illustrate several of the primary historical approaches and models in the realm of digital poetry. In the examples introduced above, and on apparent across the Internet, there is an historical consistency displayed, whereby digital poets use language as a conduit, sometimes contained on multiple registers. Digital poets labor to experiment and invent not out of cultural necessity or desperation; works have sprung from self-driven exploration of media and the individual desire to craft language with technology that, in turn, modulates and modifies traditional approaches to writing. The computer presents both a puzzle and formidable sounding board for poetic ideas and animated articulations.

Digital poets use computer science and technology to explore or expand literary reality. Amid these productions, mediated application of ideas aims to stimulate audiences. Factors contributing to the success of works include effective use of time: striking a balance between making viewers familiar–yet not necessarily comfortable – with the process while leading them along in a manner that allows for tension and contemplation. Infusing projects with familiar unfamiliarity and discrepancies offer the benefits of surprise, impart a lack of predictability, and perpetually perform for the audience. Digital poetry grows and expands, not in a unified direction but pluralistically. Computer processes, still relatively new to the world and artists engaging with them, adorn poetic features unavailable to previous generations of literary artists. Writers and artists create with computers in ways that do not simply document the poetic forms of bygone eras: they are reinventing the possibilities for poetry. The authorial ability to shock by media, stun by visual beauty, avoid boredom in and through language, cannot be underestimated.

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AUTHOR'S SHORT BIO

Dr. Christopher Funkhouser is a writer, musician, and multimedia artist. He is author of two scholarly monographs, Prehistoric Digital Poetry: An Archeology of Forms, 1959-1995 and New Directions in Digital Poetry. Funkhouser has taught in the Communication and Media Program at New Jersey Institute of Technology since 1997, and was a Visiting Fulbright Scholar at Multimedia University, Malaysia, in 2006. A publisher who worked closely with Amiri Baraka and Kamau Brathwaite, Funkhouser was commissioned by the Associated Press to prepare digital poems for the occasion of Barack Obama's inauguration in 2009, and in 2016 he performed at the Whitney Museum's Open Plan: Cecil Taylor exhibition. He is a Contributing Editor at PennSound, hosts the POET RAY'D YO radio program at WGXC (Hudson, NY), and is a member of the improvisational musical ensemble Most Serene Congress.

[i] The pursuit of composing poetry by using computer operations began in 1959 when Theo Lutz made "stochastic" (i.e., random variation) poems written on a program-controlled ZUSE Z 22 computer. At the time, he was a student of Max Bense, who suggested using a random number generator to accidentally determine texts. Examples of this work, which applies tools of mathematics and calculation (i.e., logical structures) to process language, along with descriptions of its attributes, were published in a 1959 article ("Stochastic Text") in Bense's journal *Augenblick*. An animated version of the program, made by Nick Montfort, is available via https://nickm.com/memslam/stochastic_texts.html .

[ii] Text generators usually rapidly produce many poems, using a programmatic formula that selects words from a database to create output. Computers cannot be programmed to engineer a "perfect" poem; some poets use the computer to alter or subvert typical forms of expression, others seek to be imitative. Either way, selecting appropriate input text is the most important element in the process of pronouncing meaningful expression. Whoever establishes the database co-authors the poem with the writer of the program; the user of the program also has authorial prerogatives in selecting from and editing output. This type of computer poem challenges and invites the reader to participate imaginatively in the construction of the text; some mock the conventions of poetry, others reify them. From a general point of view, the majority of combinatoric and permutation works produced feature variations, extensions, or technological implementations of Dadaist technique. Many aleatoric poems contain few parameters and also share sensibilities common to open-form poetry. Of course, and somewhat ironically, the poems are not pure chance occurrences—they are preconfigured to be randomized, and some examples contain fixed attributes, as in slotted works, where the author strives to imbue rigid syntax or comply with established parameters. Digital poetry made with text-generating programs gradually developed into a multi-faceted form of its own, exploring many styles of literary expression.

[iii] By the mid-1960s, graphical and kinetic components emerged, rendering shaped language as poems on screens and as printouts. Since then, videographic and other types of kinetic poems have been produced using digital tools and techniques. This advancement—foregrounding the visual aspects of language at least as much as the verbal—marks several changes in the development of digital poetry. In contrast to computer poems introduced above, these visual and kinetic works largely

employ mutation as opposed to permutation. Static and kinetic visual works introduce a poetry of sight, overtly conscious of its look, sited on and incited by computers; standard typefaces became a thing of the past. Digital poets began to work with prosody that was literally in motion. The earliest works by Marc Adrian (1968) and Carl Fernbach-Flarsheim (1970) were, like text-generated poems, automatically spawned by viewers encountering a program in an installation setting. With the development of graphics software, subsequent works embodied visual methods that approximated concrete and visual poems, non-interactively rendered and fixed on the page. The computer became a convenient tool to manipulate the appearance and presentation of text. Some titles closely follow earlier manifestations of visual poetry; others (like the videographic and hypermedia productions) venture further afield and do not aim to simply reconfigure the style of poems that are read and understood exclusively through alphabetic language. By the 1980s, poets increasingly presented moving language on screens as a result of the development of PCs. Kinetic poems long predate a style of digital poetic practice that erupted with the emergence of the WWW, typified by works such as Stefans's "The Dreamlife of Letters", and elsewhere. Groundwork for animated digital poems (such as those made with Macromedia Flash) was in fact underway by the mid-70s, in coded works such as Arthur Layzer's textured animated poetry (written in FORTRAN) that featured words "streaking" down the page. Digitally rendered poems portray at least three different traits: words are arranged into literal shapes; words show patterns that represent dispersal or displacement of language; or, words are combined with images (as in a collage). In static poems words that do not move are placed on the screen. In kinetic works, optical mutation of words and letters is the operative principle; poems, by design, move and change before the viewer's eyes. Poems that inscribe kinetic language can be divided into two general categories: projected and interactive. Projected works set poetry in motion in two distinct ways. Words are plotted into motion (or letters themselves change shape or morph in appearance), or are presented as part of kinetic collages in which elements of language are combined with visual objects or symbols in single or multiple visual scenes/scenarios. In the few interactive works that are kinetic and do not involve overt hypertextual operations, viewers are invited to set some of the poem's parameters (used in the activation or appearance of words), or interact with a virtual object that is fixed in position on the screen. In kinetic works, poets find dozens of ways to portray poetic text as shifting, vibrant verse. Palimpsest is used powerfully; images can be a mélange of fragments of words complimented or replaced by imagistic forms. These poems show that many different expressive elements can be plotted at once, or in a short period of time, layered on top of one another. Putting phrases in motion as sliding, spinning objects, and otherwise synthesizing words, lines, and symbols are the techniques established as typical of all visual works. The inclination to display poetic work in such ways developed alongside the technology capable of accomplishing the task, which has only increased with the technical developments in the WWW era, where even games have been developed.

[iv] In the 1980s, hypertext (non-linear texts that are intrinsically, mechanically interconnected) developed in sync with the increasing availability of the personal computer. Theorist Michael Joyce classifies presentational modes used by authors into two distinct categories: "constructive" and "exploratory" (*Of Two Minds* 41). These models are useful towards establishing the broadest codification of hypertextual poetry. Thus far, nearly all works are explorative, and various forms emerge within this vein of production which pertain to the media inscribed and methods of navigation. As defined by Joyce, exploratory hypertexts allow their audience to guide themselves through a text as interest, engagement, and curiosity dictate, and reflect the author's sense of structure. This mode, according to Joyce, ideally allows the audience the ability "to create, change, and recover particular encounters with the body of knowledge, maintaining these encounters as versions of the material, i.e. trails, paths, webs, notebooks, etc." (41). A reader explores a body of work that has been set before them on the computer. Constructive hypertexts, on the other hand, are steadily built by

their audience, as part of a process of transforming the knowledge previously presented; Joyce has described dynamics of such texts as "versions of what they are becoming, a structure for what does not yet exist" and "serial thought" (179, 189). Programmers developed tools that facilitated such non-linear writing, enabling authors to create links within and between texts while simultaneously incorporating visual, kinetic, sonic, and static verbal texts. In these works, a number of different files (comprised of various media) are programmed into arrangement with each other, presenting poems in segments through a series of links, or may be otherwise conceived, as Jay David Bolter observes in *Writing Space: Computers, Hypertext, and the Remediation of Print*, as "visual objects with which the reader interacts" (156). Once hyper- works were developed, all the principal possibilities of contemporary digital poetry were available—the genre has proliferated in the past twenty years by synthesizing and cultivating each of its modes. We can identify distinct characteristics in every digital poem, but the accumulation of styles confounds any single critical definition of artistic works which merge poetry with digital technology. Essentially, four types of hypertext works were designed: 1.) those which feature only text presented as a series of nodes which are directly interlinked (sometimes with some sort of "map" that can be used as guidance); 2.) those that feature significant graphical and kinetic components (i.e. hypermedia), also based on the 1:1 link-node premise; 3.) those that present a virtual object that the user negotiates (without having to constantly "click" on links to traverse that text); and 4.) those that are formed through methods of aleatoric progression.

[v] Internet publications, network writing initiatives, digital projects conducted in physical space (including holographically presented poems), and audio poetry have been produced since the 1980s. In these manifestations of digital poetry, the expressive issues do not include whether or not the computer can write poetry, or graphically enhance it, but how various types of machinery can be used to accentuate and modify poetic process and range. The collaborative composition of online texts, as practiced by groups, in MOOs and elsewhere, extends previous forms of written collaboration into a virtual environment. Atypical modes of design and quick delivery are characteristics of these publications. In the network era, computers are also being used as a mechanism to circulate contemporary and historical productions. Digital sound tools and processes alter the way voices are constructed, heard, and combined. In so many ways, computer technology has been used in conjunction with poetry, as writers invent new practices, and re-invent old ones with digital media.

[vi] Works that are entirely cinematic, featuring soundtracks favoring the poetic over ordinary narrative, have been explored by Roderick Coover and Scott Rettberg and others.

[vii] For Melo e Castro, Videopoetry and digital poetry both emphasize, "the importance of phonetic values in oral poetry, of scriptural values in written poetry, of visual values in visual poetry and of technological values with computer use and video for the production of poetry, and not only for simple repetitive and non-creative tasks" (141). Another quote that informed my thinking and excited me considerably appeared in André Vallias' essay "We Have Not Understood Descartes," which encapsulates the essence of digital poetry as literature in a broad sense and offers insight into its most potent characteristics: "Interactivity allows a work to be modified according to internal criteria (those defined in the programming language) and also according to the repertoire and interests of the reader; it opens up a field of unlimited dimensions for poetic research, and provokes an irreversible subversion of the traditional relationship between author, work, and reader. (157)