2015 • Press

Golan Levin

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featured a computer-generated animated character (consisting simply of a head) named Jeremiah endowed with artificial intelligence by his programmer, Richard Bowden. Jeremiah tracks participants’ movements with a video camera, and responds emotionally to their behavior. For example, Jeremiah becomes happy when in the presence of a lot of motion, but startled if the motions are too sudden; he grows angry if objects in his field of vision are still, which he construes as ignoring him, and sad if they go away altogether.¹³

Again, the media object, even an autonomous digital agent, need not be visual or even humanoid to function as a virtual actor. In 1997, a team of researchers from MIT presented a piece called “Improvisational Theater Space,” which featured a “typographic actor” consisting of projected text that responded dynamically to a live performer’s gesture, simple words and sentences to create “an emergent story . . . not strictly tied to a script.”¹⁴ In 1988, jazz trombonist and digital composer George Lewis created a computer program called Voyager that improvises with live musicians by detecting melodic and rhythmic patterns in real-time performance and generates its own original music in response. Lewis describes Voyager as “a nonhierarchical, improvisational, subject-subject model of discourse, rather than a stimulus/response setup.”¹⁵ clearly articulating the distinction between what I am calling the actor function (media as autonomous agent) and the prop function (media as instrument).

4. Media as Costume

Costumes in conventional theatre move in conjunction with performers, merging with them to define the character’s identity. In the same way, media objects that function as virtual costumes do not exist as entities discrete from the live performer, either as subject, object, or environment, but are coextensive with the performer. For example, in a segment of Golan Levin and Zachary Liberman’s performance piece *Messa di Voce* (2003), called “Insect Nature Show,” a performer moves in front of a screen, her body occluded by a blob-shaped black shadow that is created by a video projector that tracks her moving silhouette; a jagged edge outlining the blob expands and contracts in response to the timber and pitch of the performer’s voice (fig. 4).¹⁶ Klaus Obermaier and Chris Haring’s *D.A.V.E.* projects video onto a performer’s body to transform a “bare-chested, shaven-headed man”¹⁷ into, by turns, “a wrinkled body with grey hair,” a “bare-chested woman,”
and a “bulbous alien-like” creature with enormous eyes and ears; at one point the performer “lowers his shoulders level with his chest and then peels back his skin to reveal the red flesh underneath.”

Another example of media-as-costume is a robotic prosthesis, such as the “gleaming black insectile body-suits ornamented with long prosthetic arm extensions, hinged in the middle, that they could flip open and closed like jackknives” created by the Jim Henson Creature Shop for the Random Dance Company’s Nemesis (2002). In some cases, media can serve to meld multiple performers together to create a single character. The dancers in iLuminate perform in pitch darkness wearing costumes embedded with LEDs that are controlled wirelessly by offstage computers. At one point a pair of dancers may work together to create the illusion of a single character whose head floats away from the body and through the air; at another point, a group of dancers might create the image of a monstrous creature with four extremely long, spider-like legs suspending a body high in the air.

In some of the most sophisticated examples of media-as-costume, the
Practices of Abstract Art
Between Anarchism and Appropriation

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Isabel Wünsche and Wiebke Gronemeyer
phenomenon of synaesthesia. Persons, not artworks, are synesthetic. Ultimately, there is no such thing as synesthetic art—but that has not stopped anyone from trying to create it.”\textsuperscript{9} The fusing and synchronizing of the multiple senses facilitated by computer programming was most seductive in establishing the category of “synesthetic art” as a determining element of digital art. “Computers, which offer the possibility of controlling and synchronizing different media and implementing highly abstract compositional structures across media, seem an ideal tool for synesthetic art.”\textsuperscript{10} In the same line of argumentation, the concept of media synesthesetics was introduced as a complement to and key enabler of synesthetic (inter)media art.

However, media are not synesthetic themselves, but allow for synesthetic perceptual experiences. It is of crucial importance to differentiate between medialities and modalities and look carefully how they relate to and interact with each other. Only this way, a new digital synaesthetics as aesthetic theory of sensorial transcoding and hyperbinding can be convincingly developed. The path towards the achievement of this target is long and stony, given the fact that the traditional hierarchy of the senses together with the common privileging of one specific sense has to be overcome. The electronic artworks presented in the following prove evidence that, with regard to their technological development stage, it would be more appropriate to assign them to a “heteroaesthetics,” because they demonstrate the experimental phase of how to artistically and technologically model crossmodality and intersensoriality while often leaving the beholder/user in a state of perceptual irritation, destabilization, or even alienation.

**Syn(es)thesizing script: Hypermodal dimensions of programed writing**

(Trans-)scribing the body: intersensorial as intercorporal communication

In view of its abstract visual language, the interactive installation *Ghost Pole Propagator* (2007) (Plate 8.1) by the US-American media artist Golan Levin expresses the pictographic trend triggered off by digital


\textsuperscript{10} Ibid., 399.
writing culture and its new means of interactive communication. The original version of the installation was designed for projection in the thirteenth century Belsay Castle Hall in Newcastle, England, as part of the Picture House exhibition. The work presents a ghostlike transcription of the visitors moving in the exhibition space, capturing and replaying the abstracted skeletons of its own observers. Viewers are interactively confronted with the real-time images of their own body movements abstracted to stick-figures, but also with the animated skeletons of previous visitors. Projected simultaneously onto the historical stone wall of the castle, the human stick-figures are suggestive of the ancient petroglyphs of the British Isles. By this process of transcription, the work performs the introduction of so-called “real characters”—the creation of which has been a major ambition in the history of universal writing projects. The movements and gestures of a real object, the body, are caught in real time and real space, thus transcribing the body character into real characters—the pictographs of the human figure. This transmission process is activated by the interactive art installation, serving the function of a transcoder for the creation of (virtual) universal communication among humans.

This virtual experience of script animation is more explicitly emphasized in the interactive installation Bloated City/Skinny Language by the Hong-Kong Chinese media artist Hung Keung. (Plate 8.2) Dating from 2007, it reflects the technological advancements in the field of interactive computer animation. The work presents itself as an allegory on “new” China, driven by radical economic modernization. The change process is visualized on the basis of Chinese writing, its reform history. The divide between traditional and modern writing, that is complex and simplified Chinese characters, is highlighted in the form of two juxtaposed screens that allow for an immediate experiential comparison between the old and new Chinese system.

The viewer, standing and moving in front of the screen installation, is recorded in real-time. He or she is confronted with his/her self-image in life action, run over by animated Chinese characters that move like insects. The moving behavior of these characters on the left screen differs principally from that on the right screen. The more the viewer tries to move away from his/her own projection image on the left side, the quicker the characters follow him/her. However, an escape movement on the right side allows the viewer to at least temporarily flee the relatively slowly moving swarm of characters. It was a central motivation of the artist to make the viewer bodily experience the contradictions between move-on and stand-still, approaching and distancing. Like new China, the new
writing is on the leap. Through strong inter-sensory body experience, the installation seeks to evoke the new mobility and visual interaction capacity of writing, the feeling of “characters on the move.”

Yet, the transcribing of the body is characterized by a paradox. The bodily performed withdrawal from writing, here from the rich Chinese writing tradition, results in a virtual-real revival of writing. The characters of *Bloated City/Skinny Language* show off a very aggressive behavior.\(^{11}\) The script unfolds an enormous power in itself, an insect-like life of its own. It captures the body in communication with it, casts a textile web around it, inscribes into it. The entanglement in Chinese writing becomes the symbol for a society caught in the dilemma between tradition and renewal, continuity and change. Thus, the power of persecution of the characters also implies a critique of writing: not to forget the rich cultural heritage of Chinese writing and its related writing culture over the rapid societal transformations in the age of digital abstraction.

**In-situ visualization of gestural writing and typography**

Hand movements, including handwriting, are often involved in digital writing as a programming process. This has to do with the fact that the hand is employed as an interface tool. By way of manual impulses, gestural aspects of writing are revived. *The Manual Input Session* (2004), an interactive installation and performance realized by Golan Levin in cooperation with Zachary Lieberman, demonstrates the digitally augmented possibilities of handwriting as gestural writing and movement script. They are reminiscent of modern experiments in gestural abstraction, as found in American abstract expressionism and French tachism and Informel.\(^{12}\)

Scribbling as a manual form of pre-, proto- or even post-writing is transcribed into picto-sono-graphics. This result is attained by the synthesizing of analog and digital image recognition and transmission.

\(^{11}\) This aggressive script animation stands in stark contrast to softer modes of in-situ visualization of writing. In the interactive script installation *Textrain* (1999) by the video installation artist Camille Utterback for instance, the viewer is animated to tenderly, almost erotically play with writing by catching letters “raining” over the screen and thus forming text particles.

During the performance, a computer vision system analyses the silhouettes of the performers' hands as they scribble on transparencies, and move across the glass tops of the overhead projectors. The hand gestures and transparency drawings are then analysed by custom software. In response, the software generates synthetic graphics and sounds that are tightly coupled to the forms and movements of the performers' actions. The synthetic responses are co-projected over the organic, analog shadows, resulting in an almost magical form of augmented-reality shadow play.\textsuperscript{13}

The hypermodal configuration of the audiovisual performance manifests itself in the production of sounds from shapes created by the performers' hand actions.\textsuperscript{14} It is as if the performers would direct the audiovisual concert by the magic silhouette play of their hands.

The \textit{Alphabet Synthesis Machine}, created in 2001 by Golan Levin, Jonathan Feinberg, and Cassidy Curtis for Art21 in New York and The Arts Company in Cambridge, Massachusetts, refines the digital synthesizing of script on the level of the writing system, although it maintains the manual input of handwriting as primary design source. Constructed as interactive online artwork, the \textit{Alphabet Synthesis Machine} allows users to guide "an evolutionary genetic algorithm in order to create and explore coherent sets of abstract glyphs."\textsuperscript{15} The abstract, imaginary alphabets, or in more neutral terms, graphic sign inventories of virtual writing systems (Fig. 8.1), can be downloaded as PC-format TrueType fonts at both the time of its creation, or at any future time from an online archive in which the users' script creations are permanently stored. With regard to the technical realization of the project, it becomes manifest that

\textsuperscript{13} Quoted according to the work description by the artist under http://www.tmema.org/mis/.

\textsuperscript{14} Mainly three software instruments have been used to produce the gestural concert: \textit{NegDrop}, \textit{InnerStamp}, and \textit{Rotuni}. By use of the NegDrop instruments, interior contours become droppable virtual objects which emit sounds when they collide with the boundaries of the overhead projection. InnerStamp enables interior contours to persist after being created. The Rotuni software instrument allows for the generation of a rhythmic melody for each positive silhouette contour. For a detailed explanation of these software instruments, Golan Levin and Zachary Lieberman, "Sounds from Shapes: Audiovisual Performance with Hand Silhouette Contours in ‘The Manual Input Sessions’," Proceedings of NIME '05 (2005), Vancouver, BC, Canada, http://www.flong.com/storage/pdf/articles/NIME_2005c_MIS.pdf.

\textsuperscript{15} Cit. following http://www.alphabetsynthesis.com/, accessed September 11, 2013.
the concept of genetic art as self-producing art is applied to the genesis and evolution of writing:

At the heart of the interactive applet is a genetic algorithm. This algorithm attempts to evolve a population of candidate glyphs according to a set of fitness metrics established by the user. Some of these fitness metrics are obtained from an initial “seed glyph” provided by the user, while others are controlled by the user in real-time, through a set of parametric sliders and other interface controls. The glyphs are evolved both as individuals (i.e. each in relation to an ideal metric, in order to enhance their individual “letterness”), and also as a species (i.e. each in contradistinction to each other, in order to enhance the variety of the alphabet as a whole).\textsuperscript{16}

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Figure 8.1. Free characters produced with Golan Levin’s \textit{Alphabet Synthesis Machine}. Copyright Golan Levin.


Machine which emphasizes the handwritten gestural mode of production, the Alphabet Soup project departs from typography as a playground for algorithmic script generation. The linguistic goal of this project is to develop a “universal grammar,” or more precisely, devise a universal grammatology of European orthography by programming an alphabet synthesis. With this vision, Alphabet Soup presents itself as one of the, historically speaking, rare projects of universal typographic writing systems, only technically enabled by the programmable composite modularities of the computer. Generated by a computer, hypotheses are produced about what basic graphic forms are needed in order to be able to set up all forms of existing letters as they are found in the different alphabetical writing systems confined to Europe. So far, Chisholm has included the Latin alphabet, Arab numbers in upper and lower cases, the International Phonetic Alphabet, and parts of the Greek alphabet in upper case in the typographical analysis. The project relies on fixed rules for a typographical, principally expandable syntax with the help of which clear program instructions about the composition of the letters can be given. As a result, a correspondent typographic-syntactic rule is composed of 1. the initial stage of the graph or graphic nucleus, and 2. a list with further construction phases that provides insight into how the construction of the initial graph is continued, whether graphs are added horizontally and/or vertically and up to which distance. The graphical key units from which the alphabetical universal letters are to be constructed have been designed by the artist himself using standard serif fonts such as Times. The graphical composite modules through the combination of which the alphabetically-synthesized letters emerge are produced by the application of the programming language Python and the related Imaging Program. The typographical result looks both familiar and unfamiliar. Although the new universal alphabetical writing is visually recognizable and a general readability of words and sentences is given, it looks transcoded, like a foreign, un-deciphered alphabetical writing system. Once again, we are confronted with a visuo-graphical semi-meaning of symbols, already characteristic for the Alphabet Synthesis Machine. Reading irritations and comprehension difficulties mostly occur during the icono-graphic transcoding. The sentences on the basis of which the typographic alphabet synthesis is illustrated are manifesto-like phrases. They are more than explicit about the digital transformations to which the type-set and orthographic system is subjugated. In a paradoxical turn, namely in the image of the new, digitally synthesized typoscript, typography is declared dead and the boredom of the Unicode is complained about.
Rather informative is a close look at which graphic signs the *Alphabet Soup* project deliberately spares when formulating rules and hypotheses for the development of a universal *grammatography*.21 Beside punctuation signs, special symbols, mathematical symbols, diacritical signs, type-based notation signs, and ligatures, these are to a large extent the characters of non-European writing systems as hieroglyphic graphs and ideographic characters, as well as handwritten signs. There is a good reason for the renouncement on these graphic sign types: Due to their higher graphical complexity, they present a particular challenge for graphic programming. Therefore, the typographical transcription experiment is, at the given time of its production, still limited to alphabetic writing as the by far most reduced system of graphs. This shows that digital abstraction has to be understood and developed as a tool of complexity reduction.

**In-situ visualization of speech**

Whereas the *Alphabet Synthesis Machine* was developed by Golan Levin with the target to enable the in-situ visualization of writing as graphic design process, the artistic project *Hidden Worlds* (2002) with its companion piece *RE::MARK* and *Ursography* (2005) aimed at the converse process of digital transcription, that is in-situ speech visualization. It is more than natural that forms of iconic writing pop up when it comes to the visualization of speech, since it is writing, in its most advanced and consistent form of alphabetic writing as relatively pure phonetic writing that serves the traditional linguistic function of visually representing spoken language. The multimedia performance *Ursography* commissioned by the 2005 Ars Electronica Festival in Linz, Austria, is a very representative example for demonstrating that digital speech visualization results in new crossmodal forms of iconoscripts. The work has been conceived as a new audiovisual adaptation and interpretation of Kurt Schwitters’ famous *Ursonate*, a piece of concrete sound poetry that has written history as vanguard forerunner of audiovisual media and performance art.

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In *Ursonography*, the live performance of the *Ursonate* by the virtuous Dutch sound poet and vocalist Jaap Blonk is multimodally augmented by the use of computer-based speech recognition, including a real-time syllable detector, combined with score-following techniques that allow the simultaneous visualization of the sounds produced by the interpreter on stage. The sounds are visually displayed on a projection screen as real-time written subtitles. The visuo-phonetic transcription of the live-produced sounds is animated: letters, among them punctuation marks, are wildly moving or smoothly floating around in the visual, topographical space of the projection screen, directly depicting the timing, sound volume, and timbre of Blonk’s vocalizing in dynamic typographic transformations. As Roland Barthes was obsessed by “seeing language,” so is *Ursonography* by “seeing sound.” The poem *Ursonate* can be seen in a new sono-iconic way that allows the viewer/listener the crossmodal perception and interpretation of the piece. It is exactly by this technological enhancement of semiotic transcoding that Golan Levin’s ursonographic project sheds new “digital” light on the early typographic experiments of avant-garde art, in particular lettrism which pursued similar goals of speech visualization.

The installation *RE:MARK* presents a similar, but more analytic attempt to visualize speech that is naturally invisible:

... sounds spoken into a pair of microphones are analyzed and classified by a phoneme recognition system. When a phoneme is recognized with sufficient confidence, the written name of the phoneme (for example, oh, ee, ah, etc.) is projected on the installation’s display. If the user’s sound is not recognized by the system’s classifier, then an abstract shape is generated instead, according to parameters derived from the timbral (spectral and formant) characteristics of the vocalization. Among other mappings, sounds with high-frequency spectral centroids are represented with pointier, more irregular forms.\(^{22}\)

An important element of this interactive sound-iconics is the *in situ* visualization, referring to the animation of the transcribed phonemes and sounds in such a way that they appear to emerge from the mouth of the performing speaker. This is realized by using a speech analysis system in

combination with a computer-vision system that estimates the location of the user’s mouth in relation to the head silhouette projected onto the screen. What RE:MARK evidences by the combined usage of complex transcoding technologies is the threshold of phonetic recognition. It illustrates the gray zone between sub- or prephonetic and phonetic comprehension, semi-recognition and full recognition as transitional differences between graphic shapes and graphic signs, that is letter forms. The title RE:MARK intriguingly reflects this phonetic threshold as writing threshold since it implies the return—or reversal—of a remark as spoken utterance to/wards a mark as graphic marking, a point of origin from which writing historically evolved. In that sense, it is also symbolic for the early stage of digital (trans)writing with its multimodal analytical processing.

Seeing hearing: The hypermodal modeling of sound

The work of the Korean media artist Kim Kichul explores the crossmodality of sound in multidimensional ways. Connective work titles such as Sound Talking, Sound Drawing, and Sound Looking indicate Kim’s artistic ambition to fuse different active and passive sense modalities, that is: to let sound speak, or draw, or look. His own self-understanding as sound sculptor reveals that his primary goal is to embody, materialize, and visualize the abstract, immaterial and transient qualities of sound. According to a statement by the artist, the idea to use sound as a medium for artistic creation was inspired by the Buddhist figure of the Bodhisattva Avalokiteśvara (Holder of the Lotus, Lord of the World). It was initiated by a kind of synesthetic experience—the looking at radio sound. His first sound artwork entitled 11-Faced Avalokiteśvara (1993) was derived from his own experience of

feeling as though I were looking at the actual physical sound coming from a radio. While questioning what it meant to actually see something, I was inspired by the word Avalokiteśvara which (translated in the Sino-Korean characters Kwan Eum) means “to see the sound.” What struck the chord within was a verse from Bomunpum—the 25th chapter of The Sutra of the Lotus which stated that if Sattva, in their suffering, chanted the Avalokiteśvara with a simple concentration, they could reach to Nirvana. I therefore placed 10 statues of Avalokiteśvara each on the radios tuned
Schriftikonik.
Bildphänomene der Schrift in kultur- und medienkomparativer Perspektive

Birgit Mersmann
205

In seiner Beschreibung des ikonisch organisierten elektronischen Schreibraums verweist Bolter auf das Konzept der Bildschrift als aktueller Form postphonetischen Schreibens. Er benutzt die Bezeichnung »Bildschrift« (picture writing) jedoch primär zur Definition der hyptertextuellen Funktion des Computerprogramms, Schrift(text), Bilder und Diagramme automatisch zu kombinieren und in dieser Symbiose auf dem Bildschirm darzustellen. Über diesen Referenzrahmen hinaus liegt es jedoch auf der Hand, den Begriff auch auf neue Formen elektronischer Bilderschriften im strengen visuell-kommunikativen Sinne der Piktographie anzuwenden, insbesondere wenn man das Character Design, die neue Bildzeichengraphik in den Blick nimmt, die sich in den digitalen Künsten und Medien als ein globaler Trend der visuellen Kultur zu erkennen gibt.

Das An- und Ausschalten der auf dem Schreibtisch stehenden Tischlampe aus. Die seiner eigenen Medialität zurück: In seiner neuen multimedialen Form als Berührung des abgebildeten Lichtschalters mit dem elektronischen Lese-Schreibstift...
In den 1980er Jahren, als Xu Bing noch in China lebte, entwickelte er in seinen Kunstprojekten Ansätze zum in der typographischen Logographie garantiert gegebenen konkreten Zeichenkatalog, der in der chinesischen Schrift die Grundlage für die von der Maoistischen Schriftreform herabgeordnete Übergänge der ideographischen Schrift und Schriftkultur in den prioritär kommunikativen Charakter und unterminierten Evakuierung des chinesischen Schriftzeichensystems verbunden war. Die Kalligraphie fungiert dabei als eine Art künstlerische Spielwiese, auf der sich Sprach- und Zeichenverbände, die aus einer speziellen sprachlichen Konstellation entstanden sind, anordnen lassen. Aufgrund der topographischen Reorganisation der Zeichensysteme fußenden Intermedialität scheint sich das von jeder Kunstpraxis nachwirkende Netz der Ideographie auf rein visuelle, völlig bedeutungsleere Zeichen zu verbergen. Xu Bing setzte die Zeichen als Metaphern für das, was nicht mehr geformt werden kann, und das heißt, dass die Zeichen keine sprachlichen Kategorien mehr umfassen. Darauf aufmerksam, dass sie es mit einem alphabetischen Schriftsystem zu tun haben, das die chinesische Sprache als nationales Eigentum legitimiert, so erzeugten die Zeichen eine Form digitaler Remediation (und damit Hyperschrift) der analogen, vom Künstler selbst erfundenen und gestalteten »Quadratwort-Kalligraphie«. Er war der erste, der auf die sprachliche Transformation aufmerksam machte, dass sie es mit einem alphabetischen Schriftsystem zu tun haben, das die chinesische Sprache als nationales Eigentum legitimiert, so dass die Zeichen eine Form digitaler Remediation (und damit Hyperschrift) der analogen, vom Künstler selbst erfundenen und gestalteten »Quadratwort-Kalligraphie« dar. Man sollte sich aufmerksam machen, dass sie es mit einem alphabetischen Schriftsystem zu tun haben, das die chinesische Sprache als nationales Eigentum legitimiert, so dass die Zeichen eine Form digitaler Remediation (und damit Hyperschrift) der analogen, vom Künstler selbst erfundenen und gestalteten »Quadratwort-Kalligraphie« dar. Man sollte sich aufmerksam machen, dass sie es mit einem alphabetischen Schriftsystem zu tun haben, das die chinesische Sprache als nationales Eigentum legitimiert, so dass die Zeichen eine Form digitaler Remediation (und damit Hyperschrift) der analogen, vom Künstler selbst erfundenen und gestalteten »Quadratwort-Kalligraphie« dar.

Sprachtransformation als ikonische Transkription


Durch die stilisierte Ikonisierung der Schrift, der Reduktion der Sprachkomplexität und der sich in den Zeichen vorwiegend verbergen sich aber auch politische Implikationen. Die typographische Logographie verändert sich aber auch politische Implikationen. Die typographische Logographie ist nicht nur als konkrete kritische Geste gegenüber der Maoistischen Schriftreform interpretiert worden, sondern auch als eine generelle Kritik an Schriftformen und ihrer Schreibweise, die als politisches Medium und besonders als nationales und politisches Machtwerk fungieren. Xu Bing machte die Sprache nicht mehr zum einzigartigen Projekt, repräsentieren die Wendepunkte dieses mediakulturellen Streits, und die Zeichen wurden nicht nur als künstlerische Zeichen, sondern auch als Persönlichkeitsabdrucke verwendet, die die Persönlichkeit, den Charakter und die Herkunft des Schreibenden widerspiegelten. Die Kalligraphie fungierte dabei als eine Art künstlerische Spielwiese, auf der sich Sprach- und Zeichenverbände, die aus einer speziellen sprachlichen Konstellation entstanden sind, anordnen lassen.

Zusammenfassend könnte man sagen, dass die Quadratwort-Kalligraphie als eine ikonische Transkription von Alphabet und Graphik weitschweifige Auswirkungen auf die Sprach- und Kulturverhältnisse der Zukunft der Schrift und Kultur im allgemeinen hat. Es ist jedoch wichtig zu beachten, dass die Quadratwort-Kalligraphie als eine ikonische Transkription von Alphabet und Graphik nur ein Beispiel für die Auswirkungen von ikonischen Transkriptionen und ihrer vielfältigen Auswirkungen auf die Schrift und Kultur ist.

217

Skriptoikonizität

Ikon(o)Skript

kommunizieren wollen, tippen sie einen englischen Satz in die Tastatur ein, wie beim Chatten, und drücken dann die Eingabetaste, wodurch die Simultanübersetzung des eingegebenen Satzes in die von Xu Bing kompilierte piktographische Symbolsprache aktiviert wird. Aufgrund ihrer interaktiven Konzeption demonstriert die Installation anschaulich, wie globale E-Kommunikation sich in Richtung ikonischer Schrift bezieht - Icon-Schrift.

Von höchster Relevanz ist in diesem Kontext die Frage, auf welche systemischen Grundlagen und Prinzipien Xu Bing seine universale Icon-Schrift oder kurz: seinen Unicode gründet [Abb. 29].


Eine bemerkenswerte Novität des universalschriftlichen Projektes betrifft die translatorische Funktionserweiterung. So soll das ›Grundbuch‹ auch als universales Übersetzungstool zum Einsatz gelangen und die Übersetzung geschriebener Sprachen aus aller Welt, einschließlich der zugehörigen Schriftsysteme, in das vom Künstler graphisch gestaltete und kontinuierlich ausgebaut piktographische Universalschriftsystem leisten. Die mit dem Buchprojekt verknüpfte Entwicklung eines Font Library-Computerprogramms ermöglicht es dem Nutzer, englische Sätze über die Computertastatur einzugeben und mitzuverfolgen, wie diese in die neue ikonische Schrift ›übersetzt‹ werden. Das zukünftige Potenzial dieser eigens kompilierten und programmierten Universalschrift beschreibt Xu Bing wie folgt: »[...] after our currently unfinished computer program is perfected, writers of every language will be placed on equal footing. To a certain extent, this software will function as a point of transfer between dissimilar languages. This early result should not be minimized because it has limitless potential to expand into even larger arenas. The relationship between our new language and other, pre-existing languages resembles the relationship between Mandarin and the many Chinese dialects: disparate pronunciations refer to identical characters. English cannot become a ›global language‹, as its relationship with other languages is one of mutual exclusivity. As the use of English expands, other languages are lost. Michael Evamy states, ›for now, the world's peoples must either be addressed in their own language, or by non-verbal means.‹ In that respect, a pictographic language not reliant upon phonics has a special advantage.«

Der zentrale Aspekt einzelsprachenunabhängiger, ikonisch fundierter Schriftkommunikation spiegelt sich deutlich in der Aufbaustruktur der Installation wider. Zwei Computerstationen stehen sich dialogisch gegenüber; sie sind durch eine Wand aus Milchglas voneinander getrennt. Auf der Glaswand notiert ist ein schriftikonischer Dialog, notiert in Xu Bings universaler Bilderschrift. Die beiden Computerterminals sind mit einem Basis-Chatprogramm ausgestattet. Die Chattteilnehmer sitzen sich gegenüber. Einerseits werden sie durch den transparenten Raumteiler auf Distanz gehalten; andererseits sind sie sehr nah zueinander platziert, wodurch der Eindruck einer Telepräsenz entsteht. Wenn die Computernutzer...
Ikon(o)skript

Skriptoikonizität

universaler Schriftprojekte immer schon eine große Herausforderung darstellte. Die historischen Perspektive der an ihrer generellen Anwendbarkeit gescheiterten duziert die Arbeit so genannte »Realcharaktere«, deren Kreation in der Geschichte

den kann. So utopisch sich das künstlerische Buch-Projekt aus der

mit der neuen piktographischen Schrift vertraut zu machen, so dass sie in Zukunft, dies

auf die historische Steinmauer des Schlosses vermitteln diese den Eindruck alter Pe

noch ist das Übersetzungsprogramm ein wesentliches Element des

–

mittleren Buches. Es erlaubt den Künstlern, in Zeichnungen interagierend mit den Echtzeitschli

nen auszudrücken. Eine Mehrfachiteration des auf Zeichenmultiplikation basierenden

»Stau« auszudrücken. Eine Mehrfachiteration des auf Zeichenmultiplikation basierenden

das aus einer Dopplung des Schriftzeichens für Holz beziehungsweise Baum gebildet

–

-resulten, sie beziehen sich auf die Entwicklung der Schriften von der frühen Kristallographie

Varietät bildhafter Zeichentypen ist nicht auf eine Standardkategorie reduziert; sie ist

als die interaktive Installation鬼魂旗牌 2006. Die Installation besteht aus einem Anhangs

E, der die funktionale und formale Ästhetik des Schriftzeichens aufgreift, ist nicht auf die

statische Schrift, sondern auf die dynamische, die die Zeichen und Schriftzeichen in ihrer

multimodale Dimension

Einen interessanten Aspekt bietet die Kombination von...
Ikon(o)Skript

Alphabetsynthesemaschine produziert. Zieht man die technische Realisierung des Schriftsynthese-Projektes in Betracht, so manifestiert sich, dass das Konzept genetischer Kunst als sich selbst generierender Kunst hier auf die Genese und Evolution der Schrift angewandt wird:

»At the heart of the interactive applet is a genetic algorithm. This algorithm attempts to evolve a population of candidate glyphs according to a set of fitness metrics established by the user. Some of these fitness metrics are obtained from an initial ›seed glyph‹ provided by the user, while others are controlled by the user in real-time, through a set of parametric sliders and other interface controls. The glyphs are evolved both as individuals (i.e. each in relation to an ideal metric, in order to enhance their individual ›letterness‹), and also as a species (i.e. each in contradistinction to each other, in order to enhance the variety of the alphabet as a whole).«

Die Aktivität händischer Schriftschöpfung determiniert die Impulse zur Generierung der Glyphen:

»The glyphs themselves are the virtual trajectories of synthetic hand movements, produced by a 3-dimensional physics simulation of a hand-pen-paper system. This model incorporates such forces as the response of hand muscles to neural firing rates; the inertia and Bewegungen und Gesten eines realen Objekts – in diesem Fall des menschlichen Körpers – werden in Echtzeit und im Realraum aufgezeichnet, die Charakteristika des agierenden Körpers in reale Charaktere – Piktogramme der menschlichen Gestalt – transkribiert. Wie bereits zuvor herausgestellt, gewinnt die Hand und Handschrift neue Bedeutung, wo sich der Schreib- als Programmierprozess gestaltet. Dies hat unter anderem damit zu tun, dass die Hand als klassisches Handlungsmedium des Schreibens neu als Interfacetool zum Einsatz gelangt, wodurch die gestischen Aspekte der Schrift, die in der Schriftgeschichte und Schrifttheorie meist mit ideographischen und hieroglyphischen Schriften in Verbindung gebracht wurden, wiederbelebt werden.


»During the performance, a computer vision system analyses the silhouette of the performers’ hands as they scribble on transparencies, and move across the glass tops of the overhead projectors. The hand gestures and transparency drawings are then analysed by custom software. In response, the software generates synthetic graphics and sounds that are tightly coupled to the forms and movements of the performers’ actions. The synthetic responses are co-projected over the organic, analogue shadows, resulting in an almost magical form of augmented-reality shadow play.«


Ihrer Aktivität bezieht sich auf handschriftlichem Input als Primärquelle des programmierten Schriftdesignprozesses [Abb. 31]. Aufgrund ihrer Konzeption als interaktives Online-Kunstwerk erlaubt die Alphabetsynthesemaschine ihren Nutzern, »einen genetischen Evolutionsalgorithmus anzuleiten, mittels dessen ein kohärentes Set abstrakter Glyphen kreiert und erkundet werden kann.«

Die abstrakten imaginären Alphabete, oder neutraler ausgedrückt, graphischen Zeicheninventare virtueller Schriftsysteme können als TrueType Fonts im PC-Format heruntergeladen werden, und zwar sowohl zum Zeitpunkt ihrer Kreation, als auch zu einem späteren Zeitpunkt, da alle user-kreierten Schriften in einem Online-Archiv dauerhaft gespeichert werden. Seit dem Start des Projekts am 1. Oktober 2001 wurden mehr als 5000 Alphabete mithilfe der online geschalteten 31
Ikon(o)Skript
Skriptoikonizität

berühmter Ursonate vor, einem Stück konkreter Lautpoesie, das als avantgardistisch
chen scheinen. Technisch realisiert wird diese Topographie des Sonographischen durch die
beit führt eine neue audiovisuelle Adaption und Interpretation von Kurt Schwitters-
pisch so animiert werden, dass sie aus dem Mund des performenden Sprechers aufzuta-
–
Festivals in Linz 2005 entstandene Multi-
Ars Electronica

Ein wichtiges Element der interaktiven Lautikonik ist die
(gesprochener) Sprache. Dabei tauchen meist auch Formen ikonischer Schrift auf. Ein
oder die Visualisierung von
fi

neme (for example, oh, ee, ah, etc.) is projected on the installation's

sonus spoken into a pair of microphones are analyzed and

date spezialised are recorded with computer noise filters.

Die Schrifttypenexperimente Paleys demonstrieren, dass die Schrift-
schrif-wörtlichem als auch übertragenem Sinn.

–

–

Die Funktionsweise der Arbeit erläutert der Künstler wie folgt:

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–

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sonor gestaltet und bildreich dynamisiert überwindet sie ihre typographisch

im Kontext digitaler Kunstproduktion häufig.

–

–

–

Vorläufer audiovisueller Medien- und Performancekunst gelten kann. Die sonogra-

so sehr ist

versüßt. Die Laute werden als in Echtzeit geschriebene Untertitel auf den Bild

hidden Worlds
MARK
RE

So lud Paley aus Adobes

so dass der Prozess des Überschreibens zum Transkript gerinnt. Die Motivation, ty-

dynamisch-typographischen Transformationen bilden sie direkt, also in Simultan-

I'm enthralled by the approximating traces

–

–

–

So interessiert sich Paley für die Frage, wo der graphisch indizierte Grenzwert für das

verschiedener Buchstaben, unter ihnen verstreut auch Satzzeichen, wirbeln durcheinander oder schwe-

sonant, Laute zu sehen und sichtbar zu machen. Das

die Schriftzeichen jedes Schrifttypenzeichen

durch den topographischen Bildraum der Projektionsschirme. In diesen

Die Funktionsweise der Arbeit erläutert der Künstler wie folgt:

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sonor gestaltet und bildreich dynamisiert überwindet sie ihre typographisch

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hidden Worlds
MARK
RE

So lud Paley aus Adobes

Aufgrund ihres hohen Verschaltungsgrades sind digitale Ikonoskripte als hypermodale Transkripte ausgewiesen. Transkription referiert hier auf die »transskriptiven Kopplungen zwischen medialen Symbolsystemen«, die Ludwig Jäger als grundlegendes Verfahren der kulturellen Semantisierung definiert hat.

Die Kategorie der »Hypermodalität« bezieht sich auf »die neuen Interaktionen zwischen wort-, bild- und lautbasierten Bedeutungen in Hypermedien, d.h. semiotischen Artefakten, in denen die Signifikate auf verschiedenen Ebenen syntagmatischer Organisation in komplexen Netzwerken miteinander verlinkt sind.« Das »Trans« im Begriff Transskript hebt dabei sowohl auf die Überschreitung der traditionell ein-sinnigen Sprachbezogenheit von Schrift ab, als auch auf das neue translatorische Potential von Programmierschrift/en als Kommunikationsinstrument und Transaktionstool. Transkribieren erweist sich als ein integraler Bestandteil digitaler Transkodierung, es steht für universelle Übersetzung beziehungsweise Übertragbarkeit ein. An dieser transversalen Perspektive gibt sich der Einfluss digitaler Technologie auf die Kulturtechnik der Schrift und die durch sie hervorgebrachten Schriftkulturen am deutlichsten zu erkennen.

Die neue transmediale Qualität elektronischer Bilderschriften oder Ikonoskripte steht in unmittelbarer Relation zu ihrer multimodalen Potenz. Dass Digitalität vor allem auf sensorischen Transaktionsleistungen gründet, hat der kanadische Mediensoziologe Brian Massumi in seiner kritischen Reflexion des Medienkonzepts hervorgehoben.

Golan Levin, **RE:MARK**, 2002; interaktive Installationsansicht im Ars Electronica Futurelab.


Beyond the Display
Phenomenal Art and Design in the 21st Century
Edited and Written by Mika Iwasaka
# Table of Contents

**Introduction — Between the Visual Arts and Scientific Technology**

## Light
- Jim Campbell / Exploded View (Commuters) .................................................. 22
- Clafur Ellasson / Model for a timeless garden ............................................. 24
- Clafur Ellasson / Round rainbow ................................................................. 23
- Kimchi and Chips / Light Barrier ................................................................. 30
- Carsten Nicolai / moiré rota ............................................................ 32
- Alex Posada / The Particle ................................................................. 34
- Ryoji Ikeda / spectra [london] ........................................................... 36

## Wind
- WOW / BLOOM SKIN ........................................................................... 42
- Dean Roosegaarde / Flow 5.0 ................................................................. 46
- Tokujin Yoshioka / Maison Hermès Window Display ......................... 48
- Nils Völker / Thirty Three (Trente Trois) ........................................... 50
- Kimchi and Chips / Lunar Surface ......................................................... 52

## Sound
- Zimoun / 329 ...................................................................................... 58
- Richard Garet / Before Me ................................................................. 62
- Rafael Lozano-Hemmer / Voice Array .................................................. 64
- Diane Landry / Knight of Infinite Resignation .................................... 68
- Yuko Mohr / Oni-bi (ten fire) ............................................................... 70
- Carsten Nicolai / wellenwanne Ifo ....................................................... 72
- Sochiro Mihara / bell .......................................................................... 74

## Space
- Random International / Rain Room ....................................................... 78
- Richard Wilson / Turning the Place Over ............................................. 82
- United Visual Artists / Chorus .............................................................. 84
- Dato Manabe / Motoi Ishibashi / particles .......................................... 86
- Seiko Mikami / Desire of Codes ............................................................ 90
- Universal Everything / Communication ............................................. 92
- Ruari Gymn / Fearful Symmetry ........................................................... 94
- Mari Velonaki / Fish-Bird ................................................................. 96
- Robert Herke / Fragile Territories ....................................................... 98
Sculpture

Choe U-Ram / Opus Luna Umbra (Hidden Shadow of Moon)

Maika / Cloud

Galen Levin and Greg Baltus / Opto-isolator

Daniel Pfaffing / Waves

Performance

Rafael Lozano-Hemmer / Amodal Suspension - Relational Architecture 8

Rafael Lozano-Hemmer / Levels of Nothingness

United Visual Artists / Echo

Klaus Obermaier and Ars Electronica Futurelab / Apparition

YCAM InterLab / Yoko Ando / Reactor for Awareness in Motion (RAM)

Shiro Takatani / CHROMA

Others

Daniel Schulze / bltsbeauty / For Those Who See

Niklas Roy / My Little Piece of Privacy

Momoyo Torimitsu / insire Track

Yuri Suzuki and KUMA / Breakfast Machine

Nanohana Heels / Spunikio!

Daniel Rozin / Weave Mirror

The Workers / After Dark

Park JeongHo / Boxes

Julius von Bismarck, Benjamin Maus / Perpetual Storytelling Apparatus

Julius von Bismarck, Benjamin Maus, Richard Wilhelmer / Public Face

Ryuichi Sakamoto, Shiko Takatani / water state 1

Euclid / (Masahiko Sato + Takashi Kiyama) / Pool of Fingerprints

Biographical Notes

Credits
This Is for Everyone: Free Play

Posted by Pamela Popeson, Department Preparator, Department of Architecture and Design

When the world we live in feels too impossible I find myself imagining the world I want to live in. It’s not just about the major acts of horrific inhumanity that humans bestow upon one another, it’s about the small daily indignities too. In the world I want to live in we’re not senselessly slaughtering each other, and no one throws trash on the ground or holds the entire communal table in the coffee shop hostage with their cell phone conversation, either. And people actually do step aside to let the passengers off the train. In the world I want to live in, it’s understood that we are all in this together. Call me a cockeyed optimist, but I’m convinced that the smallest effort toward compatibility goes a long way.

So when MoMA’s curators brought the Free Universal Construction Kit—designed by the American new-media artist Golan Levin in collaboration with Free Art and Technology Lab, Shawn Sims, and Sy-Lab—into the collection, I wanted to celebrate. It’s a ideal example of what the open-source design movement is making...
The Free Universal Construction Kit is a play set of about 80 two-way adapter units that allow full inter-system connection and construction compatibility between 10 children’s construction toy sets: LEGO, Lincoln Logs, Duplo, Fishertecnik, K’Nex, Tinkertoy, Zome, Zoob, Gears! Gears! Gears!, and Krinkles—all otherwise closed-set systems. In the audio tour accompanying the kit on display in the exhibition This Is for Everyone: Design Experiments for the Common Good, Levin explains that inspiration came to him while playing with his four-year-old son, who was trying to connect a LEGO with a Tinker Toy. He became frustrated that it wouldn't connect, and that they wouldn’t be designed to do so was a mystery to him.

In the Free Universal Construction Kit there's an adapter to connect a LEGO to a Lincoln Log, another adapter to connect a Lincoln Log to a Tinkertoy, and so on. Play teaches children to use their imagination, but play with a closed system can be an exercise in imagination limitation. The Free Universal Construction Kit extends systems to fit the imagination, creating a world of interactive rather than proscribed play. Possibility begins to shine.
There are laws protecting copyright, intellectual property, trademark, patents, and such, which may be one of the reasons that the kit itself is not available commercially. Instead, the digital blueprints for the adapter units—free, open-source design printing STL files—are available online to download for private use with your own open-hardware 3-D printer.

**Tags:** Free Universal Construction Kit, Golan Levin, graphic design, open source design, This Is for Everyone: Design Experiments for the Common Good, toys
Democratizing Design

OCTOBER 7, 2015 BY INTSCULPTURECTR IN VIEW TAGS: JONATHAN RINCK LEAVE A COMMENT


A soy dispenser as art?! Some of the objects and images in the MoMA’s exhibition This is for Everyone are now so common that it’s strange to encounter them reverentially placed on a pedestal and considered as art, such as Kenji Ekuan’s iconic red-capped soy-sauce container. But the container was actually the result of three years’ work and over a hundred prototypes, and it owes its ubiquity to the thoughtful intentionality of its minimalist design. This is for Everyone, on view until January, brings together an eclectic grouping of innovative experiments aiming to bring life-improving, sustainable design to everyone.

This multimedia exhibit fills three of the MoMA’s smaller galleries. Two spaces showcase a broad array of design experiments ranging from robotics to graphic design. A third gallery explores how design can influence our interaction with technology, and features about a dozen classic video games which viewers are invited to play. The show is an ultra high-tech blurring of art and engineering.

Emblematic of the spirit of the exhibition is the Free Universal Construction Kit, a witty and playfully subversive project by Golan Levin and Shawn Sims. It consists of 80 small components produced with a 3D printer. Each piece functions as an adaptor that allows interaction between Lincoln Logs, Legos, Tinker Toys, and other incompatible children’s building sets. The kit subverts each brand’s identity and speaks to the broader problem of technologies, software, and operating systems that don’t communicate with each other. The kit is public domain and can be downloaded and printed for free.

As art, the kit is mostly conceptual (with some subtle Duchampian humor), but viewers will also encounter some visually stunning 3D printing at its most sculptural and complex. Jessica Rosenkrantz and Jesse Louis-Rosenberg (both graduates from MIT) created the Kinematics Dress; the dress is wearable and prints already folded, showing at least one way to work around the size-constraints of a 3D printer. The other-worldly fabrications of Neri Oxman (also of MIT) are highly complex sculptural objects that could, with imagination, serve as armor for mythological creatures. Oxman uses multi-material 3D printing to create exotic forms with both hard and soft tissue. It’s an emerging technology with innumerable applications. She’s used it to create a prototype for a wrist-sleeve to be worn by those suffering from carpal tunnel syndrome.

One major subtext of the show is the question of how democratic good design actually is, particularly given the high cost of new technology. Indeed, even the Free Universal Construction Kit presupposes the availability of a 3D printer. It’s worth bearing in mind, however, that not long ago computers themselves were prohibitively expensive.

Admittedly, it’s a little difficult to approach some of the works on view as art-objects, simply because they were created for such functional purposes. But John Ruskin, himself an artist, once wrote that the loftiest purpose of art was in “bringing the power and charm of art within the reach of the humble and the poor.” Perhaps some of the young, tech-savvy minds behind the works in this exhibition might wince at being likened to the grand old Victorian, but their work squarely resonates with his ardent belief that design should be democratic. It’s a principle that can be applied to something as simple as a soy container or as massive an E3 Series Shinkansen bullet train. Indeed, Kenji Ekuan designed both.

More information about The Free Universal Construction Kit (including how to download it) can be found here (http://fffff.at/free-universal-construction-kit/).

By Jonathan Rinck (https://blog.sculpture.org/jonathan-rinck/)
PAOLA ANTONELLI HAS a theory about designers. “I keep thinking that designers in the future will become almost like philosophers, you know?” she tells me as we wander through a third floor showroom at MoMA, where her most recent exhibition, This Is For Everyone: Design Experiments for the Common Good, just opened. The room is filled with objects—Bjork’s Biophilia tablet app, Kenji Ekuan’s famed Kikkoman soy sauce bottle, the “@” sign—that seem, at first glance, to have little in common beyond the fact Antonelli decided they should be there.

But if you ask Antonelli, the senior curator of architecture and design at MoMA, she’ll say the objects are in this showroom because they share two things they feel are inherent to the practice of good design. First, they need a purpose: “Designers are little bit like singers and actors,” she says. “They need an audience, otherwise they don’t know what to do with themselves.” Second, and more importantly, the pieces in the exhibition are for everyone.
The idea that design is “for everyone” is complicated, if only because what does something being for everybody even mean? It can mean access. Is an object universally accessible regardless of economic and political circumstances? It can mean intention. Does the design add something positive to the world? It can mean the democratization of the act of designing itself, which speaks to Antonelli’s point about the designer as philosopher. Increasingly, design is less about a select group of people making aesthetic decisions on humanity’s behalf and more about presenting frameworks so everyone can play a role.

Of the dozens of pieces in the collection, certain are more obviously for everyone. Golan Levin’s Universal Construction Kit, for instance, provides 3-D printed adapters to connect proprietary toy kits like Lego, Duplo and Lincoln Logs. The “@” and Creative Commons symbols are clear examples of universal design, so too is Ekuan’s soy sauce bottle, which has retained the same design for more than 50 years. “I really get moved by something like the Kikkoman soy sauce bottle,” says Antonelli.
“It sounds crazy but, it’s the truth.” Other projects, like the Makey Makey, Arduino and the Eyewriter show how technology can, for better or worse, enable just about anyone to design. Ecovative’s mycelium bricks and Kinematics 4-D printed dress point to designs that may one day have a huge impact on how we create our built world.

It’s clear that design, both the act of designing and the objects themselves, very well may be more accessible than ever, but it’s still not for everyone. Antonelli readily acknowledges this—see Design and Violence, an ongoing project that examines the ambiguous and sometimes nefarious relationship we have with certain design objects—though she’s quick to admit to a penchant for design altruism. That designers should take what she calls a “hippocratic oath,” isn’t a naive expectation, it’s just that despite good intentions, reality is always more complicated than platitudes allow room for.

As we finish the tour, we glance at the wall text that serves as an introduction to the exhibition. It reads: “Is design today, so often simply assumed to be for the greater good, truly for everyone?” Even among the blue-skied objects in the room, it’s a healthy dose of skepticism that Antonelli says she’s becoming increasingly more at peace with. “My whole career I’ve been a little idealist, thinking always of design as a force for good,” she says. “I’m tired of being so Pollyanna-ish about it.”

This Is For Everyone will be on view at MoMA until Jan. 1, 2016.
MoMA Envisions A Future In Which Designers Become Political Philosophers

Forget about Mac versus PC. If you want to experience true incompatibility, try playing with Legos and Tinkertoys. Or Tinkertoys and K’Nex. Or K’Nex and Lincoln Logs. Though each of these playthings is supposed to give free reign to children’s imagination, they’ll only work within their own branded system. Some, such as K’Nex, are protected under patent.

So several years ago a design collective called F.A.T. Lab created the Free Universal Construction Kit, a set of eighty adapter blocks that can connect pieces from ten of the most popular building toys. To facilitate universal distribution, they made the blocks freely available online as files that could be output on any 3D printer. One set was downloaded and output by the Museum of Modern Art, and added to MoMA’s venerable design collection.

It’s now on view as part of a new exhibition of “design experiments for the common good”.

Other works range from a diagnostic lung-on-a-
chip engineered by the Wyss Institute to the open-source Arduino microprocessor to the ubiquitous Kikkoman soy sauce bottle. Audaciously eclectic, the exhibit is guided solely by the vision of architecture and design curator Paola Antonelli. As she recently told Wired, “I keep thinking that designers in the future will become almost like philosophers.”

While Antonelli’s ambition for design isn’t supported by all of her selections (including the eminently practical Kikkoman bottle), objects such as the lung-on-a-chip show that designers are already encroaching on philosophical territory. Beyond their obvious biomedical utility, miniaturized organs are modern versions of the mechanical automata with which philosophers such as René Descartes once investigated what makes us human.

The Free Universal Construction Kit even more overtly operates in the realm of ideas. By making Legos and K’Nex compatible, the adapter blocks expose how much these toys are both proprietary systems and trademarked properties: facts so obvious that we tend to overlook them, passing them to our children who take them for granted. If building with Legos entails a sort of indoctrination in American capitalism, then mixing them with Lincoln Logs and Tinkertoys is a kind of liberation. Whatever gets built is inherently subversive.

It’s just play, of course. But play is a way of learning – perhaps the most important one – for both children and grown-ups. The Free Universal Construction Kit is a kit for constructing alternative realities, and also a paradigm for making philosophy universally engaging.

Follow me on Twitter, find my latest book, Forged: Why Fakes Are The Great Art Of Our Age, on Amazon, and attend my upcoming talk at the Long Now Foundation.
The This Is For Everyone exhibition reveals future of philosophy

On the third of the 12 days of CultureLab, Jonathon Keats reveals how an exhibition at MoMA encourages free play and free thinking.

By Jonathon Keats

For each of the 12 days of Christmas, here's something to beguile, distract – and leave you with questions for the year ahead

This Is For Everyone: Design Experiments for the Common Good, Museum of Modern Art, New York, until 18 January 2016


The new symbol was created by artist Sara Hendren, who aimed to change perceptions about disabilities. She illegally plastered her stickers on every "wheelchair" sign she could find.

The icon has since been officially adopted in several US cities. It also features in a compelling exhibition at the Museum of Modern Art (MoMA) called This Is For Everyone: Design experiments for the common good.
Since the exhibition opened in February 2015, what has deeply resonated for me about it is not so much the exhibition’s world-changing premise, as a subtext that the show’s curator Paola Antonelli articulated in *Wired* magazine: “I keep thinking that designers in the future will become almost like philosophers.”

**Precious plastic**

Many of the works selected by Antonelli show how design is already operating philosophically, as designers present possible futures in terms that we’re compelled to engage with today. These can be futures that the designers wholeheartedly embrace (such as Hendren’s sign) or more speculatively open-ended, as in Studio Formafantasma’s *Botanica* series of vases.

These vases are notable for their unusual textures and colours, features of the precious plastics used by the designers. Precious because before the Industrial Revolution – and our exploitation of petroleum – such materials were painstakingly produced from plant and animal derivatives, including tree gum and insect excrement.

Today they are beguiling because they evoke a relationship with resources that must be revived in a post-petroleum world. Studio Formafantasma’s vessels explore how the world might appear.

If the *Botanica* vases exemplify speculative design, then *The Pig Wings Project* belongs to “design fiction”. A turn-of-the-millennium initiative by the sci-art collective SymbioticA (captured in photographs at the exhibition) the project set out to grow wings from pig bone tissue.

Counterbalancing the ludicrous implausibility of the designers’ goals, their work was undertaken in a tissue engineering lab using state-of-the-art synthetic scaffolds. This context makes this extreme flight of fancy (literally, “when pigs fly”) plausible enough that it needs to be taken seriously. The *Pig Wings Project* compels us to evolve our bioethics before this fiction (or one like it) becomes a foregone conclusion.

**Subversive hack**

I am excited by how both *The Pig Wing Project* and the *Botanica* vases provoke discussion through the physical equivalent of thought experiments. But there’s one work at MoMA with an extra quality that makes it a paradigm for what I believe design can achieve for philosophy (and philosophy cannot accomplish on its own).

This is *The Free Universal Construction Kit*, conceived when the artist Golan Levin saw his four-year-old son attempting to attach Lego to a Tinkertoy. The boy was flummoxed by their incompatibility, his first exposure to the proprietary systems pervasive in modern society.

Levin responded by designing a set of adapter blocks to make the most popular children’s construction kits interoperable. With collaborators at the FAT Lab (a collective of artists, engineers, scientists, lawyers and musicians dedicated to merging of popular culture with open source tech), Levin subsequently released the adapters as open-source CAD files, freely downloadable to be created on any 3D printer.

Cracking the system by which children are indoctrinated into Western capitalism, Levin’s interactive hack makes the union of Lego and Tinkertoy thrillingly subversive: it encourages free play, surely the origin of free thinking? Operating outside the university (and the museum), this is the future of philosophy. This is for everyone.

*Image credit: Mike Kemp/In Pictures/Corbis; Artist: Robert Indiana*
Golan Levin

When I started out as a young professional I was really protective of my code. I kept it closed and hidden, because I was paranoid about being “ripped off.” The thing is, getting ripped off is inevitable, even if your code isn’t public. And there’s so much more to be gained by sharing. I think the most important thing is to find a crew of friends you can be creative with. Sharing one’s code is essential to that. I wish I had joined open-source culture earlier. Not doing so was probably my biggest mistake. Occasionally I’ll see a student with a half-decent, half-baked idea. But instead of publishing it on their online portfolio page, someone, usually their parent, has advised this kid to patent it, hoard it, hide it away, and protect it. I just shake my head, not just at the financial cost of doing so, but also the huge opportunity cost. For most people and most ideas, this constipation does way more harm than good. Choose hope over fear: share.

Carnegie Mellon University
flong.com
@golan

“T’m a devoted user and advocate of free, open-source arts-engineering tools. I do nearly all my work with Processing and openFrameworks.”

I’m a professor of computer arts at Carnegie Mellon University in Pittsburgh. Since 2009 I’ve also directed an experimental arts lab within CMU, the Frank-Ratchye STUDIO for Creative Inquiry, which supports “atypical, anti-disciplinary and inter-institutional research” at the crossroads of arts, culture, and technology. I knew I wanted to somehow “combine art and technology” when I was six years old, though I wasn’t sure what that could mean until 1995. That’s when Michael Naimark and Scott Snibbe introduced me to new media art. I was 23, and I decided to learn to code. It was challenging and lonely; the Web was young, and tools like Processing were still years away. I envy today’s young people, who have both a vibrant global community and amazing tools.
Free Universal Construction Kit

Confronting questions about intellectual property, open-source culture, and reverse engineering, the Free Universal Construction Kit (by Golan Levin and Shawn Sims) consists of nearly 80 two-way adapter bricks that enable complete interoperability between ten popular children’s construction toys. Users can download the files for these adapters from various sharing sites and print the 3D models on a MakerBot or other personal 3D printer. The kit demonstrates “reverse engineering as a civic activity: a creative process in which anyone can develop the necessary pieces to bridge the limitations presented by mass-produced commercial artifacts.”
Data is infiltrating culture. Artists are using data as a subject for critique or as a new method of form generation, creating work that may help us come to terms with a changing society.
1 MARK HANSEN and BEN RUBIN. Listening Post, 2001. Courtesy of the artists

2 DOUGLAS COUPLAND with PAUL HUMPHREYS and HELIOS DESIGN LABS. Electric Ikebana, 2012. Courtesy of Douglas Coupland

3 GOLAN LEVIN, JONATHAN FEINBERG, SHELLY WYNECÔOP and MARTIN WATTENBERG. The Secret Lives of Numbers, 2002. Courtesy of the artists

4 MATTHIEU SAVARY. Pixel Is Data, 2013–present. Courtesy of the artist
Data as Narrative

Data can tell stories. Just like in traditional storytelling, data can unfold over time in a linear progression. However, a database allows narratives to move between different properties, pivoting effortlessly from time to other characterizing dimensions, such as location or category. The power of data narratives lies in breaking free from a singular viewpoint. Some data narratives make use of metaphors, allowing the information itself to tell the story. Others tell stories by drawing on a multitude of individual perspectives. Yet others involve the viewer directly, enabling people to find their own narratives by filtering and sorting information in a variety of ways. While this departure from traditional, linear storytelling can feel disorienting, it also opens the door to participation and representation of a community’s voice. The following projects present different perspectives on data as narrative.

1 Mark Hansen and Ben Rubin
Listening Post, 2001
A media installation by Mark Hansen and Ben Rubin. Listening Post consists of a suspended, curved grid of hundreds of small screens that dynamically display, in real-time, text fragments collected from Internet chat rooms. Simultaneously, a chorus of computer voices recites the content, accompanied by musical chords. The work cycles through a series of scenes that highlight different phrases and adopt various arrangements of sound and visual treatments.

Messages are organized into topic clusters based on content, causing a data-driven narrative to unfold that reflects the flow of communications on the Internet. Although the displayed text is determined algorithmically, it seems as if the screens are responding to one another. According to Rubin, the piece reflects an innate human yearning for connection. As he said in The New York Times article “Making an Opera from Cyberspace’s Tower of Babel”: “There are an untold number of souls out there just dying to connect, and we want to convey that yearning. I hope people come away from this feeling the scale and immensity of human communication.”

2 Douglas Coupland with Paul Humphreys and Helios
Design Labs
Electric Ikebana, 2012
Electric Ikebana is a collaboration between Generation X author, Douglas Coupland, and Paul Humphreys of the British synth-pop band Orchestral Manoeuvres in the Dark. The piece’s concept is a musical track that interacts with Internet traffic data, resulting in visual artifacts—unique for each viewing—that reference Japanese flower arrangements called Ikebana. Internet traffic is translated into particles, their shape, color, and quantities varying depending on the type and volume of the underlying data. User location and time affects the outcome as well; for example, 12 colors are associated with various times of day, causing the environment to look different for every person viewing the piece.

The resulting experience gives voice and form to something as abstract as Internet traffic. The Ikebana reflects the content of network activity and aligns it with the piece’s soundtrack in a way that tells a different story with every viewing. Electric Ikebana references and humanizes the narratives contained in the Internet’s constant stream of traffic data, suggesting new possibilities for expressing this data in a delightful, uplifting way.

3 Golan Levin, Jonathan Feinberg, Shelly Wynncoop and Martin Wattenberg
The Secret Lives of Numbers, 2002
Numbers hold a certain fascination. They convey confidence and authority. But while numbers are considered objective and indisputable, they are actually a reflection of our culture—our ideas, our interests, our behaviors. The Secret Lives of Numbers is an interactive Java applet by Golan Levin, Jonathan Feinberg, Shelly Wynncoop and Martin Wattenberg that visualizes the popularity of every number between 0 and 1,000,000. The work is based on an automated Internet search for all numbers in that range, counting the web pages that contain each.

Certain numbers are more popular because they are used as area or ZIP codes (212, 911, 90210), while others are used to represent years (2000, 2001, 2002, etc.). Some numbers are used frequently in technology specifications (286, 386, 486), while others are popular sales tools (98, 99). As the authors speculate, some numbers like 12345 or 8888 may be popular because they are simply easy to remember. The Secret Lives of Numbers tells countless stories through the lens of numbers, in essence forming a snapshot of our culture.

4 Matthieu Savary
Pixel Is Data, 2013–present
Pixel Is Data, created by Matthieu Savary, is a photo-taking application for iOS. Instead of representing photos as a program traditionally would, it can rearrange the image data based on a number of parameters. In addition to organizing pixels in their photographic order, the application can recompile them based on their red, green and blue components as well as in a variety of other ways, including a choice of pixel shape and the introduction of randomness via a noise slider. The application disrupts the narrative conveyed by a single photograph, enabling countless interpretations by reorganizing the image’s pixel structure. This project highlights data’s potential to tell a multitude of stories in the hands of the user, who is given control to find new narratives from within a single data source.

5 Ryoji Ikeda
Datamatics, 2006–present
Sound artist Ryoji Ikeda’s work is concerned with sound in a raw state, as pure data. Datamatics is a series of artworks (including the two variations of datatron featured here) that use data in audiovisual concerts. Visuals are rendered in stark, minimalist black and white with color accents, mirrored by a data-driven soundtrack. A variety of scenes cycle through visualizations of data from hard drive errors and code studies as well as mathematical processes. Data is used as texture to create spectacular, immersive landscapes and vistas that tell sonic and visual narratives. Ikeda’s objective is to make visible and material the data that permeates the world. What does the invisible substance of data look like when given form? The artist interprets data as cold, distant and dystopian, enveloping the viewer and invoking an uneasy sense of the sublime.
Data as Narrative

Christian Marc Schmidt

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The below is from the ARCADE feature/essay “Data Culture” in the spring 2015 issue of ARCADE. The feature/essay has been releasing online in installments. “Data Culture” Part 1, Part 2, Part 3 and Part 4 discuss the rise of data and its cultural impact. This post is the first of five which explore the use of data in the arts. Subscribe to our e-newsletter and follow us on Facebook and Twitter for notice of future posts.—ARCADE

Ryoji Ikeda, data.tron [8K enhanced version], audiovisual installation, 2008–09. © Ryoji Ikeda. Photo: Liz Hingley

From “Data Culture: Part 4: The Art and Impact of Data”:

“The rise of data is disrupting the core of our society, impacting us deeply as both individuals and members of communities. Throughout history, frictions created as societies undergo...
change have spurred innovative responses in the arts. New artistic forms and statements examine the fabric of society as well as the role of the individual, and the artist, within it. The arts, and more broadly, all manner of cultural production, provide ways for society to process change. One particularly poignant example is the Italian futurist movement, which preceded the Bauhaus and modernism in its celebration of technology and the machine at the height of the industrial era. A more recent example is net art, an art form leveraging the web as a distribution channel and a response to the proliferation of the Internet. Poised as we are today at the dawn of the information era, we are witnessing the coalescence of another movement — data art.

In the coming weeks, we'll be sharing a series of posts — “Data as Narrative,” “Data as Mirror,” “Data as Truth,” “Data as Equalizer” and “Data as Interface” — which will focus on the use of data in the arts to generate new forms of creative output as well as critique our data driven world. Despite the issues that data presents, many of the following projects represent the unexpected moments of humanity that arise from quantification. The work speaks to a shared human condition and proposes questions and observations that may help us come to terms with our changing society.”

Data as Narrative

Data can tell stories. Just like in traditional storytelling, data can unfold over time in a linear progression. However, a database allows narratives to move between different properties, pivoting effortlessly from time to other characterizing dimensions, such as location or category. The power of data narratives lies in breaking free from a singular viewpoint. Some data narratives make use of metaphors, allowing the information itself to tell the story. Others tell stories by drawing on a multitude of individual perspectives. Yet others involve the viewer directly, enabling people to find their own narratives by filtering and sorting information in a variety of ways. While this departure from traditional, linear storytelling can feel disorienting, it also opens the door to participation and representation of a community's voice. The following projects present different perspectives on data as narrative.

Mark Hansen and Ben Rubin

*Listening Post*, 2001
A media installation by Mark Hansen and Ben Rubin, *Listening Post* consists of a suspended, curved grid of hundreds of small screens that dynamically display, in real-time, text fragments collected from Internet chat rooms. Simultaneously, a chorus of computer voices recites the content, accompanied by musical chords. The work cycles through a series of scenes that highlight different phrases and adopt various arrangements of sound and visual treatments.
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Douglas Coupland with Paul Humphreys and Helios Design Labs

*Electric Ikebana*, 2012

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Golan Levin, Jonathan Feinberg, Shelly Wynecoop and Martin Wattenberg

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*The next post exploring data art, “Data as Mirror,” will release 30 June.*

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Christian Marc Schmidt is the founder of Schema, a research and design firm focused on turning information into action. Prior to Schema, Christian was a designer at Microsoft, an associate partner at Pentagram and an interaction designer at IDEO. Christian holds a BFA from Parsons School of Design in New York and an MFA from the Yale University School of Art. His work has received widespread recognition. Christian has taught at Cornish College of the Arts, the University of Washington and New York University, and speaks frequently about his work and design approach.

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Mapping, Meaning, and Motion: An Artistic Framework for Visualizing Movement Quality

by

Pattarawut Subyen

M.F.A. (Computer Art), School of Visual Arts, 2007
B.F.A. (Hons., Creative Arts), Chulalongkorn University, 2001

Dissertation Submitted In Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the School of Interactive Arts and Technology Faculty of Communication, Art and Technology

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SIMON FRASER UNIVERSITY

SPRING 2015

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However, we cannot state that the artistic visualization outcome is sublime and unreadable and pragmatic visualization is utilitarian and readable. The artistic visualization outcome can evoke a wide range of emotions (i.e., positive and negative), whether it is unreadable or readable. Some unreadable (artistic) visualization may be enigmatic and not immediately recognizable or readable for those who do not know how to read them. However, when one spends time with the visualization, understands the visual generation process and/or knows how to read the visualization, it is possible to understand and read the meaning of the visualization. Similarly, pragmatic visualization can be sublime although it is utilitarian and readable. When one takes time to explore the visualization, interacts with the system, and understands the visualization process, then the outcome of visualization can elicit a wide range of emotions, such as in *We Feel Fine* (Kamvar and Harris, 2011), *The Dumpster* (Levin et al., 2006) or *The Shape of Song* (Wattenburg, 2001) (see the next section). Therefore, the outcome of artistic visualization can be sublime, whether it is readable or non-readable.

Instead of identifying artistic visualization based on whether it is readable or not, this thesis uses the term “readability” to refer to how much of the information is communicated or how easy the outcome of visualization is to read, understand, communicate, and draw the meaning out of the dataset when the viewer know the visualization context. The term “legibility” is also used to refer to the amount of effort that the viewer has to spend in order to understand the outcome of visualization at first glance. Hence, the artistic visualization outcome has a wide range of readability and legibility (i.e., from low to high). Low readability refers to arbitrarily abstract representation that is hard to interpret even the viewer know the visualization context. High readability refers to the outcome of visualization that is similar to information visualization representations (e.g., chart, graph, diagram). In this case, the viewer need not spend much effort to understand the outcome of visualization at first glance. However, in some cases, abstract representation can be easily interpreted when the visualization is carefully designed. High legibility refers to high amount of effort and low legibility refers to low amount of effort that the viewer has to spend in order to understand the outcome of visualization. Figure 2.20 presents and illustrates examples of artistic visualization outcome based on readability and legibility.

14 See *The Garden of Chances* by Hutzler et al., 2000.
Figure 2.20. Examples of artistic visualization outcome based on readability and legibility

Note. See more information about these artistic visualization projects in the next section.

Taking all characteristics together, artistic visualization can be broadly defined as “the use of computing as a medium in combination with art theory and artistic process with an intention to explore creative design space for art making, in order to provide sensory outcome (either readable or non-readable), new visual experience, and some useful functions to a viewing audience.”

2.2.3. Examples of Artistic Visualization Projects

Table 2.7 summarizes some examples of artistic visualization projects based on the four characteristics described in the previous section.
**Table 2.7 Examples of artistic visualization projects**

<table>
<thead>
<tr>
<th>Author</th>
<th>Project Name</th>
<th>Data Type</th>
<th>Goal / Intention</th>
<th>Data Set</th>
<th>Design Process</th>
<th>Tool or Technique</th>
<th>Mapping Focus</th>
<th>Data Focus</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dragulescu (2005)</td>
<td>Spam plants &amp; Spam architecture</td>
<td>Text</td>
<td>To transform useless data into aesthetic and meaningful visual representation</td>
<td>Spam email and messaging data</td>
<td>N/A</td>
<td>PHP &amp; Maya: MEL - Scripting</td>
<td>O</td>
<td>-</td>
<td>O</td>
</tr>
<tr>
<td>Fry (1997)</td>
<td>Valence</td>
<td>Text or numeric</td>
<td>To propose a new way to visualize dynamic information based on different properties of an organism; To provide a qualitative feel of how the information is structured.</td>
<td>The structure of content taken from a book called “The Innocents Abroad” by Mark Twain</td>
<td>Organism theories, such as cellular automata, metabolism, homeostasis, and adaptation</td>
<td>Dynamic query</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Hutzler et al. (2000)</td>
<td>The Garden of Chances</td>
<td>Numeric</td>
<td>To explore the associations between abstract painting and reactive multi-agent systems</td>
<td>Meteorological data (e.g., temperature, rain, clouds or wind direction)</td>
<td>Multi-agent systems</td>
<td>Evolutionary algorithm</td>
<td>O</td>
<td>O</td>
<td>-</td>
</tr>
<tr>
<td>Krcadinac et al. (2013)</td>
<td>Synesketch</td>
<td>Text</td>
<td>To enhance learning and creativity in the area of real-time text visualization by associating with other fields</td>
<td>Emotions in the text</td>
<td>Ekman’s six basic emotions Green-Armytage colour palettes</td>
<td>Bubble Chamber</td>
<td>O</td>
<td>-</td>
<td>O</td>
</tr>
<tr>
<td>Harris and Kamvar (2006)</td>
<td>We Feel Fine</td>
<td>Net-work data (text)</td>
<td>To collect the world’s emotions to help people understand themselves and others</td>
<td>Human feelings or emotions from blog posts in various subjects</td>
<td>Sentimental Analysis, Computational Social Psychology, Datavis</td>
<td>Various techniques borrowed from Information visualization</td>
<td>O</td>
<td>-</td>
<td>O</td>
</tr>
<tr>
<td>Levin et al. (2006)</td>
<td>The Dumpster</td>
<td>Net-work data (text)</td>
<td>To reveal intimate perspectives, similarities, differences, and patterns in failed relationships of American teenagers</td>
<td>Online blogs post of the romantic breakups of teenagers</td>
<td>N/A</td>
<td>Java Processing</td>
<td>O</td>
<td>-</td>
<td>O</td>
</tr>
</tbody>
</table>

(Continued)
Levin et al.’s *The Dumpster* collected teenagers’ romantic breakup stories from online blog posts and visualized them to reveal behaviour patterns in failed relationships (Levin et al., 2006) (Fig. 2.26). *The Dumpster* had several artistic goals related to social-cultural elements, such as allowing the voyeur to observe thousands of personal stories of romantic relationships, reassuring and healing those who experience romantic breakups, and revealing how people expressed their pain through different language patterns.\(^{15}\) *The Dumpster* created “a group portrait”\(^{16}\) of teenagers’ romantic relationships and the visualization was represented through statistical or analytical interfaces that allowed the viewer to navigate the personal breakup stories and see differences and similarities among stories. Each story is represented by particle pile ups in two-dimensional space, while colour brightness indicated their similarity to the story selected by the viewer. The data representation process relied on various techniques borrowed from information visualization (e.g., table lens and histogram), and involved direct data mapping and extrinsic data focus.

---

\(^{15}\) See more information in Golan Levin’s artistic statement at http://artport.whitney.org/commissions/thedumpster/statement.html

\(^{16}\) A term used by Lev Manovich to describes *The Dumpster*; see: http://www2.tate.org.uk/intermediaart/entry15385.shtm
Figure 2.26. The Dumpster: a portrait of romantic breakups


Jason Salavon’s artworks often dealt with analyzing and reconfiguring American contemporary culture in order to reveal the uncanny patterns, structures, and beauty of common products of American culture, such as art, education, film or real estate (Columbus Art Museum, 2008). Salavon often used the same technique (i.e., averaging colour) to abstract data into new information and the process of representing data often involved intrinsic data focus, which is presented in three works described below.

In Top Grossing Film of All Time (Fig. 2.27a), Salavon visualized the colours and moods of the movie Titanic by abstracting the movie’s information, digitizing the entire film, and placing each frame into a left-to-right, top-to-bottom grid structure. The “averaging colour pixels” technique was used to select the best colour representation of each frame, resulting in visual representation that allowed audiences to detect changes in the movie’s colours and mood (Salavon, 2000).
How to create interactive loops using lenticular animation and GifPop

written by Filip Visnjic

Golan Levin, director of The Frank-Ratchye STUDIO for Creative Inquiry (Carnegie Mellon University), has 27 students in his Interactive Art & Computational Design class. They range from sophomores (2nd-year undergraduates) to doctoral students. They come from 10 different department (Art, Architecture, Design, Robotics, Computer Science) and they use a
huge variety of programming techniques. The purpose of this assignment was to sharpen the students' craft as a creative technologist and provide a good/basic introduction to programming. For their 3rd week of class Golan developed an assignment titled “A Looping, Computationally-Generated Animated GIF, and a Lenticular GIFPop! Print”. The following learning objectives were set out:

- Create computational animations using an arts-engineering toolkit;
- Prepare animated imagery for publication in GIF and lenticular formats;
- Conceive and appraise graphical concepts within the constraints of the GIF format.
- Compare the qualities of physical and virtual media

The purpose of this tutorial is to enable you to write code to create a brief looping animation, using computationally-generated graphics, suitable for both online and lenticular publishing. Then, using the unique GifPop services, you can get your GIFPOPs printed.

You can use provided Processing sample code below but also have the liberty to work in any programming environment you are comfortable with. Students mostly worked in Processing and openFrameworks, but some responses were made in Node.js, JavaScript, and other tools.

Founded by the computational designer-entrepreneurs Rachel Binx and Sha Hwang — GIFPOP! is a recently Kickstarted enterprise which “creates custom cards from animated GIFs, using the magic of lenticular printing”.

Before starting, here are some suggestions:
- **SKETCH FIRST!** Before doing anything, make some (real) sketches in your notebook. Try to come up with graphical concepts.
- Your design may be abstract, figurative, etc. according to your tastes.
- GIFS are palette-based images, which means that they must represent all of your frames with a single common palette of just 256 colours. For this reason, you may obtain better results with imagery that just uses a small number of colours, or is monochromatic.
- Avoid using recorded (i.e. photographic and/or video) media.
- You may find this repository of nonlinear mapping functions helpful.
- Export a series of frames, and compile these into an animated GIF. Here is a helpful tutorial for creating animated GIFs from folders of images, using Photoshop. Remember to set its duration to “forever”, and to adjust the frame durations to something appropriate.
- Your GIF can be any length, but keeping it under 2MB would be sensible.
- Test out your GIF to make sure it animates as you expect! You can open most animated GIFs with web browsers to test them out.

GIFPOP also offer the following suggestions for creating lenticular prints with their system:

- Looping in 10 frames is great. It makes the effect that much more magical as you don’t get that “seam” of the animation restarting.
- There will always be some ghosting in high frame-count lenticular printing. A good way to imagine (or simulate!) this is that every frame you see will have 10-20% opacity visible of the frames on either side.
- Smooth movements will work well. 10 completely different images won’t be super legible. The “cinematography” here is important: less slam cuts, more long takes. Small movements, not big movements.
- Geometric patterns are great, bright colours work well. Thin lines are harder to see without enough contrast.
- By default, their 5”x5” cards are printed so that you rotate them up/down to see them. Left/right rotation gives blurrier animation when your head is close to the card because of the spacing of your eyes, but if you rotate your animation 90 degrees it will print left/right. For example, Jono did this and rotated his.

Here is an animated GIF, and the Processing code template below that produced it.
Some things to observe about this animated GIF:

- It uses a simple colour palette — just a couple of colours.
- Visual elements move smoothly and in small increments.
- It has 30 frames, at 30fps, which looks nice in a webpage. But for Gifpop lenticular prints, you’ll need to export a version which has no more than 10 frames, and the amount of movement (pixel deltas) between frames should be even smaller.

```csharp
// This is a template for creating a looping animation in Processing.
// When you press a key, this program will export a series of images
// into an "output" directory located in its sketch folder.
// These can then be combined into an animated GIF.
// Prof. Golan Levin, January 2014 - CMU IACD

//===================================================
// Global variables.
int nFramesInLoop = 30; // For lenticular export, REMEMBER TO CHANGE THIS to
int nElapsedFrames;
boolean bRecording;
//===================================================
void setup() {
    size (400, 200);
    bRecording = false;
    nElapsedFrames = 0;
    frameRate (nFramesInLoop);
}
//===================================================
void keyPressed() {
    // Press a key to export frames to the output folder
    bRecording = true;
    nElapsedFrames = 0;
}
void draw() {

    // Compute a percentage (0...1) representing where we are in the loop.
    float percentCompleteFraction = 0;
    if (bRecording) {
        percentCompleteFraction = (float) nElapsedFrames / (float)nFramesInLoop;
    } else {
        float modFrame = (float) (frameCount % nFramesInLoop);
        percentCompleteFraction = modFrame / (float)nFramesInLoop;
    }

    // Render the design, based on that percentage.
    renderMyDesign (percentCompleteFraction);

    // If we're recording the output, save the frame to a file.
    if (bRecording) {
        String  myName = "golanlevin";
        saveFrame("output/"+ myName + "-loop-" + nf(nElapsedFrames, 4) + ".png")
        nElapsedFrames++;
        if (nElapsedFrames == nFramesInLoop) {
            bRecording = false;
        }
    }
}

void renderMyDesign (float percent) {

    // This is an example of a function that renders a temporally looping desi
    // It takes a "percent", between 0 and 1, indicating where we are in the l
    // This example uses two different graphical techniques.
    // Use or delete whatever you prefer from this example.
    // Remember to SKETCH FIRST!

    // here, I set the background and some other graphical properties
    background (180);
    smooth();
    stroke (0, 0, 0);
    strokeWeight (2);

    // Here, I assign some handy variables.
    float cx = 100;
    float cy = 100;

    // Here, I use trigonometry to render a rotating element.
    float radius = 80;
```cpp
int nSpokes = 7;
for (int i=0; i < nSpokes; i++) {
    float armAngle = (percent + i) * (TWO_PI/nSpokes);
    float px = cx + radius*cos(armAngle);
    float py = cy + radius*sin(armAngle);
    fill(255);
    line(cx, cy, px, py);
    ellipse(px, py, 20, 20);
}

//----------------------
// Here, I use graphical transformations
// to render a rotated square.
pushMatrix();
    translate(cx, cy);
    float rotatingSquareAngle = percent * TWO_PI * -0.25;
    rotate(rotatingSquareAngle);
    fill(255, 128);
    rect(-40, -40, 80, 80);
popMatrix();

//----------------------
// Here’s a set of linearly-moving circles
float ballSize = 20;
float topY = 0 - ballSize - 2;
float botY = height;
float spanY = botY - topY;
int nMovingBalls = 5;
for (int i=0; i <= nMovingBalls; i++) {
    float ballSpacing = spanY / (float)nMovingBalls;
    float yBase = topY + ballSize/2; // offset for radius of ball
    float yPercent = map(percent, 0, 1, topY, topY+ballSpacing);
    float yPosition = yBase + (yPercent + (i*ballSpacing))%spanY;

    fill(255, 255, 255);
    ellipse(250, yPosition, ballSize, ballSize);
}

//----------------------
// Here’s a pulsating ellipse
float ellipsePulse = cos(percent * TWO_PI);
float ellipseW = map(ellipsePulse, -1, 1, 20.0, 80.0);
float ellipseH = map(ellipsePulse, -1, 1, 80.0, 20.0);
float ellipseColor = map(ellipsePulse, -1, 1, 0, 255);
fill(ellipseColor, ellipseColor, ellipseColor);
ellipse(340, cy, ellipseW, ellipseH);

//----------------------
fill(0, 0, 0);
textAlign(CENTER);
String percentDisplayString = nf(percent, 1, 3);
```
To achieve more nuanced animation effects, you may also be interested in Golan's Pattern Master functions.

In the process of making the works, it’s also a good idea to compare the visual results of screen-based works to the lenticular one since they may be very different. For example, Thomas Langerak made a colour-changing GIF. His aim was to create something different than motion. Unfortunately he was not particularly happy with how it turned out on-screen, however the lenticular Gifpop print was a surprisingly interesting object. You can download Thomas' piece here.

To print your animations, GifPop! currently offers two sizes for custom gifs. Business Card (2 1/8” x 3 3/8”) at $12 each, Landscape Postcard (5” x 3 ½”), Portrait Postcard (3 ½” x 5”) and Large Square (5” x 5”) all at $15 and finally a Small Square (2 ¾” x 2 ¾”) at $12 each. All of these get less expensive as you order more including 50% off if you order 50+ (think of all your friends!).

Huge thanks to Golan for sharing his class instructions with CAN. You can access and browse all of the student responses here. Their blog posts generally include their project narratives, sketches, and code. For any other info, please see additional links below.

Project Page | Student Gifs | The Frank-Ratchye STUDIO for Creative Inquiry | GifPop
A light beam scims the surface of a table strewn with geometrical objects. As the glowing bar passes over each object in turn, you hear eerie sounds related to the shape and placement of the object. You can even create your own weird music by shifting the rectangles, circles, and other everyday shapes into new positions.

Golan Levin, an artist at Carnegie Mellon University, created this audiovisual installation. He calls it “Scrapple.”

Levin’s system is essentially a scanner that reads and interprets the positions and shapes of objects. It works a bit like a musician converting the notes he or she sees on a sheet of music into a sequence of sounds. In this case, the table and its objects are not only the score but also a musical instrument.

In the computer-operated “Scrapple” system, an overhead video camera registers the positions and shapes of the objects on the table. A projector generates the sliding, glowing bar visible on the surface. Special software links the moving bar with the objects. It also determines what sounds correspond to each shape and runs the sound synthesizer.

You can imagine the table as a grid. The position of an object along the table’s length determines when the sound is heard: its position along the table’s width sets its pitch, or frequency. A computer uses a formula to convert the pattern of light and dark in an object’s video image into various sounds. Objects covering larger areas produce sounds with a wider range of frequencies. Darker objects correspond to louder sounds.

You can try all sorts of different objects to explore the link between shape and sound. And what do you think you would hear if you were to send a small wind-up toy wandering around the table, chased by the glowing bar?

Visitors to the Exploratorium science museum in San Francisco can see and play with “Scrapple.” It was first installed at the Ars Electronica Center in Linz, Austria.
Simon Heijdens: Lightweeds

Simon Heijdens project “Lightweeds” is an interesting example of how the digital environment can be an inspiration and a reflection of the natural world. Applying concepts inspired by the changing rhythms of growth, life, and decay present in organic matter, the work consists of a series of digital light projections that look like plants that grow taller and bend in the breeze. Often situated within an urban interior space, the presence of digital botanical forms that self-seed and undulate creates a sharp contrast to the controlled environments and architecture of modern spaces: a reminder of the lost presence of nature in daily life.

The digital plants grow from code that mirrors the growth patterns and structures of organic life. Codogenerated “seeds” determine the genetic structure and behavior of each plant. All plants generated from the same family are generated by the same seed and therefore grow and act according to a shared “genetic” code. Each digital plant grows, lives, and dies in accordance with its digital seed. The plants even pollinate new plants, generating further growth. Information about the outside weather conditions (humidity, wind, and temperature) and the movement of people in front of the projection is translated into data that determines how the digital plants move and develop. The line between the digital and the organic blurs as the digital projections undulate and propagate in response to real environmental conditions.
<table>
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<th>Dejan Grba</th>
<th>GET LUCKY: COGNITIVE ASPECTS OF GENERATIVE ART</th>
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| **Abstract:**
This paper addresses the creative, cultural and cognitive aspects of symbolic and procedural thinking in contemporary generative art.

Generative art is perceived broadly, as a heterogeneous realm of artistic approaches based upon combining the predefined elements with different factors of unpredictability in conceptualizing, producing and presenting the artwork, thus formalizing the uncontrollability of the creative process, underlining and aestheticizing the contextual nature of art.

The introduction provides an overview of generativeness as one of the key factors of art making, outlines the characteristics of ludic, pseudo- or proto-scientific methodology that distinguish generative art, and focuses on generative principles in digital art.

The main section includes several interrelated sets of contemporary generative art projects, with comments on the conceptual, technical and poetic qualities of their methodologies.

The conclusion summarizes the specifics of symbolic and procedural thinking which is required for the development of generative art projects, and discusses its cognitive implications for creativity in general.

| **Keywords:** abstraction, algorithm, analogy, anticipation, art, code, cognition, creativity, digital art, generativeness, innovation, intuition, invention, knowledge, language, learning, predictability, procedure, programming, reduction, semantics, software, science. |

**Topic:** Art

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Golan Levin and Zachary Lieberman, Reface [Portrait Sequencer], 2007-2010 [Courtesy of the artists].

Reface [Portrait Sequencer] (2007-2010) by Golan Levin and Zachary Lieberman wittily exploits the sight as a dominant human sense and the human reliance on facial communication. Its camera captures a brief video of the viewer’s portrait, divides the image in three horizontal slices (mouth/nose, eyes and forehead) and dynamically mixes them with the slices taken from previous viewers. The face tracking algorithm provides the continuous capture of the viewer’s moving face, the seamless alignment and blending of the video slices, and triggers their rearrangement as the viewer blinks [27].

Distracted Computer Vision

Kyle McDonald’s brilliant innovations, modifications and applications of real-time computer vision (CV) and face recognition software open the new aspects for critical assessment of the role of selective observation and depiction of details in drawing.

McDonald’s and Matt Mets’ Blind Self Portrait (2012) uses CV to build a contour portrait of the visitor who has to keep the eyes closed while holding a pen on a moving platform in order to execute the drawing, thus becoming both the subject and a slightly inconsistent ‘mechanical part’ of the system [28]. This seemingly passive role is similar to the role of William Anastasi’s body in his Subway Drawings from the 1960s.
Few interactive documentaries have the pedigree of CLOUDS. After a hackathon experiment into harnessing the Kinect for computational photography and set out to make a documentary delving into the nature of code and creativity, digital artist James George and Jonathan Minard dreamed up an ambitious application of their new form of wireframe videography, and set out to make a documentary delving into the nature of code and creativity. To gain insight they interviewed several dozen leading artists, curators, and instigators, and engaged in profound and personal conversations about software, technology, and culture. A successful Kickstarter interview marathon at festivals like RiSE and Eyes, institutional support from the Studio for Creative Inquiry and Syddia, and then after considerable development—interactive installation and VR build—of the project were featured at film festivals like Sundance and Tribeca last year. Now, after four years of development CLOUDS has been released and is available for purchase. CAN has been exploring CLOUDS for the last six weeks and we feel obliged to go on-record and share our thoughts about this project.

During one of the documentary's several hundred interview clips, Casey Reas comments on virtual reality and says 'it's not cinema, it's not a game, it's not an attractivue— but it somehow puts them together,' in an attempt to identify that medium's inherent weirdness. Ironically, this found site on VR perfectly frames the tropes and tensions running through CLOUDS, which is fundamentally fragmented in both its aesthetic and narrative. As recorded and reconstituted by Graphite, each of its interview subjects is a uniquely moving complete with tropes (spatial location), and each conversation has been chopped up into dozens of quotes and statements. While building CLOUDS with source material has always been the project's driving force in this documentary it is taken to another level altogether and the film makes use of a custom story engine to organize and sequence its content based on metadata. Yes indeed, CLOUDS is a generative documentary.

↑ Man's voice, man's visual: CLOUDS is not lacking in perspective or cinematography

CLOUDS revels in abundance. Paola Antonelli, Régine Debatis, John Maeda, Bruce Sterling, Chris Sugrue, Markus Wachtel’s interviews are expansive and the knowledge it taps rare deep. This wealth of source material has been broken down into quotes, comments, and specifications, all expressed in response to high level questions. Does the network promote creativity? When is an artwork done? How do complex ideas emerge from simple rules? On launching CLOUDS in its default 'play' mode, a viewer navigates down a 3D tunnel and selects one of several flowing questions (represented by a blue and white circular prompt) to begin their session. A selection of commentary related to the query is layered up and begins playing, sometimes the sequence of clips is serendipitous, ingenious, and really expressive, often juxtaposed one on another and don’t really gel. It’s about the thrill of the hunt though, right? When a viewer has got their fill of a selected topic they can exit the scene by selecting new questions at the side of the current talking head (and breis) and deep dive into the most provocation of their choosing.

While Graphite’s portraiture is compelling, Minard and George have wisely opted to change things up sporadically and provide some visual variety. An inventory of 2D and 3D interstitial animations sometimes a cluster in lieu of an interview subject and these range from miniature landscapes, to summary layered ribbons, to matte and cellular abstractions—many coded by the interview subject themselves. It seems as if the abstract animations are tagged with the same taxonomy as the interview clip data— then often you get a visual map on that is thematic match for a visual sequence, yielding some nice interwoven narratives. Additionally, when jumping from question to the next, the load screen conveys a network diagram of the entire corpus, and you get a sense of the cartography of the upcoming networked conversation you are exploring.
If CLOUDS default mode is "play" its default user experience is on a standard display and while this is perfectly engaging it's a pale shadow of what the documentary is like in VR. When viewed through the Oculus Rift DK2 the interview subject has a much more tangible presence and an almost visceral flavor, you feel a much more embodied relationship to the subject and to the interviewees, and the interface is nicely tuned to your gaze (want to go somewhere? Look there) - This is the first VR project I've spent more than five hours in and - coming from this community - I believe that it's a compelling attempt to have the assembled 'cast' of interview subjects serve as tour guides for venturing through the proposition of what immersive documentary could be.

When the project success in VR mode it has its goals and idiosyncrasy that permeate all its functions, many of them tied to interface and general navigation. While I'm all for new forms, the generative clip sequencing doesn't always yield engaging results. Sometimes you can get a 'lead run' of marginally related clips. In one of my sessions Kyle McDermott flashed by and told me he could imagine ones being embedded in all cultures, and then Julia Kaganskiy appeared and wondered aloud about "who owns the internet?". The combinatory relationships can be more engaging. A survey of CLOUDS is akin to stumbling, Minard and George have provided an alternate "research" mode to alleviate this by showing viewers to scroll through an index of topics, people, and visual and methodically drill down into whatever it is that interested them - and this is a great workaround. That said, if there is the desire of utilizing efficient content navigation and immersion (research mode is not available in VR) but rather than describe the either/or situation as a fault, I think it actually underscores why CLOUDS is interesting and vital at this particular moment.

CLOUDS is a generative documentary filmed with emerging computational photographic techniques that feature multiple modes of navigation and VR support that has been released via a post-Netix video distribution service. In 2015 and all, we are all about what media is or should be. Yes, the film industry has been beating the transmedia drum for years and latched on (much like a barnacle) to VR as the next frontier in cinema but all that really means is they are worried about their relevance in light of emerging technology. CLOUDS is absolutely worth exploring because it is a work hybrid that draws from several traditions and fuses a contemplative pace for reflection in the middle of all this uncertainty. It's a software of linear dream directed by GMUNK, it's a provocation about immersive media before James Cameron creates the party: it's the faces and discoveries of the 2013-14 creative technology festival circuit frozen in amber and that discourse is still about five years ahead of the curve, and if it's a fact that the most innovative media making comes from independent voices who aren't saddled with the baggage of market-driven (and medium-driven) modes of working.

It's not often you find a documentary that is big enough to get lost in and alien enough in its aesthetic so that the primary point of reference is in-game. While the chorus of voices have considered the right of computation, creativity, and the cultural moment, CLOUDS itself does not offer any concrete answers about "what's next?" in media making but certainly poses some timely questions.

CLOUDS | Jonathan Minard | James George
Executive Producer: Golan Levin
Producer/Wind River: Winlow Porter
Design Director: Shirley G. Markowitz
Lead Interaction Developer: Chris Zananiri
Story Writer: Supa Mattu

http://www.creativeapplications.net/reviews/clouds-code-creativity-and-immersion/
by Greg J. Smith

A writer and editor based in Toronto, Greg is interested in media art and its broader cultural implications. Beyond contributing to CAN, he is the Editor-Of-Field of CAVE and serves on the Board of Directors of CCAFCC.
China’s version of the ‘Maker Movement’ puts the U.S. to shame

Clay Shirky
Oct 21, 2015

In the U.S., the lament goes, we used to know how to make things. In China, there’s a decent chance that’s how you got your computer. In an engaging new book, Little Rice: Smartphones, Xiaomi, and the Chinese Dream in stores this week, internet guru and NYU professor Clay Shirky looks inside China’s weird world of retail, and what it means for companies trying to break into the country’s enormous market. Here, a lightly edited excerpt from Shirky’s latest release—a perfect primer for anyone looking to do business in China.

The Maker Movement

Young Chinese students play electronic games at a stall in an empty electronics mall in Zhongguancun, Beijing, China. Photograph by Song jiaru — Imaginechina/AP
China is the world headquarters of making things. Golan Levin, who created a twenty-first century upgrade of the camera lucida drawing tool using Kickstarter, decided to have his product made here. When I asked him what he’d learned bridging the gap between American maker culture and Chinese manufacturing, he replied, “The hardest thing to understand when talking to Chinese manufacturers is that there is no shelf. They’d ask, ‘What sort of screw do you want here?’ And we’d say, ‘Well, let’s see, what do you have off the shelf?’ And they’d ask again, ‘Well, what do you want to use?’”

Levin said it took them a couple of go-rounds before they realized that there wasn’t any shelf to get things off of, that any given screw was going to be as cheap as any other because none of those screws existed in advance of demand. The producers didn’t own screws, they owned machines for making screws, so you might as well design everything from scratch. He had gone so far up the supply chain there were no more supplies.

**To an American eye, the whole thing is a little nuts, but it works.**

In any big Chinese city and most of the medium-sized ones (which is to say any of the hundreds of cities here with a population larger than Seattle’s) there will be a big electronics mall—Cybermart is a common brand, though there are many others. These are multi-story stores, divided up into booths of different sizes, like a trade show, each rented out to a different merchant. To an American eye, the whole thing is a little nuts, but it works, and traveling through one is like taking a core sample of electronics in China, only here you start at the bottom and work your way up.

The economics of retail floor space mean that the showy, high-margin stuff is at street level, and the gritty low-margin goods are at the top. The ground floor of a Cybermart will tend toward the bright, clean, white space of a showroom floor. There will be a few big booths selling premium brands like Samsung, Apple, Sony, and Lenovo. You could be in a Best Buy in Ohio, except for the Chinese signs. This is the least interesting part of the space; the real action is upstairs.
'Shadow Monsters' creator keeps it simple, fun

By Molly Glentzer  |  May 29, 2015

People were acting beastly at the Museum of Fine Arts, Houston. Some growled without provocation as spikes and werewolf hair sprouted from their heads and arms. One tossed her purse, and it grew teeth.

And these were the adults. Philip Worthington couldn't wait for the kids to arrive.
The boyish, gregarious inventor of "Shadow Monsters" knew young people would eat up his projections. Even jaded adults can feel 8 years old again as they move in front of the installation's three huge light boxes to watch - and hear - what develops from their looming shadows.

Occupying the huge Cullinan Hall walls that previously held 17th-century tapestries designed by Peter Paul Rubens, "Shadow Monsters" aims for the purely playful side of the imagination.

"I like fun stuff," said Worthington, who designed the installation as a "technological magic trick" for an interactive design course when he was earning his master's degree at London's Royal College of Art 11 years ago.

Before that he worked as a graphic designer. "I was dying to get off the screen and do something more visceral," he said.

That meant learning how to write software code. Then he hit upon the idea of digitally reinventing Victorian and Asian shadow play.

"It began with pencils and little finger puppets. I began adding bits of hair and fingernails, and it grew into a monster - no pun intended," Worthington said, grinning.

Spoiler alert if you like your magic tricks to remain a mystery: Each "Shadow Monsters" station consists of a camera, a computer and a large light box. The camera sends high-contrast images to a computer, which analyzes silhouettes, finds points of extreme curvature (say, the inside of your fingers or your neck) and applies graphics from a library of sounds and images.

"It's built on a finite number of things but applied in a way that hopefully is free for the participant to experiment and get creative with," Worthington said. "I didn't want to prescribe that a head does one thing, a
hand does something else. It's just a shape, treated as a piece of curvature."

"Shadow Monsters" has made the rounds of several major museums even though Worthington no longer considers himself an artist. In 2008, he co-founded the live-broadcasting company Livestream.com, which now has 150 employees in five countries.

"I've always been a bit confused because I've been somewhere in between engineering and design, art and science," he said. "There's lots of cool stuff out there, people playing with cameras and sensing and making graphic and sound forms. It's a rich and evolving field. I'm like a little dot somewhere in that constellation."

His heroes include the American new media artist Golan Levin, whose recent "Augmented Hand Series" weirdly and instantly transformed full-color images of participants' hands so they appeared to grow extra digits or have fingers that moved autonomously.

But Worthington also appreciates simplicity. While he's changed coding to accommodate newer technology and said he's working on a "top secret" update, the "Shadow Monsters" experience hasn't changed much.

He's not interested in adding color, for example.

"Somehow, the minimalism and lack of detail is what lets you imagine further," he said. He doesn't think colorful effects would have the same magic. "Sometimes, simplicity is more powerful than all the things you can do," he added.

The urge to play with shadows is "one of those things that's just intuitive in all of us, whether you're 5 or 55," he said. "Today's kids are playing with more complex things, but there's still playfulness inside all of us."
The other day, while waiting at the registration desk for an event entitled “Visualizing Climate Change,” I met a data visualization developer from Bloomberg News. Upon his introduction, I immediately thought of the terrific interactive climate change infographic Bloomberg put out earlier this year. The strength of this graphic lies not only in its clear visual form and brilliantly delivered punch line, but also in the ease and seamlessness of its interactivity. My new acquaintance told me how thrilled he was at how it turned out, and said that Bloomberg was working on more graphics of this sort, specifically focused on climate change.
I was pleased to hear it. What can be more convincing, I thought, than a well researched, user-friendly visualization that lets the data speak so plainly and eloquently for itself? As I sat down for a lecture on visualizing climate change by artist Melissa Fleming, I readied myself for a presentation filled with climate-related data and innovative ways of presenting it. Indeed, Fleming began her talk with a few slides setting up the problem of climate change, featuring some ordinary charts and graphs. But then she dismissed them, saying, in essence, that charts and graphs are simply not compelling. They don’t grab our attention, and they don’t change our minds.

It is true, I thought, that data visualization lacks a sense of passion. But isn’t that what makes it so powerful in its own right? Data visualization presents facts, and—if done well—nothing more. The absence of bias or zeal lends strength and credibility to a good data graphic. On the other hand, if Fleming is correct that charts and graphs don’t convince people, or move them to change, then perhaps we need a stronger, more emotionally based approach.

She went on to make the point that art can appeal to our emotions in a way that data visualization cannot. Fleming cited the famous “Earthrise” photo, taken in 1968 by Apollo 8 astronaut Bill Anders. Many people are convinced that this photo helped crystallize the environmental movement; just two years later, the world celebrated Earth Day for the first time. While I can hardly dispute the power of this image—especially when placed in the historical and cultural context of the late 1960s—I had trouble imagining a piece of art capable of yielding an equivalent effect in today’s visual-media-soaked world.
The bulk of Fleming’s presentation was a general survey of (mostly) contemporary fine artists whose work fits under a broad umbrella of environmental and climate-oriented themes. The majority of them were unfamiliar to me, and I enjoyed seeing their vast range of work, from photography to sculpture, installation, murals, and street art. It was heartening to see so much work focused on climate change, much of it infused with a visibly earnest devotion to the subject.

In terms of evoking an emotional response, the work of sculptor Isaac Cordal stands foremost in my mind. In photos, his 2013 installation entitled "Waiting for Climate Change" is deeply unsettling in the way it highlights the urgency of rising water levels. Cordal placed fourteen sculptures of “businessmen” in the moat of the Château des Ducs de Bretagne, in Nantes, France, and left them to float and drift throughout the summer. With their dead eyes staring ahead, their business-suit-clad bodies largely submerged in
the water, they are seem disturbingly apathetic to their own plight. As a portrait of our own passivity in the face of potentially dire events, the artwork is effective.

"Waiting for Climate Change" photo: Château des Ducs - Isaac Cordal, July 2013, by Objectif Nantes (From Flickr)

Photographer Edward Burtynsky’s work underscores the impact of fossil fuels and other industrial products. Some of his photos struck me as an interesting alternative to data visualization. Take, for example, a photo in which a monstrous pile of abandoned tires stretches as far as the eye can see, obscuring the landscape almost entirely. Contrast this with a graph showing the quantity of car parts contributing to solid waste generation over a certain period of time. Which is more effective? In the photo, it is impossible to tell how many tires there are, but that is precisely the point. The number is so large as to become irrelevant, as the massive pile overwhelms and subsumes the land around it.

However, I am doubtful that this image or Cordal’s installation would have any real or lasting effect on a viewer who is indifferent to or skeptical of environmental issues. Sure, the image is striking, but it is rendered in a subjective medium by an artist who probably has an agenda. Why should people take this more seriously, either as evidence of a problem or as a call to action, than an objectively presented visualization of hard, irrefutable data?
Perhaps the answer is to fuse data with art: back the emotional punch with some quantitative substance. Some artists have tried this, with mixed results. One cited in Fleming’s talk, Paolo Grangeon, worked with the World Wildlife Foundation in 2008 to make a sort of public data installation comprising 1600 pandas made from recycled paper. The number is significant, as it matches (approximately) the number of endangered pandas left in the wild. At the same time, it grabs viewers’ attention and pulls on their heartstrings. (What could be more captivating than an adorable baby panda, let alone 1600 of them?)

However, whether the installation conveys the gravity of its subject is debatable. Not having seen it in person, I cannot say for sure whether it is effective in this respect. But given my initial reaction to photos of the sprawling installation (“wow, so many pandas!”), along with the abundance of whimsical panda selfies to be found online, I cannot help but question its value as an effective data visualization.

Nonetheless, I believe there are ways to use visual media to prompt the kind of shift inspired by the Earthrise photo, and I remain convinced that data can, and should, play a role. If the emotional and psychological pull of something like a public art installation could be combined in the right way with the weight of solid, relevant data, perhaps art could affect real and lasting change.

With artists like Golan Levin and Domestic Data Streamers beginning to inject data into public installations and street art, and offering opportunities for consumers of their art to interact with and even become part of the work, the potential is there. I look forward to seeing where this trend will lead us next, and I hope to see climate change emerge as a prominent theme in the world of data art.
If you happen to be staying in San Francisco during the long Memorial Day weekend, one of the things you can do is see the art in the F.A.T. Gold Retrospective at Gray Area in the Mission District.

F.A.T. Gold is a collective of hackers, engineers, musicians, and graffiti artists who have created punk projects that have unleashed fake Google Streetview cars onto the roads of Berlin to a Free Universal Construction Kit that makes pieces from Lego, Lincoln Logs and K’nex kits connected.

“What I love about the F.A.T. Lab projects is how joyful, trashy and funny they are,” said Golan Levin, who created the universal construction kit as a critique on how corporate-
Below is a short video about the group’s work:

And what follows is an edited interview with Katsu, a pseudonymous drone graffiti artist who just finished a poop painting of Google Chairman Eric Schmidt (called “Eric Shit”) that is going on display with the retrospective this weekend. One of his drones recently defaced a Kylie Jenner billboard in Manhattan earlier this month.

**So how did you get into shit painting?**

**Katsu:** My background is in graffiti, hacking and just general technology. The painting is part of a series of paintings that I did called “Shitheads.” I had done a portrait of Mark Zuckerberg earlier this year in my solo show at the Hole Gallery in New York. It was a triptych of Mark Zuckerberg, Eric Schmidt and a dog that I grew up with.

I like getting my hands dirty. I was thinking about the human body removed from all art mediums. I was thinking, what is the human body capable of producing pigment-wise? You can use blood, feces, semen and urine. If you just stripped away and removed humans from everything and all technological devices, what could the body naturally produce?

I’m also a little bit fascinated with data on any level. I was really interested in the taboo of feces. I was watching a Gates Foundation video about how Bill Gates is trying to revolutionize the toilet and change the way we look at excrement.

But it’s really about bio-data. These titans of the cloud, are like, basically in competition to control every bit of granular data about individuals. That’s what makes their companies so powerful. They understand that human data has this immense value and they’re shielding and hiding that from the public.
Um, actually, there’s this company called Ubiome, that collects poop samples to help you learn about your microbiome, or your body’s natural bacterial flora and fauna. They just started collecting dental and vaginal samples too. And Andreessen Horowitz invested in them.

Katsu: Andreessen Horowitz. Oh God, we should definitely include them in the show.

We were joking about how FAT is going to look for ‘FEECEE’ funding with an undefined use. Silicon Valley should have to pay a premium to have an allegiance with the FAT Lab. We’re a group of brilliant, humble human beings that are trying to do a Warholian kind of tech pop art.

But Warhol lived in and critiqued the era of mass consumer culture. Today, everything is fragmented. How does that affect your livelihood and work as an artist?

Katsu: Tech is becoming this one single thread. People are feeling that if they’re not involved in technology, they’re going to be left behind. There’s this incredible attention, obsession and worship of these Zuckerbergs, Tim Cooks, and that Snapchat kid. We put them on this pedestal of greatness, but they represent this vast separation in class and culture.

I guess I meant, how does fragmentation affect the way you earn a living as an artist?

Katsu: There is still this hyper-exclusive upper art world in New York and the U.K.

I did a booth at the first Silicon Valley Contemporary art fair. It was pathetic. I showed a bunch of drone paintings.

All these big giant New York galleries were hedging. They were thinking, holy shit, we’re going to make a ton of money. They were hoping that these tech titan billionaires were going to show up and let these galleries tell them what art is.

One of their mistakes was doing it in San Jose.

Katsu: You know, we would really like to invite Eric Schmidt to this show. And Jaron Lanier, because he’s my hero.
So how do you make a poop painting?

**Katsu:** There are all these 99 cent stores around where I live that have these Chinese takeout boxes. I have a big hangar studio in East New York.

**Oh, East New York? That’s where the artists are these days.** Mayor De Blasio is rezoning all of that real soon.

**Katsu:** It’s the last industrial area of New York City where you can find stuff that’s cheap enough.

Already, my landlords are getting all weird. They’ll see me squatting into these little takeout boxes. Feces molds pretty quickly, which is pretty whack. So you have to use a lot of gloves and hand sanitizer. I have to wear a mask. Lots of flies play with me while I’m painting.

**Do you have to be on a certain diet?**

**Katsu:** People always ask me if I’m eating beets all the time or something. You know, I do name all of my boxes. I have some called “Green Jungle Curry” and “Pad Thai”. Honestly, it’s probably all diner food.

**Does the painting smell?**

**Katsu:** It decays. That’s part of the piece. It chips away.

**People are into that?**

**Katsu:** Yeah, the guy who bought my Mark Zuckerberg piece was crazy about it.

**And how do you do drone paintings?**

**Katsu:** Drone paintings are my main thing. I have a basic consumer drone that carries spray paint.

**Are you the one that defaced that billboard the other week in New York?**

**Katsu:** The one of Kylie Jenner? Yeah, that’s me.
Will an artificially intelligent system ever be able to "feel" as humans do?

Recently, a Boston-based organization called the Future of Life Institute composed an open letter warning of the "potential pitfalls" of artificial intelligence. Their concern? That, given the vast and growing power of artificially intelligent systems, one day, a rational AI might decide humanity should no longer run shit. The Institute put it slightly more tactfully, asking that technologists engage in "expanded research aimed at ensuring
do."

The letter comes across as science fiction, and if not for the names underwriting it, it very well might have been dismissed as such. However, when people like Stephen Hawking and Elon Musk—along with various Oxford scholars, researchers at Harvard, and employees of Google's DeepMind project—sign your open letter warning that the computers might take over, people tend to pay attention.

The possibility that this might happen is alarming, certainly: nobody likes being told what to do, especially when the entity that's telling you what to do is your mechanical overlord. But if AI systems retain human qualities—if they have feelings and the ability to express those feelings—would it really be so terrible if they replaced us?

This is, in many ways, a hopelessly human question. It anthropomorphizes systems that are vastly different from us. Still, I can't help but to be curious about the potential for AIs to develop interiority, if only because it makes the threat they pose less horrifying. Can artificially intelligent systems ever "feel" as humans do? And will they prove that those feelings exist in the same way we do? Will AIs ever be capable of, or interested in, creating art?

The capability question is easier to answer, at least when it comes to producing art. Artificially intelligent systems and even robots have been used in the creative arts for decades, and many have even made their "own" art.
its artistic capability, programming instructions and data into its system. By giving it information about the proportions of the human body, he granted it the ability to paint fairly impressive pictures of humans. Cohen would argue that, like an art teacher instructing a toddler, he taught AARON the rules of art, but that the system then went on to express its own agency with what it had been taught.

Contemporary artists have followed in Cohen's footsteps. Ben Grosser, an artist and professor at the University of Illinois, has his own painting system. Grosser spoke explicitly of the machine's agency to VICE.

"We always talk about artificial intelligence in systems that are in service to us," he said. "What might these machines want to do for themselves? What might a machine paint for its own purposes? What are its aesthetic desires?"

Fine art isn't the only medium in which artificially intelligent systems have produced novel and interesting work. In the realm of AI-created music, a group of researchers collaborated on a project in which they used multiple machines to create a "Deep Belief Net" that could then produce improvisational jazz licks. Professors at Canada's Brock University have used AI to help choreograph dance steps.

The systems that scientists and artists are using in these productions are a form of artificial intelligence. They conform to the definition of the warning letter, which focuses on machines' ability to make rational decisions. But there are many artists, engineers, philosophers, and scientists who would say that
self-awareness. Their human creators have enforced their interest in art.

The latter argument seems to be the opinion of Golan Levin, a professor at Carnegie Mellon University who specializes in generative art, in which the artist creates an autonomous system that aids him in the creation of art, either by generating the work itself or by aiding the artist in the making of art. It's a category to which many would relegate artists like Cohen and Grosser. Levin related a phrase, one that he says is commonly known, about the slipperiness of the very term "artificial intelligence":

"Once artificial intelligence exists, it's just engineering," he told me. "It's no longer intelligent."