Can buildings think? descends from: Can machines think? The original was posed by Alan Turing in 1950 referencing computers and became a theoretical challenge and then an algorithmic quest implicating biological simulation, artificial intelligence (AI), and synthetic biology. Today we take AI for granted. It powers Google searches, autopilot in Airbus and Boeing airplanes, and game simulators in your Android or iOS smartphones. Through lectures, presentations, projects, and discussions this studio will reformulate Turing’s visionary question to peruse strategies for how generative architecture is approaching biological and computational intelligence using strategies from nature. We look to technology both for visualization techniques and for production implementation. In our work we cover theory as it drives ideas for new concepts of material production and performance inspired by biology. Furthermore, we look to how synthetic biology, AI, and mobile technologies conceptualized in experimental roles impact design and material issues of generative design, environmental justice, social responsibility, and machine fabrication. The questions: Can machines think? and Can buildings think? thus drive the studio exploring biological and computational simulation, intelligent materials, and nature as they emerge for biodigital advanced architecture — specifically in the context of biomimetics, simulation, drawings, and fablab performance.

First Project
The first project looks to technological transformations from nature visualized from an electron-scanning microscope (right & pp 3-11). This project moves from morphological digital visualizations to produce materials and/or systems using Rhino and laser, CNC or STL modeling.
Assignment 1. The potential of new architectural systems using lightweight easily transported infrastructure is behind this studio investigation. Think of flexible system based in cables and ropes and how through advanced visualization they might join to make nets and frames that could be part of a kiosk or an experimental structure. Consider the way snaps, hooks, anchors, and links work in the natural world. To begin this design research we begin innovating structural and aesthetic architectural junctures. And we look to nature and technology to do it. Connectors are abundant in the plant world with its stickers, thorns, barbs, and burrs; all in one way or another connecting one living thing with another support system. Researching connectors from seeds, branches, and barbs can be done with a magnifying glass, a light microscope, and more technologically, with an electron scanning microscope. Illustrated here are thorns, invisible to the naked eye — the images if explored in terms of structural use will reveal functional properties that may be translated into connector systems for design. Imagine something like Lego + Velcro systems evolved from branches or interlocking cable structures that could lead us to a construction project at a larger scale. The assignment has two parts — 1) draw the hook and receptor (see Rhino drawings above); and, 2) fabricate both as a connection system (next page).
Assignment 1. Part #2
Branching

Following the research for a connector system, this segment involves ways to interlink the connections in a structural system — the link-segments could be blocks like Lego, struts as in geodesic components, or branching systems as illustrated as a revisualized tree growth (left) or as curved STL pieces illustrated (right).
Visualization to Fabrication

STL Demonstration Model
Dennis Dollens, 2011
Plant branching from a generated digital tree used as a structural bridge frame. Generated in Xfrog, exported & edited in Rhino and exported again as an STL file for 3D printing. YouTube video of early digital tree growth experiments.

Modeling Anatomy & Morphology

STL Heart
Leonardo da Vinci: The Mechanics of Man
The Queen’s Gallery
Palace of Holyroodhouse
Edinburgh, Scotland
02 August 2013 to 10 November 2013

STL Model by Dr. Gregory Gibbons
WMG: University of Warwick, England

The STL model originated as a CT scan exported as an STL file and printed on a Connex 260 and the material is Veroclear. The model is not directly manufactured from Leonardo’s drawings but was intended to accompany them as a demonstration of the correctness of da Vinci’s anatomical observations. Left, heart detail: Leonardo’s, “The Cardiovascular System and Principal Organs of a Woman.” 1509-10.
Autopoiesis: 
Leaf: Structure, Membrane, Performance

The Xfrog, L-system drawing above activates biological algorithms to model stem and leaf growth behavior and provide a window to potential folding and unfolding for building performances determined by the building’s design parameters and expected responses to environmental conditions both inside and out.

Assignment 2: BioRobotic Leaf
Investigation here begins with the selection of a leaf. First: Identify your own leaf and gather biological data. The next step is to draw how the leaf unfolds, its morphological development and to articulate its structural support and circulatory system on different drawing layers. The design principles involve materialization between the structural network of the leaf (its veins), its system of communication (its veins) and its cellular performative the surface.
Leaf morphology (top) played a role in the generative design (above) of a tobacco leaf used to extend botanic forms in to the first iteration for a canopy shelter (right).

Morfología de las hojas (parte superior) jugaron un papel en el diseño generativo (arriba) de una hoja de tabaco que se utiliza para extender las formas botánicas en la primera iteración de un refugio del dosel (derecha).
Rubber Band Bridge
This project began with an investigation of branching systems using L-Systems and quickly reached the stage of a 2.5m reconfigurable structure built with standard rubber bands. It demonstrates emergent and distributed strength, easily supporting the weight of a person.

Rubber Band Puente
Este proyecto se inició con una investigación de la ramificación sistemas que utilizan L-Systems y rápidamente llegaron a la etapa de una estructura reconfigurable 2,5 m construidos con bandas de goma estándar. Esto demuestra la fuerza emergente y distribuida, fácilmente soportar el peso de una persona.
Student Work: 10m Tensegrity Tower
Trabajos de Estudiantes: Torre Tensegridad 10m
This brief video illustrates non-standard urban visualizations and place mapping with a digital overlay of a living organism. What does ALife mean here? Is it important to know we are in Paris? What does it tell us about its maker's views of urban occupation and movement. I'm previewing it here for you to have a sense of the type of material that can propel class projects. What is this video's relationship to graffiti for example, and how could we learn from its technology and aesthetics using mobile phones as research and production equipment? What does it tell us about “marking” place or making “signs?” Is there a narrative? Are we entering the territory of e-games?

Rhetorical questions perhaps, but one of the responses to uDrift could be a series of linked, mobile produced & edited videos, hit-and-run ideas, tested for generative idea value.

Are urban spaces technologically alive? In a digital age what does place, space, & time mean for mobile e-learning? What is mobile research and design mediated by a smartphone? How can it be understood as generative, contributing to ideas of presence, environment, screen ID, occupation of space & ALife?
Apps
The class uses a suite of apps that provide communication lines between members — a screen base where we receive messages, images, & videos; sites where collaboration might take place. In a sense, the apps ground the class in asynchronous time and dispersed locations. The class, in the mode of mobile e-learning then becomes a hybrid facilitator between your work, your digital equipment, and the place(s) you map, track, overlay, video, photograph, write about, make music for, sculpt, or build. It helps create and organize data layers for a mobile screen presence in a kind of m-leaning atlas of space, form, and time.

La clase utiliza un conjunto de aplicaciones que ofrecen las líneas de comunicación entre los miembros - una base de la pantalla donde recibimos mensajes, imágenes, y videos, sitios donde la colaboración puede tener lugar. En cierto sentido, las aplicaciones de tierra de la clase en el tiempo asíncrono y ubicaciones dispersas. La clase, como un tipo de móviles de e-learning se convierte en un facilitador híbrido entre su trabajo, su equipo digital, y el lugar(s) de asignar, pista, cubierta, video, fotografía, escribir, hacer música para, esculpir, o construir. Ayuda a crear y organizar las capas de datos para una presencia en la pantalla móvil en una especie de m de tendencia atlas de espacio, la forma y el tiempo.

There are many Twitter aggregators available. Tweet7 is illustrated because of its fast graphic presentation and clear design. Above a video made with Vine is illustrated.

https://vine.twitter.com/
TweetDeck for Sequential Texts & Manifestos
TweetDeck para los Textos secuenciales y Manifiestos

Always include the #aupo hashtag, and as long as each member of the class is following, we can sync and exchange messages, images, and brief videos. TweetDeck for desktops and mobiles collects and organizes all posts. The hashtag organizes the class in a social media space for informal talk as well as announcements.

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Siempre incluya el hashtag #aupo, y siempre y cuando cada miembro de la clase esté siguiendo, podemos sincronizar e intercambiar mensajes, imágenes y vídeos cortos. TweetDeck para computadoras de escritorio y móviles recopila y organiza todos los mensajes. El hashtag organiza la clase en un espacio social los medios de comunicación para la conversación informal, así como anuncios.

With a tracking program working in the background, it is often possible to use location screen shots in ongoing conversations and work distribution and documentation. Such posts can be organized with research during fieldwork or linked to ongoing information collection and later coordinated with the maps. Consider how MapMyRide groupings — image/video, location — could be organized for indexing research data and/or presentations.

Mobile Tracking • Cycling • Walking • MapMyRide

MapMyRide
http://www.mapmyride.com/app/
The OlloClip Macro Lens
(iPhones only)

Adobe: SketchBookX with image from the Olloclip

Morphology Field Research:
The OlloClip Macro Lens
http://www.olloclip.com/3-in-1-iphone-macro-lens/
(See pps 58-59)
Adobe Ideas • Android & iOS • $9.95

This is a very good app for sketching that also imports photos allowing you to draw or annotate them. However, there is no free version . . . see next page for an excellent alternative.

Adobe Ideas Blog
http://blogs.adobe.com/adobeideas/

AutoDesk • SketchBookX • Android & iOS • Free

SketchBook is a beautiful drawing tool with a great airbrush feature. There is both a free and a pro version. Most screen drawings reproduced in this handbook were sketched with it.

SketchBook es una herramienta de dibujo hermoso con una función de gran aerógrafo. No es tanto una gratuita y una versión profesional. La mayoría de los dibujos de la pantalla se reproducen en este manual fueron trazados con la misma.

... if you don’t like drawing with your finger; remember a touchscreen stylus . . .

... si no te gusta dibujar con el dedo; Recuerdo a un lápiz táctil . . .

Esta es una aplicación muy buena para dibujar, que también importa las fotos que le permite dibujar o escribir en ellos. Sin embargo, no hay una versión libre. . . vea la página siguiente de una excelente alternativa.
Mobile CAD · FormIt (Autodesk) · iPad & Android · Browser Version in Beta ·

Mobile CAD · 123D Design (Autodesk) · iPad, Mac, Windows, & Web App · Free

http://autodeskformit.com/

http://www.123dapp.com/design
Mobile FAB (sort of) • 123D Make (Autodesk) • iPad, iPhone, Android, Mac, & PC

Mobile Scanning • xxxx (Autodesk) • iPad & Android • Browser Version in Beta •

http://www.123dapp.com/make
One possible use of QR codes for learning is to code sequential messages, manifestos, or poetry and distribute them variously through a mapped trail of discovery. The locations could be predetermined and included in the QR generation to lead readers or students to the next sites (the printed codes could be tied or taped where other graffiti is found.) The possibility of learning games created with literary, botanic, art, or program information and linked over a learning course is huge. In this approach there are strong relationships to the MScEL course, Introduction to Digital Game Based Learning where our mapping and tracking relate to game courses strategies: go there: do this: get that.

Un posible uso de los códigos QR para el aprendizaje consiste en codificar los mensajes secuenciales, manifestos, o de la poesía y los distribuyen de diversas maneras a través de una ruta asignada de descubrimiento. Los lugares podrían ser predeterminados y se incluye en la generación de QR para llevar a los lectores o los estudiantes a los lugares próximos (los códigos impresos pueden atar o pegar donde el graffiti se encuentra otro.) La posibilidad de aprender los juegos creados con el botánico literario, el arte, o la información del programa y conectados a través de un curso de aprendizaje es enorme. En este enfoque, hay una fuerte relación con el curso, Introducción a la MScEL aprendizaje del juego digital basada en nuestra cartografía y el seguimiento se refieren a campos de juego de estrategias: ir allí: Haga esto: conseguir eso.
Experiments
This project uses microscopic organisms for both material and form. In a sense Radiolarians have glass exoskeletons. Whereas human skeletons are made of calcium, these are made of silica. And they grow in an astonishing array of forms. Search the website either on a desktop or mobile, select a radiolarian to work with and bring that from into a new use — this can be done by hybridizing new shapes and/or developing a new material approach based in structure and using glass biomimetically.

Consider implications for design including membranes, panels, skeletons, nets, & geodesic structures • Function in the environment • Determine if other organisms have glass skeletons. (26-27)

Ernst Haeckel: Die Radiolarien
http://caliban.mpiz-koeln.mpg.de/haeckel/radiolarien/

Wikipedia Radiolarian
http://en.wikipedia.org/wiki/Radiolarian
Expanding Notions of M-Research: Virtual Microscopes

Life forms with silica (glass) skeletons present material challenges when imagining biodigital structures and materials. Extension of ideas from such research to design is assisted through exposure to nature at shifted scales where the atomic-field is made visible by scanning electron microscopes (SEM) and other instruments. In terms of our visual and morphological research, the use of scientific equipment is productive in design for illuminating or inspiring new realms not only of forms and materials, but of connectors, spaces, and massing. Optical equipment presents new channels for visualization.

Las formas de vida con sílice (vidrio) material de esqueletos presentan retos al imaginar las estructuras Biodigital y materiales. Extensión de las ideas de este tipo de investigación para el diseño con la ayuda de su exposición a la naturaleza a escalas desplazadas, cuando se efectúe el campo atómico visible por microscopios electrónicos de barrido (SEM) y otros instrumentos. En términos de nuestra investigación visual y morfológica, el uso de equipamiento científico es productivo en el diseño de nuevos reinos iluminación o inspiración, no sólo de formas y materiales, sino de conectores, espacios y masajeando. Equipo óptico presenta nuevos canales para la visualización.

University of Illinois • Virtual Microscope http://virtual.itg.uiuc.edu/

Consider low-tech alternative visualizing
Mobile Mediated Environment: Leaf Investigation

This leaf, tracked at the Royal Botanic Garden Edinburgh, presents four views for an advanced 3D structural translation into the leaf panel (far right). But for urban drift, considered in situ, it provides ideas for translation into drawing, sketches, or video.

If you think of Leaves as shape-shifting organisms, what quality does that invoke?

Right and above: The leaf influenced the layered structure, embedded sensors, and curving form for an air-exchange, architectural panel.

D. Dollens
The important point here is not the generative results; it is the original visualization of how the seedpod’s rotational flight path is phenotypic with extractable practical information available to observation, while being convertible to visualized data. The seedpod’s flight is influenced by environmental factors such as wind velocity, sine frequency, and seedpod trajectory. Natural forces thus alter the shape of its subsequent spirals. This is information useful to project research. And, such data is available to observation at almost every point in the natural world, here without scientific equipment. It is a core lesson for understanding biomimetics as they meet technology.

Three spirals of differing direction and frequency were used from seedpod flight to generate this footbridge.

Tres espirales de dirección diferente y la frecuencia se utilizaron en el vuelo vaina para generar esta pasarela.
The idea illustrated here is to use video as a tool of discovery, documentation, and research employing in-phone apps. By making very brief — one minute for example — videos, you can explore specific aspects of a subject. Using an app video editor (here iMovie) production can be completed outdoors or in a cafe, associated with MapMyRide or Google Maps and distributed via TweetDeck or other social media.

La idea se ilustra aquí es utilizar el video como una herramienta de descubrimiento, documentación, investigación y empleo de aplicaciones en un teléfono móvil. Al hacer muy breve - un minuto, por ejemplo - vídeos, usted puede explorar aspectos específicos de un tema. El uso de un editor de video aplicación (en este caso de iMovie) la producción se puede realizar al aire libre o en un café, asociada con los mapas de Google y MapMyRide o distribuidos a través de TweetDeck u otros medios de comunicación social.
Generated from interlocking tree branches using Xfrog, Rhino, and MAX to create an exoskeleton (box, left), the project is visualized to include robotic actuators (second from left) here represented as spheres that control leaf-like panels that open and close for ventilation and light, as well as filter the air. Based on tree structures, leaf functions, and seedpod spaces the tower illustrates digital biomimetic systems visualized as both biorobotic, living, and environmentally friendly.
Territory
For most students, mapping and documenting environmental influences and research subjects will be in urban or suburban locations. But there is no reason not to consider a bicycle in a rural or city context. The program easily accommodates discovery, exploration, documentation, and site research from walking or riding. If you decide to use a bicycle one aspect to keep in mind is the emergence of cycling culture in the form of neighborhood development, city markings of bike lanes, public policy, bike cafes, and specialized forms such as fixies. Here, a project of yuca (32-33) is documented with a “pin drop” in MapMyRide and later exported to Google Earth as part of research data.

Para la mayoría de los estudiantes, la cartografía y la documentación de las influencias ambientales y temas de investigación serán en lugares urbanos o suburbanos. Pero no hay razón para no considerar una bicicleta en un contexto rural o urbano. El programa se adapta fácilmente a descubrimiento, exploración, documentación e investigación del sitio de caminar o montar a caballo. Si usted decide usar una bicicleta un aspecto a tener en cuenta es la aparición de la cultura de la bicicleta en el barrio de los desarrollos de la ciudad, de las marcas a partir del desarrollo de la ciudad, de las políticas públicas, los cafés para bicicletas, y las formas especializadas como fixies. Aquí, un proyecto de yuca (32-33) se documenta con una “caída de un alfiler” en MapMyRide y posteriormente exportado a Google Earth como parte de los datos de la investigación.
Documenting, mapping, cross-referencing, and interpreting graffiti is a way of reading the contemporary city (42-43). Insights into art, politics, and environment are expressed, often reflecting local qualities of neighborhoods as well as readings of contemporary art and graphics. By mapping, reading, and layering graffiti, a record of ephemeral flânerie creates mobile documents open to alt research (42-45).

La documentación, cartografía, referencias cruzadas, y la interpretación de graffiti es una forma de leer la ciudad contemporánea (42-43). Miradas en el arte, la política, y el medio ambiente se expresan, a menudo refleja las cualidades de los barrios locales, así como lecturas de arte contemporáneo y los gráficos. Mediante la cartografía, la lectura, y capas de graffiti, un registro de flânerie efímera crea documentos móviles abiertos a la investigación alt (42-45).
If you consider architecture as elements of an urban body, by extension would graffiti have a role in marking, signing, and communication similar to that of tattoos “written” on a body?

• Does this change our perceptions of urban space and the nature of u-drift? How is this related to Flânerie and/or Dérive?

• Do we alter the notion of narrative structure if we consider urbanisms and bodies related via semiotics, data, form?

• Does the idea of written on a body take new aesthetic and political meaning when considered as performance? As politics?

• Can you track narrative, sign, and symbolic meaning via graffiti vis-à-vis tattoos?

Si se considera la arquitectura como elementos de un cuerpo urbano, por extensión, que el graffiti tiene un papel en la marca, la firma, y de la comunicación similar a la de los tatuajes “por escrito” en un cuerpo?

• ¿Se modificó nuestra percepción del espacio urbano y la naturaleza de la u-la deriva? ¿Cómo se relaciona esto con Flanerie y / o derivar?

• ¿Se altera la noción de estructura narrativa si tenemos en cuenta urbanismos y organismos relacionados a través de la semiótica, los datos del formulario?

• ¿La idea de escribir en un cuerpo a tomar un nuevo significado estético y político cuando se considera como el rendimiento? Como la política?

• ¿Puede realizar un seguimiento de la narrativa, el signo y el significado simbólico a través del graffiti vis-à-vis los tatuajes?
This is a study model made at the site where a bit of palm bark was found. It’s joined with a broken zip-tie. The idea is to generate bio-models from found material. Study and document them on the site, leave them as 3D graffiti, and then generate digital models from the experience. (46-47)

Se trata de un modelo de estudio realizado en el sitio donde se encontró un poco de corteza de palma. A esto se une con una fractura de las bridas. La idea es generar bio-modelos a partir de material encontrado. Estudiar y documentar que en el sitio, dejarlos como el graffiti en 3D, a continuación, generar modelos digitales de la experiencia. (46-47)

The models provide form & material data for later studio translation.

Los modelos proporcionan los datos del formulario y material para la traducción de estudio más adelante.
This is one of many approaches for using found natural objects for design. (44-45) It is an investigation and has an open trajectory where you define the project research you undertake. • This is an e-learning deployment to blend the uses of technology, urban, and natural observation for form, structure, composition, connections, and structures. The project need not be with shells; it could successfully be researched with leaves, feathers, flowers, bones, seedpods etc. The goal is transition; to engage natural elements for design invention; the results of which do not look like what you began with. Your time in the field should be used to investigate materials and build or assemble materials as form/structure studies. Your models may be built on site and revisited many times or almost instantly lost. Think of the models as small urban interventions — as 3D graffiti.
Texts
I began the course playing PacMan on my iPhone. I played all over the city; in the metro and at cafes. After days of playing I saw the game course as a labyrinth and city related. From that, I looked to PacMan’s labyrinth as a playing field, maplike, and related to urban drifting. Later I realized that cellular automata, as seen in the Game of Life, could generate lines, nodes, triangles, squares and rectangles and therefore could be used as a plan or design simulator. Further, these paths (top right) may be extruded to generate 3D compositions.
This image of a bracketed [ant] from a cooking school’s banner and logo in Barcelona, attracted me to its graphic design and urban humor (ants clearly know something good when they’re headed to an experimental pastry shop.) As a sign, symbol, or marker it alerts our m-leaning class to how visual language, form, color, design, and graphics are integrated into our biological cognition as well as into the modern urbanism. It illustrates a means of physical and symbolic communication and ways data is transmitted by abstract and associative signs and symbols (semiotics).

For years the ant has been the subject of research concerning emergence, pheromone communication, and bottom-up intelligence. An ant’s structural and design abilities, their nest building, infrastructure, and management, is frequently considered emergent architecture. For us ant’s building powers are examples of superorganisms and bioarchitecture without architects. Their work is seen as a model of collective, emergent behavior with biologically modified materials. I think of the [ant] sign as part of an emergent text telling us of constantly changing biological assemblies we call a city. Consider: other species may sense or recognize what we see as a city, as nests or hives. Factoring in a perspective through nature might help us develop skills for reading and interpreting city and natural environments as design research and using that data as design generative. That’s part of the strategy for this class: map new strategies through digital equipment and software that opens perceptions of new forms, structures, organisms, and design.

The unique but not difficult use of mobile smartphones and tablets is developed to link research and investigation of physical and material spaces as well as cultural and environmental places in a network of connected class tools.

Edward O. Wilson’s research, begun decades ago with ants has reverberated through his subsequent work as well as through next-generations of scientists and theorists. In this class we drift over the writings of Wilson to where they intersect Complexity Theory. In this sense, Steven Johnson in his 2001 book, Emergence, factors in insect societies and their consequent structural expression as superorganism:

“Just as the social insect deserve to be seen as some of the planet’s most successful organisms, so too should the superorganism of the city... because they [cities] have done such a good job of rep-

Esta imagen de una corchetas [ant] en el estandarte de una escuela de cocina y el logotipo de Barcelona , me atrajo su diseño gráfico y humor urbano ( hormigas saben claramente algo bueno cuando se dirigen a un taller experimental de pastelería.) Como signo , símbolo , o marcador que alerta a nues-tra clase -m-inclina hacia dónde el lenguaje visual, forma, color, diseño, y gráficos se integran en nuestra cognición biológica, así como en el urbanismo moderno . Ilustra un medio de comu nicación física y simbólica y datos maneras se transmite por signos y símbolos ( semiótica ) abstractos y asociativos .

Durante años la hormiga ha sido objeto de investigación en relación con la emergencia , la comunicación de feromonas , y la inteligencia de abajo hacia arriba . Capacidades estructurales y en diseño de una hormiga , la construcción del nido , la infraestructura y la gestión , se considera con frecuencia arquitectura emergente . Poderes de construcción Para nosotros la hormiga son ejem plos de superorganismos y bioarquitectura sin arquitectos. Su trabajo es visto como un modelo de comportamiento emergente colectivo con materiales biológicamente modificados . Pasen en el signo [ant ] como parte de un texto emergente decinos de constante cambio ensamblajes biológicos que llamamos una ciudad. Considerar : otras especies pueden detectar o reconocer

lo que vemos como una ciudad, como nidos o colmenas. Factoring in una perspectiva a través de la naturaleza puede ayudarnos a desarrollar habilidades para la lectura e interpretación de la ciudad y los entornos naturales como la investigación del diseño y el uso de esos datos como diseño generativo . Eso es parte de la estrategia para esta clase: mapear nuevas estrategias a través de los equipos digitales y el software que se abre la percepción de nuevas formas , estructuras , organismos y diseño .

El uso único, pero no es difícil de teléfonos inteligentes móviles y las tabletas se desarrolla para vincular la investigación y la investigación de los espacios físicos y materiales , así como lugares culturales y ambientales de una red de herramientas de clase conectados .

La investigación de Edward O. Wilson, hace décadas comenzado con las hormigas ha reverberado a través de su obra posterior , así como a través de próximas generaciones de científicos y teóricos . En esta clase vamos a la deriva en los escritos de Wilson a donde se cruzan Teoría de la Complejidad . En este sentido, Steven Johnson en su libro de 2001, Aparición, factores en las sociedades de insectos y su expresión estructural consecuente como superorganismo :

“ Del mismo modo que el insecto social, merece ser visto como algunos de los organismos más exitosos del planeta , también lo debería ser el superorganismo de la ciudad .
licating themselves, drawing in migrant populations from around the world, and encouraging – for the most part – higher birth rates and longer life spans within their confines.” (99)

Recognizing the city as an organism, as part of a living cultural dynamic whose vast complexity drives emergence, then provides us some guidelines for studying and experimenting with generative design systems where the city is employed to provide alternative design ideas and data. From here we could track Wilson’s definition: “emergence [is] the appearance of complex phenomena not predictable from the basic elements and processes alone” (Consilience 94) and hybridize it with Johnson’s words stressing that “laws of entropy are temporarily overcome, and higher-level order may spontaneously emerge out of underlying chaos” (Emergence 52). In such emergence, we seek generative ideas and research situations to propel approaches to our projects.

In doing so, research via mobile research presents to us the question of how to deploy emergence as a research method. Here, we look to Walter Benjamin for a perspective on seeking data in an urban landscape: “Perhaps the daily sight of a moving crowd once presented the eye with a spectacle to which it first had to adapt . . . . [T]hen the assumption is not impossible that, having mastered this task, the eye welcomed opportunities to confirm its possession of its new ability. The method of Impressionist painting, whereby the picture is assembled through a riot of flecks of color, would then be a reflection of experience with which the eye of a big-city dweller has become familiar” (The Arcades Project 1999).

Through Benjamin we are brought to understand that moving in a city – walking and cycling – present a political action of analysis that affects biology and culture. We can fuse ideas and data from the city then in ways Benjamin understood, analyzed, and observed as related to technology and media; for example via photography, recordings, newspapers, advertising, and cinema.

From similar flâneur/dérive/uDrift sources, we instill a new methodology for thinking of our research as generative and emergent, as technologically fused and extended into the environment with the apps and software we employ to “mediate” places, plants, situations, organisms, and environments. Over the course of the next several weeks the emergence of ideas, nature, and design may be targeted in order to develop new design-in-the-environment.

, porque [ las ciudades ] han hecho un buen trabajo de replicarse a sí mismos tal , el dibujo en las poblaciones migrantes de todo el mundo , y alentando - en su mayoría -, altas tasas de natalidad y una vida más larga se extiende por dentro de sus confines “(99 )

Reconociendo la ciudad como un organismo, como parte de una dinámica cultural vivo , por su complejidad inmensa impulsa la emergencia, luego nos dan algunas pautas para el estudio y la experimentación con los sistemas de diseño generativo donde se emplea la ciudad para aportar ideas de diseño alternativas y datos. A partir de aquí podríamos rastrear definición de Wilson : “ la emergencia [ es ] la aparición de fenómenos complejos no predecibles a partir de los elementos y procesos solos básicas “ ( Consilience 94) y se hibridan con las palabras de Johnson haciendo hincapié en que “las leyes de la entropía se superan temporalmente, y superior orden de nivel puede surgir espontáneamente del caos subyacente “ ( emergencia 52 ) . En tal emergencia , buscamos ideas generativas y situaciones de investigación para impulsar enfoques de nuestros proyectos.

De este modo , la investigación a través de la investigación móvil nos presenta la cuestión de cómo implementar la emergencia como método de investigación . Aquí, vemos a Walter Benjamin como una perspectiva en la búsqueda de datos en un paisaje urbano : “ Tal vez la vista diaria de una multitud en movimiento , una vez presentado el ojo con un espectáculo al que primero tuvo que adaptarse . . . .[T ] usando el supuesto no es imposible que , después de haber dominado esta tarea , el ojo dio la bienvenida a la oportunidad de confirmar su posesión de su nueva habilidad . El método
Flâneur to Dérive to uDrift: A Means of Doing Research

I.

Visualization and spatial history are not about producing illustrations or maps to communicate things that you have discovered by other means. It is a means of doing research: it generates questions that might otherwise go unasked: it reveals historical relations that might otherwise go unnoticed, and it undermines, or substantiates, stories upon which we build our own versions of the past. (Richard White 2010 Para 36 Boldface original. Quoted in Hayles 2012 197).

Occupation of space, generation of ideas, and stewardship of movement through environments involves levels and layers of perceptual selection. And selection, as in evolution and complexity theory, alters not only behavior and artistic, mechanical production, but establishes narrative feedback. The flâneur, as evolved in critical theory from Baudelaire by Benjamin, exemplifies one of many types of urban occupation and peripatetic perception. Considered as programmatic attributes, the movements of evolutionary descent through flâneur, dérive, and uDrift may be deployed as “means of doing research” (White 2010).

The gaze of the allegorist, as it falls on the city, is the gaze of the alienated man. It is the gaze of the flâneur, whose way of life still conceals behind a mitigating nimbus the coming desolation of the big-city dweller. The flâneur still stands on the threshold — of the metropolis as of the middle class … The crowd is the veil through which the familiar city beckons to the flâneur as phantasmagoria — now a landscape, now a room.” (Benjamin 2006 40)

But for uDrift, the historical trope is not what we seek — our goal is to map and extrapolate from flâneur into present spatial occupation, data, and movement. In the age of digital propagation, movement and electronic (smartphone) mediation are ubiquitous and emergent; factors in the gestation of new roles, cartography, and techniques for m-learning.

We are looking toward a strategy where the flâneur melds into the dérivist and both fuse in uDrift. Benjamin used flâneur in various contexts and for widely divergent goals ranging from the person-about-town (frequently viewed as a “dandy”), to an engaged analytical figure embodying Marxist critique. Interestingly, he locates the flâneur in time and space.

Benjamin establishes the flâneur as simultaneous (almost symbiotic) with the capitalist expression in real estate and architecture synonymous with the architectural and social height of the Parisian Arcades (Benjamin 2006). While this is a fleeting conceptual frame, it strongly established lasting critical links to fashion, trend, place, advertisement, traffic, spectacle, crowds, and architectural power — all components of emergent phantasmagoria and the uncanny — and all alive in today’s city.

I think Benjamin’s flâneur is a powerful dialectical tool needing to be evolved through newer technologies than arcades. While beautifully theorized, the historical flâneur, as witness to commodification and spectacle, is nevertheless inadequate to contemporary narrative, notions of speed, virtual space, and mobilephone-mediated urban life. These are the areas the Situationist’s manifestos, critique agenda, and notion of psychogeography offers the flâneur — evolutionary upgrading. Here we can almost dissolve Benjamin’s phantasmagoric in Situationist psychogeography and end up near White’s “visualization and spatial history” (White 2010).

Situationist psychogeography, linking cognitive and emotional states, is attuned with today’s hacker, cyclist, and urban walker. It conceivably hosts the “doing research” aspect of walking/drift/cycling through physical, technologically mediated spaces, as inflicted with different sets of performative values. It supports hybridizing ideas flowing form flâneur to dérivist to uDrifter occasioning the possibility to seek and cultivate emergent learning situations embedded in urban chaos and simultaneously enacted by natural systems.

What I’m arriving at is that the city and the walker cannot be separated from natural systems, and therefore uDrift functions for tactical discovery open to potential social analysis, aesthetic inspiration, and learning construction. Mediated discovery then incorporates formal, spatial, and morphological discoveries/observations possible in the cracks and crannies where urban and social systems interface nature. And, this interface is at a physical and technological scale students equipped with a smartphone can monitor for various types of technologically interfaced data. This is then a territory of mediation where the connectivity to, and facilities of apps, aid mobile research, drawing, notation, mapping, and image coordination to fundamentally complete the reconfiguration of flâneur/dérivist as uDrift, mobile researcher.

II.

In Katherine Hayles’s How We Think (2012), she establishes narrative as a technology (180). In the “Narrative and Database” chapter she builds on Doreen Massey’s theories of spatial geography. Hayles notes that Massey:

has a dream: to replace the idea of space as an inert container with a conceptualization of it as an emergent property constructed through interrelations and containing diverse simultaneous trajectories. (Hayles 2012 183).

I think this is raw material for the hybridization and reconceptualization of nature/space/learning — thus underpinning, for m-learning, the cultivation of emergence as a practice assisting the growth of generative knowledge.

Through Hayles’s referencing Google Earth, GPS, and citing Manuel Castel’s’s “spaces of flows” (185) we may appropriate the “spaces of flows”
mapped via our evolution through flânerie, dérive, and uDrift as layers and levels of learning data. From Hayles quoting Massey on place, we hear: “not from some long internalized history but the fact that it [place] is constructed out of a particular constellation of social relations, meetings, and weavings together at a particular locus” (Massey in Hayles 2012 185), we are confronted with space/location mapped and layered differently than in established learning cartographies.

These new cartographic layers are factored into uDrift “as a necessary consequence that space is emergent” (185), from this we may extrapolate m-learning protocols as consequent with complexity. If we then trace, map, and construct research sites and locations as tiered, interrelated data we may translate our uDrifts as data documenting performative thinking, walking, and discovery in time and space.

In aggregate, the layers, like the folios of a bound book, construct and/or support narrative, ideas, images, and design. Narrative here is inseparable from technological discovery and articulation and we recursively loop back to the epigraph from which I contend that uDrift is “a means of doing research” (White 2010. Hayles 2012).

The evolutionary descent of today’s walker/cyclist from flâneur or dérivist into uDrifter could itself be traced through various recent formulations. For a theoretical reading we could visualize rhizomic and nomadic as scaffolding via Deleuze and Guattari (1989). Mobile learning with engaged technologically mediated reality as a serious pedagogical tool then addresses urban and environmental observation and data sourcing for research. Technology and science are then in ontological positions to influence new learning and visualization and may be of specific interest within the context of uDrift projects.

If we were looking to skirt (but not totally skip) theory we might riff-off urban hacking as sounded by Iain Sinclair’s London Orbital (2002) or Will Self on “Walking is Political”. http://www.guardian.co.uk/books/2012/mar/30/will-self-walking-cities-foot?CMP=twt_gu Both offer insights where development and infrastructure collide with the author’s POV, and in doing so become models for textual uDrifting. In the field of badland dérives, we might look to Savage Messiah by Laura Oldfield Ford as it establishes a political commentary as well as a graphic style set in the romance of 1980s zine culture: http://www.guardian.co.uk/books/2011/dec/22/savage-messiah-laura-oldfield-ford-review

These three titles (and many others) illustrate for us perspectives on uDrifting and possibilities of in-field urban research. In most cases, our uDrifts will evolve digitally with influences looking back to print culture and forward through social media. Expression could be constructed as feedback loops in a series of blog posts, Tweets, videos, or drawings — referencing and taking into consideration emergent ideas mediated by GPS, mapping, and apps as interchanges of exploration and documentation. Mobile uDrift, to recap from Richard White is “is a means of doing research” (White 2010), but the research documentation is open to selection, adaptation, and evolution.


"What is the necessary and sufficient organization for a given system to be a living unity? In other words, instead of asking what makes a living system reproduce, we ask what is the organization reproduced when a living system gives origin to another living unity? … Every unity can be treated … as a complex system that is realized as a unity through its components and their mutual relations. … Its properties as a unity are determined by the way this unity is defined, and not by particular properties of its components. It is these relations which define a complex system as a unity and constitute its organization” (p187-88).

The model consists of a two-dimensional universe where numerous elements ("substrate"), and a few ("catalysts") move randomly in the space of a quadratic grid. These elements are endowed with specific properties which determine interactions that may result in the production of other elements ("links") with properties of their own and capable of the interactions ("bonding") (P189).

"Interaction [1] between the catalyst and two substrate elements 2 is responsible for the composition of an unbounded link . These links may be bonded through Interaction [2] which concatenates these bonded links to unbranched chains of . A chain so produced may close upon itself, forming an enclosure which we assume to be penetrable to the , but not for . Disintegration (Interaction [3]) is assumed to be independent of the state of the links , i.e., whether they are free or bound, and can be viewed either as a spontaneous decay or as a result of a collision with a substrate element (P189-90).

If an -chain closes on itself enclosing an element (Fig 1), the 's produced within the enclosure by interaction [1] can replace in the chain, via [2], the elements that decay as a result of [3] (Fig 2). In this manner, a unity is produced which constitutes a network of productions of components that generate and participate in the network of productions that produced these components by effectively realizing the network as a distinguishable entity in the universe where the elements exist. Within this universe these systems satisfy the notion of autopoiesis. For the purpose of explaining and studying the notion of autopoiesis, however, one may take a more general view as we have done here, and revert to the tessellation domain where physical space is replaced by any space (a two-dimensional one in the model), and molecules by entities endowed with some properties. The phenomenology is unchanged in all cases: the autonomous self-maintenance of a unity while its organization remains invariant in time.

In the present case we required that the components have specificity of interactions, forms of linkage, mobility, and decay. … The necessary feature is the presence of a boundary which is produced by a dynamics such that the boundary creates the conditions required for this dynamics” (P191-2).

"An autopoietic system arises spontaneously from the interaction of otherwise independent elements when these interactions constitute a spatially contiguous network of productions which manifests itself as a unity in the space of its elements” (P192).

