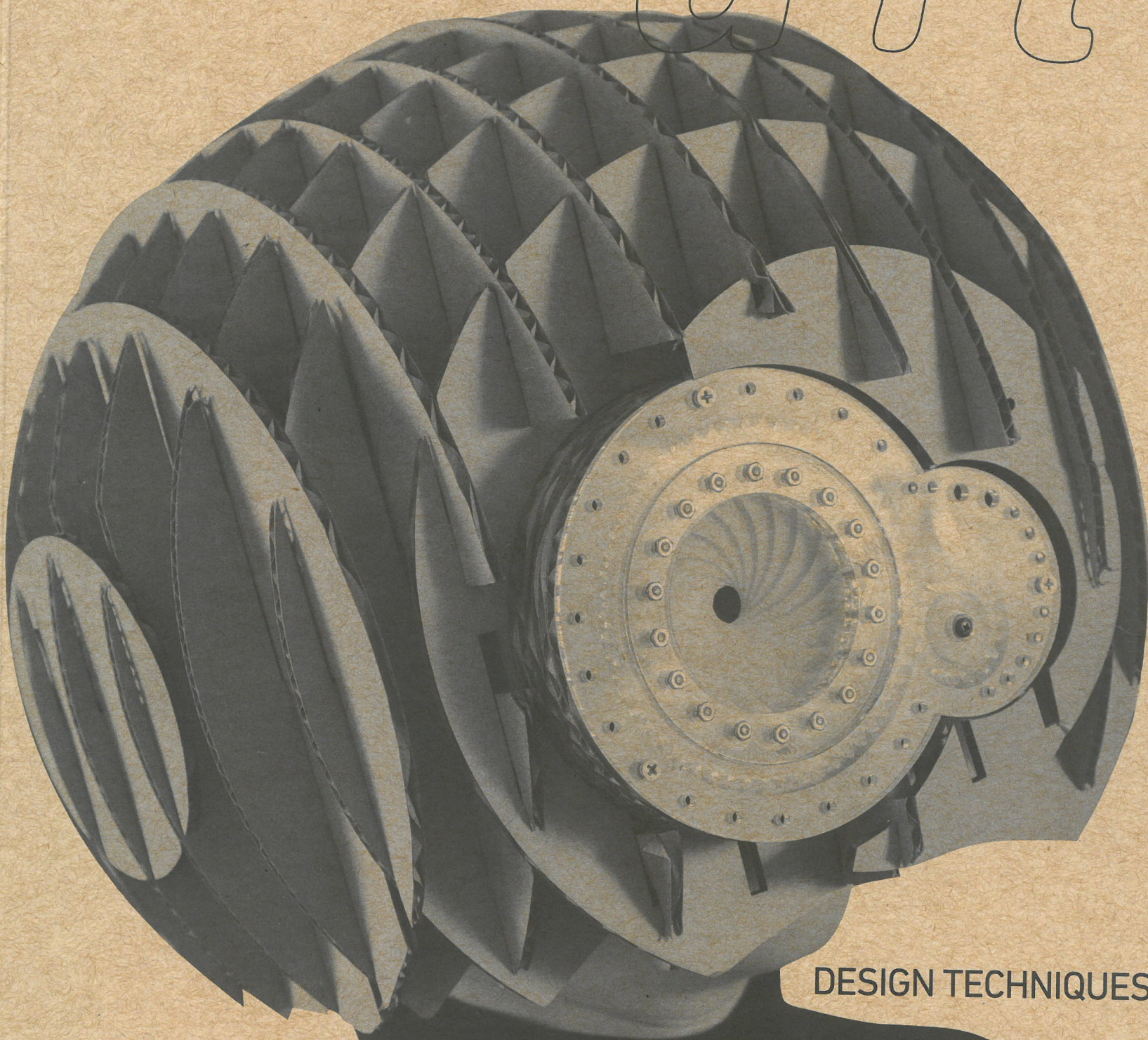


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DESIGN TECHNIQUES

# SOLID

HARVARD SYMPOSIA ON ARCHITECTURE  
SOLID SERIES

DESIGN TECHNIQUES

# SOLID

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HARVARD SYMPOSIA ON ARCHITECTURE  
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INDEPENDENT MAGAZINE OF ARCHITECTURE+TECHNOLOGY  
SPRING 2015. ISSUE 45  
FREE OF ADVERTISING

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## PUBLISHER

a+t architecture publishers  
ISSN 1132-6409  
ISBN 978-84-606-9238-6  
Frequency: Bilingual (Spring and Autumn)

## PRINTING

Gráficas Irudi s.l.  
VI-683/94

## DISTRIBUTION

(Europe, USA, Canada, Australia, Asia)  
Idea Books  
Nieuwe Herengracht 11. 1011 RK Amsterdam. The Netherlands  
Tel. +31 20 6226154  
Fax +31 20 6209299  
idea@ideabooks.nl  
www.ideabooks.nl  
(Spain, Portugal and Latin America)  
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## COVER

Anne Liu. Embodied Cognition.  
Eyeris helm for haptic eye contact.  
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*a+t architecture publishers* General Álava, 15 2ºA. 01005 Vitoria-Gasteiz. Spain. [www.aplust.net](http://www.aplust.net)

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**a+t** magazine of architecture initiates SOLID, a new series published in collaboration with Harvard GSD Department of Architecture. DESIGN TECHNIQUES, the first volume in the series, is a selection of shared knowledge from the academic year 2014-2015 on the current techniques in architectural design. Faculty, critics and theorists, and students discuss the different approaches contributing personal experiences, working practices, and opportunities encountered in the field of design.

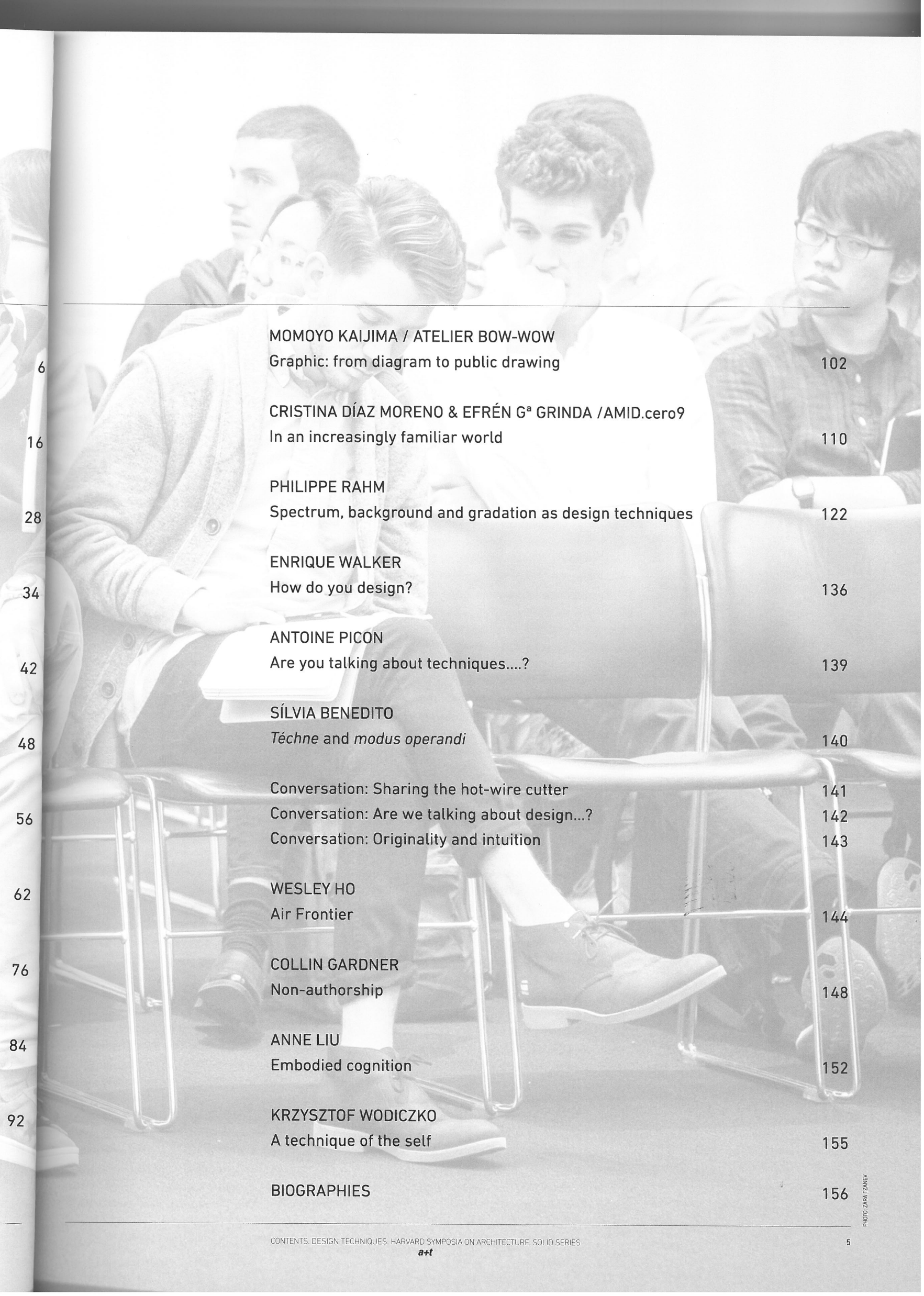
La revista de arquitectura **a+t** inicia SOLID, una nueva serie editada en colaboración con Harvard GSD Department of Architecture. DESIGN TECHNIQUES, el primer número de la serie, es una selección del conocimiento compartido durante el curso 2014-2015 en torno a las actuales técnicas de diseño arquitectónico. Profesorado, arquitectos invitados y alumnos discuten las distintas aproximaciones, aportando sus experiencias personales, formas de trabajar y oportunidades encontradas en el campo del diseño.

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# EMBODIED COGNITION\*

Anne Liu

**"I MODELLED IN** every CAD program, learned to code, built circuits. I strapped on every virtual reality [VR] and augmented reality [AR] headset I could get my hand on, walked out of the studio and lived in them for days. These experiences furthered my research inquiries, and I started to adapt and refine the experiences by building my own AR and VR headsets. These experiences would eventually lead me to attempt to communicate the thesis itself by means of constructed experiences, which I would strap onto the critics themselves."

**"MODELÉ EN TODOS** los programas de CAD que encontré, aprendí código, construí circuitos. Me até a la cabeza todos los aparatos de realidad virtual [VR] y de realidad aumentada [AR] que pude conseguir, salí del estudio y viví con ellos durante días. Estas experiencias fomentaron mis interrogantes sobre el trabajo y a la vez empecé a adaptar y perfeccionar las experiencias, construyendo mis propios aparatos de AR y VR. Todo esto finalmente me llevó a tratar de comunicar el propio proyecto de investigación por medio de estas experiencias construidas que ataría a las cabezas de los propios críticos."

Anne Liu.



My thesis explored the reciprocal relationships between technology, design, culture, and our perceived reality. After all, as famously quipped, "We become what we behold. We shape our tools, and thereafter our tools shape us."<sup>1</sup> Beyond producing texts and representational drawings, to examine and expose these relationships, I built a set of wearable devices that allowed me to investigate and communicate the concepts experientially.

While it is never easy to pin down the exact processes by which creative insights are coaxed to the surface of the mind, one of the design techniques I was consciously experimenting with is the concept of embodied cognition. Embodied cognition is the radical hypothesis that the brain is not the sole cognitive resource we have to solve problems with.<sup>2</sup> The idea is that our bodily actions actively contribute and shape the mental process; that we think and analyze through our perceptual and sensory systems.<sup>3</sup> Thus, in addition to voraciously reading, sketching, blogging, and having as many research conversations as my colleagues would stand, I made it a point to physically experience the mediums of which I was theorizing. Perhaps the way I came to this method of inquiry was rooted in my observation that digital tools were transforming the way my peers were showing off their work—namely, with a much buzzed about VR headset glued to their face. For instance, after designing Kanye West's dream villa, my colleague invited me for a tour. His VR headset, which employs head and eye tracking, allows the user to 'look around', self-navigating through a digital representation of architectural space. So immersive is this experience that he warned me some first time users of OculusRift often experience a nausea associated with motion sickness.

While navigating his twisted Loosian-voyeurism-meets-selfie-induced-narcissism environment in VR, I had the visceral experience of both stomach flutters and goosebumps. This was an "ah-ha!" moment for me. The reproduction of a visual reality in architectural representation, I reasoned, is becoming more experiential through virtual reality simulations. Simultaneously, 'reality' is continually augmented by technological extensions to the body. Thus, this method of corporeal based inquiry evolved

Mi trabajo final del Máster explora las relaciones recíprocas entre tecnología, diseño, cultura y la manera en que percibimos la realidad. Como todo el mundo sabe "nos convertimos en lo que contemplamos. Damos forma a nuestras herramientas y después nuestras herramientas nos conforman."<sup>1</sup>

Más allá de la producción de textos y dibujos figurativos y con el fin de examinar y exponer estas relaciones, he construido un conjunto de dispositivos portátiles que me han permitido investigar y comunicar estos conceptos experimentalmente.

Si bien nunca es fácil precisar los procesos exactos por los que las ideas creativas surgen en la mente, una de las técnicas de diseño que experimenté conscientemente fue el concepto del 'conocimiento corporeizado'.

Este tipo de conocimiento se basa en la hipótesis radical de que el cerebro no es el único recurso cognitivo que tenemos para resolver problemas.<sup>2</sup> La idea es que nuestras acciones corporales contribuyen y dan forma al proceso mental de una forma activa; que pensamos y analizamos a través de nuestros sistemas perceptivos y sensoriales.<sup>3</sup> Por lo tanto, además de leer con voracidad, de dibujar, de bloguear y de investigar con mis compañeros, tuve la oportunidad de experimentar físicamente los medios sobre los cuales estaba teorizando.

Tal vez la manera por la que llegué a este método de investigación se basaba en mi observación de que las herramientas digitales estaban transformando la forma en que mis compañeros exponían sus trabajos—concretamente, con un aparato de VR, que zumbaba mucho, pegado a la cara de uno de ellos. Por ejemplo, después de que mi colega diseñara una villa de ensueño para Kanye West me invitó a dar una vuelta virtual por ella. Su aparato de VR realizaba un seguimiento de la cabeza y de los ojos, y permitía al usuario 'mirar a su alrededor' y auto-navegar, buceando a través de una representación digital del espacio arquitectónico. Esta experiencia es tan inmersiva, que me advertió de que algunos de los usuarios que utilizaran OculusRift por primera vez, podrían experimentar a menudo náuseas asociadas con mareo. Durante la navegación por su retorcido ambiente dentro de la VR, que era del tipo: voyeurismo-loosiano—mezclado con un—auto—inducido—narcisismo, tuve una experiencia visceral de espasmos en el estómago y de piel de gallina. Ese fue el momento eureka para mí. La reproducción de una realidad visual en la representación arquitectónica, razoné, es cada vez más una experiencia a través de simulaciones de realidad

1. McLuhan, Marshall. Wikiquote. Accessed April 9, 2015.
2. Wilson, Andrew, and Golonka, Sabrina. "Embodied Cognition Is Not What You Think It Is." *Frontiers in Psychology* 4, no. 58 (2013). Accessed April 1, 2015. <http://journal.frontiersin.org/article/10.3389/fpsyg.2013.00058/full>.
3. Smith, Amanda. "Embodied Cognition: Thinking with Your Body." *Radio National*. September 24, 2014. Accessed April 2, 2015.



EXPERIMENT 2: REIFICATION  
Anne Liu

Architecture traditionally creates social relationships through material composition. However, with so many social relations occurring in the digital realm, what is in play of materiality? What role does physical space, flesh and tangibility play in this digital age of rapidly changing media and fluid interfaces where everyone has access to a networked pocket full of insta-friends? Today's apparatuses of engagement have evolved—so I sought to design a device to heighten

\*MArch Thesis: Spring 2014.  
Advisor: Ingeborg Rocker.  
Secondary Advisor: Krzysztof Wodiczko.



Anne Liu's desk at Gund Hall studios

EXPERIMENT 2: REIFICATION OF A SOCIAL ENCOUNTER. HAPTIC EYE CONTACT. EYERIS. Cambridge MA, 2015.

Anne Liu

Architecture traditionally creates social relationships through material compositions. However, with so many social relations occurring in the digital realm, what is in place of materiality? What role does physical space, flesh, and tangibility play in this digital age of rapidly changing media and fluid interfaces, where everyone has access to a networked pocket full of insta-friends? Today's apparatuses of engagement have evolved—so I sought to design a device to heighten

awareness of new models of etiquette for social interaction. The result was Eyeris a helm that renders the user dependent on human touch for sight. It was designed to play with the social dimension of vision: what is the role of eye contact in a cultural environment where so much socialization is done via two thumbs tapping on a screen? At times tongue in cheek, this helm explores the wearable as an architectural device that doesn't just transform our context but transforms its wearer.

Tradicionalmente, la arquitectura crea relaciones sociales a través de unas composiciones materiales. Sin embargo, con tantas relaciones sociales en el ámbito digital, ¿qué ocupa el lugar de la materialidad? ¿Qué papel juega el espacio físico, la carne, y la tangibilidad en esta era digital de rápida evolución de los medios y de interfaces fluidas, donde todo el mundo tiene acceso a una red llena de Insta-amigos? Hoy en día, los aparatos de relación han evolucionado—así que traté de diseñar un dispositivo para aumentar la conciencia sobre unos nuevos modelos de protocolo para

la interacción social. El resultado fue Eyeris, un yelmo que hace que el usuario dependa del toque humano para poder ver. Fue diseñado para jugar con la dimensión social de la visión: ¿cuál es el papel del contacto visual en un entorno cultural en el que la mayor parte de la socialización se realiza con dos pulgares tecleando en una pantalla? Irónicamente, este yelmo explora el papel que tiene lo posible como dispositivo arquitectónico, que no sólo transforma nuestro contexto, sino que transforma también a su portador.



HANG XU



**"ANNE'S TECHNIQUE** of sensory mediation explicitly changes the medium and scale of architectural design. It aims to dissolve the given fixity and familiarity of architectural space. Her work reinforces the strong bind between technique and perception, and accentuates perception's re-programmability. Technique always arises through and simultaneously realizes a way of seeing the world and these perceptual coordinates are susceptible to disruption. Her work is about disrupting reality and the pervasive sense of determinism this term evokes in architects. It not only acknowledges that our experience of reality is always mediated by fictions, but also that the way beyond fiction does not proceed directly, through a removal of fiction, but indirectly, through the construction of more extreme and, perhaps, bizarre fictions. The idea of an 'architect of perception' suggests that technology does more than temporarily distort the appearance of reality—it augments, changes, reality itself. The question remains: Are these re-programmed perceptions ways of thinking about and experiencing existing architectures differently, or are they new architectures in themselves?"

**"LA TÉCNICA DE ANNE** de la mediación sensorial cambia de forma explícita el medio y la escala del diseño arquitectónico. Su objetivo es disolver la inmovilidad y la familiaridad dadas del espacio arquitectónico. Su trabajo refuerza el estrecho lazo entre la técnica y la percepción y acentúa la re-programación de la percepción. La técnica siempre surge y se desarrolla a partir de una forma de ver el mundo y estas coordenadas perceptivas son susceptibles de interrupción. Su trabajo es sobre la ruptura con la realidad y sobre la sensación generalizada de determinismo que este término sugiere a los arquitectos. No sólo reconoce que nuestra experiencia de la realidad siempre está mediada por ficciones, sino también que más allá de la ficción no se llega a una eliminación de la ficción, sino indirectamente, a la construcción de ficciones más extremas y extravagantes quizás. La idea de un 'arquitecto de la percepción', sugiere que la tecnología sirve para algo más que para distorsionar temporalmente la apariencia de la realidad; amplía, cambia la realidad misma. La pregunta sigue siendo: ¿Son estas percepciones re-programadas formas de pensar y experimentar las arquitecturas existentes de manera diferente, o son nuevas arquitecturas en sí mismas?"

Collin Gardner.



in line with current wearable computing trends that are amalgamating technology further and more intimately onto the body. Beyond the proliferation of handheld and wearable networked electronics, (iPhones, smart watches, Google Glass...) specific to design, architectural representation itself has made a bodily leap. Such trends have shifted the notion spatial experience itself, offering a constant augmented overlay to 'reality'.

I started to ask, what symbiotic relationships exist between digital design processes and the experience of our built reality, as it relates to virtual, augmented, and networked domains? How has a shift in constructed vision in recreational worlds (gaming, cinema, social media, GPS based apps) affected the way we perceive reality? Lastly, how can design critically reflect the reality in which we live—one in which technology has become a cultural prosthesis and extension of humanity? To explore the theoretical concerns and concepts in my research, I set out to design a series experimental helms and vision devices—with the emphasis on constructing the experiential, and perceptual. After all, perception is fundamental to architecture; it is through our bodies, sensorial organs, and cognition that architectural experiences exist. The whole constitution of any space is at the gateway of perception, so I began by asking, "what if we became architects of perception?"

The following are descriptions of some experimental devices designed and built in exploring new channels of embodied thinking during my thesis. These tools served as both a method of design inquiry, as well as a method to communicate ideas through bodily experiences.

The artifacts produced by my research reconstruct spatial perception from within the human sensory system, becoming a means of forcing us to reconsider the very constructs of our own points of view. Through investigating systems of perception, my work aims to reframe and reveal a more nuanced and ineffable understanding of the human experience within our networked cultural and spatial constructs, both as inhabitants and designers.

Our tools have become extensions of our bodies, and our bodies themselves, make powerful platforms from which design inquiry is launched. During my thesis, I actively set up experiential experiments in an exploration of the ability of the body to process thoughts and information before it is even known to the conscious mind.<sup>4</sup> By conducting and sharing the research of my thesis through a set of wearable devices and experiences, I hope to broaden our views of what it means to know.

4. In coming to embodied cognition as a mode of research, I was influenced by many thinkers before me, including phenomenological philosophers Maurice Merleau-Ponty, Edmund Husserl, the architect and writer Juhani Pallasmaa, Nobel Laureate Gerald Maurice Edelman and AI computer scientist Rolf Pfeifer.

virtual. Al mismo tiempo, la 'realidad' está continuamente aumentada por las extensiones tecnológicas en el cuerpo. Por lo tanto, este método de investigación basado en el cuerpo evolucionó en línea con las actuales tendencias de *wearables* de computación, que están amalgamando la tecnología con el cuerpo, cada vez más íntimamente. Más allá de la proliferación de la electrónica en red, que ya tenemos al alcance de la mano y que ya está lista para objetos de diseño (iPhones, relojes inteligentes, Google Glass...), la propia representación arquitectónica ha experimentado un salto corporal. Estas tendencias han cambiado la noción misma de la experiencia espacial, que ahora ofrece una superposición aumentada y constante de la 'realidad'.

Empecé a preguntarme, ¿qué relaciones simbióticas existen entre los procesos de diseño digital y la experiencia de nuestra realidad construida, en su relación con los ámbitos virtuales, aumentados y en red? ¿Cómo ha afectado la visión de los mundos construidos para el ocio (juegos, el cine, las redes sociales, aplicaciones basadas en GPS) a la forma en que percibimos la realidad? Por último, ¿cómo puede reflejar el diseño, de manera crítica, la realidad en la que vivimos, en donde la tecnología se ha convertido en una prótesis cultural y en una prolongación de la humanidad? Para explorar las preocupaciones teóricas y los conceptos de mi investigación, me puse a diseñar una serie de yelmos experimentales y de dispositivos de visión, con el énfasis puesto en la construcción de la experiencia y la percepción. Después de todo, la percepción es fundamental para la arquitectura; porque es por medio de nuestros cuerpos, órganos sensoriales y del conocimiento por lo que existen las experiencias arquitectónicas. La constitución de cualquier espacio pasa por la percepción. Por lo que comencé con la pregunta "¿qué pasa si nos convertimos en arquitectos de la percepción?"

Incluyo tres dispositivos experimentales diseñados durante mi tesis, para la exploración de nuevas vías de pensamiento corporeizado. Estas herramientas sirven tanto como método de investigación sobre el diseño, como para comunicar ideas a través de experiencias corporales.

Los artefactos producidos durante mi investigación reconstruyen la percepción espacial desde dentro del sistema sensorial humano, convirtiéndose en un medio

que nos obliga a reconsiderar a su vez las propias construcciones de nuestros puntos de vista. Al investigar los sistemas de percepción, mi trabajo tiene como objetivo replantear y revelar una comprensión más matizada e inexplicable de la experiencia humana. Todo esto, tanto como habitantes, o como diseñadores, pero dentro de nuestras propias redes culturales y espaciales.

Nuestras herramientas se han convertido en prolongaciones de nuestros cuerpos y nuestros propios cuerpos, hacen de plataformas poderosas desde donde se inicia la investigación sobre el diseño. Durante mi proyecto de investigación, puse en marcha experimentos que exploraban la capacidad del cuerpo para procesar pensamientos e información. Antes siquiera de que la mente fuera consciente.<sup>4</sup> Al realizar y compartir la investigación de mi tesis a través de un conjunto de *wearables*, espero ampliar nuestra visión sobre lo que significa el conocimiento.

## A TECHNIQUE OF THE SELF

Krzysztof Wodiczko



EXPERIMENT 1



EXPERIMENT 3

Foucault defines 'techniques of the self' or 'arts of existence' as "those reflective and voluntary practices by which men not only set themselves rules of conduct, but seek to transform themselves, to change themselves in their singular being, and to make of their life into an oeuvre that carries certain aesthetic values and meets certain stylistic criteria." Ethics for Foucault can be "understood as the elaboration of a form of relation to self that enables an individual to fashion himself into a subject of ethical conduct" so 'technique of the self' is a business of Ethics.<sup>1</sup>

The mask safely reveals while hiding and hides while revealing, but... it can also have a transformative effect toward a new desirable situation of the self and of the others, in which it may no longer be needed –toward a world of open communication and expression. The ethics of such a technique is in its useful design utopia. As Rosalyn Deutsche said on another occasion: "its utopia is in the hope that its function will render it obsolete." To find a performative function and form, through which to recognize and publically acknowledge one's own numbness toward other being, to see one's own fear of direct contact with other being, is good but not good enough. One must do more, two things at once, by simultaneously articulating and ameliorating such a condition, and one must do so in a contemporary technological way, with the use of prosthetics, a mask, an interactive technical device, software and hardware –indeed the noble task for the designer in a present-day alienating and alienated world. It is design as a technique of displacing displacement or alienating alienation. Bizarre situations need bizarre responses. Dear Anne, this project is worth expanding without losing its precious sense of technical and functional elegance and its performative sense of humor. You have a good sense and intuition as to why the eye is not at the center of the head, as in a Cyclops, and it is instead in place of one of one's eyes. It seems to be both "looking at" the person who is seeking a human contact through touch and—with the use of ingeniously designed and fabricated iris-like interface –giving a sign of secret camaraderie as a socially significant, psychologically kind, and artistically humorous 'blink'. "To save one person (from one's own social isolation and lack of sense of humor) is to save the world". It is a transformative design task and a 'technique of the self' worth advancing indeed.

Foucault define las 'tecnologías del yo' o 'artes de la existencia' como "aquellas prácticas sensatas y voluntarias por las que los hombres no sólo se fijan reglas de conducta, sino que buscan transformarse a sí mismos, mortificarse en su ser singular y hacer de su vida una obra que presente ciertos valores estéticos y responda a ciertos criterios de estilo." La Ética para Foucault puede ser "entendida como la elaboración de una forma de relación del yo, que permite a un individuo fabricarse a sí mismo como sujeto de conducta ética". Por lo tanto la 'tecnología del yo', es una cuestión de Ética.<sup>1</sup>

La máscara revela a la vez que esconde y esconde a la vez que revela, pero... también puede tener un efecto transformador hacia una nueva situación deseable, en relación a uno mismo y a los otros, en la que ya la máscara no sea necesaria –un mundo de comunicación y expresión libres. La ética de dicha tecnología está en la utopía del diseño útil. Como dijo Rosalyn Deutsche en otra ocasión: "su utopía reside en la esperanza de que su función la haga obsoleta." Encontrar una función y una forma performativas, a través de las cuales se reconozca y se manifieste públicamente la propia insensibilidad hacia otro ser, que haga patente el propio miedo al contacto directo con el otro, es bueno, pero no es suficiente. Hay que hacer más, dos cosas a la vez, mejorar y articular simultáneamente tal condición performativa con una tecnología contemporánea: con el uso de prótesis, con una máscara, con un dispositivo técnico interactivo, software y hardware; una noble tarea para el diseñador en este mundo alienante y alienado. Se trata del diseño como técnica para marginar la marginación o para alienar la alienación. Situaciones extrañas necesitan respuestas extrañas.

Querida Ana, este proyecto merece la pena difundirlo sin que pierda su sentido máspreciado de elegancia técnica y funcional y su sentido performativo del humor. Tienes buen criterio e intuición, por eso el ojo no está en el centro de la cabeza, como en un cíclope, sino en el lugar de uno de los ojos. Parece que se trata, tanto de mirar a la persona que está buscando un contacto humano a través del tacto –con el uso de un interfaz fabricado e ingeniosamente diseñado como si fuera el iris–, como de dar una señal de secreta camaradería, una especie de guiño socialmente significativo, psicológico y artísticamente divertido. "Salvar a una persona (de su propio aislamiento social y de su falta de sentido del humor) es salvar el mundo". Es una tarea de diseño transformadora y una 'tecnología del yo' que, de verdad, vale la pena potenciar.

<sup>1</sup> Foucault, Michel (1992) [1984]. *The Use of Pleasure. The History of Sexuality: Volume Two*. Tr. R. Hurley. Harmondsworth, Middlesex: Penguin, pp. 10–11 and <http://www.michel-foucault.com/concepts/>

<sup>1</sup> Foucault, Michel. *Historia de la sexualidad. El uso de los placeres: volumen 2. Siglo XXI Editores*, 2013.

### EXPERIMENT 1: DIGITAL DESIGN TOOL AS ARCHITECTURAL DESIGN EXPERIENCE. CONTOUR HELM. Cambridge Ma., 2015.

The Contour Helm is a wearable which draws a line in 180 degrees around any space or room you enter. It was a playful experiment in exploring the potentials of the digitally drawn line projected onto spatial experience—an experience where digital and physical were collaged and collapsed—in a sense, an embodiment of designer becoming design tool.

El Contour Helm es un artilugio ponible que dibuja una línea de 180 grados alrededor cualquier espacio o sala, cuando el que lo lleva entra en ella. Fue un experimento lúdico para explorar las potencialidades de la línea trazada digitalmente y proyectada en una experiencia espacial –una experiencia donde lo digital y lo físico se montan como en un collage y colapsan. En cierto sentido, es la propia encarnación del diseñador la que se convierte en una herramienta de diseño.

### EXPERIMENT 3: SENSORIAL HACKING. EMBODIED EXPERIENCE OF THE NOOSPHERE. VISION SWAP. Cambridge Ma., 2015.

Reflecting on spatial experience in an interconnected age, I designed an experiment which allows two people to swap vision. What happens when you wear someone else's vision on your body? Through this set of devices, I sought to answer this as two individuals become sensorially tethered by engaging in the same feedback loop. What happens when our personal perception is decoupled from reality?

Al reflexionar sobre la experiencia espacial en una era interconectada, he diseñado un experimento que permite a dos personas intercambiar su visión. ¿Qué sucede cuando uno usa la visión del otro? A través de este conjunto de dispositivos, traté de responder a esta pregunta, cuando dos individuos quedan sensorialmente atados mediante su participación en el mismo circuito de retroalimentación. ¿Qué pasa cuando nuestra percepción personal se desacopla de la realidad?

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26 € in Spain  
ISBN: 978-84-606-9238-6



**a+t**

Independent magazine of architecture+technology  
Free of advertising / Spring 2015 issue 45  
Revista independiente de arquitectura+tecnología  
No contiene publicidad / Primavera 2015 número 45

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