Haus Rucker Co,
'Mind Expander'

HOW DO WE SENSE SPACE?

INSTRUCTOR
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DESCRIPTION

Sensorial stimuli are crucial for our ability to perceive space. This allows us to process information about our surroundings so we can recognize our relationship to them. The signals received from the eyes, nose, ears and skin allow for the brain to create a mental image of our environment. We are able to calculate light, reverberation and echo, material quality, temperature and distance via these signals that situate us within our reality. Without them we would not be able to understand our relationship to space in the same way. The body then responds to these stimuli and negotiates itself within the environment. Our experience of space is directly linked to our perception of it. Manipulating sensorial experience allows for reinterpretations of perception and ultimately provides an exploration into other modes of perceiving ourselves within space and our relationship to other bodies.[1] Allowing architecture to become more responsive provides an opportunity to create dialogue between perceiver and perceived, renegotiating the role of design as an active, rather than static or passive, participant in the production of experience.

> *"No artistic practice is spared the examination of the role of the human body in the work, whether the body is the subject, the tool or the negated presence."*
> -Madeline Schwartzman, *See Yourself Sensing*

Historically, humans have produced devices, whether as tools or through the built environment, that have allowed a manipulation of perception, using the respective technologies of the time period to do so. In a way, we have always been cyborg, incorporating various tools that augment our abilities to perceive. Architecture always, to some degree, augments sensory experience and has the capability to take on an even more active role in this through the implementation of new technologies and the development of more communicative and responsive attitudes with our built environment.

The production of expererience directly has psychological implications, impacting subjectivity in space. From a sociological standpoint, it is also inherently biased - based on the experience and collective subjective histories of those that design it. The sensorial and perceptual qualities are a crucial part of this, and so, the studio questions our norms of designing space and reflects upon sensory experience and perception of it. While it is impossible to design anything that is not in some way biased- design will inevitably reflect the subjectivity of its designer- we must be conscientious of this fact so that we may become more critical of why or how we chose to design- what social histories are we perpetuating and why. This acknowledgment of the 'other' ultimately creates more equitable space that caters to a multiplicity of experience.

This studio seeks to challenge current modes of perceiving through the use of new technologies and proposes exploration into alternate models in order to design architecture for the multiplicitous body. It does this through three lines of related inquiry:

1. the examination of human interaction with architecture and ways of producing more communicative structures;
2. the examination of the cyborg and the production of sensorial and biometric devices that produce perceptual shifts;
3. and the examination of the built environment and how it can be augmented through the production of narrative and world building that re-imagines Hong Kong.

The studio will build upon experiential theories of architecture and design, examining the responsive, sensorial, and immersive through 3 phases that build upon one another. We will be using various technologies and modes of representation to formulate critical standpoints on architectural issues in Hong Kong.

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[1] There are many relationships at play within the design of architectural space. On one side, there is our relationship of self with space- how are subjectivity is affected by the environment we are in, whether on the small scale or large scale. On the other, there is our relationship of self in space with others- how the environment affects our interactions and experience of the other.

PROCESS

BRIEF
Using Hong Kong as an incubator for perceptual shifts, this unit will create responsive structures, wearable devices and architectural fantasies that challenge current norms of perception and interaction with the city. The year will be composed of three phases that address the responsive, the sensorial and the immersive. The projects will illustrate a new sensorial engagements and modes of communication with the environment culminating in a re-imagination of architecture and human interaction. The studio will be using various technologies, media, and modes of representation and incorporate theory, history, literature and film related to ideas of the body in space. We will identify architectural issues (related to socio-political, cultural and economic conditions in Hong Kong) to examine and formulate a critique that can be addressed through responsive structures and perceptual shifters. We will develop multidisciplinary skills, incorporating the sciences and programming into our design process, and representing the projects through multiple media outputs including drawing, photography, modeling and film.

SYMPOSIUM
The symposium will be held on <u>September 16th from 8am-noon HKT</u>, setting the stage for the examination of a new experiential theory of architecture and design. Invited speakers include Shama Milon M.D., Chrisoula Kapelonis, Pico Velasquez, Filippo Nesci, George Guida, Melodie Yashar and Nathan Su. The event will be divided into 2 panels and the format provides time for discussion after each set of panel presentations. The first panel will focus on the psychologizing of space, the body and the immersive and the second panel will focus on world creation and narrative architecture. <u>Students will be required to prepare a series of questions for the panelists to facilitate discussion and to build up our own definitions regarding the experience of space</u>.

WORKSHOPS
There will be a series of workshops conducted in order to provide tools that will suppliment your current skill set and can be used for your design work. These workshops include skillbuilding for use of Arduinos and Raspberry Pi's, 3D scanning, VR equipment, videography and editing and presentation.

Phase 1 / RESPONSIVE STRUCTURES (6 weeks)
Can our environments sense us?

Students will be divided into groups of 4 in order to collaboratively devlop a responsive structure. This can be a wall section, canopy, or platform, amongst many other things. The project, while also exploring how architecture can interact and communicate with us, will allow students to learn technological skills that will be used and developed throughout the year. This phase will happen in conjunction with two workshops on arduino useage.

A particular human interaction with the architectural artifact will be specified and the device will utilize sensors, motors and arduinos/raspberry pi's. Groups will start out by identifying an interactive objective, they will then develop a methodology to produce this interaction. Several modular testing models will be prototyped in order to produce a functioning final 1:1 responsive structure.

Students will interact with the responsive structure and document their and other human interaction with it in order to produce a short trailer that demonstrates how the device works and what architectural communication is imagined.

Phase 2 / WEARABLE DEVICES (6 weeks)
How do we sense our environment?

Students will develop 2 wearable prototypes that explore our sensorial experience of space (how we see, hear, feel, smell, and taste space). Using skills acquired in phase 1, students will use arduinos/raspberry pi's and sensors to develop wearables that interrogate how we perceive. These can also implement biometric data and explore bodily responses to an environment such as heart rate changes, body temperature changes, etc. Learning from cognitive scientists, psychologists and neurologists, the body (and subjectivity) and cyborg will be examined.

Prototypes will be tested, data collected and interpreted, and documented in use around Hong Kong. Documentation will include photos and video footage from which short trailers will be produced demonstrating

how the devices operate and how they manipulate or interact with the experience of the environment.

Prior to phase 2, students will have a 3D scanning workshop where they will be able to scan parts of their body from which to develop their wearable devices.

Phase 3 / NARRATIVE SPACES (16 weeks)
What world do we want to perceive?

The second half of the academic year will be dedicated to building a 'perceiving' world. Each students definition of this will be unique and different and build upon ideas developed in and extrapolated from the first two phases. The challenge is to develop an answer to the question- how can we think of architecture and our urban environment as an interactive and evolving environment that responds to and communicates with its public?

This will be developed through narrative and story telling in order to present a wider architectural critique. Students will create story boards that break down their fantasy world that reimagines the Hong Kong context and what it could be. This will be developed into a ~10 minute feature film that incorporates different modes of representation.

Prior to phase 3, students will have a VR workshop to learn the basic skills necessary. Students have the option of implementing this methodology in this phase or to use an alternative mode of representation for their film. Students will also have a videography and video editing workshop at the beginning of phase 3.

DELIVERABLES

1. **Phase 1 / RESPONSIVE STRUCTURES**
   A0x4 panels
   > Plans, Sections, Elevations, Axonometrics, Detail Drawings and Views
   > Photographs
   > Technical specs and coding input
   > Biometric/ Sensory Data (as applicable)
   > Architectural Critique (statement and abstract)

   Trailer video showing how responsive structure operates
   Module development models
   Full scale 1:1 Responsive Structure prototype
   Curated Presentation incorporating theoretical, scientific and architectural critiques

2. **Phase 2 / WEARABLE DEVICES**
   A0x4 panels (2 panels each prototype)
   > Plans, Sections, Elevations, Axonometrics, Detail Drawings and Views
   > Photographs
   > Technical specs and coding input
   > Biometric/ Sensory Data (as applicable)
   > Architectural Critique (statement and abstract)

   (2) Trailer videos showing how 2 prototype devices operate
   developmental sketch models
   (2) Full scale 1:1 Wearable Devices
   Curated Presentation incorporating theoretical, scientific and architectural critiques

3. **Phase 3 / NARRATIVE SPACES**
   A0x6 panels
   > Plans, Sections, Elevations, Axonometrics, Detail Drawings, Urban Intervention Overview, and Views
   > Storyboards
   > Narrative Process
   > Architectural Critique (statement and abstract)

   'Feature Film' Narrative Video of Architectural Imagination

Models
    Developmental Models
    Detail Model
    Final Design Model
Curated Presentation incorporating theoretical, scientific and architectural critiques

4. Final Presentation
A0x10 panels (showing individual work including Phase 2 and Phase 3
    Plans, Sections, Elevations, Axonometrics, and Views of final project
    Sceneography and narrative development
    Drawings of wearable devices
    Architectural Critique (statement and abstract)
Video composition that illustrates critical point of view
Video Trailors for wearable devices
Models of final project
Wearable devices
We will also display the A0x4 Panels with Drawings of the Responsive Structure group project, the Responsive Structure and the video trailor of the structure
Curated Presentation incorporating theoretical, scientific and architectural critiques

5. Process Portfolio
Process Report A3x30 pages
Evolution of project
Technical studies involved in design
Critical point of view being argued- the thesis of the project
Evaluation of the theoretical, scientific and architectural discourse that supports the project

LEARNING OUTCOME

1. Ability to create architectural designs that satisfy both aesthetic and technical requirements.
2. Adequate knowledge of the histories and theories of architecture and the related arts, technologies and human sciences.
3. Knowledge of the fine arts as an influence on the quality of architectural design.
4. Understanding of the relationship between people and buildings, and between buildings and their environment, and the need to relate buildings and the spaces between them to human needs and scal
5. Understanding of the methods of investigation and preparation of the brief for a design project.
6. Ability to generate complex design proposals showing understanding of current architectural issues, originality in the application of subject knowledge and, where appropriate, to test new hypotheses and speculations.
7. Ability to evaluate and apply a comprehensive range of visual, oral and written media to test, analyse, critically appraise and explain design proposals.
8. Awareness of the theories and methods of inquiry that seek to show the relationship between human behaviour and the physical environment.
9. Understanding of the basic principles of sustainable development and architects' responsibilities with respect to the social, economic and environmental sustainability in architecture and urban design.
10. Understanding of the principles of structural behaviour in withstanding gravity and lateral forces, and the range and appropriate applications of contemporary structural system.
11. Ability to assemble a comprehensive programme for an architecture project, including:
12. Ability to respond to natural and built site characteristics in the development of a programme and design of a project.
13. Ability to work cooperatively with others in a team setting. Ability to discuss architectural ideas with non-architects, to listen objectively to their opinions and to consider those opinions in designing.
14. Ability to speak and write effectively on subject matters contained in the professional curriculum in English.
15. Ability to use appropriate representational media, such as drawings, models, diagrams, charts, including computer technology, to convey essential design information at each stage of the programming and design process.

ASSESSMENT SCHEME

1_Midterm Reviews (30%)
1. Midterm Review 1, October (10%)
2. Midterm Review 2, December (10%)
3. Midterm Review 3, March (10%)

2_Final Review (50%)
1. Final Project Presentation, May (50%)

3_Project Book (20%)
1. Project Book to have three parts: Position/ Technology / Process
2. To be started at the beginning of the year and reviewed throughout.

COURSE FORMAT

1_Group Work
1. Students are allowed to work in groups only the first semester.
2. The second semester will be all individual projects.

2_Teaching Days
1. The Design Studio will be taught two days a week Monday and Thursday 13:30 to 18:00

3_Studio Spaces
1. Each Studio will have their own space, accommodating a desk for each student
2. Layouts will be issued at the start of the academic year

FIELD TRIP

At present all foreign trips are suspended until further notice. If the COVID-19 situation improves, the school will inform the Design Studio tutors.

REQUIRED READINGS

Agamben, G., 2009. *What is an Apparatus?: And Other Essays*. Stanford University Press.

Antonelli, P., 2008. *Design and the Elastic Mind*. The Museum of Modern Art.

Bickhard, M.H., Richie, D.M., 1983. *On the Nature of Representation: A Case Study of James Gibson's Theory of Perception*. Praeger Pub Text, New York.

Butler, J., 2015. *Senses of the Subject*. Fordham University Press, New York.

Crary, J., 2001. *Suspensions of Perception: Attention, Spectacle and Modern Culture*. MIT Press, Cambridge, Mass.

Crary, J., 1992. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. MIT Press, Cambridge, Mass.

Damisch, H., 1994. *The Origin of Perspective*. MIT Press.

Gibson, J.J., 2014. *The Ecological Approach to Visual Perception: Classic Edition*. Psychology Press, New York, London.

Gombrich, E.H., 2002. *Art and Illusion: A Study in the Psychology of Pictorial Representation: v. 6*. Phaidon Press, London; New York, NY.

Grau, O., 2003. *Virtual Art: From Illusion to Immersion*. MIT Press.

Haraway, D.J., 1991. *Cyborg Manifesto, in: Simians, Cyborgs and Women: The Reinvention of Nature*. Free Association.

Hight, C., 2007. *Architectural Principles in the Age of Cybernetics*. Routledge, New York.

Howes, D. (Ed.), 2004. *Empire of the Senses: The Sensual Culture Reader*. Berg Publishers, Oxford ; New York.

Jones, C.A., 2006. *Sensorium*. MIT Press, Cambridge, Mass.

Lefebvre, H., 1991. *The Production of Space*. Wiley-Blackwell, Oxford, OX, UK; Cambridge, Mass., USA.

Mauss, M., 1992. "Techniques of the Body", in: Crary, J., Kwinter, S. (Eds.), *Incorporations*. Zone Books, New York, NY.

Merleau-Ponty, M., 2002. *Phenomenology of Perception*. Psychology Press.

Merleau-Ponty, M., 1964. *The Primacy of Perception: And Other Essays on Phenomenological Psychology, the Philosophy of Art, History and Politics*. Northwestern University Press.

Morris, M., Aling, M. (eds), 2021. *Worldmodelling: Architectural Models in the 21st Century*.Wiley, Oxford, UK.

Pallasmaa, J., 2005. *The Eyes of the Skin; Architecture and the Senses*. John Wiley & Sons, Great Britain.

Sartre, J.-P., 1996. *Being and nothingness : an essay on phenomenological ontology /* by Jean-Paul Sartre; translated by Hazel E. Barnes; introduction by Mary Warnock. Routledge, London.

Sartre, J.-P., Jameson, F., Kail, M., Kirchmayr, R., 2016. *What Is Subjectivity?* Verso Books, London ; New York.

Schilder, P., 2014. *The Image and Appearance of the Human Body*. Routledge, London.

Schopenhauer, A., 2000. *The World as Will and Representation*. Dover Publications Inc., New York.

Schwartzman, M., 2020. *See Yourself X: Human Futures Expanded*. Black Dog Press.

Schwartzman, M., 2011. *See Yourself Sensing: Redefining Human Perception*. Black Dog Publishing London UK, London, UK.

Wolfflin, H., 1994. "Prolegomena to a Psychology of Architecture", in: *Empathy, Form, and Space: Problems in German Aesthetics*. Getty Center for the History of Art and the Humanities.

Young, L., 2021. *Planet City*. Uro Publications.

Zylinska, J., 2002. *The Cyborg Experiments: The Extensions of the Body in the Media Age*. Continuum, London ; New York.

IMPORTANT NOTE TO STUDENTS

Attendance
Class attendance is required in all courses. For an excused absence, the instructor must be notified and presented with documentation of illness or personal matter. Please note: **Three (3)** or more unexcused absences may result in a failing grade for the course.

Academic Honesty
Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at: http://www.cuhk.edu.hk/policy/academichonesty/. With each assignment, students may be required to submit a statement that they are aware of these policies, regulations, guidelines and procedures.

Student Work

Submission of studio documentation must be complete and correctly formatted. Missing or incomplete submission of the documentation folder will result in the grade for the course being withheld. This will prevent registration for the following term or delay graduation. In addition, a grade deduction of *one letter grade* will be made.

SCHEDULE

Important Dates

SEMESTER 1
1_Midterm Reviews (30%)
Midterm Review 1, 25-29 October 2021 (10%)
Midterm Review 2, 06-10 December 2021(10%)

SEMESTER 2
Midterm Review 3, 01-04 March 2022 (10%)

2_Final Review (50%)
Final Project Presentation, 03-06 May 2022 (50%)

3_Project Book (20%)
Project Book to have three parts: Position/ Technology / Process, 13 May 2022 (20%)

Term 1: 6 September 2021 (Mon) – 4 December 2021 (Sat)

	WEEK 01	
06.09	**INTRODUCTION**	**STUDIO SELECTION**
10.09		Results Announced

	WEEK 02	
13.09	**Assignment 1: RESPONSIVE STRUCTURES (3 teams of 4)**	• **Studio Intro** • **Reading Discussion Session 1** • **Introduction of Assignment 1** • **Breaking off into groups for R.S. project brainstorming and concept designing**
16.09	**SYMPOSIUM**	**SYMPOSIUM (8am-noon)**

	WEEK 03	
20.09	**WORKSHOP**	• **ARDUINO WORKSHOP Part 1 (morning)** • **Reading Discussion Session 2 (afternoon)** • **Tutorials**
23.09	**WORKSHOP**	• **3D SCANNING WORKSHOP (all day)**

	WEEK 04	
27.09	**WORKSHOP**	• **ARDUINO WORKSHOP Part 2 (morning)** • **Tutorials**
30.09		• **Tutorials**

	WEEK 05	
04.10		• **Tutorials**
07.10	**PINUP- Progress Presentation of Assignment 1** **Assignment 2: WE ARE CYBORG (individual projects)**	• **INTERNAL PRESENTATIONS OF RESPONSIVE STRUCTURES** • **Introduction of Assignment 2**

	WEEK 06	
11.10	**WORKSHOP**	• **VR WORKSHOP (tbc)**
14.10	**HOLIDAY**	Chung Yeung Festival

	WEEK 07	
18.10		• **Tutorials**
21.10	**PINUP**	• **Pin up and discussion- mid review prep.**

	WEEK 08	
25.10	**MID REVIEW**	**MID REVIEW 1 (10%)**
28.10	**WE ARE CYBORG, 2.1**	• **Development of 1st wearable prototype**

	WEEK 09	
01.11		• **Tutorials**
04.11		• **Tutorials**

	WEEK 10	
08.11		• **Tutorials**
11.11	**PINUP** **WE ARE CYBORG, 2.2**	• **INTERNAL PRESENTATIONS OF ASSIGNMENT 2.1** • **Development of 2nd wearable prototype**

	WEEK 11	
15.11		• **Tutorials**
18.11		• **Tutorials**

	WEEK 12	
22.11		• **Tutorials**
25.11	**PINUP**	• **INTERNAL PRESENTATIONS OF ASSIGNMENT 2.2**

	WEEK 13	
29.11		• **Tutorials**
02.12	**PINUP**	• **Pin up and discussion- mid review prep.**

	WEEK 14	
06.12-10.12	**MID REVIEW**	**MID REVIEW 2 (10%)- tentative date 06/12**

Term 2: 10 January 2022 (Mon) – 23 April 2022 (Sat)

Over the break, preparation of initial design study that extracts concepts from term 1 and applies them to a [fictional] world building scenario. The second half of the academic year will use narrative methods and mixed media and should set up an architectural critique of our built environment, using the design as a catalyst for critique.

	WEEK15	
10.01	**Assignment 3: WORLD BUILDING/ NARRATIVE ARCHITECTURE (individual projects)** **PINUP**	• **Prensentations and initial work-shopping of ideas developed over break**
13.01	**WORKSHOP**	• **VIDEOGRAPHY WORKSHOP**

	WEEK16	
17.01	**WORKSHOP**	• **VIDEO-EDITING WORKSHOP**
20.01		• **Tutorials**

	WEEK17	
24.01		• **Tutorials**
27.01	**PINUP**	• **Pin Up**

	WEEK18	
31.01-05.02	**HOLIDAY**	**LUNAR NEW YEAR VACATION**

	WEEK19	
07.02		• **Tutorials**
10.02	**WORKSHOP**	• **PRESENTATION WORKSHOP**

	WEEK20	
14.02		• **Tutorials**
17.02		• **Tutorials**

	WEEK21	
21.02		• **Tutorials**
24.02	**PINUP**	• **Pin up and discussion- mid review prep.**

	WEEK22	
28.02	**MID REVIEW**	**MID REVIEW 3 (10%)**
03.03		• **Tutorials**

	WEEK23	
07.03		• **Tutorials**
10.03		• **Tutorials**

	WEEK24	
14.03		• **Tutorials**
17.03	**PINUP**	• **Pin Up**

	WEEK25	
21.03		• **Tutorials**
24.03		• **Tutorials**

	WEEK26	
28.03		• **Tutorials**
31.03		• **Tutorials**

	WEEK27	
04.04	**HOLIDAY**	**Ching Ming Festival**
07.04		• **Tutorials**

	WEEK28	
11.04		• **Tutorials**
14.04	**PINUP**	• **Pin Up**

	WEEK29	
18.04	**HOLIDAY**	**Easter Monday**
21.04		(Official End of Term 2)

	WEEK30	
25.04		• **Production Mode for Final Review**
28.04		• **Production Mode for Final Review**

	WEEK31	
02.05	**HOLIDAY**	**Day following Labour Day**
03.05-06.05		**FINAL REVIEW (50%) – tentative date 03/05** A0x10 panels + A0x4 panels from group project Devices, Models, Drawings (Plans, Sections, Elevations, Axonometric, Rendered Views), Video Content/VR Content
05.05		• **Production Mode for Process Book**

	WEEK32	
09.05	**HOLIDAY**	**PUBLIC HOLIDAY** (Birthday of Buddha)
13.05	**PROCESS BOOK**	**PROCESS BOOK (20%)** Including three parts: POSITION, TECHNOLOGY, PROCESS Process Report A3x 30 pages

APPENDIX

Symposium Poster

Haus Rucker Co.
Mind Expander

HOW DO WE SENSE SPACE?

SYMPOSIUM
September 16, 2021, 8am-noon HKT

The symposium sets the stage for the *examination of a new experiential theory of architecture and design*. The event will be divided into 2 panels. The first panel will focus on the psychologizing of space, the body and the immersive and the second panel will focus on world creation and narrative architecture.

zoom webinar, please register here -
https://cuhk.zoom.us/webinar/register/WN_5xDJ_6T2TGqUzQDxPvm-fw

Panel One - sensing spaces

Shama Milon, M.D. is a physician specializing in Pediatrics, Psychiatry, and Child and Adolescent Psychiatry practicing in New York City. While addressing various psychological disorders, she also works with patients that suffer from spatial perceptual issues that relate to depression and psychosis.

Chrisoula Kapelonis is a Design Strategist at Google Nest working on the future of the home and spaces. She has worked with wearables and IoT and previously was a researcher at the MIT Media Lab, City Science Group where her work focused on responsive environments.

Pico Velasquez is a multimedia artist and director of PIICO Creative Partners, computational architect, movement composer and entrepreneur curious about the rhythms expressed in form, music, light and the body in motion. Her work exists at the intersection of design innovation, performance and technology to create unique experiences that question assumptions of space and interaction.

Filippo Nesci is a film producer and designer doing work with Family, a technology-driven storytelling arts and entertainment studio. He has award winning productions consisting of commercials, music videos and short films and experiments with glitch art and Virtual Reality installations and films.

Panel Two - sensing worlds

George Guida is an architect and creative technologist, co-founder of ArchiTAG LLP, whose research lies at the intersection of design, technology and equity through the lens of computation, machine intelligence, and mixed realities. He is examining creative applications of 2D and 3D machine learning as well as alternative collective 'virtual' spaces, and current works at the Harvard Laboratory for Design Technologies.

Melodie Yashar is Director of Building Design & Performance at ICON, a startup developing advanced construction technologies to shift the paradigm of homebuilding on Earth and beyond. She is co-founder of Space Exploration Architecture (SEArch+), a Senior Research Associate with San Jose State University Research Foundation at NASA Ames, and an Associate Researcher within the UC Davis Center for Human/Robotics/Vehicle Integration and Performance (HRVIP).

Nathan Su is a speculative designer who works between media and architecture. He is co-founder of Inferstudio- an interdisciplinary world building practice that works through film, image and writing to critically imagine and investigate technological, cultural and environmental horizons.