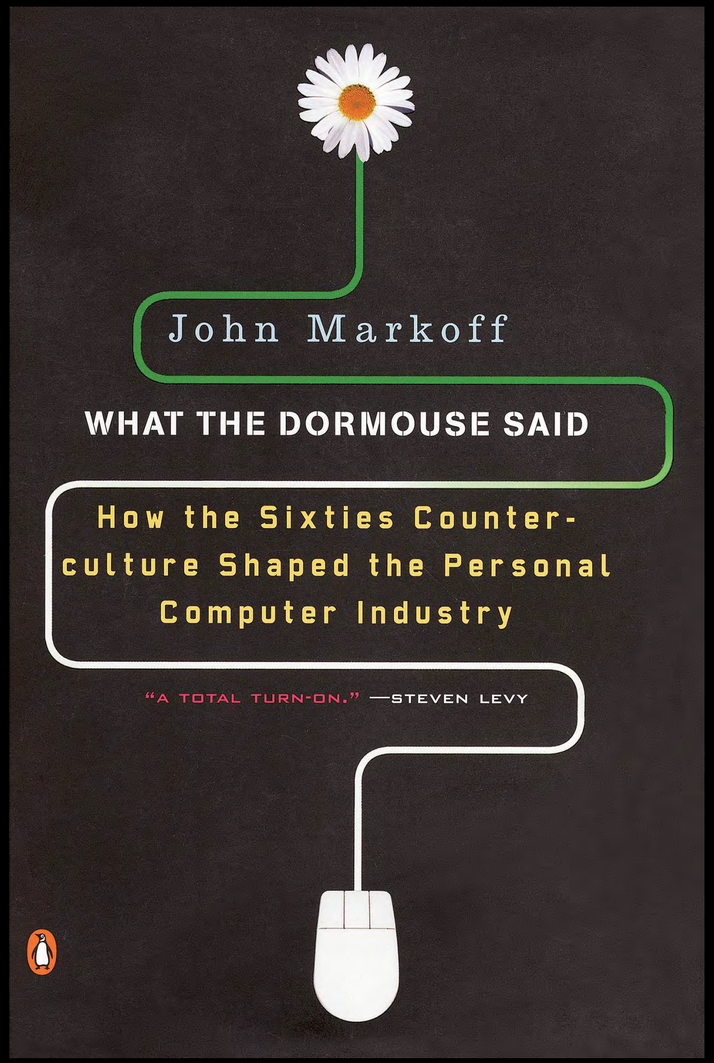
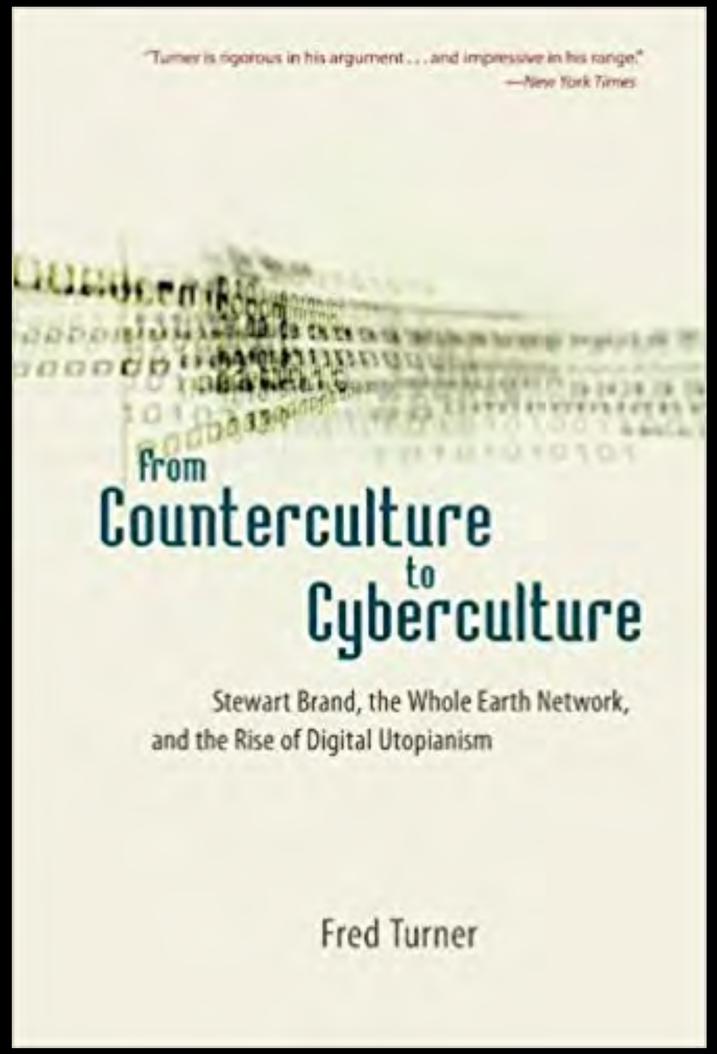
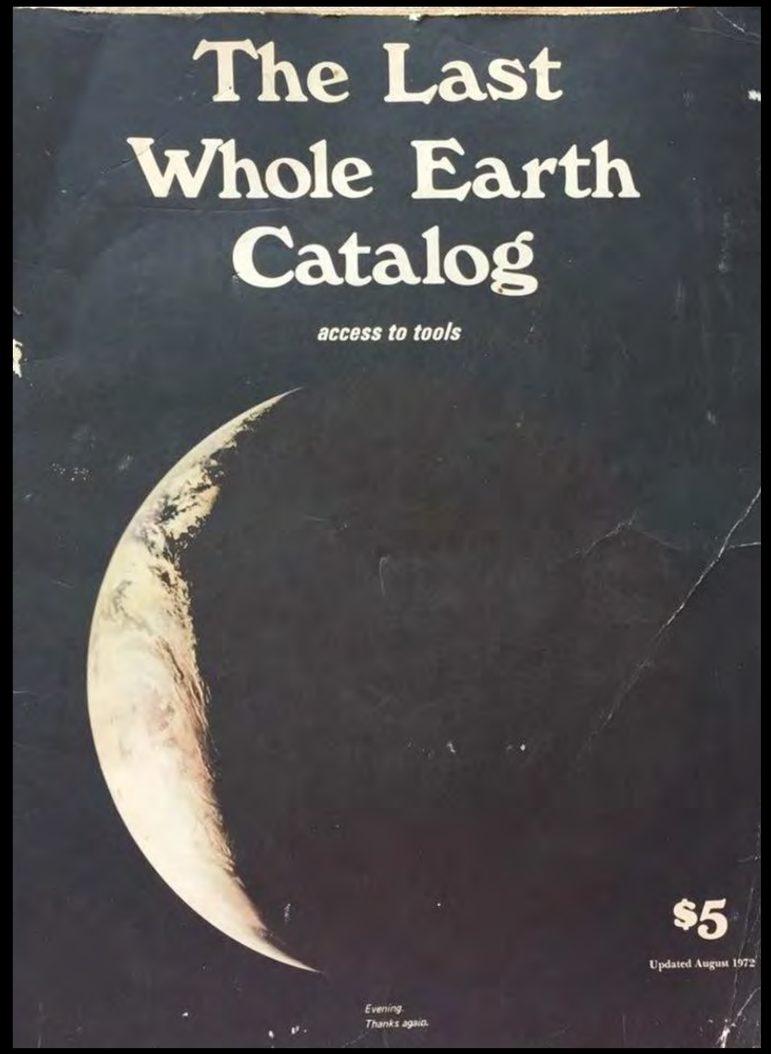
Conversation | Design | Wicked Problems

Paul Pangaro
Professor of Practice
Human-Computer Interaction Institute
Carnegie Mellon University

HCII Seminar Series
March 20, 2020
pangaro.com/hciiseminar2020/

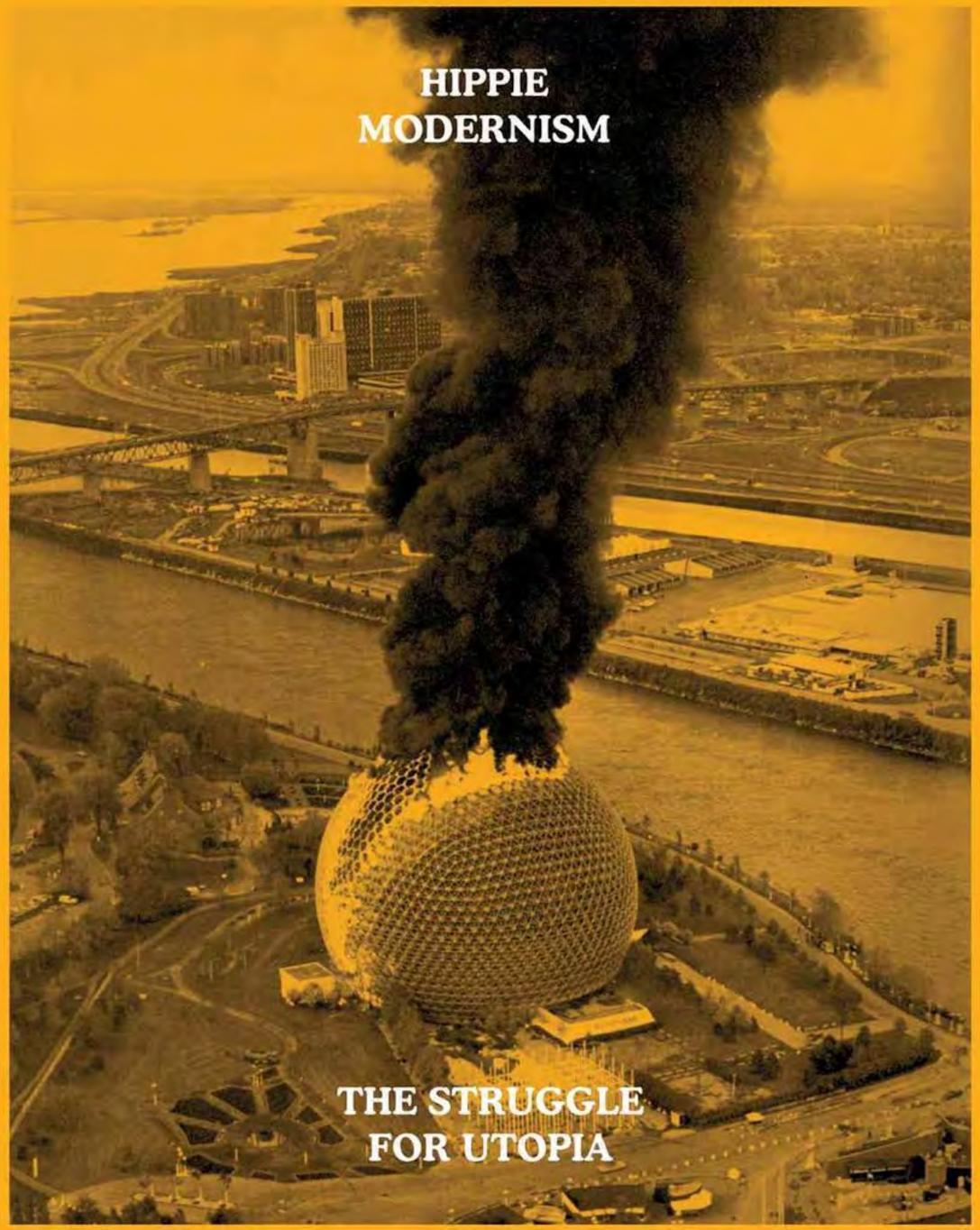

John Markoff
WHAT THE DORMOUSE SAID
How the Sixties Counter-culture Shaped the Personal Computer Industry
"A TOTAL TURN-ON." —STEVEN LEVY


"Turner is rigorous in his argument . . . and impressive in his range."
—New York Times
From Counterculture to Cyberculture
Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism
Fred Turner


The Last Whole Earth Catalog
access to tools
$5
Updated August 1972
Evening.
Thanks again.

Catalog
HIPPIE MODERNISM
Walker Art Center, 2016
Minneapolis

Andrew Blauvelt, Curator



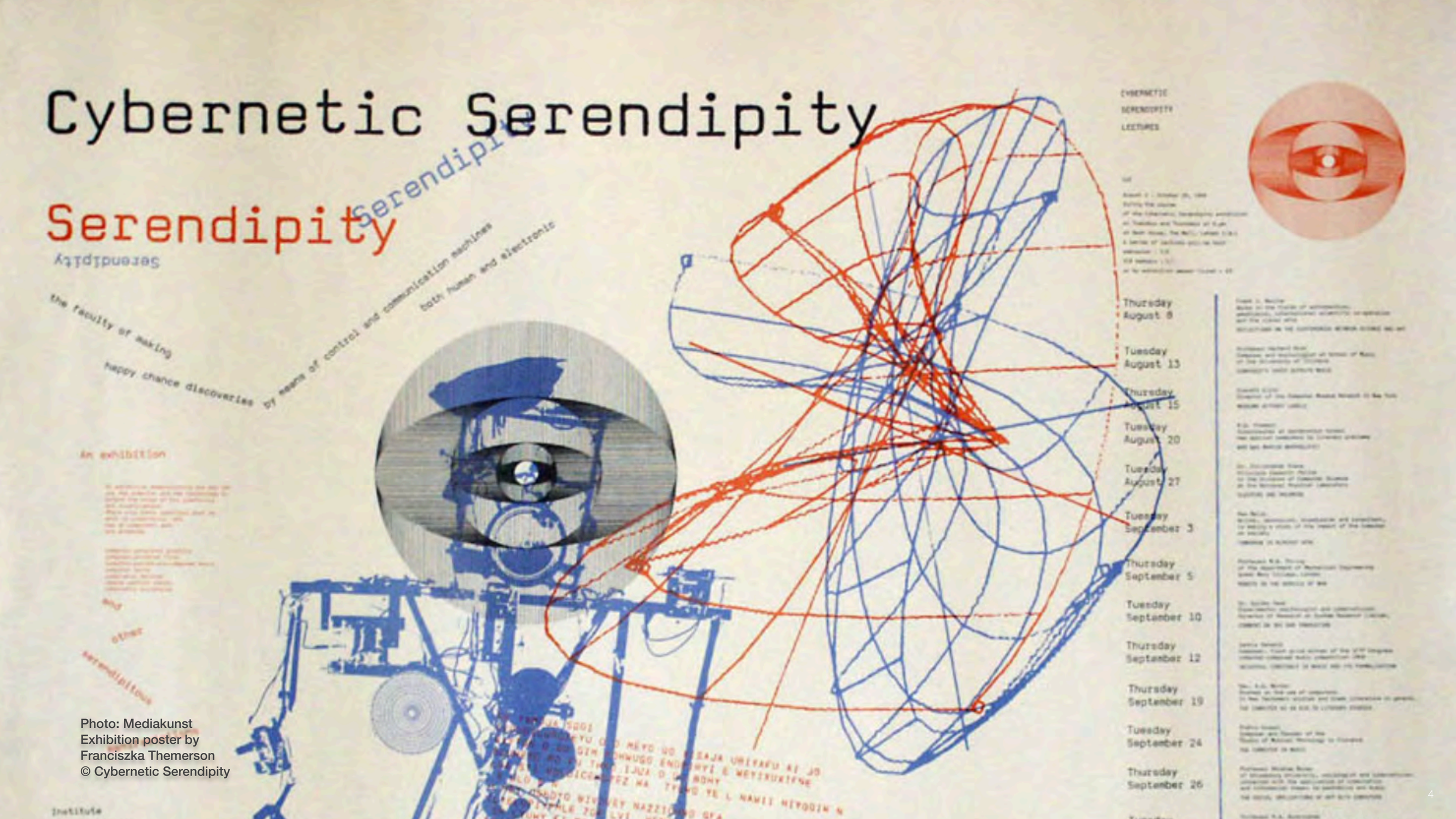


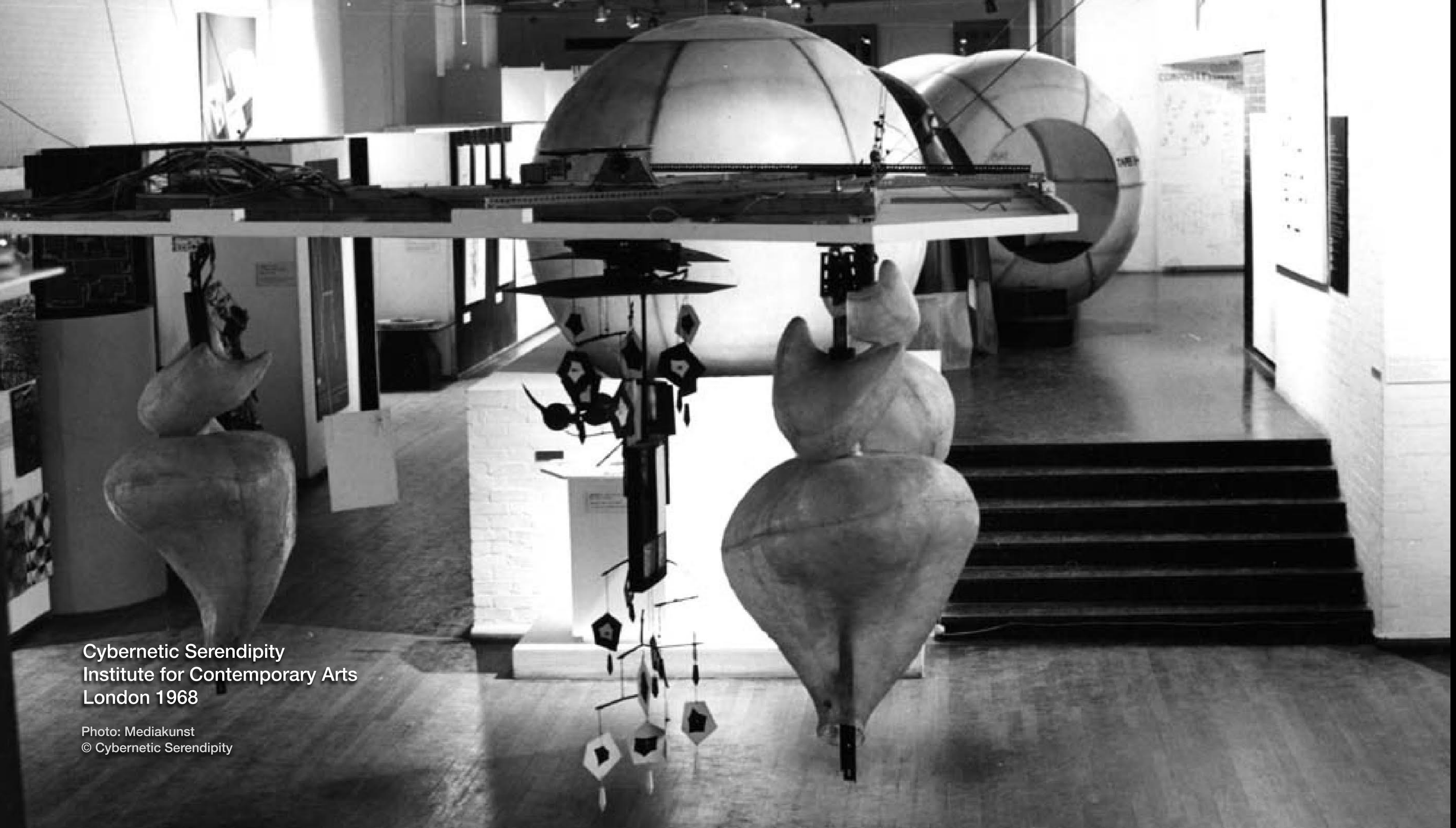
Photo: Mediakunst
Exhibition poster by
Franciszka Themerson
© Cybernetic Serendipity

Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst
© Cybernetic Serendipity

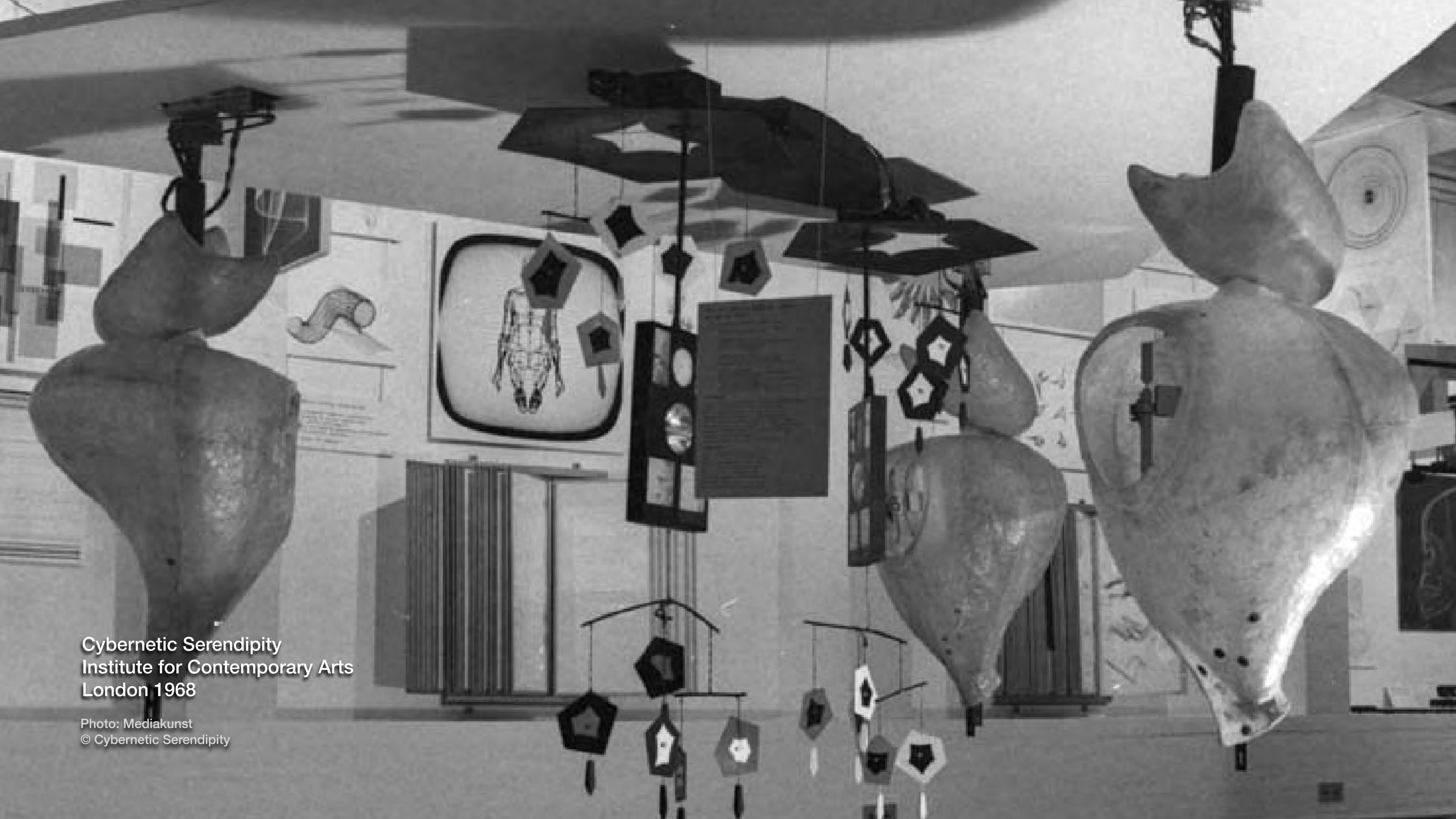
Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst



Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst

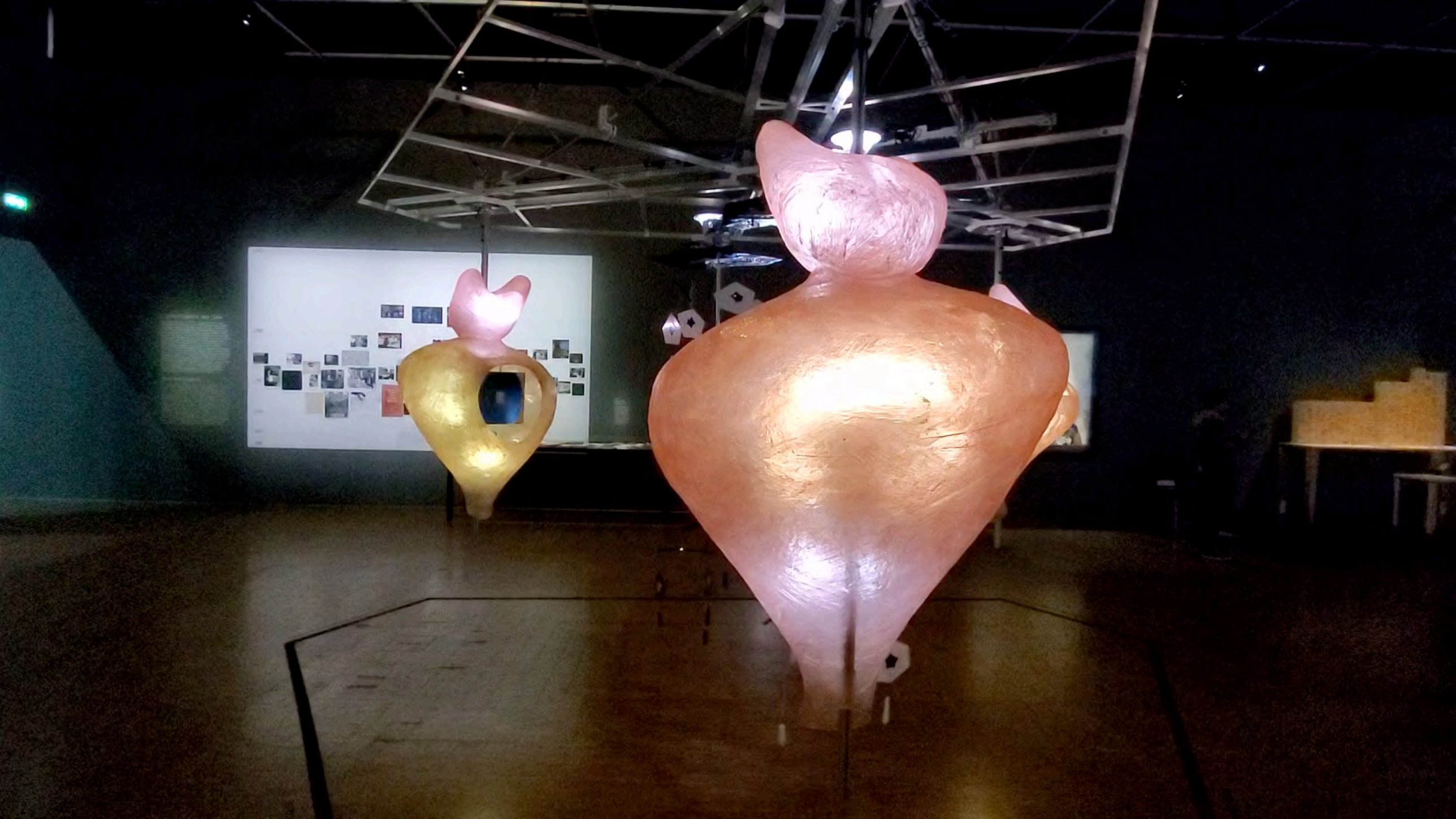


Cybernetic Serendipity
Institute for Contemporary Arts
London 1968

Photo: Mediakunst

College for Creative Studies
Detroit 2018

Centre Pompidou
Paris 2020



Gordon Pask

The Colloquy of Mobiles, 1968/2018

2018 Installation / 2018 Installation
Fibre de verre, aluminum, Delrin®, et matériel électromécanique / Fiberglass, aluminum, Delrin®, and mechatronics
Reconstitution de Paul Pangaro et TJ McLeish / Reconstruction by Paul Pangaro and TJ McLeish
Collection ZKM | Center for Art and Media Karlsruhe
Don de Paul Pangaro / Gift of Paul Pangaro

Neurones

les intelligences simulées

26 février - 20 avril 2020

#ExpoNeurones
#MutationsCreations

Centre Pompidou

Dossier
de presse

Direction de la communication et du numérique

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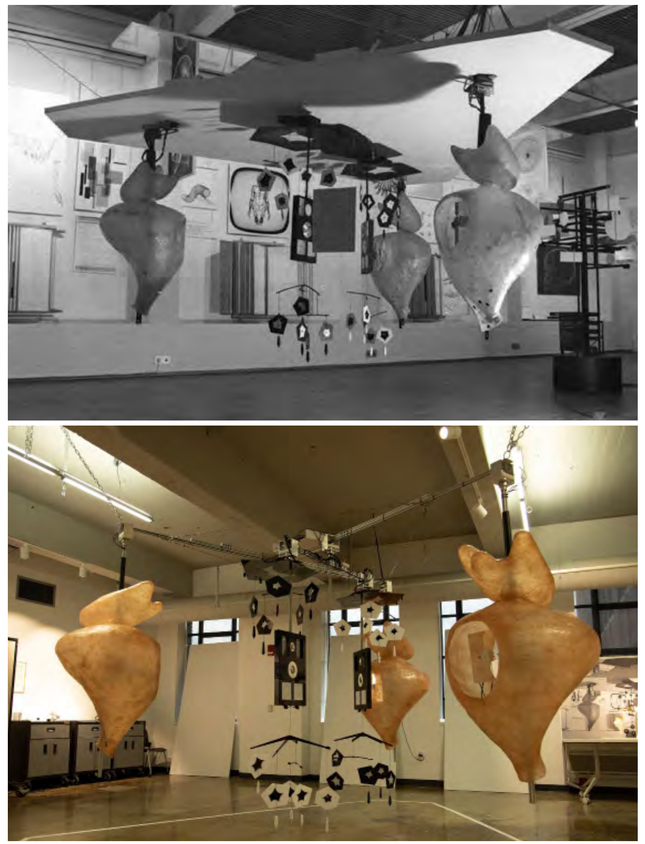
Neurones, les intelligences simulées

26 février – 20 avril 2020
Dans le cadre de Mutations / Créations #4

Press Release

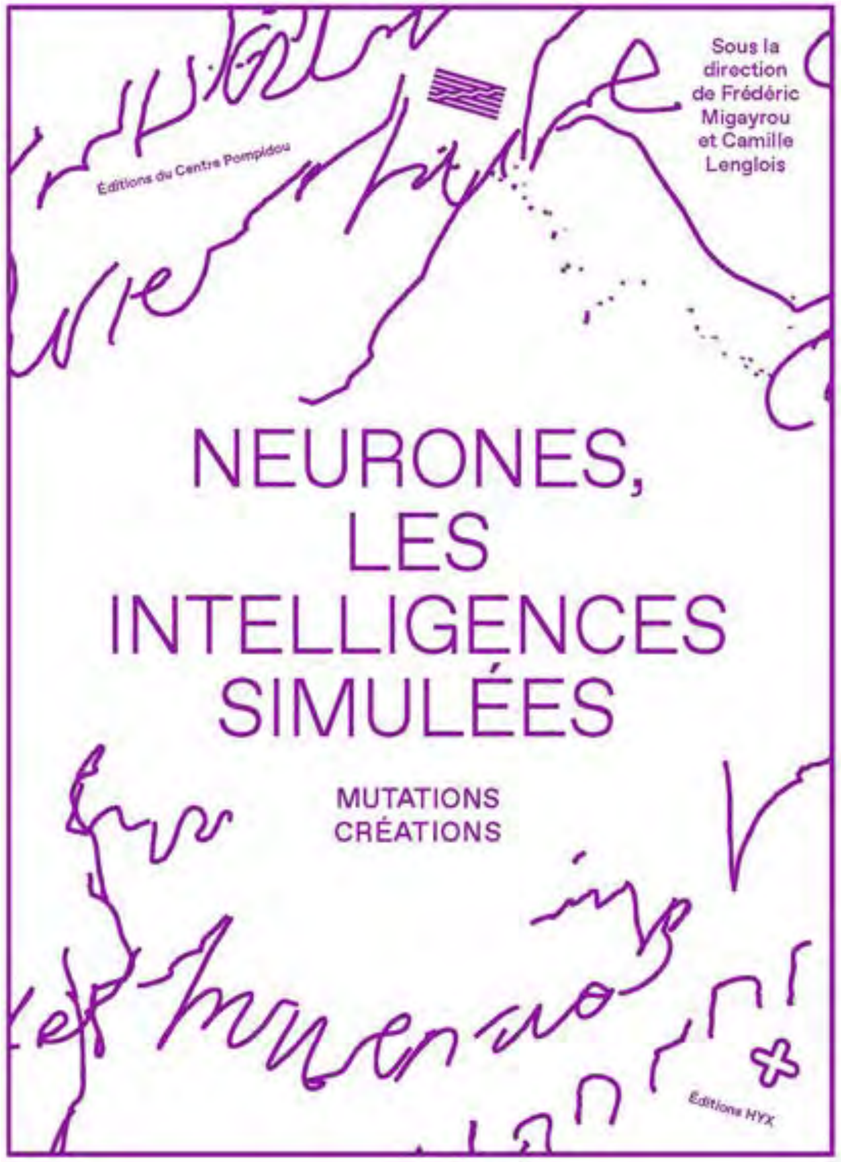
Conversation | Design | Wicked Problems | March 2020

Focus sur *Colloquy of Mobiles* de Gordon Pask



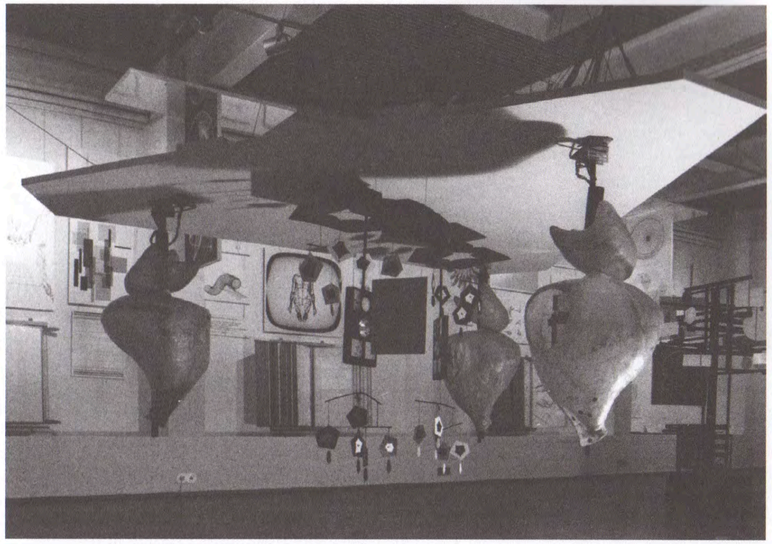
7 **Gordon Pask**
Colloquy of Mobiles, 1968 et 2019

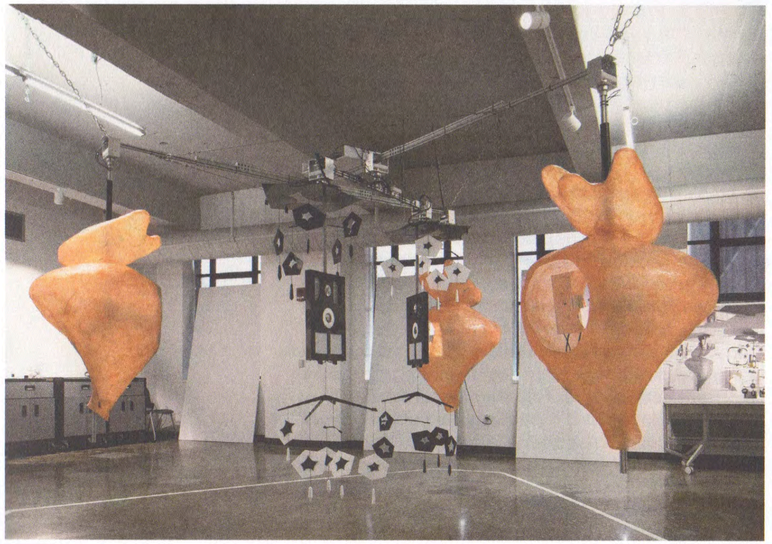
Personnage complexe d'abord influencé par Norbert Wiener, Gordon Pask a été un des pionniers de la cybernétique de second ordre, s'attachant aux effets et aux contextes dans lesquels la cybernétique soit la science du contrôle des système d'information, vivant ou non-vivants s'applique à elle-même. Au centre de ses recherches l'interaction entre l'homme et la machine est conçue comme un processus dynamique qu'il formalise en une « théorie de la conversation » et une théorie de l'interaction entre acteurs organisés autour de systèmes de contrôle aussi bien électronique que mécanique ou biologique. Au travers de multiples publications dont *Conversation, cognition and learning* (1975), Gordon Pask développe sa théorie de l'interaction ancrée au sein d'une théorie des systèmes définissant la fonction des acteurs au sein d'un réseau et anticipant des modèles d'apprentissage (learning) qui trouvent aujourd'hui toute leur actualité. Au travers de multiples installations comme *Musicolor* (1953) où le musicien était l'acteur d'un mécanisme d'apprentissage, comme *SAKI* (1956) un système informatique adaptatif d'enseignement ou plus tard des environnements informatiques permettant d'interagir avec de vastes bases de données (*Thoughstickers*, 1974). Enseignant dans de nombreuses universités en Angleterre, aux États-Unis ou au Canada, il sera aussi l'interlocuteur de Cedric Price pour la conception du *Fun Palace* (1961) une architecture prônant l'interaction et la participation ainsi que consultant auprès du Architecture Machine Group avec Nicholas Negroponte au M.I.T. *Colloquy of Mobiles* est une installation présentée lors de la célèbre exposition *Cybernetic Serendipity* organisée par Jasia Reichardt en 1968 à l'Institute of Contemporary Art (I.C.A) à Londres et consistait en une sculpture cybernétique dans laquelle des automates mâles et femelles conversent alors qu'un spectateur humain armé d'une torche pouvait interagir et s'impliquer dans les échanges, le dispositif évoluant ainsi au cours des différentes actions.



Gordon Pask

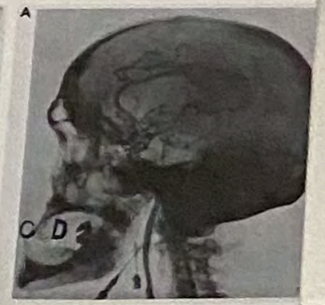
Personnage complexe d'abord influencé par Norbert Wiener, Gordon Pask a été un des pionniers de la cybernétique dite de second ordre, s'attachant aux effets et aux contextes dans lesquels la cybernétique, soit la science du contrôle des systèmes d'information, vivant ou non-vivants s'applique à elle-même. Pour Pask, l'interaction entre l'homme et la machine est conçue comme un processus dynamique qu'il formalise en une « théorie de la conversation » et une théorie de l'interaction entre acteurs organisées autour de systèmes de contrôle aussi bien électronique que mécanique ou biologique. Au travers de multiples publications dont *Conversation, Cognition and Learning* (1975), Gordon Pask développe sa théorie de l'interaction ancrée au sein d'une théorie des systèmes définissant la fonction des acteurs au sein d'un réseau et anticipant des modèles d'apprentissage (*learning*) qui trouvent aujourd'hui toute leur actualité. Il développe à cet égard *Musicolor* (1953), une installation où le musicien était l'acteur d'un mécanisme d'apprentissage ou plus tard des environnements informatiques permettant d'interagir avec de vastes bases de données (*Thoughstickers*, 1974). Enseignant dans de nombreuses universités en Angleterre, aux États-Unis ou au Canada, il sera consultant auprès du *Architecture Machine Group* avec Nicholas Negroponte au MIT *The Colloquy of Mobiles* est une installation présentée lors de la célèbre exposition *Cybernetic Serendipity* organisée par Jasia Reichardt en 1968 à l'Institute of Contemporary Art (ICA) à Londres et consistait en une sculpture cybernétique dans laquelle des automates mâles et femelles conversent alors qu'un spectateur humain armé d'une torche pouvait interagir et s'impliquer dans les échanges, le dispositif évoluant ainsi au cours des différentes actions.



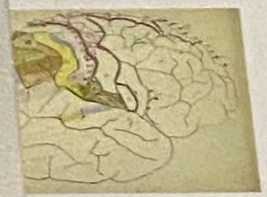


The Colloquy of Mobiles, 1968/2018
Installation
Fibre de verre, aluminum, Delrin®
et matériel électromécanique
Reconstitution par Paul Pangaro
et TJ McLeish
Collection ZKM | Center for Art
and Media Karlsruhe
Don de Paul Pangaro

Exhibition Catalog

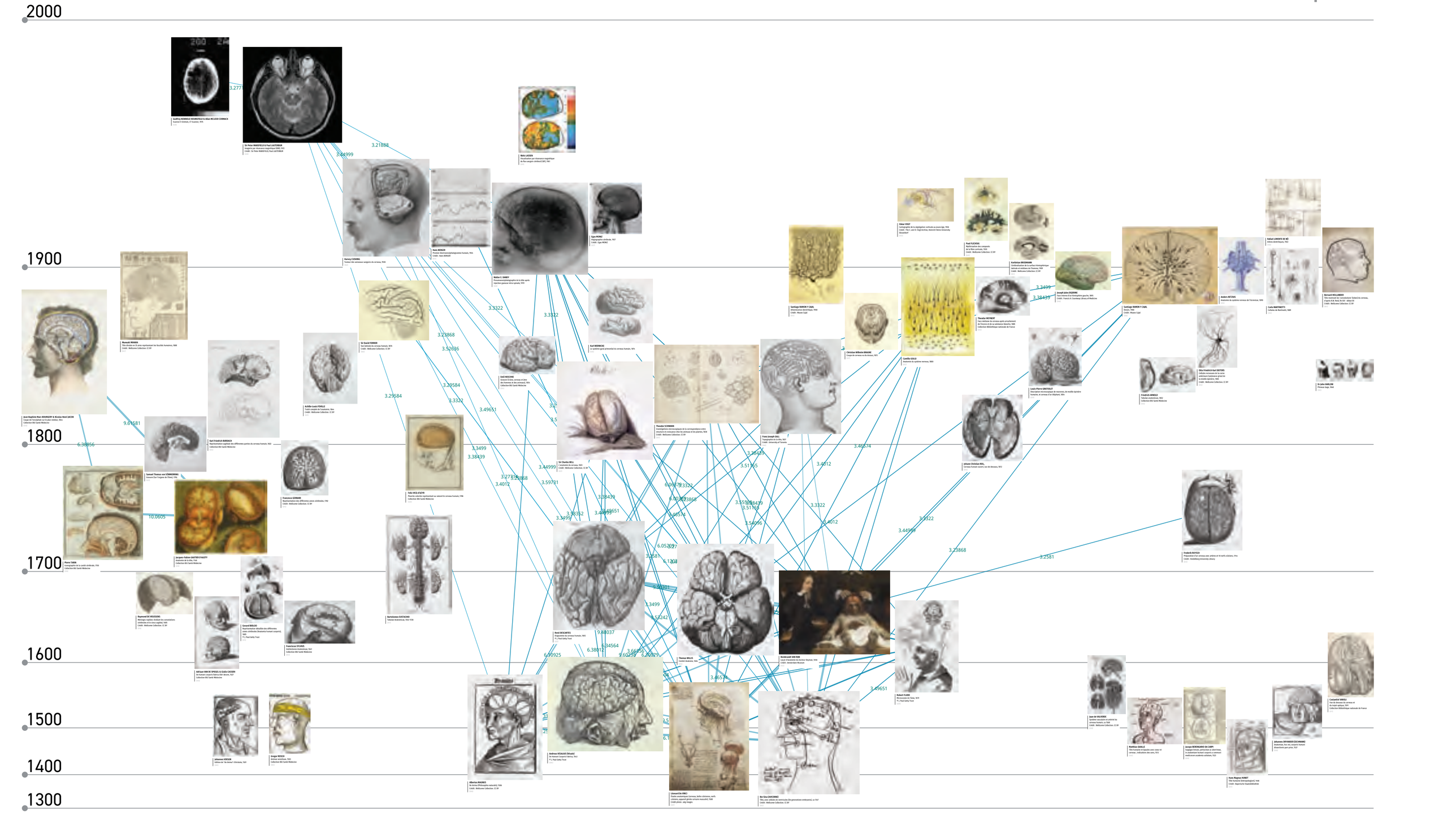


Egas MONIZ
Angiographie cérébrale, 1927
Crédit : Egas MONIZ



la ségrégation corticale au jeune âge, 1926
d O. Vogt Archive, Heinrich Heine University

Paul FLECHSIG
Myélinisation des composés
de la fibre corticale, 1920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Geoffrey N.HOUNSFIELD & Allan M.CLEOD CORMACK
Sir Peter MANSFIELD & Paul LAUTERBUR
Hans BERGER
Harvey CUSHING
Walter E. DANDY
Egas MONIZ
Santiago RAMON Y CAJAL
Oskar VOGT
Paul FLECHSIG
Joseph Jules DEJERINE
Bernard HOLLANDER
Raphael LEMOINE DE MS
Carlo MARTINOTTI
Anders RETZIUS
Otto Friedrich Karl DEITERS
Friedrich ARNOLD
Dr John HARLOW
Hans BERGER
Sir David FERRIER
Karl BRODMANN
Ondi MUCHNIC
Sir Charles BELL
Theodor SCHWANN
Franz Joseph GALL
Christian Wilhelm BRAUNE
Camillo GOLGI
Theodor BEYNEAT
Louis-Pierre GRATIOLET
Achille-Louis FOVILLE
Karl Friedrich BURDACH
Samuel Thomas von SÖMMERING
Jean-Baptiste Marc BOURGERY & Nicolas Henri JACOB
Honoré MIHARA
Felix VICQ d'AZYR
Francesco GENNARI
Jacques-Fabien GAUTIER D'AGOTY
Pierre TARIN
Raymond DE VIEUSSENS
Gerard BIDLOO
Adriaan VAN DE SPIEGEL & Giulio CASSERI
Bartolomeo EUSTACHIO
Franciscus DUVERS
Johannes VESCIUS
Gregor REISCH
Albertus MAGNUS
René DESCARTES
Thomas WILLIS
Rembrandt VAN RIJN
Robert FLUDD
Andreas VESALIUS [Situs]
Leonard Da VINCI
Ibn Sina (AVICENNE)
Jean de VALVERDE
Matthias QUELLE
Jacopo BERENGARIO DA CARPI
Johannes DRYANDER (ECKMANN)
Costantin VAROLI
Hans Magnus HUBERT
Frederik RUYSCH

2050

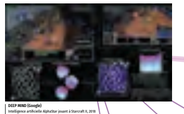
2000

1950

1900

1850

1800



DEEP MIND (Google)
Intelligence artificielle Alphastar jouant à Starcraft II, 2019
Fr Dk

10.494

DEEP MIND (Google)
Alphazéro - Alphatalo Zero, 2016
Fr Dk

0.4574

Dennis HASSABIS, Mustafa SULEYMAN, Shane LEGG
Ils travaillent présentant la technologie Deep Mind, 2015
Fr Dk

3.48124

DEEP BLUE (IBM)
Programme de jeu d'échecs Deep Blue contre G. Kasparov, 1996
Fr Dk
Crédit : Bernie Nunez/Allsport

3.56953

3.71337

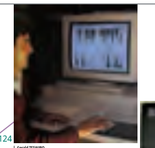
Hans BERLINER et Carl EBELING
HiTech, ordinateur de jeu d'échecs développé par M. Campbell, C. Ebeling et G. Goetsch à l'Université Carnegie-Mellon (CMU), 1985
Fr Dk Matrice

3.49651

Robert WYATT
Easy Rider, 1969
Crédit : Carnegie Mellon University
Fr Dk

Feng-Hsiung HSU, Thomas ANANTHARAMAN, Murray CAMPBELL
Ordinateur de jeu d'échecs ChipTest, 1985
Fr Dk
Fonction Feng-Hsiung Hsu

3.48124



Gerald TESAURO
Jeu de Backgammon TD-Gammon, utilisant l'apprentissage par renforcement (Reinforcement Learning), sur ordinateur IBM, 1992
Fr Dk

Alexey PAZHITNOV (avec Dmitri PAVLOVSK) et Vadim GERASIMOV
Jeu vidéo Tetris sur ordinateur Elektronika 60, 1984
Fr Dk+Sylvie Maria

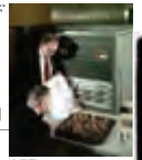
Richard GREENBLATT
Alan Mashie et R. William Sniper utilisant Robert G sur un ordinateur PDP-6, 1967
Fr Computer History Museum

Peter R. JENNINGS
Micro-Chess, programme de jeu d'échecs pour microordinateur MOS Technology 6502, 1976.
Fr Peter Jennings, 1976

3.59731

BORIS
Boris Electronics Chess Computer, 1977
Crédit : Creative Commons

Oswald MICHIE
MENACE, 1962
Fr Oswald MICHIE



Alex BERNSTEIN
A. Bernstein (programmeur IBM et Joueur d'échec) devant un IBM 704, 1958
Crédit : Photo Andreas Feininger/The LIFE Picture Collection/Getty Images

Christopher STRACHEY
Programme de jeu de dames et premier programme de jeu « Turing complet » fonctionne pour la première fois à Internet nationalisée lors de l'été 1952 sur l'ordinateur Ferranti Mark I de l'University de Manchester, 1951

Dietrich PRINZ
A Simple Answer to Arithmetic
Ferranti Mark I, 1951
Crédit : Photo Raymond Mortimer/Picture Post/Hulton Archive/Getty Images

Alan TURING
Enid Turing, 1946
Fr Dk

Peter R. JENNINGS
Micro-Chess, programme de jeu vendu sur cede fourni sur papier mis à exploitation par le journal, 1976
Fr Peter Jennings

Paul STEIN et Mark WELLS
Y. Stein (gauche) et N. Metropolis jouant aux échecs sur un ordinateur MANIAC I à Los Alamos, 1951
Crédit : Courtesy of Los Alamos National Laboratory

Gonzalo TORRES Y QUEVEDO et Norbert WIENER
Gonzalo Torres y Quevedo jouant avec N. Wiener sur la machine inventée par son père Leonardo. Image tirée d'une vidéo du Congrès Cybernétique de Paris, 1951

John H. CONWAY
Game of Life, 1970
Game of LIFE, 1970

John McCARTHY
Programme Kotok-McCarthy, MIT, 1966

Nicholas METROPOLIS et Stanislaw ULAM
Méthode de Monte Carlo, 1947

6.14204

6.18441

3.7013

3.55535

6.14204

3.46356

6.23

6.61

6.61

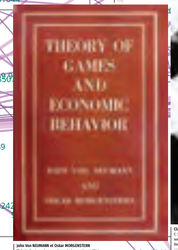
3.61092

6.10925

3.77226

Bell Labs
Ken Thompson et Joe Condon jouant sur Belle, ordinateur pour jeu d'échecs, 1982
Fr Bell Laboratories

Arthur SAMUEL
A Samuel jouant sur un IBM 701, 1957
Fr IBM



Herbert SIMON et Allen NEWELL
Programme de jeu d'échecs NSS,
Carnegie-Mellon University, 1958

3.7013

3.7

6.26

6.62

6.56801

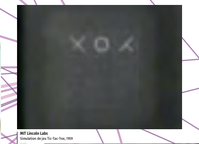
7.8548

7.8548

3.54

Konrad ZUSE
Représentation de « combinaisons » logiques à trois bits dans un tableau XML (Pastebin), 1945
Fr Deutsches Museum

New Mexico Los Alamos Laboratories
Premier programme de Blackjack sur un ordinateur IBM 701, 1956
Fr IBM



MIT Lincoln Labs
Connection de jeu Tic-Tac-Toe, 1959

John BENNETT et Raymond S. WILLIAMS pour FERRANTI
Ordinateur NIMROD permettant de jouer au jeu de Nim, 1951

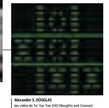
STAGE
Semi-Automated Ground Environment
Site de simulation de guerre à grande échelle du Department of the Air Force, centre de recherche de MITLAB-TTY, USA, 1962

Lights Out Game
Le Président L. Johnson examinant des positions stratégiques au Vietnam, 1966

Josef KATES
Tac : Un système logiciel basé sur les Better The Brain Sur-Acron Rogers Majestic2 basé sur le Canadian National Expositions, 1958
Crédit : Photo Bernard Hoffman/The LIFE Picture Collection/Getty Images

RAND CORPORATION
Project Simulator, programme d'entraînement et de simulation de guerre du Centre de direction de la défense aérienne (Air Defence Direction Center, ADE), 1957-1958
© RAND Corporation

OPERATION RESEARCH OFFICE (ORO)
Prospect, en espionnant FITOM à l'INFO, 1955



Alexander S. DOUGLAS
OXO, jeu de Tic-Tac-Toe (Noughts and Crosses) conçu sur ordinateur EDSAC, 1952
Fr Dk

John Von NEUMANN et Oskar MORGENSTERN
Theorie des jeux et comportements économiques, 1944

Claude SHANNON et Edward LASKER
Claude Shannon jouant aux échecs à Bell Labs (Assis) et Ed Lasker (Debout) sur la première machine de Shannon au MIT, 1950
Fonction Maurice Rowbotom

6.45362

6.19441

9.87302

6.33683

3.66356

3.58352

3.7013

Charles BABBAGE
Tic-Tac-Toe, Mars 1864
Crédit : Wikimedia Commons

Charles HOPPER
Bomb, jeu d'échecs mécanique de l'électricité de Bristol Ch. Hopper, 1865

Koordinaten-Darste

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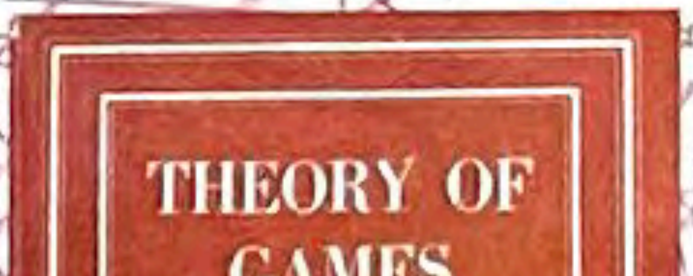
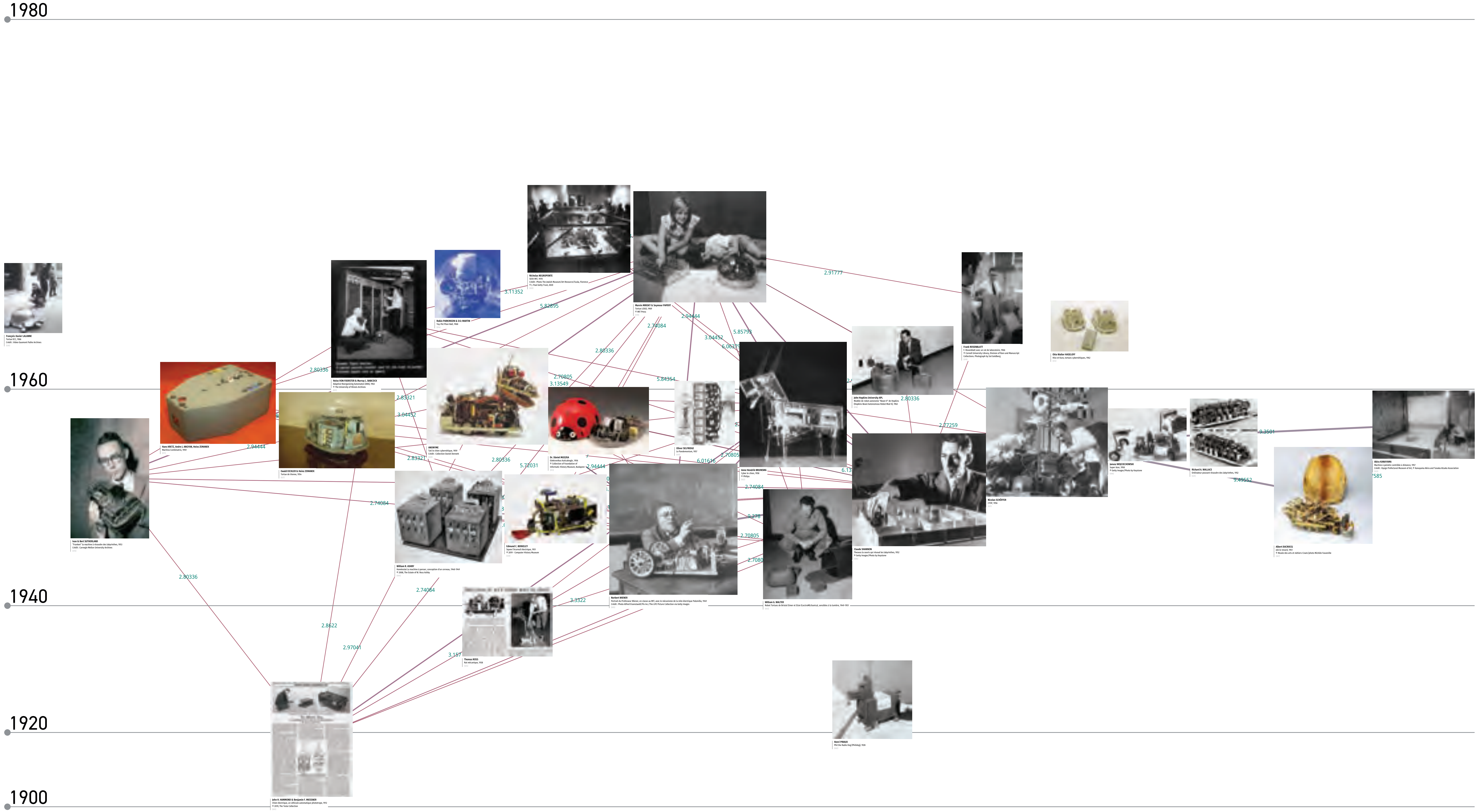
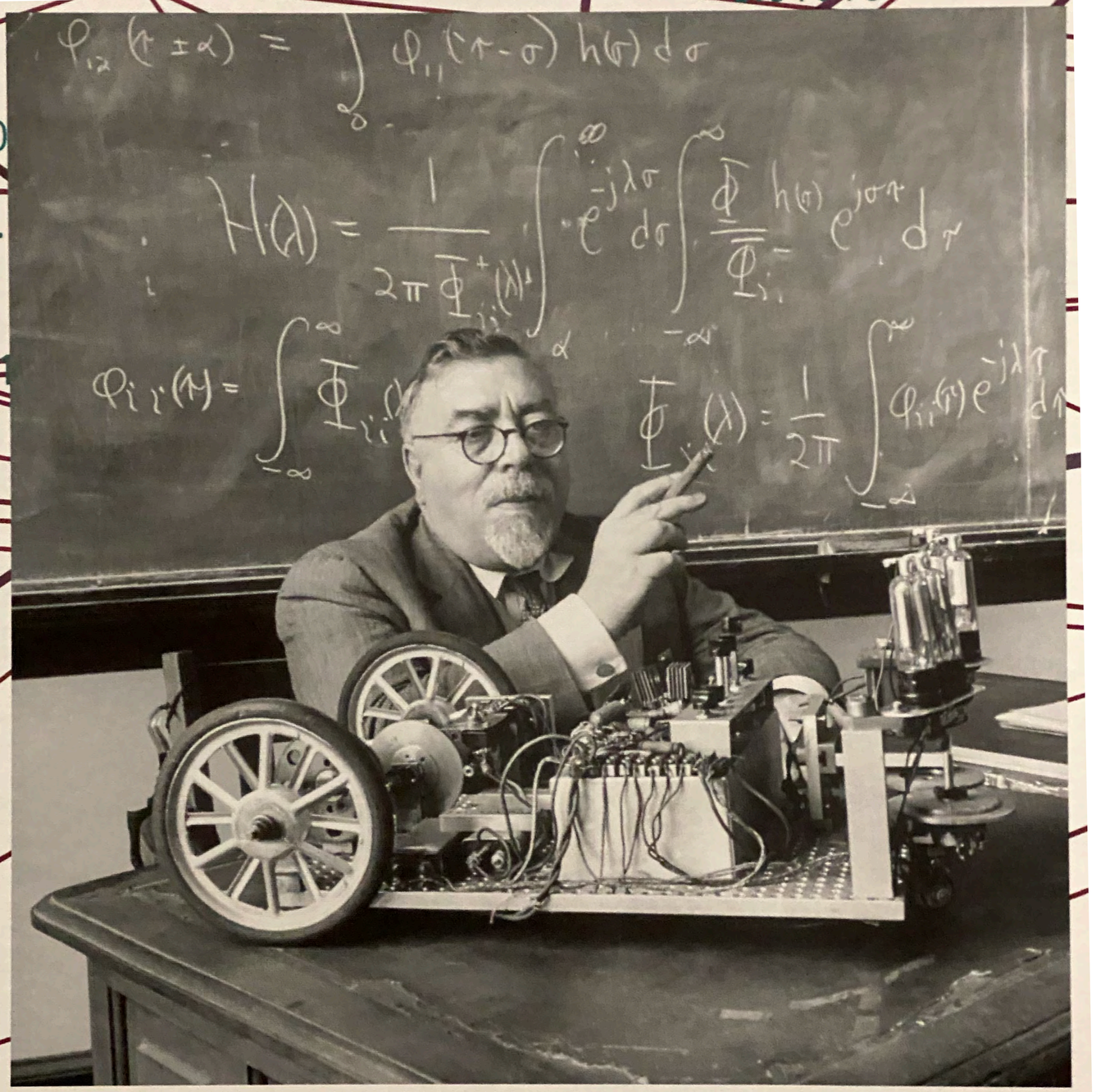
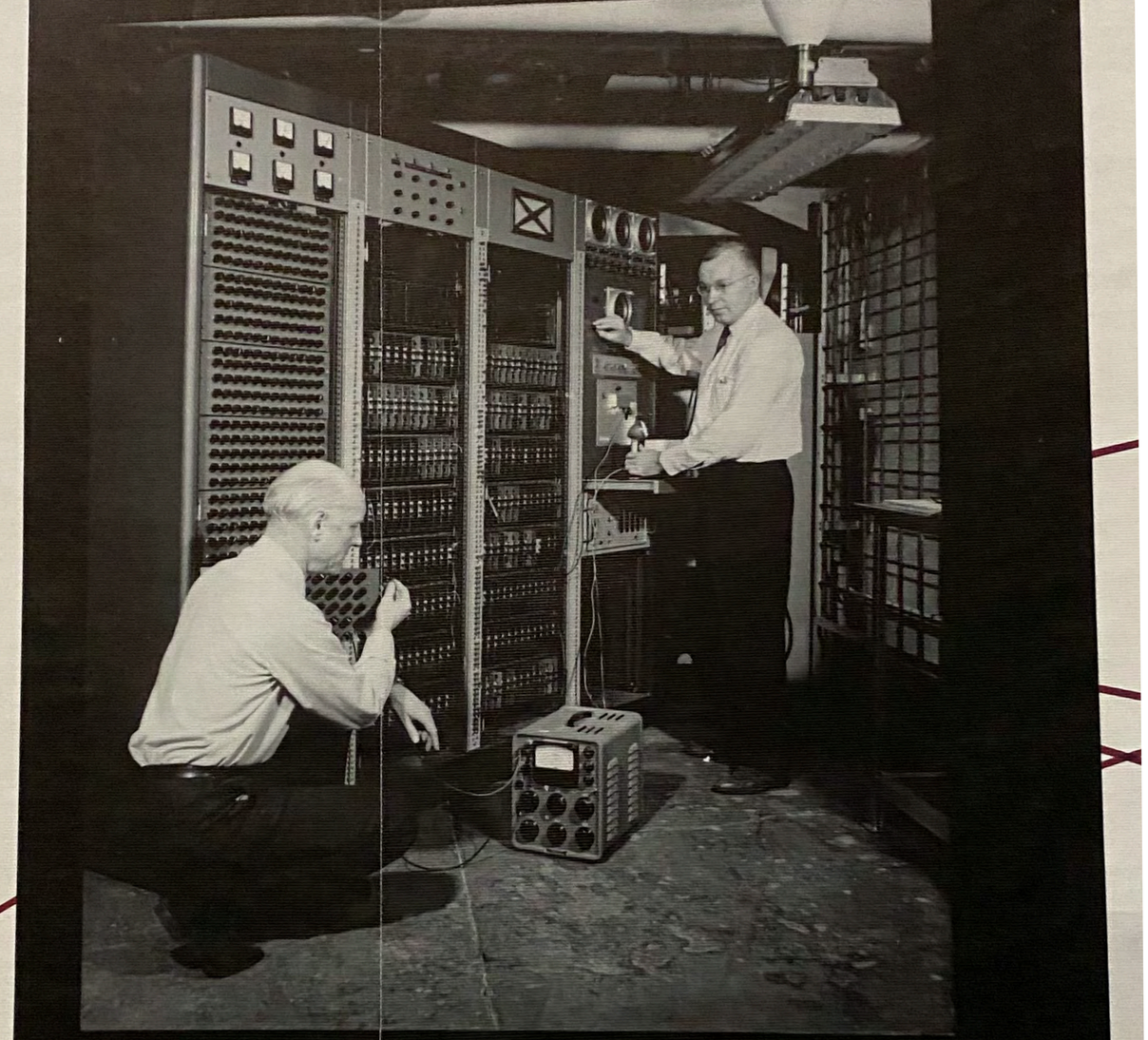


Graphe 3



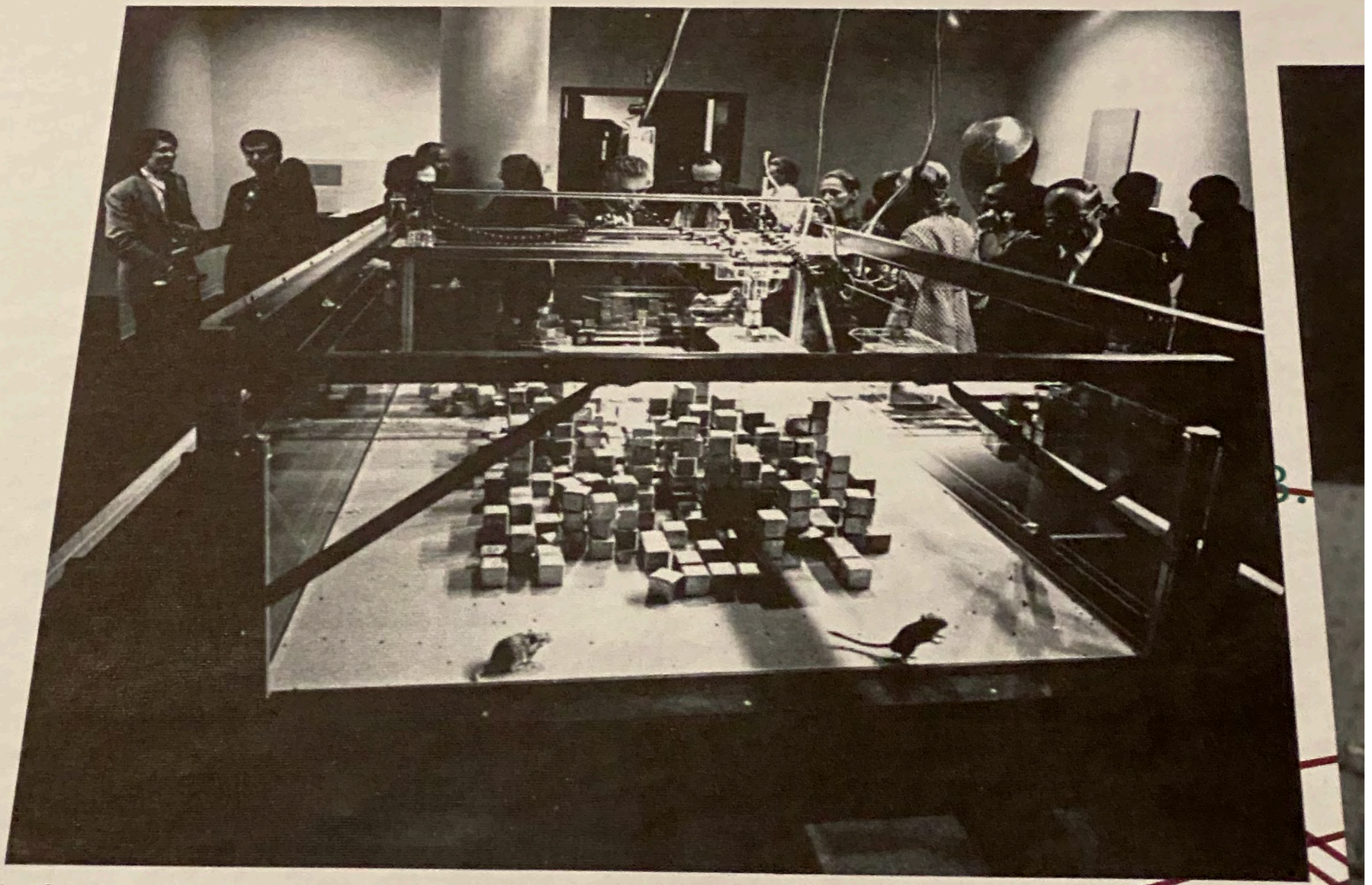


Norbert WIENER
Portrait du Professeur Wiener, en classe au MIT, avec le mécanisme de la mite électrique Palomilla, 1949
Crédit : Photo Alfred Eisenstaedt/Pix Inc./The LIFE Picture Collection via Getty Images

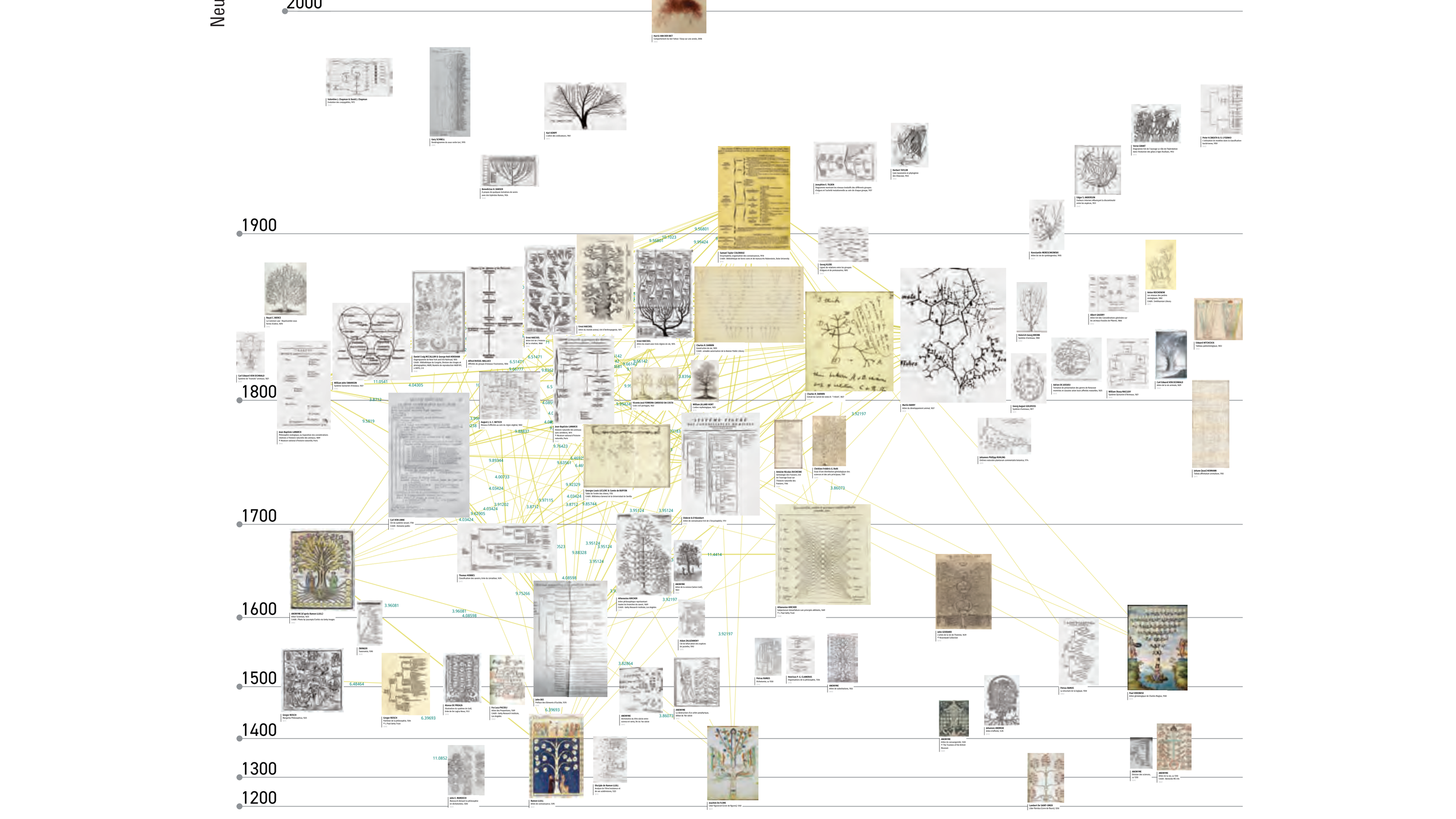


Dynamic Signal Analyzer.
A special purpose computer used for the study of pseudo-transient signals such as speech.

Heinz VON FOERSTER & Murray L. BABCOCK
Adaptive Reorganizing Automaton (ARA), 1963



Nicholas NEGROPONTE
SEEK MIT, 1970
Crédit : Photo The Jewish Museum/Art Resource/Scala, Florence


Neuf
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Harris VAN DER BIET
Comportement du bel Yahoo ! Ouvy sur une année, 2006
Valentine J. Chapman & Daniel J. Chapman
Evolution des conjugaisons, 1955
Gary SCHNELL
Arrondissement du sous-ordre lart, 1978
Karl KORPF
L'arbre des ordinateurs, 1961
Benedictus H. SINGER
A propos de quelques tentatives de savoir avec des hybrides flames, 70s
Peter N.SMEATH & G. LI'LEMKO
L'utilisation de modèles dans la classification bactérienne, 1959
Herbert TAYLOR
Cahn taxonomie et phylogénie des Dinocoon, 1942
Josephine E. TILDEN
Diagramme montrant les niveaux évolutifs des différents groupes d'algues et l'activité métabolomolé au sein de chaque groupe, 1917
Edgar S. ANDERSON
Facteurs internes influençant la discontinuité entre les espèces, 1953
Verne GRANT
Diagramme tiré de l'ouvrage La rôle de l'hybridation dans l'évolution des gilles à tiges feuillues, 1953
Peter N.SMEATH & G. LI'LEMKO
L'utilisation de modèles dans la classification bactérienne, 1959
Roy C. BEECE
Les Lemna Lap - Nouvelle(le sous forme d'arbre), 1878
Carl Edward VON ECHWALD
Système de "l'ovule" animaux, 1821
William John SWAINSON
Système Quinaire d'oiseaux, 1837
Daniel Craig MCCALLUM & George Holt HENSHAW
Diagramme de l'organisation de l'US Military Rail Road
Crédit : Bibliothèque du Congrès, Division des images et photographies, HAER, Numéro de reproduction HAER NY, 4-BATH, 2-4
Alfred RUSSEL WALLACE
Affinités de groupe d'oiseaux Passereaux, 1876
Ernst HAECKEL
Arbre tiré de L'histoire de la création, 1868
Ernst HAECKEL
Arbre du monde animal, Sitt d'anthropogenie, 1874
Ernst HAECKEL
Arbre du monde avec trois règnes de vie, 1874
Charles R. DARWIN
Grand arbre de vie, 1859
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Extrait du Carnet de notes B : "I think", 1837
Georg KLEBS
Lignes de relations entre les groupes d'algues et de protozoaires, 1892
Heinrich Georg BRONN
Système d'animaux, 1858
Georg August GOLDFUSS
Système d'animaux, 1837
Konstantin MERESCHKOWSKI
Arbre de vie de symbiogenèse, 1905
Albert GAUDRY
Arbre tiré des Considérations générales sur les animaux fossiles de Pikermi, 1866
Antoine ROCHEBRUNE
Les oiseaux des jardins zoologiques, 1882
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Tentative de présentation des genres de Rutacées montrées et classées selon leurs affinités naturelles, 1825
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Carl Edward VON ECHWALD
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Tableau paléontologique, 1851
Johann [Jean] HERMANN
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Code civil portugais, 1822
Thomas HOBBES
Classification des savoirs, tiré du Léviathan, 1676
ANONYME
Arbre de la science (selon Clad), 1651
Athanasius KIRCHER
Arbre philosophique représentant l'harmonie des différentes sciences, 1669
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Athanasius KIRCHER
Subterranei Orientalium cum principiis affixionis, 1669
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Arbre Scientiae, 1635
Crédit : Photo by Ipsumpix/Corbis via Getty Images
ZWINGER
Taxonomia, 1696
Gregor REISCH
Margarita Philosophica, 1525
Gregor REISCH
Partition de la philosophie, 1504
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Fra Luca PACIOLI
Arbre des Proportions, 1509
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Ramon LLULL
Arbre de connaissance, 1296
Disciple de Ramon LLULL
Analyse de l'Arbre Existence et de ses subdivisions, 1320
John E. MURDOCH
Manuscrit distant la philosophie et Alchimiens, 1984
ANONYME
Déclaration du XIVe siècle entre science et vertu, fin du 14e siècle
ANONYME
La destruction d'un arbre porphyrique, début du 14e siècle
Joachim De FLORE
Liber figurarum (Livre de figures), 1200
Petrus RAMUS
Dichotomie, ca 1550
Henricus P. G. CLAMERIUS
Organisation de la philosophie, 1556
ANONYME
Arbre de subordination, 1502
Adam ZALUZANSKY
Clé de bifurcation des espèces de plantes, 1592
ANONYME
Arbre de la vie, ca 1550
Crédit : Bonacia MS 446
Lambert De SAINT-OMER
Liber floridus (Livre de fleurs), 1250
Johannes HEDIGIUS
Arbre d'affinité, 1478
Petrus RAMUS
La structure de la logique, 1550
Paul VERONESE
Arbre géométrique de Charles Magius, 1598
John GODDARD
L'arbre de la vie de Thomme, 1639
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ANONYME
Arbre en cartouche(mêlé), 1602
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ANONYME
Structure des sciences, ca 1550
ANONYME
Arbre de la vie, ca 1550
Crédit : Bonacia MS 446
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Frédéric Migayrou
Co-Curator of the Exhibition
& Deputy Director
Centre Pompiou

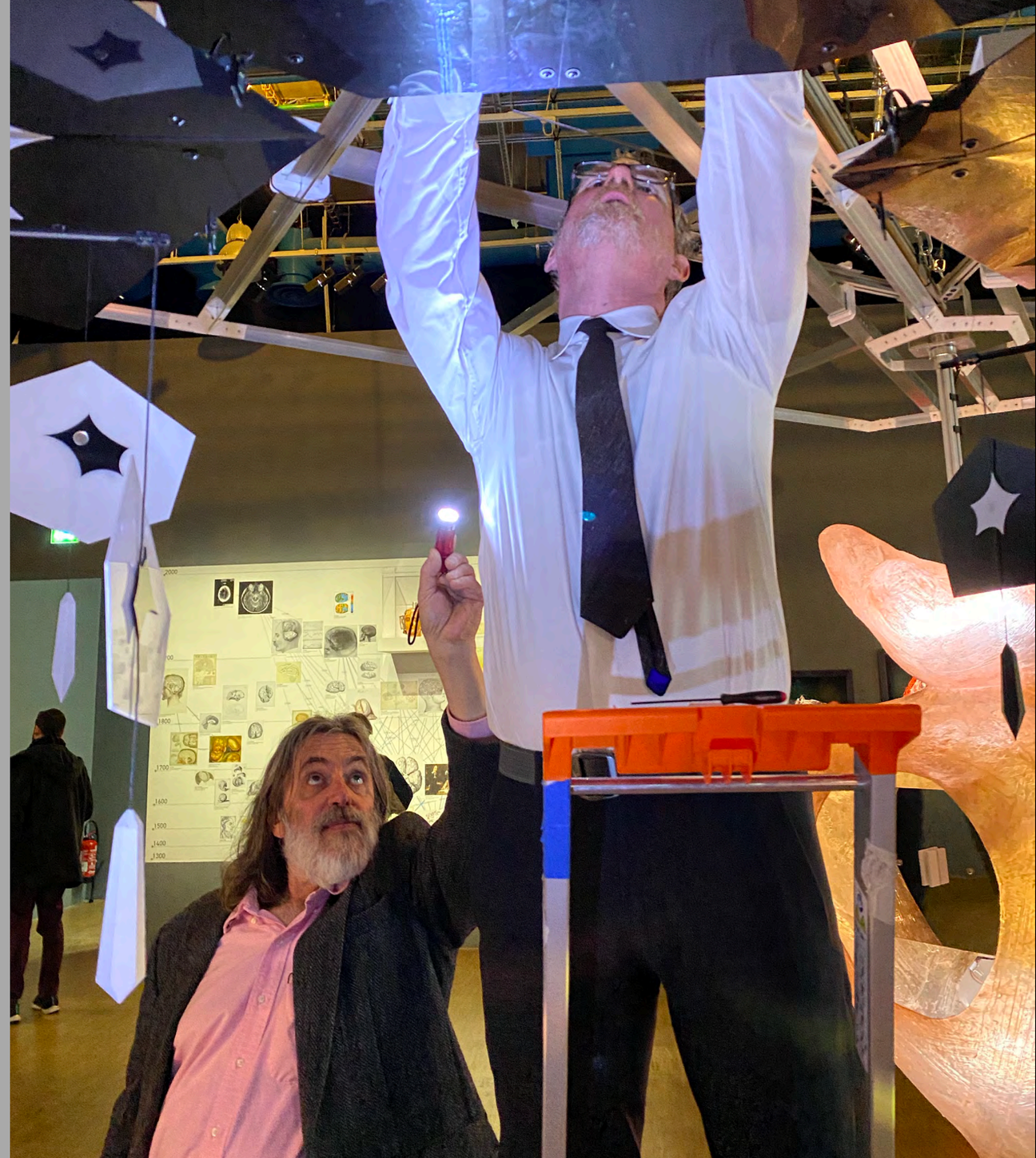

Centre
Pompidou
Exposition 28
Anonyme
DIR.PROD

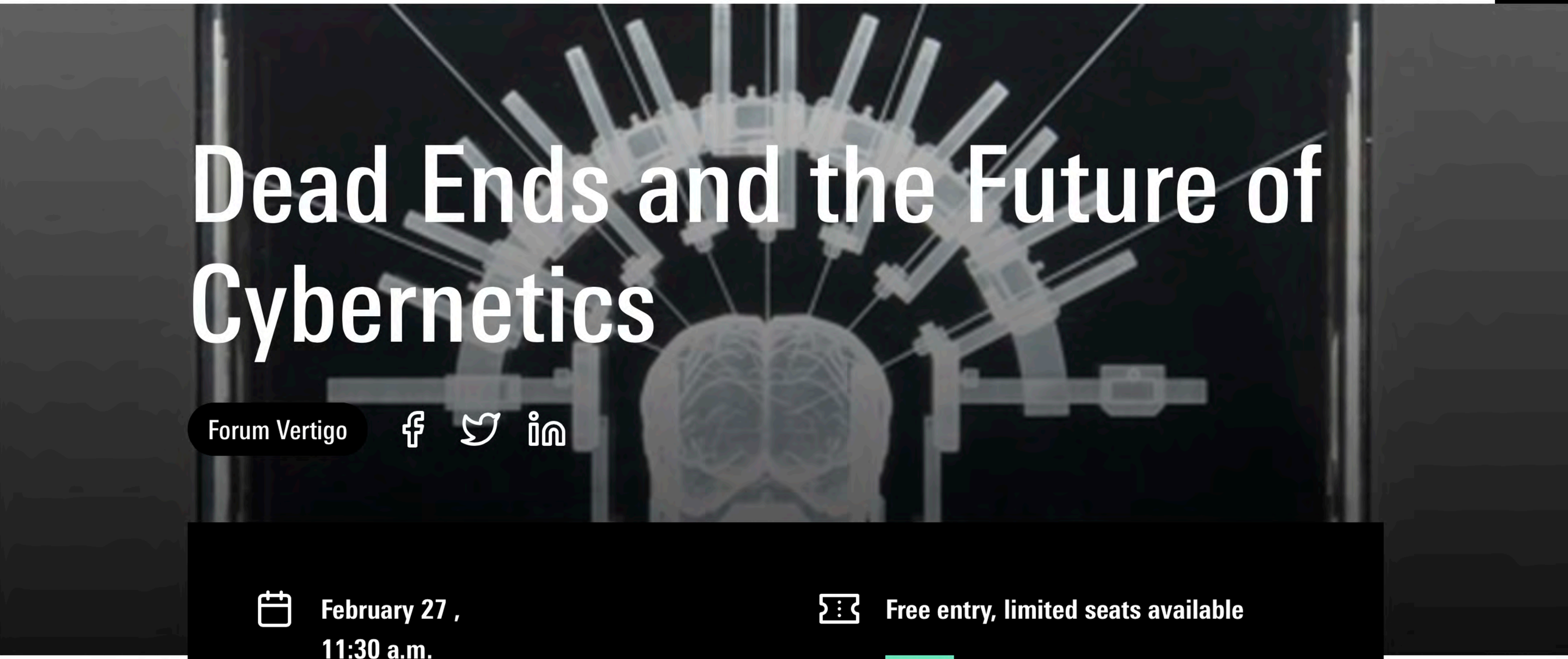
« Neurones, les intelligences simulées » témoigne de la co ches d'artistes, d'architectes, de designers et de musiciens da ntelligence artificielle et du Deep Learning [apprentissage profond] av pées par les grands laboratoires scientifiques ou ceux du monde industr scrit l'ensemble de ces recherches dans une relation étroite avec une hist gence Artificielle, qui se déploie depuis une cinquantaine d'années. E évolution constante de l'usage des réseaux neuronaux dans le d e de recherches scientifiques, industrielles ou ation.

Cinq graphes structurent le parcours de rences historiques différents à partir d'une chr d'entre eux. Le premier graphe s'attac e vue historique. Le deuxième souligne l computationnel pour la logique du jeu sion. Intitulé « cyberzoo », le troisième grap de robots mobiles interagissant avec leur de l'esprit et rend compte de la simulta les facultés cognitives. Quant à la cinqu aux classifications de la connaissance so neurones, montrant l'importance de l'hist dans le déploiement de l'Intelligence Artifi

"Neurons, simulated intelligences" highlights the ongoing research between the work of artists, architects, designers and musicians in the realm of artificial intelligence and deep learning, and developments in this f by major scientific and industrial laboratories. The project gathe this research together and closely relates it to development of intelligence over a fifty-year period. Therefore, it acts as an upd constantly-evolving ways in which neural networks are used in whether for scientific or industrial research or in relation to differe fields.

The exhibition itinerary is organised around five graphs, representi different fields of historical references based on a timeline of inn specific to each field. The first graph deals with historical depictio brain. The second underlines the ongoing inter of computing i gaming logic and its interpretation v The third "cyberzoo", addresses cybernetics and the mobi interact with their environment. The fourth examin mind and charts the research into cognitive faculties t simultaneously by artists and the military. The fifth and final devoted to the categorisation of knowledge in the form of trees of neural networks, demonstrating the importance of the histor imulations and logic in the development of artificial intelligence.





Dead Ends and the Future of Cybernetics

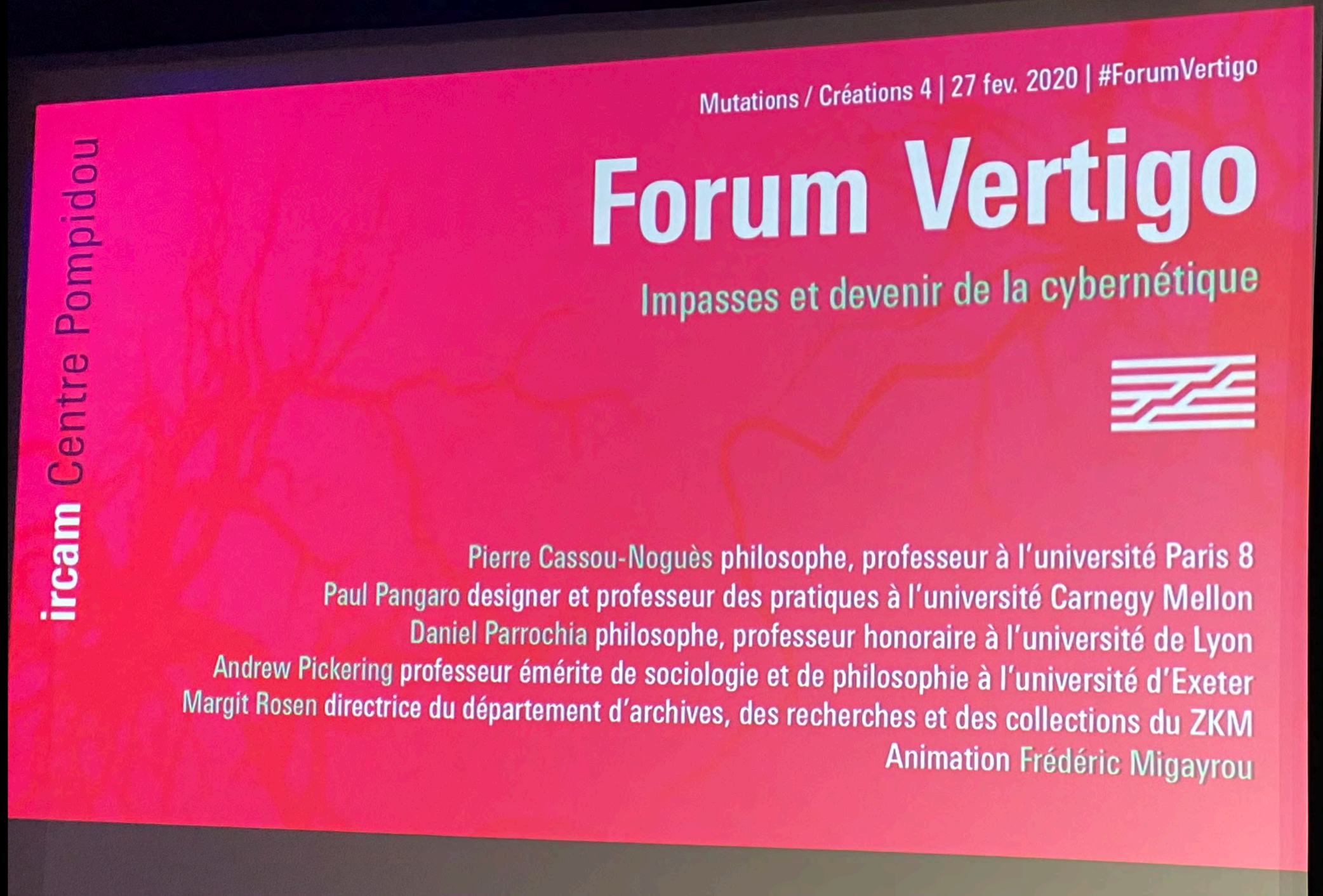
Forum Vertigo

February 27 ,
11:30 a.m.

Free entry, limited seats available

Free

Centre Pompidou, Petite salle
Access plan


ircam Centre Pompidou
Mutations / Créations 4 | 27 fev. 2020 | #ForumVertigo
Forum Vertigo
Impasses et devenir de la cybernétique
Pierre Cassou-Noguès philosophe, professeur à l'université Paris 8
Paul Pangaro designer et professeur des pratiques à l'université Carnegy Mellon
Daniel Parrochia philosophe, professeur honoraire à l'université de Lyon
Andrew Pickering professeur émérite de sociologie et de philosophie à l'université d'Exeter
Margit Rosen directrice du département d'archives, des recherches et des collections du ZKM
Animation Frédéric Migayrou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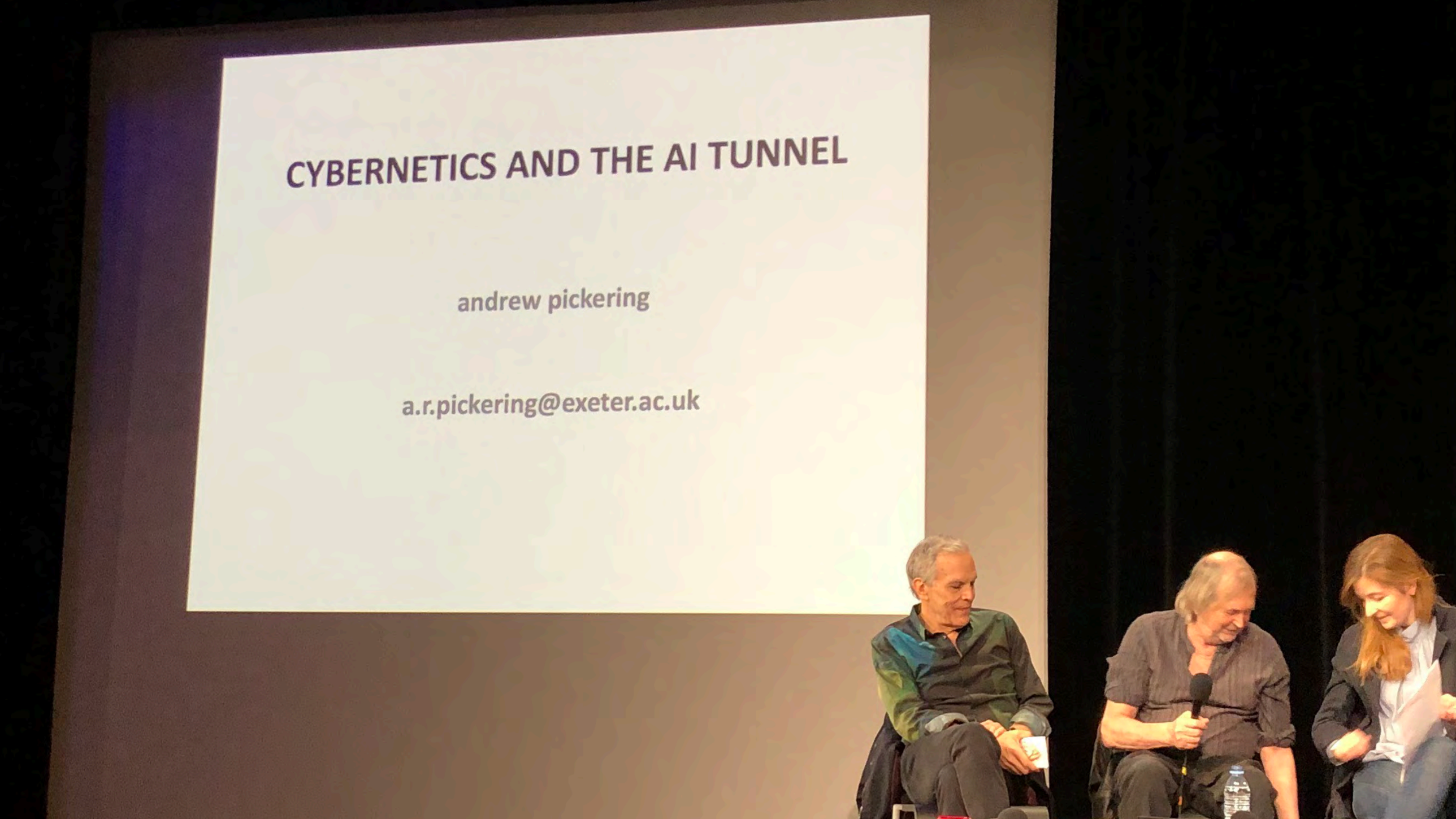
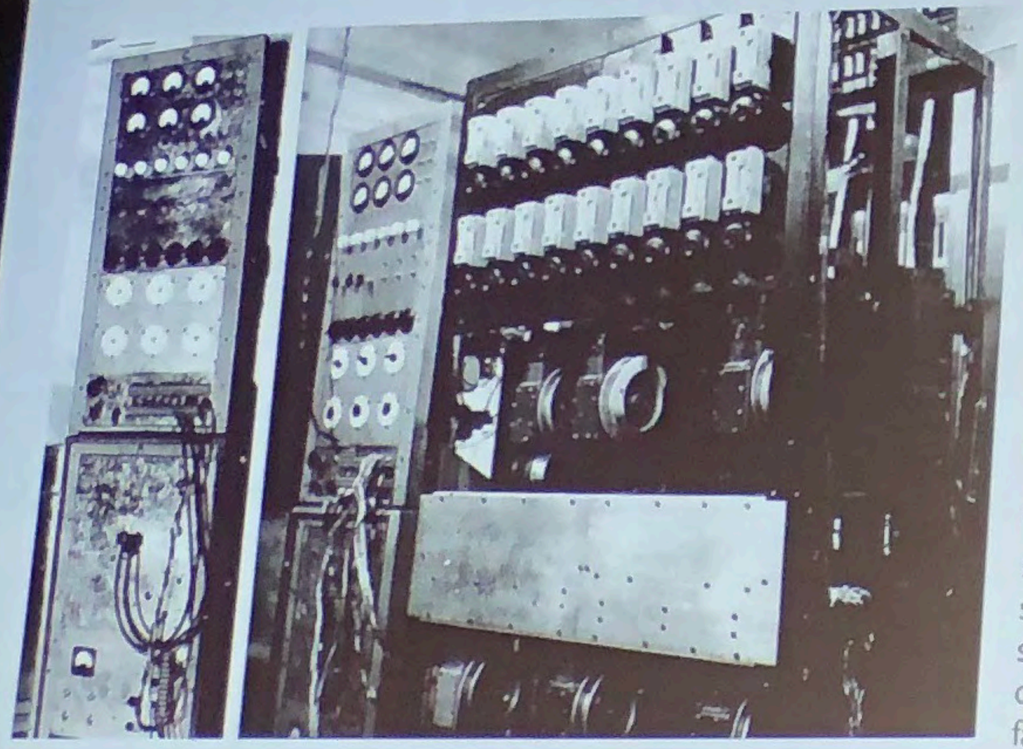
Margit Rosen directrice du département d'archives, des recherches et des collections du ZKM
Animation Frédéric Migayrou
ircam Centre Pompidou
Vertigo
Intelligence artificielle et création artistique
Artificial Intelligence and Artistic Creation
lenovo


CYBERNETICS AND THE AI TUNNEL
andrew pickering
a.r.pickering@exeter.ac.uk

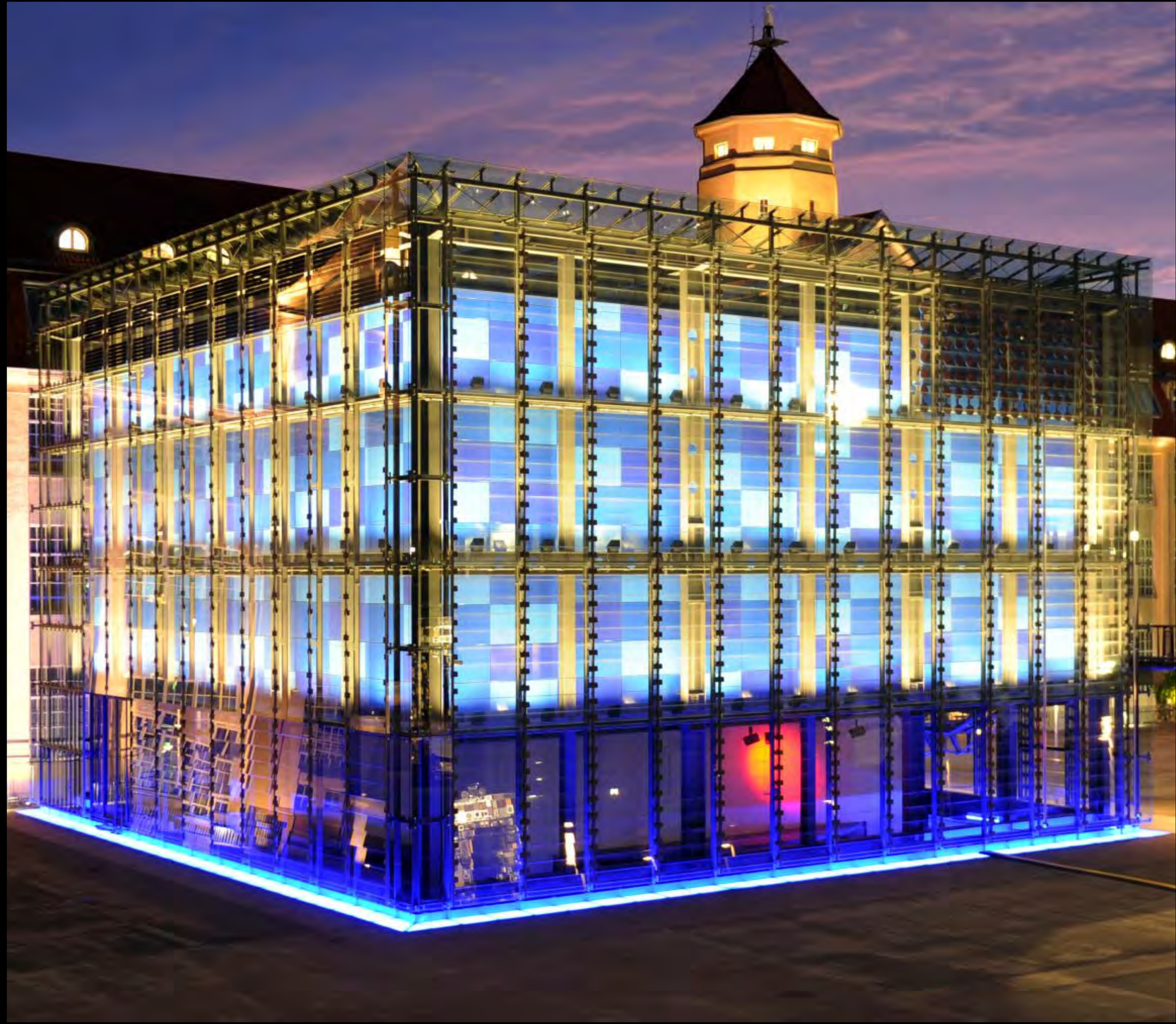


Gordon Pask, Musicolour, 1953–1957
machine and servo dimmer board

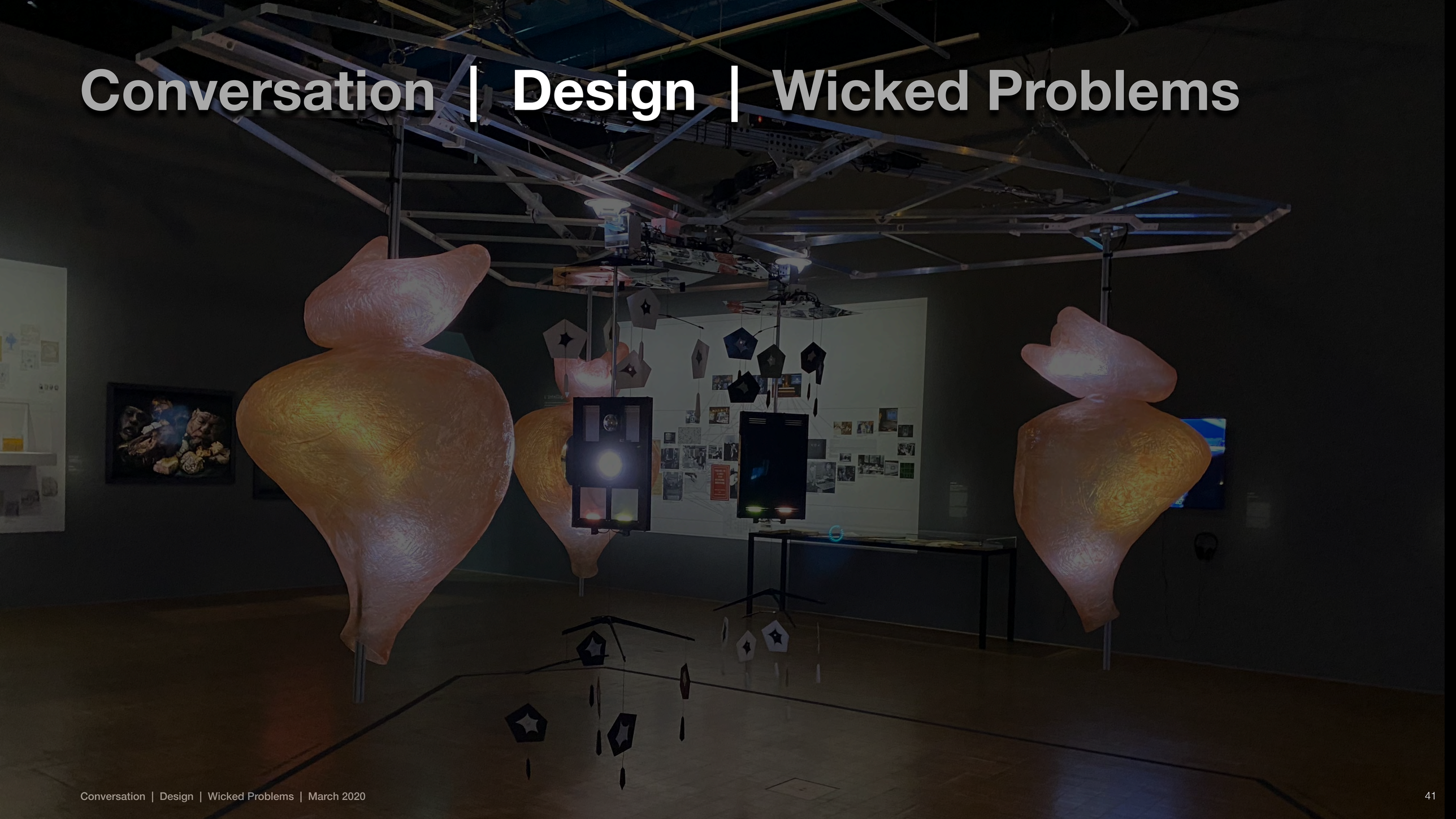
"Whereas most computors are designed to solve a problem according to a set of instructions, this particular system is revolutionary because it functions as a dummy partner for [the pianist] and it has, quite literally, all the properties of a living organism.. The organism grows as a function of [the pianist's] performance."

"Alors que la plupart des ordinateurs sont conçus pour résoudre un problème selon un ensemble d'instructions, ce système particulier est révolutionnaire car il fonctionne comme un partenaire factice pour [le pianiste] et il possède, littéralement, toutes les propriétés d'un organisme vivant. L'organisme se développe en fonction des perfo[illegible]es [du pianiste]."

Colloquy will enter the
permanent collection of
ZKM Museum of Art and Media
Karlsruhe, Germany



Conversation | Design | Wicked Problems



Gordon Pask, inventor of the work, in front of a male mobile of his own design

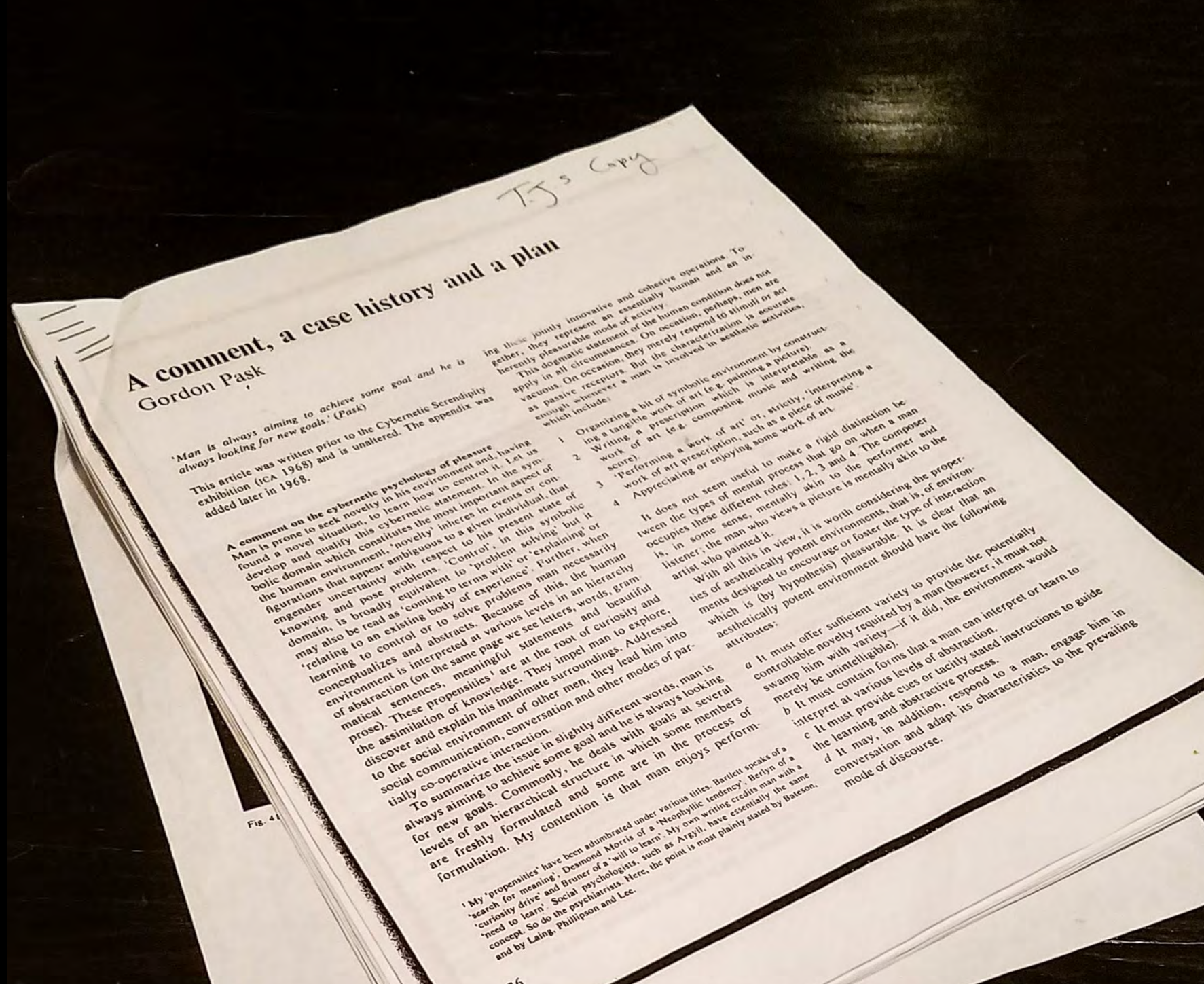
Yolanda Sonnabend, prominent theatre and ballet designer for the Royal Ballet, designer of Colloquy’s female mobiles

Pask Photo: Gordon Pask Archive
University of Vienna

Beginning from the historical record written before Colloquy was created

"A comment, a case history, and a plan" by Gordon Pask

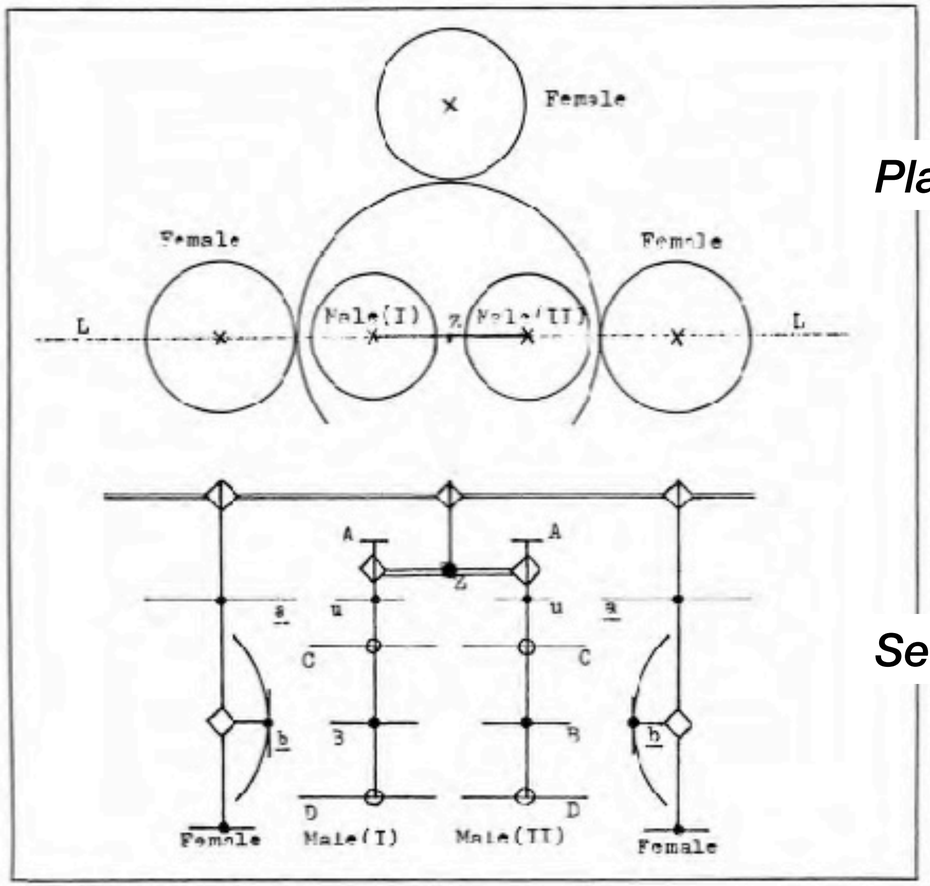
In *Cybernetics, Art and Ideas*
Jasia Reichardt, editor
Published 1971



Schematic diagram of the mobiles written before Colloquy was created

"A comment, a case history, and a plan" by Gordon Pask

In *Cybernetics, Art and Ideas*
Jasia Reichardt, editor
Published 1971



Plan View

Section View

Fig. 34 A rough sketch of powered mobiles.
a Horizontal plan
b Vertical section taken through line *L* in horizontal plan.
A = drive state display for male
B = main body of male, bearing 'energetic' light projectors *O* and *P*
C = upper 'energetic' receptors
D = lower 'energetic' receptors
U = non 'energetic', intermittent signal lamp
a = female receptor for intermittent positional signal
b = vertically movable reflector of female
Z = bar linkage bearing male I and male II

= Drive motor
= Free coupling
= Fixed coupling
= Bar linkage

Flowcharts of mobile behaviors
written before Colloquy was created

"A comment, a case history, and a plan"
by Gordon Pask

In *Cybernetics, Art and Ideas*
Jasia Reichardt, editor
Published 1971

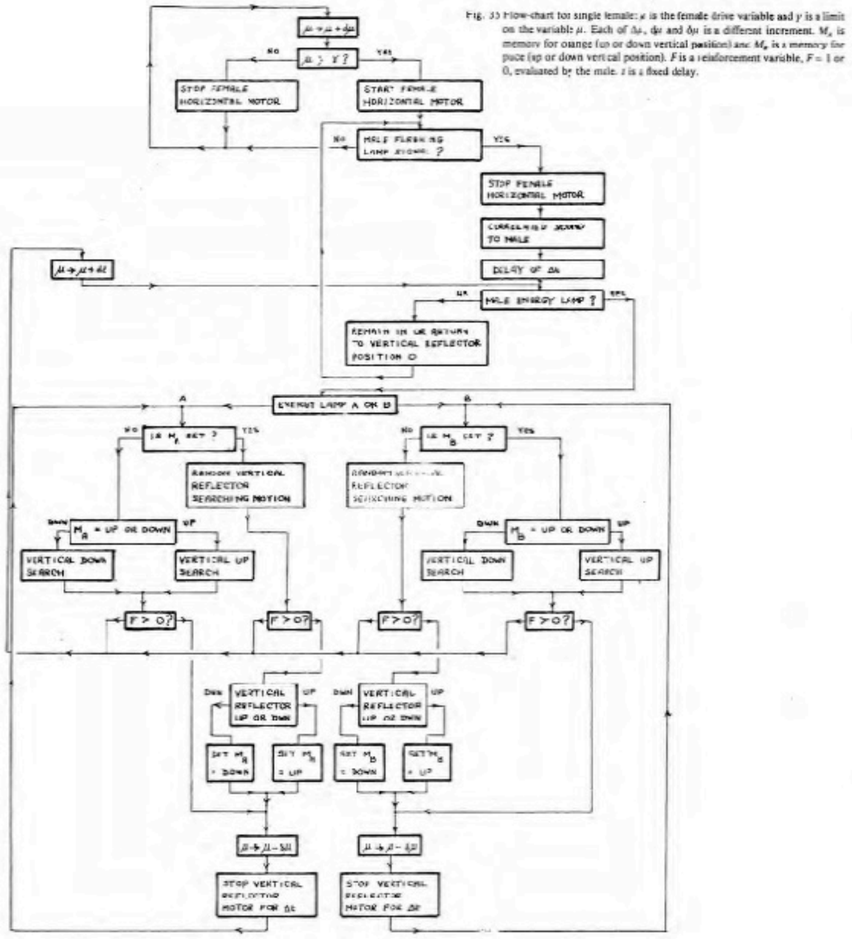
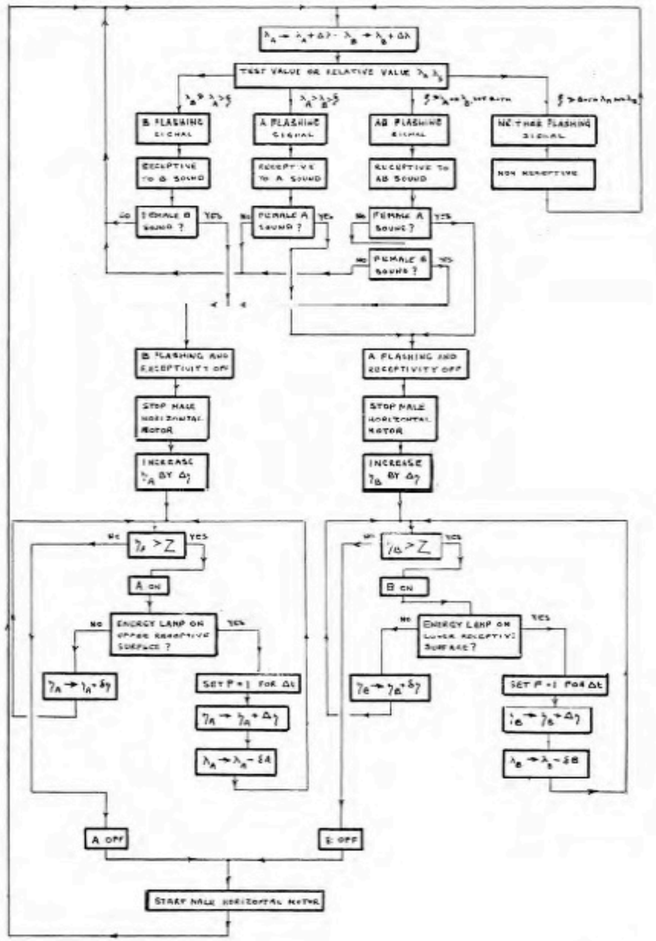
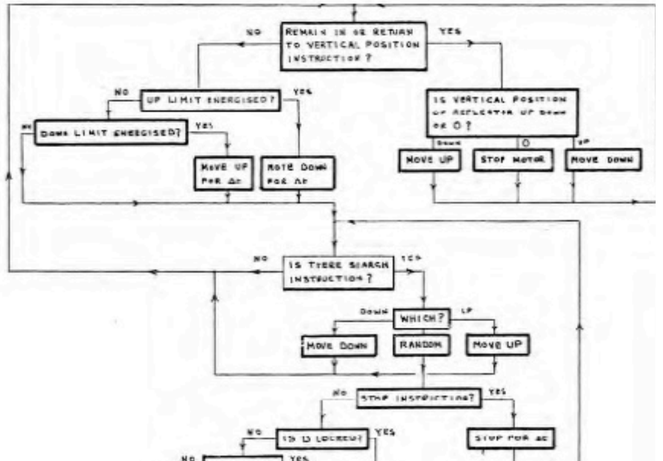
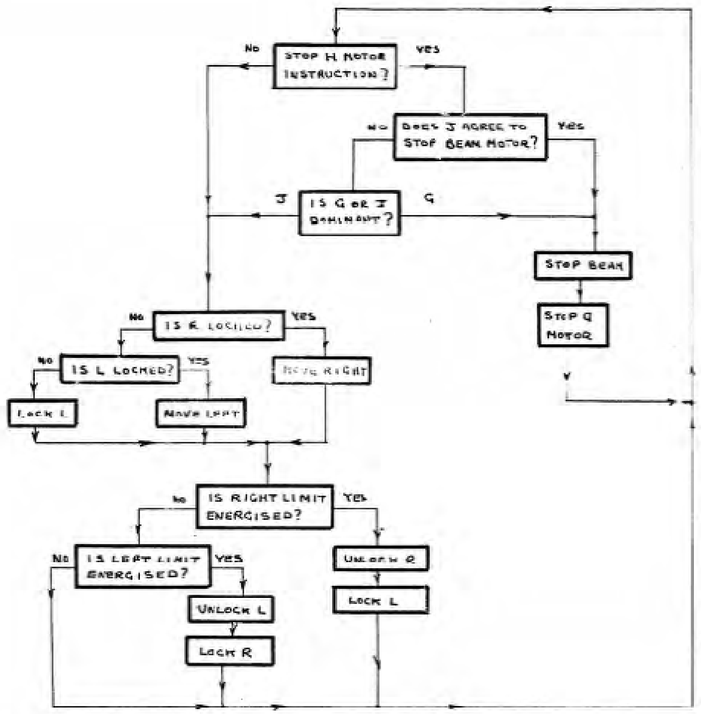
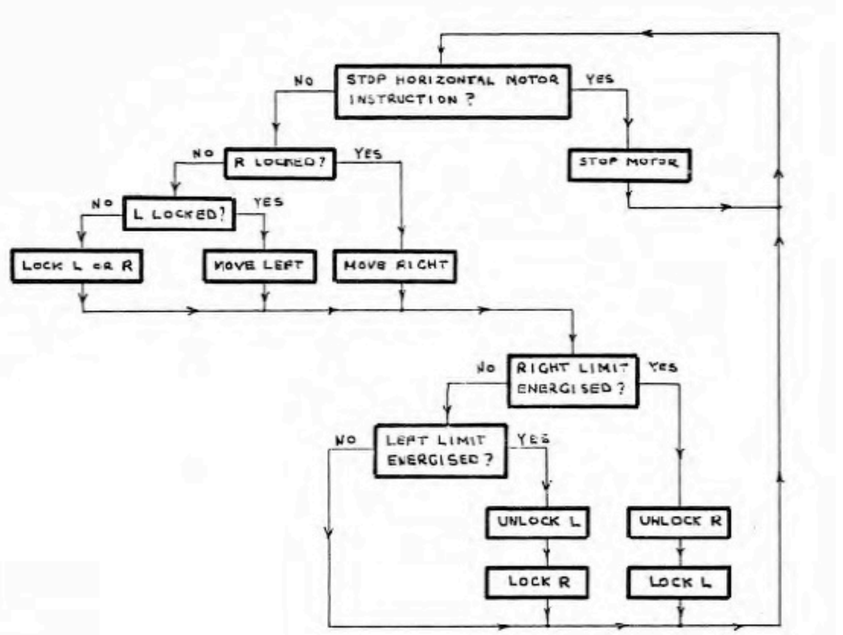


Fig. 33 Flow-chart for single female: μ is the female drive variable and y is a limit on the variable μ. Each of $\Delta\mu$, $\delta\mu$ and $\delta\mu$ is a different increment. M_y is memory for orange (up or down vertical position) and M_x is a memory for puce (up or down vertical position). F is a reinforcement variable, $F = 1$ or 0, evaluated by the male. τ is a fixed delay.









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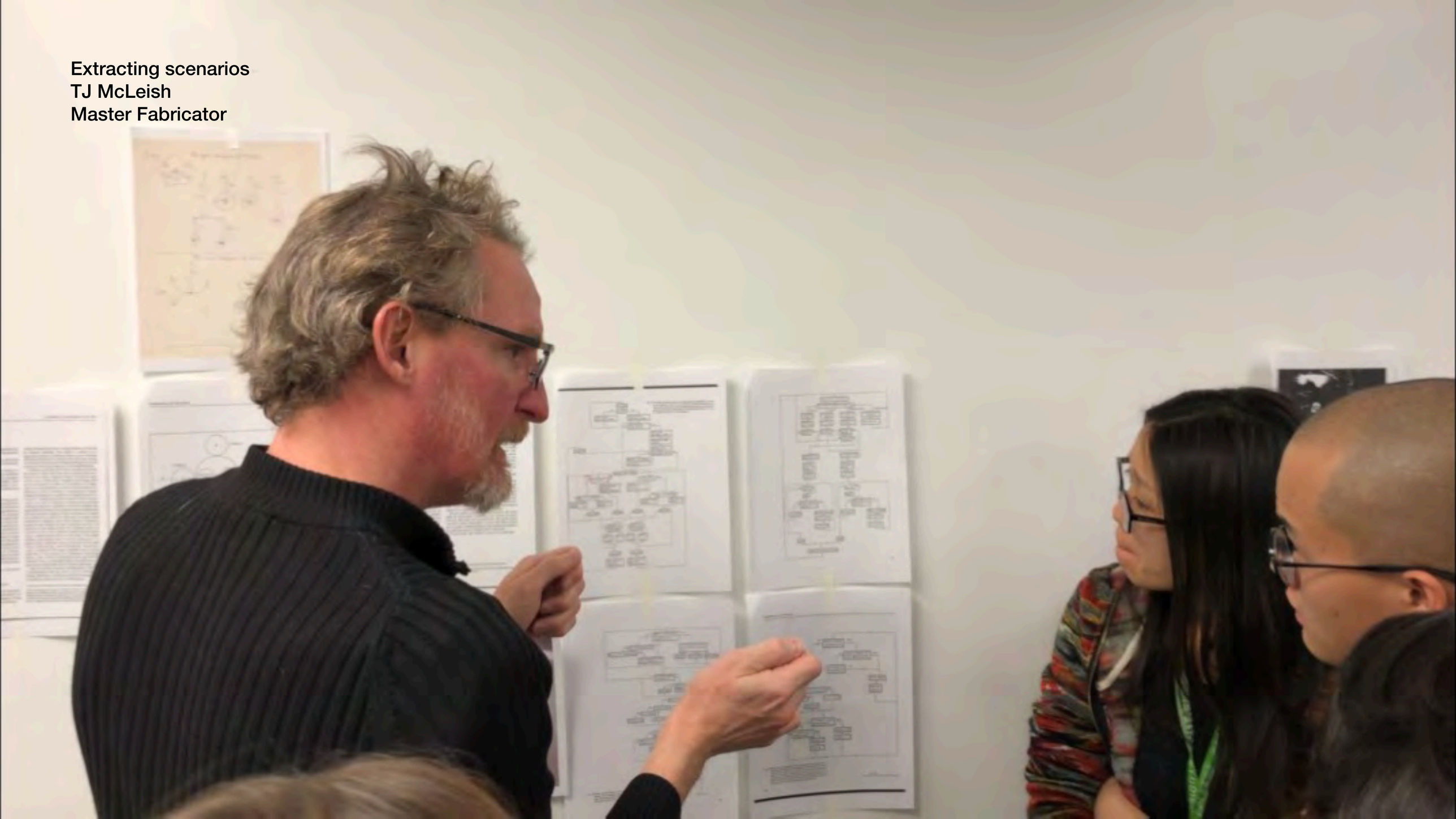
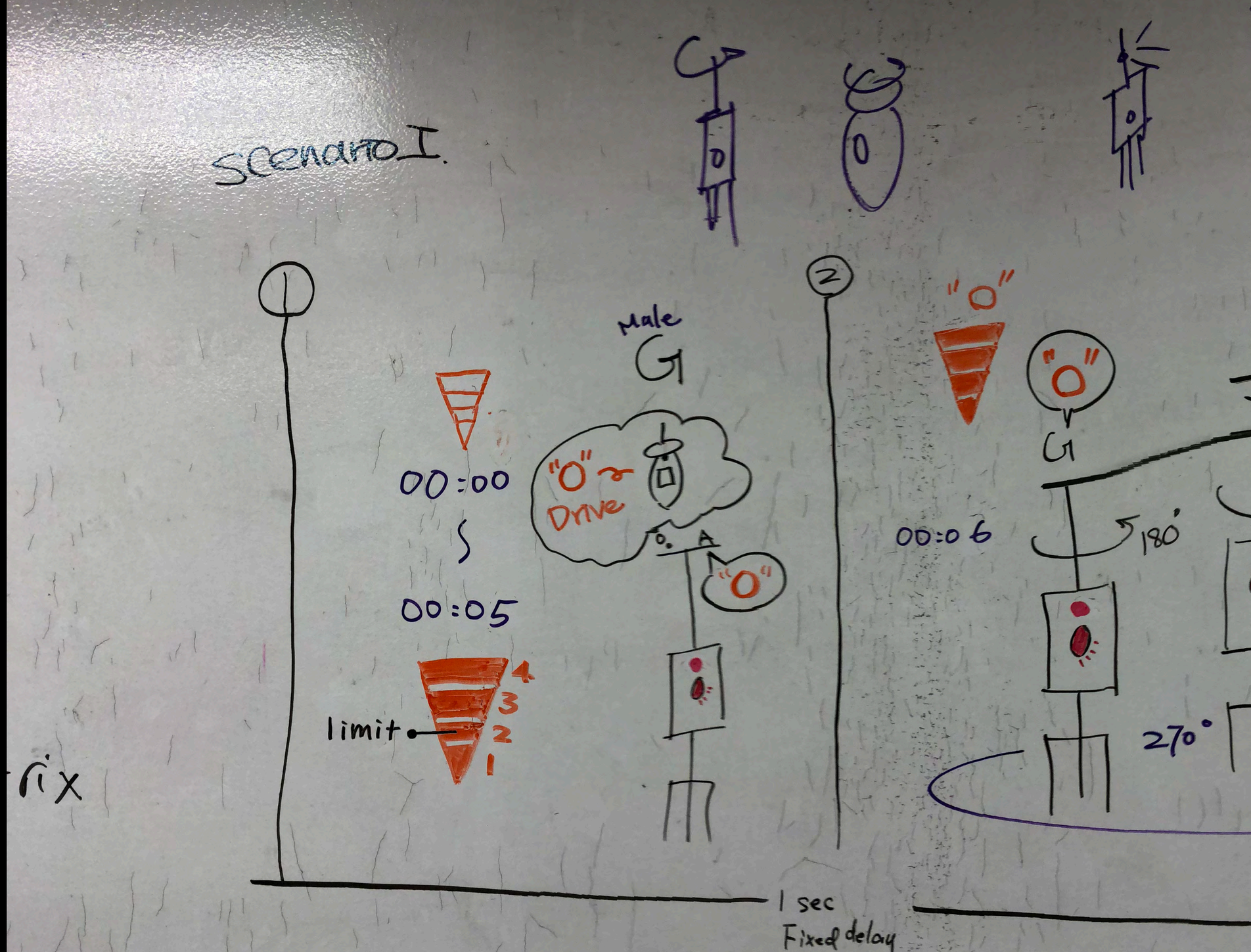
College for Creative Studies

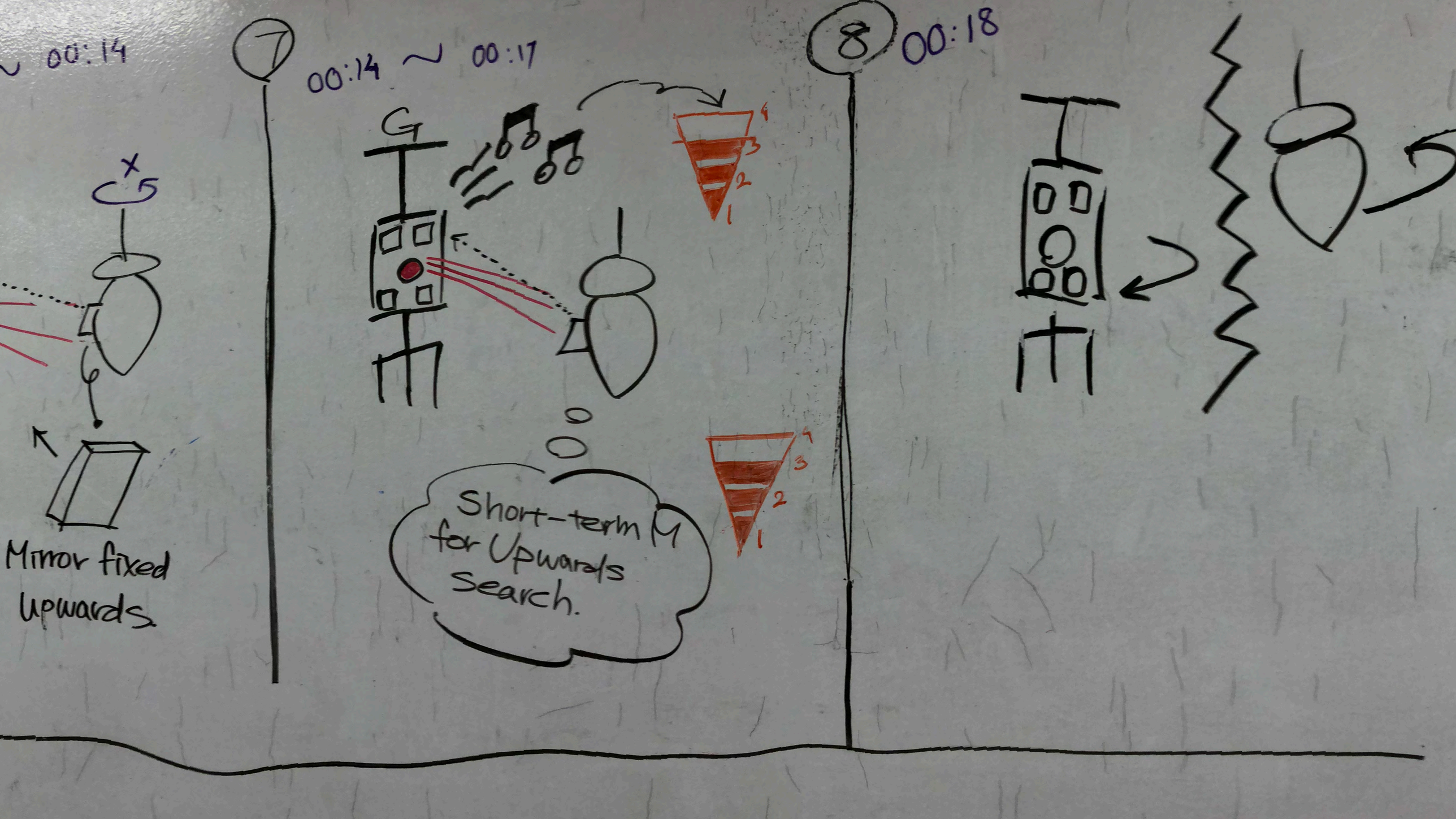
Studio IV
Immersive Interactive Experiences

Extracting scenarios
TJ McLeish
Master Fabricator



Extracting scenarios

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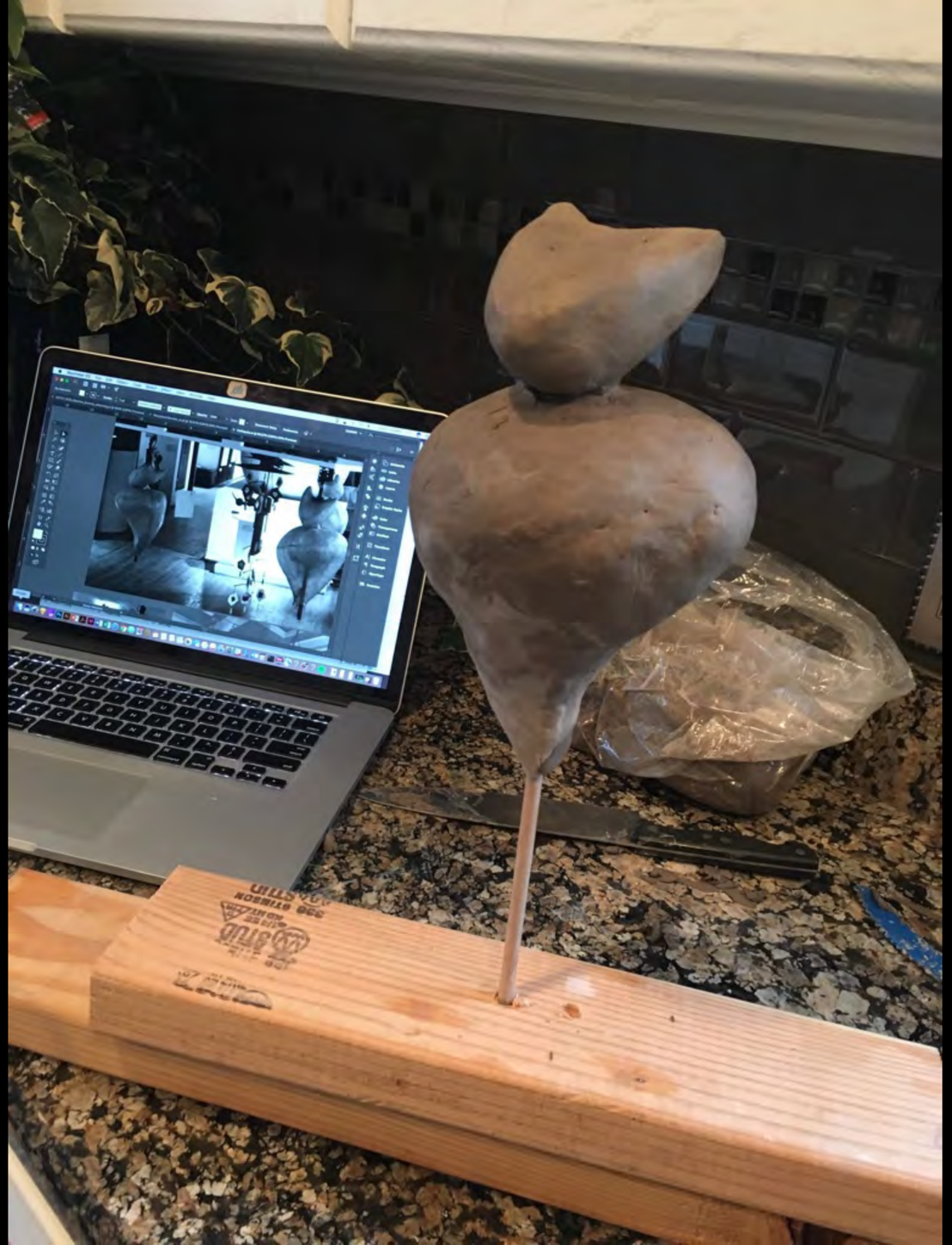
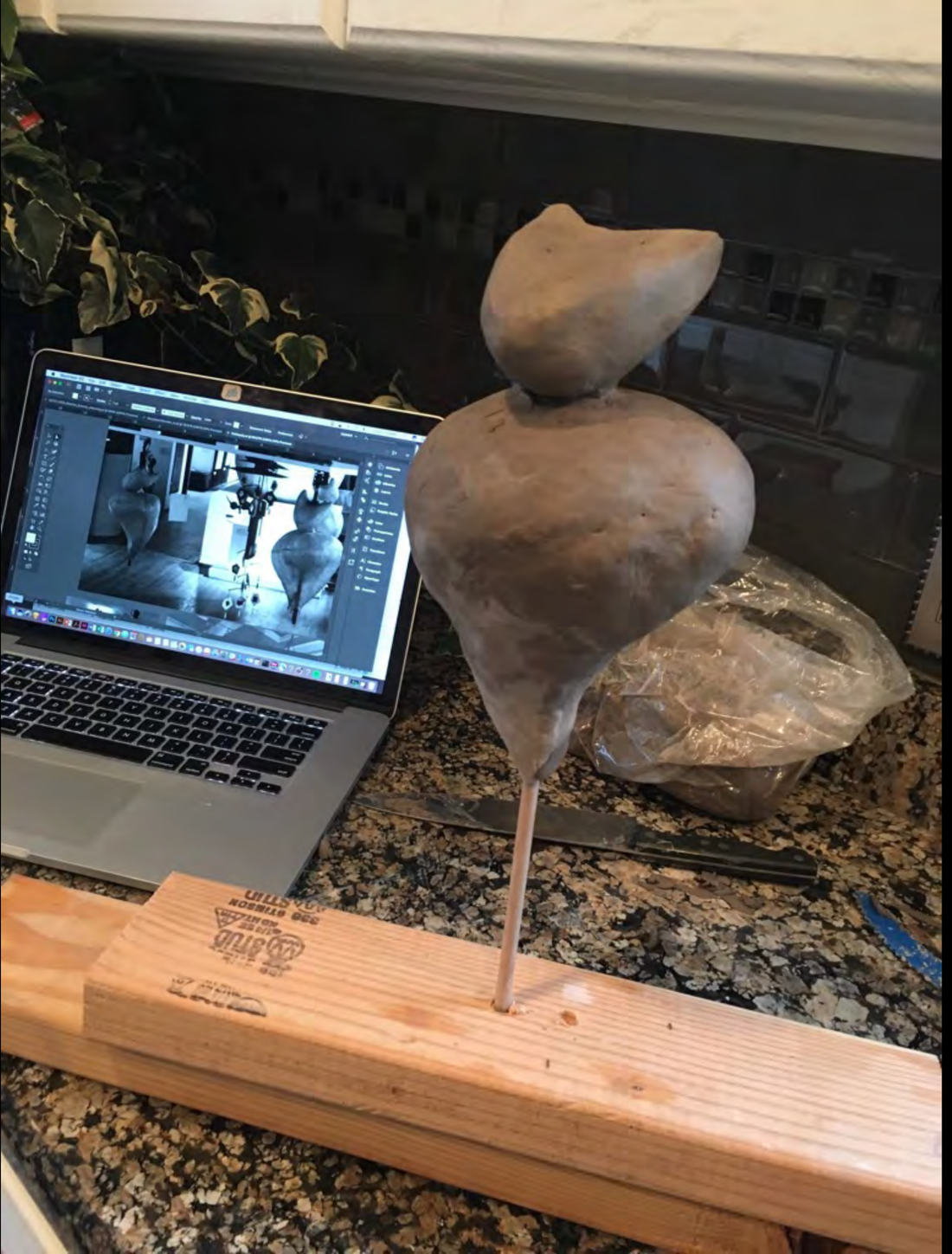
Short-term G for Upwards search.
Mirror fixed upwards.

Role-playing mobile behaviors

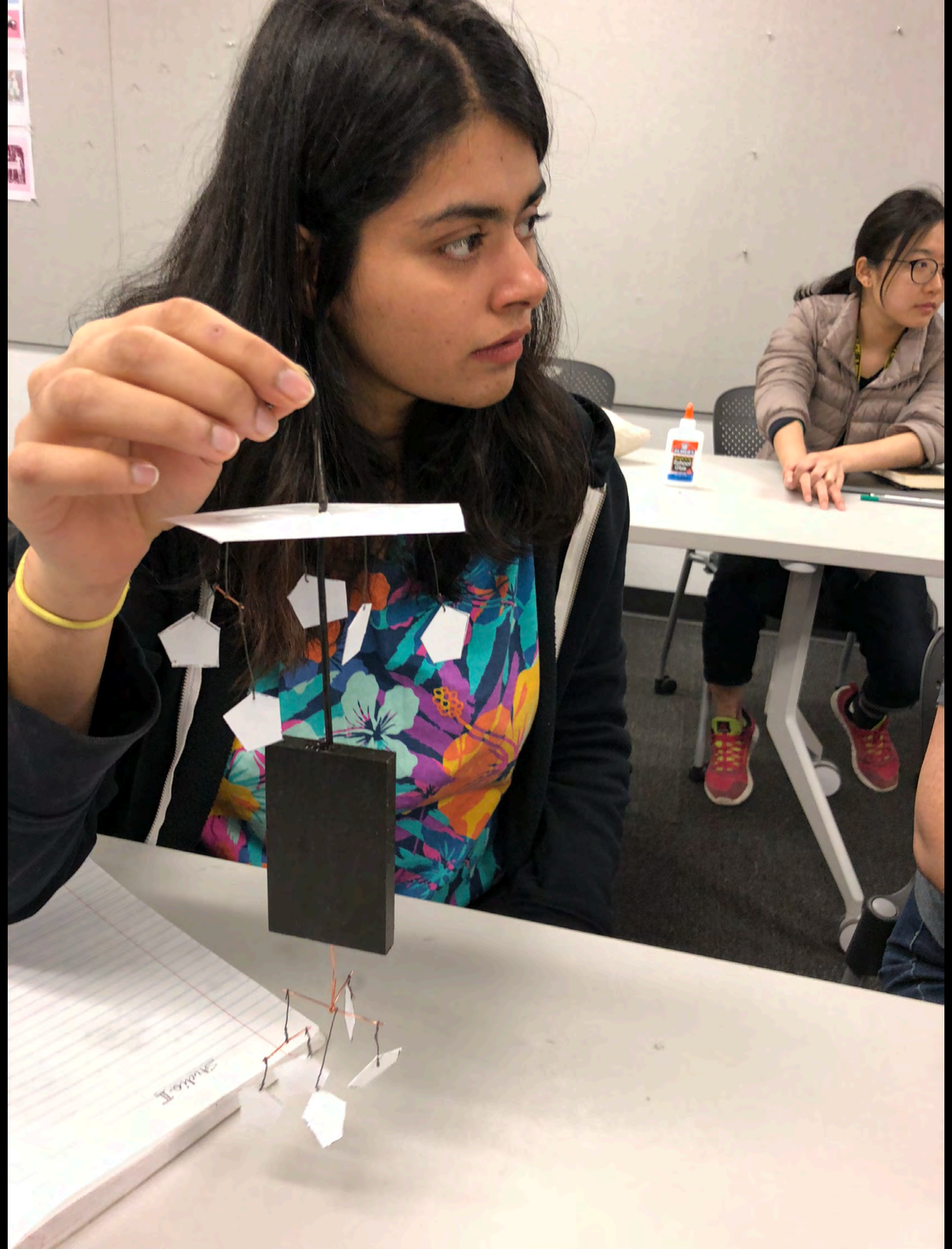
Enter the students
MFA Interaction Design Program
College for Creative Studies

Studio II
Prototyping & Internet of Things





Building the 1/6 scale model
Khyati Shah, MFA IxD Class of 2019



Pask's schematic drawing (before building Colloquy)
1968

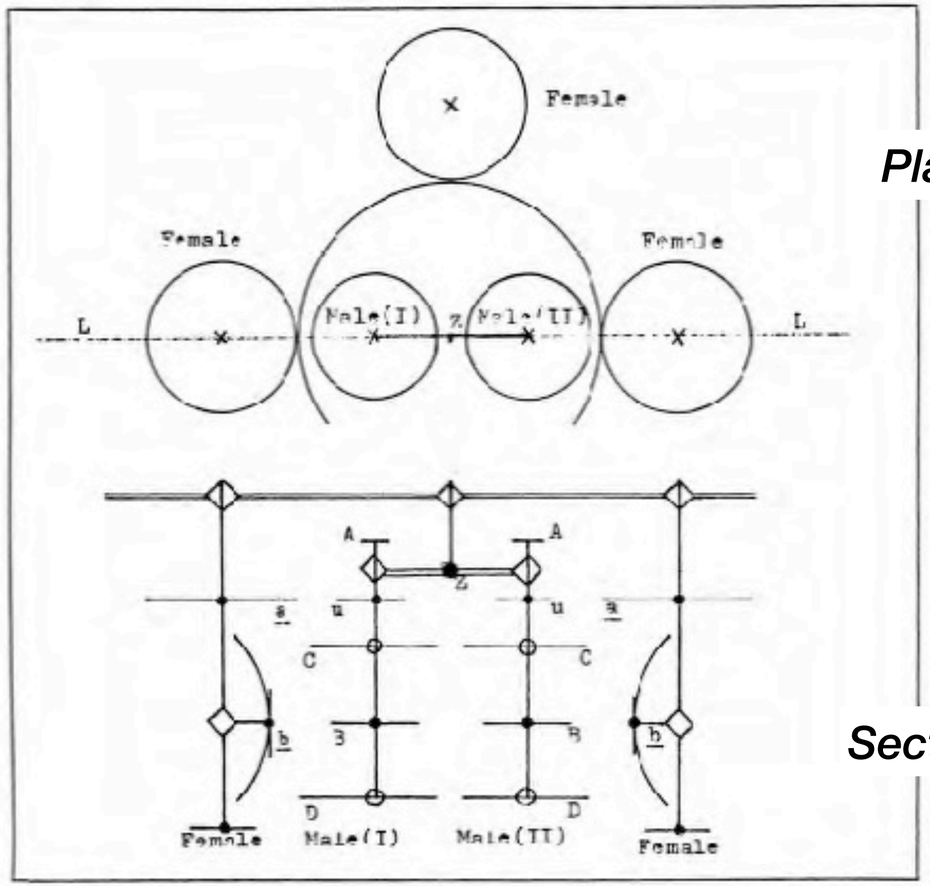


Fig. 34 A rough sketch of powered mobiles.
a Horizontal plan
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A = drive state display for male
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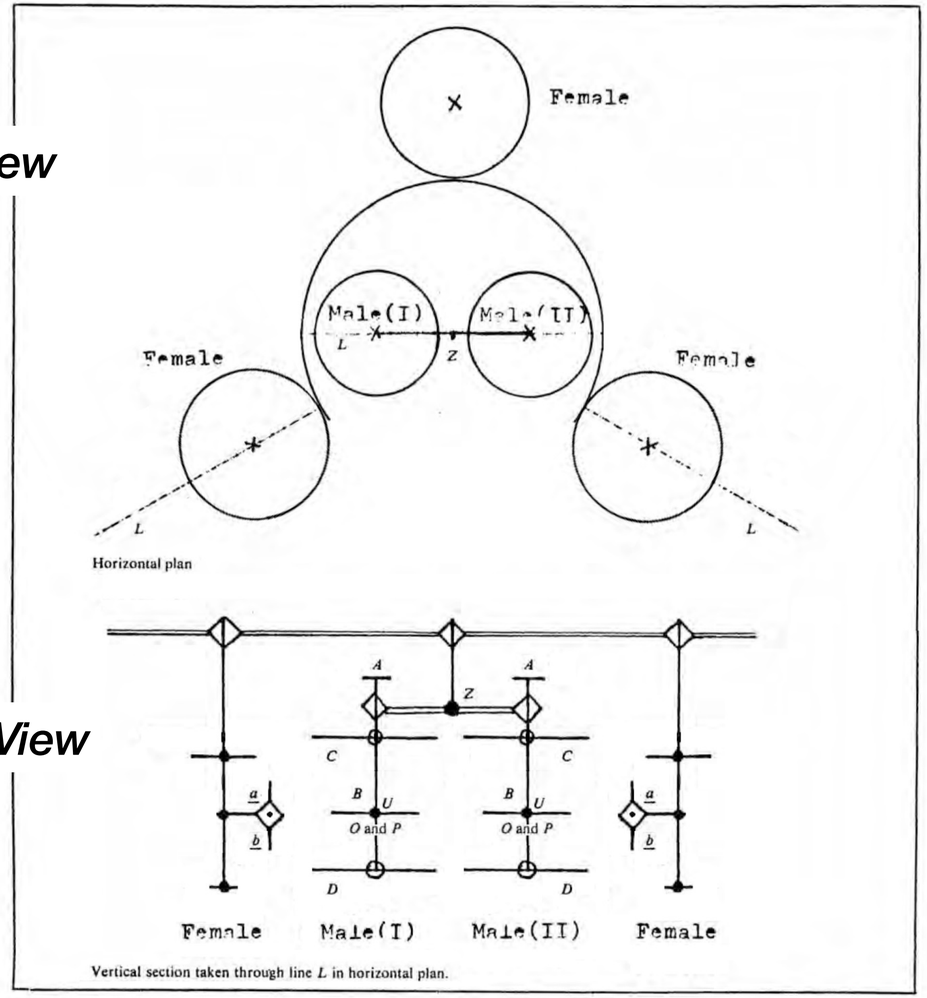
Z = bar linkage bearing male I and male II

= Drive motor
= Free coupling
= Fixed coupling
= Bar linkage

Corrections based on photographic record
2018

Plan View

Section View



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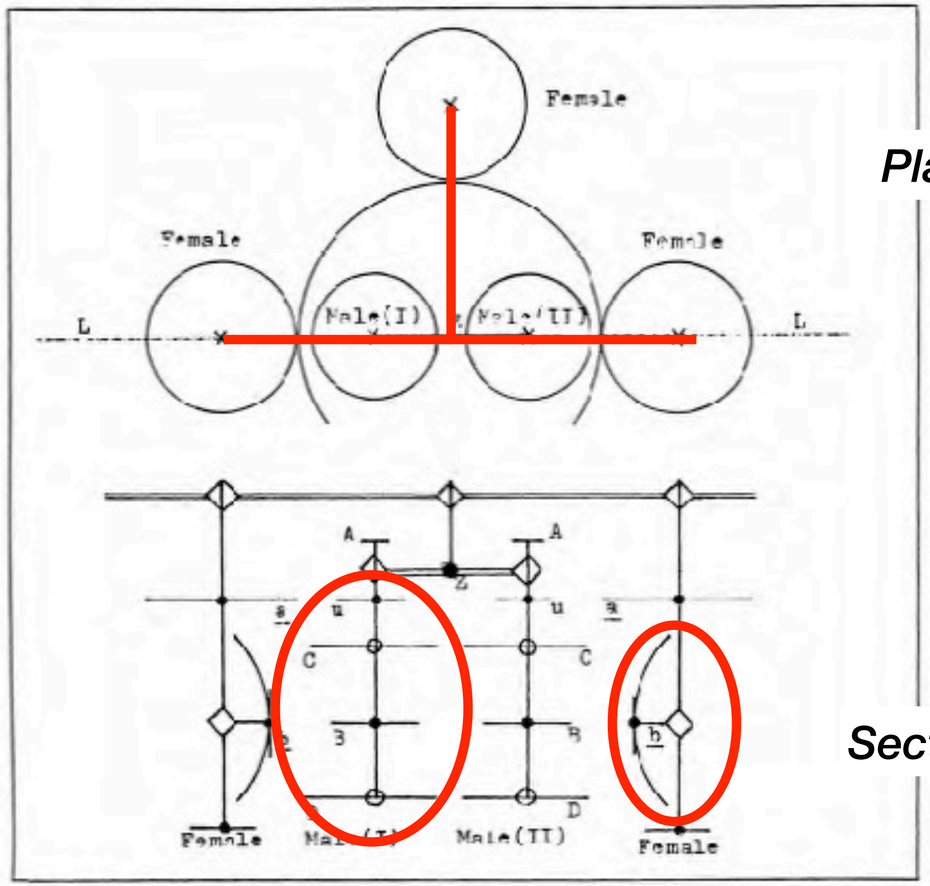

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Corrections based on photographic record
2018

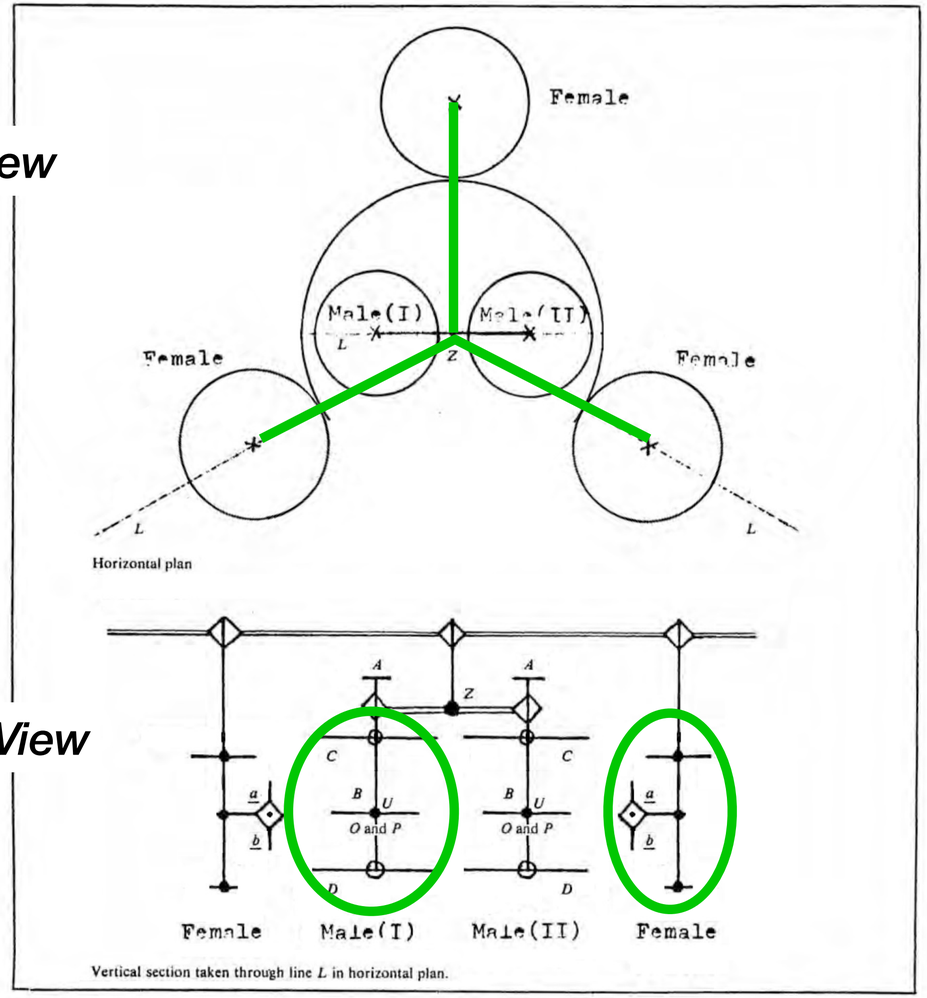


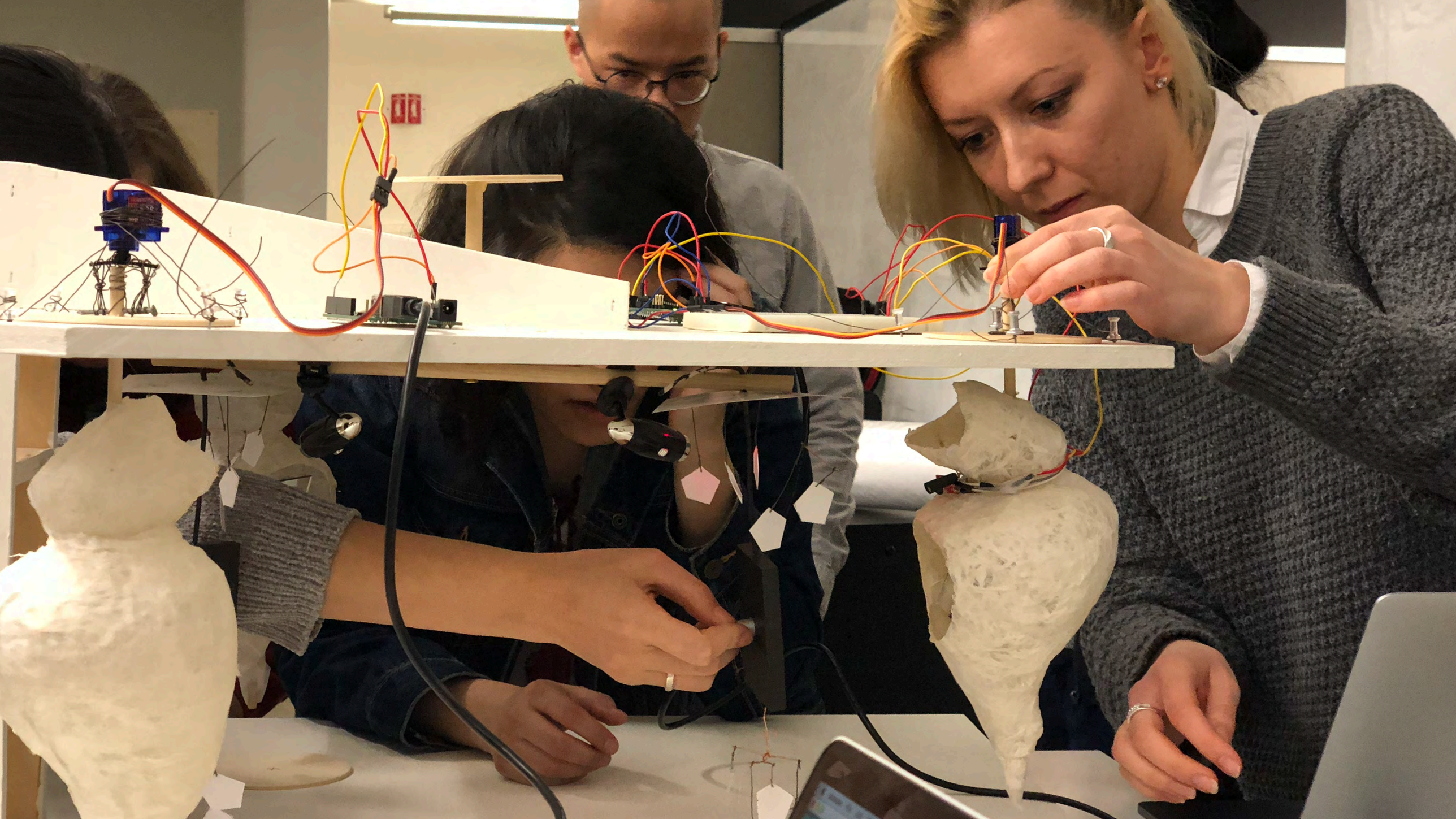
Fig. 34 A rough sketch of powered mobiles.

A = drive state display for male
B = main body of male, bearing 'energetic' light projectors *O* and *P*
C = upper 'energetic' receptors
D = lower 'energetic' receptors
U = non-'energetic', intermittent signal lamp
a = female receptor for intermittent positional signal
b = vertically movable reflector of female
Z = bar linkage bearing male I and male II

= Drive motor
= Free coupling
= Fixed coupling
= Bar linkage

Michael Evans, Instructor
Studio II
Prototyping & Internet of Things

Conversation | Design | Wicked Problems | March 2020

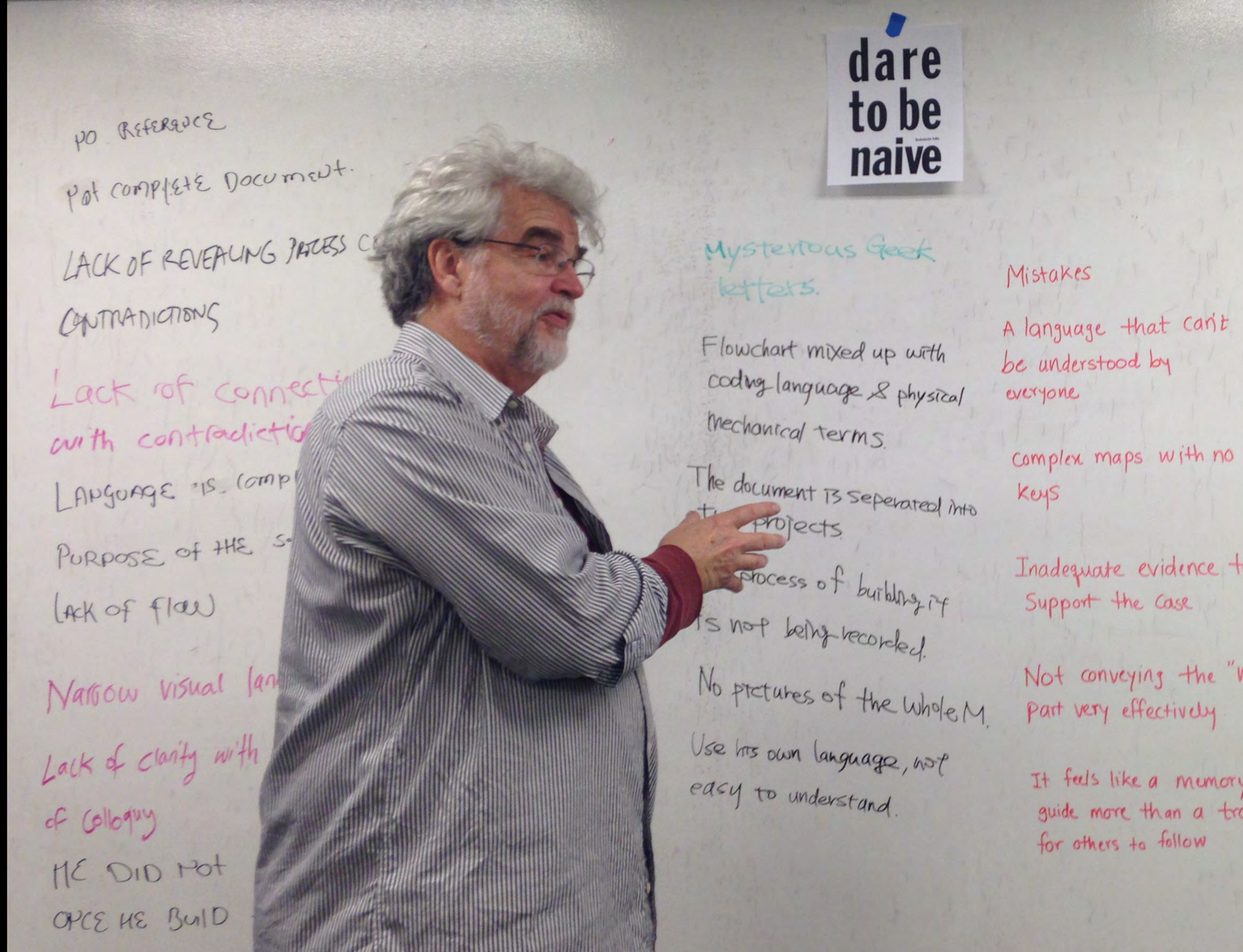


Building the 1/6 scale model

Annual Student Exhibition
MFA Interaction Design
College for Creative Studies
2018

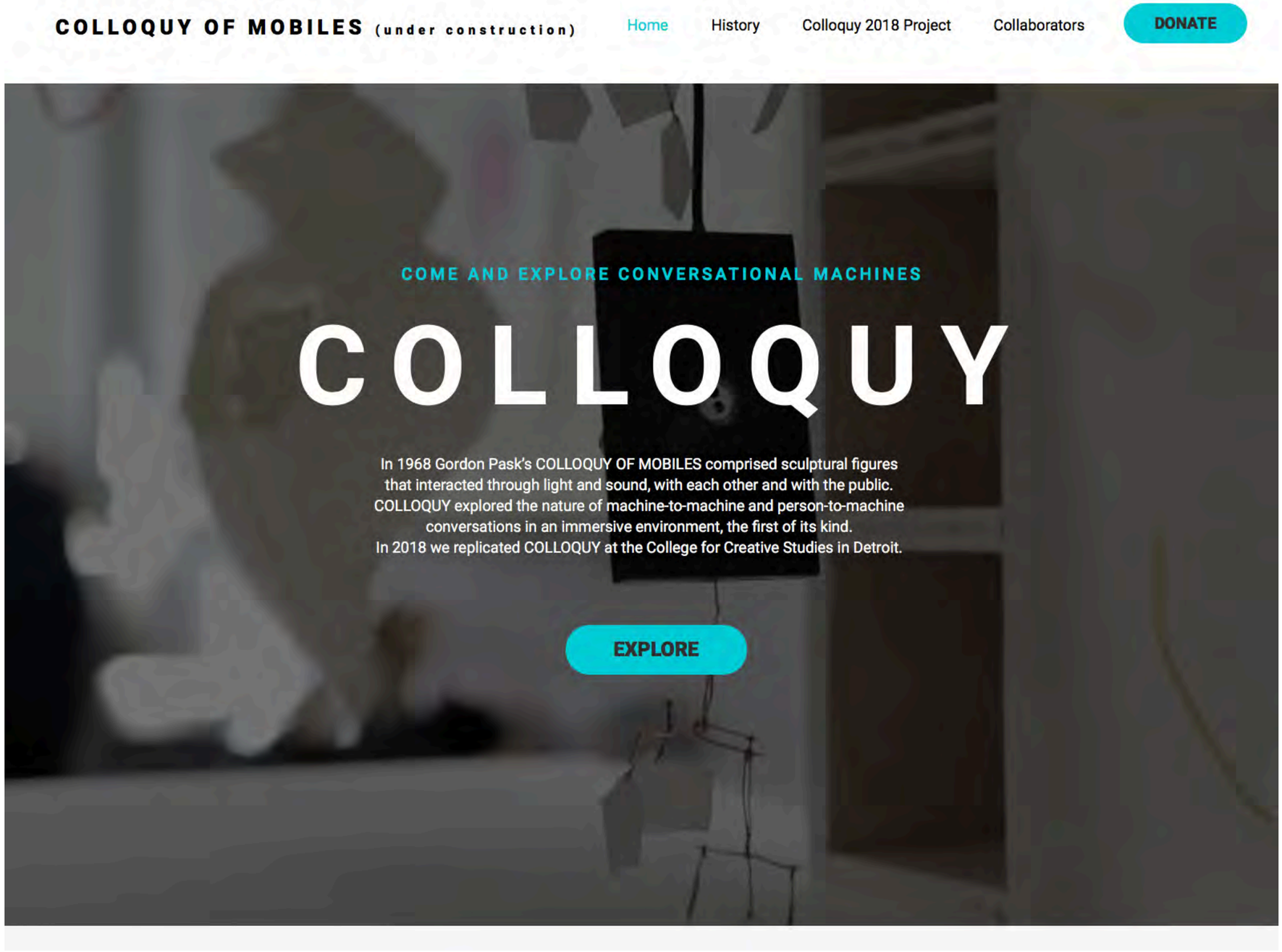

Colloquy of Mobiles
COLLOQUY 2018

Bruce McIntosh, Facilitator
MFA Interaction Design
College for Creative Studies
2018



Bruce McIntosh, Facilitator
Studio IV, MFA IxD Class of 2018
MFA Interaction Design
College for Creative Studies
2018

Project Web Site
Students of MFA IxD Class of 2018



ColloquyOfMobiles.com

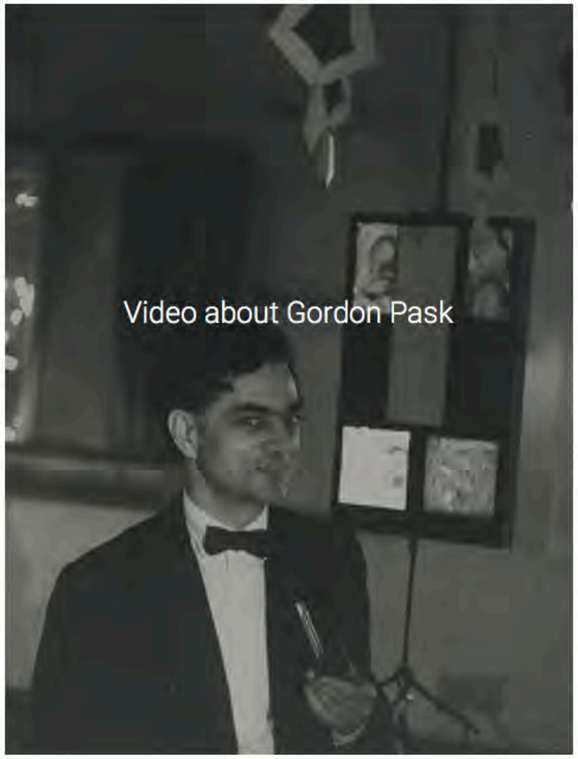
Project Web Site
Students of MFA IxD Class of 2018

COLLOQUY OF MOBILES (under construction)

Home | History | Colloquy 2018 Project | Collaborators | DONATE

HISTORY

About Gordon Pask | Cybernetic Serendipity | Colloquy of Mobiles



About Gordon Pask

Andrew Gordon Speedie-Pask, M.A., Ph.D., D.Sc., Sc. D., lived many lives in the span of one. Over the course of his 68 years, he stayed up for 36-hour days, published 6 books and 270 papers, soldered machines into behaving like learning organisms, and developed a comprehensive theory of human cognition. If the worlds of psychology, artificial intelligence, and cognitive science knew his work better, they would never be the same: for then they could hold the human and the rational, subjective and objective, in the same frame.

When Pask built his machines and his theory, his philosophical view was at odds with artificial intelligence, which arose from the seeds of cybernetics but presumes that knowledge is a commodity to pluck from the environment and stick in a cubbyhole. Pask's learning environments, whether for entertainment or touch-typing or statistics, viewed the human as part of a resonance that looped from the human, through the environment or apparatus, back through the human and around again. For Pask, that is the interaction by which we understand each other when we speak or dance together. He specified how this works in detail in his many publications on Conversation Theory.

Conversation Theory has provided cybernetics its prescriptive power for modeling, learning, and agreement. Which the colloquy of mobiles explores in the form of an interactive installation

Connecting cybernetics & design

ColloquyOfMobiles.com

Project Web Site
Students of MFA IxD Class of 2018

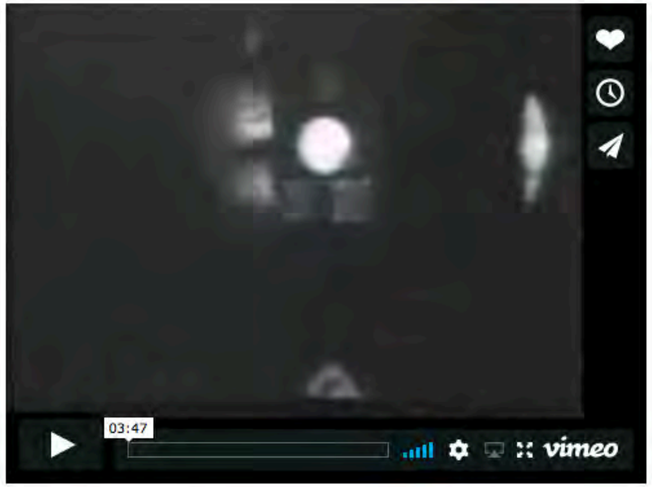
Colloquy of Mobiles

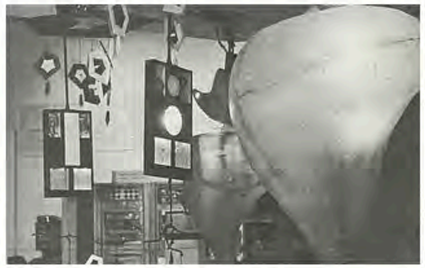
Colloquy of Mobiles, designed by Gordon Pask, was originally installed in the ground-breaking exhibition Cybernetic Serendipity at the Institute of Contemporary Arts in London in 1968. The installation comprises sculptural figures that move and interact through light and sound, with each other and with the public.

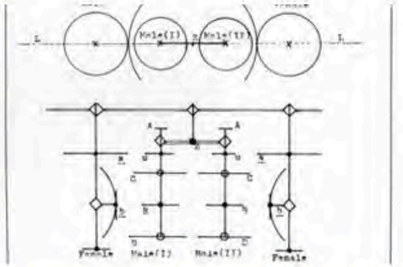
It explores the nature of machine-to-machine and person-to-machine conversations in an interactive, immersive environment. Surprising and revolutionary in its day, Colloquy of Mobiles has influenced generations of artists and critics concerned with the role of technology in everyday life. It has never before been reproduced and the project has garnered attention and support from communities in the arts, media, design, and education.

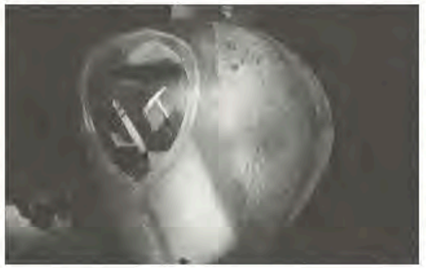
Colloquy of Mobiles creates a human environment that contains conversational machines, a condition that is now part of everyday life. Colloquy allows gallery audiences to participate in immersive, real-time interactions that are surprising and provocative.

The experience of moving among the mobiles of the installation and engaging them via sound, speech, body movements, and facial expressions, offers a rational as well as emotional sense of what it means to live among machines that converse. The Colloquy 2018 Project will change how we feel about going home to voice interfaces such as Siri and Alexa, and how we experience living among smart machines.



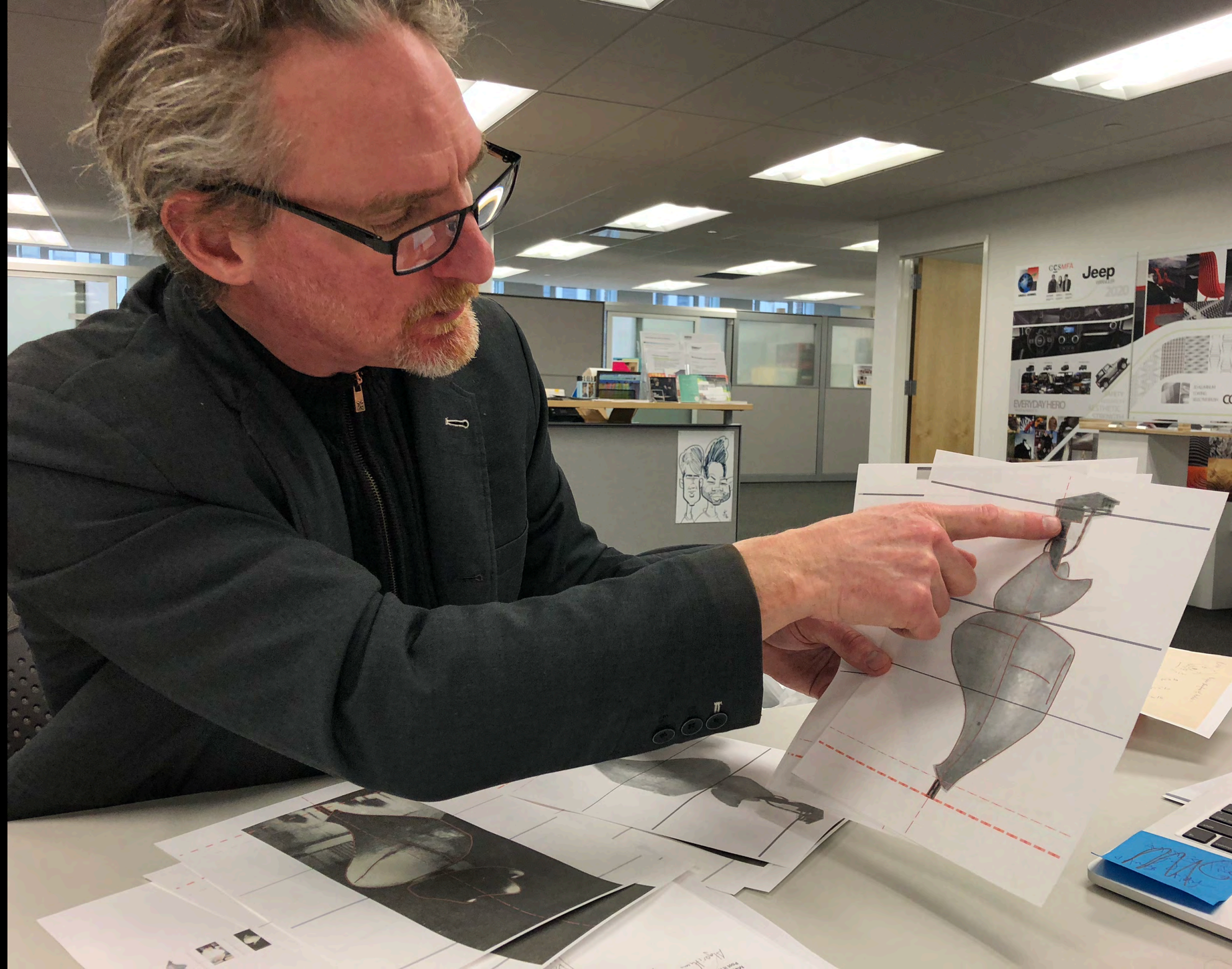






ColloquyOfMobiles.com

TJ McLeish, Master Fabricator
COLLOQUY 2018 Project



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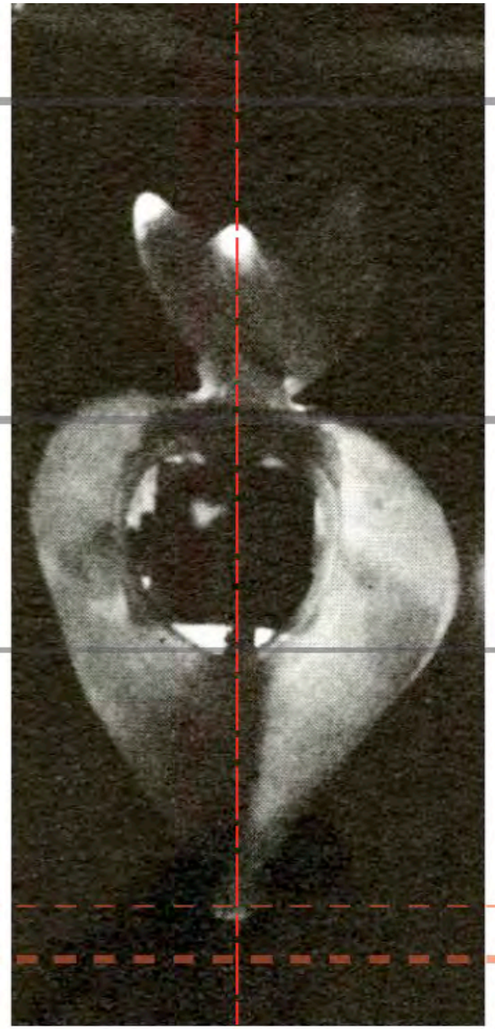
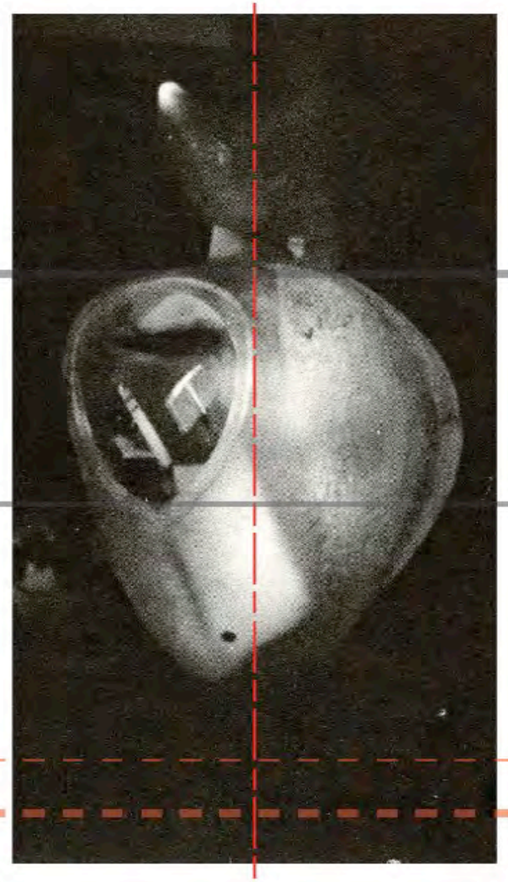
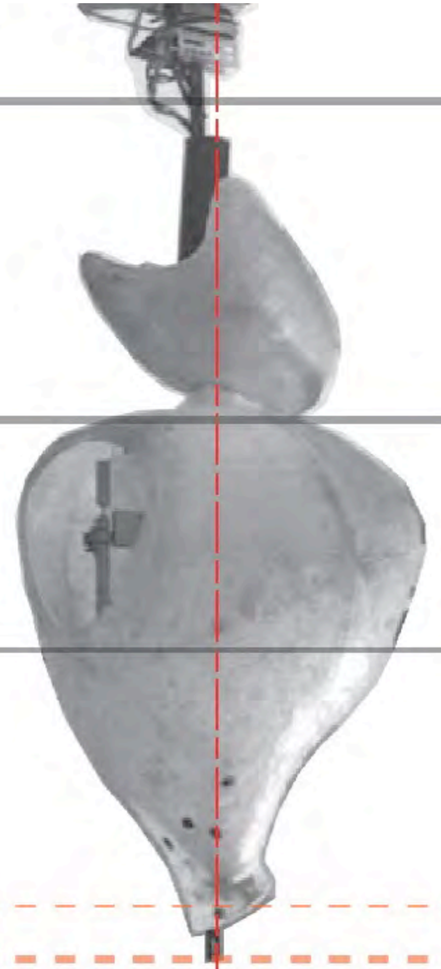
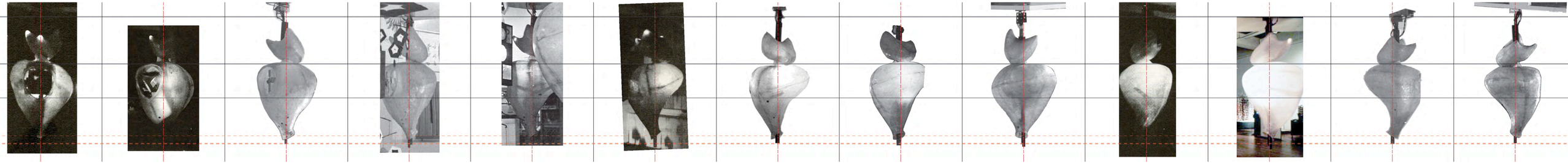
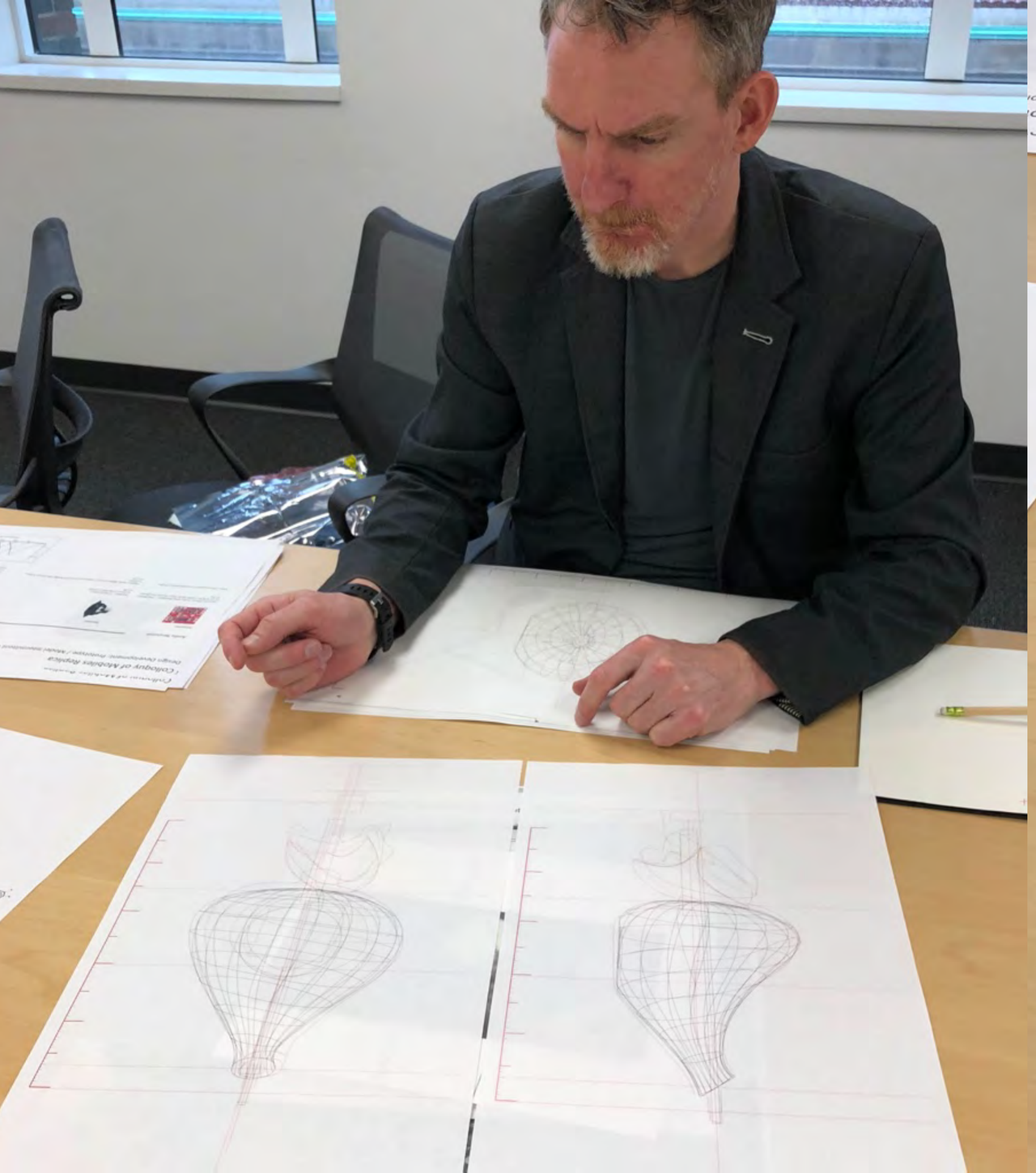
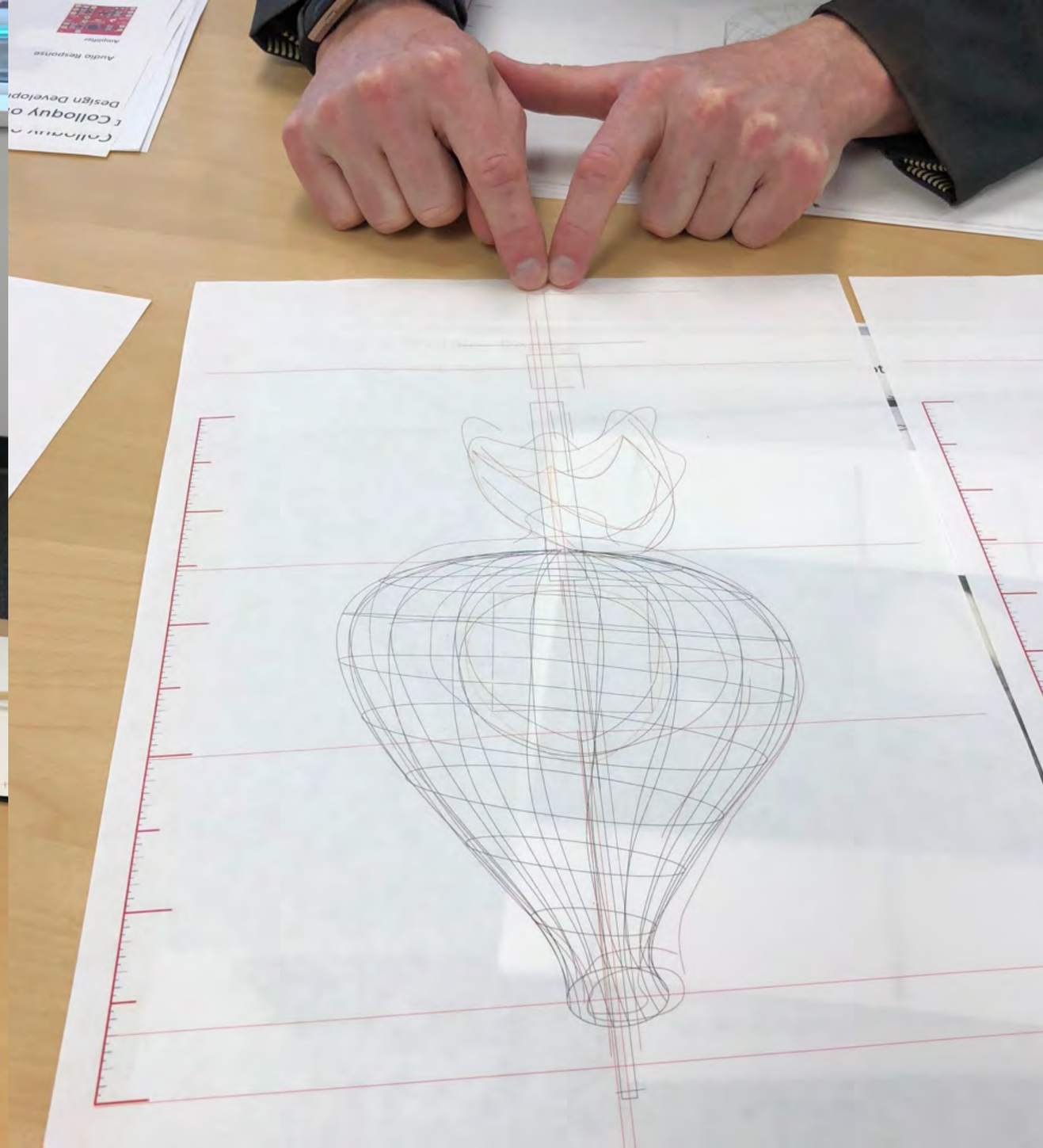


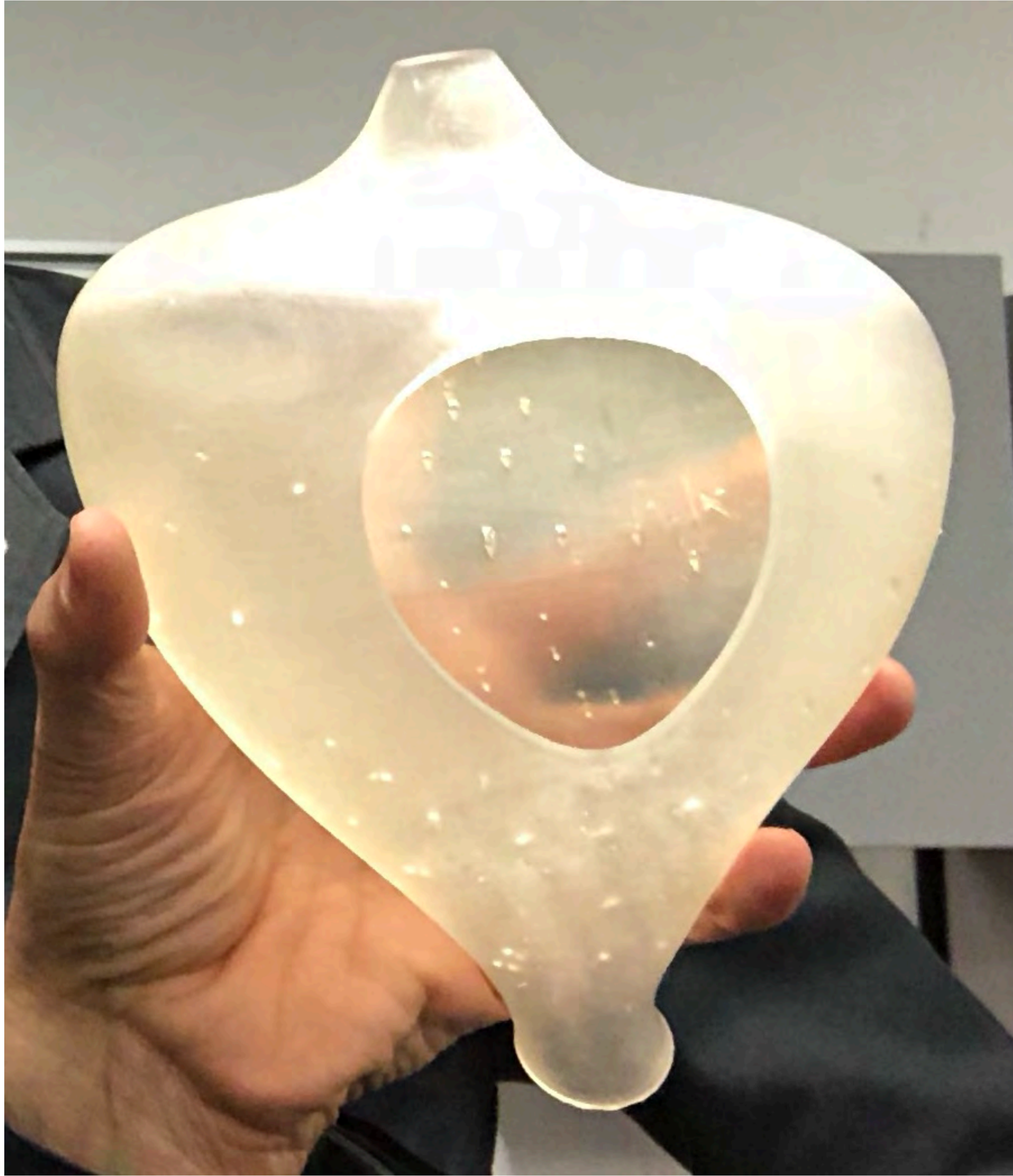




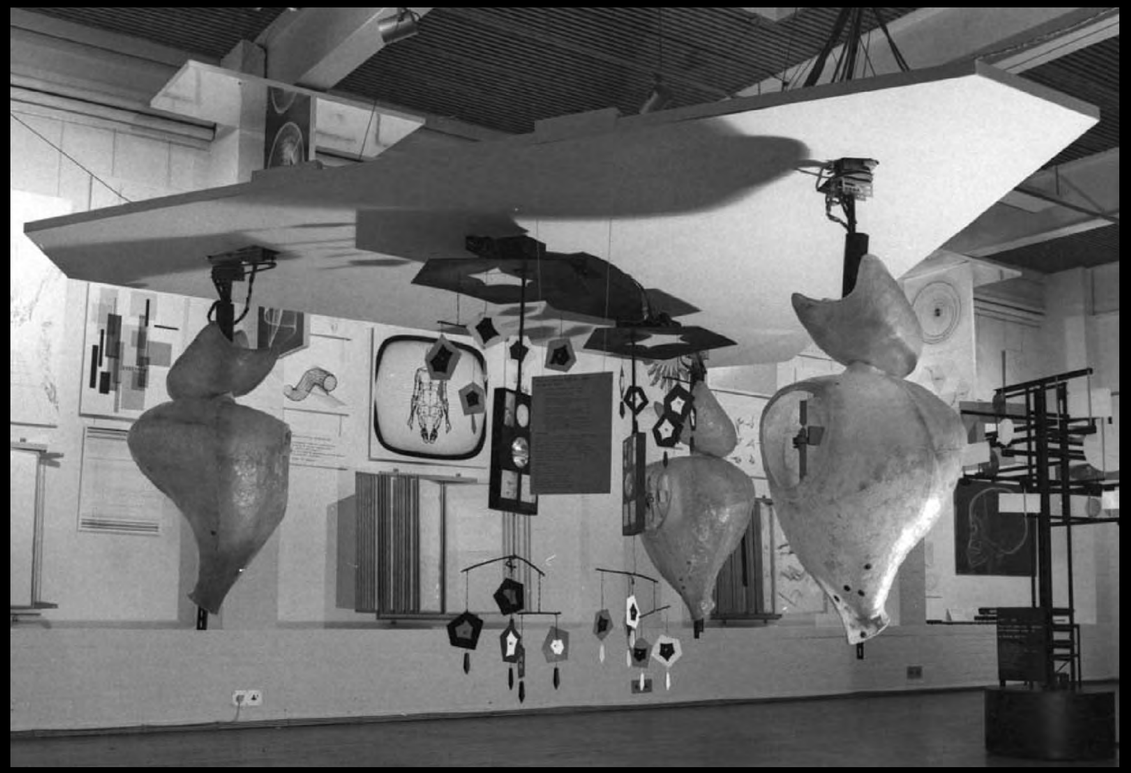




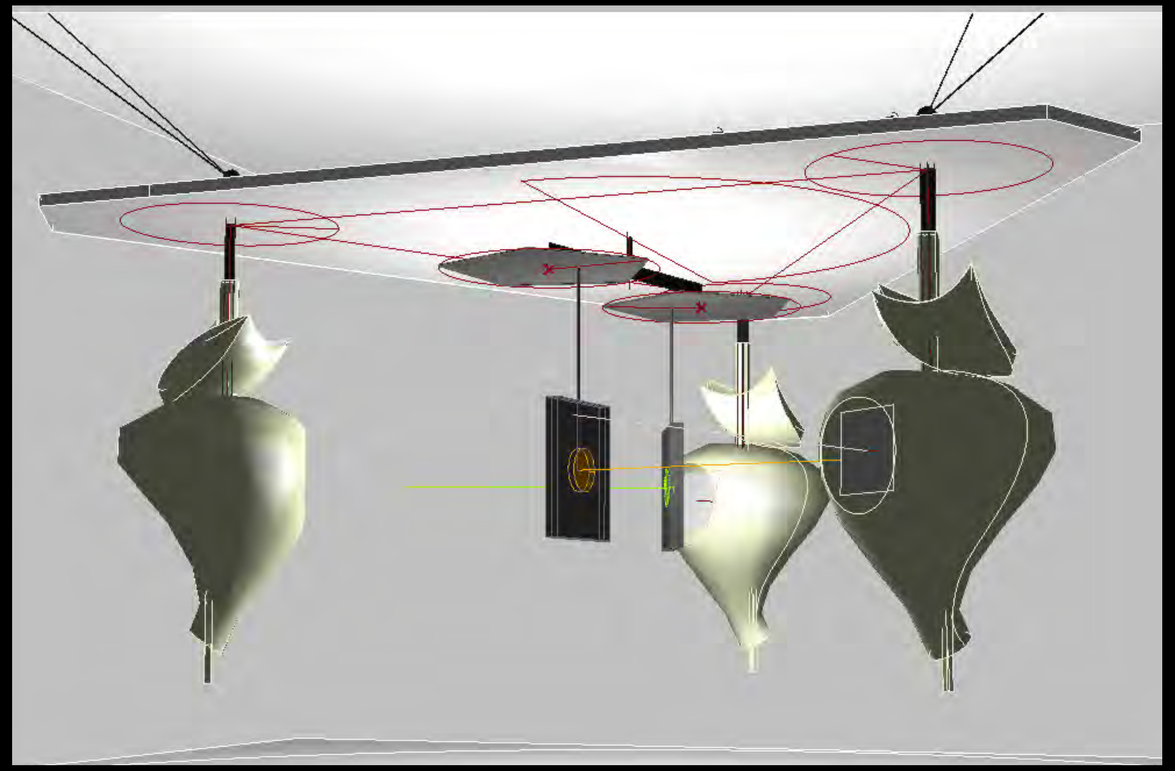


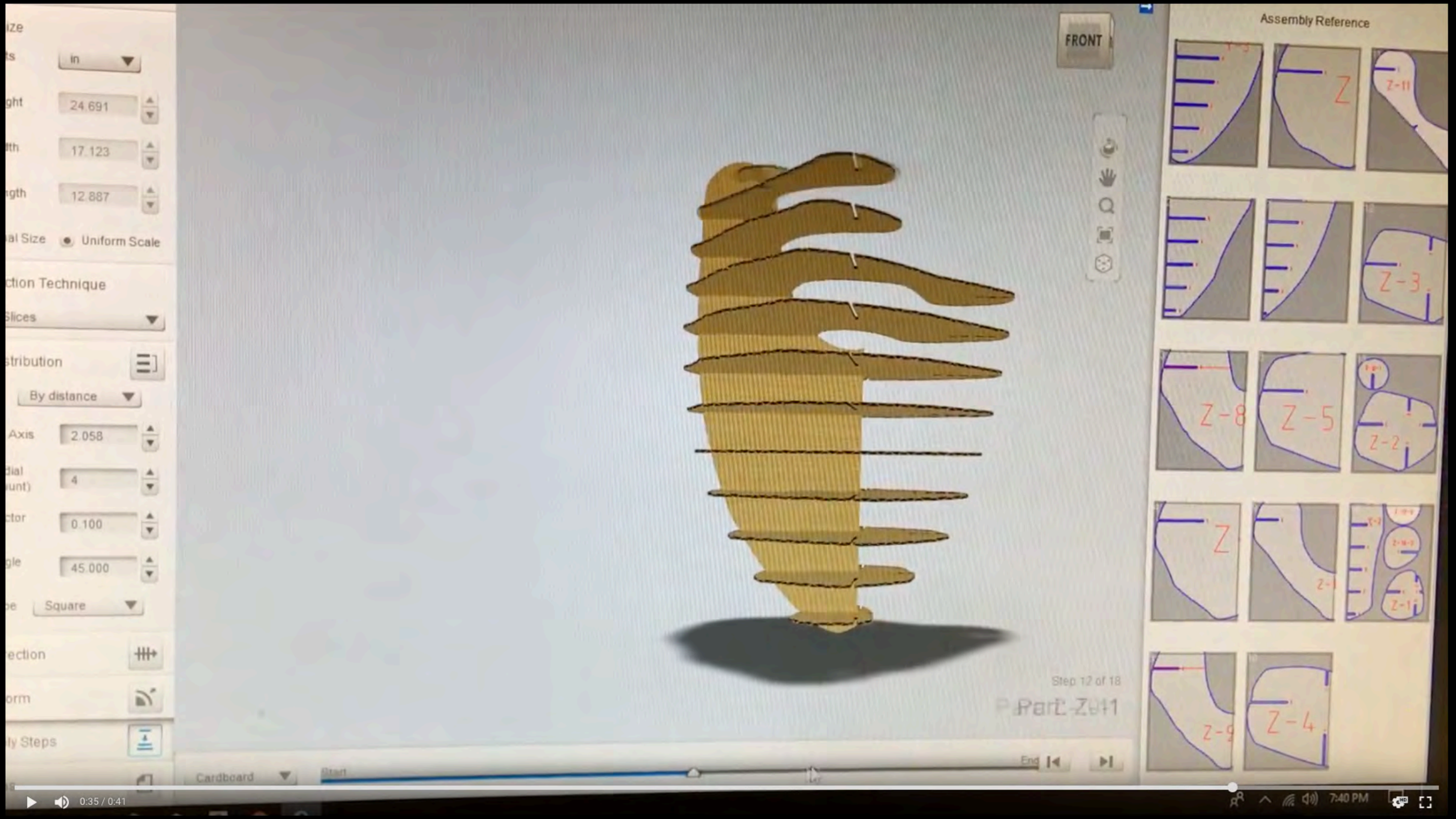


Colloquy of Mobiles
Gordon Pask
1968



3D Digital Model
TJ McLeish
2018





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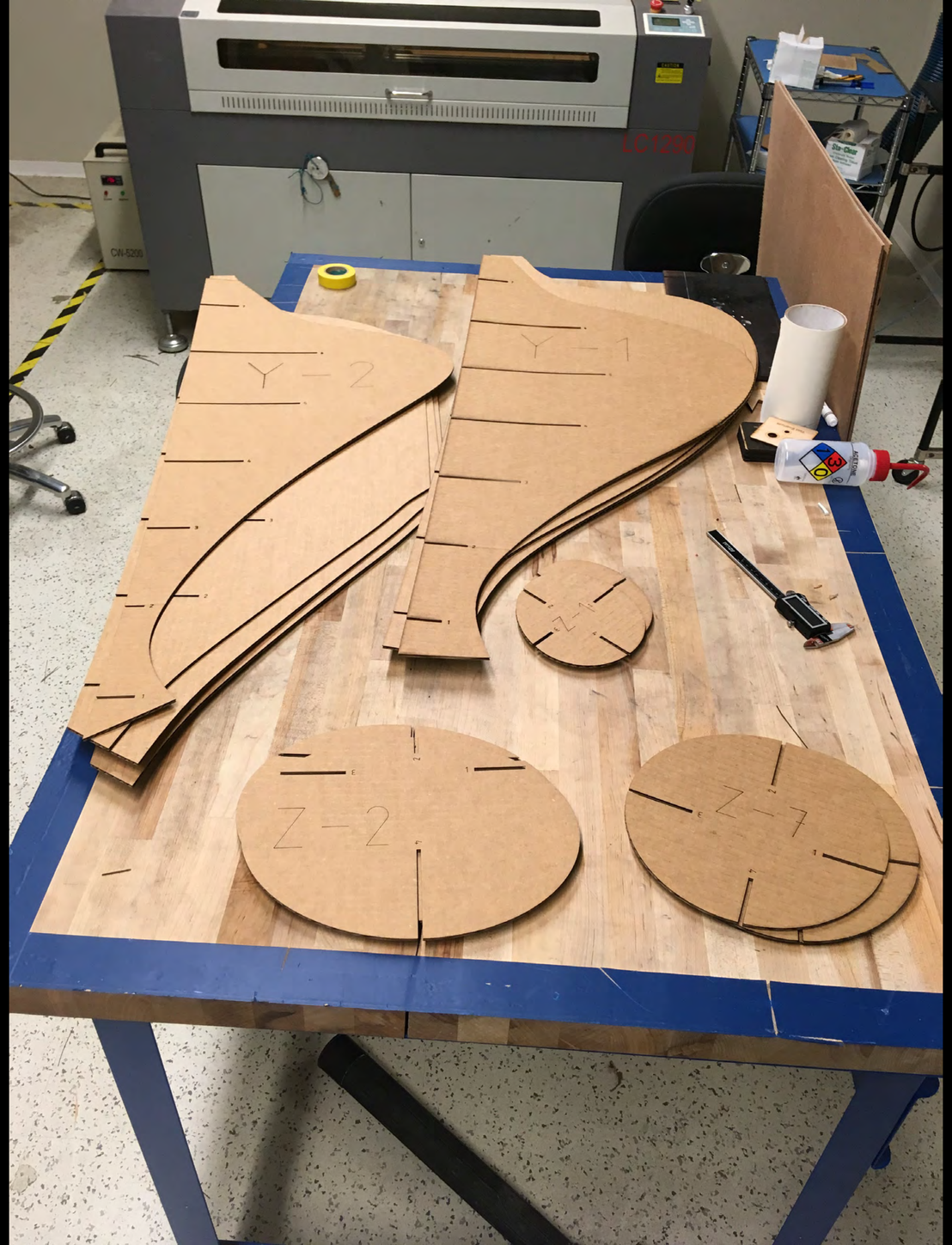
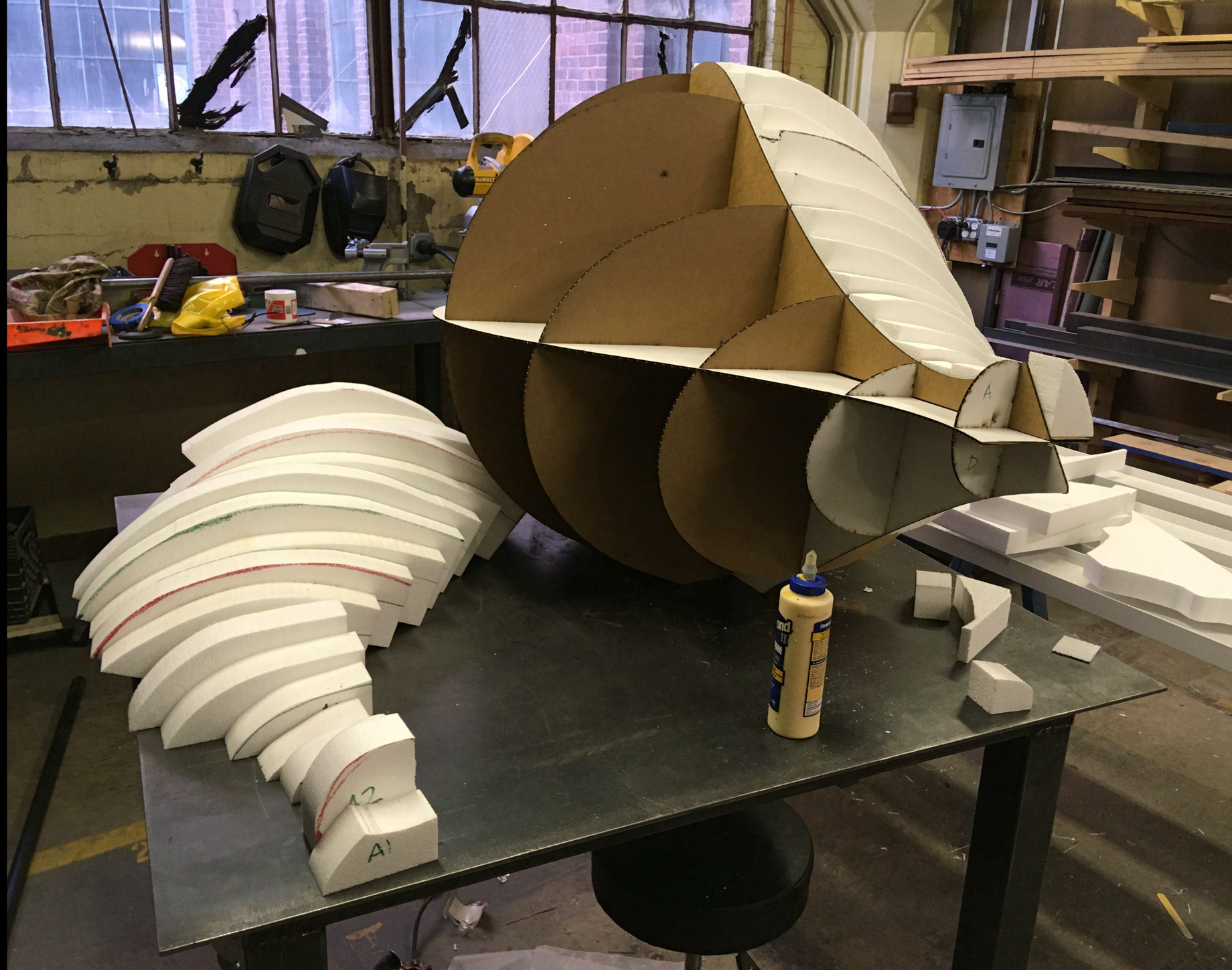
Laser-cut sections
Female mobiles
Building Brown Workshop
Chicago



Cutting foam to fit the forms
Female mobiles
Building Brown Workshop
Chicago



Smoothing the foam models
Female mobiles
Building Brown Workshop
Chicago

Wrapping before coating with resin
Female mobiles
Building Brown Workshop
Chicago

Final female mobile
TJ McLeish, Master Fabricator
mHub, Chicago


EXIT

Beginning assembly
MFA IxD Class of 2018 & Class of 2019
CCS MFA Interaction Design

Raising the structure
MFA IxD Class of 2018 & Class of 2019
CCS MFA Interaction Design

Assembling the female mobiles
TJ McLeish
Alecia Secord, MFA IxD Class of 2019
CCS MFA Interaction Design

Hanging the female mobiles
TJ McLeish
Alecia Secord, MFA IxD Class of 2019
Sofia Lewandowski, MFA IxD Class of 2018
CCS MFA Interaction Design

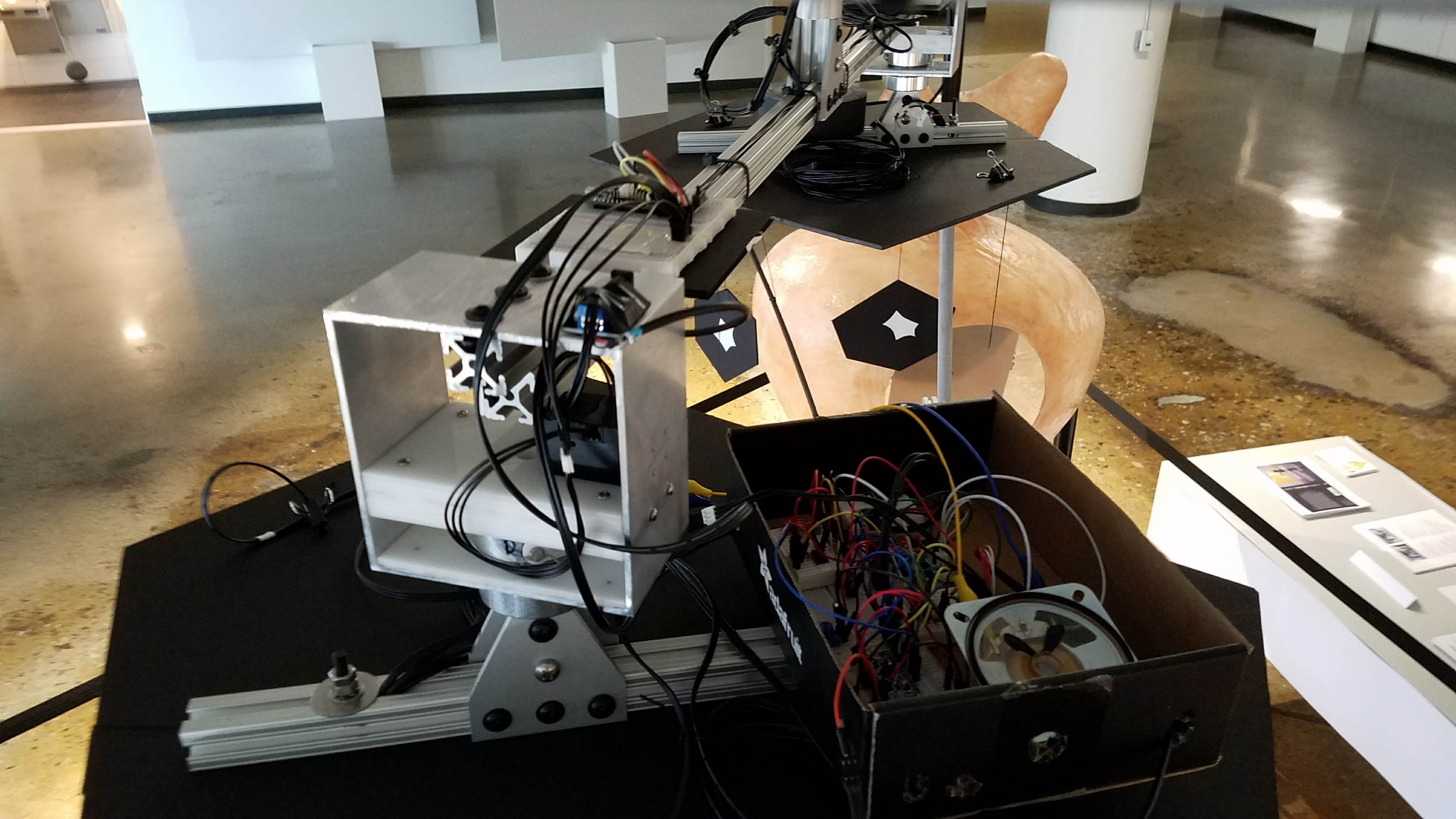
Installing the female mobiles

Cutting templates for male mobile parts
Paul Pangaro, MFA IxD Chair
MFA Interaction Design
College for Creative Studies
2018

Assembling male mobiles
TJ McLeish
Gissoo Doroudian, MFA IxD Class of 2018
CCS MFA Interaction Design

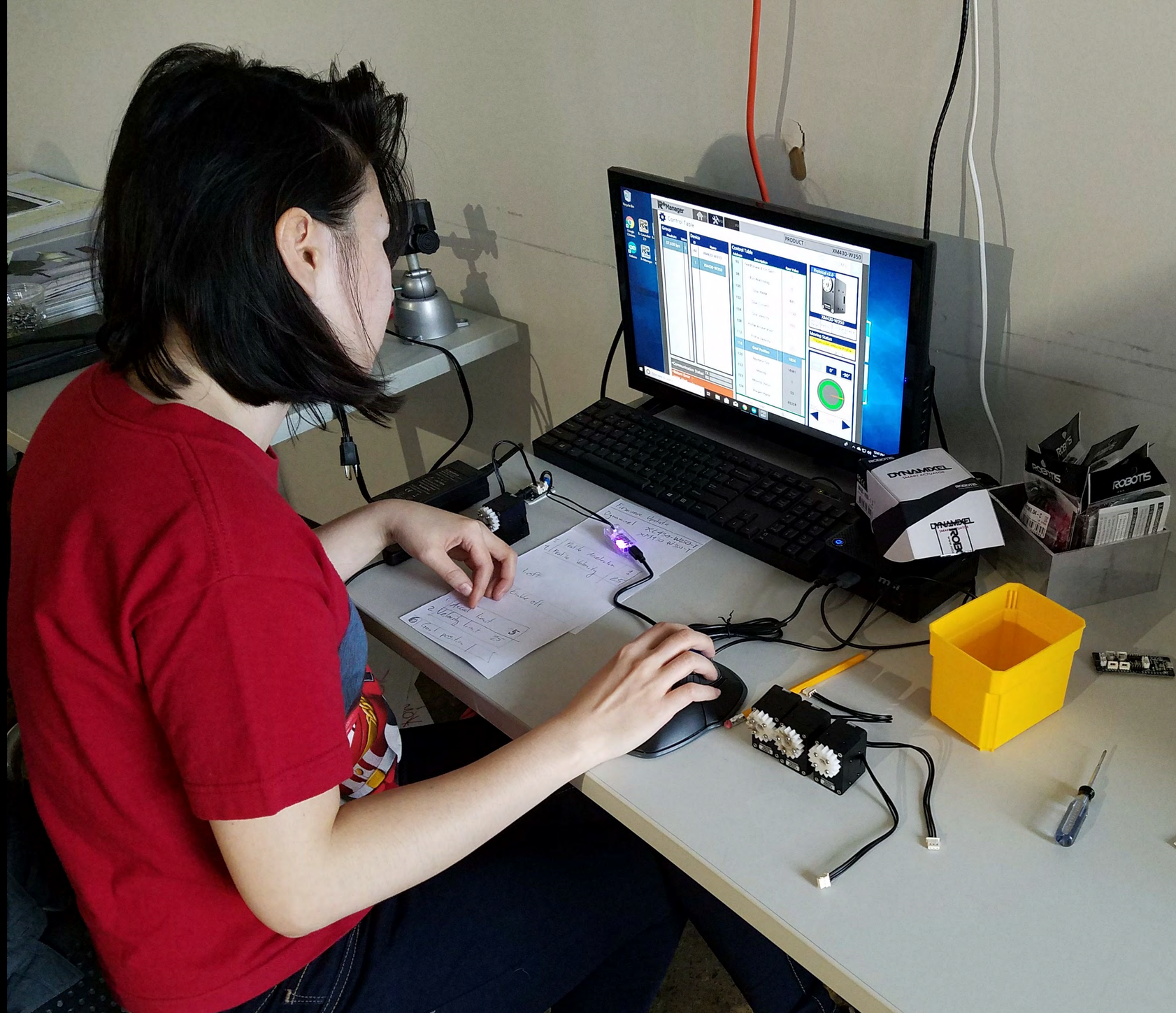
Installing male mobile structure

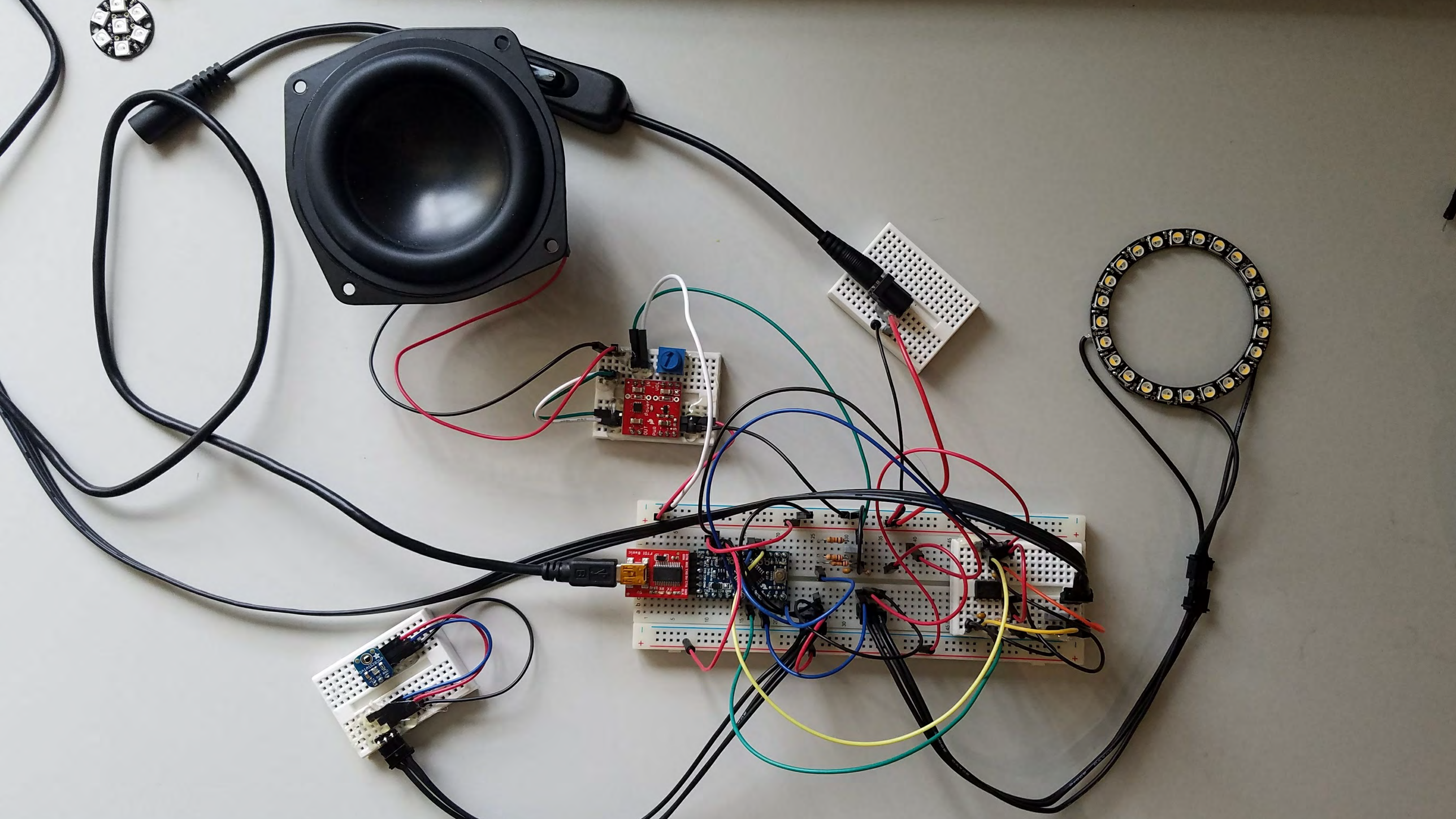
Installing mirror motors
TJ McLeish

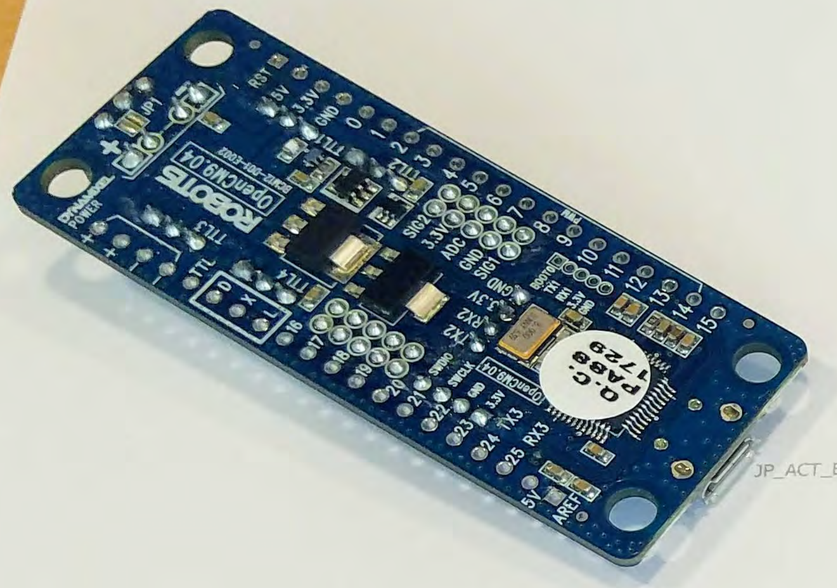


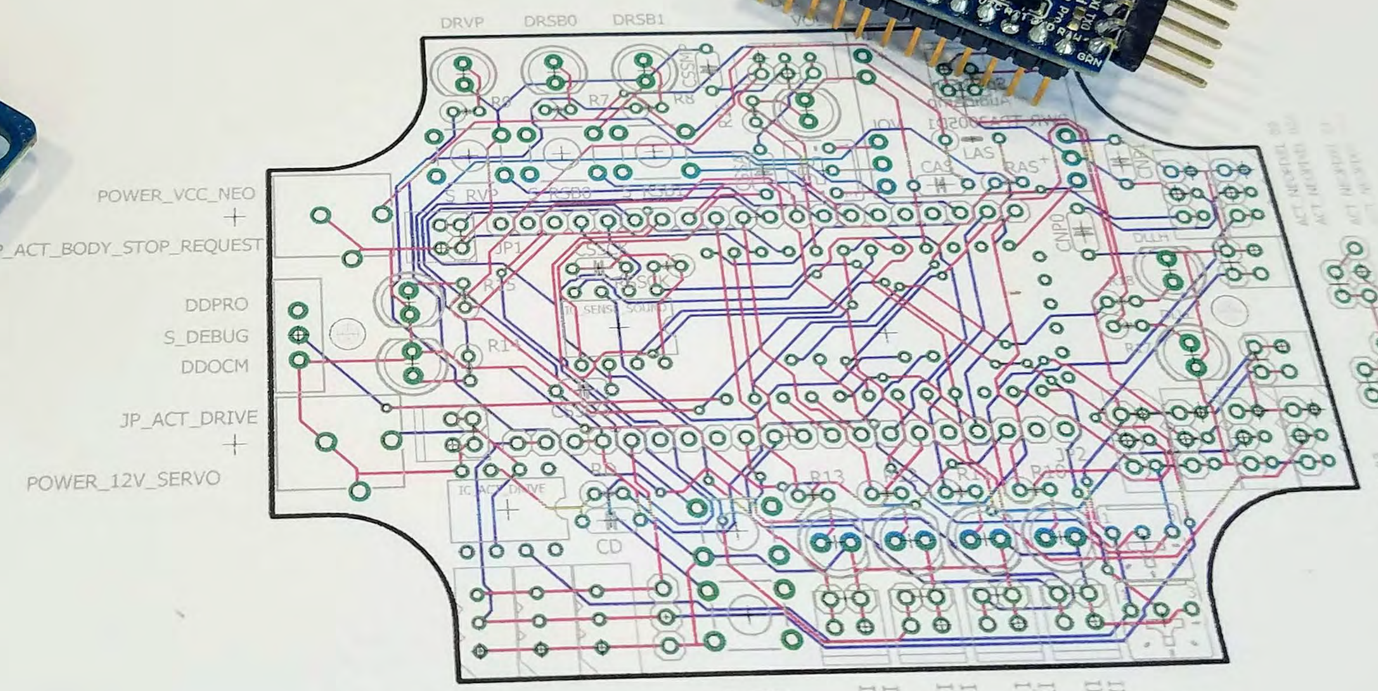
Designing & building the electronics
TJ McLeish, Master Fabricator
COLLOQUY 2018 Project

Testing the servo motors & circuits
Wendy Wu, MFA IxD Class of 2019
MFA Interaction Design

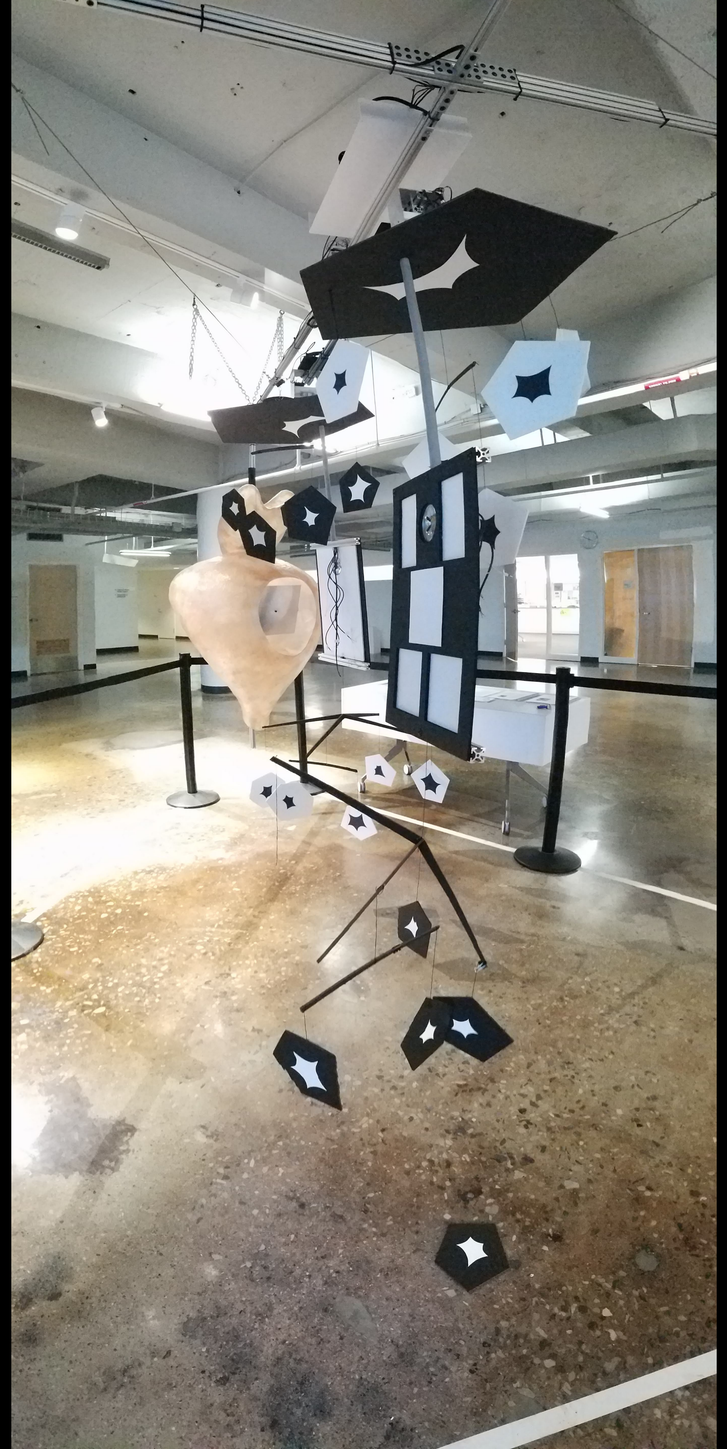




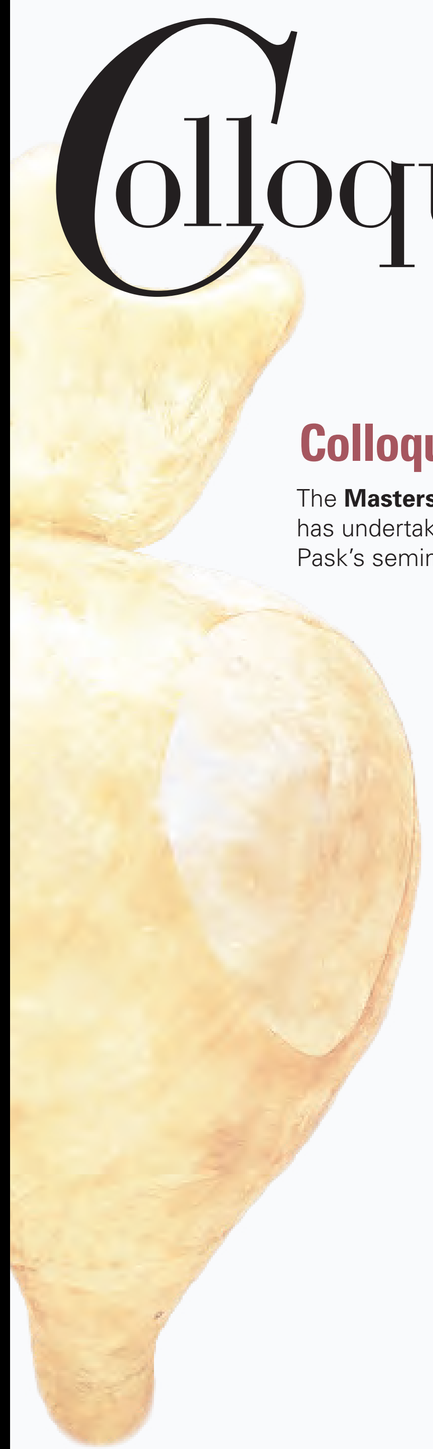



POWER_VCC_NEO
JP_ACT_BODY_STOP_REQUEST
DDPRO
S_DEBUG
DDOCM
JP_ACT_DRIVE
POWER_12V_SERVO
DRVP
DRSB0
DRSB1
SERVO_COM_A
SERVO_COM_B
SERVO_COM_C
SERVO_COM
S_BSRI
S_BSRII
JP_SENSE_DRIVESTATE_I
DDSI
JP_SENSE_DRIVESTATE_II
DDSII
JP_SENSE_BODY_STOP_REQUEST_I
DBSRI
JP_SENSE_BODY_STOP_REQUEST_II
DBSRII
R_DSII
R_DS

Testing the completed assembly



Opening the exhibit
MFA Interaction Design
College for Creative Studies
2018



Colloquy of Mobiles

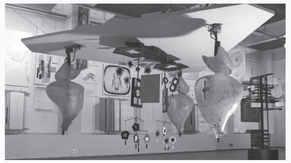
Colloquy 2018

The **Masters in Interaction Design** department at CCS has undertaken the full scale reproduction of Gordon Pask's seminal interactive work, **Colloquy of Mobiles**.

The work, then and now, explores:

- **the dynamics of conversing with machines, now occurring every day**
- **the impact of smart environments, which increasingly effect our lives**
- **the implications of artificial intelligence, inside of every device we use**

Colloquy 1968



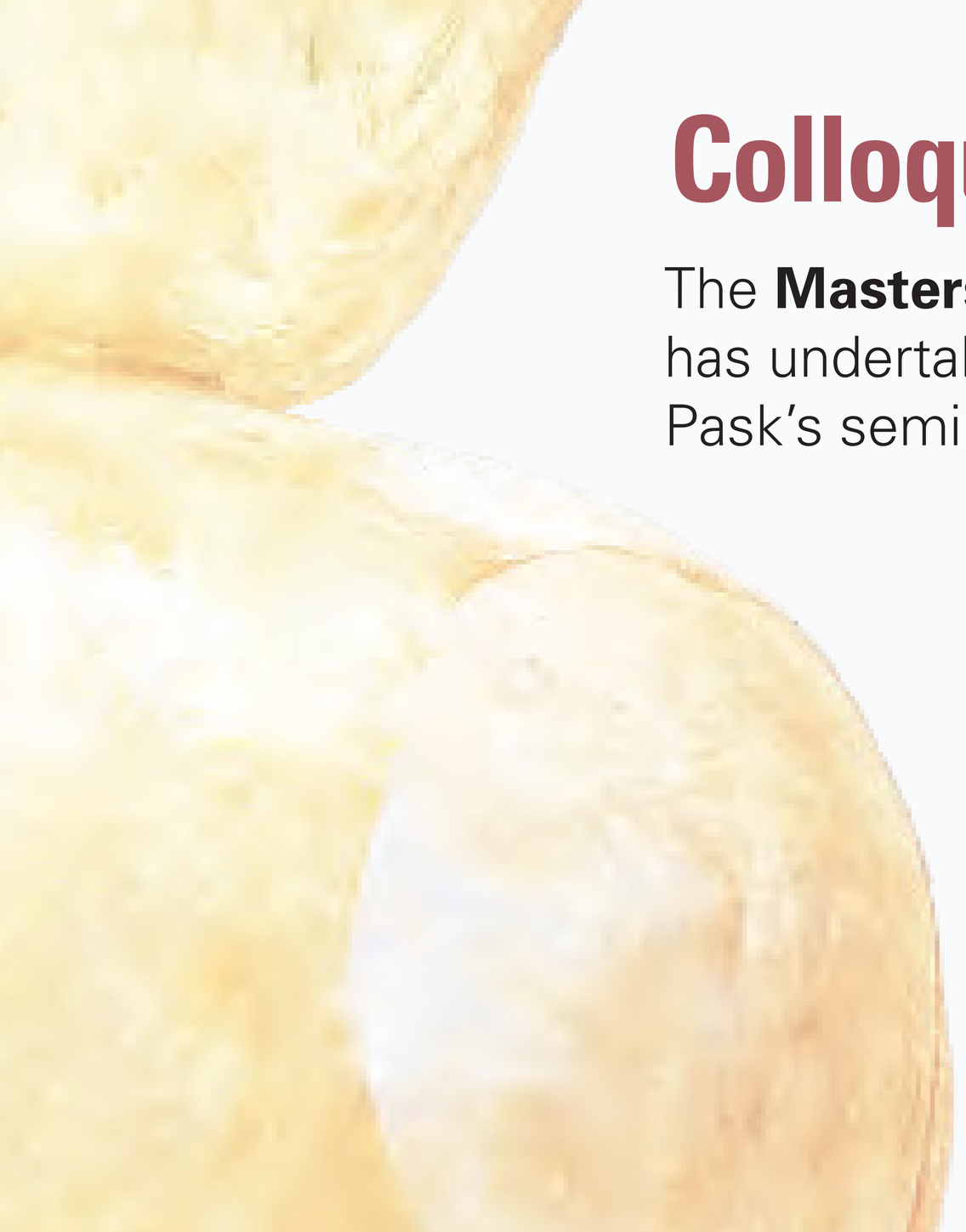
Colloquy of Mobiles was designed by Gordon Pask for the ground-breaking 1968 exhibition ***Cybernetic Serendipity*** at the Institute of Contemporary Arts in London. The installation comprises sculptural figures that move and interact through light and sound, with each other and with the public. Colloquy explores cooperative and competitive conversations, machine-to-machine and person-to-machine, in an interactive, immersive environment. Surprising and revolutionary in its day, **Colloquy of Mobiles** has influenced generations of artists and critics.

FUNDING

We have received $28,500 from individual donors and are seeking $6,000 to complete the full-scale **Colloquy of Mobiles**. Additional funding is sought to disseminate thorough documentation as widely as possible under an open-source license, as well as to hold symposia and foster deep conversations on the implications of conversational machines in our lives.

Contact us at **colloquy2018@gmail.com**

Conversation | Design | Wicked Problems | March 2020



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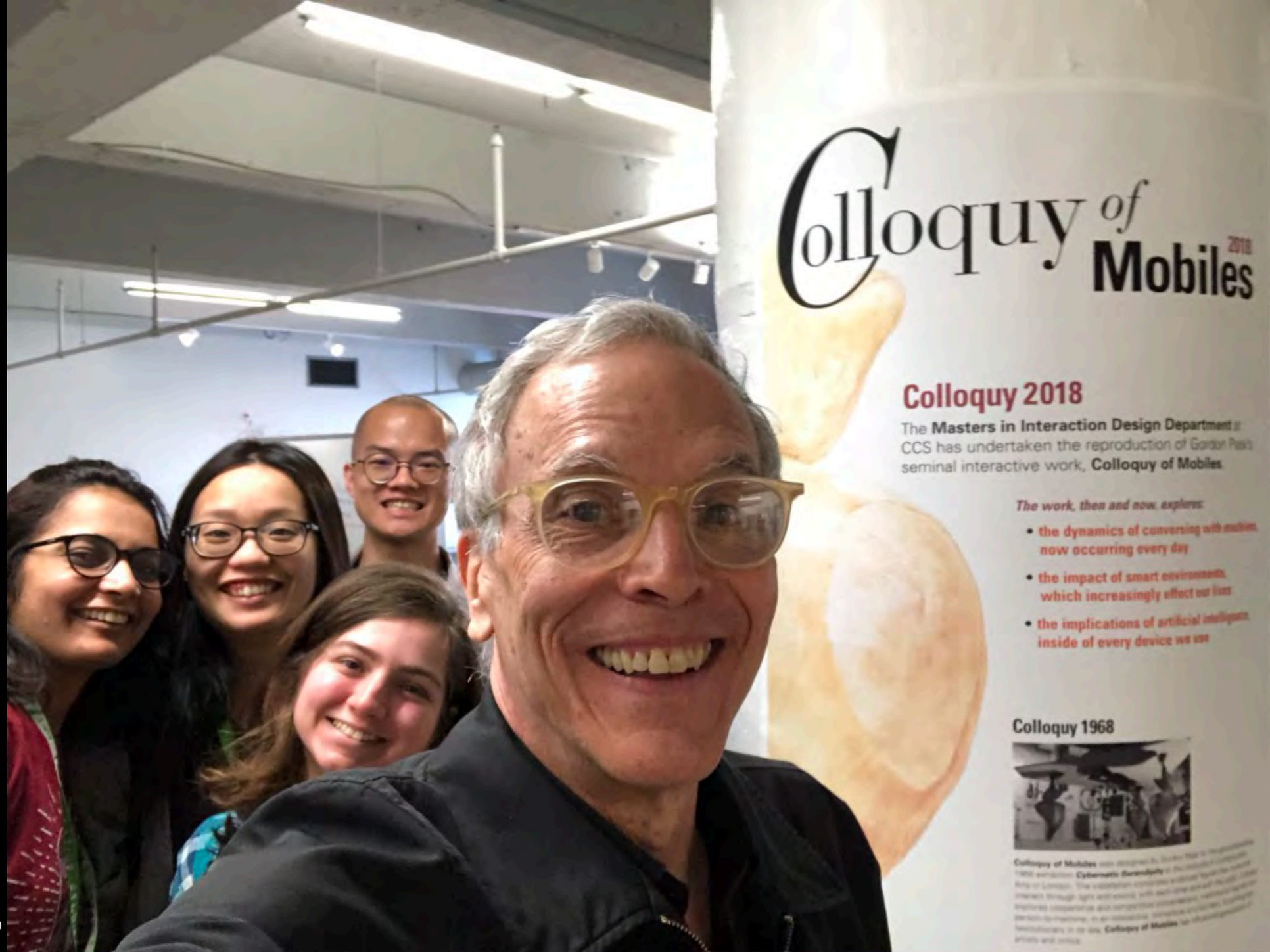
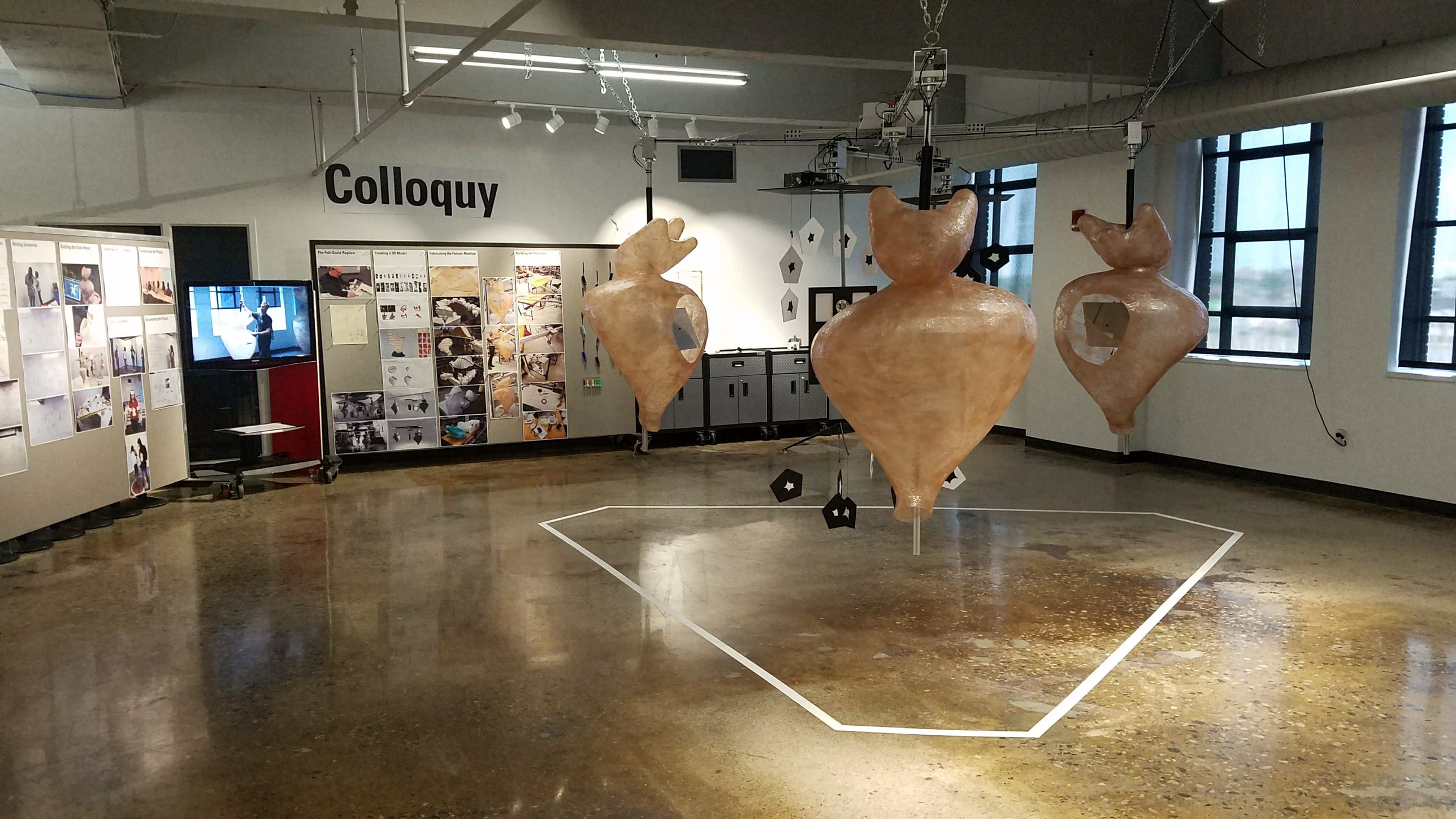
Opening the exhibit
Paul Pangaro, MFA IxD Chair
Students of Class of 2018
MFA Interaction Design
College for Creative Studies
2018




Colloquy
The Full-Scale Replica
Creating a 3D Model
Fabricating the Female Mobilee
Building the Structure

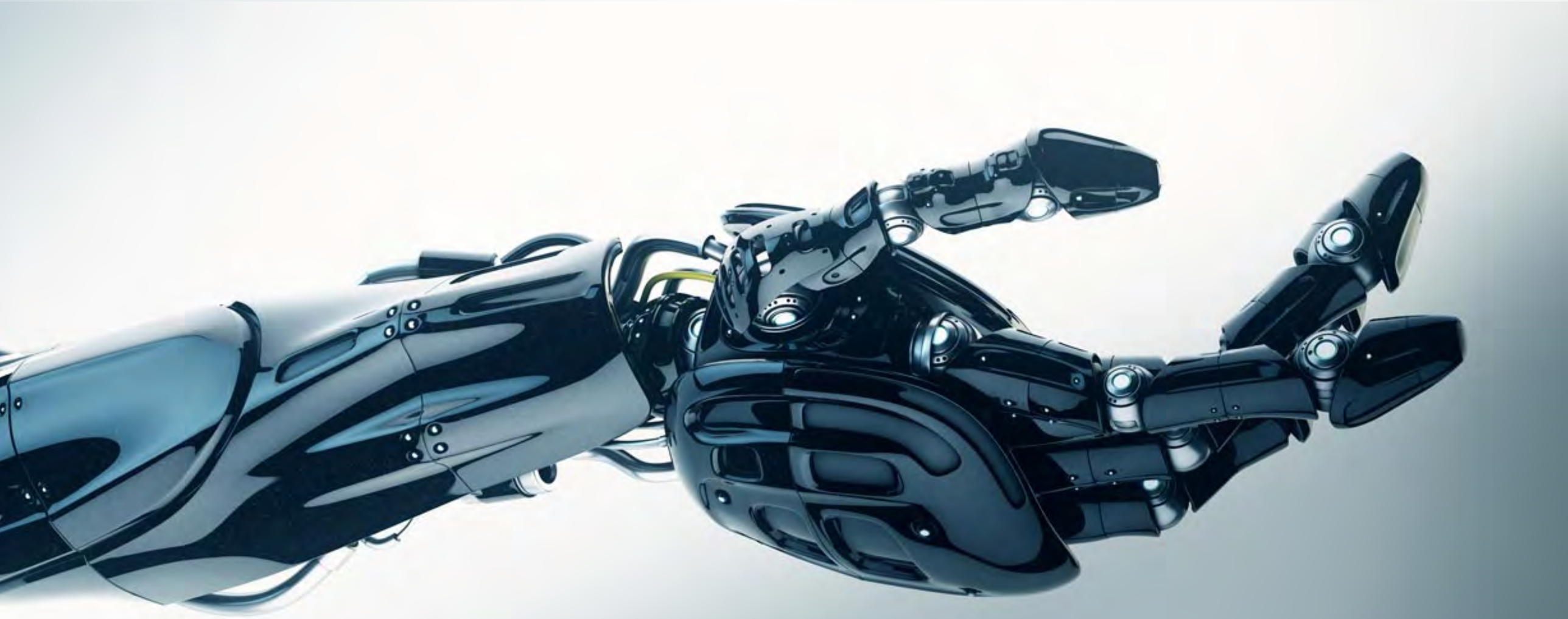
Conversation | Design | Wicked Problems

How did Pask get there?
How is Colloquy different?

Cybernetics is not Robotics

https://en.wikipedia.org/wiki/Forbidden_Planet

Cybernetics is not Biomechatronics



https://carleton.ca/mechatronics/

Cybernetics is not AI

Annapurna Pictures

Cybernetics is not AI
Cybernetics is not Biomechatronics
Cybernetics is not Robotics
Cybernetics is not Chips in Your Brain
… and Cybernetics is not Freezing Dead People!

CYBERNETICS

OR CONTROL AND COMMUNICATION IN THE ANIMAL AND THE MACHINE

Norbert Wiener

PROFESSOR OF MATHEMATICS
THE MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

THE TECHNOLOGY PRESS

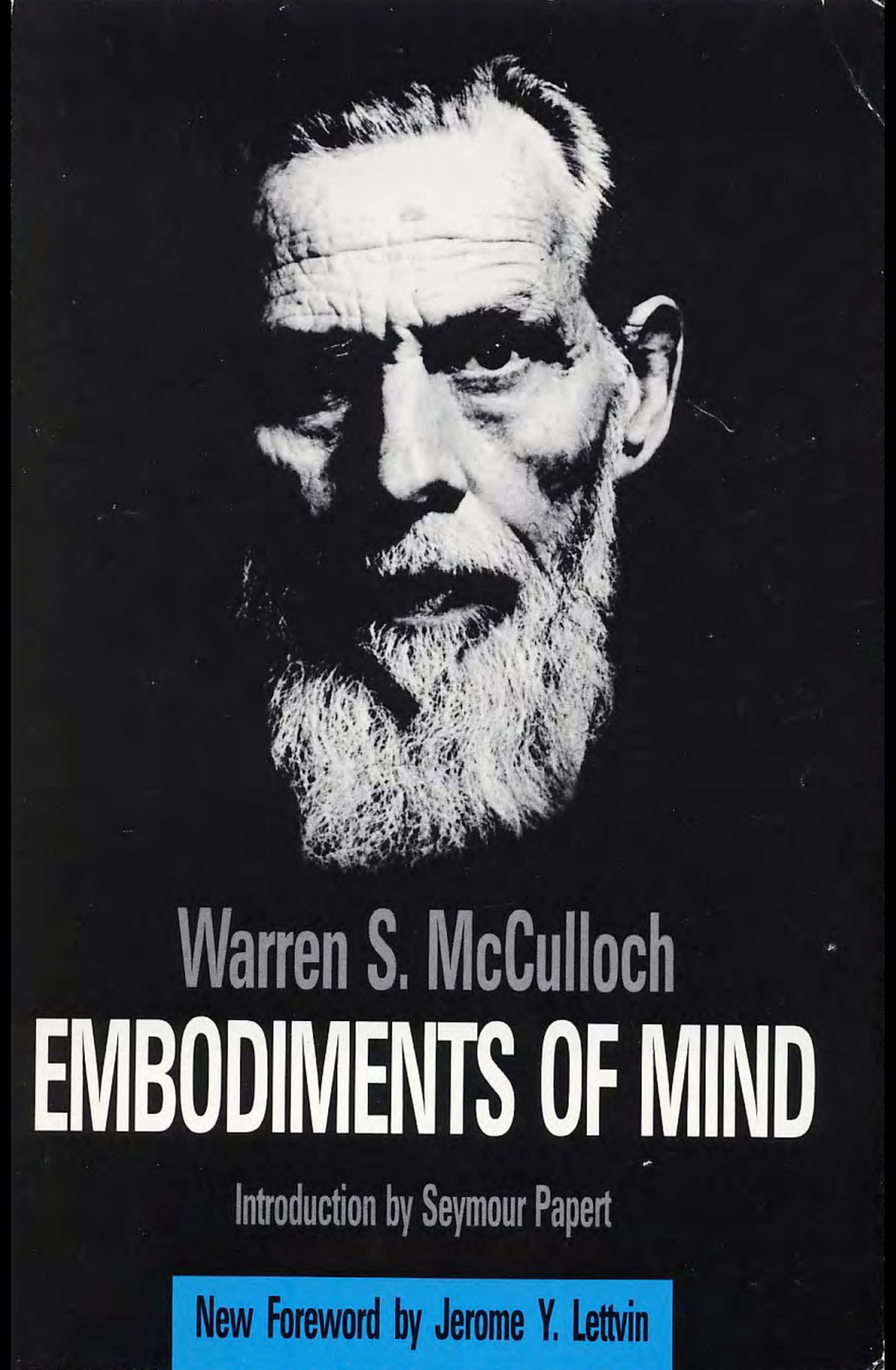
JOHN WILEY & SONS, INC., NEW YORK
HERMANN et CIE, PARIS

Cybernetics is the title of a book published in 1948 by Norbert Wiener.

Photo: MIT Archives

Wiener became world-famous for his work in cybernetics.

But he was not the only important figure at the origin of the field.



Warren McCulloch was a neurophysiologist and genius who gathered world-renowned scientists to a series of conferences.

CYBERNETICS

CIRCULAR CAUSAL AND FEEDBACK MECHANISMS IN BIOLOGICAL AND SOCIAL SYSTEMS

Transactions of the Tenth Conference
April 22, 23, and 24, 1953, Princeton, N. J.

Edited by

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NEW YORK, N. Y.

Sponsored by the

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NEW YORK, N. Y.

McCulloch organized the Macy Meetings that founded the trans-disciplinary field of cybernetics.

Von Foerster ran the renowned Biological Computer Lab in Urbana from the 1950s to the 1970s.

He influenced generations of cyberneticians.

Photo: BCL Archives
University of Illinois
Urbana-Champaign

Margaret Mead was a world-renowned scholar who revolutionized anthropology.

Photo via UN Multimedia

1953

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*Tenth Conference on Cybernetics**

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* This is the final conference.
† Absent.

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chemistry
JOHN R. BOWMAN
Department of Physical Chemistry
Mellon Institute of Industrial Research, University of Pittsburgh
Pittsburgh, Pa.

YUEN REN CHAO
Department of Oriental Languages, University of California
Berkeley, Cal.

JAN DROOGLEEVER-FORTUYN
Department of Neurology, University of Groningen
Groningen, Holland

psychiatry
W. GREY-WALTER
Burden Neurological Institute
Stapleton, Bristol, England

HENRY QUASTLER
Control Systems Laboratory, University of Illinois
Urbana, Ill.

electrical eng.
CLAUDE SHANNON
Bell Telephone Laboratories, Inc., Murray Hill Laboratory
Murray Hill, N. J.

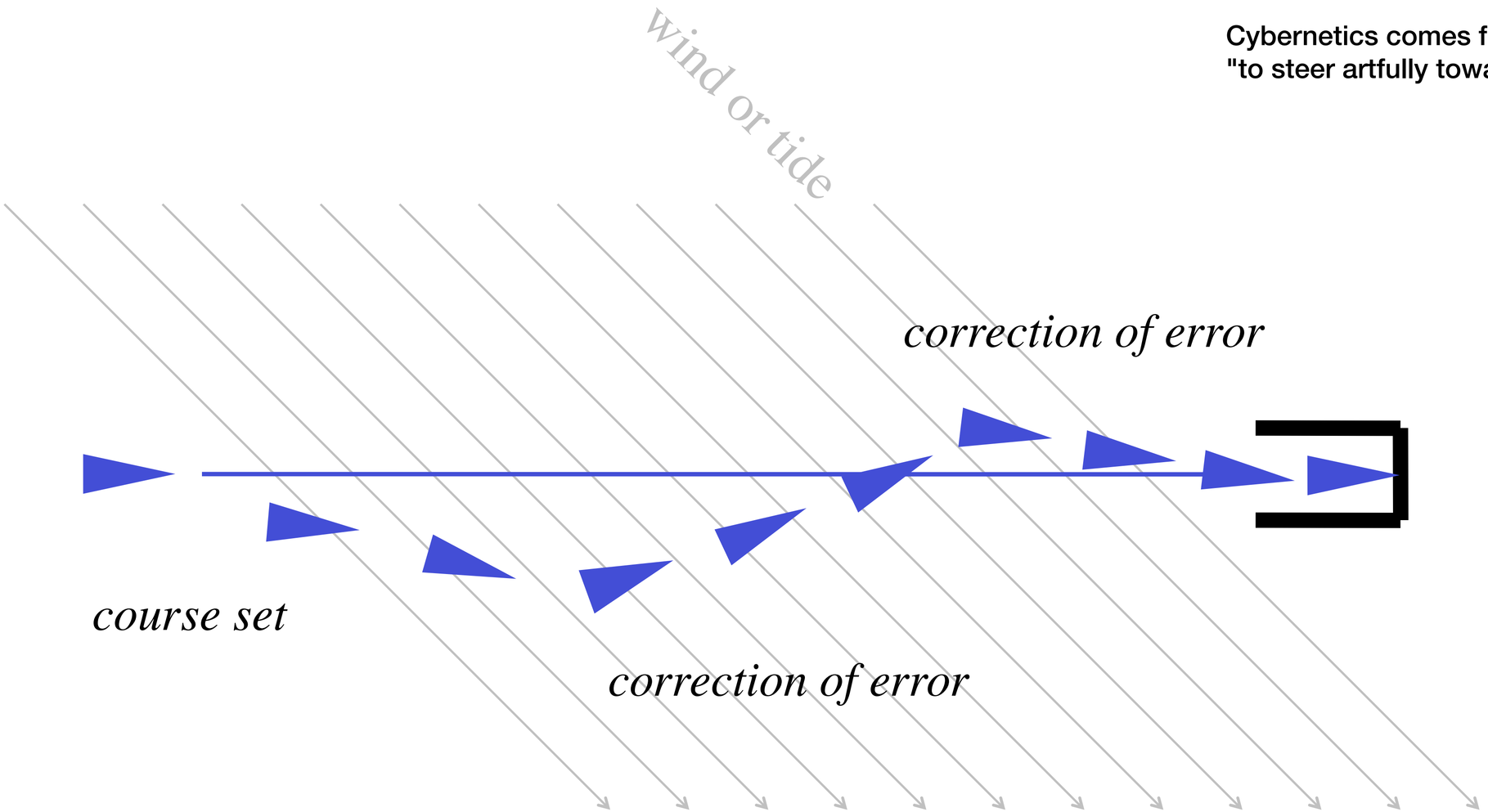
THE JOSIAH MACY, JR. FOUNDATION
FRANK FREMONT-SMITH, *Medical Director*
JANET FREED LYNCH, *Assistant for the Conference Program*

† Absent.

Great thinkers from all the major disciplines were involved in conversations that created cybernetics.

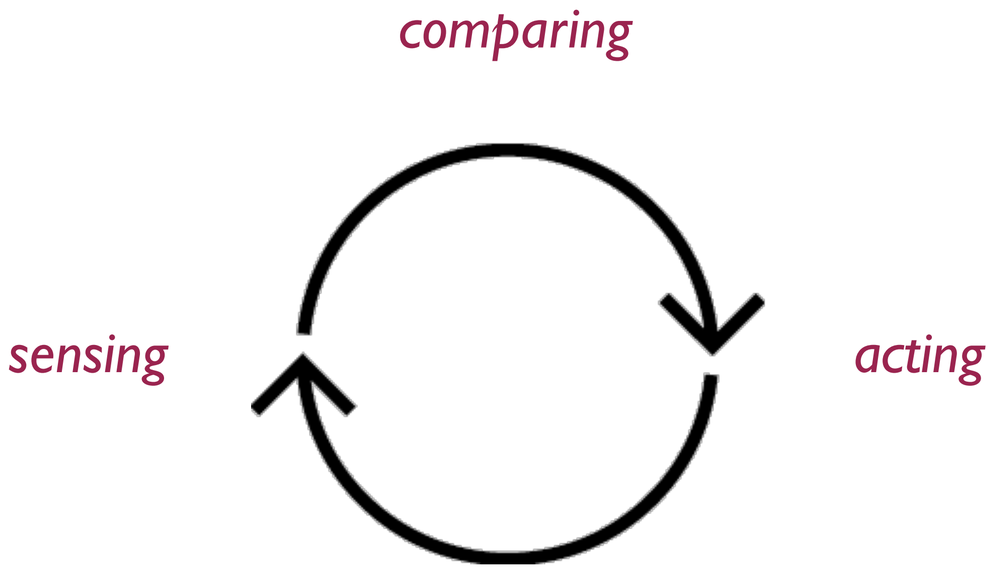
the art of steering

Cybernetics comes from the Greek,
"to steer artfully toward a goal."



the art of steering

Cybernetics is the art and science of feedback and goals.



Early 1950s

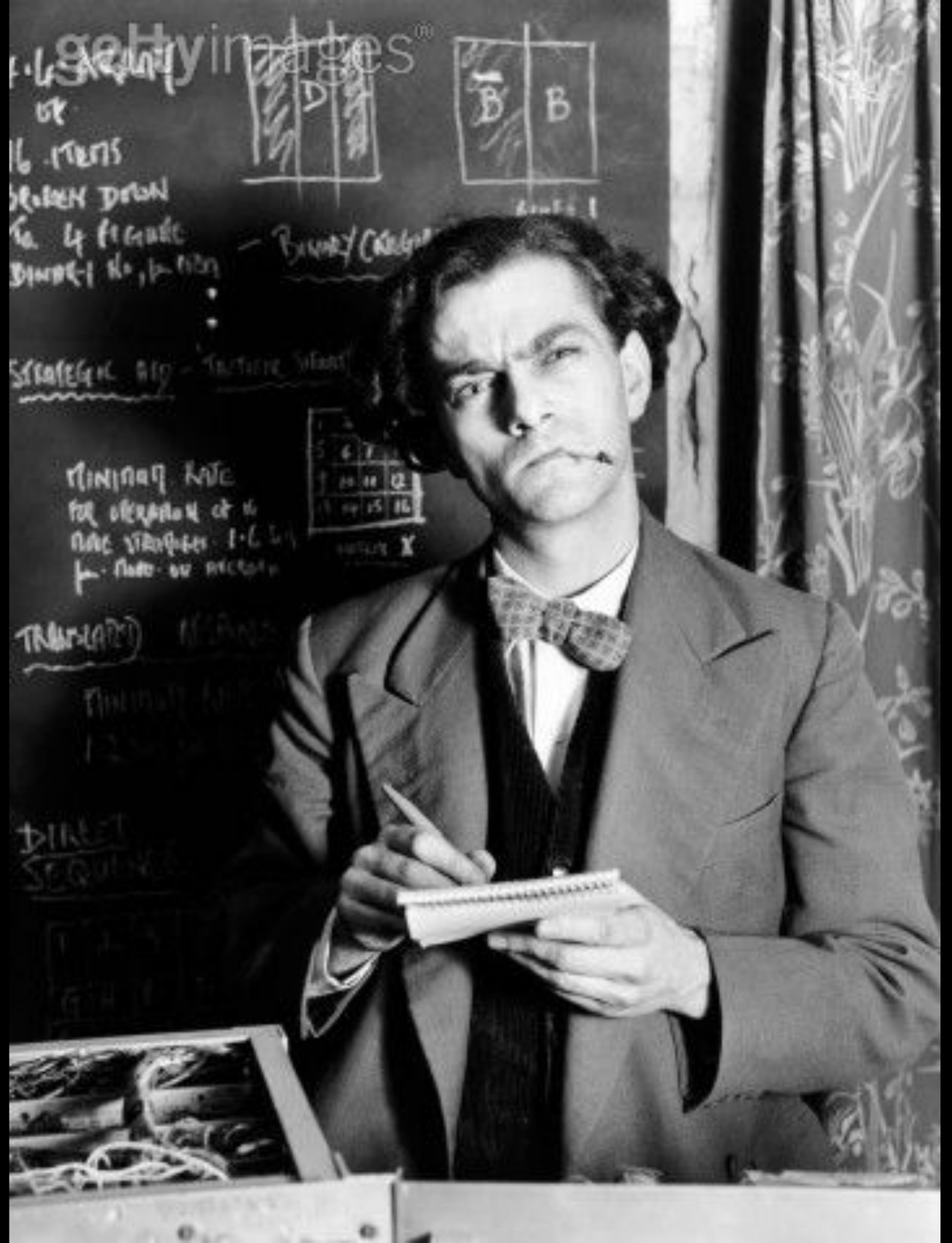


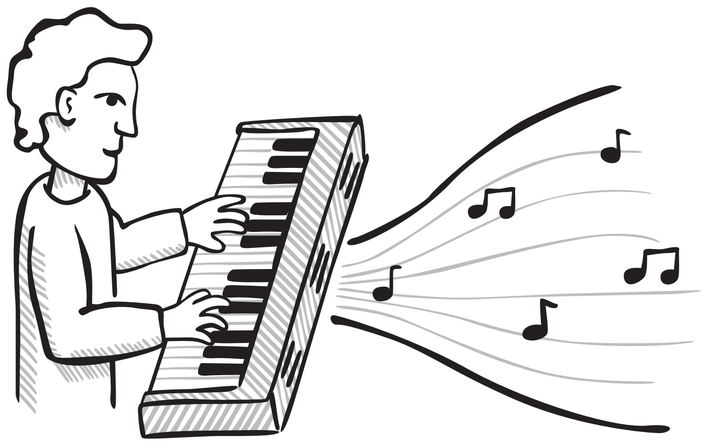
Photo: Uncredited

Gordon Pask was a wunderkind who was doing cybernetics before he knew it.

He realized it only after meeting Norbert Wiener.

Pask’s first interactive machine was called Musicolour, completed in 1953.

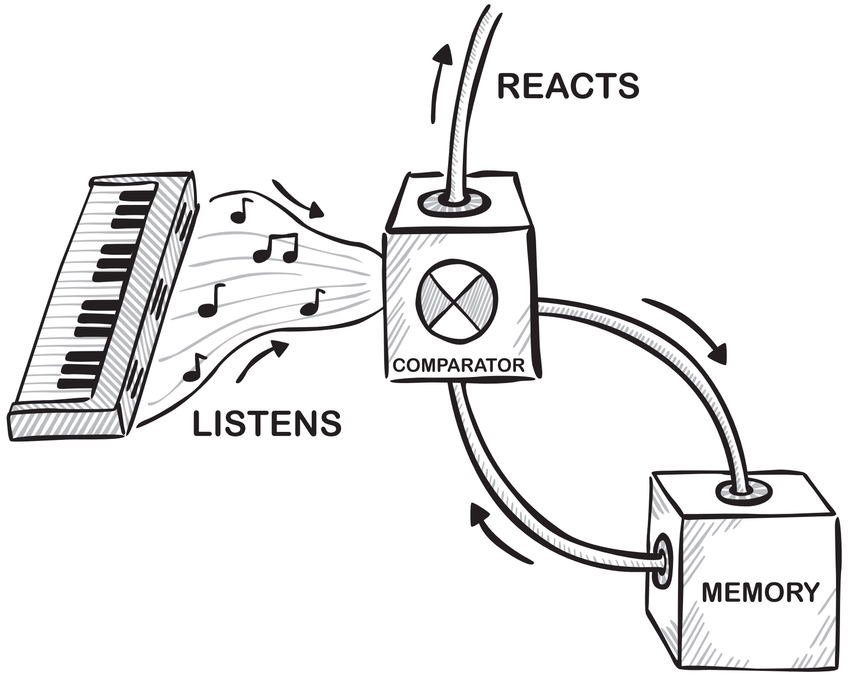
A musician improvises on any musical instrument.

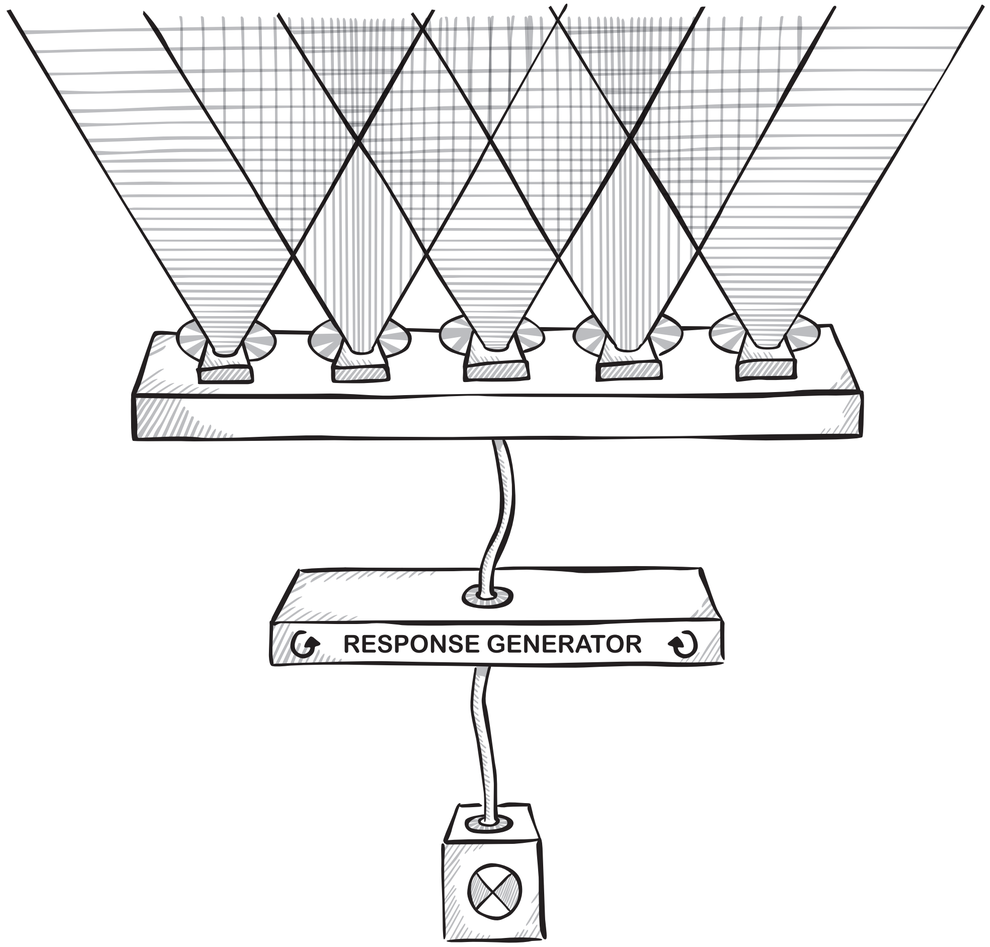


Musicolour listens in real-time and reacts, depending on what came before.

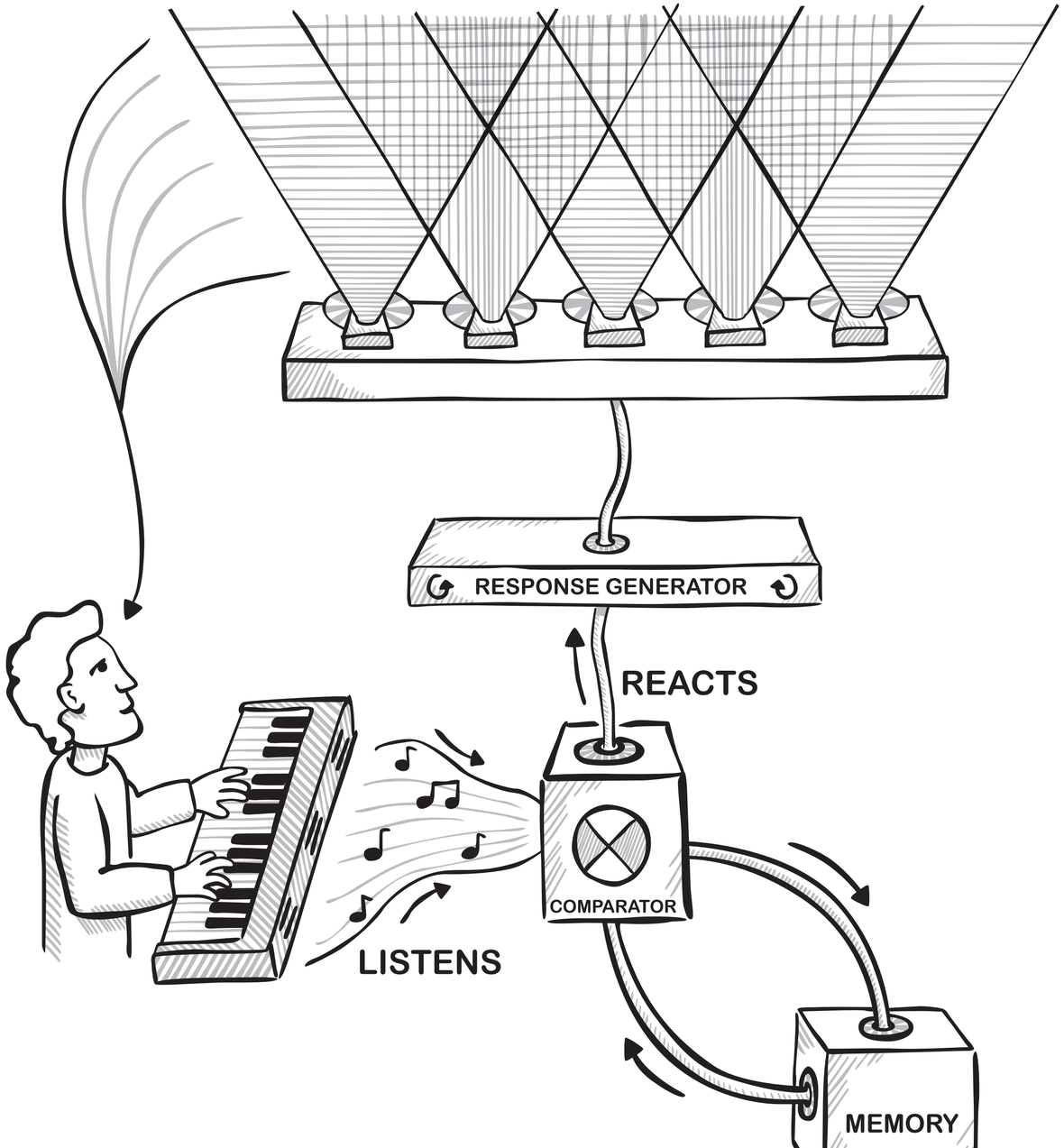
It’s purpose is to avoiding getting "bored."

It wants the music to change over time.



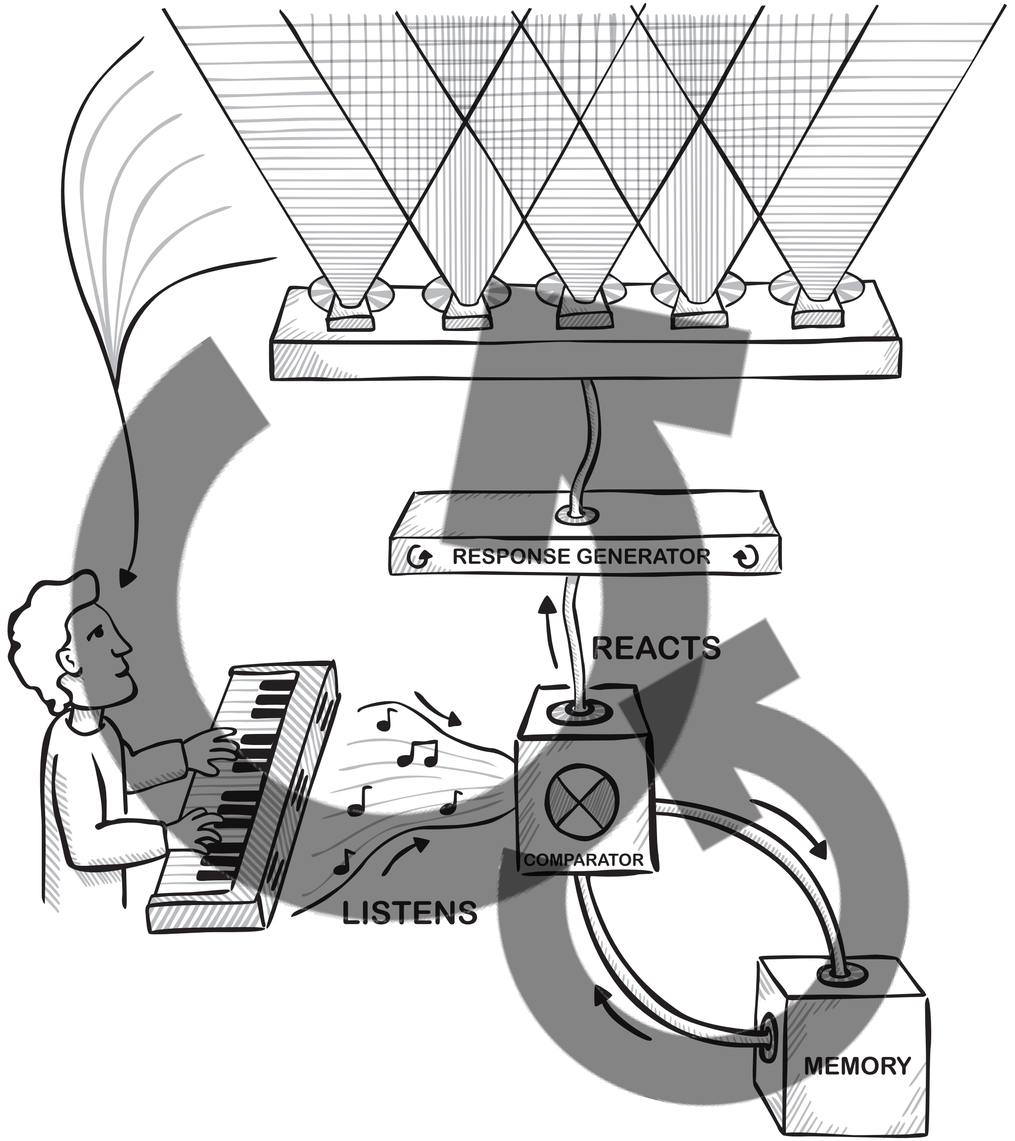


If the music is changing, Musicolour responds with colored lights that synch with the music—but its response also changes over time.



If the musician sees Musicolour is not responding, he changes his playing.

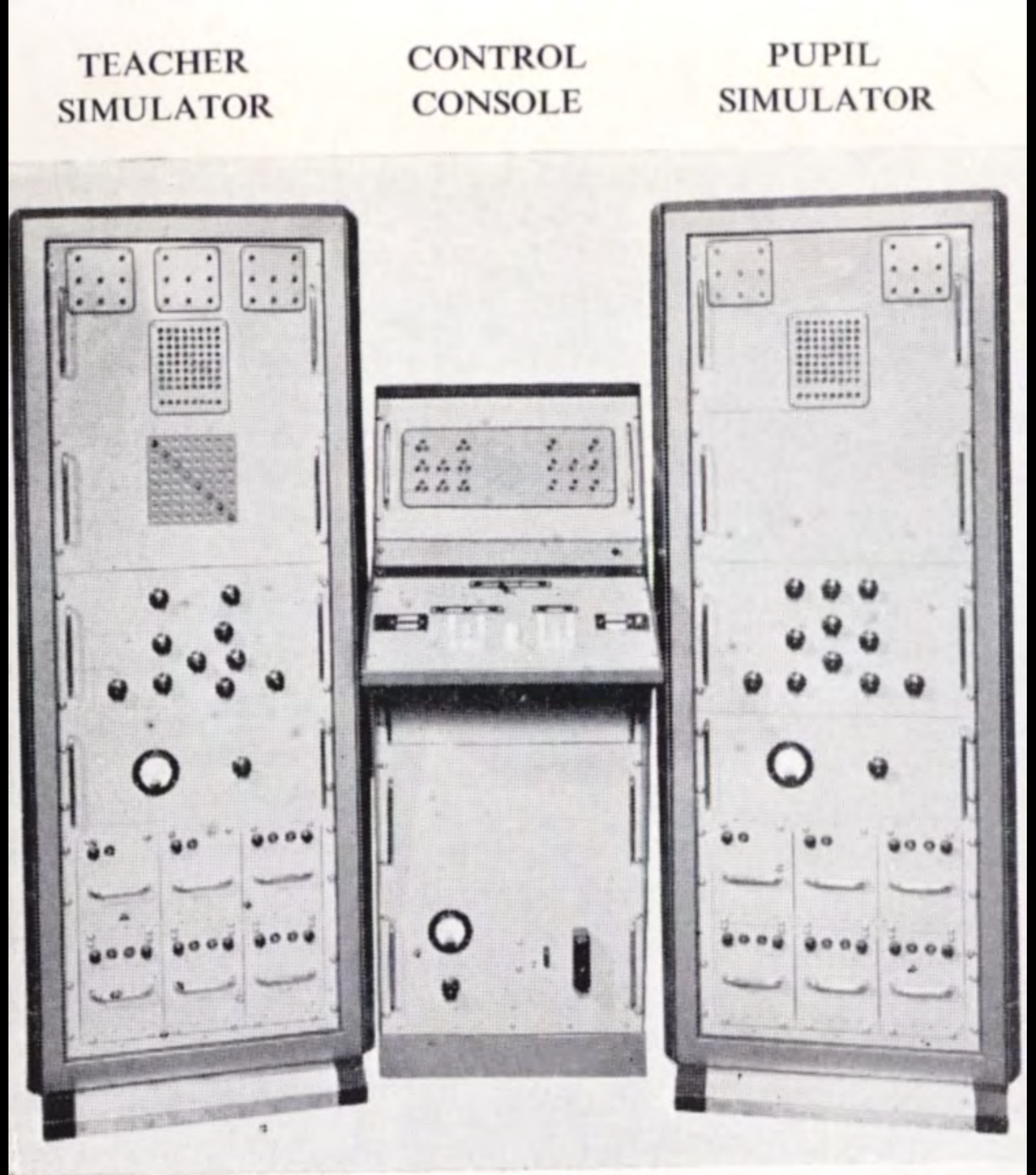
Musicolour provokes a conversation between human and machine.



Musicolour had multiple levels of feedback that separated actions from goals.

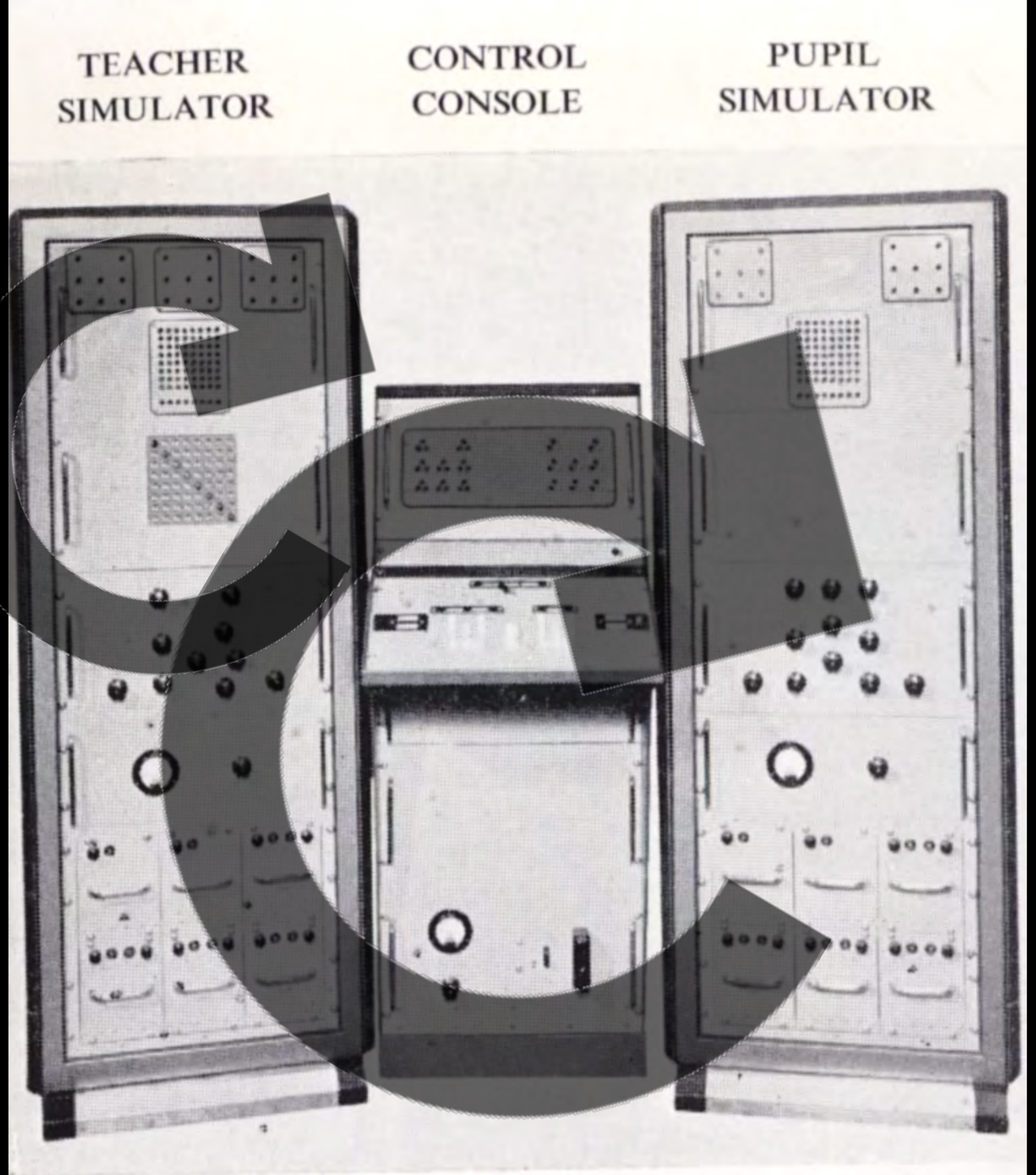
This architecture brings a human back to being human—it brings human attention to what is novel and interesting.

AIs—what to watch next on Youtube—don't create this depth of engagement.



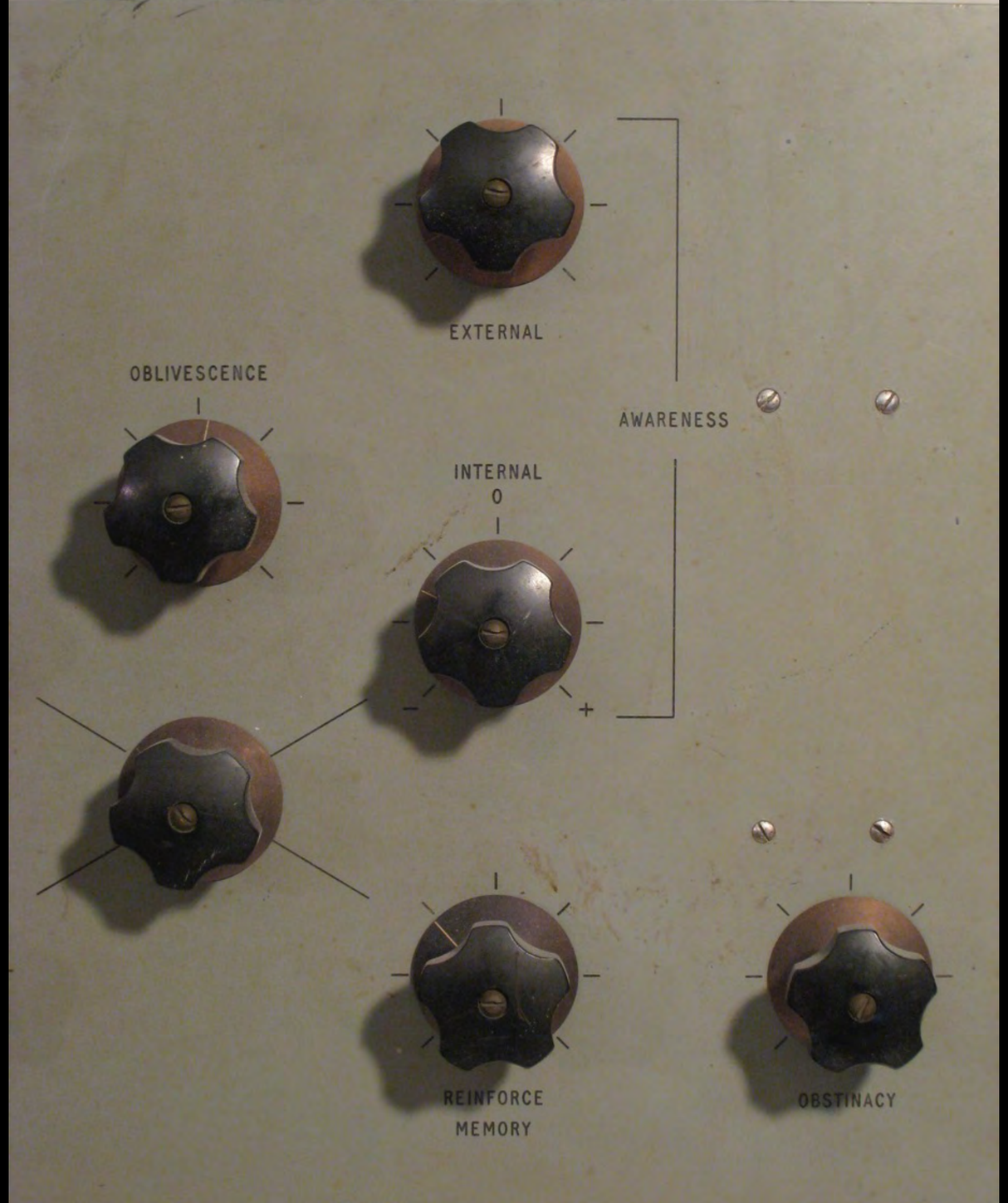
Pask created many conversational machines.

Here a teacher-machine converses with a pupil-machine.



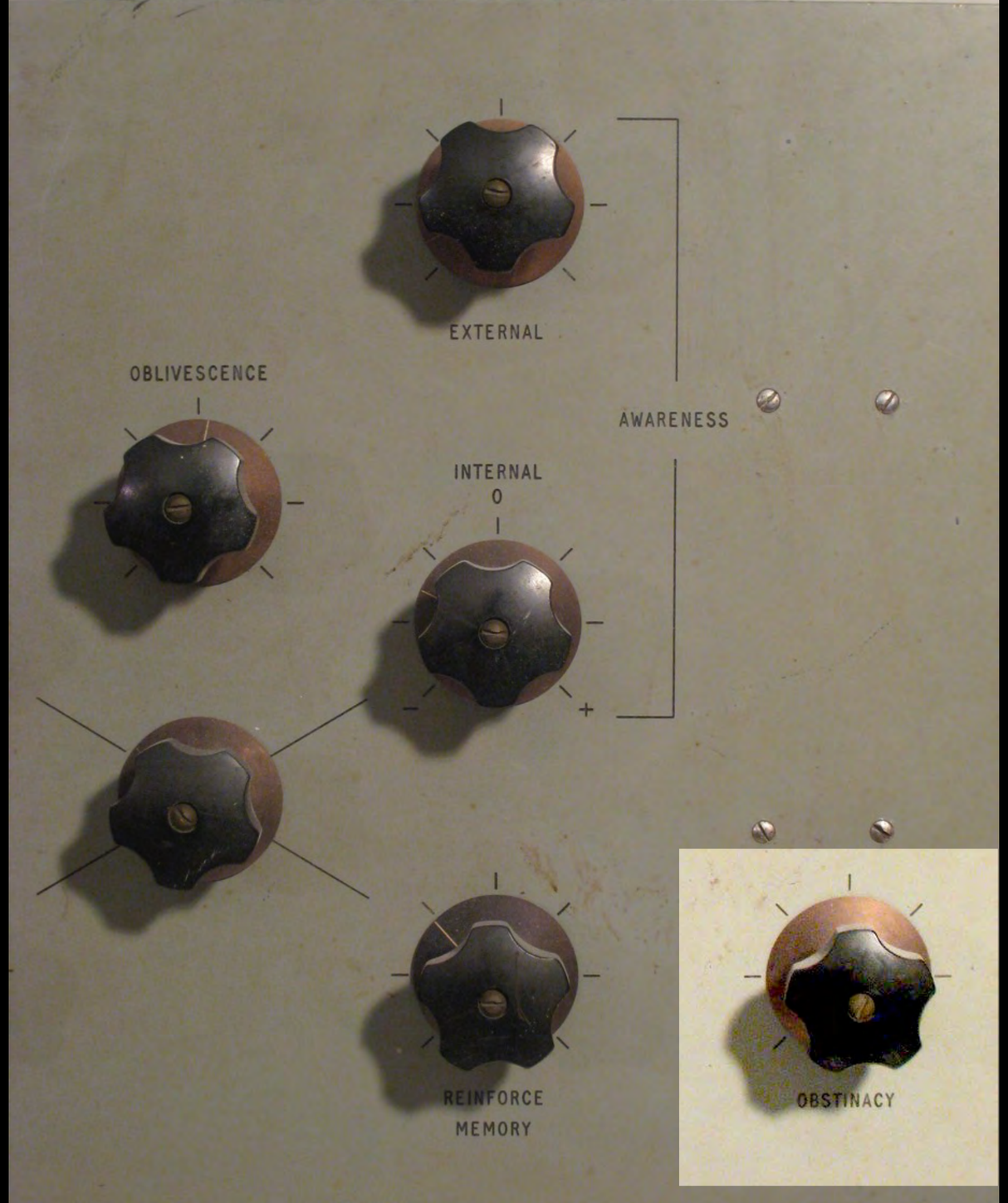
The conversation architecture was the same as Musicolour.

One loop applied feedback from actions and another applied feedback about goals.

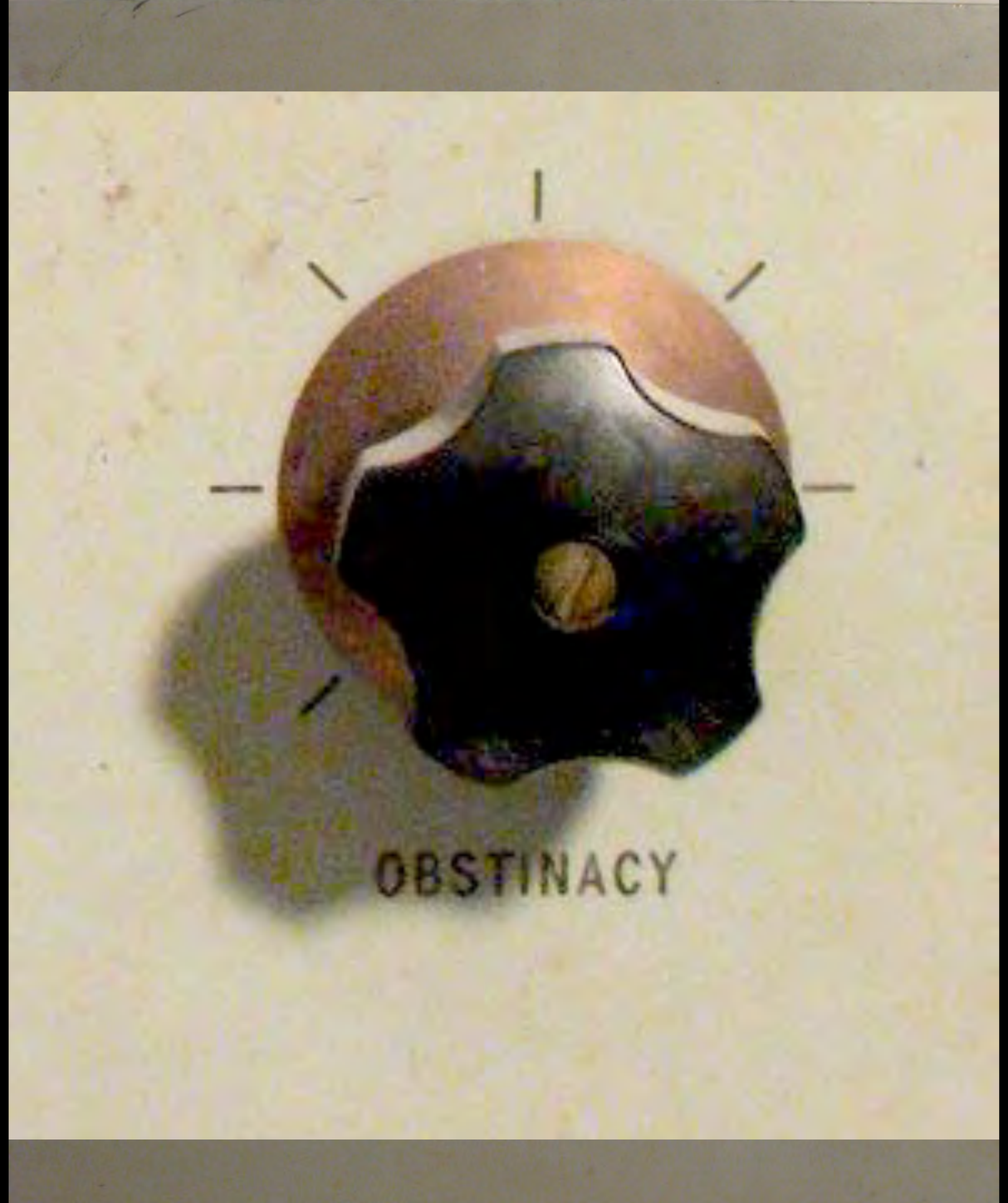


The control panel of the pupil-machine had a knob to control internal awareness

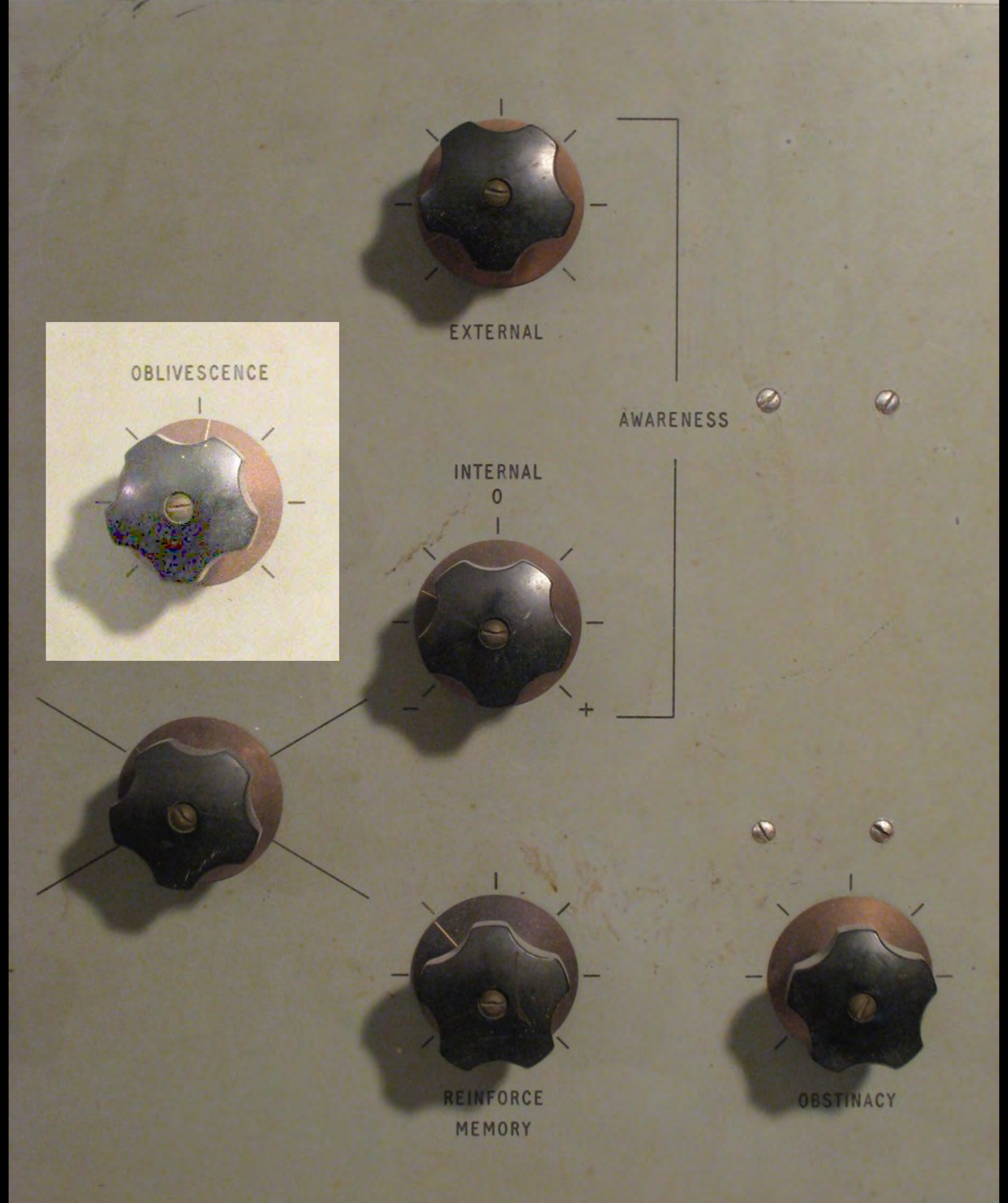
And another knob to control external awareness.



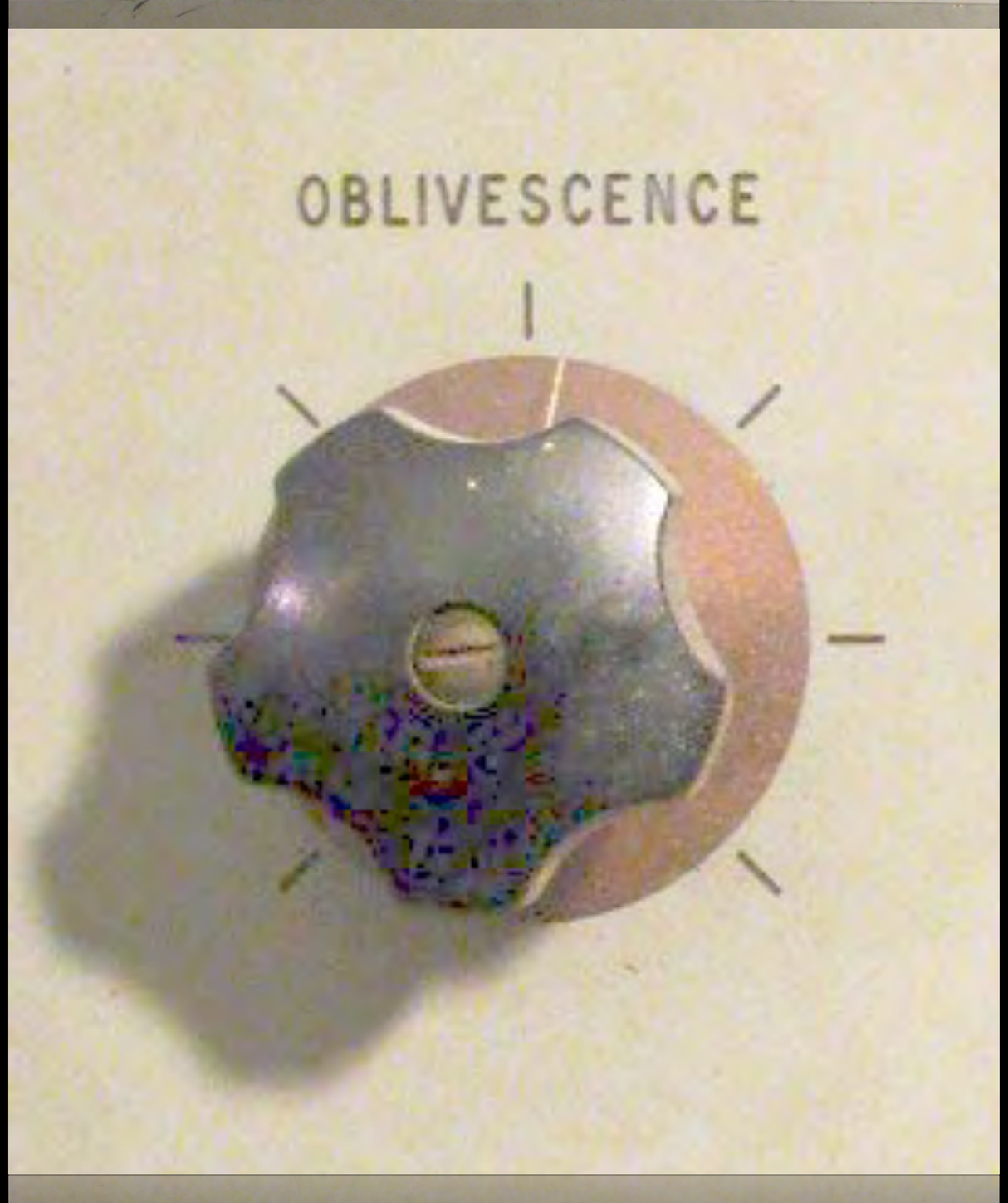
Yet another knob controlled the degree of obstinacy.



Turning up this knob made the pupil-machine less willing to learn.



But there was something beyond obstinacy.



"Oblivescence" means
"willful forgetfulness."

Pask was a second-generation cybernetician.

He had his own research approach before learning about the discipline of cybernetics.

1980s

Photo: Paul Pangaro

Pask's approach was to create machinery for studying feedback in conversations of all kinds.

That's his wife, Elizabeth.

Mid-1980s

Photo: Paul Pangaro

Mid-1980s

Photo: Paul Pangaro

GORDON PASK

CONVERSATION, COGNITION AND LEARNING

A CYBERNETIC THEORY AND METHODOLOGY

ELSEVIER

1975

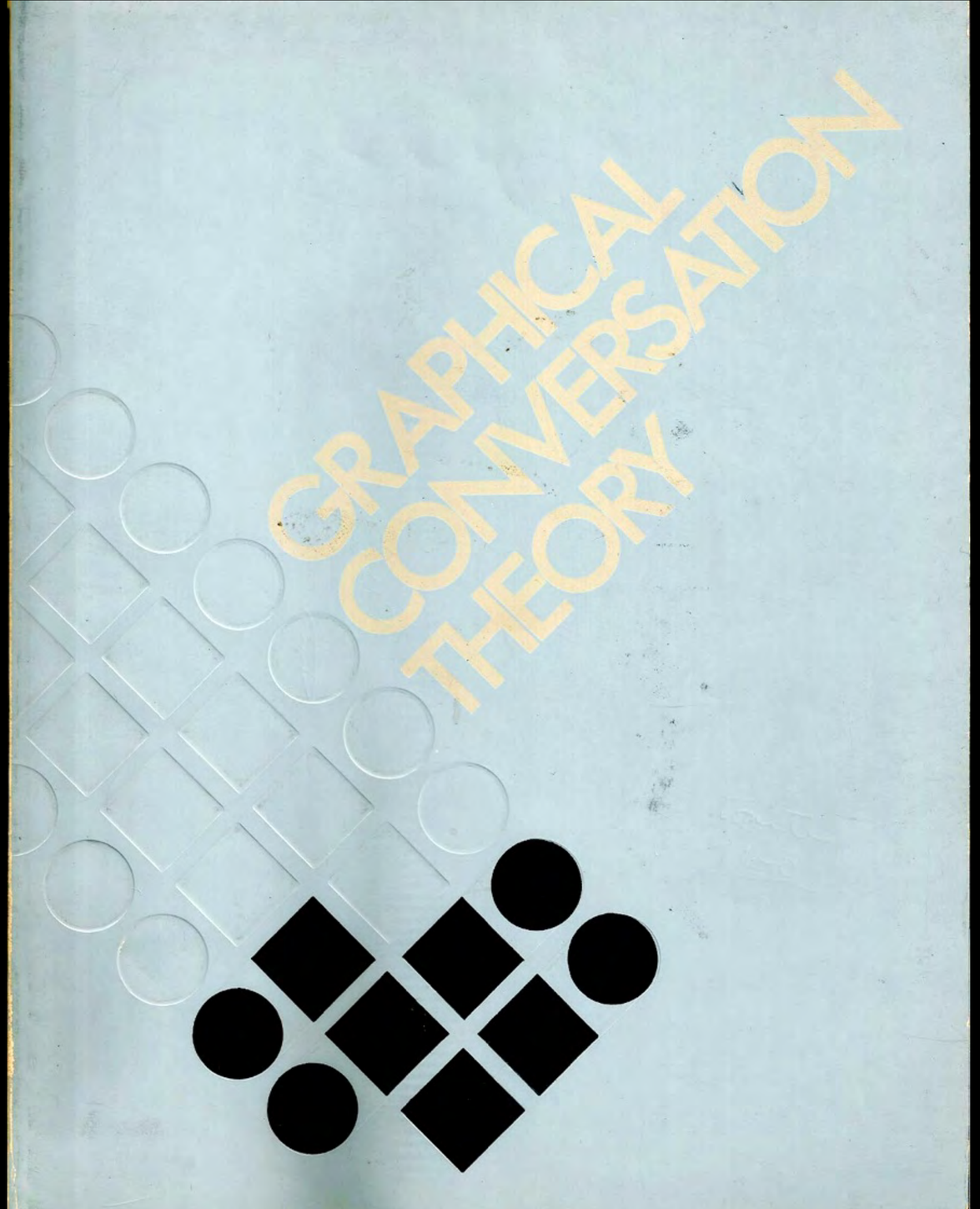
GORDON PASK

CONVERSATION THEORY

APPLICATIONS IN EDUCATION AND EPISTEMOLOGY

ELSEVIER

1976



Pask influenced many researchers, including those that founded the MIT Media Lab.

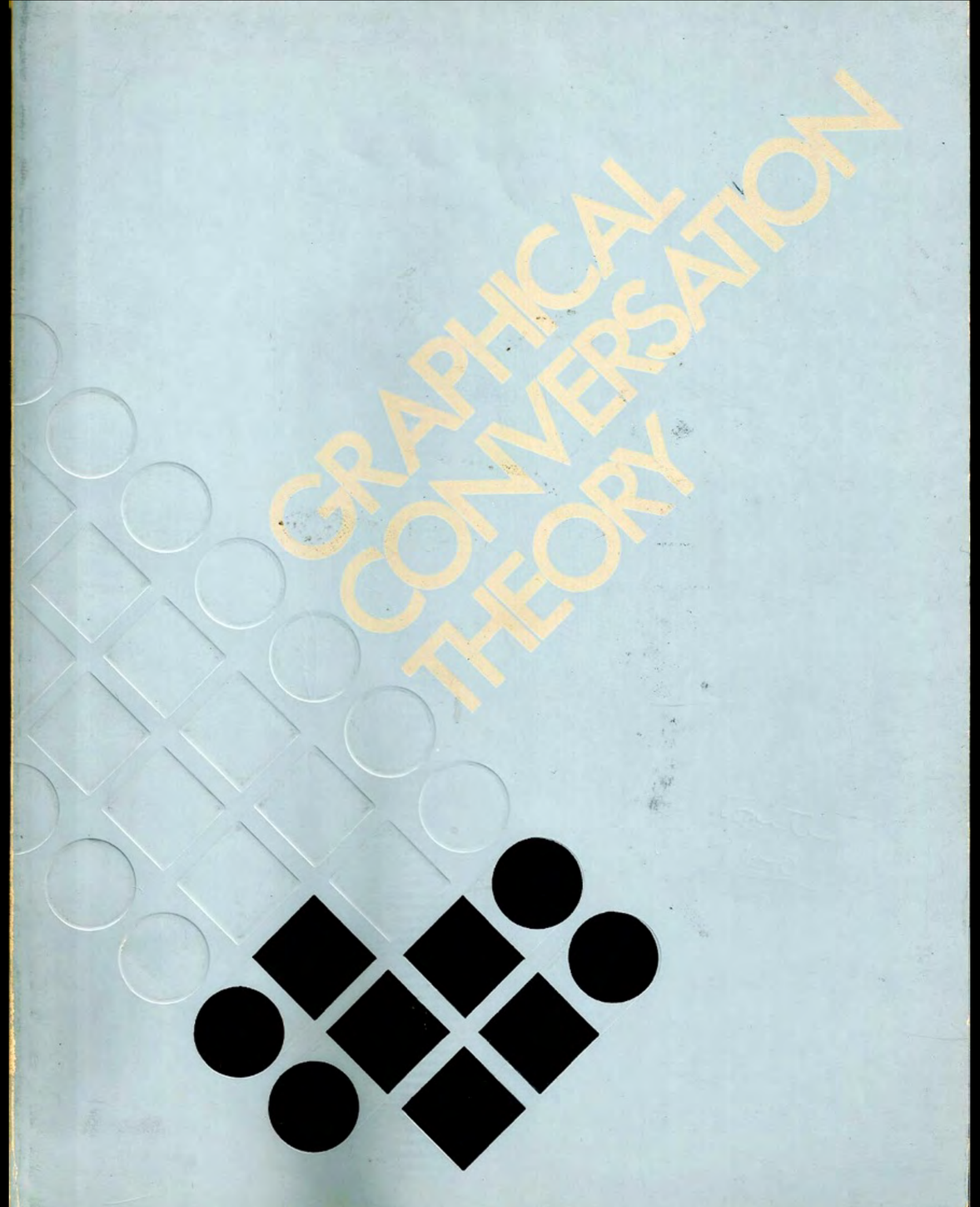
Pask offered them inspiring metaphors and rigorous models of conversation.

1977

Cover Design: Muriel Cooper
Visible Language Workshop, MIT

1977

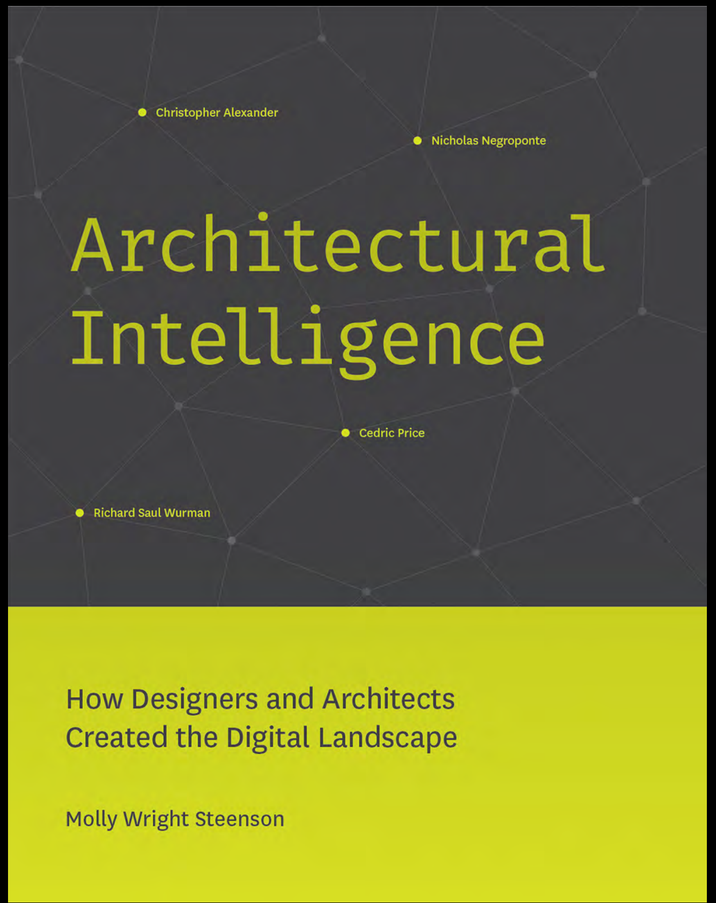
Cover Design: Muriel Cooper
Visible Language Workshop, MIT



Pask influenced many researchers, including those that founded the MIT Media Lab.

Pask offered them inspiring metaphors and rigorous models of conversation.

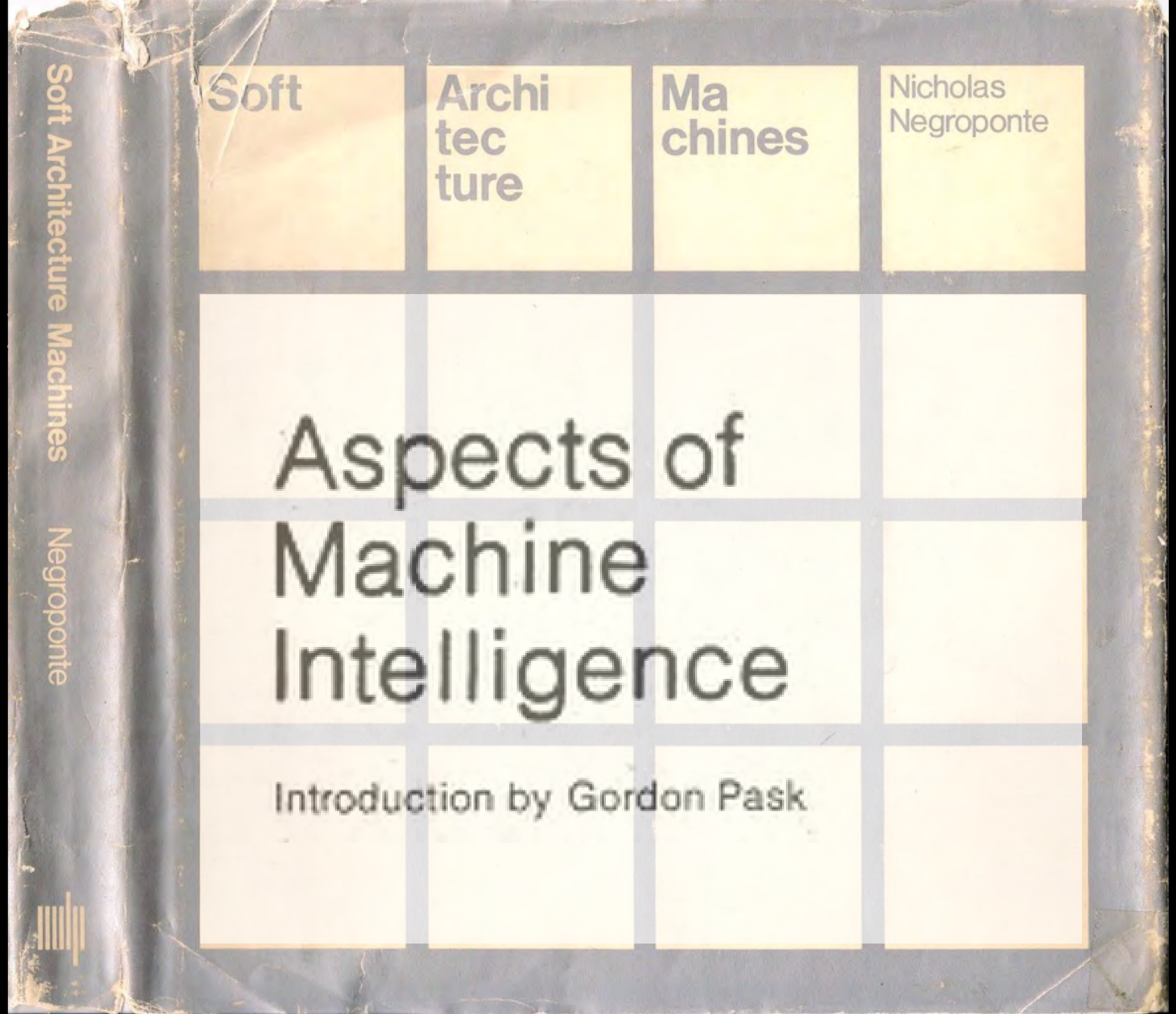
The work is documented in *Architectural Intelligence* by Molly Wright Steenson.



In 1976 Nicholas Negroponte edited a book about machines that could converse with designers about designing.

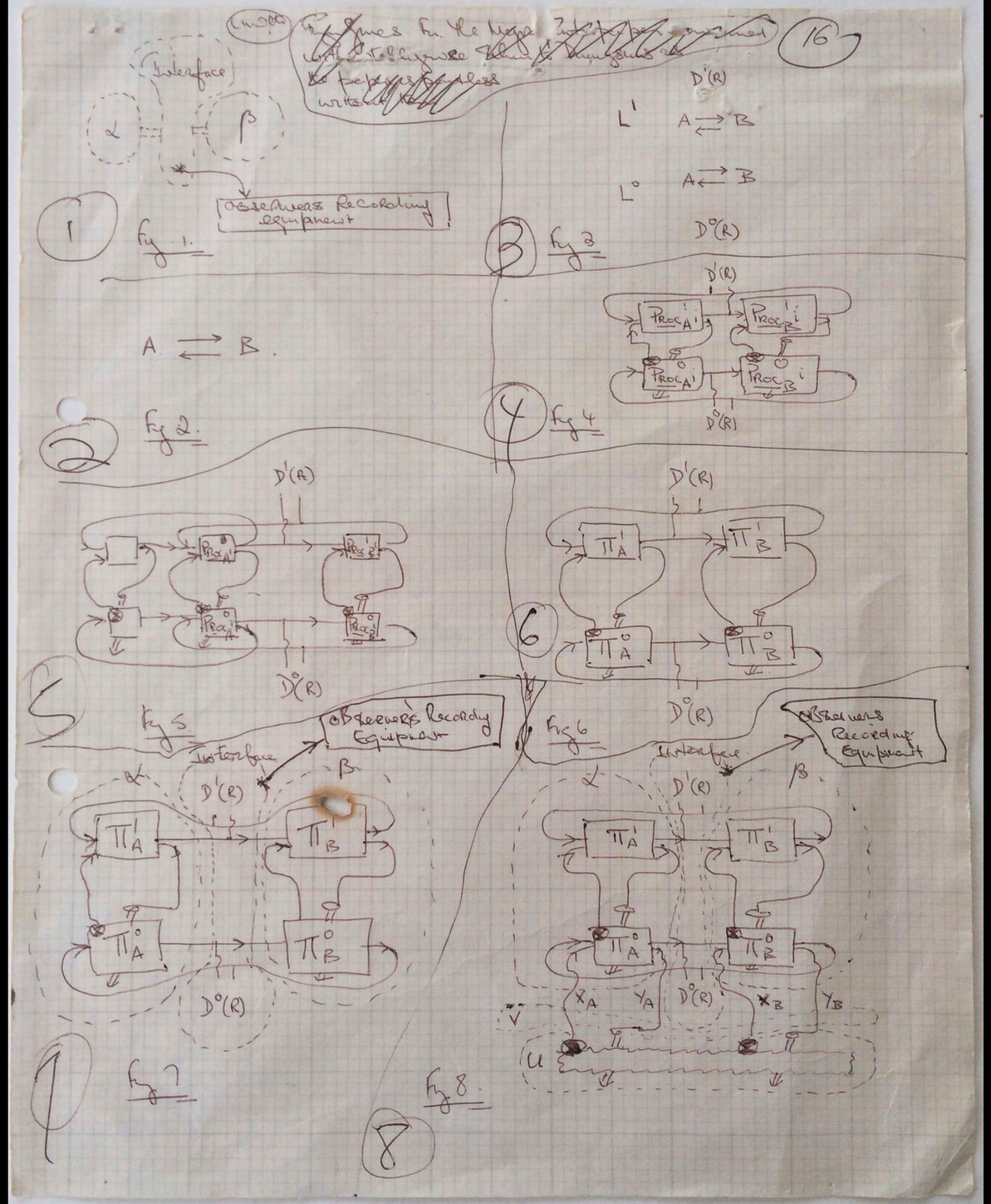
(He later co-founded the MIT Media Lab.)

Book Design: Muriel Cooper
MIT Press



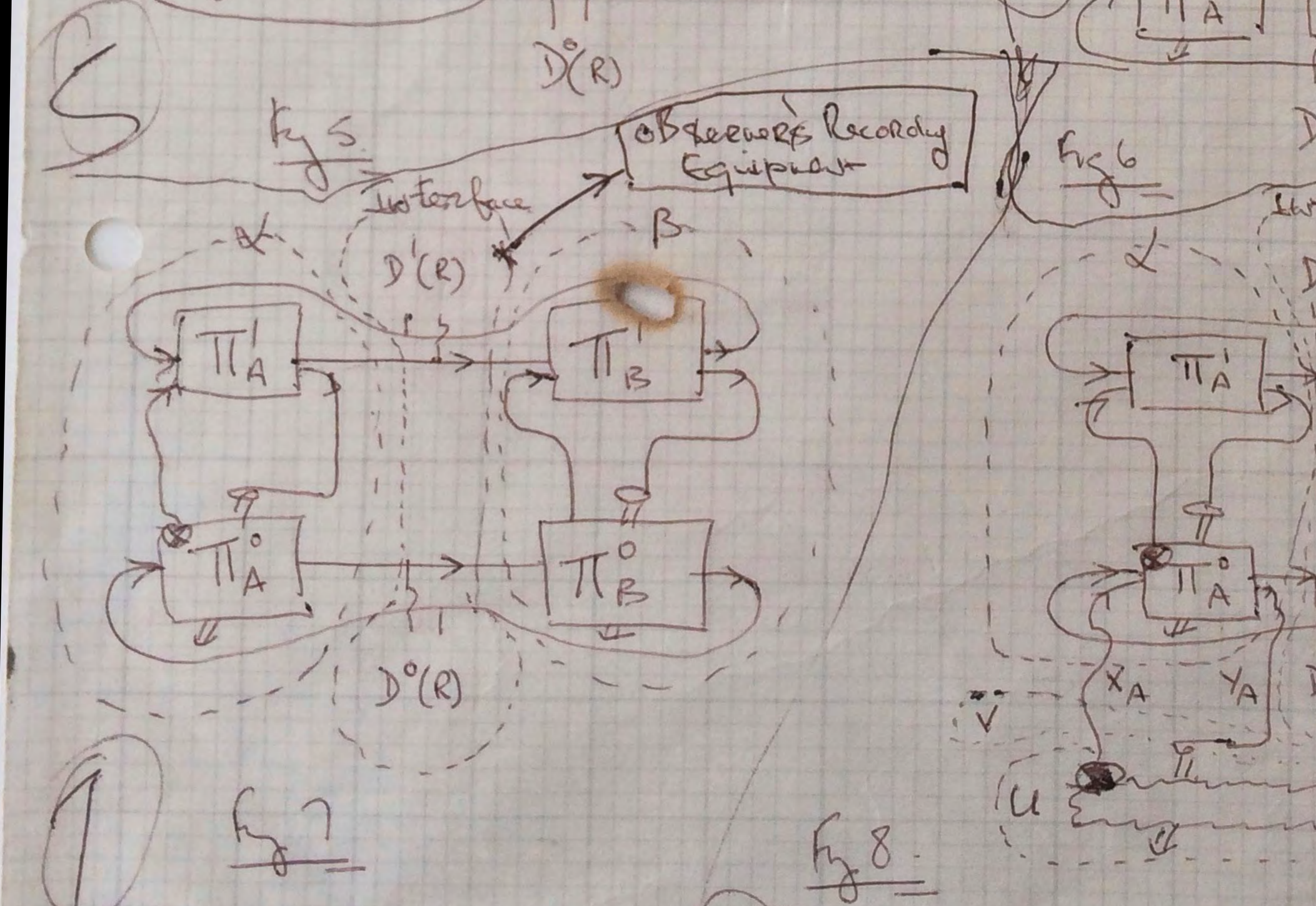
Pask took the opportunity to summarize his formal approach to conversation and made sketches to explain his model.

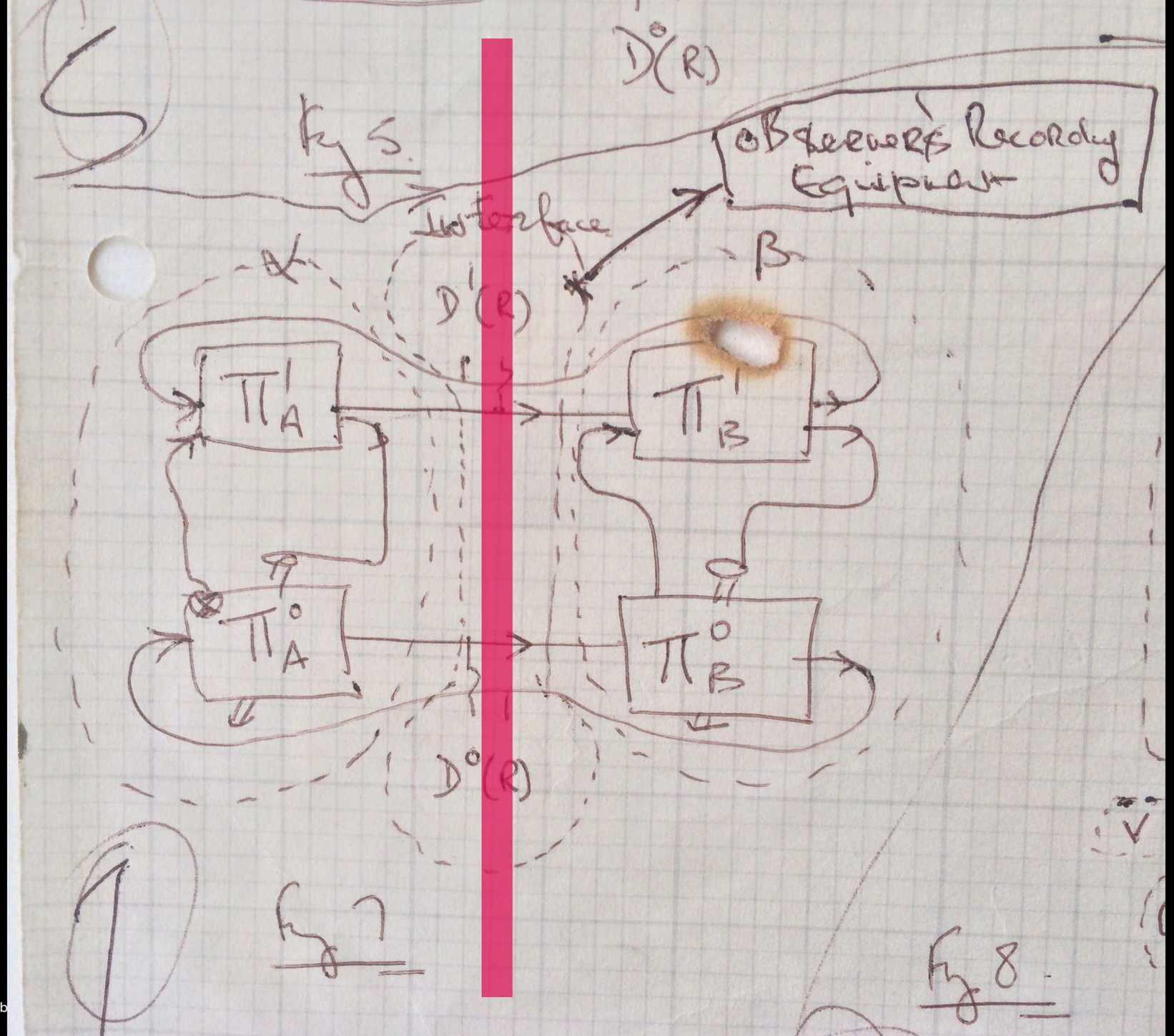
Book Design: Muriel Cooper
MIT Press



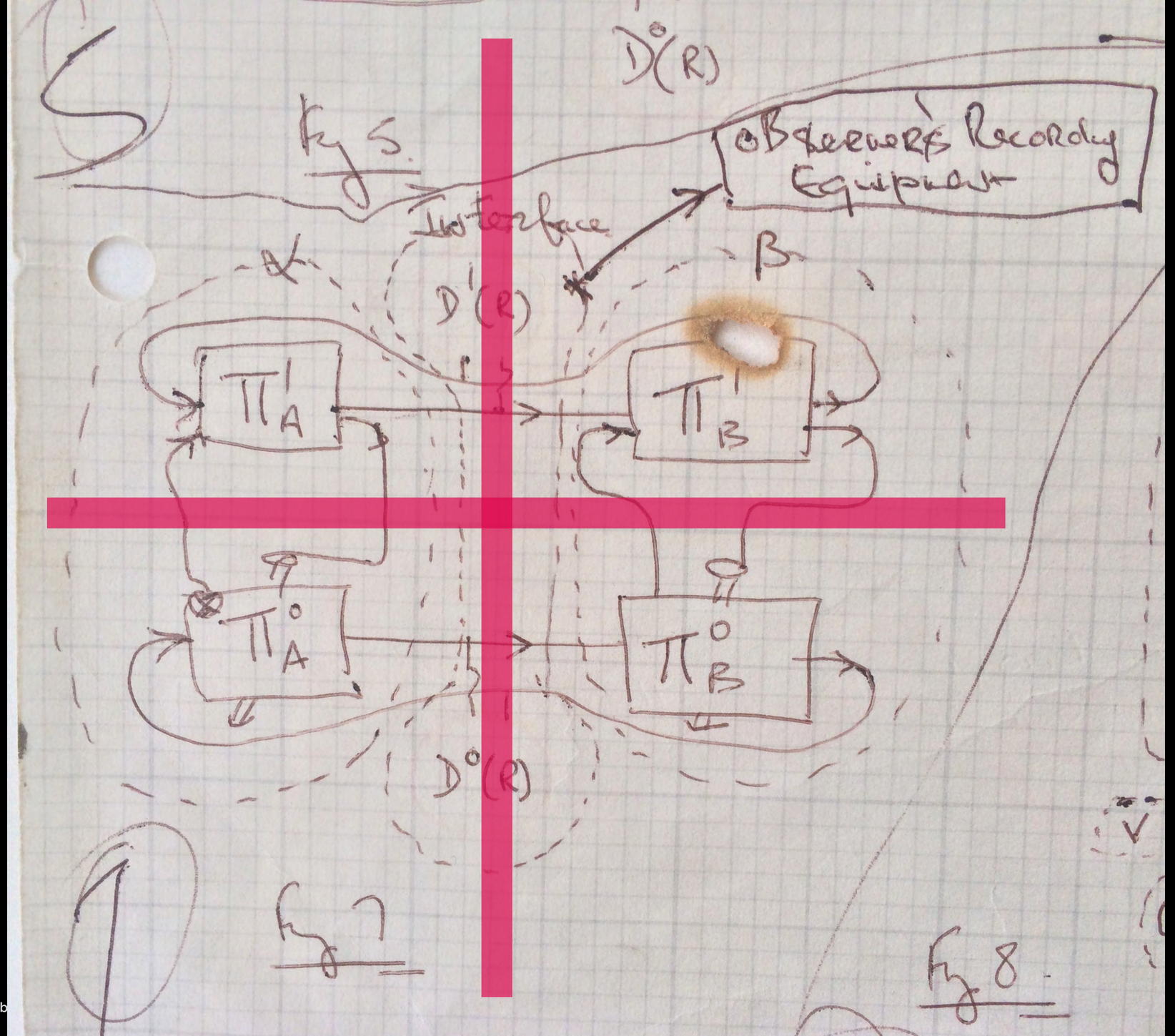
Pask's drawings are playful in character and rigorously complete.

They capture all the interactions involved in conversation.

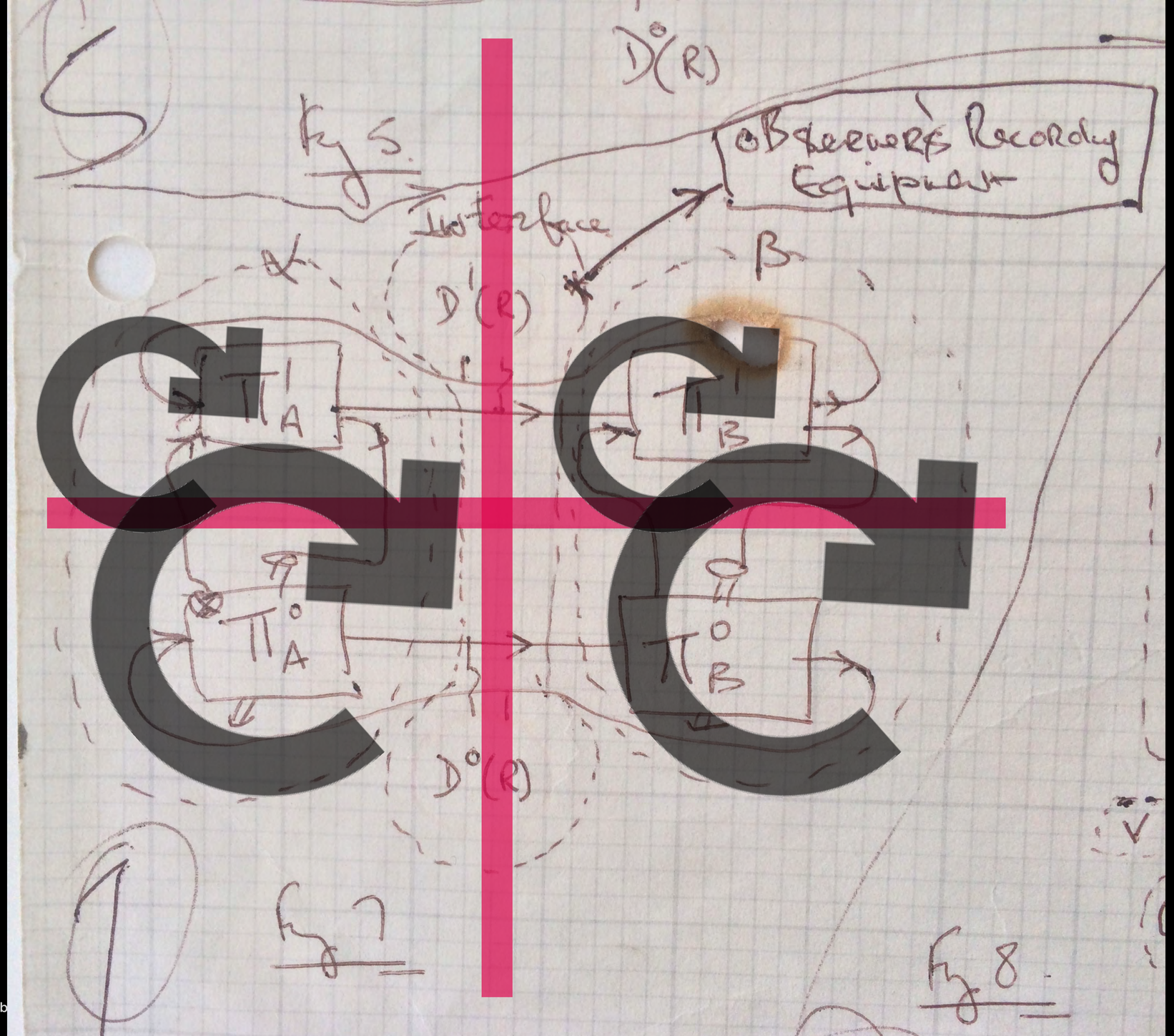




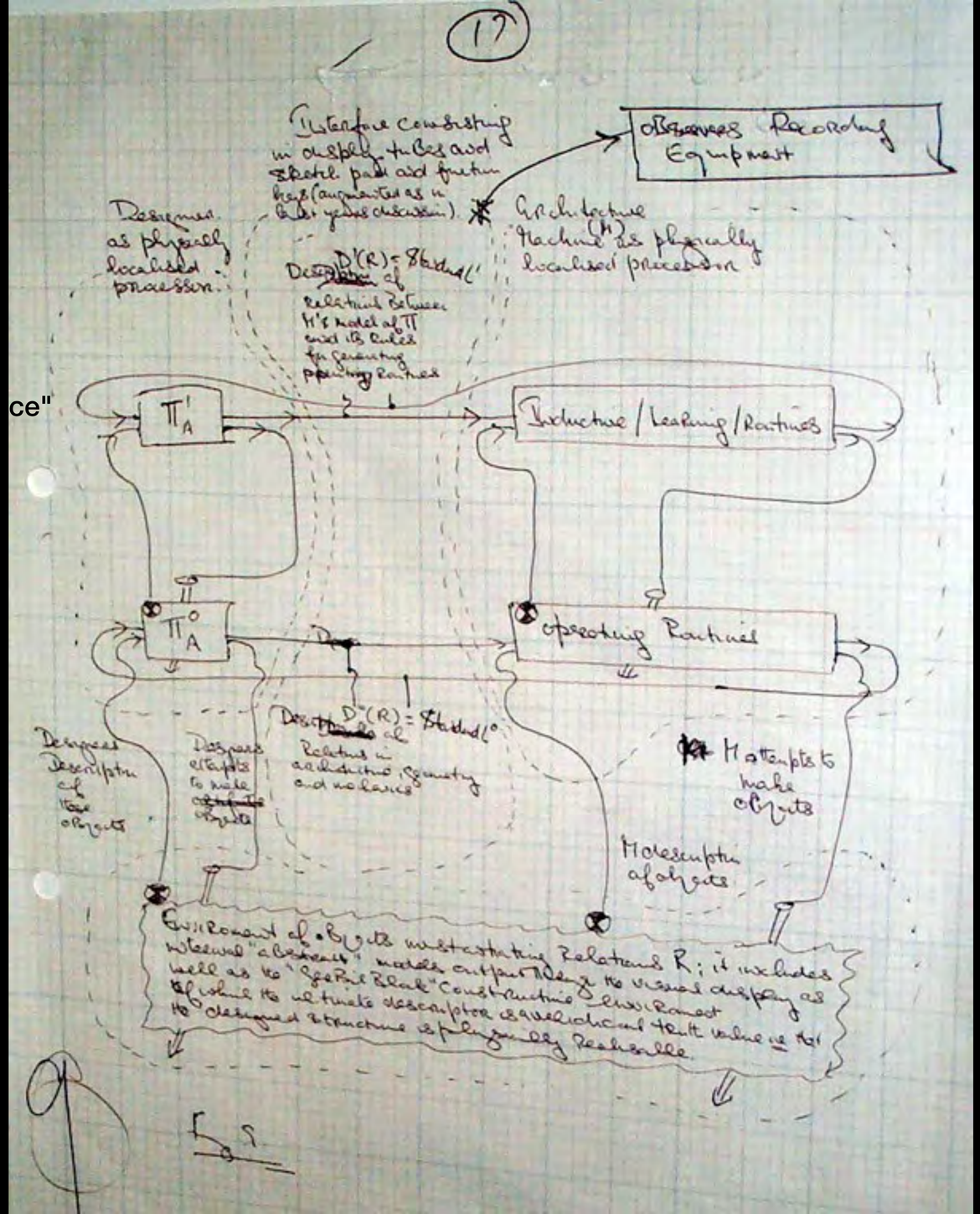
Conversations involve distinct actors.



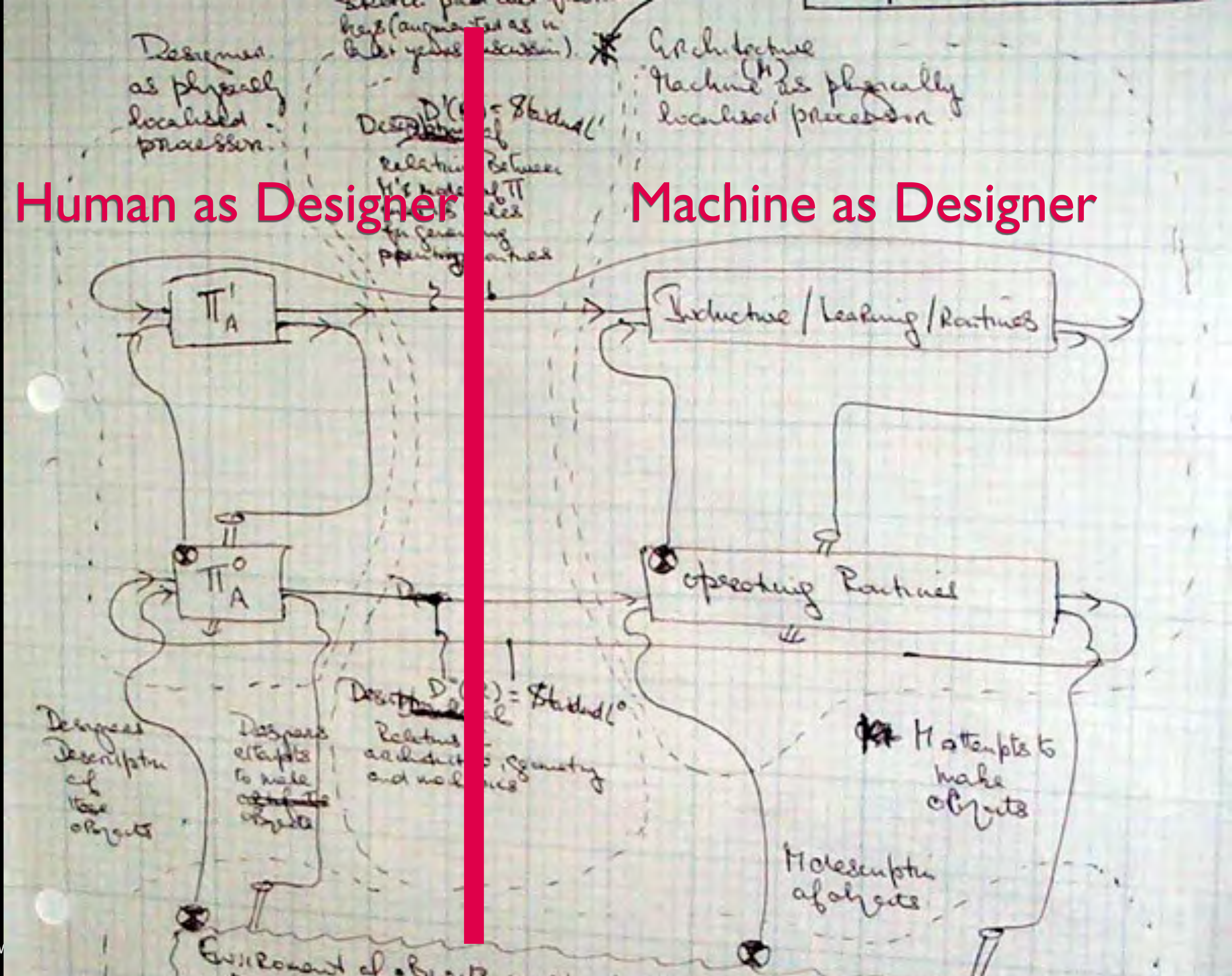
Actors interact at different levels about goals and about actions.

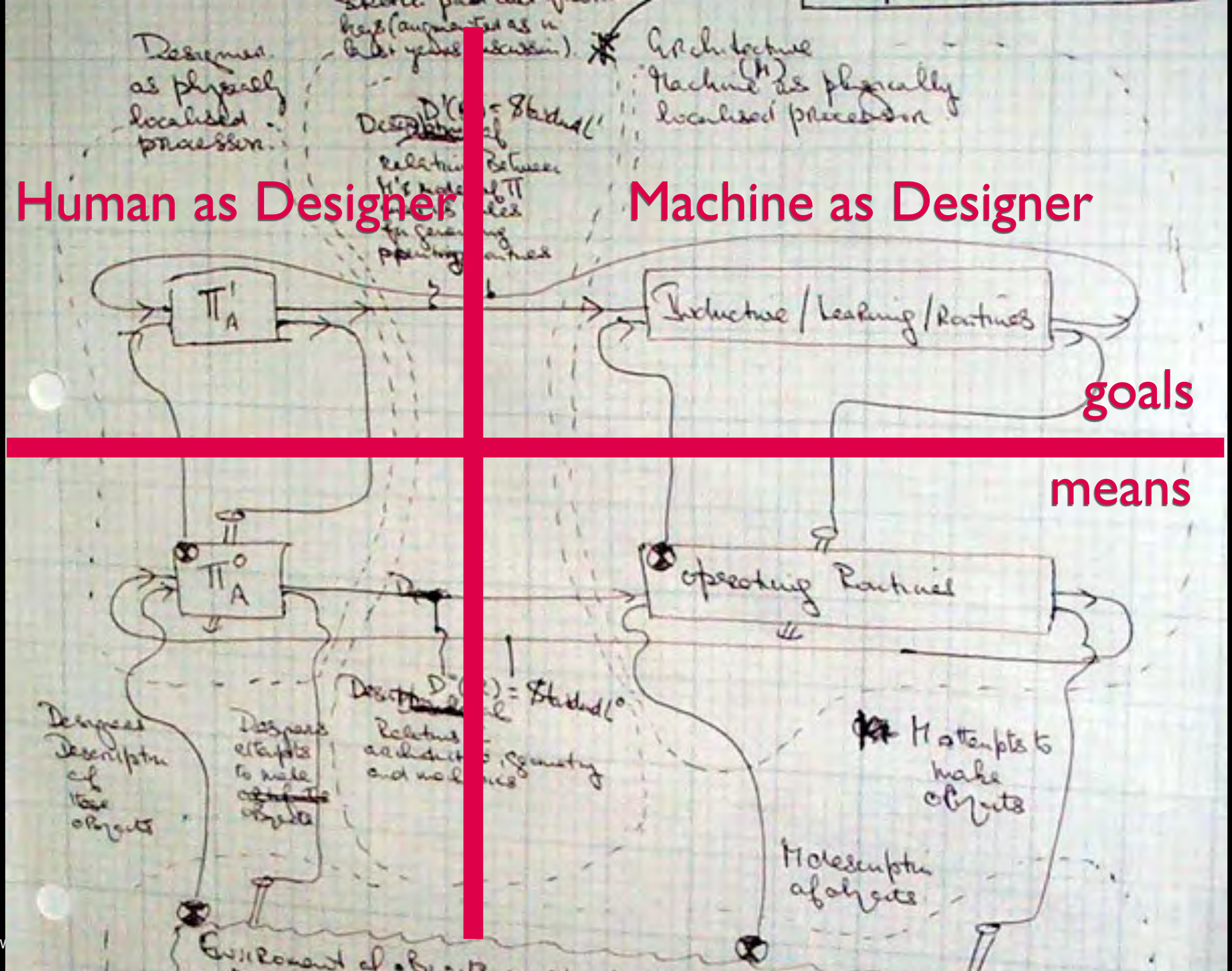


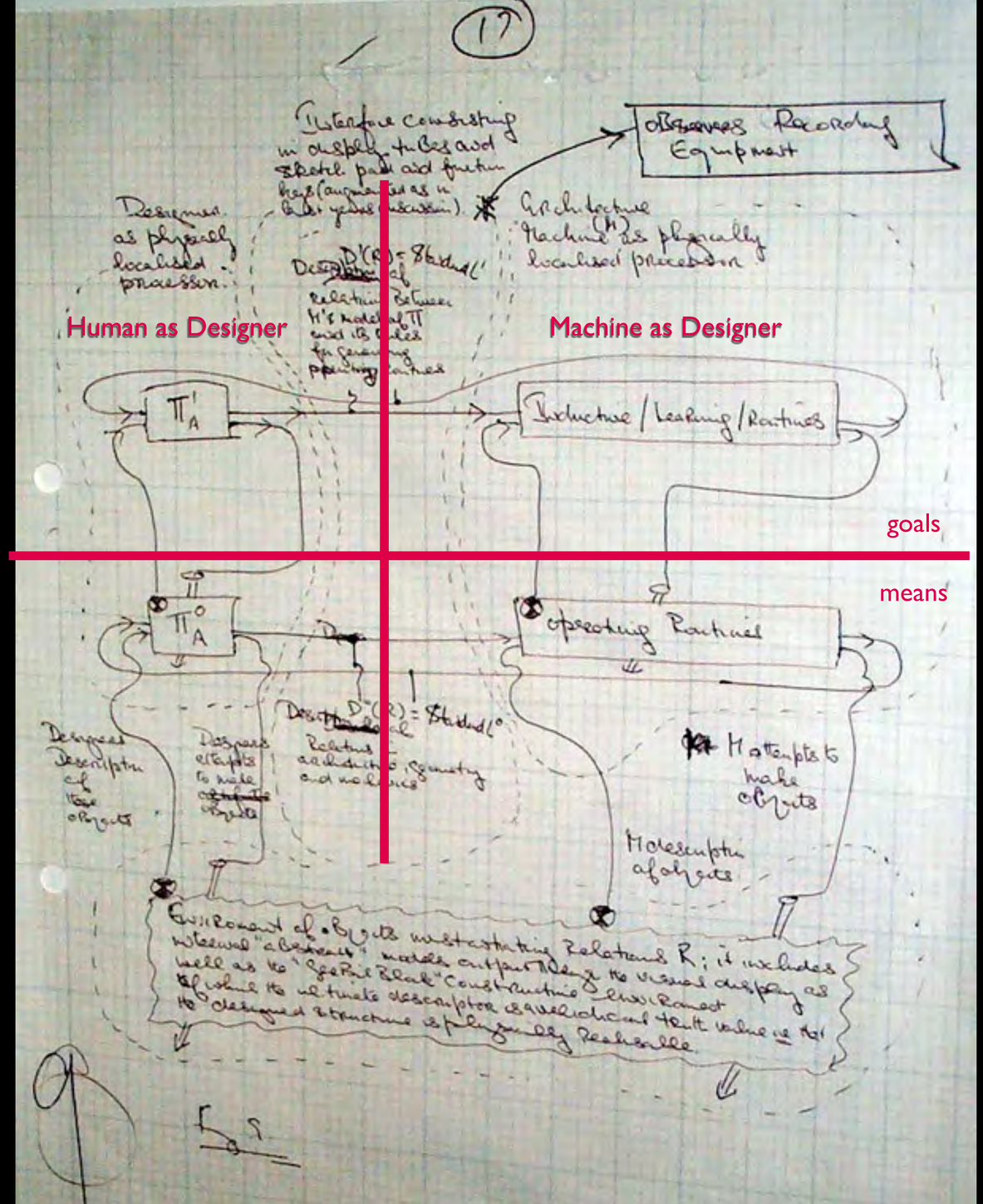
Feedback loops steer across actors and across levels.



In Pask's model of conversation, the actors need not be human.

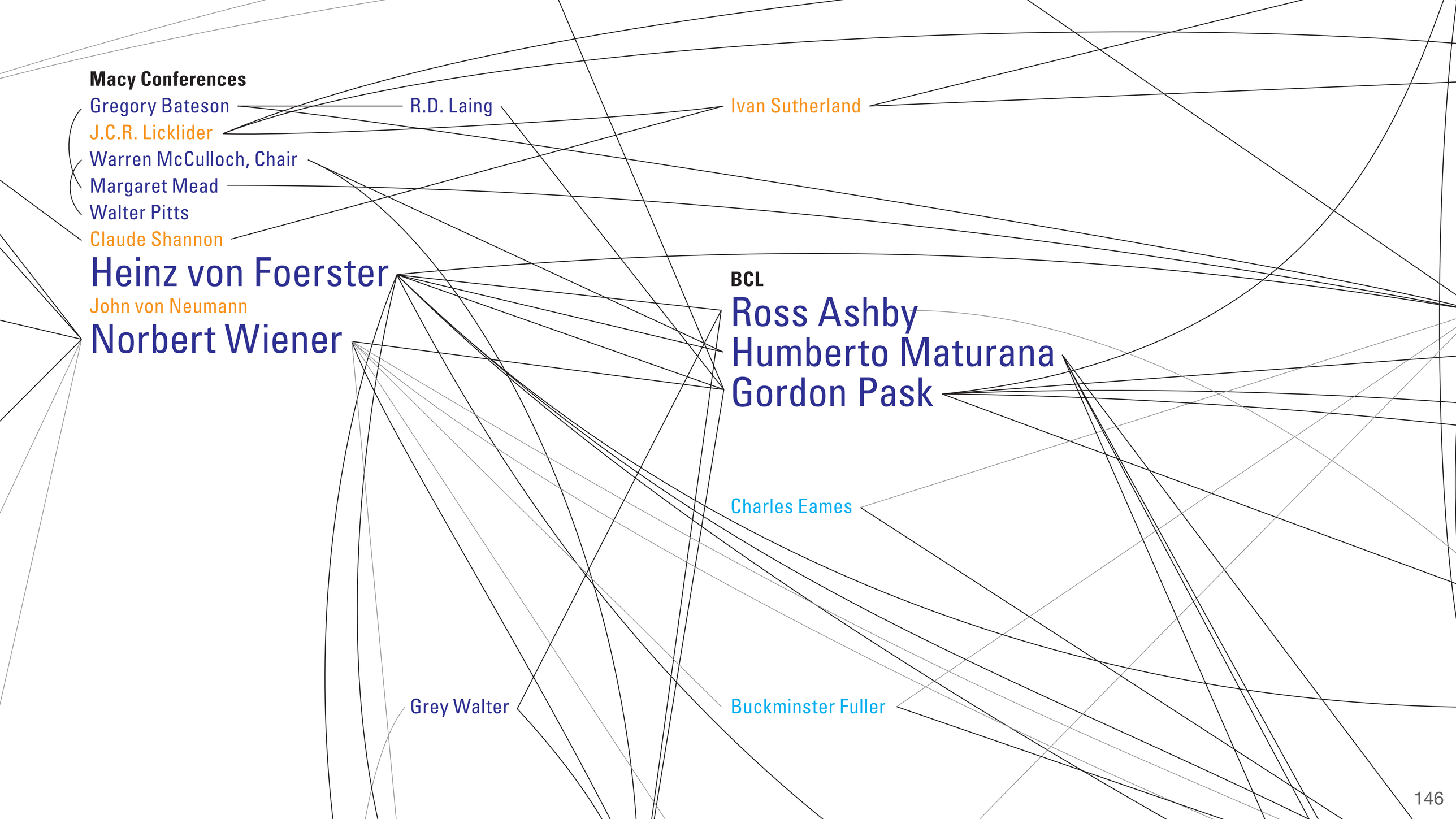

Human as Designer
Machine as Designer
Architecture Machine (M) as physically localised processor
Inductive / Learning / Routines
Operating Routines


Human as Designer
Machine as Designer
goals
means



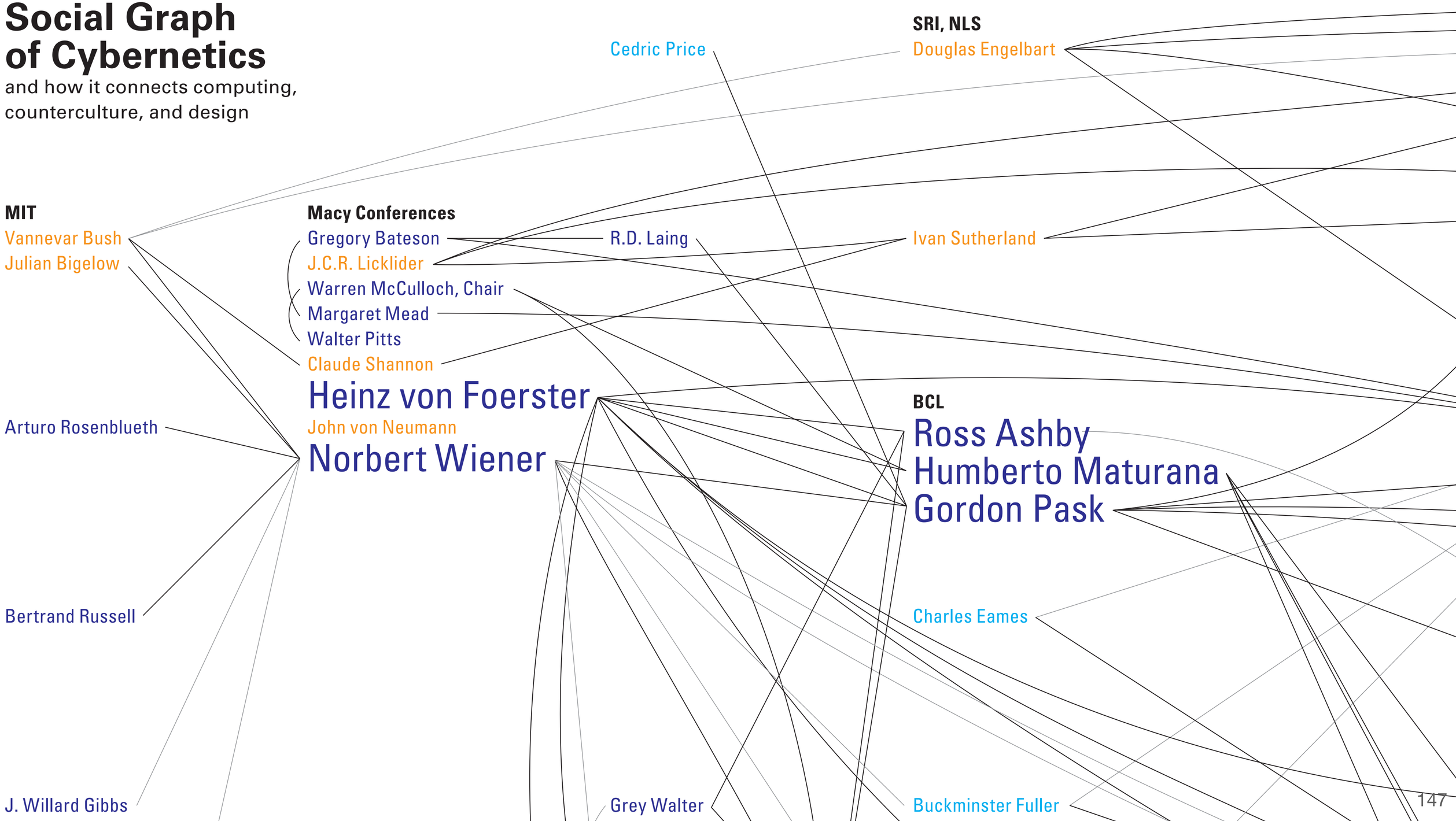
Here Pask proposes a design conversation between a human and a machine.

They have exchanges about possible goals as well as the means to achieve them.


Macy Conferences
Gregory Bateson
J.C.R. Licklider
Warren McCulloch, Chair
Margaret Mead
Walter Pitts
Claude Shannon
Heinz von Foerster
John von Neumann
Norbert Wiener
R.D. Laing
Ivan Sutherland
BCL
Ross Ashby
Humberto Maturana
Gordon Pask
Charles Eames
Buckminster Fuller
Grey Walter

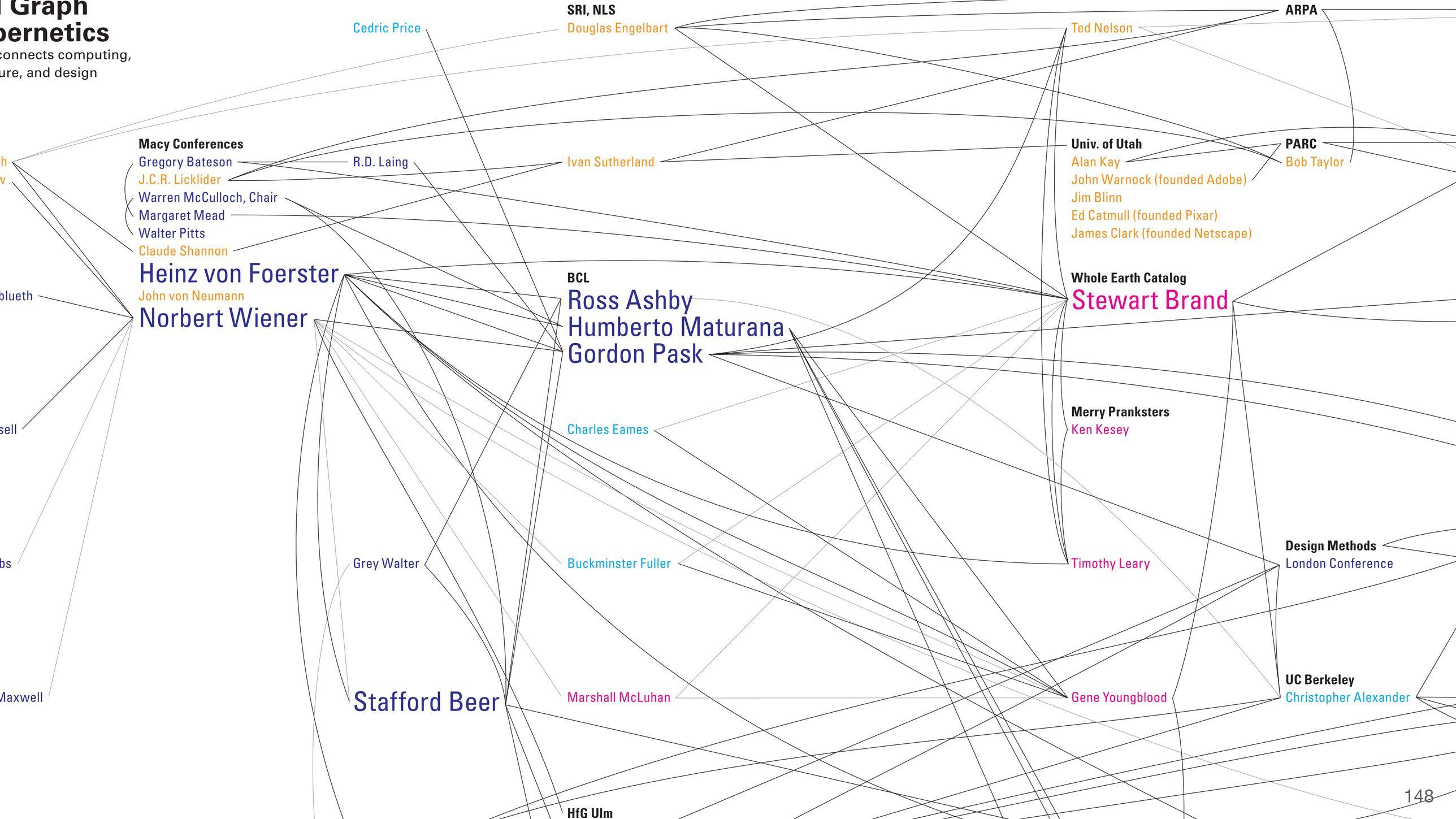
Social Graph of Cybernetics

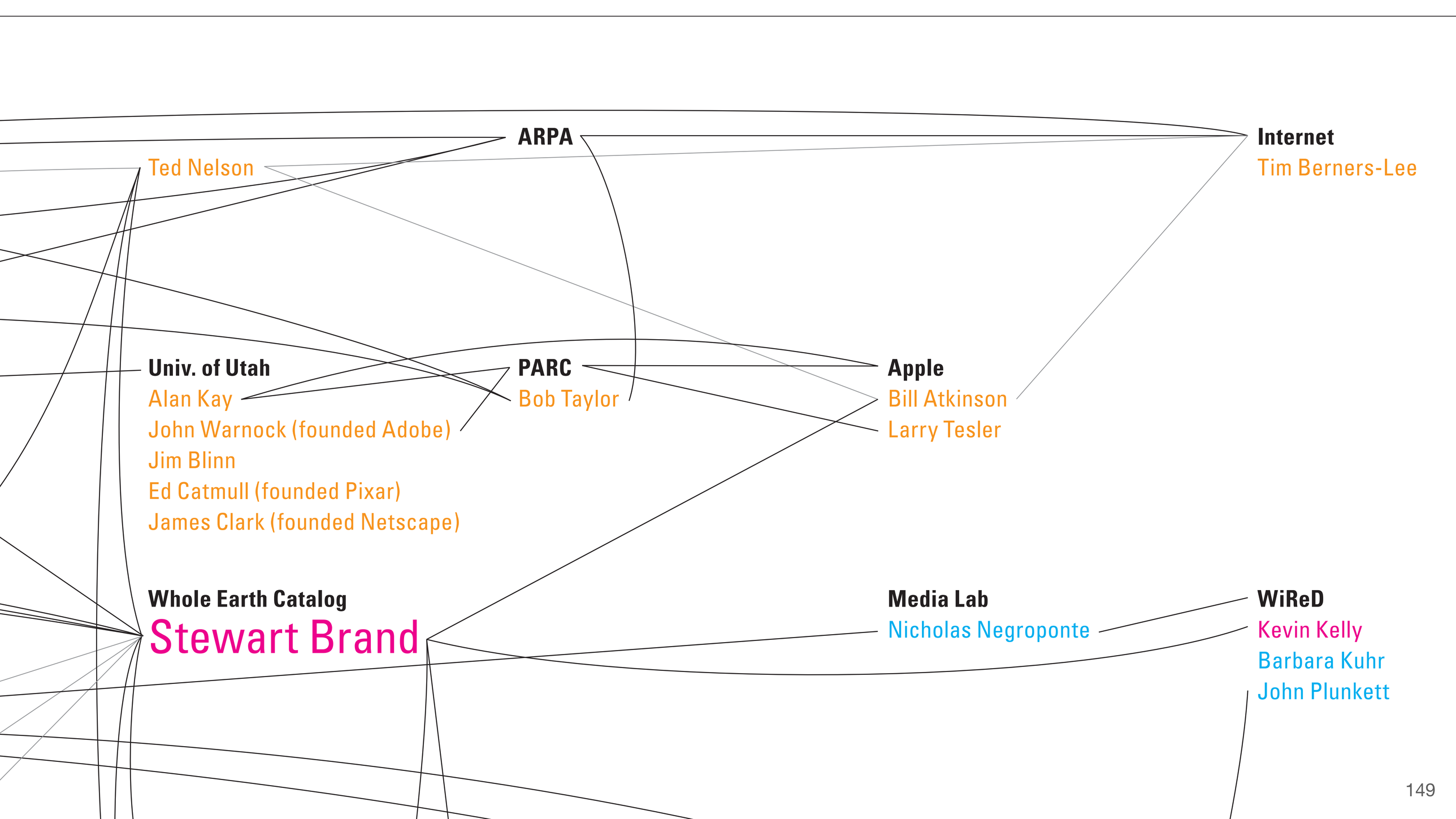
and how it connects computing, counterculture, and design

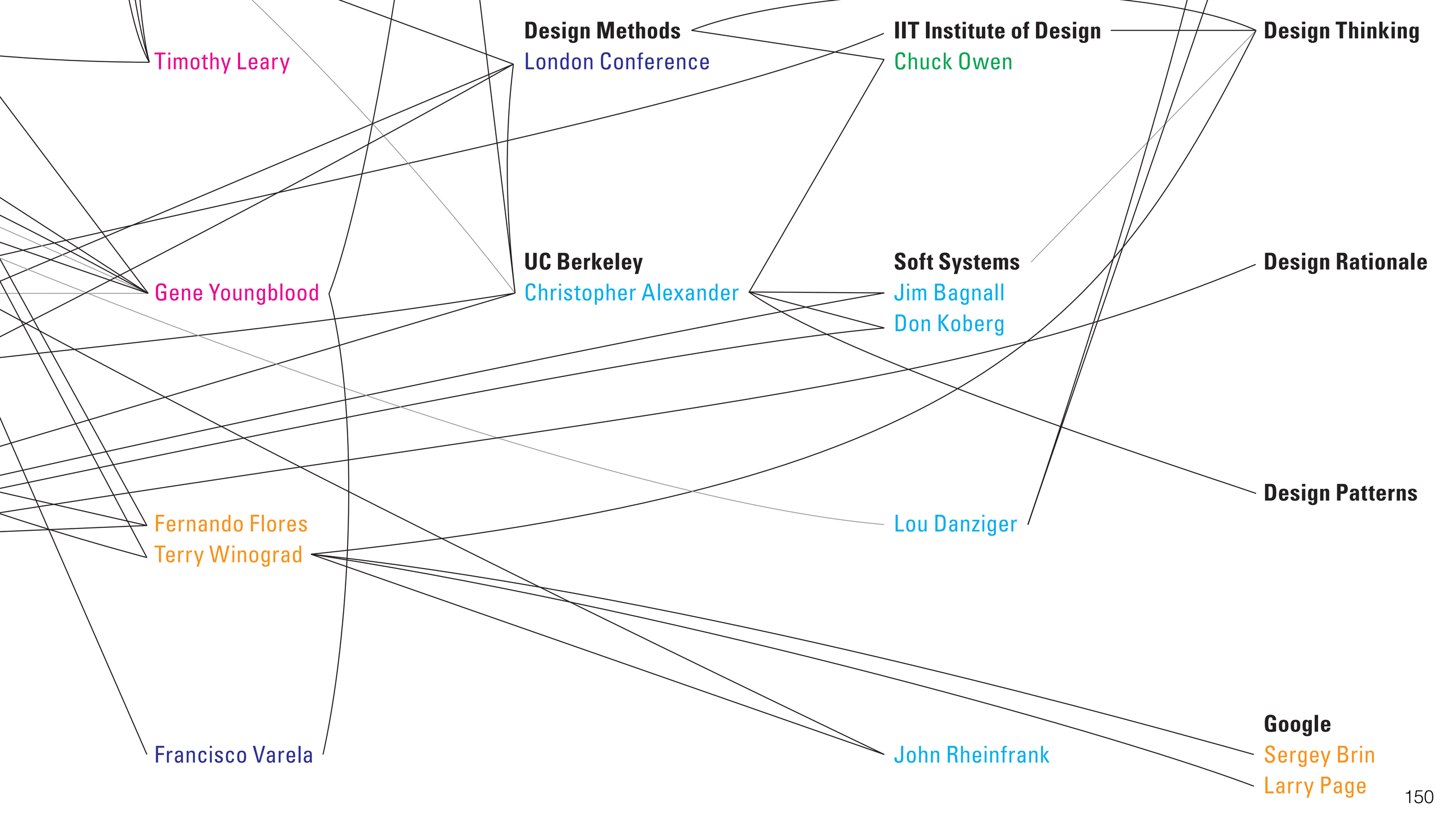


Graph
bernetics

connects computing,
ure, and design

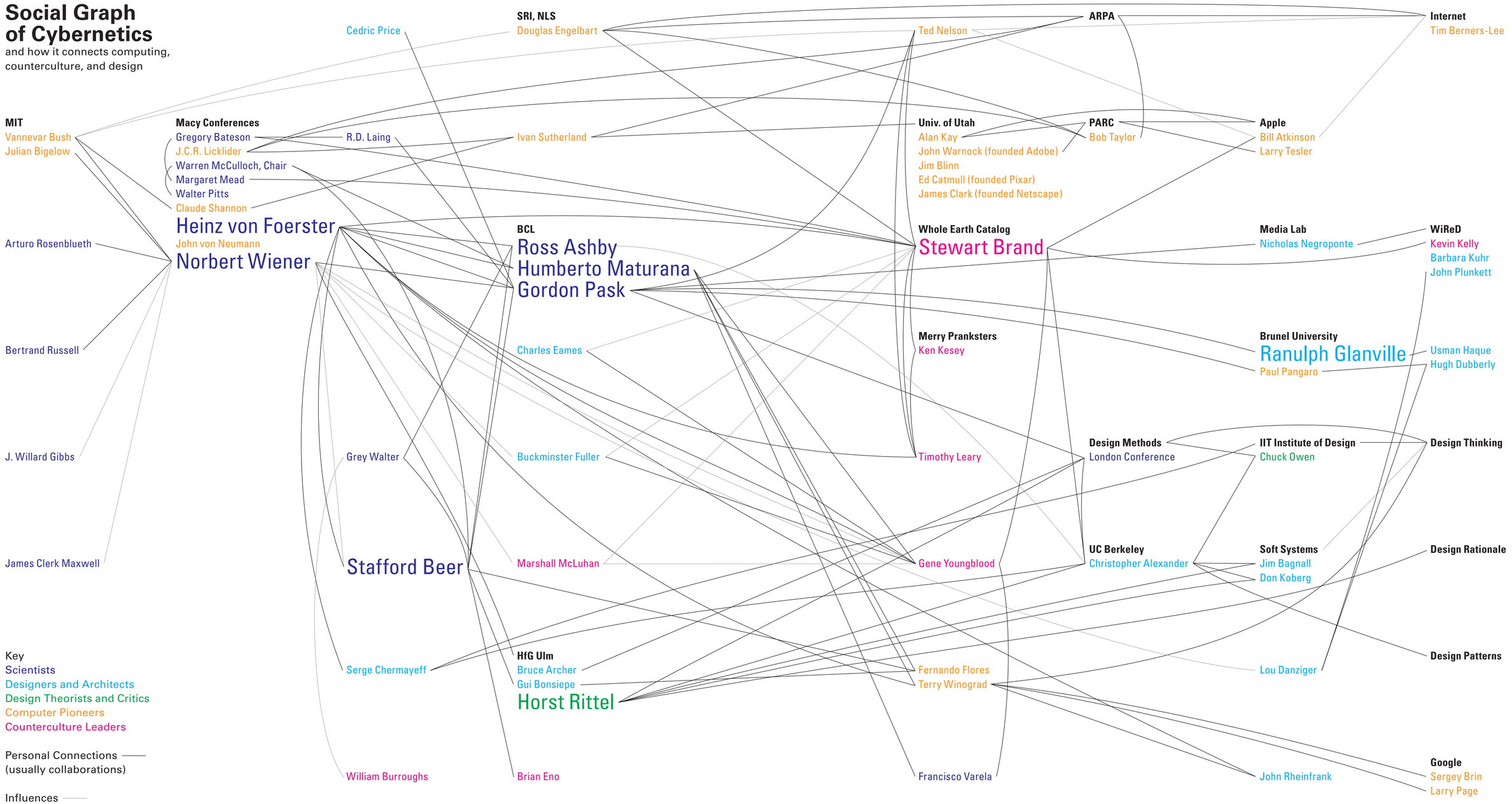



ARPA
Internet
Tim Berners-Lee
Ted Nelson
Univ. of Utah
Alan Kay
John Warnock (founded Adobe)
Jim Blinn
Ed Catmull (founded Pixar)
James Clark (founded Netscape)
PARC
Bob Taylor
Apple
Bill Atkinson
Larry Tesler
Whole Earth Catalog
Stewart Brand
Media Lab
Nicholas Negroponte
WiReD
Kevin Kelly
Barbara Kuhr
John Plunkett


Timothy Leary
Design Methods
London Conference
IIT Institute of Design
Chuck Owen
Design Thinking
Gene Youngblood
UC Berkeley
Christopher Alexander
Soft Systems
Jim Bagnall
Don Koberg
Design Rationale
Design Patterns
Fernando Flores
Terry Winograd
Lou Danziger
Francisco Varela
John Rheinfrank
Google
Sergey Brin
Larry Page

Social Graph of Cybernetics

and how it connects computing, counterculture, and design



Key
Scientists
Designers and Architects
Design Theorists and Critics
Computer Pioneers
Counterculture Leaders

Personal Connections ——
(usually collaborations)

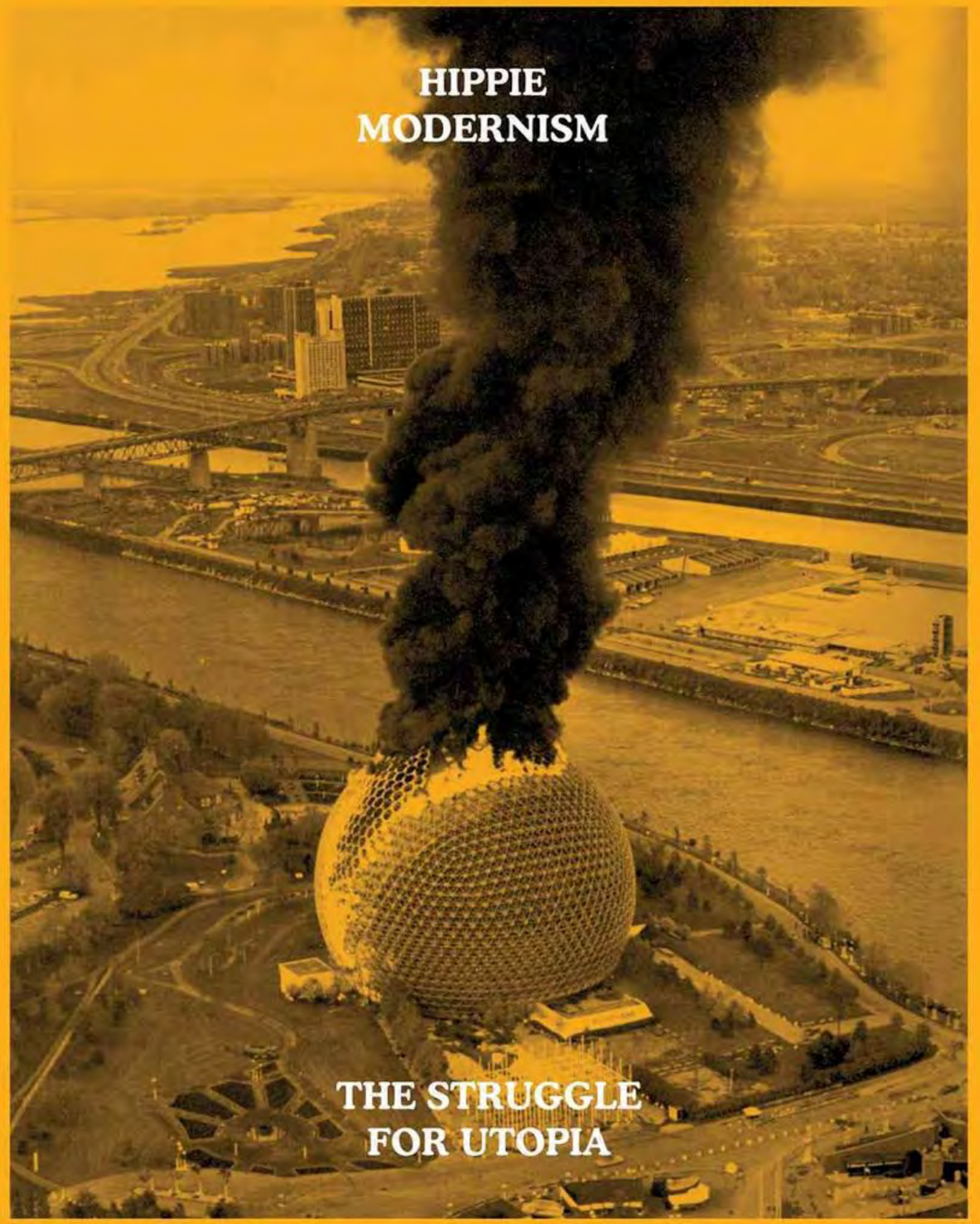
Influences ——
(usually publications)

Interactive version at
http://cybergraph.dubberly.com/

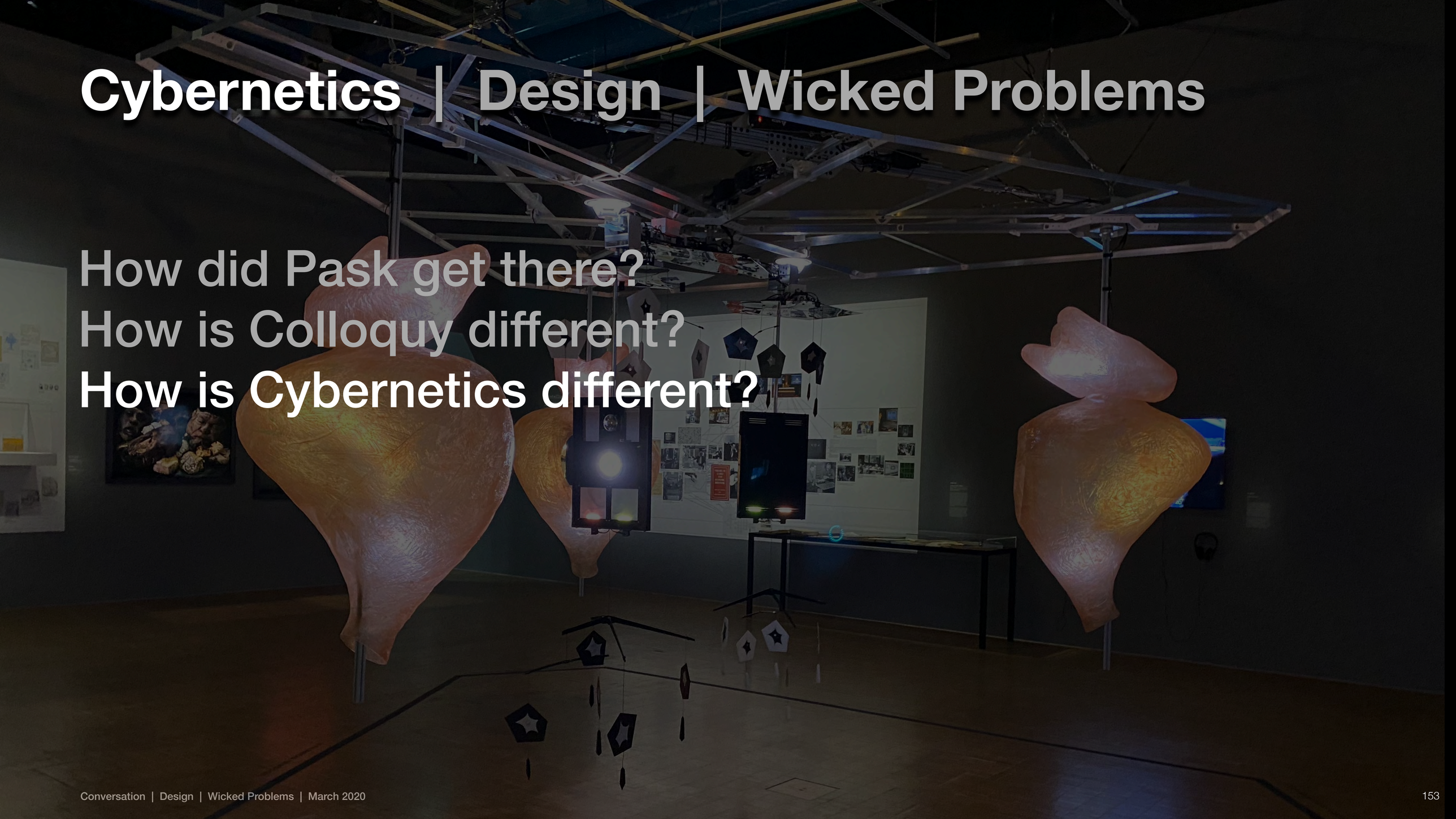
In Dubberly & Pangaro: How cybernetics connects computing, counterculture, and design

Catalog
HIPPIE MODERNISM
Walker Art Center, 2016
Minneapolis

Andrew Blauvelt, Curator



Cybernetics | Design | Wicked Problems



How did Pask get there?
How is Colloquy different?
How is Cybernetics different?

Cybernetics | Neural Nets | AI

McCulloch-Pitts neurons	— 1943	— "neural nets" are born
Macy Meetings on Circularity	— 1946-1953	— swarms the zeitgeist
Cybernetics by Wiener	— 1948	— influences generations
Dartmouth AI Conference	— 1956	— *contra* Cybernetics
Symbolic AI rises	— 1956-1980	— AI swarms the zeitgeist
Cybernetics languishes	— 1956-2010	— AI influences generations
Perceptrons kills neural nets	— 1969	— Minksy denies von Foerster
Hinton brings back neural nets	— 1980s	— Expert Systems come & go
Internet brings Big Data	— 2000s	— NN swarm the zeitgeist
"Surveillance Capitalism"	— 2000s-2020	— "Wicked problems" arise

Cybernetics | Neural Nets | AI

Neural Nets

AI Symbolic AI
Expert Systems
Neural Nets
"Today's AI" — AI Everywhere — AI in Our Lives

Cybernetics

"Performative Ontology"
Design for action with emergent goals
Embodied interaction
Circular causality
Evolutionary viability / resilience

Could be applied anywhere
Lost the competition with computers
Stolen & elided by French intellectuals
Reduced to the prefix "cyber-"
Yet… undergoing a resurgence

Today’s AI

"Intelligence Inside"
Design for efficiency & scale
Transactional interaction
Input / output fulfilment
Consistency / reliability

Limited to digital infrastructure
Grew from "smaller, cheaper, faster"
Became an industry, a market
Makes alternatives unthinkable
Overwhelming daily living

"Wicked problems" arising from Today's AI

Manipulation of attention by Internet platforms

Manipulation of sentiment in elections

Loss of privacy

"Dark Patterns" and "Deep Fakes"

Bias in law enforcement algorithms

Facial recognition leading to social control

Overpowering of human capacity and "Human Downgrading"

—AI is making the world we see and the world we live in

Cybernetics | Design | **Wicked Problems**

How did Pask get there?
How is Colloquy different?
How is Cybernetics different?
What might Cybernetics offer?

"Antidisciplinarity" arising from Cybernetics

Applies across siloed disciplines
Focuses on purpose, goals, feedback in any system
Offers methodology for "complex adaptive systems"
Seeks to regulate and operate effectively, not dominate
Brings an ethical imperative to human action

—Cybernetics is the art and science of steering

Cybernetics | Design | **Wicked Problems**

How did Pask get there?
How is Colloquy different?
How is Cybernetics different?
What might Cybernetics offer?
What are the alternatives?

What are the alternatives?

Science has failed.
Governance has failed.
Socio-technical systems have failed.
Today's AI has failed.
Engineering has failed.
Psychology has failed…

—Will society fail?

What are the alternatives?

"… we are trying to apply design to science
and think that second-order cybernetics X design
X some modern version of Bauhaus is what we need
to fix science…"

— Research Lab Director, 2014

What are the alternatives?

Since wicked problems cut across complex adaptive systems, we need deep conversations across all domains.

We need the New Macy Meetings* (virtual of course) with Cybernetics as the glue, bridging humans and societies, machines and networks.

* Andrew Pickering invoked this phrase in 2014, click here for his presentation

Cybernetics | Design | **Wicked Problems**

How did Pask get there?
How is Colloquy different?
How is Cybernetics different?
What might Cybernetics offer?
What are the alternatives? None apparent.
What is missing?

Conversation X Design → Wicked Problems

Why does conversation matter?

- ***to tame wicked problems, we must act together***
- ***to act together, we must reach agreement***
- ***to reach agreement, we must engage with others***
- ***to engage with others, we must have shared language.***

To cooperate and collaborate requires conversation.

Conversation X Design → Wicked Problems

What may follow from conversation?

- ***shared history***
- ***relationship***
- ***trust***
- ***respect***
- ***unity.***

All these require conversation.

Conversation X Design → Wicked Problems

What does conversation enable?

- ***community***
- ***commerce***
- ***culture***
- ***government***
- ***society.***

All these **demand** conversation.

Conversation X Design → Wicked Problems

What's an "*effective conversation*"?

- *stays sensitive to context & language*
- *engages — keeps continuity in the exchange*
- *leads to agreements — even agreements-to-disagree*
- *enables coordination — acting together with others.*

Conversation X Design → Wicked Problems

What makes a "*great conversation*"?

- ***brings momentum to learning***
- ***brings surprises — and therefore energy***
- ***goes places you didn't expect to go — is generative***
- ***evolves in ways you couldn't evolve on your own.***

Conversation X Design → Wicked Problems

What makes a "*great conversational partner*"?

- *asks great questions*
- *offers different ways to achieve your goal*
- *collaborates with you to define new goals*
- *helps you to be what you want to be… or to become.*

Dance of Shared Creativity

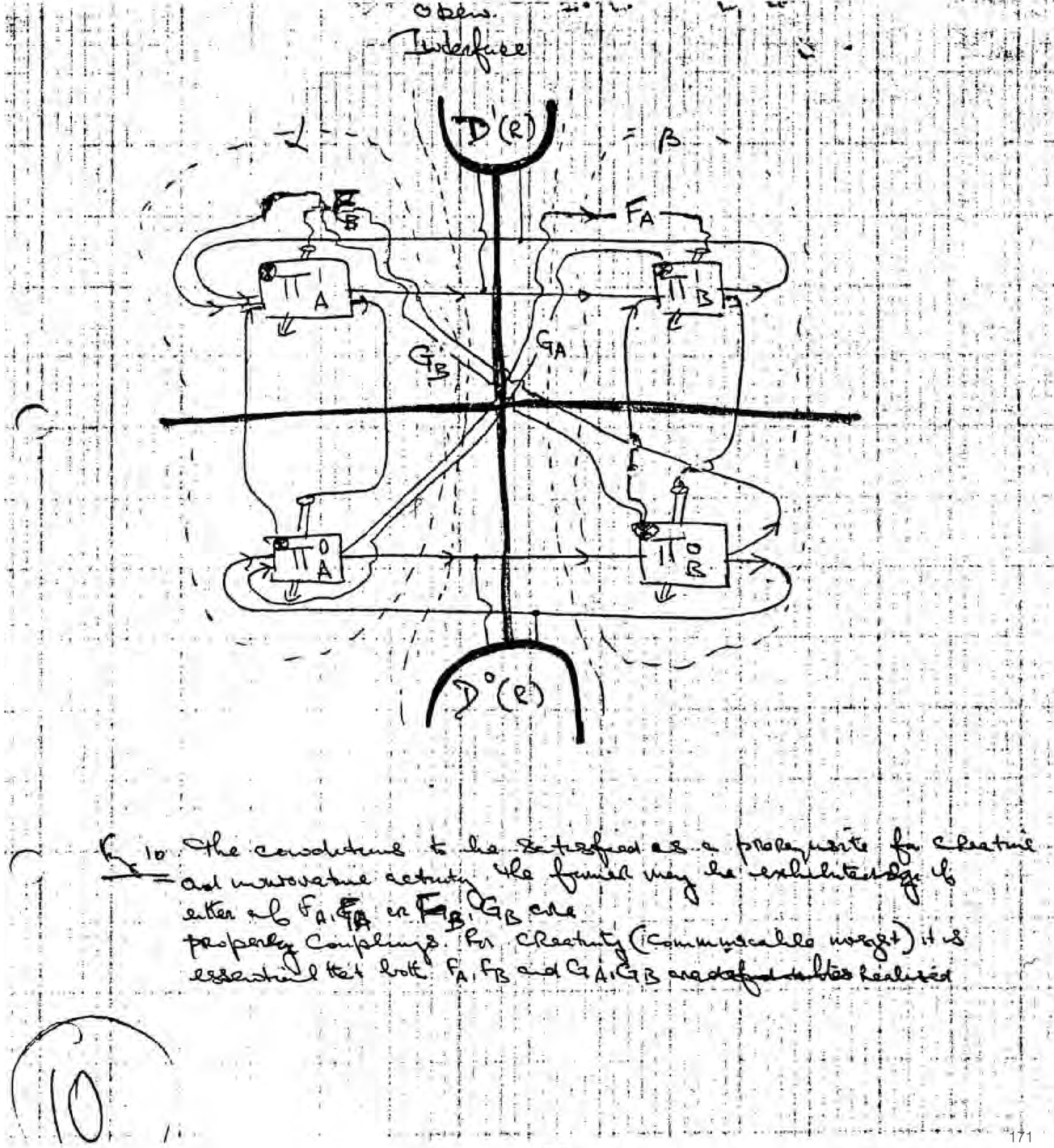


Fig 10. The conditions to be satisfied as a prerequisite for creative and innovative activity. The former may be exhibited if either of F_a, G_a or F_b, G_b are proper couplings. For creativity (communicable insight) it is essential that both F_a, G_a and F_b, G_b are realised

Cybernetics | Design | **Wicked Problems**

How did Pask get there?
How is Colloquy different?
How is Cybernetics different?
What might Cybernetics offer?
What are the alternatives? None apparent.
What is missing? Conversation!

Conversation | Design | Wicked Problems

How did Pask get there?
How is Colloquy different?
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What might Cybernetics offer?
What are the alternatives? None apparent.
What is missing? Conversation!

Conversation | Design | Wicked Problems

How did Pask get there?
How is Colloquy different?
How is Cybernetics different?
What might Cybernetics offer?
What are the alternatives? None apparent.
What is missing? Conversation!
How does all this go together?

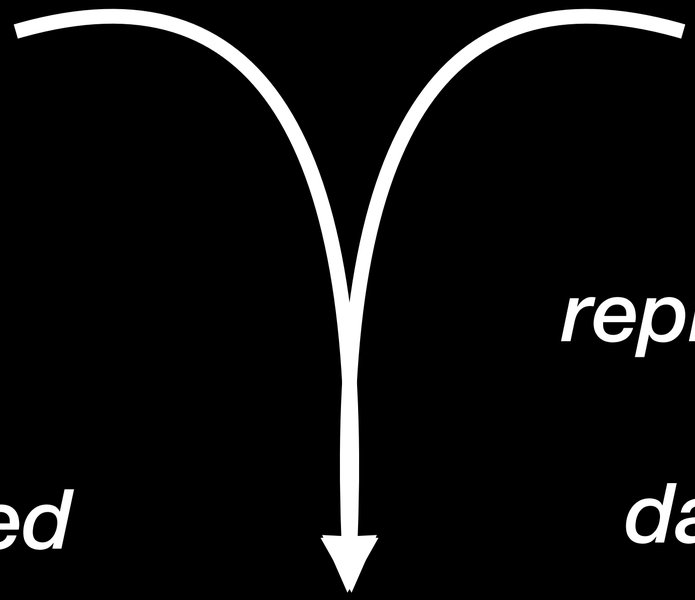
How does all this go together?

Conversation

-human
-organic
-resonant
-emergent
-socially-animated

Today's AI

machinic-
digital-
representational-
predictive-
data-animated-



Cybernetics

bilingual sensibility

How does all this go together?

Conversation

-human
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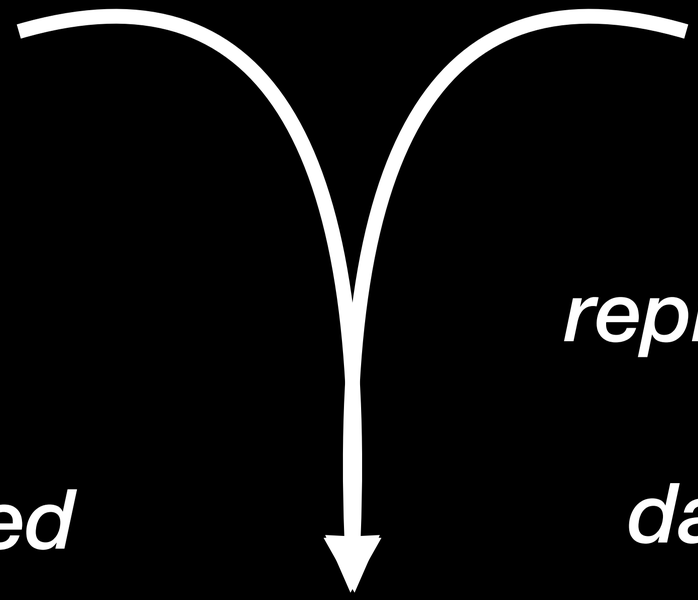

Norbert Wiener

"*animal and machine*"

How does all this go together?

Conversation

-human
-organic
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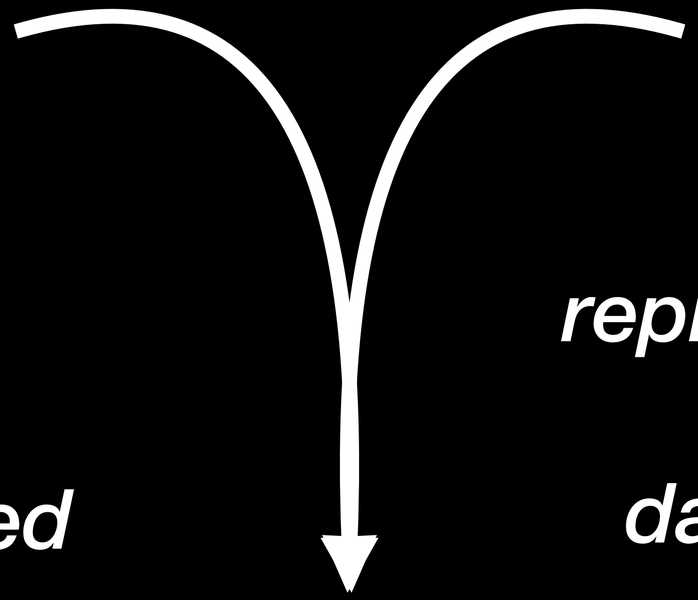


Gordon Pask

"*conversation theory*"

Gordon Pask

Colloquy of Mobiles

Autonomous agents that learn and converse

Bilingual sensibility—human & social, mechinic & digital

Resonance not representation

Interactional not stand-alone

Gordon Pask – Computing Conversation as a creative act

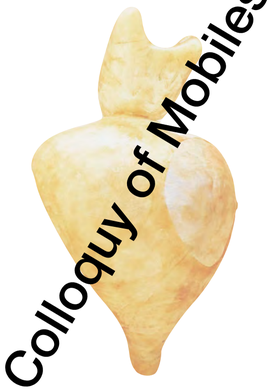
Musicolour 1953

S.A.K.I. 1956

Eucrates 1958

Cybernetic Theatre 1964

Colloquy of Mobiles 1968



Thoughtsticker 1975

Architecture Machine 1976

Team Decision System 1978

Colloquy of Mobiles (replica) 2018

Gordon Pask

Goals of Conversation Theory

To rigorously understand what makes conversation work—
and to make machines conversant like humans.

To rigorously understand how systems learn—
and to makes machines that learn like humans.

To build better machines
— to build a better society.

Conversation | Design | Wicked Problems

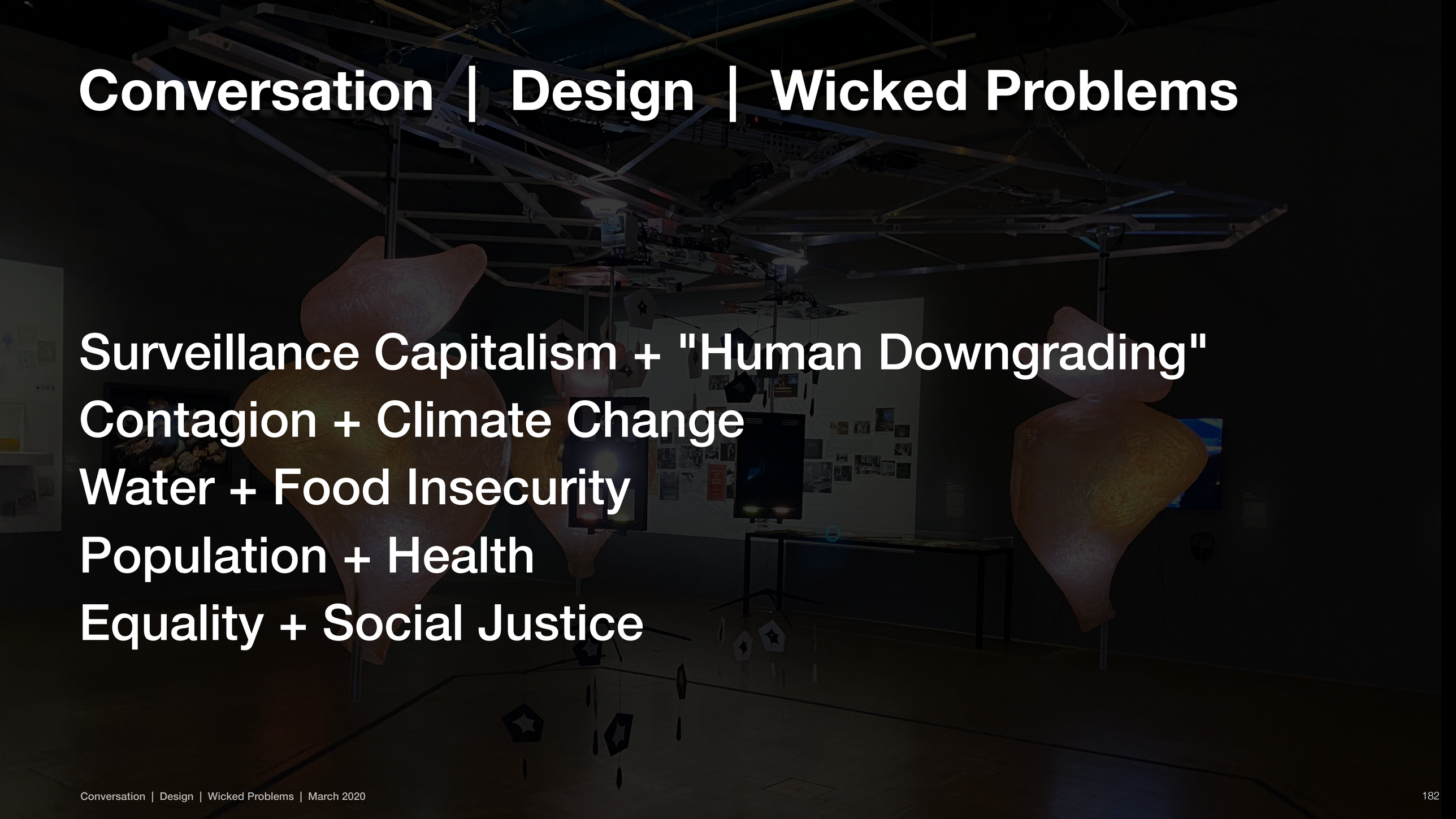
Goals of HCI and Interaction Design

To rigorously understand what makes conversation work—
and to make machines conversant like humans.

To rigorously understand how systems learn—
and to makes machines that learn like humans.

To build better machines
— to build a better society.

Conversation | Design | Wicked Problems



Surveillance Capitalism + "Human Downgrading"
Contagion + Climate Change
Water + Food Insecurity
Population + Health
Equality + Social Justice

Conversation | Design | Wicked Problems

How did Pask get there?
How is Colloquy different?
How is Cybernetics different?
What might Cybernetics offer?
What are the alternatives? None apparent.
What is missing? Conversation!
How does all this go together?
Who else do we need in this conversation?

Conversation | Design | Wicked Problems

Early Generations

Margaret Mead—Second-order Anthropology
Heinz von Foerster—Second-order Cybernetics
W. Ross Ashby—Requisite Variety
Stafford Beer—Cybersyn (regulating a country's economy)

Jerry Lettvin—Subjectivity of the nervous system
Humberto Maturana—Biology of Cognition
Gordon Pask—Conversation Theory, Calculus of Cognition

Michael C. Geoghegan—Regeneration of Organizations
Hugh Dubberly—Design & Systems
Ranulph Glanville—Design & Cybernetics

Conversation | Design | Wicked Problems

> "*Conversation is the bridge between cybernetics and design.*"

— *Ranulph Glanville*

Conversation | Design | Wicked Problems

> "*Computation is to Artificial Intelligence as Conversation is to Cybernetics.*"

— *Karen Kornblum Berntsen*

Conversation | Design | Wicked Problems

Next Generations

Usman Haque
Ruairi Glynn
Despina Papadopoulos
Margit Rosen
Daniel Rosenberg
Marcelo Mejia Cobo
Delfina Fantini von Ditmar

Gissoo Doroudian
Estefania Ciliotta Chehade
Cameron Burgess
Shalini Sahoo
Abby Loughrey
Cole Shiffer
Ensar Temizel

Conversation | Design | Wicked Problems

> "*I shall act always so as to increase the total number of choices.*"

— *The Ethical Imperative,* Heinz von Foerster

Click for more on Ethics and Cybernetics

Conversation | Design | Wicked Problems

"*A is better off when B is better off.*"

— Heinz von Foerster

Click for more on Ethics and Cybernetics

Conversation | Design | Wicked Problems

"*If you desire to see, learn how to act.*"

— *Aesthetic Imperative*, Heinz von Foerster

Click for more on Ethics and Cybernetics

Thank you.

pangaro.com/hciiseminar2020/

Special Thanks to:
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Brad Myers
Jodi Forlizzi
Pooja Upadhyay
College for Creative Studies

In 2020 we live among machines talking to machines, machines talking to people, and people talking to people through machines.

Yet that is Pask's Colloquy—how could he foresee our world as it is today?

From 1968 he chides us with his vision of rich, humane interaction—organic and analog, immersive and unpredictable, conversational and emergent.

Would that today's digital interactions and commercial AIs have even some of those properties.

Colloquy of Mobiles appeared 50 years ago as an apparition from a distant future. Living in that future, what future shall we build from here?

COLLOQUY 2018 Advisory Board

Amanda Pask Heitler and Hermione Pask, Gordon Pask's daughters and executors of his scientific and artistic estate

Jasia Reichardt, Curator, Cybernetic Serendipity Exhibition, 1968

Andrew Pickering, Author of "The Cybernetic Brain"

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Appendices

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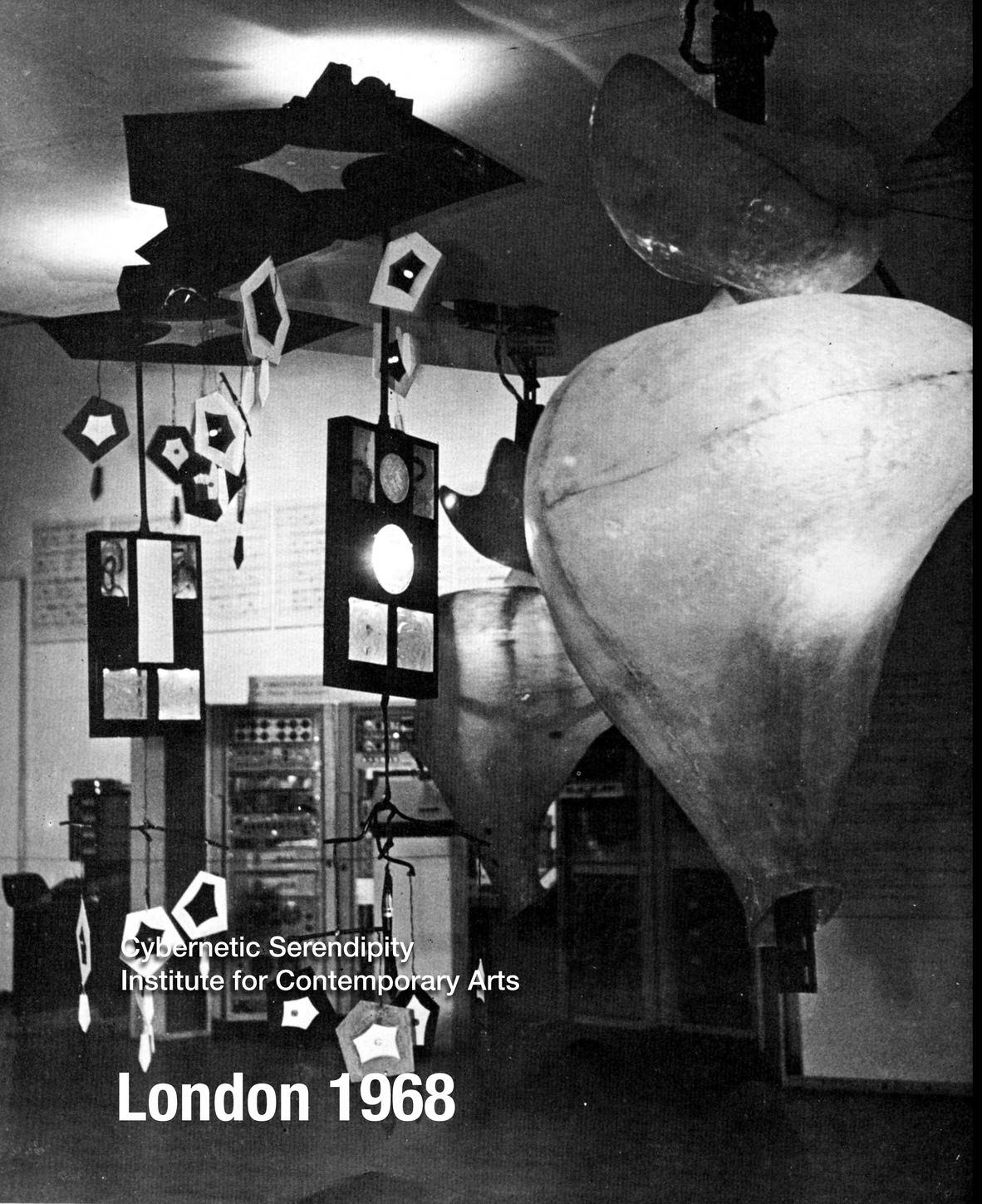

Cybernetic Serendipity
Institute for Contemporary Arts

London 1968

MFA Interaction Design Program
College for Creative Studies

Detroit 2018

Click here to GoFundMe!

http://gofundme.com/f/reanimating-colloquy

Contact

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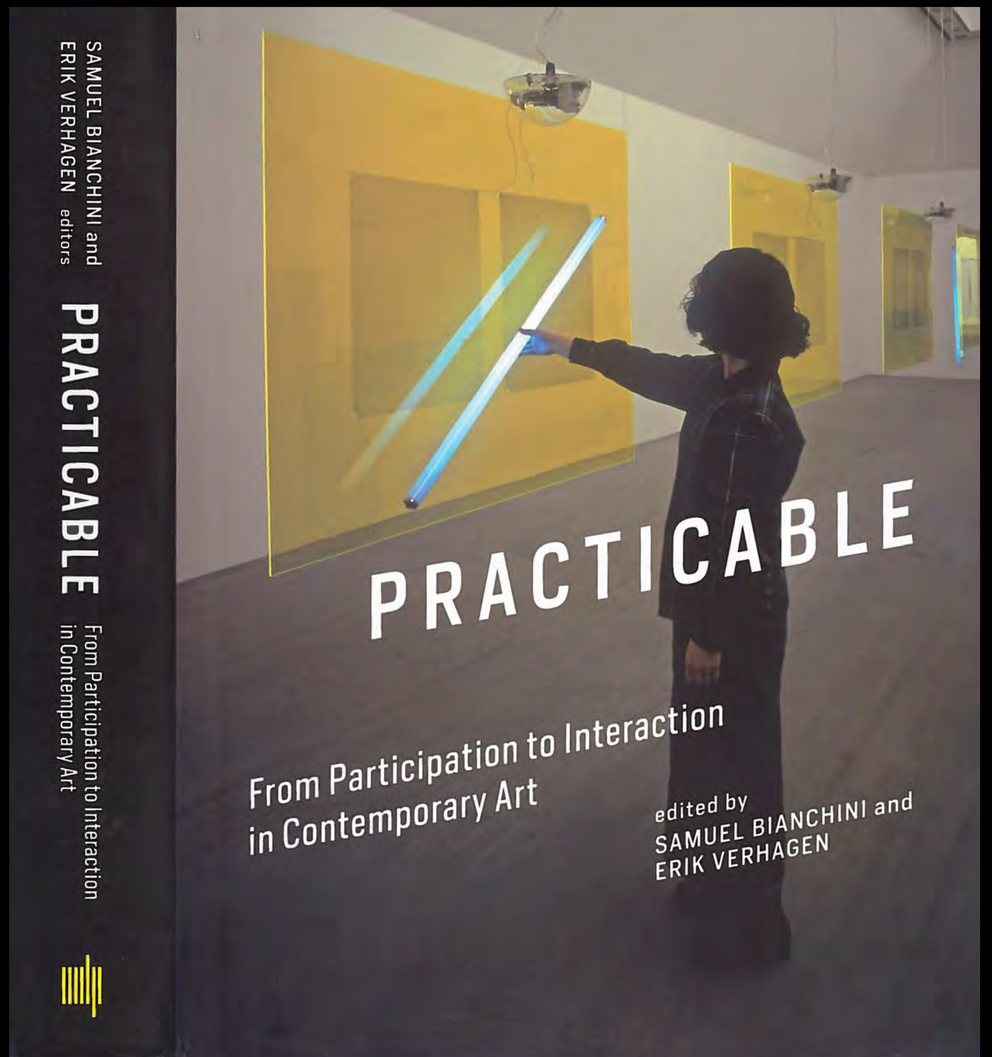
TJ Mcleish
tjm@tjmcleish.com
773-885-9851

Additional Resources

- ColloquyOfMobiles.com
- Hypoallergic.com
- Colloquy as pivot to interactive art

Colloquy was a sensation then and has been written about since as a pivot to interactivity in contemporary art



what actually would be the chief merit of this externalization. He welcomed, of course, from the scientific point of view of a psychologist and learning theorist, a particular side effect: what was normally hidden in the mind of the silent, motionless spectator would become observable. As to the virtue of externalization that was more specific to the concerns of the art world, Pask identified this as the "ambiguity of role": whoever played with a reactive environment could "alternate the roles of painter and viewer at will."[23] Pask used the term "painter" or "artist" simply to describe a viewer who was not anymore doomed to silence and motionlessness, but allowed to express thoughts and thereby cause changes in his or her environment.

But Pask's suggestion to alternate roles obscured one of his motivations for developing adaptive systems—that is, his fascination with the complete absorption of people when exchanging messages with the machine. Interacting with adaptive teaching devices for civil and military purposes guaranteed the quick acquisition of skills, while interacting with adaptive control systems for automated industrial production ensured efficiency and low error rates, and Pask was involved in research in all of these fields. In the context of art, though, he emphasized a different facet: absorption was the state of mind that promised satisfaction, if not happiness. And frequent, varying stimuli demanding immediate reflection and reaction would ensure that attention did not start to wander.

In the artistic context, Pask's *Cybernetic Theater*,[24] a concept that he developed in 1964 together with the British theater activist Joan Littlewood and Gerry Raffles, provides a clearer picture of the rhythmic pattern of his cybernetic conversations. Pask considered the established forms of feedback in theater—such as applauding or leaving early—to be insufficient, and he intended to replace them with a more accurate process. He planned to equip the audience with signal transmitters that would allow them to choose, at certain moments, from different options to further the play's course. In order to maintain the audience's attention it was necessary, according to Pask, to ask for a decision every two and a half minutes.[25]

Beyond the question of absorption, a text written in 1960 by Pask and Heinz von Foerster, one of the founders of second-order cybernetics, indicates that prompting the audience to externalize their thoughts through decision-making processes had wider implications. The cyberneticians saw such decision-making as essential to the human condition. As Pask and von Foerster declared: "man *must* make decisions about something, in order to *be* man."[26] In the context of Pask's "aesthetically potential environments," this assertion could be paraphrased as follows: the spectator must make decisions in order to become man. Communicative and adaptive artworks became the prerequisite for this process of individuation in the field of art. They were supposed to incite their human counterparts to make choices and to react in real time, thereby

Figure 1.2
Gordon Pask, *Colloquy of Mobiles*, 1968. Installation view showing part of Gordon Pask's *Colloquy of Mobiles*, with Peter Zinovieff's computer in the background, in the exhibition *Cybernetic Serendipity*, Institute of Contemporary Arts, London. Courtesy of Jasia Reichardt.

reinforcing a person's perception of him- or herself as an acting subject that could see him- or herself "reflected in the environment."[27] This assumption that the spectator desires to take the role of the artist had little to do with traditional notions of creation or creativity. It was simply about the experience of seeing that one's actions had an impact, if only on a fragile electronic device in an exhibition space. The machine perceived the individual; therefore the latter existed.

Inducing Happiness

Pask staged his adaptive systems in the art context as devices to induce pleasure. Beyond pure physical responses, a person should taste the delights of learning—that is

It was widely hailed by the world-wide media arts community and was covered in the press, including the prestigious HYPERALLERGIC on June 26, 2018

Click for article

HYPERALLERGIC

ART

Interactive, Dancing Machine Sculptures Play Out Courtship Rituals

Interaction Design students at the College for Creative Studies created a function, full-scale replica of Gordon Pask's visionary 1968 installation "Colloquy of Mobiles."

Sarah Rose Sharp June 26, 2018

"Colloquy of Mobiles 2018" at the College for Creative Studies (all photos by the author for Hyperallergic)

DETROIT — Remember the last time you called Siri into action, and instantly large, Venus of Willendorf-like figures rotated gracefully around with graphic, black-and-white mobiles, attempting to win a dance by signaling them with flashlights? No? That's because artist

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2 Required Reading
3 Extraordinary California Women Artists Working from 1860 to 1960
4 How Criticisms of Roma Have Revealed American Biases
5 Sackler Scion Doesn't Think the Opioid Epidemic Her Family Profited From Should Impact Her

Additional Resources

- ColloquyOfMobiles.com — student website from project
- Hypoallergic.com — media coverage of replica
- Colloquy as pivot to interactive art — Book chapter by Margit Rosen, curator at ZKM Museum
- “The Next Macy Conference: A New Synthesis” — a talk by Andy Pickering