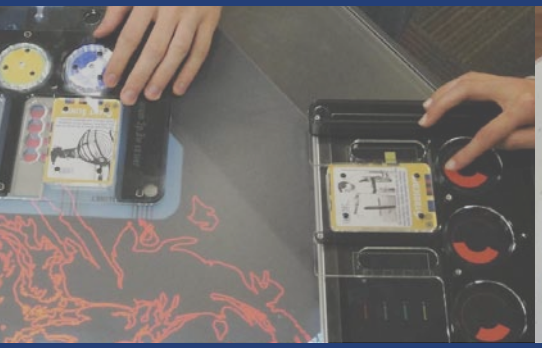
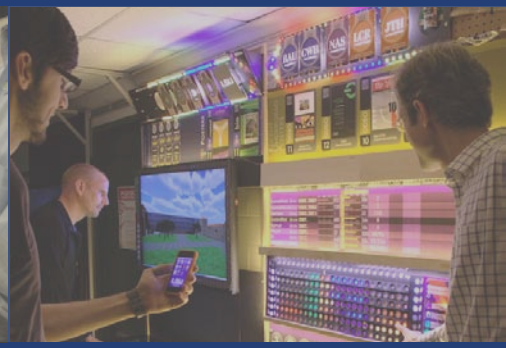
# of medium and message:

le tangibles passé et le futur / tangibles historisch und zukünftig

Brygg Ullmer + Tangible Visualization Group
Louisiana State University
Department of Computer Science
Center for Computation and Technology
ullmer@lsu.edu

tangint/fr: June 7, 2012





“I propose that you present your works and results of the past 18 years….”

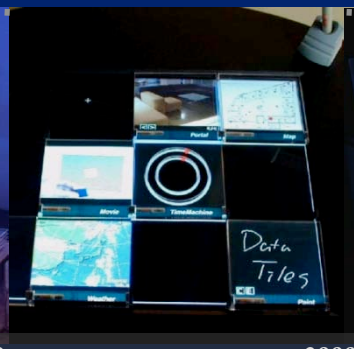
-

des exemples de mon + groupe travail [mit · sony · zib · lsu]

1997

1998

2000



2000

2002

2003

2004

2006

2007

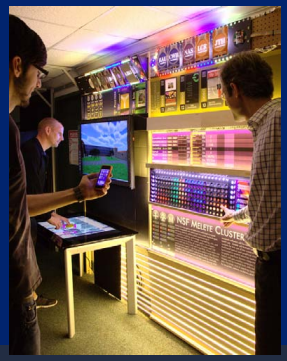
2008

2009

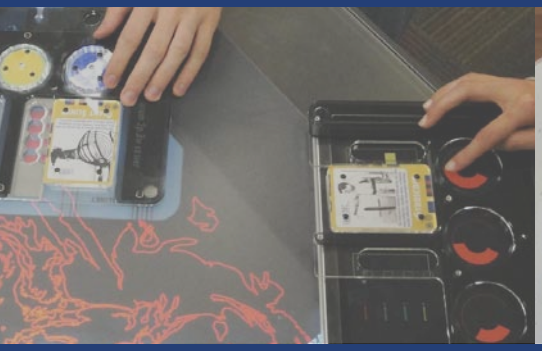
2010

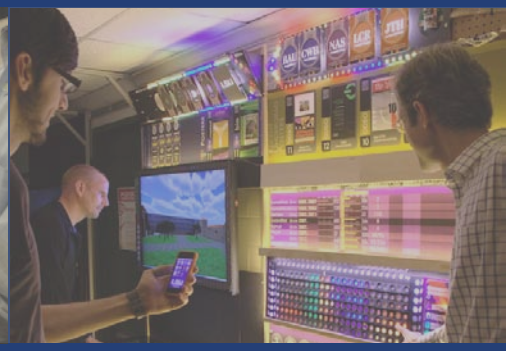
2011

2011



2012





Overview / Aperçu

- **Avant-Hier** (1992-2002)
- **Un peu plus tôt** (8000BC..1992AD)
- **Hier** (2002-2012)
- **Demain et le jour suivant** (2013+++)

-

mon petite histoire

University of Illinois, Urbana-Champaign
Computer Engineering, B.S., 1994

MIT Media Laboratory
Media Arts and Sciences, M.S. 1997, Ph.D. 2002

Interval Research *(California)*, Sony CSL *(Tokyo)*
Internships, 1993..1995; 2000

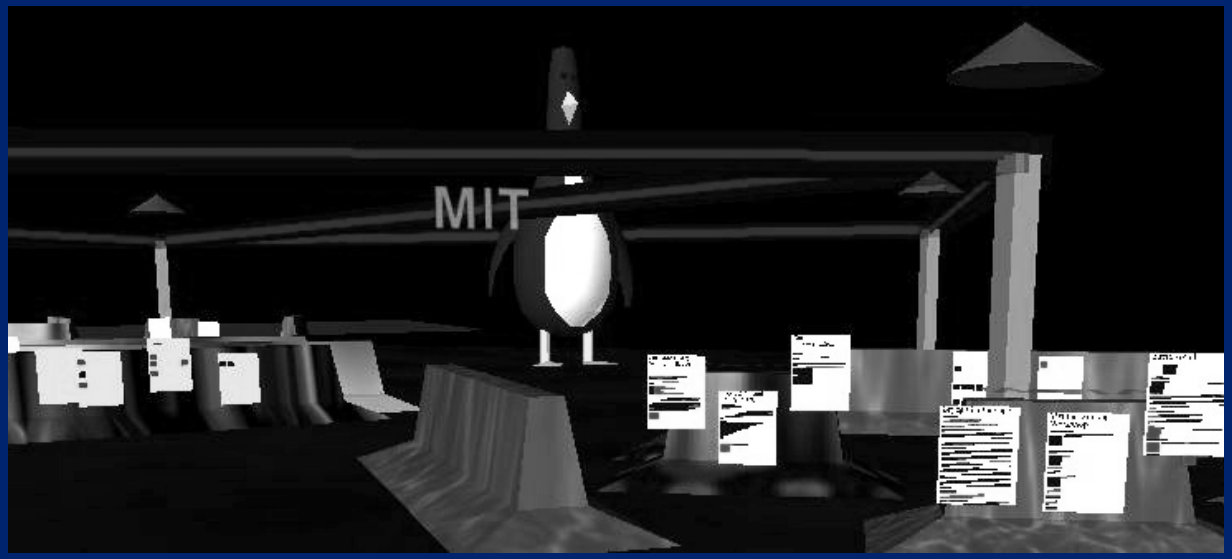
Hong Kong Polytechnic University, School of Design
Visiting Lecturer, 2002; Remote Lecturer, 2006

Zuse Institute Berlin
Postdoctoral researcher, Visualization Department, 2002-2004

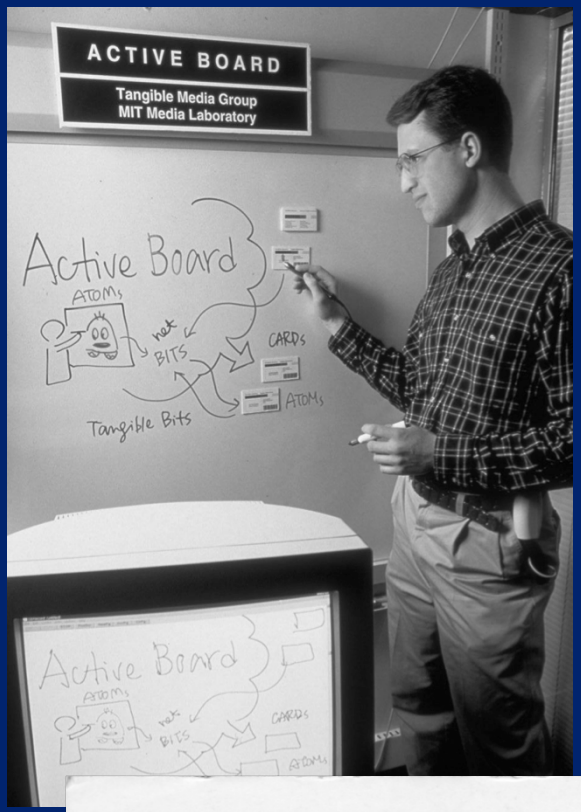
LSU Dept. of Computer Science + CCT
Associate Professor, 2005..2011..present
2011.09..: Director, BBC (Computational Biology), NIH LBRN
2012.07..: Lead, Digital Media, CCT + seven-department arts+tech minor

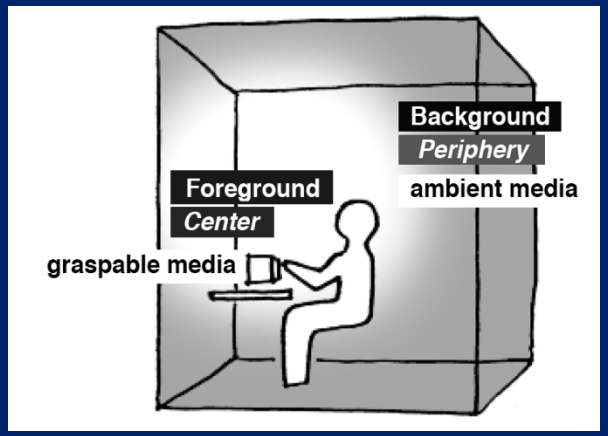
mon petite histoire

- ..1989: electronics (sensors, robotics, interfacing), graphics
- 1989..92: Internet, scientific visualization, VR, wavelets
- 1992..94: 3D information flows, FPGAs; Durrell Bishop
- 1995: “Conditional” for MIT: night school graphic design; “urban” 3D online spaces



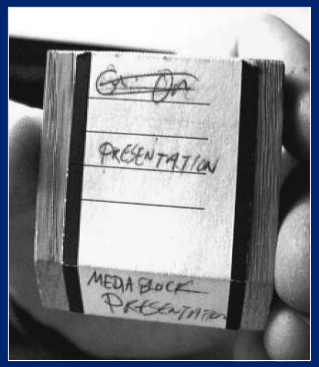
Tangible Bits (CHI'97): un début passionnant





mediaBlocks (SIGGRAPH’98): Pour plus d'informations abstraite

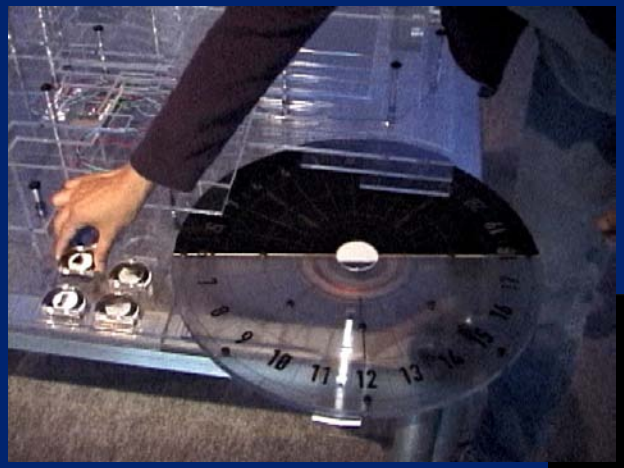
Les objets physiques comme des représentations de média Web

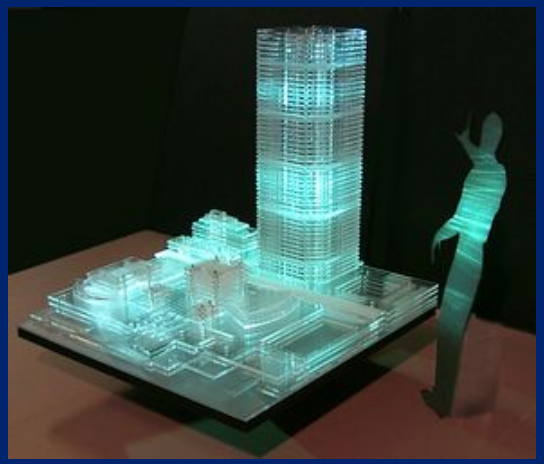


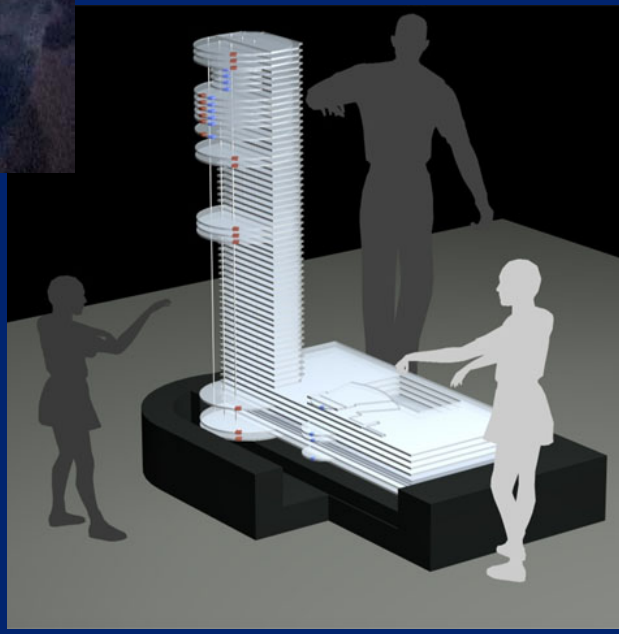
inter-périphérique "copier-coller" pour le contenu Web (peute-etre direct)

manipulation physique de la vidéo, images, etc.

Strata (CHI'01): vers les descriptions physiques des systèmes complexes

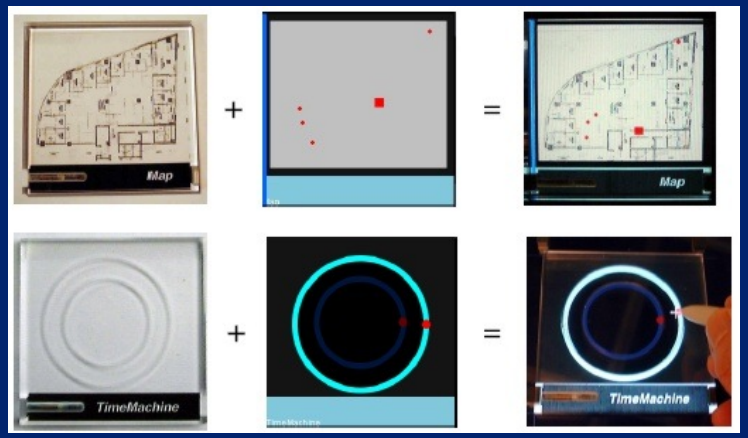






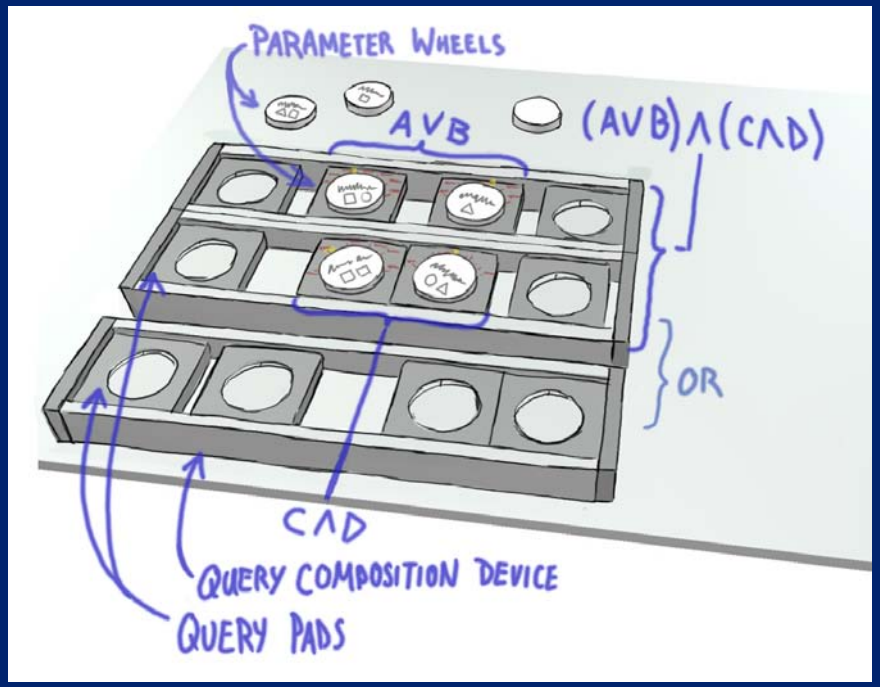
DataTiles (CHI' 01; work @Sony CSL)

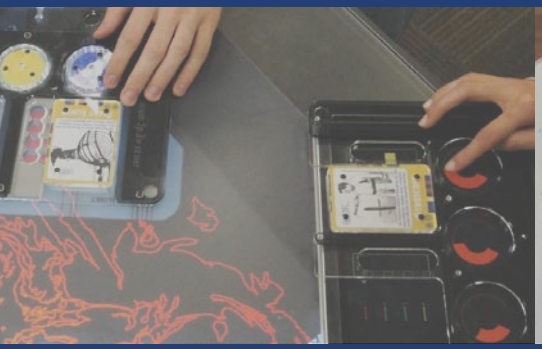
Ouverte composition de digital données, fonctions

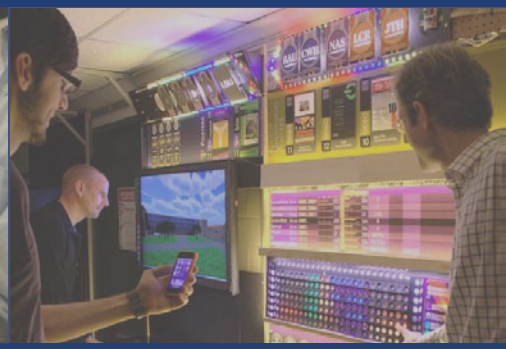


Tangible query UIs (INTERACT'03)

L'interaction paramétriques avec les données grandes







Overview / Aperçu

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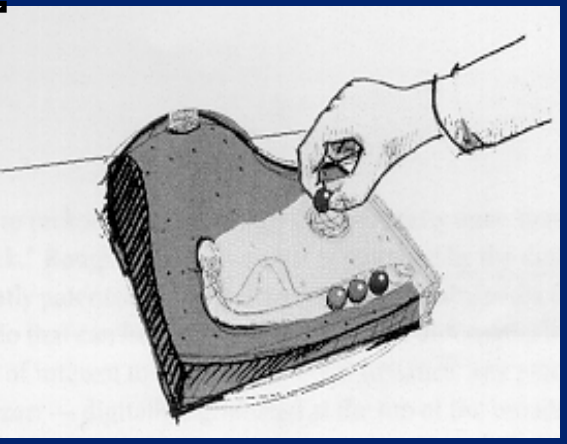
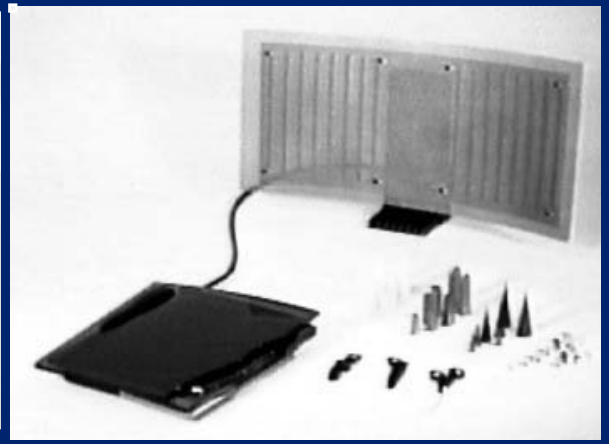
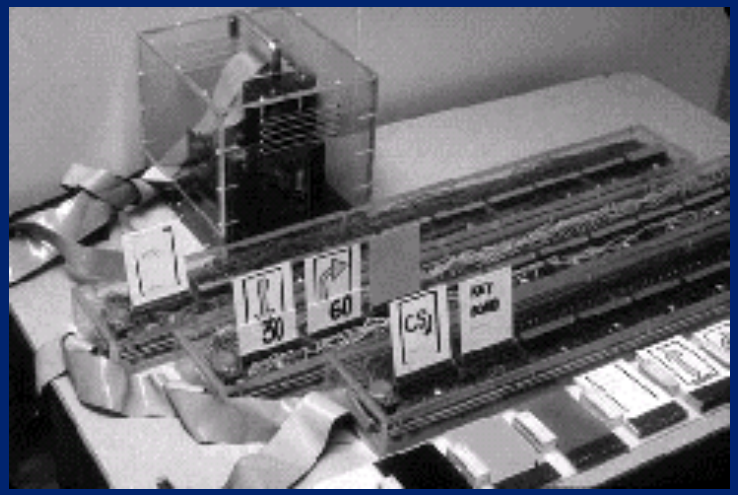
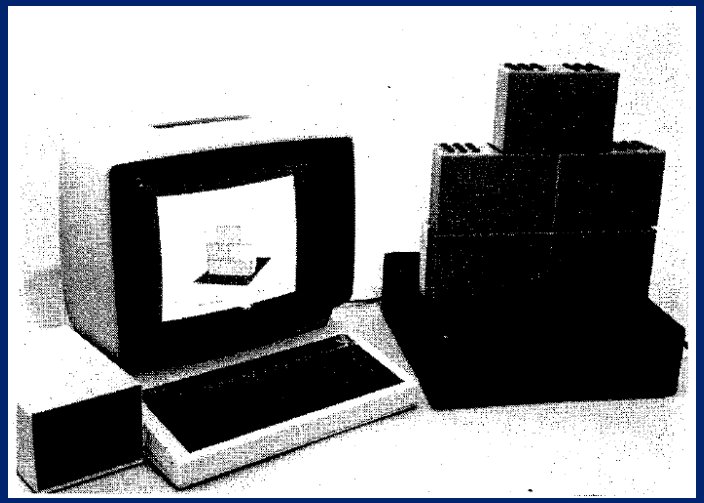








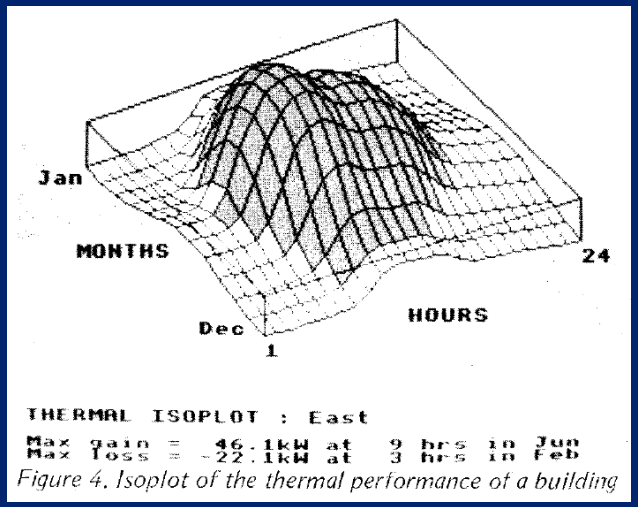
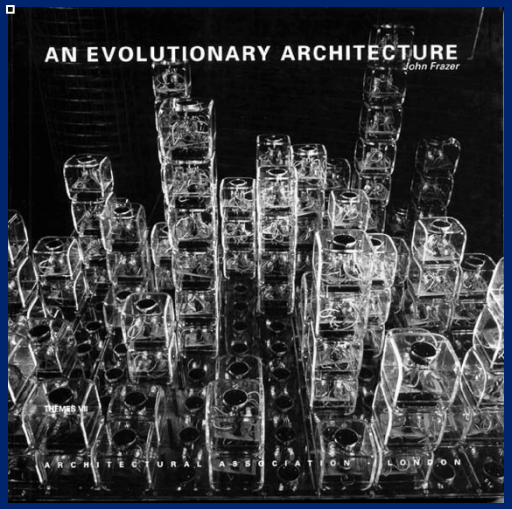
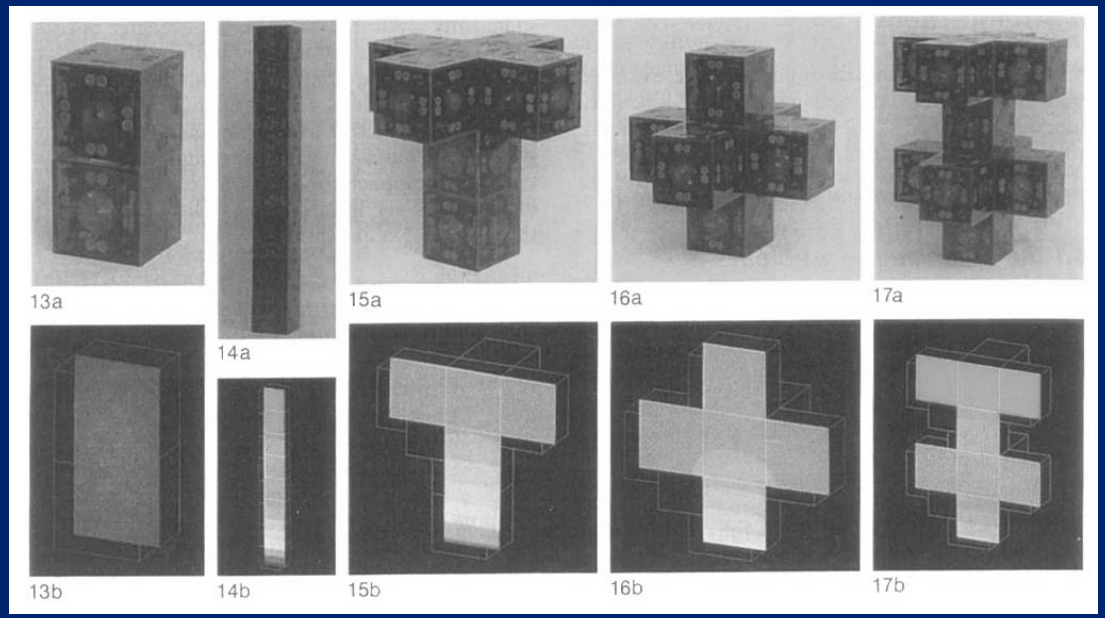


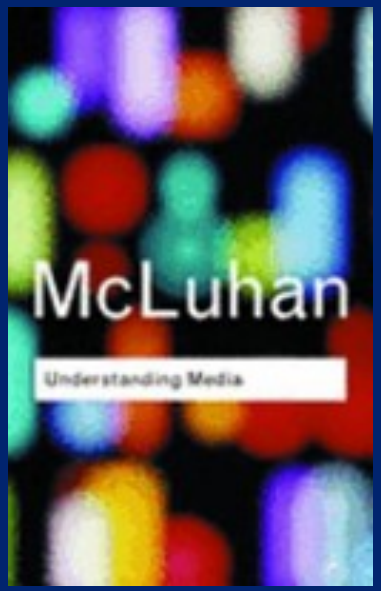
Figure 4. Isoplot of the thermal performance of a building



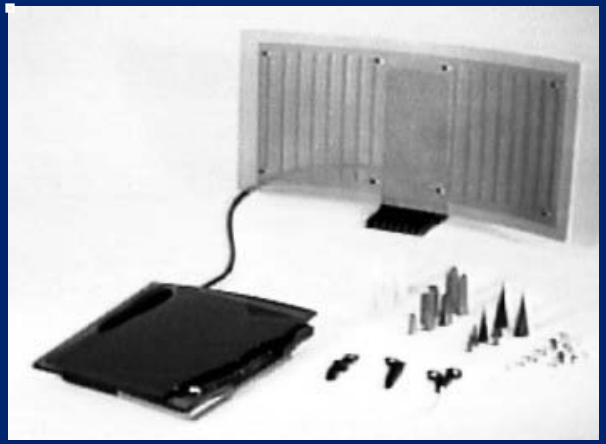


McLuhan

Understanding media: the extensions of man
"the medium is the message" [1964]

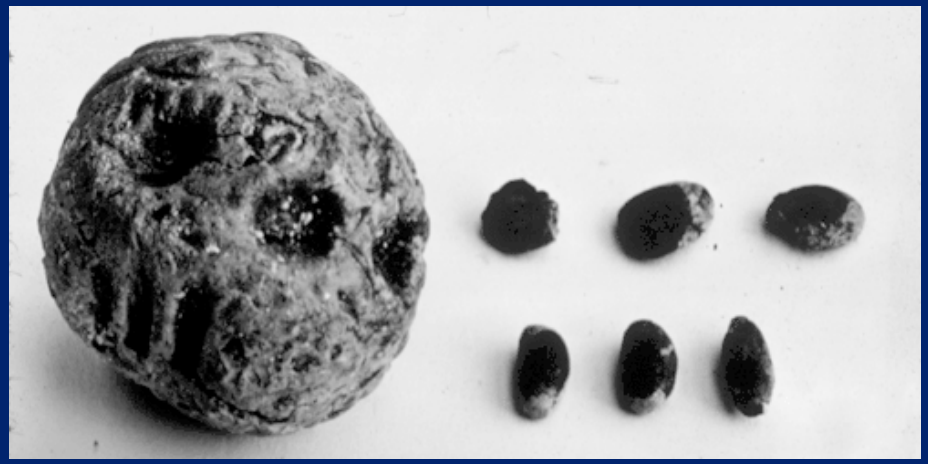


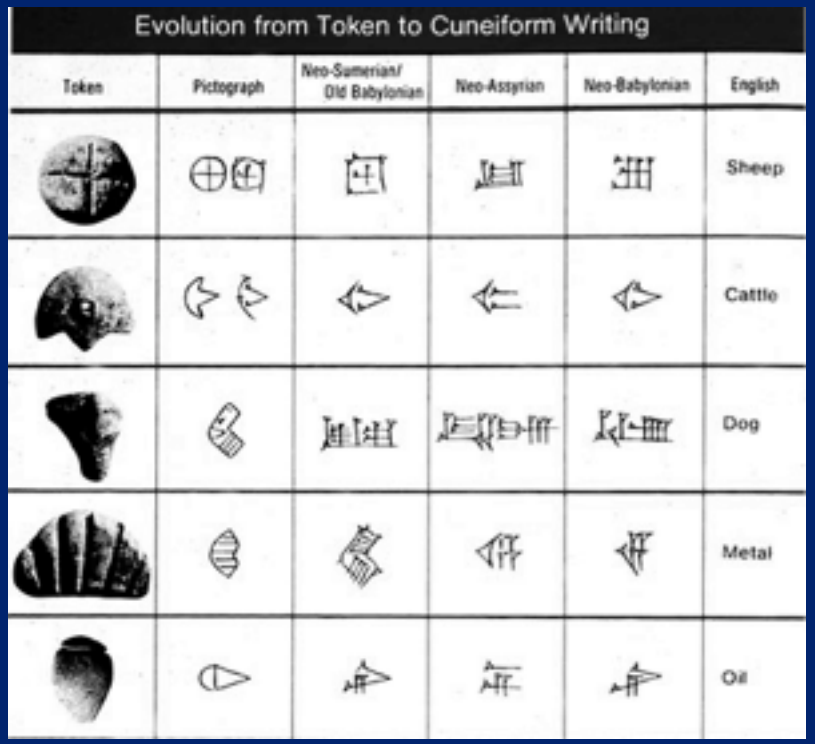
wp: "all media have characteristics that engage the viewer in different ways; for instance, a passage in a book could be reread at will, but a movie had to be screened again in its entirety to study any individual part of it. So the medium through which a person encounters a particular piece of content would have an effect on the individual's understanding of it."



Tangibles past and future

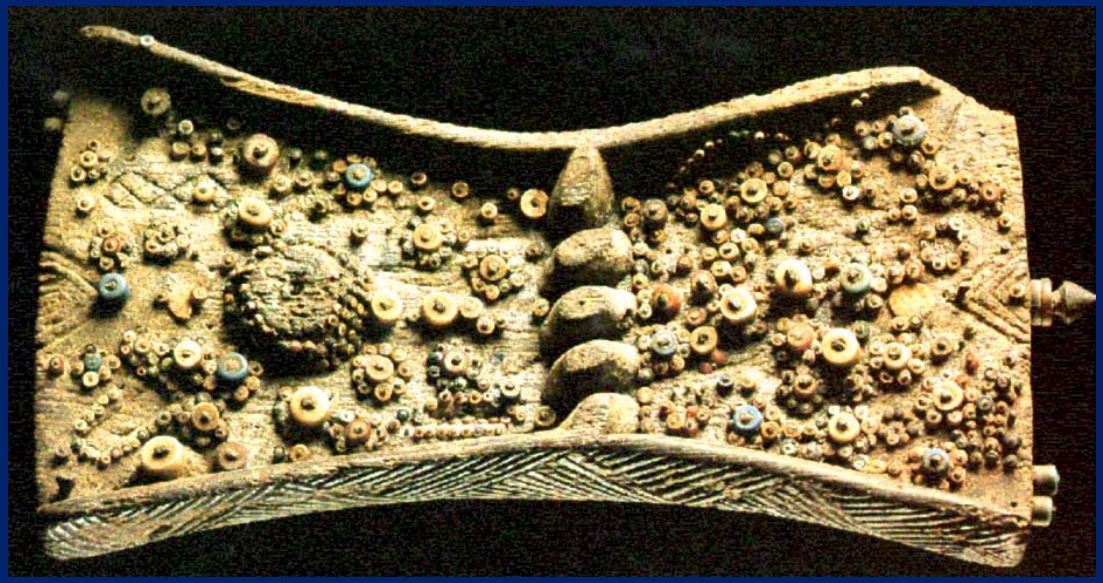
~8000 BC: Clay Accounting Tokens (Mesopotamia)





context: wheel, first city: ~3500 BC; writing: ~3000 BC

Relationships to other disciplines:



Memory board (Africa)

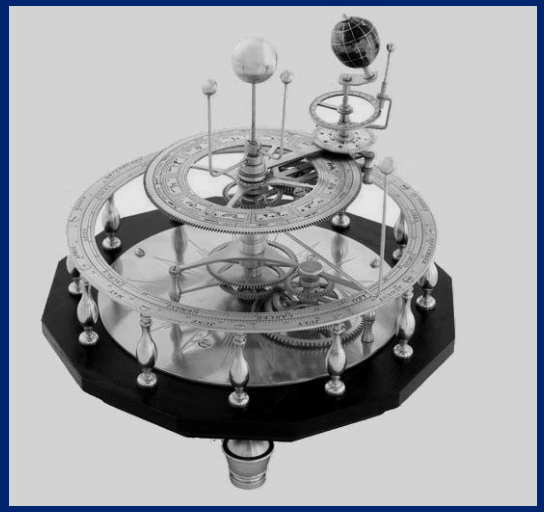
Tjuringa (Australia)

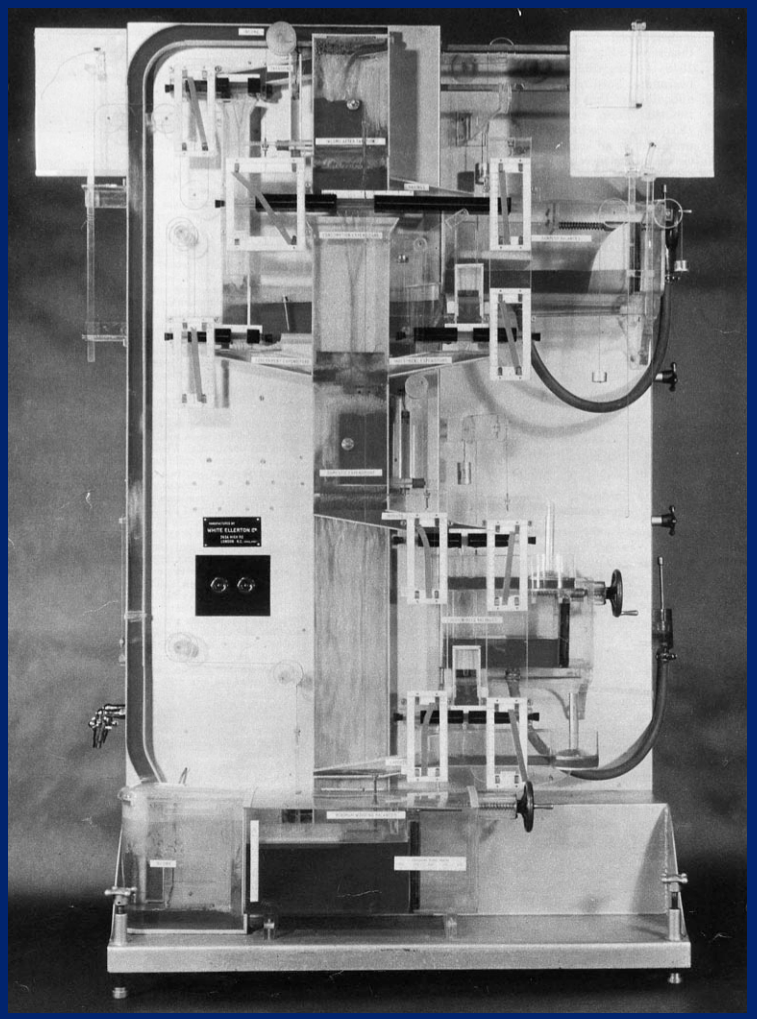
Tangibles past and future

Tabula (~16th century AD; later, abacus)

Leyden Jar (Leidse fles)

Orrery

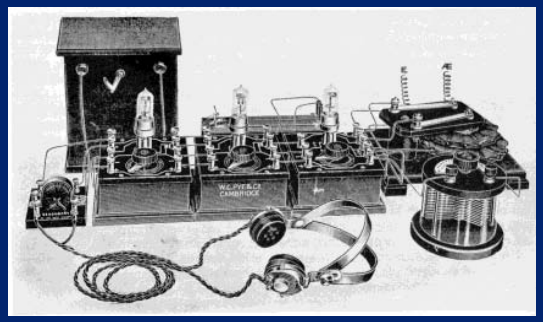


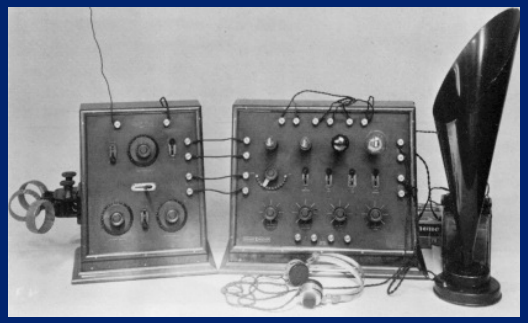


MONIAC (London School of Economics, 1949)

La radio au début: itérations sur décision tangible l'intangible *(Forty 1986)*

(1922)



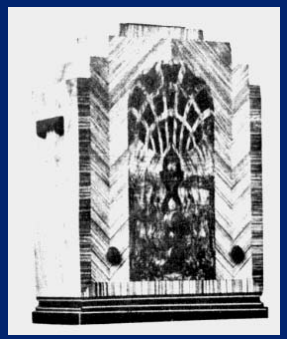


(1924)

(1924)

(1933)

(1932)



(1934)

Marcel DuChamp

readymades:
“bicycle wheel”

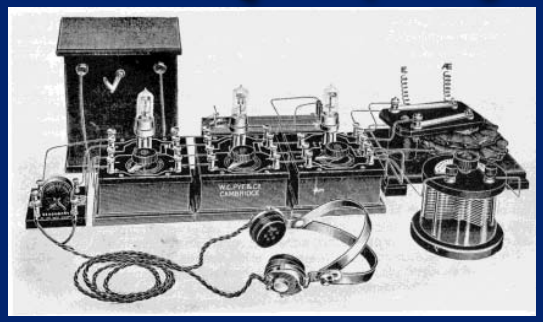
bote a valise

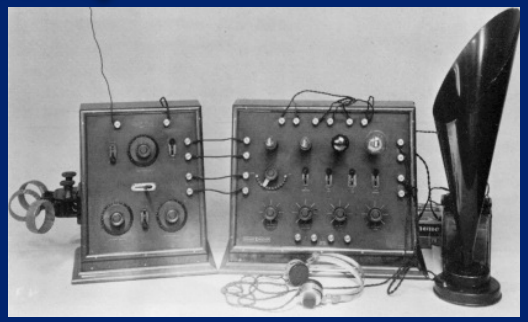
(~museum in a box)

Design : product design

Radio example *(Forty 1986)*

(1922)





(1924)

(1924)

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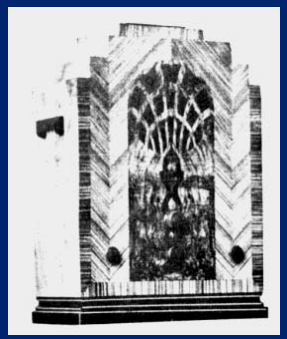

(1934)

Une autre tournure: le feu comme un moyen

Waldman, 1996

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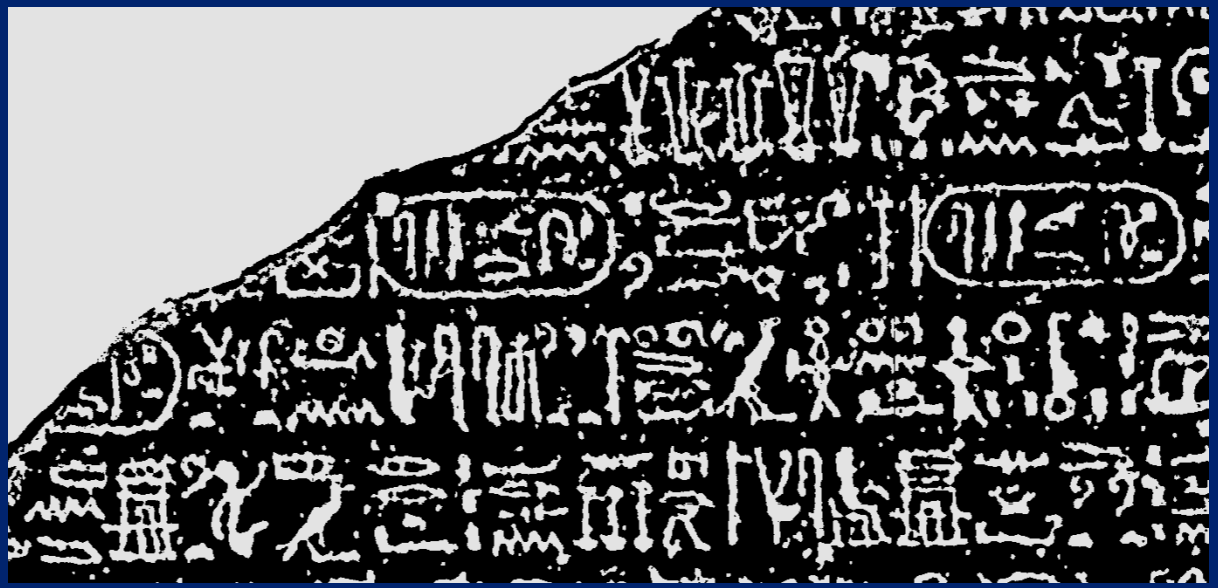
Cartouche: inspirations

- Symbolic legibility 
- Key role in bridging diverse languages
- Used across varied mediums, physical scales, temporal scales
- Link coupling earthly+divine



Cartouche

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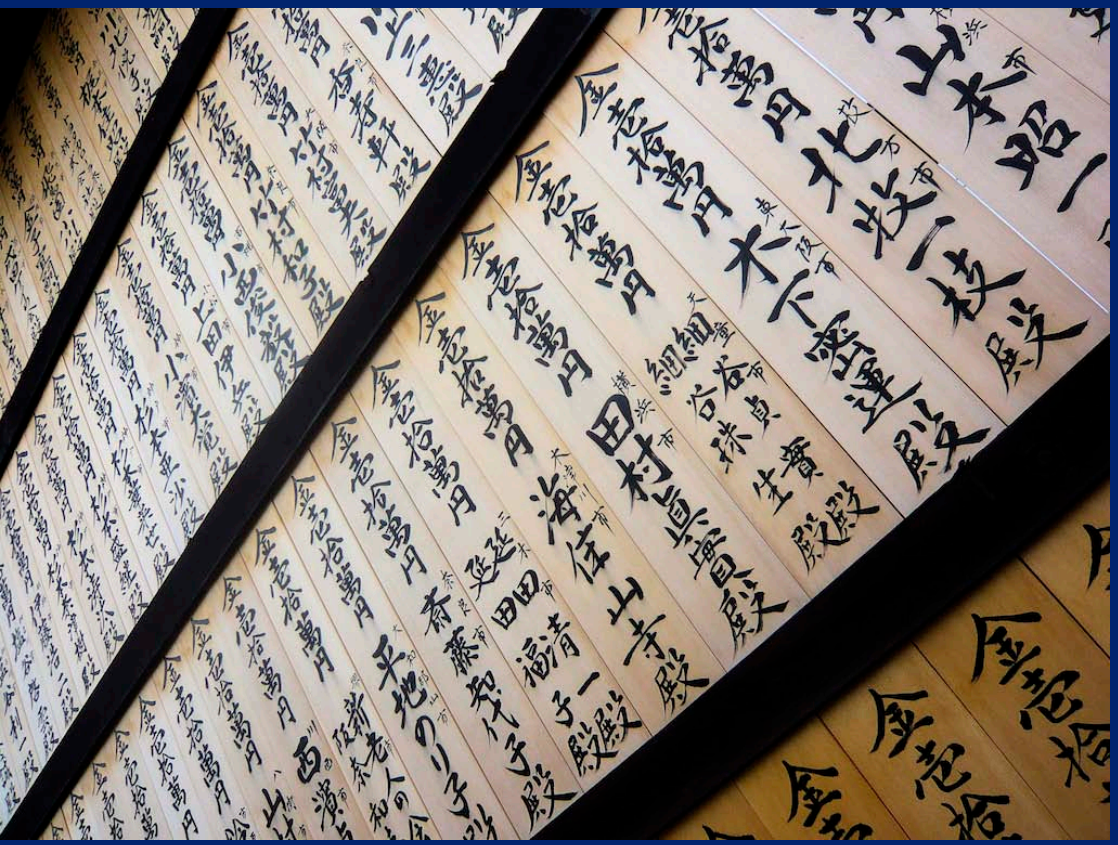
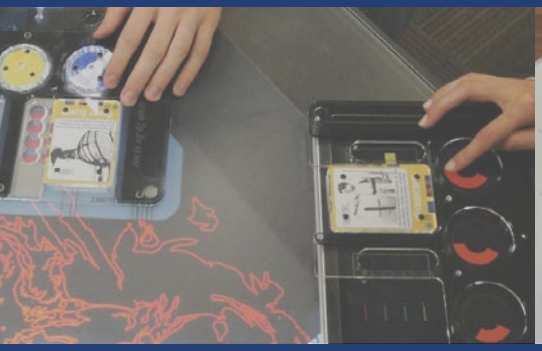
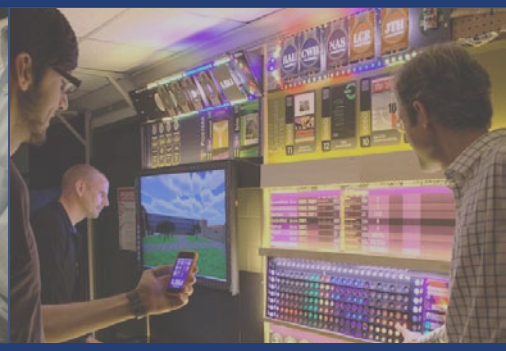
de patrons du temple et les avertissements à travers les siècles



"High dwellings are the peace and harmony of our descendants. Remember the calamity of the great tsunamis. Do not build any homes below this point." (ca 1400)





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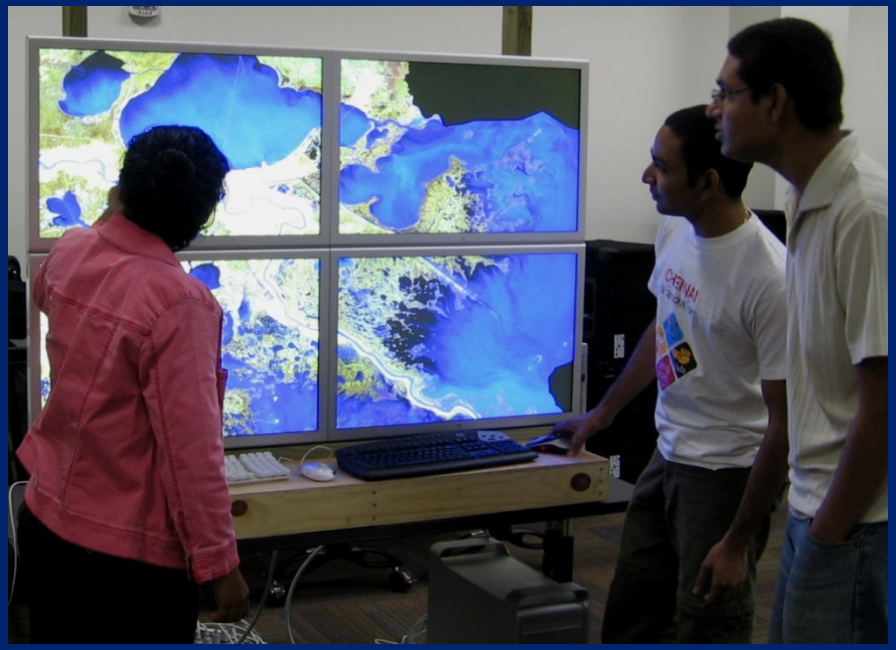
-

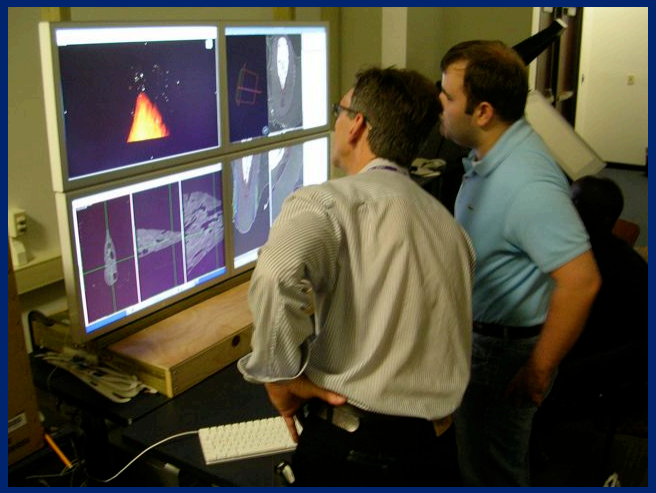
Nouvelles racines dans la science et de la superordinateur

EU IST “GridLab” project (5th FWP); Visualization and Mobile Devices work package

Participants: Germany, Poland, Hungary, Czech Republic, Italy, Greece, U.K., Netherlands, France

Contextes d'immersion exemple





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Re: Hollan and Storan, CHI'92: "Beyond Being There"

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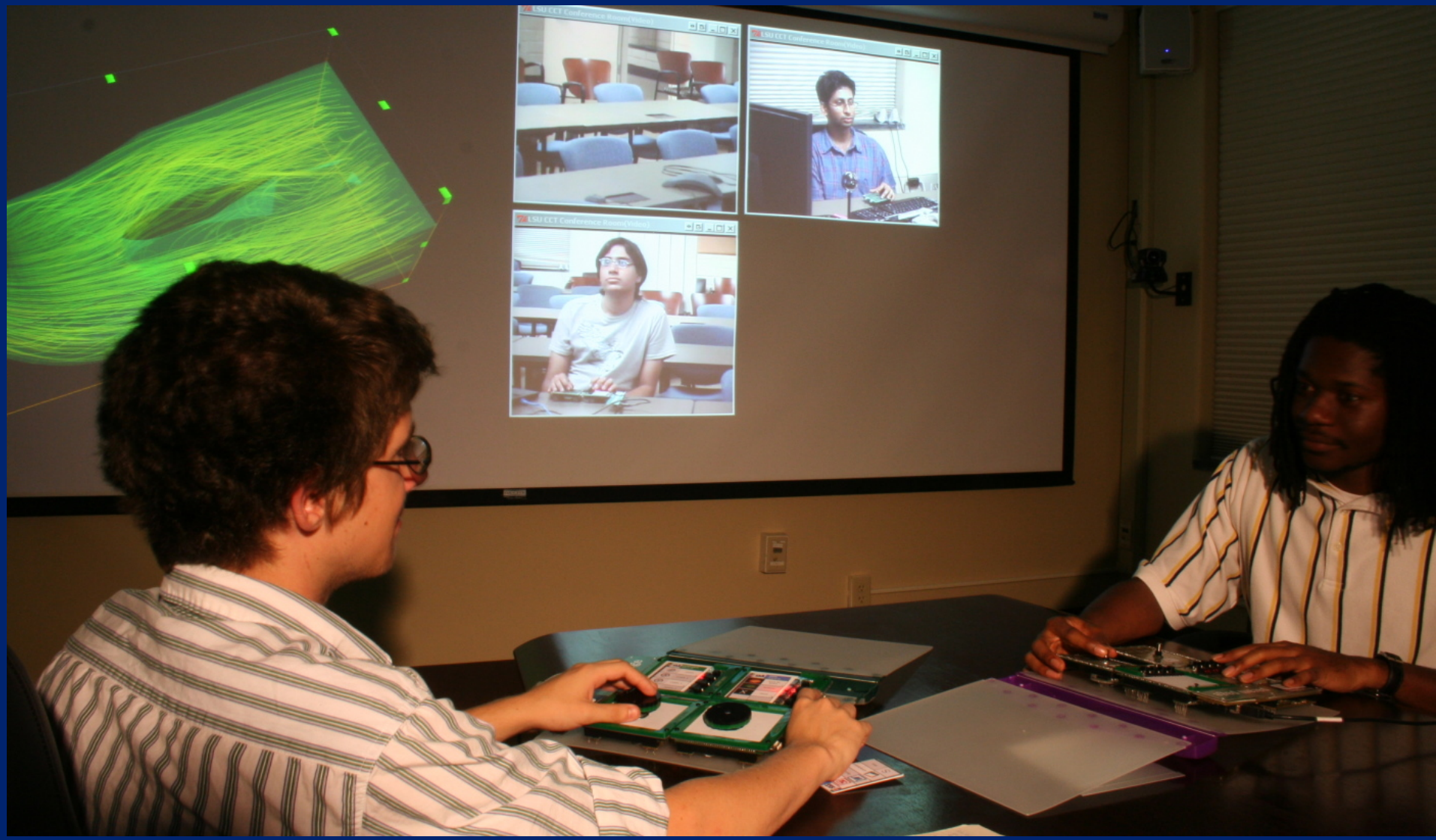

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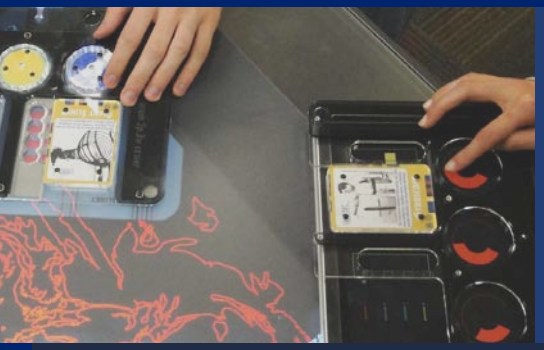


Tangible Visualization group approach

Tangible Architectures

Concepts

- General (core tangibles)
- Specific (domain tangibles)
- Scale (complexity, sustainability)

Technology

- Electronics (bladed systems)
- Software (interweaving C,T,D)

Design

- Physical (products, architecture)
- Visual (dynamic+static surfaces)

Tangible Applications

Computational STEAM

- Scientific visualization (multi-domain)
- Computational genomics
- K-12 informal education

Digital media

- Content navigation, manipulation, management
- Collaborative, multi-device environments

Tangibles: (my recent) past

- Community (Tangibles, C.STEAM, and genomics)
- Core tangibles
- Computational science + viz (e.g., CFD) + K-12

Tangibles: future (several threads)

- multi-device Composition
- tangibles + Computational STEAM + genomics
- tangibles + Culture + ecdev

Subject: Announcement, Tangint wiki and digest (tangible interfaces)
Date: Wed, 15 Jun 2005 23:21:33 +0200
From: Albrecht Schmidt <albrecht.schmidt@informatik.uni-muenchen.de>
To: <bcs-hci-request@jiscmail.ac.uk>
CC: 'Eva Hornecker' <eva@ehornecker.de>, 'Brygg Ullmer' <ullmer@cct.lsu.edu>

Greetings! The following is an announcement of a new wiki and e-mail
digest called "Tangint."

Tangint is intended to service the international community of
researchers, designers, artists, and other practioners in the area of
tangible interfaces and (more generally) tangible interaction.

The Tangint wiki is accessable at the address http://www.tangint.org/.
The Tangint digest is a ~bimonthly e-mail newsletter which accompanies...

We welcome and look forward to your participation!

Tangint Editors:
- Brygg Ullmer, Tangible Visualization group, Louisana State University
- Eva Hornecker, Interact Lab, University of Sussex
- Albrecht Schmidt, Embedded Interaction group, University of Munich

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========== TANGINT 2005 n1 ==========
June 15, 2005

ACM TEI: Tangible, Embedded, & Embodied Interaction (Mardi Gras 2007)

TEI' 07: Baton Rouge, Louisiana (submissions from 20 countries)

TEI' 08: Bonn, Germany

TEI' 09: Cambridge, UK (Microsoft Research)

TEI' 10: Cambridge, MA (MIT)

TEI' 11: Madeira, Portugal

TEI' 12: Kingston, Ontario

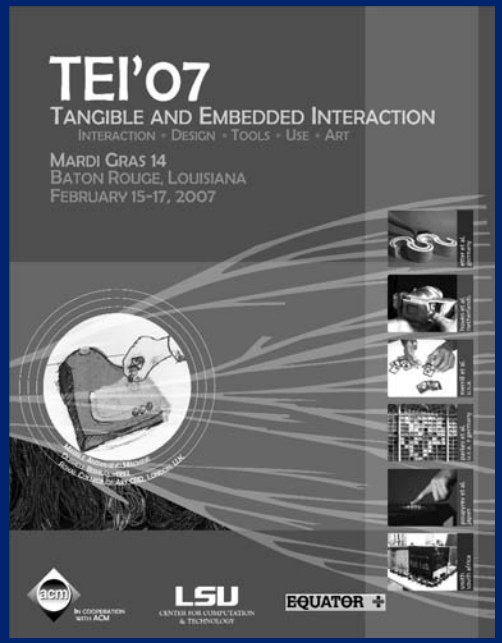
TEI' 13: Barcelona, Spain

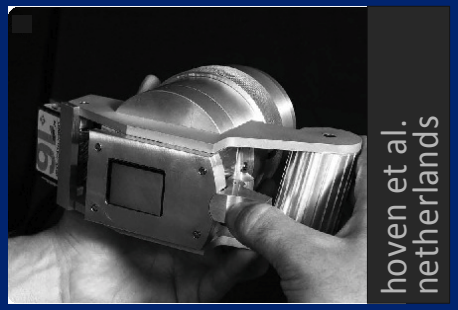
http://tei-conf.org/

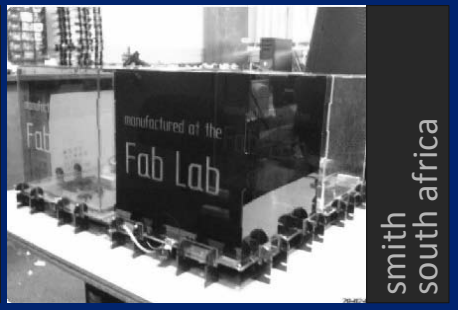
Microsoft, MIT events: both sell-outs

2010: live webcast streamed to > 2,100 unique IP addresses

2011: More than 300 attendees







personne ne reste seul…

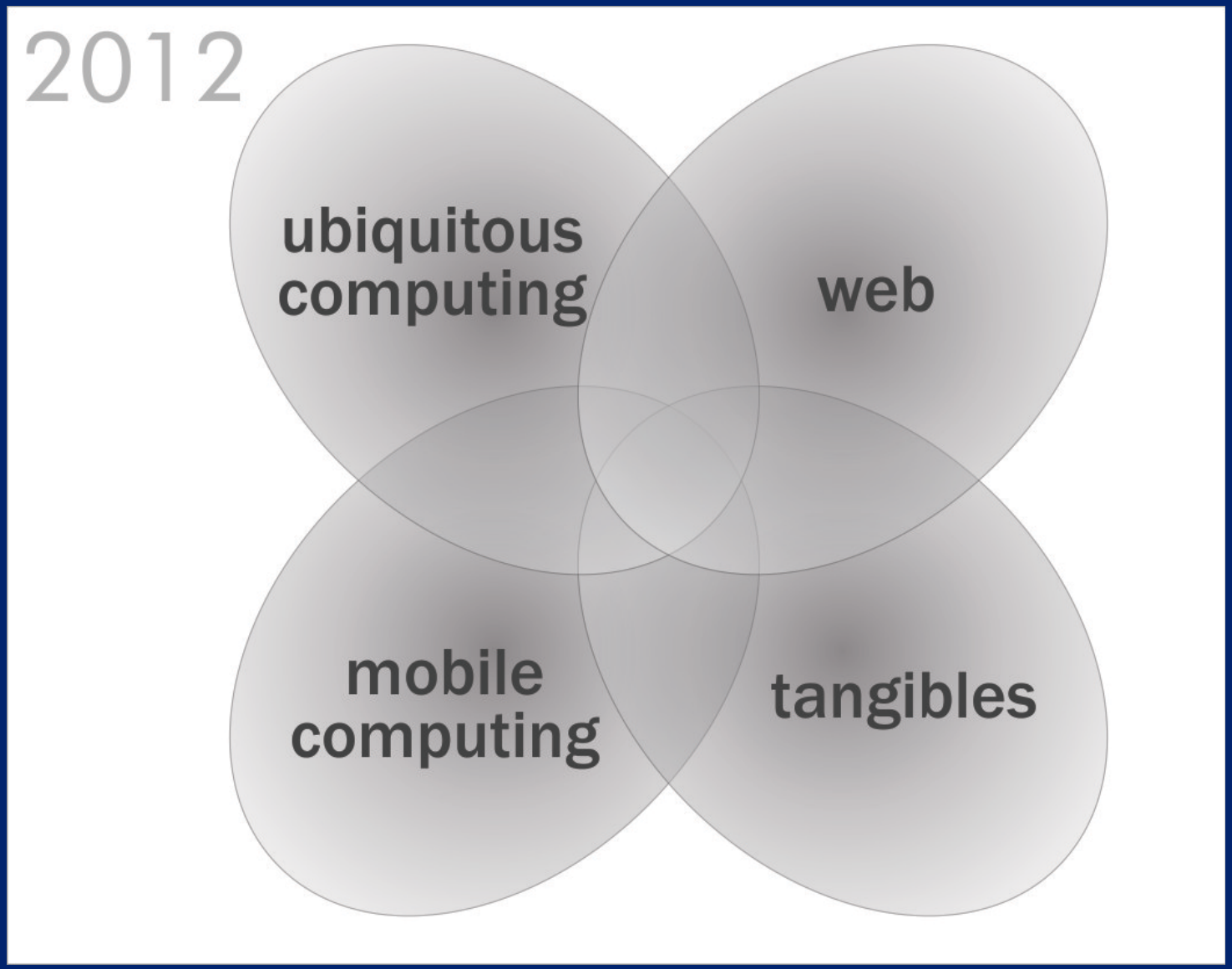
PUC' 04 (Introduction by Holmquist, Schmidt, and Ullmer):

- "…An overarching ambition has been to move beyond the dominating single-point approach, which considers only individual systems by a single author or group…"

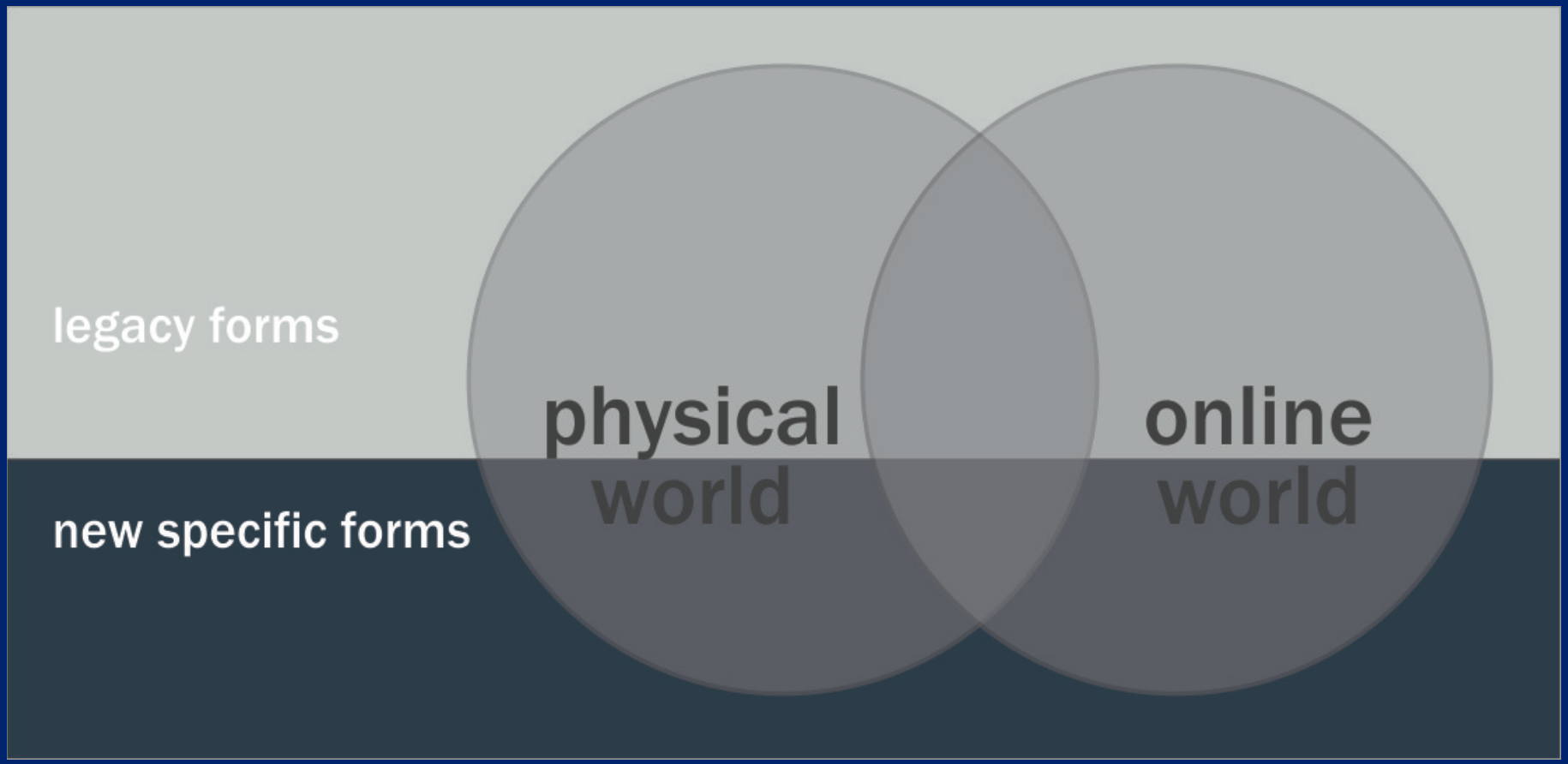
TEI' 07 (Proceedings preface):

- "It is worth noting that Bishop strongly felt his [Marble Answering] Machine should not stand on its own, but rather as one of a diverse ecology of interconnected, interoperating tangibles. … We believe such ecologies likely still represent much of the future and potential of tangible and embedded interaction…"

Aujurd'hui: enchevêtré thème

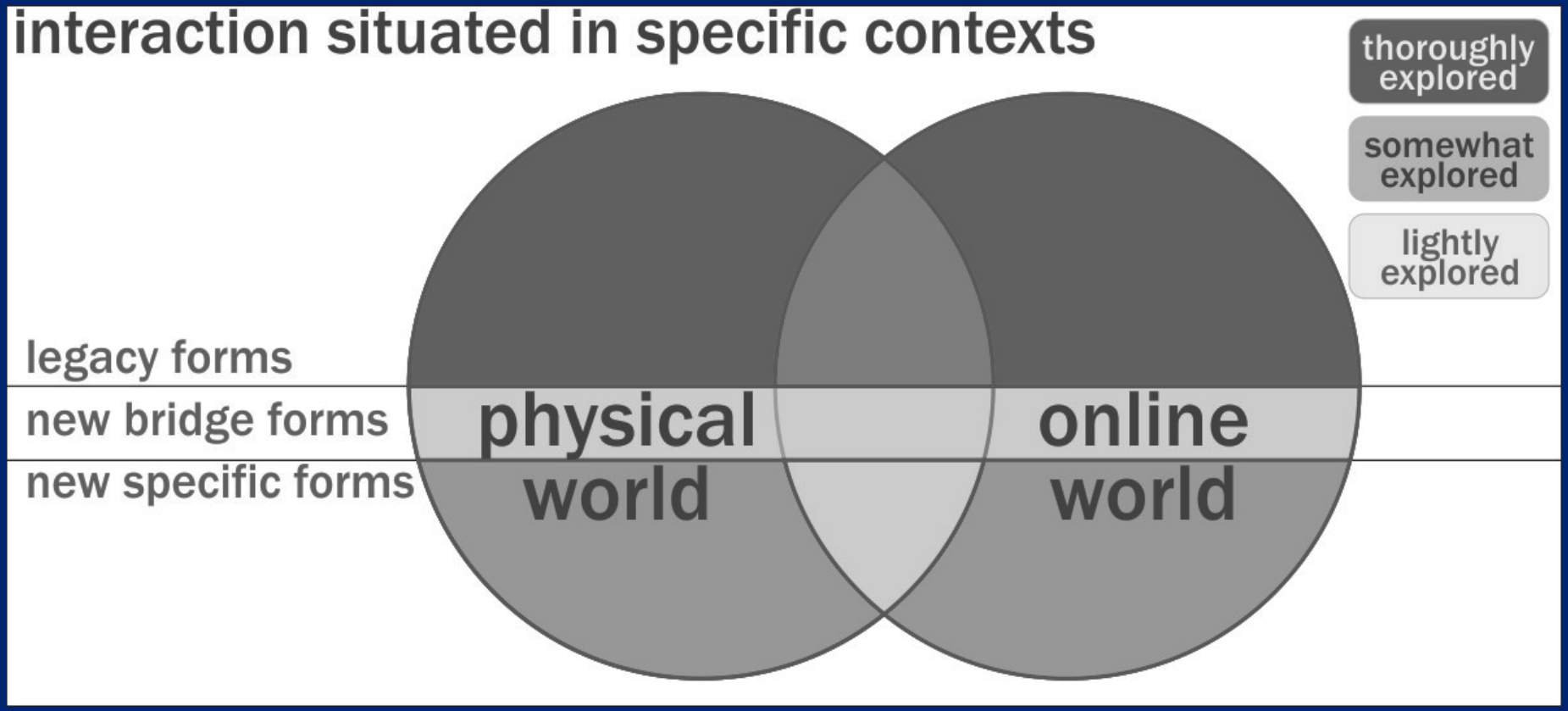


Plusieurs intersections: le plus connu et le nouveau

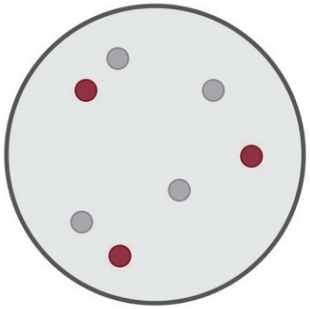


-

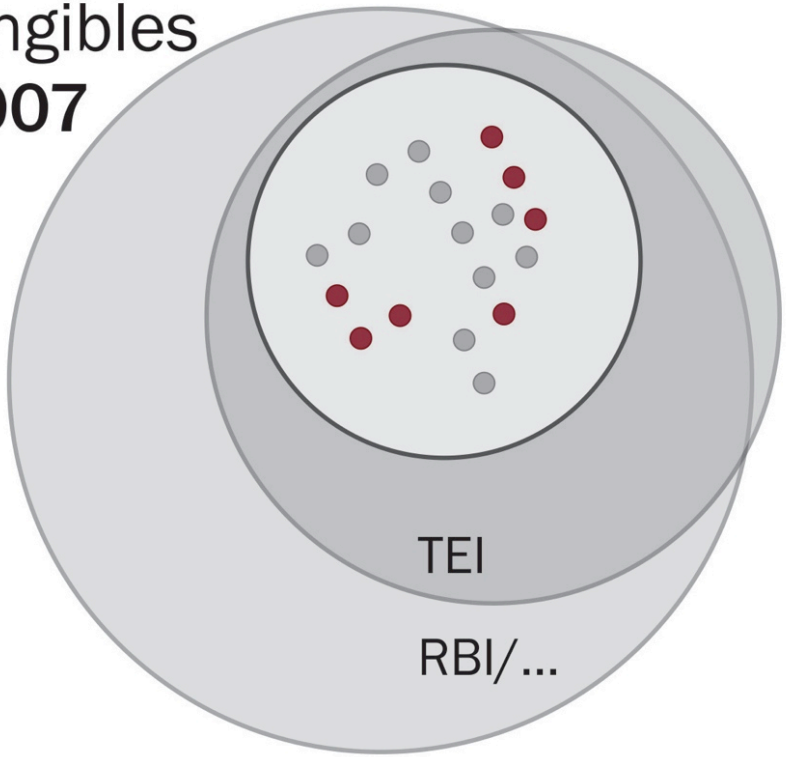
Sous-espaces différents, différemment explorés



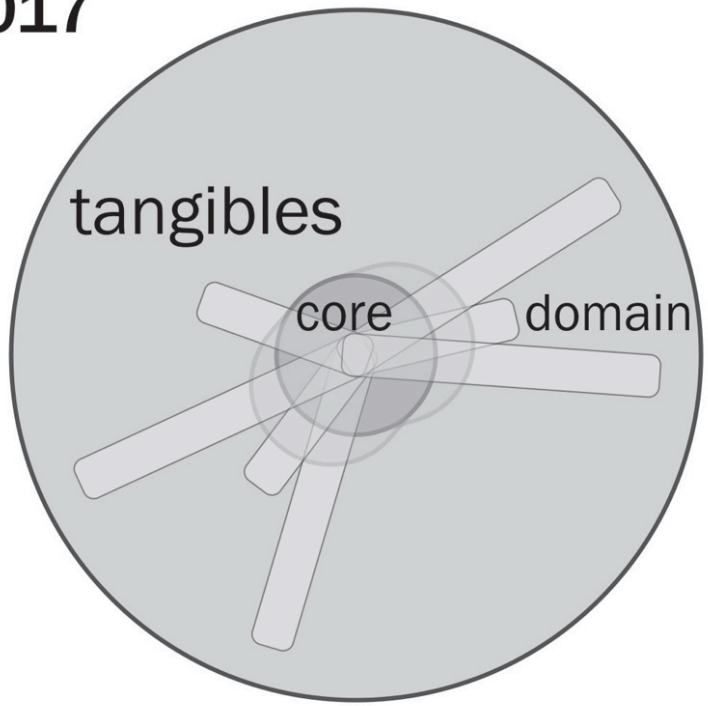
TUI
1997



tangibles
2007



ecologies of tangibles
and other cloudshards
2017

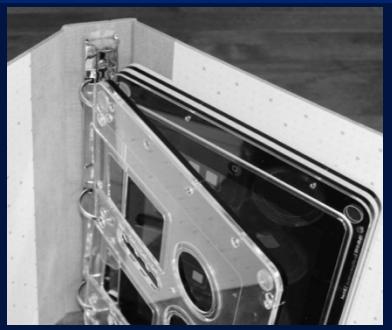


cartouches et casiers (1/2)

cartouches

- physical tokens representing data, events, operations, parameters, people, devices, etc., following certain conventions
- embody “words” – nouns, verbs, adjectives, etc.

casiers

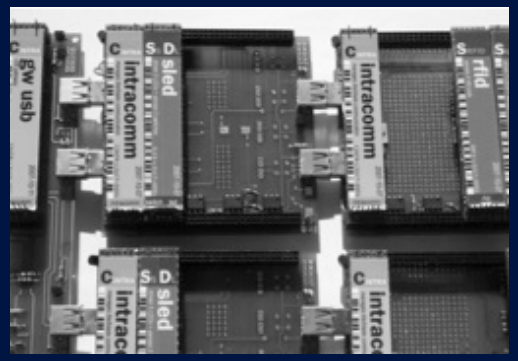




- structure the physical + functional composition of cartouches and complementary interactors (e.g., buttons and sliders), following certain conventions
- comparable to sentences and (differently) GUI windows

cartouches et casiers (2/2)

interaction pads + cards

I3D/05



function blades

TEI'09

interaction tiles + cards

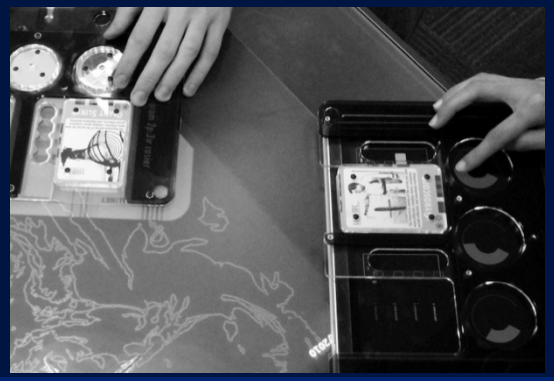
TEI'07

cartouche

TEI'10

core tangibles: i.trays + t.menus

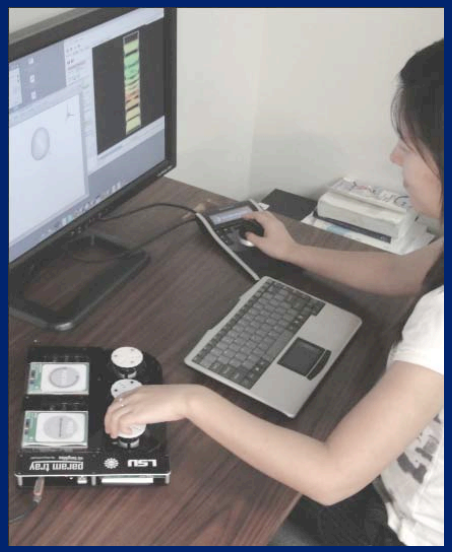
TEI'08

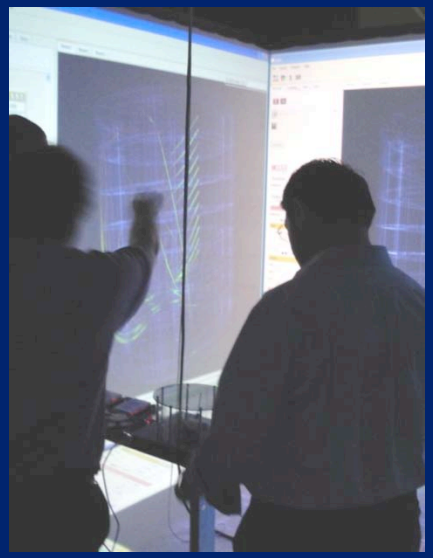


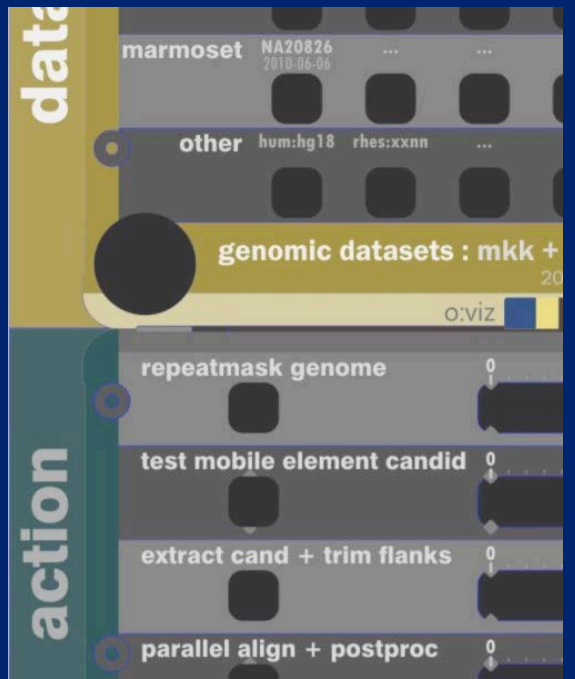
casier

TEI'11

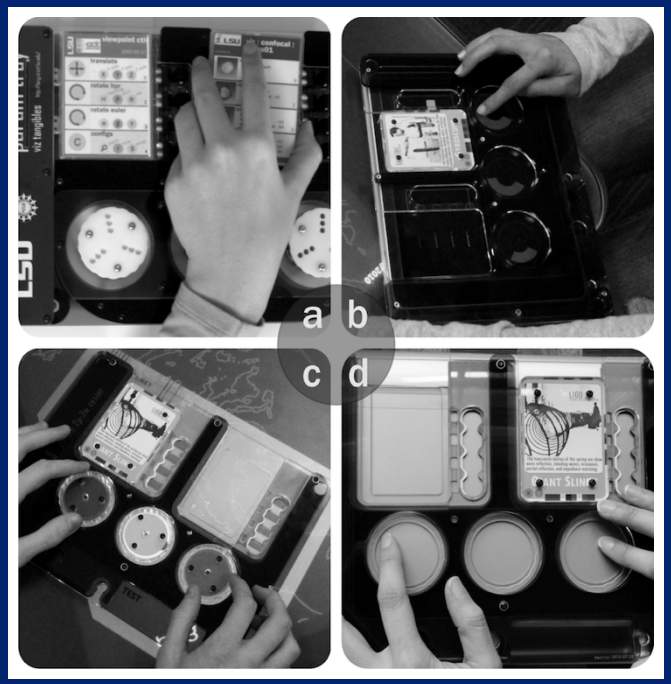
App domains: sciviz, genomics, K-12, arts + culture

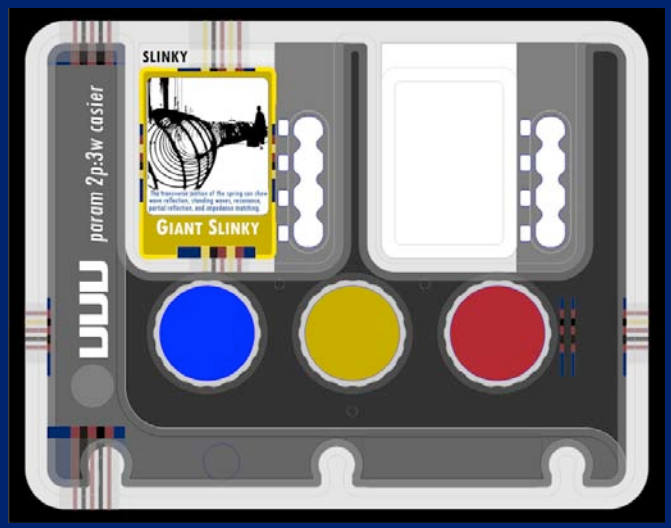




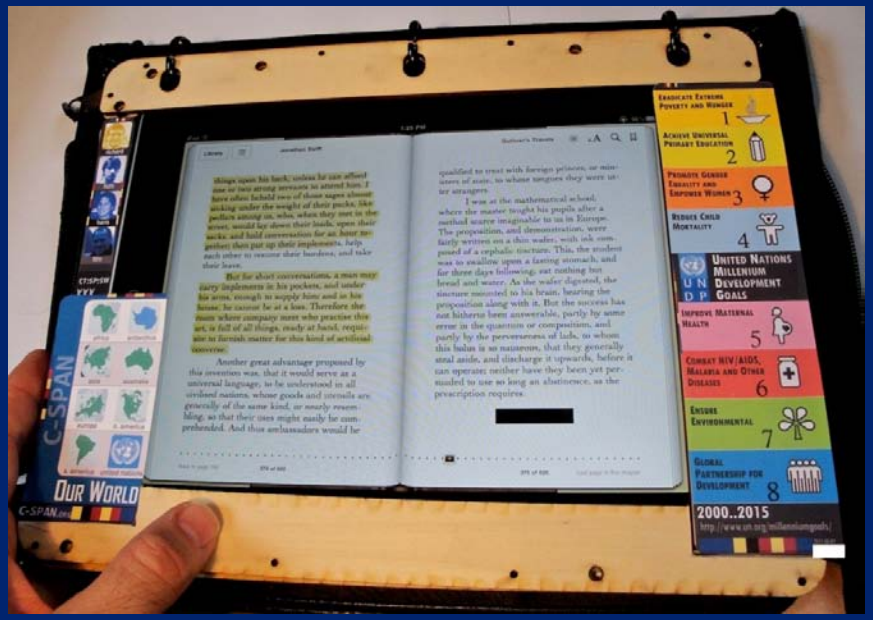


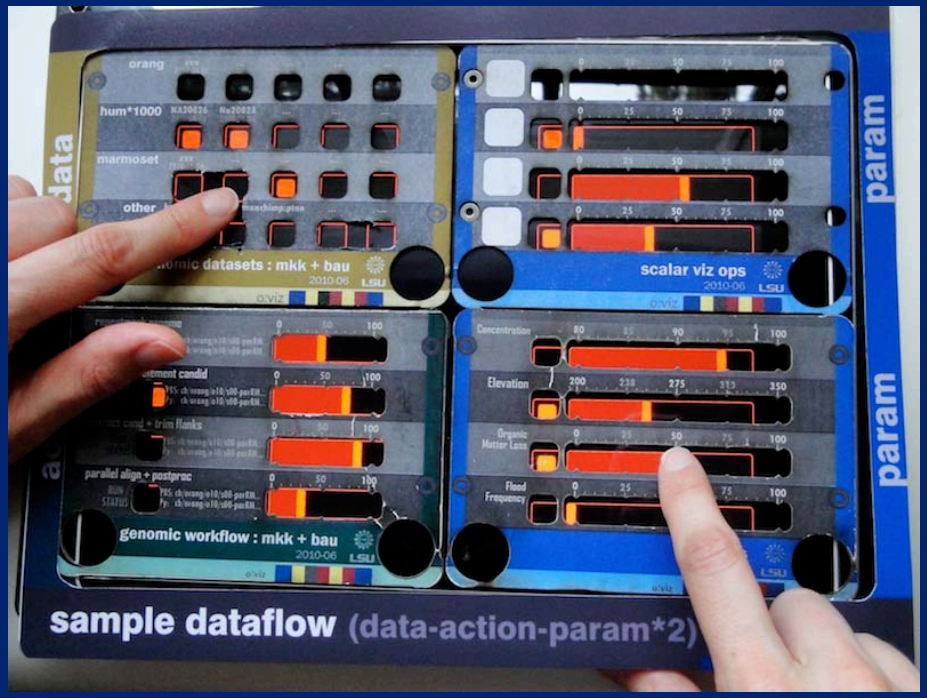
Casier example: three-wheeled param casier

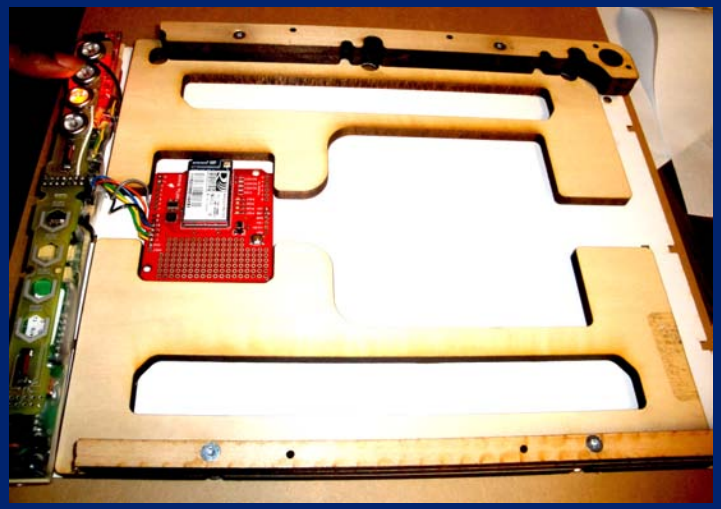


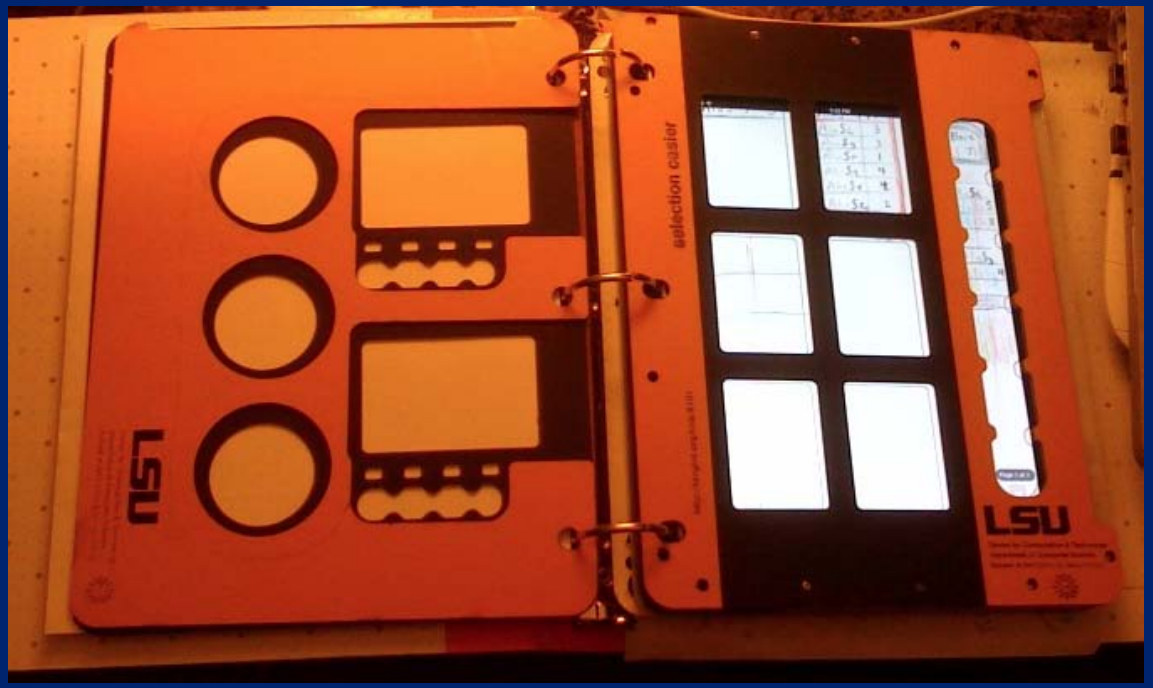


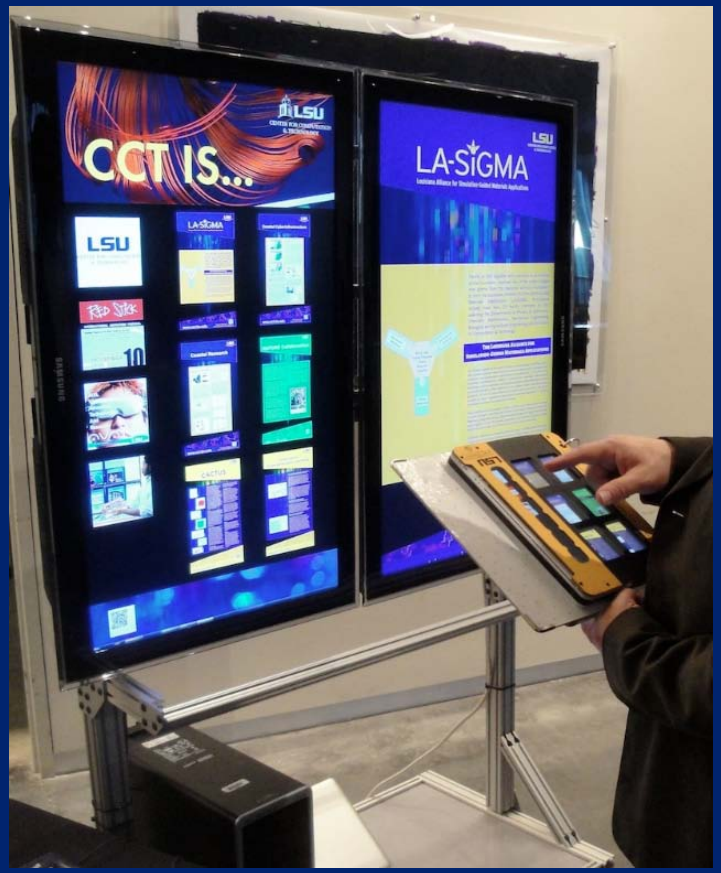
[on Surface, iPad, Wacom Fun, 3M glass]

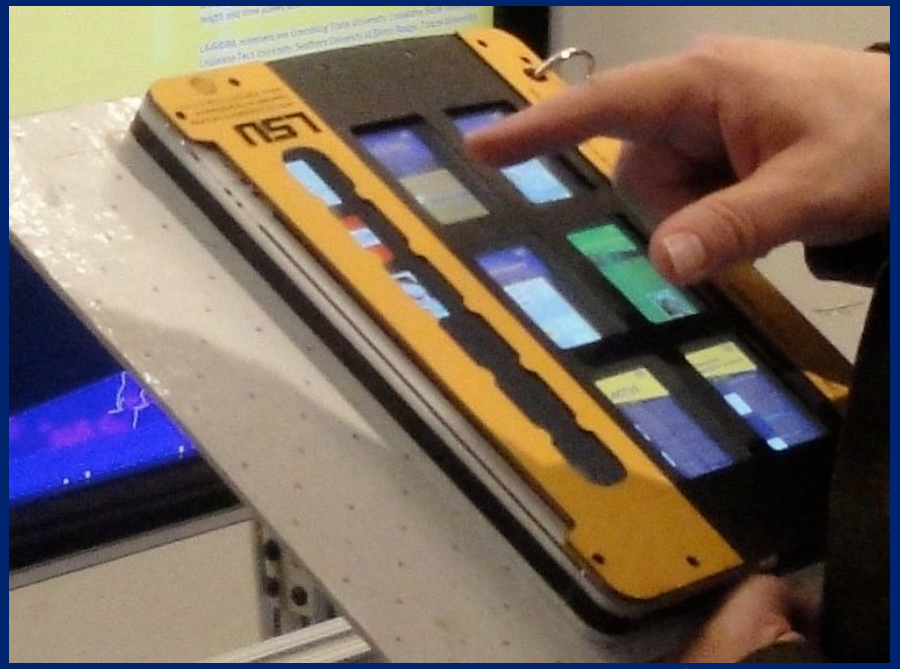


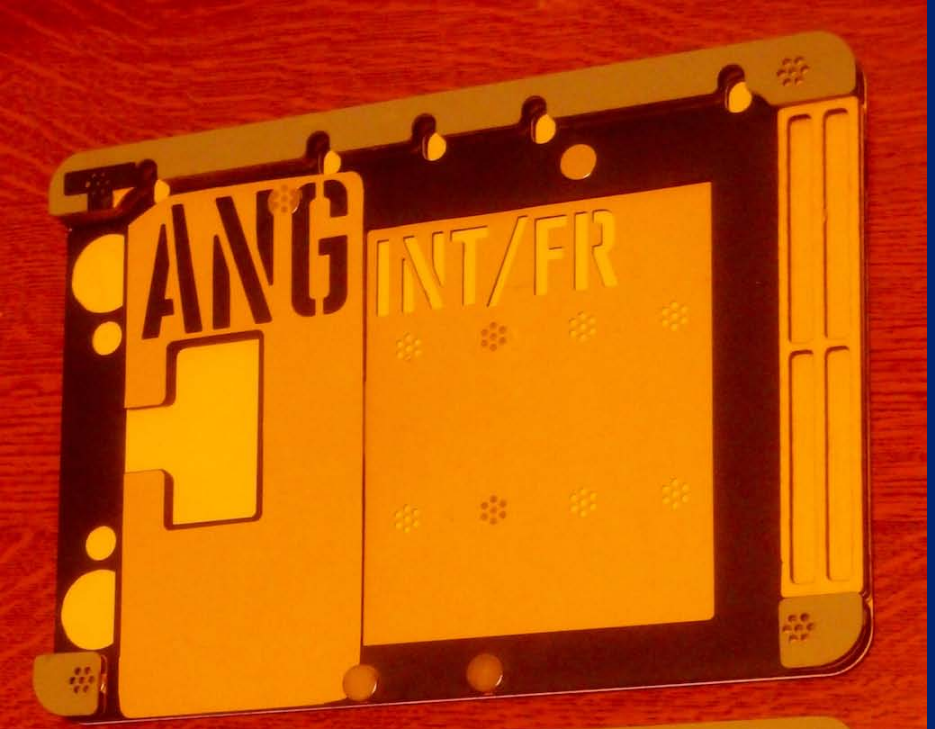








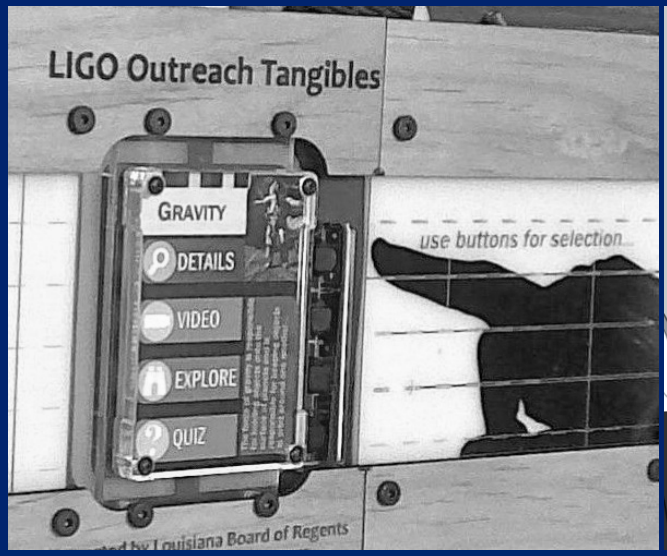




Kiosks

Lanier, 2000: “Top Eleven Reasons VR has not yet become commonplace”

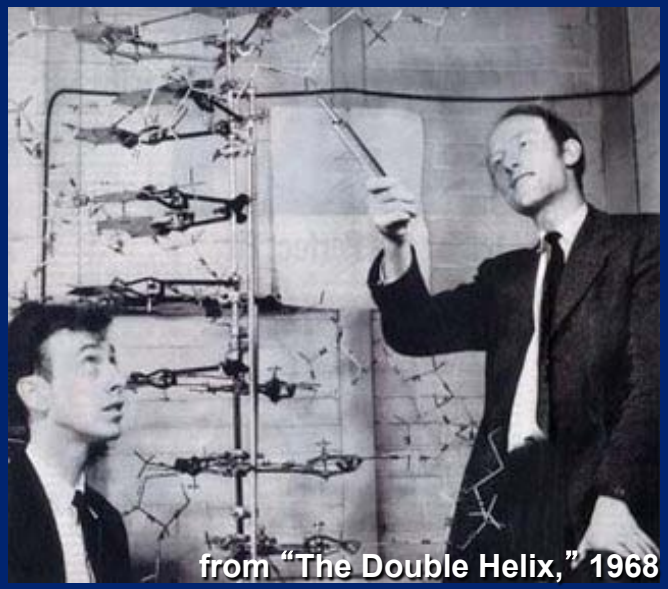
10) There is still no clear sense of where VR fits into the time and space of our lives and workflows. VR setups take up space. Where would you put one? When would you use it?



Domain-specific tangibles

"[other scientists gained an appreciation that our past hooting about Model building represented a serious approach to science, not the easy resort of slackers..."

Watson 1968



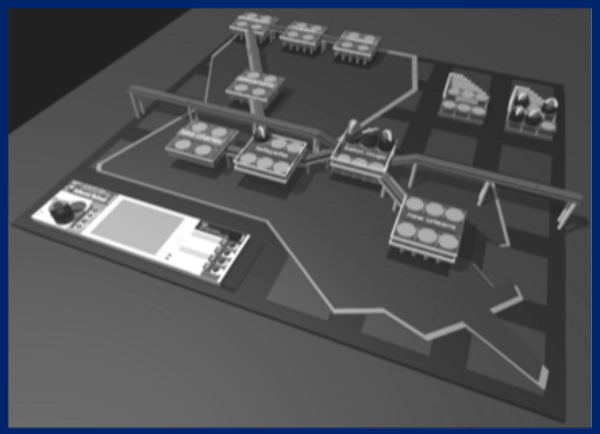
"In biology, a clone is the opposite of a clade. ... All this, too, has its analog in the domain of linguistics. A linguistic clone is a monoglot culture, a population with a single language sheltered from alien words and alien thoughts... In human culture as in biology, a clone is a dead end, a clade is a promise of immortality.

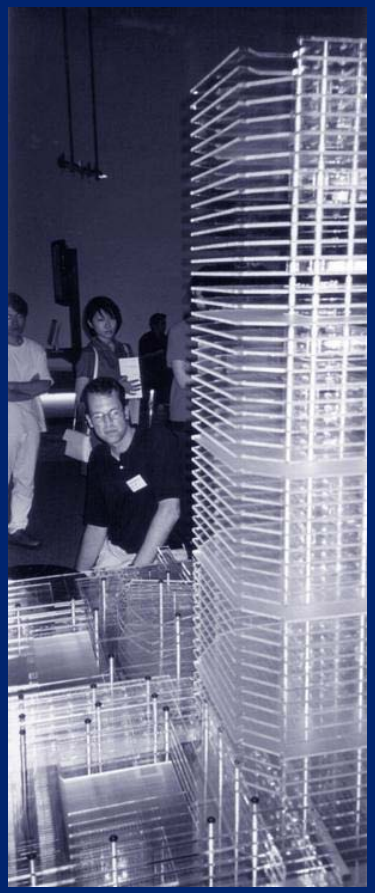
Are we to be a clade or a clone? This is perhaps the central problem in humanity's future. In other words, how are we to make our social institutions flexible enough to preseve our precious biological and cultural diversity? ...."

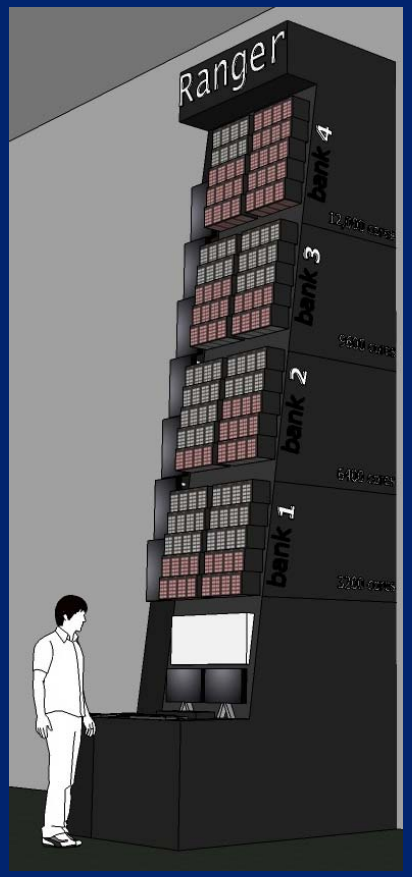
Dyson 1979

Tangible Visualization

- "interactive physical descriptions of complex systems"
- marry trends in physical fabrication, exponentiating cores with diversity + economic development challenges/opportunities
- again, interdependency between special+general-purpose els







Components: blades + tiles as design elements

blade: quantum of hw+fw+sw+materials+form+visuals

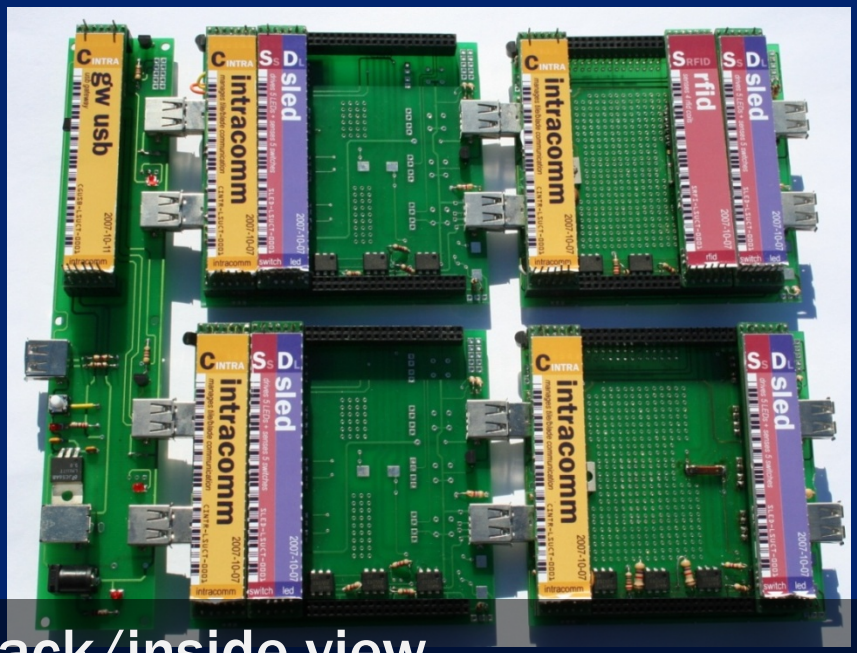
tile: composition of multiple blades, often with interactors

~2-4 tiles,

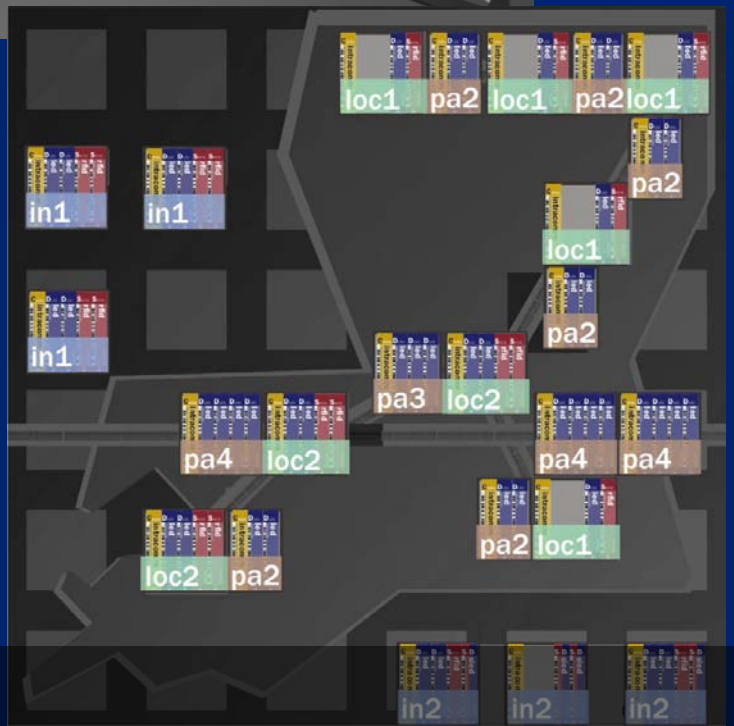
~5-12 blades

~25 tiles,

~100 blades



back/inside view



2012

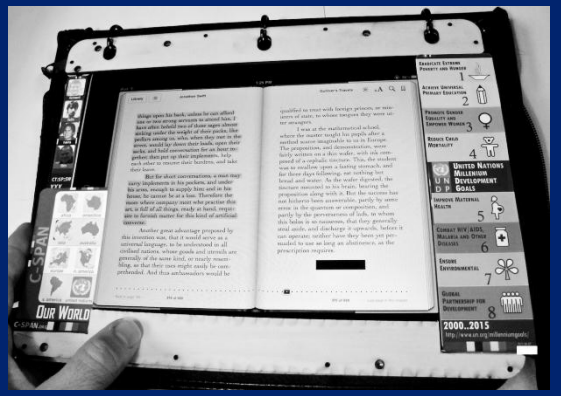
Computational STEAM: Melete (funded 2011-09-01)

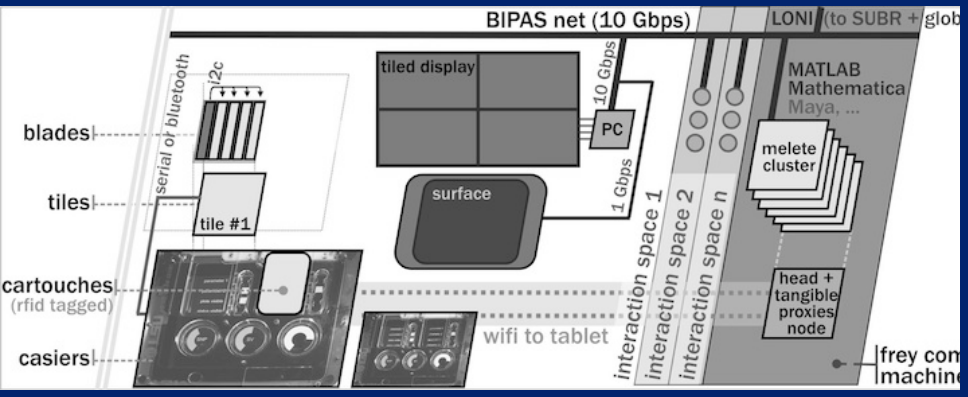
Melete: an interaction-oriented, software-rich compute cluster with tangible interface support for collaborative research and the classroom

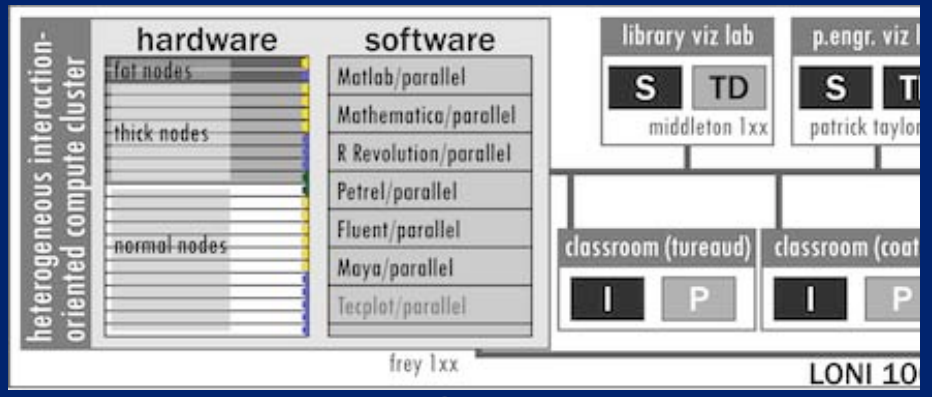
PI: Ullmer

Co-PIs: Full professors in Mathematics, Chemistry, Biology, Design

Senior investigators: 39 faculty from 6 colleges, 12 departments







perspectives on futures for tangible interaction:

- object composition, ecologies, sustainability, cultural specificity
  - Vanderdonckt: and decomposition, recomposition!
- legible, actionable, aspirational, inspirational
- analogues: ubicomp+1933 plastics; web; GUIs
- dyson: ±10, 100, 1000, 10000 years

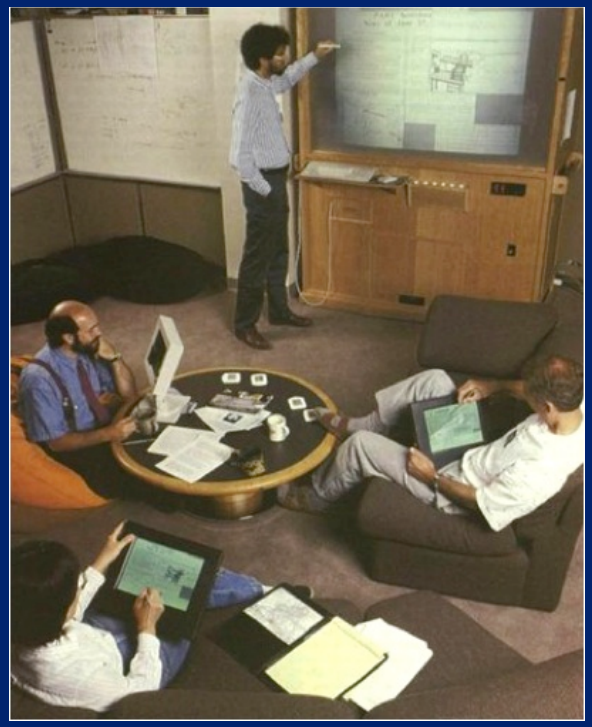
Desired properties

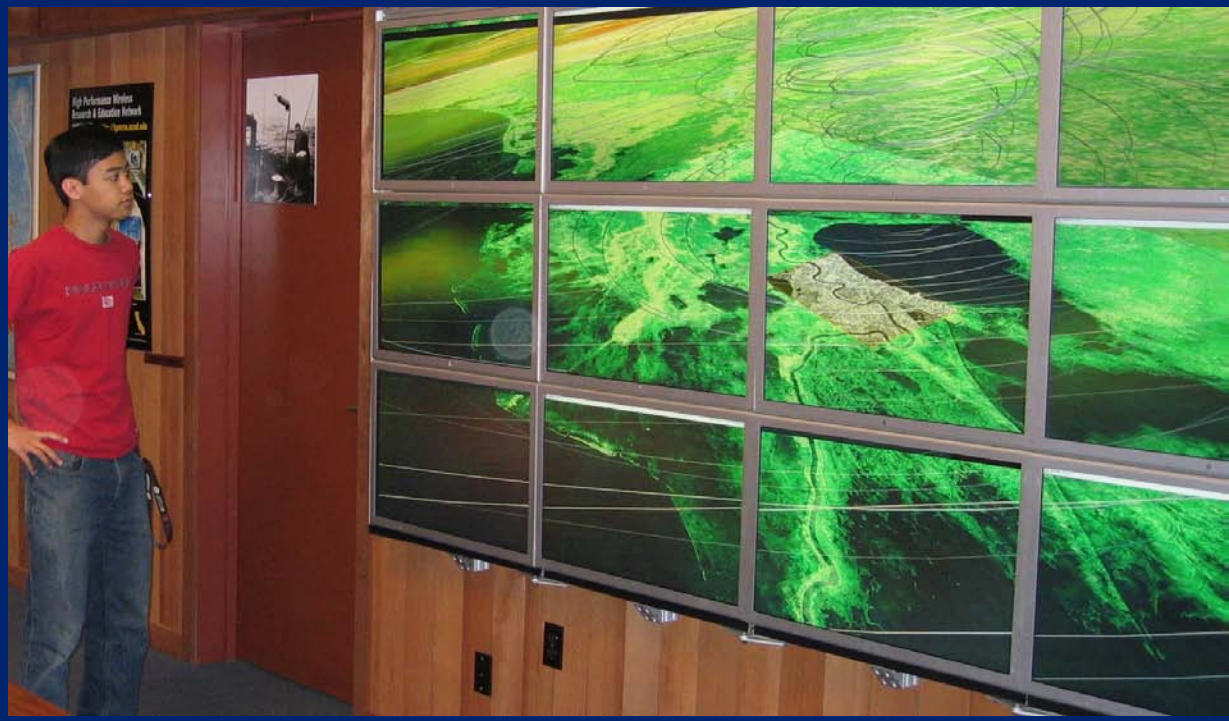
- Interoperability
- Composability, Decomposability, Recomposability [JvdD]
- Decoupling
- Legibility
- Attention
- Aggregation
- Authentication
- Network effects / externalities
- Spanning multiple physical scales
- Bridging interaction genres (AR, VR, etc.)
- Prospects for varied fabrication by varied producers
- Extended interaction real estate, complementary with other modalities

Union Carbide, Vinylite House, Chicago's Century of Progress Exposition, 1933 (discussed in “American Plastic,” 1995)

All surfaces–floor, walls, dishes, light fixtures–of vinylite (plastic)

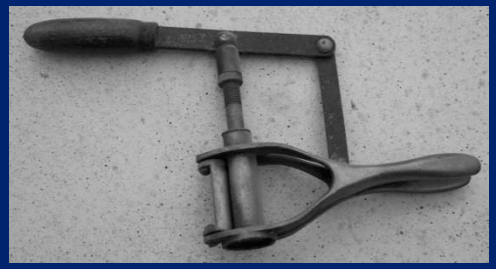
“Despite its vibrant colors… the Vinylite House seemed spartan, severely modernistic, too austere… When plastic, used frankly and directly, became the overwhelming material in a given environment, the result often seemed cold or inhuman.”





tangible opportunities: culturally specific artifacts

ulm school of design: roughly the opposite



france

netherlands

japan

switzerland

china

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TangViz: Allen, Dell, Reeser, Washington, Wiggins; Bradford, Carroll, DeLatin, Dever, Diabi, Douthut, Foley, Gavin, Hargrove, Hess, James, Laan, Losso, Morris, Oliver, Ramb, Seidel, Sun, Tregre, Wallace, Wesley-Smith, Wiley, Collab: Barren, Freeman, Ogunbakin, Tanner

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merci beaucoup + questions?

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