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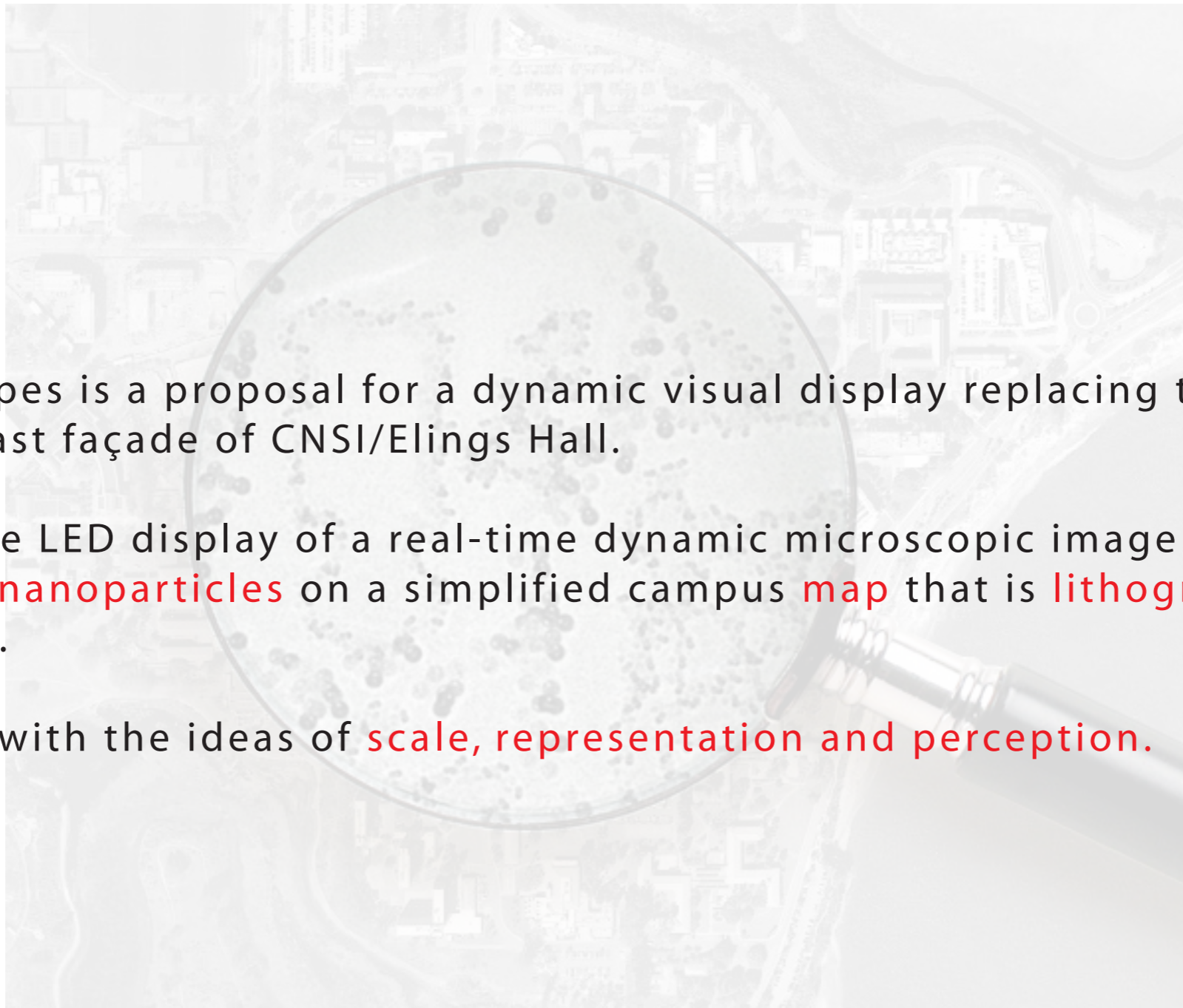
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Dynamic Nanoscapes is a proposal for a dynamic visual display replacing the existing painting on the east façade of CNSI/Elings Hall.

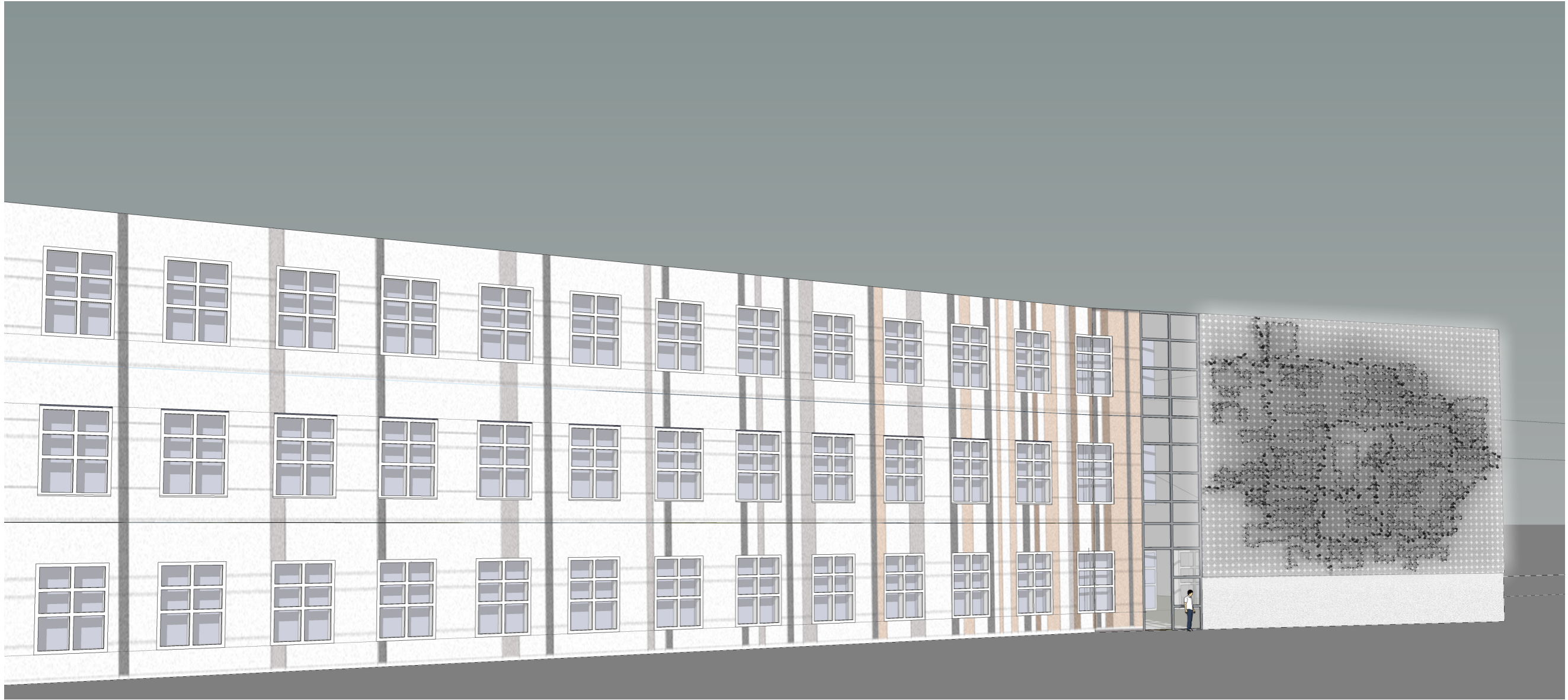
The proposal is the LED display of a real-time dynamic microscopic image that shows the behavior of silica **nanoparticles** on a simplified campus **map** that is **lithographed** onto a nanoscale surface.

The project plays with the ideas of **scale, representation and perception.**

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D Y N A M I C N A N O S C A P E S

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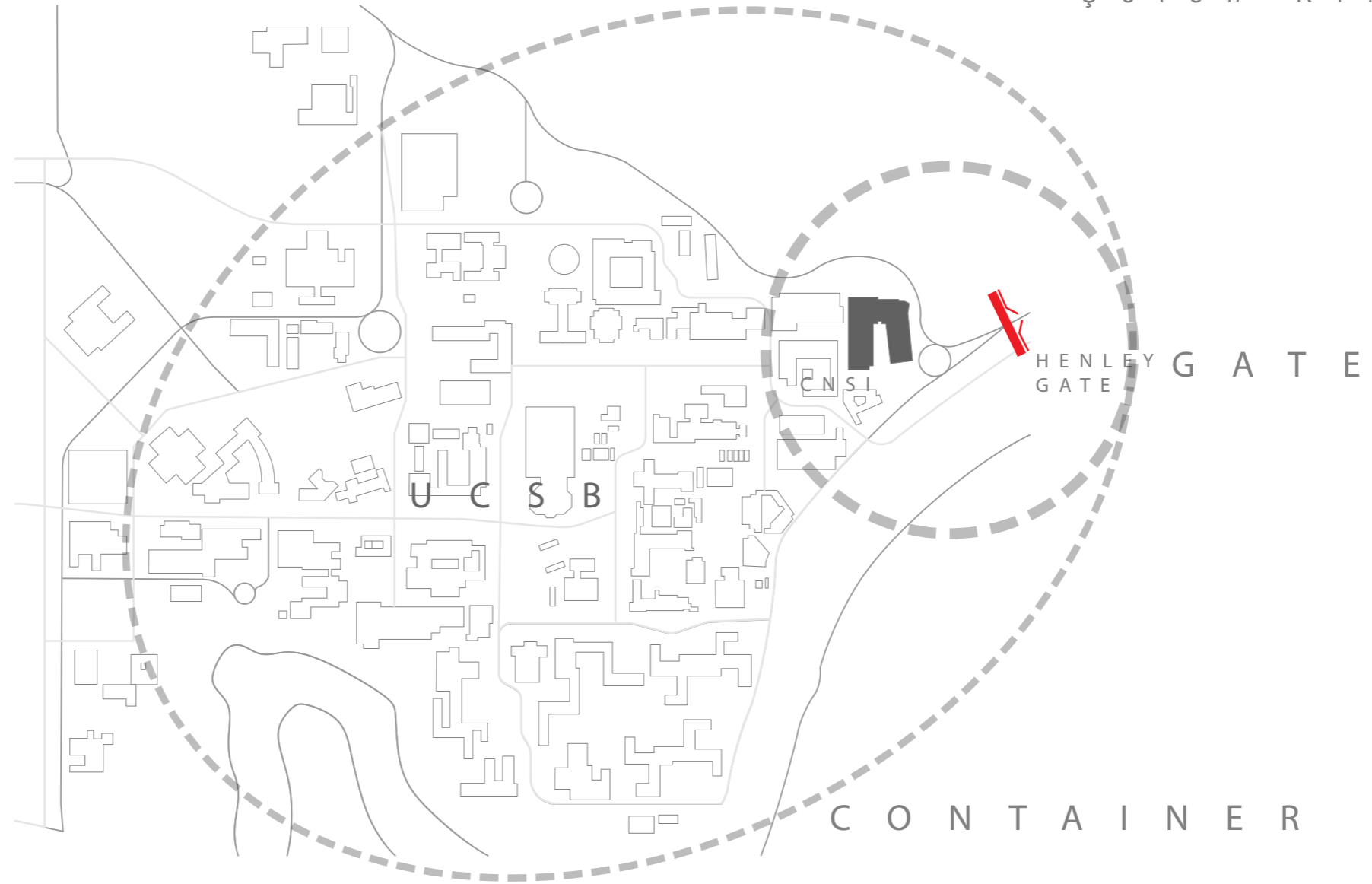
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Elings Hall contains CNSI and MAT.

Elings Hall is contained by the UCSB campus.

It is located at the entrance to the campus, at the Henley Gate.

Because of this gate condition, the proposed display on east wall should relate to the campus as well as the Elings Hall itself.

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D Y N A M I C N A N O S C A P E S

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0-10⁻¹⁵

S U B A T O M I C

10⁻¹⁵-10⁻⁶

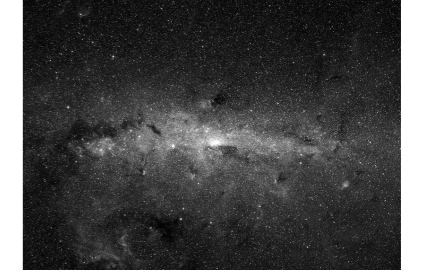
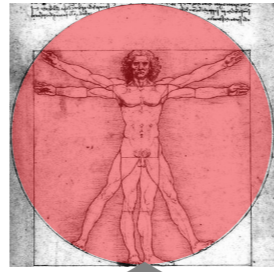
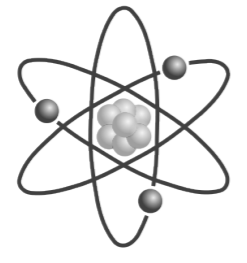
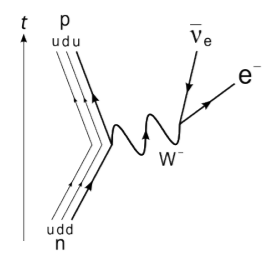
C E L L U L A R

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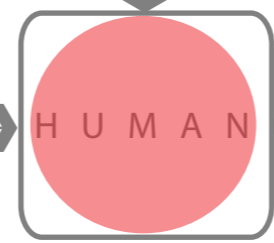
H U M A N

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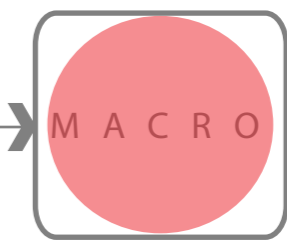
A S T R O N O M I C A L



CONTAINED :
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SUBJECT IN CNSI



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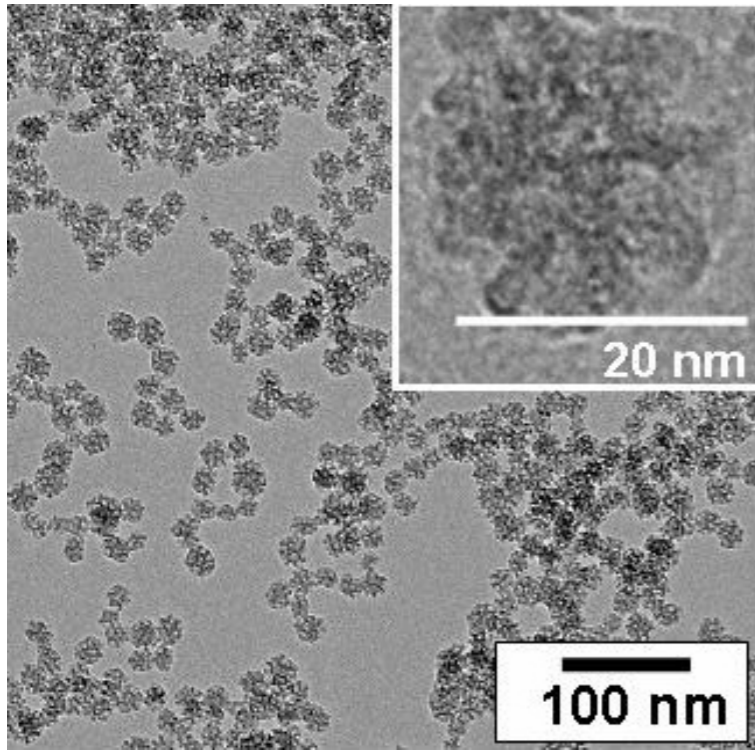
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THE CAMPUS

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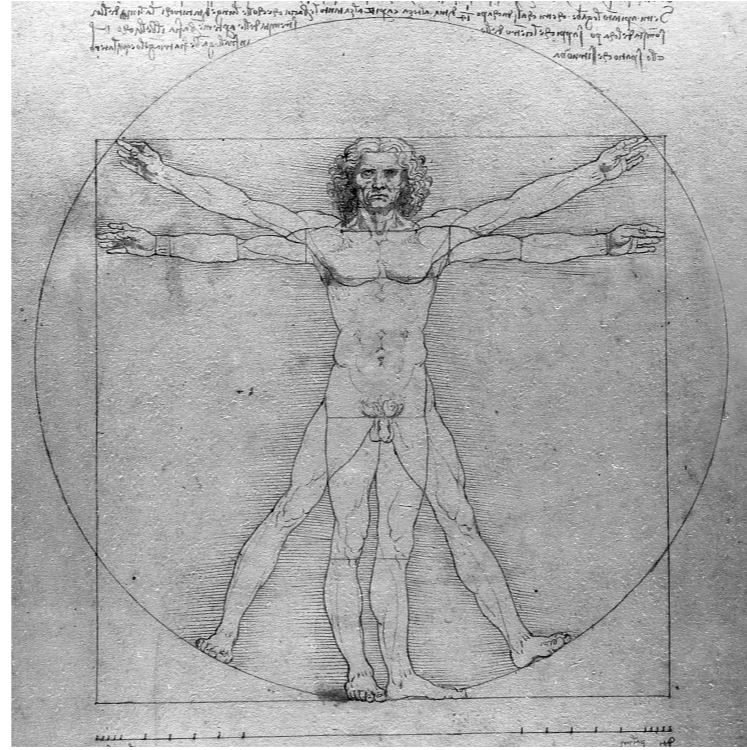
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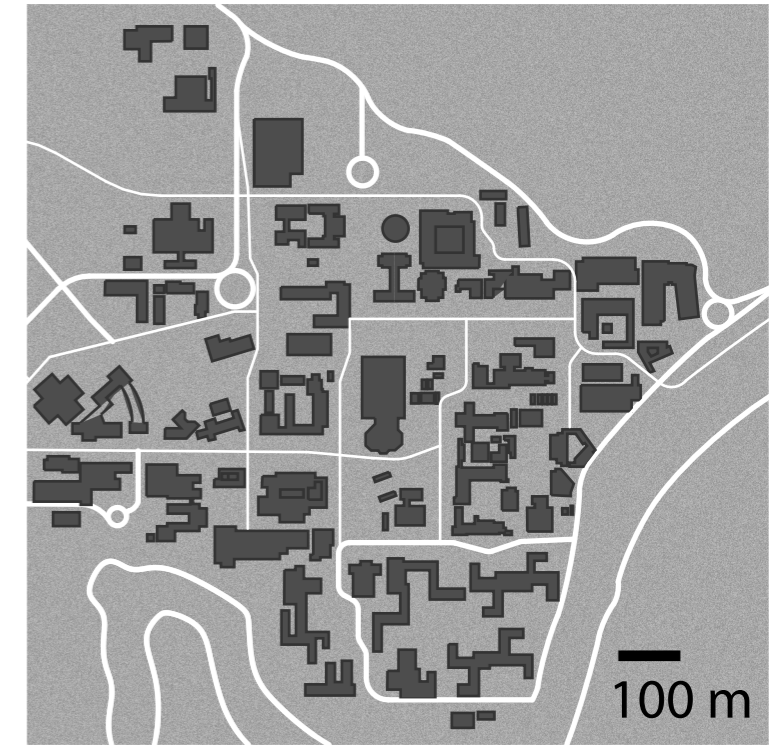
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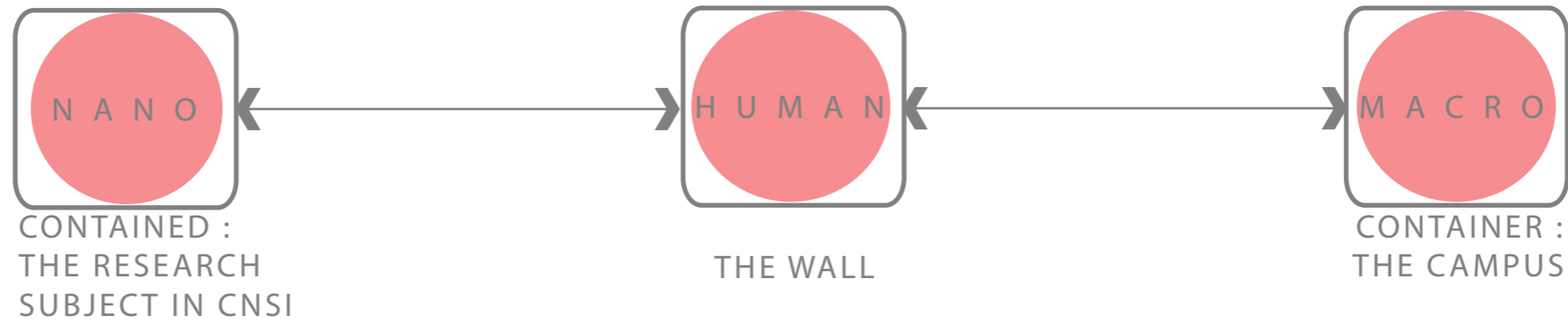
mesoporous silica nanoparticles under TEM



the Vitruvian Man - Da Vinci

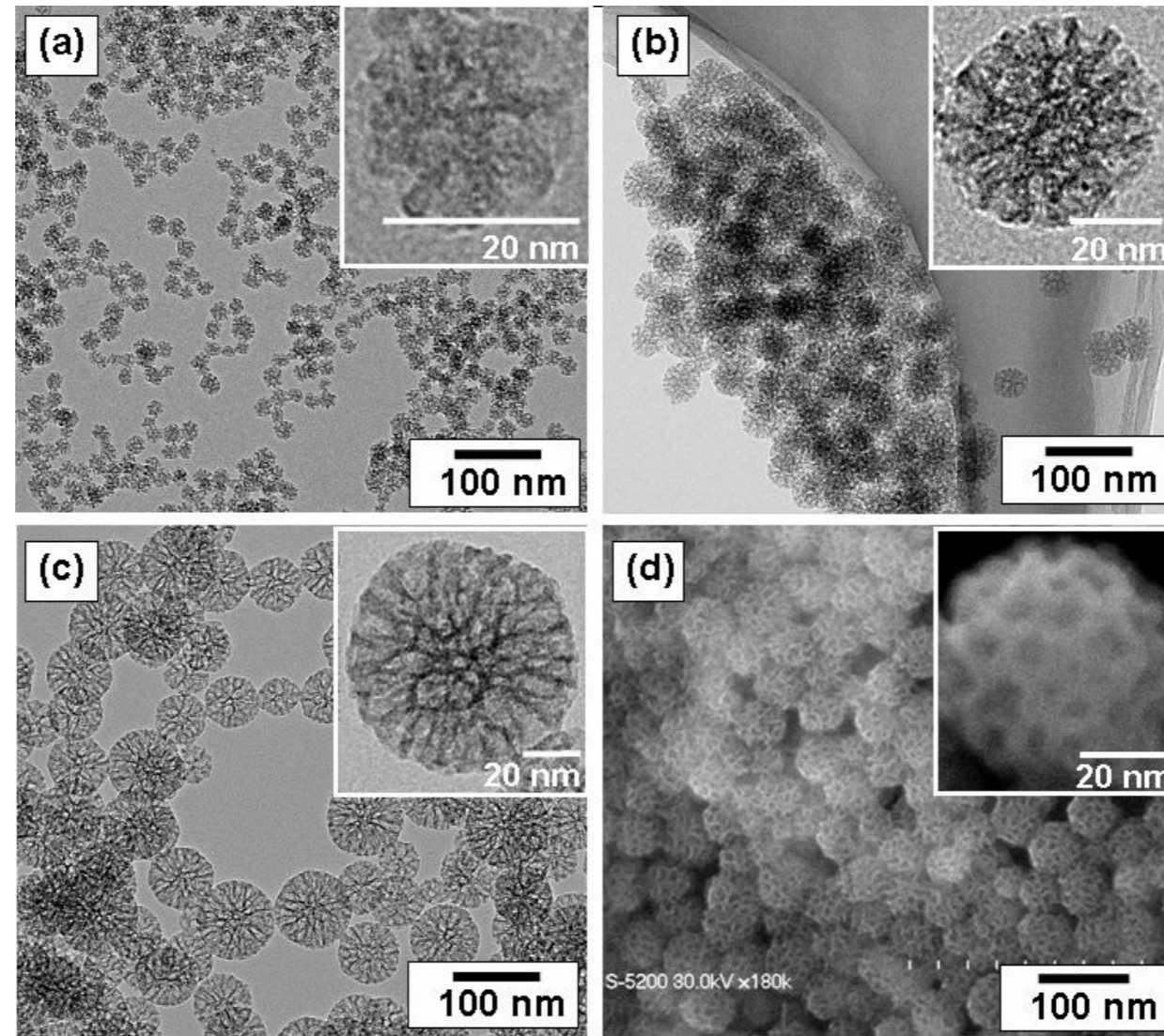


UCSB campus



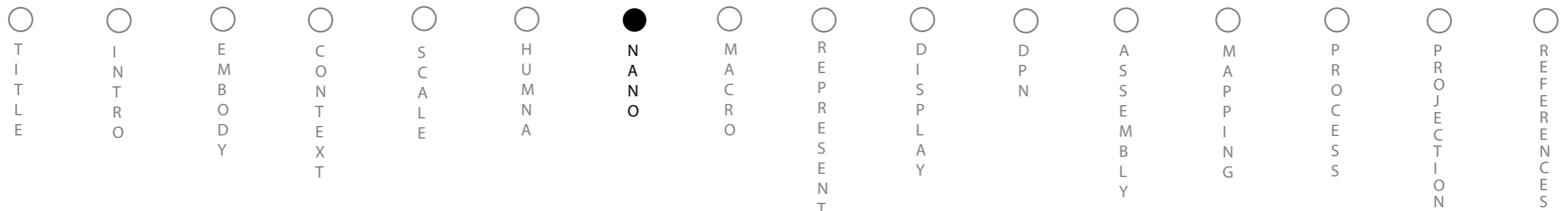
What is the nature of our relationship to things of different scales?
 What is the way in which we experience or perceive them?

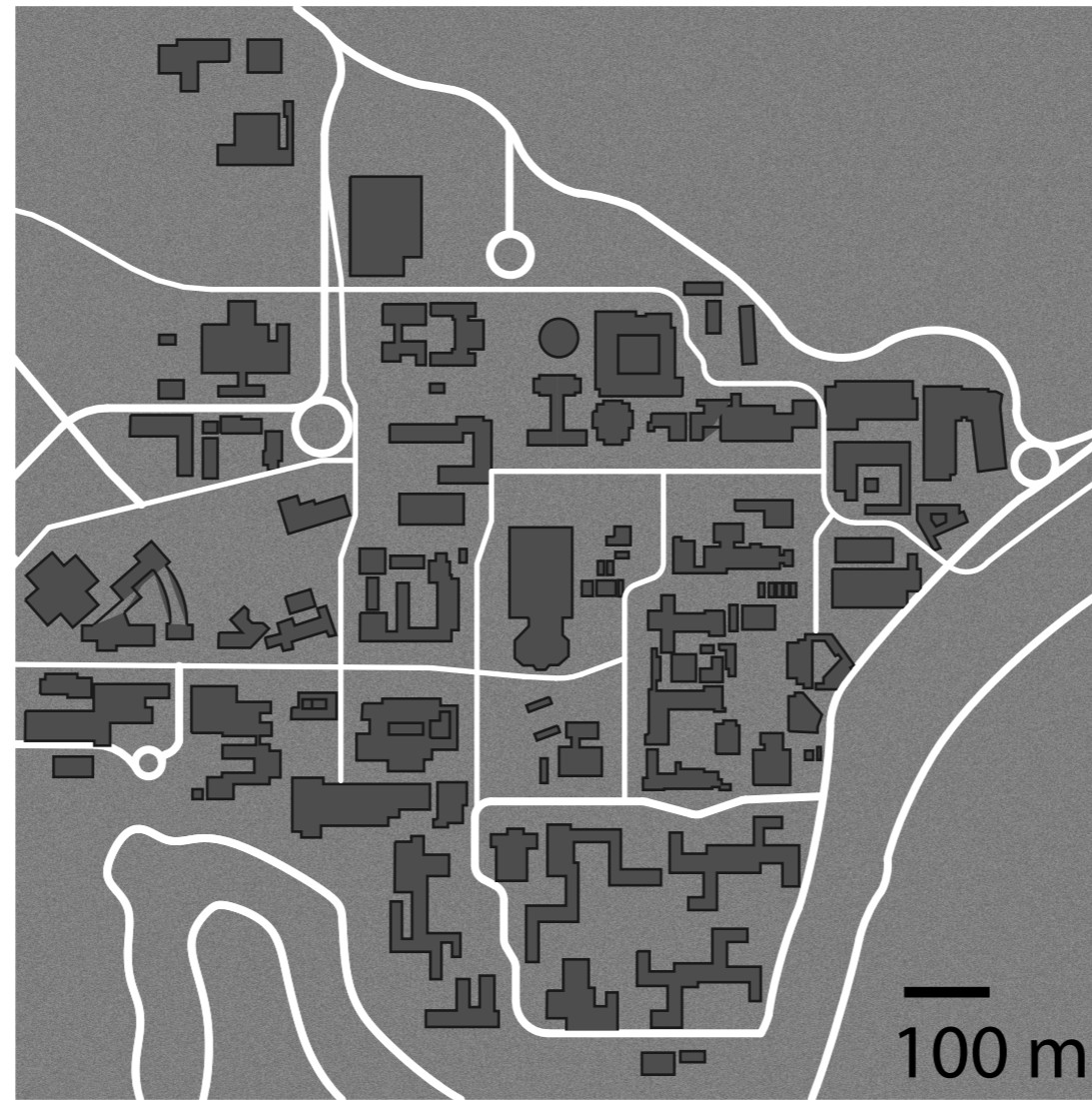
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TEM (a, b, and c) images of prepared mesoporous silica nanoparticles with mean outer diameter: (a) 20nm, (b) 45nm, and (c) 80nm. SEM (d) image corresponding to (b).

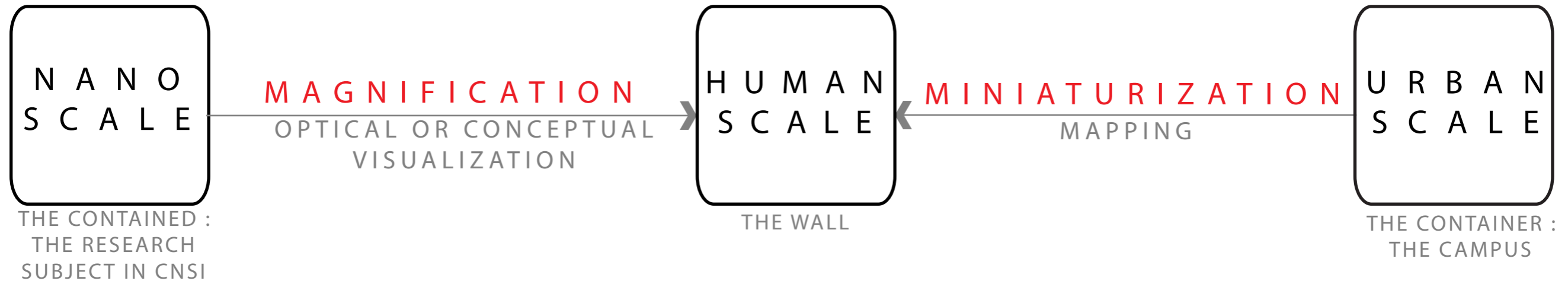
Nanoscale: We cannot directly interact with it. Our **perception** or understanding of this scale is through **conceptualization (mental representations)** since we rely on external tools and scientific data to visualize and manipulate it.





Urban Scale: Our experience and perception of this scale relies on our movement through it. Our functioning at this scale also relies on conceptualizations, for we use **representation** (maps; mental or actual) to navigate through it.

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DYNAMIC NANOSCAPES is a **nanoscale** map of the campus that is using nano-systems as actual models for **representation**.

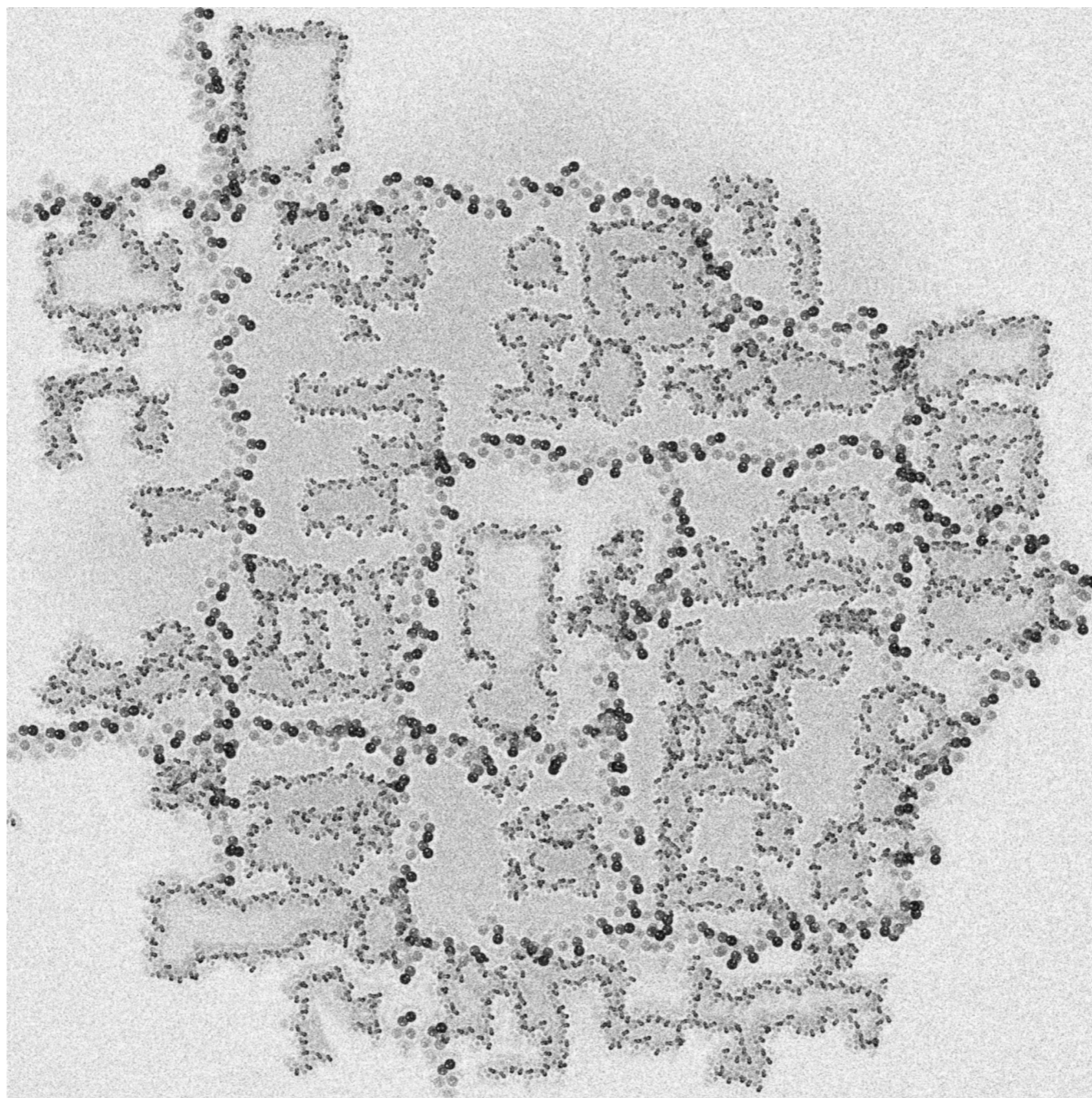
The meadia wall will display the **projection** of the **magnified** realtime video silica particles assembling along the lithographed patterns that represent the campus bikeways and buildings.

The actual events happening under the microscope are **mapped** to the events taking place on the larger campus **scale**.

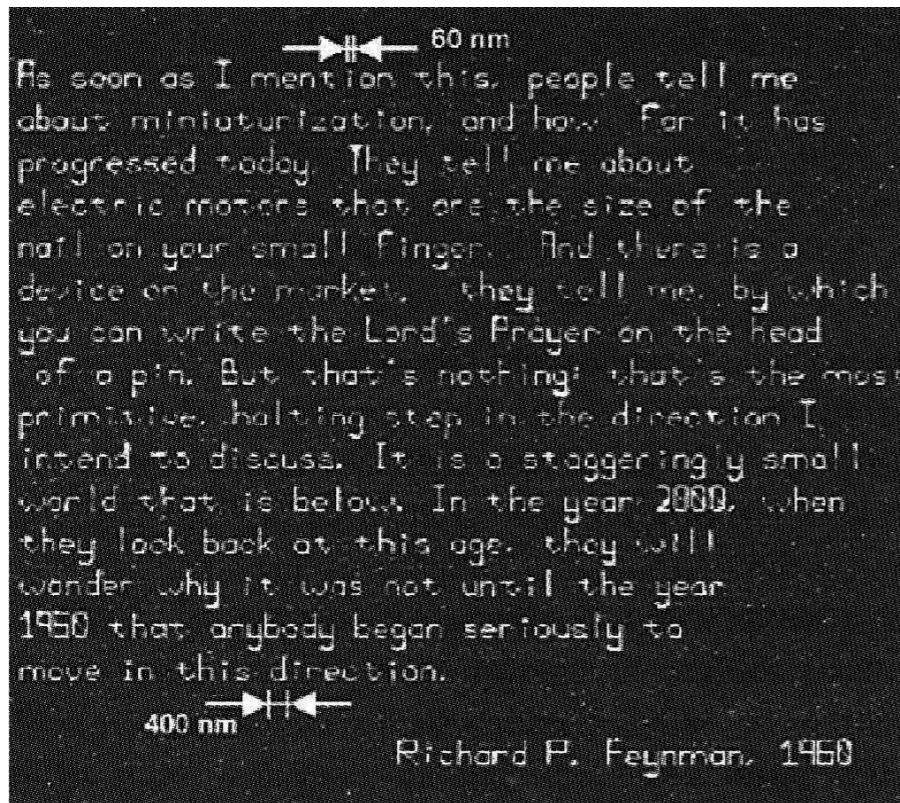
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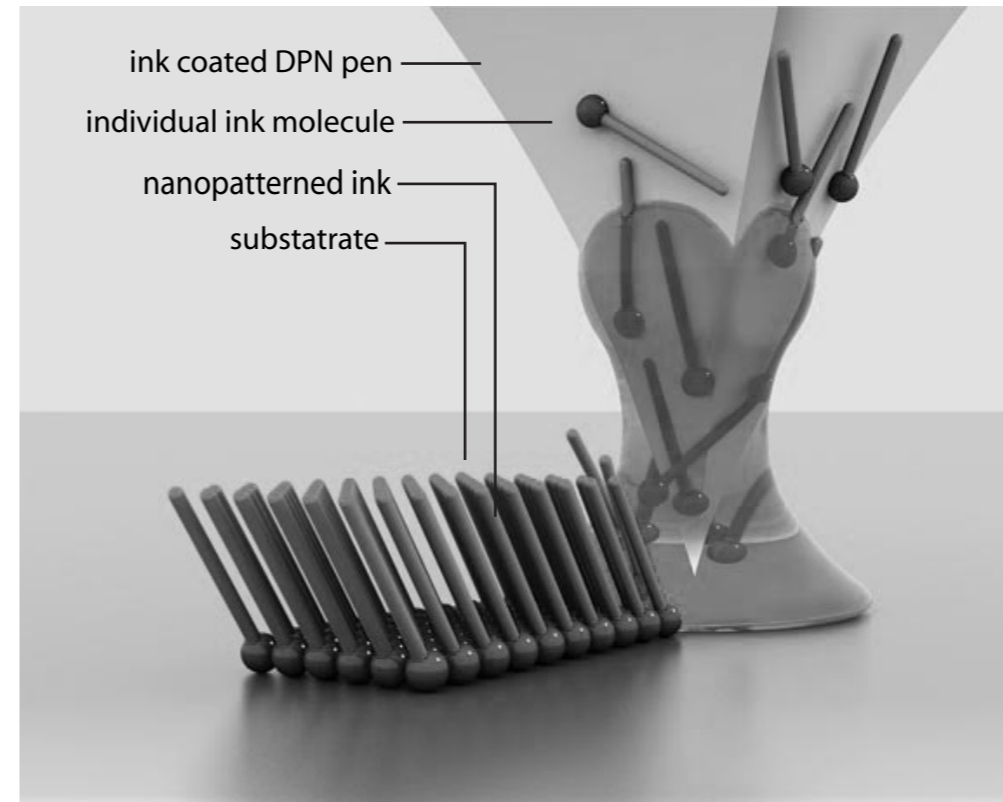
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Feynman's 1960 article "There is Plenty of Room at the Bottom" nano-lithographed by scientists at the Northwestern University, 1999. (2)



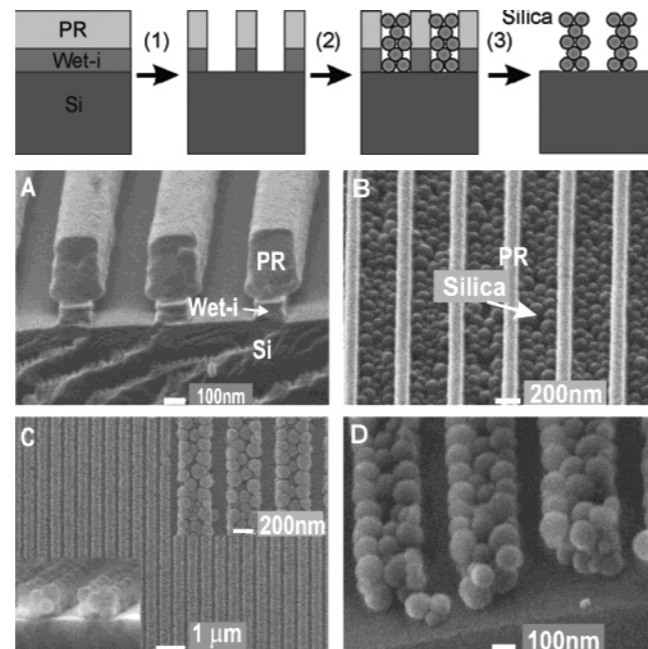
AFM (atomic force microscope) tip

Dip Pen Nanolithography

The basic idea is transferring fluids to surfaces using scanning probe microscopy. The tip of an atomic force microscope cantilever acts as a "pen," which is coated with a chemical compound or mixture acting as an "ink", and put in contact with a substrate, the "paper."⁽³⁾

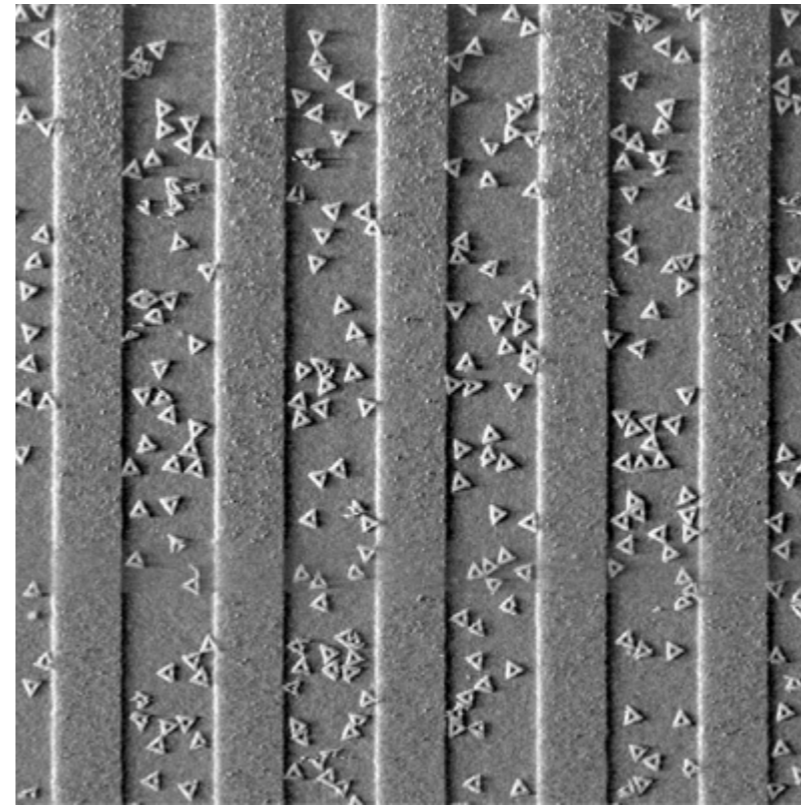
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Schematic illustration of deposition of patterned silica particles on planar surface (4)



SEM (Scanning Electron Microscopy) images of silica arrays (5)

Tiny circuit boards (triangles) which use self assembly for alignment on a substrate, confined to lines on a lithographically patterned surface. (6)



Lithographically Induced Self-Assembly

Molecular self-assembly and lithography are two different approaches that are used in the fabrication of nanostructures.

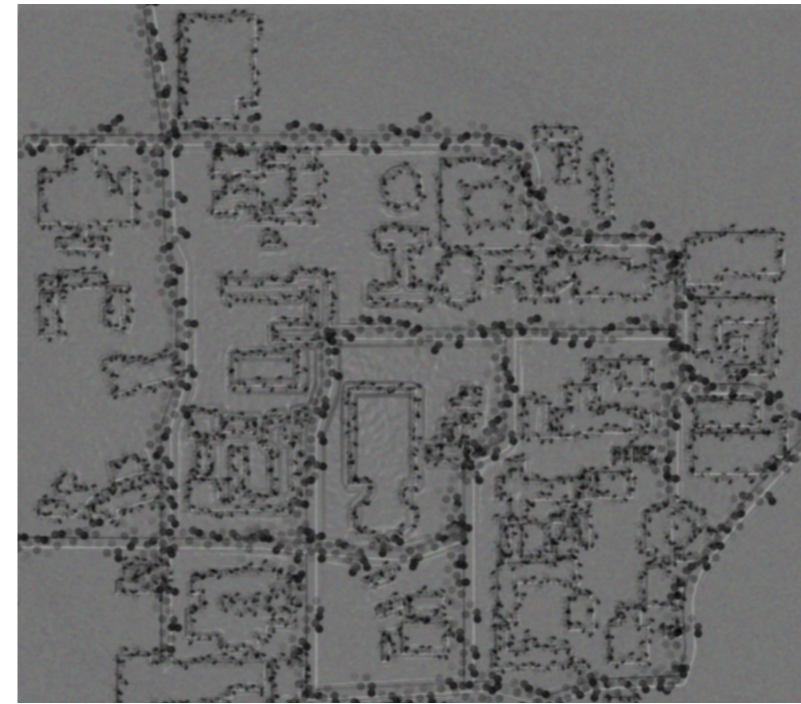
Self-assembly is a strategy in which atoms and molecules can arrange themselves into an orderly structure or final product without any outside assistance.(7)

Lithographically Induced Self-Assembly (LISA) is a novel pattern formation phenomenon. The process offers guided self assembly on lithographed patterns. (8)

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nanolithographed campus map
scale:10⁻⁹
1nm = 1m



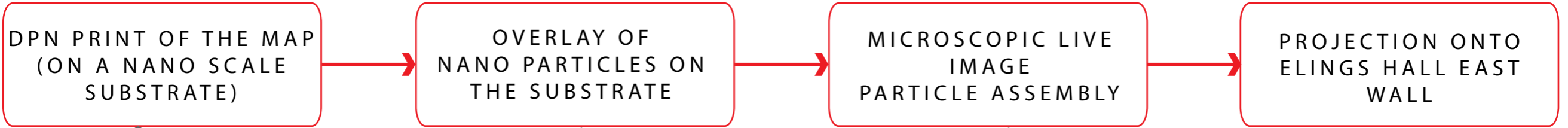
self assembly of silica particles guided by
nanolithography

1. LITHOGRAPHY

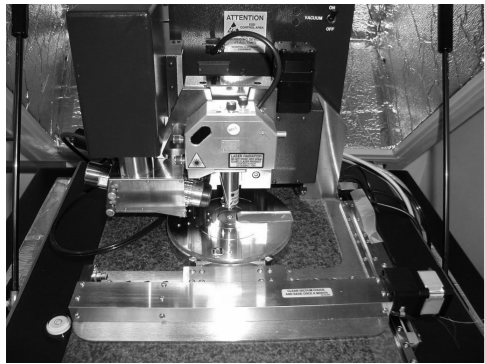
2. LITHOGRAPHICALLY INDUCED SELF-ASSEMBLY

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P R O C E S S

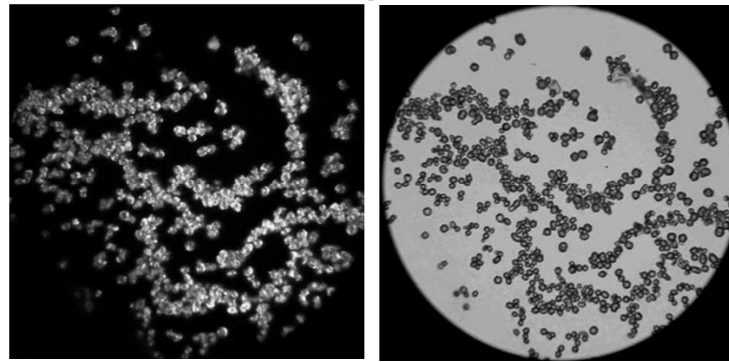


AFM
 Dip Pen
 Nano-
 lithography



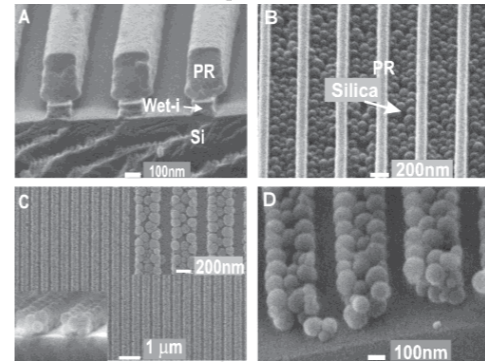
atomic force microscope

silica



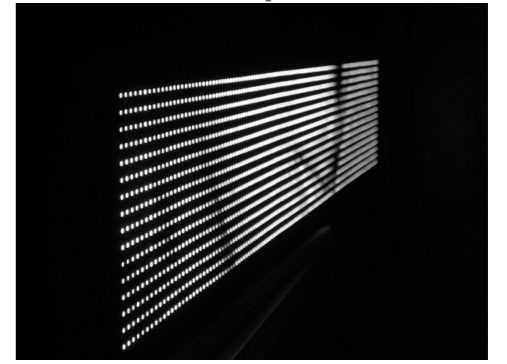
optical images of assembled silica particles

Lithographically
 Induced Self-
 Assembly



SEM image of assembled silica particle arrays

LED



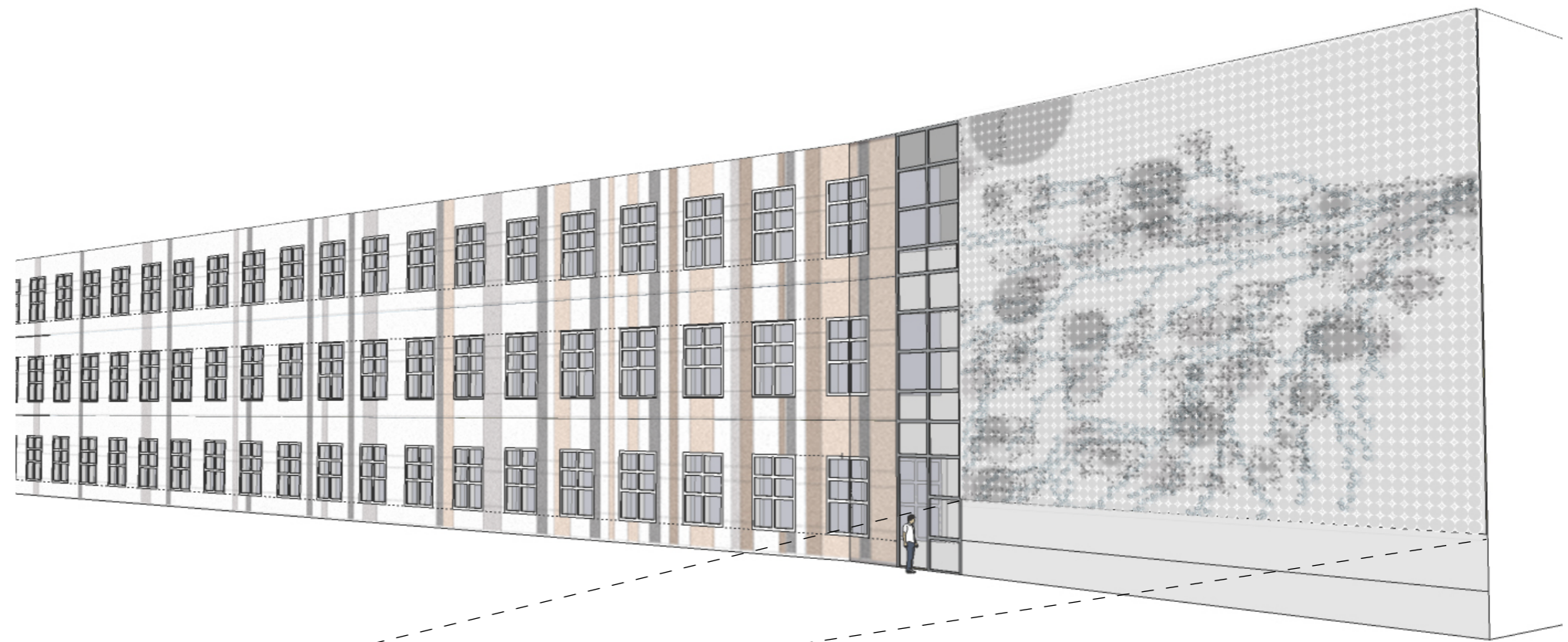
light emitting diode display

M A T E R I A L S & M E T H O D

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D Y N A M I C N A N O S C A P E S

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A F M

LED DISPLAY
52' x 38' @ 1 p p i , 5 f p s

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- D P N
- A S S E M B L Y
- M A P P I N G
- P R O C E S S
- P R O J E C T I O N
- R E F E R E N C E S

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