

## ***Diluvio: Teatro delle Ombre***

Interactive and Immersive Exhibitions/Installations for:  
***Cinquecento: Carleton Celebrates Leonardo da Vinci***  
from the Crossings Interdisciplinary Research Collective

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#### **Abstract**

*“You who speculate on the nature of things, I praise you not for knowing the processes which Nature ordinarily effects of herself but rejoice if so be that you know the issue of such things as your mind conceives.”*

Leonardo da Vinci

*Diluvio: Teatro delle Ombre (Deluge: Theatre of Shadows)* is part of *Cinquecento: Carleton Celebrates Leonardo da Vinci*, the 2019 year-long initiative at Carleton University commemorating the 500th anniversary of Leonardo's death in France on May 2, 1519. The author, as one of the originators of the initiative, conceived this interactive and immersive exhibition as the culmination of his series of *Diluvio* installations for the commemoration. This is the recent work by students from the Crossings Interdisciplinary Workshop offered in the Fall of 2018 and the Summer of 2019 at Carleton's Azrieli School of Architecture and Urbanism. The overall project is inspired by Leonardo's *Deluge* drawings and his reflections on the inter-connected reciprocity within nature as revealed by his studies of the flow of water, air, light, shadows and energy.

Additional inspiration has also been drawn from the correlations between Leonardo's insightful reflections regarding visual perception and Plato's

*Allegory of the Cave*. Leonardo recommended pondering and interpreting such elusively vague phenomena as cloud formations, shadows, resonant patterns, including evocative stains on walls as a way of stimulating and expanding the imagination and of gaining insight into the inner workings and generative potential of the mind and perception.

*“ ... Look into the stains on walls, or the ashes of a fire, or clouds, or mud, or similar places, in which, if you consider them well, you may find really marvelous ideas ... because by indistinct things the mind is stimulated to new inventions.”*

An interactive and immersive experience was offered through a flood of self-activated shadows, evoking and triggering the generative and captivating *theatre of the mind*.

#### ***Generative Woven and Folded Patterns***

The generative haptic working process and material properties incorporated in *Diluvio* expand upon previous work from the Crossings Interdisciplinary Workshop. Under the broader comprehensive initiative titled *The Phenomenological Garden: A Work in Morpho-logical Process*, these series of evolving projects have explored the morphological, integrative and generative potential of fundamental

processes that correlate with the fluently diverse and dynamic realm of natural phenomena. Through the emergent properties of “woven” flexible membranes (or networks) that perform as highly coordinated-cellular-arrangements of basic elemental relationships, a variety of forms, structures and installations have been conceived, fabricated and exhibited. The inherent properties of the cellular units, along with the nature of the materials and processes involved in the evolution of these projects, allowed for a generative and intuitive learning process to occur. More comprehensive information regarding these related projects is available through previous Generative Arts Conference papers: *Generative Dynamics: Process, Form and Structure*, 2004, and *The Generative Dynamics of X, Y and Z Coordination*, 2005).

The *Diluvio* series of related projects expand upon previous work where the dynamic and generative potential of an orthogonal grid composed of a basic square cellular unit was explored. At that time, the cellular units were constructed with bamboo dowels that were joined together with rubber bands, thus creating a very malleable joint. The assembly of these flexible joints and units into two-dimensional fields, along with the de-formation of the fields into inherent three-dimensional configurations, allowed for the form generating potential of both the individual cells and their assemblies to be easily and experientially explored. This overall dynamic flexibility and the complex emergent three-dimensional relationships, generated a wealth of forms and structures through the transformative and self-organizing properties of the integrated assembly (see figures 8 and 9 below and the Generative Arts Conference papers previously referred to).

*Diluvio* explored the generative potential of a significantly much larger orthogonally woven field (or membrane) comparable to those previously explored. This allowed for self-similarity at different scales of organization, along with related emergent complex properties, to be investigated. Working with aluminum mesh that's been folded into a very fluidly malleable origami pattern (even more so due to the additional pliable properties of the mesh), students were encouraged to experientially explore, conceive and improvise through the generative and emergent dynamic shape-shifting properties of the folded membrane. Eventually, this included exploring the dynamic shadow projections offered by the variety of possible sculptural configurations generated, leading to the *Diluvio: Teatro delle Ombre* interactive and immersive installation proposal. Throughout this process, students were drawing comparisons and inspiration from Leonardo's speculations and studies of dynamic phenomena. His studies of the dynamic flowing properties of water and related phenomena, including, most notably, his evocative *Deluge* drawings, were the main sources for the experientially conceived and proposed sculptural installations. As Leonardo stated in his notebooks: “*Water is the driving source of all nature.*”

### ***The Generative Theatre of the Mind***

The Greek philosopher Plato offered his *Allegory of the Cave* in his work *The Republic* (514a–520a) as a reflective dialogue between his brother Glaucon and his mentor Socrates. Narrated by the latter, the illusion of perceived reality is metaphorically presented as being interpreted by people living chained to a wall of a cave, while only being able to perceive the shadows projected on a wall by a fire behind them and the objects in front of this fire. These shadow-projections are presented as the

reality of the prisoners. Meanwhile, unbeknownst to them, the true nature of the *Light* entering the cave, casting these illusions of reality, dwells behind creating and limiting their perceptions. An enlightened person, such as a philosopher, is one of these prisoners who is freed from the chains, escapes the cave, and realizes that the shadows are merely perceived illusions of the true nature of reality. Insightful correlations can be drawn between this allegory by Plato and Leonardo's quote above regarding "*the issue of such things as your mind conceives.*" Leonardo acknowledges that these metaphoric shadows are illusions of reality, but emphasises that they also offer insightful clues regarding the nature of perception, how the imagination can be stimulated and how the pondering and understanding of this generative process can be appropriated. "*Learn how to see,*" he writes regarding this generative process, "*realize that everything connects to everything else.*"

Inspired by these correlations, *Diluvio*:

*Teatro delle Ombre* offered students an experientially generative working-process whereby they were able to construct fluidly sculptural configurations while simultaneously understanding how the malleability of the folded membrane was achieved. The inherent dynamism of the conceived sculptures was activated and revealed through a moving light source (i.e., the cellphone flashlight) and the projected shadows. These mysteriously evocative shadow-projections and their related visual activations, "*if you consider them well,*" as Leonardo has reminded us, "*you may find really marvelous ideas ... because by indistinct things the mind is stimulated to new inventions.*" Thus, with this insightful offering in mind, students and the public were encouraged to ponder and interpret the elusively evocative forms, shadows and resonant patterns generated through *Diluvio: Teatro delle Ombre* as a way of stimulating and expanding their imagination and of gaining insights into the inner workings of the mind and perception.



**Figure 1:** © M. Báez, *Diluvio: Teatro delle Ombre*, interactive shadow-projections.



**Figure 2:** © M. Báez, *Diluvio: Teatro delle Ombre*, interactive shadow-projections and sculptures.



**Figure 3:** © M. Báez, *Diluvio: Teatro delle Ombre*, interactive shadow-projection and sculpture details.





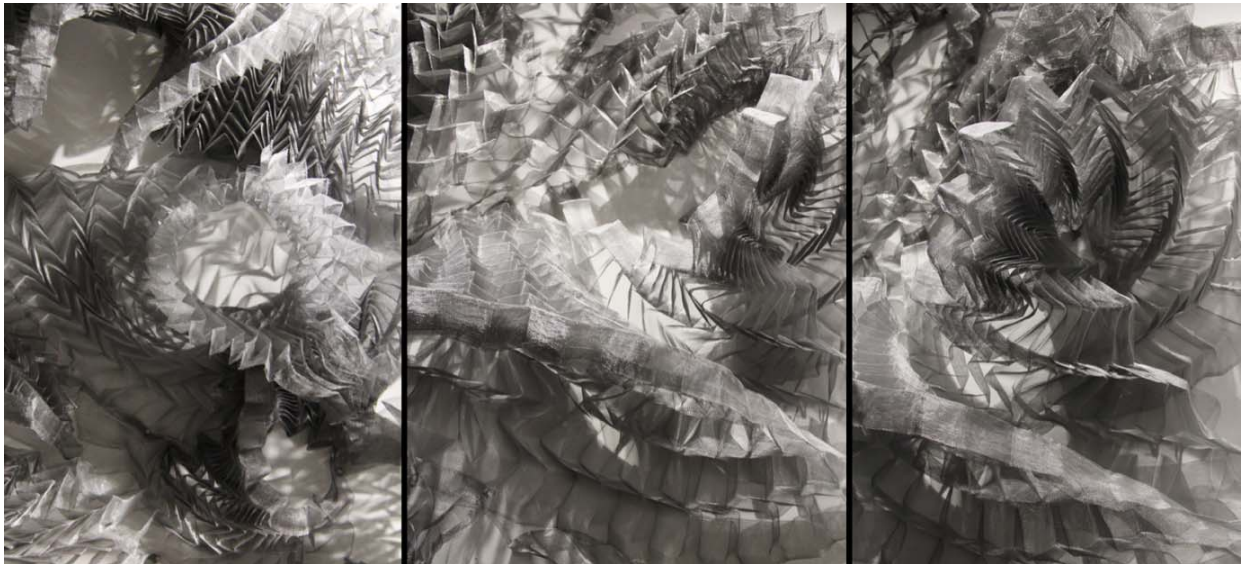
**Figure 4:** © M. Báez, *Diluvio: Teatro delle Ombre*, interactive shadow-projection and sculpture details.



**Figure 5:** © M. Báez, *Diluvio: Teatro delle Ombre*, exhibition highlighting the sculptures.



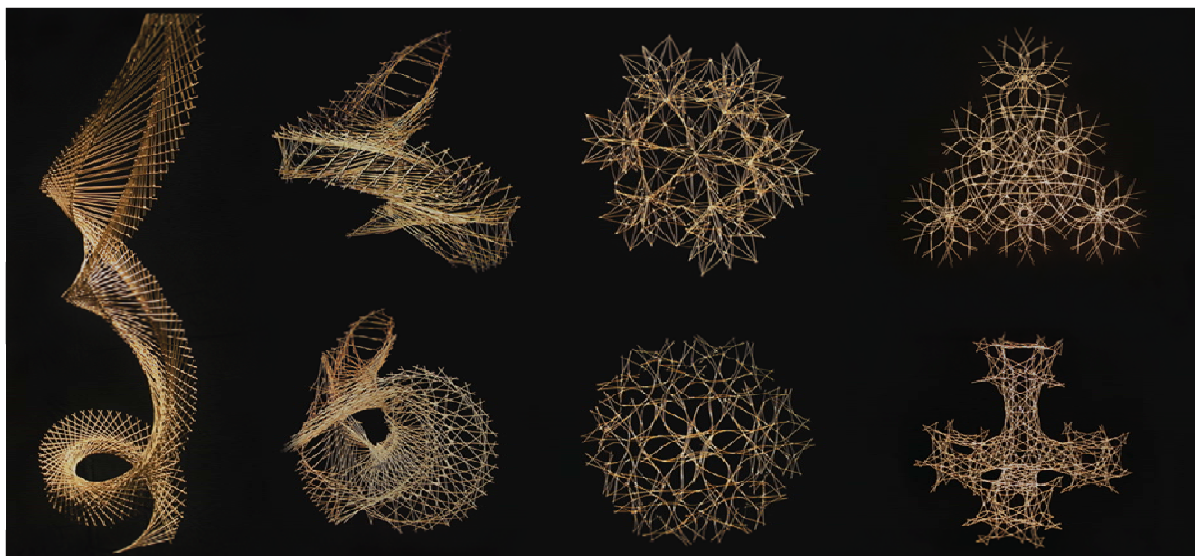
**Figure 6:** © M. Báez, *Diluvio: Teatro delle Ombre*, interactive shadow-projection and sculpture details.



**Figure 7:** © M. Báez, *Diluvio: Teatro delle Ombre*, interactive shadow-projection and sculpture details.



**Figure 8:** © M. Báez, *The Phenomenological Garden*, previous exhibition inspired by Leonardo's *Deluge* drawings.



**Figure 9:** © M. Báez, *The Phenomenological Garden*, Crossings Workshop student projects, constructed from cellular units made with bamboo dowels and rubber bands (also as shown in fig. 8, using a square cellular unit).



**Crossings Interdisciplinary Workshop**

**Diluvio: Teatro delle Ombre student groups:**

Daniel Baldassarri & Liam Yeaman

Abigail Maguire & Edyta Suska  
Shaylyn Kelly & Walter Fu

Kaleigh Jeffrey & Stephen Scanlan  
Elta Pulti & Mai Duraipah

Alexis Almacin & Yana Kigel  
Shirley Chung & Riya Garg

Stephanie Alkhoury & Lina Mahmoud  
Jessie Wei & Walid Chikh Alard

Taskinul Hassan  
Sami Karimi

Red Narvasa

**Crossings Interdisciplinary Workshop**

**Diluvio / student teams:**

Hamid Aghashahi & Guillermo Bourget  
Morales

Daniel Baldassarri & Liam Yeaman  
Abigail Maguire & Edyta Suska

Shaylyn Kelly & Walter Fu  
Connor Tamborro & Jasmine Sykes

Kaleigh Jeffrey & Stephen Scanlan  
Nikolina Braovac & Asmi Sharma

Sepideh Rajabzadeh & Runjia Li  
Petros Kapetanakis & Hadi Siddiqui

Dylan Rutledge & Tianlang Feng  
Sami Karimi

**Shown in Fig. 9: Crossings Interdisciplinary Workshop**

**Suspended Animation Series, student projects.** Works by:

Marian Shaker

Diana Park

Daniel Cronin

Sharif Kahn

Karam Georges

Nathan Dykstra.

**Main References:**

Kemp, Martin, *Leonardo da Vinci: The Marvellous Works of Nature and Man*, Oxford Univ. Press, 2006

Plato, *The Republic*, Benjamin Jowett (translator), CreateSpace Independent Publishing Platform, 2017.

Leonardo da Vinci, *The Notebooks of Leonardo da Vinci*, Vols. 1 & 2, compiled and edited by J. P. Richter, Dover Publications, 1970.