

Exhibition (will be open for two days of conference and after it)

Eden Orion, Israel – “Light Years within Touching Distance” – (photographs, drawings and telescopes)

Madatech – The Israel National Museum of Science – (interactive)

Gazit Ehud, Israel – “Motion” (video)

Noah Shamir, Israel – “Frozen Vertical Flow” (photography)

Joseph Salzman, Israel – “Science and Technology” (sculptures)

Mehrdad Garousi, Iran – “Quest” (animation); “Particulate Colosseum” and “Mayan Architecture” (digital print artworks)

Katharina Prinzenstein, Austria – “Water boat ... $2/3 H_2O$ ” (model boat)

Alon Chitayat and Lila Chitayat, Israel – “TaxiLink - Catch a Ride to the Other Side” (interactive installation which enables users to experience an authentic taxi ride in Jerusalem from abroad presented in film)

Elad Mentovich, Netta Hendler, Tamas Pusztas, Laslo Granasy, Shachar Richte, Israel – “Growth-front-nucleation” (electron microscope images)

Alexandra Sirota-Madi, Inna Brainis, Eshel Ben-Jacob, Israel – “Shaped to Survive” (microscope images)

Igor Grabec, Slovenia – “Application of Intelligent Systems for Modeling of Natural and Artistic Patterns” (sculptures)

David Gordon, Israel – “Hands Free” (music & video user interfaces)

Ran Peleg, Ruti Tamir, Israel – “Atom Surprise” (video)

Vladimir Loifer, Israel – “Art healing” (digital pictures)

Geneviève Anhoury, France - "Who Ate the Cosmic Soup?" (film), "Astronomy Gastronomy" (19 digital pictures)

Chezi Poznanski, Israel – “Stories about the Nation and the State of Israel in View of Currency, Coins, Stamps and Songs” (objects exhibition)

Svetlana Belinsky, Israel - "Man" (paintings)

Leeya Engel, Israel – "Chemical Cuisine: Looking at a lab through the eyes of a kitchen" (microscope images in power point presentation)

Neri Bloomfield Academy of Design and Education (WIZO), Israel – “Posterauma” (posters).

Lionel Wolberger, Israel – “The Mirror of Narcissus” (graphics)

Stephen G. Lipson, Israel – “Topology and Map-coloring in Wood” (sculpture)

Quest

(Animation)

Mehrdad Garousi

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This animation is a three dimensional journey inside a 3D fractal formula known as “Amazing Box”. The journey starts from the dark empty space outside the fractal shape and intrudes the endless constructive details of such an amazing shape with fractional dimension. The farther we go ahead, the more details we appear to quest. I started this journey without any forehand provided plan and selected the paths according to my instant sense inside those amounts of complexity and chaos around me. Such 3D representations of fractals, entirely constructed on the basis of fractal mathematics of nature, could inspire future constructions of human kind in the future world, for real or virtually.

The music of the animation, exploiting 13 instruments sound samples, is composed according to a number of sequences and maps related to number theory, chaos and Cellular automaton including Morse-Thue Sequence, Gingerbread man, Henon, Wolfram one-dimensional Cellular Automata, and Lorenz algorithm.

The animation is made in Mandelbulb 3D and the music in FractMus 2000.

Special thanks to my friend Vahid Barzegaran whose hexa-core CPU rendered the animation, sized 1024 x 768 pixels, in 27 hours while it might have taken my dual-core CPU over 130 hours.

Particulate Colosseum and Mayan Architecture

(Two digital print artworks)

Mehrdad Garousi

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Fractal mathematics stemming from nature behaviors and describing chaosity of nature has been used as one of the very modern ways of investigation and creation in modern sciences. A substantial one is fractal art, especially newly emerged three dimensional fractal art. 3D fractals present bizarre and mostly constructible architectures that seem to belong to future. These types of massive architectures spanning different notions like chaos, order, disorder, fractional dimension, regularity, scalability, self-similarity, aesthetics, mathematics, art, science, and nature could play more applied usages in future, due to their tangible 3D structures. Two works “Particulate Colosseum” and “Mayan Architecture” disclose some of my artistic investigations to catch such an essence of future architectures among fractals.



Water_ boat... 2/3_H₂O, 1996

Katharina Prinzenstein^{1*}

¹ Freelance Social Scientist and Methods' Researcher. Head of the Office of the Equal Treatment Working Group of the University of Technology, Vienna, Austria.

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The Object describes the story of the worlds' (fresh)water-cycle: The natural areas deliver freshwater for industry and the “civilized world”. - We use and waste it in a way that streams out polluted and greasy material into the sea:

So the calculation runs as follows: 2/3 of the world sustain life, 1/3 endangers it. Let's re-install the equilibrium!

http://www.unet.univie.ac.at/~a8401943/sustainability/2_3H2O/boat_pictures/album/index.html

That boat-with-the sea inside can be used for exhibition in or in the lobby of any room - not outdoors: Data: 170 cm x 56 cm x 130 cm (columns), weight: about less than 50 kg.

This recycling art's object has an integrative-material-approach: Most items had been used before differently (e.g. washing machine), so by constructing I needed less resources than otherwise and I met some special challenges to manage the specific characteristics of the materials.



http://www.unet.univie.ac.at/~a8401943/sustainability/2_3H2O/boat_pictures/album/index.html

Catch a ride to the other side

Alon Chitayat, Lila Chitayat

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Objective

TaxiLink Project (commissioned by ARS Electronica) is an interactive installation which enables users to experience an authentic distant taxi ride.

TaxiLink creates a link between a taxi driving in Jerusalem and participants from distant locations abroad.

Sitting in the static TaxiLink booth, the passengers join a live ride in and around the old city of Jerusalem, experiencing a personal interaction with a real-life taxi driver screened through a rear view mirror.

Through live video and audio transmitted from the driving cab, the passengers experience a genuine ride though they are physically miles away.

Overview

TaxiLink was developed as a multi-layered experience of an urban virtual tour, offering a brief yet meaningful experience of Jerusalem. The intensity of this encounter is two-fold, since the passengers see the city once through their eyes and again, as seen through the eyes of an authentic local driver.

By recording a personal journey, absorbing, gazing, collecting glimpses along the way, one will end up with an unexpected personal virtual experience.

The users choose their destination, starting the trip at the point where the previous one ended.

It is the road that we focus on rather than a set destination. The urban icons become meaningless and the place is exposed to chance and singularity.

The taxi is a private hub that travels through public spaces, influenced by the pace of the city. It provides a unique communication experience of a temporal intimacy.

www.Taxilinkproject.com



Frozen vertical flow

Noah Shamir

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As a physicist, I am always fascinated by vertical ice forms. The freezing point of flowing water is determined by its hydrodynamics and specifically by the velocity and mass of the flowing water volume.

Presented are 4 photographs of vertical ice structures, taken in Utah, winter 2008.



Growth-front-nucleation based bottom-up approach to spherulitic growth of peptide nanotubes

Elad Mentovich, Netta Hendler, Tamas Puszta, Laslo Granasy, Shachar Richter.

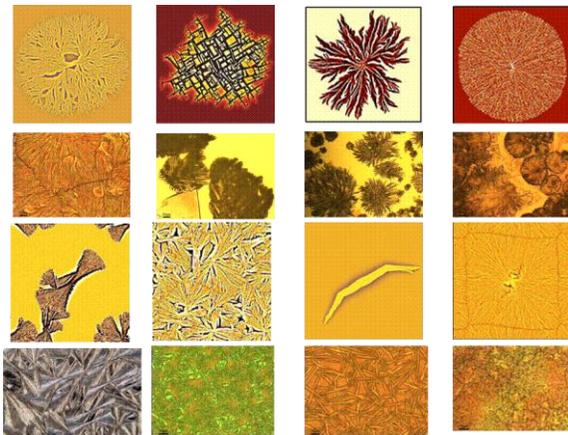
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Understanding and utilization of multi-hierarchy self-assembly for preparing macromaterial using nanomaterials building blocks via the bottom up approach is one of the key issues in nanotechnology. In the specific example of peptide nanotubes (PNT) arrangement, a variety of techniques for multi-hierarchy of self assembly has been developed. We have previously shown a multi hierarchy self-assembly process using a simple bottom up methodology resulting in the formation of spherulite films of peptide nanotubes. Materials of substantially different molecular geometry (e.g., oxide glass, uric acid, graphite, insulin, and PNT) lead to very similar spherulites, raising the possibility that a coarse-grained description neglecting the molecular details can be feasible for describing spherulitic solidification. Indeed, recent simulations based on the *phase-field theory*, which relies on coarse-grained order parameter fields; neglecting thus the molecular details, yield growth morphologies that are very similar to the experimental ones. An essential question is whether these similarities are only superficial or closer connections can be established among these substances. This requires a detailed comparison of the mechanism of polycrystalline growth in experiment and theory. In this work, we compare crystal growth experiments on peptide nanotubes with phase-field simulations. Relying on the observed similarities, we propose the phenomenon of growth front nucleation as a new paradigm for bottom up approach based on multi hierarchy self-assembly of peptide nanotubes. Furthermore, we identify this multi-hierarchy self-assembly system as a new test bed for the polycrystalline growth puzzle.



Shaped to Survive: Pattern formed by *Paenibacillus vortex* social bacterium

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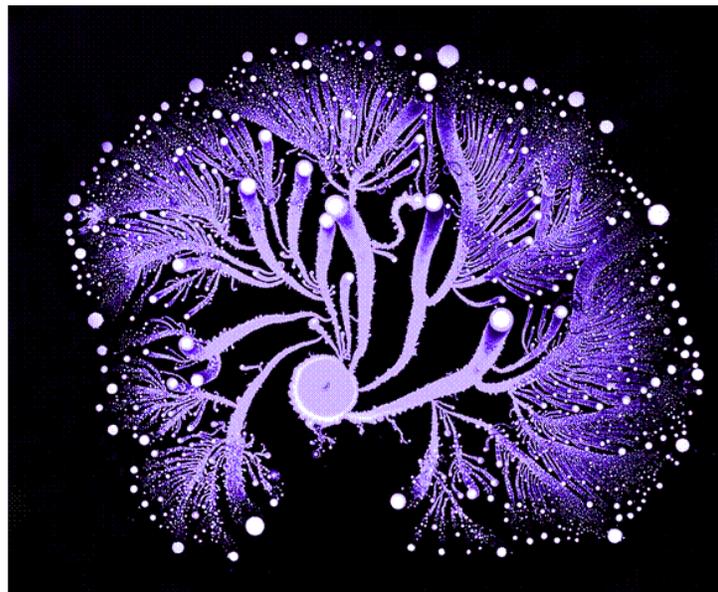
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Paenibacillus vortex is a bacterial species discovered in the early 90's. It is a social microorganism that forms colonies with remarkably complex and dynamic architectures. These facultative anaerobic, spore-forming bacteria are found in a variety of heterogeneous environments, such as soil, rhizosphere, insect larvae, and clinical samples.

To face the challenges posed by these environments, *P. vortex* produce a wealth of enzymes and proteases as well as a great variety of antimicrobial substances that affect a wide range of microorganisms. The possession of these advanced defensive and offensive strategies render the *P. vortex* bacteria as a rich source of useful genes for agricultural, medical, industrial applications.

A successful behavioral strategy utilized by *P. vortex* is to cooperatively form and develop large and intricately organized colonies of 10^9 - 10^{12} cells. Being part of a large cooperative, the bacteria can better compete for food resources and be protected against antibacterial assaults. When grown on hard surfaces, *P. vortex* generates special aggregates of dense bacteria that are pushed forward by repulsive chemotactic signals sent from the cells at the back. These rotating aggregates (termed vortices) pave the way for the colony to expand. The vortices serve as building blocks of colonies with special modular organization.

Accomplishing such intricate cooperative ventures requires sophisticated cell-cell communication. Communicating with each other, bacteria exchange information regarding population size, a myriad of individual environmental measurements at different locations, their internal states and their phenotypic and epigenetic adjustments. The bacteria collectively sense the environment and execute distributed information processing to glean and assess relevant information. Next, the bacteria respond accordingly, by reshaping the colony while redistributing tasks and cell differentiations, and turning on defense and offense mechanisms, thus achieving better adaptability to heterogeneous environments.



Application of intelligent systems for modeling of natural and artistic patterns

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In the article I should describe the neural-network-like structure of a intelligent system capable to learn from presented records of patterns characteristic relations between elements composing these patterns. Based upon self-organized learning the system forms an optimal set of characteristic samples of relations which it further applies when creating new patterns. The operation of the system would be demonstrated on examples of patterns created in turbulent fields, laser manufacturing systems etc. It would also be explained how the system could be adapted for characterization of various artistic styles. In relation to this I should briefly present my sculptures and explain what do the characteristic samples of relations represent.



A picture of my sculpture is included below, while several others are presented in the window of at my web page

<http://lab.fs.uni-lj.si/lasin/www/~grabec/art/index.htm> .

"Hands free" - Controlling an audiovisual performance through body movements in space.

David Gordon

Israael

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This presentation will introduce different user interfaces that are used to control and manipulate audio and video data through body movements in space. The hardware that is used in the above user interfaces, includes the theremin and the Wii remote controller. The software that is used to process and convert the different types of data, is MaxMSP. The presentation will begin with a review of these basic components within the limits of their traditional use. Later on, it will introduce some unique and custom applications such as the following:

- 1) The "Terebel" (an acronym of theremin and the Hebrew word "Nevel", which means harp) - An interface that allows it's user to play an imaginary harp that functions as a MIDI controller.
- 2) The "Magic flute" - The use of the Wii nunchuk's circuit board to control and manipulate data through gesture recognition.
- 3) Playing the Wii remote - Different possibilities for live and interactive audiovisual performances, played on the Wii remote controller.

The presentation will include live musical and visual demonstrations.

Atom Surprise

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Plays on science may be categorized into three groups: (1) plays on science and society, (2) plays on scientists and (3) plays in which the science is an integral part of the plot [1]. Plays which fall in the latter category are rare. "Atom surprise" is such a play. It is a forty minute, two-actor play for elementary school children on the topic of matter with a strong influence of physical theatre. A boy and a girl enter science class for the first time. Through interactions with the teacher, a magic adventure and a treasure hunt they become familiarized with the world of matter and the concepts of mass, volume, atoms, molecules and the three states of matter. In addition to the science themes, there is also a repetitive prosocial theme throughout the play of children's (high and low) self-esteem with respect to science, school and other students. A great deal of deliberation took place while constructing the play to make it enjoyable to all viewers regardless of their inclination to science. The play has been approved by the Theatre Committee of "Sal Tarbut Artzi" (a body authorized by the Israeli Ministry of Education for approving and funding artistic activities in schools). In the presentation, parts of the play will be shown and will be accompanied by comments on how the play was constructed as well as findings from a research conducted on the play.

Motion

Ehud Gazit

Technion, Israel

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Studying different events of movements and changing, by using several physical phenomena. All works has some degree of non-linear and/or fractal and/or coincidental characteristics behavior.

Instalation.

Art healing

Loifer Vladimir

Israel

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I'm the doctor and the artist.

And, as has always been an artist to heal. Naturally, I in my work use the relatively recent advances in science and technology.

It is on one side.

On the other hand, I'm an artist and use science and technology to create my work in computer graphics or DIGITAL ART.

And the third part, I use my paintings as a medicine. And the most interesting thing is that absolutely no side effects!

In this exhibition of my artworks reflect my perception of the universe, man sciences and nature.

Exhibition of my artworks can be seen always at-

<http://fineartamerica.com/profiles/dr-loifer-vladimir.html?tab=artwork>

Who ate the Cosmic Soup ?

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It's an animation short film made entirely with food is inspired by myths and scientific theories.

The film is 13 minutes long. It tells the story of the universe, from 'before the beginning' through the Big Bang, to the beginning of life on earth, then evolution, the appearance of mankind, through to the very end.

Scientists often describe the condition of the period 'before the beginning' as a 'cosmic soup'. In making this film, I decided to take this metaphor literally: all appearances to the contrary, everything in the film is made out of different kinds of food. For instance, the nebulae are made out of milk, the solar system out of egg yolk, the night skies out of burnt pancakes, the trilobites out of jelly, and the humans out of ginseng roots.

The English voice over is by Bill Nighy and the French voice over by Denis Lavant.

The film was co-produced by ARTE, the CNC (Centre National du Cinéma), the the CNRS (the National Center for Scientific Research) and the ICS (Institut du Cinéma Scientifique). Scientific advice was given by the astrophysicists Jean-Pierre Luminet and Marc Lachièze-Rey.

Links to the film and the making of « Who ate the cosmic soup ? » on the ARTE site :

<http://www.arte.tv/fr/mouvement-de-cinema/Court-circuit-le-magazine-du-court-metrage/184414,CmC=1764828,CmPart=com.arte-tv.www.html>

Making of (clic on MAKING OF) :

<http://php.arte-tv.com/court-circuit-off/index.php?page=magazine&mag=EM322>

Astronome Gastronom

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The exhibition includes large macro-photographies which are made with food prepared to look, once photographed, like astronomy photography. The astrophysicist Sébastien Charnoz, a doctor at the CEA (and professor at the university Paris Diderot, comments the photos as if they came from a spatial telescope and I wrote the recipe of each picture under his comment.

« Espace Cuisine », broadcast on the web about Astronome Gastronom for Le Journal de l'Espace, Web TV of the CNES, by Daniel Fiévet and JP Courbatze.

http://www.dailymotion.com/video/xbd6d0_espace-cuisine-jde-decembre-2009_tech

Chemical Cuisine: Looking at a lab through the eyes of a kitchen

L. Engel^{*1}, J. Shklovsky, Yelena Sverdlov, Prof. S. Krylov, Prof. Y. Shacham-Diamand

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In recent years, polymers have become a popular building material in the micro-processing of tiny medical devices. They are cheaper than standard materials and can be biocompatible. Polymers are often praised for their optical properties which enable optical applications, but when you look at them you can't help but find them fascinating from a purely aesthetic perspective. In fact, they sometimes look downright palatable.

Here, we present two different kinds of polymers. The first is an electro-active (responds to electricity) hydro-gel (water based) that has been doped with different nano-particles that change its conductive properties. Before the doping, it has a jello-like consistency and is clear. When different nano-particles are introduced to the gel, they are absorbed by diffusion, bringing about a striking change in the volume, color and texture of the gel. Although this gel in its final form is FDA compliant, we do not recommend eating it as its monomers are carcinogenic.

The other polymer that we work with is a fully biocompatible silicon rubber called poly(dimethylsiloxane) (PDMS). We develop freestanding, micron-scale membranes of this material and have included photographs of these layers that were taken with a microscope with a magnification of 2500. Because it is so thin and elastic, the optically transparent layer tends to fold over onto itself just like a dangling piece of plastic wrap. Air bubbles can also sometimes get trapped below the membrane surface, creating striking patterns.

Polymer processing has an obvious parallel to cooking as different ingredients are mixed and then heated to create each polymer. In fact, each process comes with its own "recipe" that include a final step of baking. We are working on building a device that integrates different polymers to enrich the growing toolbox of polymeric micro-processing. You could say that we are trying to come up with a new dish.

Posterauma

Neri Bloomfield Academy of Design and Education (WIZO), Israel

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Graphic design students at the Neri Bloomfield School of Design and Education in Haifa studied various aspects of environmental and sustainability issues affecting our society today. The students familiarized themselves with the public and scientific debates concerned with these issues.

Creating a poignant graphic statement and effecting changes in consciousness and thought patterns cannot exist without intellectual rigor and investigation.

The design process becomes a journey of intellectual discovery when the object of study by students is beyond the discipline of design per se.

Visual communication is a vehicle for expressing ideas. By exposing students to the current discussion around environmental conservation, sustainability, scientific issues, unwanted phenomena and processes taking place due to the human impact on the environment we create identification with the subject matter and thus a more committed and responsible message by any given student.

The purpose of this type of exercise is to expose students to written and documentary materials, increase their awareness and enable identification with a topic in question. The second goal is to enhance their ability to communicate via verbal and visual means.

The purpose of these posters is not ornamental and we hope that due to their visual and verbal power they will constitute a fertile ground for discussion, awareness and action.

More info on the project at: www.posterauma.org

The Mirror of Narcissus

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Numbers from a trillion trillions to a trillionth of a trillionth unfurl as wings in a void, representing the advance of science into vast realms and tiny spaces. The two are linked like a mirror's reflection and depend on one another: consider CERN being 27 km wide in order to measure a particle that is smaller than a billionth of a millionth of a meter. But the mirror captures us as well. When we focus only on measurement we are like Narcissus, enamored of our reflection and missing the truth, to the point of endangering our lives. More power, more food, more money will never bring enduring wealth and happiness, as neither will less power, less food, less money, being mere self denial. The void that lurks, waiting, beyond the mighty and the tiny, is a gap that is forever mysterious, but speaks in a small still voice a message clear to all who care to listen: destiny is not encompassed by the measure of our striving, it waits in the quiet between each beat of your heart.

Media: Ink on paper, 70 x 100 cm.

Topology and Map-coloring in Wood

Stephen G. Lipson

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One of the best-known areas of mathematical topology is that concerning "map-colouring problems". The famous "four-colour problem", states that on a closed or open two-dimensional surface a map of any complexity can be painted with at most four colours, such that no two regions with a common boundary have the same colour. Although the problem was posed by Guthrie in 1852, it was only proved by Appel and Haken in 1976, after more than a century of effort, that four colours suffice. A similar problem has been posed in one dimension; three colours seem to be sufficient to paint the sections of a linear manifold such that no two adjacent ones have the same colour (I know of no proof of this). In three dimensions on a torus, the maximum number of colours sufficient to paint a map was proved to be seven by Heawood in 1890. A delightful discussion of these problems appears in the book by Rouse Ball (1938).

This sculpture in wood (2011) illustrates implementations of the above three solutions, where each colour is the natural hue of a hardwood. The base (two-dimensional) is constructed from brown oak, cherry, Brazilian rosewood and American walnut. The ring (one-dimensional) is from tulipwood, jacaranda and cocobolo. The suspended torus is from purpleheart, ebony, yellowwood, mahogany, zebrawood, yew and cypress.

Reference: W. W. Rouse Ball, "Mathematical Recreations and Essays", Macmillan (1938), revised ed. 1962.



