# Artist in residence on the Faculty of Science
# The Hebrew University, Givat Ram

**Project report**

**Boris Oicherman, October 2014**

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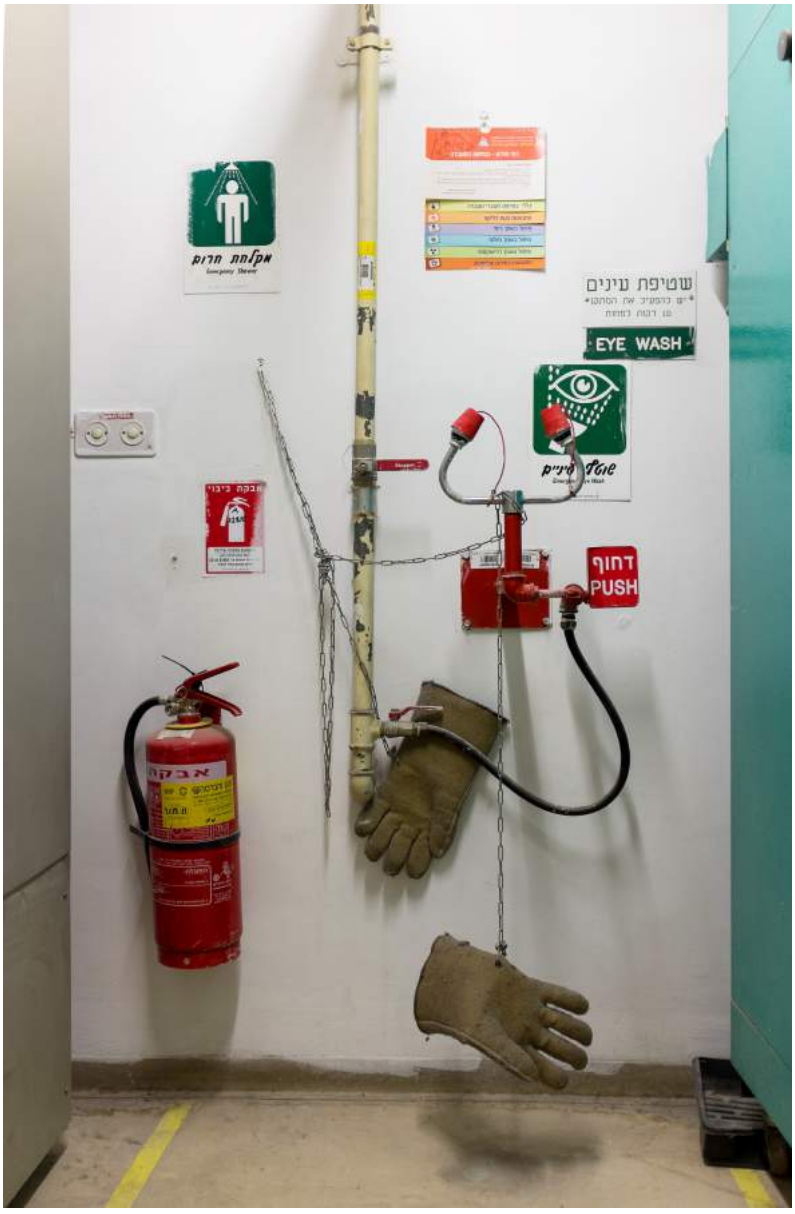

# Introduction and Conclusion

Collaborations between artists and scientists are not uncommon, but they generally happen on the fringes of artistic and scientific practices, and the consequences they have for either arts or sciences are limited. My experience on the Faculty of Science has led to a number of realisations that I believe are important in planning similar projects in the future. Here are some of them.

In order for collaborative art-science projects projects to be of significance for both fields or knowledge, they have to be based on what unifies the two fields. This unifying factor is knowledge. Both arts and sciences produce knowledge about the same world by using different tools, and the separation between them can be seen as the matter of historical and institutional circumstance. The proposition of this residency program is that the relationships between artists and scientists can be based on a collaborative research that is scientific and artistic at the same time. Given an adequate institutional support, such relationships can lead to non-hierarchical projects that will deliver outcomes of consequence for both, arts and sciences.

The collaborations happen not between art and science, but between artists and scientists: concrete people with specific interests and drives. Any framework for art-science collaboration must allow the time and the conditions for the personal relationships to build up - otherwise no meaningful long-term research will be possible. As much as this conclusion seems obvious, its implications on the logistics and the planning of the artist residencies is rarely seriously considered.

Finally, both fields - the arts and the sciences - are enormously complex and non-uniform, each involving different approaches, disciplines and subdivisions. Only in very rare cases will the any given person involved in art-science initiative have good knowledge and understanding of both fields. Therefore, any fruitful collaboration between the artists and the scientists must begin from the point of not knowing: each side must assume that he has to learn about the other in order to have the chance for an interaction. If there is a single important condition for the success of the art-science collaborative initiatives it is the openness: freedom to learn and expect the unexpected.

# Background

*Artist in residence on the Faculty of Science* is an experimental project initiated by the neuroscientist Prof. Idan Segev and myself. I took residency on the faculty for one academic year (2013-14), during which I attempted to examine the question: how does an artist adopt the methodologies of site-specific public art to institutional framework: what would it mean for the artistic practice to take a research institution as a site? The project was defined as open-ended: since there was no prior knowledge as to what methods will be developed and which ways of action will be effective, there could be no particular outcomes that the artist can commit to. The residency has led a three main direct outcomes: collaboration with the Prof. Israel Nelken (neuroscience) to develop a sound installation based on standing waves; collaboration with Prof. David Avnir (chemistry) to research the asymmetry of perception; and a succesfull research grant application to the Israeli Lottery Fund to develop the practical methodology of establishing researh-based art-science collaborative projects.

# Site-specificity

The term “Site Specific” in arts stands for the type of artistic practice that is based, to varying degrees, on the particular site where the artwork is created or exhibited. Exact approaches to this practice vary greatly between artists and genres. My own interest in it arises from my interest in processes and mechanisms of learning: how do we gain knowledge about the world, as individuals and as a society. Hence, I seek ways to put myself in situations of not knowing and having to “learn by doing”. In my case, working “Site Specifically” means beginning with the unknown site, researching it, and producing work that is inseparable from this research - or even a research that is the work.

Taking this approach seriously essentially leads to considering the art practice as the way to approach knowledge - as opposed to the means of production of art objects. This does not mean that the art objects are not produced: rather, they are considered as means of learning and affecting the reality rather than aims of art on their own right.

One consequence of this approach is re-thinking the role and function of sites, and asking - what are they good for? why working in them? Another consequence concerns the artistic practice itself: how artistic work is useful for them? what artistic language is good for them? do methods and materials I used before make sense in this particular setting?

The term “site” can be taken in a variety of meanings. A narrow one is a place, a location, a street corner, a gallery. A broader meaning of “site” can be an institution: an art organisation, a city hall, a corporate company, a university. In the latter case the importance of functionality of the site as an institution exceeds that of the physical site. The function of the university campus is production of knowledge, and this is the functionality that I consider the most important in my residency in Givat Ram.

The goal of my “site specific” research in the university was to learn how the scientific knowledge is produced, and how the scientists - particular people - are producing it. This learning may hopefully lead to understanding how collaborations between artists and scientists can lead to joint research projects that have consequences for both fields: how involvement of an artist in research can lead to new scientific knowledge, and how

involvement of scientists can lead to new developments in arts.

# Learning the research landscape

A conventional site-specific research begins by surveying and characterizing the architectural and environmental setting of the site. As I set my goal to learn the knowledge production process on the campus, I decided to survey the research landscape instead: meet with as many scientists as would agree to meet me, and to learn about their research activities and the development of their research interests. I met 27 researchers and students from several institutes and research groups: Idan Segev, Adi Mizrahi, Eli Nelken, Danny Mandler, Yigal Erel, Yossi Gruenbaum, Eran Sharon, Udi Zohari, Yossef Yarom, Ariel Chipman, Baruch Meerson, Jeff Rosenschein, Jeff Camhi, Sorin Solomon, David Avnir, Danny Porath, Liran Carmel, Idan Maor, Hermona Soreq, Shimon Eliav, Uri Banin, Roie Yerushalmi, Shlomo Magdassi, Gershon Ben Shachar, David Shohami, Ron Chen, Shmuel Peleg.

The meeting would usually proceed in three parts. First I would introduce my project, the rationale and the working methods. Then the researcher would introduce her or his research practice. Finally we proceeded to discussion on specific topics that arose, both art- or science-related. Some of the discussions have led to topics of interest both for the researcher and myself. In such cases we would have a follow-up meeting do explore the topics further. In two cases such follow-ups have eventually lad to establishing collaborative projects, as described below.

I found, maybe surprisingly - considering the opposite experience in arts - how highly approachable the researchers are: with the exception of one or two, I could meet everyone I approached. This approachability is, in my opinion, an essential condition for the success of open-ended artistic projects on the campus. Second was, again contrary to my expectations, the very high level of multidisciplinarity in research - the knowledge seems to flow fairly freely between disciplines.  Almost every researcher described projects that involved, to varying degrees, different disciplines, and most of the researchers have indicated willingness to explore the possibilities of collaborating with an artist.

## Meetings that have led to collaborative activity

*Israel Nelken, neuroscience*
Eli is studying the perception of sound, mostly on rats, and has a strong background in music. At the time of our first meeting there was a conference paper poster on the wall hear his office entitled "When the Rat Heard Ligeti: Neural Sensitivity to Auditory Structure."

Our conversations developed to discussions of perception of sound in space, effects of “confusion” of direction or the sound source (“precedence effect”) and others, while touching on the way upon some fundamental issues in perception  such as the distinctions between the natural and the artificial sounds. Eventually we have got to the question - can one conduct an experiment in sound perception on humans in public space? Can the experimental setup be an artwork? When one does this - how the experimental data is collected?

The sound installation project developed in collaboration with Eli is described below.

*David Avnir, chemistry*
David is studying symmetry in chemistry, developing computational tools for measurement of symmetry. He has gradually developed interest in questions of symmetry in architecture, and in aesthetics in general. From this David has developed collaborative research with two experimental psychologists from Norway and Germany, asking whether chirality is a fundamental property of human perception. At this stage David invited me to join the research. I suggested that the research should be extended from perception of 2D images to spatial cognition: if chirality indeed is a feature of perception, most of the chances it was not developed for evaluation of pictures. This approach was accepted.

The collaborative research proposal included laboratory-based and gallery-based experiments, and was submitted for funding. After two unsuccessful funding applications the project was put on hold.

## Meetings that could have potentially lead to joint activity, or have led to notable realisations

*Eran Sharon*
Nonlinear physics: modelling the process of curling surfaces, such as drying leaves. Eran is modeling the curling processes in the lab with the use of screen printing, essentially similar method to that used in textiles or in arts. Great potential for art and surface design collaboration. I put Eran in contact with Shenkar textile design department; an ongoing discussion between him and the department staff is already in place, and he has visited Shenkar a number of times for lecturing and participation in meetings.

*Ariel Chipman*
Biology, evolution, curator of invertebrate collection - part of the the National Collection of Natural History. During the conversation Ariel told the history of that part of the collection: it was the result of the peace treaty between Israel and Egypt, and was collected in a collaborative expedition funded by the Smithsonian Foundation. When went down to see the collection, noticed a piece of grey metal on the floor - which turned out to be a piece of a fight jet that crashed into the sea, was brought for an analysis to the Uni, and stayed there. Later on it appeared that the collection also holds the buoys from Dakar submarine.

This encounter is an example of a completely unexpected connection that could not be planned for in advance.The collection is a real treasure that holds the potential for a multi-way collaboration and research - art, biology, political sciences, social sciences, history, asking questions - what is “natural” and what is “history”.

*Jeff Camhi*
Biology, Professor Emeritus. Working on an exhibit in Canada building dedicated to multidisciplinary connections in the academy. Potential for collaboration on development of the exhibit.

*Shimon Eliav*
Physicist, Nano Lab. Invited me to discuss his idea of a presentation movie for the lab. After

the tour in the lab I realised that the entire process of nano fabrication is based on imaging - virtually all stages of the process are imaged and recorded visually. This in turn can provide a basis for animation. I proposed to conduct an animation workshop with the researchers in the lab, during which the researchers themselves will create an animation clip that will present the technology.

*Baruch Meerson*
Physicist, head of Physics institute. One of the most startling examples of multidisciplinary development of knowledge I encountered. Develops statistical models of rare events - extinction of species, nuclear accidents, tsunamis. When asked what this has to do with physics he explained that the models he develops are based on physical statistical model describing the transition from quantum to Newtonian physics, that exists from 1930s. He explained that there is this "resource" in physics, and he recognised that it can be utilised in other fields.

As I was listening I realised that this is the same situation I find myself in many conversations in the university, but in reverse: when asked what does my activity has to do with art, I explain the same thing: I'm trying to find out how the knowledge resources existing in arts can be used in other fields, and the other way round.

# "Step Aside": a standing wave sound installation

*Eli Nelken and David Avnir in the Artport Gallery during the development of the sound installation.* Tel Aviv, April 2014

Meetings between Eli Nelken, David Avnir and myself have led to discussions of meaning of symmetry and chirality when applied to sound perception, and to a question: how sound can be used to break up the perceived symmetry of a space? Eli has raised the possibility of using the physical phenomenon of a standing wave to partition the space acoustically. This has led to a collaborative project to develop a sound installation, which is still on-going. Below is the account of the project up to the time of this writing.

## Standing Waves

A standing wave is a wave that does not propagate in space. It is caused by the interference between multiple waves of equal frequency traveling in different directions. In the case of the sound waves, and in the ideal acoustical conditions (anechoic chamber), a standing wave can be generated by placing two loudspeakers opposite to each other. A listener walking on a line between them would hear changes in volume: from maximum in places corresponding to maximal amplitude of the wave, to silence in places corresponding to zero amplitude. In places with non-ideal acoustics, in any given location a number of reflected waves interfere, creating a complex three-dimensional pattern of changing sound volume. Using low-frequency sounds (up to about 300 Hz) with relatively long wavelength (longer than 1 m) results in a 3-dimensional spatial patterns which can be explored by the listener moving in space.

A number of standing waves of different frequencies in the same space create a rich spatial pattern of sound. With the appropriately selected frequencies, phases and relative amplitudes, a listener walking through the space experiences a continuous change in timbre - sub-pitches appear and disappear, beat frequencies form when two nearby frequencies interfere with each other, and overall sound level changes

Performance in Teiva hall, Tel Aviv, May 2014

## Listener is the Performer is the Composer

Since the perceived sound is controlled by the position of the listener in space, and is audible only to the same listener, experiencing the space patterned by the standing waves can be conceived as a musical performance whereby the listener, the performer and the composer are the same person. The array of the standing waves here is a musical instrument; the space where the standing waves are created can be thought of as a resonance box of that instrument; and the path followed by the listener becomes the musical score. Here, the composing/performing/listening is an act of active exploration of space, in which the interaction with the sound is completely embodied: the experience of sound is shaped by one's movements in space; the perception of sound is inseparable from embodied negotiation of space.

## Standing Waves: Decomposition/Composition of Sound

The design of the standing waves sound space is the process of decomposition/composition of sound. The character of the sounds synthesised in the space is determined by the character of the sounds emitted by the sources. The source sounds are created by decomposing a chosen sound pattern into frequency components which are assigned to different loudspeakers. The sum of all sounds from the different sources approximates the original sound pattern, but an ideal recomposition of the source occurs only rarely in space. Instead, the properties of the space impose different recompositions of the different sources at each position, resulting in a multitude of variations on the original sound pattern. By

moving in space, the listener is composing her own temporal sequence of recomposed variations on the theme consisting of the original sound pattern. The resulting soundscape is formed by the interaction between the sound pattern, the rules governing its decomposition into the different sources, the space in which it is produced by the sound sources, and the movement of the listener in that space.

## Current status

Currently the project exists as a conceptual sound installation. It was presented in the Artport Gallery, Tel Aviv, in April 2014, and in Teiva hall in Tel Aviv in May 2014 - in collaboration with the Music Technology students of Bar Ilan university.

The installation development is on-going, and is advancing in two directions. One is conceptual and technical research of compositing the standing waves pattern, done by Eli and myself. Another direction is using the installation as the platform for a musical and choreographic performance, in collaboration with a musician, a composer and a choreograph.

### Documentation

Links to video documentation of the work in process can be found on the project page:

http://oicherman.net/boris/art/_2014/turn-aside/

As the project is in development, additional information and documentation will be added to this web page as it becomes available.

***Update November 2015:*** **Turn Aside, V. 2**

The installation was developed into a musical performance, in collaboration with Eli Nelken, Ronald Boersen (sound, composition), Dan Weinstein (cello), Tomer Damsky (metal plate and bow) and Ella Rothshild (choreography). The performance was presented four times in Gabirol Center for Art and Culture, Tel Aviv, in April 2015. Information about the performers can be found on the project page: http://oicherman.net/boris/art/_2015/turn_aside_2/

The performance was accompanied by the following text.

*The listener is the performer is the composer.*

*What might be the consequences of taking this statement as the starting point for a musical performance?*

*Are "music" and "performance" even proper words to describe the result? Perhaps "happening" is better: something that happens when the listener composes and performs, something to be engaged with, something that happens through engagement with the space.*

*Space that is the happening, space that is the story.*

*Space that is the simultaneity of all stories so far.*

*Perhaps, just “space”.*

*Turn Aside is a project that has began in conversations between the artist Boris Oicherman, and professors David Avnir (chemistry) and Eli Nelken (neuroscience) about the perception of symmetry. The discussion has developed from visual to auditory symmetry, to perception of space through sound, to attempts to sculpt the space by means of sound, and finally to the concept of space as the musical instrument which is played by moving in it. Turn Aside V. 2 is one implementation of this concept, where the concrete tunnels of the old telephone company building are turned into the instrument’s resonance chamber.*

*Your path in the tunnel is the score.*

*Come play it.*

# Artist in Residence in the Faculty of Science - proposal

One of my aims in the residency was to learn the practical methodology of organising a platform for research-based art-science collaborative projects. I believe that my experience at HUJI demonstrates the feasibility of the approach to "artist in residence" concept as a free platform for facilitation of mutually-beneficial collaborations between artists and scientists. Here I formulate the principle of such platform.

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*Artist in Residence in the Faculty of Science* is a platform for establishing art-science collaborative research relationships based on the Artist Placement scheme. The artists will embed themselves and their artistic research practice into the scientific research environment of the faculty and, over the period of one year, establish personal and professional relationships with the researchers. The program will be grounded in basic research as the base of both - artistic and scientific thinking, and will be process-based: the aim is not producing an exhibition, an art piece or a scientific paper, but the mutual learning, changing of the mindset, and establishing longer-term relationships that will continue beyond the framework of the residency.

## The Artists

At the first stage, the fellowship includes a long-term (1 year) residency for an Israeli artist. At the second stage, subject to success of the first one and available funds, it will also include a short-term (2-3 months) residencies for international artists. The two kinds of residents - local and international - bring different perspectives and allow for different opportunities. The most fruitful research collaborations must be long-term, and may well extend beyond the timeframe of the residency - this is by the nature of scientific and artistic research, grant application deadlines, etc. The Israeli artists can afford developing these long-term relationships due to the fact of them being local. The international artists cannot develop such a long-term projects, but they can bring the knowledge and experience in developing collaborative research elsewhere and fill in the gap in knowledge in the Israeli art scene, where art-science collaborative research is extremely rare. The combination of the two will ultimately enrich the possibilities of research and the Israeli art scene in general.

The artists are expected to engage in active communication with the research community on the campus, and generally to expect not to be based in the studio but "in the wild". They will be working on the faculty at least two days a week. The Israeli artists are expected to develop collaboration research project that will continue beyond the residency period; the international artists are expected to engage in knowledge-exchange with the Israeli artists on the residency and beyond, and to develop short-term projects. Israeli artists are expected to be in the beginning or mid-stages of their careers, whether the international ones have established careers and a record of cross-disciplinary research projects. Both Israeli and international artists are expected to contribute to the teaching on the campus - right setting

for that is to be established.

## Open-endness

When talking about collaborations between artists and scientists, one common misconception is the perception of the "other" party (i.e. perception of scientists by artists and the other way round) as a uniform, homogeneous area. Thus, many artists are not aware of extreme heterogeneity in scientific approaches and practices in different scientific disciplines, while many scientists will have a similar preconception of uniformity for artistic practices. It is only expected that the views of the artists on scientific research, and views of the participating scientists on art, will greatly change during the long-term engagement. Moreover, the ability to develop collaborations depends on factors that are hard to plan for and that have nothing to do with either art or science - such as inter-personal relationships, personal interests, or just willingness - or the lack of thereof - to engage in any collaboration at all. Therefore the artists should not be required to submit any project proposal but rather a letter of intent stating why and how they will approach the project, but not what they will specifically do. On the faculty's side there should be readiness to expect the unexpected, including taking the chance of a failure.

## Open call selection

Both the local and the international artists are selected through an open call, on a competitive basis. The aim of the selection is to find the artist who's activity on the campus has the greatest potential to lead to unexpected results - as opposed to one that is guaranteed to deliver a "high-quality" artwork by some existing standards. We must expect the artist to challenge those standards rather than to conform to them. Therefore we must not limit ourselves to the circle of artists we or the recommending committee might know, but rather to be open to unexpected applicants that we otherwise might not reach. This can be achieved only by an open call.

Artists should be chosen on the basis of statement of intent, a course or a workshop/course proposal intended for students, a proven ability of open-ended, cross-disciplinary research and good communicative skills (portfolio, CV, writings). The selected artists should be committed to an open-ended research - should expect learn new things and change directions.

*List of resources required for realisation of the program*

- Artists Scholarships
- Accommodation costs
- Working space
- Material budget
- Investing in a platform for continuous interaction between the artists and researchers, in the form of discussion clubs, talks, joint activities, joint teaching projects and others.
- Creating the framework for a year-long course or workshop that artist will provide to the

science students

- Investing in coordination work that will facilitate joint research projects - such as assistance in locating grants, locating relevant material suppliers, etc.
- Creating a network of the art curators, institutions (galleries/museums), publications and critics that will be supporting, discussing and showing the outputs of the residency on a continuous basis