



NEWSLETTER 2017

CENTER FOR RESEARCH AND DEVELOPMENT
ARCHITECTURE AND DESIGN

FACULTY OF ARCHITECTURE AND TOWN PLANNING



NEWSLETTER CONTENT

ABOUT |
3

RESEARCH |
4

GRANTS |
29

PUBLICATIONS |
31

AWARDS |
39

CARD

CENTER FOR ARCHITECTURAL RESEARCH AND DEVELOPMENT

Established in the seventies, the Center for Research and Development in Architecture and Design (CARD) promotes innovative research in a wide array of fields. Its research subjects include, among others, Sustainable Architecture and Urban Design (with emphasis on energy in buildings and lighting), Computation in Design, Digital Technologies, Advanced Building Simulation, E Urban Design, Housing, Industrial design, Building Technology, ReUse and Retrofit of Buildings.

These works can be classified as either basic research or applied research. CARD also supports development projects that constitute preliminary design ideas and methodologies of an innovative nature. CARD houses activities of faculty members, adjunct teachers, graduate and post-graduate students.

The following newsletter summarizes CARD members' work during 2017. The newsletter's main aim is to present the fields and the of scope of research that is conducted in the center and communicate them to researchers, the industry, research authorities and students, in order to promote collaboration.

HEAD

Yasha J. Grobman

MANAGEMENT MEMBERS

Ezri Tarazi, Abraham Yezioro

MEMBERS – FULL-TIME FACULTY

Yael Allweil, Tal Alon-Mozes, Iris Aravot, Shamay Assif, David Behar, Bilu Blich, Isaac Guedi Capeluto, Dafna Fisher-Gewirtzman, Yehuda Kalay, Rachel Kallus, Eyal Karni, Nurit Lissovsky, Alona, Nitzan-Shiftan, Danny Shoshan, Assaf Shwartz, Aaron Sprecher

MEMBERS – PART TIME FACULTY

Uri Cohen, Ram Eisenberg, Yitzhak Hirsch, Ruth Liberty-Shalev, Gabriel Schwartz, Ariel Tibi

MEMBERS - EMERITI

Michael Burt, Gabriela Goldschmidt, Edna Shaviv



YASHA J. GROBMAN, PHD

CARD CHAIR. ASSOCIATE PROFESSOR

RESEARCH INTERESTS

Design computation and performance-oriented architectural design.
Sustainable architectural design.
Computer aided manufacturing.
The connection between digital design research and architectural practice.

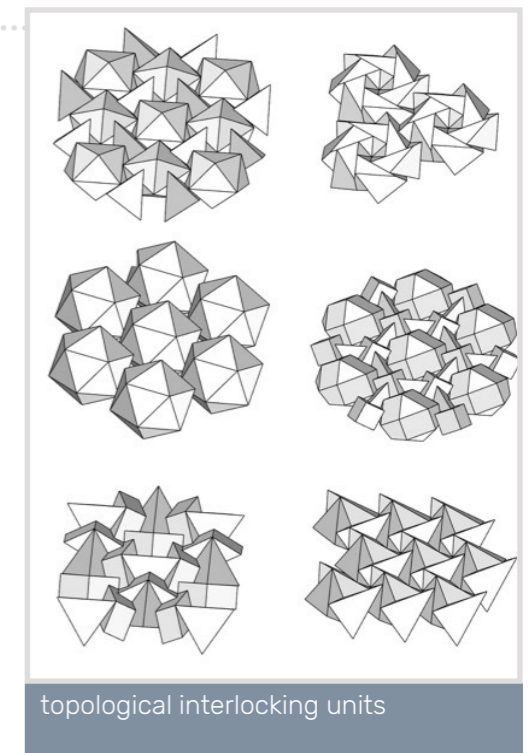
AUTONOMOUS MOVEMENT OF KINETIC CLADDING COMPONENTS IN BUILDING FACADES

The research examines the potential of autonomous movement of facade cladding elements. It defines types of autonomous movement strategies and compares the advantages of these strategies over those using traditional methods of centrally controlled movement. Early results were published in Architectural Science Review journal and in leading conferences proceedings.

DEVELOPING MYCELIUM BASED BIO-COMPOSITE MATERIALS FOR THE BUILDING INDUSTRY

IN COLLABORATION WITH PROF. EZRI TARAZI (TECHNION), DR. OFER DANAI (MIGAL).
PHD RESEARCH OF NOAM ATTIAS.

A complex enzymatic process enables the white rot fungi with a unique ability to digest highly stable molecules such as the structural polysaccharides of plants. This process plays a significant role in natural ecosystems and is already widely used for varied agriculture and food applications. However, the integration of fungal mycelium with the plant fibers can also provide an inherent bonding, forming a natural light weight bio-composite, with unique properties, in which the fungal mycelium functions as the matrix and binds the plant substrate, without the use of any additional adhesives. The research explores this natural ability of fungi to develop natural bio-composite materials for applications in architecture and industrial design. Early results were presented and published in a conference proceedings.



BUILDABILITY

IN COLLABORATION WITH PROF. GUEDI CAPELUTO (TECHNION). PHD RESEARCH OF GUY AUSTERN.

A complex enzymatic process enables the white rot fungi with a unique ability to digest highly stable molecules such as the structural polysaccharides of plants. This process plays a significant role in natural ecosystems and is already widely used for varied agriculture and food applications. However, the integration of fungal mycelium with the plant fibers can also provide an inherent bonding, forming a natural light weight bio-composite, with unique properties, in which the fungal mycelium functions as the matrix and binds the plant substrate, without the use of any additional adhesives. The research explores this natural ability of fungi to develop natural bio-composite materials for applications in architecture and industrial design. Early results were presented and published in a conference proceedings.

DEVELOPING BUILDING ELEMENTS FROM COMPOSITE MATERIALS

IN COLLABORATION WITH PROF. YEHUDA KALAY (TECHNION). PHD RESEARCH OF ARIELLE BLONDER.

The research investigates alternative design and fabrication processes for architectural FRP, relying on the fibres, but tackling it on the fabric level. Relying on the inherent capacities of the fibre constituent, under the form of fabrics, the research introduces the concept of Fabric Materiality in the design and fabrication of architectural FRP. It examines the potential for a FRP structure that embeds biological design principles to reach resilient properties, by employing a new, fabric based, design and fabrication approach. Early results were published in Architectural Science Review journal and in leading conferences proceedings.

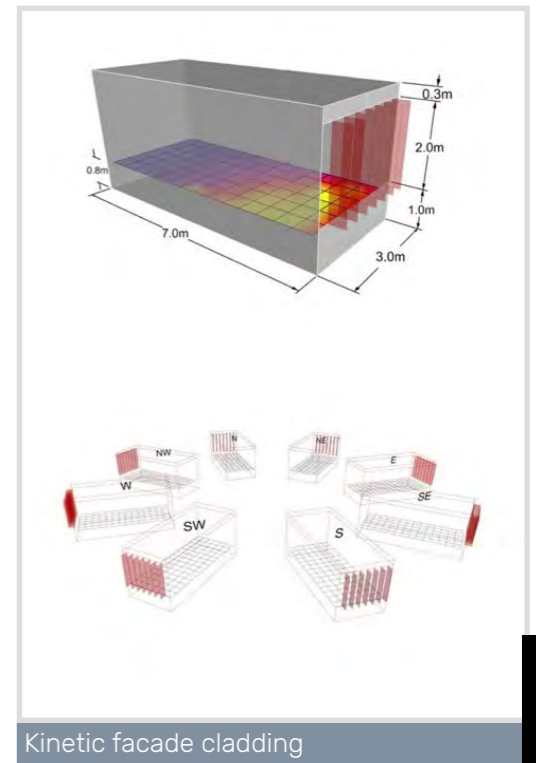
AFFECTIVE RESPONSE TO ARCHITECTURE - INVESTIGATING HUMAN REACTION TO SPACES WITH DIFFERENT GEOMETRY

IN COLLABORATION WITH PROF. MOSHE BAR (BAR ILAN) AND RONEN TALMON (TECHNION). PHD RESEARCH OF AVISHAG SHEMESH.

The research examines the connection between human perception and architectural space. Using new virtual reality techniques, physiological sensors and data analysis methods. It argues that emotional and cognitive reactions that are generated by various types of architectural space geometries can be empirically measured and quantified. Early research results were published in the Architectural Science Review Journal and in conference proceedings (CAADRIA 2015).



Mycelium based composite



Kinetic facade cladding

STRUCTURAL SYSTEMS BASED ON TOPOLOGICAL INTERLOCKING UNITS

IN COLLABORATION WITH PROF. ODED AMIR (TECHNION). PHD RESEARCH OF MICHAEL WEIZMANN.

The research examines the potential of using the concept of topological interlocking (TI) as a structural and organizational mechanism for buildings. It currently concentrates on new types of TI-based floor systems, which seem to have advantages over traditional floors in terms of their seismic behavior and the ease and speed of onsite assembly. The research results were published in Automation in Construction, International journal of architectural computing (IJAC) and presented in Leading conferences. A workshop that examined possible application of TI in design was invited by INHA University in South Korea in 2016.

DESIGN THE WAVES: A NEW MULTIFUNCTIONAL APPROACH TO WATERFRONT DESIGN

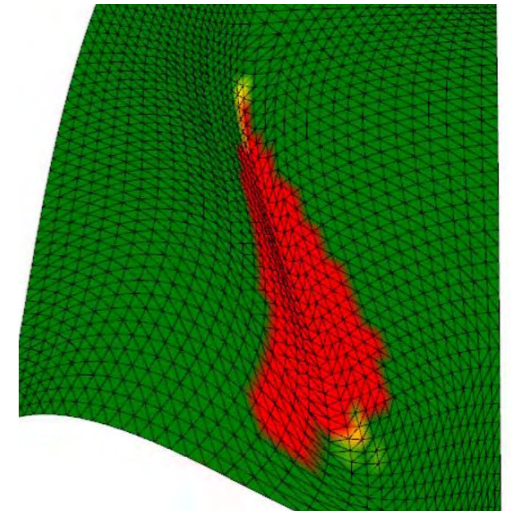
IN COLLABORATION WITH DR. ROY KOZLOVSKY (TEL-AVIV UNIVERSITY). MSC RESEARCH OF HANNA LEVI.

Seawalls and other types of coastal infrastructure are predominantly designed according to the single functional criterion of countering natural forces and maintaining structural stability. Thus, their design is defensive and reactive, and often precludes other types of uses and users. As an alternative to the single use paradigm, the research presents a performance-based, civic and ecological approach that meets the needs of many stakeholders, both human and non-human. It suggests employing computational tools for waterfront design that conceptualizes waves as a design material. The preliminary research that validated the potential to utilize the morphology and materiality of breakwaters to enhance the biological, social, and experiential performance of urban coastal infrastructure. The preliminary results were published in Landscape Research and Caadria conference.

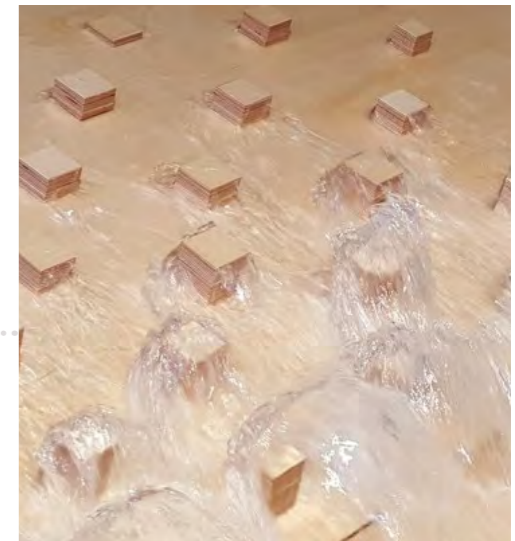
MICROCLIMATE ON BUILDING ENVELOPES

IN COLLABORATION WITH PROF. RENE VAN HOET (TECHNION). MSD RESEARCH OF CHELI HERSHKOVITCH.

The research examines a potential shift toward building envelopes that are based on complex geometry. It argues that by manipulating the geometry of the façade's exterior surface, it is possible to achieve a microclimate that will act as a thermal barrier. The argument is tested via computational fluid dynamic simulations that examined the relationship between various airflows and geometry in different sections of the building envelope. The research results were published in Architectural Science Review journal and presented in leading conferences.



buildability of form



waterfront design



Fabric materiality in composite materials



Yael Allweil, PhD

HEAD. HOUSING ARCHITECTURE, HISTORY AND THEORY RESEARCH GROUP.

RESEARCH INTERESTS | History and Theory of Architecture and Urbanism
Housing and/as Urbanism
Housing as Experimental Architecture.

TEL AVIV'S ARCHITECTURE OF THE 1980S-1990S

A research project for the Tel Aviv Municipal Preservation Department. Producing an architectural history account of Tel Aviv's postmodernity.

BRUTALISM AND COMMUNITY? BE'ERI HOUSING ESTATE

A study of the Be'eri Brutalist housing estate, designed by architects Sharon, Idelson, Carmi and Melzer in the mid-60s. The complex includes 166 apartments in 14 buildings, including two parks, an inner street and a parking lot at a prime location in Tel Aviv. Residents recently declined a lucrative proposal for redevelopment that would have replaced their complex with towers. This study questions accepted knowledge regarding Brutalism's failure in producing community, via historical, ethnographic and architectural research.

THE URBANIZATION PROCESS OF HAIFA AND NORTHERN PALESTINE IN LATE OTTOMAN PERIOD

M.SC RESEARCH OF KEREN BEN HILLEL.

A study of Haifa's modern urbanization process during the Late-Ottoman period, challenging accepted historiography regarding of the city.

HOUSING AS ARCHITECTURE: TRANSFORMATIONS OF ISRAELI ARCHITECTURE CULTURE VIS-A-VIS HOUSING, 1948-1977

This study examines Israeli architecture culture's disengagement from housing as a key design premise in the mid-1960s, towards alliance with the international avant-garde.

EXPERIMENTAL ARCHITECTURE FOR HOMELESS SELF-HOUSING

A continuous study of homeless self-housing solutions in Israel, in relation to the Israeli and international avant-garde.



YEHUDA E. KALAY, PHD

HENRY AND MARILYN TAUB ACADEMIC CHAIR
PROFESSOR EMERITUS, UNIVERSITY OF CALIFORNIA, BERKELEY

RESEARCH INTERESTS

Implications and applications of digital technologies for architectural design. Evaluating building performance in terms of the interactions between spaces, the people who inhabit them, and their impact on the activities they engage in, in particular in the field of hospital design.

THE NOTION OF 'PLACE' IN DESIGN EDUCATION.

PHD RESEARCH OF HADAS SOPHER

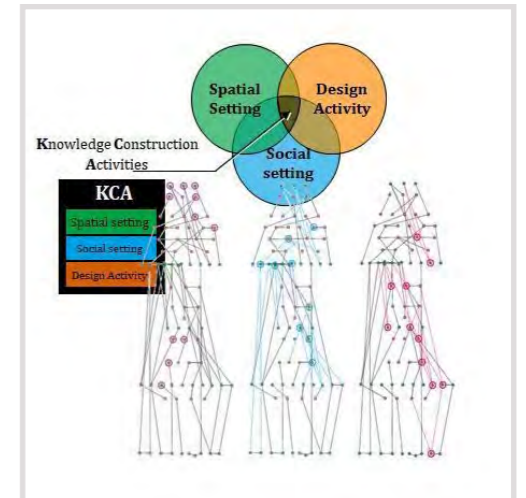
The research proposes a framework to assess the impact of learning environments on learning processes in the architectural design studio. We have developed a model for coding the three main learning activities of the architectural design process, along with their physical and social settings. The model comprises of units we call Knowledge Construction Activities (KCAs). The model presents a detailed description of learning environments' capacity to support active learning, peer participation and embodied understanding. Research results have been published in conference proceedings in the field of education and computer aided architectural design (eCAADe 2017, Immersion 2015).(SimAUD).

PLANNING FOR CHANGE: EVALUATION OF HOSPITAL DESIGN STRATEGIES.

PHD RESEARCH OF NIRIT PUTIEVSKY PILOSOF

The research explores the connection between healthcare, architecture and time, acknowledging both the challenge of planning hospital facilities to meet the rapid progress of medicine and technology, and the limitation of current tools to predict and evaluate the design. The research proposes to develop a method to facilitate the evaluation of hospital design strategies for change, by testing 'what-if' scenarios. Simulating various future scenarios, taking into account different changing needs and evaluating the effects of multiple variables, will allow designers to optimize their design strategy. A transparent, data-driven process which visualizes the physical, social and behavioral dynamics of the hospital after it has been changed will enhance collaboration and knowledgeable decision-making.

The research is supported by the Azrieli Foundation Fellowship.

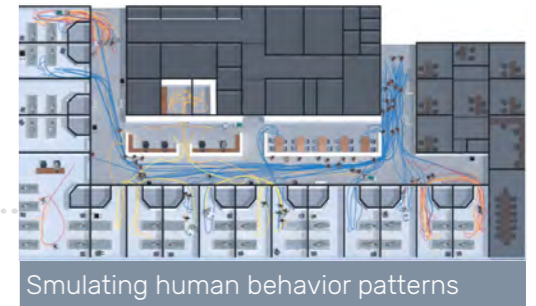


The Notion of 'Place' in design education.

AN EVENT-BASED MODEL FOR SIMULATING HUMAN BEHAVIOR PATTERNS IN BUILT ENVIRONMENTS

PHD RESEARCH OF DAVIDE SCHAUMANN

The research focuses on the development of a new multi-agent model for simulating day-to-day human behavior patterns in built environments (in particular in hospitals). The aim is to predict and evaluate in architectural design the mutual interactions between a space, the users who inhabit it and the activities they perform. Research results have been published in leading journals and conference proceedings in the field of simulation in computer-aided design, such as the Journal of Building Performance Simulation, and the Symposium on Simulation in Architecture and Urban Design (SimAUD).

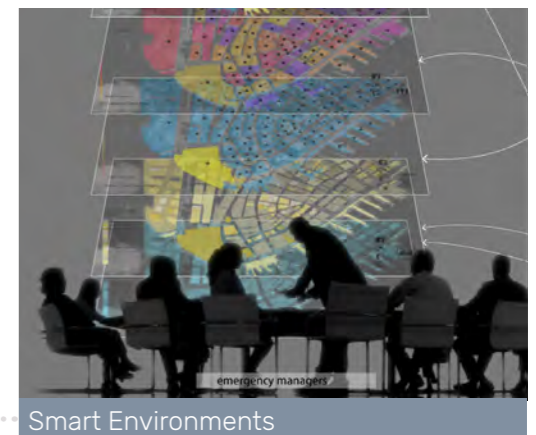


SMART ENVIRONMENTS TO SUPPORT EMERGENCY EVACUATION IN URBAN SETTINGS: ASSESSING THE EFFECT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON URBAN EVACUATION.

MSC RESEARCH OF EINAT MORAD ZINGER

Advancements in the field of ICT present an opportunity to enhance urban response ability in the form of smart environments: physical built settings embedded with sensors and actuators, able to acquire information about their surroundings, communicate it, process it and ultimately act upon it in varying manners. This research aims to explore smart environments' potential to affect citizens' evacuation behavior during urban emergencies. The ability to understand the relation between smart environments and evacuation behavior is highly critical to multiple stakeholders including municipalities, urban designers, emergency managers and citizens.

The research hypothesis is that spatio-temporal data regarding cities' assets, malfunctions, citizens' status and hazard impact over the city can change the manner in which emergency evacuation is performed today, allowing for greater situational awareness in real time for both emergency managers and citizens, and ultimately affecting decision making abilities and performance during emergency response. To elucidate the possible advantages and disadvantages of the proposed smart environment approach, a lab experiment was conducted intended to compare citizens' evacuation behavior within a smart environment to that same performance within a non-smart environment.



A VIRTUAL CITY SIMULATION PLATFORM TO ASSESS THE EFFECTS OF INFORMATION AND COMMUNICATION TECHNOLOGIES ON PEDESTRIAN NAVIGATION IN URBAN SETTINGS

MSC RESEARCH OF MICHAL GATH-MORAD(CO-SUPERVISED WITH PROF. PNINA O. PLAUT)

The thesis provides an empirical exploration of the potential implications of integrating ICT's in complex urban systems. Unlike the technologically driven discourse on "smart cities", in which the basic premise is that the mere integration of ICT's in urban spaces will make the city more efficient, sustainable, livable and in general "smarter", the premise of this thesis is that urban "smartness" is a far more complex notion. In order to understand if, and to what degree cities will be made "smarter" via ICT, we argue that it is first required to gain an in-depth understanding of how ICT effect the low level spatial decision making of the city's most dynamic and intelligent particles – its people. The chosen domain of application is that of pedestrian navigation in urban settings, a spatial decision making process which is highly dependent on spatial information. Subsequently, ICT's potential to affect this process and its output spatial behavior could transform how, when, and where people walk, having a direct effect on urban dynamics and a host of urban performance measures.

Following, the research question aims to reveal the effects of ICT's on individual pedestrians' spatial navigation behavior in urban settings. Despite the body of literature that investigates pedestrian movement in cities, existing models fail to account for these newly emerging, ICT driven spatial patterns, which if ignored, could lead to a misfit between the intended design and its actual use. In order to mitigate this knowledge gap and gain a deeper understanding of the interplay between pedestrian movement, urban settings and ICT, we explore the use of participatory simulations in Immersive Virtual Environments (IVE), as a testing ground in which individual navigation behavior in ICT integrated urban settings could be observed, measured and spatially analyzed.

* The thesis was awarded with Atel Fridman excellence scholarship on behalf of Tel Aviv's municipality center for economic and social research.



Navigation in Urban Settings

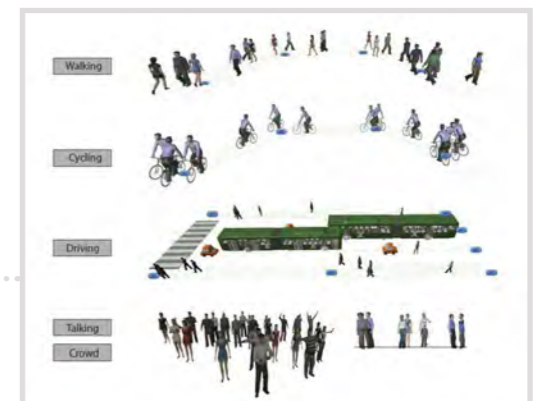


Fig. 6.9 Types of dynamic agents (pedestrians, cyclists, vehicles) and the activities they perform (walking, cycling, driving, talking, cheering in crowd).



Navigation behavior



DAVID BEHAR, PHD

HEAD AND FOUNDER OF MUNDI_LAB

RESEARCH INTERESTS

Daylight museum's architecture
Public space research & interventions
Interaction design and responsive environments

COMMUNITY SURVEILLANCE IN THE PUBLIC SPHERE

IN COLLABORATION WITH. KARL MARTENS, PHD RESEARCH OF RONEN EIDELMAN

Community Surveillance in the Public Sphere, The research explores how the control over the surveillance systems can be allocated to communities. How can we use the surveillance technology not to control people; but have communities use this technology for their own needs, making their environment not only safer and welcoming, but also more opened and democratic.

ACTION RESEARCH IN DOWNTOWN HAIFA

MSC THESIS, BROKMAN NOAM

Local Intervention in the Public Space in Order to Negotiate Knowledge, During Urban Renewal Process.

THE ROLE OF PLAY IN PARTICIPATORY PRACTICE - ACTION BASED RESEARCH

MSC RESEARCH, ORI CARMELI

TOWARDS THE WELL-BEING MUSEUM

New code for quality light in museum display spaces: Function, performance, technologies and planning recommendations. The research examines a well-being approach for museum display spaces focusing on light. The research scheme include three major directions: expanding the scientific description of light quality with quantitative, qualitative and well-being measures, examining a real study case (Mishkan museum) under the architectural cultural sustainability approach; and defining a new operation code for museum display spaces.



AARON SPRECHER, RA, MRAIC

ASSOCIATE PROFESSOR

RESEARCH
INTERESTS

Computational Architecture
Digital Fabrication
Architectural Robotics
Theories of Digital Cultures
Architecture in Extreme Environments

RETHINKING MATERIAL SYSTEMS THROUGH COMPUTATIONAL LIGHTWEIGHT DESIGN

PHD RESEARCH OF FRANCOIS LEBLANC (MCGILL UNIVERSITY) IN COLLABORATION WITH PROF. JORGE ANGELES (MCGILL CIM), AND DAMIANO PASINI (MCGILL UNIVERSITY)

This research aims to contribute to the development of sustainable design and construction practices, i.e. through an economy of material, using structural optimization methods applied in architectural design and automated fabrication technologies. The research focuses more specifically on the integration of topology optimization, a computational form-generating method at the crossroad of lightweight structures and material science, and extrusion-based additive manufacturing applied in construction to develop a design method for lightweight structures. The novelty of the research is the integration, in the logic of material reduction, of fabrication constraints revealed in the nascent application in construction of additive manufacturing, a technology capable of producing very intricate details by laying successively two-dimensional sections of material directly from a digital model. Therefore, the objective of the research is to explore the potential of design specific to this technology and develop a unified methodology providing a seamless workflow between design, simulation, and fabrication, and therefore allowing topologically optimized models to be efficiently fabricated with additive manufacturing.

ARCHITECTURE IN THE EXTREME: EMBRACING GEO-PHYSICAL CONSTRAINTS WITH OPTIMIZED FORMS AND SYSTEMS

PHD RESEARCH OF ELISABETH BOUCHARD (MCGILL UNIVERSITY), IN COLLABORATION WITH PROF. MARTIN BRESSANI (MCGILL UNIVERSITY)

This research examines the current state of knowledge and the principal problematic surrounding architecture designed for extreme and remote environments. As a research-creation project, it focuses on the potential of computer-aided design for environmental mediation between architecture and severe geo-physical constraints. In its most simplified description, the project's process treats the architectural forms and construction systems of past and current case studies as the initial instructive data for computational protocols employed at conceiving new prototypes of environmentally responsive architectures.

TECHNICAL INDETERMINISM: TOWARD A SENSIBLE ARCHITECTURAL TOOL

PHD RESEARCH OF TOM SHAKED

In his acclaimed work, *On the Mode of Existence of Technical Objects* (1958), the French philosopher Gilbert Simondon considers automation to be a low degree of technical perfection, a mode of operation which sacrifices potential uses due to its control by economic or social vectors. He suggests an alternative: relating to the margin of indetermination inherent in the machine in order to increase its sensitivity to outside information. Sensitivity of machines to information, rather than an increase in automation enables technical ensembles to reflect a new relation between human, object and tool.

We propose to outline a progression in the sensitivity of the architectural model starting with generative models of virtualization capable of displaying algorithmic sensitivity, to models of actualization that incorporate automated manufacturing. These models exemplify a new form of digital craft, most recently expressed by the widespread use of low-cost open-source electronics and the popularity of do-it-yourself culture. Architects are moving toward a physical model that promotes a new relationship between operator and tool that employs indeterminism and sensitivity as a new platform for exchange.

ADAPTIVE URBAN SURFACES

PHD RESEARCH OF KAREN LEE BAR-SINAI

Streets and cityscapes are designed to fulfill particular and predetermined relationships between the built fabric, the pedestrian movement and the vehicular needs of the city. However, the street section is ultimately fixed in form, while its use patterns change dramatically, even throughout the day. Let's imagine that the urban surface could adapt and reconfigure itself to allow different patterns of use. This research investigates the nature and role technology can play in shaping the urban surface through a number of aspects of design (materiality, adaptability, responsiveness), and their potential contribution to the performance of the urban space.

DESIGN OPTIMIZATION THROUGH ROBOTIC SENSING AND EVOLUTIONARY ALGORITHMS

MSD OF IONATHAN LAZOVSKI

This research considers the application of Evolutionary Algorithms (EA) in robotics and the inherent potential of optimization it provides to designers using parametric methods and tools. The use of algorithms to solve or to optimize parametric models is not new, although it exists only in the virtual realm where the laws of physics do not apply, and if they do, it is usually because the designer wrote a script to mimic that physicality. Designers cannot presume to understand all the various forces, and even if they do succeed in understanding them, the resolution of the data will probably be less than the physical resolution. The research aims to assess whether using data driven from physical sensing can provide a more optimized outcome in a design process based on EA and robotic manufacturing.



ABRAHAM YEZIORO, PHD

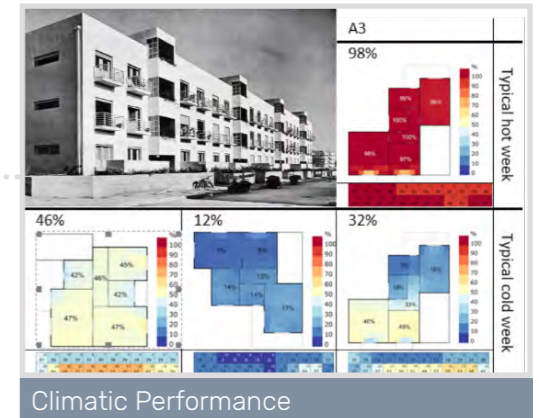
VICE-DEAN FOR TEACHING
CHAIR. CLIMATE & ENERGY LAB IN ARCHITECTURE

RESEARCH INTERESTS | Sustainability in Architecture
Performance Based Design and Research
Development of Computer Models for Sustainability in Architecture

THE INTERNATIONAL STYLE AND THE CLIMATE IN ISRAEL: CLIMATIC PERFORMANCE OF RESIDENTIAL BUILDINGS IN TEL-AVIV. FROM 1930'S TILL THE ESTABLISHMENT OF THE STATE

MSC RESEARCH OF SABA NICOLA

The research assesses whether the architectural solutions, guidelines and guidance, which architects and professionals set, wrote and hypothesized, at the 30's address the climatic and thermal needs of buildings in the International style in Tel Aviv and whether they provide a comfortable internal environment. What is the extent of their effectiveness? Do they really fulfill the requirements, such as the architects had planned and hypothesized for, or do they remain a guess that failed in the test of reality? The research evaluates the level of the climatic solution's efficiency in achieving thermal comfort.

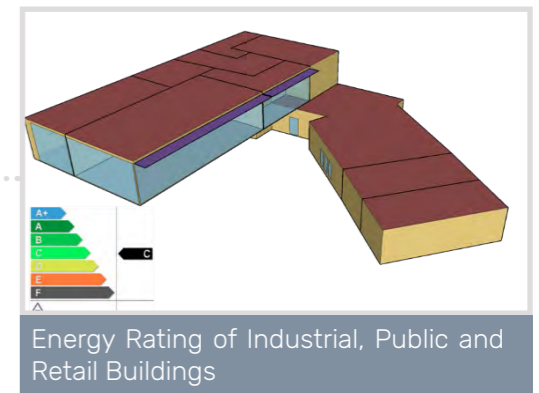


ENERGY RATING OF INDUSTRIAL, PUBLIC (GATHERING) AND RETAIL BUILDINGS ACCORDING TO THE PRESCRIPTIVE/DESCRIPTIVE & PERFORMANCE APPROACHES

IN COLLABORATION WITH PROF. GUEDI CAPELUTO (TECHNION)

The research presents the development of the Prescriptive/Descriptive and Performance approaches for the Energy Rating of the following building types: Industrial, Public and Retail, including the determination of criteria for the Energy Rating of these buildings' types.

This rating expresses the energy saving rate for heating, cooling, ventilation and lighting of the building. In order to rate a building, it is necessary to compare its energy performance in relation to a given "Reference Building". For each building type a reference building was defined, including characteristics, qualities and recommended default values. The Rating Energy Levels were set for each climatic zone in Israel.



THE EFFECT OF ARCHITECTURAL CHARACTERISTICS OF RESIDENTIAL BUILDINGS ON REGIONAL ENERGY CONSUMPTION IN ISRAEL

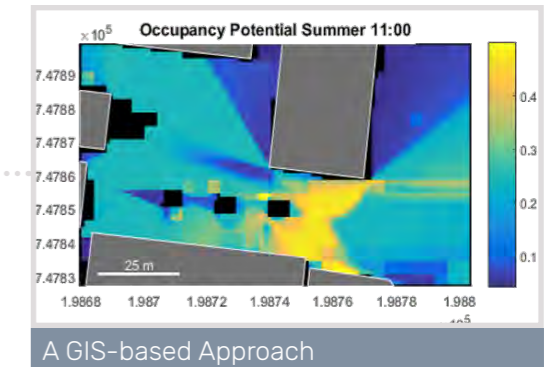
IN COLLABORATION WITH DR. OR ALEXANDROWICZ (TECHNION). MSC RESEARCH OF LOTEM KIRSCHT

In the light of the expected population growth in Israel and the need to significantly increase the number of buildings accordingly, this research seeks to examine how architectural characteristics of buildings affect the energy consumption of residential buildings in specific urban areas. The research strives for the creation of a library of local energetic building types. A model for examining the effect of architectural characteristics on energy consumption for acclimatization of residential buildings at the urban level is being developed.

A GIS-BASED APPROACH TO URBAN BIOCLIMATIC CONDITIONS AND HUMAN USE OPEN PUBLIC SPACES

IN COLLABORATION WITH PROF. GUEDI CAPELUTO (TECHNION). PHD RESEARCH OF GABRIEL COTLIER

This research implements and validates a fuzzy inference model capable of providing with reliable predictions of static occupancy pattern at outdoor urban OPS on the bases of the combined effect of several environmental variables, which can be effectively used to evaluate and improve different design alternatives. Findings of this research have shown that the combined effect of thermal comfort conditions and users' preference over the visibility structure gives an accurate estimation of static occupancy patterns at urban OPS. The FIS model allows a flexible design decision-making tool capable of generating user oriented environmentally conscious design solutions at small scale urban OPS, such urban squares, plazas and parks.



GUIDELINES FOR URBAN TYPOLOGIES FOR ZERO ENERGY COMMUNITIES

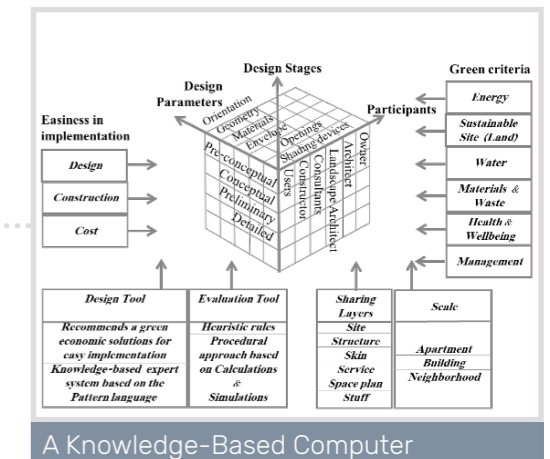
MSC RESEARCH OF OLGA MALISHEVSKA

The research deals with the challenge of creating nZEC (Net Zero Energy Communities) neighborhoods. It asks whether is it possible to suggest recommended guidelines for creating various urban layouts that can reach an nZEC goal for a neighborhood or at least bring this results as close as possible? If so, what they will be? The relevance of this study is determined by the fact that within the housing complex which is designed simultaneously it is easier to fulfill energy saving requirements than in an existing neighborhood.

A KNOWLEDGE-BASED COMPUTER-AIDED DESIGN TOOL FOR GREEN RETROFIT OF EXISTING RESIDENTIAL BUILDINGS

IN COLLABORATION WITH PROF. EDNA SHAVIV (TECHNION). PHD RESEARCH OF DAPHNA DRORI

A knowledge-based expert system was developed for designing and evaluating green retrofit of multifamily residential buildings in Israel. It uses a methodology based on the concept of Multiple Resources Productivity (MRP) emphasizing the integration of the green criteria: energy, land, water and health & wellbeing. The tool displays conflicts and meeting points of the interlinked criteria and other variables essential for the decision-making process. In addition, it recommends multi-beneficial solutions considering its sustainability and feasibility, while using generic data given by the system and dynamic project oriented input to be entered by the user.





DAFNA FISHER-GEWIRTZMAN, PHD

ASSISTANT PROFESSOR

RESEARCH INTERESTS

Architecture and urban design endorsed by Neuroscience
Visual and Spatial analysis and simulation.
Generative architecture design
Adaptive Reuse, Regeneration and Recycling of buildings

COGNITION, PERCEPTION AND BEHAVIOR IN THE BUILT ENVIRONMENT

CONSULTING RESEARCHER. FUNDED BY THE NATIONAL RESEARCH FOUNDATION OF SINGAPORE AS WELL AS THE SINGAPORE-ETH-CENTER AS PART OF THE FUTURE CITIES LAB PHASE 2 WITHIN THE SEC SINGAPORE-ETH-CENTER.

This research addresses the manner in which people perceive and process spatial information in high-density, mixed-use, vertical settings. Dafna was invited to apply her visibility analysis methods to reinforce the expected 'perceived density' of user's in the future proposed built environments.

2015-2018/20

THE PERFECT DESIGN FOR URBAN DWELLERS ENDORSED BY NEUROSCIENCE

IN COLLABORATION WITH PROF. SIMON SHAMAI TSOORY, DR. LEEHE PELED AVRON AND ARCHITECT ERAN CHEN – ODA, NYC.

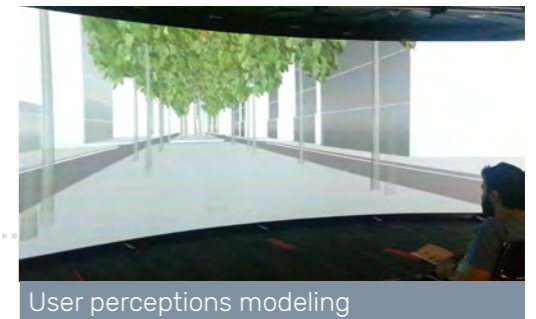
On a technical and practical level, it is possible to design and construct very dense urban environments, to compress people into small compact spaces both in their private and public environments. This could and most likely would result in crowded and stressful environments influencing the wellbeing and quality of life of their inhabitants. Some configurations have proven to be more acceptable than others, perceived as less dense, providing more privacy than others, or defined as well designed spaces. No in-depth study has been conducted to identify specific architectural schemes that can reduce stress and increase mental and physical resilience. This research proposal aims at understanding the impact of alternative architecture settings at different scales on human well-being; identifying the designs and spatial configurations that enhance positive emotions, relaxation, reducing stress in personal and social contexts and enhance an individual's capacity to cope with daily challenges and stress.

The objective of this study is to apply the scientifically ratified results as design guidelines for improvements of existing urban settings and for better future design. The result of this study would have a vast impact on planning and design processes as well as on the quality of life and well-being of urban dwellers.



USER PERCEPTIONS MODELING AND 3D VISUAL STRUCTURE ANALYSIS OF BUILDING ENVELOPES IN DENSE URBAN ENVIRONMENTS

Understanding how interior and exterior architecture and urban design alternatives impact human experience is still a challenge. One of the factors that impact human experience is the visibility available to users given a location with respect to an architectural design. The objective of this work is to understand and quantify the impact of visibility under varying architectural proportions and settings on human physiological and emotional measures.



HOW DO ARCHITECTS THINK AND DESIGN SPACE? AN INTERDISCIPLINARY INVESTIGATION ON ARCHITECT'S SPATIAL KNOWLEDGE, SPATIAL ABILITY AND OPPORTUNITIES FOR PEDAGOGICAL IMPROVEMENTS IN ARCHITECTURAL EDUCATION

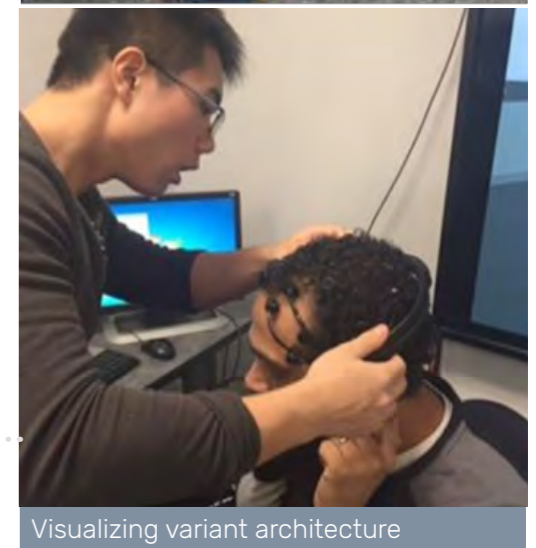
CONSULTING RESEARCHER. PROF. DR CHRISTOPH HÖLSCHER, ELSBETH STERN AND STEFAN KURATH (PI). FUNDED BY THE SWISS NATIONAL SCIENCE FOUNDATION.
2017-2020



THE IMPACT OF VISUALIZING VARIANT ARCHITECTURE/URBAN SPACES ON HUMAN PHYSIOLOGICAL AND EMOTIONAL MEASURES

IN COLLABORATION WITH DR. SEMIHA ERGAN TANDON SCHOOL OF ENGINEERING, DEPARTMENT OF CIVIL AND URBAN ENGINEERING, NYU. A RESEARCH ASSISTANT WAS GENEROUSLY FINANCED BY THE CENTER FOR URBAN SCIENCE AND PROGRESS (CUSP) NYU.

Understanding how interior and exterior architecture and urban design alternatives impact human experience is still a challenge. One of the factors that impact human experience is the visibility available to users given a location with respect to an architectural design. The objective of this work is to understand and quantify the impact of visibility under varying architectural proportions and settings on human physiological and emotional measures.





GUEDI CAPELUTO, DSC

CHAIR – THE ARCHITECTURE PROGRAM

RESEARCH INTERESTS

Lighting and Daylighting in Architecture
Solar and Daylight Rights
Performance Based Design
Sustainable Green Architecture

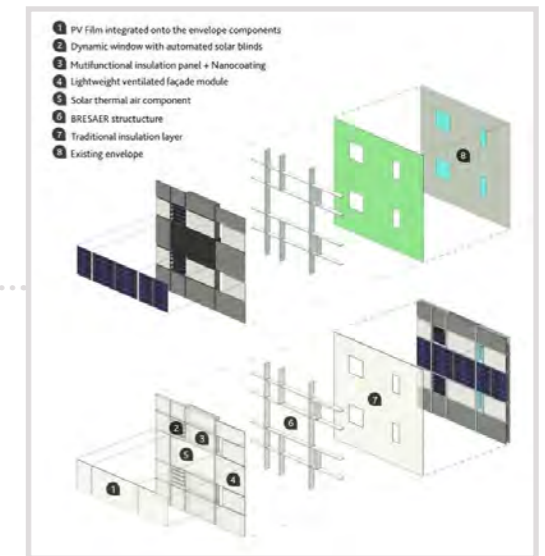
Intelligent Buildings
Energy Conscious Building Design
Architectural Design
Computer Aided Architectural Design (CAAD)
Digital Design

BRESAER - BREAKTHROUGH SOLUTIONS FOR ADAPTABLE ENVELOPES IN BUILDING REFURBISHMENT

IN COLLABORATION WITH. CARLOS E. OCHOA. EU FUNDED, HORIZON 2020

BRESAER will develop a cost-effective, adaptable and industrialized “envelope system” for buildings refurbishment. The BRESAER’s envelope (for façades and roofs) will include a combination of active and passive pre-fabricated solutions which will be integrated in a versatile lightweight structural mesh. This new technology is expected to significantly reduce the building’s primary energy consumption and the Greenhouse emissions while improving indoor environment quality through thermal, acoustic, lighting comfort and air quality at the same time.

With the BRESAER system the whole building will be governed by an innovative Building Energy Management System, which will manage all the different envelope functions, the energy facilities of the building and monitor the energy generated by the BRESAER system.



Solutions for Adaptable Envelopes

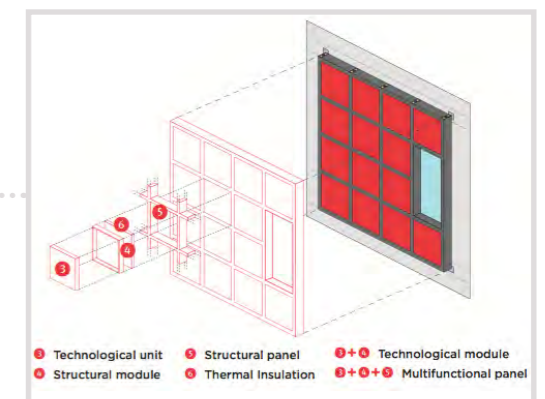
MEEFS - MULTIFUNCTIONAL ENERGY EFFICIENT FACADE SYSTEM FOR BUILDING RETROFITTING, PI, EU FUNDED FP7

GUEDI CAPELUTO, DSC

The MeeFS project, launched in January 2012, develops an innovative, energy efficient, multifunctional façade system for retrofitting geared towards the residential building sector.

The team works collaboratively on the façade development (architectural, energetic, breakthrough technologies according to passive and active technologies, energy management system, installation, and structural material), façade evaluation (of energy efficiency, new composite material life cycle and fire resistance) and façade demonstration in real life building in Spain.

The project brings together a multidisciplinary consortium with a well balanced distribution between industry sector and research organisations. The team is composed of large companies (research capabilities), technologically specialised SMEs (manufacturers), research (dealing with energy efficient buildings and solutions) as well as open innovation and government organisations.



Multifunctional energy facade system

A GIS-BASED APPROACH TO URBAN BIOCLIMATIC DESIGN AND HUMAN USE OF OPEN PUBLIC SPACES

PHD RESEARCH OF COTLIER GABRIEL IN COLLABORATION WITH ABRAHAM YESIORO

DEVELOPMENT OF AN ENERGETIC – ARCHITECTURAL PROFILE OF BUILDINGS. LIGHTING AS GENERATOR OF BUILDING RETROFIT IN PUBLIC/ COMMERCE BUILDINGS

PHD RESEARCH OF RINGEL GAL

NET ZERO ENERGY STRATEGIC PLANNING PRINCIPLES: ISRAELI AIR FORCE 2025

MSC RESEARCH OF YASNER AVIVA, URBAN AND REGIONAL PLANNING. IN COLLABORATION WITH PORTMAN, M

BIM IN THE BUILDING PERMIT PROCESS

MSC RESEARCH OF WAKS ZIV

FORM FINDING AND OPTIMIZATION FOR DIGITAL FABRICATION

PHD RESEARCH OF GUY AUSTERN IN COLLABORATION WITH YASHA J. GROBMAN

TOWARDS ZERO EMISSION NEIGHBORHOODS IN HIGH-DENSITY CONDITIONS

MSC RESEARCH OF KOLODIY OLGA

LIGHT EXPERIENCE CHARACTERIZATION AND ITS RELATION TO DIFFERENT ARTIFICIAL LIGHTING ENVIRONMENTS

MSC RESEARCH OF SEGAL RAM

INTELLIGENT ENVELOPES FOR HIGH-PERFORMANCE BUILDINGS: DESIGN AND STRATEGY

This book presents a series of significant methods and examples for the design of sustainable intelligent facades in a variety of contexts. Emphasis is placed on how intelligence has been applied for successful energy-saving efforts in the planning of building envelopes.

Readers will find essential information on the core principles involved in designing, calculating and organizing intelligent facades according to the need for a new or retrofitted building. Not only are different materials and technologies considered, but also efficient ways to combine them according to user needs and other project-specific constraints. Illustrations, tables and graphs accompany the text, clarifying the concepts discussed. Architects, facade consultants and all those interested in and energy-saving measures and improved indoor comfort will find this book useful not only as an introduction to the subject but also as a guide to achieving more responsive building methods.



GABRIELA GOLDSCHMIDT

RESEARCH INTERESTS

Design cognition and reasoning.
Visual thinking, sketching.
Creativity.
Design learning and teaching.

PROBLEM STRUCTURING AND CREATIVITY: EFFECTS OF PROBLEM TYPES AND COGNITIVE FACTORS

IN COLLABORATION WITH PROF. EMERITUS MIRIAM EREZ. MSC RESEARCH OF ORI RONEN

This interdisciplinary work combines perspectives and methods of design research and organizational psychology in treating design problem solving. It studies experimentally the impact on creativity of problem structuring in closed and open problem presentation, novelty and usefulness focus problems, and the role of problem solvers' need for cognitive closure (NFCC). The experiment is of a 2x2 factorial design and comprise 48 architects and advanced architecture students. Each participant solves one design problem under one of four conditions (combinations of two presentation modes and two focuses). Design sessions are conducted individually, and participants are asked to 'think aloud' and are recorded, which enabled the measurement of their problem structuring (self-interpretation of the problem while solving it). NFCC is measured separately using an established index, and at the end of the experiment participants are debriefed.

THE DYNAMIC RELATIONSHIP BETWEEN CONSTRAINTS AND CREATIVITY: THE IMPACT OF TIMING

IN COLLABORATION WITH ASSOCIATE PROFESSOR ELLA MIRON-SPECTOR.
PHD RESEARCH OF MARNINA HERRMANN

In today's increasingly complex world, we are required to tackle problems creatively while adhering to an ever-growing list of constraints. Existing research on the constraint-creativity relationship reveals mixed findings, with some studies suggesting that constraints can hinder creativity, and others showing that constraints can enhance creativity. Most studies that look at this relationship examine the impact of the type or severity of the constraint on creativity leaving us with many questions about the less studied factors that can moderate this relationship. In our study we seek to explore how the timing of when constraints are introduced into the creative process affects creativity.

SHARED MENTAL MODELS AND ZONE OF PROXIMAL DEVELOPMENT IN TEACHING & LEARNING ARCHITECTURE

IN COLLABORATION WITH ASSOCIATE PROFESSOR REVITAL TAL. PHD
RESEARCH OF LEE ARIAV

Teaching and learning architectural design involve sharing of knowledge and skills which cannot be fully explained. Nevertheless, one can learn how to think like an architect by means of learning-by-doing, under the guidance of a studio master in a studio setting. The studio master (coach) guides the students during their architectural problem-solving endeavors. Students and coach rely on shared mental models (SMM) which allow a common basis acquisition of complex knowledge. Sharing mental models in the studio is crucial, seeing they assist in bridging the gap between coach's and student's knowledge. In the studio, knowledge is formed and shared in a Zone of Proximal Development (ZPD) – the distance between problem solving abilities exhibited by a learner working alone and these abilities when assisted or collaborating with a coach. The goal of this research is to fill in some of the gaps in our knowledge on architectural education.



RACHEL KALLUS, M.A.R.C.H., P.H.D
ACADEMIC HEAD, SOCIAL HUB, TECHNION

RESEARCH
INTERESTS

- Community Planning and Development
- Professional education and social engagement
- Planning with communities - methods, tools and strategies
- Professional knowledge vs. local knowledge and knowledge of the locale

- Postwar Professional Culture and International Development
- Architecture/planning and nation building (internal development)
- Export of professional knowledge (external development)

- Urban Culture and Urban Design
- Urban experience in ethno-national contested places
- Architecture/planning and everyday life
- Housing and the city, urban form, use and function
- Gender aspects, fear of crime, safety and security

THE JISR PROJECT: TECHNOLOGY FOR THE COMMUNITY

FUNDED BY RUCH EXCHANGE GRANT, JACOBS-CORNELL INSTITUTE

Through the consolidation of academic-community partnerships, the project brings advanced technologies to a marginalized community in a participatory process that engages and empowers local residents to play a role in strengthening their lives and their environment. The project, a collaboration between the Social Hub at the Technion and the HCI group at Cornell Tech, involves theoretical, methodological and empirical considerations of best practice technological co-creation.

DEVELOPMENT FROM THE PERIPHERY: THE EXPORT OF NATION-BUILDING KNOWLEDGE FROM ISRAEL ABROAD, 1950-1970

FUNDED BY THE ISRAEL SCIENCE FOUNDATION

This research project focuses on regional planning as a significant layer of modernisms. It examines Israeli involvement in international projects of regional development from the 1950s to the 1970s and evaluates their impact on post-WWII transfer of professional knowledge. The detailed study of selected projects and their comparative analysis vis-à-vis political and professional paradigms of the time reveals Israeli experts' contribution to the shifting patterns of global professional expertise in post-WWII development and reaffirm the role of professionals in the distribution of knowledge, the creation of a community of practice and its potential in the current resurfacing "cosmopolitan moment".

PLANNING IN A MIXED CITY: PROFESSIONAL RESPONSIBILITY, SOCIAL CHANGE AND SPATIAL JUSTICE

FUNDED BY THE PAYIS COUNCIL FOR ARTS AND CULTURE

Through investigation of projects conducted in cooperation with local communities, this research explores the role and meaning of community engaged professional practice in a mixed city enmeshed in an ongoing ethnonational conflict. Unlike other studies of community-engaged practice, this research emphasizes the unique role of community-engaged practice in situations of conflict and highlights processes over outcomes, to illustrate the ebbs and flows of community-engaged professional practice.

PROFESSIONAL EDUCATION AND SOCIAL ENGAGEMENT

FUNDED BY THE ISRAEL COUNCIL OF HIGHER EDUCATION

This research project explores the potential of urban visualization and participation. It derives from the experience of a community-based academic course that uses visualization and on-site methods and examines how participatory imagination and the imaging of urban spaces becomes a platform for discourse that allows local residents to become involved in thinking the future of their locality, and thereby activating their urban citizenship. Research findings identify taxonomy of collaborative professional methodologies and techniques, and show how participatory visualization as a vehicle for promoting a communal sense of place and urban identity.

PLANNING THE HOME FRONT: AN URBAN READING OF CIVIL DEFENSE MECHANISMS.

PHD RESEARCH BY IDO ZUK

This research examines the effect of civil defense mechanisms in Israel and how they turn into a planning policy tool and partake in urban design practices of cities in the frontline. The exploration of policy measures, legal regulations, urban design schemes and their urban environment outcome in the fortifying processes of the city of Sderot reveal the consequences of civil defense mechanisms on the form and function of two urban neighborhoods and on their day to day lived experience.

PARTICIPATING SOCIAL DESIGN: A NEW FRONT OF KNOWLEDGE IN PRODUCT DESIGN

IN COLLABORATION WITH PROF. EZRI TARAZI (TECHNION).

PHD RESEARCH BY IRIS TALMI

The study focuses on the characteristics of collaborative social design processes. It explores the position of designers and of production processes in a neo-liberal reality and in light of global socio-economic processes, especially in view of the challenges and opportunities posed by the Fourth Industrial Revolution.

THE EFFECT OF INDUSTRIAL REVOLUTION IN EASTERN EUROPEAN TEXTILE TOWNS ON THEIR URBAN MORPHOLOGY: THE CASE OF ŁÓDŹ, POLAND, 1820-1914

MASTER RESEARCH BY RUTH KAPLAN

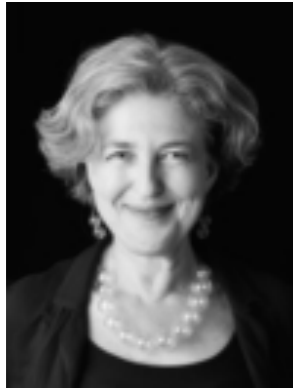
The research examines the spatial layout of the Jewish district of the city of Łódź at a time of great transition in the 19th century, as Łódź has turned into industrial town. Research methodology is taken from the field of urban morphology to analyze the district's structural evolution and its building typologies. Additional data, taken from photographs, archived documents, periodical newspapers, fine arts and literature, to add physical and historical information. Findings reveal how the Jewish community that has once lived in Łódź took part in the industrial transformation of the town.

THE INTEGRATIVE HABITATION UNIT IN KIRYAT GAT: FROM HOUSING POLICY TO RESIDENTIAL PRACTICES

MASTER RESEARCH BY NOA BAR AM

FUNDED BY BALABAN GLASS RESEARCH GRANT

The research aims to reveal the meaning of national housing policy in the everyday lived experience of residents in public housing. The research relies on the residents' local knowledge, obtained using qualitative methods to enable an understanding of the meanings given to housing characteristics by the residents themselves. The case study selected for the research is the experimental Integrative Habitation Unit in Kiryat Gat, known today as the Glikson neighborhood. This neighborhood was founded in the 60's as an experiment by the Ministry of housing to implement planning and sociological knowledge in order to fulfill the national goal of social integration using residential environments. The meaning of housing policy in the lived experience of the inhabitants is examined in an integrative analysis of the local knowledge with other bodies of knowledge, assisted in the interpretation of life stories: Planning knowledge relating to the construction of the national housing policy, and architectural knowledge, relating to changes in the built environment. The integration these three bodies of knowledge suggests the meaning of housing policy to the lived experience of public housing residents.



ALONA NITZAN-SHIFTAN, PHD

ASSOCIATE PROFESSOR

RESEARCH
INTERESTS

Modernity and Modernism: History, Theory and Criticism of 20th Century and Contemporary Architecture
Post-W.W.II Architectural Culture: a Focus on Israel and the US
The Politics of Architecture: Nationalism, Orientalism, Postcolonialism and Globalization
Israeli Architectures in History: Architecture Encountering Zionism, Judaism and Statism (Mamlachtiyut)
Past Perfected: Cultural Heritage and the Politics of Preservation
Architectural Historiography
Art as urban intervention
Research by Design

ISOTROPIC UNIVERSE AND MODULAR GRID: ECONOMY AND SPACE IN THE TEFEN MODEL, 1979-1991.

PHD RESEARCH OF DAN HANDEL. COMPLETED 2017.

NEW TOWNS IN ISRAEL: NEGLECTED OR ENABLING SPACES? UPPER NAZARETH AS A CASE STUDY.

IN COLLABORATION WITH DR. MEIRAV AHARON GUTTMAN (TECHNION).
MSC RESEARCH OF YAMIT LAZIMI. COMPLETED 2017.

ARCHITECTURE OF NEGOTIATIONS: THE CITIES GAZA AND YAMIT AS A CASE STUDIES FOR THE ISRAELI CONSTRUCTION BEYOND THE GREEN LINE, 1967-1982.

PHD RESEARCH OF FATINA ABREEK-ZUBIEDAT.

ART AS PRESERVATION: INTERVENTIONS IN CONFLICTED SITES IN ISRAEL.

PHD RESEARCH OF IRIT CARMON POPPER.

BETWEEN THE IMAGINARY AND THE REAL: THE NATIONAL WATER CARRIER AND THE NATIONAL LANDSCAPE OF DEVELOPMENT

IN COLLABORATION WITH ROY KOZLOVSKY (TEL AVIV UNIVERSITY). PHD RESEARCH OF ZIV LEIBU



**SEIZING
JERUSALEM**
The Architectures of Unilateral Unification

LEVANTINE MODERNISM: LEBANESE ARCHITECTS IN PALESTINE'S COASTAL CITIES, 1933-1948

IN COLLABORATION WITH DR. ELS VERBAKEL (BEZALEL). MSC RESEARCH OF ADEEB D. NACCACH (ON LEAVE).

MONUMENTALITY AS SPATIAL ACTION: THE MODERNISM OF THE LABORERS COMPLEX IN HADAR HA'CARMEL

IN COLLABORATION WITH DR. DORIT FERSHTMAN. MSC. RESEARCH OF AMIT BEERI.

COMPARATIVE METHODOLOGY OF DESIGN TOOLS FOR INFORMATION BASED FLEXIBLE SYSTEMS

IN COLLABORATION WITH AARON SCHPRECHER. MSC. RESEARCH OF LIZ LEIBOVICH.



EZRI TARA ZI

FULL PROFESSOR CHAIR OF INDUSTRIAL DESIGN PROGRAM

RESEARCH INTERESTS

Design Thinking
Life Support Design
Generative Design and Digital manipulation
Sustainable Design and Marine design
Design and Human Psychology
3D printing and digital Manufacturing for mass production

NEW IDF PREHOSPITAL WEARABLE MEDICAL MONITORING AND RECORD

IN COLLABORATION WITH HIRSCHHORN ARIEL ISRAEL MD, SHLAIFER AMIR MD (IDF MEDICAL CORP) MASTER RESEARCHER YONATAN BEN-HAIM (TECHNION)

The present a novel digital, web-based, on-line or off-line medical data recording system design that allows for multiple, simultaneous peripheral acquisition modules with central command monitoring. Combat casualty care can be divided into two distinct treatment phases: the pre-hospital phase and the hospital phase. At the pre-hospital phase, the medical team aims to perform life-saving operations, stabilize the patient's hemodynamic status and transfer him safely to the hospital for definitive treatment.



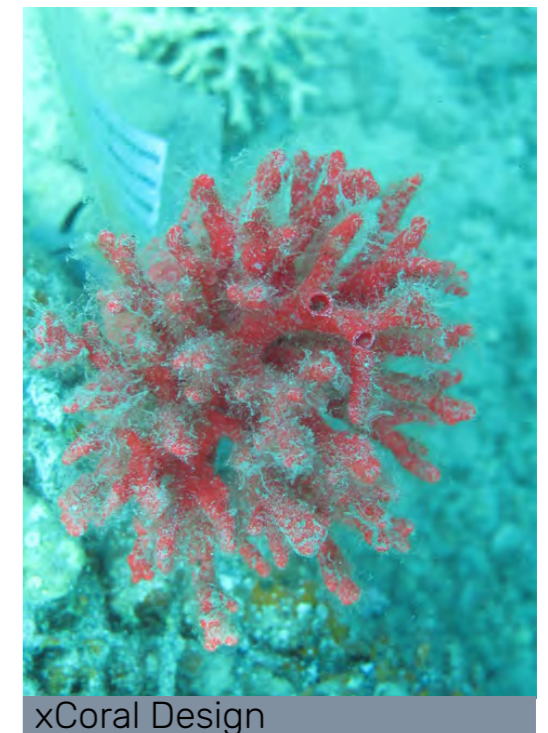
medical recording system

It is a well-known fact that during transfer between the two, information regarding surgery performed, medications administered, and vital signs monitoring, is very often, not recorded or lost. The team created a prehospital documentation eco-system, which harnesses emerging technologies like the internet of things (IoT), near-field communication (NFC) and cloud based data, including a smart automated wearable wrist-watch-like intermediary for medical file creation. The design wrist described is flexible, lightweight, inexpensive, fast and intuitive to operate, thus making it easy to implement in the harsh combat theater. Comprehensive digital information regarding location of the event, site, nature, and severity of the injury, clinical signs, procedures performed, instruments used, drugs administered, and evacuation sequence is recorded. Any instructions or special emphases by the treating medical officer or support staff can be added to the system with the aid of a PDA (personal digital assistance) android based, by using the application attached or verbally. The use of this data eco-system, provides an efficient mean for data transfer and mining. Data is readily available to following echelon of care, central medical command and receiving hospital at the same time. This revolutionary system will, improve information transfer, and reduce morbidity and mortality. It is therefore crucial to make available an efficient, user-friendly combat casualty care documentation system that can provide, in real time, a complete and comprehensive prehospital medical record starting at the point of injury for each casualty.

XCORAL DESIGN: A NEW 3D PRINTING DESIGN OF A CORAL REEF

IN COLLABORATION WITH PROF. NADAV SHASHAR (BEN GURION UNIVERSITY) AND MSC. RESEARCHER ASA OREN (THE IUI, EILAT).

Coral reefs are complex eco systems which are characterized by high biodiversity. A correlation exists between the complexity of a coral reef's and the bio diversity surrounding it, this correlation can be partially explained due to the fact that diverse micro habitats attract different populations. The fish community of a coral reef plays an important role in maintaining high coral abundance, as well as preventing phase shift from a coral environment to another- such as an algae one. This may occur when seaweed covers the corals due to the lack of herbivorous organisms. Indeed, studies have shown the contribution of fish abundance to the health of individual corals and to the coral reef community. When a coral has been damaged by harmful seaweed that settle on it, the coral release chemical cues which signal the herbivorous fish that live-in symbiosis with the coral to remove it. The introduction of 3D scanning and printing enable to create a new environment based on friendly materials. The overall goals of this study are (1) to better understand the interactions between coral design structure and the various populations that recruit into and live within it, while (2) examining different materials used in 3D printing as substance for creating artificial corals. (3) Create the design intentions for re-construct coral reefs. Coral reefs around the world are experiencing a continuous process of degradation which is a result of both anthropologic and natural causes. These causes include, among other factors, diseases, rise in ocean water temperature, ocean acidification, tourism, and over fishing of reef fishes. Our goal is to identify and create new ways to foster the growth of coral reefs by using 3D printing and expand the possibilities to recover and grow them in a systematic way.



DEVELOPING MYCELIUM BASED BIO-COMPOSITE MATERIALS FOR THE BUILDING INDUSTRY

IN COLLABORATION WITH PROF. YASHA J.GROBMAN (TECHNION), PROF. OFER DANAI (MIGAL). PHD RESEARCH OF NOAM ATTIAS (TECHNION).

A complex enzymatic process enables the white rot fungi with a unique ability to digest highly stable molecules such as the structural polysaccharides of plants. This process plays a significant role in natural ecosystems and is already widely used for varied agriculture and food applications. However, the integration of fungal mycelium with the plant fibers can also provide an inherent bonding, forming a natural light weight bio-composite, with unique properties, in which the fungal mycelium functions as the matrix and binds the plant substrate, without the use of any additional adhesives. The research explores this natural ability of fungi to develop natural bio-composite materials for applications in architecture and industrial design. Early results were presented and published in a conference proceedings.

FASHION AND MEMORY - MATERIAL, SHAPE AND SELF-EXPERIENCE

IN COLLABORATION WITH PROF. TAMAR EL-OR (THE HEBREW UNIVERSITY). PHD RESEARCH OF RACHEL GETZ-SALOMON (TECHNION)

The design research project examines the relationship between form, material, and self-experience through a specific designed object - The Skirt. Over the course of history, the skirt has become a feminine item. In pre-modern fashion and in the modern one, except for ethnic and folkloristic performances such as the Scottish Skirt, there was no offer for a masculine skirt. Since the end of the last century, post-modern fashion has formulated several such proposals, although they have not yet become widespread and accepted. The transformation of the Skirt into a feminine clothing item has led to the skirt being perceived to be associated with femininity to the point of turning it into a metonymy for femininity. In the Israeli sphere, the skirt is located in different fields of gender reference, which also relate to ethnic, sectoral and personal characteristics. Through the method of Memory-Work the research explore the theory and meaning of the skirt as a cultural object of material and design value, and how are these embodied in the ways in which women experience it differently in their minds, feelings, and body, and in what ways the definition of the Self depends on an object and what issues of material and form produce these dependencies.



The Skirt as design object



YASHA J. GROBMAN, PHD

ISRAELI MINISTRY OF CONSTRUCTION AND HOUSING GRANT
Developing building envelope cladding tiles based on complex geometry. Principal investigator, 387,398NIS (~100,292US\$).

2015-2017

ISRAEL SCIENCE FOUNDATION (ISF) GRANT
Autonomous Movement of Kinetic Cladding Components in Building Facades. 390,000NIS (~114,000US\$).

2014-2017



YEHUDA E. KALAY, PHD

ISRAEL SCIENCE FOUNDATION (ISF) GRANT
Yehuda E. Kalay, PhD in collaboration with Dr. Efrat Eizenberg
Simulating human behavior in yet un-built environments. 176,000\$.

2016-2019

EUROPEAN RESEARCH COUNCIL GRANT
User behavior Simulation in built Environments (USE). 150,000€.

2017-2018

EUROPEAN RESEARCH COUNCIL GRANT
Next-generation building information modeling to support evaluation of human behavior in built. 1,629,370 €.

2013-2018



Yael Allweil, PhD

ISRAEL COUNCIL OF HIGHER EDUCATION GRANT
Brutalism and Community. 40,000 NIS.

2017

DAVID AZRIELI PUBLICATION GRANT
Yael Allweil, PhD \$5000

2016-2017



DAVID BEHAR, PHD

HERTZELIYA MUSEUM OF CONTEMPORARY ART GRANT
Mundi_Lab In house research project: Exposures.

2016-2017

MIFAL HAPAI'S GRANT

Light-Space Pulsations research and exhibition project.

2016-2017



EZRI TARAZI

DESIGN AND DEVELOPMENT OF A 3 FOLD SYSTEM TO MONITOR MEDICAL TREATMENT IN THE BATTLE.
Israeli Ministry of Defence. 430,000 NIS

2017-2018

DESIGN AND DEVELOPMENT OF A HYBRID SHELTER FOR THE UNCHR

Tel Aviv Museum. (classified),

2016-2018

DESIGN AND DEVELOPMENT OF A WORKSHOP-INSTALLATION 'DESIGN THINKING OF THE MIDDLE EAST.
MAXXI Museum, Roma (classified)



GUEDI CAPELUTO, DSC

BRESAER-BREAKTHROUGH SOLUTIONS FOR ADAPTABLE ENVELOPES IN BUILDING REFURBISHMENTS)
Principal Researcher Technion, w/17 International Partners - Industry and Academia, from Spain, Turkey, Hungary, Italy, Greece, Netherlands, France, Belgium, and Israel, HORIZON 2020, European Commission (Total Budget: 5,850,000 Euro, Technion Budget: 350,000 Euro - 4 1/2 years)

2015-2019



DAFNA FISHER-GEWIRTZMAN, PHD

USER PERCEPTIONS MODELING AND 3D VISUAL STRUCTURE ANALYSIS OF BUILDING ENVELOPES IN DENSE URBAN ENVIRONMENTS

Principal Investigator. (600,000 NS) 170,000\$, Funded by the Israel Science Foundation.

2015-2018



YASHA J. GROBMAN, PHD

“MICROCLIMATE ON BUILDING ENVELOPES: WIND TUNNEL AND COMPUTATIONAL FLUID DYNAMIC ANALYSIS OF BASIC AND COMPLEX GEOMETRIES”

Hershkovich, C. Van Hout, R. Rinsky, V. Laufer, M. Grobman Y. J. • SimAUD 2017 conference proceedings • Toronto, Canada May 22-24, 2017

"TOPOLOGICAL INTERLOCKING IN ARCHITECTURE: A NEW DESIGN METHOD AND COMPUTATIONAL TOOL FOR DESIGNING BUILDING ELEMENTS"

Journal of Architectural Computing (IJAC). Published online 15(2) June. 2017. DOI: 10.1177/1478077117714913

2017

“DEVELOPING NOVEL APPLICATIONS OF MYCELIUM BASED BIO-COMPOSITE MATERIALS FOR ARCHITECTURE AND DESIGN”. BUILDING WITH BIO-BASED MATERIALS: BEST PRACTICE AND PERFORMANCE SPECIFICATION"

Attias, N. Danai, O. Tarazi, E. Grobman, Y. J. • September 6th-7th. Zagreb, Croatia.

2017

"MULTIFUNCTIONAL COMPUTATIONAL APPROACH TO WATERFRONT DESIGN.

Grobman, Y.J., Kozlobsky, R., *Levi, H •Architectural Science Review (ASR). Published online 60(6) October. 2017. DOI: 10.1080/00038628.2017.1383229

2017



DAFNA FISHER-GEWIRTZMAN, PHD

“DEVELOPING NOVEL APPLICATIONS OF MYCELIUM BASED BIO-COMPOSITE MATERIALS FOR ARCHITECTURE AND DESIGN”. BUILDING WITH BIO-BASED MATERIALS: BEST PRACTICE AND PERFORMANCE SPECIFICATION"

Golub D., Doytsher Y. and Fisher-Gewirtzman D.

2017



"ADAPTIVE REUSE ARCHITECTURE DOCUMENTATION AND ANALYSIS".

Fisher-Gewirtzman D. • Journal of Architectural Engineering technology. Volume 5, Issue 3

"THE IMPACT OF ALTERNATIVE INTERIOR CONFIGURATIONS ON THE PERCEIVED DENSITY IN MINIMUM APARTMENTS"

Fisher-Gewirtzman D. • in press in Journal of Architectural and Planning Research (JAPR)

2017

"3D LOS VISIBILITY CALCULATIONS AS COMPARATIVE ANALYSIS AND EVALUATION OF URBAN TYPOLOGIES"

Fisher-Gewirtzman D • ACE2017 • 5th Annual International Conference on Architecture and Civil Engineering, Singapore, pp 10-23

2017

"CAN 3D VISIBILITY CALCULATIONS ALONG A PATH PREDICT THE PERCEIVED DENSITY OF PARTICIPANTS IMMERSSED IN A VIRTUAL REALITY ENVIRONMENT?"

Fisher-Gewirtzman D. • 11th Space Syntax Symposium, Lisbon 3-7

2017

"WHY IMMERSIVE? USING AN IMMERSIVE CAVE IN ARCHITECTURAL EDUCATION"

Sofer H., Kalay Y., Fisher-Gewirtzman D. • eCAADe2017- ShoCK, Rome

2017

"GENERATIVE URBAN DESIGN MODULE: INTEGRATING SPACE SYNTAX AND SPATIAL COGNITION EXPERIMENTAL METHODS.

Natapov A., Barr O. and Fisher-Gewirtzman D. • 11th Space Syntax Symposium, Lisbon 3-7

2017

"THE EFFECT OF TOPOGRAPHY ON PEDESTRIAN MOVEMENT: DEVELOPING AN ANALYTICAL MODEL"

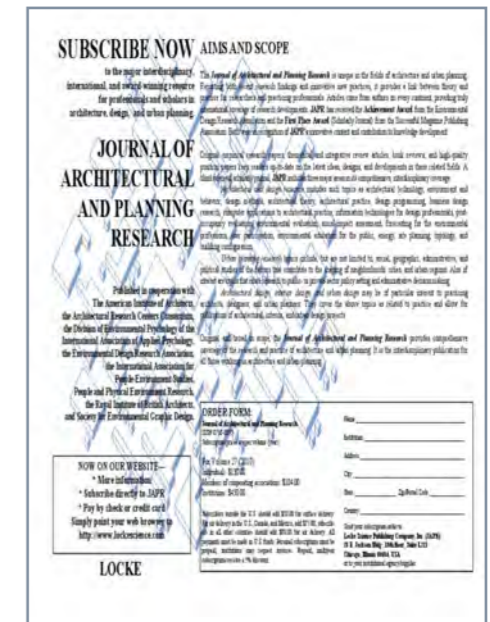
Greenberg E., Natapov A. and Fisher-Gewirtzman D. • 11th Space Syntax Symposium, Lisbon 3-7

2017

"THE BALANCE BETWEEN PHYSICAL CLOSURE AND OPENNESS IN OFFICE WORKSPACES AND THE RELATIONS TO INTERACTION BETWEEN WORKERS AND THEIR NEED FOR PRIVACY"

Lerer-Melamed R. and Fisher-Gewirtzman D• 11th Space Syntax Symposium, Lisbon 3-7

2017



"AUTOMATING A SYNTHESIS PROCESS FOR MINIMAL DWELLING UNITS & CLUSTERS FOR RESILIENT SUSTAINABLE MEDITERRANEAN CITIES"

Polak N., Fisher-Gewirtzman D.

2017

"THE USE OF VIRTUAL REALITY FOR ENVIRONMENTAL REPRESENTATIONS"

Fisher-Gewirtzman D., Portman M., Natapov A., Hölscher C. Editorial paper •

2017



YEHUDA E. KALAY, PHD

"ARCHITECTURAL DESIGN CREATIVITY IN MULTI-USER VIRTUAL ENVIRONMENT: A COMPARATIVE ANALYSIS BETWEEN REMOTE COLLABORATION MEDIA"

Seungwan Hong, Ahmed El Antably, Yehuda E. Kalay • Environment and Planning B: Urban Analytics and City Science - Decision on Manuscript ID EPB-2015-0144.R2

2017

"SIMULATING USE SCENARIOS IN HOSPITALS USING MULTI-AGENT NARRATIVES".

Davide Schaumann, Simon Breslav, Rhys Goldstein, Azam Khan, Yehuda E. Kalay • Journal of Building Performance Simulation. 10(5-6), 636 – 652

2017

"SIMULATING THE BEHAVIOR OF BUILDING OCCUPANTS USING MULTI-AGENT NARRATIVES: A PRELIMINARY STUDY IN A GENERIC HOSPITAL WARD"

Schaumann, Davide, Breslav Simon, Goldstein Rhys, Azam Khan, and Yehuda E. Kalay • In Proceedings of the Building Simulation Conference (IBPSA). San Francisco

2017

"AN EVENT MODELING LANGUAGE (EML) TO SIMULATE USE PATTERNS IN BUILT ENVIRONMENTS"

Schaumann, Davide, Kartikeya Date, and Yehuda E. Kalay • In Proceedings of the Symposium on Simulation for Architecture & Urban Design, 189–96. Toronto

2017



"A FORM-FUNCTION-USE (FFU) MODEL TO SIMULATE HUMAN BEHAVIOR IN BUILT ENVIRONMENTS"

Schaumann, Davide, Yehuda E. Kalay, and Seung Wan Hong • In The Proceedings of the 13th Biennial International Conference of the European Architectural Envisioning Association, 146–53. Glasgow

2017

"MODELING SPACE TO SUPPORT USE-PATTERN SIMULATION IN BUILDINGS"

Date, Kartikeya, Davide Schaumann, and Yehuda E. Kalay • In Symposium on Simulation for Architecture and Urban Design, 181–88. Toronto

2017

"A PARAMETRIC APPROACH TO SIMULATING USE-PATTERNS IN BUILDINGS: THE CASE OF MOVEMENT"

Date, Kartikeya, Davide Schaumann, and Yehuda E. Kalay • In Proceedings of the International Conference on Education and Research in Computer Aided Architectural Design in Europe (eCAADe), 503–10. Rome.

2017

"WHY IMMERSIVE? USING AN IMMERSIVE ENVIRONMENT IN ARCHITECTURAL EDUCATION"

Hadas Sopher, Yehuda E. Kalay, Dafna Fisher-Gewirtzman • In Proceedings of the International Conference on Education and Research in Computer Aided Architectural Design in Europe (eCAADe), Rome, Volume 1, pp. 313–322

2017

" OPEN ARCHITECTURE FOR HEALTHCARE: CASE STUDY OF HOSPITAL CHANGE IN PRACTICE"

Nirit, Putievsky Pilosof, and E. Kalay Yehuda • In the proceedings of the UIA 2017 Seoul World Architects Congress

2017



ABRAHAM YEZIORO, PHD

"THE INTERNATIONAL STYLE IN ISRAEL. SPATIAL COMFORT PERFORMANCE OF RESIDENTIAL BUILDINGS IN TEL-AVIV ON THE 1930'S"

Yezioro A., S. Nicola. • Submitted for the PLEA2018 conference, Hong Kong

2017

"A DESIGN TOOL FOR GREEN REGENERATION OF RESIDENTIAL NEIGHBORHOODS - GREEN FACADES"

Drori, D., A. Yezioro, and E. Shaviv • PLEA2016 - 32th Conference, CITIES, BUILDINGS, PEOPLE: TOWARDS REGENERATIVE ENVIRONMENTS • Los Angeles, USA

2017



ENERGY RATING OF INDUSTRIAL, PUBLIC (GATHERING) AND RETAIL BUILDINGS ACCORDING TO THE PRESCRIPTIVE/DESCRIPTIVE & PERFORMANCE APPROACHES

In collaboration with, Guedi Capeluto, the Ministry of National Infrastructures (900.000 NSh – 3 years. 300,000 NSh/year) 3.



Yael Allweil, Ph.D.

BOOK "HOME-LAND: ZIONISM AS HOUSING REGIME"

Allweil, Y. • Routledge: London

2017

"HOUSING IN NEOLIBERALISM: ARCHITECTURE AND THE PARADOX OF DWELLINGS"

Allweil, Y. and Motta, N. • Footprint

2017

"NATION BUILDING IN ISRAEL: NEGOTIATIONS OVER HOUSING AS GROUNDS FOR THE STATE-CITIZEN CONTRACT"

Allweil, Y. • Gharipour, M., ed. Identity, Nation, and Beyond: Social Housing in Contemporary Middle East, London: Ashgate

2017

"LIVING WITH GEDDES"

Allweil, Y • Amir, T., ed., Signs, Hargol, Tel Aviv

2017

"EXPERIMENTAL ARCHITECTURE FOR HOMELESS SELF-HOUSING"

Allweil, Y. • JAE 72:1

2017

"THEY KILL, WE BUILD: WEST BANK SETTLEMENTS, HOUSING NEOLIBERALIZATION AND ZIONIST HOUSING ETHOS TRANSFORMATION FROM SHELTER TO VIOLENCE"

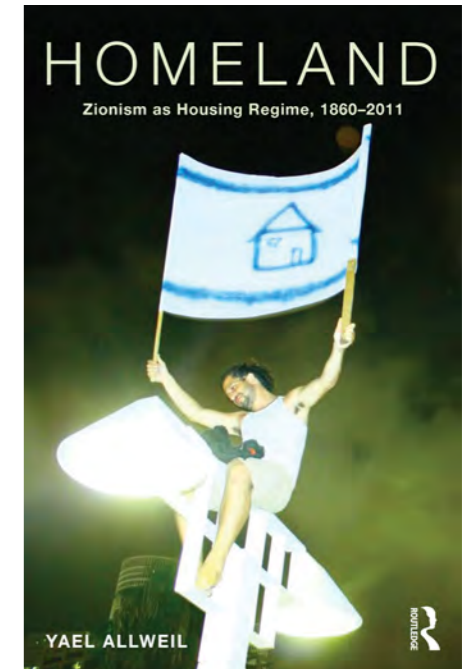
Allweil, Y. • Footprint, 10:2. Pp. 13-36

2017

"FRANK GEHRY'S LOU RUVO CENTER IN LAS VEGAS: RE-INVOKING HOUSING, CONTEMPLATING THE 'DEATH' OF LATE-CAPITALIST ARCHITECTURE"

Allweil, Y. • Agarez, R. ed. Routes of Knowledge

2017





G U E D I C A P E L U T O , D S C

“CONSIDERATIONS FOR EXTENDING BENEFITS OF ENERGY RETROFITS AT THE BUILDING LEVEL TO THE BUILDING STOCK”.

I.G. Capeluto and C.E.Ochoa.

PLEA 2017: 33rd PLEA International Conference: Design to Thrive (eds. Luisa Brotas, Susan Roaf and Fergus Nicol), Edinburgh, Vol. III pp.3507-3514, ISBN 978-0-9928957-5-4.

2017

“TOWARDS NEAR ZERO ENERGY IN HIGH DENSITY RESIDENTIAL AREAS”.

O. Kolodiy and I.G. Capeluto.

PLEA 2017: 33rd PLEA International Conference: Design to Thrive (eds. Luisa Brotas, Susan Roaf and Fergus Nicol), Edinburgh, Vol.III pp.3563-3570, ISBN 978-0-9928957-5-4.

2017

“A METHOD FOR THE GENERATION OF CLIMATE-BASED, CONTEXT DEPENDENT PARAMETRIC SOLAR ENVELOPES”.

Capeluto I.G and Plotnikov B.

Architectural Science Review, Taylor & Francis, UK, Vol. 60, Issue 5, pp. 395-407. <http://dx.doi.org/10.1080/0038628.2017.1331334>

2017



R A C H E L K A L L U S , M . A R C H , P H D

“THE DACHA: HOME AWAY FROM HOME”

Kallus, R. and Vinnitsky, Y.*, Journal of Architectural and Planning Research 33(4): 271-291

2017

“REFLEXIVE APPROACH TO ARCHITECTURAL EDUCATION: STUDENTS CONFRONT THEIR PROFESSIONAL AND NATIONAL IDENTITY IN CONFLICTUAL URBAN ENVIRONMENT “

Kallus, R. and Shamur, T.

in Golan, Daphna, Rosenfeld, Yona and Or, Zvika (eds.), Bridges of Knowledge: Campus-Community Partnerships in Israel, Tel-Aviv: Mofet, pp. 70-92,

2017

SOCIAL CHANGE AND SPATIAL JUSTICE, HAIFA: SOCIAL HUB, TECHNION
Kallus, R., Planning in a Mixed City: Professional Responsibility

2017

“EXPERTISE IN THE NAME OF DIPLOMACY: ISRAELI TECHNICAL ASSISTANCE IN THE QAZVIN REGION, IRAN”

Feniger, N.* and Kallus, R.

in: Gharipour, Mohammad (ed.), European and American architects in late Pahlavid Iran, London: Intellect (book series on architecture of the Middle East), in print

2017



EZRI TARA ZI

DESIGN IN THE MIDDLE: A NEW APPROACH TO COLLABORATIVE SOCIO-POLITICAL DESIGN

Merav Perez & Ezri Tarazi in Conflict Areas, The Design Journal, 20:sup1, S4307-S4318.

2017



ALONA NITZAN-SHIFTAN, PHD

SEIZING JERUSALEM :THE ARCHITECTURES OF UNILATERAL UNIFICATION, A QUADRANT BOOK, UNIVERSITY OF MINNESOTA PRESS

Nitzan-Shiftan, Alona.

2017

“JERUSALEMITE MODERNISM: DAVID ANATOL BRUTZKUS AND THE MAKING OF A LOCAL MODERN LANGUAGE”

Yarnitsky, Reut* and Alona Nitzan-Shiftan. Iyunim BeTkumat Israel, Vol.28, 2017, pp. 225-255, (Hebrew).

2017

“ON THE RELENTLESS MODERNIZATION OF THE PAST: THE PLAN TO CONSTRUCT THE ‘KEDEM CENTER’ IN THE GIVATI PARKING LOT IN JERUSALEM”

Nitzan-Shiftan, Alona. In Teoria ve'Bikoret (Theory and Criticism) 48, 2017, pp. 177-190 (Hebrew)

2017

“A HISTORICAL OPPORTUNITY: LANDSCAPE, MAMLACHTIYUT AND THE COMPETITION OVER THE ISRAELITES IN THE CONSTRUCTION OF THE NATIONAL PARK SURROUNDING JERUSALEM’S WALLS,”

Wilkof, Shira* and Alona Nitzan-Shiftan

Cathedra 163, Yad Ben Zvi, 2017, pp. 163-190, (Hebrew)

2017

“TRANSFER AND ENCOUNTERS”

Nitzan-Shiftan, Alona.

in The Transfer of Modernity: Architectural Modernism in Mandatory Palestine (1923-1948), Bauhaus-Universität Weimar. Accepted.

2017

“TRANSFORMATIVE DESTRUCTION IN GAZA CITY: 1967-1982”

Abreek-Zubiedat, Fatina* and Alona Nitzan-Shiftan,

in Entangled Histories, Multiple Geographies, Proceedings of the 2nd Thematic EAHN Conference, Belgrade 2015, 2017.

2017



YASHA J. GROBMAN, PHD

TEACHING AWARD CITATION 2017

2017 AEC EXCELLENCE AWARD

First place in the 2017 AEC Excellence Awards in the sustainability category for the design of the Porter School for Environmental Studies building. Autodesk University. Las Vegas 12-16th November 2017.



AARON SPRECHER

AMERICAN INSTITUTE OF ARCHITECTS (AIA) DISTINCTION AWARD 2017

St. Louis Chapter, Missouri, USA
Project: Rajeunir, Palm Desert, California

TEACHING AWARD CITATION 2017

Technion Faculty of Architecture and Town Planning
Course 205011 Evaluation and Tools in Architecture, Spring 2017

AMERICAN INSTITUTE OF ARCHITECTS (AIA) MERIT AWARD 2017

St. Louis Chapter, Missouri, USA
Project: SlrSrf, Culver City, California

AMERICAN ARCHITECTURE AWARD 2017

The Chicago Athenaeum: Museum of Architecture and Design
European Center for Architecture, Art Design, and Urban Studies



ALONA NITZAN-SHIFTAN, PHD

EXCELLENCE IN ACADEMIC EDUCATION

First recipient of the Yanay Entrepreneurial Grant for excellence in academic education for initiating and developing the school-wide Thematic-Vertical Studio as part of implementing the new 4+2 program in architecture. \$ 12,000.



**CENTER FOR RESEARCH AND
DEVELOPMENT ARCHITECTURE
AND DESIGN**

FACULTY OF ARCHITECTURE AND TOWN PLANNING

NEWSLETTER 2018

