

research newsletter



Eastern Mediterranean University



Buoyancy: A newly emerging form in architecture

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Dear Colleagues,

We are happy to bring out the second issue of 2008 to you. As we stated in our first issue, the main aim of our newsletter is to emphasize the importance of research for EMU.

We believe that the wealth of EMU resides in its potential for significant research, waiting to be promoted.

Therefore, in this issue, we are including a special feature; EMU's newly elected president Ufuk Taneri shares her research vision with us.

In this issue, we also bring three interesting on-going research projects to your attention. Mathematician Müge Saadetoğlu shares with us her work together with Ian Leary of Ohio State University, USA, on algebraic topology.

Architect Isaac Lerner introduces buoyancy as a newly emerging form in architecture and details this concept of the modern buildings by presenting a case study from Toronto, Canada.

Electrical and Electronic Engineering graduate student Gholamreza Anbarjafari discusses his biometric authentication method based on iris recognition.

I hope you will enjoy reading these articles.

To continue illustrating the diversity of research at EMU, we will feature contributions of EMU researchers in the fields of Archaeology, Civil Engineering, and Tourism in our upcoming issue.

Many thanks to all those who have contributed to this latest issue of the *EMU Research Newsletter*.

With best regards,

Bahar Taneri

Special Feature	3
A New Look at EMU Research: President Ufuk Taneri's Research Vision	

News Highlights	4
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Research Spotlight: Engineering and Sciences	9
Algebraic Topology: An Investigation of Finiteness Properties and Bestvina-Brady Groups	

By Müge Saadetoğlu

Research Spotlight: Arts, Humanities and Social Sciences	11
Buoyancy: A Structural Effect of Digital Representation on the Design of Architectural Form	

By Isaac Lerner

Student Research Profile	13
Identification Based on Iris Recognition	

By Gholamreza Anbarjafari

Spring 2007-2008 Postgraduate Degrees	16
--	-----------

Recent Publications and Presentations	18
--	-----------

President Ufuk Taneri's Research Vision



As the newly elected president of EMU, I am pleased to inform the EMU community that research is in the list of our top priorities. Over the years, research at EMU has contributed to innovation and development in a diverse range of disciplines. It is now a good time to do our self-study, assess EMU Research and discuss future orientations. The world is changing through acceleration of globalization of research and technology. We will therefore bring the research activities at EMU to the forefront, promoting research by all members of EMU, in particular by the young faculty members, facilitating establishment of new collaborations locally and internationally, and enforcing further development of EMU research. EMU should be characterized as a global higher education institution where researchers, technology and knowledge freely circulate.

First and foremost, we will place emphasis on research that will benefit local and neighboring geographical regions. With a broader vision, we will of course continue contributing to world research efforts. We aim to optimize the current research programs by setting research as a priority, efficiently coordinating the existing research activities, programs and policies, and enhancing the existing research infrastructure. Our efforts will be toward internationalization of EMU. In order to facilitate the training of young researchers and establishment of international collaborations, we must enable the global mobility of researchers, technology and knowledge:

- The flow of competent researchers needs to be at a high level between institutions, disciplines, sectors and countries.
- The research infrastructure has to be world-class, integrated, networked and accessible to research teams from across the world, in this age of electronic communication infrastructures.
- EMU has to be engaged in effective state-private-public cooperation and partnerships, well-coordinated research programs, jointly programmed research investments so as to form the core of research and innovation communities including 'virtual research communities'; hence, paying particular interest to interdisciplinary research and attracting a critical mass of human and financial resources.

In order to ensure quality research at EMU, effective knowledge sharing is of necessity. Having an all-campus Quality Management System (QMS), as well as Campus Automation (CA), for flow and sharing, and best use of knowledge are on top of our new agenda. QMS and CA will bring excellence in time management, resource management and knowledge management.

Looking into Europe, currently, EMU is a member of European Universities Association (EUA). The European Research Area (ERA) and the European Higher Education Area (EHEA) are two very important agendas of the EUA. Our goal is to have distinguished contribution to ERA and EHEA, in the near future.

I am confident in my faculty, their existing local and international collaborations, their aspirations for the new-age world-research, and in our graduate students. There is no doubt that given the right motivation and resources, EMU as a whole will contribute to world higher education and research, and will continually and confidently move ahead.

■ A Timely Contribution from Europa Nostra in the Effort to Secure the Welfare of the Historic Walled City of Famagusta

Michael Walsh of EMU Faculty of Arts and Sciences, Department of Archaeology and Art History, organized and chaired the international colloquium, *Medieval Famagusta: An International Workshop for the Advanced Study of History, Art, Architecture and Cultural Management*, which met at the National Archive in Paris, France on 4-5 April, 2008. At the workshop, Walsh emphasized the importance of international co-operation for future restoration and stabilization projects concerning the fragile heritage of the city. The workshop had the following aims:

- To understand the rich historical, artistic and architectural heritage of the Medieval, Renaissance and Ottoman port town of Famagusta.
- To appreciate the danger that it is facing on account of scholarly neglect and potentially inappropriate future development.
- To plan, nationally and internationally, for the future of the city and its monuments.

Walsh was also involved in the organization of a bi-communal meeting between Greek and Turkish Cypriots, under the leadership of Europa Nostra, relating to the historic city of Famagusta. Europa Nostra, a federation dedicated to the welfare of cultural heritage and its maintenance, hosted the Greek and Turkish Cypriot representatives at the Representation of the European Commission in Paris, France on 4 April 2008. Representatives of UNESCO, the World Monuments Fund, the International Commission on Monuments, and other NGOs were present to assist the two communities to build the most appropriate coordinating structure through which necessary funds and technical 'know-how' can, in the future, be channeled. Gianni Perbellini of the University of Verona agreed to chair a newly



Church of St. George of the Greeks, Famagusta

formed action group for Famagusta.

At this meeting the recent documentary film *The Stones of Famagusta* was also shown and the film makers Allan Langdale (former member of EMU Department of Archaeology and Art History) and Dan Frodsham (former BBC director) took questions about the architectural heritage of Famagusta, they so richly depicted.



Lala Mustafa Paşa Mosque (St. Nicholas Cathedral), Famagusta

■ EMU hosts prominent Turkish Biologist Ali Demirsoy

EMU had the privilege to host prominent Turkish scientist Ali Demirsoy on 15 May 2008. Demirsoy, professor of biology at Hacettepe University, Turkey, delivered an insightful seminar on the investigation of global warming from a geo-biological perspective.

Demirsoy emphasized that the regulation of the Earth's temperature is a mechanism which is related to the life forms on the Earth and their carbon dioxide consumption, not mainly related to the change of the heat level that comes from the Sun, as it is assumed by many.

He explained the role of unicellular marine organisms in absorbing carbon dioxide from the atmosphere and thus reducing the greenhouse effect. These organisms convert the carbon dioxide gas into calcium carbonate which aggregates in the environment in the form of limestone.

Within the geological time periods, it is known that there were times when the aggregation of this carbonate layers had increased or decreased, causing changes in the Earth's temperature. The picture below shows carbonate sediments on Toros Mountains in Turkey.

Demirsoy devoted a large portion of his seminar on the



Ali Demirsoy

coral reefs and their effect on global warming. The coral reefs, which could stretch up to 2500 km, are the most efficient actors of the system, functioning in carbon dioxide absorption from the atmosphere. These are the main aggregation places



Carbonate Sediments on Toros Mountains, Turkey

where carbon dioxide is stored and deactivated. Unfortunately, the coral reefs have been destroyed significantly so that their carbon dioxide absorption rate has decreased tremendously, leading to increased greenhouse effect. Demirsoy emphasized that in addition to the increase of carbon dioxide and other greenhouse gases emission, as a result of industrial revolution, the destruction of coral reefs plays a tremendous role in global warming.

Interestingly, Demirsoy took a different perspective at explaining global warming and gave information about how this phenomenon took place several times before, in the Earth's history. The Earth recovered from global warming as a result of coral reefs absorbing the majority of carbon dioxide emitted to the atmosphere. He warned that with the decrease of the coral reefs in the Earth's ecosystem, the next global warming might not be recovered so simply.

Demirsoy reported several key observations on the effect of global warming in Turkey's ecosystem. He noted that Anatolian lakes are significantly decreasing in size and in parallel the biodiversity of the lake ecosystems is being negatively affected. In addition to the lake ecosystems, Demirsoy and colleagues investigated the glaciers of mountains in Turkey. In comparison to earlier observations, some mountains have entirely lost their glaciers. The next picture shows decreasing glaciers of Kaçkar Mountains in Turkey.

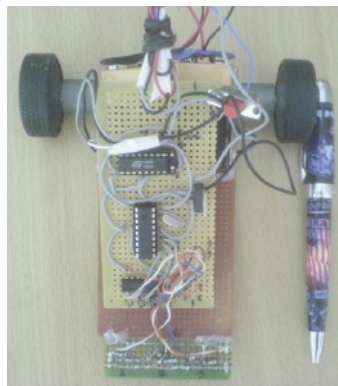


Decreasing Glaciers of Kaçkar Mountains, Turkey

Demirsoy ended his seminar by emphasizing that education is important when dealing with global warming and that necessary precautions should be taken immediately for preventing ecological catastrophies.

■ EMU hosts first International Joint Robotics Competition

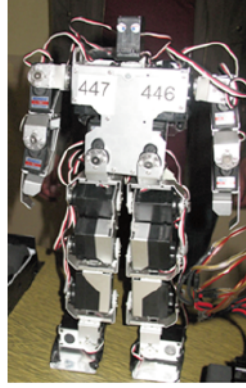
The first International Joint Robotics Competition (IJRC 2008) organized by the EMU Robotics Club took place at EMU during 15-17 May 2008. EMU organized this competition in cooperation with three universities from Turkey; Süleyman Demirel University (SDU), Boğaziçi University, Middle East Technical University (METU), and Shiraz University of Iran. In addition



Gazoz

to teams from these universities, teams from Cyprus International University (CIU), Nicosia and Gebze Institute of Technology (GIT), Turkey, also participated in the competition. The competition was set up in the following categories; Line Following, Fight Club, Labyrinth Discovery, Car Racing, Mini Sumo and

Cooperative Labyrinth Discovery. In order to be eligible for competition, the robots must have been autonomous, ie. self-agile without being controlled by an external agent, in order to reflect the prevailing advanced state of the technology. At the end of the two-day event, EMU team with their robot Gazoz and SDU teams with their robots Reis and SDU Isparta took the first places in Line Following, Fight Club and Mini Sumo categories, respectively.



Sako

Designers of Gazoz, Oğuz Sezer and Serhat Kayıkçı, explained that their robot was designed to follow black lines on a white surface in a short amount of time without any diversions. Second and third prizes were shared by teams from CIU, GIT and SDU. The special award for technical merit was given to the team of Eyüp Çakı, Seyit Akpancar, Şahin Çavuşoğlu and Halil Kaygısız from SDU who designed Sako, a humanoid-type robot able to sense the objects in its environment and adjust its movements accordingly. President Ufuk Taneri who attended this event, encouraged the EMU Robotics Club to repeat such competitions and participate in prominent international robotics competitions.



EMU Robotics Club members with President Ufuk Taneri

■ EMU-PDRAM Workshop on Domestic Violence

Eastern Mediterranean University Psychological Counseling Guidance and Research Center (EMU Psikolojik Danışmanlık Rehberlik ve Araştırma Merkezi-PDRAM) is an active unit, working in direct association with the President's office, since 1997. The Center's mission is to assist students in their search for understanding their social, academic, and cognitive potential. The Center does so by providing individual and/or group counseling sessions and guidance services. EMU-PDRAM also

conducts research in various psychological topics keeping up to date with national and international developments in the field. In addition the Center strives to develop societal awareness in several psychological issues. Toward this aim, EMU-PDRAM has conducted research on attitudes toward domestic violence and has organized a series of workshops to three different target groups: students training to become nurses at Near East University, Nicosia, Akova Women's Association and practicing health professionals at Gazimağusa State Hospital. Domestic violence is one of the leading health issues facing contemporary societies today. Domestic violence need not be physical violence such as hitting, kicking, or beating, but includes subtle forms such as psychological (threatening, isolation, humiliation), social (indifference of societal institutions such as social services, welfare or police) and sexual abuse (forcing, hurting, punishing by withholding sex). Contrary to popular opinion, domestic violence is prevalent in North Cyprus. As reported by Çakıcı and colleagues of Cyprus Turkish Mental Health Association in 2007, domestic violence is experienced by a large percentage of Turkish Cypriot women. Their research indicates that up to 36.7% of Turkish Cypriot women have stated experiencing physical abuse from their partners at least once in their lifetime. This percentage rises to 54.5% for psychological abuse experienced. To enhance awareness on this serious threat, particularly within the health sector, EMU-PDRAM organized its final workshop on 16 May 2008 at Gazimağusa State Hospital held for a group of practicing nurses and doctors. Psychologists Biran Mertan (director of EMU-PDRAM) and Uğur Maner provided valuable information and knowledge from the literature of domestic violence, exemplifying the causes and consequences of domestic violence by challenging preconceived notions of gender roles, the significant role of the media and its portrayal of women, ultimately delivering the audience with a compelling picture of domestic violence both at home, in North Cyprus and around the world. For further information about EMU-PDRAM and its activities, please visit: <http://pdram.emu.edu.tr>.

Upcoming Research Events

■ An International Congress on Advances in Civil Engineering



EMU Civil Engineering Department is getting ready to host the 8th International Congress on Advances in Civil Engineering (ACE 2008). ACE 2008 is going to be held at Salmis Bay Conti Hotel in

Famagusta during 15-17 September 2008. Advances in Civil Engineering is organized jointly every two years by Eastern Mediterranean University, Middle East Technical University, Ankara, Turkey and three universities of Istanbul, Turkey; Boğaziçi University, Istanbul Technical University and Yıldız Technical University. ACE 2008 aims to bring together scholars from all around the world whose specializations are in different fields of civil engineering. A wide scope of issues such as case studies in civil engineering, coastal and harbor engineering, computational methods in civil engineering, construction technology and management, engineering materials, geotechnical engineering, hydraulic engineering, structural and earthquake engineering, and transportation engineering will be covered during the conference. The organizing committee has announced respectful academicians including A. Ghani Razaqpur of McMaster University, Canada, A. Osman Akan of Old Dominion University, USA, Craig H. Benson of University of Wisconsin-Madison, USA, David Arditi of Illinois Institute of Technology, USA, Nemkumar P. Banthia of University of British Columbia, Canada, Randy Machemehl of University of Texas at Austin, USA, and Ronald McCaffer of Loughborough University, UK as confirmed keynote speakers for ACE 2008. During the conference, an exhibition space will also be provided for organizations who wish to exhibit their products, such as services, recent technological designs for testing equipment and software. Official website of ACE 2008 is accessible via <http://ace2008.emu.edu.tr/>.

■ An International Conference on Central Asia and North Cyprus



EMU Center for Strategic Studies (CSS) is organizing an international conference on Central Asia and North Cyprus which will be held at EMU during 20-21 November 2008. This conference will be the second in the series of conferences organized by CSS in 2008, aiming to aid in strengthening the status of Turkish Republic of North

Cyprus (TRNC) internationally. First conference in the series was held in March 2008 discussing the relations between North Cyprus and Middle Eastern countries. The upcoming conference will focus on the relations between Central Asia countries and North Cyprus. CSS is inviting all those who are interested to take part in this event.

Arts @ EMU

■ A Student-Faculty Joint Art Exhibition

First year Faculty of Arts and Sciences, Department of Archaeology and Art History students, Yılsu Hoca, Neşe Topal, Funda Oğur, Nafiye Giritli, Gülşen Kırıkkaleli, Ayşe Özgöker, and Ziba Djassemi, under the guidance of their instructor Donna Ruzzano curated the EMU Faculty and Student Art Exhibition which opened on 24 April 2008. The exhibition took place in the Art Space Gallery of the Faculty of Arts and Sciences building. Several faculty members from across EMU participated in this art exhibition. Some of the participants were: Vahid Sajjad, Yasamin Chegini, Zehra Sebil Çetin, Mehmet Kunt, Nima Balazadeh, Osman Yılmaz, Mahboubeh Abbaszadeh, John Wall, Can Sancar, Aslı Giray, Ozan Turan, Laden Uyguroğlu, Sinem Ertaner, Zehra Sonya and Donna Ruzzano. Some of the highlights lining the walls of the exhibition space were groups of colorful landscape and seascape photographs which used dramatic lighting to bring out the richness of colors and movement. Next to the land and sea imagery laid colorful and elusive portrait images of young women by young



Art Space Gallery, Faculty of Arts and Sciences

women. In the heart of these vibrant photographs stood a powerful black and white ink drawing that showed a hint of psychological presence paying homage to Edvard Munch's "The Scream". Encircled by these works stood a small stone and metal sculpture whose form seemed enigmatic at first glance, yet with a closer look it managed to depict a compelling individual. Around the corner from the colorful photographs were sets of black and white photographs, showing visions of the unidentifiable which were rendered photographically in a vacant space. Next to these faceless and nameless photographs

was a matched set of black and white insightful images showing the day to day struggles, rituals and relationships that make up a life, however heroic or tragic. The art exhibition was visited by more than 100 students and faculty members who added to its success.

■ The Juniper Tree and Traditional Roof Construction

“The Juniper Tree and Traditional Roof Construction”, an ethnographic exhibition of more than 50 photographs, by Wilburt “Skip” Norman, from the EMU Faculty of Communications and Media Studies, opened on 22 May 2008 in the Art Space Gallery located in the EMU Faculty of Arts and Sciences building. This collection of colorful and insightful images, of



Exterior perspective of the Juniper beam used in roof construction



Interior perspective of the Juniper beam used in roof construction

the many stages of the roof construction building process, was the result of an important environmental project which puts the Juniper Tree at the heart of village life in Cyprus. Traditionally, the materials used in roof construction in Cyprus depended on what was locally available in the area, free or at low cost. Juniper trees, which grow in the Karpaz forest on the mountainous slopes north of the Büyükkonuk/Komi Kebir village, were used for roof beams, while in other areas Cypress trees were more commonly used. The photographs, made in the course of the ethnographic field work showing the use of Juniper beam in the construction of a traditional Cypriot roof, present a dynamic view of the step by step process of converting the roof of an olive mill at Büyükkonuk into a crafts center. The exhibition opening also featured traditional music on the flute and drum by local musicians. The exhibition was visited by large number of students and faculty members and closed on 11 May 2008.

Algebraic Topology: An Investigation of Finiteness Properties and Bestvina-Brady Groups

By Müge Saadetoğlu

One can think of algebraic topology as a combination of algebra and topology; the idea is to convert problems about topological spaces into problems about algebraic objects such as vectors and rings. This method may prove useful if the algebraic object dealt with is easier than the topological one.

The main concept of topology is to decide whether two spaces are topologically equivalent (homeomorphic) or not. To show this, one needs to construct a continuous one to one, onto map with continuous inverse, mapping one space to the other. It is often hard to do this by using the standard definition. An easier approach would be to find some topological property (i.e. property invariant under homeomorphisms) that is satisfied by one space but not the other. Attempts by mathematicians to construct such topological and algebraic invariants originated the field of algebraic topology. Examples include the notions of ‘the fundamental group of a space’ introduced by Poincaré, ‘Euler characteristic’ introduced by Euler, and the ‘homology group’, introduced by Betti. It can be shown that two spaces are homeomorphic if they have the same fundamental group (which follows easily from the defini-

tion of the latter) or even if they have the same homology group. We should remark that there are also other topological invariants such as ‘cohomology group’ and ‘cohomology ring’ (Munkres, 1984; Rotman, 1988).

In algebraic topology there is also the notion of ‘finiteness properties’, which is essentially a list of properties separating groups into various classes. As an example, a group G is said to be of type F if it has a finite classifying space. Some of these properties can get quite technical but it has always been an interesting problem to find examples of groups satisfying a certain finiteness condition but not the other. My study of the finiteness conditions was motivated by two different definitions for a certain finiteness property Finite Homological Type (FHT) introduced by K.S. Brown (Brown, 1974; Brown, 1994). The equivalence of the two definitions still remains to be an open problem; however, in collaboration with Ian J. Leary of Ohio-State University, USA, we were able to construct examples of groups which satisfy Brown’s finiteness condition FHT but not J.P. Serre’s one FP (Serre, 1971). More specifically, we were able to show that for each $n \geq 1$ there is a group that is torsion-free, FHT and FP_n but not FP_{n+1} (Leary & Saadetoğlu, 2006).

In 1995, Bestvina and Brady introduced a construction which takes as

input a finite flag complex L and outputs the Bestvina-Brady group HL . As a remarkable application of this construction they were able to show that for the case when L is acyclic but not contractible HL is of type FP but not finitely presentable (Bestvina & Brady, 1995). At the time Bestvina-Brady paper appeared the Euler characteristic and the cohomology of these groups were yet to be known, and so this had led us to the study of these topological invariants. This work, also in collaboration with Ian J. Leary, appears in our recently submitted paper (Leary & Saadetoğlu, 2008).

While studying the finiteness condition FHT , introduced by K.S. Brown, we have realized that Brown had a theorem which involved the two Euler characteristics for a group G , the algebraic ‘naïve’ one originated by himself and the topological one, by C.T.C Wall back in 1960 (Brown, 1974). In this theorem, he stated a formula relating the two characteristics through a term he called πH . The definition of these πH ’s involves equivariant Euler characteristic, the computation of which proves to be a difficult task; so we are trying to see the ways by which these computations can be simplified. So far, we have a result which provides a simpler way to compute these terms when the group acts with finite stabilizers on contractible space X with finitely many orbits of cells (Saadetoğlu, 2008).

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Buoyancy: A Structural Effect of Digital Representation on the Design of Architectural Form

By Isaac Lerner



Isaac Lerner

The emerging post-industrial automated world is lived and experienced increasingly by means of information technologies. With the emergence of an electronic acoustic space, or cyberspace, whereby synaesthesia is mediated digitally at the scale of a global surround, our body image or identity tends towards the discorporeal. I believe that we are living between dual influences of embodied (material) and discarnate (immaterial) synaesthesia spaces, which foster new conceptions and approaches in architectural design.

This postmodern stance leads to exploration of new forms of architecture. Through my studies, I have come across newly emerging forms of architecture which I refer to as 'buoyancy'. Buoyancy is the property of a building, which expresses the effect of the virtual discarnate sensibility upon the formal aesthetics of the material world of architecture; as fostered by the weightless property of cyberspace.

Examples of architectural form exhibiting buoyancy are increasing today, as evident in a sampling taken from a single city, Toronto, Canada. In the work of the deconstructionist architect Daniel Libeskind, buildings are composed of tumbling cubes, in a kind of short-fall avalanche, which exhibits a style of *free-fall buoyancy*. Currently, this appears in his work for the extensions of the Denver Art Museum and the Royal Ontario Museum in Toronto (Fig. 1).

The extension to the College of Art, by the British architect Will Alsop provides another fascinating design in which the building appears as a cubic simulation of a dirigible. The cubic volume is supported, above the existing buildings on the street, by means of slender sloping columns (Fig. 2). The intriguing aspect, with respect to the form of these columns, is that they actually taper, like a sewing needle, where they contact the underside of the building. The effect is that these columns don't appear to be holding the building 'up', but rather they are keeping it 'down' (Fig. 3); as if the building was pegged or tied to the street in the manner of helium balloon. This is an example in the style of what could be termed as *aerial buoyancy*; in which the form simulates an object, lighter than air and in which work and study happen in this virtual or illusory form of weightlessness.

Another style of this manner of floating weightlessness might be

termed as *submarine buoyancy* and is provided by the British architect Norman Foster who designed the new Complex for Pharmacological Research in the University of Toronto (Fig. 4). What is extremely interesting about this work is that from the exterior it is almost the twin to Foster's modernist offices located on the Thames in London which was built in the early 1980's. This is only a skin-deep resemblance because in the lobby of the university building we are confronted with two seemingly inflated volumes, suspended from the structures above. These simulated inflatable forms are lecture halls which are connected by short bridges to adjacent mezzanines. The effect of feeling submersed, within or below submarines is reinforced by the exterior views which mimic the appearance of an aquarium (Fig. 5).

Buoyant forms, as an architectural image in the material world, represent this shift from the mechanistic worldview, and its visual space bias, towards an acoustic space identified with the production of virtual simulacra by means of an emergent electronic media and information environment as a resonant field. Today, I believe we must adapt to living in dual worlds, dual communities of traditional material / embodied communications (speech, books, newspapers, film etc.) as well as the immaterial / discarnate world by means of digital communications; telephones (far-hearing), television (far-seeing), and internet (virtual co-presence). Neither the disembodied / material world of traditional hardware communities nor the emerging software / discarnate communities, if privileged, will sustain a life of well-being or survival. As mentioned above the digital community and its technological environment have fostered a sensibility of responsive interplay or ecological atti-

tude which resonates in the physical world as a design for a total sustainable architecture which ultimately represents a synthesis of material / immaterial being. Ironically, the immaterial conditions, if ethically embraced at a material level, can provide the architectural balance in the context of a design sensibility for cultural identity in the age of both analogue and digital worldviews.



Figure 1: The Extension to the Royal Ontario Museum by Daniel Libeskind



Figure 3: The slender columns as they taper at the point of contact with the underside of the building



Figure 4: The Leslie L. Dan Pharmacy Building in the University of Toronto by Norman Foster



Figure 2: The extension to the College of Art, by the British architect Will Alsop

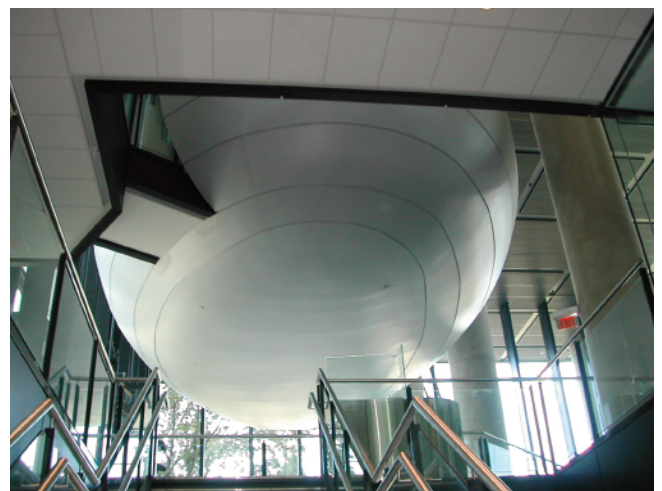


Figure 5: Lecture halls as simulated inflatable forms

IDENTIFICATION BASED ON IRIS RECOGNITION

By Gholamreza Anbarjafari



Gholamreza Anbarjafari (left) with Supervisor Hasan Demirel

In recent decades, many biometric authentication methods, such as face, fingerprint, and iris recognition, have been developed due to advances in multimedia signal processing. The earliest work in computer recognition of faces was reported by Bledsoe and a bit later on by Kanade (Bledsoe, 1964; Kanade, 1977). But there have been lots of issues which have made the face recognition not very reliable. One of these issues is that the performances of the available systems are not significantly high. Also the available systems suffer a lot from the environmental variations such as the illumination problem. All these issues together have brought the idea of concentrating more on some other biometric features.

Flomm and Safir estimated the probability for the existence of two similar irises to be 1 in 10^{72} and commented on the stability of iris morphology over one's lifetime (Flomm & Safir, 1987). Apparently, iris morphology is not based on genetic inheritance and has random morphogenesis, which makes it one of the most reliable biometric signals (Proenca & Alexandre, 2006). The iris has a rich and unique pattern of stripes, pits,

furrows and rings (Cui *et. al.*, 2004). The iris parallels the uniqueness of fingerprints as a biometric measure, in addition has further practical advantages (Daugman, 1995). It can be non-invasively authenticated due to its external visibility (Ma *et. al.*, 2003). Overall characteristics of iris have made it a very reliable feature for recognition purposes.

John Daugman, one of the pioneers of iris recognition, developed an algorithm for testing statistical independence on iris phase structure encoded by quadrate wavelets. Combinatorial complexity of

this phase information across different persons spans about 249 degrees-of-freedom and generates discrimination entropy of about 3.2 bits/mm² over the iris, enabling real-time identification decisions with great enough accuracy to support exhaustive searches through very large databases (Daugman, 1993; 2003). One of the concerns about his method is the complexity of the technique due to the nature of wavelet analyses. Together with my supervisor Hasan Demirel of EMU Electrical and Electronic Engineering Department, we have been working on simplifying Daugman's method. Instead of quadrate wavelets, we propose to use Probability Distribution Function (PDF) based colour statistics for the recognition of iris images. Recently, we have shown that colour statistics can be used for biometric recognition, such as face recognition (Demirel & Anbarjafari, 2008). In our technique, the PDF of the pixels of segmented faces are used as feature vectors of the face images. The majority of voting and feature vector fusion are applied for combining decisions in different colour channels.

One of the key processes in iris recognition is the iris localization. Wildes and colleagues have developed a device to capture iris images from a distance and then applied a super-resolution method to achieve clear images (Wildes, 1996). We have tested our method on a limited iris database, called the UPOL iris data-

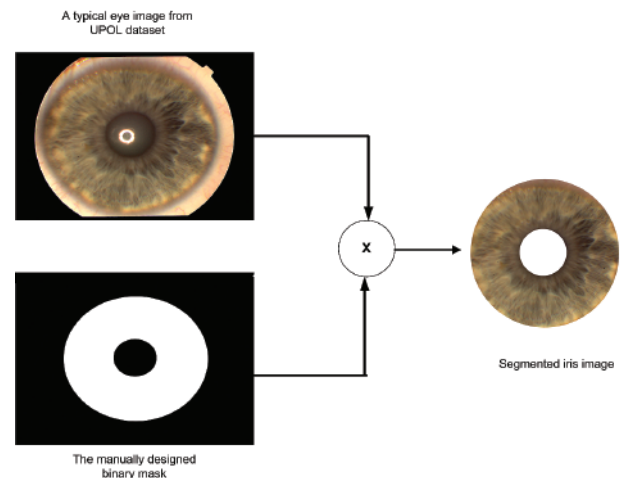


Figure 1: Different stages of the iris localization of the proposed iris recognition system

base (Dobes & Machala, 2004), where the localization has been done by manually defined binary mask as shown in Figure 1. The similarity measurement has been done by using the cross correlation between the PDF of the query iris image and the PDF of the training iris images.

We are currently working on the intelligent identification system which will have the following system components:

- Data acquisition system component:
 - a. A high quality video camera to acquire vision data and the image processing techniques.
 - b. Sonar sensors located in front of the system to enable energy safe mode for the camera.
- Processing unit component: A high-level system control provided by a Pentium 4 processor based board with high-speed memory and secondary storage capabilities.

Figure 2 shows the False Acceptance Rate (FAR- where a query iris image which is not in the training set is accept-

ed) and the False Rejection Rate (FRR- where a query iris image whose class is available in the training is rejected) analysis of our method for iris recognition. The horizontal axis of the graph represents the threshold values, which is the cross correlation coefficients, between 0 and 1. As the figure illustrates Equal Error Rate (ERR) is zero when the cross correlation coefficients are in the range of [0.992, 0.998]. This illustration shows that the proposed method is reliable and robust for application.

Our method has various potential applications such as entrance control in buildings, e.g. libraries and airports in order to give access to respective personnel. In addition, the technique can be used in many machine vision applications such as high-tech robots. Initial results suggest that the proposed system will perform successfully in such practical applications. As part of my doctoral dissertation project under the supervision of Hasan Demirel, I am aiming to further develop this method by overcoming issues in iris recognition such as

illumination or pose variation problems.

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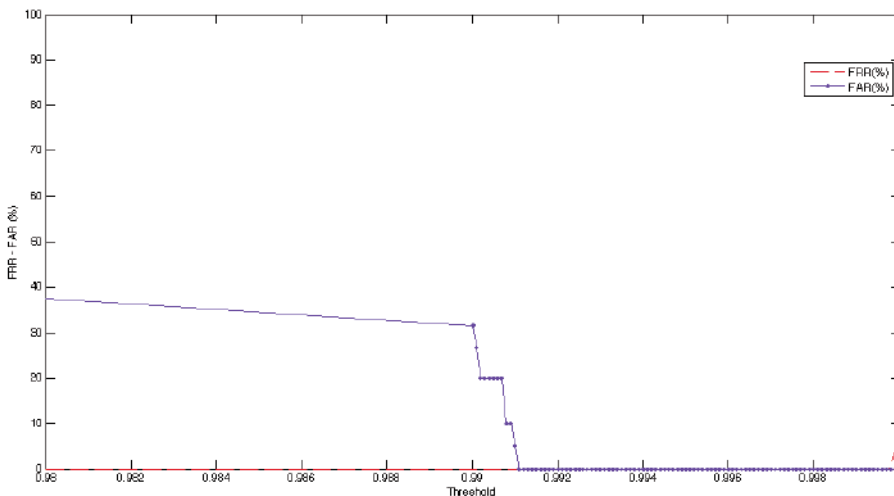


Figure 1: The False Acceptance Rate (FAR) - False Rejection Rate (FRR) curves

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Spring 2007-2008 Postgraduate Degrees

The following is the list of students who have successfully completed their postgraduate degrees in Spring 2007-2008. This list has been provided by EMU Institute of Graduate Studies and Research on the 26 June 2008. On behalf of EMU family, we congratulate our graduates and wish them continued success.

■ MA ■

English Literature and Humanities

Elham Shayegh

Thesis Title: Sufism and Deconstruction: A Comparative Study of Rumi and Derrida

Supervisor: Nicholas Pagan

International Relations

Naciye Bey

Thesis Title: The Autonomous Kurdish Region in Northern Iraq and Its Implications for the Kurds in Turkey and the Turkish Foreign Policy (1991 to 2003)

Supervisor: Haldun Çancı

Turkish Language and Literature

Ayşe Bozatlı

Thesis Title: Yaşar Kemal'in Ortadirek, Yer Demir Gök Bakır ve Ölmez Otu Romanlarındaki Kadının Yeri

Supervisor: Adnan Akgün

Yeliz Ünal

Thesis Title: II. Meşrutiyet'e Kadarki Romanlarıyla Hüseyin Rahmi Gürpınar ve Edebi Akımlar

Supervisor: Nazım Hikmet Polat

■ M.Arch. ■

Architecture

Ali Mohammad Sami Kashkooli

Thesis Title: Re-Usability of High-rise Buildings

Supervisor: Nicholas Wilkinson

Olusola Abimbola Sonaiya

Thesis Title: Evolution, Analysis and Future of the Traditional Yoruba House

Supervisor: Özgür Dinçyürek

■ M.Ed ■

Educational Sciences

Ruşen Yücesoylu

Thesis Title: Self-concept, Self-talk, Statements made by significant others and Self-esteem: Possible Relationship among these Concepts

Supervisor: Hüseyin Yartan

■ MS ■

Banking and Finance

Gift Khozapi

Thesis Title: An Integrated Appraisal of A Five-Star Hotel Investment in Uganda: The Case of Kampala Hilton Hotel

Supervisor: Glenn P. Jenkins

Moner Mohammad Salah Murtaja

Thesis Title: Comparative Analysis of Commercial Banks Operating in the Turkish Banking Sector

Supervisor: Eralp Bektaş

Majilind Lazimi

Thesis Title: The Role of Mortgage Securitization in Credit Markets and Risk Transfer: An Insight into Subprime Mortgage Crisis

Supervisor: Cahit Adaoğlu

Alpaj Jasar

Thesis Title: Foreign Direct Investment in Southeast Europe: Challenges and Policies

Supervisor: Mustafa Besim

Computer Engineering

Yasser Hijazi

Thesis Title: Combined Monte Carlo and Finite-Difference Time-Domain Modeling for Computational Biophotonics

Supervisor: Dizem Arifler

Kiavash Bahreini

Thesis Title: A New Software Agent Architecture for Semantically Mining and Annotation of Web

Supervisor: Atilla Elçi

Electrical and Electronic Engineering

Gholamreza Anbarjafari

Thesis Title: A New Face Recognition System Based On Colour Statistics

Supervisor: Hasan Demirel

Mechanical Engineering

Hossein Assefi

Thesis Title: Review and Analysis of Solar Desalination System

Supervisor: Hikmet S. Aybar

■ **Ph.D.** ■

Applied Mathematics and Computer Science

Fatoş Tuncay

Thesis Title: Oscillation of Nonlinear Differential Equations

Supervisor: Yuri V. Rogovchenko

Mustafa Tanel Babagil

Thesis Title: The Development of Multi-Agent Intelligent System for Production SCM

Supervisor: Rashad Aliyev

Computer Engineering

Ruhsan Önder

Thesis Title: Specification and Implementation of Programming Language Semantic using Extensible Stylesheet Language Transformations

Supervisor: Zeki Bayram

Recent Publications and Presentations (April 2008 - May 2008)

■ Journal Publications (AHCI, SCI, SSCI) ■

The journal publications presented in this category are limited only to those that are listed in Arts & Humanities Citation Index (AHCI), Science Citation Index (SCI), Science Citation Index Expanded (SCI-Expanded), or Social Sciences Citation Index (SSCI). A search was performed on 30 June 2008 to retrieve articles from ISI Web of Science dated within the specified time-frame for this issue. All articles must have had at least one author with EMU affiliation.

Al-Badawi A and Sakalli I. (2008) "Solution of the Dirac Equation in the Rotating Bertotti-Robinson Spacetime." *Journal of Mathematical Physics* 49(5): 052501.

Bengisu M, Brow RK, and Wittenauer A. (2008) "Glasses and Glass-Ceramics in the SrO-TiO₂-Al₂O₃-SiO₂-B₂O₃ system and the effect of P₂O₅ additions." *Journal of Materials Science* 431(10): 3531-3538.

Bengisu M, Izbirak G, and Mackieh A. (2008) "Work-Related Challenges for Individuals who are visually Impaired in Turkey." *Journal of Visual Impairment & Blindness* 102(5): 284-294.

Kortun C, Hijazi YR and Arifler D. (2008) "Combined Monte Carlo and Finite-Difference Time-Domain Modeling for Biophotonic Analysis: Implications on Reflectance-Based Diagnosis of Epithelial Precancer." *Journal of Biomedical Optics* 13(3): 034014.

Kusaf M and Oztoprak AY. (2008) "An Unconditionally Stable Split-step FDTD Method for Low Anisotropy." *IEEE Microwave and Wireless Components Letters* 18(4): 224-226.

Mustafa O. (2008) "Energy-Levels Crossing and Radial Dirac Equation: Supersymmetry and Quasi-Parity Spectral Signatures." *Journal of Theoretical Physics* 47(5): 1300-1311.

Mustafa O and Mazharimousavi SH. (2008) "(1+1)-Dirac Particle with Position-Dependent Mass in Complexified Lorentz Scalar Interactions: Effectively PT-Symmetric." *International Journal of Theoretical Physics* 47(4): 1112-1120.

Ramadan O. (2008) "Envelope LOD Wave Equation PML algorithm for Dispersive Band-Limited FDTD Applications." *IEEE Microwave and Wireless Components Letters* 18(5): 293-295.

Ulusoy AH and Rizaner A. (2008) "Adaptive Path Selective Fuzzy Decorrelating Detector under Impulsive Noise for Multipath Fading CDMA Systems." *IEEE Communications Letters* 12(4): 228-230.

■ Other Refereed Journals ■

The following list of journal publications has been put together based on e-mails sent to EMU Research Newsletter staff by 21 May 2008.

Kunt N. (2008) "Beliefs about language learning: A study of international university students learning Turkish as a second language." *Dilbilim Araştırmaları* 63-75.

Lerner I. (2008) "Buoyancy as an architectural image of the transition between the age of printing and the culture of cyberspace." *The Journal of Architecture (RIBA – Royal Institute of British Architects)* 13(2): 153-158.

Nadiri H, Hussain K, Ekiz EH and Erdoğan S. (2008) "An investigation on the factors influencing passengers' loyalty in the North Cyprus national airline." *The TQM Journal* 20(3): 265-280.

■ Conference Papers ■

The following list of conference papers has been put together based on e-mails sent to EMU Research Newsletter staff by 21 May 2008.

Aybay Y. "Effects of Girls' Magazines on the Identity Formation and Consumption Habits of Teenagers." in *Proceedings of Child and Teen Consumption 2008*, Trondheim, Norway, 24-25 April 2008.

Celebi E and Amca H. "Mobil Telefonların Mikro-Ödeme Aracı Olarak Kullanılması." in *Proceedings of Ağ ve Bilgi Güvenliği Ulusal Sempozyumu*, (2. ABG'08), Girne, KKTC, 16-18 Mayıs 2008.

Chefranov AG. "Yeni saldırıya karşı koyabilen iki IFEA-M modifikasyonu." in *Proceedings of the 2. Ağ ve Bilgi Güvenliği Sempozyumu*(2. ABG'08), pp. 27-29, Girne, KKTC, 16-18 Mayıs 2008.

Demirel H and Anbarjafari G. "A New Face Recognition System based on Colour Histogram Matching." in *Proceedings of 16. IEEE Sinyal İşleme ve Uygulamaları Kurultayı*, (SIU'2008), Didim, Türkiye, 19-22 April 2008.

Demirel H and Eleyan A. "Multiresolution Eigenspace and Fisherspace Face Recognition." in *Proceedings of 16. IEEE Sinyal İşleme ve Uygulamaları Kurultayı*, (SIU'2008), Didim, Türkiye, 19-22 April 2008.

Faaya TH and Toygar O. "Recognizing Faces under Facial Expression Variations and Partial Occlusions" in *Proceedings of The 7th WSEAS International Conference on Signal Processing (SIP'08)*, İstanbul, Turkey, May 27-29, 2008.

Hijazi YR, Kortun C, and Arifler D. (2008) "Combined Monte Carlo and Finite-Difference Time-Domain modeling for biophotonic analysis." in *Proceedings of SPIE Europe Photonics Europe International Symposium - Biophotonics: Photonic Solutions for Better Health Care*, pp. 6991-84, Strasbourg, France, 7-10 April 2008.

Ilkan M, Amca H, Alicik S and Cirak YK. "Endüstriden Sağlanan Gerçek Hayat Problemleri ile Bilişim Öğrencilerinin Mezuniyetten Önce Endüstriye Adaptasyonlarının Sağlanması, Bilişim Mezunlarından Beklentiler." in *Proceedings of Mesleki Eğitim Sempozyumu*, Doğu Akdeniz Üniversitesi, KKTC, Mayıs 2008.

Kafkas S, Varoğlu E and Taneri B. "Methods For Abstract Retrieval From Pubmed Database For Alternatively Spliced Genes." in *Proceedings of International Symposium on Health Informatics and Bioinformatics (HIBIT 2008)*,

İstanbul, Turkey, May 2008.

Lerner I. "Instant City: City as Recreation/Re-Creation." in *Proceedings of Instant Cities Conference: Emergent Trends in Architecture and Urbanism in the Arab World*, American University of Sharjah, Sharjah, UAE, 1-3 April 2008.

Oktay D and Marans RW. "Assessing the Quality of Life in Famagusta Neighborhoods: Initial Findings from an Ongoing Research Program" in *Proceedings of Environmental Design Research Association Conference (EDRA 39)*, Veracruz, Mexico, May 28 – June 1, 2008.

■ Conference Presentations ■

The following list of conference presentations has been put together based on e-mails sent to EMU Research Newsletter staff by 21 May 2008.

Ilic S. "Evliya Çelebi'nin Batı Balkanlar Yolculuğu: Günümüze Kadar Yapılan Yayınlarla Eleştirel Bir Bakış." *Uluslararası Evliya Çelebi ve Seyahatname Sempozyumu*, Bilkent University, Ankara, Turkey, 3-5 April 2008.

Sozen A. "From Dispute to Agreement: Possible Resolutions of the Cyprus Problem." *Conflict Avoidance and Resolution in the Eastern Mediterranean Region*, The Chartered Institute of Arbitrators/European Branch, İstanbul, Turkey, 2-4 May 2008.

Sozen A. "A Paradigmatic Shift in Turkish Foreign Policy Making." *Turkey: Challenges, Prospects and Dynamics*, The Moshe Dayan Center, Tel Aviv University, Tel Aviv, Israel, 30 April 2008.

Sultanzade V. "Irak Türklerinin tarihi açısından Sümer-Türk ilişkilerine bir bakış." *Uluslararası Çağdaş Irak Türkmen Türkçesi ve Edebiyatı Bilgi Şöleni*, Kayseri, Türkiye, 6 April 2008.

Svatos T. "On the Sovietization of Czechoslovak Music." *Cyprus Musicology Forum*, University of Nicosia, Cyprus, May 2008.

■ Book Chapter ■

The following book chapter has been submitted to EMU Research Newsletter staff by 21 May 2008.

Demirel H and Soyel H. (2008). "Facial Expression Recognition using 3D Facial Feature Distances." in *Affective Computing Emotion Modelling, Synthesis and Recognition*, by Vedran Kordic, I-Tech Education and Publishing.

■ Erratum ■

The following publications listed under the Other Refereed Journals category of EMU Research Newsletter issue 2008/1, should have been listed under the Journal Publications (AHCI, SCI, SSCI) category:

Ghosh BN. (2008) "Rich Doctors and Poor Patients: Market Failure and Health Care Systems in Developing Countries." *Journal of Contemporary Asia* 38(2): 259-276.

Gunce K, Erturk Z and Erturk S. (2008) "Questioning the 'Prototype Dwellings' in the Framework of Cyprus Traditional Architecture." *Building and Environment Journal* 43(12): 823-833.

Vural Y and Peristianis N. (2008) "Beyond Ethno-Nationalism: Emerging Trends in Cypriot Politics after the Annan Plan." *Nations and Nationalism* 14(1): 39-60.