

Research newsletter



Eastern Mediterranean University



Research on bullying
and victimization among
adolescents

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Dear Colleagues,

We are happy to present the second issue of the *EMU Research Newsletter* in 2009. Starting with this issue, our newsletter will only be available online, through the *EMU Research Advisory Board's* website at <http://research.emu.edu.tr>. All our previous issues may also be accessed through this website.

The common theme of our 2009 newsletters, *Biomedical Science Research at EMU*, introduced in our last issue, was well received by the EMU community. As part of this article series, in this issue biomedical engineer Dizem Arifler writes about her work on biomedical imaging, particularly on bionanophotonics. Arifler discusses the paradigm shift in cancer treatment, emerging with nanotechnology.

We continue to draw attention to different aspects of research at EMU and share with you articles from various disciplines. Here, developmental psychologist Fatih Bayraktar introduces his work on bullying and victimization among Turkish Cypriot adolescents. In addition, Mathematics Ph.D. student Tolgay Karanfiller writes about his work on petri net applications in optical networks.

One mission of our editorial team is to highlight EMU's current and former student researchers. Toward this goal, in our interview section, we feature mathematics graduate student Mustafa Hasanbulli, who talks about balancing his research with his career as a professional folk dancer. In the EMU Alumni section, which interested many of our colleagues with its debut in the last issue, we share news about our recent graduates and underscore how the education at EMU has impacted their research careers.

Finally, we add a new section to our newsletter titled the *Notice Board*, where we announce advertisements for upcoming conferences and other research related events at EMU. Please feel free to contact us at research.newsletter@emu.edu.tr and submit your advertisements for the Notice Board.

We thank all those who have contributed to this issue.

With best regards,

Bahar Taneri

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Research @ EMU

■ The House Stories: Time, Space and Memories



*Turkish Cypriot Architect
Ahmet Vural Behaeddin*

EMU Faculty of Architecture organized a seminar on 15 April 2009 in memory of Architect Ahmet Vural Behaeddin. Behaeddin, as the first Turkish Cypriot architect, is remembered every year with a different academic and educational event at the Faculty of Architecture. This year Faculty of Architecture has initiated a series of seminars titled “*The House Stories: Time, Space and Memories*”. As architecture is the reflection of socio-economic, political and cultural attributes of a society, these seminars are considered as platforms for debates of contextual and

architectural characteristics of the buildings designed by Architect Behaeddin in particular and the social history of the Turkish Cypriot community in general. As the theme of the first seminar Sömek House built in 1957 in Lefke was selected because of its particular architectural characteristics and its role in the region of Lefke during the second half of the twentieth century. The house is typically a modern interpretation of the traditional architecture of Cyprus. The semi-open spaces, the spatial sequence and the interaction of the public and private realms through certain thresholds are embodied in the house within an abstract approach which strongly considers the environmental features of the site. The first seminar was honored with the participation of the house owners, Emine Sömek and Selçuk Sömek. They were the invaluable guests of the seminar as the representatives of an important period in the history of the island. Selçuk Sömek a medical doctor was also one of the Turkish Cypriot members of the parliament of the Cyprus Republic in 1960s. In the seminar, architects highlighted different characteristics of the Sömek House and the settlement of Lefke. Emine Sömek shared with the audience her life experiences, memories and dreams realized in one of the Architect Behaeddin’s houses. Additionally, Semra Galippaşazade an academician originally from Lefke now at the Department of Sociology Paris University France, the invited speaker of the seminar, delivered a speech on the settlement of Lefke from the perspective of Modernity. She interpreted the interaction between the local/traditional values and the modern living conditions of the period in the case of Lefke. In 2010 “The Architect Behaeddin Student

Awards” competition will be held at EMU, which is regularly organized by the Faculty of Architecture every two years with the participation of students from all schools of Architecture in Northern Cyprus. The next seminar on another house design of Architect Behaeddin will be organized in 2011.

*News Submitted by: Hifsiye Pulhan
Faculty of Architecture*

■ EMU-PDRAM’s Collaboration with TENTS Project

Traumatic events, like disasters, strike the wellbeing of an entire community. In the aftermath of disasters, many survivors experience trauma-related disorders such as post-traumatic stress disorder and they are in need of adequate psychosocial assistance. The European Network for Traumatic Stress (TENTS) was a 2-year project, funded by European Union, aimed to assess the current services for the psychosocial care and management of trauma victims across Europe. Two years ago, Cyprus -among many other European Countries- was invited to get involved in TENTS Project. EMU-PDRAM contributed as a liaised partner since then. TENTS representatives had visited each country twice. The aim of their first visit to Cyprus and EMU-PDRAM was; to map the Centre’s services for psychosocial care after a traumatic event, to get detailed information about the methods for screening and diagnosing, and to analyze the needs. After one year of effort to get all the



*Anke B. Witteveen & Miranda Olf
University of Amsterdam*

information from other organizations throughout the whole European Countries, TENTS representatives visited Cyprus once again during 20-22 April 2009 in order to disseminate their findings. As part of this visit, Anke B. Witteveen and Miranda Olf of University of Amsterdam gave a seminar at EMU about post-disaster psychosocial care plan. As a result of TENTS Project; a list of



EMU-PDRAM members with TENTS participants at Brussels

local trauma networks and a website were made available (www.tentsproject.eu), services for psychosocial care across EU were mapped and systematically reviewed for evidence based practice and guidelines were formed regarding; planning, preparation and management of post-disaster psychosocial care. Shortly after the second visit, a final meeting was arranged at Brussels on 14 May 2009 and the key people from the involved countries have all come together to share results regarding the dissemination of evidence based practice for the assistance of disaster victims. No significant differences were found in the areas regarding the post-disaster psychosocial response, except the number of organizations. Delivery of services were more often in North-Western (e.g: Norway, Sweden) and Western Europe (e.g: Netherlands, UK) and less often in Central-Eastern (e.g: Latvia, Estonia) and South-Eastern Europe (e.g: Turkey, Cyprus). At the final meeting, the countries were also informed about TENTS being extended with another 2-year project, called TENTS-Training & Practice (TENTS-TP). EMU-PDRAM will be collaborating in TENTS-TP Project, while this time the focus will be more on implementing training courses about screening, diagnosing and interventions for trauma-related disorders.

News submitted by: Gözde Pehlivan, EMU -PDRAM

■ Knowledge, Differences and Harmonies in the Time of Globalization

The Conference on Knowledge, Differences and Harmonies in the Time of Globalization was held at EMU on 21-22 May 2009. This conference was hosted by the EMU Cyprus Policy Center in cooperation with the Faculties of Arts & Sciences, Communication, and Education. The main theme that interconnected the four panels of this conference was exploring the role of the university in the time of globalization. The conference brought together high profile scholars from the international research community, from countries such as Canada, Italy, Portugal, Sweden, Turkey, United Kingdom, and USA. These scholars came together to discuss how we organize knowledge by way of power, culture, communication

and ways that such discourse relates to differences and possible harmonies in issues yet to be resolved or fully understood. In the first panel on *Knowledge & Power*, the presenters suggested that a convergence of power and knowledge can be thought of spatially. Various speakers suggested that the couple— Knowledge/Power spatially— can be viewed as an alchemy, as an agora and as a space of a mirror. In the second panel on *Knowledge & Culture*, the speakers presented novel ideas on how to view globalization from different angles and the impact it has on culture, the state and higher education. In the third panel on *Knowledge & Communication*, the belief was expressed that in 2009 universities all over the world are international and face a variety of challenges. The question was posed of how to enliven the discussion of higher education in the time of globalization while at the same time decrying the repetition of norms, current theoretical dis-



Panel on Knowledge and Culture

courses across multiple fields and entrenched worldviews. In the fourth panel on *The Cyprus Issue, Knowledge & Globalization*, awareness of the Cyprus issue was raised among international representatives at this panel in a manner that would enhance the



Conference panelists at an informal dinner, Boğaz, North Cyprus.

ongoing search for reconciliation and peace. Given the international reputation of the speakers, this conference served as a platform to foster new collaborations for EMU.

*News submitted by: Jim Kusch and Eriola Pema
Department of Educational Sciences
Faculty of Education.*

Biomedical Imaging Gets a Boost from Nanotechnology: A Paradigm Shift in Cancer Management

By Dizem Arifler
Department of Physics
Faculty of Arts and Sciences



Dizem Arifler

Imagine inserting tiny particles into the body of a patient. These particles automatically find their way towards cancer cells and with the help of a light source such as a laser, you can make them glow and hence locate cancerous tissue regions. Further, you can use the same light source to heat up and kill cancer cells on the spot. Even though this may sound like science fiction, it is not far from reality thanks to fast-paced research in biomedical optics or biophotonics, which has recently partnered with nanotechnology leading to the creation of a new field commonly referred to as bionanophotonics.

We are all familiar with medical diagnostic techniques such as ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI). Another modality that is rapidly emerging as a useful clinical tool is optical imaging which has the potential to enable *noninvasive* and *real-*

time assessment of tissue structure without the need for biopsy removal. Optical imaging is based on interaction of light with tissue microstructures and provides cellular and even subcellular resolution, a significant advantage in identifying curable preinvasive cancer (Enderle *et al.*, 2005; Wang & Wu, 2007). Further, this imaging technique is highly safe, portable, and cost-effective.

Table 1. Comparison of various medical imaging modalities (adapted from Enderle *et al.*, 2005 and Wang & Wu, 2007).

Modality	Ultrasound	CT	MRI	Optical Imaging
Spatial resolution	0.3 mm – 3 mm	~ 1 mm	~ 1 mm	~ 1 μm or less*
Penetration	3 cm – 25 cm	excellent	excellent	~ several mm
Safety	very good	ionizing radiation	good	very good
Speed	real-time	minutes	minutes	real-time
Cost	very low	expensive	very expensive	very low
Portability	excellent	poor	poor	excellent

* 1 μm = 0.001 mm

Table 1 shows a comparison of various medical imaging modalities. It is important to keep in mind that the choice of the proper imaging modality depends on the specific application in question. For example, even though the penetration depth achievable with optical imaging is mostly limited to superficial tissue layers, this does not pose a disadvantage for precancer detection since over 85% of all cancers originate in the epithelium, a thin layer of highly cellular tissue covering the inner and outer surfaces of the body.

Naturally existing contrast in optical signals obtained from normal and precancerous tissues is due to differences in morphological, structural and biochemical changes associated with disease progression (Thekkekk & Richards-Kortum, 2008; Brown *et al.*, 2009). Signal and image contrast and hence diagnostic accuracy can be significantly improved by applying targeted, optically active contrast agents that can indicate the presence of disease-specific molecular markers. Metal nanoparticles exhibit optical contrast that arises from their unique interactions with light. These particles have sizes on the order of a millionth of a millimeter and they strongly scatter light and 'glow' when illuminated with specific wavelengths (Kumar &

Richards-Kortum, 2006). Cancer progression is known to be associated with over-expression of specific proteins. If metal nanoparticles are conjugated to biomolecules that can 'recognize' and attach to these over-expressed proteins, there will be an accumulation in diseased cells and tissues as the particles pass through leaky blood vessels characterizing cancerous regions. This accumulation leads to an increase in resonant light scattering in the visible and near-infrared range, and cancer cells can be localized due to the strong optical signal, as illustrated in Figure 1. Contrast enhancement has been observed in recent experimental studies with gold and silver nanoparticles (Kumar & Richards-Kortum, 2006; Loo *et al.*, 2005; Aaron *et al.*, 2007). The ability to monitor cancer-related molecular activity with combined use of optical imaging and nanotechnology is expected to contribute significantly to early detection, and has created a tremendous interest in the biomedical optics community.

Even though the resulting *molecular specificity* associated with nanoparticle-enhanced imaging is likely to pave the way for dramatic improvements in early cancer diagnosis, a few challenges

remain. The most important one is concerning the safety of nanoparticles. Questions that need to be answered are: Can these particles be safely eliminated from the body? Is there a possibility of unwanted accumulation of these particles, and what are the potential health risks? Recent experimental studies show that gold nanoparticles are nontoxic and have the potential for clinical use with topical or systemic delivery (Lewinski *et al.*, 2008).

My specific research focus is computational biophotonics and bionanophotonics and the main goal is to numerically analyze biophotonic and nanophotonic interactions to facilitate development and optimization of biomedical optical technologies. In biophotonics, computational studies are necessary to model light-tissue interaction, predict the extent of intrinsic diagnostic contrast inherent in optical signals obtained from normal and precancerous tissues, and optimize design of optical sensors. In bionanophotonics, we need to analyze how metal nanoparticles respond to electromagnetic radiation and to quantify optical contrast enhancement in nanoparticle-assisted imaging. These studies are likely to play a key role in assessing the

potential of optical diagnosis.

So far, this article has only focused on diagnosis of cancer, but what about treatment of cancer once diagnosed? It turns out that the combined use of optics and nanotechnology provides us with the opportunity of a 'see and treat' approach to cancer care. Excitation of nanoparticles with specific wavelengths of light can lead to localized absorption and heat generation sufficient to destroy cancer cells (Loo *et al.*, 2005; O'Neal *et al.*, 2004). This optical therapy results in localized treatment with no harm to healthy cells surrounding the cancerous tissue region and does not suffer from adverse side effects reported for chemotherapy or radiation. Suffice it to say that all these developments suggest an impending paradigm shift in cancer management.

Our community is worryingly ignorant of the carcinogenic effects of smoking, environmental pollution and unhealthy dietary habits. These factors have been scientifically proven to cause cancer along with other diseases and yet people are mostly indifferent to their potential health risks. Hence, we need to keep an eye on technological developments that are promising for health care, and perhaps we need to try to contribute to the development of these technologies by getting involved in or supporting biomedical research.

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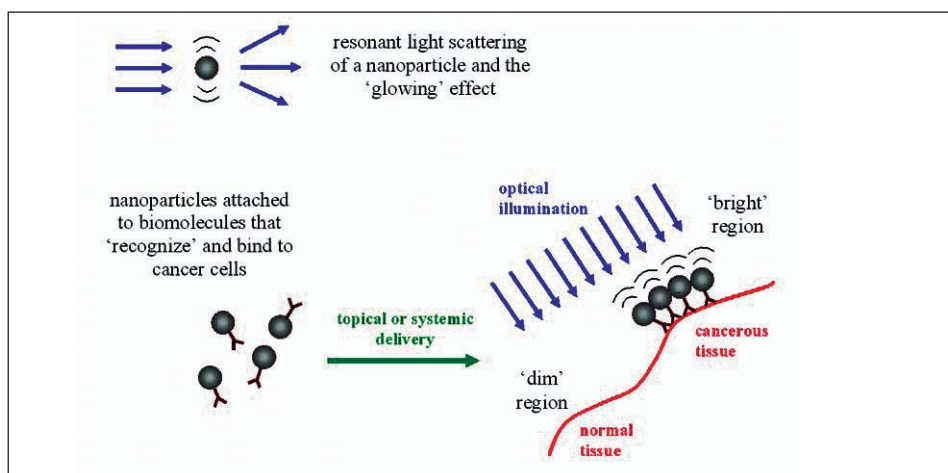


Figure 1. Basic principle of optical contrast enhancement for early cancer diagnosis: When nanoparticles are delivered to the body either topically or systemically, they localize and aggregate in cancerous tissue regions whereas they are absent at normal tissue sites. Following optical illumination, cancerous tissue regions brighten up due to resonant scattering of metal nanoparticles, whereas normal tissue regions stay dim.

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About the Researcher

Dizem Arifler received her B.S. degree in Physics, and the M.S. and Ph.D. degrees in Biomedical Engineering from the University of Texas at Austin, USA, in 2000, 2002, and 2005, respectively. She is currently an Associate Professor in Department of Physics, Eastern Mediterranean University, Famagusta, Cyprus. Her research interests include biophotonics and biomedical optics, diagnostic optical imaging and spectroscopy, design of optical sensors for biomedical instrumentation, computational analysis of photon propagation through tissues, computational electromagnetics and its applications to biophotonics and nanophotonics, and applied signal and image processing for characterization and interpretation of optical measurements. For more information about this research project, please contact our researcher at dizem.arifler@emu.edu.tr.

A Hollistic Approach to Bullying and Victimization Among Turkish Cypriot Adolescents

Fatih Bayraktar
 Department of Psychology
 Faculty of Arts and Sciences



Fatih Bayraktar

Bullying can be observed in circumstances where there are power relations (Smith & Brain, 2000). The person who has the power frequently abuses this situation and uses his/her power to harrass, exploit and/or discourage, i.e bully the victim. In other words, bullying is basically proactive in nature. One of the most investigated areas of bullying is peer bullying or school bullying. School bullying is a very common problem, the prevalence of which ranges between 5% and 59% in most countries. The first studies about peer bullying initiated by Olweus in Norway were triggered by two student suicides because of victimization (Olweus, 1978). Since then a huge literature has been collected on peer bullying/victimization and its predictors. According to a review by Monks *et al.*, individual, peer group, family, school, teacher and contextual predictors of bullying/victimization are well known (Monks, 2009).

At this point a hollistic/multi-level model is needed to investigate the whole predictors at the same time. These kind of models could help the investigation of culture specific features of bullying/victimization and could give valuable information for local prevention and intervention programs. Starting from this viewpoint, we developed a hollistic model for bullying and victimization. The aim of

our study was to test this hollistic model, shown in Figure 1, in a Turkish Cypriot Adolescent Sample. The model was tested both for bullying and victimization because recent findings indicated that bullying and victimization are not distinct but rather they co-occur most of the time (Dodge & Pettit, 2003). Structural Equation Modeling was used to test the models. As seen in Figure 1, there were 23 observed variables which were measured directly by various questionnaires and 6 latent variables (individual characteristics, parental characteristics, peer relations, teacher characteristics, physical characteristics of school and psychological climate of school). Bullying and victimization latent variables were predicted by self-reported and peer reported measures.

ables were predicted by self-reported and peer reported measures.

A total of 544 adolescents (284 females, 259 males) were recruited from 7 schools in four major settlements in North Cyprus: Nicosia, Famagusta, Kyrenia, and Morphou. The sample of schools were selected to represent all Socio-Economic Statuses. The data was collected with informed consent in two sessions. The age range was 13-18 (Mean = 14.7, SD = 1.17). According to self-reports the mean mother education level was 3.39 and mean father education level was 3.61(1= Illetarate, 8=PhD). The perceived Socio-Economic Status was middle to upper middle class. Table 1 shows the questionnaires and the con-

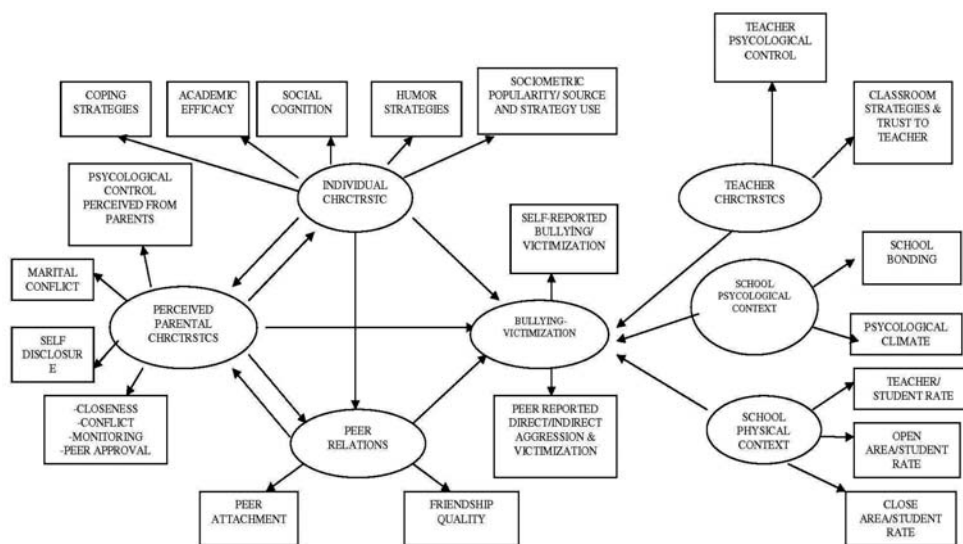


Figure 1: Hollistic Model for Bullying/Victimization

structs which they measure.

Our results indicated the rate of bullying to be 10.7% and victimization to be 10.1% among the adolescents in North Cyprus. When bullying was considered as a concrete construct, the males' bullying scores were significantly higher than females ($t = -5.17$, $sd = 543$, $p < .001$). When sub-types of bullying and victimization were considered the males were found to conduct more direct bullying and victimized directly according to self and peer reports. On the other hand, females were found to conduct more indirect bullying and victimized indirectly according to self and peer reports. When age differences were investigated, it was found that bullying level was at its peak in the 8th grade (the oldest class in primary school). Victimization was decreasing toward the 8th grade and increasing again after the 9th grade (the youngest class in highschool). These findings about gender and age differences correlated with the existing data in the literature.

Our statistical analyses showed that the data fitted well to the proposed holistic model both for bullying and for victimization. For bullying, the strongest predictor was psychological climate of school (standardized coefficient = $-.29$) followed by parenting characteristics ($-.28$), individual characteristics ($-.25$), peer characteristics ($-.15$), teacher characteristics ($-.13$) and physical structure of school ($.04$). All latent variables (except for physical structure of school) effected bullying significantly. For victimization, the strongest predictor was parenting characteristics ($-.38$) followed by psychological climate of school ($-.21$), peer characteristics ($-.17$), physical structure of school ($.11$), individual characteristics ($.10$) and teacher characteristics ($.01$). All latent variables (except for teacher characteristics) were found to

be significantly associated with victimization.

Peer bullying research in North Cyprus is in its infancy. Discussions with teachers and headmasters revealed that according to the adults working in schools bullying is not a big problem. However, our results indicated a very different situation; bullying and victimization are common among Turkish Cypriot adolescents. According to self and peer reports collected in our study, 1 of every 10 people bullied and/or were victimized. Therefore, a step forward is needed by accepting the problem and creating intervention and prevention programs according to scientific data.

Our results indicate that one of the strongest predictors of both bullying and victimization among Turkish Cypriot adolescents is the parenting characteristics. According to Mertan, Turkish Cypriot family structure is an "amalgam" of nuclear family and wide family (Mertan, 2002). This multi-parenting characteristic of the Turkish Cypriot family may be a disadvantage if parenting styles differ between parents, grandparents and/or other close relatives. But if the discipline techniques are similar between these groups, this multi-monitoring characteristic could create a buffer against bullying and victimization. The proposed intervention programs must handle this issue.

The other important predictor of peer bullying and victimization revealed by our study is the psychological climate of school. It seems that a school context which accepts power abusive behaviors (among teachers, between teachers and students, and among students) can increase bullying and victimization rates. On the other hand a authoritative school context may decrease these behaviors by increasing empathy and sympathy between the members of the school. This must be the other issue addressed by the proposed intervention programs.

Table 1: Questionnaires used in the research and the constructs they measure

The Name of the Questionnaire	Measured Construct
Multidimensional Peer Victimization Questionnaire	Victimization
Peer Reported Negative Strategies	Victimization
Multidimensional Peer Bullying Questionnaire	Bullying
Peer Reported Direct/Indirect Aggression	Bullying
Humor Styles Questionnaire	Social, Aggressive and Self-Destructive Humor Styles
Coping Across Situations Questionnaire	Coping Strategies
Social Cognition Vignettes	Social Cognition
Perceptions of the School Psychological Environment	Academic Efficacy
Peer Reported Source and Strategy Use	Source and Strategy Use
Children's Perception of Interparental Conflict Questionnaire	Marital Conflict
Psychological Control Questionnaire	Psychological Control
The Adolescent Family Process Measure	Parental Conflict, Monitoring, Closeness, Peer Approval and Trust
Self-Disclosure Scale	Self-Disclosure
Parental and Peer Attachment	Peer Attachment
Friendship Qualities Scale	Friendship Quality
School Bonding Scale	School Bonding
School Context Scale	Psychological Climate of the School
Students' Perceptions of the Classroom Environment	Teacher Discipline Strategies and Trust Perceived by Teacher
Psychological Control Questionnaire (Teacher form)	Psychological Control Perceived from Teacher

We believe that our research generated important results for the development of bullying literature in North Cyprus. However, the study had some limitations also. Cross-sectional nature of the study prevented longitudinal investigation of the participants, especially when they moved from primary school to highschool. All results depended on self and peer reports. Teacher and parental reports were not used. In future, using multi-informants would increase the validity of the results. The biological/genetic factors have not been investigated. The

model could be developed by adding these kind of objective individual measurements as well.

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About the Researcher

Fatih Bayraktar received his B.A. degree in Psychology from the Department of Psychology of Middle Eastern Technical University, Turkey in 1998. Bayraktar received his M.A. degree from the Department of Psychology of Ege University, Turkey in 2001. He continued his education at Hacettepe University, Turkey, and received his Ph.D. degree in Developmental Psychology in 2009. Before joining the EMU faculty, he taught at Near East University, North Cyprus and at Ankara University, Turkey. Since Fall 2009, he has been teaching at the Department of Psychology of EMU. He is interested in fields like internet psychology, bullying, positive and negative social behaviors of adolescents, psychological development of young adults, and resilience. For more information about this research project, please contact our researcher at fatih.bayraktar@emu.edu.tr.

Minimizing the Path Dependent Loss and the Switch Crosstalk in Optical Networks: A Petri net based approach to problem solving

By Tolgay Karanfiller
Department of Mathematics
Faculty of Arts and Sciences



Tolgay Karanfiller (right) with his supervisor Rza Bashirov

The debates on the relative merits of electronics and optics in high performance computing lead to a consensus that optics is the best choice for data communication while electronics is always preferable for data processing. Low latency, high throughput and high bandwidth are among other advantages of optical communication. The two choices for optical communication are all-optical and hybrid optical approaches. All-optical switching, where both the controlling and the controlled signals are optical, is seemingly a long-term research item (Oko, 2004). The hybrid optical approach is based on the use of optoelectronic technology where the signals are optical but the control over the optical signals is carried out electronically. Despite its advantages the hybrid optical approach suffers from path dependent loss and

optical crosstalk.

Total loss in any optical link is the sum of the losses in all optical components: propagation loss through the waveguide in a directional coupler (or path dependent loss), signal loss at waveguide bends, signal loss at waveguide crossovers, propagation loss in the medium, fiber-to-substrate and substrate-to-fiber coupling loss. As it was reported by Pan and colleagues in 1999 and later by Tian and colleagues in 2006, propagation loss through the waveguide among these losses is of major concern and is proportional to the number of directional couplers that the optical signal passes through (Pan 1999; Tian *et al.*, 2006).

Optical signals usually become weak after passing through a long connection path, which may potentially cause signal distortion. This phenomenon is known as

path dependent loss or attenuation (McCarthy, 2001; Pan, 1999; Vaez *et al.*, 2000). In a large optical multistage interconnection network (OMIN), a substantial part of this path dependent loss is directly proportional to the number of directional couplers along an optical path, which is determined by the architecture used and the network size (Jiang *et al.*, 2003; Oko, 2004). Path dependent loss in effect leads to such unwanted factors as an increase of power consumption in the system and errors in transmission of optical signals. Being a problem of primary interest in optical communication, the path dependent loss is still in the focus of the researchers.

Optical crosstalk arises in one of two forms: channel crossover (or waveguide crossover) and switch crosstalk (Katangur *et al.*, 2007; Tian *et al.*, 2006). The former occurs when the channels carrying the signals cross each other in order to follow-up a specified interstage communication pattern, while the latter arises when two paths sharing a directional coupler experience unwanted coupling from one path to the other. It has been reported that the number of channel crossovers can be reduced through carefully selecting a suitable planar layout for network topology (Lea, 1988). It has been shown through a series of experiments that by changing intersection angles between the crossing channels it is possible to keep

the channel crossover negligibly small (Padmanabhan *et al.*, 1987). The switch crosstalk, however, is more severe and becomes one of the major issues in designing OMINs (Tian *et al.*, 2006). Switch crosstalk is the most significant factor which reduces clarity of an optical signal, limits the size of an optical network and leads to error rate degradation. The four possibilities of switch crosstalk within a directional coupler are illustrated in Figure 1. In this figure a dashed line is used to indicate the path a switch crosstalk propagates through. Switch crosstalk occurs either between the upper straight path (from input 0 to output 0) and upper to lower cross path (from input 0 to output 1) or between the lower straight path (from input 1 to output 1) and lower to upper cross path (from input 1 to output 0).

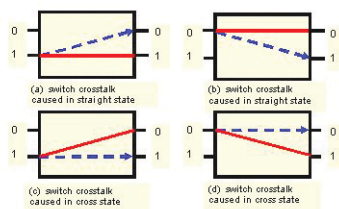


Figure 1 Coupling from (a) lower straight path; (b) upper straight path; (c) lower to upper cross path; (d) upper to lower cross path.

Our latest research at EMU focuses on an approach to reduce not only the path dependent loss but also the number of switch crosstalks in OMIN. Our approach is centered upon modeling OMINs with Petri nets and performing reachability analysis with P-invariants to determine the minimum number of stages m_{min} that would be sufficient to establish requested

communication patterns in variable-stage OMINs. Being composed of the smallest number of stages and consequently directional couplers (or photonic switches), m_{min} -stage OMIN employs minimal structure and therefore path dependent loss and number of switch crosstalks reach the least possible values in the realization of requested communication patterns.

Reachability analysis with P-invariants is based on modeling with state equations and problem solving in terms of system of linear algebraic equations. The matrices obtained in are sparse band matrices similar to the one illustrated in Figure 2.

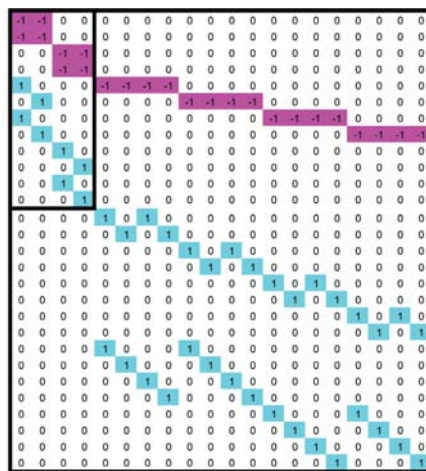


Figure 2. Incidence Matrices

We prove that the size of Petri nets created in this work is in polynomial dependence on the problem size which alleviates memory consumption significantly and ascertains the fact that memory capacity and performance of modern computers are indeed sufficient to run our task. We carry out a series of computer experiments to confirm the effective-

ness of the proposed approach.

Optical multistage interconnection networks are proposed to substitute electronic ones as they meet increasing demands in fast, low-latent, high bandwidth and high throughput communication. Architecture of high performance computers, computer and communication network are among other application areas of optical multistage interconnection networks. Possible implementation of the proposed research will increase clarity of optical signals, reduce of power consumption and decrease signal attenuation in transmission of optical signals.

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About the Researchers

Rza Bashirov was born in Baku, Azerbaijan. After receiving his B.S. and M.S. degrees in Applied Mathematics and Computer Science from Azerbaijan State University, he pursued his academic career at Moscow State University in Computer Science, where he obtained his Ph.D. degree. Before joining the EMU Department of Mathematics in 1993, Bashirov taught at different institutions, and was the head of the department in the Institute of Cybernetics at Azerbaijan Academy of Sciences. He was a researcher at USSR Academy of Sciences, Moscow, in the field of Parallel Processing and Interconnection Networks. Bashirov took part in the establishment of the Information Systems Master's program at EMU. Currently, he is the vice dean of EMU Faculty of Arts and Sciences. For more information about this research project, please contact our researcher at rza.bashirov@emu.edu.tr.

Tolgay Karanfiller was born in Lefkoşa, North Cyprus. After graduating from the EMU Department of Applied Mathematics and Computer Science in 2003, he pursued his M.S. degree in the Mathematics Department and obtained a Research Assistantship position. His M.S. thesis was titled "Controllability of Finite Dimensional Linear Systems." Since 2005, he has been continuing his postgraduate program in the Applied Mathematics and Computer Science Department and currently is working on his Ph.D. dissertation titled "On Path Dependent Loss and Switch Crosstalk Reduction in Optical Networks", under the supervision of Rza Bashirov. For more information about this research project, please contact our researcher at tolgay.karanfiller@emu.edu.tr.



Mustafa Hasانبulli, a mathematician and a dancer, shares his experience with us.

- **Where are you from? When have you started studying at EMU? What were your initial thoughts and ideas when you first started studying at EMU?**

I am from Boğaztepe, North Cyprus, and I started my undergraduate studies at EMU in 1999 in the Department of Mathematics. I finished my undergraduate studies in 2004 and I immediately proceeded to the Master's degree program, which I successfully completed within one year. Since 2006, I have been continuing the Ph.D. program at the same department. I initially wanted to study Genetic Engineering in Turkey; but, later on I have decided to study in Cyprus and enrolled to the Department of Applied Mathematics and Computer Science.

- **Please tell us a bit about your educational background before EMU.**

I studied in İskele BekirPaşa High School for 5 years. In my last year, I chose to study in the Mathematics elective program; however the number of students was not enough to conduct the program. Therefore, I transferred to Namık Kemal High School at Gazimağusa and graduate from there.

- **Could you introduce your graduate study subject here at EMU for our readers?**

I started my Ph.D. program in Spring 2006 and since then I have worked in different areas, particularly on Differential

Equations, Asymptotic Integration, Neutral Differential Equations, Oscillation Theory of Nonlinear Differential Equations, and Mathematical Biology. I am currently studying on Population Dynamics with my supervisor professor Svitlana Rogovchenko. Population dynamics is the branch of life sciences that studies short- and long-term changes in the size and age composition of populations, and the biological and environmental processes influencing those changes where it deals with the way populations are affected by birth and death rates, and by immigration and emigration, and studies topics such as aging populations or population decline. My first supervisor professor Yuri Rogovchenko, is currently at the University of Kalmar, Sweden and serves as my co-supervisor. Particularly, I work on Existence of Solutions of Certain Neutral Differential Equations with Y. Rogovchenko, simultaneously.

- **Have you had teaching experience at EMU, in addition to your research experience?**

I have been teaching for the last four years at EMU for different departments, including the Department of Mathematics. I have mainly taught Computer Science, Theoretical Mathematics, and service mathematics courses for other departments. I enjoy teaching very much.

- **What other interests do you have apart from your research?**

I have been folk dancing. It has been 18 years that I am actively involved in Turkish Cypriot folk dancing at İskele Municipality Folkdance Group. I used to teach Turkish Cypriot folk dancing to children, which was a lot of fun.

- **Have you ever attended dance contests in and out of North Cyprus, and have you ever been awarded?**

Together with İskele Municipality Folkdance Group, I have attended many dance contests abroad, mainly Europe and Turkey. Within 18 years, we have visited so many places and been awarded with 52 first prizes in different countries, some of which are Hungary, Italy, France, Spain, Poland, Croatia, and Switzerland. Also, we attended competitions in Samsun and Bursa, Turkey. In 2007, we have been awarded the first place in Samsun and second place in Bursa in 2002, which is the 3rd prestigious dance competition in Europe. Now İskele Municipality organizes the 14th International Folk Dance Festival, and I am one of the organizing committee members. So, we do a lot to represent the North Cyprus and its culture.

■ **Is dancing demanding for you? How do you balance your dancing with your academic life?**

Actually, most people believe dancing is demanding but honestly it is not. Dancing is fun; İskele Municipality Folkdance Group brings together different people with different background and ideals to promote TRNC abroad. In winter season, the number of rehearsals are not as much as in summer season. Since we have more time in summers, we frequently come together to practice for festivals. Dancing for sure is relaxing my mind and body. Honestly, the experience and skills that I have acquired have broadened my knowledge in the area of team-working, which is really helping me for my research work.

■ **Would you say that your hobby has positively contributed to your academic career?**

Not only to my academic career but to my life. It has so many positive affects on my life and studies. I have learnt how to relate with other people with different cultures, ideas, and from different age groups. Since dancing is teamwork, I have learnt how to be synchronized with friends, and how to share the same feelings with them. In addition, dancing helps me to exercise and improve my physical condition. I must tell you that all these have boosted my self esteem and had positively contributed to my teaching and research at EMU.

■ **How would you say EMU has made a difference in your life?**

I think that it is always advantageous to study in an international university like EMU, which has a very good reputation. It will make a difference when I want to go to somewhere else to continue my career. Getting an EMU diploma opens a lot of opportunities. EMU for sure helped me to build up a solid background in my field of study. The academicians of my department are highly qualified. I wouldn't manage to be here without my instructors who constantly forced me to do more.

■ **What are your short-term plans after you obtain your Ph.D. degree?**

I want to continue my academic career with a post-doc position. The U.S gives good opportunities for this position, and it is competitive, too. It would be my first choice, however I would also look for positions in Europe and in Australia.

■ **Do you have any messages for our prospective graduate students?**

If any prospective student wants to study at EMU, they should be really dedicated to their subject of study and put a lot of effort into their graduate work. Master and PhD programs at EMU offer a solid foundation for dedicated researchers.



WHY DON'T YOU...

...share this interview with your undergraduate students? Please direct them to <http://research.emu.edu.tr>.



IDIL CANDAN
I received my B.S., M.S. and PhD degrees in Computer Engineering Department from Eastern Mediterranean University in 2003, 2005 and 2007 respectively. I am an instructor in

Computer Engineering Department of Middle East Technical University Northern Cyprus Campus since September 2007. My current research interests include wireless networks with emphasis on resource allocation and management, and performance evaluation.



SAINA LAJEVARDI
In June 2008, I graduated with a Bachelor of Science degree from the Department of Electrical and Electronic Engineering at EMU. During the last two years of my undergraduate program, my main focus was on communications,

which basically directed me towards my current research area for my Master's degree. Wireless communication in whole and adaptive channel estimation for Multiple-input Multiple-output (MIMO) is currently what I am involved in at a laboratory of University of Alberta, Canada. My undergraduate education at EMU enabled me to get to my current position, but for me EMU was not just about diploma and academic records. EMU gave me the chance to learn how to appreciate differences and to love and learn from each other. I learned at EMU, not about nationalism, not about religion and not about greatness of races but that the hearts should stay strong in integrity. It thought me that our world needs our sincere love and work even if we are on a small piece of island.



SEVIN FIDE
I received my B.S. degree in computer engineering from Eastern Mediterranean University in 2002. I was awarded a scholarship to pursue my graduate study in the USA. I received my M.S. and Ph.D. degrees in electrical and computer engineering from the University of

California - Irvine in 2004 and 2008, respectively. In my master's thesis, I developed a middleware system to facilitate communications between parallel programs running on distributed clusters. In my Ph.D. dissertation, I designed and evaluated architecture optimizations for synchronization and communications in multi-core processors. During my graduate study, I published several papers in international journals and conference proceedings. I have recently published a book on architectural optimizations in multi-core processors, which is sold at popular bookstores such as Amazon, Barnes & Noble. I am currently working at Intel as a graphics software engineer.



WHY DON'T YOU...

...recommend a former student of yours for the next issue?

Following is the list of students who have successfully completed their postgraduate degrees in Spring 2009. This list has been provided by EMU Institute of Graduate Studies and Research on 20 July 2009.

■ M.A. ■

English Language Teaching

Yasemin Aksoyalp

Thesis Title: A Cross-cultural Investigation of Refusals by Turkish-speaking EFL Learners; A Case Study

Supervisor: Javanshir Shibliyev

Co-Supervisor: Fatoş Erozan

International Relations

Reyhaneh Tabatabaie

Thesis Title: The Islamic of Iran's Foreign Policy and the Regional Security in the Middle East (1979-1999)

Supervisor: Moncef Khaddar

John Kemoe Bengu

Thesis Title: The Root Causes of International Terrorism

Supervisor: Moncef Khaddar

Turkish Language and Literature

Kemal Bas

Thesis Title: Subha-I Sıbyan'ın Kıbrıs Nüshaları

Supervisor: Gülseren Tor

■ M.Arch. ■

Architecture

Amir Attarzadeh Jozdani

Thesis Title: The Principles and Tools in Design of Flexible Spaces

Supervisor: Guita Farivarsadri

Sogol Moezzi

Thesis Title: Critical Look to Double Skin Façade Systems

Supervisor: Halil Zafer Alibaba

Mahsa Tafazoli Herandi

Thesis Title: An Assessment of User Satisfaction in Public Housing: Case of Gazimağusa

Supervisor: Resmiye A. Atun

Ayla Aledavood

Thesis Title: An Investigation of Psychological Comfort Based on Innovitvity in Open Plan Workplaces

Supervisor: Kutsal Öztürk

Negar Asoobar

Thesis Title: A comparative assessment of the design approaches for the conversion of historic residential buildings

Supervisor: Özlem O. Türker

■ MBA ■

Business Administration

Sharareh Kermanshachi

Thesis Title: Identifying Service Quality Attributes that Influence Young Customers' Level of Satisfaction in Retail Stores by Using Kano Model

Supervisor: Halil Nadiri

■ M.Ed. ■

Educational Sciences

Pınar Baykara

Thesis Title: Reflection in English Language Teaching in Secondary Education

Supervisor: Bahire Özad

■ M.S. ■

Chemistry

Devrim Özdal

Thesis Title: Fluorescence-Based Ligand Conjugated Biopolymer

Supervisor: Huriye İcil

Civil Engineering

Amin Abrishambaf

Thesis Title: Principals and Practices of Seismic Isolated Buildings

Supervisor: Giray Özay

Ahmad Haseeb Payab

Thesis Title: Feasibility Study of an Urban Toll Road: A Case Study

Supervisor: Tahir Çelik

Economics

Sener Salci

Thesis Title: The Economic Cost of Foreign Exchange and Shadow Price of Non-Tradable Outdays for West African Economic & Monetary Union

Supervisor: Glenn P. Jenkins

Ojonojima Phebe Okee

Thesis Title: Health Expenditure and Economic Performance in Middle East and North Africa

Supervisor: Eric Li

Gozde Yalim

Thesis Title: Inflation and Inflation Uncertainty Relationship: Cross-country Analysis

Supervisor: Mehmet Balcilar

Kemal Bagzıbaglı

Thesis Title: Identification of Monetary Policy in Turkey: 1990-2008

Supervisor: Mehmet Balcilar

Electrical & Electronic Engineering

Toritseju Okpotse

Thesis Title: Single Frame Image Superresolution using the Dual-Tree Complex Wavelet Transform

Supervisor: Huseyin Ozkaramanli

Mechanical Engineering

Navid Salarvand

Thesis Title: Mathematical Modeling of Magnetic Regenerator Refrigeration Systems

Supervisor: Hikmet S. Aybar

Arash E. Ashtiani

Thesis Title: Comparison of Staggered and Non-staggered methods and use of Higher resolution Schemes

Supervisor: Ibrahim Sezai

Tourism Management

Umar Faruk Shuaibu

Thesis Title: Institutional Issues in Tourism Planning and Policy Development; the Case of Nigeria

Supervisor: Mehmet Altınay

Rekiya Lawal

Thesis Title: STourism Development Planning: Sustainable Strategies for Abuja City in Nigeria

Supervisor: Mehmet Altınay

Kemal Sofuoglu

Thesis Title: The Influence of Selected Antecedents on Boundary Spanning Role (BSR) Employees' Perceptions of Service Recovery Performance: The Case of North Cyprus Lodging Industry

Supervisor: Guven Ardahan

■ Ph.D. ■

Mechanical Engineering

Mohsen Sharifpur

Thesis Title: Simulation of Boiling in a Vertical Channel

Supervisor: Hikmet S. Aybar

On behalf of EMU family, we congratulate our graduates and wish them continued success.

Recent Publications and Presentations (April - June 2009)

■ Journal Publications (SCI, SSCI, AHCI) ■

The journal publications listed here are those that are listed in Arts & Humanities Citation Index (A&HCI), Science Citation Index Expanded (SCI-Expanded), or Social Sciences Citation Index (SSCI). A search on ISI Web of Science was performed on 4 September 2009 to retrieve articles with at least one author having EMU affiliation. This list may not be comprehensive as some articles could be deposited to ISI after the query date.

Adali T and Yilmaz E. (2009) "Synthesis, characterization and biocompatibility studies on chitosan-graft-poly (EGDMA)." *Carbohydrate Polymers* 77(1): 136-141.

Aksal FA. (2009) "Action Plan on Communication Practices: Roles of Tutors at EMU Distance Education Institute to Overcome Social Barriers in Constructing Knowledge." *Turkish Online Journal of Educational Technology* 8(2): 33-47.

Altin A, Aktas R and Erkus-Duman E. (2009) "On a multi-variable extension for the extended Jacobi polynomials." *Journal of Mathematical Analysis and Applications* 353(1): 121-133.

Bal M and Hashemipour M. (2009) "Virtual factory approach for implementation of holonic control in industrial applications: A case study in die-casting industry." *Robotics and Computer-Integrated Manufacturing* 25(3): 570-581.

Bogac C. (2009) "Place attachment in a foreign settlement." *Journal of Environmental Psychology* 29(2): 267-278.

Bogolubov NN, Prykarpatsky AK, Taneri U and Prykarpatsky YA. (2009) "The electromagnetic Lorentz condition problem and symplectic properties of Maxwell- and Yang-Mills-type dynamical systems." *Journal of Physics A-Mathematical and Theoretical* 42(16), Article No: 165401.

Carcenac M. (2009) "A modular neural network for super-resolution of human faces." *Applied Intelligence* 30(2): 168-186.

Dabaj F. (2009) "The Role of Gender and Age on Students' Perceptions towards Online Education Case Study: Sakarya University, Vocational High School." *Turkish Online Journal of Educational Technology* 8(2): 120-123.

Elkiran G and Ongul Z. (2009) "Implications of excessive water withdrawals to the environment of Northern Cyprus." *Water and Environment Journal* 23(2): 145-154.

Gazi ZA. (2009) "Implementing Constructivist Approach into Online Course Designs in Distance Education Institute at Eastern Mediterranean University." *Turkish Online Journal of Educational Technology* 8(2): 68-81.

Harpster M. (2009) "Keith Muckelroy: Methods, Ideas and Maritime Archaeology." *Journal of Maritime Archaeology* 4(1): 67-82.

Kusetogullari H, Gokus E and Celik T. (2009) "Dynamic traffic lights control system using computer vision." *Electronics World* 115(1876): 37-40.

Mahmudov NI. (2009) "Korovkin-type theorems and applications." *Central European Journal of Mathematics* 7(2): 348-356.

Omen B and Ozkaramanli H. (2009) "Complex linear-phase biorthogonal filterbanks with approximately analytic wavelets." *Signal Processing* 89(4): 599-604.

Ozarslan MA and Duman O. (2009) "Approximation theorems by Meyer-König and Zeller type operators." *Chaos, Solitons & Fractals* 41: 451-456.

Ozarslan MA, Duman O and Della Vecchia B. (2009) "Modified Szász-Mirakjan-Kantorovich operators preserving linear functions." *Turkish Journal of Mathematics* 33(2): 151-158.

Ozarslan MA. (2009) "I-Convergence Theorems for a Class of k-Positive Linear Operators." *Central European Journal of Mathematics* 7(2): 357-362.

Svatos TD. (2009) "Reasserting the centrality of musical craft: Martinu and his American diaries." *Musical Times* 150(1907): 55-70.

Tulgar T and Salamah M. (2009) "Performance analysis of a threshold based distributed channel allocation algorithm for cellular networks." *Computers & Electrical Engineering* 35(3): 485-496.

■ Conference Papers ■

Candan I and Salamah M. "Analytical modeling of a time-threshold based multi-guard bandwidth allocation scheme for cellular networks." in *Proceedings of the IEEE Fifth Advanced International Conference on Telecommunications (AICT09)*, pp. 33-38, Venice, Italy, 24-28 May 2009.

Demirel H and Anbarjafari G. "Farklı Renk Kanallarında Ayırık Dalgacık Ayırışımı Kullanan PDF Tabanlı Yüz Tanıma Sistemi." *17. IEEE Sinyal İşleme ve Uygulamaları Kurultayı, (SIU'2009)*, pp. 520-523, Antalya, Türkiye, 9-11 April 2009.

Eleyan A, Ozkaramanli H and Demirel H. "Çift-Ağaç ve Tek-Ağaç, Karmaşık Dalgacık Dönüşümü Tabanlı Yüz Tanıma." *17. IEEE Sinyal İşleme ve Uygulamaları Kurultayı, (SIU'2009)*, Antalya, Türkiye, 9-11 April 2009.

Lerner I. "Knowledge Processes in Design as Influenced by the Bias of Technological Environments." in *Proceedings of the colloquium 'Communicating (by) Design'*, pp. 163-170, Sint-Lucas, Brussels, April 2009.

Sertbay H and Toygar O. "Face Recognition in the Presence of Age Differences using Holistic and Subpattern-based Approaches." in *Proceedings of the 8th WSEAS International Conference on Signal Processing (SIP'09)*, Istanbul, Turkey, 30 May-1 June 2009.

Oktay D. "A Critical Discussion on the Status, Role and Future of Urban Design." in *Proceedings of the 4th International Urban Design Congress: Towards A Charter of Urban Design*, pp. 34-42, Mimar Sinan Fine Arts University, Istanbul, 27-28 May 2009.

Tumer D, Shah MA and Bitirim Y. "An Empirical Evaluation on Semantic Search Performance of Keyword-Based and Semantic Search Engines: Google, Yahoo, MSN and Hakia." in *Proceedings of the International Conference on Internet Monitoring and Protection (ICIMP)*, pp. 51-55, Venice/Mestre, Italy, 24-28 May 2009.

Yilmaz AO, Ergun C and Bitirim Y. "An Approach on Short Message Service Text Transfer for Turkish GSM Operators." in *Proceedings of the Advanced International Conference on Telecommunications (AICT)*, pp. 107-110, Venice/Mestre, Italy, 24-28 May 2009.

■ Conference Presentations ■

Aliefendioglu H and Behcetogullari P. "Missing Histories of Cyprus: War, Displacement and Women's Narratives." *3rd International Conference on Women's Studies: Gender at the Crossroads: Multi-Disciplinary Perspectives*, Famagusta, North Cyprus, 20-22 April 2009.

Bodapati JB and Huriye Icil. "Electrically Active Organic Polymers for Future High Efficient Solar Cells: Their Synthesis and Characterization." *Frontiers in Polymer Science*, Mainz, Germany, 7-9 June 2009.

Heeg M. "Learning WITH Your Brain." *EPTA-Vojvodina World Piano Conference*, Novi Sad, Serbia, 4-8 May 2009

Ilić S. "Muslims of Bosnia and Herzegovina between the Ottoman Past and the European Future." *In the Eyes of the Neighbours: Stereotypes and National Characteristics in Middle-East Europe*, Szeged, Hungary, 4-7 May 2009.

Kafkas S, Varoglu E and Taneri B. "Interaction Networks for Proteins Coded by Alternatively Spliced Human Genes." *17th Annual International Conference on Intelligence Systems for Molecular Biology (ISMB09)*, Stockholm, Sweden, 27 June-2 July 2009.

Müller U. "The Kral Tepesi Salvage Excavation Project" *Annual Meeting of the Theoretical Archaeology Group*, Stanford University, California, US, 1-3 May 2009.

Müller U. "Kral Tepesi/ Vasili: Learning by Doing on an Excavation Project" *Knowledge, Differences, Harmonies in the Time of Globalisation*, EMU, Gazimagusa, North Cyprus, 21-22 May 2009, EMU,

Müller U. "Kaleburnu Kral Tepesi Salvage Excavation Project" *Mediterranean Worlds: Cultures of Interpretation*, EMU, Gazimagusa, North Cyprus, 3-6 June 2009.

Svatos TD. "Defining Martinů's place in twentieth-century music historiography," *Continuity of Change: Bohuslav Martinů in the music of the 20th Century*, Prague, Czech Republic, 29-31 May 2009.

■ Book Chapters ■

Bailie M and Azgin B. (2009). "*Cypriot Media and the Production of Conflict: Newsworthiness versus the Possibility of Peace Communication.*" in Thomas Diez & Nathalie Tocci (Eds.). *Cyprus: A Conflict at the Crossroads* (66-83) Manchester, Manchester University Press.

Colak Y. (2009). "*1923-1929 Dönemi Türkiye'de İç Politika.*" in A. Çaylak, M. Dikkaya (Eds.). *Osmanlı'dan İkibinli Yıllara Türkiye'nin Politik Tarihi.* (pp. 219-230). Ankara: Savaş Yayınevi.

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Conference Name: The Policy Options of the Turkish Cypriot Economy under Global Economic Crises.
Date: 26-27 October 2009
Web Address: <http://www.econconference.info>

Conference Name: 2nd International Conference on Security of Information and Networks (SIN 2009).
Date: 6-10 October 2009
Web Address: <http://www.sinconf.org>

Conference Name: 7th International Congress on Cyprus Studies.
Date: 4-6 November 2009
Web Address: <http://www.cyprusstudies.org/index.html>

Conference Name: Macroeconomics and Financial Economics Workshop: Recent Developments in Theory and Empirical Modeling.
Date: 8-9 October 2009
Web Address: <http://www.econworkshop.info>

Conference Name: International Conference on Europe and North Cyprus Relations: Perspectives in Political, Economic and Strategic Issues.
Date: 12-13 November 2009
Web Address: <http://www.emu.edu.tr/ICENC/>

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