PROCEEDINGS OF
TASSA ANNUAL CONFERENCE
19-20 FEBRUARY, 2005
WASHINGTON, DC

TURKISH AMERICAN SCIENTISTS AND SCHOLARS ASSOCIATION

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1526 18th Street, NW, Washington, D.C. 20036 | www.tassausa.org

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FROM THE AMBASSADOR

Turkish-American relations are anchored in shared values as well as mutual interests and our two states enjoy close relations as allies. The Turkish-American community living in the United States is a significant force that contributes to bringing our nations closer together. This community is comprised mainly of professionals; many of whom are scientists and scholars who have distinguished themselves through their talent, creativity, and hard work.

The newly founded Turkish-American Scientists and Scholars Association (TASSA) has taken upon itself the commendable mission of bringing together these Turkish-Americans in a network that will allow them to interact in a variety of ways.

I believe that the interest and excitement witnessed at the first TASSA conference held on February 19-20, 2005 speaks volumes about the future of this organization. Distinguished speakers addressed hundreds of Turkish and Turkish-American scientists and scholars, some of whom had traveled to Washington D.C. from the furthest corners of the United States. TASSA started off with much promise. We will continue to support TASSA and trust that in time this organization will grow to encompass most Turkish-American scholars and scientists living in the United States.

While relations between Turkey and the United States are multi-faceted and generally well developed, there is room to enhance educational and scientific cooperation. Beyond bringing together bright minds in this country, TASSA will also serve the purpose of linking scientists and scholars as well as institutions in the United States with their counterparts in Turkey; thereby opening a new channel for communication and cooperation. This development will certainly impact favorably on bilateral relations as contributions of scientists and scholars are unique and therefore of great significance.

I wish to express my appreciation to those individuals who have created TASSA; they have filled a vacuum and displayed great commitment to this worthy project. I also wish to commend all TASSA members for supporting this important organization and call on them to help it grow strong roots and establish itself as one of the building blocks of Turkish-American cooperation.

H.E. O. Faruk Logoglu, Ph.D.
Ambassador of the Republic of Turkey to the United States

As we begin…

Some commented that it has been long overdue, and some exclaimed that it was a dream come true. As the First Annual Conference of TASSA adjourned, I summed up my ultimate judgment in a single word: energy! And then added: fulfillment, excitement, pride, joy…. Indeed, two days of exposure to innovative research, novel approaches, intriguing discussions and insightful wisdom from world-renown experts boosted the energy levels of many scholars to new peaks. A wide range of subjects and disciplines were presented by authorities to a diverse group of participants covering a vast geographical area from Harran, Turkey, to Seattle, Washington. The consensus opinion was that the conference was an environment of mental stimulation, useful information exchange, emotional experience, and social camaraderie. A crowd of amazing intellectual power, both on the podium and in the audience, showcased their appetite to tackle the challenge of accomplishing TASSA's missions.

As we venture into this long and arduous path to reach our goals, we have many bright ideas, yet we realize that what is expected is their implementation, and what counts will be our deeds. The tasks belong to each and every one of us to be shouldered and carried out. We will proceed carefully to make sure that the foundation is strong, and weave its fabric patiently to make sure that it withstands the test of longevity. On behalf of my newly elected friends on TASSA's Council, I thank you for entrusting your hopes with us and accept the responsibility with pride and humility.

Suleyman Gokoglu, Ph.D.
President, TASSA

FROM THE CONFERENCE CHAIR

Our first annual conference on February 19-20, 2005 in Washington DC verified TASSA as a legitimate organization with recognizable support from Turkish American Scientists and Scholars and our friends. The conference achieved its mission by providing the initial momentum for a productive lifetime for TASSA. With its stellar list of speakers, its sponsors, its organization, and all its participants, the conference was productive and memorable.

It was a proud, happy event, full of exciting moments for all of us -- Turkish Americans, scientists and scholars. The response and enthusiasm we received from the TASSA community and other communities that support us have been enormous. Although TASSA was established only a few months ago its membership has reached over 1200. In our first conference, the attendance exceeded our expectation by multiples. As TASSA, the challenge in front of us is to meet this interest with the same enthusiasm.

I am grateful to every single one of our speakers. We were humbled by their acceptance of our invitation and their presence during the conference. I thank all our sponsors. They took a chance in supporting us in our first activity. They believed in our cause and we hope this is just the beginning of a good partnership. And most importantly, I want to recognize and thank my colleagues, the organizing committee. They put in countless hours for a project because they believed in its worth for our community. They all believed science and scholarship will be our guide to the future.

The need to organize and utilize the potential of this community has always been recognized but seldom achieved. The power of cooperation and collaboration among the Turkish American Scientists and Scholars and their counterparts both in Turkey and US have always been accepted and acknowledged. When it worked, it produced great results. We believe there is an urgent need to take advantage of this collaboration, knowledge, the wide spectrum of skills, the problem solving ability, the technical know-how while Turkey is once again in the crossroads. As Turkey embarks on a new journey towards EU membership, the scientific and educated approach to solve problems, to find opportunities, to deal with threats is becoming more vital and unavoidable.

There is an undeniable reality of brain migration. It would not be a stretch to presume that this is a natural consequence of globalization. It is impossible to stop this migration but the challenge may be to find positives in it and to take advantage of them.

We would like to bring some equity to this brain migration at least for the specific case of Turkey. It need not be by sending American scientists to Turkey or by asking the Turkish American Scientists to go back to Turkey. In this technology era, the importance of location has diminished. The migration does not have to be geographical but mental. Encouraging and providing a platform to have Turkish American Scientists and Scholars consider Turkey related issues along with their research, their work, their areas of expertise, would benefit both countries and would bring some equity to the so called brain drain phenomena.

It is becoming more of an issue since it is obvious that the countries that will be on the winning side are not the ones who can fight the wars but those who advance in science, excel in education and control the technology.

TASSA has an ambitious agenda and it has an ambitious mission. In fact, TASSA with this kind of constituency, this kind of potential and a strong membership can not afford to be anything else but ambitious. It has an enormous potential. As members of this community it is up to all of us to take and run with this energy, this potential and achieve great things.

I invite all of you to become a part of this effort, not only by supporting on the sidelines but by joining us on the field, to make TASSA better.

Murat Tarimcilar, Ph.D.
Chair, Conference Organizing Committee

Turkey played a critical role in the evolution of science and technology. The Ottomans released to Europe in one big burst the accumulated knowledge of the ancients safeguarded by the Byzantine Empire when they conquered Constantinople. The Ottomans' multiethnicity and religious tolerance substantially enabled the exchange of scholarship with Europe, subsequently fueling the Renaissance. From Europe, the sparks of science and technology crossed the Atlantic to the New World.

It is highly appropriate that TASSA aims to acquire, accumulate, and to contribute to scholarly knowledge in the United States, thus becoming an important conduit in the flow of knowledge back to Turkey, from where its seeds originated. In this role, TASSA can substantially accelerate the advancement and diffusion of scholarly knowledge in the expanded university system in Turkey.

Congratulations to this young organization, which has already accumulated a large number of registered members. May it succeed in fulfilling its mission beyond expectations; may there be many Nobel prizes in the future of its membership.

Kenan Sahin, Ph.D.
President of TIAX LLC

CONFERENCE PROGRAM

SATURDAY FEBRUARY 19, 2005

8:30 – 9:30 am	REGISTRATION AND COFFEE
9:30 – 10:30 am	WELCOME AND OPENING REMARKS
	Murat Tarimcilar, Conference Chair, The George Washington University
	Carol Sigelman, Vice President, The George Washington University
	H.E. O. Faruk Logoglu, Turkish Ambassador to the U.S.
	Kenan Sahin, Honorary Conference Chair, President, TIAX LLC
10:30 - 11:30 am	KEYNOTE ADDRESS
	Erdal Inonu, Sabanci University The History of Science in the Turkish Republic Introduced by Sabri Sayari, Institute of Turkish Studies, Washington, D.C.
11:30 - 18:00 pm	POSTER PRESENTATIONS
12:00 - 13:15 pm	LUNCH Marvin Center Grand Ballroom 3rd Floor
13:30 - 14:45 pm	ENGINEERING & APPLIED SCIENCES SESSION ENGINEERING THE FUTURE
Moderator: Panelists:	Banu Onaral, Drexel University Ali Erdemir, Argonne National Laboratory Energy and Related Technologies in the 21st Century: Challenges and Opportunities Suleyman Gokoglu, NASA Glenn Research Center Assessing Performance for Technical Research: Toward Quantitative Metrics at NASA Ozgur Sahin, Stanford University Interacting with the World at the Nanoscale
14:45 - 15:00 pm	COFFEE BREAK
15:00 - 16:15 pm	HEALTH & BIOMEDICAL SCIENCES SESSION JOURNEY OF DISCOVERY: FROM MOLECULES TO SOCIETY
Moderator: Panelists:	Murat Gunel, Yale University Sefik Alkan, 3M Pharmaceuticals Molecular basis of Immmunotherapies: War against Allergy/Asthma and Cancer Gokhan Hotamisligil, Harvard University Caught between bugs and burgers: The sad story of modern humans
16:15 - 16:30 pm	COFFEE BREAK
16:45 - 18:00 pm	SOCIAL SCIENCES & HUMANITIES SESSION ECONOMIC PERFORMANCE AND INSTITUTIONS
Moderator: Panelists:	Reza Moghadam, IMF Daron Acemoglu, MIT Understanding Productivity Differences Michael Deppler, IMF Turkey's IMF-Supported Program: Macroeconomic Performance and Institutional Reform
19:30 – 21:30 pm	RECEPTION AT THE TURKISH EMBASSY
	Hosted by H.E. Ambassador O. Faruk Logoglu 2525 Massachusetts Ave. N.W. Washington, DC 20008

SUNDAY FEBRUARY 20, 2005

8:00 – 8:45 am	CONTINENTAL BREAKFAST
8:45 – 9:30 am	PRIVATE SECTOR PERSPECTIVES ON R&D IN TURKEY
	Lutfi Yenel, Chairman, Alcatel Teletas Introduced by Abdullah Akyuz, TUSIAD-US
9:30 – 10:15 am	KEYNOTE ADDRESS ROLE OF SCIENCE AND TECHNOLOGY IN FOREIGN POLICY
	George H. Atkinson, Science and Technology Adviser to the Secretary of State Introduced by Cemal Ekin, Providence College
10:30 - 11:45 am	PAST, PRESENT & FUTURE OF U.S.-TURKISH SCIENTIFIC & TECHNOLOGICAL COOPERATION
Moderator: Panelists:	Metin Akay, Dartmouth College Kerri-Ann Jones, National Science Foundation Natalie Tomitch, National Institutes of Health Aybar Ertepinar, Turkish Council of Higher Education
11:45 – 12:00 pm	COFFEE BREAK
12:00 – 14:00 pm	WORKSHOP TASSA: A SCIENTIFIC AND TECHNOLOGICAL BRIDGE BETWEEN TURKEY & THE US
Moderators:	Cengizhan Ozturk, National Institutes of Health Levent Yanik, E-Devlet Technologies
Panelists:	Engin Atac, President, Anadolu University Metin Lutfi Baydar, President, Suleyman Demirel University Ugur Buyukburc, President, Harran University Aybar Ertepinar, Vice-President, Turkish Council of Higher Education Ambassador Robert R. Gosende, The State University of New York Major General Omer Inak, Deputy Undersecretary Ministry of National Defense Emin Kansu, Executive Council Member, Turkish Academy of Sciences Kamil Ayanoglu, Social Sectors and Coordination of the State Planning Organization Yavuz Oruc, Adviser to President of TUBITAK Ayse Soysal, President, Bogazici University Semra Ulku, President, Izmir Institute of Technology
14:00 – 14:30 pm	CLOSING SESSION: LOOKING AT THE FUTURE
	Murat Tarimcilar, Chair, Conference Organizing Committee Suleyman Gokoglu, President, TASSA

THE DEVELOPMENT OF SCIENCE IN THE TURKISH REPUBLIC

Erdal Inönü, Ph.D.
Sabanci University
Istanbul

1. Introduction

It is a great pleasure for me to address your distinguished association here in Washington and I thank your governing board for having given me this opportunity. I wish great success to TASSA in the coming years.

I shall try to summarize in an hour the development of science in the Turkish Republic. That is to say from 1923 to the present covering roughly eighty years, which also coincides with my lifetime.

2. The Ottoman Legacy

To begin with I must say something about the period prior to 1923, The Ottoman period. Unfortunately, the Republic did not inherit a scientific tradition from the empire. In fact, it is my conviction that the fundamental reason behind the continuous weakening and decline of the Ottoman Empire in the eighteenth and nineteenth centuries is their lack of understanding of the meaning and importance of the scientific revolution which took place in central and western Europe during the sixteenth and seventeenth centuries. The Ottoman case is a striking example of what happens to a country if scientific research is neglected for many years. The Ottoman rulers and their advisors did not attach any importance to the revolutionary advances made by people like Copernicus, Vesalius, Galileo, Descartes, Kepler, Newton, Leibniz, Harvey and others in the sixteenth and seventeenth centuries. The Ottoman scholars did not try to participate in developing the new fields opened up by scientific research, based on observation, experimentation and mathematical formulation of theories. The result was a continuous loss of power and general decline. When the disastrous consequences of this incredible neglect appeared on the battle field or in economic competition, the Sultans realized that something, some knowledge was missing. But since two centuries of advances already had taken place, they did not dare to go to the roots of the problem, but tried to catch up in a hurry by transferring the new knowledge, first through hiring foreign military experts and next by establishing schools of engineering and medicine. No research was carried out in these educational institutions. In the rush of trying to obtain the existing knowledge, the administrators did not allow teachers sufficient time to work actively and creatively in these new fields. They were satisfied by translating the available textbooks and teaching according to them. The idea that research is an essential and integral part of university training was not realized almost to the end by the Ottoman educational system.

There are a few individual exceptions to this picture. A few Turkish scholars received Ph. D. degrees at universities in Europe before 1923. Unfortunately, most of the people did not continue to do research after receiving their degrees. Only Kerim Erim on his return to Turkey joined Istanbul University when it was still called the Darülfünun and pursued his mathematical research there.

There are also the archaeological excavations of Osman Hamdi in Lebanon of which the findings were published in France, an original mathematics book on "Linear Algebra" by Vidinli Tevfik Pasha, published in 1882-1892. Solutions of some Diophantine equations by Mehmet Nadir, published in a French Journal in the years 1908-1911 and a few more articles on various subjects

3. The Republic Era

These scattered individual efforts were insufficient to create a scientific tradition. When the Republic was created and its leaders, beginning with Atatürk, decided to embark on a course of development based on the best use of advances in science and technology, they realized the inadequacy of the existing system. They had to start from scratch and created, in 1933, two new institutions of higher education where research would be an integral part of the academic activity. This is the famous University reform of 1933. In Istanbul, Darülfünun was abolished altogether and Istanbul University was created in its stead. In Ankara, the Higher Institute of Agriculture was created replacing the old school of Agriculture.

This was a radical reform. The majority of the teaching staff of Darülfünun were discharged and given pensions. The new staff composition was made up of young Turkish scholars who had just returned from Europe with doctoral degrees, some distinguished members of the old institution who did carry out research and refugee German scientists who had left Germany to escape political pressure of the Nazi regime. At the Ankara Agriculture Institute also, the new staff had a similar structure with the only difference that there, the visiting German staff had come officially through a cooperation agreement between the two governments. The new institutions in Istanbul and Ankara

immediately started research activity.

The output of research steadily increased up to the middle of the fifties, except for a slowing down period in the forties, caused by a fire in 1942, which burned down the building of the science faculty of Istanbul University. A more important slowing down occurred in the middle of the fifties, which was caused by adverse economic conditions.

Before continuing with the development story, I want to make a general observation. In the period of 1933-1945, research activity in all fields of pure and applied science was continued vigorously at Istanbul University under the leadership of some outstanding scientists. Many articles were published bringing appreciable contributions, in particular, to such fields as mathematics, mechanics, and medicine. However no major discoveries were made, leading for instance to a Nobel Prize. One cannot escape the impression that something was missing in all this activity.

I believe what was missing was the required cultural background for scientific research. The visiting professors did not find a sufficient number of talented young assistants who would help them develop new ideas. Competition for producing important results was absent. The foreign scientists enjoyed good living conditions but they were scientifically isolated. The conclusion I derive from this observation is that a change was needed in the cultural attitude in Turkey before achieving important results 0n a large scale. When you start from a background devoid of scientific tradition and wish to engage in ambitious research, development usually proceeds through the following steps, and takes several generations to achieve the intended results:

In the first generation a few highly talented young people appear. They follow the call of the leaders for science and manage to achieve world fame with their findings. These are the stars of the first generation, who are in the case of Turkey, people like C

Cahit Arf, Ratip Berker, Hulusi Behçet, Ihsan Ketin. They make important contributions, but they are only a few people and can not influence the public understanding of science.

In the second generation, more young people appear who intend to follow the example of the first stars. They also realize that some new infrastructure is needed to enlarge the community interested in scientific advances. They spend time to create new universities, Research Councils, Research Institutes.

In the third generation one can expect to see the beginning of a new cultural attitude in a large scale. There are now institutions to supply the necessary men and women power in sufficient numbers. There exist brilliant local examples to emulate and appreciable material and moral support from private and state sources. As a result large-scale advances become highly probable only in the third generation and after, i.e., about 75-80 years from the beginning, which in our case means the twenty first century.

Let me go back to my story. The period of stagnation in the mid fifties was overcome through an impulse which came from the U.S. President Eisenhower announced in 1953 a worldwide

programme, called "Atoms for Peace", in which American firms would set up research reactors in countries willing to sign cooperation agreements with the U.S.

With these agreements, knowledge accumulated in the U.S. during the war effort would be available for pacific uses of atomic energy. Turkey became one of the first countries who answered the Eisenhower proposal. More than that, the Turkish Government asked for and obtained a three-year research programme in fields related to atomic energy to be carried out by Turkish scientists in the U.S. before the establishment of a research reactor in Istanbul.

This programme was implemented successfully and the result was a new growth trend in the research production of Turkey.

What about the contents of these articles?

Some scientists like Gürsey, Barut, Arf, Erginsoy, Kursunoglu, Baysal, Erben, Ergun, Sinanoglu and others have received many citations. On the other hand most, if not all, of these citations

were received for work done outside Turkey. In this respect the results of a selection citation analysis is quite interesting. In this study only articles, which have received more than ten citations, are considered and the two periods of 1961-71 and 1994-2000 are compared in this respect and only for physicists.

Two important conclusions can be derived from the citation data:
1.The number of physics articles with more than ten citations based on research done in Turkey has increased in the thirty years from 1961-71 to 1994-2000 much more than the total number of articles with more than ten citations. The ratio is 23 to 1 or 20 to 1 (counting only the citations received in the same period in which the articles were written.)

2.The number of experimental articles due to research done both in Turkey and abroad has also increased appreciably.

To my mind both of these consequences indicate a cultural change toward a scientific tradition in Turkey.

In classification of countries with respect to the yearly production of their research articles in science in the year 2003, as prepared by the Institute of Scientific Information (ISI), Turkey ranks 21st, ahead of several European countries.

Turkey's rank has changed in the last twenty three years, indicating a rapid increase after 1990. I must point out however that this high rank is obtained for the total population of the country. If we make a comparison after dividing the number of articles by the population, our rank would fall quite a bit, remaining behind all the countries in Europe. Therefore we must continue vigorously to increase output.

The increase in the ratio of R-D expenses over GNDP in recent years is another indication of the slowly changing cultural attitude toward research. Every government in the past thirty years has announced its aim to bring this ratio up to at least 0.01. But the aim has not been reached. The present government has allocated a comparatively larger fund to TUBITAK for financing new research projects with the aim of reaching a figure of 0.02 in the year 2010. We shall see whether this government will be more successful.

The financial contribution of the commercial or private sector to the R-D activities is relevant to our discussion. It is also increasing slowly and I believe has reached a figure in the region of 35%. You know that in Western Europe and United States it is around 70%, largely above the figure for the universities.

The comparison of the ratio of R-D expenses over GNDP among the OECD countries indicates that, that ratio for Turkey is the lowest one.

Yet another aspect of the state of advance of a country in science and technology is the number of patents received by the citizens of that country. The data shows that there is a great lack of interest for obtaining patents, which is again a sign of a non-scientific cultural background.

There is also a gradual increase in public interest in research. Anecdotal evidence may be the use of new stamps and envelopes that promotes science and Feza Gursoy, our leading physicist.

4. Conclusion

After 80 years of efforts in the Republic, we are now at the threshold of making really important contributions to science and technology in the world. We have in Turkey the personnel with the required talent, education and ambition, and who are supplied in various institutions with the necessary hardware. What is still needed is more emphasis on research at universities, more support from the State and from the private sector and more collaboration with Turkish scientists working abroad. I am confident that the third and fourth generations of Turkish scientists will achieve the Republic's aim of reaching the contemporary level of civilization in science.

ENERGY AND RELATED TECHNOLOGIES IN THE 21ST CENTURY: CHALLENGES AND OPPORTUNITIES

Ali Erdemir, Ph.D.
Energy Technology Division
Argonne National Laboratory
Argonne, Illinois

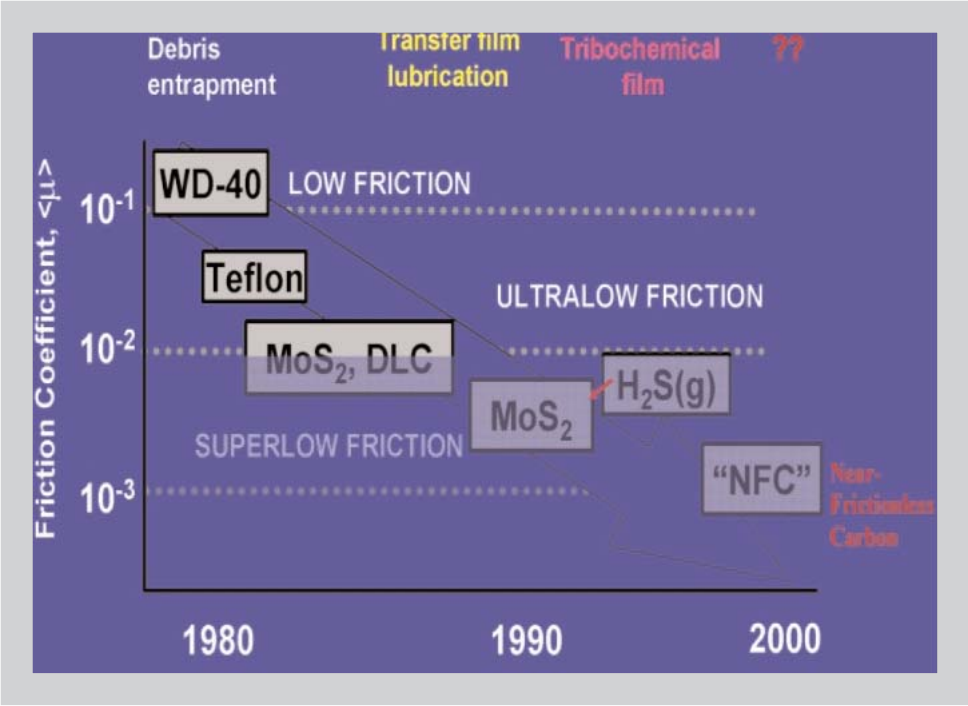
Some of the main energy resources of our planet are being depleted at an unprecedented rate and if this trend continues, by the year 2037 we will reach a peak in the amount of energy that we consume, followed by a steep decline in the years that follow. If we do not come up with some alternative energy resources, it is most likely that by the end of this century, we will run out of some of the fossil-based energy resources such as petroleum, to which we have become extremely dependent during the last century. Fossil fuels (oil, gas, and coal) account for nearly 85% of the total energy resources that we consume at present. In particular, petroleum is the most used and accounts for nearly 40% of all energy resources being in use today. With increasing demands from developing countries (in particular China and India) it is estimated that most of the remaining or recoverable petroleum reserves will dry out by 2050.

Recent comprehensive studies by some prominent research organizations and government agencies (such as EPA) have shown that mass consumption of petroleum and other fossil fuels is also the leading cause of current and future environmental crises. Specifically, the conversion of these fuels to energy is the leading cause of such pollutants as nitrogen oxides, sulfur dioxide, carbon monoxide and dioxide; as well as hydrocarbon and soot particles being released in to our environment. Global warming due to the greenhouse effect caused by some of these pollutants is also a real concern for current and future generations. Some of the near term ramifications of these greenhouse gases are: chronic respiratory disease, unexpected heat waves and severe drought, warming of sea water causing the melting of glacier ice, sudden rise in sea-levels and hence coastal flooding, etc.

Considering such a bleak outlook, what should we do in the meantime to circumvent such a situation? There are indeed several things that we can do. For example, we can simply get very serious about conserving energy. We can also re-direct our effort to further develop and use more and more renewable energy resources (such as, hydrogen, solar, and wind energy which are renewable, abundant, and clean). In particular, hydrogen looks extremely appealing for the future energy needs of all nations and it is a very hot research topic at present. As the most abundant element in our planet, it will never run out. Hydrogen can also meet most of the energy challenges associated with supply, security, environmental pollution, and the greenhouse effects mentioned above. However, there are some serious problems that need to be overcome. At the moment, there is no integrated network that links production with storage and end uses of hydrogen. Hydrogen is not yet competitive with the fossil fuel in cost, performance, or reliability, and there are no market

incentives to encourage its widespread production and uses. On top of all these, it is still very expensive to produce and store.

Besides looking into alternative energy resources, we can develop novel technologies that can save or conserve energy. Among others, reducing or eliminating the sources of friction in cars, trucks, and other moving mechanical assemblies can help a lot. In the United States alone, economic losses resulting from friction and wear related problems in moving mechanical assemblies are estimated to be $500 billion per year. In a passenger car, nearly 75% of the fuel's energy is consumed by the engine alone and nearly 25% of this is due to friction or inadequate lubrication. As part of our research on reducing friction and wear in moving mechanical assemblies at Argonne National Laboratory, we have developed several novel materials and coatings that nearly vanishes friction and wear between sliding surfaces. One of these coatings, called "near-frictionless carbon" or NFC has a friction coefficient as low as 0.001 (see Figure 1). This material is now considered as the lowest friction material ever developed. In another research activity, we have discovered that boric acid is an effective solid lubricant that can dramatically reduce friction and wear. In collaboration with scientists at Istanbul Technical University, we have also developed novel nanocomposite super hard coatings that literally eliminate wear between sliding engine parts and reduce friction by factors of 3 to 5. In short, it is indeed possible to conserve energy by controlling friction and wear in transportation systems and other moving mechanical assemblies. Our research at Argonne has been directed toward such new technologies that can save energy and at the same time protect our environment.



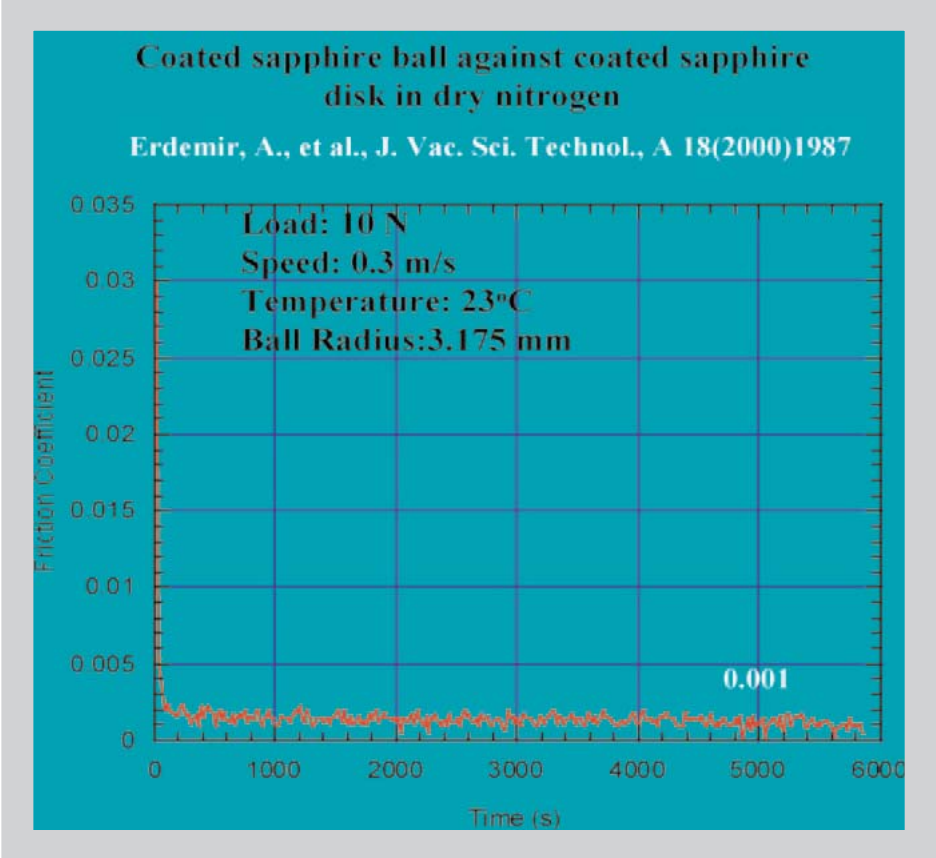


Figure 1. Typical friction coefficient of NFC film which is now considered as the lowest friction material.

ASSESSING PERFORMANCE FOR TECHNICAL RESEARCH: TOWARD QUANTITATIVE METRICS AT NASA

Suleyman Gokoglu, Ph.D.
NASA Glenn Research Center
Cleveland, Ohio

Research institutions are increasingly being asked to assess their performance from both the stakeholders' and customers' perspective. There is a need to develop quantitative measurements from which technical research performance can be analyzed and assessed. The subject has significant relevance to the Turkish American Scientists and Scholars Association (TASSA) because its first purpose as stated in its Bylaws, namely "to contribute to the social welfare and industrial development in the USA and Turkey through the promotion of education and science," requires the ability to measure the level of its fulfillment. In order to better define "success" today, scientists are typically forced to answer more difficult questions such as "So what?" or "What did we really learn?" than "Did the experiment work?" or "Did the hardware/software function properly?"

Recognizing that there are many different categories and types of metrics, and that no perfect system or answer exists, NASA decided to develop an exemplary tool applicable to its various programs and missions. After evaluating how other similar government agencies (NSF, NIH, DARPA, NIST, …) handle their research metrics, some common themes emerged. Basically, all agencies are interested in measuring performance against strategic objectives, determining when a particular research question has been answered satisfactorily, deciding future research priorities as different areas mature and evolve, and demonstrating that their research activities are implemented in an efficient manner and that taxpayers' money is spent wisely. The important difference between measuring output versus assessing outcome is keenly acknowledged. All agencies emphasize that the assessment be performed by external, independent, and non-advocate reviewers and that the reviews be done both prospectively and retrospectively. They agree that discoveries cannot be planned and that high-risk high-pay-off activities should be rewarded.

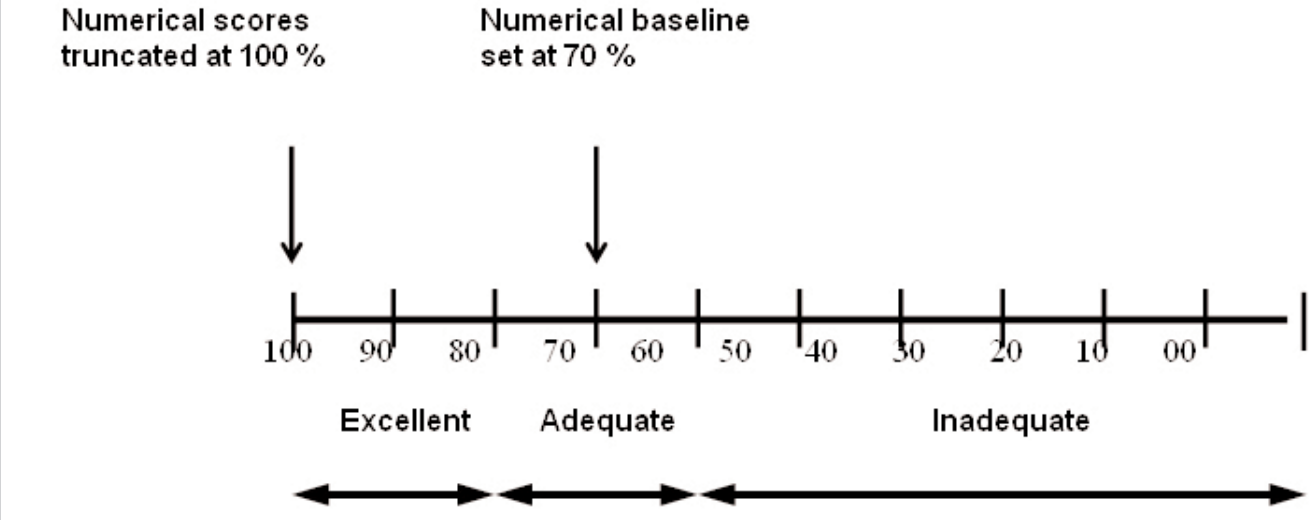
Before adopting a specific metric, NASA ascertained the following issues. Firstly, the chosen metric must add value. That is, the performance of the researchers and the output of the program must be enhanced towards achieving their goals as a result of trying to score higher for that metric. The measurement must be done relative to an established solid baseline; it should designed more to measure progress rather than "good" vs "bad." The information to be collected for evaluating a metric must be readily available. As an example, quantifying the number of students switching careers in science or engineering would be a frustrating and non-credible metric. Finally, adopted metrics should be hard to be "gamed" by easily available loopholes.

NASA decided to organize the metrics into three major and independent classes: research output, public impact, and strategic impact. These classes reflect the discipline-centric, cross-disciplinary/societal, and NASA-centric viewpoints and are evaluated with no mutual interaction from each other. Each class is then sub-divided into metric areas with weighted scores. For example, research output is determined from a weighted sum of research quality (50%), investigator quality/breadth (25%), and education (25%), whereas public impact is determined from technology development (35%), technology transfer (25%), public outreach (20%) and educational impact (20%). Finally, each metric class is further split into individual metrics with weighted scores. For example, research quality is a weighted sum of cumulative citations and journal impact factor (30%), number of refereed journal articles (20%), number of patents (10), and so on. While the research quality metric under the research output class counts the number of patents, the technology transfer metric under the public impact class would focus on the number of licensed technologies or the amount of royalties paid as more relevant. The nominal baselines for individual metrics are determined on the basis of averaging the past three years, so they are updated every year. Scores for each metric can be assigned annually and assessed relative to the established nominal baseline, as shown below:

Hence, if a metric value in a given year is the same as the average value of the past three years, it would score at 70%, which is considered "adequate." It is recommended that a non-

advocate external panel evaluates performance every three years, both retrospective and prospective.

Despite some level of arbitrariness assigned to each metric and its weighting factor, there is consensus that, in the long run, such compromising factors as program growth or budget reductions, as well as some aspects of scientific research which require longer term return on investment, would still be accounted for in a relatively fair way by this simple and practical system. Because the proposed tool is developed recently, NASA intends to test its robustness with further case studies and to consult with the members of the scientific community at large for its review. This assessment tool is not intended for measuring the performance of individuals, but only technical programs and missions.



INTERACTING WITH THE WORLD AT THE NANOSCALE

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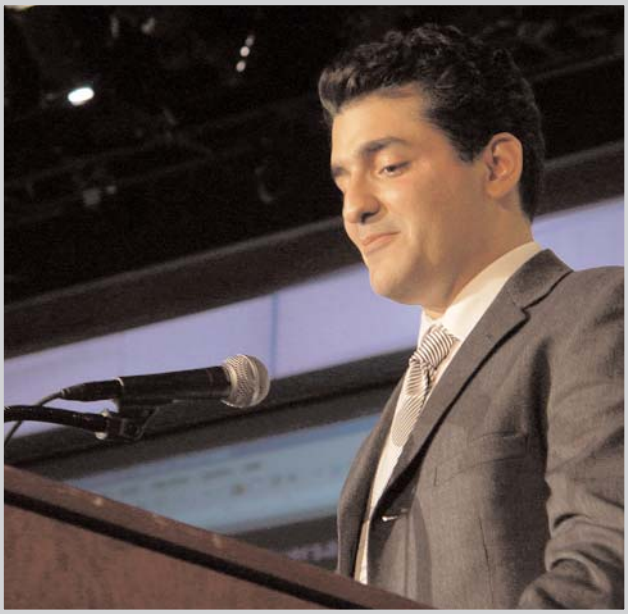
Many of the advances in life sciences and materials science depend on our ability to sense and manipulate matter at the nanometer spatial scales and single molecular level. Conventional tools for a broad range of sensing tasks mainly rely on sensing electrical and optical properties. These approaches are fundamentally limited by their sensitivity and spatial resolution as the dimensions are scaled down to the atomic level. On the other hand, mechanics is offering a great potential to interact with the world at the nanoscale. This is primarily because forces and displacements encountered in the interactions between atoms or molecules are not beyond the detection limits of our macroscopic tools.

Atomic force microscope (AFM) is a tool to map surface topography with high spatial resolution. The operation of the AFM is based on a flexible cantilever beam with an atomically sharp tip. When the tip on the cantilever makes contact with a surface, forces between the atoms at the end of the tip and the atoms of the sample in the vicinity of the contact area bend the flexible cantilever. There are various techniques that can accurately measure the deflection of the cantilever. In the simplest mode of operation, the cantilever is scanned across the sample surface, and then the deflection of the cantilever is monitored to map the topography of the surface. The sharp tip and the sensitive measurement of the cantilever deflection are the keys to resolve features as small as individual atoms and chemical bonds. Despite its success in imaging the topography of surfaces based on sensitive force measurements, AFM has a limited ability to measure mechanical properties. Measurement of mechanical properties at the nanometer length scales is an important task. At these small length scales chemical properties of materials blend in mechanical properties. A measurement of mechanical properties will tell us a lot about the chemical. Therefore a sensor capable of measuring mechanical properties at nanometer length scales will have the potential to enable detection and studies of biologically important molecules, and characterization and design of materials engineered at the nanoscale.

The most common mode of AFM operation is the tapping mode. Here the cantilever is vibrated at its resonance frequency near the surface. The tip periodically contacts the surface. Then the cantilever is scanned across the surface while vibration amplitude is monitored to map the topography. This technique eliminates the frictional forces between the tip and the sample, and reduces the damage to the sample. Therefore, it has been the dominant mode of operation. There are two quantities measured during the tapping mode operation. These are the amplitude and the phase of the vibrations. Unfortunately, these quantities only tell about the average forces between the tip and the sample. The information about the mechanical properties is hidden in the variation of forces as the vibrating probe is approaching and retracting from



the surface. Recent studies on the dynamics of cantilever motion in tapping-mode AFM has shown that there are high-frequency vibration components at the integer multiples of the driving frequency. We have shown that these higher-harmonics carry important information about the time variation of tip-sample forces and their amplitude depend on the hardness of the sample. An important problem with these higher harmonics is the low signal levels for practical applications. To increase the signal level at a higher harmonic we proposed cantilevers with special geometries. These cantilevers are designed so that one of their higher order resonance frequencies is matched to an exact integer multiple of their fundamental resonance frequency. This way a higher harmonic of the periodic tip-sample force matches with a resonance of the cantilever and excites that resonance resulting in much larger deflections of the cantilever. This way we have achieved good signal levels at a particular harmonic for practical measurements. When used in tapping mode as a replacement for the conventional cantilevers, these specially designed cantilevers provide extra information at the higher harmonic frequency. This enables simultaneous generation of the topography image and higher-harmonic force image. This second image is a map of the mechanical properties of the sample. We have fabricated these special cantilevers with a conventional silicon micro-machining technique and demonstrated its capability to enhance the vibrations at higher harmonics. We imaged samples ranging from polymers, self-assembled monolayers of organic molecules to semiconductor thin films and carbon nanotubes. These preliminary experiments show the potential of imaging with higher harmonic signals and in general the potential of mechanics for mapping chemical composition and structural variations across surfaces.

We are currently working on new generations of these special cantilevers to further enhance signal levels. A list of references on the harmonic imaging technique and the special cantilevers we developed are given below.

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MOLECULAR BASIS OF IMMUNOTHERAPY: WAR AGAINST ALLERGY/ASTHMA AND CANCER

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Our immune system consist of 1012 cells, but has to cope with 1013 other host cells (self) plus trillions of friendly microbes (non-self) that normally reside on our skin (1012), or nose/mouth (1010), or gut (1014). Besides friendly microbes, our immune system also encounters pathogenic microorganisms. Although our immune system can recognize almost any microbe, foreign antigen, or unfriendly pathogen, the number of genes devoted to host defense is very limited. How does the immune system manage to create such diverse responses so that we can cope with the microbial world? The cellular and molecular basis of antigen recognition by antigen presenting cells (APC), T-cells, and B-cells has been my principal area of interest for over thirty years. In this presentation, I will briefly review the molecular basis of immunotherapies and relate: (i) how the various components of the immune system function to protect (or harm) the host (for example, studies on Toll Like receptors, (TLRs) as bridges between innate and adaptive immunities) (ii) how Th1 and Th2 cells are regulated to undergo differentiation into naïve, central, or peripheral T memory lymphocytes [1] (also give an example of studies on HIVs' exploitation of APC to infect Th cells) [2]; (iii) how Th1 and Th2 cells contribute to the pathogenesis of allergy and asthma (for example, studies on a TLR2 agonist capable of suppressing allergic/asthmatic reactions in vivo [3]; and, (iv) how synthetic small molecules known as immune response modifiers (IRMs) [4] activate the innate and adaptive immune systems (for example, studies on TLR7 and TLR8 agonists from 3M that activate APC to produce cytokines capable of enhancing T- and B-cell function) [5]. Lastly, I will focus on new data, which suggests that the TLR7 agonist, imiquimod, and the dual TLR7/TLR8 agonist, resiquimod, can act as potential anticancer agents.

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CAUGHT BETWEEN BUGS AND BURGERS: THE SAD STORY OF MODERN HUMANS

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The major interest of Dr. Hotamisligil is to study the regulatory pathways, which control energy metabolism. Dr. Hotamisligil's talk at this conference was an insightful look at the evolution of the dietary and environmental changes that affect the health of human beings today. A global perspective of related important health problems was also given. It was a colorful journey between topics like infections, inflammation, immunology, nutrition, various diseases and novel treatment ideas. Since it contained some unpublished research, we include here only a brief introduction to Dr. Hotamisligil's work. Detailed information can be reached at http://www.hsph.harvard.edu/GSH-LAB/index.html.

The research work at the Harvard Hotamisligil Laboratory can be divided into three major areas of research:

1. Lineage Commitment and Differentiation of Adipocytes and Control of Energy Metabolism: One of the most fundamental questions in biology is how different cell types commit to the specific lineages and regulate their terminal differentiation program. To understand this process, adipogenesis (fat tissue generation) is used as a model system and the molecules that control early stages of differentiation in these cells are studied. Through this line of research, it is hoped to generate insights into the process of adipocyte (fat cell) differentiation and the integration of positive and negative hormonal and metabolic signals that regulate the program of differentiation, which could assist the development of new tools for prevention and treatment of obesity.

2. Inflammation, Stress and Metabolic Diseases: Studies have clearly demonstrated that adipocytes produce and regulate many metabolic and hormonal signals, which generate profound effects on systemic endocrine equilibrium. In studies done by Hotamisligil et al , it is demonstrated that these cells exhibit an inflammatory capacity which is abnormal in obesity and key to the pathogenesis of insulin resistance and diabetes. Recently, they identified a key molecular mechanism underlying the link between inflammatory responses and insulin action. Currently, the detailed molecular mechanisms underlying this crosstalk are being investigated and therapeutic and preventive possibilities for diabetes and obesity by blocking JNK function are explored. The molecular mechanisms of the crosstalk between inflammatory and metabolic pathways have recently led to the discovery of endoplasmic reticulum stress as the central mechanism linking metabolic stress with insulin resistance and type 2 diabetes. The mechanisms leading to ER stress and targeting these pathways for novel therapeutic strategies are also being explored.

3. Lipid Trafficking, Signalling and Biology of Fatty Acid Binding Proteins: The nutrient content of diet has a profound influence on a number of vital physiological pathways.

Furthermore, a strong link exists between the dietary trends and a number of common diseases such as cancer, diabetes and atherosclerosis. Dr. Hotamisligil's team approaches the molecular basis of these interactions by focusing on fatty acid-mediated transcriptional regulation in cells and the biological role of fatty acid binding proteins (FABP) as molecules involved in intracellular lipid trafficking. Using FABP-deficient animals and cells as model systems, Hotamisligil et. al. is trying to establish the components of the signaling pathway that is controlled by FABPs and the mechanisms by which these pathways are linked to inflammatory and metabolic responses. It is hoped to generate insights into the mechanisms leading to obesity, diabetes and atherosclerosis and create novel preventive and therapeutic opportunities.

TURKEY'S IMF-SUPPORTED PROGRAM: MACROECONOMIC PERFORMANCE AND INSTITUTIONAL REFORM

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Washington, DC

Turkish economic performance since the 2001 crisis has been remarkably successful. Economic growth has averaged close to 7 percent each year since 2002, inflation has fallen to single digits and the floating exchange rate has proved strong and stable. This contrasts with the 1990s, where inflation reached triple digits and growth was extremely volatile.

What explains this transformation? Though substantial financial assistance from the international community helped buy time during the crisis, the main reason is the implementation of more orthodox fiscal and monetary policy. The government increased its primary surplus by 8 percent of GNP - from a deficit of 1½ percent of GNP in 1999 to a surplus of more than 6 ½ percent of GNP in 2004. This lowered the overall deficit (including interest payments) from 20 percent in 2001 to 6 percent of GNP in 2004. Central bank independence - and setting price stability as the clear goal - has also resulted in the much more skilful conduct of monetary policy.

Paradoxically, these tight fiscal and monetary policies have been anything but tight for the real economy. By making the government debt more sustainable, tighter fiscal policy reduced the risk premium and brought real interest rates down. By reducing its borrowing demands, the government has freed up banks to lend to the real economy. And lower inflation itself has helped stimulate domestic demand, through much lower nominal and real interest rates.

This improvement in economic policies would not have been possible without institutional reform, which has been central to the economic program. Aside from central bank independence and the gradual shift to inflation targeting, the recapitalization of the state banks and the creation of a fully independent Banking Regulation and Supervision Agency has helped stabilize the financial sector. The budget has been made more transparent and its coverage broadened. Special expenditures and revenues have been brought into the central budget, the number of extra-budgetary funds reduced, and those remaining must have their budgets approved by Parliament. The government has also taken steps to improve the private sector business climate, including the formation of an Investor Council and passage of the Foreign Direct Investment Law.

Continued implementation of these reforms offers the best prospect for sustaining the economic transformation of the last four years.

EXAMINING THE ROOTS: THE ROLE OF GEOGRAPHY AND INSTITUTIONS IN ECONOMIC DEVELOPMENT

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Tremendous differences in incomes and standards of living exist today between the rich and the poor countries of the world. Average per capita income in sub-Saharan Africa, for example, is less than 1/20th of per capita income in the United States. Explanations for why the economic fortunes of countries have diverged so much abound. Poor countries, such as those in sub-Saharan Africa, Central America or South Asia, often lack functioning markets, their populations are poorly educated, and their machinery and technology are outdated or nonexistent. These are, however, only proximate causes of poverty, begging the question of why these places don't have better markets, better human capital, more investments, better machinery, and better technology. There must be some fundamental causes, leading to these outcomes, and via these channels, to dire poverty.

The two main candidates to explain the fundamental causes of differences in prosperity between countries are geography and institutions. The geography hypothesis, which has a large following both in the popular imagination and in academia, maintains that the geography, climate, and ecology of a society's location shape both its technology and the incentives of its inhabitants. The geography hypothesis emphasizes "forces of nature" as a primary factor in the poverty of nations. The alternative, the institutions hypothesis, is about "man-made" influences. According to this view, some societies are organized with "good institutions" that encourage investment in machinery, in human capital, and in better technologies, and consequently, achieve economic prosperity.

Three crucial elements comprise "good institutions": first, enforcement of property rights for a broad cross-section of society, so that a variety of individuals have incentives to invest and take part in economic life; second, constraints on the actions of elites, politicians, and other powerful groups so that these people cannot expropriate the incomes and investments of others in the society or create a highly uneven playing field; and finally, some degree of equal opportunity for broad segments of the society, so that they can make investments, especially in human capital, and participate in productive economic activities. These good institutions contrast with conditions in many societies of the world throughout history and today, where the rule of law is selectively applied, property rights are nonexistent for the vast majority of the population, the political and economic power of elites is without bounds, and only a small fraction of citizens have access to education, investment, and production opportunities.

Geography's influence

If you want to believe that geography matters, look at a world map. Locate the poorest places in the world, with per capita income levels less than 1/20th of the United States. You will find

almost all of them close to the equator, in very hot regions with periodic torrential rains, in places where, by definition, tropical diseases are widespread.

However, this evidence does not establish that geography is a first-order influence on prosperity. It is true there is a correlation between geography and prosperity. But correlation does not prove causation. Most important, there are often omitted factors driving the associations we observe in the data.

Similarly, if you look around the world, you'll see that almost no wealthy country achieves this position without institutions protecting the property rights of investors and placing some degree of control over the government and elites. Once again, however, this correlation between institutions and economic development could reflect omitted factors or reverse causality.

To make progress in understanding the relative roles of geographic and institutional factors, we need to find a source of "exogenous" variation in institutions, in other words, a "natural experiment" where institutions change for reasons unrelated to potential omitted factors (and geographic factors remain constant, as they almost always do).

The colonization of much of the globe by Europeans starting in the 15th century provides such a natural experiment. The colonization experience transformed the institutions in many lands conquered or controlled by Europeans, but, by and large, had no effect on their "geographies". Therefore, if geography is the key factor determining the economic potential of an area or a

country, the places that were rich before the arrival of the Europeans should continue to be rich after the colonization experience, and in fact still be rich today. In other words, since the key determinant of prosperity remains the same, we should see a high degree of persistence in economic outcomes. If, on the other hand, it is institutions that are central, then those places where good institutions were introduced or developed should get richer compared to those where Europeans introduced or maintained extractive institutions to extract resources or exploit the non-European population.

Historical evidence suggests that Europeans indeed pursued very different colonization strategies, with very different associated institutions, in various colonies. At one extreme, Europeans set up exclusively extractive institutions, exemplified by the Belgian colonization of the Congo, slave plantations in the Caribbean or forced labor systems in the mines of Central America. These institutions introduced neither protection for the property rights of regular citizens nor constraints on the power of elites. At the other extreme, Europeans founded a number of colonies where they created settler societies, replicating-and often improving-the European form of institutions protecting private property. Primary examples of this mode of colonization include Australia, New Zealand, Canada, and the United States. The settlers in these societies also managed to place significant constraints on elites and politicians, even if they had to fight to achieve this objective.

Reversal of fortune

So what happened to economic development after colonization? Did places that were rich before colonization remain rich, as suggested by the geography hypothesis? Or was there a systematic change in economic fortunes associated with the changes in institutions?

The historical evidence shows no evidence of the persistence suggested by the geography hypothesis. On the contrary, there is a remarkable "Reversal of Fortune" in economic prosperity. Societies like the Mughals in India, and the Aztecs and the Incas in America that were among the richest civilizations in 1500 are among the poorer societies of today. In contrast, countries occupying the territories of the less-developed civilizations in North America, New Zealand and Australia are now much richer than those in the lands of the Mughals, Aztecs and Incas. Moreover, the reversal of fortune is not just confined to this comparison. Using various proxies for prosperity before modern times, we can show that the reversal is a much more widespread phenomenon. For example, Figures 1 and 2 here show a strong negative relationship between urbanization rates in 1500 and income per capita today, and between population density in 1500 and income per capita today. Before industrialization, only relatively developed societies could sustain significant urbanization and high levels of population, so urbanization rates and population density are relatively good proxies for prosperity before European colonization. These figures therefore show that the former European colonies that are relatively rich today are those that were poor and sparsely-settled before Europeans arrived.

This reversal is prima facie evidence against the most standard versions of the geography hypothesis discussed above: it cannot be that the climate, ecology or disease environments of the tropical areas condemn these countries to poverty today, since these areas with the same climate, ecology and disease environment were richer than the temperate areas 500 years ago. Although it is possible that the reversal may be related to geographic factors that have time-varying effects on economic prosperity, for example because certain characteristics that first cause prosperity then condemn nations to poverty, a more detailed look at the evidence shows that there is no evidence of any such factors or any support for "sophisticated" geography hypotheses of this sort.

Is the reversal of fortune consistent with the institutions hypothesis? The answer is yes. In fact, once we look at the variation in colonization strategies, we see that the reversal of fortune is exactly what the institutions hypothesis predicts. European colonialism made Europeans the politically powerful group with the capability to influence institutions more than any

From right to left Dr. Daron Acemoglu, MIT, Dr. Reza Moghadan, IMF and Dr. Michael Deppler, IMF

indigenous group was able to at the time. In places where Europeans did not settle and thus did not care much about aggregate output or welfare, in places where there was a large population to be coerced and employed cheaply in mines or in agriculture, or simply taxed, in places where there was a lot to be extracted, Europeans pursued the strategy of setting up extractive institutions or taking over already existing extractive institutions and hierarchical structures. In those colonies, there were no constraints on the power of the elites (which were typically the Europeans themselves and their allies) and no civil or property rights for the majority of the population; in fact, many of them were forced laborers or slaves. Contrasting with this pattern, in other colonies where there was little to be extracted, where most of the land was empty, where the disease environment was favorable, Europeans settled in large numbers and developed the laws and institutions of the society to ensure that they themselves were protected, both in their political and economic lives. In these colonies, the institutions were therefore much more conducive to investment and economic growth.

This evidence does not mean that geography does not matter at all, however. Which places were rich and which were poor before Europeans arrived might have been determined by geographic factors. These geographic factors also likely influenced the institutions that Europeans introduced, as illustrated by the example of the climate and soil quality in the Caribbean, which made it productive to grow sugar, encouraging the development of the plantation system based on slavery. What the evidence shows instead is that geography neither condemns a nation to poverty nor guarantees its economic success. If you want to understand why a country is poor today, you have to look at its institutions, not at its geography.

No natural gravitation

If institutions matter so much for economic prosperity, why do some societies choose or end up with bad institutions? Moreover, why do these bad institutions persist even long after their disastrous consequences are apparent? Is it an accident of history, the result of some misconceptions or mistakes by societies or their policy-makers? Recent empirical and theoretical research suggests that the answer is no: there are no compelling reasons to think that societies will naturally gravitate towards good institutions. Institutions not only affect the economic prospects of nations, but are also central to the distribution of income among various individuals and groups in society - in other words, institutions not only affect the size of the social pie, but also how it is distributed. This perspective implies that a potential change from dysfunctional and bad institutions toward better ones that will increase the size of the social pie may nonetheless be blocked when such a change significantly reduces the size of the slice that powerful groups receive from the pie and when they cannot be credibly compensated for this loss.

That there is no natural gravitation towards good institutions is illustrated by the attitudes of the landed elites and the emperors in Austria-Hungary and in Russia during the nineteenth century, who blocked industrialization or even the introduction of railways and protected the old regime because they realized capitalist growth and industrialization, would reduce their power and their privileges.

Similarly, European colonists did not set up the institutions to benefit society as a whole. They chose good institutions where it was in their interests, because they would be the ones living under the umbrella of these institutions as in much of the New World. In contrast, they introduced or maintained already-existing extractive institutions when it was in their interest to extract resources from the non-European populations of the colonies, as in much of Africa, Central America, the Caribbean and South Asia. Furthermore, these extractive institutions showed no sign of gravitating towards better institutions, either under European control or once these colonies gained independence. In almost all cases, we can link the persistence of extractive institutions to the fact that, even after independence, the elites in these societies had a lot to lose from institutional reform. Their political power and their claim to economic rents rested on the existing extractive institutions, as best illustrated by the Caribbean plantation owners, whose wealth directly depended on slavery and extractive institutions. Any reform of the system, however beneficial for the country as a whole, would be a direct threat to them.

European colonialism is only one part of the story of the institutions of the former colonies, and many countries that never experienced European colonialism nonetheless suffer from institutional problems (while certain other former European colonies have arguably some of the best institutions in the world today). Nevertheless, the perspective developed in this article applies to these instances as well: institutional problems are important in a variety of instances, and in most of these, the source of institutional problems, and the difficulty of institutional reform, lies in the fact that any major change will create winners and losers, and these potential losers are often powerful enough to resist change.

The persistence of institutions and potential resistance to reform do not mean that institutions are unchanging. There is often significant institutional evolution, and even highly dysfunctional institutions can be successfully transformed, as the example of Botswana, which managed to build a functioning democracy after its independence from Britain and become the fastest-growing country in the world, demonstrates. Institutional change will happen either when groups that favor change become powerful enough to impose it on the potential losers, or when societies can strike a bargain with potential losers so as to credibly compensate them after the change takes place, or perhaps shield them from the most adverse consequences of these changes. Recognizing the importance of institutions in economic development and the often-formidable barriers to beneficial institutional reform is the first step towards significant progress in jump starting rapid growth in many areas of the world today.

PRIVATE SECTOR PERSPECTIVES ON R&D IN TURKEY

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Chairman, Alcatel Teletas
Istanbul

First, let me highlight some important facts about Turkey. Its population is very young, 30% of 70 Millions are under 15 years old. It forms a bridge between Europe and Asia. It has a large domestic market, high growth rate and growing fast on export. Let's look at the last three in detail:

Large Domestic Market:

• 70 million population with 15 million households
• GDP per capita: $4112
• GDP per capita (PPP): $7,213 in 2004.

Turkey achieved very high GDP growth rates in the last 3 years:

• 7.9% (2002), 5.9% (2003), 10% (2004)
• GDP: From $182 Billion in 2003 to $292 Billion in 2004

Fast growing exports:

• Total exports grew by 16% in 2002, 30% in 2003, 34% in 2004
• In absolute terms: $36 billion in 2002, 47 billion in 2003, 63 billion in 2004

Leading export sectors of Turkey

• TV industry: Total production 22 million (14% world production, 17 million exported to EU)
• Automobile: 1996: $ M 800 to 2004 $M 8,094 (producers: Mercedes-Benz, Toyota, Ford, Fiat, Renault, Honda, Hyundai)
• Textile: Many famous brands (Levi's, Hugo Boss, Armani, Banana Republic, GAP, Mavi Jeans…)

What is the driver behind fast growing economy?

• The biggest driver/challenge is the new –enlarged- domestic market: Population of EU-25 is nearly half-a-billion with high purchasing power. (Customs Union with EU)
• Total trade between Turkey and EU is expanding: $M 7.2 (1990), $M 14.5 (2000), $M 32.4 (2004) in terms of export, $M 13.8 (1990), $M 26.6 (2000), 42.3 $M (2004) in terms of import.

Key for further growth:

• Turkey is an industrial economy, 93% of Turkish exports are industrial products.
• Maintaining growth is possible only by creating high value added products through innovation and advanced technologies.
• Further growth needs to be strengthened in the following capabilities:

- Products Differentiation
- Cost Improvements
- Improvements in Quality
- Adaptability to the Market Needs
- Flexibility
- Speed on Deliveries and Product Development Cycles

Who Is behind the transformations in Turkey

• Turkish Government

- E-Transformation Council Headed by Deputy Prime Minister
- TUBITAK: The Scientific And Technical Research Council of Turkey
- TTGV: Technology Development Foundation of Turkey
- KOSGEB: Small and Medium Industry Development Organization
- Ministry of Education

• Universities

- Technoparks and Incubators: ITU, Bogazici, METU, Bilkent, etc

• European Union

- 6. Frame Program
- E-Europe Initiative

• World Bank

- Supports E-Government Initiative

• TUSIAD

- National Quality Awards and Congress : Co-Founder ; KALDER
- National Technology Awards and Congress : Co-Founder ; TUBITAK- TTGV
- E-Government Awards and Congress : Co-Founder ; Turkish Informatics Foundation

A survey was conducted in Europe and the US about Turkish products. The question asked to the consumers was: “What is the first thing that comes to your mind when you see a ‘made in Turkey’ tag?” Answers: excellent quality, high tech, expensive. It is a dream that may come through. Think about the products which were “Made in Japan” 30 years ago.

SCIENCE AND TECHNOLOGY IN 21ST CENTURY GLOBAL AFFAIRS

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Science and Technology Adviser to
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Washington, DC

The centrality of scientific research, and especially the technology that emerges from advances in science, is a hallmark of the most developed and economically successful societies. Indeed, a strong case can be made that modern societies are largely shaped by their access to technology. An even more critical criterion for ensuring future success is a society's expertise in the scientific knowledge underlying that technology. Such expertise is primarily obtained through a quality education system capable of adjusting to the rapidly changing nature of scientific research and the demands of the society itself.

The correlation between the well-being of a society and its educational and research infrastructure is evident in modern times. As the United States assumed a leadership position in science and technology (S&T) during the middle of the 20th century, it developed a new approach to supporting scientific research and developing associated technology. Governmental and public appreciation, and therefore financing, of basic research increased dramatically, but so did expectations of significant technological results of economic and societal value. In general, the United States model has fulfilled the expectations, as evidenced by the extent to which this model has been emulated worldwide. The success of the United States, however, has continued to accelerate to the point that currently, the S&T gap between the United States and even its closest competitors in Europe and Asia is substantial. The S&T differences between the United States and many developing countries, both real and imagined, are so large that they create a significant "intellectual divide" which underlies a range of societal instabilities. These characteristics of modern S&T, and the societal differences it can create, suggest strongly that S&T should be an important element in the formulation and implementation of global policy.

The optimistic view would also suggest that the S&T represents a critical tool for addressing many of the pivotal global policies issues of our time. Daily developments reported publicly highlight numerous examples, including infectious diseases; public health and quality of life for an aging population; affordable, environmentally acceptable energy sources; molecular medicine and therapies based on genomics; disruptive technologies that dramatically alter the work force; genetically-modified foods and pharmaceuticals; the potential uses of nanotechnologies; and xenotransplantation of animal organs into humans.

Yet the interface between scientists and governmental policy makers remains difficult to cross. The policy community is largely devoid of scientific expertise and experience, and the S&T community is comfortably absent from most policy discussions. This trend toward a divergence between the policy and scientific

communities benefits neither. The growing importance of S&T in so many aspects of 21st century societies, including issues of economics, social structure, and health extending even to ethical principles, demands that this trend be reversed quickly.

Recognition of the overall success of the United States system in advancing scientific research and in converting those advances into viable economic enterprises leads one to examine its most important elements and characteristics. It is evident that consistency in supporting a well-funded educational experience throughout the elementary, secondary, and university years is the beginning of any success. In the middle of the 20th century, the United States developed a new model of strong government support for scientific research, much of it delivered through merit-based, peer-reviewed grants. This system fueled the emergence of an extensive system of public and private research universities, which became centers of state-of-the-art basic research. The success of the higher education system became a beacon to foreign students and scholars, and the universities welcome them; the foreign students in turn make significant contributions to the ongoing success of the universities. The universities develop a highly trained S&T workforce for the private sector, and a wealth of knowledge and ideas that can be developed into new products and services. The free enterprise system and patent law provide the necessary capital and opportunities for return on investment that spur the private sector to invest in R&D, and for entrepreneurs to take the risks involved in starting new companies. This integrated system has contributed significantly to creating the superpower status currently enjoyed by the United States.

The rapid pace of globalization in the 21st century presents significant societal challenges to the United States, including to its S&T system. As this system adopts a more global perspective, can it maintain its relevance to national and local needs? Can this system be maintained at its current level of success? What "lessons learned" can be identified from the past to guide modifications or must a substantially different approach be introduced? Is the model for success in the United States transferable to other societies and other times? These are the types of relevant questions facing the United States and the global community in general.

Only a cursory answer can be provided here. While such tasks are enormously complex to envision and certainly to implement, one can find a few guiding principles to consider: There is no substitute for a well-funded, consistently supported educational system focused on providing the opportunities needed to maximize human potentials.

A research system centered in Universities for long-term projects and in the private sector for short-term development activities is a critical component. Both must be open and have a welcoming attitude toward the global S&T community that optimizes collaboration and exchange of people. This model mobilizes, integrates, and focuses the best human resources on the complex S&T problems of our time.

A viable, energized commercialization community capable of efficiently recognizing and converting scientific advances into products and services of value to humankind makes it possible for the benefits of scientific research to be realized in the economy.

INTERNATIONAL COOPERATION: NSF PERSPECTIVE

Kerri-Ann Jones
Office of International Science and Engineering
National Science Foundation (NSF)
Arlington, Virginia

Dr. Jones started with brief overview of NSF (National Science Foundation). The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…" With an annual budget of about $5.5 billion, NSF is the funding source for approximately 20 percent of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing.

Dr. Jones summarized NSF mission as "Enabling the nation's future through discovery, learning and innovation". She stressed the following points for NSF:

- Independent Agency
- Supports basic research & education
- Uses grant mechanism
- Low overhead; highly automated
- Discipline-based structure
- Cross-disciplinary mechanisms
- Use of Rotators/IPAs
- National Science Board

Some interesting numbers about NSF:

- Proposals evaluated in FY 2004 through a competitive process of merit review: 44,000
- New awards funded in FY 2004: 11,000
- Scientists & engineers who evaluate proposals for NSF each year: 58,000
- Proposal reviews done each year: 250,000
- Students supported by NSF Graduate Research Fellowships since 1952: 40,000
- People (researchers, postdoctoral fellows, trainees, students) NSF directly supports: 200,000

There are also other specific responsibilities and programs of NSF: 1) Polar Programs like U.S. Antarctic Program 2) Keeping Science Resources Statistics (Data collection and analysis, Science and Engineering Indicators) 3) International activities. This part is maintained in close cooperation with state department.

NSF's international objectives are:

- Advance the frontiers of science and engineering
- Enable an educated U.S. S&E workforce through international research and education experiences
- Build and strengthen effective international collaborations and institutional partnerships

Specific programs are designed as a menu of activities to address people at various career points, needs of supports for varying duration recognizing differences in disciplines, individuals and institutions:

- International research experiences for students
- Postdoctoral Fellowships
- International elements as part of the broader NSF portfolio
- Partnerships for International Science and Engineering NSF-TUBITAK collaboration started with exchange of letters in1996.

Dual dedicated grants undergo parallel review and parallel funding. Approximately 20 awards are funded each year. If we look at the grants the topics of interest are mostly in oceanography, geophysics (seismic activity), electronic materials and Biological/environmental.

For more information:

NSF: www.nsf.gov

NSF Office of International Science and Engineering,
http://www.nsf.gov/div/index.jsp?div=OISE

NSF Africa, Near East & South Asia (ANESA) Regional Resources
http://www.nsf.gov/od/oise/anesa.jsp

OISE new programs: Dear Colleague Letter
http://www.nsf.gov/pubsys/ods/getpub.cfm?ods_key=nsf04034

Planning Visits & Workshops
http://www.nsf.gov/pubsys/ods/getpub.cfm?ods_key=nsf04035

Developing Global Scientists
http://www.nsf.gov/pubsys/ods/getpub.cfm?ods_key=nsf04036

The specifics for preparation of proposals are in "Proposal Preparation Guide"
http://www.nsf.gov/pubsys/ods/getpub.cfm?gpg

TUBITAK-NSF joint program info at TUBITAK web side:
http://www.tubitak.gov.tr/uidb/nsf.html

U.S.-TURKEY COLLABORATION IN THE LIFE SCIENCES: NIH PERSPECTIVE

Natalie Tomitch, MPH, MBA
Program Officer for Eurasia and
Central and Eastern Europe
Fogarty International Center (FIC)
National Institutes of Health (NIH)
Bethesda, Maryland

The mission of FIC is to promote and support scientific research and training internationally to reduce disparities in global health and to prepare current and future health scientists in the U.S. and abroad to meet global health challenges "Science for Global Health".

Natalie Tomitch talked about the NIH Perspective on collaboration between U.S. and Turkey in the life sciences. The outline of her presentation was as follows:

• Overview of NIH structure and funding of international collaboration.

• FIC research and training programs, opportunities for funding in the CEE region.

• Examples of U.S.-Turkish collaborations funded by FIC and other NIH Institutes and Centers.

One of the ways NIH fulfills its mission is by supporting the research of non-Federal scientists in universities, medical schools, hospitals, and research institutions throughout the country and abroad. Foreign scientists are eligible to apply for NIH International Research Grants as principal investigator or co-investigator to pursue research in any area normally funded by NIH but, application must address two questions:

" Why is the research being done abroad? The foreign principal investigator must demonstrate a special opportunity to further health research not readily available in the U.S. (Special opportunity = special expertise or access to equipment, resources, or populations)

• What is the benefit to the US population?

NIH currently supports more than 150 collaborative research and training projects involving CEE (including multi-site trials), demonstrating a significant investment of funding and expertise (more than $7 Million USD in Fiscal Year 2003). NIH International Research & Training Support Mechanisms fall into three categories:

• Domestic Award with a Foreign Component, including FIRCA (most common mechanism in the form of R01, R03, R21, D43 grants).

• Direct Award to a foreign institution is rare but the trend is increasing.

• Research Training grants.

FIC Research Grant Programs:

• Fogarty International Research Collaboration Award (FIRCA)

• Ecology of Infectious Diseases

• Global Health Research Initiative Program for New Foreign Investigators (GRIP)

• International Cooperative Biodiversity Groups (ICBG)

• International Studies on Health and Economic Development

• International Tobacco and Health Research and Capacity Building

• Health Environment and Economic Development (HEED)

• Brain Disorders in the Developing World: Research Across the Lifespan

• Stigma and Global Health Research Program

Fogarty Int'l Research Collaboration Award (FIRCA) supports

international research partnerships between NIH-supported U.S. scientists and collaborators in developing nations and countries in transition. It provides $32,000 per year (up to 3 years) for equipment and supplies for foreign lab, travel, and stipend for the foreign principal investigator. There are four reviews cycles per year and CRISP database lists current DHHS research projects (NIH, CDC, FDA, AHRQ) at http://crisp.cit.nih.gov.

U.S.-Turkey Research FIRCA Grants are:

• Genetic variability of Entamoeba Histolytica in Turkey.

University of Virginia (Petri, W.)

Gulhane Military Medical Academy (Tanyuksel, M.)

• In vivo correlates of altered red blood cell aggregation.

University of Southern California (Meiselman, R.)

Akdeniz University Medical Center (Baskurt, O.)

• Triggering mechanism for migraine headaches.

Massachusetts General Hospital (Moskowitz, M.)

Gazi University (Bolay, H.)

• Predicting Substrate Specificity in HIV-1 Protease.

University of MA Medical School (Schiffer, C.)

Bogazici University (Haliloglu, T.)

U.S.-Turkey Research Grants with other NIH Institutes:

• Human Epilepsy Genetics: Neuronal Migration Disorders (NINDS).
Beth Israel Deaconess Medical Center (Walsh, C.)

Hacettepe University (Topcu, M.)

• Surgical Treatment for Ischemic Heart Disease: STICH (NHLBI).

Duke University Medical Center (Jones, R.)

Uludag University (Ener, S.)

• Immune System Development and the Genesis of Asthma (NHLBI).

Brigham and Women's Hospital (Lily, C.)

Hacettepe University (Kalayci, C.)

• Assessing Genetic Diversity in E. Histolytica (NIAID)

Stanford University (Singh, U.)

Gulhane Military Medical Academy (Tanyuksel, M.)

Global Health Research Initiative Program for New Foreign Investigators (GRIP) is designed to;

• Promote productive re-entry of NIH-trained foreign investigators into home countries.

• Enhance research infrastructure and stimulate research on high-priority health issues in developing countries.

• Advance NIH efforts to address health issues of global import.

GRIP provides up to $50,000 per year for 5 years. Individual eligibility criterias are; (i) trained under the FIC D43 training grants, the NIH Visiting Program, or NIDA's Fellowships, (ii) investigator has to be from developing or low-income country, (iii) investigator must be returning to developing or low-income country, (iv) investigator has to be soon completing or recently completed training (within 3 years), (v) finally, research conducted must relate to scientific priorities of the country or region.

Brain Disorders in the Developing World: Research Across the Life Cycle. Yale University (Leventhal, J.) Ankara University (Ertem, I.):

Enormous burden of disease is posed by mental illness and brain disorders. This group of disorders is the leading contributors of all years lived with disability (YLDs) globally. Phases and long term goal of this grant program;

• Phase I: planning grants to assess needs, develop collaborations, gather resources, conduct feasibility and pilot studies.

• Phase II: Request for application is to be issued in 2005 for RO1s.

Long term goal is to build sustainable research capacity in neurological/ developmental impairment. Current funding in Turkey is based upon the development of infrastructure and strengthening capacity to conduct research on the recognition, prevention, and treatment of developmental problems and disabilities in children.
FIC Research Training Grant (D43) provides opportunities for scientists and health professionals from low- and middle-income nations to train at the Ph.D., Masters, and post-doctoral levels while working on international research projects. These grants are designed, (i) to support training of scientists for building of research capacity in developing nations and countries in transition, (ii) they are institutional training grant to U.S. universities and non-profit research institutions in response to a specific request for application, and (iii) the awardees are current NIH grant recipients with demonstrated research collaboration with foreign research institutions.

Another FIC research training grant, International Clinical, Operational, and Health Services Research & Training (ICOHRTA) supports integrated multidisciplinary, clinical, operational, and health services research and training collaborations. First series of grants focused on mental health

and drug abuse-related research training. Partners are NIDA, NIMH, NIA, NCCAM, NIDCR. ICOHRTA-AIDS/TB focuses across the full range of conditions and issues that relate to care of adult and pediatric patients with HIV/AIDS or TB. Turkey is one of the ICOHRTA sites in CEE region. The goal of program is training in clinical, prevention, and epidemiological science, with focus on children's developmental disabilities and mental health.

Other opportunities for international scientists:

• NIH Visiting Program. It provides opportunities for foreign scientists to train and conduct collaborative research at NIH. It is open to scientists at all career levels. Appointment must be requested by a senior NIH intramural scientist on behalf of the foreign scientist.

• National Institute on Drug Abuse (NIDA), international visiting scientists and technical exchange program (INVEST). It provides opportunities for foreign scientists to train and conduct collaborative research related to drug abuse at NIH. It is open to health scientists at all career levels.

• Graduate Partnerships Program (GPP). It is an exchange program between NIH and select national and international universities and institutions. In GPP, candidates must be currently enrolled in a Ph.D. program, with completed coursework, dissertation research to be performed at NIH with dual mentorship and currently, NIH has agreements and exchange programs with several European countries, further information can be obtained at http://gpp.nih.gov.

TURKISH HIGHER EDUCATION SYSTEM

Aybar Ertepinar, Ph.D.
Vice President,
The Council of Higher Education,
Ankara, Turkey

The Council of Higher Education (HEC, in Turkish YÖK) is the fully autonomous supreme corporate public body responsible for the planning, coordination, governance, and supervision of higher education. It has no political or governmental affiliation. (For more info: http://www.yok.gov.tr)

The Council is composed of 21 members: seven nominated by the Interuniversity Council, seven by the government, seven selected by the President of the Republic.

All of them are appointed by the President of the Republic for a renewable term of four years. President of the Republic appoints the President of the Council from among the Council members. The day-to-day functions of the Council are carried out by a nine full-time member Executive Board, including the President and two Vice-Presidents and all elected from among its members. The Minister of National Education represents higher education in the Parliament and can chair the meetings of the Council but has no vote.

The decisions of the Council and the universities are not subject to ratification except for the establishment of a new university or a new faculty within an existing university. However, a hidden or indirect governance of the state universities by the government stems from the public finance laws, which stipulate in minute detail the procedures to be followed in the preparation of annual budgets, procurement (including construction contracts), and auditing of expenditures, to which all public agencies are subject. This indirect governance also covers the allocation of both academic and administrative staff positions to state universities. Hence, state universities, being dependent on the governmental decisions on those two issues, do not enjoy financial and administrative autonomies.

The Interuniversity Council is an academic advisory body, comprising the rectors of all universities and one member elected by the senate of each university. In addition to those, the Turkish Rectors Conference acts in an advisory capacity to the President of the Council of Higher Education. The Center for Student Selection and Placement, ÖSYM (to all higher education institutions in Turkey) operates at the discretion of the Council of Higher Education for both Turkish and foreign nationals.

There are 53 state and 24 foundation (private non-profit) universities in Turkey which are all governed by the same Higher Education Law no. 2547 enacted on November 4, 1981. At present, enrolment in the foundation universities accounts for only 5.7 % of the total.
The structure of all higher education institutions in Turkey is similar to the structure of the US universities (4-year

undergraduate programs except medicine and veterinary medicine which are both 5 and 6-year programs respectively, graduate schools responsible for master and Ph.D. degrees and a similar credit system). However, in Turkey, 2-year vocational schools are also affiliated with universities. Link to all universities in Turkey:

http://www.yok.gov.tr/universiteler/uni_web.htm

There are universities in which medium of instruction is other than Turkish:

State Universities

- Middle East Technical University, www.metu.edu.tr (English)
- Bogaziçi University, www.boun.edu.tr (English)
- Galatasaray University, www.gsu.edu.tr (French)
- Gaziantep University, www.gantep.edu.tr (English)
- Marmara University, www.marmara.edu.tr (Polyglod)

Private Universities

- Bilkent University, www.bilkent.edu.tr/ (English)
- Koç University, ku.edu.tr/main.htm (English)
- Çankaya University, www.cankaya.edu.tr (English)
- Fatih University, www.fatih.edu.tr (English)
- Istanbul Bilgi University, www.ibun.edu.tr (English)
- Kadir Has University, www.khas.edu.tr (English)
- Maltepe University, www.maltepe.edu.tr (English)
- Sabanci University, www.sabanciuniv.edu.tr (English)

There is some limited student exchange between USA and Turkish Universities:

Many more Turkish universities have exchange protocols with US Universities (9 protocols with 29 Turkish Universities). Joint degree-dual diploma programs have started with 6 Turkish universities -AU, BOU, BU, ITU, METU, IEU with the State University of New York (SUNY) in 25 different programs, date-in - force: November 2002. First year number of applicants: 3369 (quota: 500).

	2003-2004		2004-2005	
	INCOMING	OUTGOING	INCOMING	OUTGOING
BOGAZIÇI	23	30	37	56
METU	34	7	19	16
BILKENT	17	11	14	11

European Union is aiming for:

• Mobility of qualified labor

• Compatibility and comparability of programs while keeping diversity

• More professional doctorates are encouraged for a Europe which can compete with the U.S. by 2010

• revitalize the existing agreements on education, research and create a new structure similar to NATO science fellowship programs

• Explore possibilities of building the EHEA and ERA type structures, increasing joint-dual degree programs especially in Ph. Programs

Promotion of Mobility within Europe is an action line of Bologna Process. Turkey participates in:

• Framework programs of EU (european research initiatives)
• The Bologna process in Europe
• Student and faculty exchanges
• Research partnerships

Turkey formally joined the Erasmus program in 2003.The first program was started in 2003-2004 as a pilot project in a small number of universities. In 2004-2005, 45 universities are participating in the program and the number of outgoing students is 1230 while the number of incoming students has not yet been determined.

Turkey is participating in the 6th framework program. 12 centers of excellence are chosen by commission in Turkey (balance of brain drain- brain gain). Preparations in the 7th framework program are underway.

Turkish Higher Education System by Numbers: (For 2003-2004 Academic Year)

Faculties (570)		598 236
4-year Schools (175)		62 184
2-year Vocational Schools (469)		199 604
Evening Schools:	4 year	163 320
	2 year	145 380
In-Class Total		**1 168 724**
Open Education		
	4 year	447 273
	2 year	204 997
Open Education Total		**652 270**
Graduate:		
Master		90 057
MD Specialization		10 556
PhD		24 835
Graduate Total		**125 448**
Grand Total		**1 946 442**

The Ratio of Students Abroad to Those at Home in Turkey: 3.2%. (Compare to Hong Kong 36.1%, Malasia 21.5%, Singapore 19.7%, Jordan 15.4, USA 0.2%, UK 1.3%, Japan 1.6%, Germany 2.1%, Israel 4.8%)

Student Distribution with Respect to the Type of Institution: State Universities 94.3% Foundation Universities (Non-profit private universities) % 5,7. Graduate student percentages: State 7.1%; Foundation 0.1%.

Academic Staff in 2003-2004: Prof. 10.688; Assoc. Prof. 5.121; Asst. Prof. 13.266; RA&TA 28.426, other 19.564 (grand total: 77.065), Share of foundation universities in academic staff: 6.7%, Student/Academic staff with PhD 31 for Bachelor 56 for 2-year vocational

Average Budget Allocation per Student in USD (2003): 2059 $ (of which 536$ in investments)

Budget allocated to state universities (2004): 23.2% of the education budget, 2.6% of total budget, 0.93% of GDP

R&D spending/GDP ratio: <= 0.5% up until 2000 (increasing in the last two years)

References:

1. Kemal Guruz, ”Turkish Higher Education System” (in Turkish), report 2002 (see http://www.yok.gov.tr).

2. Statistics of Council of Higher Education and OSYM.

3. TUBITAK (Turkish Scientific and Technical Research Council), ARBIS, 2004.

TASSA: A SCIENTIFIC AND TECHNOLOGICAL BRIDGE BETWEEN TURKEY AND THE USA

Moderators:

• Cengizhan Ozturk, M.D. Ph.D., NIH & Bogazici Univ.

• Levent Yanik , GWU & E-Devlet Technologies

Participants:

• Engin Atac, President, Anadolu University

• Metin Lutfi Baydar, President, Suleyman Demirel University

• Ugur Buyukburc, President, Harran University

• Aybar Ertepinar, Vice-President, Turkish Council of Higher Education

• Ambassador Robert R. Gosende, Assoc. Vice Chanc.for Int. Programs, SUNY

• Major General Omer Inak, Deputy Undersecretary Ministry of National Defense

• Emin Kansu, Executive Council Member, Turkish Academy of Sciences

• Kamil Ayanoglu, Head of Social Res. Dept., Undersec. of State Planning Org.

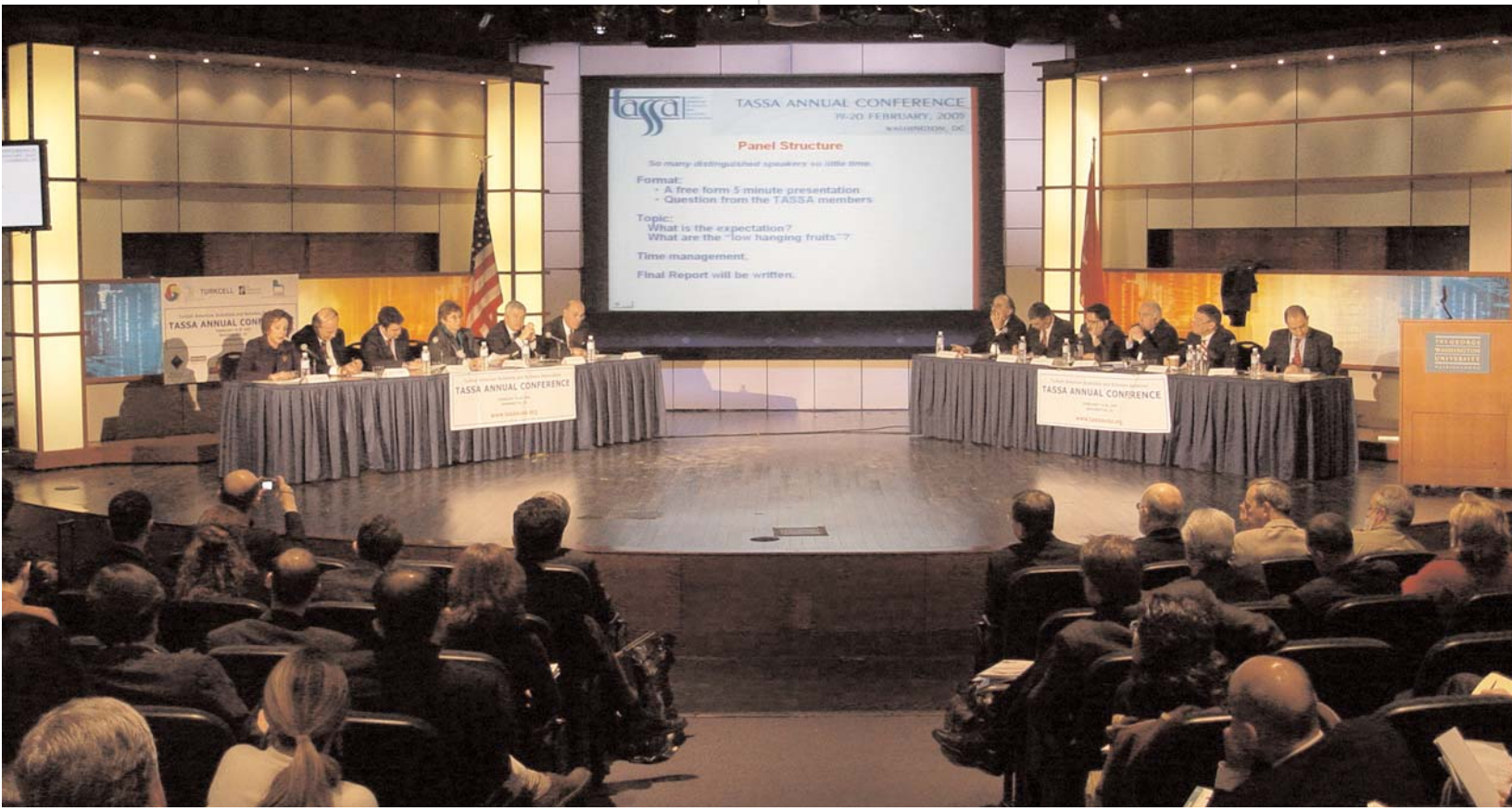
• Yavuz Oruc, University of Maryland, Adviser to President of TUBITAK

• Ayse Soysal, President, Bogazici University

• Semra Ulku, President, Izmir Institute of Technology

The session is started with a brief welcome and introduction from Dr. Ozturk. There are one round of brief position statements and institutional introduction. After each panelist had a chance to talk, panelists answered questions from the audience. The main theme was: *What is the current status of US-Turkey cooperation in science and education and what is the expectation from TASSA? What are the "low hanging fruits"?*

Bogazici University, a sponsor of the TASSA 2005 conference, was represented by its rector Prof. Soysal, who emphasized the importance of academic collaboration without the fear of brain drain, the recognition of Turkish academics abroad, the facilitation of a dialogue with them, and the importance of self-confidence in academia. She stated that:



Bogaziçi University was founded in 1863 as Robert College, the first American institution of higher education in the region. Its liberal arts curricula and its strong historical connections with institutions of higher learning in the United States have made it possible, indeed easy, for many of its graduates to attain successful academic careers within the American system, and the university itself has been a center of attraction for scholars coming from abroad. 69% of our present faculty have Ph.D.'s from overseas. More than 2/3 of these degrees have been awarded by American universities. We have active academic collaboration agreements with about 30 universities in the United States. I believe that Bogaziçi University has been, and will continue to be, a strong participant in scientific and technological cooperation between Turkey and the US, and contribute to the mission of TASSA.

What can TASSA do to facilitate dialogue and collaboration among Turkish scholars in both countries? My recommendations are:

• To create specific agendas and to establish specific targets for collaboration

• To create mechanisms for project-based collaborations

• To obtain support from funding agencies in both countries, such as the DPT, TÜBITAK, the Fulbright Commission, and the like

• To establish a trust fund, with the contributions of Turkish associations and businessmen in the US, for this purpose

• To disseminate information about modes of collaboration established within this framework and about projects and activities supported by it

Prof. Buyukburc (Harran University) answered this question from Dr. Ozturk: *"Most Turkish-American scientist come to Istanbul, to Antalya. What do you say to people to convince them to come to your university?"* Prof. Buyukburc introduced the university, some of the advantages of his institution, and the provisions for visiting scientists. He emphasized the cultural wonders of his area and the dynamic changes due to the GAP project. He highlighted the YOK/SUNY framework agreement and importance from his university's point of view. He mentioned that they are just starting and he would have more participants from his university with research proposals in the next year's meeting.

Prof. Baydar (Suleyman Demirel University) answered the same question. He started with a presentation and followed up with a short video showcasing Suleyman Demirel University. He stated that:

I believe the theme of the conference is very suitable for the mission of TASSA and for the need to strengthen scientific links between academic and research institutions in Turkey and the USA. This cooperation is especially important for our university because we have 40 faculty members educated in the USA who are able to make progress in this area. I think TASSA comprises very talented scholars and researchers that have great potential for improving scientific, academic and technological collaborations between the US and Turkey. There are a number of areas in which TASSA can contribute to improve scientific and technological relations between two countries. I find the following areas to be very important:

• Establishing a protocol(s) between the major public funding agencies for scientific and technological research such as National Science Foundation (NSF) in the US and TUBITAK in Turkey to improve collaborations in scientific and technological research conducted in both countries.

• Launching and extending the student and scholar exchange programs between two countries.

• Initiating a short term student exchange program similar to ERASMUS which currently exists within the universities in the European Union members.

• Assisting individual universities in Turkey to develop projects and programs in the areas of science and education with universities in the US and the other way around.

He stated that the TASSA would be more effective in achieving its mission if it were able to organize and open an office in Turkey. This would not only strengthen the TASSA's bonds with Turkey but would also provide an opportunity to the US educated Turkish scientist and scholars in Turkey to participate in TASSA activities.

Prof. Ulku (Izmir Institute of Technology) was asked this question "Many people here think that Turkey as a developing country can use all the help it can get, I believe you have a slightly different view as to why US universities and companies should not help but instead invest in universities in Turkey?" Prof. Ulku emphasized the comparative success of Turkish universities with limited resources. She stated that her institution is an example of this. Izmir Institute of Technology (IIT) was founded in 1992 as a state university with an emphasis is on research and graduate education in science and technology. Its first graduate students were admitted in 1994, undergraduates in 1998. She said that IIT has over 200 nationally and internationally funded research projects with 7 research centers, 3 faculties with 14 departments and 9 undergraduate, 24 masters and 5 PhD programs and 112 faculty members. She highlighted the Wireless Communication Networks & Multimedia Research Center within IIT. This center was founded 2005 and was recently endowed with a "Center of Excellence" grant of the EU Sixth Framework Program (~750,000 Euros). IIT is closely affiliated with the Izmir Technology Development Zone (founded in 1992) which aims to promote Industry-University partnership for product and technology development, to encourage market-oriented technological development, to convert intellectual assets of the University into economic assets, to foster the incubation and growth of firms that make value added production, and to contribute to the international competitiveness and development of the economy by improving economical and technological standards

Prof Ulku stated that: *Turkish universities have achieved excellence in scientific and technological education, research, and development. The only difference between US institutions and Turkish ones is the difference in funds allocated to research.*

We have, however, a scientific research force that is enormously gifted and exceedingly well educated. US academic and industrial research and development will be amply rewarded economically and intellectually for transferral of funds and the establishment of close ties and circulation capacity in Turkish academe and industry. Can TASSA contribute to the formation of these funds?

Scientific and technological collaboration between Turkey and the US may be taken up within the categories of inter-university collaboration and university-sector collaboration. Fundamental to all categories is enhanced accessibility of scientific information and technology in Turkey. While these are largely available throughout the nation, their further development is dependent on reduced rates and other funding facilities. Such investment will make available to US institutions a high-quality and inexpensive work force as well as tax-free research and development in university-affiliated Technoparks. US institutions and relevant public and private organizations should, without delay, endeavor to match EU-initiated investment in Turkish research. TASSA should be a mediator in this effort.

Prof Atac (Anadolu University) answered this question: “Your university has experience on mass education, distant education. Could you look at this collaboration issue from a technological perspective? Are we using it enough? What can we do?” Prof. Atac started by naming their current international collaborations:

• SUNY Empire State College

• SUNY - Cortland

• San Diego State University (Student and Faculty Exchange Program)

• Arizona State University (Scientific and Cultural)

• Houston University

He mentioned that Turkey now ranks 22nd in the world with 11900 publications in 2003. He believes this is clearly due to:

• Improvement in the Criteria for Academic Promotion by Higher Educational Council and Universities

• Increase in the number of young researchers returning back upon completion of their PhD

• Encouragement programs of TÜBITAK, TÜBA and Universities

But he stressed that are still hurdles in Turkey:

• Lack of enough emphasis on innovation-based research,

• Lack of application of university-based research in industry,

• Lack of application of university-based research in society

• Lack of understanding the importance of intellectual property rights.

He stressed the importance of the establishment of industrial PhD programs and provided information about the Ceramic research Center, a collaborative effort among Anadolu University, TÜBITAK and major ceramic producing companies

On the topic of distance education, Dr Atac stressed that they can be thought as a mega university with 930.000 enrolled students and 651.558 graduate students. He finished by stating that innovation is one of the key missions of a university and there is an urgent need of cooperation in this matter in Turkey.

Ambassador Gosende gave a brief introduction about SUNY and an overview of current SUNY joint projects in Turkey. These programs started 5 years ago with an agreement with the Higher Education Council. High school students can enter the nation-wide student entrance exam and select these paid programs as their choices along with regular Turkish universities. Currently there are two types of programs: Dual diploma programs and Junior faculty development program. He stated that he is expecting improvements in faculty exchange and participation of more American students in these joint programs.

Prof. Ertepinar from the Higher Education Council highlighted the need for person-to-person collaboration. He introduced the TOKTEN program and their Faculty Member Development Program (Ogretim Uyesi Yetistirme Programi, ÖYP) currently being implemented at Middle East Technical University (METU) and Ege University. He stated that TASSA may be instrumental for funding matches for a one year abroad stay of PhD candidates enrolled in OYP. He emphasized the structured approach for collaborations. He stated that:

For the improvement of scientific and technological collaboration between our two countries, a concerted action from all the stakeholders in both countries not only in research but also in education is needed. Effort at the parliamentary level is needed to overcome the present difficulties. The stand of the Council of Higher Education of Turkey has always been very supportive in enhancing collaboration between the higher education institutions of Turkey and the USA.

I have already given a brief sketch of higher education in Turkey, the EHEA, the ERA and where Turkey stands in this picture. Europe's developments in to achieve a world-competitive system of HE&R should not be disadvantageous to the US if proper measures are taken to balance of brain drain and brain gain.

To my knowledge, the research agreement between the two countries that ended as of 14 June 2004 has not yet been renewed. The US side has informed the Turkish Ministry of Foreign Affairs that the US is working on intellectual property rights and that is why the agreement has not been renewed yet. I hope that this agreement can be renewed soon, subject to proper changes due to possible new regulations on intellectual property rights in the US.

General Inak presented information about the R&D activities at Department of Defense and introduced a new database, Turkish Defense Technologies Information System, to the audience. This department is composed of various divisions, which include international R&D programs, weapon systems and energetic materials sections, sensors and electronics systems section, air and space systems section, and a vehicle and materials section. Their vision is *"By constantly following the technological developments around the world, providing their adaptation for the nation's benefit, by working jointly with the other relevant governmental institutions and foundations, utilizing technology, increasing the percentage of meeting the requirements of the Turkish Armed Forces locally and decreasing foreign dependence through planning, coordinating, directing, promoting and supporting the defense research and technology activities."* He mentioned that defense related R&D and technology activities in Turkey were carried out in three areas by research organizations, universities, and defense industries. Due to new protocols, the requirements of Turkish Armed Forces are considered in three main groups according to the appropriate use of the existing resources. Determined in accordance with the concept based requirement systems, these requirements are met from domestic or foreign markets or via joint production through direct purchases, foreign military sales programs, national production programs or long-term contracts.

The Turkish Defense Technologies Information System is a web based application designed by the Ministry of National Defense, to build up a technological database of the Turkish defense industry and its research capabilities, and to keep and update the database dynamically. Turkish Defense Technologies Information System mainly searches for research and development studies of Turkish scientists and technological applications of defense industries in Turkey. With this information system, authorized Turkish defense organizations, individuals, institutes and organizations doing technological research on defense industry area, and Turkish researchers working abroad would submit and update their information. The main goal of the Turkish Defense Technologies Information System is to provide input for the feasibility studies of defense industry projects. It will report on the overall technological adequacy of Turkey by collecting data about different technologies. The system will also provide access to the needed technology by the practitioners when needed. Turkish researchers working abroad may submit and update their information by registering to database from one center. This software application is currently undergoing tests within the MND. Turkish Defense Technologies Information System will soon be accessible from the URL www.msb.gov.tr through the Internet. General Inak concluded his remarks by stating that Turkey and USA have long lasting military cooperation and Turkish-American scientists may contribute to the defense industry. He encouraged all Turkish scientists to participate in their information system.

Prof. Kansu spoke next on the behalf of Turkish Academy of Sciences (TUBA). Founded on 2 September 1993T, the Turkish Academy of Sciences (TUBA) reports to the office of the Prime Minister but is autonomous concerning the administrative and financial matters. The Academy is responsible for promoting the level of science in the country by supporting projects solely on their scientific merit. Its goals are:

• To stimulate scientific curiosity

• To raise interest in research

• To confer awards on successful scientists

• To promote scientific method and scientific thinking

• To elevate the social status and prestige of scientists and researchers

• To work with the government to materialize these aims and objectives

TUBA has 118 members of which 28 are in medical sciences, 66 are in natural and engineering sciences, and 24 are in social sciences. Prof. Kansu stated that TUBA, together with the Scientific and Technical Council of Turkey (TÜBITAK), and the Higher Educational Council (YÖK), now supports research projects in topics involving the social sciences and humanities as well. TUBA has set up two commissions with the participation of the Ministry of Culture, universities, scientists, museologists, and civil societies to develop the "Cultural Sector of Turkey Project" (TÜBA-TÜKSEK). This project includes subsections such as "taking a cultural inventory," "modern museology," "education," "restoration," "revision and modernization of regulations concerning cultural riches," "cultural tourism," "culture related industries," and "conventional and computerized programming." He next introduced the GEBIP award for young scientists. The objective of TÜBA-GEBIP is to provide support to a pool of young scientists under 37-years of age within their research groups. TÜBA aims to recruit a new generation of promising, highly qualified young researchers from all disciplines. He later outlined a proposal to create a TUBA/TASSA endowment fund and a joint scholarship program. This idea proposes that TASSA form an endowment fund for the Turkish scholars and scientist. TUBA and TASSA, throught two independent Scientific Selection Committees will evaluate the applications for scholarships by junior and senior scientists. TUBA Selection Committee will select the candidate based on his or her CV, scientific qualifications, the project proposal, and its scientific merit. TUBA will send the nominations to TASSA Selection Committee for final approval and decision. In the end the committee may award 12-month scholarships for the junior scholars and 3-6 month scholarships to the senior scholars. He mentioned a few other topics to be explored for collaboration: 1) TASSA assisting the TUBA Young Research Awardees (GEBIP Candidates) in their search of academic institutions, 2) organizing joint scientific meetings and symposia, 3) using their Web sites to exchange further ideas.

Mr. Ayanoglu (State Planning Organization, DPT) focused on the restructuring of the state funding of research in Turkey in recent years. He mentioned that in cooperation with TUBITAK, a significant funding for R&D is earmarked at historic levels as of 2005. This will increase more as we implement reforms in light of our aspirations to join the European Union. He reminded that Turkey is already scientifically integrated since it is full partner of the 6th Framework, a Europe-wide research initiative with significant funding. Turkey signed this agreement and paid its dues. Researchers can benefit from this membership though competitive grants; Mr. Ayanoglu suggested that already grant-savvy TASSA members could help Turkish researcher to develop proposals for the European 6th Framework.

The last panelist was Mr. Oruc, who was on sabbatical at Bilkent University from University of Maryland last year and was working as a special advisor to the president of TUBITAK. He mentioned that good things are happening at the TUBITAK in terms of both budget and the operations. Dr. Oruc focused on two new programs; KARIYER and EVRENA. KARIYER is a program designed for young scientists to establish their careers. The funding level is around $20,000 per year for 5 years. In its first year, 250 scientists won this award. EVRENA is a program to build scientific knowledge in Turkey through joint projects and international mobility. This was a pleasant surprise to many in the audience. Dr. Oruc mentioned that he was expecting this program to start sometime in 2005 and asked the participants to submit proposals to TÜBITAK and to make an effort for initiating joint research projects with fellow researchers in Turkey. He stressed that TÜBITAK has made it a high priority to develop the new Career program to support the funding of young researchers in Turkish universities.

In the last part, panelists answered specific questions from the audience related to summer schools, getting short term paid positions at Turkish state universities, funding sources for international projects, and the like.

Everybody agreed time was limited for full exploration of these matters and urged TASSA to continue with these meeting with specific topics.

ENGINEERING & APPLIED SCIENCES

Effect of Polyaniline Coated Clay Nanoparticles on the Thermal and Mechanical Properties of Intercalated Polyaniline-Clay Epoxy Nanocomposites

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Conducting polyaniline (PAni) montmorillonite (MMT) clay nanocomposites were synthesized by using emulsion polymerization. The X-Ray diffraction patterns showed that polyaniline was intercalated between clay galleries in the order of nanoscale. The electrical conductivities of the synthesized PAni-MMT nanocomposites in pressed pellets ranged in the order of between 10-4 and 10-3 S.cm-1. Polyaniline surface modified clay nanoparticles were then dispersed in diglycidyl ether of bisphenol-A (DGEBA) epoxy prepolymer using high shear mixing and ultrasonication. The effect of PAni surface modified nano particles on the curing reaction and kinetics of epoxy with tri-ethylene tetra amine (TETA) was analyzed by using DSC and explained by Arhenius equation. Thermal analysis showed that for 5% (w/w) PAni-MMT filled epoxy nanocomposites has 6oC higher T_g than pristine epoxy. Polyaniline on the surface of nanoparticles also improved crosslinking reaction by reducing the curing time and help the reaction to occur at lower temperatures. Mechanical testing results for polyaniline clay epoxy nanocomposites showed 20 to 25% increase compared to the pristine epoxy.

The Use of A Fiber Optic Probe To Measure Dynamic Behavior of Gas-Solid Two-Phase Flows

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The objective of this study was to perform instantaneous particle velocity measurements using a novel fiber optic probe and describe how the accuracy of calculations for particle velocity fluctuations could be improved by the use of a window overlapping technique. First, the effects of various window-overlapping parameters on the results were investigated by the use of artificially generated signal pulses. Then, this technique was applied to the data obtained from the fiber optic probe to estimate the turbulence levels of the particle velocities.

A reflective fiber-optic probe was designed and tested to measure instantaneous particle velocities in a dilute-phase pneumatic conveying system. The fiber-optic probe consists of two identical probes aligned parallel to the flow direction. Two glass fibers were used in each probe: one of the fibers was used to send light from a light emitting diode (LED) into the gas-particle flow region, while the other fiber transfered the reflected light onto the detector (Photodiode). Particle velocities were computed by using a cross-correlation technique and the signals received from the two photodiodes.

Signals from the two fiber optic probes were sampled continuously for a short time period, then, the signals were broken into a number of equally spaced data segments (Data Windows). Then, the windows of data were shifted in time, while the data in each window were used to calculate particle velocities by using cross-correlation techniques. Finally, the calculated velocities were used measure turbulence intensity of the particulate phase.

The results indicated that the particulate phase turbulence could be measured up to 100 Hz with this technique.

Retrofit of a Three-Span Slab Bridge with FRP Systems – Testing and Rating

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There is a growing decay of current infrastructure in the world and non-compliance of existing structures with the more stringent requirements of current design codes, specifically seismic codes. The capacities of reinforced concrete bridges, that are the arteries of transportation in a country, are of particular concern in earthquake prone regions, like Turkey.

A high percentage of bridges in Turkey are considered to be structurally deficient, functionally obsolete, or both. If the inadequacies are structural, effective strengthening systems, like Fiber Reinforced Polymers (FRPs), can typically alleviate the need for other drastic options such as weight limit posting or total replacement.

This research involves retrofitting of a 45-year old, three-span reinforced concrete slab-bridge with insufficient capacity, with four different FRP systems. The use of four systems in one bridge provided a unique opportunity to examine the long-term performance of each system under identical traffic and environmental conditions. Using truckload tests, theresponse of the bridge before retrofitting, shortly after retrofitting, and after one year of service was measured. The measured strains suggested the use of the FRP systems. A three-dimensional finite element model of the original and retrofitted bridge was developed and calibrated based on measured deflections. The model was used to more accurately predict the demands needed for computing the rating factors. After retrofitting the rating factor, the corresponding load limits increased 22%. This acceptable performance of the FRP systems enabled the engineers to remove the load limits, resume normal traffic, and proved that the FRP systems to be viable options for retrofitting.

Ms. Serpil Boy, LJB Inc. discussing her poster.

Quick Response Airborne Deployment of Viper Muzzle Flash Detection and Location System During DC Sniper Attacks (*)

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An infrared muzzle flash detection system was deployed from a helicopter and an airship in response to the Washington, DC area sniper attacks in October 2002. The system consisted of a midwave IR camera, which was used to detect a muzzle flash and then cue a visible light camera on a gimbal to the detected event. The helicopter installation was done to prove quickly that a manned airborne installation of the detection system would work. Within 36 hours of the request to deploy the system, it had been modified, approved by an FAA inspector and test flown. Testing at the Ft. Meade rifle range showed that in the helicopter installation the system worked at least as well as the baseline ground based system.

Because of the limited endurance that a helicopter allows, the system was then installed aboard a Navy leased airship. It was flown at Elizabeth City, NC and was tested against live fire. In response to the Washington, DC sniper shootings, the OSD had tasked a parallel effort to deploy a 20" WesCam gyro stabilized gimbal on the same airship. Software was developed in the field to interface the WesCam gimbal to the infrared system so that it could automatically slew over to a detection event. The airship installation also added GPS based moving map display capability. That was completed within four days of the first request to deploy. The next four days were spent coordinating a concept of operations for working with law enforcement agencies and getting flight clearances to bring the airship into the DC-Richmond corridor. After the sniper incident suspects were caught, the airship was flown to Patuxent River Naval Air Station and the muzzle flash detection system was tested there against live rifle fire.

These were the first flights of the airborne muzzle flash detection payload. It has since been flown numerous times on helicopters and tested against various guns, mortars, and artillery. Operation of multiple payloads was also demonstrated, where each system flew aboard a piloted helicopter and all systems were controlled from a single ground station.

(*) This work was originally published at the 2004 IEEE Applied Imaging and Pattern Recognition Workshop

Towards Building a Survivable Optical Internet

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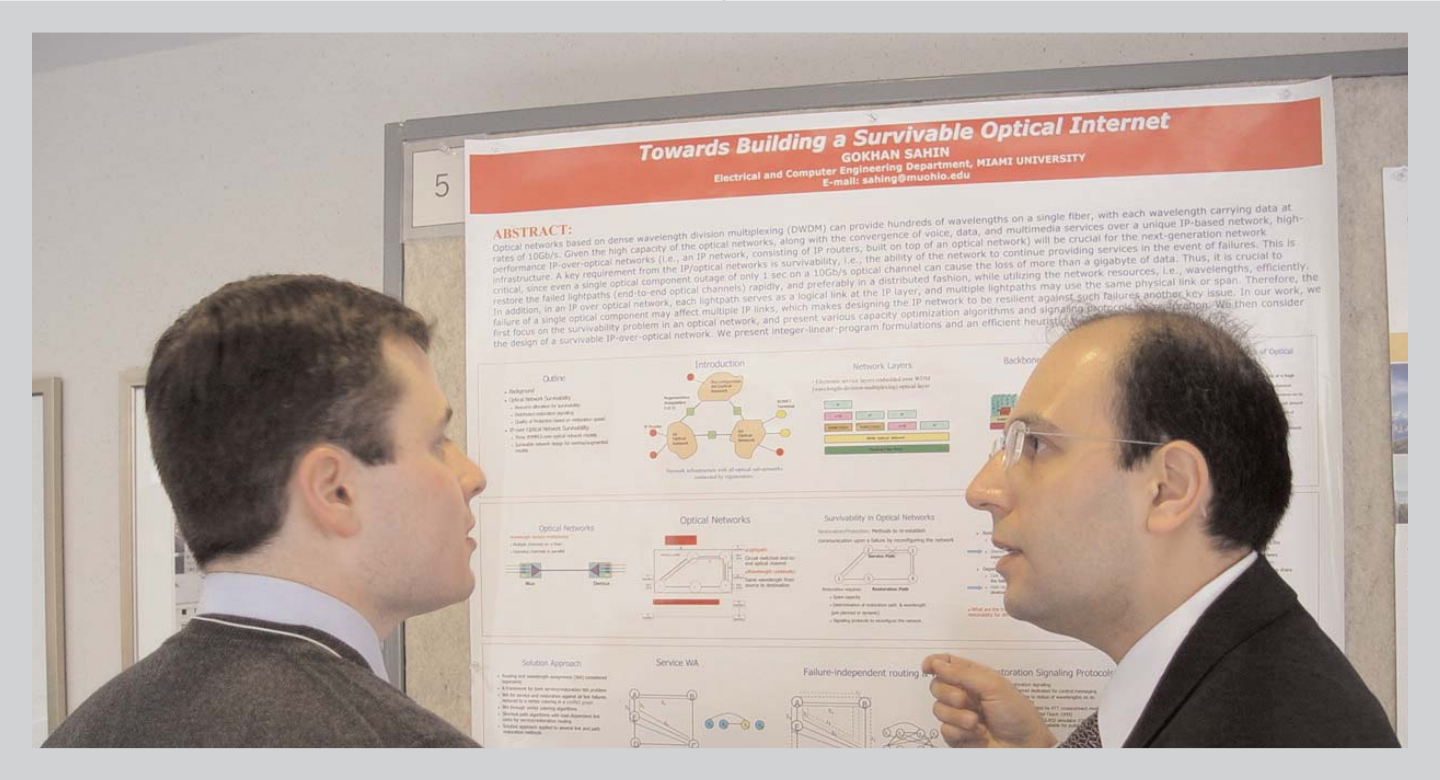
Optical networks based on dense wavelength division multiplexing (DWDM) can provide hundreds of wavelengths on a

single fiber, with each wavelength carrying data at rates of 10Gb/s. Given the high capacity of the optical networks, along with the convergence of voice, data, and multimedia services over a unique IP-based network, high-performance IP-over-optical networks (i.e., an IP network, consisting of IP routers, built on top of an optical network) will be crucial for the next-generation networks. A key requirement from the IP/optical networks is survivability, i.e., the ability of the network to continue providing services in the event of failures. This is critical, since even a single optical component outage of only 1 sec on a 10Gb/s optical channel can cause the loss of more than a gigabyte of data. Thus, it is crucial to restore the failed lightpaths (end-to-end optical channels) rapidly, and preferably in a distributed fashion, while utilizing the network resources, i.e., wavelengths, efficiently. In addition, in an IP over optical network, each lightpath serves as a logical link at the IP layer, and multiple lightpaths may use the same physicallink or span. Therefore, the failure of a single optical component may affect multiple IP links, which makes designing the IP network to be resilient against such failures another key issue. In our work,
we first focus on the survivability problem in an optical network, and present various capacity optimization algorithms and signaling protocols for restoration. We then consider the design of a survivable IP-over-optical network. We present integer-linear-program formulations and an efficient heuristic algorithm.



Dr. Gokhan Sahin, Miami University discussing his poster

An Ultra-Low Power CMOS MICS Transceiver

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North Carolina A&T State University, Greensboro, NC

The Medical Implant Communications Service (MICS) is an ultra-low power, unlicensed, mobile radio service for transmitting data in support of diagnostic or therapeutic functions associated with implanted medical devices. Prior to the establishment of the MICS in 1999, medical implant devices had to be magnetically coupled to external programmers or readers. This magnetic coupling required that the device implanted in the patient be in very close proximity to the external monitoring control equipment, often necessitating body contact for proper operation. In addition, medical implant devices operated with very slow data rates, sometimes requiring up to fifteen minutes for the required data transfer. The FCC established the MICS to overcome these limitations of medical implant devices by allowing physicians to establish high-speed, easy-to-use, reliable, short-range (six feet) wireless links to connect such devices with monitoring and control equipment. The MICS transceiver presented in the poster will be used in the cochlear testbed at the University of Michigan. Cochlear implants are now established as a new option for individuals with profound (sensorineural) hearing impairment. Many of the cochlear implant patients are able to understand speech without lip-reading, and some can communicate over the phone.

Our MICS transceiver will utilize low-power mixed-signal circuits in the RF frontend and baseband circuit blocks by using TSMC 0.18 um CMOS process. To achieve "low-power", system level power saving techniques such as "sleep mode" will be targeted. The MICS transceiver will employ various architectural and circuit techniques to reduce power while maintaining an acceptable range and data throughput.

A design procedure and its verification for operational amplifier design in CMOS technology

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In this paper a design procedure and successful experimental verification results obtained from it are being reported for implementing internally compensated general purpose operational amplifiers powered from a single power supply and with high gain-bandwidth product, good slew-rate, low output impedance and good drive levels. The procedure was developed for an in-house training course on "analog integrated circuit design" as an example of using mathematical tools (MathCad) in the design of analog integrated circuit blocks. The resulting MathCad file became a design automation tool for CMOS OpAmp Design. It is shown that all opamp specs targeted are met or exceeded by the sample opamp designed and fabricated using Fairchild Semiconductor's CS80C CMOS process with the W/L ratios predicted by this tool. The computer-aided-design procedure reported has also been verified with success on MOSIS fabricated CMOS Operational Amplifiers, as well.

HEALTH & BIOMEDICAL SCIENCES

Dynamics of Actin-driven Thin Membrane Protrusions

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Motile cells explore their surrounding environment by sending out thin protrusions, or filopodia, of several hundred nanometers. The growth of the protrusions is driven by actin bundles polymerizing inside the cell membrane. A formalism is presented to compute the dynamical features of the membrane protrusions. A simple Brownian ratchet model allows us to compute the protrusion speed as and force/velocity curves. There are a critical number of filaments needed to generate protrusions. The protrusion speed is completely limited by the slow fluctuations of the cell membrane. The speed also depends on the number of filaments in the actin bundle and the overall actin monomer concentration in the cell. Without external influences, the filopodium can extend indefinitely up to the buckling length.

The Neural Circuitry of Behavioral and Cognitive Set Shifts in Normal and Autistic Individuals: An fMRI Study

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Autistic Disorder is characterized by severe impairments in social abilities, often accompanied by ritualistic, repetitive behaviors. These repetitive behaviors can be described as deficits in executive functioning (EF), the ability to plan actions, initiate task appropriate behaviors, inhibit inappropriate behaviors, and allocate attentional resources. While social deficits in autism have been well classified and investigated, less is known about the EF deficits that often occur in conjunction with social. The aspects of EF particularly relevant to the study of Autistic Disorder relate to the generation of task-appropriate behavioral responses. These include selecting the most fitting response among competing possibilities, inhibiting ongoing prepotent responses, and altering stimulus-response associations when the global rules governing behavior are changed (i.e., shifting of cognitive set). Neuroimaging studies investigating the neural circuitry of EF in typically developing humans have shown that these cognitive abilities are mediated by a distributed network of brain regions, including dorsolateral and ventrolateral prefrontal cortices (DLPFC and VLPFC), premotor cortex, anterior cingulate cortex (ACC), basal ganglia, and regions of posterior parietal cortex, including the intraparietal sulcus (IPS). However, the precise role of these regions in the shifting of behaviors and cognitive sets remain elusive. Moreover, there are no neuroimaging studies to our knowledge investigating EF deficits in autism. The current study sought to test the hypotheses that two dissociable neural systems mediate shifts in behavior and cognitive set (Experiment 1), and that individuals with Autistic Disorder would show deficits in activation within these neural systems (Experiment 2).

Multimodal Imaging of Fronto-Striate Circuits and Associated Executive Functions in the Prodromal, First Episode and Chronic Stages of Schizophrenia

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Using multimodal neuroimaging we examined prefrontal MRI activation and event-related potentials associated with visual and auditory executive processes in three cross-sectional groups representing disease progression of schizophrenia spectrum psychotic disorders. Fifty-three individuals from four groups (control, high-risk prodromal, first episode and chronic schizophrenia) were studied with functional MRI and event-related potentials during an auditory-visual oddball task. Event-

related potentials were recorded from 32 electrode sites, and MMN, N2, P3 ERP components were extracted for both visual and auditory deviant events. Functional MRI images were analyzed both using conventional statistical mapping procedures, as well as a Region of Interest (ROI) analyses, where each frontal and striate region was traced on high-resolution individual subject anatomical maps to extract auditory and visual target -related activation. The behavioral and neurocognitive results revealed an early decline in fronto-striate executive functions, beginning as early as the emergence of "prodromal" symptoms in high-risk individuals, and demonstrating a significant declining trend with disease progressing. Electrophysiological indices of target detection showed a similar decline with the progress of the disease. Finally, FMRI findings revealed that high-risk individuals experiencing prodromal symptoms of schizophrenia showed significantly smaller activation to task-relevant target events in frontal regions (anterior cingulate gyrus, inferior frontal gyrus, middle frontal gyrus) compared to controls. These results suggest that prefrontal function declines prior to illness onset and hence may represent a vulnerability marker in assessing the risk of developing psychotic disorders among high-risk individuals. These findings also represent the first multimodal imaging of high-risk individuals, as compared to first episode and chronic patients.

Role of Ubiquitin Specific Protease Ubp10 in Histone H2B Deubiquitylation and Telomere Proximal Sir2 Association in Gene Silencing in the Yeast S. Cerevisiae

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Several genetic and epigenetic mechanisms regulate gene expression in eukaryotic organisms and proper control is important for normal development, homeostasis and prevention of disease states, such as cancer. The expression of genes proximal to the chromosome ends (telomeres) are epigenetically silenced through a position effect akin to heterochromatic silencing in diverse organisms including human cells and budding yeast S. cerevisiae. We study gene silencing in yeast S. cerevisiae as a model for heterochromatic silencing. Ubiquitylation of histone H2B and methylation of histone H3 are associated with gene silencing in S. cerevisiae. It has been postulated that low levels of histone methylation within telomeres, and high levels within euchromatin, help to sequester silent information regulatory (Sir) proteins to silenced regions. Here we show that the ubiquitin specific protease Ubp10, previously genetically linked as DOT4 to telomeric silencing, targets H2B for deubiquitylation both in vivo and in vitro and helps to localize the silencing factor Sir2 to the telomere. Ubp10 exhibits Sir2-dependent preferential localization proximal to telomeres where it serves to maintain low H2B ubiquitylation and low H3 Lys4 and Lys79 methylation in this region. Ubp10 is also localized to the rDNA locus, a second silenced domain, where it similarly maintains low histone methylation. We propose models to explain the effect of Ubp10 on silencing. Furthermore, we compare Ubp10 to Ubp8, another H2B deubiquitylase that is involved in gene specific activation, and show that telomeric and gene silencing functions are specific to Ubp10, suggesting that H2B deubiquitylating enzymes have distinct genomic functions.

Laboratory validation of a hypothesis generated In-Silico: the discovery of five new complex I inhibitors

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In context of cancer therapy, in an effort to find novel compounds that induce apoptosis and exhibit antitumor activity, mitochondrial ETC (electron transport chain) can be considered as molecular targets for new chemotherapeutic agents. NADH:CoQ oxidoreductase (complex I) is the largest and most complicated component of that chain within the mitochondrial inner membrane, where it initiates electron transport by catalyzing the oxidation of water-soluble NADH, and contributing to the formation of the electrochemical proton gradient required for the synthesis of ATP. In an effort to find novel complex I inhibitors, we examined the SOM (selforganized maps) of the Developmental Therapeutics Program (DTP) of the National Cancer Institute (NCI) which contains data for ~ 20,000 compounds. The compounds grouped into map clusters based upon the pattern of their activity against 80 cancer cell lines of diverse origin (leukemias, cancers of the lung, CNS, colon, ovary, breast, kidney, prostate and melanomas), expressed as the GI50 (Growth Index50). We chose ten compounds from a number of mitochondrial complex I inhibitors located in several contiguous map loci of SOM maps with unknown mechanism of action. Testing of those compounds for their ability to inhibit of NADH:CoQ oxidoreductase activity in bovine heart submitochondrial particles (SMP), revealed that five of the ten compounds (NSC's 619196, 619195, 629621, 668602 and 618296) have strong complex I inhibitor capacity. This study serve to validate the hypothesis that the data-mining tools and procedures used to organize the NCI drug-screening data into SOM's can significantly narrow the search for novel agents which share a particular mechanism of action.

Validity and reliability of instruments used to measure cultural competence of health professionals

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Background: Cultural competence training for health professionals has been raised as one potential mechanism to reduce minority health care disparities. Tools that accurately and reliably measure knowledge, attitudes, and skills reflecting cultural competence would be helpful to medical educators, but instruments have not been comprehensively identified, systematically described or critiqued.

Methods: We systematically identified and reviewed English language articles published from 1980 through June 2003 that evaluated the effectiveness of cultural competence interventions targeted at health professionals. Our review included studies that had both a pre and a post intervention evaluation or had a control group for comparison. We abstracted information about evaluation methods, reliability, and validity of instruments used in these studies.

Results: Thirty-four studies were included in our review. Studies evaluated curricula targeted at physicians (n=17), nurses (n=18) and other health care professionals (n=11) and evaluated learner attitudes (n=25), knowledge (n=19), or skills/behaviors (n=14). A total of 70 instruments were used in the 34 studies. Most studies used more than one method for evaluation; the most common methods used were learner self-assessment forms or questionnaires (n=21) and written exams (n=17); other methods used were participant ratings of the curriculum (n=10), learner essays (n=3), group or individual interviews (n=3), direct observation of learner skills (n=2), and patient ratings (n=3). Of the studies that used learner self-assessment questionnaires and written exams, the same instrument, Bernal and Froman's Cultural Self-Efficacy Scale (CSES), was used in only 4 studies. Questionnaires measured a variety of attitudes toward cultural and social issues in learning and healthcare (i.e., cultural salience and self-efficacy, ethnocentrism vs. ethnorelativism, cognitive development, dogmatism); knowledge of culture-general concepts and organizational policies and procedures regarding diversity; and culture-specific knowledge (communities and resources, health beliefs and practices of populations). Only one fifth of instruments (15/70) had been previously validated, and an additional 2 instruments were validated in the current study. Thirty-eight percent (13/34) of the studies used at least one validated instrument; these were studies using learner self-assessment and one study using patient reports.

Conclusions: Studies of cultural competence training use a wide range of evaluation methods and instruments. Yet, few studies include independent ratings of learner skills or patient reports, and although self-assessment instruments measure various attitudes and concepts, most have not been rigorously validated. The results of cultural competence training could be interpreted more accurately and reliably if objective evaluation methods and standardized, validated instruments were used.

Crystal Structure of 2,3-Dihydroxybiphenyl 1,2-Dioxygenase from Rhodococcus globerulus P6 and Its Implications

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R. globerulus P6, a polychlorinated biphenyl (PCB) degrading bacterium, carries three isoenzymes for 2,3-dihydroxybiphenyl 1,2-dioxygenase (DHBD) encoded by three bphC genes. In PCB biodegradation, DHBD catalyses the cleavage of the hydroxylated ring of 2,3-dihydroxybiphenyl (DHB). Having reversed the order of specificity against mono-Cl DHBs, DHBD-I and DHBD-III presents an interesting case for structural effect on substrate specificity. We determined the crystal structure of DHBD-I at 1.62 Å resolution, and of DHBD-I with 3'-Cl-DHB at 1.7 Å. Analysis of substrate specificity will be presented, based on these structures and structure of DHBD from Burkholderia sp LB400. DHBD-I complex with 3'-Cl-DHB, prepared by introducing powdered substrate to crystal, contained three substrate molecules per enzyme molecule, one at the active site coordinated to Fe++, another at the mouth of the active site. This type of substrate positioning could suggest a mechanism for substrate inhibition, typical of extradiol dioxygenases.

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Growth Factor-Mediated Survival of a Pure Population of Cortico-Spinal Motor Neurons.

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MGH-HMS Center for Nervous System Repair, Depts. of Neurosurgery and Neurology, and Program in Neuroscience, Harvard Medical School, MGH, Boston, MA

Cortico-spinal motor neurons (CSMN) project from cortical layer V to target neurons in the spinal cord and contribute critically to cortical control over muscle movement. CSMN degeneration is the CNS component of ALS/Lou Gehrig's disease, and CSMN injury is a critical aspect of spinal cord injury. To characterize some of the cellular and molecular factors controlling CSMN survival and differentiation, we modified recently developed

approaches to purification of cortical projection neurons by fluorescence activated cell sorting (FACS; Catapano et. al 2001,2004). We retrogradely labeled postnatal day 2 (P2) CSMN using ultrasound-guided microinjection of fluorescent microspheres into the corticospinal tract. Labeled CSMN were isolated at P4 and purified by FACS, yielding a > 99% pure, lineage-specific neuron population. We cultured FACS-purified CSMN on polylysine-coated coverslips; isolated CSMN retain many elements of stereotypic morphology in vitro. We investigated their neurotrophin and growth factor receptor expression in vivo via immunocytochemistry (ICC) and in vitro both via ICC and RT-PCR. We find thhat CSMN express mainly TrkB, TrkC, IGFIRa, and CNTFRb, low levels of GFRa1, but not TrkA or PDGFb. Their survival is effectively supported by medium conditioned by cortical glia. We tested the role of the candidate growth factors on CSMN survival by adding candidate growth factors into serum free medium, where their survival is at its minimal. We find that mainly BDNF, IGF-I and CNTF support the survival of CSMN. Further characterization of growth factor controls over survival and differentiation of this lineage may allow manipulation of immature neural precursors for cellular repopulation and circuit reconstruction toward a potential therapeutic application, especially in ALS. *Supported by: HCNR, NINDS, CRPF and Alzheimer's Assoc.*

Computation and Use of Instantaneous Attribute Analysis of ECG Data for the Detection of Ventricular Fibrillation

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Automated pattern recognition of ECG signals is commonly used to detect abnormal physiological conditions. Due to their life-threatening nature, early detection of ventricular fibrillation (VF) and ventricular tachycardia (VT) is of primary urgency. Many automated methods have been developed for the early detection of these pathological conduction states.

Here, we describe a newly developed method based on complex-instantaneous attributes. These attributes provide a unique and rapidly recognized pattern for VT and VF waveforms.

A measured ECG signal is treated as the "Real" component of a complex phaser: ECG(t) = Amp(t)*e $^{iq(t)}$, where Amp(t) and *q(t)* are the instantaneous amplitude and phase of the ECG signal. This can be decomposed into real and imaginary components: ECG(t)=Real(t)+ i Quad(t); The Hilbert transformation to compute the "quadrature" component of the complex ECG function from which the instantaneous attributes of amplitude, phase, and frequency are derived.

Current VF/VT detection techniques use either spectral or time domain analysis for pattern matching. The presence of noise and normal signal variability degrades performance of these techniques. Also, spectral methods require a window of data for transformation, extending detection time.

Our method analyzes ECG data frequency content at successive instants, which eliminates data windowing delays. Identification of slow rate of change of the instantaneous frequency facilitates recognition of the non-impulsive wave pattern of VF/VT events. Several data files from the MIT-BIH database were used to test the technique's performance. VF and VT episodes present in these data sets were easily detected.

Improving Genome Assembly

Cevat Ustun
University of Maryland, College Park, MD

We present a reliable, easy to implement algorithm to generate a set of highly reliable overlaps based on identifying repeat k-mers. Our method is coverage independent and has no tunable parameters. Whereas traditionally reads have been trimmed to have expected error rates of 2%, we find our error correction allows extending usable sequence in reads to 16% trimming. We use a version of the Phrap assembly program that uses only overlaps computed by the UMD overlapper, called PhrapUMD. We integrate the UMD algorithms with Baylor's ATLAS assembler applied to Rattus norvegicus. Starting with the same data as the Nov. 2002 ATLAS assembly, we compare our results to 4.5 Mbp of rat sequence in 21 BACs that have been finished. We find that after extension and error correction, (i) the reads are 30% longer than reads trimmed to 2%; (ii) the average error rate across the extended reads is about 3 in 10,000 bases, with 88% of the extended reads matching finished sequence exactly across their entire length; and (iii) PhrapUMD with these reads and our reliable overlaps produces a draft assembly of the rat which has no misassemblies and increases the coverage of finished sequence from 92.2% to 95.7%, while simultaneously reducing the base error rate for quality 20 or higher bases from 1.50 to 0.87 errors per 10,000.

Activation of the Canonical Wnt Pathway During Genital Keratinocyte Transformation: a Model for Cervical Cancer Progression

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Cervical carcinoma, the second-leading cause of cancer deaths in women worldwide, is associated with human papilloma virus (HPV). HPV-infected individuals are at high risk for developing cervical carcinoma; however, the molecular mechanisms that lead to the progression of cervical cancer have not been established. We hypothesized that in a multistep carcinonegenesis model, HPV provides the initial hit and activation of canonical Wnt pathway may serve as the second hit. To test this hypothesis, we evaluated the canonical Wnt pathway

Dr. Tulin Yanik, NIH discussing her work with Dr. Meltem Mutfuoglu, NIH

as a promoting factor of HPV induced human keratinocyte transformation. In this in vitro experimental cervical carcinoma model, primary human keratinocytes immortalized by HPV were transformed by SV-40 small-t (smt) antigen. We show that smt transformed cells have high cytoplasmic ß-catenin levels, a hallmark of activated canonical Wnt pathway and that activation of this pathway by smt is mediated through its interaction with protein phosphatase-2A. Furthermore, inhibition of downstream signaling from ß-catenin inhibited smt-induced transformed phenotype. Wnt pathway activation transformed HPV-immortalized primary human keratinocytes even in the absence of smt. However, activation of the Wnt pathway in the absence of HPV was not sufficient to induce transformation. We also detected increased cytoplasmic and nuclear staining of ß-catenin in cervical carcinoma samples from 48 patients. Our results indicate that the transformation of HPV expressing human keratinocytes requires activation of the Wnt pathway and that this activation may serve as a screening tool in HPV-positive populations to detect malignant progression.

Missense Mutation in ProCART in Obese Humans is Missorted, Poorly Processed and Constitutively Secreted in Endocrine Cells

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Cocaine and amphetamine regulated transcript (CART) is an anorexigenic neuropeptide that inhibits eating. A Leu34Phe missense mutation in the proCART has been found in an obese family in humans. ProteinChip analysis shows diminished levels of bioactive CART and increased levels of higher molecular mass of non-bioactive CART in humans bearing this mutation. Expression of Leu34Phe proCART in AtT20 endocrine cells revealed that it was partially missorted into the constitutive secretory pathway but was largely retained in the Golgi and poorly process to an active CART. Thus, the intracellular trafficking defect of mutant proCART results in a lack of secretion of bioactive CART, and may provide a molecular basis for the obese phenotype in these humans.

NATURAL SCIENCES

Design and Analysis of a Library of Synthetic siRNAs Targeting 139 Cancer Associated Genes

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In mammalian cells, short interfering RNAs (siRNAs) induce a sequence-specific degradation of transcripts homologous to the siRNA through activation of the epigenetic gene silencing mechanism RNA interference (RNAi). RNAi can be used experimentally to study gene function by transfection of mammalian cells with synthetic siRNAs. We designed a Cancer Gene Library of 278 siRNA against 139 known oncogenes and tumor suppressor genes. We analyzed the effect of transfecting this library of siRNAs (synthesized by Qiagen Inc., Germantown, MD) into HeLa cells, plus negative and positive control siRNAs, on cell survival, on a 96 well plate, high throughput basis. Approximately 5% of the siRNAs had a significant effect on HeLa cell survival. For genes, which showed positive phenotypic hits, validation of sequence specific gene silencing was performed. We are now fully validating this phenotypic effect by the use of real-time quantitative reverse transcriptase PCR to determine the degree of RNAi knockdown as well as further characterizing the RNAi effects seen with specific target genes noted in this first screen. In conclusion, we present here a cancer siRNA library and demonstrate a strategy to apply such reagents in functional genomics studies to discover causal links between the expression of cancer genes and molecular and phenotypic endpoints.

SOCIAL SCIENCES AND HUMANITIES

The Effects of Classroom Environment on Students' Academic Achievement

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This paper presents information pertaining to classroom environment and academic achievement, specifically the relationship between "selected" and "perceived" classroom environments and academic achievement. In this paper, the subjective classroom environment perspective includes teacher expectations and student perceptions whereas the objective environment perspective includes class size and atmosphere. I looked at the related literature to address the effects of these variables on academic achievement. Some of these studies were conducted with qualitative, others with quantitative and evaluation research techniques. Five studies are related to high school, college and university level; two studies were done in elementary school and one study in middle school. I generally focused on classroom climate to see the effects of classroom environment on academic achievement. Warmth of classroom structures, work orientation, teacher and classroom rules are perceived as physical-environmental characteristics of classrooms by some researchers. Some other studies analyze the effects of classroom social climate and physical-environmental characteristics on teachers' grading. Mainly the studies conclude that students feel comfortable and succeed in classrooms that give opportunities to discuss with their friends and friendly, caring teachers.

Portfolio Assessment: Literature Based Research

Mustafa Cinoglu
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I used literature based research method to address the following topics 1) What the portfolio is 2) The importance of portfolio 3) How portfolio should be implemented (steps of portfolio). In addition, I discussed the factors that teachers must consider when putting portfolio assessment into practice. This research results may be helpful guide for teachers who consider using portfolio assessment.

The research results show that portfolio is not only used as an assessment method but also used as an instruction method. A portfolio is a purposeful collection in one or more specific subjects. Students exhibit their efforts, progress, and achievements via portfolio. Portfolio assessment provides a practical strategy for systematically collecting and organizing data. Once a teacher decides to use portfolio with his/her students, it still can take a few years to create a professional type of portfolio. Many teachers use the following steps in portfolio; purpose, assessment criteria, planning procedures, collection, and reflection. These steps are not firm and teachers can create different steps according to their goals.

Turning Brain Drain into Brain Gain: Some Suggestions for Turkey

Refik Culpan
The Pennsylvania State University, Middletown, PA

Many Turks who are educated overseas have not returned to Turkey upon completion of their education, others after working in Turkey for a period of time, return to work in the country where they are educated. This poster section will address the reasons for the brain drain from Turkey. Moreover, to offset the disadvantages of brain drain it will suggest some policy recommendations drawing on the experiences of other countries.

They include:
To offset the disadvantages of brain drain, economists and sociologists need to conduct rigorous studies in Turkey to identify the cause of the problem and offer remedies to deal with the issue.

The Turkish government should adopt a policy and enact a law requiring repayment of public university tuition costs from those university graduates who migrate to another country.

The government should also develop a database including scientists, professionals, businessmen, artists with Turkish origins, who have become established in their fields in foreign countries.

By launching stimulating and well-coordinated programs, Turkey can establish linkages and cooperation between Turkish programs and organizations and the talented and skilled scientists and professionals working overseas.

Overall, it is a rational and pragmatic approach to take advantage of brain drain from Turkey rather than to see it as a total lost. I hope this poster session can provoke some thoughts and eventually help to develop some policy measures.

the question of how student achievement should be improved. One can argue that smaller classes can be the easiest answer of this question. Reducing class size has been used as a method to increase student achievement in some states. In addition, researchers have questioned how or why small classes have positive effects on students' academic achievement. Therefore, the purpose of this paper is to show and examine existing literature about class size and student achievement relationship in order to answer the question of whether there is a relationship between class size reduction and student academic achievement" and "class size reduction and its effect (especially on student achievement). Accordingly, smaller classes do increase student achievement. However, some researches stated that it is necessary that instruction style should be redesigned to accommodate the needs of reduced class sizes. In general, this study explores class-size reduction should be implemented with other counterparts for higher student achievement.

Dr. Belger, University of North Carolina discussing her poster with Dr. Ihsan Gursel, FDA

A literature Review Study on Relationship between Class Size and Student Achievement.

Nihat Gurel Kahveci
University of Illinois at Urbana-Champaign, Urbana, IL

Developing student achievement is one of the most important aims of education. Educators have been looking for answers to

E-training for Teachers` Professional Development in Technology Integration: An Online Model of Problem-solving Approach

Mustafa Koc
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Appropriate use of technology is one aspect of teaching that both pre-service and in-service teachers need to demonstrate as

reflective practitioners who evaluate choices for presentation of content, monitoring and measuring students' understanding of content, and students' explorations of a variety of resources in the learning process. However, previous research shows that a great number of pre-service teachers do not understand the pedagogy that lies in effective integration of technology into educa tion and have difficulties in using technology in more constructivist ways to engage learners in critical and higher order thinking (Koc & Bakir, 2003). By applying problem-solving and inquiry strategies as a pedagogical framework, this paper proposes a web-based e-training environment in which teachers can generate technology-integrated projects and strategies for addressing real classroom questions, problems, and issues related to technology integration, and use them in their classroom, and share their experiences and findings with others. The advantages of such an environment, implications for professional development as well as the process of learning occurred in this online module are analyzed with a discussion of constructivist framework of technology implementation.

A Classification and Analysis of Cities Based Tourism Supply Resources in Turkey

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Tourism is one of the major export items of Turkey contributing significantly to its gross national products. Over the past two decades, tourism has become a very important industry to the economy of a large number of both coastal and inland Turkish cities. The key to continued attraction of visitors to Turkey in significant numbers requires a careful coordination of marketing and planning of tourism supply resources. These efforts also necessitate an assessment of the existing and potential components of tourism development of under and over supplied cities and regions as tourism destinations. Thus, it is the objective of this study to define, analyze, and classify cities based on their supply indicators. Many approaches exist for the identification and classification of tourism places as destinations. This study employs a regional analytical method developed by Smith (1989). This particular approach with some variations is also subsequently applied in various spatial settings by several other researchers (Shoval and Raveh 2004, Formica 2001, Uysal and Pots, 1990, Cha and Uysal 1994). In addition to measurable supply indicators, this study augments the analytical approach by adding an overall attractiveness city score as defined by the State Planning Organization of Turkey to its supply matrix. Using a factor analysis of supply indicators, the study attempts to identify the extent of tourism development in each of the cities in Turkey. The resultant factor scores of supply resources are then used as independent variables in two subsequent analyses: (1) to cluster cities in order to delineate the level of development as suggested by supply indicators and (2) to establish a relationship between supply and demand measures. The latter is achieved by regressing select demand measures on the delineated factor groupings of supply indicators. Then, appropriate planning, marketing, and resource allocation implications are provided for select city destinations.

Turkish Families' Views on Foreign Language Teaching in Pre-school Education

Dilek Pecenek
Ankara University, Ankara

The general purpose of this study is to put forward the perception and views of families, whose children take pre-school education, on foreign language and foreign language teaching in the pre-school period.

The working group of this study consists of families whose children, ranging in age from 4 to 6, go to different pre-school education institutions (Pre-school I and Pre-school II) which are similar in terms of social environment and educational opportunities. In total 61 families (122 mother-father) participated in this research; 27 families from Institution I and 34 families from Institution II. The data of the research was obtained with the questionnaire technique. In the questionnaire there are phenomenal questions (education level, profession and foreign language knowledge); importance of foreign language knowledge and perception and approach questions on pre-school foreign language teaching. The qualitative and quantitative data analysis techniques have been used for analysis of the acquired data.

According to research, the majority of the families' education level is at the university/college level and they work in fields like health, mathematics-science-engineering, economics-management and practical social sciences. A significant percentage of the families can speak a foreign language and they consider knowledge of foreign language as important for job opportunities and communication requirements. The majority of families participating in the study group generally perceive that the foreign language teaching in pre-school education should serve the purpose of familiarizing children with the foreign language and of encouraging them to develop some experiential learning processes. Families approve the foreign language teaching (English) in pre-school education since their children can develop a positive attitude towards learning a foreign language and gain beneficial affective experiences while learning it. The findings were discussed in relation to foreign language teaching programs in pre-school education.

Remembering Songs via Melodies, Lyrics, and Titles

Zehra F. Peynircioglu, Brian Rabinovitz, and Jennifer L.W. Thompson
American University, Washington, DC

Songs are special entities. They usually have intricately enmeshed lyrics and melodies. There are, however, findings that suggest that these two components are not equal partners in the cognitive processing of songs (e.g., Ali & Peynircioglu, 2003),

and several asymmetries have also been reported between the recall of titles, lyrics, and melodies from the same songs (e.g., Peynircio?lu, et. al. 1998). In the present study, we explored how lyrics, melodies, and titles, the three components that define songs, were related to each other in semantic memory by investigating their effectiveness as cues for each other. W also explored metamemory by investigating feeling of knowing (FOK) judgments when memory failed in such situations. The results showed that melodies and titles were recalled equally well and both better than lyrics. Lyrics were the better cue for both, however. Lyrics were also given the higher FOKs when recall failed, especially with the melody cues. Thus, despite poorer initial recall, people felt they would be more likely to recall the lyrics in the future when given the titles or melodies as cues than they would be to recall either the melodies or the titles when given the lyrics as cues. In addition, titles elicited stronger FOKs for melodies than vice versa. When cued by itself, on the other hand, lyrics cued further lyrics just as effectively as melodies cued melodies, although people felt more confident about recalling further melodies than they did about recalling further lyrics.

Literacy Development and Reading Assessment of a Fifth Grade Student: A Semester Long Case Study

Mustafa Ulusoy
University of Illinois at Urbana-Champaign, Urbana, IL

The purpose of this study was to examine and improve a fifth grade male students' literacy skill. This was a semester long study. The main data collection instruments were interviews, observations, students' works, surveys, and running records. The researcher and the student met two times a week to improve his reading and writing. Every meeting was two hours long. Reading books based on his interests, assessing his reading, answering questions about the books, and making story webs on the computers were basic activities in these meetings. At the beginning of the semester, interest surveys were applied to learn his reading interests, and books were selected based on these surveys. The research results showed that he made many omissions, repetitions, and visual errors in the first meetings. His reading improved weekly. The student started to read for meaning, and wanted to understand all of the story details. His reading fluency also improved. During the semester, the student increased his Running Record score from 67.56% to 92.72 %. This fifth graders' first writing samples revealed many spelling errors. The researcher and the student create a writing checklist to have error free writing samples. The checklist included six items including thinking about the subject, making a rough draft, showing the draft to someone, revising, editing and publishing it. As a result of the study, the student realized his reading and writing weaknesses and learned how to minimize them.

Power of Imagery in Teacher Education: Semiotics and Multicultural Perspective

Melda N. Yildiz
William Paterson University, Wayne, NJ

In this participatory research, participants from different technical backgrounds and various Teacher Education programs explored the power of visual imagery and sound in designing instructional programs for their classroom presentations. After given necessary technical skills on how to use various authoring tools, participants integrated visuals such as pictures, graphics, photos, charts, videos, and sounds into their multimedia projects. The study explores three key topics in order to understand the educational experiences of the participants: the wide range of meanings participants associate with media education and instructional design; the impact of multimedia production activities on participants' understanding of new media; and the ways in which they integrate visual imagery in their final multimedia projects and presentations.

INSTITUTIONAL POSTERS

Neurocognition and Imaging Research Laboratory, University of North Carolina at Chapel Hill

Aysenil Belger
University of North Carolina, Chapel Hill, NC

The neurobiological and pathophysiological mechanisms underlying many neuropsychiatric and neurodevelopmental disorders, such as schizophrenia, autism, and ADHD, remain unknown. The mission of our Laboratory is to use state-of-the-art brain imaging methods to elucidate the functional anatomy of attention and information selection in the healthy human brain, and how these neural circuits breakdown in schizophrenia and other neuropsychiatric and neurodevelopmental disorders. In particular, our studies utilize multimodal neuroimaging techniques, including functional magnetic resonance imaging, scalp-recorded event-related potentials and behavioral neurocognitive testing batteries. We will present an overview of our techniques, and discuss the scope of our research.

UNC Neurodevelopmental Disorders Research Center: Developmental Neuroimaging Core Laboratory

Aysenil Belger
University of North Carolina, Chapel Hill, NC

The primary objective of the Developmental Neuroimaging Core of the UNC Neurodevelopmental Disorders Research Center is to

provide centralized support and services to the pre-clinical and clinical projects utilizing image acquisition and image processing technology for quantitative measurements of structural MRI (SMRI), functional MR (fMRI), diffusion tensor imaging (DTI), ultrasound in human neuroimaging; and, multiphotonl/confocal microscopy data of mouse or cellular models relevant to neurodevelopmental. We will present an overview of our techniques, and discuss the scope of our research.

Methodology includes the analysis of media survey; questionnaires; journals; reflection and responses to activities; field notes derived from on-site classroom observations; the content analysis of pre- and post- multimedia projects and presentations by using Semiotics (study of signs) Theory; self assessment; and focus group online discussions.

The study outlines the difficulties and unique characteristics of integrating new media and technologies and compares the result of integrating semiotics, multicultural education, and instructional design in teacher training to develop different perspectives and points of view in teaching styles and strategies. It provides creative strategies for integrating visuals into multimedia production with minimal resources and equipment; and explores how a critical approach to the study of visual imagery combines knowledge, reflection, and action, promotes educational equity, and prepares new generation to be socially responsible members of a multicultural, democratic society.

A Quantitative Evaluation of Antitrust Policies within a Cross-Country Framework: Effectiveness and Efficacy

Serdar Dalkir
Micra Microeconomic Consulting Research Associates Inc. Washington DC

Keywords: antitrust policy; cross-sectional analysis; ex-post evaluation; policy relevance, effectiveness and efficacy This paper proposes a quantitative, cross-sectional, framework for ex-post evaluation of antitrust policies from an effectiveness and efficacy perspective. The paper looks at antitrust effectiveness and outcome efficacy in the sample countries and reaches some tentative conclusions. Effectiveness is defined as the link from the legal framework and resource use to implementation. Effective implementation is an intermediate policy outcome that is achieved through the use of an enforcement mechanism. Efficacy is defined as the link from general governance to a “final outcome,” defined as long-term prosperity. Each of these links is assessed through the use of one or more numerical indicator. If implementation effectiveness is a function of time, then countries with extensive antitrust laws and/or relatively large enforcement budgets but a low level of implementation effectiveness (such as the recent European Union members and the candidates) can expect to strengthen implementation effectiveness over time. Allowing private parties to sue under antitrust laws may be a way to accelerate their progress. Even JEL then, an efficacy gap may persist if reforms are forestalled in areas other than antitrust. Principal, MiCRA Microeconononomic Consulting and Research Associates, Inc.; previously consultant to the World Bank for evaluation of privatization, industrial restructuring and financial reform projects. The views represented in this paper are not necesssarily MiCRA’s. I thank Cihan Akta? of Turkish Competition Authority, Dr. Refet Gürkaynak of the Federal Reserve Board, Dr. David Eisenstadt of MiCRA, and attendees of a presentation to the Turkish-American Business Forum, D.C. Chapter. Any errors are mine.

NIHTURK: Turkish Scientists Association

Mustafa Dosemeci, Tulin Yanik, Cem Elbi
National Institutes of Health, Bethesda, MD

NIHTurk is established in early 2004 by a handful of Turkish-American scientists working at the National Institutes of Health (NIH), Bethesda, Maryland. Expanding its base to visiting students and clinical fellows at NIH and other academicians and researcher in health sciences in the area, it has now more than 80 members.

Objectives of NIHTurk

Contribute to the mission and scientific endeavor of NIH.
Help in the career development by organizing seminars and workshops specifically geared to its members.

Increase communication, scientific interaction and collaboration among its members.
Increase communication, scientific interaction and collaboration between its members and other Turkish-American scientists in USA.

Keep members up-to-date about the academic and scientific developments in Turkey; guide and help members who are returning Turkey after completing their studies at NIH.

Provide information to new and potential members and their families about scientific at NIH and social life in the greater Washington area.

Introduce new members to the wider Turkish-American Community in the greater Washington area.

Act as a liaison for any NIH scientist who wants to collaborate with a Turkish scientist or institution.

Introducing Anatolian Artisans (AnArt): Providing Sustainable Economic Development Through Arts

Elif M. Gokcigdem
History of Islamic Art & Museum Studies Founding Member, and Advisor to AnArt

Anatolian Artisans (AnArt), a non-profit, 501c3 tax-exempt organization, is dedicated to keep artistic traditions alive by providing sustainable economic and social benefits for the low-

income artisans in Turkey. This proposal aims to introduce AnArt and its activities to members of TASSA to foster cooperation between the two communities. AnArt's cultural and educational projects would provide a unique platform for TASSA's members to supplement, and enrich their activities in their institutions towards the promotion of educational cooperation between Turkey and the U.S.

To fulfill its mission AnArt creates a chain reaction first by identifying unique artisans in Turkey who apply traditional techniques and designs in their work. Later, these artisans are provided with funding, assistance in product development and marketing, and training in entrepreneurship and micro-enterprise management. Once their products are considered marketable in competitive U.S. markets, they are then introduced by AnArt representatives to a variety of outlets such as museum shops, retail stores, and the global market through internet. This effort results in a steady flow of orders, and financial support for the artisan, who continues to apply his/her unique knowledge and artistic abilities in preserving traditional Turkish arts and culture.

Maintaining and increasing the interest in Turkish arts and culture is an important goal of AnArt, where artisans' works are indirectly promoted through a variety of educational and cultural activities; such as traveling exhibitions, lecture series, as well as representation at major international folk life festivals throughout the U.S., in order to create demand for their products.

Brain Drain to Brain Gain

Senay Gokbayrak, A. Gürhan Fisek
Fisek Institute Science and Action Foundation for Child Labour, Faculty of Political Sciences, Ankara University, Ankara

Recently, migration studies are given much interest from politicians, academics and international institutions. The main reason of this situation is unwilling of rich areas from immigration. It is seen that preventing this flows, countries like Turkey are selected as a "bumper". However this prohibition is only valid for un-skilled labor. For highly skilled labor (brain), developed countries implement "open door" politics.

Brain drain problem attracted much attention recently than past. Some countries has revealed "best practice" examples by intervention programs aimed at brain drain to brain gain.
Today what can we do maximizing origin countries interests from brain flows, at conditions against to origin countries? When we reply to this question, proposing "drain to gain" activities. This approach is called "da? keçisi (chamois)" by us?. Beyond classical approaches like prohibiting brain migration or reversing brain drain, we imagine "strength transfer" between sending and receiving countries by building intellectual bridges.

Our poster will be formed two parts.

1. Studies on brain drain by Fisek Institute Science and Action Foundation for Child Labor:
    - 1.1. Questionnaire studies.
    - 1.2. Web side
    - 1.3. Models
    - 1.4. Academic meetings and conversations.

2. Other activities beside brain drain of Fisek Institute Science and Action Foundation for Child Labor:
    - 2.1. Provision of social services to child labor working SME's (Practice of mobile clinic).
    - 2.2. Support systems of occupational safety to SME's.
    - 2.3. Practice of summer camping for apprentices.
    - 2.4. House of youth girls
    - 2.5. Library accessed by internet.
    - 2.6. Contest of child labor photography.
    - 2.7. Periodical publications: Journal of Working Environment is 13-years-old.

Finally, at this poster, we will present to participants our cooperation call.

Chemical Reaction Engineering and Combustion Research Laboratory

Nesrin Olten
Kocaeli University, Izmit

Chemical Reaction Engineering and Combustion Research Laboratory (CRE&CRL) is directed by Assistant Professor Nesrin Olten. In her research, experimental and computational facilities are used in developing insights on the Detailed Chemical Kinetic Mechanisms (DCKM) associated with combustion, catalysis, and other industrially important reaction processes. Experiments and theory are combined to better understand and control environmentally important, homogeneous and heterogeneous chemical reaction processes. The laboratory is equipped with advanced research tools to undertake experimental and computational studies in high-temperature chemical kinetics and combustion, including a fully computerized high resolution capillary gas chromatograph/mass spectrometer (GC/MS) system for on-line gas analysis; an opposed jet diffusion flame burner; flow reactor to study catalytic and other types of reactions; a single piston gasoline engine with dynamometer to study pollutant formation and control in internal combustion engines. In addition, several high-speed workstations and software for molecular and fluid mechanical simulations are available.

The Izmir Institute of Technology

Semra Ulku
President, The Izmir Institute of Technology, Izmir

State university founded in 1992 in Izmir, Turkey, the Izmir Institute of Technology is a research-oriented institution with emphasis on graduate education in the fields of science and technology. The Institute admitted its first graduate students in 1994, the first undergraduates in 1998. The language of instruction is English. Today, around a decade later, the Institute possesses three faculties housing 14 departments; nine

undergraduate, 29 graduate programs; 1250 undergraduate, 650 graduate students; and 112 faculty members engaged in over 200 nationally and internationally funded research projects in fields including molecular biology and genetics, biotechnology and bioengineering, food safety, environmental pollution and pollution control, nanotechnology, advanced materials, robotics, materials development for historical sites, and urban policy. The Faculty of Science comprises the Departments of Biology, Chemistry, Mathematics, Physics; the Faculty of Engineering comprises the Departments of Chemical Engineering, Civil Engineering, Computer Engineering, Electrical & Electronics Engineering, Food Engineering, Mechanical Engineering; and the Faculty of Architecture comprises Architectural Restoration, Architecture, City & Regional Planning, and Industrial Design. While all of these departments administer graduate programs, interdisciplinary graduate programs include Biotechnology & Bioengineering, Energy Engineering, Engineering Management, Environmental Engineering, and Materials Science & Engineering. Research centers and laboratories are equipped for cutting edge research in science and technology. Education is student-centered, research- and project-oriented on all levels and trains for teamwork in an interdisciplinary context. Research aims at value-added production, sustainable development, human safety and well-being. The 8650-acre campus just outside the city of Izmir offers living, working, and natural leisure facilities as well as a large variety of student activities and sports.

Society of Turkish American Architects, Engineers and Scientists Inc. (MIM)

Ali N. Akansu
Turkish House, New York City, NY

MIM was established in New York City on May 22, 1970. MIM is a private non-profit, educational, non-political association and is also open to professionals of any other heritage. After having started by a small group of friends in 1970, it now has hundreds of members and is highly regarded in the Turkish American community and internationally. In addition, MIM has been accredited as a NGO by the UN.
MIM's goals are:

• To foster professional advancement of its members
• To promote the collaboration and networking of Turkish American architects, engineers and scientists.
• To provide guidance in technical, scientific and professional issues.
• To develop collaboration with other scientific organizations.
• To coordinate joint activities with professional, social, educational and cultural organizations with which MIM may be affiliated.

MIM organizes the following activities:
• MIM publishes bulletins and web pages with news about professional and social activities. They include articles by members about their current professional activities. Through its networking events, MIM provides sharing of information and experience on professional activities, jobs and project opportunities in the USA and Turkey.
• MIM organizes conferences and informs its members about current scientific issues.
• MIM also serves as a cultural community organization. Social and artistic events enable members and their families to maintain their heritage.

MIM is a member organization of The Federation of Turkish American Associations and The Assembly of Turkish American Associations.

Daron Acemoglu, Ph.D.

Current Position:	Charles P. Kindelberger Professor of Applied Economics, MIT
Research Interest:	Political Economy, Economic Development, Labor Economics
Education:	Ph.D., Economics, London School of Economics (1992)
	B.S., York University (1989)

Metin Akay, Ph.D.

Current Position:	Associate Professor of Engineering, Dartmouth College
	Founding editor-in-chief of the Biomedical Engineering Book Series
Research Interest:	Neural Engineering, Biocomplexity, Biomedical Signal Processing
Education:	Ph.D., Rutgers University in (1990)
	B.S., Electrical Engineering, Bogazici University (1981)

Abdullah Akyuz

Current Position:	President, TUSIAD-US
Previous Positions:	Director, Bonds and Bills Market of Istanbul Stock Exchange
	Economist, Capital Markets Board, Turkey
Education:	M.A., Economics, University of California-Davis (1986)
	B.A., Economics and Finance, University of Ankara (1983)

Sefik S. Alkan, Ph.D.

Current Position:	Head of Immunology, 3M Pharmaceuticals
Previous Positions:	Aventis, Ciba-Geigy (Novartis), Basel Institute of Immunology
Research Interest:	T and B Lymphocyte Immunobiology, Immune Therapeutics
Education:	Ph.D., Hacettepe University
	B.S., Hacettepe University

Engin Atac, Ph.D.

Current Positions:	President, Anadolu University
Previous Positions:	Vice-President, Anadolu University
	Dean, College of Fine Arts, Anadolu University
	Chairperson, Public Budgeting and State Planning
	Department of Public Finance, Anadolu University
Research Interest:	Public Finance and Budget
Education:	Ph.D., Public Finance, Anadolu University (1979)
	B.A., Finance and Economics, Ankara University (1968)

George H. Atkinson, Ph.D.

Current Positions:	Science and Technology Adviser to the Secretary of State (STAS)
	Professor of Chemistry and Optical Sciences at the University of Arizona
Previous Positions:	American Institute of Physics (AIP) Senior Fellow for Science, Technology, and Diplomacy at the U.S. Department of State
Education:	Ph.D., Indiana University (1971)
	B.S., Eckerd College (1967)

Metin Lutfi Baydar, M.D.

Current Positions:	President, Suleyman Demirel University
Previous Positions:	Head Physician, Research & Practice Hospital, Suleyman Demirel University
	President, Orthopedics and Traumatology, Suleyman Demirel University
Research Interest:	Knee Surgery
Education:	M.D., Medicine, GATA (1991)
	B.S., Medicine, Dokuz Eylul University (1984)

Ugur Buyukburc, Ph.D.

Current Positions:	President, Harran University
Previous Positions:	Vice President, Gazi Osman Pasa University Director, Agricultural Researches of the Ministry of Agriculture
Research Interest:	Grassland and Erosion Control
Education:	Ph. D., Plant Production, Bonn University, Germany B. S., Agriculture Ankara University (1967)

Michael Deppler, Ph.D.

Current Position:	Director, Europe 1, International Monetary Fund
Education:	Ph.D., Economics, Georgetown University (1976) B.A., International Relations, Brown University (1964)

Cemal Ekin, Ph.D.

Current Position:	Associate Professor, Providence College
Research Interest:	Marketing research, marketing strategy, and marketing on the Internet
Education:	Ph.D., Adana Academy of Economic and Commercial Sciences (1974)MBA, Michigan State University (1970)

Ali Erdemir, Ph.D.

Current Position:	Senior Scientist, Energy Technology Division, Argonne National Laboratory
Research Interest:	Novel Tribological Coatings that Nearly Vanish Friction
Education:	Ph.D., Materials Science and Eng., Georgia Inst. of Technology (1986) B.S., Metallurgy, Istanbul Technical University (1977)

Aybar Ertepinar, Ph.D.

Current Position:	Vice-President, Council of Higher Education of Turkey
Previous Positions:	Vice-President, Academic Affairs, Middle East Technical University Vice-President, Turkish Scientific and Technical Research Council Dean, Faculty of Eng. and Architecture, Karadeniz Tech. University Chairperson, Dept. of Eng. Sciences, Middle East Technical University
Research Interest:	Large Elastic Deformations, Related Stability and Vibration Problems, Developments in Higher Education
Education:	Ph.D., Applied Mechanics, Drexel University (1972) B.S.C.E., Middle East Technical University (1967)

Suleyman Gokoglu, Ph.D.

Current Position:	Senior Scientist at NASA Glenn Research Center (GRC)
Research Interest:	Heat/mass Transport Phenomena, Advanced Materials Synthesis and Coatings, Combustion, and Turbo Machinery
Education:	Ph.D., Chemical Eng., Yale University (1982) B.S., Chemical Eng. and Math, Bogazici University (1978)

Murat Gunel, M.D.

Current Position:	Associate Professor of Neurosurgery, Section Chief, Neurovascular Surgery and Neurointensive Care, Yale University School of Medicine
Research Interest:	Molecular Biology and Genetics of Vascular Malformations
Education:	M.D., Istanbul University

Sharon Hrynkow, Ph.D.

Current Position:	Acting Director of the Fogarty International Center (FIC) at NIH
Previous Positions:	Science Officer at the U.S. Department of State
Education:	Ph.D., Neuroscience, the University of Connecticut B.A., Rhode Island College

Gokhan Hotamisligil, M.D. Ph.D.

Current Position:	James Stevens Simmons Professor of Genetics and Metabolism, Chair, Department of Genetics and Complex Diseases, School of Public Health, Harvard University,
Research Interest:	Genetic Basis of Common and Complex Diseases, Particularly Obesity, Diabetes and Heart Disease
Education:	Ph.D., Harvard University (1994) M.D., Ankara University (1984)

Erdal Inonu, Ph.D.

Current Position:	Professor, Sabanci University
Previous Positions:	Deputy Prime Minister, Foreign Minister, Republic of Turkey; Dean, Bogazici University; President, Middle East Technical University;
Research Interest:	Neutron Transport Phenomena, History of Science in Turkey
Education:	Ph.D., Physics, CalTech (1951) B.S., Ankara University (1947)

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Current Position:	Director, Office of International Science and Engineering, NSF
Previous Positions:	Director, Experimental Program to Stimulate Competitive Research (EPSCoR) for the State of Maine Program Manager, Fogarty International Center, NIH
Area of Interest:	Biotechnology, Health, Bioterrorism, International Cooperation, Technology Commercialization
Education:	Ph.D., Molecular Biophysics and Biochemistry, Yale University B.S., Chemistry, Barnard College, Columbia University

Faruk Logoglu, Ph.D.

Current Position:	Turkish Ambassador to the US
Previous Positions:	Deputy Minister of Foreign Affairs, The Republic of Turkey Turkish Ambassador to Denmark Turkish Ambassador to Azerbaijan
Education:	Ph.D., Political Science, Princeton University (1969) B.A., Brandeis university (1963)

Reza Moghadam, Ph.D.

Current Position:	Senior Advisor, Europe 1, International Monetary Fund IMF Mission Chief to Turkey
Education:	Ph.D., Mathematics, Oxford University (1991) B.S., Economics, University of Warwick (1985)

Banu Onaral, Ph.D.

Current Position:	H. Sun Professor of Biomedical Engineering and Electrical Engineering Founding Director, the School of Biomedical Engineering Science and Health Systems, Drexel University
Previous Positions:	President, IEEE Engineering in Medicine and Biology Society (EMBS); Founding Fellow, American Institute for Medical and Biological Engineering (AIMBE).
Education:	Ph.D., Biomedical Eng., University of Pennsylvania (1978) B.S., Electrical Engineering, Bogazici University (1973)

A. Yavuz Oruc, Ph.D.

Current Position:	Professor, University of Maryland, USA Advisor to President, TUBITAK, Turkey President, Sabatech Corporation, USA
Previous Positions:	Program Director, CSA, NSF, 2000-2002 Visiting Professor, Bilkent University , 1996-1997 Assistant Professor, RPI, USA
Research Interest:	Quantum Networks, Parallel Computing, Computer Science Education
Education:	Ph.D., EE, Syracuse University. (1983) B.Sc., EE, METU (1976)

Cengizhan Ozturk, M.D. Ph.D.

Current Position:	Visiting Staff Scientist, National Heart Lung Blood Institute (NHLBI), NIH Assoc. Prof., Biomedical Eng. Inst., Bogazici University
Research Interest:	Medical Imaging, MRI, Cardiac Imaging, Image Guided Medical Interventions
Education:	Ph.D., BME, Drexel University (1997) M.D., Marmara University (1990)

Kenan Sahin, Ph.D.

Current Position:	President, TIAX LLC
Previous Positions:	President, Lucent's Software Product Group President, Kenan Systems Faculty, Harvard University Faculty, University of Massachusetts
Education:	Ph.D., Sloan School of Management, MIT, (1966) B.S., MIT (1963)

Ozgur Sahin

Current Position:	Ph.D. Student, Electrical Engineering, Stanford University.
Awards:	Grand Prize at the Collegiate Inventors Competition organized by Unites States Patent and Trademark Office and the National Inventors Hall of Fame
Research Interest:	Atomic Force Microscopy Technique for Quantitative Imaging of Material Properties with Nanometer Scale Resolution
Education:	M.S., Electrical Engineering, Stanford University (2003) B.S., Electrical Engineering, Bilkent University (2001)

Murat Tarimcilar, Ph.D.

Current Position:	Associate Professor, The George Washington University
Previous Positions:	Research Professor and TIPP Fellow, GMU, Institute of Public Policy Associate Professor, Suffolk University
Research Interest:	Multi-Criteria Decision Models, Public Sector Decision Analysis
Education:	Ph.D., Quantitative Methods, Louisiana State University, (1987) B.S., Industrial Engineering, Bogazici University (1980)

Stephen Joel Trachtenberg, Ph.D.

Current Position:	President, The George Washington University
Previous Positions:	President, University of Hartford
	Vice President, Boston University;
Research Interest:	Higher Education, University Leadership
Education:	MPA, Harvard University (1966)
	J.D., Yale University (1962)
	B.A., Columbia University (1959)

Ayse Semra Ulku, Ph.D.

Current Position:	President, Izmir Institute of Technology
Previous Positions:	Dean, Faculty of Engineering, Izmir Institute of Technology
	Head, Ege University Dept. of Chemical Engineering
	Head, Thermodynamics Div., Dokuz Eylul Univ. Dept of Mech. Eng.
Research Interest:	Heat and Mass Transfer in Porous Media and in Biological Systems Zeolites
	Adsorption, Heat Pumps and Energy Storage.
Education:	Ph.D., Faculty of Engineering, Middle East Technical University (1975)
	B.S., Faculty of Engineering, Middle East Technical University (1969)

Ayse Soysal, Ph.D.

Current Position:	President, Bogazici University
Previous Positions:	Dean, School of Arts and Sciences, Boðaziçi University
	Member, Executive Council of the Turkish National UNESCO Commission
Research Interest:	Finite Group Theory, Cohomology ofGgroups, Commutative Rings
Education:	Ph.D., Mathematics, University of Michigan, Ann Arbor (1976)
	B.S., Physics and Mathematics, Robert College (1971)

Levent Yanik

Current Position:	Founder and President, e-Devlet Technologies
	Ph.D. Candidate, EE, The George Washington University
Previous Positions:	Research Fellow, National Institute of Standards and Technology
	IT Consultant, The World Bank Group
	Research Fellow, Thomas Jefferson National Accelerator Facility
Research Interest:	Strategy Design, Analysis, and Implementation of e-Government Solutions,
	Numerical Modeling of Magnetic Materials and Devices.
Education:	M.Sc., EE, The George Washington University (2003)
	M.A., Physics, The George Washington University (2000)
	B.S., Physics, Cukurova University (1990)

Lutfi Yenel

Current Position:	Chairman of the Board, Alcatel Turkey
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	B.S., Electrical Engineering, Istanbul Technical University

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Esra Yonel, Lehigh University
Caner Yurteri, University of Florida

Dr. Erdal Inonu with Andrea Sahin and Dr. Kenan Sahin

Dr. Suleyman Gokoglu, NASA and Dr. Ali Erdemir, Argonne National Laboratory interview by TRT

Dr. Semehat Demir, NSF with Dr. Ertdal Inonu

Dr. George H. Atkinson interview by TRT

Dr. Cem Elbi, NIH and Dr. Metin Lutfi Baydar, President of Suleyman Demirel University

Reception at the Turkish Embassy

Dr. Erdal Inonu with students at the reception

Dr. Kenan Sahin with his son at the reception

Dr. Engin Atac, President of Anadolu University with his student Mustafa Aydin at the reception

Dr. Murat Tarimcilar and Dr. Gokhan Hotamisligil with students

We thank our volunteers, they did a superb job.

Lunch break

Lunch break

ABOUT TASSA

The Turkish-American Scientists and Scholars Association (TASSA) is an independent, non-profit and non-political organization promoting educational and scientific cooperation between the USA and Turkey. Established in June 2004 in Washington, D.C., it aims to facilitate the advancement of science in Turkey and the USA through scientific exchange and educational programs and increased networking.

VISION
TASSA's vision is to build a sustainable science bridge between the U.S. and Turkey. This bridge would facilitate the flow of people (scientists and scholars), knowledge, and technology and help link science and technology institutions in the two countries.

TASSA will accomplish its vision by:
• Exchanges of scientists
• Facilitating joint research projects and joint publications with scientists based in Turkey
• Facilitating sabbaticals
• Establishing a "Science Corps" for voluntary short-term assignments
• Forming networks of scientists based in the U.S. and Turkey in various disciplines
• Twinning of U.S. and Turkish scientific and academic institutions
• Facilitating the sharing of best practices among science institutions.

The building of a science bridge requires strong "legs" on both sides of the Atlantic. Thus, as a matter of priority, TASSA is strengthening its own internal organization, expanding its membership, and developing directories of people and institutions, in both Turkey and the US.

ACTIVITIES AND PROGRAMS
During its short existence TASSA has held its first annual conference, developed a Web site, started its first program, and completed its organization.

The Visiting Scholars Program
This first program launched by TASSA aims to promote communication and cooperation between TASSA members in the US and their counterparts in Turkey. It helps match TASSA members planning to visit Turkey and are willing to share their research activities and experience with their colleagues in Turkey with Turkish universities or other institutions expressing interest in the research area of the visiting TASSA member. A database of potential host institutions in Turkey has been developed, as well as online application forms for those interested to serve as visiting scholars, or to host them in Turkey. TASSA members wishing to serve as visiting scholars can join the program through the TASSA Web site and Turkish institutions wishing to host such scholars can express their interest through an e-mail addressed to:visitingscholars@tassausa.org.

ORGANIZATION AND MEMBERSHIP
TASSA is governed by a Board of Directors, whose members are elected for two-year terms by the dues-paying members. The Board's Executive Committee serves as the principal administrative and managerial oversight body within TASSA, led by the TASSA President and President-Elect. TASSA's operations are managed by the Executive Director. In addition, several standing and ad hoc committees facilitate the operations of the organization. Three of these have played significant roles in the establishment and "take off" of TASSA: the Elections and Bylaws Committee, the Web Development Committee, and the Annual Conference Committee.

TASSA's members are scientists and scholars in the fields of:
• Social sciences, arts and humanities
• Health & biomedical sciences
• Engineering & applied sciences
• Natural sciences.

Members of each of the four technical groups listed above elect their own representatives to serve on the Board.

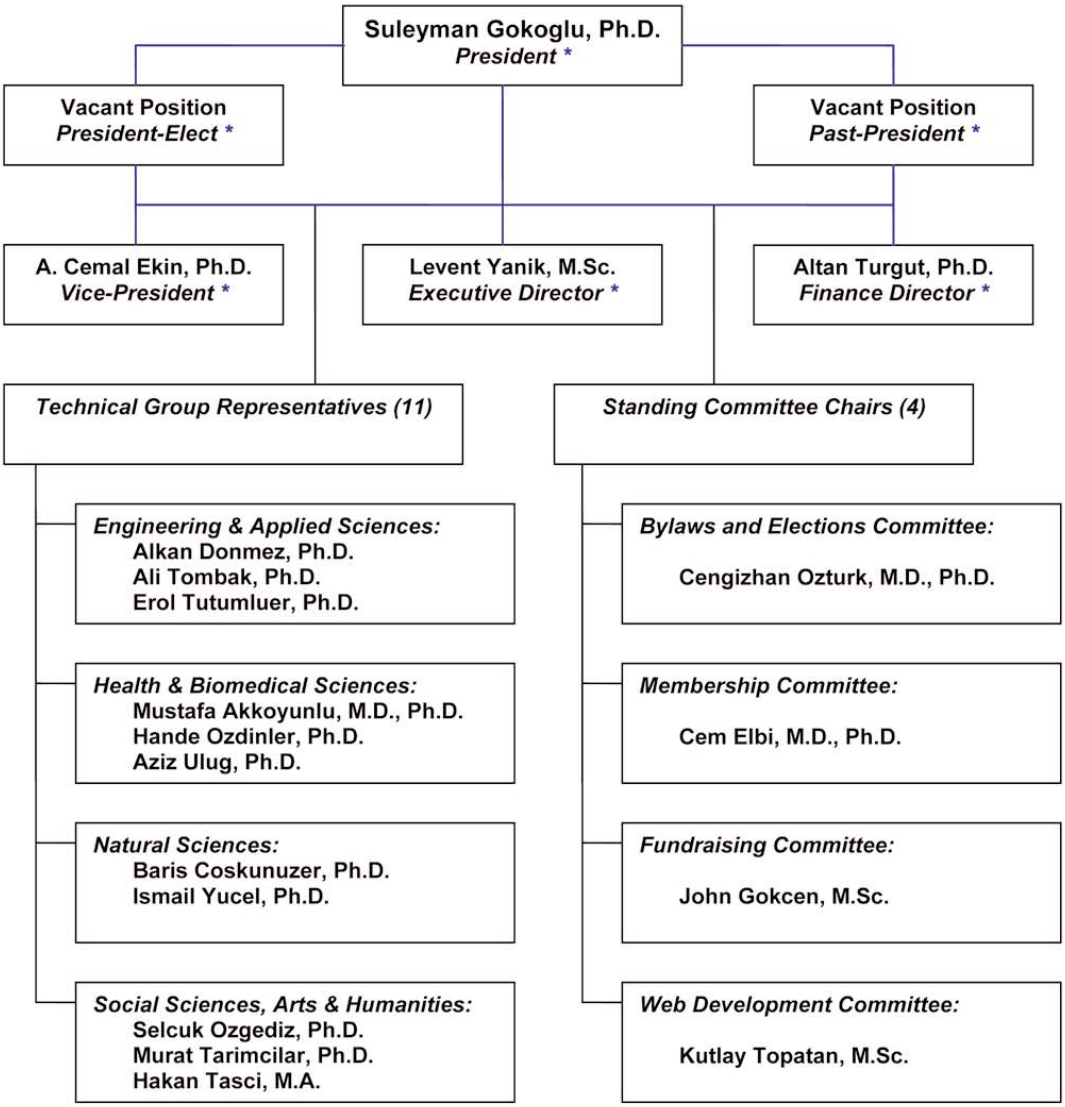
During its first year of existence, TASSA has attracted over 1200 registered members, practically all living in North America or Turkey. Membership is open to all scientists and scholars interested in the mission of TASSA, including students as "student members."

For more information please visit: www.tassausa.org - For inquiries send message to: info@tassausa.org

Our mailing address is: 1526 18th Street N.W. Washington, DC 20036 USA

Give us a call at: +1-800-620-4120

The Governance Structure of Turkish American Scientists and Scholars Association



*** Members of Executive Committee as of September 2005**

PLEASE SAVE THE DATE!

NEXT TASSA ANNUAL CONFERENCE
MARCH 25-26, 2006

DREXEL UNIVERSITY
EDMUND D. BOSSONE RESEARCH ENTERPRISE CENTER
PHILADELPHIA, PA 19104

Start making plans to attend TASSA Annual Conference at Drexel University in Philadelphia, PA, on March 25-26, 2006. This conference will bring together prominent scientists and scholars from leading American and Turkish institutions as well as decision makers and potential partners.

TASSA VALUES YOUR PARTICIPATION AND WISHES YOUR PRESENCE AT THE CONFERENCE

Please contact TASSA with any questions.

1526 18th Street, N.W. Washington, DC 20036
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