

TASSA ANNUAL CONFERENCE

25-26 MARCH, 2006
DREXEL UNIVERSITY, PHILADELPHIA, PA



TURKISH AMERICAN
SCIENTISTS AND
SCHOLARS ASSOCIATION

Conference Theme:

Knowledge and Innovation to Benefit Society

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CONFERENCE ORGANIZING COMMITTEE

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Nihat Bilgutay, *Logistics*
Banu Onaral, *Academia in Turkey*
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Dear TASSA Members and Conference Participants,

We would like to welcome you to the 2006 TASSA Annual Conference hosted by Drexel University in Philadelphia. We are certain that the conference program fulfills the expectations of our distinguished community and serves its theme "Knowledge and Innovation to Benefit Society." It showcases the accomplishments of many eminent American, Turkish, and Turkish-American scientists and scholars and establishes a forum for many young and experienced researchers to explore and develop new collaborative initiatives. We are pleased that you did not miss this rare opportunity to listen to the experts the world is talking about and to experience the enriching venue.

The list of honorary speakers and dignitaries is a meaningful tribute to the commitments of both the U.S. and Turkey for promoting scientific cooperation between the two countries. Prof. Nuket Yetis, the Acting President of the Scientific and Technological Research Council of Turkey (TUBITAK), will deliver the keynote address on the first day. Dr. Gazi Yaşargil, honored as the Neurosurgeon of the Century in 1999 by the Journal of Neurosurgery, will give the keynote speech on the second day. Key policy making organizations such as the U.S. State Department, TUBITAK, the National Science Foundation (NSF), and the American Association for the Advancement of Science (AAAS) will participate with prominent representatives on various panels.

The technical group sessions will feature world-renown speakers under themes reflecting today's emphasis on "bio" sciences, namely, bio-nanotechnology, bio-chemical physics, and bio-medicine. While the social science session will focus on discussing the relevance of the Turkish political model in a globalizing world, the session concentrating on meeting the needs of the private sector for R & D will host top-level executives of major U.S. and Turkish companies.

The final session of the conference is devoted to exploring new visions for the Turkish higher education system. About ten presidents of major universities in Turkey will participate in discussions with the representatives of other relevant institutions of Turkish higher education to tackle the challenges for a brighter future.

TASSA is delighted accept nearly sixty poster presentations this year. The contributions came mostly from graduate students and postdoctoral fellows in academia as well as institutions and included participants from Turkey, Europe, Canada, and the U.S. TASSA is proud to support a few of these colleagues for their conference travel expenses.

Thank you for coming to Philadelphia to share our excitement and pride.

Suleyman Gokoglu PhD
TASSA President

Selcuk Gucerı PhD
Conference Chair

CONFERENCE PROGRAM

Friday, March 24, 2006

19:00 - 21:00 **Welcome Reception (A.J. Drexel Picture Gallery, Main Building)**

Saturday, March 25, 2006

8:00 - 8:45 **Breakfast (Bossone Research Center)**
Registration (Bossone Research Center)

8:45 - 9:00 **Welcome and Introduction**
Suleyman Gokoglu, TASSA & Selcuk Guceri, Drexel University

9:00 - 9:45 **Honorary Speakers: Role of Turkey in the New Geopolitical Order**
H.E. Nabi Sensoy, Ambassador of the Republic of Turkey
Matthew Bryza, US Department of State
Kenan Sahin, TIAX LLC
Introduced by Selcuk Ozgediz, World Bank Group

9:45 - 10:30 **Keynote Address**
Nuket Yetis, TUBITAK
Introduced by Nihat Bilgutay, Drexel University

10:30 - 10:45 **Coffee Break**

10:30 - 18:30 **Poster Presentations/Exhibits**

10:45 - 12:15 **Technical Group Sessions: Engineering & Applied Sciences**
Theme: Bio-nanotechnology
Moderator: Selim Unlu, Boston University
Panelists: Hur Koser, Yale University
Mihri Ozkan, UC Riverdale
Mehmet Sarikaya, University of Washington

12:15 - 13:15 **Luncheon (Behrakis Hall, Creese Student Center)**

13:15 - 14:45 **Technical Group Sessions: Natural Sciences**
Theme: Biochemical physics
Moderator: Selcuk Cihangir, Fermi Nat. Accelerator Lab
Panelists: Ivet Bahar, University of Pittsburgh
Ibrahim Cemen, Oklohoma State University
Ahmet Yildiz, UC San Francisco

14:45 - 15:00 **Coffee Break**

15:00 - 16:30 **Technical Group Sessions: Social Sciences, Arts and Humanities**
Theme: Relevance of the Turkish Political Model in a Globalizing World
Moderator: David Cuthell, The Institute of Turkish Studies
Panelists: Ersel Aydinli, The George Washington University
Marcie Patton, Fairfield University
Omer Taspinar, The Brookings Institution

16:30 - 16:45 **Coffee Break**

16:45 - 18:15 **Technical Group Sessions: Health & Biomedical Sciences**
Theme: Bio-medicine
Moderator: Gonul Velicelebi, TorreyPines Therapeutics, Inc.
Panelists: Serap Aksoy, Yale University
Aziz Sancar, University of North Carolina
Murat Tuzcu, The Cleveland Clinic

18:30 - 21:00 **Reception Dinner (Behrakis Hall, Creese Student Center)**
Hosted by Drexel University

Sunday, March 26, 2006

- 8:00 - 9:00** **Breakfast (Behrakis Hall, Creese Student Center)**
- 9:00 - 9:45** **Keynote Address**
- M. Gazi Yasargil, University of Arkansas for Medical Sciences
Introduced by Kamil Ugurbil, University of Minnesota
- 9:00 - 17:00** **Poster Presentations/Exhibits**
- 9:45 - 11:15** **Meeting Private Sector Needs for R&D - From Research to Commercialization**
- Moderator:** Yilmaz Arguden, TAIK (Turkish-US Business Council)
Panelists: Izak Bencuya, Fairchild Semiconductor
Gorkem Guven, Hittite Microwave Istanbul
Tibet Mimaroglu, Beko
Cengiz Ultav, Vestel
- 11:15 - 11:30** **Coffee Break**
- 11:30 - 12:45** **Challenges in Building a Sustainable Science Bridge between the US and Turkey**
- Moderator:** Mirat D. Gurol, San Diego State University
Panelists: Guldal Buyukdamgaci Alogan, TUBITAK
Norman Neureiter, AAAS Ctr. for Sci., Tech. & Security Policy
Osman Shinaishin, National Science Foundation
Alex King, US Department of State
- 12:45 - 14:00** **Luncheon (Behrakis Hall, Creese Student Center)**
- 14:00 - 16:30** **New Visions on Higher Education: Challenges for Turkey**
- Moderator:** Banu Onaral, Drexel University
Panelists: Omer Cebeci, TUBITAK
Ustun Erguder, Istanbul Policy Center, Sabanci University
Tuncalp Ozgen, Turkish Higher Education Council
- Discussants:** Representatives of Turkish Universities and Other Invitees
- ◆ Ural Akbulut, President, Middle East Technical University
 - ◆ Suheyl Batur, President, Bahcesehir University
 - ◆ Metin Lutfi Baydar, President, Suleyman Demirel University
 - ◆ Ugur Buyukburc, President, Harran University
 - ◆ Nilufer Egrican, Vice-President, Yeditepe University
 - ◆ Faruk Karadogan, President, Istanbul Technical University
 - ◆ Tahsin Kesici, President, TOBB Economics and Technology University
 - ◆ Tuncalp Ozgen, President, Hacettepe University
 - ◆ Ayse Soysal, President, Bogazici University
 - ◆ Semra Ulku, President, Izmir Institute of Technology
- 16:30 - 17:00** **Closing Remarks**
- Suleyman Gokoglu, TASSA; Selcuk Guceri, Drexel University

MARCH 25, 2006 SATURDAY

MARCH 25, 2006
SATURDAY

Saturday, March 25, 2006
9:30 - 10:30

Prof. Dr. Nüket YETİŞ

Acting President of TÜBİTAK

Professor Yetiş was born in Eskişehir, Turkey in 1950. She was educated at Bogazici University. She received her MBA in Operations Management at the same university and Ph.D. in Industrial Engineering at the Istanbul Technical University.

She is the former dean of Marmara University Faculty of Engineering (MUFE) (1994-2000) where she established Master and Doctoral Programs of Engineering Management. She led Continuous Quality Improvement activities at MUFE which is the first Turkish public organization that became a finalist at the European Quality Award in 2000. She also led MUFE to be the first applicant and finalist of European Quality Award in higher education.

She was the Director of the Turkish Institute for Industrial Management (2000-2003). She became Acting President of the Scientific and Technological Research Council of Turkey (TÜBİTAK) in 2004.

Her major interests are engineering and technology management, quality management and reengineering, production and resources management. She has several national and international academic publications.

She led several projects for institutions and companies both in public and private sector on continuous quality improvement and reengineering at the Turkish Institute for Industrial Management.

She is a member of several professional societies including Turkish Quality Association (KalDer), EFQM Education Community of Practice, EFQM HealthCare Working Group.

She is married with two daughters.

Saturday, March 25, 2006
10:45 - 12:15

Bio-Nanotechnology

Moderator: M. Selim Ünlü

M. Selim Ünlü is a Professor of Electrical and Computer Engineering, Biomedical Engineering, and Physics at Boston University. He received the B.S. degree in electrical engineering from Middle East Technical University, Ankara, in 1986, and the M.S.E.E. and Ph.D. in electrical engineering from the University of Illinois, Urbana-Champaign, in 1988 and 1992, respectively. Prof. Ünlü's interests are in research and development of photonic materials, devices and systems focusing on the design, processing, and characterization of semiconductor optoelectronic materials and devices, as well as high resolution imaging and sensing of biological materials. During 1994-1995, Dr. Ünlü served as the Chair of IEEE Laser and Electro-Optics Society, Boston Chapter, winning the LEOS Chapter-of-the-Year Award. He was awarded National Science Foundation Research Initiation Award in 1993, United Nations TOKTEN award in 1995 and 1996 and both the National Science Foundation CAREER and Office of Naval Research Young Investigator Awards in 1996. In 2005, he was selected as a recipient of LEOS Distinguished Lecturer Award. He has authored and co-authored over 200 technical articles and holds several patents. His professional service posts include the current chair of IEEE/LEOS Nanophotonics committee, an Associate Editor for IEEE Journal of Quantum Electronics and a VP of LEOS.

Magnetic Liquids for Lab-on-a-Chip and Rapid Diagnostics Applications

Hur Koser

Hur Koser is an Assistant Professor in the Electrical Engineering Department at Yale University. Dr. Koser graduated from Kadikoy Anatolian High School and Robert College of Istanbul prior to coming to U.S. for undergraduate education. He obtained double B.S. degrees in Electrical Engineering and Physics from the Massachusetts Institute of Technology (MIT), a Master's of Engineering degree for his work on magnetic random access memory devices at IBM T. J. Watson Research Laboratory. He stayed at MIT's Electrical Engineering Department for his Ph.D. in the field of Microsystems (2002). After a post doctoral work in microfluidics at the Research Laboratory of Electronics at MIT, he joined Yale University in 2003, where he currently conducts research in micro and nanotechnology applications to biomedical engineering and power devices. Dr. Koser has recently received the NSF Career Award for his work on ferrofluid dynamics and will be on Junior Faculty Fellowship (awarded by Yale) during next year. He is also the recipient of the 2003 Yale Information Technology Systems Instructional Innovation Award and the Moore Award for the development of a microfluidics-based teaching laboratory. During his years at MIT, he was selected as a member of academic honor societies such as Sigma Pi Sigma, Sigma Xi, Phi Beta Kappa, and Eta Kappa Nu (1998).

Nanoparticles and Their Use in Diagnosis and Therapy

Mihri Ozkan

Mihri Ozkan is an Assistant Professor in the Department of Electrical Engineering at UC-Riverside with a research focus in nanotechnology and its applications in biology and engineering. She received her Ph.D. degree in the Department of Electrical and Computer Engineering at UC-San Diego and her M.S. degree in the Department of Materials Science and Engineering at Stanford University. She has over four years of industrial experience including at Applied Materials, Analog Devices and at IBM Almaden Research Center. Her awards and honors include "Distinguished Engineering Educator of the Year Award" by the National Engineers' Council (2006), National award of "Emerging Scholar" by the American Association of University Women (2005), "Regents Faculty Excellence Award" (2001 and 2004), "Visionary Science Award" (2003), "Technical Ingenuity Award" (2003), "Research Leadership Award" (2003), "Selected US team member in US-Japan Nanotechnology Symposium" (2003), and "Best graduate student awards" from the Materials Research Society, the Society of Biomedical Engineering and Jacobs School of Engineering (1999, 2000, 2001). She is an active board member and treasurer in the International Society for BioMEMS and Biomedical Nanotechnology. Her editorial activities include the Journal of Sensors and Actuators B, the Journal of Biomedical Microdevices and the Springer Encyclopedia about BioMEMS and Nanotechnology. Along with more than 70 paper publications, she holds more than 25 patent disclosures and about 8 US-patents.

Genetically Engineered Materials and Systems - Lessons from Mother Nature for Technology and Medicine

Mehmet Sarikaya

Mehmet Sarikaya is a Professor in the Materials Science and Engineering (MSE) and Chemical Engineering Departments and the Director of the Genetically Engineered Materials Science and Engineering Center, an NSF supported Center, at University of Washington (UW). Dr. Sarikaya earned his BS in Metallurgical Engineering from the Middle East Technical University in Turkey in 1977, and received his MS and PhD in MSE from the University of California, Berkeley in 1979 and 1982, respectively. He was a postdoc at the Max-Planck Institute fur Metallforschung in Germany and the Edgar Bain Fundamental Research Laboratories with U.S. Steel in Pittsburgh, PA. He was a lecturer at the Lawrence Berkeley Laboratory for one year before he joined UW in Seattle. He was a visiting professor at both Princeton and Nagoya (Japan) Universities during the 90s. Professor Sarikaya is leading a new area of polydisciplinary research called Molecular Biomimetics, combining commonly known areas of nanobiotechnology, synthetic biology, and medical material science and engineering. Dr. Sarikaya is a member of many professional societies including MRS, ACS, APS, ACerS, MSA, AAAS, etc. He has been a member of large federal panels, including National Academy of Sciences, NSF, NIH, DOE, ARO, DARPA, and AFOSR, and the reviewer of many scientific journals and publications.

Saturday, March 25, 2006
13:15 - 14:45

Biochemical Physics

Moderator: Selcuk Cihangir

Selcuk Cihangir is a Physicist at Fermi National Laboratory (Fermilab) in Illinois, USA. He received his Ph. D. in physics from the University of Rochester, New York in 1981. He was a Research Associate at the University of Illinois, Urbana-Champaign and Texas A&M University. He taught at Texas A&M as a Visiting Assistant Professor before joining Fermilab. He also teaches physics at Elmhurst College, Elmhurst, Illinois as an Adjunct Faculty. His research is in Experimental High Energy Physics. He participated in construction and operation of five major experiments at Fermilab. He authored or co-authored more than 300 research articles and experimental proposals. He is a member of the American Physical Society.

Computational Biology in Postgenomic Era

Ivet Bahar

Ivet Bahar is the Founding Chair of the Department of Computational Biology and Professor of Computational Biology at the School of Medicine, University of Pittsburgh. She received her B.S. and M.S. from Bogazici University, Turkey, and her Ph.D from Istanbul Technical University, Turkey. She served as an Assistant Prof (1986-1987), Assoc Prof (1987-1993), Full Professor (1993-2001) and as the Director of the Polymer Research Center at the Chemical Engineering Department of Bogazici University, until she joined the University of Pittsburgh in 2001 as the founding director of the Center for Computational Biology and Bioinformatics. Dr. Bahar's research expertise is in modeling and simulations of macromolecular dynamics, developing new theories and computational tools for analyzing complex biological processes, which opened the way to a wealth of computational studies of protein dynamics and improved our understanding of the structural basis of biomolecular functional mechanisms. She is the recipient of TUBITAK-TWAS prize in 1995, several NATO, NIH and NSF awards, including a recent HHMI/NIBIB award for the PhD program in computational biology, jointly offered by the University of Pittsburgh and Carnegie Mellon University. Dr. Bahar authored over 170 research articles. She is an elected member of the European Molecular Biology Organization (EMBO) since 2000, and she is a principal member of the Turkish Academy of Sciences since 1997.

Where and when will the next big Turkish earthquake occur?

Ibrahim Cemen

Ibrahim Çemen is a professor of geology at Oklahoma State University (OSU) School of Geology. He received his Ph. D. from the Pennsylvania State University in 1983. He became an Assistant Professor at OSU in 1984, was promoted to Associate Professor in 1987 and to Professor in 1993. He served as the Department Head from 2001 to 2005. His major research interests are studying earthquake potential of large active fault zones, and determining oil and gas potential of sedimentary basins. Since 1999, his research group has been studying the earthquake potential of active fault zones in Turkey. The group has carried out extensive research following the August 17, 1999 Izmit Earthquake. He has also been conducting research in determining oil and gas potential of sedimentary basins in Oklahoma and in Turkey. He has authored 43 archival refereed articles; edited 2 books, wrote 19 technical reports and delivered 163 presentations. He has received various grants and contracts from federal and state funding agencies including NSF, and from major oil and gas companies. He taught at the Middle East Technical University from August 1989 to December 1991. He spent a sabbatical at Ankara University in 1999. He is a fellow of the Geological Society of America and an active member of American Association of Petroleum Geologists.

How do Molecular Motors Move?

Ahmet Yildiz

Ahmet Yildiz is a postdoctoral fellow at University of California, San Francisco. He grew up in Sakarya, Turkey. He received his B.S. degree in physics from Bogazici University, Istanbul, Turkey, in 2001 and started his graduate studies in biophysics at the University of Illinois Urbana-Champaign. He worked in the research group of Paul R. Selvin where he developed the technique of Fluorescence Imaging with One Nanometer Accuracy (FIONA). His work was awarded the Gregorio Weber International Prize in Biological Fluorescence. He subsequently applied FIONA to molecular walking mechanism of motor proteins: myosin V, myosin VI, and kinesin. Dr. Yildiz received his Ph.D. in 2004. His thesis was granted the Young Scientist Award by the AAAS. In 2005, he moved to University of California, San Francisco, where he does research in the laboratory of Dr. Ronald D. Vale. He is currently studying the structural mechanism of cytoplasmic dynein.

**Saturday, March 25, 2006
15:00 - 16:30**

Relevance of the Turkish Political Model in a Globalizing World

Moderator: David Cuthell

David Cuthell is the Executive Director of The Institute of Turkish Studies and is a visiting professor at Columbia and Georgetown Universities. He previously was Director of Turkish, Middle East and Central Asian Studies at Stevens Institute of Technology in Hoboken New Jersey. Prof. Cuthell has a PhD. in history from Columbia as well as an earlier MA in political economy and an MBA in international finance. Prior to returning to Columbia University in 1998 for his doctorate, Prof. Cuthell worked in the capital markets for twenty years in New York and London for Citibank and Morgan Stanley and later was a Managing Director of fixed income trading at Mabon Securities. His research interests include the social and demographic transformation of the 19th century Ottoman Empire as well as the impact of technology on Ottoman and modern Turkish society. He recently contributed to *The Creation of Iraq: 1914-1922* (Columbia Press 2004).

The Essence of the Turkish Model: Theorizing Reform Security

Ersel Aydinli

Ersel Aydinli is an Assistant Professor of International Affairs at The George Washington University, Elliott School of International Affairs. He previously taught at Middle East Technical University and Bilkent University in Ankara. He has an M.A. from the George Washington University and a Ph.D. in political science from McGill University, Montreal. Last year he held a post-doctoral research fellowship from Harvard University's Kennedy School of Government. His research interests include international relations theory, globalization and security, non-state security actors, and Turkish politics and foreign policy. His works have appeared in such journals as *Foreign Affairs*, *International Studies Review*, *Current History*, *Middle Eastern Studies* and *Security Dialogue*. He is the co-editor (with James N. Rosenau) of *Paradigms in Transition: Globalization, Security, and the Nation State* (SUNY Press, 2005). He is married to a fellow academic and has one son, age nine. He is actively involved in efforts to mobilize an anti-gun awareness campaign and lobby in Turkey.

The War on Terror and Turkey's Democratization Problematic

Marcie Patton

Marcie J. Patton is an Associate Professor and former Chairperson of the Politics Department at Fairfield University. She has previously taught at Boğazici University in Istanbul, and Middle East Technical University and Bilkent University in Ankara. She has an M.A. in International Relations from University of Chicago and a Ph.D. in Political Science also from the University of Chicago. She serves on the Committee on Academic Freedom of the Middle East Studies Association of North America, and plays an active leadership role in the Turkish Studies Association. Her research interests include the political economy of the Turkish republic, transformations in state-society-market relations, the discourse of development and postdevelopmentalism. Her most recent article, "The Economic Policies of the AKP Government: Rabbits from a Hat?" will appear in Middle East Journal, summer 2006.

The Turkish Model: How Applicable?

Omer Taspinar

Omer Taspinar is the Director of the Turkey Program at the Brookings Institution and Adjunct Professor at the Johns Hopkins University, School of Advanced International Studies (SAIS). Prior to joining Brookings, Taspinar worked as an Assistant Professor at SAIS in Bologna, Italy. He completed his doctorate studies on Political Islam and Kurdish Nationalism in Turkey at SAIS in Washington DC in 2001. The courses he has been teaching at SAIS include "Islam and Europe," "French Domestic and Foreign Policy," and "European Political Economy". Dr. Taspinar is also a columnist for the Turkish Daily Radikal and the Pakistan Daily Times. He is the author of two books: "Political Islam and Kurdish Nationalism in Turkey" (Routledge, 2005) and "Fighting Radicalism with Human Development: Education and Growth in the Islamic World" (Brookings Press, forthcoming 2006). Some of his recent articles and monographs include "Europe's Muslim Street," Foreign Policy (March-April 2003); "An Uneven Fit: The Turkish Model and the Arab World," Brookings Analysis Paper (August 2003); "Changing Parameters in US-German-Turkish Relations," AICGS (January 2005), "The Anatomy of Anti-Americanism in Turkey," Insight Turkey, (July-August 2005)

Saturday, March 25, 2006
16:45 - 18:15

Bio-Medicine

Moderator: Gönül Veliçelebi

Gönül Veliçelebi is Vice President of Research and Drug Discovery at TorreyPines Therapeutics since 2000. Dr. Veliçelebi has over 20 years of research and management experience in biotechnology. Before joining TorreyPines Therapeutics, she was Vice President of Research at MitoKor and Director of Cell Biology at SIBIA Neurosciences. During her tenure at SIBIA, Dr. Veliçelebi directed cell biology and electrophysiology laboratories and managed several projects. She has played an integral role in strategic collaborations with pharmaceutical companies as project leader and steering committee member. Dr. Veliçelebi has published extensively in peer-reviewed journals and received the 1998 Scientific Achievement Award in Health Sciences given by the Scientific and Technical Research Council of the Turkish Republic (TUBITAK). Dr. Veliçelebi received her BA summa cum laude in chemistry at Randolph-Macon Woman's College, her PhD in biophysical chemistry from Yale University, and completed her postdoctoral fellowship in biochemistry and molecular biology at Harvard University.

Molecular Mechanism of the Biological Clock

Aziz Sancar

Aziz Sancar is Sarah Graham Kenan Professor of Biochemistry and Biophysics at the University of North Carolina School of Medicine. He was born in Savur-Mardin, Turkey in 1946. He obtained his primary and secondary education in Savur and Mardin and received an M.D. degree in 1969 from Istanbul University School of Medicine. After practicing medicine in Savur for two years he attended the University of Texas at Dallas and obtained a Ph.D. degree in Molecular Biology in 1977 with his work on a DNA repair enzyme called 'photolyase.' Dr. Sancar conducted postdoctoral work at Yale University on another DNA repair enzyme called 'excinuclease' in the period 1977-1982. He joined the Department of Biochemistry and Biophysics at UNC as an Associate Professor where he rose through the ranks to his current position in 1997. Dr. Sancar is currently conducting research on DNA Repair, Cell Cycle Checkpoints, Cryptochrome and the Circadian Clock. He has published 279 research articles and 32 book chapters. He is a recipient of the Presidential young Investigator Award (USA), the American Society for Photobiology Research Award, the Turkish Scientific and Technical Council (TUBITAK) Scientific Achievement Award, and the North Carolina Distinguished Chemist Award. He is a Fellow of the Third World Academy of Sciences, a Member of the American Academy of Arts and Sciences, a Member of the American Academy for Microbiology, and a Member of the National Academy of Sciences, USA.

Progression and Regression of Artherosclerosis

Murat Tuzcu

Murat Tuzcu is a Professor of Medicine at The Cleveland Clinic Lerner College of Medicine, CWRU and staff cardiologist at The Cleveland Clinic. He received his medical degree and residency in medicine at Istanbul Medical Faculty. He completed cardiology and interventional cardiology fellowships at The Cleveland Clinic and Massachusetts General Hospital. He was appointed to The Cleveland Clinic in 1992. As an interventional cardiologist Dr. Tuzcu's expertise includes transcatheter treatment of structural heart disease, in addition to coronary artery disease. Dr. Tuzcu has made seminal contributions to the understanding of transplant vasculopathy, subclinical atherosclerosis, and progression /regression of atherosclerosis through his work at the Intravascular Ultrasound Research Laboratory that he directs. He also leads the investigations of catheter-based treatments for structural heart disease at the Cleveland Clinic. Dr. Tuzcu has authored more than 200 peer-reviewed publications and serves as a reviewer and editorial board member for many academic journals. Dr. Tuzcu is involved in the medical education of doctors from all over the world, including many young cardiologists from Turkey. Similar to his educational activities, his clinical practice involves management of patients from all corners of the world. He was repeatedly voted into the listing of "Best Physicians in America".

Novel approaches to combat global infectious diseases

Serap Aksoy

Serap Aksoy is a Professor and the Head of Epidemiology of Microbial Diseases at the School of Public Health at Yale University. She graduated in Biology from Vassar College and received her PhD from Columbia University. She completed her postdoctoral studies in parasitology in the Department of Internal Medicine at Yale University. She joined the ranks of faculty at Yale first in Internal Medicine and subsequently at her current position at the School of Public Health. Her interests are in the molecular basis of biological complexity that determines host-microbe interactions with a focus on disease control. Her research on tsetse flies investigates the molecular aspects of tsetse-trypanosome interactions. Dr. Aksoy has pioneered a paratransgenic approach, where insect commensal gut flora are exploited to express products that can block parasite development as a novel approach to control disease transmission.

MARCH 26, 2006 SUNDAY

MARCH 26, 2006
SUNDAY

Sunday, March 26, 2006
9:00 - 9:45

Prof. Dr. M. Gazi Yaşargil

University of Arkansas for Medical Sciences

Introduced by **Kamil Uğurbil**, *University of Minnesota*

Prof. Dr. M. Gazi Yaşargil was born July 6 1925 in Turkey. He attended Medical School at the Friederich von Schiller University, Jena/Germany and at the University of Basle, Switzerland, where he received Doctor of Medicine degree March 2, 1950. After completing residency in Psychiatry, Internal Medicine, General Surgery and Neurosurgery he become Chief Resident in Neurosurgery at the University of Zurich, Switzerland in 1957, where he became first Assistant Professor in 1965, and later Associate Professor in 1969. He became full professor and chairman of the Department of Neurosurgery, University of Zurich, Switzerland in 1973, until he retired there in 1993. Since 1994 he works as a Professor of Neurosurgery, in the Department of Neurosurgery, at the University of Arkansas for Medical Sciences.

Prof. Dr. M. Gazi Yaşargil has a collection of Honorary Medical Doctorals (Ibni Sina University, Ankara-Turkey, 1990; Cerrahpaşa University Istanbul-Turkey, 1991; University of Lima/Peru, 1999; Hacettepe University Ankara-Turkey) and he is Honorary Professors of Capital University of Medical Sciences Beijing and Xian (China, in 2001), Fourth Medical University in Xian (China, in 2001), 19th May University in Samsun (Turkey, in 2003) and Friedich von Schiller University in Jena (Germany in 2003).

Prof. Dr. M. Gazi Yaşargil is the receipt of numerous awards, to name few: Vogt-Award of the Swiss Ophthalmological Society (1957), Robert-Bing-Prize of Swiss Academy of Medical Sciences (1968), Marcel-Benoist-Prize of Swiss Federation (1976), Pioneer Microsurgeon Award of the International Microsurgical Society, Sidney, Australia (1981), Università di Napoli e della Compagna (Honorary Medal, 1988), Medical Award of the Republic of Turkey (1992), Gold Medal of the World Federation of Neurosurgical Societies (1997), Distinguished Faculty Scholar, University of Arkansas for Medical Sciences (1998), Honored as "Neurosurgeon of the Century" by the Brazilian Neurosurgical Society (1998), European Association of Neurological Surgeons Medal of Honor (1999), Honored as "Man of the Century 1950-2000" by the journal, Neurosurgery at the Congress of Neurological Surgeons Annual Meeting (1999), Fedor Krause Medal, German Neurosurgical Society (2000), Honorary Fellowship of the American College of Surgeons (2000), "Yaşargil Endowed Chair in Neurosurgery" University of Arkansas for Medical Sciences (Founded, 2000), Medal of the Republic of Turkey (2000), Award of the Turkish Academy of Sciences (2000), First International Francesco Durante Award, Italy (2002).

He has honorary memberships in Academia Brasileira de Neurocirurgia, Society of Neurological Surgeons, American Heart Association, Canadian Neurosurgical Society, Congress of Neurological Surgeons, Japan Neurosurgical Society, American Association of Neurological Surgeons, Harvey Cushing Society, Swiss Society of Neuroradiology, Royal Society of Medicine, London, Section of Neurology, Turkish Neurosurgical Society, International Skull Base Society (ISBS), Swiss Neurosurgical Society, Argentine Neurosurgical Society, American Society of Neuroradiology, Turkish Academy of Sciences, Peruvian Neurosurgical Society, Italian Neurosurgical Society, Hong Kong Neurosurgical Society, Georgia Neurosurgical Society, Polish Neurosurgical Society. Prof. Dr. M. Gazi Yaşargil has over 350 publications with 13 monographs and over 41 contributions to handbooks and monographs.

Sunday, March 26, 2006
9:45 - 11:15

From Research to Commercialization

Moderator: Yilmaz Arguden

Yilmaz Arguden is a leading strategist, advisor, and board member of major public and private sector institutions. He is the Chairman of TAIK (Turkish-US Business Council) and ARGE Consulting, a leading management consulting firm in Turkey. ARGE has been recognized at the European Parliament as one of the best three companies "shaping the future" with its commitment to corporate social responsibility. Dr. Arguden is also an Adj. Professor of Business Strategy at Bogazici University and the MBA program of Koc University and a columnist focusing on business and strategy issues. He was selected as a "Global Leader for Tomorrow" by the World Economic Forum for his commitment to improving the state of the world. (www.arguden.net)

Power Semiconductors' role in our daily lives

Izak Bencuya

Izak Bencuya is the Executive Vice President of Fairchild Semiconductor and the General Manager of the Functional Power Products Group in San Jose, California. Dr. Bencuya has 25 years of industry experience. He began his career at Yale University where he researched ultra thin oxide MOS devices. Dr. Bencuya later worked at GTE Laboratories and Siliconix in various research and management roles to develop and market leading edge Power Devices, such as MOSFETs, IGBTs and SITs. He joined Fairchild Semiconductor in 1994 to start the Low Voltage MOSFET business which has grown to be the major revenue and earnings generating line at Fairchild. The Functional Power Products Group, at \$900M annual revenue, mainly supplies Power Semiconductor solutions for all power supply applications in the computing, communications, industrial, consumer and automotive markets. Dr. Bencuya has a B.S. in Electrical Engineering from Bogazici University in Istanbul, Turkey, an M.S. and Ph.D. in Engineering and Applied Science from Yale University and an M.B.A. from the University of California-Berkeley. He is a member of the IEEE Electron Device Society. Dr. Bencuya holds 15 patents and has published extensively in the electronics field.

A Silicon Valley in Istanbul?

Gorkem Guven

Gorkem Guven is the General Manager of the Istanbul Technology Center of the Massachusetts based Hittite Microwave Corporation (HMC). After graduating from the Middle East Technical University in 1998, Mr. Guven began his career in a Lockheed Martin Company. He joined the Chelmsford Headquarters of HMC in 2000 and has been with the company ever since. He recently came back to Turkey to establish the HMC Istanbul Technology center within the ITU Technocity. HMC designs and develops high performance integrated circuits (ICs), modules and subsystems for technically demanding radio frequency (RF), microwave and millimeterwave applications covering the frequency range of DC to 110 GHz. HMC products are used by more than 2,300 customers in a variety of applications and markets, including; automotive, broadband, cellular infrastructure, fiber optics, microwave & millimeterwave communications, military, space and test & measurement market applications. Mr. Guven is also one of the initial shareholders of Airties Wireless Networks in Istanbul, which is a prominent name in the wireless communication market.

Finding Qualified R&D Engineers in Turkey and Comparison of R&D to Silicon Valley

Tibet Mimaroglu

Tibet Mimaroglu is the Deputy General Manager of R&D at Beko in Istanbul. He started his professional life as Medical Imaging Equipment Designer at Quantex X-Ray in 1981. He designed digital video recorder at Vicom Systems and developed biometric security systems at Identix. During 1987-1993 he worked as Director of System Development at Compression Labs. During 1993-1999 he worked as Technical Staff Member and Project Manager at Silicon Graphics. During 1999-2001 he worked as Director of Engineering at Ubicom. During 2001-2005 he worked as Senior Staff Engineer and Project Manager at Nextray, CEO at Spreadvision, Director of Video Systems at Atheros Communications, and Mobile Imaging Director at Insilica. Before joining Beko, he worked as Consultant for both Intel Corporation and Connex Technology. He received his B.S. and M.S. degrees from Bogaziçi University, Electronics Engineering Department in 1976 and 1978, respectively, and his Ph.D. degree on Digital Image Processing of Computer Engineering from Oakland University, Michigan in 1981. He authored a textbook published by Prentice Hall "Programming and Designing with the 68000 Family". He taught Digital Image Processing Courses at UC, Berkeley in 1987 and was a Visiting Professor at Bogaziçi in 1998. Dr. Mimaroglu worked at MPEG Committee for more than 10 years and is a member of SMPTE. He has 12 patents.

Innovation Potential of Turkey and Its Global Standing

Cengiz Ultav

Cengiz Ultav is a Senior Vice President at Vestel in Istanbul responsible from Strategic Planning, Investor Relations and New Business Development. He received his BS and MS degrees in Electronics Engineering from Middle East Technical University. He held technical and management positions at Bimsa A.S. and Info A.S. in Turkey, and Philips and Dornier System GmbH in Europe between 1973 and 1981. He worked as a consultant to major groups in Turkey (Koç, Sabancı and Eczacıbaşı) between 1981 and 1988. He was an Assistant GM at NCR Turkey and GM at Sun Mikrosistemler Turkey between 1988 and 1992. He established his own company Multima in 1992, as a Microsoft Certified Solution Provider (top winner two years in a row), personally became a Microsoft Solution Development Discipline - SDD consultant, serviced major holding groups (Koç, Sabancı and Eczacıbaşı) and Vestel. He joined Vestel in 1995 as a VP participating from day one as Zorlu Group acquired Vestel and embarked upon a major growth challenge that by 2005 achieved more than 25% market share in the EU in consumer electronics. Multima continues as a software company with ERP sales to Far East. He is a founding member of UNIX User's Group in Turkey and a founding member of Turkish Informatics Society and a current board member.

*Sunday, March 26, 2006
11:30 - 12:45*

Challenges in Building a Sustainable Science Bridge between the US and Turkey

Moderator: Mirat D. Gurol

Mirat D. Gurol is the Blasker Chair Professor and Director of Environmental Engineering Program at San Diego State University (SDSU). She received her degrees in Chemical and Environmental Engineering from the Middle East Technical University in Ankara and the University of North Carolina at Chapel Hill. She had served as a faculty member for seventeen years at Drexel University before moving to SDSU in 1997. She has been quite active in research, receiving numerous national and international awards and recognitions on her contributions to innovative processes of water treatment and fundamental understanding of chemical oxidation technologies in elimination of environmental pollutants. She has closely collaborated with private sector on many research and development projects, which helped her understand the importance of public and private partnerships in bringing new ideas and technologies to life. Over the last few years, she has worked towards providing safe drinking water to impoverished societies of the world, which included installation of a water treatment system into a tsunami-hit hospital in Southern India. Her continuing efforts have been recognized by the President of India who granted her three private meetings, and the President of SDSU who bestowed on her the President's Leadership Award. Dr. Gurol was a member of the delegation that recently visited TUBITAK-MAM for development of collaborative research programs.

TUBITAK's role in Fostering the Efforts to Build a Sustainable Science Bridge between the US and Turkey

Guldal Buyukdamgaci Alogan

Guldal Buyukdamgaci Alogan is a Vice President at the Scientific and Technological Research Council of Turkey (TUBITAK). Dr. Büyükdamgacı received her BS degree (1976) from the Middle East Technical University (METU), MS (1982) and PhD (1985) degrees from the University of Wisconsin-Madison, all in Industrial Engineering. After working as a strategy advisor for a major corporation in Turkey between 1987-88, she taught in the Departments of Industrial Engineering and Management at the University of Wisconsin-Madison and Whitewater, WI between 1989-92, and at Polytechnic University - New York between 1993-96. In 1996-97, she served in the top management of two secondary education institutions. In 1998, she joined Industrial Engineering Department of Marmara University in Istanbul, and later got concurrently (2001-04) involved in the Institute for Industrial Management (TUSSIDE) of TUBITAK. In March 2004, she was appointed to TUBITAK in Ankara where she is a Vice President. She also teaches at the Department of IE at METU and the Faculty of Medicine at Hacettepe University. Her areas of interest and research are decision theory, measuring health outcomes, strategic management, and organizational excellence. Her affiliations are Society for Medical Decision Making (SMDM - USA), The Institute of Operations Research and Management Sciences (INFORMS - USA), Operational Research Society of Turkey (YAD - Turkey), and Society for Health Related Quality of Life (SAYKAD - Turkey).

The Roles of Science and Technology in International Relations

Alexander H. King

Alexander H. King is a Jefferson Science Fellow at the US Department of State. This one-year appointment takes him away from his permanent position as Head of the School of Materials Engineering at Purdue University. Alex King was born and raised in London, England. He has a baccalaureate from Sheffield University, and a doctorate from Oxford. He held post-doctoral positions at both Oxford and MIT before joining the faculty of the State University of New York at Stony Brook, where he also served as the Vice Provost for Graduate Studies. He left Stony Brook in 1999, to take up his present position at Purdue. A naturalized American citizen, he is a Fellow of both ASM International and the (UK) Institute of Materials and he has been a Visiting Fellow of the Japan Society for the Promotion of Science. He served as the President of the Materials Research Society in 2002, and he now serves as a member of the Executive Committees of the Federation of Materials Societies and the University Materials Council. Dr. King maintains an active research program. He has over 150 refereed publications and has edited four books in areas such as thin films, metals, electro-ceramics, semiconductors, polymers and materials processing. Thirty graduate students, from all around the world, have earned PhDs under his supervision.

Turning a Cooperative Science Agreement into Real Cooperation

Norman P. Neureiter

Norman P. Neureiter is the Director of the Center for Science, Technology and Security Policy at the American Association for the Advancement of Science (AAAS). With a Ph.D. in 1957 from Northwestern University, Norman Neureiter joined Humble Oil in Baytown, Texas. He moved in 1963 to NSF to run a cooperative science program with Japan that had been initiated by President Kennedy. From there he joined the US Foreign Service, serving in Germany and in 1967 became the first US science attache in Eastern Europe--based in Warsaw, Poland. In 1969, he moved to the White House Office of Science and Technology in charge of international affairs--playing a role in President Nixon's breakthroughs with both Russia and China. He left Government in 1973 and joined Texas Instruments where a 23-year career in international business development culminated in the position of Vice President of TI Asia based in Japan for five years. Retiring in 1996, he was a consultant until being appointed the first Science and Technology Adviser to the US Secretary of State in 2000, serving briefly under Madeleine Albright and then Colin Powell. In 2004 he joined AAAS at his current position. He speaks German, Russian, Polish, French, Spanish and Japanese.

NSF International Programs - Potential for support of collaboration between US and Turkey

Osman A. Shinaishin

Osman A. Shinaishin is a Senior Program Manager at the Office of International Science & Engineering (OISE) at the National Science Foundation (NSF). Dr. Shinaishin has served as Senior Program Manager for North Africa, the Middle East and South Asia (except for India and Nepal) since October 1993. He has served in a number of capacities within the OISE at NSF. From 1976 to 1977, he served as Program Manager for the US-Pakistan program. From November 1977 until October 1993, he served as Senior Program Manager for South Asia, with programs mainly in India and Pakistan. Dr. Shinaishin's experience includes work as a research engineer at the Boeing Company Aircraft Division, at the General Electric R&D center, and at the EPA Directorate for Research and Development. Dr. Shinaishin received a B.S. in Agricultural Sciences from Cairo University, Egypt, a M.S. in Agricultural Engineering from Michigan State University and a Ph.D. in Mechanical Engineering from the University of California, Davis and Berkeley. He has published technical articles in acoustics and in non-destructive testing, and has made several presentations, in the U.S. and abroad, about science and technology in developing countries in general and in the Middle East in particular.

**Sunday, March 26, 2006
14:00 - 16:30**

**New Visions on Higher Education:
Challenges for Turkey**

Moderator

Banu Onaral, *Drexel University*

Panelists

Omer Cebeci, *TUBITAK*
Ustun Erguder, *Istanbul Policy Center, Sabanci University*
Tuncalp Ozgen, *Turkish Higher Education Council*

Discussants

Representatives of Turkish Universities and Other Invitees:

Ural Akbulut, *President, Middle East Technical University*
Suheyl Batum, *President, Bahcesehir University*
Metin Lutfi Baydar, *President, Suleyman Demirel University*
Ugur Buyukburc, *President, Harran University*
Nilufer Egrican, *Vice-President, Yeditepe University*
Faruk Karadogan, *President, Istanbul Technical University*
Tahsin Kesici, *President, TOBB Economics&Technology Univ.*
Tuncalp Ozgen, *President, Hacettepe University*
Ayse Soysal, *President, Bogazici University*
Semra Ulku, *President, Izmir Institute of Technology*

POSTERS

ENGINEERING & APPLIED SCIENCES

E1) Adaptive Grid Modeling with Direct Decoupled Method for Predicting the Air Quality Impacts of Biomass Burning, Alper Unal and M. Talat Odman , *MACTEC Inc., Trenton, NJ, Georgia Institute of Technology, Atlanta, GA*

Prescribed burning is becoming an integral part of land management. Prescribed fires have a number of benefits ranging from reducing the risk of uncontrolled wildland fires to maintaining functional ecosystems. However, they produce combustion byproducts that are potentially harmful to human health and welfare. These products may lead to the formation of secondary products such as ozone and particulate matter that can be transported long distances in the atmosphere and contribute to the air pollution problems in more populated distant areas. The objective of this study is to improve the ability to model the air quality impacts of biomass burning on the surrounding environment. The focus is on prescribed burning emissions from a military reservation, Fort Benning in Georgia, and their impact on local and regional air quality. The approach taken in this study utilizes two new techniques we recently developed: 1) Adaptive grid modeling and 2) Direct sensitivity analysis. We equipped an advanced Three-Dimensional Eulerian-type Air Quality Model, Multiscale Air Quality Simulation Platform (MAQSIP), with these techniques and conducted regional scale air quality simulations. Grid adaptation reduces the grid sizes significantly in areas that have rapid changes in concentration gradients consequently the results are much more accurate than those of traditional static grid models. Direct sensitivity analysis calculates the rate of change of concentrations with respect to emissions from specific sources. This paper presents the novel methods used in this study as well as the comparative findings. Implications on regulatory planning and exposure assessment studies will also be presented.

E2) Bio-Assisted Assembly at the Nanoscale: Towards Functional Nanostructures and Devices, Cengiz S. Ozkan, *Center on Functional Engineered Nano Architectonics, University of California, Riverside, CA 92521*

Conventional device fabrication strategies must be augmented by new techniques including self assembly methods in order to truly take advantage of the quantum nature of novel nanoscale electronic devices and systems. I will describe self assembly processing for the fabrication of nanoassemblies of carbon nanotubes (CNT) and quantum dots (QD). Such heterojunctions could become better alternatives for the synthesis of nanoscale devices which would preserve the electronic properties of MWCNT's compared to configurations that depend on the bending or overlapping of CNT's. Such configurations could be useful for the bottom-up assembly of nanoscale circuits or as dropin technologies for the existing device platforms. During processing, CNT's are primarily functionalized with carboxylic end groups by oxidation in concentrated sulfuric acid. Thiol stabilized QD's in aqueous solution with amino end groups were conjugated to carbon nanotubes using the ethylene carbodiimide coupling reaction. Next, I will describe self assembly processing by making use of DNA (Deoxyribonucleic Acid) and PNA (Peptide Nucleic Acid) molecules which could become more useful due to their spatial encoding capabilities for

the integration of devices. Detailed chemical and physical characterization of the heterojunctions have been conducted using Fourier transform infrared spectroscopy, transmission electron microscopy and energy dispersive spectroscopy. Current research aims to combine chemically mass-produced nanoscale building blocks with biomimetic structuring schemes employing DNA recognition to encode the desired structure at various levels. Next, I will discuss the applications of carbon nanotubes for biological applications including encapsulation and mass transport of DNA. We have shown by molecular dynamics computations that DNA fragments can be spontaneously inserted into carbon nanotubes and this phenomenon was confirmed by experimental observations. Potential future applications of our studies include the fabrication of novel electronic and spintronic devices and biosensors and gene transfer vehicles for cell differentiation.

E3) Semi-Automatic Lymph Node Segmentation in LN-MRI, Gozde Unal , Greg Slabaugh, Tong Fang, Mukesh Harisinghani, Ralph Weissleder, *Siemens Corporate Research, Princeton, NJ, Massachusetts General Hospital, Harvard University, Boston, MA*

Accurate staging of nodal cancer still relies on surgical exploration because many primary malignancies spread via lymphatic dissemination. Recently, Harisinghani et al. utilized nanoparticle-enhanced lymphotropic magnetic resonance imaging (LN-MRI) to explore semi-automated noninvasive nodal cancer staging. Radiologists outline borders of lymph nodes manually in order to assess nodal characteristics and for follow-ups on malignancies. This is a time consuming and laborious process. Our goal in this study was to develop semi-automatic lymph node segmentation techniques to increase the efficiency of the clinical workflow in lymphatic spread assessment. We present two problem specific and efficient image segmentation approaches. The first one is based on a joint segmentation and registration idea, which makes use of ordinary differential equations and rigid transformations. The second one utilizes a front propagation technique known as fast marching, and builds competing distance functions for the object and its background. We obtain 3-dimensional surface of lymph node, which is visualized with respect to vascular anatomy of the patient for surgical planning. In addition, volumetric measurements and features of the nodes are extracted to help the clinicians in their malignancy assessment. We demonstrate these methods with a given lymph node analysis problem in post-contrast pelvic MRI sequences.

E4) Removal and Recovery of Heavy Metals from Industrial Waste Streams by Means of a Hybrid-Precipitation and Polymer Enhanced Ultrafiltration, Sezin Islamoglu, Prof.Dr.Levent Yilmaz, Prof.Dr.Onder H. Ozbelge, *Middle East Technical University, 06531-Ankara/Turkey*

In this study, for selective removal and recovery of the metals like Cd, Cu, Fe in cadmium electroplating bath (containing high amounts of Cd, Zn, Cu, Fe and small amounts of Ni, Co, Mn), hybrid precipitation- polymer enhanced ultrafiltration based separation scheme was developed. The precipitation scheme comprised three consecutive steps: 1) Acid treatment with HNO₃:

Cyano-metal complexes were decomposed. Whole Fe content and almost half of the Ni were removed 2) Alkali precipitation by NaOH: pure Cd(OH)₂, was obtained which is a valuable product used in electroplating industry 3) Sulfide Precipitation by Na₂S: pH is an important parameter, such as: Addition of sodium sulfide in alkali pH range led to cadmium precipitation whereas Cu is totally precipitated in acidic pH range. Depending on the quality and quantity of the desired solution obtained at the end of the precipitation experiments, different acidification, alkalination and sulfide precipitation paths were followed. Cd-rich samples were obtained by making sulfide precipitation in acidic pH range whereas Cu-rich samples were obtained by making sulfide precipitation in basic pH range. After precipitation experiments, PEUF was applied to the selected samples. It can be concluded that, by adjusting the precipitation parameters (pH, time, precipitation agents), together with the parameters of PEUF experiments (pH and loading (metal/polymer ratio)) selective separation of heavy metals from industrial wastes can be achieved. Process sequencing can be suggested for the removal and recovery of heavy metals, especially for Cd and Cu, from electroplating industry's waste effluents.

E5) Effect of Carbon and Inoculum Sources on Filamentous Growth in Activated Sludge, Gamze Gulez, Francis De Los Reyes, *North Carolina State University, Department of Civil, Construction, and Environmental Engineering, Campus Box 7908, Raleigh, NC, 27695*

Filamentous bulking in activated sludge treatment plants is a worldwide problem. Understanding the growth requirements of specific filamentous organisms will allow the development of better control strategies for bulking. In this study, the short term effects of eight carbon sources and three inoculum sources on the growth of filamentous bacteria were tested. Three lab scale sequencing batch reactors (SBR) were operated. Microscopic (Gram and Neisser staining) and molecular methods (Denaturing Gradient Gel Electrophoresis [DGGE], Fluorescent in Situ Hybridization [FISH]) were used to track the microbial population changes in the reactors. Sludge volume index (SVI) measurements were used to monitor bulking in the reactors. DGGE and sequencing results indicated the presence of the filamentous bacteria *Sphaerotilus natans* and *Thiothrix*. *S. natans* grew in glucose-, acetate-, and sucrose-fed reactors, regardless of the inoculum source. It also grew in propionate- and pyruvate-fed reactors inoculated with the sludge from the Neuse River Wastewater Treatment Plant (WWTP). *Thiothrix* was detected in propionate- and pyruvate-fed reactors inoculated with sludge from the South Cary WWTP, and in glucose- and acetate-fed reactors inoculated with the sludge from the Neuse River WWTP. In addition to these two filaments, Gram and Neisser staining indicated the presence of *Nostocoida limicola* in Neuse River WWTP inoculated reactors. The presence of *S. natans* and *T. nivea* was confirmed with FISH. SVI measurements were consistent with the level of bulking, showing an increase as the number of filaments in the reactors increased. This study confirmed that readily biodegradable substrates favored the growth of *S. natans*, *T. nivea* and, *N. limicola* in activated sludge. The simultaneous use of microscopic and molecular tools was crucial in obtaining these insights, because one approach compensated for the other's limitations.

E6) Sustainable Integrated Solid Waste Management for Wakw County Using Life Cycle Based Decision Support Tool, Gamze Gulez, Ranji Ranjithan, Morton Barlaz, *North Carolina State University, Department of Civil, Construction, and Environmental Engineering, Campus Box 7908, Raleigh, NC, 27695*

In World Summit on Sustainable Development 2002, the importance of solid waste management (SWM) was stressed and it was indicated that priority attention should be given to the waste minimization, reuse, recycling, and the development of environmental friendly disposal and treatment technologies, since the growing economic activities and consumption results in an increased level of waste problem. Deciding an optimum management strategy, however, is a complex and difficult task, as environmental impacts, economics, and public policy issues have to be taken into account. Due to this complexity and the emergence of growth of the environmental problems, a decision support tool for integrated SWM planning is necessary. The Integrated Solid Waste Management Decision Support Tool (ISWM DST) developed by NCSU enables a comprehensive analysis. The ISWM DST performs life cycle inventory (LCI) based optimization for environmental emissions, energy recovery, and cost, and generates alternative SWM strategies (recycling, waste to energy, landfilling with energy recovery, etc.) to satisfy desired environmental and economic goals. Currently, ISWM DST is being used to explore and generate alternative management strategies for Wake County, NC. Present efforts are focused on data gathering and model formulation. While no results are available yet for this Wake County case study, through the end of the study, we anticipate to quantify the cost, energy and environmental implications of varying levels of utilization of alternative waste management options, including waste-to-energy facility, recycling programs, composting options, energy recovery from landfill gas, and long-haul of waste for external disposal.

E7) Discrete to Continuum Modelling Shear Buildings under the Effect of the Gravity Loads, Sahin, M., Ozturk M, *Mechanical Engineering and Mechanics Department, Lehigh University, Bethlehem PA 18018*

This study is about modeling and analysis of the sufficiently long, multistory, uniform, discrete shear buildings under the effect of gravity load as continuum model. The model is derived from the finite-difference form of the governing dynamic equilibrium equation. The stability parameter for static loading case, which is required prior to a dynamic analysis, for the discrete and continuum models is derived. Eigen-frequencies, displacement and drift modes of the continuum model are obtained by eigen-analysis. It is shown that how the non-dimensional structural parameter $\beta = mgN / kh$ for the discrete model and equivalently $\beta = \bar{m}gH / \bar{k}$ for the continuum model shear building respectively affect eigen-analysis including the drift ratio modes. Eigen-solution of the governing equation for the continuum model shear building results in the Bessel functions of first and second kinds. It is also shown that how the non-gravity shear building eigen-solution can be approximately obtained from the gravity shear building using asymptotic values of the Bessel functions for small β values. The modal load and mass equations are solved using orthogonality relations of the Bessel functions. The non-dimensional parameter β , which contains all the parameters existing in a uniform shear building, controls all aspects of the dynamic characteristics of the shear build-

ings. The eigen-modes shapes under the effect of gravity loads are similar to forced sine-waves towards to down.

E8) Towards Faster Machine Learning Algorithms for Automatic Classification, Şeyda Ertekin, Léon Bottou, C. Lee Giles, *The Pennsylvania State University, University Park, PA, 16801, NEC Laboratories America, Princeton, NJ, 08540*

In recent years the amount of digital data available has increased significantly due to the wide use of computers and improved storage facilities. As the volume of electronic information increases, people need more effective tools to better find, filter and manage these resources. Classification, -the assignment of instances (i.e. pictures, text documents, emails, Web sites etc.) to one or more predefined categories based on their content- is an important component in many information organization and management tasks. Support Vector Machines (SVMs) is a popular machine learning algorithm for classification problems due to their theoretical foundation and good generalization performance. However, SVMs have not yet seen widespread adoption in the communities working with very large datasets due to the high computational cost involved in solving quadratic programming (QP) problem in the training phase. The dataset sizes are quickly outgrowing the computing power of our computers. During the last decade, processors became 100 times faster, hard disks became 1000 times bigger. Therefore we need faster machine learning algorithms in order to make computers learn faster from the example data. This research presents an online SVM learning algorithm, LASVM, which yields classification accuracy rates of the state-of-the-art SVM solvers but requires less computational resources. LASVM tolerates much smaller main memory and has a much faster training phase. We also show that not all the examples are equally informative in the training set. We present methods to select the most informative examples and exploit those to reduce the computational requirements of the learning algorithm.

E9) Micro- and Nanoscale Robotics, Metin Sitti, *NanoRobotics Laboratory, Department of Mechanical Engineering and Robotics Institute, Carnegie Mellon University, Pittsburgh, PA 15213, USA*

For the miniaturization of devices and machines down to nanometer sizes, micro/nanorobotic approach enabling precision manipulation, manufacturing, and interaction at the micro- and nanoscales is indispensable. Micro/Nanorobotics as an emerging robotics field is based on the micro/nanoscale physics, fabrication, sensing, actuation, system integration, and control taking the scaling effects into consideration. Micro/Nanorobotics encompasses: (i) programmable assembly of micro/nanoscale components; (ii) design and fabrication of micro/nanorobots with overall dimensions at the millimeter and micrometer ranges and made of micro/nanoscale components; and (iii) programming and coordination of large numbers of micro/nanorobots. This poster will present current micro/nanorobotics research activities at the NanoRobotics Laboratory. As the first focus area, precision micro/nanomanipulation systems using Atomic Force Microscope (AFM) or other nanoprobe will be introduced. Here, AFM probes are utilized as a pushing, pulling, cutting, and indenting type of nanomanipulator, and also as a three-dimensional (3-D) topography and force sensor. As the first application, using an AFM probe and a teleoperated human-machine interface, fine gold particles down to 14nm radius are positioned in two-dimension by mechanical pushing for developing micro/nanoassembly technology, and teleoperated touch feedback

from the surfaces at the nanoscale is realized. Next, liquid polymers are pulled and solidified precisely by nanoprobe to manufacture customized 3-D polymer micro/nanofibers. As the second focus area, biologically inspired micro/nanoscale robots and materials will be reported. Design methodology, analysis, and fabrication of biomimetic fibrillar adhesives inspired by geckos will be explained. Geckos have unique dry adhesive fibers in their feet to climb any surface with a very high maneuverability. Discovering the principles of gecko adhesion recently, synthetic polymer micro/nanofibers are fabricated using micro/nanomolding and optical lithography techniques. The results of current prototype adhesive fibers and miniature climbing robots inspired by geckos are reported. Finally, miniaturization issues of biologically inspired micro/nanorobots will be discussed. As current miniature robotics activities, biomedical swimming and endoscopic capsule robots and water strider robots walking on water are explained briefly, and challenging issues are addressed. These miniature robots could revolutionize health-care, environmental monitoring, manufacturing, and space exploration applications in the future.

E10) Ultra-Low Power CMOS MICS Transceiver, Huseyin S. Savci, Zheng Wang, Dr. Numan S. Dogan, *North Carolina A&T State University, Greensboro, NC, 27411*

The Medical Implant Communications System (MICS) is an ultra-low power, unlicensed, mobile radio system for transmitting data between an outside control unit and implanted medical devices. The allocation of 402-405 MHz frequency band for MICS operations on a shared, secondary basis in 1999 by FCC, enabled MICS usage in many medical applications including cochlear testbed which is designed to find a treatment for patients with profound bilateral deafness. Biocompatibility, ultra-low power consumption, having extremely small size are some of the challenges in developing an implant device. From an IC designer perspective, power and size constraints are main issues. Since the implants are battery operated devices, they are expected to work with only couple mWs which enables them to operate for many years. Ultra-low power consumption can be achieved with reduced supply voltage and low drain current. However reducing the supply voltage and driving the transistors with lowest possible current will push their operations toward weak inversion region where the device models are not as precise as in saturation in standard CMOS processes. MICS transceiver, under development, is being designed by using 0.18- μm RF CMOS process with reduced supply voltage, 1 V. To reduce the power consumption, effective power reduction techniques and sleep mode operation will be employed. Direct conversion receiver architecture has been chosen for its lower power consumption and higher integrability. After careful design of each blocks, such as LNA and VCO, corner analyses and post-layout simulations are being done to insure first-pass success.

E11) Pathways Database Querying and Visualization: PathCaseWeb, Z. M. Ozsoyoglu, G. Ozsoyoglu, J. Nadeau, S.F. Akgul, A. Cakmak, B. Elliott, M. Kirac, M. Starke, M. Reynolds, G. Yavas, *Center for Computational Genomics, Case Western Reserve University (CWRU), Department of Electrical Engineering and Computer Science, CWRU Case School of Engineering, Department of Genetics, CWRU School of Medicine*

In this poster we present PathCase: Case Pathways Database System. PathCase is an integrated set of software tools for modeling, storing, analyzing, visualizing, and querying biological path-

ways data at different levels of genetic, molecular, biochemical and organismal detail. The novel features of the system include: a) genomic information integrated with other biological data and presented from a pathway; b) design for biologists who are possibly unfamiliar with genomics, but whose research is essential for annotating gene and genome sequences with biological functions; c) database design, implementation and graphical tools which enable users to visualize pathways data in multiple abstraction levels, and to pose exploratory queries; d) a wide range of different types of querying including, "path" and "neighborhood queries", and graphical visualization of query outputs; and, e) an implementation that allows for web(XML)-based dissemination of query outputs (i.e., pathways data in BIOPAX form) to researchers in the community, giving them control on the use of pathways data.

E12) Polymer Waveguide Technology for RF-Photonics and Optical Communications Applications, Aydin Yeniay, Renfeng Gao, Yongming Cai, Anthony F. Garito, *Photon-X, LLC, Malvern, PA, 19355, USA*.

Polymer waveguide technology promises a highly integrated platform for cost-effective photonic devices with flexible design of optical properties, ease in processing and high-density device integration with high volume production. However, nearly all of the polymer planar waveguides demonstrated to date exhibit relatively high single-mode waveguide loss ($>0.2\text{dB/cm}$) within the 1300-1650nm telecommunications window compared to 0.05-0.07 dB/cm for high- n silica-on-silicon waveguides. Various material systems such as partially fluorinated acrylates, polyimides, and silicone resins have been investigated to reduce the absorption loss that results from C-H groups, however, in order to achieve polymer waveguides with propagation loss comparable to silica waveguides, a fully fluorinated polymer material system with little, or no, C-H content is required. In addition to propagation loss, polarization dependent loss (PDL) is also a critical factor. PDL usually originates from material birefringence, asymmetric waveguide cross sections, or induced stresses, for example. Stress usually arises during waveguide fabrication steps, especially when the materials of the waveguide structure and supporting substrate have different coefficients of thermal expansion (CTEs). In the present poster, we introduce an optical device technology platform of unprecedented performance based on ultra low loss ($<0.05\text{dB/cm}$ at C/L/O band), polarization independent, and athermal, perfluoropolymer waveguide architectures built on polymer substrates. Various highly efficient devices such as AWGs, true time delay modules have been fabricated based on this polymer platform. The new platform provides whole comprehensive classes of both passive and active integrated photonic device components and circuits for communications and RF-Photonic signal processing with orders of magnitude performance and cost improvements.

E13) Development of Polybenzoxazines and Their Applications as High Performance Composite Materials, Tamer Uyar, Hatsuo Ishida, *Case Western Reserve University, Cleveland, Ohio, 44106-7202*

In this study, the properties and the applications of polybenzoxazines (a new class of ring-opening polymerized phenolic resins) are investigated. The phenolic resins still dominate the U.S. thermoset resin production due to their attractive properties including inexpensive raw materials, superb flame resistance, and excellent thermal and chemical resistance. However, the attractiveness of

these properties is compromised by the problematic nature of phenolic chemistry. Very recently, a new class of phenolic resins called benzoxazines has been developed. The benzoxazine resins are formed from phenol and formaldehyde in the presence of amines and the choice for phenol and amine permits structural design flexibility where the properties of the resulting polymer can be tailored for the specific requirements of individual applications. These benzoxazine resins have overcome almost all shortcomings of the phenolic resins. Moreover, they exhibit several very unusual properties that have not been often observed by other well-known polymers. Their unique properties can be listed as; near zero volumetric change upon polymerization, low water absorption (less than 2%), high glass transition temperature ($T_g = \sim 350^\circ\text{C}$), high char-yield (ranging from 65 to 82 %) low coefficient of thermal expansion, low viscosity and excellent electrical properties etc.. Due to their superb mechanical, thermal and physical properties, these benzoxazine resins are excellent choice for materials to be used in aerospace applications, electronic packaging and high performance composites. Additionally, high char yield, no dark smoke and self extinguishing make them an attractive candidate as non-flammable materials for the industry. Our research group has been working on polybenzoxazines over ten years in which we have developed many different polybenzoxazines with diverse functionality for various applications. In this presentation, we will focus on three latest ongoing projects which are (1) Synthesis of Benzoxazine Resins for Development of High Performance Carbon-Carbon Composites (2) Development of Polybenzoxazines that are Stable under Very High Energy Radiation in Deep Space (3) Development of Very High Char Forming Matrix for Rocket Nozzle Application.

E14) Nuclear Energy Facts and Figures, Gokhan Gelisen, MS, PE, MASCE, *Washington Group International Inc., New York NY* Nuclear energy has been the most controversial energy production method since its early stages. It has both advantages and disadvantages. There have been strong supporters and opponents. On June 27, 1954, the world's first nuclear power plant that generated electricity for commercial use was officially connected to the Soviet power grid at Obninsk, Kaluga Oblast, Russia, according to the Uranium Institute (London, England).

At the end of 2005, there were 443 nuclear power reactors in operation and 24 under construction in the world [1, 2]. Today, three nuclear power reactors are considered to be built in Türkiye. I asked myself the following three questions and this study is a result of my efforts to find the reliable answers to those questions: 1) Is it feasible to build three nuclear power reactors in Türkiye at the same time? 2) Are there any other alternative energy sources that can provide comparable energy with a comparable cost? 3) Should Türkiye continue with the existing Nuclear energy production methods or consider new options? Nuclear power reactor units under construction in 2005 were typically in the range of 600-1200 MWe. Electricity generating from nuclear energy is cheaper than it is from coal energy in seven of ten, and cheaper than gas in all but two of investigated countries [3]. Globally, 16 per cent of electricity generation is nuclear sourced. France is generating up to 78 per cent of its electricity from nuclear plants [4]. In OECD countries, electricity from nuclear generation accounts for about 24 per cent of total generation [4]. Canada has over 353,000 tones of reserves and 1/4 of world production (85% exported) [5]. Australia

has 863,000 tones of reserves and 1/7 of world production [5]. In my research, I studied the nuclear energy related data like populations, economies, resources, repositories, and other energy production methods of selected countries. I selected the countries based on the availability of their historical data from 1960s to post-2000. Refs: [1] <http://www.iaea.org/cgi-bin/db.page.pl/pris.oprconst.htm> [2] <http://www.iaea.org/cgi-bin/db.page.pl/pris.opercap.htm> [3] OECD/IEA NEA 2005 [4] World Nuclear Association [5] <http://canteach.candu.org/library/20000401.pdf>.

E15) Translational Hearing Aid Engineering, Julius L. Goldstein, Ph.D., Metin Oz, D.Sc., Peter Gilchrist, Tai Lin, D.Sc., Michael Valente, Ph.D., Roger D. Chamberlain, D.Sc., *Hearing Emulations LLC, St. Louis, MO, 63132, Washington University Medical Center, St. Louis, MO, 63110, Washington University, St. Louis, MO, 63130*

Gain compression in the normal cochlea is effectively instantaneous, as revealed by cochlear distortion tones and suppression. We translated properties of nonlinear cochlear models for the design and fitting of hearing aids with compressive amplification. Gain compression in conventional hearing aids is provided by automatic gain control of linear amplifiers (AGC), resulting in adaptation constraints on attack and release times to avoid nonlinear distortion and unwanted gain variation. The normal cochlea avoids these constraints with effectively instantaneous compression embedded in a bandpass system. Cochlear mechanisms, including rapid tail suppression and slower intelligent efferent feedback, appear to optimize performance by adjusting the onset of instantaneous compression to control waveform quality with little effect on gain. We designed, implemented, and tested a computer-simulated hearing aid with instantaneous gain compression (IGC), comprising six octave band-pass-non-linear (BPNL) amplifiers, with intelligent adaptation of the instantaneous compression thresholds. Candidate compression ratios to counter loudness recruitment in SNHL were selected for our clinical tests from model fits to published psychophysical studies of most-comfortable and uncomfortable sound levels (MCL, UCL). Patients reported their loudness-scaling preferences and speech understanding. Hearing aids with conventional and instantaneous gain compression have different temporal dynamics, because IGC can provide gain compression without adapting and effective syllabic compression without syllabic-rate adaptation. The dynamic properties of IGC are expected to contribute to increased acceptability of hearing aids by the growing elderly hearing-impaired population. A wearable version of our IGC hearing aid has recently been completed, to allow field tests. Supported by NIDCD SBIR Grant 5R44DC04028.

E16) Design and Microfabrication of an Actuated PDMS High-Aspect-Ratio Microbeam Array for Piconewton Force Transduction, F Mert Sasoglu and Bradley E Layton, *Drexel University, Philadelphia, PA 19104*

We are developing a method for highly parallel piconewton force transduction. We have fabricated an array of optically transparent circular microbeams with Sylgard® polydimethylsiloxane (PDMS). We plan to measure beam tip-deflection as it pulls on an array of flexible structures such as axons in an array of printed neurons. A steel mold was manufactured by drilling a 4x4 array of holes with micro drill bits. PDMS was injected into the mold and the array peeled from the mold after freezing at -80°C. Each beam has a length of 4mm, and a diameter of 500µm. The array was calibrated

with a scale with a precision of 1µN and found to have an average stiffness of 50 ± 40 nN/µm. The elastic modulus of PDMS in a prototype design was determined at different four curing agent concentrations of 5%, 7.5% 10% and 20% resulting in moduli of 300 ± 20 , 410 ± 30 , 510 ± 20 , 610 ± 25 kPa. Our ultimate design will have a length of 4mm, and a diameter of 100µm. The high aspect ratio beam array enables to transduce forces even on rough surfaces. Linear and non-linear finite element analysis were also performed for stress analysis and found that at deflections of 500 micrometers the maximum stress was 10% of yield stress.

E17) Development of a Fiber Optic Probe to Measure Dynamic Behavior of Gas-Solid Two-Phase Flows (Engineering & Applied Sciences), Harun Bilirgen, Ph.D., *Lehigh University, Bethlehem, Pennsylvania*

The objective of this study is 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 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 transferred 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.

E18) Mixing Behavior of Particle Ropes Downstream of a 90-Degrees Elbow (Engineering & Applied Sciences), Harun Bilirgen, Ph.D., *Lehigh University, Bethlehem, Pennsylvania*

Pipe bends are a common feature of most pneumatic conveying systems and are well known to create flow problems, even in single phase flows. The situation is further complicated with the presence of a solid phase, such as occurs in pneumatic conveying. As the air-particle mixture approaches the pipe bend, a double vortex flow structure occurs in the fluid phase and a significant phase separation in the particulate phase is experienced within the bend geometry due to centrifugal forces. Upon exiting from the bend, the particles flow together in a narrow localized stream and the velocity of the particles in the suspension is reduced to almost one half of the mean gas velocity. This phenomenon is referred to as "roping". Once formed, this flow stratification pattern can persist over a region extending up to 25 pipe diameters downstream of the elbow. It eventually breaks down due to flow turbulence and to the

secondary flow induced by the elbow. The objective of this study is to investigate mixing mechanisms in lean phase pneumatic conveying, with the emphasis on techniques for dispersing the severe particle stratification caused by flow through a 90-degree elbow. This study describes a combined numerical and experimental study of the rope dispersion characteristics of various mixing devices that were installed immediately downstream of the elbow. The laboratory experiments were conducted in a 0.154 m I.D. vertical test section. Local particle velocities and concentrations were measured using a reflective type fiber optic probe. The numerical simulations were carried out using the CFX-4.2 code developed by AEA Technology.

E19) A Secure Biometric Authentication Scheme Based on Robust Hashing, Yagiz Sutcu, Husrev Taha Sencar, Nasir Memon, *Polytechnic University, Brooklyn, NY 11201*

Although for most of the cases, traditional password based authentication systems may be considered secure enough, the level of security is limited to relatively weak human memory and therefore, it is not a preferred method for systems which require high level of security. An alternative approach is to use biometrics (fingerprints, iris data, face and voice characteristics) instead of passwords for authentication. Higher entropy and uniqueness of biometrics make them favorable in so many applications which require high level of security, and recent developments of biometrics technology enable widespread use of biometrics-based authentication systems. Despite the qualities of biometrics, they have also some privacy and security related shortcomings. Main weakness of the biometrics is the fact that, if biometrics compromised, there is no way to assign a new template, and therefore, storing biometric templates should be avoided. However, unlike passwords, the dramatic variability of biometric data and the imperfect data acquisition process prevents the use of secure cryptographic hashing algorithms for securing the biometrics data. In this paper, we propose a secure biometric based authentication scheme which employs a user-dependant gaussian based one-way transformation combined with a secure hashing algorithm. The robust hash function is a one-way transformation tailored specifically for each user based on their biometrics. The function is designed as a sum of properly weighted and shifted Gaussian functions to ensure the security and privacy of biometric data. We discuss various design issues such as scalability, collision-freeness and security. We also provide test results obtained by applying the proposed scheme to ORL face database by designating the biometrics as singular values of face images.

E20) The Utilization of a Life-Cycle Based Computer Model to Support Solid Waste Management Planning for Delaware, P. Ozge Kaplan, S. Ranji Ranjithan, Morton A. Barlaz, *Department of Civil, Construction and Environmental Engineering, North Carolina State University, Raleigh, NC*

The management of non-hazardous solid waste must be addressed in every community. The objective of this study was to develop potential alternative strategies for solid waste management in Delaware in consideration of both cost and environmental emissions. The study was performed with the assistance of the Solid Waste Management - Life-Cycle Inventory (SWM-LCI) computer model. The SWM-LCI model identified optimal alternatives for Delaware on the basis of their planning objectives that represent specific goals for cost, environmental emissions, landfill diver-

sion requirements, and the solid waste processes to be considered (e.g. curbside recycling, yard waste composting, mixed waste material recovery facilities, combustion). In addition to optimal alternatives, sub-optimal alternatives that are maximally different from the optimal alternative with only a small decrease in the level of performance as measured by net cost or emission level, were generated using the modeling to generate alternatives feature. This feature may be useful in developing alternatives that meet unmodeled selection criteria. Lastly, an uncertainty analysis utility of the model was applied to evaluate the uncertainty in the performance of a selected SWM strategy and the relative robustness of alternate SWM strategies. These results are expected to provide valuable input to the Delaware as they evaluate future SWM plans.

E21)A Machine Learning Solution for Splice Site Prediction, Rezarta Islamaj, *University of Maryland, College Park, MD 20740*

The right set of features to describe a model is the essential step of statistical learning methods. However the right set is usually not obvious. So one often chooses to start with all possible features making the problem computationally very hard, possibly intractable. Thus it becomes very important to choose an effective subset of these. Here we present a new approach to feature selection for sequence data. We identify general feature categories and give construction algorithms for them. We show how they can be integrated in a system that tightly couples feature construction and feature selection. This integrated process, which we refer to as feature generation, allows us to systematically search a large space of potential features. We demonstrate the effectiveness of our approach for an important component of the gene-finding problem, splice-site prediction. We show that predictive models built using our feature generation algorithm achieve a significant improvement in accuracy over existing, state-of-the-art approaches.

E22) Investigating the Potential of Early Breast Cancer Detection by Characterization of Ultrasound Images of Breast Ducts, Ezgi Taslidere, Fernand S. Cohen, *Electrical and Computer Engineering Department Drexel University, Philadelphia, PA 19104, USA*

A wavelet-based decomposition algorithm of the RF Echo into its coherent and diffuse components is used for characterization of ultrasound images of breast ducts. Our work is extremely important for early cancer detection as over 90% of breast cancers start at the duct before infiltrating the surrounding tissue. The hyperplasia formation in breast ducts is studied in depth for early breast cancer detection. The hyperplastic growth in breast ducts is simulated for various conditions such as varying resolution and SNR values. We extract texture parameters obtained by the decomposition that would capture the signature of hyperplastic growth in ductal epithelium in its various stages. The discrimination power of the estimated parameters is studied based on the simulations. The results demonstrate the effectiveness of three parameters, in particular, the number of coherent scatterers, the Rayleigh scattering degree and the energy of the diffuse scatterers. The results are presented in terms of empirical receiver operating characteristics (ROC) curves. Values of $A_z > 0.942$ were obtained for resolution less than or equal to 0.4mm even in low SNR values, then it drops below the 0.9 range as the resolution exceeds the 0.4mm range. It is shown that the presented features are able to differentiate reli-

ably between various stages of hyperplasia even in cases of low resolution and SNR values.

E23) Rational Design and Development of Nanophase Functional and Structural Materials, Material Systems, Tahir Cagin, *Department of Chemical Engineering, Texas A&M University, College Station, TX 77843-3122*

Using electronic structure theory, molecular level simulations and meso- and macro-scale models we aim at developing design principles for functional materials and materials systems. In this poster, we will present applications on, thermoelectrics, ferroelectrics, functional nanocomposites, dendrimers and nanocrystalline materials.

E24) Modeling and Simulation of Urodynamics, Coşkun Bayrak, İsmail Çelik, Asaf Varol, Remzi Şeker, Abdullah Şakarcan, Mohammed Abdallah, Nabil Bissada, and Alex Finkbeiner, *Computer Science Department, University of Arkansas at Little Rock, Little Rock, AR 72204, Mechanical and Aerospace*

Engineering Department, West Virginia University, Morgantown WV 26506, Computer Education Department, Technical Education Faculty, Fırat Üniversitesi, Elazığ, Türkiye, Department of Pediatrics, University of South Carolina Medical School, Columbia, SC, Department of Urology, University of Arkansas Medical Sciences, Little Rock, AR, 72205

The role of modern medical imaging is not limited to simple visualization and inspection of anatomic structures, but goes beyond that to patient diagnosis, advanced surgical planning and simulation, and radiotherapy modeling. In addition, segmenting and rendering methods currently plays an effective role in medical imaging. These methods help to provide more accurate models and simulations especially from digital and medical images. Therefore, the focus of this research investigation is to build and simulate realistic 3D environments of urodynamics to understand the holding or storage of urine in the bladder, the way the bladder empties, and the rate of movement of urine out of the bladder during urination. More specifically we are interested in studying stress incontinence related problems and provide diagnostic tools to detect and

NATURAL SCIENCES

N1) Shape Optimization for Image Segmentation, Günay Doğan, *University of Maryland, College Park.*

We introduce an efficient and reliable computational method to extract the boundaries of objects in given digital images. Potential applications are in medical imaging and computer vision. The basic idea of our approach is to place some curves on the image and to deform them iteratively, so that their final locations are the object boundaries. For this we define an energy on the curves. Then we choose a velocity that will deform the curves in a direction decreasing their energy. The object boundaries correspond to local minima of the energy where the curves should stop. Two fundamental tools for this method are shape derivatives and the finite element method. We use the shape derivatives to derive the correct velocities. We use the finite element method to compute the sequence of curves numerically. Our method has the following features: 1) Space adaptivity: the curves adapt their resolution with respect to variations in the image, 2) Time step adaptivity: at each iteration the curves take the time step that gives the best decrease in energy, 3) Topological changes: the curves may split and merge to detect an unknown number of objects. Our method works for surfaces in 3D volume images as well (without topological changes). (This work is joint with P. Morin and R.H. Nochetto)

N2) Sol-gel Thin Film Applications at Harran University, Ibrahim H. Mutlu, Bulent Yesilata, M. Zarbeliyav, Ugur Buyukburc, *Harran University, Turkey*

Sol-gel deposition of optical films is a rapidly advancing technology. The sol-gel process is based on hydrolysis and condensation reactions of organometallic compounds in alcoholic solutions. In recent years this technique has been extended to the fabrication of thin films or coating on different substrates. This method exhibits a number of advantages; 1) increased chemical homogeneity in multicomponent system, 2) high surface area of gels or coated samples, 3) relatively high chemical purity, 4) lower cost film processing maintenance of and the fabrication of easier conventional thin film forming process such as evaporation, sputtering or chemical vapor deposition. Today sol-gel thin film coatings are being intensively studied for different applications as protective and optical coatings, sensors, dielectric constant films, inorganic membranes, semiconducting coatings, superconducting films, and ferroelectrics. In our work, CdS, CdTe, TiO₂, ITO, InSe coatings were obtained by the alkoxide route and deposited on to the glass using the sol-gel dip coating technique. The starting solutions were prepared by mixing organometal precursors, acid, and solvent. Optical properties of all these films were investigated as a function of the number of repeated dip coatings and annealing temperature. Measurements of optical band gap values were obtained by Perkin Elmer Lambda 45 UV-VIS Spectrophotometer. Transmission and absorption spectrums were analyzed and compared with other coating methods. X-ray diffraction of crystalline coatings was obtained using Rigaku Ultima III system.

N3: Can Remote Sensing Detect Aphid Stress in Crops? Mustafa Mirik, Gerald J. Michels, Jr., Sabina Kassymzhanova-Mirik, Norman C. Elliott, and Vasile Catana *The Texas A&M University, USDA-ARS,*

The Russian wheat aphid (*Diuraphis noxia* (Mordvilko)) and greenbug (*Schizaphis graminum* (Rondani)) are two devastating aphid

pests of wheat (*Triticum aestivum* L.), barley (*Hordeum vulgare* L.), and other cereals in the Great Plains of the United States. The Russian wheat aphid and greenbug infestations in crops are unpredictable over space and time. Remote Sensing appears promising to observe Russian wheat aphid and greenbug infestations in crops. In this research, the potential use of spectral data to sense Russian wheat aphid and greenbug stress in winter wheat fields located in Texas, Oklahoma, and Colorado was studied. A multispectral ground radiometer and a digital camera were used to collect reflectance and digital images, respectively. The results indicate that vegetation indices associated well with percentage damage caused by the Russian wheat aphid and greenbug feeding in wheat. In addition, paired t-test indicates that there were significant differences between infested and uninfested wheat canopies. We concluded that remote sensing is a useful method to monitor aphid damage in wheat.

N4) Using Hyperspectral Imageries to Portray Musk Thistle from Surrounding Vegetation, Mustafa Mirik, Gerald J. Michels, Jr., Sabina Kassymzhanova-Mirik, *Texas A&M University*

Invasion by a noxious weed species presents a serious threat to the remaining fragments of the natural habitat. Identifying the population dynamics and extent of spread of noxious weeds in a temporal and spatial perspective improves monitoring, planning, and management practices. Methods for reliable, repeatable, quick, and cost effective mapping of invasion patterns are needed to facilitate these practices. Remote sensing has been used to map various plant species including invasive and noxious weeds. Musk thistle (*Carduus nutans* L.) a noxious weed, is a good candidate for detection by remote sensing platforms because it may produce a unique spectral signature due to a large, purple-reddish flower head. Therefore, airborne hyperspectral imageries acquired at two dates were used to map musk thistle infestation in a pasture at Friona, TX, in the second week of April when musk thistle was at the rosette form and mid June when musk thistle was at the flowering stage in 2003. Imageries were classified using the supervised maximum likelihood classifier technique. Overall accuracy was verified to be greater than 80% by ground survey for both imageries. These results demonstrate the value of hyperspectral data for mapping noxious weed species and the habitats they threaten.

N5) Remote Sensing for Big Sagebrush Biomass, Mustafa Mirik, Jack E. Norland, Robert L. Crabtree, Mario E. Biondini, Gerald J. Michels Jr., *The Texas A&M University, North Dakota State University : Yellowstone Research Center*

The prediction power of the fine spatial resolution narrowband vegetation indices along with simulated multispectral reflectance measurements for estimating woody and herbaceous biomass was examined for a big sagebrush (*Artemisia tridentata* Nutt.) region in Yellowstone National Park, Wyoming. The modified normalized difference vegetation (NDVI) and structural-independent pigment (SIP) indices of 1 m² spatial resolution of PROBE-1 hyperspectral imagery acquired in August 1999 was used to investigate the relationships between ecological variables and reflectance spectra. Biomass components were regressed on custom-built vegetation indices, which provided the R² values ranged from 0.83 to 0.96 by the simple linear regression models using hyperspectral data

alone. As a result of observed correlations, it can be confidently concluded that fine spatial and spectral resolution remotely sensed data have been found to be an important tool to capture the information about vegetation properties enabling to estimate biomass components in big sagebrush areas at the time when data were collected.

N6) Classification of Hyperspectral Imageries for delineating Yucca and Tree Cholla in Grasslands, Mustafa Mirik, Gerald J. Michels, Jr., Sabina Kassymzhanova-Mirik, *Texas A&M University System*

Hyperspectral remote sensing is an emerging technology with the potential to identify plant species, delineate vegetation and habitat characteristics, differentiate causes of vegetation stress, and characterize soil properties. This technology can be used in range management as a tool to map various plant communities so as to determine current range production and utilization. Mapping of unpalatable rangeland species, such as yucca (*Yucca glauca* Nutt.) and tree cholla (*Opuntia imbricata* (Haw.) DC.), using hyperspectral data provides temporal and spatial information for monitoring and managing rangeland productivity for livestock utilization. The objectives of this study were to examine the spectral characteristics of yucca and tree cholla using an airborne hyperspectral spectrometer and to test hyperspectral one-meter-spatial-resolution remote sensing imageries for identifying and mapping individually distributed tree cholla and yucca species. The spectral reflectance of both yucca and tree cholla recorded with an airborne hyperspectral spectrometer was different from the co-occurring green grass species throughout the visible and near infrared spectrum. The classification results using a maximum likelihood procedure indicated that the dormant woody species were classified as yucca. A mixture of actively growing short grass species within tree cholla dominated areas were classified as tree cholla. However, areas dominated by each species within each rangeland were correctly delineated from the areas occupied with green grass species.

N7) K-exact Group C^* -algebras and Coarse Embeddability, Semail Ulgen, *University of Mississippi*

We define and develop the notion of K-exact C^* -algebras and K-exact groups. This is the K-theoretic analogue of structural property known as exactness. A group G is called K-exact if the minimal tensor product by $C^*_r(G)$ preserves the K-theoretic six-term exact sequence regardless of whether it preserves short exact sequences of C^* -algebras. We investigate the relationship

between coarse embeddability and K-exactness of countable discrete groups and we prove the main result that under a technical assumption, every group coarsely embeddable into a Hilbert space is K-exact. It is known that every coarsely embeddable group satisfies the coarse Baum Connes Conjecture. The main result suggests the study of this fundamental conjecture for K-exact groups. Hence, K-exactness draws its significance from its relationship to coarse embeddability, and hence, to the Baum Connes Conjecture. We also present the foundations for further exploration of K-exactness and of related properties (e.g. generalizing K-exactness to KK-theory and E-theory for crossed product algebras); and the relation of K-exactness to geometric and other properties of groups.

N8) New Insights into the Maturation of C-Type Cytochromes in *Rhodobacter capsulatus*, Serdar Turkarlan, Carsten Sanders, Fevzi Daldal, *University of Pennsylvania*

C-type cytochromes (cyt) are universal electron carrier proteins with essential roles in important processes such as photosynthesis, respiration and apoptosis. Their heme (iron protoporphyrin IX) prosthetic group is covalently attached to the apoprotein in a post-translational process named c-type cyt maturation. In most gram-negative bacteria, maturation takes place in the oxidizing environment of the periplasm. Therefore, it was proposed that c-type cyt maturation requires periplasmic thiol-disulfide oxidoreductases DsbA and DsbB that introduce disulfide bonds into heme-binding (Cys-Xxx-Yyy-Cys) motif of newly translocated apocyt c and membrane associated thioredoxin-like proteins (CcdA, CcmG and CcmH) that reduce the disulfides before the heme attachment. Previously we have demonstrated that *Rhodobacter capsulatus* DsbA and DsbB proteins are not directly involved in c-type cyt maturation but interestingly their inactivation restore the c-type cyt defect of thioreductive protein CcdA-null mutant. In this study, we have undertaken extensive study of another thioredoxin-like protein, CcmG whose mutation leads to the deficiency of c-type cyts. Here we show that absence of DsbA also enables CcmG mutants to produce c-type cyts albeit at lower levels. We also demonstrated that in the absence of CcdA, CcmG and DsbA, *R. capsulatus* can still produce c-type cyts at amounts sufficient to support physiological needs of photosynthetic growth. In the light of these findings we propose a model in which we define heme ligation core complex as well as accessory components of c-type cyt maturation.

SOCIAL SCIENCES, ARTS AND HUMANITIES

S1) Job Stress and Productivity among Foreign Workers, Ali Soylu, *Human Resource Management Department, Fax School of Business and Management, Temple University.*

Stress is found in all workplaces, and can have both good and bad effects on individuals, their work performance and their health and well-being. Stress is the body's natural response to pressures or stressful situations we find ourselves in and which we are not certain. Situations that are unfamiliar, or challenge or threaten us, increase our level of stress. The level of stress you experience depends on your personality, your state of health and many other factors. Foreign workers with H-1B visa are individuals who seek overseas employment without sponsorship from a firm in their home country and hold temporary work visas in the United States. Despite the rising numbers of these particular foreign workers in the labor market, very little research examines workplace variables that may impact their motivation, affect, and performance of foreign workers. This study predicts unique differences in job-related stress between foreign and domestic workers that impact their productivity. The terrorist attack in the U.S.A on September 11 was most significant act of domestic aggression event in the world since World War II. Therefore, the events of September 11 have changed the perception of foreign workers in the U.S. On one hand, for example, companies are very selective and careful in terms of hiring new foreign workers and monitoring their current foreign workers. Not only companies but also the U.S.' government and INS are monitoring them. This study will include individual and organizational factors and effects of stress. It also will summarize a detailed literature review of work stress and develop a stress model.

S2) Teacher-Efficacy Beliefs of English Language Teaching Trainees, Anil S. Rakicioglu, *William Paterson University of New Jersey, Wayne, NJ 07470*

This descriptive research studied the teacher-efficacy beliefs held by English Language Teaching Trainees during their preservice education, created suggestions for increasing efficacy beliefs of the teacher candidates, and explored teacher candidates' point of views while they are getting ready for the profession. Although there are studies focused on efficacy beliefs of other subject areas, few studies have investigated the teacher efficacy beliefs held by English Language Teaching trainees during their undergraduate education. A quantitative survey study was undertaken to explore efficacy beliefs of the candidates. Research questions: 1. what are the personal-efficacy beliefs held by English Language Teaching trainees? 2. What is the teaching-efficacy beliefs held by English Language Teaching trainees? 3. How is the efficacy beliefs related to cognitive development of teacher candidates?

S3) Reverse Globalization: From Yaglidere, Turkey to the Eastern Shore, MD - Entrepreneurial Movement Around the World, Dr. Hakan Kislal, *School of Business, Saint Leo University*
The Eastern Shore Region of Maryland covers three major states, Virginia, Maryland, and Delaware. The region is surrounded by the Chesapeake Bay on one side and the Atlantic Ocean on the other from New Castle, Delaware to the Chesapeake Bay Bridge in the South. The Eastern Shore has remained agrarian despite the proximity of industrialized areas that span from Boston to North

Carolina along the I-95 corridor.

The Eastern Shore from Dover, Delaware to the Chesapeake Bay Bridge has seen an influx in Turkish entrepreneurs who began to appear early in 2002 and continue to emigrate. Preliminary results show that Turkish entrepreneurs have established over forty businesses, predominantly diners or restaurants. Interestingly, over ninety percent of these entrepreneurs come from the same region of Turkey (Yaglidere, Turkey) and many of them are distant relatives of each other. Typical entrepreneurs come to the United States through the help of a network of people from Turkey. Almost all of them arrive in New York or New Jersey and work for a period of time at a diner with the help of the same network. The close-knit community helps each member find employment, housing, and provides psychological support. The relatively low cost of opening a business on the Eastern Shore helps Turkish entrepreneurs to own their first establishment. Today, these Turkish entrepreneurs have become prominent members of the Eastern Shore community.

S4) The Conditions of Brain Gain Strategies, Şenay Gökbayrak, *Department of Labor Economics and Industrial Relations, Faculty of Political Sciences, Ankara University*

Today, the demand of skilled labor force is increasing, owing to globalization, expansion of production process based on knowledge economy. In a consequence of economic activities that increasingly require skilled labor force, developed countries implement "open door migration policies" for skilled labor force. According with US Citizenship and Immigration Services official data, 5192 Turkish citizens were admitted USA, under H-1B visa category in 2004. While brain drain creates many positive effects for receiving countries, does it represent absolute loss for sending countries? The data of our case study which focused on Turkish engineers living in abroad indicate that it can be obtain positive externalities from brain drain under certain conditions. %89,7 of all engineers intended to give a support for development practices in Turkey, even if they were no-returning(n=130). Only %10,3 of all participants didn't think any kind of support. For brain gain strategies, our analyses indicate that strong relationship is necessary condition between colleagues living in Turkey and living in abroad together with relationship among Turkish intellectual diasporas. Cooperative projects, establishment of network and forums and consultancy services to Turkish companies, were the most mentioned supports manners. To acquire positive externalities from brain drain, it is important to provide support for activities which are aimed at rising social life quality in Turkey in addition to scientific and technical activities. To realize these proposals, it is essential to develop active public policy by participation of all shareholders- public and private sector, universities, NGOs, profession associations etc.

S5) Income Inequality and Poverty in Turkey, Mexico and South Korea, Gokhan Guder, Tuncay Guloglu, *State Planning Organization of Turkey, Kocaeli University*

Overall purpose of the study is to analyze the situation of income inequality and poverty in Turkey, Mexico and South Korea within last two decades. The scientific questions of the study are: What happened to poverty and income inequality in these countries dur-

ing last two decades?, What is poverty profile in these countries? and Is there an economic development in favor of the poor? In order to answer these questions a literature review and an analysis of household income surveys are done. Initial results are: Economic growth in Turkey is in favor of the poor. Absolute poverty declined within the period. On the other hand, Turkey experienced an inequitable growth during the period. In the periods of economic growth income inequality worsened and in the periods of recession and economic crises income inequality improved. Macro economic conditions in Mexico are unstable. Country experienced a recession between 1984 and 1989 and a financial crisis in 1994. Overall economic growth within the period is limited. The poor effected negatively from unstable macro economic conditions and economic crises. Income inequality worsened in the economic recession period between 1984 and 1989, improved in the period of 1994 financial crisis and again worsened in the economic growth period after 1994. South Korea experienced an equitable economic growth for decades. Both absolute poverty and relative poverty improved in 1980s and 1990s. The exception for that is the Asian crisis took place in 1998. The income inequality and poverty indicators worsened during the economic crisis.

S6) Teaching in America: Perspectives of Turkish Graduate Student Instructors, Asil A. Özdoğru, *University at Albany, SUNY Albany, NY 12222*

Teaching in higher education institutions is an arduous task including many elements like adult learner characteristics, instructional design, assessment concerns, and classroom management. Growing numbers of international students carry out various teaching responsibilities (i.e., teaching assistant, co-teacher, and adjunct instructor) in the United States. As one of the leading countries, Turkey is the top eight country of origin for international students. Purpose of this qualitative study is to provide a general perspective on the perceptions and experiences of Turkish graduate students on teaching undergraduate and graduate level classes in the United States. Semi-structured interviews were conducted with 6 Turkish graduate students teaching in a university setting. In addition to challenges and difficulties of teaching in a different environment, advantages and rewards of this experience were solicited through the interview protocol. Procedure was tailored to capture students' opinions and suggestions about teaching in a multicultural environment. Results suggested that it is not an easy endeavor but a rich and useful experience for both students and instructors to take place in ethnically and culturally diverse classroom settings. Linguistic limitations and cultural differences were the major barriers in creating an effective and efficient learning environment for Turkish graduate student instructors. Having a different background than students and knowledge of international issues were mentioned as being valuable qualities in teaching. Difference between undergraduate and graduate student expectations, needs, and attitudes was also one of the primary points interviewees referred. Implications for multicultural education are discussed in terms of teaching styles and strategies.

S7) Turkification of Anatolia - A Matrilineal Perspective, Omer Gokcumen, Theodore G. Schurr *University of Pennsylvania, Philadelphia 19104 USA.*

The Turkification of Anatolia remains a fascinating anthropological

question. It not only marks the beginning of a significant political transition that has influenced world history, but also represents a unique moment of linguistic and cultural change. However, the complex processes through which Turkic-speaking groups moved into Anatolia from Central Asia and settled within the region remain relatively unexplored. Despite great interest in this topic, however, the scarce and incomplete historical documentation and the current political sensitivities in Turkey create considerable obstacles for the studies of population history in the region. The emerging field of molecular anthropology may allow us to hurdle these obstacles by introducing powerful new tools to reveal the complexity of the region's population history without emphasizing stable biological identities, which is generally the basis for ethnocentric or racist discourse. In this paper, we have analyzed the mitochondrial DNA (mtDNA) data from several studies, including our own, to map the patterns of genetic diversity associated the western expansion of the Turkic groups. Our findings suggest that, during the westward movement of Turkic nomads, there was varied, but substantial, maternal admixture with local populations. In addition, the population of contemporary Turkey differs from that of pre-Turkic Anatolia and Thrace. Thus, it is essential, from a genetic perspective, to characterize both the complex legacy of Turkic expansion and the multi-layered population history of Anatolia in efforts to elucidate the Turkification of the region.

S8) Research Opportunities in Europe, Dr. Hatice Duran, *Max Planck Institute for Polymer Research, Germany*

Research is a major driving force for economic and social development. New scientific and technological discoveries are constantly changing and improving the way we live and work. Europe has an enviable reputation in the world of research thanks largely to its highly qualified research personnel and their rich intellectual capacity and know-how. The EU is responsible for producing one third of the world's scientific knowledge and boasts world-class expertise in areas such as environmental science, medical research, transport, aerospace and telecommunications. This poster presentation will provide an overview of the scientific research and career development opportunities in Europe mainly covered under the name of Marie Curie Actions. These opportunities are open to researchers of all ages and levels of experience regardless of nationality. (Hereby, I confirm that in this presentation I am not representing and/or engaging the European Commission. This is my personal point of view based on the documents available by the European Resercher's Mobility Portal and on my own experience as a Marie Curie Fellow.)

S9) Students' Representations of Negative Numbers, Mehmet A. Ocak, *State University of New York at Albany, Albany, New York, 12222*

Teachers often believe that middle grade students have a good understanding of how to interpret and use negative numbers. Generally, students do not learn signed numbers as a topic until middle grade. In some curriculums, negative numbers are not taught until prealgebra. However, this can lead to confusion and cognitive obstacles. Students learn that "you can not subtract a larger number from a smaller number" and later they must reconstruct their understanding again. Teaching firstly counting numbers, addition, subtraction, then negative numbers leads to misun-

derstanding (National Council of Teachers of Mathematics, 2001). Moreover, negative numbers are more difficult to understand than positive numbers because they are not directly related to children's everyday experiences. Additionally, children seem to have some obstacles with negative numbers. Representational systems help us understand some of the obstacles that children may have for particular mathematical ideas. The general purpose of this poster is to understand some of the cognitive obstacles that students may have for negative numbers. This poster considers examples with young children, illustrating some of their early understandings of negative numbers. Specific obstacles may come from the particular representations that students use. This poster shows some interesting and different obstacles of this sort and explores how such obstacles can be overcome as more efficient, powerful representations develop.

S10) Multiple Determinants of Business Cycle Synchronization, Cigdem Akin, *George Washington University, Washington, DC 20052 USA*

The phenomenon of globalization has recently incited the interest in understanding propagation of business cycle fluctuations across national borders. Despite the recent surge in trade and financial flows, studies have been unable to distinguish a clear-cut tendency for synchronization. One major reason is that various transmission channels can influence output correlations in both directions when we take into account the varying degrees of intensity across the world. In order to fully decipher this result, further research needs to be conducted about the underlying forces behind the comovement of world economies. This study looks at the multiple channels of business cycle synchronization in a unified framework to explain the economic linkages behind synchronization of 47 countries including 27 emerging markets. Paper conducts a GMM-IV and simultaneous equations estimations on correlations of real GDP cycles for 1970-2003. Results show that bilateral trade intensity, intra-industry trade and similarity in economic structures are the most important determinants of bilateral output correlations. There are no statistically significant effects from trade partner similarity, free trade area membership and being commodity exporter when macroeconomic policy measures are accounted for. Similarity in idiosyncratic fiscal shocks increases synchronization while bilateral real exchange rate volatility has no significant effect. On average global financial integration has a positive but weak effect. Synchronization increases for country pairs with higher degrees of financial openness. Simultaneous equations estimation shows that there is a strong positive feedback from financial openness to trade integration. Oil price shocks increase synchronization for pairs with similar oil import dependencies.

S11) Knowledge Management in the Liberty Private Elementary School, Mustafa Cinoglu, *University of Illinois at Urbana-Champaign, Urbana, IL*

The purpose of this study was to examine knowledge management in the Liberty Private Elementary School (LPES) (pseudonym). Case study methodology was used in the study. I collected the data via participant observation and interviews and school documents. I used to semi-formal interview questions. Interviews were conducted with teachers, administrators, parents and students to explore the school culture and staff beliefs about authority and to

identify a critical decision method that provide uncover knowledge structures used in decision-making. This study demonstrated that, in the decision process, school principal had considerable knowledge and were actively involved in the collective creation of shared values and common interpretation schemes. Teacher committees were independent from school management. Teacher committee members responded that they supported organized teamwork and that the work of administration was highly integrated with the work of the teacher committees. Collective values were part of the knowledge structures engaged by the all school staff during the critical decisions. The principal role of values in the critical decisions was to select out information that was deemed acceptable by the group or compatible with the group's existing knowledge base.

S12) Inquiry-Based Reading Assessment, Mustafa Ulusoy, *University of Illinois at Urbana-Champaign, Urbana, IL 61801*

Teachers spend extensive amount of time to find suitable reading assessment techniques for reading problems. An Inquiry Based Reading Assessment web site (WebQuest) was developed to help teachers find reading assessment techniques for common reading problems. This WebQuest provides participants introduction (general explanation about the WebQuest), task and process, cases (reading problems), useful resources, and evaluation (survey to assess WebQuest). In this WebQuest, every case contained a problem related to reading assessment. Participants were wanted to answer the following questions for each case: 1) What is the reading problem(s) in your case? 2) Which kind of reading assessment techniques can be used to assess the student's reading? 3) Why do you think this/these assessment technique(s) are the best? 4) How can you help this student to become a more fluent reader? Participants used resources section of the WebQuest to find useful sources. In similar cases, participants were expected to apply these techniques in their classrooms to find and solve reading problems. Twenty teachers examined the WebQuest web site and filled out an on-line survey. Analyses of the responses showed that participants easily identified problems in each case. Links were categorized according to the cases under the resources link. Due to this reason, participants found answers of the cases easily and did not have any frustrations. According to the survey results, 10 out of 20 participants had three or four years teaching experience. Open-ended survey questions revealed that the WebQuest was excellent, and the links were helpful.

S13) Process vs. Product: Rethinking Assessment in Teacher Education from Assignments to E-portfolios, Melda N. Yildiz, *William Paterson University of New Jersey, Wayne, NJ 07470*

This participatory research studied strategies for integrating media education into the curriculum, created suggestions for producing video in the classroom with minimal resources, explored teacher candidates' experiences with media production. To date, few studies have investigated the impact of assessment in creating media projects in teacher education. This study attempts to fill the gap by outlining the links between the role of assessment and educational media. Participants were encouraged to focus on process where they integrate new media into their projects. The study focused on the difficulties and characteristics of assessing new media projects such as videos and multimedia presentations. E-Portfolio model was designed and tested during three different courses. The study

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explored three key topics in order to understand the educational experiences of the participants: the wide range of meanings participants associate with assessment in media education; the impact of developing alternative assessment tools and strategies on participants' reaction and understanding of evaluating performance; and the ways in which they align their artifacts such as assignments and curriculum projects into their portfolios. Research questions: 1) Design: What types of Portfolio design, assessment

strategies, and reflective practices are most conducive for Teacher Candidates? 2) Format: What is the value-added of publishing a portfolio in an electronic format? 3) The role of media: Does creating an electronic portfolio enhance a teacher candidate's multimedia development skills? 4) Assessment: How do we assess our teacher candidates? What kind of artifacts do they need to create and how do they create their projects.

HEALTH AND BIOMEDICAL SCIENCES

H1) Enhancement of Cellular Memory by Reducing Stochastic Transitions, Murat Acar, Attila Becskei, and Alexander van Oudenaarden., *M.I.T., Cambridge, MA, 02139 USA*

On induction of cell differentiation, distinct cell phenotypes are encoded by complex genetic networks. Here we explore the key parameters that determine the stability of cellular memory by using the yeast galactose-signalling network as a model system. This network contains multiple nested feedback loops. Of the two positive feedback loops, only the loop mediated by the signal transducer Gal3p is able to generate two stable expression states with a persistent memory of previous galactose consumption states. A negative feedback through the inhibitor Gal80p reduces the strength of the core positive feedback. Despite this, a constitutive increase in the Gal80p concentration tunes the system from having destabilized memory to having persistent memory. A model reveals that fluctuations are trapped more efficiently at higher Gal80p concentrations. Indeed, the rate at which single cells randomly switch back and forth between expression states was reduced. These observations provide a quantitative understanding of the stability and reversibility of cellular differentiation states. (For more information: *Nature* 435, 228-232 (2005)).

H2) Infant Mortality in Turkey: Determinants of Access to Prenatal Care, Sule Calikoglu, MPP, MA, *Bloomberg School of Public Health Johns Hopkins University Baltimore, MD, USA*

Infant mortality declined in almost all regions of the world between the 1960s and the 1990s with varying rates ranging from a 73 percent decline in East Asia (mainly China), down to a 34 percent decline in sub-Saharan Africa. Turkey was among the countries with the most striking declines together with Peru and Thailand. However, the rate of decline slowed down since 1980s and Turkey's infant mortality rate is higher than other nations with similar economic development. The first section of this study examines infant mortality rate in a historical and comparative perspective. The second section analyzes the determinants of receiving prenatal care, one of the leading factors in infant mortality, using Turkish Demographic Survey and Health Survey. Receiving prenatal care is explained by having no education, rural area residence, region, ethnicity, religion, health insurance and poverty. An analysis of the standardized coefficients reveals that the major significant variables in explaining access to prenatal care are education and the residence in the Eastern Anatolia. Furthermore, Kurdish identity, coverage of health insurance and poverty are statistically significant factors influencing the level of access to prenatal care. The importance of education can be related to women's sense of empowerment, which may result in more demand for health care during pregnancy. However, education may also reflect income levels and social class.

H3) Features of Distributed Thinking in Biomedical Communities, Murat Cokol, Ivan Iossifov, Chani Weinreb, Andrey Rzhetsky, *Columbia Genome Center, New York, NY, 10032*

We analyzed several large-scale properties of the growing knowledge about molecular interactions, using automated text-mining technology and a huge collection of full-text research articles. At least in three respects the growing knowledge appears analogous to evolving scientific collaboration networks: First, biomedical knowledge tends to advance by incremental attachment of newly

discovered relations to islands of highly interconnected "old" facts. Second, the visibility of facts known to individual researchers appears to be restricted to "knowledge pockets" that are probably very small compared to the whole accessible knowledge. Third, at every given moment only a thin layer of knowledge is active and growing. The older knowledge appears to be largely abandoned and hidden from the active scientists, while the total amount of potentially useful knowledge is enormous: We estimated that at least a billion non-redundant molecular interactions are currently locked in biomedical literature covering just the last quarter of century of research.

H4) Loss of FilaminC (FLNc) Results in Severe Defects in Myogenesis and Myotube Structure, Isin Dalkilic, Jaelyn Schienda, Terri G. Thompson, Louis M. Kunkel, *Howard Hughes Medical Institute, Children's Hospital Boston, and Harvard Medical School, Boston, MA 02115*

FilaminC is the muscle specific member of a family of actin binding proteins. Although it interacts with many proteins involved in muscular dystrophies, its unique role in muscle is poorly understood. To address this, two models were developed: First, FLNc expression was stably reduced in C2C12 myoblasts by RNA interference. While these cells start differentiation normally, they display defects in differentiation and fusion ability and ultimately form multinucleated "myoballs" rather than maintain elongated morphology. Second, a mouse model carrying a deletion of last 8 exons of Flnc was developed. FLNc deficient mice die shortly after birth, due to respiratory failure and have severely reduced birth weight, with fewer muscle fibers and primary myotubes, indicating defects in primary myogenesis. They exhibit variation in fiber size, fibers with centrally located nuclei and some rounded fibers resembling the in vitro phenotype. Similarity of the phenotype of FLNc deficient mice to the filamin interacting TRIO null mice was further confirmed by comparing FLNc deficient C2C12 cells to TRIO deficient cells. These data provide the first evidence that FLNc has a crucial role in muscle development and maintenance of muscle structural integrity, and suggest the presence of TRIO-FLNc dependent pathway in maintaining proper myotubes structure.

H5) Simulation-based Teaching And Learning Resource For Cellular Physiology Training: iCell, Semahat Demir, Ph.D., *Program Director Biomedical Engineering & Research to Aid Persons with Disabilities (BME/RAPD), Division of Bioengineering and Environmental Systems, National Science Foundation, Arlington, VA, USA, Associate Professor of Biomedical Engineering, Joint Biomedical Engineering Program, Univ. of Memphis & Univ. of Tennessee Health Science Center Memphis, TN, USA*

The interactive cell modeling resource, iCell, that has been developed as a simulation-based teaching and learning tool for electrophysiology since 1998 by integrating research and education will be presented. Dr. Demir's interactive cell modeling web site can be accessed freely over the internet at <http://ssd1.bme.memphis.edu/icell/>. This JAVA-based platform-independent software, iCell, provides an interactive and user-friendly teaching and learning resource, and also a collaboration environment for electrophysiology to be shared and disseminated over the Internet.

H6) Development and Characterization of Laser Glucometer for Diabetes, Aysegul Ergin, Gordon A. Thomas, *New Jersey Institute of Technology, Newark, NJ, 07102*

In this study, we have measured the Raman spectra of near-physiological-level glucose in the aqueous humor of intact, ex vivo porcine eyes and determine the characteristic concentration constant for glucose. For this study, an optical, non-invasive technique, Raman spectroscopy, has been used as the measurements method. We inject the glucose solutions into the eyes, control the concentration, and measure the Raman spectra using a compact spectroscopic system with a laser excitation wavelength at 785nm. The measurement system in this study is designed to optimize the signal collection from the anterior chamber of the eye. Our preliminary data also show that the sensitivity of the system is almost adequate, since we can detect the glucose at near-physiological concentrations in the anterior chamber of the eye in the presence of the other eye components. This method can be used in the development of a detection system that could be an alternative to the current diabetic patients' blood glucose finger-stick test, which is painful and done infrequently. This method could allow for frequent testing in a fast, painless manner so diabetic patients can regulate their glucose levels more closely. Providing frequent and continuous glucose measurement would be useful in patient-based blood glucose control or in a closed loop automated insulin delivery system. We believe that a small, portable system like ours may be made sufficiently affordable and convenient for patient use.

H7) The Effect of the Lipiodol on the Intraabdominal Adhesion and Ovarian Mass Formation on the Rats, Bahar Baskan MD, Orhan Gelisen MD, Gulay Beydilli MD, Dilek Bulbul MD, Ali Haberal MD, *Infertility Clinic, Pathology Department, Ankara Etlik Maternity and Women's Health Training and Research Hospital,*

OBJECTIVE: Hysterosalpingography (HSG) is used for the evaluation of the uterine cavity and tubo-peritoneal structures in infertile females. The aim of this study was to examine intraabdominal reactions of the Lipiodol, which is widely, used oil soluble contrast agent for HSG, experimentally on the rats.

MATERIAL and METHOD: Forty-five rats those weights ranging from 180 to 230 grams were included into the study. By insulin injector 0.5 cc lipiodol was injected peritoneal cavity of 35 rats while no medication was done to 10 rats reserved as control group. Under laboratory conditions the rats were observed 3 weeks. At the end of the third week after anesthesia with ketamin, total abdominal hysterectomy, bilateral salpingo-oophorectomy were done and peritoneal specimens sized 2x2 centimeters from anterior pelvic wall were taken. The specimens were preserved in formaldehyde solution. Dying with Hematoxylin-Eosin histopathologic examinations were done.

RESULTS: After macroscopic and histopathologic examinations fibrosis, granulomatous reactions, ovarian cyst formation were detected neither in control group (n=10) nor in the Lipiodol injected group (n=35). Only in two of the lipiodol injected rats, there were massive eosinophilic leukocyte infiltration in the perivascular spaces of the paratubal and paraovarian fat tissue. These findings were evaluated as nonspecific for adhesion or fibrosis.

CONCLUSION: It is observed that intraabdominal application of the Lipiodol do not cause granulomatous reactions in the peritoneal cavity or formation of the retention cysts or adhesion.

H8) High LET Radiation Exposure Yields Less Tumors than Low LET Radiation at Higher Doses, Zekiye Hiz, Rutgers, *The State University of New Jersey, Camden, NJ*

In this study a model considering possible different modes of action of low and high-LET particles is tested against the data of experiments on cancer induction by ionizing radiation in rat skin. Also included in the model are the multiple steps in completion of degeneration or mutation in genes, namely oncogenes and tumor suppressor genes on both chromosomes, biological repair of pre-mutagenic damages, necrotic and apoptotic cell deaths, and proliferation due to cell death. The dose-response relationship in the model for electron radiation (low LET) included the second, third and fourth powers of the dose and for neon and argon ion radiation (high LET) the first, second and third powers of the dose. Analyses of the experimental data showed that exposure to particles of different energy and LET show different cancer incidence dependence on the power of dose. For example, in 28 day old rats a dose of 8 Gy of 0.8 MeV electrons yielded 0.16 Cancer/ Rat.cm² and 640 MeV Argon ions about 0.37 Cancer/ Rat.cm², while 12 Gy of 0.8 MeV electrons caused 0.22 Cancer/ Rat.cm² and 640 MeV Argon ions 0.18 Cancer/ Rat.cm². Radiation with its different modes of action is a unique agent that reveals the effects of biological structure-function relationships on dose and time responses in carcinogenesis.

H9) Trabecular Micro-Structure in Lumbar Pedicle Differs from Vertebral Trabecular Bone, Serkan Inceoglu, Andrew Burghardt, Atilla Akbay, Sharmila Majumdar, Robert F. McLain, *Spine Research Laboratory, The Cleveland Clinic Foundation, Cleveland, OH, 44195, Musculoskeletal Quantitative Imaging Research Group, UCSF, 94158*

The pedicle is a clinically crucial element of the spine. Although the anatomy of the pedicle is well-studied, the micro-structure of the trabecular bone in the pedicle and age-related changes are unknown. This study was designed to investigate the architecture of the trabecular bone in the pedicle and age-related changes in the structure by using micro-CT. Pedicles of eight L3 human lumbar vertebrae were sectioned off at the isthmus after DEXA-scanning. Pedicle sections were, again, DEXA-scanned for measurement of bone density. A micro-CT scanner was used to analyze following structural parameters: bone volume fraction (BV/TV), trabecular number (Tb.N), thickness (Tb.Th) and spacing (Tb.Sp), structural model index (SMI), and degree of anisotropy (DA). The results showed that the morphological parameters were not correlated with age (p>0.05). Significant correlation was found between Tb.Th and the pedicular BMD (p<0.05). BV/TV showed correlations with Tb.Th (p=0.06) and Tb.Sp (p=0.07), but not with Tb.N (p=0.13). The pedicular trabeculae were plate-like and isotropic. The vertebral BMD could explain only 63% of the variance in the pedicular BMD. In conclusion, the pedicular trabeculae are larger in thickness and number and have less spacing in the network than vertebral trabeculae. The measurement of BMD within the pedicle might provide a better sense about fixation quality in surgery. Changes in the bone volume in pedicle are through thinning but not loss of trabeculae in the pedicle. Thus, therapeutic interventions might be useful in the restoration of bone mass in the pedicle in elderly to improve fixation quality.

H10) Genetic Approaches in Human Congenital Diaphragmatic Hernia, Sibel Kantarci, Ph.D., Barbara Pober, M.D., Thomas B. Kinane, MD, Lihadh, Al-Gazali, MD, David Casavant, M.D., Dick Tibboel, MD, Ph.D, Meaghan Russell, M.P.H., Jay M. Wilson, MD, Charles Lee, Ph.D., Patricia K. Donahoe, M.D., *MassGeneral Hospital for Children, Boston, MA, USA, United Arab Emirates University, United Arab Emirates, Erasmus Medical Centre, Rotterdam, The Netherlands, Children's Hospital Boston, Boston, MA, USA, Brigham and Women's Hospital, Boston, MA, USA.*

Congenital Diaphragmatic Hernia (CDH) is a common developmental anomaly with a high mortality due to lung hypoplasia and pulmonary hypertension. Little is known about the etiology of CDH. We aim to identify genes involved in CDH in our carefully phenotyped cohort of patients. We have sequenced 66 of the 173 enrolled patients for 22 candidate genes. We found several potentially damaging SNPs, nor in 485 ethnically matched control group recruited as part of this study. To detect possible microdeletions or microduplications we used array-based Comparative Genomic Hybridization (aCGH) on 30 patients. A de novo deletion of chr1q41-q42.12 region was detected. Prior cases with deletions of 1q42 suggest this is a CDH hotspot. We are performing homozygosity mapping by application of the 10K Affymetrix SNP chip on a large family containing several members affected with an autosomal recessive multiple anomaly condition with CDH. These numerous strategies will identify genes contribute to the development of CDH. These approaches provide a model for elucidating the genetic basis of common, but etiologically heterogeneous, birth defects.

H11) Defining the Molecular Organisation of the Airway Mucosal Barrier: Proteomic and Biochemical Studies on Human Bronchial Epithelial Cell Cultures, Mehmet Kesimer, Raymond J. Pickles, Genevieve DeMaria, Ashley Henderson, John K. Sheehan, *Department of Biochemistry and Biophysics, Cystic Fibrosis/Pulmonary Research and Treatment Center, University of North Carolina, Chapel Hill, 27599-7248 NC USA*

Cleaning the air we breathe from chemical, pathological and physical toxins is a vital physiological function which is largely performed at the mucosal surface of the airway. The molecular organisation of this barrier is poorly understood but with the advent of effective normal human tracheobronchial epithelial (NHTBE) cultures which can recapitulate the behaviour of a real muco-ciliary surface it is now possible to integrate biochemical, biophysical and physiological approaches. We report here our integrated approach to proteomic, biochemical and histological studies on NHTBE cultures that are yielding new insights into both the secreted mucus and the underlying peri-ciliary liquid (PCL) layer. How this layer maintains its integrity and distinctiveness from the mucus above forms the main question of this work. We have identified over a 100 molecules in the mucus secretion many of which are arranged in complexes with the large MUC5B and 5AC mucins which we are now defining. In particular we have identified by proteomics MUC1, MUC4 and MUC16 as the major glycoconjugate molecules in the PCL and biochemical studies indicate that these molecules are distinctively glycosylated with highly charged oligosaccharides as compared with the MUC5B and 5AC mucins in the mucus. On the basis of the proteomics identification we have designed new peptide antibodies to MUC4 that identify it as a major secreted component surrounding the cilia. On the other hand MUC1 is clearly

identified on the microvilli but not the cilia. MUC16 is found in and above the PCL as well as in the mucus secretion.

H12) Effects of Shear Stress Injury on the Morphology and Structure of Cultured Chick Forebrain Neurons, Devrim Kilinc, Gianluca Gallo, Kenneth A. Barbee, *Drexel University School of Biomedical Engineering, Science and Health Systems, Philadelphia, PA 19102 USA, Drexel University Health Sciences, Philadelphia PA 19129 USA.*

Traumatic brain injury (TBI) is an important pathology associated with closed head trauma and affects around 2 million people annually. Diffuse injury to axons results in secondary axotomy if the injury severity is insufficient to disrupt the axon immediately. Secondary axotomy is a progressive event that involves increase in the axolemmal permeability and subsequent calcium ion (Ca^{2+}) influx followed by the increase in the activity of Ca-dependent protease Calpain and subsequent damage to cytoskeletal structure. We have applied fluid shear stress injury (FSSI) on cultured primary chick forebrain neurons to determine if this type of injury mimics the structural and morphological changes in central nervous system neurons following TBI. Our results demonstrate that axonal beading, which is the "hallmark" morphology of TBI, is increased following FSSI, suggesting that our in vitro model system mimics TBI-like changes observed in vivo. Beads appeared at the same distinct locations along the axon where microtubule (MT) mass is decreased, providing direct evidence for the hypothesis that beading is related with impaired axonal transport conducted over MTs. We have also found that post-injury application of the triblock co-polymer Poloxamer 188 (P188) reduces axonal beading to control levels. We suggest that focal changes in axolemmal permeability following trauma is responsible for focal peaks of intracellular Ca^{2+} concentration ($[\text{Ca}^{2+}]_i$) which, in turn, causes focal loss of MTs via Calpain activation. We are currently investigating axolemmal permeability changes, $[\text{Ca}^{2+}]_i$, and Calpain activity in response to FSSI.

H13) Agonist-Induced Cyclic ADP Ribose Production in Airway Smooth Muscle, Sertac N. Kip, Molly Smelter, Adeyemi Iyanoye, Eduardo N. Chini, Y.S. Prakash, Christina M. Pabelick and Gary C. Sieck. *Departments of Physiology and Biomedical Engineering, Anesthesiology and Medicine Mayo Clinic College of Medicine, Rochester, MN 55905*

Cyclic ADP-ribose (cADPR) is a novel second messenger generated by the enzymatic activity of a trans-membrane protein, CD38. cADPR triggers Ca^{2+} release from sarcoplasmic reticulum (SR) via Ryanodine receptor channels in airway smooth muscle (ASM). SR Ca^{2+} release is an important component of the intracellular Ca^{2+} ($[\text{Ca}^{2+}]_i$) responses of ASM to agonists. Whether cADPR is endogenously produced in ASM during agonist stimulation which results in contractility has not been established. In this study, cADPR production was examined in acutely dissociated porcine ASM cells. Acetylcholine (ACh) stimulation significantly increased cADPR levels, peaking between 30 s and 1 min. This effect was inhibited by M2 and M3 muscarinic receptor antagonists. Histamine stimulation also increased cADPR levels, the effect being inhibited by diphenhydramine, a histamine receptor antagonist. Although the time-course was slower, the extent of cADPR elevation with histamine was greater than that induced by ACh. These results indicate that in porcine ASM, agonist stimulation induces an increase in cADPR production that is mediated via

membrane receptors, which may have importance in bronchial hyper-responsiveness. Furthermore, the extent of cADPR responses to ACh and histamine vary, possibly reflecting differences in G protein coupling. Better understanding of CD38/cADPR signaling involved in calcium homeostasis of ASM may provide new insights into novel therapeutic targets for the control of airway diseases, including asthma.

H14) Using Hyperspectral Imageries to Portray Musk Thistle from Surrounding Vegetation, Mustafa Mirik, Gerald J. Michels, Jr., and Sabina Kassymzhanova-Mirik *Texas A&M University System, Agricultural Research and Extension Center, 6500 Amarillo Boulevard West, Amarillo, TX 79106.*

Invasion by a noxious weed species presents a serious threat to the remaining fragments of the natural habitat. Identifying the population dynamics and extent of spread of noxious weeds in a temporal and spatial perspective improves monitoring, planning, and management practices. Methods for reliable, repeatable, quick, and cost effective mapping of invasion patterns are needed to facilitate these practices. Remote sensing has been used to map various plant species including invasive and noxious weeds. Musk thistle (*Carduus nutans* L.) a noxious weed, is a good candidate for detection by remote sensing platforms because it may produce a unique spectral signature due to a large, purple-reddish flower head. Therefore, airborne hyperspectral imageries acquired at two dates were used to map musk thistle infestation in a pasture at Friona, TX, in the second week of April when musk thistle was at the rosette form and mid June when musk thistle was at the flowering stage in 2003. Imageries were classified using the supervised maximum likelihood classifier technique. Overall accuracy was verified to be greater than 80% by ground survey for both imageries. These results demonstrate the value of hyperspectral data for mapping noxious weed species and the habitats they threaten.

H15) Remote Sensing for Big Sagebrush Biomass, Mustafa Mirik, Jack E. Norland, Robert L. Crabtree, Mario E. Biondini, Gerald J. Michels Jr., *The Texas A&M University, Agricultural Research and Extension Center, Amarillo, TX 79106. North Dakota State University, Fargo, ND. Yellowstone Research Center Bozeman, MT.*

The prediction power of the fine spatial resolution narrowband vegetation indices along with simulated multispectral reflectance measurements for estimating woody and herbaceous biomass was examined for a big sagebrush (*Artemisia tridentata* Nutt.) region in Yellowstone National Park, Wyoming. The modified normalized difference vegetation (NDVI) and structural-independent pigment (SIPI) indices of 1 m² spatial resolution of PROBE-1 hyperspectral imagery acquired in August 1999 was used to investigate the relationships between ecological variables and reflectance spectra. Biomass components were regressed on custom-built vegetation indices, which provided the R² values ranged from 0.83 to 0.96 by the simple linear regression models using hyperspectral data alone. As a result of observed correlations, it can be confidently concluded that fine spatial and spectral resolution remotely sensed data have been found to be an important tool to capture the information about vegetation properties enabling to estimate biomass components in big sagebrush areas at the time when data were collected.

H16) Classification of Hyperspectral Imageries for delineating Yucca and Tree Cholla in Grasslands, Mustafa Mirik, Gerald J. Michels, Jr., Sabina Kassymzhanova-Mirik, *Texas A&M University System, Agricultural Research and Extension Center, Amarillo, TX 79106.*

Hyperspectral remote sensing is an emerging technology with the potential to identify plant species, delineate vegetation and habitat characteristics, differentiate causes of vegetation stress, and characterize soil properties. This technology can be used in range management as a tool to map various plant communities so as to determine current range production and utilization. Mapping of unpalatable rangeland species, such as yucca (*Yucca glauca* Nutt.) and tree cholla (*Opuntia imbricata* (Haw.) DC.), using hyperspectral data provides temporal and spatial information for monitoring and managing rangeland productivity for livestock utilization. The objectives of this study were to examine the spectral characteristics of yucca and tree cholla using an airborne hyperspectral spectrometer and to test hyperspectral one-meter-spatial-resolution remote sensing imageries for identifying and mapping individually distributed tree cholla and yucca species. The spectral reflectance of both yucca and tree cholla recorded with an airborne hyperspectral spectrometer was different from the co-occurring green grass species throughout the visible and near infrared spectrum. The classification results using a maximum likelihood procedure indicated that the dormant woody species were classified as yucca. A mixture of actively growing short grass species within tree cholla dominated areas were classified as tree cholla. However, areas dominated by each species within each rangeland were correctly delineated from the areas occupied with green grass species.

H17) Can Remote Sensing Detect Aphid Stress in Crops?, Mustafa Mirik, Gerald J. Michels, Jr., Sabina Kassymzhanova-Mirik, Norman C. Elliott, and Vasile Catana, *The Texas A&M University, Agricultural Research and Extension Center, Amarillo, TX 79106, USDA-ARS, 1301 N. Western Road, Stillwater, OK 74075.*

The Russian wheat aphid (*Diuraphis noxia* (Mordvilko)) and greenbug (*Schizaphis graminum* (Rondani)) are two devastating aphid pests of wheat (*Triticum aestivum* L.), barley (*Hordeum vulgare* L.), and other cereals in the Great Plains of the United States. The Russian wheat aphid and greenbug infestations in crops are unpredictable over space and time. Remote Sensing appears promising to observe Russian wheat aphid and greenbug infestations in crops. In this research, the potential use of spectral data to sense Russian wheat aphid and greenbug stress in winter wheat fields located in Texas, Oklahoma, and Colorado was studied. A multispectral ground radiometer and a digital camera were used to collect reflectance and digital images, respectively. The results indicate that vegetation indices associated well with percentage damage caused by the Russian wheat aphid and greenbug feeding in wheat. In addition, paired t-test indicates that there were significant differences between infested and uninfested wheat canopies. We concluded that remote sensing is a useful method to monitor aphid damage in wheat.

H18) Characterization and Long Term Maintenance of Rat Taste Primary Cells, Hakan Ozdener, Nancy Rawson, *Monell Chemical Senses Center, Philadelphia, PA 19104*

While much is known about molecular and biological basis of taste,

comparatively less is understood about factors governing proliferation and differentiation of taste receptor cells. Our objective was to develop a protocol to maintain taste cells in culture for more 2 weeks and to establish a longer-term culture in which new taste cells would be generated from stem cells. In this study, we report an in vitro culture method to maintain and generate rat taste cells in primary culture with good viability, physiological function and expression of taste cell specific markers. This optimized culture system maintains primary taste cells obtained from rat tongue foliate and vallate papilla and supports the de novo generation of new taste cells for at least two months. Gustducin and phospholipase C β_2 (PLC β_2) expression was shown by immunocytochemistry and Western blot. PCR analysis indicated that mRNA for gustducin and PLC β_2 and taste cell receptors (T1R3, T2R5) was present in cultured taste cells. Labeling cultured cells with bromodeoxyuridine to identify cells that divided in culture concurrently with taste cell markers indicated that taste cells both proliferated and differentiated in vitro. Functional studies using the ratio metric indicator fura-2 showed that a subset of cells responded to taste stimuli. This system will enable studies of the process involved in proliferation, differentiation and stimulus responses of mammalian taste receptor cells in an in vitro preparation.

H19) Effect of Stress on the Pattern of LH Secretion in Sheep Passively Immunized against Adrenocorticotrophic Hormone (ACTH), T. E. Adams, A. Ozpinar, C. C. Huxsoll, B. M. Adams, *Department of Animal Science, University of California, Davis, CA 95616*

The effect of inflammatory stress on LH secretion was assessed in castrated male sheep (wethers) passively immunized against the amino (N)- and/or carboxy (C)- termini of adrenocorticotrophic hormone (ACTH). Sheep serving as anti-serum donors were actively immunized against immunized against peptides representing the N (ACTH₁₋₁₄) or C (ACTH₂₃₋₃₉)-terminal portions of ovine ACTH (oACTH). At passive immunization (PI), wethers (n = 6 animals/treatment group) animals in Group 1 (dual immunization) received 400 ml of anti-ACTH₁₋₁₄ and 150 ml anti-ACTH₂₃₋₃₉ sera. Animals in Group 2 received 150 ml anti-ACTH₂₃₋₃₉ sera and 400 ml of control sera. Animals in Group 3 received an equivalent volume of control serum alone. An immunologic stress (lipopolysaccharide [LPS], 125 ng/kg IV) was administered 24 h after PI and serum concentrations of LH and cortisol were determined in blood samples collected during the post-stress period. In control animals (Group 3) LPS induced a marked, but short-lived, increase in serum concentrations of cortisol, with peak levels noted 1-1.5 h after LPS challenge. The adrenal response to LPS reached peak levels 2-5 h after LPS in animals in Group 2. In addition, the duration of stress-induced cortisol secretion was markedly extended in animals in Group 2. Conversely the adrenal response to LPS was abolished in animals passively immunized against both the N- and C-terminal portions of ACTH (Group 1). Serum concentrations of LH were significantly reduced 2-4 h after LPS challenge in control animals. The extent and duration of stress-induced decrease in LH secretion was amplified in animals passively immunized against the A-terminus of ACTH (Group 2). Conversely, LPS challenge did not significantly affect LH secretion in animals receiving the dual immunization treatment paradigm. Collectively these observations demonstrate that antisera targeting the N- and/or C-termini of ACTH have differential effects on the adrenal response to stress. In addition, stress-dependent modulation of LH secre-

tion is inversely related to the magnitude and duration of stress-induced cortisol secretion. Taken together, these data indicate that cortisol is an important mediator of the decrease in LH secretion that is triggered by stress.

H20) Diagnostic Value of Adenosine Deaminase in Nontuberculous Peritoneal Effusions, Gülsevım Saydam, Cengiz Aydın, Aynur Terim Çağır, Tülin Yazıcı, Tuğrul Himmetoğlu, Perihan Oğuz, *T.C. Yüksek İhtisas Research and Training Hospital, Clinical Biochemistry Laboratory 06100 Ankara-Türkiye*
Adenosine Deaminase (ADA) can aid in the diagnosis of tuberculous peritoneal effusions. The purpose of this study is to assess the ADA levels in non-tuberculous peritoneal effusions of different aetiologies, to investigate false-positive results from peritoneal effusions and to show correlation between ADA levels and white blood count. ADA activity in periton effusions (82 cases) were measured by the Giusti method. Mean ADA activities were 7.47 ± 4.31 U/L in cirrhosis (17 cases), 10 ± 6.47 U/L in chronic liver diseases (23 cases), 26.14 ± 13.37 U/L in peritonitis carcinomatosa (7 cases), 16.1 ± 12.09 U/L in hepatic carcinoma (19 cases), 15.75 ± 13.12 U/L in miscellaneous cases (16 cases). The negative predictive value of ADA for the diagnosis of peritoneal tuberculosis was %96.34. The peritoneal fluid ADA levels were significantly higher in different types of exudative effusions than transudative effusions ($p < 0.001$) and there was weak correlation between ADA levels and white blood count. ($p < 0.001$, $r = 0.648$). As a result, our study shows assesment of ADA in pathologic peritoneal effusions is helpful and it is supporting parameter as well as peritoneal biopsy in the diagnosis of tuberculosis.

H21) The in Vitro Analytical Interference of Drugs on Tests of Thyroid Function, Dr. Hatice ERBEYİN , Dr. Gülsevım SAYDAM, *T.C. Yüksek İhtisas Research and Training Hospital, Clinical Biochemistry Laboratory, 06100 Ankara-Türkiye.*

Many drugs may cause changes in the serum concentrations of the Triiodothyronine and the Thyroxine. It is important to know these changes in clinical thyroid state for the interpretation of thyroid function tests. Commonly prescribed drugs used for coronary artery disease, hiypertension, congestive cardiac failure may result in abnormal thyroid function tests in the absence of clinical features of thyroid dysfunction. In this study, we aimed to determine the in vitro effect of drugs as Furosemid, Metoprolol, Acetyl Salisilic Acid, İsosorbit Dinitrat are used frequently in the therapy of the patients with coronary artery disease, hypertension and congestive heart failure on FT₃ and FT₄ tests which are measured by Electrochemiluminescence. We performed our study according to "Analytical İnterference Evaluation Guide" of IFCC as in vitro. In our study no in vitro analytical interference was observed on FT₃ and FT₄ tests with therapeutic doses of Acetyl Salisilic Acid (300 mg/day), Metoprolol (100 mg/day), İsosorbit Dinitrat (60 mg/day) and in vitro analytical interference was observed on FT₃ and FT₄ tests with only therapeutic doses of Furosemid (40 mg/day) ($p < 0,01$). A nonlinear increase was found in FT₃ and FT₄ values with increased doses of Furosemid (10, 20, 40, 60, 80 mg/L) in vitro. As a result we found that Acetyl Salisilic Acid, Metoprolol, İsosorbit Dinitrat had no analytical interference effects on FT₃ and FT₄ tests and Furosemid had analytical interference effect on FT₃ and FT₄ tests and FT₃ and FT₄ values showed a nonlinear increase with increased doses of Furosemid in vitro.

H22) Importance of The Fecal Elastase in Chronic Pancreatitis Diagnosis, Şebnem Gök, Gülsevım Saydam, Cengiz Aydın, Hüseyin Şimşek, Tuğrul Himmetođlu, Dilek Ođuz, *T.C. Yüksek İhtisas Research and Training Hospital, Clinical Biochemistry Laboratory 06100 Ankara-Türkiye*

Evaluation of exocrine functions of pancreas is important in the diagnosis and treatment of the chronic pancreatitis. Today determination of fecal pancreatic elastase gains importance due to being a non-invasive method. Our aim in this study are to determine the diagnostic importance of Fecal Elastase (FE-1) level on patients diagnosed as chronic pancreatitis in Gastroenterology Clinic, to investigate the effects of the usage of enzyme preparations on the fecal elastase method and to show correlation between FE-1 level and serum lipase level. In our study FE-1 level is measured by micro ELISA method in 26 patient with chronic pancreatitis and 17 healthy subject. The cut off value was found 240 µg/g. Sensitivity and specificity of the method were found as % 85 and % 70,6 respectively. FE-1 levels of patient groups when compared with that of healthy subjects, it was found significantly low ($p < 0.001$). As a result we found FE-1 test might only be a supporting parameter as well as Ultrasonography, Computerized Tomography, Endoscopic Retrograde Colangiography in the diagnosis of chronic pancreatitis because of the low diagnostic proficiency parameters, FE-1 is unaffected by exogenous pancreatic enzyme treatment and there was no correlation between the FE-1 and serum lipase levels.

H23) Albumin Cobalt Binding Assay and Fatty Acid-Binding Protein in Early Detection of Myocardial Infarction, Kemal Sönmez, Gülsevım Saydam, Hüseyin Şimşek, Aygöl Türkmen, Yücel Balbay, *T.C. Yüksek İhtisas Research and Training Hospital, Clinical Biochemistry Laboratory 06100 Ankara-Türkiye*

Diagnosis of acute myocardial infarction (AMI) in patients attending emergency departments with acute chest pain is often difficult. Cardiac Troponin I and T (cTnI, cTnT), CK-MB are sensitive and specific for detection of myocardial damage, but they may not rise during early stage of myocardial infarction. The release of currently used myocardial markers into the circulation are believed to require tissue necrosis, whereas the assessment of cardiac ischemia before or in the absence of cell death is frequently an important component of clinical decision-making in the suspected AMI patient. Albumin Cobalt Binding Assay (ACB) and heart type Fatty Acid-Binding Protein (H FABP) have recently been shown to be sensitive and early biochemical markers of ischemia. The aim of our study was to compare H FABP and ACB tests with cTnI, cTnT and CK-MB tests in the first 3 hours in the patients with the chest pain who have been diagnosed as AMI according to EKG, biochemical markers and family history. In our study, H-FABP was measured with the CardioDetect test kit based on qualitative immunocromotographic cassette method and ACB was measured with Bar-Or method based on indirect colorimetric principle in 30 patients with chest pain, which started 2 hours before. The sensitivity and specificity of the H FABP and ACB were higher than that of CK-MB and cTnT, cTnI. We conclude that H FABP and ACB are more sensitive and specific markers than cTnT, cTnI and CK-MB in the early diagnosis of AMI.

H24) A Novel Gene Regulating Autophagy and Development, Turgay Tekinay, Richard H. Kessin, *Columbia University, Department of Pathology and Cell Biology, New York, NY, 10032*

Autophagy is a cellular mechanism by which cytoplasmic molecules and organelles are degraded. Autophagy is activated by starvation and other stress conditions. Dictyostelium discoideum is a social amoeba that enters into a developmental pathway during starvation to form fruiting bodies, in which a stalk supports a ball of spores. We showed that autophagy is required to obtain the nutrients and energy necessary for Dictyostelium development. The autophagy pathway is conserved in all eukaryotic cells. By using genetic methods many of the genes involved in this pathway have been identified in budding yeast. However, there are significant differences between autophagy pathways in mammals and yeast. We hypothesized that there are genes that regulate autophagy and development, which are not found in yeast, but are conserved between mammals and Dictyostelium. To identify such genes, we screened Dictyostelium mutants defective in development, since autophagy mutants are also defective in development. We tested these mutants for survival in nitrogen-free medium, which is hallmark of autophagy mutants. We isolated a gene, a mutation of which results in defects in Dictyostelium autophagy and development. This gene, which we named atgN, has homologues present in the mammals and the nematode Caenorhabditis elegans, but not the yeast genome. We are now elucidating the mechanism of action of this gene in lifespan extension in C. elegans. We propose that this novel gene regulates initiation of autophagy.

H25) Ewing's Sarcoma Oncoprotein EWS-FLI1 Activity is Enhanced by RNA Helicase A (RHA), Jeffrey A. Toretsky, Verda Erkizan, Ogan D. Abaan, Aykut Üren, *Lombardi Comprehensive Cancer Center, Georgetown University Medical Center, Washington D.C. 20057.*

RNA helicase A (RHA), a member of the DEXH box helicase family of proteins, is an integral component of protein complexes that regulate transcription and splicing. EWS-FLI1 oncoprotein is expressed as a result of a chromosomal translocation that occurs in patients with Ewing's Sarcoma Family of Tumors (ESFT). Although more than 95% of the tumors carry EWS-FLI1, therapeutic applications using this target have not been developed. Using phage display library screening, we identified an EWS-FLI1 binding peptide containing homology to RHA and characterized human RHA protein as a potential EWS-FLI1 interacting protein. We observed endogenous RHA and EWS-FLI1 in the same protein complex in ESFT cell lines. GST pull-down and ELISA assays with recombinant proteins showed that EWS-FLI1 directly bound to RHA. Chromatin immunoprecipitation experiments demonstrated both proteins bound to EWS-FLI1 target gene promoters. RHA stimulated the transcriptional activity of EWS-FLI1 regulated promoters, including Id2, in ESFT cells. RHA expression in mouse embryonic fibroblasts cells stably transfected with EWS-FLI1 enhanced the anchorage-independent phenotype of EWS-FLI1 alone. Reduction of RHA protein levels by siRNA in ESFT cell lines decreased their growth rate. Our results provide strong evidence for EWS-FLI1 and RHA interaction and its oncogenic consequences. This finding may lead to development of better therapeutic agents that may target EWS-FLI1 and RHA interaction.

H26) Naturally Occuring Antibody Responses in Lung Cancer: Candidate Targets for Immunotherapy, and Diagnostic/Prognostic Markers Lin-Chi CHEN, Sowmita NARAYAN, Lloyd J. OLD, Nasser K. ALTORKI, Jerome HONNORAT, Ali O. GURE, *Memorial Sloan Kettering Cancer*

Center, New York, NY; Ludwig Institute for Cancer Research, New York, NY; Weill Medical College of Cornell University, New York, NY; University of Lyon, Lyon, France

Cancer is known to associate with naturally occurring antibody responses to an array of antigens of which the SEREX database currently lists about 2000 (www.licr.org/SEREX.html). We have identified strong correlations between a group of neuroectodermal antigens and parameters indicative of indolent disease as well as with longer survival in 240 small cell lung cancer (SCLC), as well as in NSCLC patients, when stratified according to clinical stages. Although immune responses against some of these proteins have been associated with paraneoplastic neuronal disease (PND), none of the patients studied had neurological symptoms. While antibody titers to some antigens were very low compared to those associated with PND, Cox regression analysis shows them to predict better outcome, independent of stage, performance status and other confounding factors. The potential value of these proteins as cancer vaccine targets, and biomarkers in lung cancer is discussed.

H27) Cancer-Testis Genes are Coordinately Expressed in Response to Cancer Associated Genomic Hypomethylation and are Markers of Poor Outcome in Non-Small Cell Lung Cancer, Ali O. GURE, Woo Jung LEE, Ramon CHUA, Barbara WILLIAMSON, Mithat GONEN, Cathy A. FERRERA, Lloyd J. OLD, Yao T. CHEN, Nasser K. ALTORKI, *Ludwig Institute for Cancer Research, New York, NY; Memorial Sloan Kettering Cancer Center, New York, NY; Weill Medical College of Cornell University, New York, NY*

PURPOSE: Cancer-testis (CT) genes mapping to the X chromosome have common expression patterns and show similar responses to agents that induce hypomethylation of genomic DNA. We asked whether CT gene expression occurred coordinately, and whether it correlated with parameters of disease and clinical outcome of non-small cell lung cancer (NSCLC). We also evaluated the association of CT gene expression with known epigenetic abnormalities known to occur in tumors. **EXPERIMENTAL DESIGN:** Tumor tissue from 523 NSCLC patients undergoing surgery were evaluated for the expression of 9 CT genes (NY-ESO-1, LAGE-1, MAGEA1, MAGE-A3, MAGE-A4, MAGE-A10, CT7/MAGE-C1, SSX2 and SSX4) by semiquantitative PCR. Clinical data available for 447 patients were used to correlate CT expression to parameters of disease and clinical outcome. Genomic DNA from CT gene-expressing and non-expressing cell lines were compared for genomic methylation content as well as for hypermethylation of cancer associated genes. **RESULTS:** At least one CT gene was expressed by 90% of squamous carcino-

ma, 62% of bronchioloalveolar cancer and 67% of adenocarcinoma samples. Statistically significant co-expression was observed for 34 of the 36 possible CT combinations. CT gene expression, either cumulatively or individually, showed significant associations with male sex, smoking history, advanced tumor, nodal and pathological stages, pleural invasion and the absence of ground glass opacity. Cox regression analysis revealed the expression of NY-ESO-1 and MAGE-A3 as markers of poor prognosis, independent of confounding parameters for adenocarcinoma of the lung. Although CT expression was inversely associated with hypermethylation of some genes it was not related to an overall hypomethylation as reported earlier. **CONCLUSIONS:** CT genes are coordinately expressed in NSCLC and their expression is associated with advanced disease and poor outcome. CT genes are likely markers for selective hypomethylation in NSCLC at repeat elements and within CT genes.

H28) The in Vitro Analytical Interference of Drugs on Tests of Thyroid Function, Dr. Hatice ERBEYİN Dr. Gülsevım SAY-DAM, T.C. Yüksek İhtisas Research and Training Hospital, *Clinical Biochemistry Laboratory 06100 Ankara-Türkiye*

Many drugs may cause changes in the serum concentrations of the Triiodothyronine and the Thyroxine. It is important to know these changes in clinical thyroid state for the interpretation of thyroid function tests. Commonly prescribed drugs used for coronary artery disease, hypertension, congestive cardiac failure may result in abnormal thyroid function tests in the absence of clinical features of thyroid dysfunction. In this study, we aimed to determine the in vitro effect of drugs as Furosemid, Metoprolol, Acetyl Salisilic Acid, İsosorbit Dinitrat are used frequently in the therapy of the patients with coronary artery disease, hypertension and congestive heart failure on FT₃ and FT₄ tests which are measured by Electrochemiluminescence. We performed our study according to "Analytical Interference Evaluation Guide" of IFCC as in vitro. In our study no in vitro analytical interference was observed on FT₃ and FT₄ tests with therapeutic doses of Acetyl Salisilic Acid (300 mg/day), Metoprolol (100 mg/day), İsosorbit Dinitrat (60 mg/day) and in vitro analytical interference was observed on FT₃ and FT₄ tests with only therapeutic doses of Furosemid (40 mg/day) ($p < 0,01$). A nonlinear increase was found in FT₃ and FT₄ values with increased doses of Furosemid (10, 20, 40, 60, 80 mg/L) in vitro. As a result we found that Acetyl Salisilic Acid, Metoprolol, İsosorbit Dinitrat had no analytical interference effects on FT₃ and FT₄ tests and Furosemid had analytical interference effect on FT₃ and FT₄ tests and FT₃ and FT₄ values showed a nonlinear increase with increased doses of Furosemid in vitro.

INSTITUTIONAL PRESENTATIONS

11) Harran University - Sustainable Vision 2023,

Ugur Buyukburc, Ibrahim H. Mutlu, Bulent Yesilata,
Harran University, Turkey

The Harran University is committed to become a model of environmentally sustainable institution in the year 2023, which is the 100th year of the Turkish Republic. Very recently the university has initiated a foundation of the development program for its new Osmanbey Campus. The main objective is to be one of the sustainable university campuses in the world. The Osmanbey Campus is still in construction stage on 27 km² land. All the departments and units of the Harran University will be situated in this campus in near future. The first major phase of the Vision 2023-project-series is to incorporate advanced solar energy technologies in the Osmanbey Campus. In this poster presentation, we describe some past and present research activities accomplished at Harran University. The main emphasis is given to photovoltaic systems and their effective use in South East region of Turkey (GAP). We introduce here an ergonomically PV system rack with manually adjustable slope-angle and an economical data-acquisition card for testing and control of PV systems. Some results from our experimental measurements on PV-powered irrigation, PV-powered refrigeration and PV- fuel-cell system are also presented.

12) Towards a Knowledge-based Society in Turkey

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As industrial societies have been developing, first of all, share of capital and labor decreased among growth factors, and contribution of technology increased. With the further development, a new factor has emerged: Knowledge and Knowledge Creating... in more technical term: Intellectual Capital. Hence, humanity has moved from the stage of accumulating capital and goods to stage of accumulating knowledge. One of the most important key concepts of this change has been finding sustainable solutions to the problems. Societies, able to achieve this change, are called as sustainable societies, in other words responsible societies or information societies. Today, education and learning process is getting transformed into lifelong adventure interfering and becoming a united whole at home, school, business and wherever possible. The expectation of information society from its individuals is to become knowledge and technology literate and even science literate. As knowledge creation by processing information is getting more important; new environments are required to facilitate learning, to support deep learning by comprehension and to make learning process a pleasure. TÜBİTAK, TÜBA, The Chamber of Industry of Istanbul, Bogazici University, Istanbul Technical University, Yıldız Technical University, Marmara University... and a group of academicians, educators, businessmen, managers and artists who know the facts of the country and believe in necessity for strong and respectful role of Turkey in the emerging new civilization came together. They said that they couldn't suffice to know and express the facts and also had to do something. They decided not to expect everything from the government and thus established the Turkey Science Centers Foundation in September 1995. Vision: The vision of the Foundation is to enhance knowledge, skills and employability of Turkish citizens from all age groups; with

special emphasis on our youth; by contributing to the growth of interest in the society towards natural and social sciences, innovative and emerging technologies and rising Turkish industries in order to help the strengthening of our national economy and to facilitate a healthy social transformation towards a knowledge-based society. Objectives: 1) To establish Science Centers that will stimulate the desire for learning, the bliss of discovering and the 2) enthusiasm for experimenting. 3) To provide scientific forums for our society to present and discuss new information, discoveries, innovations 4) To complement educational programs for our schools by offering application and practical opportunities. Targets: 1) to run a prototype Science Center in Istanbul in Şişli, 2) to establish a national and contemporary Science Center in Istanbul with more than one million visitors capacity per year, 3) to guide and provide knowledge for science centers to be founded in other cities of Turkey, 4) to organize annual Science Festivals and celebrate throughout the country.

13) International Association of Educators: A New International Platform

Mustafa Koc, Mustafa Yunus Eryaman, Nihat Gurel Kahveci,
University of Illinois at Urbana-Champaign

International Association of Educators (INASED) was established in 2001 at the University of Missouri-Columbia and is currently registered as a non-profit academic organization in the State of Illinois. INASED aims to develop new pedagogies and alternative languages for the cross-cultural communication and understanding. The association provides the global communications spheres for its members from 12 different countries and 18 different universities in order to contribute to the world peace through dialogue and education. It promotes educational theory and practice worldwide through publications, conferences, cross-cultural activities, international projects, research, online networking and professional development. INASED publishes International Journal of Progressive Education, and Turkish Journal of Educational Policy Analysis and Strategic Research. It uses Community Inquiry Labs (CIL) designed at the University of Illinois at Urbana-Champaign, Department of Library and Information Science to provide its members worldwide communication. The presentation will include overview of activities and discussion of future developments.

14) International Journal of Progressive Education: Understanding Educational Inquiry

Nihat Gurel Kahveci, Mustafa Yunus Eryaman, Mustafa Koc,
University of Illinois at Urbana-Champaign

International Journal of Progressive Education (IJPE) is a peer-reviewed, interactive educational journal. IJPE takes an interdisciplinary approach to its general aim of promoting an open and continuing dialogue about the current educational issues and future conceptions of educational theory and practice in an international context. In order to achieve that aim, IJPE seeks to publish thoughtful articles that present empirical research, theoretical statements, and philosophical arguments on the issues of educational theory, policy, and practice. IJPE is published three times a year in four different languages; Chinese, Turkish, Spanish and English. IJPE is indexed in several major academic databases

including but not limited to EBSCO, DOAJ, WORLDCAT and ULRICH'S periodicals directories. IJPE uses Community Inquiry Lab (CIL), an interactive inquiry page developed by University of Illinois at Urbana-Champaign, to provide a virtual communication environment to its readers and members. In this presentation, we will provide an overview of the editorial policy and decision making process, and demonstrate past and future special issues.

15) Izmir University of Economics: Analyzed through Importance-Performance Analysis

Yurdal TOPSEVER, Alev KATRİNLİ, Gülem ATABAY, Gonca GÜNAY, Burcu GÜNERİ, Alp Giray KAYA,
Izmir University of Economics, Izmir

Izmir University of Economics is the first foundation university in Izmir and the Aegean Region as well as the first university in Turkey that is founded by an organization representing the business world, Izmir Chamber of Commerce. Since its foundation in 2001, the university developed at an enormous rate increasing the student number initially from 282 to about 5000 by increasing the number and variety of programs offered at both graduate and undergraduate levels including a PhD program in Business as well as providing students with newly served opportunities such as international exchange programs and the Embryonix Unit through which they are able to establish their own enterprises. Although these developments served as a positive signal regarding the path the university took, a scientific analysis of the customers' viewpoints were required. Hence, a research to explore the image of the university from the viewpoint of the potential customers was conducted to address this need. Data is collected from high school students, their advisors and their parents regarding the importance of a set of selected attributes concerning the image of universities and the performance of Izmir University of Economics on those attributes in addition to three other universities in the region. Collected data is analyzed through importance-performance analysis to create a roadmap that shows areas to concentrate on and to keep up good work besides areas of low importance and possible overkill. The results provide a picture of the current setting for strategy development for Izmir University of Economics in comparison with other universities in the region.

16) The Center of Knowledge and Innovation: METU-Technopolis

Mr. Ugur Yuksel,
General Manager of Middle East Technical University Technopolis

Nowadays the most powerful strategy for the development of countries is to use knowledge and innovation effectively. For the purpose of having a high national prosperity level, countries have to improve themselves by utilizing knowledge, innovation and technology. And it is obvious that the international collaborations have a tremendous role in progressing development and help to improve the level of knowledge and absorption of innovation. For these reasons Metutech; 1) Promotes and encourages 157 companies as regards research and technological development, 2) Builds platforms for synergy between hosting companies and international companies, 3) Hosts foreign companies within its territory, 4) Takes the role of a mediator between national and foreign companies for the purpose of knowledge, innovation and technology

exchange (by utilizing the 6th Framework Programs Projects), 5) Forms regional innovation strategies by taking advantages of the international collaborations.

17) Turkish American Scholars and Scientists, and Research Opportunities at Texas A&M University.

Tahir Cagin,
Department of Chemical Eng. Texas A&M University, College Station, TX

Texas A&M University is one of the largest state universities in USA. With about thirty Turkish-American professors, lecturers and scientific staff in its Faculty present great deal of opportunities in establishing collaborations with Turkish Universities and research organizations in Turkey. In this poster we present the research areas, existing projects and collaborations of each faculty member.

18) State-of-the-Art Testing Facility at Columbia University for use in Civil and Geoscience Engineering,

Ahmet Pamuk,
Columbia University, New York, NY, 10027

Currently, centrifuge physical modeling is considered to be a cost effective method for modeling and predicting the soil behavior as well as the behavior of various soil-structure systems in civil and geoscience engineering. The main principle in centrifuge modeling is that a 1/N scale model subjected to a gravitational acceleration of Ng (g is acceleration of gravity) experiences the same stress as the prototype. Thus, stress-strain relationships at all similar points in the model and prototype will be equivalent and the behavior of the model will mimic the behavior of the prototype. Consequently, with the help of scaling laws, measurements in centrifuge tests can be related directly to an equivalent full-scale prototype. Since 2004, the newest centrifuge facility has been in operation in the eastern US at the Department of Civil Engineering and Engineering Mechanics, Columbia University in the City of New York. The centrifuge machine is one of the largest centrifuges among the US universities. Having a 3 m-long radius with a 0.75 metric tone load carrying capacity, the centrifuge machine is capable of increasing the gravity up to 200 times. The facilities are available to other research institutions, universities and private companies in an effort to provide invaluable contributions in the earthquake, geo-environmental, geotechnical and geological engineering.

19) A Proposal for Research Collaboration Between the Center for International Health Services Research and Policy at Washington State University (WSU) and TASSA Scholars,

Fevzi Akinci, Ph.D., Joseph S. Coyne, Dr.P.H., *Center for International Health Services Research Washington State University, Spokane, Washington, USA*

This proposal aims to introduce the WSU Center for International Health Services Research and Policy (the Center) and areas of expertise to TASSA scholars, to foster future research collaboration. We propose that such a research collaboration will likely lead to funded international health services research projects and Fulbright Fellowship opportunities between the USA and Turkey. The Center was founded in March 2004 and is housed in a Carnegie Doctoral Research Extensive University at WSU. The

mission of the Center is to work with Ministries of Health, Public and Private Universities, and Research Centers to conduct international comparative analyses regarding health system priority areas identified by the Ministries of Health around the globe, with particular emphasis on low or middle-income countries, to improve health system performance and global health. The Center includes scholars from around the world that span the following wide range of international areas of expertise: 1) Financing of healthcare delivery including payment methodologies and development of national health insurance and policies, 2) Developing and restructuring healthcare delivery with a focus on primary and acute care health services including facilities mergers and acquisitions, 3) Health outcomes research and quality improvement including program evaluation (cost benefit and cost effectiveness analysis), 4) Health promotion and disease prevention directed towards cancer, diabetes, and heart disease, 5) Epidemiological study design, implementation, and monitoring including primary data collection and statistical analysis. For more information about research conducted at the Center, you may visit their Website at www.ihs.wsu.edu.

I10) National Science Foundation and Bioengineering Funding Opportunities, Semahat Demir, Ph.D., *Program Director, Biomedical Engineering & Research to Aid Persons with Disabilities (BME/RAPD), Division of Bioengineering and Environmental Systems, National Science Foundation (NSF), Arlington, VA, USA and Faculty of Biomedical Engineering Joint Biomedical Engineering Program Univ. of Memphis & Univ. of Tennessee Health Science Center Memphis, TN, USA*
Dr. Demir will present (1) the vision, mission, strategic goals and core strategies of NSF, (2) NSF's current priority areas, (3) a summary of different NSF Funding Opportunities for engineering and bioengineering, (4) Program of Biomedical Engineering & Research to Aid Persons with Disabilities (BME/RAPD) and (5) NSF Merit Review Criteria.

I11) Biomedical Engineering Institute at Bogazici University, Cengizhan Ozturk M.D. Ph.D. *Boğaziçi University, 34342 Bebek-Istanbul-Turkey*
The field of Biomedical Engineering has emerged as an important

profession in developed as well as developing countries and is concerned with the application of engineering technology and science methodology to the analysis of biological, physiological and health care problems. During the past several decades the medical profession has grown to depend increasingly on machines and sophisticated electronic instrumentation supported by elaborate clinical data processing procedures for the delivery of quality health care. As a response to these requirements the Biomedical engineers are responsible for producing high technology medical equipment and biological instrumentation, for devising new and efficient methods for physiological measurements, medical data processing and analysis, for developing prosthetic materials and artificial organs, and for introducing the suitable technological developments to the health care system. The Institute of Biomedical Engineering of Boğaziçi University was established in 1982 as an interdisciplinary graduate school in the field of Biomedical Engineering. The Institute of Biomedical Engineering is unique in Turkey and offers interdisciplinary instructional programs and research, leading to MS and Ph.D. degrees in three major areas, namely in Bioelectronics, in Biocybernetics and Biomechanics, and in Prosthetics and Artificial Organs. All classes are thought in English. From September 1982 to October 1992, the Institute had been receiving UNDP and UNESCO assistances in the framework of a development project, the consulting services, training programs and fellowships. The aim of the project was to support the activities of the Institute and strengthen its capacities in order to respond to the critical health care problems in Turkey, with the long-term objective of becoming a Regional Center for neighboring countries with similar problems. The Biomedical Engineering Institute has 13 full time faculty and over 130 graduate students actively involved research in dedicated labs for medical imaging, biophotonics, robotics, medical instrument calibration & quality assurance, psychophysics, cellular imaging & electrophysiology, biomedical instrumentation, biomedical signal processing and instrumentation. The Biomedical Engineering Institute is now a regional center for advanced biomedical research and is becoming a favorite spot for students and faculty who would like to visit Turkey or to start long term scientific collaboration. A solid bridge is already present between US and Turkey in the field of Biomedical Engineering.

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: visiting scholars@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.

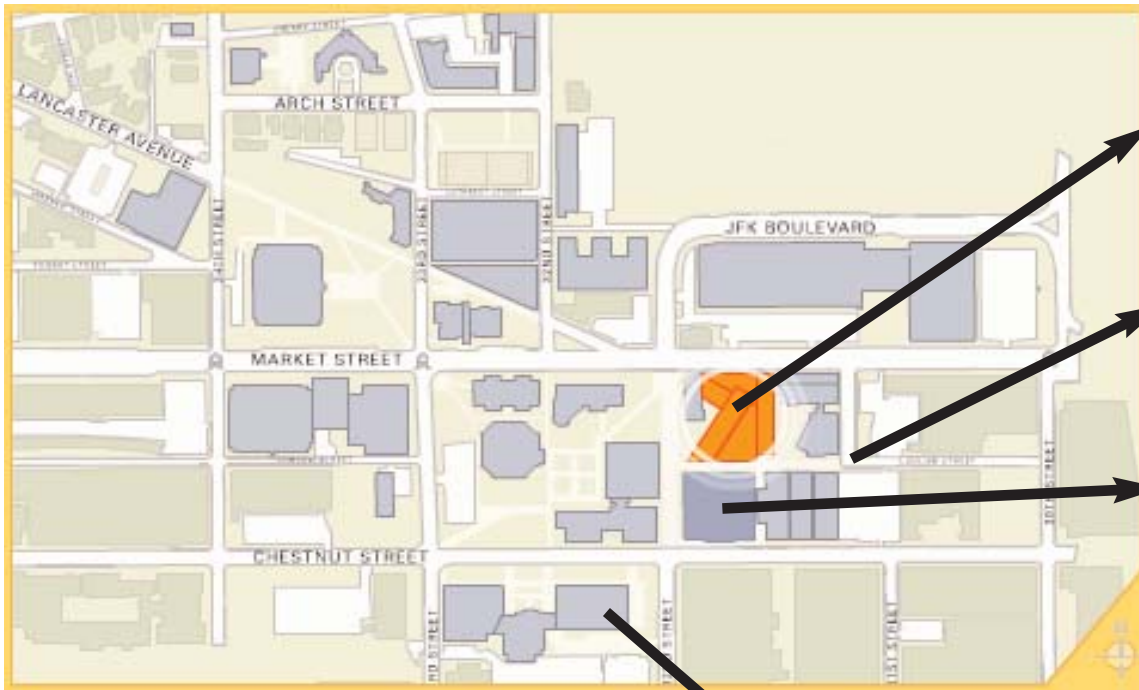
During its first year of existence, TASSA has attracted over 1200 registered members, practically all living in North America or Turkey. Membership is open to all scientists and scholars interested in the mission of TASSA, including students as "student members."

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

DIRECTIONS



Conference Center
"Bossone"

Parking

Friday Reception
"Main Building"

Saturday Reception
"Behrakis Hall Creese"



Attorney **Jeff Goldman** has represented hundreds of foreign scientists and engineers for U.S. Immigration and Permanent Residency matters. He is a frequent speaker at MIT, Harvard, Brown, and other universities, and concentrates in representing Chinese Nationals for Extraordinary Ability, National Interest Waiver, Outstanding Researcher, and PERM Labor Certification Matters.

Read Jeff's articles on immigration at *Science* magazine's online site.

CONTACT JEFF AT [JGOLDMAN@MINTZ.COM](mailto:jgoldman@mintz.com)

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