

3rd Southwest Energy Science and Engineering Symposium

April 27, 2013
Double Tree Hotel
600 North El Paso Street
El Paso, TX 79901

Department of Mechanical Engineering
College of Engineering
University of Texas El Paso
500 W. University Ave.
El Paso, Texas 79968
Phone: (915)-747-5450 Fax: (915)-747-5019
seses@utep.edu

Web Link: <http://engineering.utep.edu/seses/>

FOREWARD

Welcome to the Southwest Energy Science and Engineering Symposium sponsored by Shell. The purpose of the symposium is to encourage communication among the engineers and scientists in and around the El Paso area's universities and industries.

The following individuals and organizations are acknowledged for their assistance with the symposium.

Conference Chair: Dr. Ahsan Choudhuri
University of Texas El Paso

Program Chair: Dr. Evgeny Shafirovich
University of Texas El Paso

Logistics Committee: Carmen Medellin, University of Texas El Paso
Laura Orozco, University of Texas El Paso
Gloria Salas, University of Texas El Paso

Hosted By: College of Engineering
Department of Mechanical Engineering &
Center for Space Exploration and Technology Research (cSETR)
University of Texas El Paso

Welcome and Introduction: Dr. Richard Schoephoerster
Dean, College of Engineering
University of Texas El Paso

Session Chairs: Dr. Arturo Bronson, University of Texas El Paso
Dr. Jack Chessa, University of Texas El Paso
Dr. Bidhan Dam, Woodward
Dr. Thomas Davis, University of Texas El Paso
Dr. Vinod Kumar, University of Texas El Paso
Dr. Yirong Lin, University of Texas El Paso
Dr. Norman Love, University of Texas El Paso
Dr. Eric Petersen, Texas A & M
Dr. C.V. Ramana, University of Texas El Paso
Dr. Ishraq Shabib, University of Texas El Paso
Dr. Miguel Velez-Reyes, University of Texas El Paso

Keynote Lecture: Dr. John Rawls
Chief Scientist for Energy and Advanced Concepts
General Atomics

Southwest Energy Science and Engineering Symposium

UNIVERSITY OF TEXAS EL PASO

April 27, 2013

7:00 am	REGISTRATION	Double Tree Hotel	Main Lobby
8:00 am	BREAKFAST	Double Tree Hotel	Sky Lounge
8:00 am	OPENING NOTES	Dr. Ahsan Choudhuri Professor and Chair, Department of Mechanical Engineering University of Texas El Paso	Sky Lounge
8:05 am	WELCOME	Dr. Richard Schoephoerster Dean, College of Engineering University of Texas El Paso	Sky Lounge
8:30 am	BREAK		
8:45 am	PARALLEL TECHNICAL SESSIONS I		
	Session 1-A	Advanced Power Generation Systems	Room: Salon I
	Session 1-B	Heterogeneous Combustion and Energetic Materials	Room: Salon II
	Session 1-C	Coatings and Nanocomposites	Room: Salon III
	Session 1-D	Energy Storage and Sustainability	Room: Discovery
	Session 1-E	Solid Mechanics: Measurements	Room: Voir Dire
	Session 1-F	Combustion, Oxidation, and Pavement Distresses	Room: Justice
10:00 am	BREAK		
10:15 am	PARALLEL TECHNICAL SESSIONS II		
	Session 2-A	Gas Flames	Room: Salon I
	Session 2-B	Rocket Propulsion	Room: Salon II
	Session 2-C	Nanofilms and nanowires	Room: Salon III
	Session 2-D	Photovoltaics and Smart Grid	Room: Discovery
	Session 2-E	Solid Mechanics Modeling	Room: Voir Dire
11:30 am	LUNCH		Sky Lounge
12:15 pm	KEYNOTE LECTURE		Sky Lounge
		Dr. John Rawls Chief Scientist for Energy and Advanced Concepts General Atomics	
1:00 pm	ADJOURN		

ABOUT THE SPEAKER

John Rawls received his doctorate in physics from Brandeis University and served on the faculty of the Physics Departments at Yale University and the University of California, San Diego prior to joining the fusion research program at General Atomics.

Among his technical accomplishments at General Atomics (GA) are: conceiving of the DIII-D tokamak, now the nation's premier magnetic fusion research vehicle; spearheading the development of the linear motor -based technology development that is now slated to replace steam catapults on aircraft carriers; and productizing a Sandia-based concept for a compact, exceptionally high resolution synthetic aperture radar, now in use on four continents.

After serving in a variety of management positions, including CEO of GA Electronic Systems Inc., he has returned to his scientific roots in his present position as Chief Scientist for GA's Energy and Advanced Concepts group.



PARALLEL TECHNICAL SESSIONS I

Session 1-A: Advanced Power Generation Systems Session Chair: Vinod Kumar, UTEP		Room: Salon I Double Tree El Paso
8:45 am	Investigation on Size and Sphericity measurements of Non-Spherical Particles <i>M.R.H Sarker, R.R. Chowdhury, N. Love, A. Choudhuri UTEP</i>	
9:00 am	Computational Fluid Dynamics Using a Two Fluid Model to Predict Pressure Drop in a Fluidized Bed <i>R.R. Chowdhury, M.R.H Sarker, N. Love, A. Choudhuri UTEP</i>	
9:15 am	Development of the Control and Ignition Systems for a High Pressure Gas Turbine Combustor <i>S. Hossain, S. Maldonado, S. Sarker, C.A. Valdez, N. Love, A. Choudhuri UTEP</i>	
9:30 am	Design of Novel and Effective Thermal Control Systems <i>S. Sandoval, N. Love UTEP</i>	
Session 1-B: Heterogeneous Combustion and Energetic Materials Session Chair: Eric Petersen, Texas A & M		Room: Salon II Double Tree El Paso
8:45 am	Combustion Synthesis and Densification of $\text{MoSi}_2\text{-Mo}_5\text{Si}_3$ Composites <i>M.S. Alam, E. Shafirovich UTEP</i>	
9:00 am	Towards Better Combustion of Lunar Regolith with Magnesium <i>A. Delgado, E. Shafirovich UTEP</i>	
9:15 am	Combustion of Activated Aluminum with Water <i>A.K. Narayana Swamy, E. Shafirovich UTEP</i>	
9:30 am	Nanocomposite and Mechanically Alloyed Reactive Materials as Energetic Additives in Gas Generators <i>M.A. Machado, D.A. Rodriguez, E.L. Dreizin, E. Shafirovich UTEP and New Jersey Institute of Technology</i>	
9:45 am	Hybrid Rocket Burning Rate Enhancement by Nano-Scale Aluminum Additives in HTPB Fuel Grains <i>J.C. Thomas, J.D. DeSain, B. Brady, E.L. Petersen Texas A&M University and the Aerospace Corporation</i>	
Session 1-C: Coatings and Nanocomposites Session Chair: C.V Ramana, UTEP		Room: Salon III Double Tree El Paso
8:45 am	Thermal Barrier Coatings (TBC's) for High Heat Flux Thrust Chambers <i>C. Bradley, C.V. Ramana, A. Choudhuri UTEP</i>	
9:00 am	Phase Evolution and Thermal properties of Ytria-Stabilized Hafnia Nano-coatings Deposited on Alumina <i>E.J. Rubio, C.V. Ramana UTEP</i>	
9:15 am	Fabrication of Barium Titanate Nanocomposite for Dielectric Capacitor <i>M. Rajib, A.I. Shuvo, H. Karim, Y. Lin UTEP</i>	
9:30 am	Concept and Model of a Piezoelectric Structural Fiber for Multifunctional Composites <i>L. Vera, Y. Lin, UTEP</i>	
9:45 am	Development of Metamaterial Based Passive Wireless Temperature Sensor <i>H. Karim, M.A.I. Shuvo, M. Rajib, D. Delfin, Y. Lin, R.C. Rumpf, UTEP</i>	

PARALLEL TECHNICAL SESSIONS I

Session 1-D: Energy Storage and Sustainability Session Chair: Thomas Davis, UTEP		Room: Discovery Double Tree El Paso
8:45 am	Computational Analysis of Flow Distribution for a One Tank Thermal Energy Storage System <i>A. Cabral, S. Afrin, V. Kumar, UTEP</i>	
9:00 am	Numerical Analysis of Total Energy Storage of Nanofluidized Heat Transfer Fluid In Thermocline Thermal Energy Storage System <i>A. Rios, J. Ortega, V. Kumar, UTEP</i>	
9:15 am	Numerical Analysis of Total Energy Storage of Nanofluidized Heat Transfer Fluid in Thermocline Thermal Energy Storage System <i>M. Chaidez, S. Afrin, V. Kumar, UTEP</i>	
9:30 am	Initial Exploration of Machine Learning to Predict Customer Demand in an Energy Market Simulation <i>J. Parra, C. Kiekintveld, UTEP</i>	
9:45 am	Recycling Sodium Chloride: Reducing Cost and Making the Environment Safe <i>A.A. Yetayew, T. A. Davis, UTEP</i>	
Session 1-E: Solid Mechanics: Measurements Session Chair: Ishraq Shabib, UTEP		Room: Voir Dire Double Tree El Paso
8:45 am	Mechanical Property Degradation of Marine Composites Inside Sea Water <i>M. Flores, UTEP</i>	
9:00 am	Measuring Thermal Strain in Asphalt Concrete Based on Field Instrumentation <i>M.R. Islam, R.A. Tarefder, University of New Mexico</i>	
9:15 am	Determining Fatigue Endurance Limit of HMA using Four-Point Bending Beam Apparatus <i>G. Barlas, R.A. Tarefder, University of New Mexico</i>	
9:30 am	Resilient Modulus Test of Lime Stabilized Subgrade Soil <i>M.T. Rahman, R.A. Tarefder, University of New Mexico</i>	
Session 1-F: Combustion, Oxidation, and Pavement Distresses Session Chair: Arturo Bronson, UTEP		Room: Justice Double Tree El Paso
8:45 am	Effect of Partial Premixing Level on Turbulent Flame Kernel <i>D. Mohamed, A.M. Elbaz, M. Mansour Cairo University and Helwan University</i>	
9:00 am	High Velocity Oxy-Fuel Thermal Spraying Techniques <i>L.A. Cabrera, D. Mohamed, N. Love, A. Choudhuri UTEP</i>	
9:15 am	Modeling of Oxidation Kinetics Utilizing Level Set Method <i>M. Flores, J. Chessa, UTEP</i>	
9:30 am	Evaluating the Effect of Air Voids on Pavement Distresses Using MEPDG <i>M. Ahmad, R.A. Tarefder, University of New Mexico</i>	
9:45 am	Evaluating the Effect of HMA Thickness on Pavement Distresses Using MEPDG <i>U. A. Mannan, R.A. Tarefder, University of New Mexico</i>	

PARALLEL TECHNICAL SESSIONS II

Session 2-A: Gas Flames		Room: Salon I
Session Chair: Bidhan Dam, Woodward Aerospace		Double Tree El Paso
10:15 am	Flashback Model for Oxy-methane Flames Using Calculated Critical Velocity Gradients <i>M. De La Torre, B. Dam, N. Love, A. Choudhuri, UTEP</i>	
10:30 am	Effects of CO₂ Recirculation Ratio on Radiative Heat Release Factor of Premixed Oxy-Syngas Flames <i>A.R. Chowdhury, M. De La Torre, N. Love, A. Choudhuri, UTEP</i>	
10:45 am	Ignition Delay Time Measurements of Acetylene-Air Mixtures at Elevated Temperatures and Pressures <i>J.E. Vivanco, O. Mathieu, E.L. Petersen, Texas A&M University</i>	
11:00 am	Turbulent Flame Speed Measurements of Hydrogen/Carbon Monoxide (Syngas) Mixtures <i>S. Ravi, E.L. Petersen, Texas A&M University</i>	
11:15 am	Laser Absorption Measurements of CO behind Reflected Shock Waves <i>A. Camou, J.E. Vivanco, E. L. Petersen, and D. Cusano, Texas A&M University</i>	
Session 2-B: Rocket Propulsion		Room: Salon II
Session Chair: Norman Love, UTEP		Double Tree El Paso
10:15 am	Automated Controls and Data Acquisition for Remote Operation of Propulsion System Performance Evaluations <i>G. Martinez, A. Vargas, M.A. Ingle, A. Choudhuri, UTEP</i>	
10:30 am	Thrust Measurement and Propellant Feed System Development for Testing LOX/Methane Reaction Control Thrusters <i>J.L. Mena, A. Acosta-Zamora, A. Choudhuri, UTEP</i>	
10:45 am	An Experimental Evaluation of a Torch Ignition System for Propulsion Research <i>L. Sanchez, V. Dorado, R. Ellis, A. Choudhuri, UTEP</i>	
11:00 am	Design and Operation of a 3rd Generation Methane Condensing System <i>A. Trejo, M. Galvan, A. Trujillo, A. Choudhuri, UTEP</i>	
11:15 am	Experimental Investigation on the Transient and Steady State Heat Transfer Characteristics of Liquid Methane <i>A. Trejo, M. Galvan, A. Trujillo, A. Choudhuri, UTEP</i>	
Session 2-C: Nanofilms and Nanowires		Room: Salon III
Session Chair: Yirong Lin, UTEP		Double Tree El Paso
10:15 am	The Effect of Lead-Free Nanowire Fillers in Dielectric Capacitors <i>D. Delfin, M. Mendoza, M.A.R. Khan, M.A.I. Shuvo, A. Guerrero, Y. Lin, UTEP</i>	
10:30 am	Flexible Nanowire Hybrid Super-capacitor for Energy Storage <i>M.A.I. Shuvo, M. Rajib, H. Karim, P. Morton, Y. Lin, UTEP</i>	
10:45 am	The Effect of Growth Temperature on Nanocrystalline HfO₂ Thin Films <i>M. Vargas, C.V. Ramana, UTEP</i>	
11:00 am	Titanium Doped WO₃ Thin Films for Photovoltaic Devices <i>A.P. Gutierrez, T. Wilson, C.V. Ramana, UTEP</i>	
11:15 am	Tungsten Oxide (WO₃) Nanowire Growth for Application in Photovoltaic Devices <i>T. Wilson, A. Gutierrez, Y. Lin, C.V. Ramana, UTEP</i>	

PARALLEL TECHNICAL SESSIONS II

Session 2-D: Photovoltaics and Smart Grid		Room: Discovery
Session Chair: Miguel Velez Reyes, UTEP		Double Tree El Paso
10:15 am	Cyber Security Appliances for Smart Grid Security <i>P. Rangel, R. Price, R. Martinez, UTEP</i>	
10:30 am	A Hybrid Intelligent Method for Predicting Power Output of Solar PV System <i>S.T.S. Madhira, P. Mandal, A. Haque</i> <i>UTEP and Montana State University</i>	
10:45 am	Application of Photosensitive Renewable Energy Devices (Photovoltaic cells) for Targeted Therapeutic Delivery <i>T.-L. Tseng, J. Rodriguez-Devora, M.K. Bhuyan, UTEP</i>	
11:00 am	Nonlinear Optical Microscopy in Energy Research <i>J.N. Rivera, B. Cao, C.B. Honsaker, C. Li, UTEP</i>	
Session 2-E: Solid Mechanics: Modeling		Room: Voir Dire
Session Chair: Jack Chessa, UTEP		Double Tree El Paso
10:15 am	Investigation of Irradiation Induced Damage of Fe-Cr Alloy via Molecular Dynamics Simulation <i>S. De La Rosa, I. Shabib, UTEP</i>	
10:30 am	Molecular Dynamic Simulation Approach to Determine Impacts of Moisture Inclusion in Asphalt Binder <i>J. Pan, M. Hossain, R.A. Tarefder, University of New Mexico</i>	
10:45 am	Cluster and Discriminant Analysis on Adhesion and Cohesion Force of Asphalt <i>S. Ahsan, R. A. Tarefder, University of New Mexico</i>	
11:00 am	Moisture Sensitivity at Matrix-Aggregate Interface Region <i>M. Hossain, R.A. Tarefder, University of New Mexico</i>	
11:15 am	A Heterogeneous Multiscale Model for Solid Deformation in Porous Media <i>P. Delgado, V. Kumar, UTEP</i>	



Department of Mechanical Engineering | Engineering Annex, Suite 126
The University Of Texas At El Paso | 500 W. University Avenue | El Paso, Tx. 79968-0521
Ph (915) 747 5450 | Fax (915) 747 5019 | [Http://me.utep.edu/](http://me.utep.edu/)
Mechanical@utep.edu | Meug@utep.edu | Megrad@utep.edu