



**The American Society of
Mechanical Engineers**

Central Oklahoma Section Newsletter
Volume 4, Number 6, February 6, 2003

The Section is located at: Oklahoma
Engineering Center, 201 Northeast 27th
Street, Oklahoma City, OK 73105

The Central Oklahoma Section Newsletter is
nominally published nine times per year to
convey monthly meeting dates, meeting topics,
section activities, and/or other ASME
information to its membership.

***** Announcement: February All Engineering Societies Banquet Meeting *****



Speaker: Captain Gary F. Chavez, ASC/YFAAT
“U.S. Air Force’s F22 ‘RAPTOR’ Fighter Program”

Tuesday, Feb. 18 Tinker Air Force Base Officers Club

No fighter in the world comes close to matching the F/A-22 developed by Lockheed Martin Aeronautics Company. By every measure, the Raptor represents extraordinary breakthroughs in maneuverability, stealth, sensor fusion – a wealth of parameters that define a new era in fighter capability.

The origins of the F/A-22 can be traced to the early 1970s, when the U.S. Air Force began studying concepts for replacement of its F-15 air superiority fighter. This became a formal Advanced Tactical Fighter (ATF) program in October 1985. The simple fact: New air and ground threats were looming that the F-15 would not be able to counter.

Now these threats will be defeated by the highly lethal and survivable F/A-22, with its balance of increased speed and range, enhanced offensive and defensive avionics, and reduced observability. The design of the F/A-22 also emphasizes reliability and maintainability of systems.

The F/A-22 is capable of flying and fighting against the most advanced integrated radar networks and dense surface-to-air missile environments in the world. Under the Air Force’s *Global Strike Task Force* initiative, the F/A-22 Raptor enables successful air-land operations, both now and into the future, by its preeminent ability to detect and destroy enemy fighters as well as attack high-value ground targets with precision weapons.

See page 2 for more information on Captain Chavez’ presentation and a map to the Tinker Air Force Base Officers Club. Make plans to attend this event on February 18! Bring a technically minded youngster along!

Joint Engineering Societies Banquet Schedule and Ticket Information

Time: 6:30PM Social Hour; 7:00PM Banquet Dinner; 8:00PM Program and Awards

Tickets Price is \$18.00 each and are available at the Oklahoma Engineering Foundation office, 201 NE 27th Street, Room 125, OKC; Phone 405-528-1435. PLEASE MAKE CONTACT FOR TICKETS ASAP.

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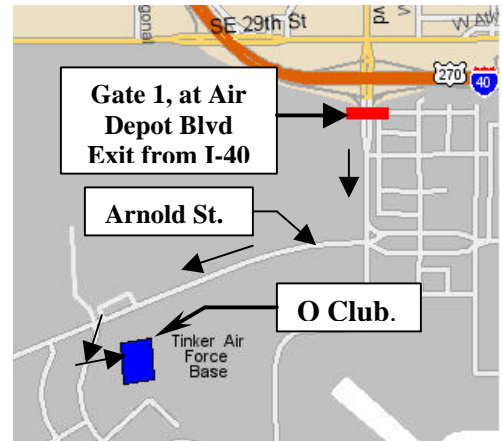
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Additional February Meeting Information

Our speaker, **Captain Gary F. Chavez** is the Avionics Flight Test Lead/Project Engineer for the F/A-22 System Program Office in the Aerospace Systems Center at Wright Patterson AFB, OH. He is responsible for overseeing several avionics programs for the Air Force's newest fighter aircraft including the F-22 Air Combat Simulator, avionics flight tests, and ground-attack munitions. Capt Chavez holds Level II certifications in Test and Evaluation. He is currently working on his Aerospace Engineering Master's degree through the University of Alabama, Tuscaloosa.

He received a Bachelor's degree in Aerospace Engineering with a minor in English from the University of California at Davis in 1993. In 1996, Capt Chavez attended Officer Training School, Maxwell AFB, AL, and received his commission.

Capt Chavez became a Mechanical and Structural engineer at the C-5 System Program Office at Kelly AFB, responsible for the sustainment of the 126 aircraft C-5 Galaxy fleet. His efforts supported many operations including Operation Determined Falcon in Kosovo. At Kelly, Capt Chavez also received training in Aircraft Battle Damage Repair (ABDR) Engineer, learning to repair battle damaged aircraft in the field.



Map to Tinker AFB Officers Club

NATIONAL ENGINEERS WEEK 2003: NEW TALENT AND FRESH FACES

Oklahoma National Engineers Week Events



Engineering Fair: The Oklahoma Engineering Foundation sponsored *Engineering Fair* offers 6th-12th grade students approximately 250 **hands on** science and engineering related exhibits. In addition are a number of booths and displays of engineering and technical societies and engineering colleges. Students may also enter a number of engineering related contests, and interact with professionals about the wide range of engineering and technical careers. **The Engineering Fair will be held Wednesday, February 19, 2002, 9:00 a.m. to 3:00 p.m., at the Omniplex, N.E. 52nd Street @ Martin Luther King Blvd, Oklahoma City.**

➡ **Our Central Oklahoma ASME Section will once again sponsor the Rubber Band Powered Car Contest** at the Engineering Fair. **Volunteers are needed to help** with student registration, organization, rules enforcement, distance measurement, etc. **Contact Wendell Cavin**, (405) 291-5586, to volunteer or for more information. **Contact Alicia Helsley**, Oklahoma Engineering Center, (405) 528-1435, for other Engineering Fair information. ⬅

All Engineering Societies Banquet: The annual Engineers Week Banquet will serve as our February ASME Central Oklahoma Section meeting. See Page 1 and the column above for more information about this event.

Central Oklahoma Section Awards

The executive committee has established six (6) awards to recognize the section and student members who are making outstanding contributions to their section or the profession of mechanical engineering. Recipients of these awards will be recognized at the April 24th Central Oklahoma Section Meeting.

Outstanding Engineer Award – To be presented for outstanding professional and technical organization activities and achievements. Also considered will be community and civic activities along with awards received. The nominee must be a member of ASME.

Minority and Women Engineer-of-the-Year Award – To be presented for outstanding professional and technical activities by a minority or woman engineer. In addition, community and civic activities will be considered as well as awards received. The nominee must be a member of ASME.

Outstanding Engineer-in-Management Award – To be presented to the engineering manager deemed by the nominator to have done an outstanding job in furthering the goals of ASME and the engineering profession. The ability to select and develop engineers as well as to communicate with and motivate engineers will enter into the selection of awardee. The nominee must be a member of ASME.

Outstanding ASME Student Member Awards – Four awards will be made in recognition of academic achievement and outstanding service to an ASME student section. The Jerald D. Parker Award will be awarded at Oklahoma Christian University; the James H. Boggs Award will be awarded at Oklahoma State University/MAE; the Tom J. Love Award will be awarded at the University of Oklahoma; and an Outstanding Student Award will be awarded at Oklahoma State University/MET.

For application and/or additional information contact: **Ed Reynolds**, 6507 N.W. 96th Street, Oklahoma City, Ok. 73162, Phone: (405) 721-6753, E-mail: edwin_c_reynolds@yahoo.com. ® **Nomination deadline is March 21, 2003** →

The 23rd annual Oklahoma AIAA/ASME Symposium will be held at the Sarkeys Energy Center on the University of Oklahoma campus in Norman on Saturday, March 8, 2003 (see accompanying map for directions and parking information). The purpose of the symposium is to encourage communication among engineers of Oklahoma's universities and industries. The Symposium encourages the widest possible participation, as evidenced by the tentative list of presentations included here. You are invited to attend the Symposium even if you are not a presenter. Following welcoming remarks, about 50 presentations will be offered throughout the morning in parallel technical sessions. Presentations are scheduled for 15 minutes including questions and answers. A detailed schedule is provided on the next page.

After presentations, the participants will walk over to the Oklahoma Memorial Union for Lunch at 12:15pm. The luncheon address will be presented by Mr. Carl Michael Smith, Assistant Secretary of Energy for Fossil Energy. Mr. Smith is the primary policy advisor to the Secretary of the U.S. Department of Energy on issues involving federal coal, oil, and natural gas programs, including extensive research and development efforts in those areas. He shall make his presentation on National Energy Policy.

The registration fee is \$25 for professionals and \$10 for students. Registration includes morning snacks, lunch, and Symposium Proceedings with presentation abstracts. For further information, please contact conference co-organizers Professor Ajay K. Agrawal (aagrawal@ou.edu, 405-325-1754) or Professor Kumar Parthasarathy (rparthasarathy@ou.edu, 405-325-1735). Updates and additional information is available at the Symposium website: <http://www.coe.ou.edu/ame/symposium>.

Tentative Symposium Event Schedule

<u>Time</u>	<u>Activity</u>	<u>Location</u>
8:30 am	REGISTRATION Sarkeys Energy Center	Entry to Room A235
9:00 am	INTRODUCTION Dr. S. R. Gollahalli Director, School of Aerospace and Mechanical Engineering, OU	Room: A235
9:05 am	WELCOME Dr. W. Arthur "Skip" Porter Dean, College of Engineering, The University of Oklahoma	Room: A235
9:15 am	PARALLEL TECHNICAL SESSIONS	
	Session 1-A Experimental Fluid Dynamics	Room: M204
	Session 1-B Aerodynamics/Aerospace Systems	Room: N202
	Session 1-C Solid Mechanics I	Room: N202A
	Session 1-D Design and Controls I	Room: P201
	Session 1-E Heat Transfer/Combustion I	Room: P203
	Session 1-F Systems Analysis/Training	Room: P207
10:35 am	BREAK WITH REFRESHMENTS	
10:50 am	PARALLEL TECHNICAL SESSIONS	
	Session 2-A Computational Fluid Dynamics	Room: M204
	Session 2-B Fluid Dynamics	Room: N202
	Session 2-C Solid Mechanics II	Room: N202A
	Session 2-D Design and Controls II	Room: P201
	Session 2-E Heat Transfer/Combustion II	Room: P203
	Session 2-F Bioengineering	Room: P207
12:15 pm-2:00pm	LUNCH and LUNCHEON ADDRESS Oklahoma Memorial Union, Scholars Room (walk west through the parking lot between Jenkins and Asp Ave.; Oklahoma Memorial Union is across from Felgar Hall on Asp Avenue)	

Luncheon Speaker: Mr. Carl Michael Smith (Assistant Secretary of Energy for Fossil Energy) served as Oklahoma's Secretary of Energy and as president of the Oklahoma Petroleum Association. He was a member of the Oklahoma Energy Resources Board and is a member of the Oklahoma Bar Association. A native of Oklahoma, Mr. Smith is a graduate of the University of Oklahoma College of Law.

Tentative Technical Session Roster as of February 5, 2003

9:15 a.m.

Session 1-A: Experimental Fluid Dynamics

"Third Stream" Eductor Flow Control, D. Nickoley, Oral Roberts University, Tulsa.

Effect of Solid Particle Distribution on Erosion in Annular Multiphase Flow, Q. Mazumder, S.A. Shirazi, and B.S. McLaury, The University of Tulsa, Tulsa.

Effects of Liquid Viscosity on Submerged Gas Injection from a Free-Standing Tube in Microgravity, R.A. Koepp, R.N. Parthasarathy, and S.R. Gollahalli, The University of Oklahoma, Norman.

Analysis of Flow Structure in Momentum Dominated Helium Jets, B.S. Yildirim and A.K. Agrawal, The University of Oklahoma, Norman.

Session 1- B: Aerodynamics/Aerospace Systems

Aerodynamics System Identification, C. R. O'Neill, Oklahoma State University, Stillwater.

Current State of Reusable Launch Vehicle Technology, D. Tuckness, The University of Oklahoma, Norman.

Challenges of Airborne Open Port Optical Systems, J. A. Kidd, Aeromet, Inc, F5 Division, Tulsa.

The Road to a Dedicated Aerospace Vehicle Design Knowledge-Based System, B. Chudoba, The University of Oklahoma, Norman.

Session 1- C: Solid Mechanics I

Measurement of Complex Creep Compliance Using Nanoindentation, G. Huang, B. Wang and H. Lu, Oklahoma State University, Stillwater.

Isolation of Mechanical Vibration: A Nonlinear Torsional Flexible Coupling, S. Wu and C. W. Bert, The University of Oklahoma, Norman.

Tension in Fluttering Flags, P.M. Moretti, Oklahoma State University, Stillwater.

Comparative Results for Rectangular Plates with Nonlinearly Distributed In-Plane Loading, C. W. Bert and K. K. Devarakonda, The University of Oklahoma, Norman.

Session 1-D: Design and Controls I

Design of HVOF Sprayed Tungsten Carbide Coatings for Best Sliding Wear and Fatigue Life Characteristics, R.V. Isaac, J.R. Shadley, and E.F. Rybicki, The University of Tulsa, Tulsa.

Performing Finite Element Analysis on a Family of Products, J. Ninan and Z. Siddique, The University of Oklahoma, Norman.

Semi Tractor Accessibility Device, E. Hara, M. Murrow, and J. Yates, Oklahoma State University, Stillwater.

Creating Parametric Solid Models from Point Cloud Scans of Physical Source Parts, D. C. Gibson and K-H. Chang, The University of Oklahoma, Norman.

Session 1-E: Heat Transfer/Combustion

Dehumidifier Design, N. Bernklau and J. Dingman, Oral Roberts University, Tulsa.

Evaporation of Liquid Spray in Porous Media: A Numerical Study, P. Chendhil and S.R. Gollahalli, The University of Oklahoma, Norman.

Tests for Soil Thermal Conductivity in Geothermal Heat Pump Applications, R. A. Beier, Oklahoma State University, Stillwater.

Comparison of Flame Stabilization Techniques for Lean Premixed Combustion of Natural Gas, J. Kelly and A.K. Agrawal, The University of Oklahoma, Norman.

Session 1-F: Systems Analysis/Training

The Application of LEAN to Aircraft Maintenance: A Case Study from the Tinker Air Logistics Center, L.A. Deaton and D.L. Shirley, The University of Oklahoma, Norman.

Web-based Training for Tinker Air Force Base, K. Gramoll, H. Wen, C. Nisagorsen, W-S. Wun, The University of Oklahoma, Norman.

----- 10:50 a.m. -----

Session 2-A: Computational Fluid Dynamics

Accelerating Computational Fluid Dynamics Based Aeroelastic Predictions Using Distributed Processing, A. Boeckman, Oklahoma State University, Stillwater.

Computational Analysis of Buoyancy-Induced Instability in a Helium Jet, K.S. Pasumarthi, A.K. Agrawal, and R.N. Parthasarathy, The University of Oklahoma, Norman.

Numerical Study of Mixing Patterns in Intersecting Corrugated Channels using Computational Fluid Dynamics, S.Y. Dhumal and G.L. Foutch, Oklahoma State University, Stillwater.

Session 2-B: Fluid Dynamics

Accurate Full-Bore Acoustic Densometer for use with Proppant-Laden Stimulation Fluids at High Pressures, J. R. Birchak, C. M. Vickery, and R. G. Morgan, Halliburton Energy Services, Houston, Texas and Duncan, Oklahoma.

Instabilities in Fluid Flows Due to Body Forces, J. Matsson, Oral Roberts University, Tulsa.

Effects of Mean Velocity Profile on the Temporal Instability of a Gas Jet Injected into a Liquid, M. Bhattacharya and R. N. Parthasarathy, The University of Oklahoma, Norman.

Linear Fluid Stability, J. Jones, Oral Roberts University, Tulsa.

Session 2-C: Solid Mechanics II

Thermal Bending of an Infinite Elastic Plate with a Circular Hole, R.P. Kunapuli and C.W. Bert, The University of Oklahoma, Norman.

New Paradigms in Damage Repair of Composite Materials: Autonomic Healing, M.R. Kessler, Oklahoma State University, Stillwater.

Session 2-D: Design and Controls II

Using Web-based Technologies to Automatically Generate CAD Models from User Specifications in Real Time, K. Boddu and Z. Siddique, The University of Oklahoma, Norman.

Design Parameterization for CAD-Based Mechanism Optimization, S-H. Joo and K-H. Chang, The University of Oklahoma, Norman.

Golden Eagle One, S. Nelson and S. Lay, Oral Roberts University, Tulsa.

Reverse Engineering and Redesign of E-3 Torque Tube, I. Bryant IV and K-H. Chang, The University of Oklahoma, Norman.

Session 2-E: Heat Transfer/Combustion II

Fuel Composition Effects on the Flowfield of a Lean Premixed Swirl-Stabilized Combustor, D. Wicksall and A.K. Agrawal, The University of Oklahoma, Norman.

Combustion of Kerosene Fuel using Porous Inert Media, R. Heatly, T.L. Marbach, and A.K. Agrawal, The University of Oklahoma, Norman.

Session 2-F: Bioengineering

Flow and Pressure Measurements in a Human Tracheobronchial Airway Model Under Cyclic Flow Conditions, O.A. Pulat, R.N. Parthasarathy, and M. C. Altan, The University of Oklahoma, Norman.

Chair's Corner

Dear ASME-Central Oklahoma Section Members:

At most of our meetings I usually have the chance to speak to many of you—I'm always interested in the varied occupations and experience of our Section's members. However, the attendance at last month's meeting (72) made that all but impossible. I would like to be placed in the same predicament at future meetings and hope their topics generate as much interest as **Renewable Energy and Sustainability** did. Few individuals, however, are as qualified to present the issues involved in such an interesting format as did our Distinguished Lecturer, **Mr. Ian Arbon**. We would also like to thank **Mr. Arbon** for indulging us by giving a presentation at the University of Oklahoma on the last day of his lecture tour, where 44 attended. As promised, Mr. Arbon's lecture was thought provoking. It noted that many of the challenges in moving towards more sustainable energy systems and renewable resources seem to be political as well as technological. As proud as I am of American ingenuity, one of the presentation's points is that it's not applied in this area as much as it should be. **Bergey Windpower**—an Oklahoma based company filling a need for small-to-medium scale energy generation market—is a notable and encouraging exception. However, in general we have missed many opportunities in advancing the technology for renewable energy, thus handing the baton to our European colleagues and the companies they work for.

It's my hope that the next generation of engineers will see the issues presented in our last meeting for the golden opportunities they are and are willing to tackle them with enthusiasm. In that regard, **I would like to remind everyone of the upcoming events during National Engineers Week**. Your participation, if only to promote or attend some the events, may encourage many of today's K-12 students to seriously consider engineering as their vocation. Creativity has been the hallmark of our nation since its inception. However, like anything worthwhile, it must be consistently and carefully cultivated. The **Engineering Fair**, on February 19th, contributes significantly towards this goal and depends on the volunteers who organize and run its activities. **If you have some spare time you are encouraged to contact the Oklahoma Engineering Foundation for more information**. Besides the Engineering Fair, a **Joint Engineering Societies Banquet** is scheduled for February 18th, beginning at 6:30 pm. All activities are listed in this Newsletter and on the February calendar link in our Section's web site, at the following URL: www.asme.org/sections/CentralOK/. Just follow it and click on the top arrow keys to navigate the calendar.

A final note: since last month's presentation lasted two hours, all PEs requesting CE credit will receive 2.0 PDHs.

Hope to see you at the Banquet on Tuesday, the 18th of February.

Frank Parker – Chair

HAS YOUR ASME MEMBERSHIP SLIPPED?

If your ASME membership has not yet been renewed – DO IT NOW! Your Central Oklahoma Section is diligently working to retain all current members and striving to attract new members. Our Section consistently offers outstanding technical programs, and has a lengthy record of outreach to youngsters (K-12) and the technical community at large (cooperative programs with AIAA, IEEE, etc). So **RENEW WITH ASME** and take advantage of the assorted activities and benefits offered locally.



Engineering Outreach Presentation Offered to ASME Student Sections

As part of our Section's Engineering Outreach program funded by **The Halliburton Corporation**, Frank Parker gave a presentation to the **Oklahoma Christian University ASME Student Section** on Monday, January 27th. The presentation was entitled **Guidelines for Advancing an Engineering Career**. It starts by categorizing the three key components which sustain and enhance an engineering career and how they reinforce each other. In doing so it demonstrates what accumulated experience and non-technical skills have to offer and how to apply them in a technical world. Two design and process development projects were presented as case studies. How these skills were applied to these cases were noted, as well as the consequences when some were not fully employed. Some of the developed systems and tools used in the case studies were also brought for display and handling by the students, who seemed genuinely interested in them and the subject, in general.


Other Student Sections interested in hearing this presentation at an evening student section meeting are encouraged to contact Frank Parker by e-mail (parkerfj@asme.org). Frank will be glad to work out a date and details for the section. Food and drink arranged for the presentation will be paid for by the Central Oklahoma Section's Engineering Outreach funds.

Other Student Section News

OU-AME Student Section (Myron Stout):

For February, the OU ASME Student Section plans to have a bowling party, which everyone seemed to enjoy last year, as well as tour the facilities at Tinker AFB. The bowling party will be more of a membership drive than anything else. We believe that it's extremely important to bring in new, young members who have potential of continuing and building upon past OU ASME success. The Tinker AFB tour should also give students a great chance to see the Tinker facilities that many OU graduates and professors are involved with.

Future ASME-Central Oklahoma Section Events

Date	Location	Program Topic and Speaker
February 15, 2003 (Saturday)		<p style="text-align: center;">Regional MATHCOUNTS Competitions</p> <p>Feb. 15: Central Okla. Region, Southeast Okla. Region, Northwest Okla. Region, Southwest Okla. Region.</p> <p>Contact Alicia Helsley, Okla. Eng. Center (405) 528-1435 for more information. Please volunteer to help!</p>
Feb. 18, 2003 (Tuesday)	 <p style="text-align: center;">National Engineers Week 2003</p>	<p style="text-align: center;">All Engineering Societies Banquet</p> <p style="text-align: center;">Tinker AFB Officer's Club, Del City, OK</p> <p style="text-align: center;">Speaker: Capt. Gary Chavez</p> <p style="text-align: center;">(Enter at <u>Gate 1</u> on <u>Air Depot Blvd</u>-see map on page 2)</p>
Feb. 19, 2003 (Wednesday)		<p style="text-align: center;">Oklahoma Engineering Fair featuring engineering related exhibits & competitions for Jr. and Sr. High School students.</p> <p style="text-align: center;">Kirkpatrick Center Omniplex, OKC, 9:00AM-3:00PM</p>
March 8, 2003 (Saturday)	University of Oklahoma Norman, OK	<p style="text-align: center;">AIAA-ASME Symposium featuring presentations from Industry and Academia from across Oklahoma.</p>
March 27, 2003 (Thursday)	Okla. Engineering Center 201 NE 27 th St., OKC	<p style="text-align: center;">March Section Meeting</p> <p style="text-align: center;">Speaker: Mr. Daniel W. Berndt, P.E., C.E.M.</p> <p style="text-align: center;">Topic: "Hydrogen Energy Storage"</p>

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