EXECUTIVE SUMMARY

The Center for Advanced Vehicular Systems is pleased to announce significant growth under my first year as Director. I am happy to report both positive performance and excellent future prospects. During the first quarter of fiscal year 2007 (July – September), the Center for Advanced Vehicular Systems (CAVS) faculty and staff’s proposal activity included 4 awards totaling $543,537 and 7 continuation awards totaling $816,570. This gave a net award inflow of $1,360,107 while CAVS had a net expenditure of $3,652,710.

CAVS research participation for the quarter included:

▫ 27 faculty
▫ 38 research associates
▫ 11 postdoctoral fellows
▫ 70 graduate students
▫ 53 undergraduate students
▫ 20 academic departments represented

Highlights from the detailed listing include the following:

• 19 proposals, totaling $4,655,050 were submitted for future funding
• CAVS staff submitted 19 articles for publication and 75 conference submissions
• During the same time CAVS was responsible for
 ▫ 28 published articles
 ▫ 55 presentations
 ▫ 1 MS degree defense
 ▫ 1 new patent disclosure

I. Activities

A. Proposal Submissions by PI’s and Co-PI’s

Coltharp, David - 1
German, Rand - 1
Gullett, Phillip - 1
Haupt, Tomasz - 1
Horstemeyer, Mark - 2
Martin, Paul - 6
Newman, James - 1
Park, Seong Jin - 1
Rowland, Zach - 1
Shelly, Robert - 1
Steele, Glenn - 1
B. Publication Submission


C. Conference Full Paper Submission


“Welding Fixtures in Griffin’s West Point Facility,” G. Dennis, 6th International Conference on Industrial Tooling, September, 2006

D. Conference Abstract Submission


“An Examination of Local Atomic Deformation Computed by Means of a Discrete Gradient,”

“Anisotropy Evolution During Sequential Thermomechanical Processing of Aluminum Alloys,”


“Microstructure of Tungsten Copper and Model to Predict Thermal Conductivity,” S.J. Park, J. Johnson, R.S. Yassar, Y.S. Kwon, R.M. German, PowderMet 2007, Denver, CO.


“Welding Fixtures in Griffin’s West Point Facility,” Glenn Dennis, 6th International Conference on Industrial Tooling, September, 2006.

E. Patents (disclosures or applications)

“Friction Spot Welding Pin Tool Design: Geometry and Material,” R.M. German

F. Proposal Submission
(Note: Only proposals submitted through Sponsored Programs Administration were counted.)

“An Integrated Design Optimization Methodology for Prediction of Forming Limit Diagrams,”
R.S. Yassar, $100,000.
“ATA Year 2 Project: Focus Area Breakout,” Z. Rowland, R. Sheely, $3,026,262.
“High Temperature Reverse Bias Reliability Test System for SiC VJFETs,” P. Martin, G. Tian, (one of three), $80,287.
“Materials Modeling and Airborne Validation for MIMR,” M. Horstemeyer, $90,046.
“Mathematical Modeling of Microstructure Evolution at Elevated Temperatures,” R.S. Yassar, $100,000.
“Pulsed High Temperature Forward Bias Reliability Test System for SiC VJFETs,” P. Martin, G. Tian, (one of three), $88,564.
“Pulsed High Temperature Forward Bias Reliability Test System for SiC VJFETs,” P. Martin, G. Tian, (two of three), $88,564.
“Pulsed High Temperature Forward Bias Reliability Test System for SiC VJFETs,” P. Martin, G. Tian, (three of three), $88,564.
“Quantitative Uncertainty and Reliability of a Mechanistic Multistage Fatigue Model,” Y. Xue, $400,000.
“Simulation for FSSIM,” T. Haupt, $64,021.
“Sustaining Microgravity Research: Developing Effective In-Space Fabrication and Repair,” S.J. Park (with S. Yang, MUW), $39,870.
“Tungsten-Polymer Formulations,” R.M. German, $68,507.

II. Outcomes

A. Publications


**B. Presentations**


“Analysis of Intermodal Transportation Infrastructure Relative to Prospective Automotive Assembly Sites,” C. Walden, S. Eksioglu, B. Eksioglu, M. Jin, final Project Briefing to Harry Lee James, MDOT Chief Engineer, August, 2006.


“Center for Advanced Vehicular Systems,” R. German, presented at the Bagley College of Engineering Department Heads and Center Directors Retreat, Columbus, MS, August, 2006.

“Center for Advanced Vehicular Systems,” R. German, presented to the Greater Starkville Development Partnership, Starkville, MS, September, 2006.


“InSite Studio Booth,” S. Calhoun, ADL Implementation Fest, hosted by the Advanced Distributed Learning Co-Laboratory, Orlando, FL, August, 2006.

“Integrating ACT-R and Virtual Environments,” D. Carruth, invited presentation to Caterpillar for University of Iowa CCAD, Iowa City, IA, July, 2006.


“Mississippi State University eX,” D. Oglesby, MDA, CAVS, August, 2006.


“Mobile Map User Interfaces,” J. Baca, Mississippi Department of Transportation, CAVS Executive Conference Room, September, 2006.


“Particulate Materials Processing at the Nanoscale Range: Opportunities in Tungsten-Based Composites,” R.M. German, technical seminar, Materials Division, Army Research Laboratory, Aberdeen Proving Grounds, MD, August, 2006.


Presentation to Middle Mississippi Chapter of the American Society for Quality (ASQ) at CAVS Extension, G. Dennis, L. Simmons, September, 2006.


“Prototype Build and Manufacturing Scenarios for the ORYX vehicle in West Point,” G. Dennis, International and Griffin Executives and Managers at the ORYX kickoff meeting, Chicago, IL, August, 2006.


“Research Issues in Automotive Materials for Reduced Weight, Improved Efficiency, and Crashworthiness,” invited presentation, Catedra Randall German en Pulvimetalurgia, Universidad Internacional Menendez y Pelayo, Palacio de la Magdelena, Santander, Spain, July, 2006.


“The General Trend of the Powder Metallurgy Field in the USA,” R. German, invited seminar, Department of Materials Science and Engineering, Gyungsang National University, Jinju, Korea, September, 2006.


C. Research Supervision


D. Grant and Proposals

1. Submitted Proposals Awarded – Totaling $543,537


“MOA Between MSU/CAVS and MS Department of Education, Office of Vocational and Technical Education, V. Branch, $5,736.98.


2. Continuations – Totaling $816,570


“Challenge X: Crossover to Sustainable Mobility,” M. Molen, General Motors Research & Development Center, $12,750.


“Simulation Environment for FSSIM,” T. Haupt, SAIC, $64,012.


E. Participation


CAVS-E, Hosted “Mississipi Automotive Study” planning meeting at request of Entergy and Mississippi Development Authority, CAVS Extension, September, 2006.

CAVS-E, Planned & hosted “The Eagle’s View: Lean Six Sigma Executive Overview” workshop led by noted author and consultant Forrest Breyfogle, CAVS Extension, August, 2006.


D. Carruth, Hosted J. McCarley, University of Illinois Urbana-Champaign, for vision research collaboration meeting with C. Williams, MSU Psychology Department, August, 2006.


D. Norman, Attended Mississippi Department of Education, “Discovery Taskforce Committee” meeting, Jackson, MS, September, 2006.


J. Baca, organized MDOT visit. Participants: J. Baca, B. Bland, Z. Rowland (CAVS); John Vance, Stephen Holley (MDOT). Current status of the Vehicle Performance Monitoring project for MDOT was reviewed. A schedule for completion was agreed upon. A technology demonstration of portable computing interfaces was also given and future research activities discussed. September, 2006.


M. Thomas, Hosted training seminar for local law enforcement, August, 2006.

P. M. Gullett, Traveled to Brazil and met with faculty at four universities Universidade Federal de Viçosa, Universidade Federal do Rio de Janeiro, Universidade Federal do Ceará, and Pontificia Universidade Católica do Rio de Janeiro as well as the Brazilian oil company Petrobras. Discussed research interests, joint proposals and development of educational exchange programs.


S. Felicelli, Traveled to USCAR, Project HI-MAC (High Integrity Magnesium Automotive Castings), to attend Initial project review meeting, USCAR Headquarters, Detroit, MI, April, 2006.

S. Felicelli, Traveled to American Foundry Society Headquarters (IL) to represent MSU in committee meetings 2-E (Permanent Mold Castings) and 2-D (Structural Castings), September, 2006.


S.J. Park, Meeting with Chul Park (Ph.D., CEO, FineOptics, Inc.) and Kyung-Hwan Yoon (Ph.D., Professor, Dankook University), to discuss future collaboration, Seoul, S. Korea, September, 2006.

S.J. Park, Visit Pai-Chai University to meet with Dae-Young Lim (Ph.D., Dean, Office of Planning, Pai-Chai University, Professor Dept of Information and Electronic Materials Eng) and Cheol-Woo Kim (Dr. Eng. The general director, Techomart, KOTM) to discuss future collaboration, Daejeon, S. Korea, September, 2006.

S.J. Park, Visit Korea Institute of Industrial Technology (KITECH), to meet with Jeong-Han Kim (Ph.D., Executive Director, Incheon Research Center), Jong-Deok Kim (Ph.D., Director, Bucheon Digital Molds & Dies Technology Center), Young-Moo Heo (Ph.D., Director, Molds and Dies Technology Center), and Chul-Jin Hwang (Ph.D, Senior Researcher, Precision Molds & Dies Technology Team) to discuss future collaboration, Incheon, S. Korea, September, 2006.

S.J. Park, Visit Handong Global University and Pohang University of Science and Technology (POSTECH), to meet with Young-Gil Kim (Ph.D., President) and Tai-Hun Kwon (Ph.D, Professor, Mechanical Engineering) to discuss future collaboration, Pohang, S. Korea, September, 2006.


S.J. Park, Visit CetaTech, Inc. and Gyungsang National University, Jinju, to meet with Young-Sam Kwon (Ph.D., CEO) and Man-Su Chun (Ph.D, Professor, Mechanical Engineering, Director, Technology Innovation Center, TIC) to discuss future collaboration, S. Korea, September, 2006.

Y. Hwang, T. E. Lacy, Traveled to NTCNA, Project Autoglass, to attend Project progress review meeting, Nissan Technical Center of North America, Detroit, MI, September, 2006.

F. Peer Recognition


P.M. Gullet, Chair – Solid Mechanics Working Group, Mississippi State University.


S. Felicelli, 2006 Faculty Research Award, BCoE, MSU.

S. Felicelli, 2006 MSU/IMAGE Award, BCoE, MSU.

S. Felicelli, Member of AFS Modeling Committee, American Foundry Society.
G. Service

L. Wang, Reviewer for Solid Freeform Fabrication Symposium.
M. Molen, Conference Chair, IEEE 2008 Power Modulator Conference, Las Vegas, NV, August, 2006 to select a hotel site.
R. Yassar, Reviewship for Metallurgical and Materials Transactions A.
R. Yassar, Chair organizer of a symposium:
S.G. Kim, Consulting: Become, Inc., Mountain View, CA.
S.J. Park, Invited as chairperson at two technical sessions, PM 2006, Busan, Korea.
S.J. Park, Nominated for membership in the KSEA Young Generation Committee.
S.J. Park, Recommended to the Research Department of the International Biographical Centre.
T. Haupt, Member, 2006 Nomination Committee of Open Grid Forum.
T. Haupt, Program co-chair, Society for Modeling and Simulation International’s HPC 2006 Conference.
T. Haupt, Program committee member: 2nd Workshop on Large Scale Computations on Grids, Wisla, Poland.
T. Haupt, Program committee member: 2nd Workshop on Grid Computing Environments at Supercomputing ’06, Tampa, FL.
Y. Xue, Attended the ASME Essential Teaching Seminars.
Y. Xue, Prepared the presentation for the WCCM conference, Micromechanics Modeling on Fatigue Damage Incubation Life for a Wrought Aluminum Alloy.

H. Other Activities

C. Walden, Trip to Faurecia’s plant in Cleveland, MS, to meet key managers and discuss preliminary “Six Sigman Kaizen” proposal, August, 2006.
C. Walden, R. Sheely, Trip to Faurecia’s plant in Cleveland, MS, to meet key managers and
discuss preliminary “Six Sigma Kaizen” proposal and begin execution of the proposal,
September, 2006.

D. Carruth, M. Thomas, Psychology Department Outreach, tour for K. Armstrong, Graduate
Coordinator for Psychology Department, July, 2006.


D. Carruth, M. Thomas, Tour for S. Klein, Head of Psychology Department, and D. Eakin,
August, 2006.

D. Carruth, M. Thomas, Tour for G. Bradshaw and J. Franck, prospective PhD student, August,
2006.

D. Carruth, J. McGinley, M. Thomas, Law Enforcement Research Outreach, Tour for A. Bennett

D. Norman, CAVS Extension training/workshops for approximately 438 people.

D. Norman, R. Sheeley, Trip to Faurecia’s plant in Cleveland, MS, to meet key managers and
discuss preliminary “Six Sigma Kaizen” proposal, August, 2006.

D. Norman, C. Walden, R. Sheely, G. Dennis, Participated in CAVS Extension Manager’s Off-
Site meeting at Northwest Community College, Senatobia, MS, August, 2006.


G. Dennis, Trip to Faurecia’s plant in Cleveland, MS, to meet key managers and discuss

H. Lim, “Inverse Conductivity from Full Boundary Measurements At Low Frequencies,” CAVS
Internal Report, MSU.CAVS.CMD.2006-R0013.

H. Rhee, K.N. Subramanian, “Roles of Imposed Cyclic Strain Amplitude and Cyclic Strain Rate
on the Cyclic Stress Relaxation Behavior of Pre-Strained Eutectic Sn-3.5Ag Solder

J. McGinley, M. Thomas, Law Enforcement Research Outreach, Tour for T. Wheeler and D.
Bartlett, Mississippi State University Police Department Officers, July, 2006.

L. Wang, S. Felicelli, P. Wang, M.F. Horstemeyer, “Numerical Simulation of the Temperature
Distribution and Microstructure Evolution in the LENS™ Process,” CAVS Internal

R. Sheeley, G. Dennis, Trip to Faurecia’s plant in Cleveland, MS, to meet key managers and
discuss preliminary CAVS Extension support, August, 2006.

R.S. Yassar, “Deformation Modeling of 6022 and 5005 Aluminum Alloys,” CAVS Internal

R.S. Yassar, “Hot Deformation of Superalloys: A Literature Review on Microstructural Models,”
CAVS Internal Report, MSU.CAVS.CMD 2006-R0006, April, 2006.

S.J. Park, Arrange for Prof. Seongjai Kim (Mathematics and Statistics Department, MSU)
to get software donation PIMsolver from CetaTech, Inc., Korea. ($100,000 value)
for supporting collaboration research involving powder-binder separation.

T. Hill, J. Miller, J. Welch, A. Greenwood, C. Walden, Invited to become a member of Flexsim’s
Technical Advisory Committee.

Modeling of Automotive Parts,” CAVS Internal Report, MSU.CAVS.CMD.2006-R0004.

Y. Xue, M.F. Horstemeyer, D.L. McDowell, “Microstructure-Based Multistage Fatigue (MSF),
Model for Metals (Theory Manual),” CAVS Internal Report - MSU.CAVS.CMD.2006-
R0010.