



## CENTER FOR ADVANCED VEHICULAR SYSTEMS

Bagley College of Engineering at Mississippi State University

### **FY08** **First Quarter Report**

1 July 2007 to 30 September 2007

## EXECUTIVE SUMMARY

From Director, Rand M. German

In the first quarter of the 2008 academic year, CAVS has moved into a steady-state mode as evident by the graduation of several students, completion of seven “initiative” projects, and placement of six staff into senior management or tenure-track positions. Thus, CAVS is undergoing a critical refocus on research and development projects that match its mission as an interdisciplinary center that provides team-based solutions for complex issues associated with human mobility. During the first quarter of academic year 2008 (July – September), CAVS faculty and staff’s proposal activity included 5 awards totaling \$785,023 and 4 continuation awards totaling \$1,900,876.49. This gave a net award inflow of \$2,685,899.49 while CAVS had a net expenditure of \$3,389,980.79.

CAVS research participation for the quarter included:

- 11 academic faculty
- 28 research associates
- 9 postdoctoral fellows
- 59 graduate students
- 77 undergraduate students

Highlights from the detailed listing given below include the following:

- 13 proposals, totaling \$7,703,026 were submitted for future funding
- CAVS staff submitted 16 articles for publication and 21 conference submissions
- During the same time CAVS was responsible for
  - 11 published articles
  - 29 presentations
  - 4 new patent disclosures
- In addition, 9 members of the CAVS program were part of the team that submitted a proposal to the National Science Foundation for a Materials Research Science and Engineering Center entitled “Center for Multiscale Studies on Engineering Nano-Composites” proposed for 6 years at \$16,775,518.

• The following PI’s and Co-PI’s submitted proposals:

Calhoun, Scott -	1	Horstemeyer, Mark -	2
Crocker, Marshall -	1	Littell, Neil -	2
Felicelli, Sergio -	2	Marin, Esteban -	1
German, Randall -	1	Molen, Marshall -	1
Gullett, Phil -	1	Rowland, Zach -	1

## I. Activities

### A. Publication Submissions

#### Peer-Reviewed Journals

- “A Multi-objective Optimization Procedure to Develop Modified-embedded-atom-method Potentials: An Application to Magnesium,” J. Houze, S. Kim, A. Moitra, B. Jelinek, S. Groh, M. Horstemeyer, E. Acar, M. Rais-Rohani, S. Kim, *Physical Review B*.
- “Grain Size Measurement and Modeling for Nano-Structured Tungsten Carbide,” S.J. Park, K. Cowan, J. Johnson, R.M. German, *International Journal of Refractory Metals & Hard Materials*.
- “Integrated Filling, Packing, and Cooling CAE Analysis of Powder Injection Molding Parts,” S. Ahn, S.T. Chung, S.V. Atre, S.J. Park, R.M. German, *Powder Metallurgy*.
- “Investigation of Sintering Behavior and Mechanical Properties of Al P/M Alloys by the Addition of Cu and Mg,” F. Findik, A. Arockiasamy, S.J. Park, R.M. German, *Powder Technology*.
- “Linking Homogenization and Densification in W-Ni-Cu Alloys through Master Sintering Curve (MSC) Concepts,” G. Sethi, S.J. Park, J. Johnson, R.M. German, *Metallurgical and Materials Transactions A*.
- “Melting Tungsten Nanoparticles: A Molecular Dynamics Study,” A. Moitra, S. Kim, J. Houze, B. Jelinek, S.J. Park, R.M. German, M. Horstemeyer, S.G. Kim, *Acta Materialia*.
- “Micromechanical Simulation of Cyclic Plasticity at Inclusion Particles with Overloads,” Y.A. Xue, A. Wright, K. Solanki, M. Horstemeyer, *AIAA Journal*.
- “Optimization of Process Conditions in Micro Powder Injection Molding using Taguchi Robust Design Method,” R. Urval, S. Lee, S.V. Atre, S.J. Park, R.M. German, *Powder Metallurgy*.
- “Reliability-based Crashworthiness Optimization of Automotive Structures,” M. Rais-Rohani, K. Solanki, E. Acar, C. Eamon, *Journal of Mechanical Design*, ASME.
- “Reliability-based Structural Optimization using a Multiscale Material Model,” K. Solanki, E. Acar, M. Rais-Rohani, C. Eamon, M. Horstemeyer, *Computer Methods in Applied Mechanics and Engineering*.
- “Sensitivity Analysis by the Adjoint Variable Method for Optimization of the Die Compaction Process in Particulate Materials Processing,” S.H. Chung, Y.S. Kwon, S.J. Park, R.M. German, *ASME Journal of Engineering Material Technology*.
- “Structure of Al-Sb(001) and Ga-Sb (001) Surfaces under Extreme Sb-rich Conditions,” J. Houze, S. Kim, S.G. Kim, S. Erwin, L. Whitman, *Physical Review B*.
- “The Effect of Fe Atoms on the Adsorption of a W Atom on W(100) Surface,” J. Houze, S. Kim, S.J. Park, R.M. German, M. Horstemeyer, S.G. Kim, *Journal of Applied Physics*.
- “The Ground-state Structure of a Hydrogen Double Vacancy on a Pd(111) Surface,” S. Kim, S.G. Kim, S. Erwin, *Physical Review B*.

#### Peer-Reviewed Conference Abstracts

- “ADL E-Learning Summit - Bringing SCORM Sequencing to the “Little People”,” D. Brown, Memphis, TN.
- “ADL E-Learning Summit - Empowering the Trainer with an Intuitive Authoring Tool for Adaptive eLearning,” D. Brown, Memphis, TN.
- “Atomistic Scale Study on Effect of Pressure on Densification during Sintering Nano Scale Tungsten Powder,” A. Moitra, S. Kim, S.G. Kim, S.J. Park, R.M. German, M. Horstemeyer, TMS 2008, March 9-13, 2008, New Orleans, LA.

- “CyberDesign,” T. Haupt, 2008 TMS Annual Meeting & Exhibition, New Orleans, LA.
- “Densification Behavior and Properties of Spark Plasma Sintered HfB-20SiC,” S.V. Atre, G. Kendall, B. Manish, H. Shoop, S.J. Park, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Development and Analysis of Bio-inspired Design Aluminum Composites,” A. Arockiasamy, P. Suri, S.J. Park, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “High Rate Deformation in Press-Sinter W-Cu using Hopkinson Bar Test,” M. Tucker, S.J. Park, Y.S. Kwon, S. Horstemeyer, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Injection Molding of Micro-Porous 316L Stainless Steel Parts,” O. Gulsoy, P. Suri, S.J. Park, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Investigations on Novel Titanium Alloys for Structural Applications,” O. Gulsoy, P. Suri, A. Arockiasamy, S.J. Park, R.M. German, H. El Kadiri, R. Whitehorn, W.H. Peter, C. Blue, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Integrated Simulation of Mold Filling (Binder-Powder Separation), Debinding, and Sintering in Powder Injection Molding,” S. Kim, S.J. Park, S.V. Atre, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Mapping between Material Design and Properties Using Material Informatics for P/M Simulation,” S. Lee, S.J. Park, S. Atre, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Mechanical Properties of Various Aluminum Alloys by Powder Metallurgy,” A. Arockiasamy, S.J. Park, R.M. German, TMS 2008, March 9-13, 2008, New Orleans, LA.
- “Microstructure and Mechanical Properties of Sponge Ti and its Alloy Powders with Various Powder Metallurgical Processes,” H. El Kadiri, W. Peter, R. Whitehorn, S.J. Park, Y. Hammi, R.M. German, TMS 2008, March 9-13, 2008, New Orleans, LA.
- “Mixing Simulation for Powder Injection Molding Feedstock: Quantification and Sensitivity Analysis,” S. Ahn, T.G. Kang, S.J. Park, S.V. Atre, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Multiscale Modeling in Powder Metallurgy: Atomistic, Discrete Element, and Finite Element Simulations,” S.J. Park, S.G. Kim, M. Horstemeyer, R.M. German, UKC (US – Korea Conference) 2007, August 9-12, 2007, Washington DC.
- “Prediction of Tool Wear and Tool Life by Experiment/Modeling/Simulation of the Die Compaction Process,” W. Li, P. Blau, S.J. Park, Y. Hammi, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Taguchi Method for Sintering Study of Nanoscale Silicon Carbide Fabricated using Plasma Pressure Compaction,” M. Bothara, S.V. Atre, P. Vijay, T.S. Sudarshan, R. Radhakrishnan, S.J. Park, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “The Effect of Feedstock Composition on Defect Evolution in Powder Injection Molded Ceramic Microarrays,” S. Atre, K. Simmons, S. Ladha, S.J. Park, R.M. German, S. Lee, PMS 2008, June 8-12, 2008, Washington, D.C.
- “The Effect of Processing Variables on Gas Bubble Formation in Gas-assisted Powder Injection Molding,” K. Lee, S. Ahn, R. Nambiar, S.J. Park, PMS 2008, June 8-12, 2008, Washington, D.C.
- “Three Dimensional Atomistic Simulation of the Sintering and Shrinkage Behavior of Tungsten and Tungsten Alloys,” A. Moitra, S. Kim, S.G. Kim, S.J. Park, R.M. German, PMS 2008, June 8-12, 2008, Washington, D.C.
- “World Record Thermal Conductivity of Nano-Tungsten-Copper Powder,” S. Lee, J.W. Noh, Y.S. Kwon, J. Johnson, S.J. Park, R.M. German, TMS 2008, March 9-13, 2008, New Orleans, LA.

### **Technical Reports**

- “Production System Modeling and Decision Support for VT Halter Marine, Inc.,” Monthly Technical Report – July, August, September, T. Hill.

### **Articles in Trade Journals and Popular Press**

- “A Two-dimensional Damaged Finite Element for Fracture Applications,” G. Potirniche, J. Hearndon, S. Daniewicz, D. Parker, P. Cuevas, P. Wang, M. Horstemeyer, *Engineering Fracture Mechanics*.
- “Monitoring Structural Damage of Components using an Effective Modulus Approach,” J. Hearndon, G. Potirniche, D. Parker, P. Cuevas, H. Rinehart, P. Wang, M. Horstemeyer, *Theoretical and Applied Fracture Mechanics*.

### **Professional Presentations**

- “Diversity in the Workplace,” V. Branch, INROADS .
- “Emotional Intelligence,” V. Branch, INROADS National Leadership Conference.
- “Preliminary Software Architecture and Requirements for Production Systems Modeling and Decision Support for VT Halter Marine, Inc. Project,” T. Hill, R. Holt, III .

## **B. Accepted Works Awaiting Publication**

### **Peer-Reviewed Conference Papers**

- “High-Temperature Static and Dynamic Reliability Study of 4H-SiC Vertical-Channel JFETs for High-Power System Applications,” L. Cheng, P. Martin, M. Mazzola, R. Kelly, V. Bondarenko, J. Scofield, D. Sheridan, J. Casady, J. Casady, *Silicon Carbide and Related Materials 2007*, Otsu, Japan, 2008.

### **Peer-Reviewed Conference Posters**

- “High-Temperature Operation of 50A (1600A/cm<sup>2</sup>), 600V 4H-SiC Vertical-Channel JFETs for High-Power Applications,” L. Cheng, I. Sankin, V. Bondarenko, M. Mazzola, J. Scofield, D. Sheridan, J. Casady, J. Casady, P. Martin, *International Conference on Silicon Carbide and Related Materials 2007*, Otsu, Japan, 2008.

### **Non-Refereed Conference Papers**

- “Rapid Prototyping Capabilities for Conducting Research of Sun-Earth System,” T. Haupt, 3rd IEEE International Conference on e-Science and Grid Computing, Bangalore, India.

### **In-House**

- “A Two-dimensional Damaged Finite Element for Fracture and Fatigue Applications,” J. Hearndon, G. Potirniche, P. Wang, M. Horstemeyer, *MSU.CAVS.CMD.2007-R0025*, 2007.
- “On Developing a Visoelastic-Viscoplastic Model for Polymeric Materials,” E. Marin, *MSU.CAVS.CMD.2007-R0015*, 2007.

- “Review of the Role of ABAQUS in CAVS Research,” E. Marin, *MSU.CAVS.CMD.2007-R0014*, 2007.

### **C. Patents (disclosures or applications)**

- “Desktop Peer-To-Peer Learning Management System,” M. Bennett, J. Cain, S. Calhoun, 07-0510-313.
- “Algorithm for Converting Flowchart Diagrams in SCORM Activity Trees,” A. Bullwinkle, D. Brown, J. Cain, S. Calhoun, D. Hamilton, K. McCarter, T. Miskelly, 07-0501-309.
- “Structured Sequence Notation,” A. Bullwinkle, D. Brown, J. Cain, S. Calhoun, 07-0508-310.
- “The Vision and Motion Assisted Faucet with Employee Tracking,” N. Littell, 04-0927-119.

### **D. Proposal Submission**

- “Developing Material Database & Modeling High Rate Material Response for Impact Applications,” Phil Gullett, Battelle.
- “Direct Numerical Simulation of a Mushy Zone,” Sergio Felicelli, National Science Foundation.
- “DURIP: Comprehensive Laser Digitizing System for the Creation of Large Scale, Three-Dimensional Data for Simulation, Analysis, and Digital Mock-up,” Neil Littell, Department of Defense – Air Force.
- “DURIP: Comprehensive Laser Digitizing System for the Creation of Large Scale, Three-Dimensional Data for Simulation, Analysis, and Digital Mock-up,” Neil Littell, Department of Defense – Army.
- “E-Learning Course Development, Hosting & Support,” Scott Calhoun, NeighborWorks America.
- “Intelligent Transportation Advanced Warning System,” Marshall Crocker, National Transportation Research Center.
- “Materials Database & Material Model Development for Polymeric Materials,” Esteban Marin, Battelle.
- “Micro-pelletization via High Strain & High Strain Rate Deformation,” Randall M. German, NineSigma.
- “Modeling LENS Prognostic Model for PM/LENS Product,” Mark Horstemeyer, US Army TACOM LCMC.
- “Modeling of Oxide Bifilms in Aluminum Castings,” Sergio Felicelli, National Science Foundation.
- “SiC JFET Intelligent Power Module Research,” Marshall Molen, UQM Technologies.
- “Virtual Organization for Cyber Design,” Mark Horstemeyer, National Science Foundation.
- “Virtual Soldier Research: Human Factors Development & Evaluation,” Zach Rowland, Battelle.

## II. Outcomes

### A. Publications

#### Peer-Reviewed Journals

- “A Tool for a Two-level Dynamic Load Balancing Strategy in Scientific Applications,” R. Carino, I. Banicescu, *Scalable Computing: Practice and Experience (Special Issue on Practical Aspects of Large-Scale Distributed Computing)*, SWPS, In Dana Petcu (Eds.), 2007, 8(3), 249-261.
- “Master Decomposition Curve for Binders in PIM Processing,” G. Aggarwal, S.J. Park, I. Smid, R.M. German, *Metallurgical and Materials Transactions A*, 38A(3), 606-614.

#### Peer-Reviewed Conference Papers

- “Effectiveness of a Dynamic Load Balancing Library for Scientific Applications,” R. Chaube, R. Carino, I. Banicescu, *Proc. 6th International Symposium on Parallel and Distributed Computing*, Hagenberg, Austria: IEEE Computer Society Press, 2007, 32.
- “Integrating Perception, Cognition, and Action for Digital Human Modeling,” D. Carruth, M. Thomas, B. Robbins, A. Morais, *Proceedings of HCI International 2007*, Beijing, China, 2007.
- “Kenaf Bast Fiber Retting and Inorganic Nanoparticle Impregnation Treatment for Natural Fiber/Polymer Composites,” S. Shi, S. Lee, M. Horstemeyer, University of Washington, Seattle, Washington, USA: 22nd Annual American Society for Composite Technical Conference, 2007.
- “Modeling Human Bipedal Navigation in a Dynamic Three Dimensional Virtual Environment,” M. Thomas, D. Carruth, B. Robbins, J. McGinley, A. Morais, *Proceedings of HCI International 2007*, Beijing, China, 2007.
- “Musculoskeletal and Performance Effects of Monocular Display Augmented, Articulated Arm Based Laser Digitizing,” N. Littell, K. Babski-Reeves, G. McFadyen, J. McGinley, *Human Computer Interaction International 2007*, Beijing, China: LNCS Digital Library (LNCS, <http://www.springer.com/lncs>), 2007.
- “The Design and Development of a Through-the-Road Parallel Diesel Electric Hybrid,” M. Young, M. Molen, D. Oglesby, K. Crawford, K. Walp, C. Whitt, R. Lewis, S. Phillips, IEEE VPPC 07 Arlington, TX: IEEE, 2007.

#### Books or Book Chapters

- “Toz Metalurjisi ve Parcacikli Malzeme Islemleri,” R.M. German, *Toz Metalurjisi ve Parcacikli Malzeme Islemleri*, Turk Toz Metalurjisi Dernegi, S. Saritas, M. Tuerker, N. Durlu (Eds.), 1-573.

#### Non-Refereed Conference Papers

- “Micromechanical Simulation on Hygro-Mechanical Properties of Woodfiber-Reinforced Plastic Composites,” K. Wang, Y.A. Xue, H. Zhang, M. Horstemeyer, *9th International Conference on Wood & Biofiber Plastic Composites*, May 21-23, 2007, Madison WI, 2007.

#### Articles in Trade Journals and Popular Press

- “Cooperative Grid Vortals,” T. Haupt, A. Kalyanasundaram, *Wiley InterScience*, John Wiley & Sons, Ltd., 19, 1671-1681.

## **B. Presentations**

- “CAVS Extension,” H. Dennis, C. Walden, Starkville Rotary Club, Starkville, MS, 2007.
- “Continuous Distributions in Powder Processing - Models, Origins, and Applications in Atomization, Packing, Sintering, Polymer Pyrolysis, and Fiber Fracture,” R.M. German, Departamento de Ciencia e Ingenieria de Materiales e Ingenieria Quimica, Universidad Carlos III de Madrid, Colmenarejo, Spain.
- “From Individual Properties of Dislocation to Collective Properties of Dislocations,” S. Groh, S. Kim, M. Horstemeyer, USNCCM9, San Francisco, Ca.
- “InSite Suite Workshop for NASA/UNCFSP,” D. Brown, M. Riddle, K. McCarter.
- “Mechanical and Physical Properties of Sintered Aluminum Mixed Powder Systems,” R.M. German, Materiales Estructurales para las Nuevas Tecnologias, Verano Program, Universidad Carlos III de Madrid, Colmenarejo, Spain.
- “Metal Powder Injection Molding,” R.M. German, Powder Metallurgy Basic Short Course, Penn State University, Metal Powder Industries Federation.
- “Multiscale Modeling in Powder Metallurgy: Atomistic, Discrete Element, and Finite Element Simulations,” S.J. Park, S.G. Kim, M. Horstemeyer, R.M. German, UKC (US – Korea Conference) 2007, August 9-12, 2007, Washington DC.
- “Multiscale Structures and Mechanical Behavior of the Biological Composite Material,” H. Rhee, M. Horstemeyer, US-KOREA Conference 2007, Washington, D.C., 2007.
- “Overview of Powder Metallurgy,” R.M. German, Powder Metallurgy Basic Short Course, Penn State University, Metal Powder Industries Federation.
- “Overview of the Center for Advanced Vehicular Systems,” R.M. German, Powder Technology Center, Austrian Research Centers, Seibersdorf, Austria.
- “Powder Metallurgy and Particulate Materials,” R.M. German, Thin Films Division, Heraeus, Chandler, AZ.
- “Scientific Realities in High Density Ferrous Powder Metallurgy,” R.M. German, MIBA Sintermetall, Vorchdorf, Austria.
- “Sintering Concepts and their Applications in Particulate Materials Processing,” R.M. German, Austrian Research Centers, Seibersdorf, Austria.
- “Structures and Mechanical Behavior of Lightweight Composite Foam Materials,” H. Rhee, M. Tucker, M. Horstemeyer, Materials Science and Technology (MS&T) 2007 Conference and Exhibition, Detroit, MI.
- “Success Stories: CAVS Extension 2006-7,” C. Walden, 2007 Summer Conference, Philadelphia, MS: Mississippi Economic Development Conference.
- “The Tungsten and Tungsten Carbide Short Course,” R.M. German, Allegheny Technologies, Metalworking Products, Huntsville, AL.

## **C. Grants and Proposals**

### ***1. Submitted Proposals Awarded – Totaling \$785,023***

- “Disaster Management & Simulation System (DMS),” Tomasz Haupt, Morgan Stanley, \$146,268.
- “Feasibility Study for Employing Composite/Lightweight Materials,” Mark Horstemeyer, Morgan Stanley, \$146,017.
- “High Density Power Supplies Using Silicon Carbide,” Paul Martin, SemiSouth, \$350,315.
- “Portal-Based Open Seas Interface,” Tomasz Haupt, Naval Research Laboratory, \$116,700.

- “SAVIOR Vehicle Modification and Sensor Installation,” Wesley Reeves, General Atomics, \$25,723.

**2. Continuations – Totaling \$1,900,876.49**

- “Challenge X: Crossover to Sustainable Mobility,” Marshall Molen, Mississippi State University, \$153,951.
- “Develop Macroscale Model for Metal PM Alloys,” Mark Horstemeyer, National Automotive Center, \$1,650,000.
- “Joint Contingency Operations Base (JCOB) – Task 2,” David Coltharp, Sentel Corporation, \$71,175.49.
- “Modeling of Oxide Bifilms in Aluminum Castings,” Sergio Felicelli, National Science Foundation, \$25,750.

**D. Participation**

**Special Guest**

- D. Oglesby, M. Molen, hosted Bob Storc, Architecture/Asst. Chief Engineer New Product Development, Magna International Inc., to discuss CAVS and Challenge X, July 2007.
- R. Carino, F. Ciorba, coordinated visit of Florina Ciorba to MSU-HPCC-CAVS-CMD, September 2007.

**Visit**

- A. McAlpin, R. Kirkland, exhibited the Challenge X vehicle at the MSU Riley Center in Meridian. The event was covered by the Meridian paper and the local Meridian television station, July 2007.
- A. McAlpin, R. Kirkland, showed the Challenge X vehicle at the Mobile Alumni Association's annual banquet. Were the featured speakers for the event, and gave presentation on Challenge X, July 2007.
- A. McAlpin, R. Kirkland, exhibited the Challenge X vehicle at the PACCAR luncheon, July 2007.
- A. McAlpin, R. Kirkland, exhibited the Challenge X vehicle and CAVS information at the MSU Extravaganza, an event for alumni, incoming students, and the public to learn about MSU, July 2007.
- A. McAlpin, M. Molen, exhibited the Challenge X vehicle at the Memphis, TN send-off party for incoming MSU freshmen and alumni gathering. Amanda gave a presentation on Challenge X, August 2007.
- A. McAlpin, presented to George County High School students on Challenge X, August 2007.
- A. McAlpin, attended the George/Greene County MSU Alumni chapter annual banquet and freshmen send-off party. Gave a presentation to the incoming freshmen, and to the alumni on Challenge X and CAVS. Exhibited the Challenge X vehicle, August 2007.
- A. McAlpin, visited the Greene County High School and presented to 2 separate physics classes about Challenge X and CAVS. Exhibited the Challenge X vehicle, August 2007.
- D. Oglesby, A. McAlpin, presented on Challenge X to the Appalachian Leadership Program, July 2007.
- D. Oglesby, P. Wang, B. Jones, General Dynamics Robotic Systems project kick-off meeting, August 2007.
- E. Marin, D. Oglesby, B. Jones, AGC Automotive Americas Co., project kick-off meeting, July 2007.

- R. Kirkland, A. McAlpin, exhibited the Challenge X vehicle at the Yazoo City alumni meeting and freshmen send-off party. Amanda gave a presentation on Challenge X and CAVS. Media was present, July 2007.
- R. Kirkland, A. McAlpin, M. Molen, M. Doude, exhibited the Challenge X vehicle at the Starkville send-off party for MSU incoming freshmen, and alumni gathering, August 2007.
- R. Kirkland, exhibited the Challenge X vehicle for PACCAR meeting with president's office, July 2007.
- T. Garrison, went on a ride-along session with two Starkville PD patrol officers, lasting half a standard shift day, September 2007.
- T. Hill, toured Technicolor in Memphis, TN to discuss potential project, July 2007.

### **Meeting/Discussion**

- A. McAlpin, presentation to Starkville Rotary Club on Challenge X, July 2007.
- C. Walden, presented Overview of Taxonomy Based Assessment Methodology to managers at Mimeo.com, Memphis, TN, September 18, 2007.
- C. Walden, represented Mississippi State University and CAVS at Automotive Research Alliance - Engineering Extension Meeting, Nashville, TN, September 2007.
- C. Walden, facilitated meeting with Dr. John Wyatt and the engineering staff of Trillium International in Pelahatchie, MS. Meeting held at the invitation of Andrew Mallinson, CEO of Trillium International. Purpose of the meeting was to discuss matching capability, material selection, and testing resources available through CAVS, September 2007.
- C. Walden, R. Holt, III, invited to participate in Kaizen Event at Yorozu in Flowers, MS, August 2007.
- D. Carruth, T. Garrison, D. Lindley, presented the Law Enforcement Research Initiative to the Mayor and Board of Aldermen at their July 3rd, 2007 public meeting. Chief David Lindley of the Starkville Police Department introduced Daniel Carruth to the Mayor and the Board and joined him during the presentation. The collaboration between CAVS and SPD was officially authorized by the Board following the presentation, July 2007.
- D. Carruth, M. Thomas, W. Lofton, J. Brison, J. Boxx, presented the current projects resulting from the Law Enforcement Research Initiative to representatives of MS Homeland Security in Jackson, MS. Discussed potential future proposals related to active shooter training in Mississippi and the use of videogame technology as a training tool for law enforcement and other emergency responders, July 2007.
- D. Carruth, R. Kirkland, invited to set up a booth at the MS Office of Homeland Security's "Homeland Security for Campus Executives" seminar to present HFE's current law enforcement research efforts, September 2007.
- D. Carruth, Z. Rowland, J. McGinley, M. Thomas, T. Garrison, C. Blackledge, D. Lindley, B. Laffoon, CAVS received the donation of a Starkville Police Department vehicle from Chief David Lindley for use in CAVS HFE's law enforcement research efforts, August 2007.
- N. Littell, meeting to discuss CAVS offerings and web marketing to generate revenue for CAVS, September 2007.
- R. Carino, attended meeting with USAMP representatives to match up statement of work for MSU/DOE/SRCLID and USAMP Magnesium Front End Project (on Task 7 - CyberInfrastructure), August 2007.
- R. Carino, presented progress report during the Internal DOE Quarterly Review, on CMD in-house software targeted for provisioning as web services in Task 7 - CyberInfrastructure, July 2007.

- R. Sheely, meeting with Dr. Goldsmith, CEO and President of Mississippi Technology Alliance and the CIT.ms Board to discuss ways to revitalize the Communications and Information Technology Organization of Mississippi (CIT.ms), July 2007.
- R. Sheely, participation in the Innovation-Led Economic Development training conducted at the Mississippi Technology Alliance (MTA), July 2007.
- R. Sheely, C. Walden, meetings with Gipson Steel, Inc. to become familiar with their environment and to perform an initial assessment of their production operations, July 2007.
- R. Sheely, C. Walden, meeting with Barry Lowther and Oscar Lowther, Principals at Cytec, Inc. in Jackson, MS to discuss RFID and GPS technologies and marketing potentials within Mississippi, August 2007.
- R. Sheely, bi-monthly meeting of the Communications and Information Technology Organization of Mississippi (CIT.ms) in Jackson, MS, August 2007.
- R. Sheely, C. Walden, meeting at the Yorozu plant in Flowers, MS with Yorozu officials and Mississippi economic development officials to plan follow-on participation in an upcoming Kaizen Event at the Yorozu plant, August 2007.
- R. Sheely, C. Walden, meeting at CAVS Extension with Richard Armstrong, Business Development Manager at Gipson Steel, to gather data to prepare an MEP.ms assessment of Gipson Steel's production and business operations, August 2007.
- R. Sheely, C. Walden, meeting with Dicky Sparks, President, and John Shannon, Consultant to Domes International, to discuss commercialization, financing and Finite Element Analysis work for their domes structure, August 2007.
- R. Sheely, C. Walden, meeting at MTA's offices in Ridgeland, MS with Dr. Randy Goldsmith, President and CEO, Mississippi Technology Alliance (MTA), and Dicky Sparks, President of Domes International, and John Shannon, Consultant to Domes International to discuss a potential Application for a loan from the MTA "R&D Seed Fund" to help commercialize their dome structure, August 2007.
- R. Sheely, C. Walden, telephone meeting with Ronnie Robertson, Chair of the Greenwood/Leflore Economic Development Foundation and Frank Howell, Director, Industrial and Community Development Dept. of the Delta Council, to discuss potential economic development activities for Raybestos, Inc. in Greenwood, MS, July 2007.
- R. Sheely, C. Walden, conference call meeting with AGC Automotive to discuss progress on an Finite Element Analysis project being performed by Dr. Esteban Marin and Dr. Paul Wang at CAVS and funded by the SBA Grant centered at CAVS Extension, August 2007.
- R. Sheely, Fall 2007 Meeting of the Senior Executive Advisory Board (SEAB) of the College of Business and Industry (COBI) at MSU, August 2007.
- S.J. Park, arranged for Dr. Hong-Ki Yang (University of Alabama, Tuscaloosa, AL) to visit CAVS for presentation and collaboration, August 15-16, 2007.
- S.J. Park, arranged for Dr. Ken Lee (Jackson State University, Jackson, MS) to visit CAVS for collaboration, August 27, 2007.
- S.J. Park, arranged for Mr. Zheng Li (Hunan Nonferrous Metals Corp. Ltd., China) to visit CAVS, September 20, 2007.
- S.J. Park, attended "Starting Company Workshop," Madison, MS, September, 25-26, 2007.
- T. Garrison, attended the 2007 Driving Simulator Conference - North America, September 2007.
- T. Garrison, invited by Lt. David Halliday, of the Michigan State Police, to attend the Michigan State Police law enforcement vehicle testing in Lansing, MI, September 2007.
- T. Garrison, attended the NIJ Conference 2007 in Arlington, VA, July 2007.
- V. Branch, attended S.T.E.P. Robotics Training for Instructors, Nissan Training Center, July 2007.
- V. Branch, attended Madison County Advisory Board meeting, August 2007.

- V. Branch, attended Leake County Advisory Board meeting, August 2007.

### **Peer Recognition**

- M. Riddle, J. Cain, D. Brown, K. McCarter, J.S. Calhoun, Thad Cochran Endowment for Entrepreneurship grant for \$25,000, July 2007.
- V. Branch, received letter of recognition for S.T.E.P. Program from Canton School District, September 2007.

### **Service**

- D. Brewington, K. McCarter, D. Brown, M. Riddle, J. Cain, Training modules for CAVS/HPCC administrative tasks, July 2007.
- N. Littell, working with engineering.com, was invited to sit on the judging panel for the 2008 Engineering VISION Grant. This is an international design competition sponsored by Engineering.com, September 2007.

### **Other**

- A. McAlpin, J. Brou, wrote and disseminated July issue of CAVS newsletter, July 2007.
- A. McAlpin, J. Brou, created CAVS annual report for 2006-2007, August 2007.
- A. McAlpin, worked with campus television center to produce news spot on Challenge X, which aired on network TV in September, August 2007.
- D. Brown, M. Riddle, K. McCarter, S. Smith, setup and support for InSite Suite in Pearl River Community College Learning Lab, July 2007.
- D. Oglesby, interview with Biodiesel Magazine about Challenge X, July 2007.
- D. Oglesby, M. Molen, M. Young, S. Phillips, M. Doude, A. McAlpin, participated in Fall Challenge X workshop to learn about 2008 Challenge X competition, September 2007.
- J. Brou, created CAVS advertisement for SPE newsletter, August 2007.
- J. Brou, created visiting professor picture for Dr. Gulsoy and had it printed and framed, August 2007.
- J. Cain, K. McCarter, D. Brown, M. Riddle, preparation for Microsoft conference call/meeting - New PowerPoint editor in InSite Studio, July 2007.
- R. Carino, created MATLAB application to replay, on multiple displays screens, movies from multi-scale simulations. Demonstrated during USAMP visit (Aug. 16 & 17), July 2007.
- R. Carino, created MATLAB application (ImageStitcher ver. 0) to merge/reconstruct images of long cracks, August 2007.
- R. Carino, provided "Help Desk" support for the following codes: DMGfit, ImageAnalyzer, DANN, July 2007.
- R. Carino, implemented user-requested enhancements to the following codes: DMGfit, ImageAnalyzer, MSF, July 2007.
- S. Phillips, M. Doude, A. McAlpin, presented at the Starkville chapter of Optimist Club about Challenge X, September 2007.
- S.J. Park, paper review, "Sintering Mechanism of Fine Zirconia Powders with Alumina Added by Powder Mixing and Chemical Processes," *Journal of Materials Science*, August 2, 2007.
- S.J. Park, paper review, "The Study of Evaluation Plane Strain Fracture Toughness in Induction Hardening of the SM53C Steel," *International Journal of Automotive Technology*, August 18, 2007.

- S.J. Park, paper review, “Study on Dynamic Crack Growth at 3PB Steel Specimens by Impact,” *International Journal of Automotive Technology*, September 6, 2007.
- T. Hill, R. Holt III, CAVS Extension Website development, September 2007.
- V. Branch, conducted a MSU pre-registration session with Leake County S.T.E.P. students who wanted to attend MSU in 2008-2009 school year, September 2007.
- V. Dammalapti, 1) Program which creates a global matrix from given local matrices in matlab.(Dr.Portiniche); 2) Made a presentation for Cyberinfrastructure project. 3) Helping student of Dr.Portiniche on undamaged, damaged matrices; 4) Fortran code for Global matrix; 5) Script to fit in GNU plot, July 2007.
- W. Reeves, D. Schissel, attended FPED 6 (Force Protection Equipment Demonstration) in support of General Atomics surveillance vehicle program, August 2007.

## **F. Tours**

- W. Reeves, tour for ADTRAN Engineers, September 2007