CENTER FOR ADVANCED VEHICULAR SYSTEMS (CAVS)
Bagley College of Engineering at Mississippi State University
First Quarter Report
1 July to 30 September 2006

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
Gullet, 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

Stevenson, Tommy - 1
Tian, Gyouyn - 6
Xue, Anna - 2
Yassar, Reza - 4

B. Publication Submission

"A Thermodynamic Model of Polycrystalline Damage with Internal State Variables," G.P. Potirniche, M.F. Horstemeyer, X.W. Ling, *Mechanics of Materials*, July, 2006.

"Automotive Distribution Network Design: A Perspective from Mississippi," S. Eksioglu, B. Eksioglu, C. Walden, M. Jin, A. Acharya, *Transportation Research Review*, submitted.

"Cooperative Grid Vortals," T. Haupt, A. Kalyanasundaram, *Concurrency and Computation: Experience and Practice*, submitted.

"Development of Niobium Powder Injection Molding: Part II, Debinding and Sintering," G.Aggarwal, S.J. Park, I. Smid, R.M. German, *International Journal of Refractory Metals and Hard Materials*, in press.

"Effect of Die Compaction Pressure on Densification Behavior for Molybdenum Powders," P. Garg, S.J. Park, and R. M. German, *International Journal of Refractory Metals & Hard Materials*, in press.

"Finite Element Simulation of Liquid Phase Sintering with Tungsten Heavy Alloys," S.J. Park, S.H. Chung, J.L. Johnson, R.M. German, *Materials Transactions*, 2006, in press.

"Grain Growth Behavior of Tungsten Heavy Alloys Based on Master Sintering Curve Concept," S.J. Park, J.M. Martin, J.F. Guo, J.L. Johnson, R.M. German, *Metallurgical and Materials Transactions A*, in press.

"Impact of Malleable Applications on Performance in Cluster Environment," S. Ghafoor, T. Haupt, M. Rashid, N. Ammari, *SCS Journal*, submitted.

"Master Decomposition Curve for Binders in PIM Processing," G. Aggarwal, S.J. Park, I. Smid, R.M. German, *Metallurgical and Materials Transactions* A, 2006, accepted.

"Micromechanism of Multistage Crack Growth in Aluminum Alloy 7075-T651," Y. Xue, H. El Kadiri, M.F. Horstemeyer, J.B. Jordon, H. Weiland, *Acta Materialia.*

"Nucleation and Growth Effects in the Accuracy of Predicted Gas Porosity during Solidification of A356 Aluminum Alloys," S.D. Felicelli, E. Escobar de Obaldia, *Journal of Numerical Analysis, Industrial and Applied Mathematics*, submitted.

"Optimization of the LENSTM Process for Steady Molten Pool Size," L. Wang, S.D. Felicelli, Y. Gooroochurn, P.T. Wang, M. Horstemeyer, *International Journal of Thermal Sciences* submitted.

"Process Simulation of Powder Injection Molding. I. Identification of Significant Parameters during The Mold Filling Phase," S.V. Atre, S.J. Park, R. Zauner, R.M. German, *Powder Metallurgy*, 2006, in press.

"Quantitative Prediction of Microporosity in Aluminum Castings," E. Escobar de Obaldia, S.D. Felicelli, Proceedings of Advances in Materials and Processing Technologies *AMPT'2006*, accepted.

"Rheological Properties of Ti PIM Feedstock," Z. Xin, Y. Wu, S.J. Park, D.F. Heaney, *Powder Metallurgy Industry*, (in Chinese), 2006, accepted.

"Simulation of Hydrogen Porosity during Solidification," S.D. Felicelli, E.E. de Obaldia and C.M. Pita, *AFS Transactions*, submitted.

"The Bauschinger Effect in Aluminum Alloys," J.B. Jordon, K. Solanki, M.F. Horstemeyer, A. Xue, Y. *Mechanics of Material.*

"Thermal Modeling of the Laser Engineered Net Shaping (LENS) Rapid Fabrication Process," L. Wang, S.D. Felicelli, *Materials Science and Engineering A*, submitted.

"Visualizing Complicated Quantum Mechanical Behavior From Simple 2-D Potentials Using WebTOP,"A. Benson, S.G. Kim, J.T. Foley, *International Journal of Modern Physics C*, preprint submitted.

C. Conference Full Paper Submission

"Atomistic Simulation for Activation Sintering Mechanism of Tungsten by Additives," A. Moitra, S. Kim, S.G. Kim, S.J. Park, R.M. German, PowderMet 2007, Denver, CO, May, 2007.

"Atomistic Simulation in Powder Metallurgy," S. Kim, S.J. Park, S.G. Kim, R.M. German, MS&T '06, Cincinnati, OH, October 2006.

"Compression-After-Impact Strength Estimates for Finite Width Sandwich Panels," Y. Hwang, T.E. Lacy, 21st Annual Technical Conference, Dearborn, MI, September, 2006.

"Cyberinfrastructure for Multiscale Simulations," H. Haupt, The Minerals, Metals & Materials Society (TMS) 2007 Annual Meeting, Orlando, FL, February 25 – March 1, 2006, accepted.

"Data Repository for Ad-Hoc Collaborations Horizontally Integrated with Transformation Services," T. Haupt, A. Kalyanasundaram, G. Singh, I. Zhuk, 2nd Workshop on Grid Computing Environments at Supercomputing '06, Tampa, FL, November 2006.

"Development and Testing of MEAM Potential for Al-Mg Alloys," B. Jelinek, S.G. Kim, J.L. Houze, S. Kim, M.F. Horstemeyer, M.I. Baskes, 2007 TMS Annual Meeting & Exhibition, Symposium on Advances in Computational Materials Science and Engineering Methods.

"Development of the High Performance W-Cu Electrode," Y.S. Kwon, S.T. Chung, S. Lee, J.W. Noh, S.J. Park, R.M. German, PowderMet 2007, Denver, CO, May, 2007.

"Grid-Based System for Product Design Optimizations," T. Haupt, A. Voruganti, A. Kalyanasundaram, I. Zhuk, 2nd IEEE International Conference on e-Science and Grid Computing, Amsterdam, NL, December, 2006, accepted.

"Influence of Process Parameters on the Phase Transformation and Consequent Hardness Induced by the LENSTM Process," L. Wang, S.D. Felicelli, TMS Annual Meeting & Exhibition, Orlando, FL, February 25 – March 1, 2007.

"Linkage between Atomistic and Continuum-Based Simulations in Nanoscale Powder Metallurgy," A. Moitra, S. Kim, S.G. Kim, S.J. Park, R.M. German, *2007 TMS Annual Meeting & Exhibition*, Orlando, FL, February 25, 2007 – March 1, 2007.

"Linking Homogenization and Densification in Tungsten Heavy Alloys," G.Sethi, S.J. Park, J.L. Johnson, R.M. German, PowderMet 2007, Denver, CO, May, 2007.

"Master Decomposition Curve of Nanoparticulate-Filled Polymer," O.P. Valmika Nathan, S.V. Atre, S.J. Park, J. Simonsen, PowderMet 2007, Denver, CO, May, 2007.

"Mechanical and Physical Properties of Noval Scandium Containing Mixed Powder Sintered Aluminum," F. Findik, K. Thompson, A. Antonyraj, S.J. Park, R.M. German, PowderMet 2007, Denver, CO, May, 2006.

"Microstructure of Tungsten Copper and Model to Predict Thermal Conductivity," S.J. Park, J. Johnson, R.Yassar, Y.S. Kwon, R.M. German, R.B. Dinwiddie, W.D. Porter, PowderMet 2007, Denver, CO, May, 2007.

"Model for the Press-Sinter Processing of Ultrafine and Nanoscale Tungsten, Tungsten-Copper, and Tungsten Carbide Cobalt," R.M. German, S.J. Park, J.L. Johnson, MS&T '06, Cincinnati, OH, October, 2006.

"Modeling of Powder Metallurgy Processes – die compaction, sintering, injection molding, and pressure-assisted sintering," R.M. German, S.J. Park, The 5th Brazilian MRS Meeting 2006, Florianopolis, Brazil, October, 2006.

"Novel Methodology to Quantify Tool Wear in Powder Metallurgy," J.K. Thompson, S.J. Park, R.M. German, F. Findik, A. Antonyraj, PowderMet 2007, Denver, CO, May, 2006.

"Numerical Investigations of Mixing for Powder Injection Molding Feedstock," T.G. Kang, S.J. Park, S.V. Atre, R.M. German, PowderMet 2007, Denver, CO, May, 2007.

"Numerical Simulation of the Temperature Distribution and Microstructure Evolution in the LENS Process," L. Wang, S.D. Felicelli, Proceedings of Seventeenth Solid Freeform Fabrication Symposium SFF 2006, submitted.

"Simulation of Binder-Powder Separation in Powder Injection Molding," S. Kim, S.J. Park, S.V. Atre, R.M. German, PowderMet 2007, Denver, CO, May, 2007.

"Simulation of Micro Powder Injection Molding," K. Welch, N. Benjamin, S.J. Park, S.V. Atre, S. Ahn, R.M. German, PowderMet 2007, Denver, CO, May, 2007.

"Study of Heat Transfer Mechanisms during the LENS Process," L. Wang, S.D. Felicelli, Proceedings of Advances in Materials and Processing Technologies AMPT'2006, accepted.

"Study of Liquid-Phase Sintered, Nanosized Silicon Carbide Fabricated in a Plasma Pressure Compaction System," M. Bothara, S.V. Atre, S.J. Park, R.M. German, T.S. Sudarshan, R. Radhakrishnan, PowderMet 2007, Denver, CO, May, 2007.

"Study on Agglomeration and Brakeage Behaviors of Particles by Discrete Element Method," Y. Hammi, N. Benjamin, S.J. Park, P. Wang, R.M. German, PowderMet 2007, Denver, CO, May, 2007.

"The Requirements and Design of the Rapid Prototyping Capabilities System," T. Haupt, R. Moorhead, 2006 Fall Meeting of the American Geophysical Union, San Francisco, CA, December, 2006.

"Thermal Expansion and Viscoelastic Properties of Sintered Porous Compact," A. Antonyraj, S.J. Park, R.M.German, PowderMet 2007, Denver, CO, May, 2006.

"Tungsten Heavy Alloys as a Basis for Modeling Deformation in Particulate Composites," R.M. German, S.J. Park, MS&T '06, Cincinnati, OH, October, 2006.

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

D. Conference Abstract Submission

"A First-principles Study of GaSb(001) Surface Reconstruction," S.G. Kim, J.L. Houze, S. Kim, S.C. Erwin, APS 2006 SESAPS Meeting, Williamsburg, VA, November, 2006.

"A Moisture Diffusion Model for Natural Fiber-Reinforced Composites," Y. Xue, K. Wang, H.Zhang, M.F. Horstemeyer, 9th WPCs.

"An Examination of Local Atomic Deformation Computed by Means of a Discrete Gradient," Multiscale Materials Modeling Conference, Freiburg, Germany. September, 2006.

"Anisotropy Evolution During Sequential Thermomechanical Processing of Aluminum Alloys," R.S. Yassar, J.C. Baird, J.R. Murphy, K. Stolting, P.T. Wang, M.F. Horstemeyer, MRS '06 Fall Meeting, Boston, MA, November – December, 2007.

"Application of Artificial Neural Networks in Microstructure-Property Relationships of Materials," O. AbuOmar, R.S. Yassar, M.F. Horstemeyer, 136th TMS Annual Meeting, Orlando, FL, February, 2007.

"Application of Geometrically Necessary Dislocations in Modeling of Hardening Behavior of Precipitation Hardening Crystals," R.S. Yassar, S.D. Mesarovic, D.P. Field, M.F. Horstemeyer, P.T. Wang, MRS' 06 Fall Meeting, Boston, MA, November 27 – December 1, 2006.

"Atomistic Simulations of Activated Sintering of Tungsten by Additives," A. Moitra, S. Kim, S.G. Kim, S.J. Park, R.M. German, PowderMet 2007, Denver, CO.

"Constitutive Modeling of Compaction and Sintering for P/M Automotive Components," Y. Hammi, W. Trim, L. Arias, P.G. Allison, M.F. Horstemeyer, PowderMet 2007, Denver, CO, May, 2007.

"Decision Support System for Shop Capacity Planning Across Multiple Shipyards," P. Culver, T. Hill, J. Miller, J. Welch, C. Walden, G. Dobson, B. Coates, ShipTech 2007.

"Density Determination through X-Ray Computed Tomography in Automotive P/M Parts," L.M. Arias, Y.Hammi, M.F. Horstemeyer, PowderMet 2007, Denver, CO, May, 2007.

"Determination of Microstructure-Property Relations for Performance and Design Optimization of the P/M Process," P.G. Allison, Y. Hammi, M.F. Horstemeyer, PowderMet 2007, Denver, CO, May, 2007.

"Development and Testing of MEAM Potential for Al-Mg Alloys," B. Jelinek, S. Kim, J. Houze, S.G. Kim, M.F. Horstemeyer, M. Baskes, 73rd Annual Meeting of the Southeastern Section of the APS, Williamsburg, VA, November, 2006.

"Die Filling and Powder Transfer Modeling Using Discrete Element Methods," T. Stone, Y. Hammi, P. Gullett, M.F. Horstemeyer, PowderMet 2007, Denver, CO, May 2007.

"EBSD Characterization of Interaction Between Dislocations and Precipitate," R.S. Yassar, J.C. Baird, J.R. Murphy, K. Stolting, P.T. Wang, M.F. Horstemeyer, MRS '06 Fall Meeting, November – December, 2007.

"Fatigue Damage in Laser Engineered Net Shaping Manufactured Materials," G.P. Potirniche, J. Middleton, H. El Kadiri, H. Rhee, P.T. Wang, M.F. Horstemeyer, TMS 2007 Annual Meeting & Exhibition, Orlando, FL, February, 2007.

"Fatigue Crack Growth Mechanisms in 7075-T651 Al Alloy," H. El Kadiri, M.F. Horstemeyer, Y. Xue, ICEM 13.

"First Principles Study of FCC-HCP Interface Dynamics Under Uniaxial Tension," S. Kim, S.G. Kim, M.F. Horstemeyer, APS 2006 SESAPS Meeting, Williamsburg, VA, November, 2006.

"Flexural Modulus of Vapor-Grown Carbon Nanocomposite with Polypropylene and Wood Matrices," J.L. Shi, J. Zhang, H. Toghiani, C. Pittman, Y. Xue, 9th WPCs.

"Influence of Process Parameters on the Phase Transformation and Consequent Hardness Induced by the LENSTM Process," L. Wang, S.D. Felicelli, TMS 2007 Annual Meeting & Exhibition, Orlando, FL, February 25 – March 1, 2007.

"Internal State Variable Modeling of Structure-Property Relationships in Deformed Microstructures," M.F. Horstemeyer, K. Solanki, The Minerals, Metals, and Materials Society, 2007 TMS Annual Meeting & Exhibition, Orlando, FL, February 25 – March 1, 2007.

"Is Materials Processing a Deterministic Cause-Effect World or a Statistically Uncertain World," M.F. Horstemeyer, C. Burton, R. Yassar, K. Solanki, Materials Science & Technology, Cincinnati, OH, October, 2006.

"Micromechanical Simulation of Cyclic Plasticity at Inclusion Particles with Pre-Over Straining," Y. Xue, K. Solanki, A. Wright, M.F. Horstemeyer, AIAA, March, 2007.

"Micromechanical Simulation of Cyclic Plasticity at Inclusion Particles with Pre-Over Straining," Y. Xue, K. Solanki, M.F. Horstemeyer, AIAA, Hawaii, April, 2007.

"Microstructures and Mechanical Behavior of Biological Composite Materials for Armor Design Applications," H. Rhee, Y. Hwang, S.H. Elder, M.F. Horstemeyer, R.M. German, 2006 Materials Research Society (MRS) Fall Meeting, Boston, MA, November 27 – December 1, 2006.

"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.

"Modeling of Microstructure Evolution during LENSTM Deposition," L. Wang, H. El Kadiri, S.D.Felicelli, P.T. Wang, B. Gady, SPIE International Defense and Security Symposium, Modeling and Simulation for Military Operations II, Orlando, FL, April, 2007.

"Modeling Solidification during the Laser Engineered Net Shaping Process," L. Wang, S.D. Felicelli, 2006 MRS Fall Meeting, November 27 – December 1, 2006.

"Modeling the Onset and Evolution of Hydrogen Pores during Solidification," S.D. Felicelli, E.E. de Obaldia, C.M. Pita, TMS 2007 Annual Meeting & Exhibition, Orlando, FL, February 25 – March 1, 2007.

"Molecular Dynamics Simulations of Crack Nucleation Near Nanoparticle Inclusions," J. Houze, B. Jelinek, S.G. Kim, 73rd Annual Meeting of the Southeastern Section of the APS, Williamsburg, VA, November, 2006.

"Molecular Dynamics Simulation of Sintering of Nanopowders," A. Moitra, S. Kim, S.G. Kim, APS 2006 SESAPS Meeting, Williamsburg, VA, November, 2006.

"Molecular Dynamics Simulations of the Compressive Behavior of bcc-Fe, Fe-Cu, and Fe-Ni Nanoparticles," T. Stone, B. Jelinek, P. Gullett, S.G. Kim, M.F. Horstemeyer, PowderMet 2007, Denver, CO, May, 2007.

"Numerical Modeling of Microporosity during Solidification," E. Escobar de Obaldia, S.D. Felicelli, International Conference of Numerical Analysis and Applied Mathematics, Crete, Greece, September, 2006.

"Numerical Simulation of Hydrogen Microporosityin Aluminum Castings," S.D. Felicelli, E. Escobar, Advanced Materials and Processing Technologies, Las Vegas, NV, August, 2006.

"Numerical Simulation of the Temperature Distribution and Microstructure Evolution in the LENS Process," L. Wang, S.D. Felicelli, Seventeenth Solid Freeform Fabrication Symposium SFF 2006, Austin, TX, August, 2006.

"On the In-Grain Orientation Development in Precipitation Hardening Materials," R.S. Yassar, M.F. Horstemeyer, 136th TMS Annual Meeting, Orlando, FL, February, 2007.

"Post Katrina Response at Northrop Grumman Ship Systems Using Modeling and Simulation," C. LaRue, T. Hill, J. Miller, J. Welch, C. Walden, G. Dobson, B. Coates, ShipTech 2007.

"Postural Effects of Monocular Display Augmented Laser Digitizing," N. Littell, 10th Annual Applied Ergonomics Conference, Dallas, TX, March, 2007.

"Quantitative Uncertainty Analysis for a Mechanistic Multistage Fatigue Model," Y. Xue, K. Solanki, G. Steele, M.F. Horstemeyer, J.C. Newman Jr., AIAA, Hawaii, April, 2007.

"Redesign of a 2005 Chevy Equinox Rear Cradle for the Implementation of a Hybrid Electric Drive," C. Whitt, D. Oglesby, E.B. Jones, 2007 SAE World Congress, Detroit, MI, April, 2007.

"Reliability of Mechanistic Multistage Fatigue Model for Damage and Life Estimations," Y. Xue, K. Solanki, G. Steele, M.F. Horstemeyer, AIAA, March, 2007.

"Reliability-based Structural Optimization using a Multiscale Material Model," K. Solanki, E. Acar, M. Rais-Rohani, C. Eamon, M.F. Horstemeyer, AIAA, Hawaii, April, 2007.

"Rolling History Microstructural Analysis of Texture Gradients for 6022 Aluminum Sheet," C. Burton, M.F. Horstemeyer, P.T.Wang, R.S. Yassar, 136th TMS Annual Meeting, Orlando, FL, February, 2007.

"Simulation and Testing of a Full-Scale Composite UAV Wing," R. Sullivan, Y. Hwang, M. Rais-Rohani, T. Lacy, 48th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Waikiki, HI, April, 2007.

"Simulation of Hydrogen Porosity during Solidification," S.D. Felicelli, E.E. de Obaldia, C.M. Pita, 111th Metalcasting Congress, Houston, TX, May, 2007.

"Statistical Elastic and Creep Properties of Kenaf Fibers," Y. Xue, S. Elder, D. Shame, M.F. Horstemeyer, 9th WPCs.

"Temperature Dependence of Ductile Fracture," A. Oppedal, M.F. Horstemeyer, TMS Annual Meeting, Orlando, FL, February 25 – March 1, 2007.

"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.)

"A Multidisciplinary Workshop on Materials Characterization," R.S. Yassar, $88,000.

"A Novel Materials Design Approach based on Machine Learning Algorithms," R.S. Yassar, $100,000.

"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.

"High Temperature Reverse Bias Reliability Test System for SiC VJFETs," P. Martin, G. Tian, (two of three), $80,287.

"High Temperature Reverse Bias Reliability Test System for SiC VJFETs," P. Martin, G. Tian, (three of three), $80,287.
"Joint Anti-Terrorism Force Protection Test and Evaluation," D. Coltharp, $31,500.
"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. (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 Analysis of a Fatigue Crack Growth Model," Y. Xue, J. Newman, Jr., G. Steele, M.F. Horstemeyer, $40,291.
"Quantitative Uncertainty and Reliability of a Mechanistic Multistage Fatigue Model," Y. Xue, $400,000.
"REU Site: Multiscale High Rate Phenomena," P. Gullett, T. Stevenson, $368,679.
"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

"A Molecular Dynamics Study of Void Growth and Coalescence in Single Crystal Nickel," G.P. Potirniche, M.F. Horstemeyer, G.J. Wagner, P.M. Gullett, *International Journal of Plasticity*, available online July, 2006.
"A Non-standard Anisotropic Diffusion for Edge-preserving Noise Removal," H. Lim, N. Williams, Proceedings of the *3rd International Conference on Cybernetics and Information Technologies, Systems, and Applications*, vol. 1, pp. 87-91, 2006.
"A Novel Structural-Based Approach in Application of Neural Network Modeling to Predict the Aging Behavior of Automotive Alloys," M. Al-khedher, R.S. Yassar, C. Pezeshki, D.P. Field, *Modelling and Simulation in Materials Science and Engineering*, 14 (2006), pp. 905-921.
"A Numerical Model to Simulate Precipitate Growth and Ripening in Oxygen-Implanted Silicon-on-Insulator Materials," S.D. Felicelli, S. Seraphin, D.R. Poirier, *Modelling and Simulation in Materials Science and Engineering*, vol. 14, pp. 1197-1210 (2006).
"Analysis of Thermal Phenomena in LENSTM Deposition," L. Wang, S.D. Felicelli, *Materials Science and Engineering A,* 2006, Vol. 435-436, pp. 625-631.
"Application of Work-of-Sintering Concepts in Powder Metals," D.C. Blaine, S.J. Park, P. Suri, and R.M. German, *Metallurgical and Materials Transactions*, 2006, vol. 37A, pp. 2827-2835.

"Atmospheric Oxidation Corrosion of Sintered Artistic Bronze," R.M. German, L.G. Campbell, *Powder Metallurgy*, 2006, vol. 49, pp. 189-191.

"Densification Behavior of Tungsten Heavy Alloy Based on Master Sintering Curve Concept," S.J. Park, J.M. Martin, J.F. Guo, J.L. Johnson, and R.M. German, *Metallurgical and Materials Transactions*, 2006, vol. 37A, pp. 2837-2848.

"Detailed Linkages of Powder Characteristics to Properties in Press-Sinter Processing of Powder Metals," R.M. German, *Advances in Powder Metallurgy and Particulate Materials – 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 10, pp. 125-139.

"Development of Nano-Tungsten-Copper Powder and PM Processes," S. Lee, J.W. Noh, Y.S. Kwon, S. T. Chung, J.L. Johnson, S.J. Park, R.M. German, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 9, pp. 53-59.

"Evaluation of Metal Composite Mixes for Powder Injection Molding," F. Ahmad, R.M. German, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 9, pp. 168-180.

"Full Density via Dynamic Compaction," G. Sethi, N.S. Myers, R.M. German, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 3, pp. 14-23.

"Grain Size Measurement and Modeling for Nano-Structured Tungsten Carbide," S.J. Park, K. Cowan, J.L. Johnson, R.M. German, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 8, pp. 46-54.

"High Velocity Compaction Compared with Conventional Compaction," G. Sethi, E. Hauck, R.M. German, *Materials Science and Technology*, 2006, vol. 22, pp. 955-959.

"Innovations in Sintering - New Processes for Challenging Materials," *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 9, pp. 60-71.

"Inverse Conductivity from Full Boundary Measurements at Low Frequencies," H. Lim, *Proceedings of 2006 UK Conference on Science, Technology, and Entrepreneurship,* CD-Rom.

"Master Decomposition Curve for Binders in Die Compaction," R.K. Enneti, S.V. Atre, S.J. Park, R.M. German, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 1, pp. 55-64.

"Method of Background Subtraction for Medical Image Segmentation," S. Kim and H. Lim, *Proceedings of the 3rd International Conference on Cybernetics and Information Technologies, Systems, and Applications,* vol. 1, pp. 87-91, 2006.

"Microstructural Evolution and Observed Stress Response During Hot Deformation of 5005 and 6022 Al Alloys," P. Trivedi, R.S. Yassar, D.P. Field, *Materials Science and Engineering A*, 425 (2006), pp. 205-212.

"Microstructural Evolution of Tungsten Heavy Alloys During Heating to the Sintering Temperature," J. M. Martin, J.L. Johnson, R.M. German, F. Castro, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 5, pp. 43-58.

"Prediction of Reoxidation Inclusion Composition in Casting of Steel," L. Wang, C. Beckermann, *Metallurgical and Materials Transactions B*, 2006, Vol. 37, No. 4, pp. 571-588.

"Quantitative Prediction of Microporosity in Aluminum Castings," E. Escobar de Obaldia, S.D. Felicelli, *Proceedings of Advances in Materials and Processing Technologies, AMPT 2006*, CD proceedings.

"Reliability-Based Optimization of Lightweight Automotive Structures for Crashworthiness," M. Rais-Rohani, K. Solanki, C. Eamon, *Proceedings of the 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Portsmouth, VA, September, 2006.

"Rheological Underpinnings to Powder Injection Molding and Liquid Phase Sintering," R.M. German, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 1, pp. 26-34.

"Simulation Optimization Decision Support System for Panel Shop Operations," A. Greenwood, T. Hill , S. Vanguri, J. Miller, B. Eksioglu, C. Walden, P. Jain, publication as chapter in book titled *Decision Support system Life Cycle - Development & Applications*, ICFAI University Press, expected publication date 2007.

"Special Sintering Technologies for Nano-Structured Tungsten Carbide," S.J. Park, J.L. Johnson, R.M. German, *Advances in Powder Metallurgy and Particulate Materials - 2006*, Metal Powder Industries Federation, Princeton, NJ, 2006, Part 9, pp. 114-122.

"Stress Relaxation Behavior of Pre-Strained Solder Joints under Cyclic Straining Conditions," H. Rhee, K.N. Subramanian, *Proceedings of 2006 UK Conference on Science, Technology, and Entrepreneurship*, CD-ROM.

"Study of Heat Transfer Mechanisms during the LENS Process," L. Wang, S.D. Felicelli, *Proceedings of Advances in Materials and Processing Technologies, AMPT 2006*, CD proceedings.

B. Presentations

"48 foot "MAG-I-Beam" Trailer Study," B. Jones, D. Oglesby, K. Solanki, E. Marin, G. Dennis, Wade Services, Inc., Ellisville, MS., September, 2006.

"A Distributed Prototyping Environment for Human Language Technology," J. Baca (presenter), T. Stanley, M. Liu, J. Picone, IEEE International Symposium on Signal Processing and Information Technology, Vancouver, Canada, August, 2006.

"A Hierarchical Examination of the Rabbit Patellar Tendon," L.N. Williams, 7th World Congress on Computational Mechanics, Los Angeles, CA, July, 2006.

"A Non-standard Anisotropic Diffusion for Edge-preserving Noise Removal," contributed paper session, The 3rd International Conference on Cybernetics and Information Technologies, Systems and Applications, Orlando, FL, July, 2006.

"A Unified Language Model Architecture for Web-based Speech Recognition Grammars," J. Baca (presenter), W. Holland, D. May, G. Lazarou, J. Picone, IEEE International Symposium on Signal Processing and Information Technology, Vancouver, Canada, August, 2006.

"An Examination of Local Atomic Deformation Computed by Means of a Discrete Gradient," P.M. Gullett, Multiscale Materials Modeling Conference, Freiburg, Germany, September, 2006.

"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.

"Architecture for a Secure Distributed Repository," T. Haupt (presenter), A. Kalyanasundaram, I. Zhuk, The 7th IEEE/ACM International Conference on Grid Computing, Barcelona, September, 2006.

"CAVS and Importance of Math & Science," C. Walden, CAVS Extension, Canton, MS, presentation to 7th grade Math & Science Students, July, 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.

"Compression-After-Impact Strength Estimates for Finite Width Sandwich Panels," Y. Hwang, T.E. Lacy, 21st Annual Technical Conference, Dearborn, MI, September, 2006.

"Design Regression for Identification of Optimal Components for Metal Powder Injection Molding," R. German, invited presentation, 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

"Detailed Linkages of Powder Characteristics to Properties in Press-Sinter Processing of Powder Metals," invited seminar, Catedra Randall German en Pulvimetalurgia, Universidad Internacional Menendez y Pelayo, Palacio de la Magdelena, Santander, Spain, July, 2006.

"Development and Implementation of a Control System for a Parallel Hybrid Powertrain," J. Mathews, K. Walp, M. Molen, 2006 Vehicle Power and Propulsion (VPP) Conference, Windsor, England, U.K., September,2006.

"Development of Nano Tungsten-Copper Powder and PM Process," R. German , S. Lee, J.W. Noh, Y.S. Kwon, S.T. Chung, J.L. Johnson, S.J. Park, presented at the 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

"Development of Titanium Powder Injection Molding: Experiment and Simulation," R. German S.J. Park, Z. Xin Y. Wu, G. Gai, X. Zou, K.S. Kwon), presented at the 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

"Energy Conversion Systems, Manufacturing Process Evaluation," V. Branch, C. Walden, July, 2006.

"Hybrid Electric Vehicle Modeling in Generic Modeling Environment," S. Musunuri, W. Gao, Vehicular Power and Propulsion (VPP) Conference, Windsor England, U.K., 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.

"Inverse Conductivity from Full Boundary Measurements at Low Frequencies," contributed paper session, UK Conference on Science, Technology, and Entrepreneurship, Teaneck, NJ, August, 2006.

"Mapping Particle Size Distributions into Predictions of Properties for Powder Metal Compacts," R. German, presented at the 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

"Metal Powder Injection Molding," R. German, invited seminar, Basic Short Course, Metal Powder Industries Federation, State College, PA, July, 2006.

"Microminiature Functional Parts by Powder Injection Molding of Metals and Ceramics," S. Ahn, S.T. Chung, S.J. Park, R.M. German, WCSE 2006, Seoul, Korea, July, 2006.

"Mississippi State University cX," D. Oglesby, MDA, CAVS, August, 2006.

"Mississippi State University cX," D. Oglesby, presented to Ron Eisenhour of Nissan, CAVS, August, 2006.

"Mobile Computing Usability Research at CAVS," J. Baca, Applied Cognitive Science Seminar Series, Mississippi State University, September, 2006.

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

"Modeling-Based Rate-Controlled-Sintering Process for Nanostructured Materials," S.J.Park, R.M. German, US-Korea Conference 2006, Teaneck, NJ, August, 2006.

"Numerical Modeling of Microporosity during Solidification," E.E. de Obaldia, S.D. Felicelli, International Conference of Numerical Analysis and Applied Mathematics, ICNAAM 2006, Hersonissos, Crete, Greece, September, 2006.

"Numerical Simulation of the Temperature Distribution and Microstructure Evolution in the LENS Process," L. Wang, S.D. Felicelli, Y. Gooroochurn, P.T. Wang, M.F. Horstemeyer, Seventeenth Solid Freeform Fabrication Symposium, SFF 2006, Austin, TX, August, 2006.

"Numerical Simulation on Laser Engineered Net Shaping (LENSTM) Process," L. Wang, Invited Presentation, Nevada Center for Advanced Computational Methods, University of Nevada, Las Vegas, NV, August, 2006.

"Overview of Powder Metallurgy," R. German, invited seminar, Basic Short Course, Metal Powder Industries Federation, State College, PA, July, 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.

"Powder Injection Molding Research at CAVS Targeting Metal and Ceramic Molding Using Plastic Technology," R. German, keynote presentation, Industrial Tooling 2006, Center for Manufacturing Technology Excellence, East Mississippi Community College, Mayhew, MS, September, 2006.

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

"Processing of Ceramic Nanoparticles: An Integrated Approach," S.V. Atre, G. Jovanovic, S.J. Park, M. Bothara, K. Jain, Valmikanathan O.P., and C.Wu, The ONAMI Micro Nano Breakthrough Conference (MNBC) 2006, Vancouver, WA, July, 2006 (poster presentation).

"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.

"Quantitative Prediction of Microporosity in Aluminum Castings," E. Escobar de Obaldia, S.D. Felicelli, Advances in Materials and Processing Technologies, AMPT 2006, Las Vegas, NV, July 30 – August 3, 2006.

"R&D Strategy for Tungsten Powders," R. German, presented to ATI Metalworking Products, Huntsville, AL, August, 2006.

"Reliability-based Optimization of Lightweight Automotive Structures for Crashworthiness," M. Rais-Rohani, K. Solanki, and C. Eamon, AIAA 2006-7004, 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Portsmouth, VA, September, 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.

"Stress Relaxation Behavior of Pre-Strained Solder Joints under Cyclic Straining Conditions," H. Rhee, US-Korea Conference 2006, Teaneck, NJ, August, 2006.

"Study of Heat Transfer Mechanisms During the LENS Process," L. Wang, S.D. Felicelli, Advances in Materials and Processing Technologies, AMPT 2006, Las Vegas, NV, July 30 – August 3, 2006.

"Study of Liquid-Phase Sintered, Nanosized Silicon Carbide Fabricated in Plasma Pressure compaction System," M. Bothara, S.J. Park, and S. V. Atre, The ONAMI Micro Nano Breakthrough Conference (MNBC) 2006, Vancouver, WA, July, 2006 (poster presentation.

"Technical and Economical Comparison of Micro Powder Injection Molding," R. German, S.J. Park, S. Atre, C. Wu, C.J. Hwang, R. Zauner, presented at the 2006 Powder Metallurgy World Congress, Busan, Korea, September, 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.

"The Status of P/M and PIM in the USA," invited presentation, R. German, Primer Congreso Espanol de Pulvimeturgia (First Spanish Powder Metallurgy Congress), Universidad Carlos III de Madrid, Legenes, Madrid, Spain, July, 2006.

"Training of Pipe Shop Decision Support System at Northrop Grumman Ship Systems," T. Hill, J. Miller, Pascagoula, MS, September, 2006.

"Tutorial on Electrical Contacts Fabricated by Powder Metallurgy," R. German, invited seminar, Cummins Power Generation, Findley, MN, July, 2006.

"Unified Molding and Simulation for Nanostructured Tungsten Carbide," R. German, S.J. Park, J.L. Johnson, presented at the 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

"Various Master Sintering Curve Concepts and Its Applications," R. German, S.J. Park, D. Blaine, presented at the 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

"Welcome and Overview of the Center for Advanced Vehicular Systems," R. German, presented to Powder Metallurgy Program, US Advanced Materials Program for US Car, Starkville, MS, August, 2006.

"X-Ray Analysis of Small Motor Assembly," L. Simmons, C. Walden, presented to Energy Conversion Systems, Pelahatchie, MS, August, 2006.

C. Research Supervision

"Hybrid Electric Vehicle Modeling in Generic Modeling Environment," Shravana Musunuri, MS Thesis, Electrical & Computer Engineering, Mississippi State University, December, 2006, David Gao.

D. Grant and Proposals

1.Submitted Proposals Awarded – Totaling $543,537

"A Multidisciplinary Workshop on Materials Characterization," G.T. Munn, R.S. Yassar, H. El-Kadiri, CAVS Initiatives, July, 2006 – June, 2007, $78,000.

"A Novel Materials Design Approach based on Machine Learning Algorithms," R.S. Yassar, E. Hansen, CAVS Initiatives,July, 2006 – June, 2007, $90,000.
"MOA Between MSU/CAVS and MS Department of Education, Office of Vocational and Technical Education, V. Branch, $5,736.98.
"USDOL: Workforce Development Training Quality Assessment," Z. Rowland, J.S. Calhoun, $369,800.

2.Continuations – Totaling $816,570

"Challenge X: Crossover to Sustainable Mobility," M. Molen, Amercian Society for Engineering Edcuation, Inc., $2,000.
"Challenge X: Crossover to Sustainable Mobility," M. Molen, General Motors Research & Development Center, $12,750.
"Modeling High-Rate Material Responses for Impact Applications," M.F. Horstemeyer, P. Wang, P. Gullett, Battelle Corp., September 10, 2006 – September 11, 2007, $502,669.
"Materials Modeling and Airborne Validation Support for MIMR," M.F. Horstemeyer, P. Wang, G. Portirniche, Miltec Corp., July, 2006 – August, 2007, $90,464.
"Shipyard Simulation-Optimization Decsision Support Sistem (DDS) for Lead-Time Reduction," C. Walden, Northtrop Grumman Mission Systems, $76,168.
"Simulation Environment for FSSIM," T. Haupt, SAIC, $64,012.
"Tungsten-Polymer Formulations," R.M. German, Alldyne Power Technologies, $68,507.

E. Participation

B. Jones, D. Oglesby, K. Solanki, E. Marin, G. Dennis, Wade Services, Inc., Ellisville, MS., discussed 48 foot "MAG-I-Beam" Trailer Study.
CAVS-E, Hosted "Mississippi 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, Attended SAE-DHM 2006 Conference, Lyon, France, July, 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. Carruth, Hosted J.C. LeMentec of Caterpillar, for digital human modeling discussion, August, 2006.
D. Carruth, Hosted R. Carruth and J. Vickers of NASA MSFC Materials and Processes Lab, August, 2006.
D. Norman, Attended Southern Automotive R&D Working Group Meeting, Birmingham, AL, August, 2006.
D. Norman, R. Sheely, S. Puryear, Attended Mississippi Department of Transportation (MDOT) "Safety Summit," Hinds Community College, August, 2006.
D. Norman, Attended Mississippi Department of Education, "Discovery Taskforce Committee" meeting, Jackson, MS, September, 2006.

D. Norman, Participated in "Workforce Development Round Table Event," 6th International Conference on Industrial Tooling, CMTE, East MS Community College, September, 2006.

D. Oglesby, Attended and participated in Challenge X Year Two Competition in Mesa, AZ, May 30 – June 10, 2006

G.P. Potirniche, Attended Symposium on Materials Damage Prognosis and Lifecycle Engineering, Snowmass, CO, July, 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.

L. Wang, Attended NSF Summer Institute on Nano-Mechanics and Materials: Northwestern University, Sponsored by NSF, Chicago, IL, August, 2006.

M. Molen, A. Card, A. Tigert, Attended and manned booth, 2006 Radar Power Program (CAVS, DTI, and SemiSouth), Space Missile Defense Conference and Exhibition, Huntsville, AL, August, 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 Pontifícia 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.

R. German, Session Chair (with Sang-Ho- Ahn), "Micro Powder Injection Molding and Nanopowders," 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

R. German, Session Chair (with Man Soo Choi), "Powder Synthesis and Characterization," 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

R. German, Keynote Presentation Chair, "A New Development: Powder Metallurgy with Glasses and the Resulting New Automatic Structures," 2006 Powder Metallurgy World Congress, Busan, Korea, September, 2006.

R.S. Yassar, Attended Workshop on Multiscale Mathematics of Materials: University of Puget Sound, Seattle-Tacoma, WA, sponsored by DOE, PNNL, WSU and Oregon State University, OSU, May, 2006.

R.S. Yassar, Attended workshop on Multiscale Mathematics of Materials: University of Puget Sound, sponsored by DOE, PNNL, WSU and Oregon State University (OSU), Seattle-Tacoma, WA, May, 2006.

R.S. Yassar, Attended Nano-Mechanics and Materials: Northwestern University, sponsored by NSF, Chicago, IL, August, 2006.

R.S. Yassar, Attended Advanced Orientation Microscopy: CAVS, sponsored by TSL-EDAX, Starkville, MS, July, 2006.

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, Participation in "The ONAMI Micro Nano Breakthrough Conference (MNBC) 2006," presentation of two posters, visit Oregon State University (Prof. Sundar V. Atre) to discuss papers and future collaboration, Vancouver, WA, July, 2006.

S.J. Park, Participation in "US-Korea Conference on Science, Technology, and Entrepreneurship (UKC) 2006," presentation of one poster, significant networking activities with Korean universities and institutes Teaneck, NJ, August, 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, Participation in "Powder Metallurgy (PM) 2006," five presentations, Busan, 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

L. Wang, NSF Fellowship (2006): Summer Institute on Nano-Mechanics and Materials at Northwestern University.

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

R.S. Yassar, Listed in Who's Who in America (2007).

R.S. Yassar, NSF Fellowship (2006): Summer school on the Nano-Device Characterization and Modeling at Northwestern 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

J. Baca, NSF Panel Review, August, 2006.
L. Williams - Session Co-Chair—7th World Congress on Computational Mechanics, Symposium on Multiscale Nano-and Bio-mechanics and Materials, 2006.
L. Wang, Reviewed a paper for the International Journal of Materials and Product Technology.
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:
R.S. Yassar, S. Agnew, J. Liu, Advances in Microstructure-based Modeling and Characterization of Deformation Microstructures, 136th Annual Meeting, The Minerals, Metals and Materials Society, Feb 25-March 1, 2007, Orlando, FL, Sponsored by: Texture and Microstructure Committee of ASM International.
R.S. Yassar, Reviewship for International Journal of Plasticity.
R.S. Yassar, Session Chair Invitation, 136th Annual Meeting of TMS, Orlando, FL, February 25 – March 1, 2007.
S. Felicelli, NSF Proposal Review Panel, Thermal Transport and Thermal Processing Program (CTS) and Materials Processing and Manufacturing Program (DMI), NSF Headquarters, Arlington, VA, May, 2006.
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.
Y. Xue, Reviewed paper for Journal of Engineering Materials and Technology.

H. Other Activities

C. Burton, "Failure Analysis of a Cast A380 Aluminum Alloy Casting Using a Microstructurally Based Fatigue Model," CAVS Internal Report, MSU.CAVS.CMD.2006-R0011.
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 Sigman 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 C. Adams-Price and Experimental Psychology class, 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 and B. Laffoon, Training Officers for Starkville Police Department, July, 2006.

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.

E. Escobar, "Development (Technische Entwicklung)," August – December, 2006.

E. Escobar, Intern – Volkswagen AG, Wolfsburg, Germany, August – December, 2006.

G. Dennis, Trip to Faurecia's plant in Cleveland, MS, to meet key managers and discuss preliminary "Six Sigman Kaizen" proposal, August, 2006.

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 Joints," CAVS Internal Report, MSU.CAVS.CMD 2006-R0023, August, 2006.

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^{TM} Process," CAVS Internal Report, MSU.CAVS.CMD.2006-R0014.

R. Sheely, 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 Report, MSU.CAVS.CMD 2006-R0016, September, 2006.

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.

Y. Hammi, T.W. Stone, L.M. Airas, M.F. Horstemeyer, P. Wang, "Powder Metal Performance 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.