EXECUTIVE SUMMARY

In the fourth quarter of the 2008 academic year, CAVS has secured a stable condition as evident by the graduation of several students, completion of several “initiative” projects, and placement of six staff into senior management or tenure-track positions. With the program maturation, CAVS is focusing on research and development projects to better match its mission as an interdisciplinary center that provides team-based solutions for complex issues associated with human mobility. During April – July 2008, CAVS faculty and staff proposal activities included 13 awards totaling $4,817,915 and 5 continuation awards totaling $2,169,270. This gave a net award inflow of $6,987,185 while CAVS had a net expenditure of $3,983,303.

CAVS research support for the quarter included:
- 9 academic faculty
- 23 research associates
- 9 postdoctoral fellows
- 52 graduate students
- 66 undergraduate students
- 12 administrative professionals
- 8 administrative staff

Highlights from the detailed report include the following:
- 10 proposals, totaling $4,323,628 were submitted for future funding
- CAVS staff submitted 12 articles and 3 books for publication, and 14 conference submissions
- During the same time CAVS was responsible for
  - 20 published articles
  - 1 published book
  - 13 presentations

The following PI’s and Co-PI’s submitted proposals:
- Arockiasamy, Antonyraj - 1
- Haupt, Tomasz - 2
- Marin, Esteban - 1
- McGinley, John - 1
- Rowland, Zach - 1
- Carruth, Daniel - 1
- King, Roger - 2
- McCarter, Kelli - 1
- Park, Seong Jin - 1
- Coltharp, Dave - 1
- Littell, Neil - 2
- McFadyen, Gary - 1
- Reeves, Kari - 1
I. Accomplishments
A. Grants and Proposals

1. Submitted Proposals Awarded – Totaling $4,817,914.51
   - “Investigation of the Effects of Increased Coverage Area for Soft Body Armor,” Carruth, D., Lawrence Technological Institute, $24,790.
   - “Joint Combat Outpost Quick Reaction Test (JCOP QRT) Support,” Coltharp, D., Sentel, $120,901.
   - “NEES Computational Simulation: SimPort,” Haupt, T., NEES Consortium, $75,000.
   - “Simulation Environment for FSSIM-Shadwell Forward Database Extension,” Haupt, T., Naval Research Laboratory, $92,514.
   - “Vehicle Performance Monitoring System for MDOT Law Enforcement,” Rowland, Z., Crocker, M., Reeves, W., Mississippi Department of Transportation, $139,811.

2. Continuations – Totaling $2,169,270.02
   - “ChallengeX: Crossover to Sustainable Mobility,” Molen, M., McAlpin, A., General Motors Research & Development Center, $5,000.
   - “REU Site: Multiscale High Rate Phenomena,” Gullett, P., Stevenson, T., National Science Foundation, $98,600.
B. Publications

Articles in Trade Journals and Popular Press


Peer-Reviewed Journals


**Book or Book Chapter**


**Peer-Reviewed Conference Papers**


Peer-Reviewed Conference Abstracts

Peer-Reviewed Conference Posters

Technical Report

Non-Refereed Conference Papers
• “FireGUI: A Software Tool for Predicting Fire and Smoke Spread on Ships,” Henley, G., Haupt, T., Parihar, B.S., Williams, F.W., Biloxi, MS, American Society of Naval Engineers, April 2008.

Non-Refereed Conference Abstracts

Non-Refereed Conference Posters
• “Simulation Environment for Onboard Fire and Smoke Propagation Model,” Haupt, T., Henley, G., Parihar, B.S., Austin, TX, Electric Ship Research and Development Consortium, May 2008.
C. Presentations

- “Armored Vehicle Development at Navistar Defense in West Point, MS,” Dennis, H.G., Columbus Officers Club, Columbus, MS, April 2008.

D. Awards & Recognition

II. Activities

A. Proposal Submissions

- “Joint Combat Outpost Quick Reaction Test (JCOP QRT) Support,” Coltharp, D., Sentel.
- “Methods for Homogenous Dispersion of Nanoparticles in Mg Matrix,” Antonyraj, A., NineSigma.

B. Publication Submissions

Book or Book Chapter


Articles in Trade Journals and Popular Press


Peer-Reviewed Journals


**Peer-Reviewed Conference Papers**

Technical Report

C. Participation
Special Guest
• Kirkland, R., hosted Ken Baker, retired Director of Research for General Motors, who visted CAVS and spoke about the future of the automotive industry to the staff. Ken also provided insight on areas of research that CAVS should focus upon, April 2008.
• Park, S.J., hosted Dr. Seokyoung Ahn, Assistant Professor at University of Texas Pan American, visited CAVS and gave a presentation, had two meetings with CMD and MP, April 2008.
• Branch, V., Technology Skills Association Competition Judge, April 2008.
• Branch, V., Jackson Public Schools presentation to seniors at Jackson Career Development Center, May 2008.
• Branch, V., Guest speaker at graduation ceremony for Madison Vocational Center, May 2008.
• Branch, V., Special Guest to American Association for Blacks (AABE) in Energy banquet. AABE is a program supporter for STEP, May 2008.

Visit
• Kirkland, R., met with Fred Williams, Director of Safety and Survivability, with NRL to determine the strategy for FSSIM and the scope of work for this year's funding, April 2008.

Meeting/Discussion
• Branch, V., presentation to Jim Hill High School seniors, April 2008.
• Branch, V., met with JSU Engineering Dept about scholarships for STEP seniors, April 2008.
• Branch, V., advisory meeting with Madison Vocational Center, May 2008.
• Brown, D., McCarter, K., Riddle, M., attended “Export Control Regulations Seminar” at CAVS, presented by Nick Miller, April 2008.
• Horstemeyer, M., Clayton, D.J., Field, D., III, D., Khaleel, D.M., Potirniche, D., Sarma, D., Spearot, D., Srivilliputhur, D., Chiesa, D., Bingert, D., Bammann, D., El Kadiri, H. Johnson, D., Nemat-Nasser, D.S., Wright, D.T., Zbib, D., Al-Rub, D., Barton, D.N., Voyiadjis, D., The “Symposium of Predictive Science & Technology in Materials & Mechanics” is the first in a series of three to be held over the next three years. It is designed to bring together top researchers in the fields of materials and mechanics in both modeling and experimentation at all link scales. Recognizing the importance of perceived impact in the area of mechanics and materials, we also had a panel discussion whose goal was to improve all of our efforts in that endeavor. The discussion included the possibilities of sharing graduate students, post-docs and improving knowledge of each other’s research efforts to improve recognition, June 2008.
• Kirkland, R., Molen, M., arranged a meeting with Mike McGrevey to brief him on the proposed Plugin Hybrid Project at MSU and solicit support from administration, May 2008.
• Kirkland, R., presentation of CAVS Capabilities to the Starkville Lion's Club, June 2008.
• Kirkland, R., attended the 2008 Gulf Coast Trade Conference, sponsored by the Mississippi Development Authority. Met with industries from Alabama, Louisiana and Mississippi, April 2008.
• Kirkland, R., met with the Mississippi Transportation Coalition in Jackson, MS to continue development of the Transportation and Energy Plan for the State, April 2008.
• Kirkland, R., Henley, G., attended the 2008 ASNE Shipbuilding Conference where CAVS was asked to make a presentation of the FSSIM, April 2008.
• Kirkland, R., met with Sturgis Trailer Company to order the trailer for MSU’s Motorsports Programs. Funding for the trailer was generated through the Cx Program, April 2008.
• Kirkland, R., arranged and hosted the CAVS's Steering Committee, May 2008.
• Kirkland, R., participated in the 2008 Challenge X Competition event in Baltimore, MD and Washington D.C. The MSU Team won the overall competition for 2008 and the trophy was presented to the team by the Secretary of Energy, May 2008.
• Kirkland, R., met with Ultra Life Corporation to discuss joint participation on research projects regarding automotive hybrid technology. Met with Robert Wise, Director of Research and Michael Braband, Program Manager for Government and Defense, May 2008.
• Kirkland, R., Rowland, M., met with Mike Ford, CFO and Jamie Williamson, Technical manager with LeFleur Transportation Corporation regarding CAVS' Vehicle Performance Monitoring System, June 2008.
• Kirkland, R., attended the MS Transportation Coalition meeting in Jackson; and was asked to provide technical input for the proposed the State's Transportation Plan, June 2008.
• Kirkland, R., Young, M., Philips, S., exhibited the ChallengeX Vehicle at the 2008 Freescale Technology Forum in Orlando, FL, with all expenses paid by Freescale. Freescale proposed to sponsor a Controls Lab at MSU, June 2008.
• Kirkland, R., Molen, M., Cx Students, assisted in exhibiting the Cx Vehicle at the MS State Capital where a resolution was presented to the Cx Team, June 2008.
• Kirkland, R., Molen, M., Cx Students, University Relations, assisted in exhibiting the Cx Vehicle in Meridian MS, as part of the Victory Lap around the State, June 2008.
• Kirkland, R., Toghiani, H., hosted the 2008 Annual Meeting for the Mississippi Society for Plastic Engineers. Provided a tour of CAVS for the attendees, April 2008.
• Park, S.J., traveled to NSF with (Dr. Donna Reese) to have meetings with NSF program officers, Washington DC, April 2008.
• Park, S.J., traveled to Korea to have meetings with POSTECH, Hyundai, CetaTech, SKKU, ADD for Medical micro PIM workshop in March 2009 and DOE In-Kind Collaboration, April/May 2008.
• Park, S.J., participated in Seminar on Nano/Micro manufacturing at Northwestern University, Evanston, IL, June 2008.
• Park, S.J., visited to KUSCO (Korea-US Science Cooperation Center) for discussing US-Korea workshop on micro PIM for medical application, Vienna, MD, June 2008.
• Park, S.J., participated in Symposium of Predictive Science & Technology in Mechanics & Materials, Mississippi State University, June 2008.

Peer Recognition
• Park, S.J., presented “Benefits to Industry from Simulation of Polymer Processing: Cost Reduction and Quality Improvement” as keynote speaker in Society of Plastics Engineers Chapter 2008 Meeting, CAVS, MSU, April 2008.

Service
• Branch, V., Computer Simulations Trials, April 2008.
• Branch, V., media interview with Clarion-Ledger about the STEP program. Published on May 25, 2008 special edition, May 2008.
• Branch, V., ASQ testing, June 2008.
• Kirkland, R., Molen, M., assisted in arranging support for the proposed MSU Hybrid Bus Project. Researched and identified funding for the project through EPA, May 2008.
• Simmons, L., Kaler, G., utilized the CMM to analyze the failure mode of a seatbelt bracket. Then proceeded to use the CMM results to prove there was out of spec variation that needed to be pushed back to the manufacturer, May 2008.
• Simmons, L., Dennis, G., provided Launch support at Navistar Defense for the Afghan Vehicle. This includes Layout design and equipment installation, May 2008.
• Simmons, L., Holt, R., used previously recorded data to provide a new cellular manufacturing plan and layout to Harrison Manufacturing, LLC, June 2008.

Other
• Branch, V., Sardin, E., MS Technology Education Conference, April 2008.
• Brown, D., enrolled in “Introduction to C# Programming” course offered through MSU Distance Learning, April 2008.
• Hill. T. W., attended Principles of Lean for Job Shops Workshop and became NIST certified trainer in Principles of Lean for Job Shops, June 2008.
• Hill. T. W., taught Mintab as part of CAVS Extension Six Sigma workshop, April 2008.
• Hill. T. W., Greenwood, A., delivered Flexsim software training to GE Aerospace engineers to aid in designing GE's new Batesville, MS facility, May 2008.
• Kirkland, R., McAlpin, A., CAVS had over 23 media releases about CAVS and Challenge X for the 4th Quarter. There were additional coverage that were difficult to quantify due to distribution by the Dept of Energy, utility companies, state agencies and professional and trade publications, April 2008.
• Thomas, M., Conference session co-chair of the Perceptual, Behavioral, and Cognitive Modeling technical session at the Society for Automotive Engineers Digital Human Modeling for Design and Engineering Conference, Pittsburgh, PA, June 2008.
• Thomas, M., attended the Regional Counter Terrorism Academy and collected data (BJA grant activity) during the Advanced Law Enforcement Rapid Response Training program provided by Mississippi Department of Public Safety and Homeland Security, June 2008.

F. Tours
• Kirkland, R., Dr. Clinton Graves, June 2008.
• Kirkland, R., Aron Smith, June 2008.