Members of the National Visiting Committee for the NSF ATE Center for Advanced Automotive Technology (CAAT) at Macomb Community College review the CAAT’s goals and strategies, comment on first year accomplishments and progress, and offer observations and recommendations for the NSF, as well as CAAT leadership and staff.
CAAT National Visiting Committee Report

Date: 30 January 2014
Location: Macomb Community College, Warren, MI

Members Present:
- **Deborah M. Dawson**, P.E., Director, School of Computer, Electrical, Energy & Survey Systems, Ferris State University
- **Kristin Dziczek**, Director and Assistant Research Director, Center for Automotive Research [NVC Chairperson]
- **Brad McNett**, Senior Program Advisor, HTUF, Program Manager, National Automotive Center, TARDEC
- **Monica Pfarr**, Principal Investigator, Weld-Ed, national Center for Welding Education and Training, Lorrain County Community College (CAAT NVC Member)

CAAT Staff Present:
- **Bob Feldmaier**, Co-Principal Investigator, Director, CAAT, Macomb Community College
- **Douglas Fertuck**, Assistant Director, CAAT, Macomb Community College
- Sharon Griffith, Program Manager, CAAT, Macomb Community College (via phone)
- **Dr. Y. Gene Liao**, D. Eng., Co-Principal Investigator, CAAT, Associate Professor, Division of Engineering Technology, Wayne State University
- **Scott Palmer**, Co-Principal Investigator, Macomb ISD CTE Consultant
- **Joseph Petrosky**, Principal Investigator, CAAT, Dean, Engineering & Advanced Technology, Macomb Community College
- **Dr. James Sawyer**, Vice President and Provost, Learning Unit, Macomb Community College
- **Dr. C.P. Yeh**, Ph.D., Co-Principal Investigator, Director, Chair, Division of Engineering Technology, Wayne State University

Others Present:
- **Dr. Debra D. Bragg**, Professor, Department of Educational Organization and Leadership, College of Education, University of Illinois at Urbana-Champaign (CAAT Evaluator)
- **Sherry Doherty**, Assistant Director, Communications, Macomb Community College
- **Mary Hojnacki**, Program Manager, Macomb Community College
- Gerhard Salinger, Program Officer, National Science Foundation (via phone)
- **Dr. Eboni Zamani-Gallaher**, Associate Professor and Coordinator, Graduate Certificate Program in Community College Leadership, Eastern Michigan University (CAAT Evaluator)

Others Not in Attendance:
- **Christopher Czak**, Webmaster, CAAT, Macomb Community College
- **Michael McMillan**, Project Coordinator, CAAT, Macomb Community College
- **Kevin Mull**, Vice President—Business Development, Bosch
- **Pam Sherwood**, Technical Assistant
Introduction:
The Center for Advanced Automotive Technology (CAAT) National Visiting Committee (NVC) met on Thursday, 30 January 2014. CAAT leadership provided the NVC with information and data to assess the current status of this NSF ATE Center. This report reviews the CAAT’s stated goals and strategies, the Center’s activities during the past year, and the NVC’s observations and recommendations for the CAAT team and NSF.

CAAT Strategy:
The stated purpose of the CAAT is to: “Advance the preparation of skilled technicians for automotive industry jobs now developing and producing more fuel efficient, environmentally friendly vehicles.” The Center currently focuses on technologies including: hybrid electric (HEV), plug-in/extended range electric (PEV) and electric vehicles (EV); alternative fuel vehicles including those running on advanced clean diesel, compressed natural gas (CNG), and liquefied petroleum gas (LPG); and fuel cell vehicles (FCV). The NVC views the education and training of technicians to work in these—and other—new and emerging vehicle technology areas as a critical industry need.

Briefly, the CAAT lists the following as its goals and objectives:

1. Generate an advanced automotive technology learning environment.
2. Increase awareness and understanding of advanced automotive technologies.
3. Engage regional institutions and businesses in collaborative activities.
4. Institute an Advanced Automotive Technology website for curriculum dissemination.
5. Create an effective sustainability plan.

The CAAT’s goals are both comprehensive and critical to addressing identified industry and workforce needs in powertrain and propulsion technology education and training. The NVC strongly supports the CAAT’s seed funding model, as this creates ownership of and buy-in for the Center’s work; provides a mechanism for other institutions to invest in the resources developed; efficiently builds system capacity; helps to meet industry needs in a more strategic, creative, and comprehensive manner; and expands the overall reach of the CAAT.

CAAT Year 3 Accomplishments and NVC Observations:
Through the CAAT, Macomb Community College (MCC) and Wayne State University (WSU) have implemented a vast majority of what it set out to accomplish in Year 3, and there is strong evidence that the CAAT staff are achieving many of the goals the Center set out to accomplish in Year 3.

Goal 1: Generate an advanced automotive technology learning environment
By collaborating with other educational institutions and industry partners, CAAT works to identify and fund curriculum development in areas of critical need. Through their innovative seed funding model, CAAT awarded grants to two colleges/universities and two secondary education institutions for course and program development focused on electric vehicles and battery technology. CAAT staff also consulted with a number of other potential partners during Year 3 to help develop future seed funding courses and programs. CAAT sponsored a seed funding break out session at its annual conference, which led to signed contracts on four new proposals. The CAAT curriculum development is even more
robust this year, and covers a wide range of electric vehicle technologies, including fueling and the grid, components and batteries, integrated vehicles, and vehicle maintenance and repair.

CAAT staff stayed abreast of the latest technology developments, by participating and attending a number of industry and educational conferences and events. CAAT partners at WSU presented papers at ASEE Conference for Industry and Education Collaboration, and won a Best Poster award for its research poster at the SAE World Congress. CAAT also sponsored booths at SAE World Congress, and co-sponsored the SAE Workforce Development Summit. In addition, CAAT disseminated the latest auto industry trends through its annual conference that drew nearly 100 attendees representing industry, government, university, college, and area high schools. Attendees reported a high level of value from attending the conference.

CAAT partner Wayne State University offered professional development to university faculty, community college instructors, high school STEM teachers through a 2-day short course for electric drive vehicle technology and advanced energy storage system technology.

MCC has articulation agreements with WSU and a number of other schools that provide seamless educational pathways (2+2+2) for students. MCC has agreements with Ferris State University, Michigan Technological University, Northern Michigan University, Saginaw Valley State University, and University of Detroit-Mercy. Agreements were expanded across the Southeast Michigan Community College Consortium (SMC3) partners in Year 3, and now include Oakland Community College, Henry Ford Community College, Mott Community College, and Washtenaw Community College. Additionally, there are 20 agreements in place with regional high schools linking students to an Associate Degree in Automotive Technology.

The partners are continue to successfully leverage the NSF CAAT grant with a number of other grants from different sources that are related to electric vehicle technology. This leveraging helps expand the reach of the CAAT beyond what is possible under the base ATE grant.

**Goal 2: Increase awareness and understanding of advanced automotive technologies.**

The CAAT has shown tremendous effort and creativity in sponsoring events for secondary school students and the public to gain a greater understanding of advanced automotive technologies. Through student sponsorships, ride and drive events, summer hands-on camps and activities, as well as conference participation and booth displays, CAAT has reached thousands of people. A Hybrid and Electric Vehicle Summer Academy aimed at high school students helped raised the level of interest in careers in this area, and outreach workshops for K-12 teachers are ongoing annual events. Now that the content has been developed, the outreach to first responders has been transferred to another department. WSU has worked through its University Bound program to sponsor programs serving underrepresented and financially disadvantaged populations.

**Goal 3: Engage regional institutions and businesses in collaborative activities.**

CAAT leadership has developed strategic industry partnerships with the major automakers in the region (Chrysler, Ford, GM, Toyota), as well as many first tier suppliers. CAAT staff also engages industry partners through a number of organizations in which industry is a partner, such as the Michigan Academy for Green Mobility Alliance, the Center for Automotive Research Affiliates Program, Design and Manufacturing Alliance, Clemson University’s CA2VES ATE center on visualization, and SAE. CAAT
has also formed an Industry Advisory Council, comprised of high-level representatives of Robert Bosch, Continental AG, Chrysler, Delphi, General Motors, Kaiser Aluminum, and Toyota. In addition, CAAT resources have been used with Bosch Battery Systems, LG Chem, Roush, and other corporate training clients.

**Goal 4: Institute an Advanced Automotive Technology website for curriculum dissemination.**

The CAAT filled the critical positions of Assistant Director for Communications and Webmaster, and re-launched its revised website and resource library. The library contains nearly twice as many resources in Year 3 as it did in the previous year, and content is provided by seed funding institutions, the CAAT partner institutions, and other sources. There were nearly 700 resource downloads in 2013. The CAAT content is also approved by and made available through the National Science Digital Library’s (NSDL) Applied Math and Science Education Repository, as well as the ATE Central websites. CAAT’s collection received the highest vitality rating available from the NSDL.

The new CAAT communications and web staff have helped launch a social media strategy through Twitter, Facebook, and LinkedIn (in response to an NVC recommendation), applied search engine optimization strategies to increase search rankings, and developed monthly web analytics (another NVC recommendation). The revised website includes five new content pages aimed at driving students, educators, and industry to the content most relevant to their needs. Web traffic has increased, and the CAAT has a better understanding of who is using their web resources and for what purposes.

**Goal 5: Create an effective sustainability plan.**

CAAT leaders have worked diligently to address the need for a Center sustainability plan. Through close working relationships with the NVC and the CAAT evaluators, the CAAT has assessed its overall strategy, and has improved the Center’s effectiveness. Together, MCC and WSU have made substantial progress toward achieving all of the Center’s stated goals. Through the CAAT’s close relationships with automotive leaders, the CAAT has identified and developed a plan to meet industry education and training needs in the areas of mass reduction and connected and automated vehicles. The CAAT’s planned expansion is a good fit with the Center’s mandate, and is the logical next step for the Center. If the ATE renewal is awarded, CAAT will leverage its unique seed funding model to develop a comprehensive catalog of advanced automotive technology curricula and other resources that will be widely disseminated through established channels to reach educators and students in schools, colleges, and universities throughout the United States—and beyond.

**NVC Year 3 Recommendations for the CAAT:**

Industry relevance continues to be a key measure of the CAAT’s success. The NVC is pleased to see more formal ties to industry through the Advisory Council, and commends the CAAT on securing participation from a range of global automakers and suppliers that operate in the region. If the ATE renewal is granted, the CAAT should add industry advisors who represent the new and growing technology areas—particularly the non-auto firms and smaller companies working in the connected and automated vehicle area, and increase the Center’s ties to lightweighting and connected and automated transportation organizations and associations.
The Center’s industry connections offer opportunities not only to achieve a clearer focus on industry needs, but also to help establish ties for internship, co-op, and employment opportunities for students. It has been difficult to find employers willing to take on community college interns and co-op students. The NVC recommends the CAAT develop an understanding of the barriers to employing its students. It may be necessary to explore new approaches and new connections within the companies (HR and training executives) in order to make a strong business case for employers to engage with CAAT students and graduates. The NVC strongly encourages a continued focus on developing students’ employment and placement opportunities.

The CAAT has a unique opportunity to formalize its network and achieve a national stature through both its seed funding approach and wide dissemination through electronic means and outreach activities. As the CAAT matures, the Center is building a network of seed funding recipients and users of the curricula and resources at other institutions. Creating opportunities for seed funding recipients to interface and collaborate with each other, as well as for greater interaction with users can improve the Center’s effectiveness, continued relevance, as well as provide useful feedback on the quality of the CAAT’s offerings. To achieve national reach, the leadership and staff should target key conferences and events outside the region, such as the American Association of Community Colleges Workforce Development Institute or the Southern Automotive Conference.

Another avenue to expand the reach of the CAAT is to consider making connections with trucking and the heavy and construction equipment industries. Many advanced automotive powertrain, lightweighting, and connected and automated technologies are relevant in these ground vehicle industries, and some, such as CNG, will be developed and deployed widely in these applications before achieving broad installation in light vehicles.

The NVC commends the CAAT on the substantial improvements to the electronic resources and the Center’s social media outreach. The Committee recommends four strategies to consider: use of tools that allow greater engagement with users (blogs, proactive outreach), adding ratings and reviews for resource library content, adding more content in the connected and automated vehicles technologies area, and devising a strategy for maintaining and refreshing existing content pages.

Our recommendations are as follows:

<table>
<thead>
<tr>
<th>Area</th>
<th>NVC Assessment/Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission/vision/goals</td>
<td>NVC would like to see an articulation of the Center’s intended expansion into new automotive technology areas.</td>
</tr>
<tr>
<td>Staffing and project management plan, including financial planning and reporting</td>
<td>The NVC is pleased by the Year 3 staffing changes, and continues to encourage the CAAT to articulate a plan for a revolving directorship.</td>
</tr>
<tr>
<td>Institutional support</td>
<td>Very strong.</td>
</tr>
<tr>
<td>Business/industry and other partnerships</td>
<td>Connections to industry and other regional organizations are strong, and getting stronger.</td>
</tr>
<tr>
<td>Main project activities or subprojects including curriculum and/or course materials</td>
<td>Work is proceeding according to plan.</td>
</tr>
<tr>
<td>Area</td>
<td>NVC Assessment/Recommendations</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Documented worker or education demand and current supply/participant recruitment</td>
<td>This area requires attention as the CAAT seeks to expand into new automotive technology areas. Industry needs are dynamic, and differ across the various technology areas. Additional Advisory Committee members will be required, and new relationships, memberships, and institutional connections will need to be developed.</td>
</tr>
<tr>
<td>Faculty recruitment/development, retention and professional development training</td>
<td>While this area continues to be strong, efforts to formalize train the trainer programs will improve overall effectiveness of training delivery.</td>
</tr>
<tr>
<td>Publicity/website, newsletter, media coverage/Dissemination</td>
<td>The NVC is pleased with the new CAAT website and resource library, and initial foray into social media channels. The Committee continues to encourage the CAAT to engage seed-grant recipient organizations in the broader dissemination strategy.</td>
</tr>
<tr>
<td>Overall evaluation of project</td>
<td>Continued excellent progress.</td>
</tr>
</tbody>
</table>

**Conclusion:**

The CAAT continues to meet critical automotive industry needs for advanced powertrain technicians in pre-production, production and post-production environments. The NVC strongly supports the Center’s intent to expand its mission beyond powertrain technologies into lightweighting and automated transportation technologies. CAAT leadership and staff have made considerable progress toward understanding industry needs and gaps in these areas, as well as toward developing new relationships, and amassing critical subject matter expertise. The CAAT’s seed funding model and robust dissemination channels position the Center to achieve a tremendous national impact in advanced automotive technology education. For these reasons, the NVC recommends that CAAT should receive NSF’s highest consideration for renewal, and for additional investments in automotive-focused technical education programming.

Respectfully submitted,

Kristin Dziczek, CAAT NVC Chair  
Director, Labor and Industry Group  
Center for Automotive Research  
3005 Boardwalk, Suite 200  
Ann Arbor, MI 48108  
Phone: 734-929-0469  
Fax: 734-662-5736  
e-mail: kdz@cargroup.org