Mission

The mission of the Smart Vehicle Concepts Center (SVC) is as follows: (1) conduct basic and applied research on smart materials and structures applied to ground and aerospace vehicles; (2) build an unmatched base of research, engineering education, and technology transfer with emphasis on improved vehicle performance, unprecedented safety improvements, and enhanced vehicle efficiency; and (3) prepare next-generation engineers at the PhD and MS levels who possess both theoretical and experimental expertise applicable to auto and aerospace vehicles. For additional details on SVC’s research programs, membership fees, and personnel, please visit: www.SmartVehicleCenter.org.

SVC 2016-2017 Industry Members

- Battelle Memorial Institute
- Ford Motor Company
- Honda R&D Americas, Inc. (4 memberships)
- Moog, Inc.
- NASA Glenn Research Center
- Owens Corning Science & Technology, LLC.
- Parker Hannifin Corp.
- Tenneco, Inc.
- Toyota Motor Engineering & Mfg. N.A., Inc.
- Transportation Research Center, Inc. (2 memberships)

Invited Observers

- LMS/Siemens PLM Software
- MSC Software Corp.
- Romax Technology

Spring 2018 Meeting Information

SVC’s 11th Semi-Annual Project Review and IAB Meeting

Dates: 1-2 March 2018

Location: The Ohio State University
E100 Scott Laboratory, 201 West 19th Avenue, Columbus, OH 43210

Please visit www.SmartVehicleCenter.org for updates!

Welcome New Members

Full Membership

- Battelle Memorial Institute (IAB representative Mr. Mark Davis)
- Owens Corning Science & Technology, LLC. (IAB representative Mr. Andy Davis)
- Parker Hannifin Corp. (IAB representative Mr. Peter Buca)

SVC Granted Funding Renewal

The Center was granted a five-year funding renewal effective August 1, 2017. With this award, the SVC has become a Phase III NSF IUCRC. During Phase II, SVC has attracted an average of nearly 14 full memberships each year coming from 10 distinct full member organizations. During that five-year period, the center supported an average of 13 PhD, five MS and five BS students each year, producing a total of nearly 75 journal articles, 40 conference papers, and more than 40 dissertations and theses.

Led by Professor and Honda R&D Americas Designated Chair Marcelo Dapino, SVC will continue to position Ohio State as a leader in smart vehicle technology research. SVC leadership team also includes Professor Raj Singh, Assistant Professors Vishnu Sundaresan, Soheil Soghrati and Ryan Harne, and Research Assistant Professor Scott Noll. Please click here for more information.
Autumn 2017 10th Annual Project Review and IAB Meeting

The Smart Vehicle Concepts Center held its 10th Annual Meeting on November 2-3, 2017 at The Ohio State University. Prior to the start of the meeting, a short course, titled "Laser Doppler vibrometry and theory as it relates to aerospace, automotive and related testing applications," was presented by Mr. David Oliver, VP of Business Development/Chief Technical Officer of Polytec, Inc.

Based on the recommendation of the Industrial Advisory Board, the meeting format was modified relative to past meetings to allow more time for individual meetings between industry sponsors and OSU students and researchers. The new format allowed students and researchers to discuss project posters that were displayed throughout the meeting room. The meeting kicked off with a welcoming remark from the Chair of the Department of Mechanical and Aerospace Engineering, Prof. Vish Subramaniam. The State of the Center was then presented by the Center Director for Phase III, Prof. Marcelo Dapino. The Industrial Advisory Board Chair, Tom Greetham of Moog, Inc., gave a brief overview of the upcoming Board meetings and the “Outstanding Student Presentation” Award was given to doctoral candidate Siva Chillara; the “SVC IAB Exemplary Service Award” was given to Dr. Tim Krantz of NASA Glenn Research Center. Also, new to attend was Dr. Andre Marshall, IUCRC Program Director under the NSF’s Division of Industrial Innovation & Partnerships (ENG/IIP); Dr. Marshall presented an overview of the NSF IUCRC Program discussing plans and funding opportunities. Day 1 continued with two guest presentations dealing with emerging trends in smart vehicle research, first of which was presented by Prof. Carlos Castro who heads the OSU Laboratory for Nanoengineering and Biodesign. Prof. Castro gave a presentation titled, “DNA-based nanomechanical devices and materials for sensing and actuation.” This was followed by a Member Success Story presented by OSU alumni Vivake Asnani and Justin Scheidler, who both are now with NASA Glenn Research Center.

The Industrial Advisory Board convened twice during this meeting: once after the open session on Day 1 and once after the technical presentations on Day 2. The IAB meeting of Day 1 focused on completion of past open action items and Phase III sustainability and continuation of the Center. The IAB held its executive meeting on Day 1, and commented positively on the meeting format change. The second Board meeting (on Day 2) mainly consisted of the LIFE project reviews, acceptance of new projects and a discussion of future SVC meeting possibly being held off campus.

A condensed version of the State of the Center can be found here.

Spring 2017 10th Semi-Annual Project Review and IAB Meeting

The 10th Semi-Annual Spring Meeting of the Smart Vehicle Concept Center was held on 2-3 May 2017 at The Ohio State University. Prof. Rabi Mishalani of OSU’s Department of Civil, Environmental and Geodetic Engineering delivered an invited keynote presentation titled, “Transportation systems and ‘big’ data: pathways to decision- and policy-making for smarter cities.”

Faculty and student researchers discussed ongoing projects. Members provided feedback on technical talks, offered new ideas, and provided recommendations on future research directions. The Industrial Advisory Board (IAB) held two meetings: the first one to discuss the Phase III proposal which was submitted in February 2017 and meeting format changes. The second meeting was held to discuss the LIFE project surveys and comments.

Publication Summary

This year has been good for Smart Vehicle Concepts Center publications. Thirty-seven journal publications by faculty and students based on Center research appeared in prestigious journals; of those, four publications were co-authored with industry members and twenty-five papers were presented at conferences ran by the Society for Automotive Engineers (SAE) and American Society of Mechanical Engineers (ASME).
Students Supported from July 1, 2016 to June 30, 2017*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD</td>
<td>11</td>
</tr>
<tr>
<td>MS</td>
<td>10</td>
</tr>
<tr>
<td>BS</td>
<td>4</td>
</tr>
</tbody>
</table>

*Fully or partially supported. The list includes fellowship/scholarship students. Many students have continued in Summer and Autumn 2017.

Recent SVC Graduates and Current Employment

(October 2014 – December 2017)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD</td>
<td>17</td>
</tr>
<tr>
<td>MS</td>
<td>18</td>
</tr>
<tr>
<td>BS</td>
<td>5</td>
</tr>
</tbody>
</table>

Students Employed by:

B&K  
Cummins  
Ford Motor Company  
GE R&D (USA)  
Georgia Tech  
Gorman Rupp  
Made in Space  
Moog, Inc.  
Owens Corning  
Ohio State  
TRW  
University of Illinois  

Bechtel  
F.tech R&D  
GE R&D (India)  
General Motors  
Goodyear  
Honda R&D  
MIT Lincoln Laboratory  
NASA Glenn Research Center  
Purdue University  
UCLA  
US Army (Aberdeen)

Awards Received by SVC Researchers

Outstanding Student Presentation Awards

The Outstanding Student Presentation Award certificate was presented at the November 2017 meeting to Siva Chillara by Mr. Thomas Greetham, SVC IAB Chair. Siva is a graduate student pursuing a doctoral degree in mechanical engineering and advised by Prof. Marcelo Dapino. His research work in SVC Project #45 focuses on the study of morphing panels for aerodynamic performance. Siva’s presentation at the May 2017 meeting demonstrated the development of morphing panels to control the aerodynamics of a structure; this potentially will enable shape and stiffness control, not limited to automobiles and aerospace structures, but also in robotics and bio-inspired systems that would use inexpensive materials suitable for mass-market production. Siva was also finalist of the Best Student Paper Award at the 2017 SPIE Smart Structures and Materials and Non-Destructive Evaluation Conference.

Jack Schomer was the recipient of the Outstanding Student Presentation Award based on his talk of August 2016 entitled “Embedded fiber optic sensors for structural health monitoring.” He was formally recognized in May 2017 by Mr. Thomas Greetham, SVC IAB Chair. Jack received his MS in mechanical engineering in May 2017 and joined Made in Space in Mountain View, California in September 2017. We wish him all the best!
Scott Noll joins the Department of Mechanical and Aerospace Engineering Faculty (from the MAE website)

Scott Noll aims to solve virtual product development challenges through advanced modeling and experimental approaches. His research interests include nonlinear structural dynamics, vibrations, inverse identification, experimental modal analysis, experimental FRF-based substructuring methods, applied finite element modeling and design. His research has direct applications in high-fidelity automotive crash pulse simulation; structure-borne road noise; automotive tire, road surface and vehicle interactions; body structure durability; and elastomeric and hydroelastic bushings and mounts. Noll aims to develop a new subsystem design for light-weight vehicle structural assemblies.

Prior to this position, Noll served as a research scientist and project leader for Ohio State’s Smart Vehicle Concepts Center, which is a National Science Foundation (NSF) Industry-University Cooperative Research Center. In that role, he worked to provide industry, government and other organizations with the means to leverage research and development investments with Ohio State centers renowned for their innovative research capabilities. Prof. Noll will continue working within SVC as a Project Leader and SVC Faculty Team. In addition to serving as a research assistant professor, Noll currently serves as an affiliated faculty member in the Simulation Innovation and Modeling (SIM) Center.

Noll earned his bachelor’s degree in mechanical engineering from Ohio Northern University. He received his master’s in engineering mechanics and doctorate in mechanical engineering from Ohio State.

Please visit here for full article.

Harne wins ASME Best Paper Award

On Sept. 19, Assistant Professor Ryan L. Harne (SVC Faculty Team) and MAE alumna Danielle T. Lynd ('17 BS, Mechanical Engineering) received the 2017 American Society of Mechanical Engineers (ASME) Best Paper Award in Structures and Structural Dynamics. Harne has been an ASME member since 2011, and he is an elected member of the Adaptive Structures and Material Systems Branch within ASME’s Aerospace Division. He is also the chair of ASME’s Technical Committee on Energy Harvesting. The award was presented at the 2017 ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems in Snowbird, Utah. For the full article, please click here.

RIYA scholars’ work adds to the breadth of Ohio State research

Shashwat Ranjan Chaurasia (SVC Project #56) aims to improve safety even under difficult driving conditions. His project is of particular interest to Ohio State’s Smart Vehicle Concepts Center (SVC), which is a National Science Foundation (NSF) Industry/University Cooperative Research Center program. SVC offers industry, government and professional organizations the ability to utilize the center’s innovative research capabilities in order to leverage their own research and development investments. This particular project was initiated by the Transportation Research Center (TRC), which serves as a one-stop shop for vehicle testing, certification, research, development and project management.

Chaurasia’s work has provided SVC researchers with the initial background needed to advance their research on automotive safety, including smart condition detection and monitoring.
Raunaq Bhirangi also participated this summer on SVC Project #40A as seen in this photo working with post-doc researcher, Luke Fredette. [Click here](#) for the full article.

**Harne publishes new textbook on bistable structural dynamics**

Ryan L. Harne, assistant professor of mechanical and aerospace engineering, has published the new textbook, Harnessing Bistable Structural Dynamics: For Vibration Control, Energy Harvesting and Sensing. This text is a one-source reference for researchers and engineering professionals interested in learning more about advancements in these areas of understanding. The textbook is coauthored by Kon-Well Wang, chair and professor of the Department of Mechanical Engineering at the University of Michigan. See full article [here](#).

**Dapino receives top ASME honor**

Dapino was named the 2017 recipient of the ASME Adaptive Structures and Material Systems Award. Dapino joins a prestigious list of past winners of this award, which was established by the Aerospace Division as a division-level award in 1993 and elevated to a Society Award in 2014.

The Adaptive Structures and Material Systems Award was presented to Dapino at the 2017 ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems on Sept. 18, in Snowbird, Utah.

See full article [here](#).

**Honoring exceptional teaching and student support**

For the Mechanical Engineering External Advisory Board, Dapino was the clear choice for this year's Distinguished Graduate Faculty Award. The honor was created in 2014 to recognize excellence in graduate student mentoring.

As the director of the Smart Materials and Structures Laboratory, Dapino guides his students and post-doctoral researchers as they devise experiments to understand smart materials and explore new smart system designs utilizing analytical and computational methods. See full article [here](#).

**New staff joins the Smart Vehicle Concepts Center**

Tommie Blackledge joins the Center on a part-time basis to provide administrative support and oversight of projects for the Center Director, Prof. Marcelo Dapino. She is a graduate of OSU having majored in Japanese Literature and Language and minored in Linguistics. Tommie’s experience comes from having worked in a tier-one automotive supplier to Honda in human resources and as back-up translator/interpreter.

**SVC Contacts:**

**The Ohio State University**

SVC Center Director: Prof. Marcelo Dapino

E-mail: Dapino.1@osu.edu

Center Staff: Tommie Blackledge

Email: blackledge.3@osu.edu

Tel: 614-688-1864

---

**Spring 2018 Project Review & IAB Meeting**

*SVC’s 11th Semi-Annual Project Review and IAB Meeting*

1-2 March 2018

Meeting will be held at The Ohio State University
SVC Faculty Team

Marcelo Dapino
Dapino.1@osu.edu
(Honda R&D Americas Chair & Professor; Director of SVC)
Expertise: Smart materials and structures; high power ultrasonics; additive manufacturing

Raj Singh
Singh.3@osu.edu
(Emeritus Professor; Former Director of SVC)
Expertise: Noise & vibration control; dynamic simulation; nonlinear dynamics; DSP

Ryan Harne
Harne.3@osu.edu
(Assistant Professor)
Expertise: Structural acoustics; vibration energy harvesting; nonlinear dynamics

Scott Noll
Noll.34@osu.edu
(Research Assistant Professor)
Expertise: Structural dynamics; jointed assemblies; design; inverse methods

Raj Singh
Singh.3@osu.edu
(Emeritus Professor; Former Director of SVC)
Expertise: Noise & vibration control; dynamic simulation; nonlinear dynamics; DSP

Soheil Soghrati
Soghrati.1@osu.edu
(Former Professor)
Expertise: Advanced FEM; modeling multiscale response of advanced/bio-materials and structures

Vishnu Sundaresan
Sundaresan.19@osu.edu
(Assistant Professor)
Expertise: Piezoelectric materials; active polymers; bio-derived materials; magnetostrictive materials

Department of Mechanical & Aerospace Engineering (MAE) Statistics

Mechanical & Aerospace Engineering Graduate Student Enrollment
Autumn Semester 2017
370 MAE Graduate Students

SVC has supported an average of 13 PhD, five MS and five BS MAE students each year, yielding a total of nearly 75 journal articles, 40 conference papers, and more than 40 dissertations and theses.

Links to NSF IUCRC and OSU Laboratories

NSF home page http://www.nsf.gov/
IUCRC home page https://www.nsf.gov/eng/iip/iucrc/home.jsp/
Smart Vehicle Concepts Center page https://svc.engineering.osu.edu/
Acoustics & Dynamics Laboratory https://adl.osu.edu/
Smart Materials and Structures Laboratory https://smsl.osu.edu/
Automated Computational Mechanical Laboratory https://acml.engineering.osu.edu/
Laboratory of Sound and Vibration Research https://lsvr.osu.edu/
Integrated Material Systems Laboratory https://integratedsystemsosu.org/