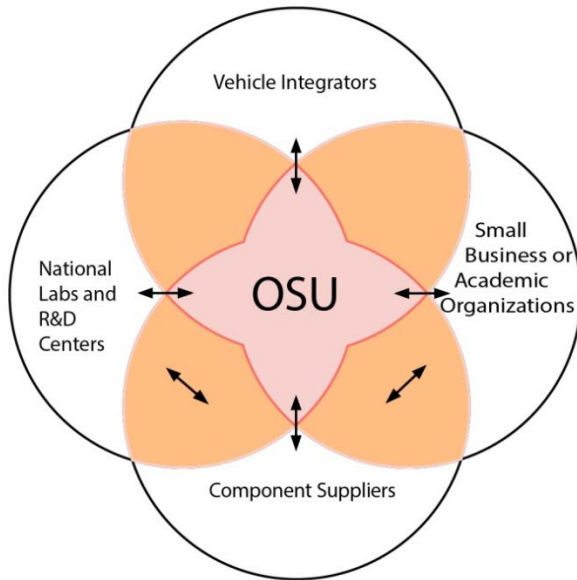




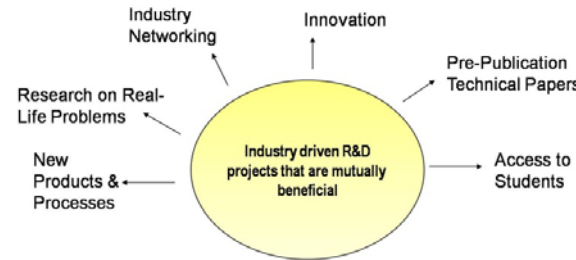
Smart Vehicle Concepts Center (SVC)

National Science Foundation Industry-University Cooperative Research Center (est. 2007)



The Ohio State University
 Phase I: 2007 – 2012
 Phase II: 2012 – 2017
 Phase III: 2017 – 2022

IUCRC - Cooperative Center Concept & Benefits to Industry



The National Science Foundation (NSF) Industry-University Cooperative Research Center (IUCRC) program provides industry, government, and other organizations the means to leverage research and development (R&D) investments with centers renowned for their innovative research capabilities.

- NSF program encourages collaborative research
- Focus on pre-competitive research
- Driven by industry to efficiently utilize the talents and resources of a university
- The NSF appoints an evaluator to ensure quality control
- Accomplishes research at a fraction of the cost
- Provides an avenue to investigate topics of common interest
- Allows industry to efficiently utilize the talents and resources of academic institutions
- Provides an excellent recruiting tool
- Leveraging: A nominal membership fee, when combined with cost-sharing and NSF money, gives members access to over \$1M per year of research and associated intellectual property

Industrial Advisory Board

- The IAB consists of one representative from each industrial member.
- The board is responsible for evaluating current research thrusts, suggesting new opportunities, evaluating center operations, and matching center capabilities with unfilled research needs.
- The IAB holds 2 meetings each year

Pre-Competitive Research Paradigm

- Overcomes basic obstacles that prevent a technology from being used in commercial applications
- Provides an understanding of the characteristics of new technologies
- Is aimed at providing the tools, information, and data that enables future products and services
- Offers equal benefit to all Center members
- Develops industry standards and test procedures where no precedents exist

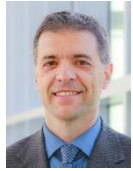
Example Sponsored Projects

- **Interfacial Mechanisms**
 - Development of Interfacial Force Sensing Systems using Experimental and Computational Methods
 - Characterization of Vehicle Subframes
 - Analysis of Automotive System Isolators
 - Inverse Identification Methods Applied to Radiator Mounts
 - Dynamic Friction Characterization of Icy Road Surfaces
- **Vibration, Noise, and Motion Control**
 - Ultrasonic Friction Control
 - Non-Contact Measurement, Visualization, and Analysis of a Smart Dynamic System
 - Hybrid Modeling Methods for Vehicle Subframes
 - Active and Passive Methods for Powertrain Vibration Control and Reduction of Noise Radiated from Shells
 - Morphing Panels for Aerodynamic Performance
 - Multifunctional Magnetostrictive Systems: Experiments and Computer Simulation
- **Machine and Material Diagnostics**
 - Characterization and Modeling of Rubber Bushings
 - Smart Condition Detection and Monitoring
 - Stress Field Development During Load Transfer in Functionally Graded Metal Matrix Composite Macro Interfaces
- **Manufacturing and System Integration**
 - Electro-Hydrostatic Actuation and Sensing (E-HAS)
 - Ultrasonically-Assisted Metal Forming
 - Characterization and Modeling of Hydraulic Bushings
 - Thermally Invariant Smart Composites
 - Mechanoluminescent Paintable Light Sources in Automotive Lighting Systems
 - Additive Manufacturing for Automotive Structures
 - Magnetic Gearing

Smart Vehicle Concepts Center (SVC) History

- The Smart Vehicle Concepts Center was officially launched in July 2007 with support from NSF and industrial members.
- Phase I: 2007 - 2012
- Texas A&M University joined SVC as an academic partner from summer 2008 to spring 2013
- SVC was renewed for another 5 years (Phase II: 2012 – 2017) effective July 1, 2012 as a single-site center
- SVC was renewed for another 5 years (Phase III: 2017 – 2022) effective August 1, 2017

SVC Faculty Team



Marcelo Dapino

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



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
(Assistant 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

SVC Companies

SVC Companies	Status
American Axle and Manufacturing	Former Member
Advanced Numerical Solutions	Former Member
Army Research Laboratory	Former Member
Battelle Memorial Institute	Current Member
BorgWarner	Former Affiliate
Bridgestone Americas Tire Operation, LLC	Former Member
Eaton Innovation Center	Former Member
Edison Welding Institute	Former Member
Ford Motor Company	Current Member
F.tech R&D*	Former Member
Goodyear Tire & Rubber	Former Member
Honda R&D Americas Inc.*	Current Member
Hyundai-Kia Motors*	Former Member
LMS Software	Invited Observer
MIT Lincoln Laboratory	Former Member
Moog Inc.	Current Member
MSC Software	Invited Observer
NASA Glenn Research Center	Current Member
Owens Corning	Current Member
Parker Hannifin	Current Member
REL, Inc.	Former Member
Romax	Invited Observer
Solidica	Former Member
Tenneco, Inc.	Current Member
The Boeing Corporation	Former Member
Tokai Rubber	Former Member
Toyota Research Center	Current Member
Transportation Research Center, Inc.*	Current Member
YUSA	Former Affiliate

*Indicates 2 or more memberships

SVC Mission

- Conduct basic and applied research on ground and aerospace vehicle components and systems
- Build an unmatched base of research, engineering education, and technology transfer with emphasis on improved vehicle performance
- Develop well-trained engineers and researchers (at the undergraduate, MS, and PhD levels) with both experimental and theoretical viewpoints

What Does SVC Offer?

- Comparative evaluation of existing materials or concepts
- Development of new sensors, actuators, and control algorithms
- New (revolutionary) design paradigms using smart materials
- Better understanding of vehicle constraints and environments
- New vehicle components and sub-systems
- New analytical and computational models
- Tools to improve vehicle development cycles and understand the limits of existing components
- Explore technologies for new applications or markets



Contact Information

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Center Director
E-mail: Dapino.1@osu.edu

Information on the semi-annual and annual
SVC meetings is posted here:
<https://svc.osu.edu/meetings>

Membership Fee Structure

- **\$40K/year - Membership**
(One vote per full membership; intellectual property rights on all Center projects)
 - For a guaranteed solo project, an additional project fee is charged (\$12K in 2017)
 - At least two \$40K membership fees from 2 members are required for an "umbrella project." An "umbrella project" is defined as a cluster of related sub-projects in the same overall research area.
 - For 2017-2018, an administrative fee is charged (\$5.2K for solo projects; \$4K for umbrella projects)
- **\$12K/year - Affiliate**
(Access to one ongoing project; no voting rights)

For membership details, visit our page at
<https://svc.osu.edu/membership>

SVC Website

Please visit us online:
<http://smartvehiclecenter.org/>
<https://svc.osu.edu>

NSF Fact Sheet on the SVC:
https://www.nsf.gov/attachments/110815/public/SVC_NSF_Center_Fact_Sheet.pdf