

2018-2019

IN WITH THE NEW



4 additions
to GSCMI

PG 8
NEW FACES

Students on the TVS India Internship Study Abroad trip. (p.4)



Dr. Ananth V. Iyer
Center Director
Department Head and Senior
Associate Dean
Susan Bulkeley Butler Chair in
Operations Management

a special thank you
to our partners

- AAM**
- John Deere**
- Arcelor Mittal**
- GM**
- CAT**

from Ananth

Thank you for every one of you who have been part of GSCMI – the Global Supply Chain Management Initiative housed at the Krannert School of Management at Purdue University. Your participation, either physically or digitally, has enhanced our ability to diffuse our passion for the field of global supply chain management. We are pleased to present this Annual report highlighting an exciting year of activities involving students, faculty staff and industry partners. You will see photographs and details from our

Spring conference focused on “Ethical Global Supply Chains” held on February 15 2019 (details at <https://www.krannert.purdue.edu/centers/gscmi/>) You will also read about and see the photographs that communicate the enthusiasm of student teams from universities across the globe who participated in the GSCM case competition. GSCMI focuses on the global supply chain of suppliers, service providers and assemblers that are the heart of the modern global marketplace. This

initiative started back in 2005 and takes a multi-functional view of the GSCM challenge. Faculty have been involved in sponsored projects and grant related research working with student teams. We continue to work on supply chain projects. One such project we completed this year was funded by INDOT – Indiana Department of Transportation, and focused on the impact of autonomous commercial vehicles and related technologies and their economic impact across the supply chain. This project offered students an opportunity to focus on the future of transportation – both how it might unfold and how it might impact stakeholders. Another project focused on the supply chains for high purity graphite for electric vehicle batteries, funded by the Department of Energy, and offered

WE HAVE GROWN RAPIDLY IN THE PAST FEW YEARS...

us an opportunity to work with researchers at Oak Ridge National Labs. These and many other projects are vital to our mission of training students to participate in the exciting field of global supply chain management. We invite you to peruse this Annual report to get more detail, engage in a photo-journey with us, and join us in thanking the many industry and government representatives, students, staff and faculty who helped us generate the vitality needed to keep the center growing. As you learn about the current activities at the center, we invite you to share ideas, comments and opportunities with us. All it takes is a phone call to Steve Dunlop or an email to gscmi@purdue.edu to

start the collaboration. We will work with you to create solutions for your question using our team of graduate students and faculty. The upside for all is that great ideas are the core to student learning, business competitiveness and faculty research. We understand that problems and their solutions do not fall into neat functional area boundaries, so our Krannert faculty engagement across disciplines will ensure that we address problems with the breadth that is appropriate. We look forward to yet another year of successful collaboration. From all of us here at GSCMI, thank for your contributions to ensure the center's continued success.



IN OUR STATE

In our new projects with the Wabash Heartland Innovation Network (WHIN), we are focused on manufacturing companies in the ten county region around Tippecanoe. Our goal is to ensure that technology adoption enables business.



ON OUR CAMPUS

Interdisciplinary engagement including the discovery park, agriculture, and engineering

REACHING GLOBALLY

in five continents through:

- projects
- student workers
- company partners
- study abroad
- conferences



1

new engagements

PERUVIAN PARTNER



“ We are excited about the solid global experience this new program offers our students.

-Heidi Allwes, Coordinator

BUSINESS IN PERU STUDY ABROAD PROGRAM

The Business in Peru program plans to kick off the first internship over spring break 2020. This course is a two credit management level class hosted by the Center and Tlogistica of Lima, Peru. The program will target MBA students to provide them with the occasion to work on real-life business problems and provide solutions to businesses in Peru. Projects will be implemented by the companies involved and will be related to the subjects of supply chain, manufacturing and operations. In addition to a rich learning opportunity, students will be exposed to cultural activities as well including a weekend trip to Machu Picchu. This program is designed to further enhance student classroom learning.



Eduardo Huerta-Mercado is a '00 grad of the Krannert MBA program & current Director of Softeon LATAM & Director of INvent Technologies that DCMME is partnering with.

PERU EXECUTIVE SUMMER VISIT TO CAMPUS

A group of business executives from various Peruvian companies came for a visit to campus fall 2018. The trip entailed several tours of supply chain related facilities in Indianapolis and locally including: Lowe's Distribution Center, General Electric, Fed Ex, Amazon, ClearObject, Birk Nanotechnology

Center, Bechtel Innovation Design Center, Indiana IoT Lab, and our Smart Lean Engagement Center here on campus. The group was also able to tour Indy including the Indy car race track. The partnership with these Peruvian businesses was established through Eduardo Huerta-Mercado with hopes of providing insight into best practices and innovative technology used in and around the local area.

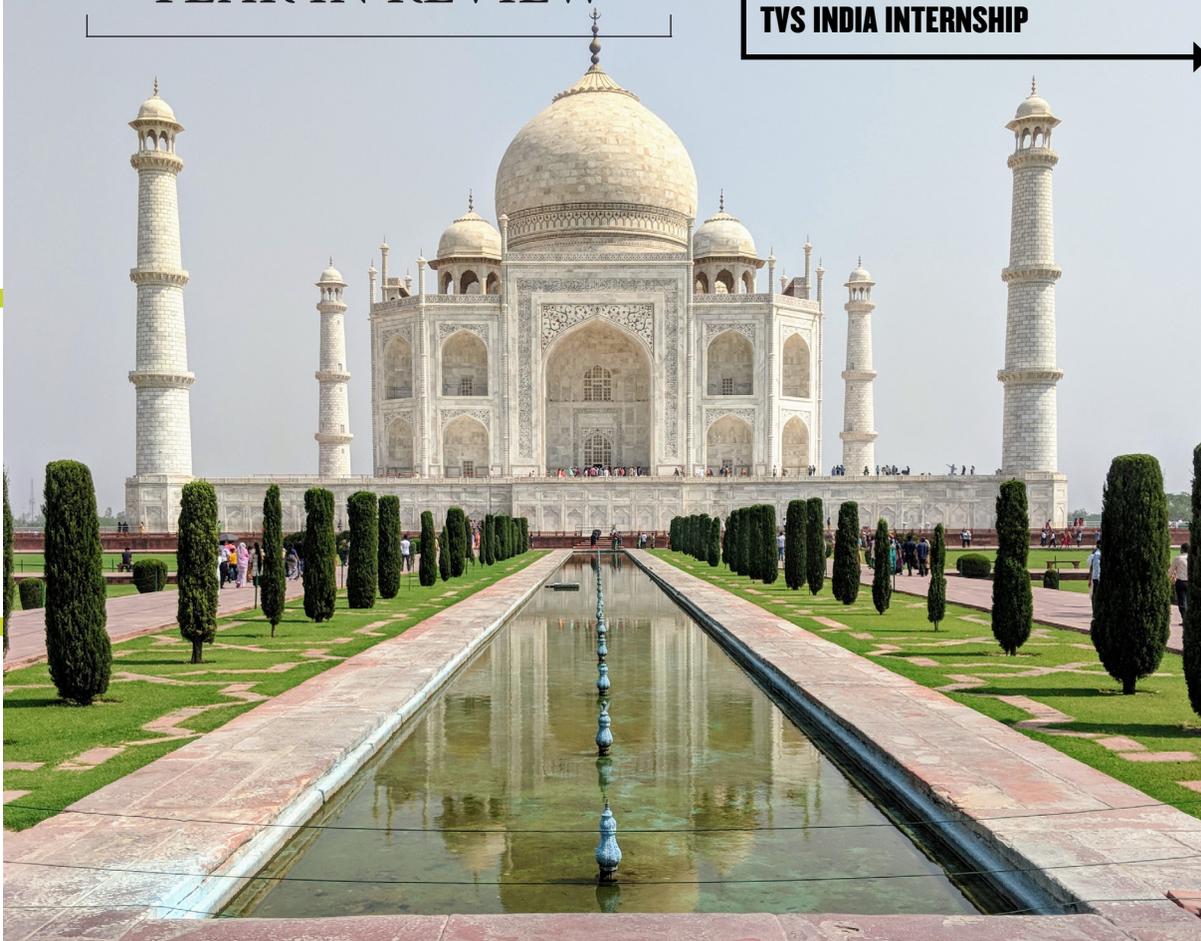


Peruvian business executives touring the DCMME Engagement Center

3

YEAR IN REVIEW

TVS INDIA INTERNSHIP



TVS INDIA INTERNSHIP FOR 14 YEARS

For fourteen years now the TVS India Internship has brought together a combination of business and industrial engineering students for a three week internship to Bangalore, India, the headquarters of TVS Motor Company who hosts the interns. TVS provides a list of projects related to their business operations that they hope to improve and implement. Students work with management on site to determine feasible options and suggestions for improvement. Krannert alumnus Venu Srinivasan is the chairman & managing director of TVS Motor.

ETHICAL GLOBAL SUPPLY CHAINS CONFERENCE

The GSCMI supply chain conference speakers included: Dr. Ananth Iyer; Eduardo Huerta-Mercado CEO, Value Chan Consulting and Technology, Director, Softeon LATAM; Shelli Austin, President InTek Freight & Logistics Inc; Richard Sherman, Senior Fellow, Supply Chain Centre of Excellence Tata Consultancy Services Limited & Aaron Benningfield, Blockchain and Supply Chain Strategist, TCS; Reggie Henderson, Telamon Vice President & General Manager; Faith Wandrie, American Axle & Manufacturing CPSM, Vice President- Global Supply Chain Management; Karoline Dygas, Starbucks VP Global Sourcing and Store Development Supply Chain.

To inspire and nurture the human spirit,
one person, one cup,
and one neighborhood at a time.



It is how we treat
people, the plane
and animals

SUPPLY CHAIN CONFERENCE KAROLINE DYGAS, VP GLOBAL SOURCING & STORE DEVT. SC, STARBUCKS



new projects

INDIANA & BEYOND

bridging industry, students, and faculty

in a very

sense.

A project with Indiana Department of Transportation

The primary objective of the Ohio River Bridges project was to develop a present value analysis by analyzing the funding structure of both INDOT and WVB partners to identify whether the P3 approach of DBFOM is profitable or not. The funding structure included the toll revenue

projection model (reflective of current traffic patterns) and operations and maintenance cost of the bridges. The team also did a comparative study of Ohio River bridge with other bridges that have similar features (physical, financial, design, policies, etc.).

WHIN IN THE NEWS p.9

<https://krannert.purdue.edu/news/features/home.php?story=5053>



As president of Zojila, I have had the privilege and opportunity to work with Professors Ananth Iyer and Steve Dunlop for several years now. The collaborations have facilitated the exploration of new opportunities as well as the application of cutting edge ideas to the solution of existing problems in manufacturing and business practice. I am thankful to have access to Krannert and DCMME to further the growth of my business and would highly recommend it to anyone who has the opportunity to avail of their services.

OUR PROJECTS

INDOT SHELTER

project scope

The project aimed at assessing the benefits of building different types of shelters for storing INDOT's vehicles and other equipment and evaluating the expected ROI to build the shelter by developing a present value analysis. The scenarios (shelter/no shelter) were compared on a simulation developed on JaamSim.

WHIN EDUCATION

project scope

The key objective of the project was to collect extensive data including employee

information, location, skills and core competencies for 270 companies in the 10-county region of Indiana with the goal to develop smart people, smart processes and smart technologies through various resources.

WHIN SUPPLY CHAIN

project scope

The WHIN Supply Chain Leakage project aims to solve the issue of the Supply Chain Leakage in the Wabash 10-county region by developing a web database which will allow companies to easily

access information about each other and take advantage of products and services available within the region itself resulting in reduced supply chain leakage. The database is being populated with information from participating company websites that will serve as a directory.

INDOT ECONOMIC DEVT.

project scope

The project aimed at exploring various ways to increase revenue along the interstates in the state of Indiana

by collecting data of existing establishments, benchmarking projects undertaken by other DOTs and proposing solutions by taking into account expenditure and space required, revenue generated, and legal framework.

ADVOCATE HEALTHCARE

project scope

The key objective of the project was to validate the standardized 2-bin system implemented by Advocate Health-Care to manage the medical supplies inventory in the sup-

ply rooms aiming at space optimization, cost efficiency, and reduced product expiration.

OPENCV PEOPLE TRACKING

project scope

This project focuses on the identification and tracking of all people in the engagement center. In this project, live video feed from cameras set up in the center was used as input. OpenCV algorithm using tensorflow library identified and tracked people.

new projects cont'd

INDOT AUTONOMOUS VEHICLE

project scope

The project aims to identify the global technological trends with the potential to transform logistics and transportation in industries and their expected overall economic impact. It also aims to analyze Indiana's industrial landscape to identify key players adopting and driving these technologies and to understand their perception of these technologies. The team will map the impact of these technologies on INDOT's future projects, decision making processes, and identify key partners within the state.

OPENCV CROWD ANALYSIS

project scope

In this project we will be leveraging video analytics to perform crowd analysis over visitors in a room. The objective of the project is to detect and count the number of people in a room every 15 minutes. Live feed

and images from pre-installed cameras will be processed by the algorithm, providing us the number of people at that instance in the room.

INDOT SHELTER

project scope

The project aimed at assessing the benefits of building different types of shelters for storing INDOT's vehicles and other equipment and evaluating the expected ROI to build the shelter by developing a present value analysis. The scenarios (shelter/ no shelter) were compared on a simulation developed on JaamSim.

FEEDBACK

DCMME gives both students & current practitioners insights into emerging ideas that will give their companies a competitive advantage in reaching a worldwide audience.

--Dean David Hummels

The center offers professional industry interaction, deadlines, and results from teamwork. --Dr. Olga Senicheva



Cummins DBU Engineering worked with a DCMME Purdue Team on an engineering cost model. Cummins has been very pleased to have this outside team like Purdue which has brought new vision to situations and independent views based on actual data. We are working to extend this relation with more projects.

-- Alexander Nazarov, Cummins



DEAN HUMMELS



OLGA SENICHEVA



ALEX NAZAROV

OPTION CERTIFICATE

2018-2019

2017-2018

2016-2017

The GSCMI Center offers two certificates to our Master's Students: GSCM & MTM Option Certificates. The GSCM option allows students to take courses to help them prepare for supply chain related concerns & the MTM option focus allows students to prepare for manufacturing challenges.

3

new faces

OUR CONSULTANTS



MEET OUR NEW CONSULTANTS

Roy & Angus are consultants on the WHIN project with the DCMME Center.

▶ Roy is responsible for development of Next-Gen educational programs for manufacturing companies in the 10 county area adjacent to Purdue University. Roy is also an assistant professor for Purdue's Executive Management of Business Administration program and is the instructor for the course "AI for Lean Business." Roy also provides technical assistance to HDS Mercury, a Silicon Valley start-up company, that is developing a robotics solution for fulfillment centers and manufacturing material handling operations. Roy's previous experience included 19+

years at Toyota Motor Manufacturing & Engineering, North America in Kentucky. His roles at Toyota included the General Manager of Information Technology for Toyota's North American Manufacturing business as well as Project General Manager for Toyota's Supply Chain reengineering program. Roy co-authored the book *Toyota's Supply Chain Management: A Strategic Approach to Toyota's Renowned System*.

▶ In his position with Purdue, Angus McLeod brings together a wealth of experience in corporate leadership at the Board Director level, in thirteen companies in the UK and USA. His consultancy work includes national

Government, CBRE., Johnson & Johnson Medical, British Aerospace and Glencore-Xstrata where he has delivered management and leadership development as well as leadership coaching. He does ongoing work with leadership on four programs at Wharton College. He is author of books, including 'Performance Coaching', 'Self-Coaching Leadership and Me, Myself, My Team'. He supervises PhD students at the Business School of Birmingham City University, UK. He has over 20,000 graduates from his web-based trainings and designs digital apps for leadership and for Small & Medium-Sized Manufacturing Enterprises via Gnowbe.com

“The WHIN grant for the 10-county region focuses on one of the largest manufacturing sectors in the state and Purdue's role in enabling its competitiveness.”



Steve Dunlop, Center Mng, Director

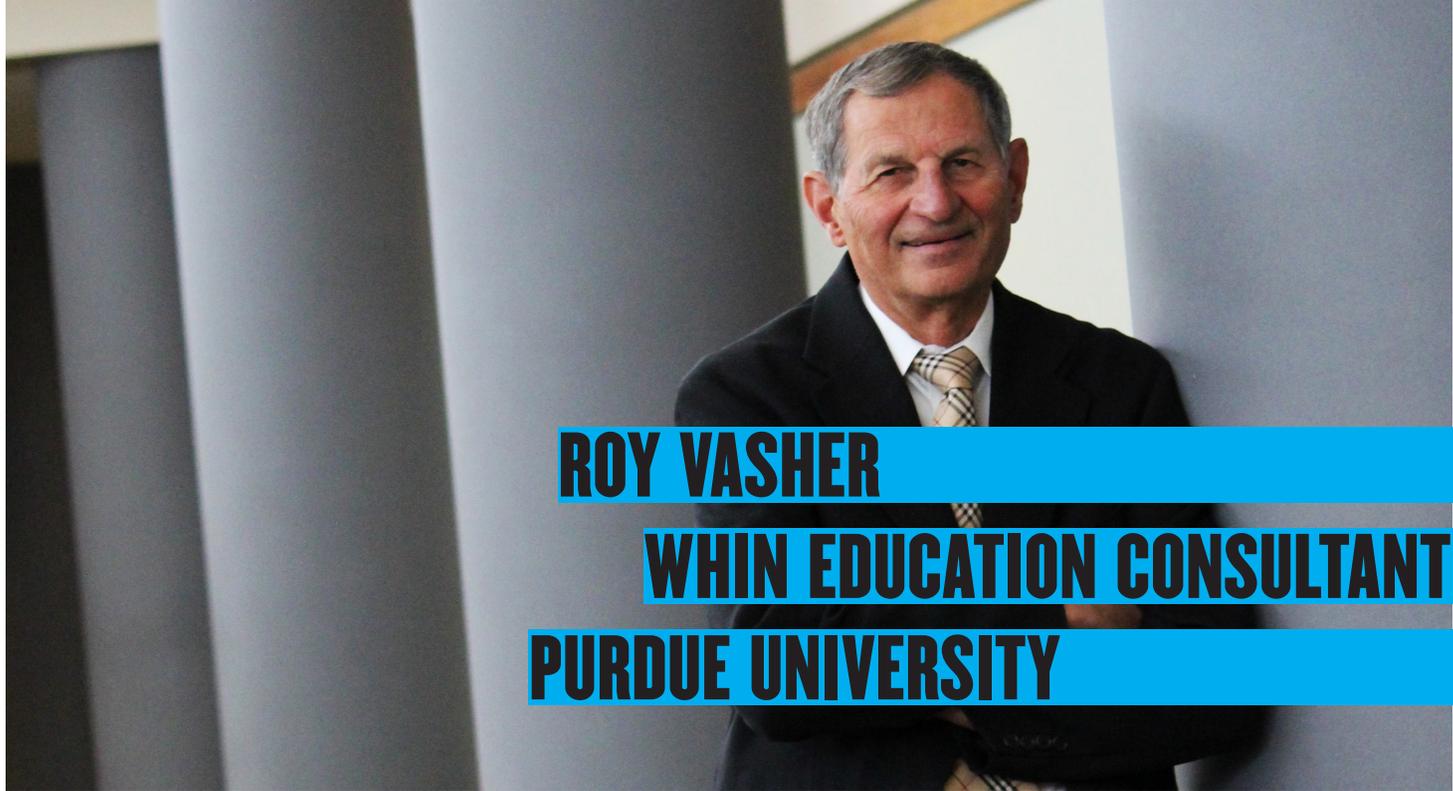
Can you picture a Silicon Valley ... in Indiana? Within the next five years, north-central Indiana is aiming to make its mark as a developing global epicenter, technologically revolutionizing agriculture and manufacturing. Leaders envision a hub that draws innovative new businesses and ultimately prosperity to the region. Community leaders

and local economic developers are collaborating with Purdue University to advance the Wabash Heartland Innovation Network (WHIN), a consortium of 10 counties in north-central Indiana that already is leading the state in agriculture and manufacturing. It was funded in 2017 by a \$39 million grant from Lilly Endowment Inc. WHIN serves

to develop the region into the global epicenter for digital agriculture (engaging agriculture producers and business in the development of agriculture IoT testbeds, career-ready certificates and digital-readiness training) and next-generation manufacturing (real-time analytics of manufacturing systems, workforce education and manufacturing IoT

WITH 85% OF OEM PURCHASING GOING OUTSIDE THE STATE OF INDIANA, ANYTHING THE WHIN SUPPLY-CHAIN TEAM CAN DO TO IMPROVE VERTICAL MOVEMENT OF GOODS AND SERVICES WILL IMPACT BUSINESS SUCCESS AND ECONOMIC GROWTH IN OUR AREA.

DID YOU KNOW



ROY VASHER

WHIN EDUCATION CONSULTANT

PURDUE UNIVERSITY

testbeds) empowered by Internet of Things (anything connected to the Internet, particularly Internet-enabled sensors of all types). In addition, the organization’s regional cultivation initiative is designed to increase the education, vitality, and connectivity of the Wabash Heartland region. DCMME is working on developing a curriculum for a variety of courses and certification programs. But they’re also developing a supply chain tool to retain more money in the region. Krannert’s Global Supply Chain Management Initiative (GSCMI) is a tool designed to reduce supply chain leakage, which occurs when manufacturers source their components outside the region. This tool is mapping all manufacturers and their capabilities so that new supply chains can be prototyped to develop emerging products and services.

WHIN stands for Wabash Heartland Innovation Network.

What does the acronym WHIN stand for?

There are 10 counties in the WHIN Initiative.

How many counties are included in the initiative?

To support the ten county area around Purdue to revive and stimulate economic advance of the WHIN area.

What is the mission statement of WHIN?

Dr. Ananth Iyer, Steve Dunlop, Roy Vasher, Dr. Angus McLeod

Who is leading WHIN Education & Supply-Chain?

With c. \$39 Million in support from the Lilly Foundation

Who provided the funding for the grant?

- Benton**
- Carroll**
- Cass**
- Clinton**
- Fountain**

- Montgomery**
- Pulaski**
- Tippecanoe**
- Warren**
- White**

What counties does the ten county region include?

Q&A about WHIN

The grant supports three broad initiatives:

- Resident ‘connectivity’ such as broadband, waterways and transportation
- ‘Vitality’ including projects of community benefit with more attractive spaces, and
- ‘Economic sustainability and education’ including training and development access to prepare current and future employees for work in smart manufacturing and digitally-enabled agriculture.

What initiatives does WHIN support?

4

new tech

Meet the new members of the GSCMI engagement center.

A close-up photograph of the Anki Vector personal home robot. The robot is black and grey, with a central camera lens and two large, treaded wheels. It has a friendly, rounded appearance. The word "hello" is written in a bright green, cursive font across the robot's face. Below the word, the text "Step in and say" is written in a white box.

hello

Step in and say

— → *Anki Vector personal home robot*

SMART LEAN ENGAGEMENT CENTER

Open for
tours Mon-Fri
9:00am-4:00pm
STEW 162

▶ **OPENCV** is a video analytics software

that allows users to track, classify, and recognize animals, people, objects and specific features on them. DCMME uses this technology in the engagement center to track the number of people entering and exiting the room and is working on a project with a local farm to monitor the number of cattle in their livestock fields.

▶ **3D PRINTERS** have advanced greatly

over the past few years and now have the capability to print using all kinds of material from plastics to metals to even concrete. In the engagement center, we have printers that print in ABS plastic and use them to create unique and complex gadgets and trinkets that would be very difficult to machine using conventional methods.

▶ **THE MICROSOFT HOLOLENS** is an augmented reality headset

that allows users to interact with the virtual world while maintaining a connection to the real world. It does this by projecting images and holograms onto the user's surroundings and lets them manipulate these projections using physical and verbal cues. The applications for this technology are limited only by the user's creativity and imagination.

▶ **THE LIGHT GUIDE SYSTEM** is another form of utilizing augmented reality

technology. It does this by projecting a digital operating "canvas" onto any work station to help train and improve the efficiencies of line workers through video and audio prompts. The prompts help ensure that the workers are following specifications so each product produced comes out perfectly each and every time.

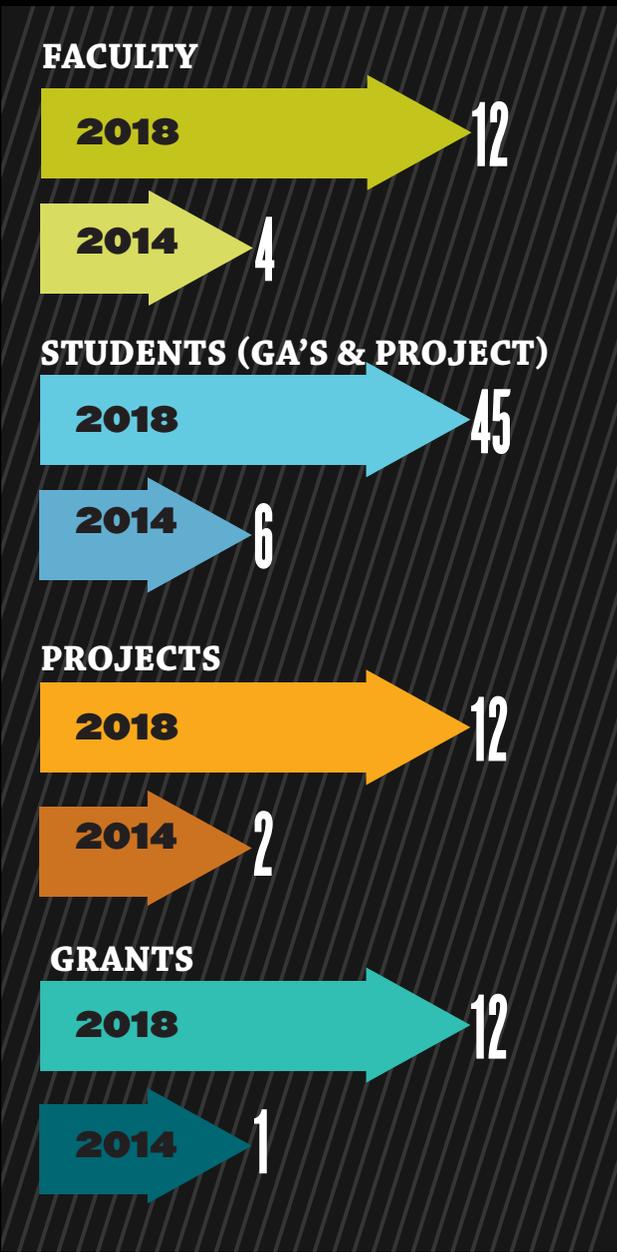


our staff pick



nick wright, mba '19

The HoloLens is our favorite technology. The applications of this technology range from employee training, to on-site maintenance assistance, to life size 3D modeling of complex parts, and even to entertainment in the form of interactive games. The possibilities are seemingly endless, and that makes it incredibly powerful in transforming businesses for the future. ● ● ●



BRIDGING INDUSTRY, STUDENTS AND FACULTY.

REVENUE

Gifts

Grants

Operations

Engagement Center

EXPENSE

Project Work



dinggo

ALUMNI FEATURE

"It's a web and mobile application, designed to make picking a movie, a piece of cake!" -Nick

NICK MOLTER
CEO & OWNER, DINGGO
MBA '18, DCMME TVS INTERN

Dinggo is an app that aggregates all of the content from Netflix, Hulu, and Amazon Prime Video, and allows the user to swipe through those options with ease. This app is available for download on the App Store and Google Play.

OUR FUTURE HOLDS AN EXCITING PROMISE WITH EVEN MORE COLLABORATIONS....

Our future goal is to enhance our global reputation for thought leadership in competitive manufacturing and supply chain. We see a bright future leveraging emerging technology (3D printing, video analytics, IOT, sharing economy) for business success. Accomplishing this goal will require leveraging Krannert's faculty expertise and its students to engage with resources across Purdue, alumni and companies. We have already started along this path by executing successful projects with Krannert and Engineering students in partnership with industry personnel. But with the addition of new programs in collaboration with the Engineering School, and new partnerships with Industrial Design partners, the GSCMI, will have even more opportunities for hands-on learning and realization of "design

thinking." We will build our footprint in the manufacturing and supply chain education space. We envision creating a stream of digital assets through blogs, videos, learning modules, and white papers, along with our strong reputation of informative conferences in order to become the centerpiece of digital knowledge within the manufacturing and supply chain industry.

Thus, we propose to add additional resources to shore up our position as a leading world-class research center in manufacturing and supply chain. If you are interested in partnering with us, please contact us. Your partnership will permit the GSCMI to expand our role in providing industry relevant research on manufacturing and supply chain trends, enhance existing components of the center,

while implementing new initiatives in transforming the manufacturing & supply chain industry with the following initiatives:

- World Class Conferences
- Student Case Competitions
- Scholarships/Fellowships
- Double the size of our Engagement Center in order to enable hands-on opportunities to experience the power of disruptive technologies. 3D printing, video analytics, shared economies and IOT
- Enhance GSCMI's digital footprint
- Build new capabilities such as Blockchain
- Significantly increase GSCMI's undergraduate student opportunities
- Enhance executive and student company visits and projects
- Increase student scholarships
- Expand our global network links with other centers
- Engage even more interdisciplinary faculty in research and projects



Dr. Ananth Iyer
Director
aiyer@purdue.edu



Steve Dunlop
Managing Director
dunlops@purdue.edu



Heidi Allwes
Coordinator
hallwes@purdue.edu



GLOBAL SUPPLY CHAIN
MANAGEMENT INITIATIVE