



Thank you.

Dedicated industry partnerships are at the heart of success for the DCMME- GSCMI Center. We thank our many distinguished industry partners for their significant and ongoing involvement and support. Our mission and the many important objectives set for the Center could not be accomplished without you.

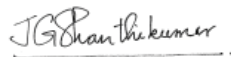
Dear Friends,

The DCMME-GSCMI Center exists because of our faithful partners. Your involvement in Center events and interaction with Krannert students leaves a lasting impact. Supporting our student focused Center truly invests in the goals and long-term successes of Krannert students. With your support, we provide our students with events that enhance their education by providing real-life experiences outside of the classroom. Take a moment to read about one such opportunity provided through DCMME-GSCMI- the TVS Motor Company India Internship (p. 39). This innovative and challenging global program is celebrating its ninth year of success with a total of 118 students having participated, represented by MBAs, MSHRMs, and

engineering students. Your support assists our faculty as well by enabling them to conduct further research in operations and supply chain. Supported by the Doug and Maria Devos Faculty Support Award, the Center is currently funding three faculty members in their research efforts. The DCMME-GSCMI Center will continue to provide our partners with occasions to share insight and interactions in order to become further equipped for emerging demands and challenges in business. During the 2014-2015 term, 46% of total funding was dedicated to student enrichment and events throughout the year. A sincere thank you to all of our center partners and sponsors; the value of your company's support is far reaching.

J. George Shanthikumar

Richard E. Dauch Distinguished Professor in Manufacturing and Operations Management
Director, Dauch Center for the Management of Manufacturing Enterprises
& Global Supply Chain Management Initiative



Heidi Allwes

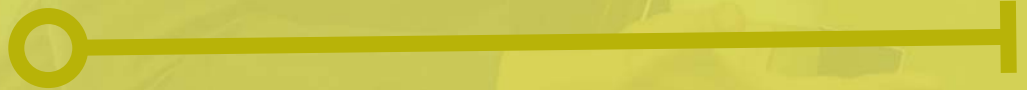
Center Coordinator, Dauch Center for the Management of Manufacturing Enterprises
& Global Supply Chain Management Initiative





STUDENT FOCUSED. FACULTY DIRECTED.

Developing meaningful coursework. Exploring innovative approaches towards operational improvement. Creating venues for collaboration among firms, students and faculty around the state and across the globe.



For twenty-five years the DCMME-GSCMI Center has been the focal point within the Krannert School of Management for promoting education, research and industrial engagement with those interested in operations management, manufacturing management, and supply chain management. This long standing history has bred a rich tradition of developing meaningful coursework, exploring innovative approaches towards operational improvement, and creating venues for collaboration between firms, students and faculty around

the state and across the globe. Partnering with organizations, companies, not-for-profit as well as governmental and economic development agencies has allowed our Center to create the essential linkages that foster innovation, develop rich insights, and enable us to accomplish our mission of celebrating the vitality of operational excellence and the importance of a strategic supply chain view. The Global Supply Chain Management Initiative and the Dauch Center for the Management of Manufacturing Enterprises provide current and



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new partners, students and faculty the synergies of two organizations working together with a shared support staff and a common structure. The goals of both are aligned and allow for opportunities for co-programs available to students and partners involved in either center according to their specific interest in manufacturing or supply chain.

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2014 DCMME FALL CONFERENCE

“Unlock the Value of Your Supply Chain with Analytics”

October 3, 2014

The 2014 DCMME Fall Operations Conference gathered students, faculty, and industry participants for a focused discussion on the topic of “Unlocking the Value of Your Supply Chain with Analytics.” Executives from American Axle & Manufacturing, Caterpillar, Cummins, Evonik, FedEx, Hewlett-Packard, and IBM shared their unique experience and insight on this topic.



“QUOTABLES”

This conference perfectly bridged the gap between academia and business and showed ways in which we can apply our education once we enter the workforce.

Tiffany Wendler (MBA 2015)

The DCMME & GSCMI conference, in a nut shell, truly goes beyond traditional academic forums by bringing industry professionals and educational stakeholders together to share and provoke insightful conversation about the role of analytics within the area of supply chains.

Raudel Medina (MBA 2015)



The conference was very helpful in understanding how the concepts taught in our classes are integrated into corporate supply chains. It is a great opportunity to gain exposure to some of the research happening in Krannert as well as in-depth knowledge of how companies like IBM, Cummins, and FedEx deal with technology in their supply chain.

Trevor DeWitt (Undergraduate)

The conference was very insightful to me. I enjoyed hearing about real world applications of the things I am learning in school regarding analytics and various supply chain models. I was impressed with how organized the conference setup was, and I especially appreciated the Q&A sessions.

Jordan Arteberry (Undergraduate)

The conference was a great experience to understand the role of analytics in supply chain initiatives and to connect with the professionals discussing the future state of supply chain roles and requirements. Furthermore, the event gave insights into the power of analytics in offering cutting edge business solutions to companies belonging to any industry by optimizing their operations and supply chain performance.

Anuj Gupta (MSGSCM 2014)

I was so honored to attend this event, and I have learned so much. This conference really is an amazing opportunity to develop your networks and learn best practices and new ideas from industry experts and leaders.

Xingying Zhao (Undergraduate)



MIKE CROSSK, AMERICAN AXLE & MANUFACTURING “MATERIAL FLOW & PACKAGING WITHIN THE INTERNAL VALUE STREAM”

One of the most important aspects of advanced or pre-production engineering is the development of a strategy for lean packaging, material flow and part presentation to the operator. Michael discussed and provided examples of the various technologies that are available to develop a sound plan for moving material within the internal value stream. In addition, he provided insight as to what the most important aspects are when making decisions about how to move, store, and package material within the internal value stream.

Brandon Herbert (Undergraduate)

Mike Crossk from American Axle & Manufacturing spoke in detail about lean manufacturing. Every company wants to cut costs and create more value for its customers. Mike spoke about this and the ways that they are creating value. I found very interesting the way that AAM has laid out their warehouse and the way material flows through it. The “robot tugger” made their employees’ job easier and also made pulling material more efficient. There is also a priority at AAM of making the environment safe and better for the employees. I think that this speaks volumes for the type of company culture that exists there.

Daniel Rowe (MBA 2015)

One topic that resonated with me was given by Mike Crossk from American Axle & Manufacturing. He spoke about designing the internal value stream such that the manufacturing floors are the most efficient. This topic was unlike the others in that it did not focus on the external supply chain, but it was obvious from this presentation that AAM uses analytics to optimize the flow of materials inside their factories. At AAM they determined how to ergonomically design the work stations to best suit the human body. They also aligned racks and shelves to best suit the forklifts



and material handlers. They even laid out their factory floor to optimize flow by recording traffic in the various lanes. They used analytics to accomplish this by gathering data on all of the variables and then by optimizing the work stations and layouts.

Brandon Titelbaum (MBA 2015)

One of the topics that impressed me the most was the presentation by Mike Crossk from American Axle & Manufacturing. It was interesting to see how the company looks at ergonomics by using simulation before equipment is built and the process is established. It was also fascinating to see the three-dimensional rendering of their storage dock and how they can implement the safety factors before actually building. My previous experience in warehousing observing CAD modeling for design used data but not to this extent. Safety in warehousing and manufacturing is very important due to the potential of employee and equipment accidents along with injuries relating to ergonomics. I am impressed that AAM is able to factor in equipment traffic ahead of time and ergonomics using data to plan their manufacturing facility layout. It was interesting to understand how AAM has been able to use data to make their material flow and packaging more efficient. The reduction in forklift traffic by using their optimization model also will help save on direct labor needs. This is not only beneficial as it saves on head count requirements, but it also reduces the risk of a work related injury. The self-guided parts delivery vehicles also will save on labor needs and are also more efficient than humans. It is amazing to see how analytics can be used to reduce direct labor rather than just using it for modeling and analyzing a supply chain.

Nicholas Grady (MBA 2015)

Of all of the guests, I believe Mike Crossk of American Axle &

Manufacturing gave the most revolutionary presentation. Mr. Crossk discussed the human factors of developing and maximizing manufacturing profit. He covered two points in particular that caught my attention. The first was quantifying ergonomic factors in process design. AAM has a focus on maintaining a work environment where production workers can be happy and ergonomically healthy. While many other manufacturers claim they care about these factors, AAM actually implements this vision as well as understands and captures the value in dollars. In the manufacturing environments that I have experienced, these workplace conditions are either not considered or considered only as a function of safety with no financial impact identified. Quantifying workstation functionality in this way provides not only more productive employees, but it also contributes to a firm's financial solvency. The second point that I found very fascinating was Mr. Crossk's attention to separating labor from non-productive distractions. He spoke at length about various ways in which he has had success keeping employees focused on their tasks. He described designing workstations where fork truck traffic is physically separated from assembly employees. This allows employees to work solely on assembling parts. The distance between these workstations and transportation is bridged by specially designed conveyers that do not require operator input. This of course not only provides gains in safety by removing mobile equipment hazards but also allows employees to strictly spend their time performing value added tasks. Even small incremental gains could have massive impacts on overall facility productivity, making the cost of the workstation redesign manageable and possibly insignificant.



Bio: Senior Value Stream Engineer

Michael Crossk began his career at AAM in June of 1997 as a college graduate in training in the Detroit Gear and Axle Materials Department. He has served primarily in the material handling and packaging group in both a daily operational and advanced engineering role. Early on in his career, Michael assumed the role of Material Handling Engineer with responsibilities for all material handling and packaging throughout AAM's North American facilities. This included responsibilities to develop program budgets and forecasts as well as procuring all necessary packaging and material handling devices. Between 2008 and 2013, Michael explored opportunities with Cummins Turbo Technologies and Fiat Chrysler Automobiles. Within these positions, Michael had the opportunity to become well versed in lean packaging and lean material display strategies to optimize the operator's productivity and efficiency. Upon returning to AAM, Michael was appointed Senior Value Stream Engineer for the North American Driveline Business Unit. In this role Michael is responsible for all of the advanced engineering for new production programs with a specific focus on advanced value stream maps and non-value-added-activity reduction through lean packaging and lean material display. Michael has challenged himself to invoke a culture where optimum operator productivity and material delivery driver efficiency can be achieved through establishing a lean methodology in step with the development of new manufacturing programs and product development. Michael holds a Bachelor of Science degree in Industrial Technology. He is the last in line from a large family of proud Purdue Boilermaker alum.



GARY SMITH, CATERPILLAR INC. “LOGISTICS COST ANALYTICS”

The complexity and multiple moving parts of modern supply chains supporting typical manufacturing environments, with all of the associated sources of variation and worldwide supplier sourcing strategies, make modeling and forecasting both logistics costs and cash flows extremely complicated. A supply chain supporting multiple product lines, non-standard configurations of product offerings, and varying manufacturing production rates within the same environment can make the challenge seem even more overwhelming. However, business planning functions require that the cash flows be reasonably understood and predicted in order to meet the overall business commitments. Gary discussed a process along with the challenges encountered to find relevant correlations to develop a simplified cost model for freight cost forecasting for a complex supply chain environment.

Nathaniel Grove (MBA 2015)

Being a civil engineering major, I was particularly interested in Gary Smith with Caterpillar. In the civil construction industry, CAT is a widely used brand with numerous markets, parts, and machines. During my undergraduate studies, I was afforded the opportunity to tour the Caterpillar Engine Plant located on the south side of Lafayette, Indiana. These previous encounters and experiences made Mr. Smith's presentation about logistics cost analysis in CAT's supply chain very intriguing. Although it seems intuitive in thinking, I didn't realize Caterpillar sales outside of the United States were greater than two-thirds of their market share, servicing over 180 countries worldwide. Listening to Gary's analysis of how to handle freight vs. build options showed the true impact that proper supply chain management can have. The freighting cost for some items was ten to twenty percent of total cost; in a market where contractors are the main customer, providing cost efficient machines is crucial. Using the analysis model that Gary helped to build, it is apparent how forecasting and tracking potential sales is very important to lowering overhead cost, shipping (bundling if possible), and manufacturing accurate quantities. In listening to Gary discuss the model, I was



very intrigued by the multiple comparisons he made regarding the initial model (with a correlation of .52) with other random items in the market such as tea etc., many ironically following the same trends up and down as the CAT sales no less. It was nice to hear during Gary's talk that the company went through over fifty models before finding the final model (with a correlation of .82). In college courses there is generally speaking, an exact answer. In industry from my experience there is almost anything but an exact answer. From Mr. Smith's discussion and the many others at the conference, I think students can build on actual in-class information by relating to these actual work force leaders.

Tarun Aggarwal (MBA 2015)

While all of the speakers were extremely informative, I believe the one speaker that I enjoyed the most was Mr. Gary Smith from Caterpillar. He spoke on "Logistics Cost Analytics." The reason why I was deeply intrigued by this topic was because of my past experience with global logistics. The topic touched on the various cost aspects associated with a complex supply chain. Gary gave information about a business forecasting model that addressed the issue faced by a supply chain having about eight hundred different suppliers with varying lead times and having different products. I believe this is a very common issue faced by a majority of the industries today. Getting cheaper products has forced companies to source from multiple suppliers and thus has increased the complexity of the whole supply chain. The business model proposed by Gary involved the use of various regression techniques to map and determine various key process parameters that affect the overall cost structure of the operation. The processes are sub-divided to ensure all the parameters are taken into account. Thereafter, the data is analyzed to assess the correlation between the various parameters. Based on the correlation information, various models

are generated to predict the cycles and trends and forecast the cost of operations. The cost model that is generated has to be PGA (Practical, Graphical and Analytical). Once these models are generated, a three month moving average of the actual data is considered to verify the accuracy of the models, and accordingly, changes are incorporated into the model to make it more accurate. This model is then finally used for forecasting the cost structure of the operations for Caterpillar industry. This model is constantly evaluated to incorporate changes in the industry and other key factors considered for building the model. In my opinion this model is extremely effective in gauging the impact that various factors have on the cost structure of an organization. This model uses historical data for forecasting, and since it is verified against the actual data, it makes the entire model even more robust. Also, I believe that establishing the correlation between various key factors helps to evaluate the relative importance of the various factors. This information is helpful in identifying and eliminating factors that may be redundant. Also, the main cost intensive factors can be identified, and processes can be set up to manage these better. This model can be applied across all industries and thus is easy to replicate for the various business units of an organization. As the supply chains in industries become more complex, comprehensive data analysis tools can be used to make more informed decisions. These tools can unlock greater value in supply chains by generating savings across each step and by eliminating redundant aspects of the supply chain. As managers move towards a more data intensive approach of decision making, the supply chains will become more efficient.



Bio: LEC Supply Chain Manager

Gary Smith is currently the Supply Chain Manager for Caterpillar's Lafayette, Indiana Large Engine facility and is responsible for leading all supply chain activities including strategic process transformation, supply chain planning, material requirements management, inventory management, demand and orders management, supply chain performance and logistics, and ensuring linkage between process planning and execution. Gary has a Bachelor Degree in Electrical Engineering from Rose-Hulman Institute of Technology and an MBA from Lewis University. Gary has extensive experiences in order-to-delivery processes at various Caterpillar facilities as well as six-sigma and lean continuous improvement processes and operating principles.



LARRY HANSON, CUMMINS INC. "JOURNEY OF DATA ANALYTICS AT CUMMINS"

Cummins Inc., a global power leader, is a corporation of complementary business units that design, manufacture, distribute, and service engines and related technologies including fuel systems, controls, air handling, filtration, emission solutions, and electrical power generation systems. Headquartered in Columbus, Indiana, Cummins employs approximately 46,000 people worldwide and serves customers in approximately 190 countries and territories through a network of more than 600 company-owned and independent distributor locations and approximately 6,500 dealer locations. Cummins earned \$1.48 billion on sales of \$17.3 billion in 2013. Beyond the company overview, Larry provided the "Journey of Data Analytics at Cummins," specifically highlighting how data analytics is leveraged across the company. In the start-up stage since 1919, Cummins was profiled as a technology company and later moved on to a technology and manufacturing company. The company implemented Six Sigma in the 2000's which drove the significant cost savings. In 2010, the company transformed itself to an integrated supply chain company while maintaining product technology and manufacturing as core competencies. Along with the growth of the company and its presence in global markets, the supply chain becomes dynamic and complex. Data analytics plays a significant role in the Cummins business model. Data analytics is utilized as a tool to transform raw input data to useful informational output in order to improve the customer service and achieve higher levels of the company's Key Performance Indicators.

Javier Arguello (MBA 2015)

I really enjoyed the "Journey of Data Analytics at Cummins." I enjoyed Larry's managerial view and the understanding of the value that Cummins has gained from analytics. His presentation was extremely engaging and easy to relate to. He had a very strategic approach, and he properly explained the impact it has had on the company.



Greg Nichter (Undergraduate)

The specific talk that impressed me the most was the talk by Larry Hanson of Cummins, Inc. Larry was very effective in presenting his information. The topic of his presentation was "Journey of Data Analytics at Cummins". The main take-away from his presentation was the importance of using raw data to get useful information. It means nothing to have the data if you do not interpret it to give you actual information; I think this is a profound point. In my coursework, when I face a problem with too much data to work with, it always helps me to apply logical filters and create graphs of the data. By doing this you can more effectively interpret your data and achieve a result. Another learning point from his presentation was his emphasis on making money in times when the economy is down. I think that this is an essential part to having a lasting business, and it can be one of the most challenging aspects to doing so. Fluctuations in the economy are natural and almost unavoidable. If your supply chain is flexible, planning for economic downturns as well as upswings can be much easier and can keep the cash flow of the business coming. Larry's explanation of how Cummins changes their supply chain philosophy every few years is important because it shows that a supply chain strategy is not a blanket strategy for all companies; every company needs to have their own strategy that fits their needs.

Sheena Harris (Undergraduate)

The topic that impressed me the most was the presentation by Cummins. Mr. Larry Hanson delivered his topic about the Journey of Data Analytics at Cummins. As introduction Mr. Hanson gave a brief history about Cummins. Cummins was once viewed as a technical company. Over the years Cummins adopted the six-sigma methodology in order to transition the company from technological to manufacturing. He also stressed that Cummins

shares their progress with people that work on the shop floor so that workers are able to measure their goals and productivity. One of Mr. Hanson's strongest points was how to develop core competencies within the company. He mentioned that the Cummins plant KPI's (in order) are: Safety, Quality, Delivery, Expense, and Inventory Turns. Each of these Key Performance Indicators must tie in with the company's core competencies in order to translate to the bottom line of how to become successful.

Brandon Titelbaum (MBA 2015)

The presentation by Larry Hanson from Cummins Inc. was impressive to see how the company collects data from a high level and analyzes it. The data is then used on the shop floor to drive change through the use of Six Sigma tools. The examples of how the data is displayed on large boards within the manufacturing floor is helpful as it is easy to see and understand. A lot of companies collect data everyday, but to learn about how Cummins only collects data that they will use to measure performance is impressive. It was also interesting to see that Cummins uses the following Key Performance Indicators to measure success: safety, customer quality, delivery, expenses, and inventory turns. It was helpful to see how Cummins has used analytics as they have made transitions over time.



Bio: Director - Manufacturing Functional Excellence

Larry has twenty-eight years of cross-functional manufacturing experience with Cummins. He has served the company in manufacturing engineering project management, new product introduction, new plant startups, and shop operations leadership within engine assembly and test and paint. Additionally, he has years of general manager experience, including profit and loss responsibility, facilities, security, real estate, and corporate support roles. Currently, he is responsible for driving common approach methods across twenty engine plants. Larry has also been involved in campus recruiting for the manufacturing function and the Manufacturing Development Program for twelve years. He serves as a talent scout on his recruiting team and is a mentor for several new hires. Larry holds a Master of Business Administration degree in Operations Management from Indiana University, Bloomington and earned his Bachelor of Science in Mechanical Engineering from the University of Illinois, Champaign.



MATTHEW VAN HOOSIER, EVONIK INDUSTRIES “BALANCING PROBABILITIES & UNCERTAINTIES FOR LONG TERM FORECASTING”

The pharmaceutical industry has changed dramatically in the last decade as big pharma has shifted their manufacturing strategies from owning the manufacturing assets to utilizing contract manufacturing organizations to outsource manufacturing. Evonik Industries is a multinational company based in Germany that is involved in multiple different chemical manufacturing platforms, with one being contract pharmaceutical manufacturing. As the pharmaceutical industry has changed and more contract manufacturers enter the market, the process for how business planning and forecasting is done has had to change also. Drug development and commercialization is a high risk and high reward endeavor. The different levels of risk, reward, and uncertainty must be accounted for and considered in short and long term business planning.

Jordan Arteberry (Undergraduate)

Evonik is a large pharmaceutical company headquartered in Germany. Representatives from Evonik's Lafayette branch visited the GSCMI conference. Their focal point was sharing techniques on how to forecast in such a large industry as the pharmaceutical industry. Evonik's analytics system is based around multivariable and probability analysis. They demonstrated how it is paramount to analytics to know when certain variables as well as assumptions change. Some of the variables to consider are competition volume erosion, product life cycle (patents expiring), and supplier strategy. These three dimensions are key to successful forecasting and supply chain analytics because they take into account different aspects of their business. The three dimensions listed are important to the sale of their drugs because they allow Evonik to know when to shift their selling strategy which was the main point of the presentation as well as a crucial aspect to their business model. I was very interested in Evonik's



awareness and discipline to change their analytical model based on predictive market changes.

Sarah Komen (Undergraduate)

Matthew Van Hoosier, Director of Supply Chain at Evonik Industries, gave a fascinating presentation on balancing probabilities and uncertainties for long run forecasting. It is difficult enough to forecast for the long run, but it becomes even more complicated when you must account for variables that are not easily defined such as failures in the pipeline. His solution involves multivariable and probability analysis. In addition to accounting for variability in variables, he mentioned that it is important to know when the focus is being shifted from one product to another as well as when the assumption you made for the model no longer applies. For example, demand for a drug when it is covered by a patent will be very different from demand after the patent expires. While it was not said directly, it is clear that a solid understanding of statistics and probability is necessary for the successful operation of a business.

Patrick Haslanger (MBA 2015)

Matthew Van Hoosier from Evonik talked about long-term forecasting in the pharmaceutical industry. Due to high uncertainty of how successful a new drug will be and whether a new drug can be developed at all, this is a highly complex task. Although the forecast accuracy is around sixty percent in the near future, with a significantly decreasing percentage in the far future, forecasts are needed to make long-term decisions including hiring or capital expenditures. In general, the risk-weighted cost of developing a drug is around \$1.3 billion. The number is very high due to the low success rates in various phases of the drug development. Mr. Van Hoosier stated that one out of one

hundred thousand attempts is successful. This success rate has to be factored in when calculating revenue forecasts. In addition, the revenue for a drug is reduced by up to ninety percent after a patent expires. The timing of this cliff can be easily determined, however, it is hard to forecast by how much the revenue will decline. Due to all these uncertainties, a three step multi variable/probability analysis is used to adjust projected sales: 1) forecast what you know (existing drug sales), 2) forecast what you are unclear about (drugs in the development phase that could materialize or die overnight), 3) forecast what you don't know. Mr. Hoosier's presentation gave a good overview of the problems that the pharmaceutical industry is currently facing.

Tiffany Wendler (MBA 2015)

While all speakers added valuable viewpoints on how to use analytics in order to improve their companies' supply chains, the presentation by Matthew VanHoosier from Evonik stood out to me due to my strong interest in the fast-paced health care and chemicals industries and past experience within this industry during an ELI project at Purdue. Matthew talked about balancing probabilities and uncertainties for long-term forecasting. Evonik, being a special chemicals manufacturer and supplier, is strongly subject to the trends and changes in the healthcare industry. Matthew mentioned that these are comprised of globalization where chemicals are being sourced globally (especially from China and India) and medication is supplied worldwide and cost increases in drug development. He stated that the average cost of drug development is \$1.3 billion. Patents are a major concern because if they expire, drug companies lose major revenue streams and therefore have to heavily invest in research and development in order to introduce new blockbuster drugs.



Bio: Director Supply Chain

Matt VanHoosier is the Director of Supply Chain for Evonik Industries at the Lafayette, Indiana site. The Lafayette site is a contract pharmaceutical manufacturing site for Evonik. In this role Matthew is responsible for overseeing the production planning, forecasting, and new business proposal functions at the site in addition to being responsible for the warehouse and logistic operations at the site. Prior to this role, he held various plant manager roles in pharmaceutical manufacturing operations at the Lafayette site. Matt has over twenty years of manufacturing experience in different leadership roles across multiple industries including petrochemical, specialty chemical, and pharmaceutical industries. Matt has a BS degree in Chemical Engineering from Rose-Hulman Institute of Technology and an MBA from Indiana Wesleyan University.



SEAN P. MCCREAVE & LIA DOUGLAS, FEDEX SERVICES “ANALYSIS & MODELING- QUANTIFYING THE VALUE OF A SUPPLY CHAIN SOLUTION”

Headquartered in Memphis, Tennessee, FedEx Corporation provides customers and businesses worldwide with a broad portfolio of transportation, e-commerce and business services. With annual revenues of \$45 billion, the company offers integrated business applications through operating companies competing collectively and managed collaboratively under the respected FedEx brand. Consistently ranked among the world's most admired and trusted employers, FedEx inspires its more than 300,000 team members to remain “absolutely, positively” focused on safety, the highest ethical and professional standards, and the needs of their customers and communities. As the supply chain needs and requirements of customers have become more complex, the solutions that FedEx provides have become more specialized and sophisticated. There are over two hundred products and services in the FedEx portfolio. The combinations of possible solutions are endless. However, these solutions have little relevance unless they are targeted specifically to a customer's needs and are quantified to show the impact to their bottom line. FedEx Services has developed a simple yet effective formula to calculate the value of the solutions that they design in terms of revenue, cost, and assets. FedEx has built online application tools to standardize the calculations, show the results, and collect all the examples in a database easily accessible and replicable by their team members.

Gustavo Amorim (MBA 2015)

The speakers that caught my attention were from FedEx. Lia Douglas and Sean McCreave did an excellent job developing the theme of quantifying the value of a supply chain solution and optimizing the FedEx customer experience. FedEx has a very complex business with many different solutions for many



customers. This reminded me of an AT Kearney guest speaker in my Sourcing and Procurement class. Both companies (AT Kearney and FedEx) face difficult challenges in a variety of industries and seek to provide value to their customers. FedEx goes through a process of assessing a customer's needs, linking to return on assets and value drivers, designing a solution personalized to the customer, quantifying the solution, and presenting the solution to the customer. Lia explained that if there is no real value added to the customer, the proposal will go to the bottom of the shelf. Linking to ROA demonstrates the meaning to the customer. There are many points where there can be a ROA formula impact. Some key value drivers include revenue, total expenses, current assets, and fixed assets. Using the revenue value drivers, we can notice that FedEx can reduce order-to-delivery cycle, improve visibility, and improve reliability. All those points are traceable and bring real value to the organization. These will not be imaginary or hypothetical numbers but actual figures that will appear in the customer financial statements. The second point that caught my attention is the integration that FedEx seeks to better help their customers fulfill their needs. After working with the customer to identify objectives, they present the solution to the customer after doing a great deal of data analysis. What surprised me the most was that FedEx does not charge its customers for this service. FedEx is very customer centric, and their goal is to keep the relationship going and add value to the customer's supply chain to make sure FedEx is their primary supplier to solve their needs. It is extraordinary that a company goes this far as to give free, in-depth supply chain analysis to its customers to make sure that the company is adding value to its customers. It was a fabulous experience to hear how a global company cares about its customers and seeks to integrate and find the right solution that will add value to a corporation.



Bio: Sr. Strategic Solutions Manager

Lia Douglas is part of a team that supports corporate and worldwide accounts in the design and implementation of customized logistics solutions. As a supply chain consultant, she is charged with assembling and managing cross-functional teams who work across all aspects of a customer's business to determine how FedEx can provide unique solutions to issues in their supply chain. The results range from strategy development, global supply chain optimization, mode optimization, direct distribution, network modeling, and system integration that can improve the inbound, outbound, and returns stages of distribution. The impact of these results are quantified through improvements to various accounting and financial metrics. Prior to this role, Lia held positions in various FedEx departments including Global Sales, Corporate Training, Sales Management, and International Direct Distribution Management. Lia holds an MBA in International Business from Bocconi University in Milan, Italy, and is a graduate of Florida International University in Miami, Florida. She is fluent in Italian, Spanish, and French.



Bio: Manager, Business Support and Analytics

Sean McCreave leads a team of FedEx business professionals who have developed analytic tools to meticulously measure current and future supply chain performance in quantifiable terms. The Business Support and Analytics Organization is an industry leader in delivering analytic solutions for complex global supply chain performance for Fortune 500 companies around the globe. His highly skilled team of professionals provides comprehensive supply chain analysis and cost modeling using state-of-the-art network and transportation modeling tools. By evaluating historical supply chain data and business requirements, they are able to design and recommend best-in-class solutions for businesses around the world. FedEx Business Support and Analytics also provides design, forecasting, and planning for FedEx holiday and peak planning and is instrumental in providing the corporation with the information necessary to maintain on-time performance when volumes have the capability to push global systems capacity. Since joining FedEx, Sean has been a contributor in the development of global customer focused solutions through the power of analytics and is a member of the eCommerce Center for Excellence. His team leverages the FedEx portfolio of operating companies to provide end-to-end business solutions that connect companies and their customers to over 220 economic markets throughout the world. Sean is an active member in his community and a frequent speaker on topics including optimizing global supply chains and leveraging analytics for better supply chain performance. He earned his Bachelor of Science degree in Mechanical Engineering from the University of Mississippi.



CARA CURTLAND, HP INC. “MANAGING COMPLEXITY WITH ANALYTICS AND GOVERNANCE”

Cara provided an overview of how analytics are used in HP’s portfolio management process. She reviewed specific strategies that enable Stock Keeping Unit (SKU) reduction while enabling channel segmentation and customer-delighting product differentiation. Cara also discussed how a complexity governance process is as important as the analytics used to support it.

Stephanie Kruse (MBA 2015)

Cara Curtland from Hewlett-Packard (HP) presented on “Managing Complexity with Analytics and Governance.” HP has a long history of innovation and great achievement. They continue along this same path not only in their approach to supply chain optimization but also through cutting edge programs .

Cara highlighted the need to “drive design and supply chain changes to optimize customer satisfaction and system profitability.” This highlights the complexity that the HP team faces when balancing fulfilling customer individual needs with maintaining a manageable SKU count. As one can imagine, given the number of the options available on HP products, the SKU count is quite high. The more SKUs, the greater the uncertainty in forecasting demand and the higher risk for an excess or shortage of inventory. They approached reducing the SKU count through portfolio management. HP eliminated SKUs based on margin, revenue, and volume. They also minimized the amount of component variation and used fewer option codes to serve country requirements. To further simplify the supply chain, they use postponement to delay customizing each until the last possible moment.

A similar approach can be used for products with low volume, high margin, and above average variability. One way to measure product interdependencies is through the revenue coverage. It allows the user to determine how much revenue can be fulfilled from the portfolio. Cara’s presentation was both engaging and rewarding. HP is using cutting edge supply chain and



manufacturing techniques to make the decisions for the organization. It will be interesting to see where HP ends up next!

Shiva Chandrashekher (STEM MBA 2015)

Cara Curtland’s talk on managing complexity with analytics at HP was the one that impressed me the most. The sheer scale of HP’s product and customer portfolio makes it a perfect battleground for supply chain innovation. To quote some numbers, in every 60 seconds, HP sells the following: 1 server, 105 PCs, 88 printers, and has 600 suppliers, 92 distribution centers, and 160,000 retail stores. As customer preferences are unique, it becomes essential to offer customized, build-to-order products which results in more SKUs. Combine this with HP’s business units (IPG, PSG, and EBG) which may all be using similar components. This introduces high complexity in the number of SKUs needed. The challenge with having a high number of SKUs is that demand planning and forecasting need to be done for every SKU which increases the variability. Additionally, there are the challenges of managing inventory and deciding when to get rid of excess inventory. There is also significant storage, transport, and human capital overhead involved in managing this many SKUs. So SKU reduction by analytics and governance becomes an important aspect of the supply chain.

HP’s target is to reduce the number of SKUs that they have by 50%. HP is leveraging their scale through convergence and standardization to drive component standardization across all HP product lines. For example, memory used by IPG and PSG may be similar for certain products. By streamlining and consolidating spending across the business units for these common parts, HP can gain significant negotiating power over their suppliers. Also, standardizing components across the business units for components may help HP get volume discounts from their

suppliers. Post standardization, HP could look at consolidating their suppliers and manufacturing partners to reduce complexity of dealing with too many suppliers that was a result of the complexity in SKUs. Profiling the category by doing a 'Spending Analysis' could provide insights on spending with respect to different vendors. Also 'Needs Analysis' to develop a thorough understanding of the product, any enhancements that may be required, and a view of the supplier performance could help drive product standardization.

The strong need for governance that drives results was emphasized. The governance team should be responsible for getting buy-in between cross-functional teams and getting the right people on board to get perspectives. It needs to have the right focus and necessary tools for making informed decisions. This team will be key in driving product standardization across product lines and business units and will be the overall flag-bearer to drive supply chain optimization across the enterprise.

On the flip-side, with very short product life-cycle, adding an additional governance process could lead to increased product development time and delay the time to market. So there should be a balance between focusing too much on standardization and the strategic importance of the product in the market.



Bio: Strategist, Strategic Planning and Modelling

Cara has been with HP for sixteen years. At HP, Cara has developed and diffused best practices in inventory management, network design, forecast accuracy, SKU reduction, product planning, manufacturing, and distribution. During her personal time, Cara spends time with her husband, two sons, and their dog. They enjoy hiking, camping, taekwondo, reading books, travelling, and watching movies together. Cara graduated with both her BSIE and MSIC from Purdue University.



SEAN ANDERSON, IBM INC. “SMARTER SUPPLY CHAIN – INNOVATIVE USE OF ANALYTICS IN IBM SUPPLY CHAIN TO DRIVE BUSINESS VALUE”

Stephanie Kruse (MBA 2015)

The GSCMI Fall 2014 conference offered a fantastic opportunity to hear from many industry professionals. One of the speakers I found particularly interesting was Sean Anderson. Sean Anderson, a Senior Manager in Global Procurement from IBM, presented on “Smarter Supply Chain Analytics.” I found his presentation insightful as he spoke of moving supply chain management from a cost center to a value center. The business impact was quite impressive. IBM wanted to be a globally integrated organization by focusing on three areas: global, functionally, and products. Analytics is a key driver in making this idea a reality. IBM streamlined global processes and increased information sharing. This led to greater supply chain transparency and improved use of big data. IBM used supply chain analytics to improve the usage of Big Data. Analytics at IBM is broken into four categories: Descriptive, Predictive, Prescriptive and Cognitive. Descriptive looks at what happened and focuses on visibility and transparency. Predictive is driven by analyzing future scenarios and the potential impact on the businesses. Prescriptive focuses on collaborating to determine a next step or solution. The final category, cognitive, is IBM’s newest and is centered on Watson Analytics. Watson is a computing system deeply rooted in analytics that learns and interacts with people. Watson utilizes three steps to analyze large amounts of data. First, the user asks a question. Watson has the ability to understand normal, everyday language and communication. Then it discovers by using the data and understanding the user’s responses. From there, Watson generates a hypothesis. The system has a wide range of possible uses from outer space to a patient diagnosis. It is quite impressive technology, and I am glad Sean was able to share it with us today.



Dawn Edwards (MBA 2015)

Sean Anderson provided concrete examples and well-defined strategies for accomplishing a company’s supply chain vision through “Smarter Supply Chain Analytics.” With a degree from Marquette University in Finance, as well as an MBA from Purdue, Anderson joined IBM in 2004 and is now the Senior Procurement Manager at the globally integrated enterprise. The theme of his discussion was establishing a smarter supply chain through a new era of reinvention. With IBM’s supply chain scale recently extended to the back end of the process, it experiences one hundred billion dollars in cash flow and over seven billion in annual procurement savings. While IBM is still working to increase its value deliverables, it has created a four-prong system to effectively leverage big data. First, through synchronization, visibility, and optimization the Descriptive section answers the question of “What happened?”. This transparency of the supply chain through real time visibility to all employees has resulted in an internal culture shift. While there might be a slight learning curve associated with this transparency throughout the organization, I think that it will ultimately result in increased collaboration and more informed decisions.

The Predictive and Prescriptive sections address the issues of “What will happen?” and “What should we do about it?”. In a case study on these two, forecasting algorithms were built to improve the supply chain through life cycle analysis and predictive models, where IBM delegates to its suppliers what to order and pull for stock in exchange for price protection. This resulted in benefits including a serviceability increase of ten percent and return reduction of fifty percent.

I was curious of the risks IBM took by assuming decision-making power for its suppliers. The supplier would presumably receive some benefit, but it is seemingly IBM that is accepting the risk. This question was clarified during Larry Hanson's presentation on Cummins when he said, "We are responsible for the entire supply chain, whether we make it all or not." Although IBM is outsourcing through various partnerships and suppliers, it is ultimately IBM's name on the finished good despite all the other contributors.

Finally, the Cognitive section of using big data analyzes "How do we optimize a big data dynamic?". The case study on this is the expansion of Watson and cognitive capabilities. This model's capabilities are trifold: asking the correct questions to interpret human data, discovering how to adjust to the specific user, and deciding on a hypothesis. Anderson stated that the benefits of the Watson approach are that it acts as a proposal professor, quality quasar, and risk rover. Anderson summarized that IBM, and presumably many other supply chains, have the ultimate goal of attaining supply chain transparency, leveraging big data and advantage analytics, and extending to a multi-enterprise supply chain. His presentation was very cohesive in terms of the steps and mindset that could really be implemented in any type of sourcing and procurement method.



Bio: Senior Procurement Manager

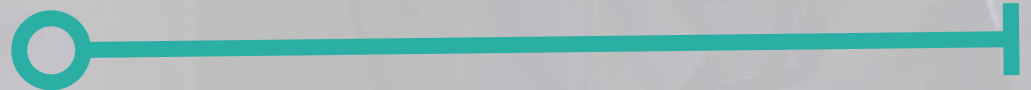
Sean Anderson is currently a Senior Procurement Manager in IBM's Services and General Procurement organization. In his current role, Sean supports IBM's Global Service organization by ensuring that business unit strategies and operations align with the procurement organization and IBM's extended supply base. He has worked for IBM since 2004 and has held various positions across IBM's supply chain in areas such as manufacturing, strategy, supply demand planning, procurement and sales operations. He has particular expertise in strategic planning, financial and data analysis, and project management and has leveraged these skills in leading large global projects and teams within IBM's Global Supply Chain division. Prior to working for IBM, Sean was a Credit Analyst at Wachovia Bank in North Carolina. Sean graduated with a degree in finance from Marquette University and a Masters in Business Administration from Purdue University.



STUDENT ENGAGEMENT OPPORTUNITIES

Student Focused.

DCMME & GSCMI strive to bring our students the best occasions to support their academic endeavors through a wide range of engagement opportunities including interaction with industry, international internships, academic programs, competitions and a variety of other events. Center events are academically enhancing and provide excellent venues for networking with faculty and industry executives.



We highly encourage our students to:

- Join us in DCMME-GSCMI Conferences
- Participate in DCMME-GSCMI Student Competitions
- Become a volunteer for DCMME-GSCMI events
- Become a GSCMI Undergraduate Student Member
- Participate in company sponsored projects under the supervision of DCMME-GSCMI faculty
- Do research in Supply Chain and Operations under the guidance of DCMME-GSCMI faculty
- Become a graduate assistant for DCMME-GSCMI

Student Projects

Faculty Directed Student Projects: Every firm has that “job jar” of important projects that just never seem to reach peak priority for the limited resources available. These are exactly the projects that the DCMME-GSCMI Center is interested in assisting you with.

1. Supply Chain Improvement, Allegion

•*Student team: Ji Lei, Pengyu Zhai, Meng-i Chou, Juan Jose Guerrero*

•*Faculty Advisor: Sang-Phil Kim*



Allegion, an international company, focuses on manufacturing security products and providing security solution for homes and business. It is made up of twenty seven global brands including CISA, Interflex, LCN, Schlage and Von Duprin. The two billion dollar company employs around eight thousand people and sells products in more than 120 countries across the world. Confronted with the fact that market and products grow fast, it has become critical to consider how to continuously decrease cost. In this project, the team implemented a clustering algorithm to identify the opportunities to consolidate the screw packs. They also conducted make and buy analysis to seek opportunities to decrease cost.

2. Accessories product chain improvement, Allegion

•*Student team: Leo Fu, Dongfang Wu, Jennifer Lu, Yang Liu*
•*Faculty Advisor: Amy David*

The student team was tasked with improving lead times for finished goods in the “accessories” category. The team first analyzed the product chains to identify components with long lead times, prioritizing those with the largest dependent demand quantities. They then recommended inventory policy and sourcing changes to alleviate the issues identified.

3. Warehouse Optimization Project, Caterpillar

•*Student team: Yoshitake Tajima, Meng Zhang, Qi Zhang*
•*Faculty Advisor: Sang-Phil Kim*

If your company is interested in supplying a project to our students, please contact us at gscmi@purdue.edu

Company Projects

Caterpillar Inc. is an American corporation which designs, manufacturers, markets and sells machinery and engines and sells financial products and insurance to customers via a worldwide dealer network. Caterpillar Inc. traces its origins to the 1925 merger of the Holt Manufacturing Company and the C. L. Best Tractor Company, creating a new entity: the California based Caterpillar Tractor Company. In 1986, the company re-organized itself as a Delaware corporation under the current name —Caterpillar Inc. Caterpillar Inc. is the world's leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives. With more than \$89 billion in assets, Caterpillar was ranked number one in its industry and number forty-four overall in the 2009 Fortune 500. The Caterpillar manufacturing plant in Lafayette, Indiana was opened in 1982, and has since become the company's main source for medium-speed diesel engines for marine, petroleum, electric power, locomotive and industrial applications. Producing Caterpillar's most well recognized and durable

Student Projects

[CONT'D]

engines, the 3500 and 3600/C175 series engines, the Lafayette Engine Center now consists of 1.3 million square feet (123,000 square meters). Caterpillar Inc. eliminated one of the three logistics buildings within the Lafayette area recently. The current local logistics warehouse structure supporting production is made up of two logistics building called VMPE and 30th ST. This project developed an algorithm and process to evaluate the most cost efficient storage location and resulting local shuttle routes to maximize shuttle usage while supporting build needs. The team established a dynamic model for consolidating the production inventory into two of the warehouses, which includes three potential reallocation policies that could be selected in the light of changing demand.

4. Intermodal Analysis, Caterpillar

•Student team: *Xinlan Fang, Priyanka Govindraj, Luoqing Liu, Yunyang Liu, Junchao Yang* **•Faculty Advisor:** *Amy David*

Students from the Fall 2014 Experiential Learning course in Operations Management analyzed various transportation options for inbound shipments to Caterpillar's Lafayette location. The team developed an algorithm to find the volume breakpoint for rail transportation from each key supplier and further investigated both the feasibility and environmental impact of rail transportation.

5. Inventory Optimization Project, Coleman Cable

•Student team: *Linjie Wang, David Windmiller, Xiangyang Song* **•Faculty Advisor:** *Sang-Phil Kim*

CCI is a leading manufacturer and innovator headquartered in Waukegan, IL which produces wire, cable and other electrical products, serving a multitude of channels and industries. CCI categorizes their broad assortment of products into four categories: Industrial, Electronic, Assembled and Copper Fabrication. Over the past forty years, Coleman Cable has built the business through a series of strategic acquisitions and organic growth to ensure exceptional performance.



A special “THANK YOU” to
all who contribute to
scholarship funding for our
DCMME-GSCMI students.

**CATERPILLAR GSCMI
SCHOLARSHIP**

Linnea Cline
Kimberly Obergfell
Michael Samm
John Riddell

**ENSIGN-BICKFORD
SCHOLARSHIP**

Ethan Gilmer
Audrey Pierick

**JOHN DEERE GSCMI
SCHOLARSHIP**

Trevor DeWitt

**JOSEPH TURK DCMME
SCHOLARSHIP**

Nicole Nulf

GSCMI Scholarships 2014-2015

Through the generous sponsored scholarships provided by our industry partners, students who express sincere interest in supply chain management and manufacturing management can benefit from Krannert’s highly regarded undergraduate and MBA programs.

ACADEMIC PROGRAMS 2014- 2015 KRANNERT SCHOOL OF MANAGEMENT

Krannert MBA Option in Operations Management

Operations Management is a multi-disciplinary field that focuses on managing all aspects of an organization's operations to provide products and services. Operations managers apply ideas and technologies to increase productivity and reduce costs, improve flexibility to meet rapidly changing customer needs, enhance product quality, and improve customer service. The concerns of Operation Management range from strategic to tactical and operational levels, which involve designing, planning and managing the system.

The Operations Management Concentration is designed to prepare students for leadership in their operations management careers. With the trend in globalization and decentralization, successful management of supply chain requires system thinking and cross-functional skills. The rigorous coursework and curriculum offered by Operations Management faculty at Krannert aim at providing state-of-the-art training to ensure the competitiveness of our students.

Undergraduate-- Supply Chain, Information, and Analytics Major

The Supply Chain, Information, and Analytics major is a boundary-spanning field of study that integrates supply chain- the sequence of organizations and activities in acquiring, producing, and delivering goods and services all over the world- and analytics- the broad set of analytical and numerical methodologies that enable business problem solving and decision making. The program unites the strengths of three elite programs in Krannert: Operations Management, Management Information Systems and Quantitative Analysis. The curriculum is designed to meet the rapidly growing business need for multi-disciplinary talents with strong analytical and leadership skills. Students complete a set of courses in all three sub-areas and select a career track of one sub-area for in-depth study. While the career tracks allow students to be well-prepared for a career in supply chain, information systems, or business analytics, the major prepares students with a cross-functional career that is required of major global companies.



The Krannert Operations Management option has been recognized for excellence by national publications that rank such programs and specialty areas. 2015 US News and World Report ranked our operations MBA and Undergraduate options #7 and #3

Top Ranked.

Recognition: a top ranked program



Master of Science in Global Supply Chain Management Program Highlights

- Full-Time, One Year Program (Spring, Summer and Fall).

- Curriculum designed to meet the rapidly growing business need for specialized talents with thorough understanding of the intricacies involved in global supply chain management as well as strong analytical and leadership skills.

- A wide selection of courses developed by Krannert faculty who teach in our elite Operations programs (ranked #3 and #7 for undergraduate and MBA in 2014 US News and World Report).

- International partnership across a global supply chain with Tianjin University (China), Institute of Management Udaipur (India), and Universidad Popular Autónoma del Estado de Puebla - UPAEP (Mexico) bring unique global perspective and experience to the students.

- Faculty directed summer internship and experiential learning projects give students unique learning experience by working in international teams to apply classroom knowledge to the real world under close faculty guidance. The Global Supply Chain Initiative (GSCMI) Center works with partner institutes and company sponsors to offer the students project opportunities in China, India, Mexico, and the United States.



2015 OPTION CERTIFICATES

The GSCMI Center offers two certificates to our Master's Students: GSCM & MTM Option Certificates. By taking specific required courses to obtain these two options, students will be better prepared for many of the challenges that must be faced in order to succeed in today's highly competitive world of manufacturing.



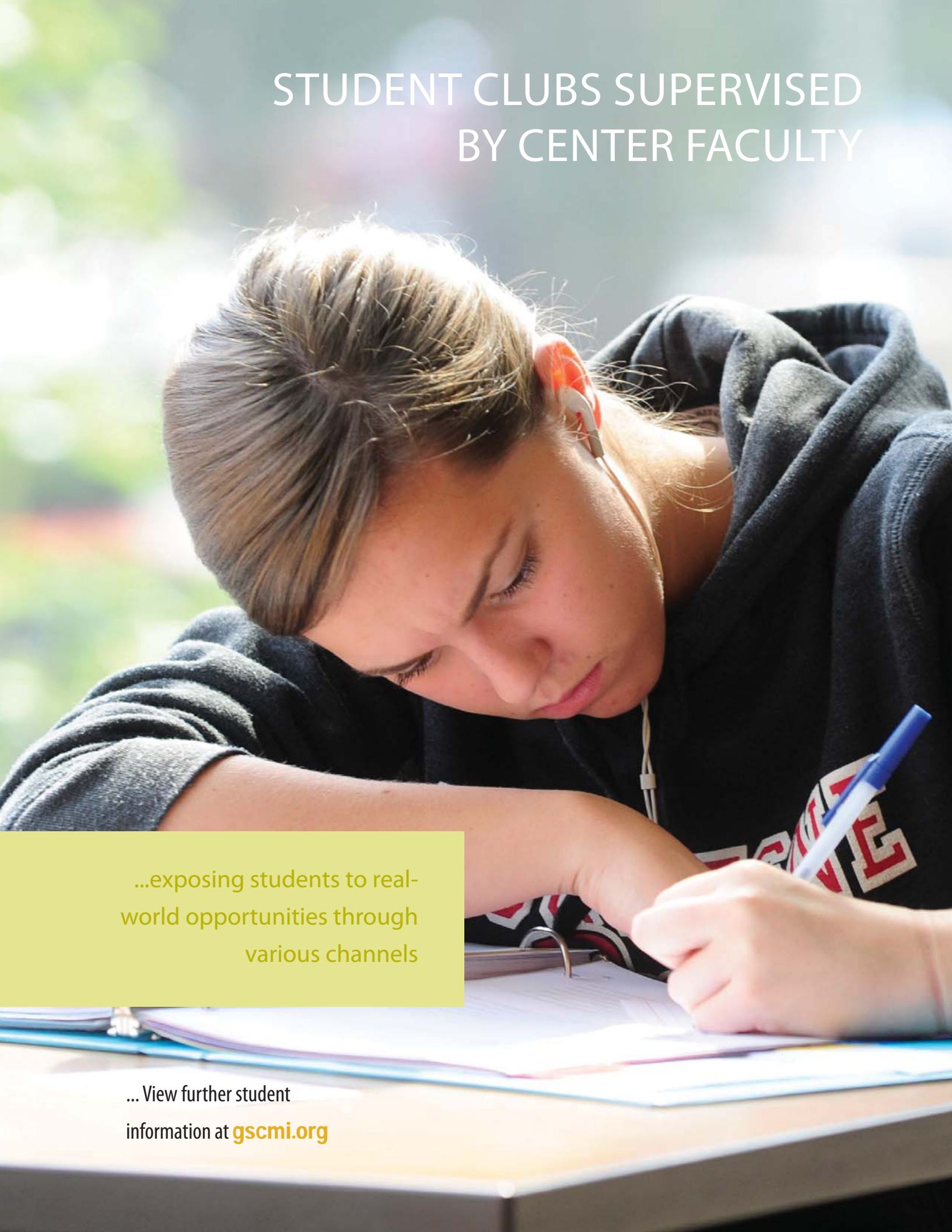
MTM and GSCM Option Certificates

The GSCMI Center offers two certificates to our Master's Students: GSCM and MTM Option Certificates. By taking specific required courses to obtain these two options, students will be better prepared for many of the challenges that must be faced in order to succeed in today's highly competitive world of manufacturing.

The Global Supply chain Management (GSCM) option allows students to learn how the network of suppliers, manufacturing facilities, distribution centers and customers located around the world work together to ensure that the right product arrives at the right place at the right time for the right price. The Center granted fifty-five GSCM Certificates in 2015.

Managing a manufacturing enterprise has never been more challenging or exciting than today. With the focus of corporate leaders increasingly shifting towards innovation and entrepreneurship and high-value, high-margin products in new and evolving industries, students must be well-prepared to succeed in today's highly competitive world of manufacturing. The Manufacturing & Technology Management (MTM) option focus allows students to prepare for these challenges. The Center granted thirty-six MTM Certificates in 2015.

STUDENT CLUBS SUPERVISED BY CENTER FACULTY



...exposing students to real-world opportunities through various channels

... View further student information at gscmi.org



(OSCO) Operations & Supply Chain Organization

OSCO's mission is to provide the means for members to gain exposure in the field of operations and supply chain management while effectively networking with companies to cultivate career opportunities for the future. The Operations & Supply Chain Organization offers its members plant visits, guest speakers, and information sessions throughout the year in order to learn about the operations of various companies in the surrounding area.

(KBAC) Krannert Asian Business Club

The club was formed to enhance Asian students' experiences at Krannert. It is intended to keep the members in touch with the business communities in Asia and the US. The club also assists the recruitment efforts through on- and off-campus events that are professional, educational, and cultural. The vision of the club is to build awareness of doing business in Asia among the student and alumni body.

(KOC) Krannert Operations Club

The KOC mission is to expose students to real-world opportunities through different channels; KOC hopes to broaden the understanding of Operations beyond the traditional classroom setting. During the course of the year, they organize various events bringing in operational leaders from industry to provide students with insight and future outlook.



Krannert Operations Club

2014-2015 Activities & Events

The KOC mission is to expose students to real-world opportunities through different channels; KOC hopes to broaden the understanding of Operations beyond the traditional classroom setting. During the course of the year, they organize various events bringing in operational leaders from industry to provide students with insight and future outlook.

The Krannert Operations Club offers its members plant visits throughout the year in order to learn about the operations of various companies in the surrounding area.

Plant visits included:
Amazon, Caterpillar, FedEx, and Subaru of Indiana Automotive

TRIP HIGHLIGHTS:

Amazon Visit

The Operations Club members visited Amazon's Fulfillment Center IND1 at Indianapolis. Members observed how Amazon handles large volumes of inbound and outbound

packages in their daily operations. Members discovered that Amazon is a living breathing unit that only works when all of the associates and management are working together. The stress placed upon continuous improvement is exactly what makes Amazon the largest e-retailer in the United States.

FedEx Visit

Club Members had the opportunity to visit the Indianapolis FedEx Hub to understand package sort operations. Students toured the two million square foot facility to see inbound packages unloaded from planes, moved systematically through miles of conveyor belts, and loaded back onto planes for the final destination.

KOC LEADERSHIP:

President: Gisela Condado, gcondado@purdue.edu
VP Events: John Vlk, vlk@purdue.edu
VP Finance / APICS: Amanda Dyson, dysona@purdue.edu
VP Case Competitions: Akshit Bajpai, abajpai@purdue.edu
VP Communications: Elsie Lee, lee1964@purdue.edu

Operations & Supply Chain Organization

2014-2015 Activities & Events

OSCO CONFERENCE:

OSCO held its first annual OSCO Conference that focused on bringing together students and potential employers in a relaxed interactive setting. This conference discussed: operations, supply chain, and logistics. The all-day event took place in the Krannert Drawing Room. Each company was asked to provide an interactive simulation or game to engage with students that tied it into their company experiences on a day to day basis.

Companies in attendance:

Evonik, GE, Ingersoll Rand, Novelis

GUEST SPEAKERS:

Dr. Julie Kalish-

Dr. Kalish, an Operations professor here at Purdue, talked about operations in various industries and the general concepts of operations and supply chain. She also provided a manufacturing simulation game that highlighted some of the objectives which operations management focuses on. Dr. Kalish has spoken with OSCO multiple times and always brings new insight to the students.

PLANT TOURS:

A guided tour through the Gatorade, Allison Transmission, and Coca-Cola Refreshments plants allowed students to see operations at work and ask questions to employees.

INFORMATION SESSIONS & DINNERS:

Caterpillar, Danaher, Cargill, Kimberly-Clark, Target

OSCO LEADERSHIP:

President: Jessica Miller, mille955@purdue.edu

Senior VP: Kaila Flanagan, flanagak@purdue.edu

VP of Professional Activities: Roger Cruz,
cruz51@purdue.edu

VP of Marketing: Edward Parchment,
eparchme@purdue.edu

VP of Operations: Eric Mirro, emirro@purdue.edu

Finance: Julie Leung, ileung@purdue.edu

Krannert Asian Business Club

2014-2015 Activities & Events

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KABC LEADERSHIP:

President: Ray (Jui-Pin) Lo, lo29@purdue.edu

VP Finance: Stacy (Xiaolan) Xu, xu703@purdue.edu

VP Communications: Tatsuhiko Daigo, tdaigo@purdue.edu

VP Events: Hyunsoo Shin, shin178@purdue.edu

Faculty Advisor: Dr. Feng, annabellefeng@purdue.edu



STUDENT CLUB CASE COMPETITION INVOLVEMENT



Operations & Supply Chain Organization

The third annual Boeing Case Competition hosted by the DCMME-GSCMI Center involved a total of thirty undergraduate students from Purdue University competing together in teams during the internal round for a chance to qualify for the final round competition at the Boeing headquarters against the University of Illinois. Teams of five students competed in business cases focused on finance, supply chain, accounting, and management.

Krannert Representing Team:

Angela Li, Undergraduate- Economics
James Yeh, Undergraduate- Strategic Management
Wesley Huang, Undergraduate- Industrial Management
Vince Coiro, Undergraduate- Finance
Kelvin Dieser, Undergraduate- Economics

The team was flown to Seattle, Washington and hosted by Boeing during the final round competition in which they won vs. the University of Illinois. Boeing provided private tours as well as in-person interviews to the winning team members.





Krannert Operations Club

MIT Sloan 10th Annual Ops. Sim. Comp

MIT Sloan's 11th Annual Operations Simulation Competition features 250 teams across the United States competing in a three day challenge.

KOC Team Placing in Top 50:

Krannert Team 2– Ronaldo Rotua, Hery Sofiaji, Dongfang Wu,

APICS Great Lake Case Competition:

Team 1 (5th place): Bihag Karnani, Siming Li, Yunyang Liu, Xuan Wang, Akshit Bajpai

Rutgers Ten Plus Supply Chain Dual Challenge

Team: Yuji Sakakibara, Raunak Sharma, Pablo Martiez, Yunyang Liu

University of Indianapolis Practice CC

Team: Wenying Lou, Bihag Karnani, Siming Li

MSU Bowersox Graduate Supply Chain Challenge

Krannert placed third at the fifth annual Michigan State University Bowersox Graduate Supply Chain Challenge represented by Siming Li (MBA 2016), Wenying Lui (MBA 2016), Vikas Solanki (MSGSCM 2014), and Yuji Sakakibara (MBA 2015). The competition was hosted by MSU's Eli Broad College of Business. This Supply Chain Operations Decision Simulation Challenge involved teams from the world's top-20 SCM programs, including Georgia Tech, Carnegie Mellon, and Purdue University.

The goal of this challenge was to build a global supply chain strategy with a simulation that replicated an end to end supply chain. This challenge required critical decision making within the functions of procurement, operations and logistics. The KPIs to assess each team were Supply Chain Contribution, Customer Service Level, Total Revenue and Inventory Turns. Krannert won the third prize by maintaining the service level of 99.63%, which was the highest in the history of this competition.

Graduate Assistants DCMME-GSCMI 2014-2015

Gustavo Amorim
MBA 2015



Gisela Condado
MBA 2016



Peter Jacobson
MBA 2015
(GA of the Year)



Stephanie Kruse
MBA 2015



Daniel Terayanont
MBA 2015



Brandon Titelbaum
MBA 2015
(GA of the Year)



Gustavo Amorim

MBA 2015 | Creative Director - Krannert Gear | VP of Communication - Krannert Business in Brazil Association | VP of Communication - Krannert Language and Cultural Club

Gustavo Amorim is a second year MBA student at Purdue University's Krannert School of Management with concentrations in operations, supply chain, and strategic management. Originally from Brazil, Gustavo moved to the United States to study at Brigham Young University, where he earned a bachelor's degree in Business Management. After his graduation from BYU, he worked for Novell in Information Technology.

Prior to coming to Purdue, Gustavo worked for three years in the Global Mining division of Caterpillar as a contract analyst in the service department. In this role he prepared business proposals and performed financial analysis and profitability studies. His role at Caterpillar gave him experience with many different areas of the company adding versatility to his repertoire.

During the summer, Gustavo completed his internship at Evonik Industries in Lafayette's Tippecanoe Laboratories facilities where he worked on cost savings initiatives and inventory management for the plant. He was able to utilize both his operations and supply chain knowledge and learn from a world leader in specialty chemicals.

Gisela Condado
MBA 2016

Gisela Condado is a first year MBA student at Purdue University's Krannert School of Management with concentrations in operations and supply chain management. Originally from Venezuela, Gisela graduated as Summa Cum Laude Production Engineer and later worked for three years in the supply chain department of multinational companies including both Cargill and Novartis.

Most recently, as demand planner at Novartis, Gisela represented the supply chain single point of contact of twelve international plants located in North America, South America and Europe, as well as participated in cross-functional teams in domains such as strategic purchasing, sales & operations planning (S&OP), global launching and inventory management.

Peter Jacobson

MBA 2015 | VP of Case Competitions – Krannert Operations Club | President - Krannert Energy Club | VP of Communications of Krannert Golf Club

Peter Jacobson is a second year MBA student at Purdue University's Krannert School of Management. In May of 2014, Peter completed a business planning project with TVS Motors, a motorcycle and auto-rickshaw manufacturer in India. He spent the remainder of the summer working with Emerson Climate Technologies, helping the compressor manufacturer develop a strategy to expand its commercial HVAC marketing channel strategy to end users and specifying engineers.

Prior to business school, he worked in various procurement and supply chain roles, including managing contract manufacturers in Asia to ensure a robust supply chain for audio manufacturer Harman International. Within Krannert, Peter is President of the Energy Club and a VP in the Operations Club and Golf Club. In his spare time he enjoys golf, skiing and travel.

Stephanie Kruse
MBA 2015

Stephanie Kruse is a second year MBA student at Krannert School of Management. She spent the summer interning with Shell Chemical LP constructing supply and demand models based on the US Gulf Coast ethylene industry.

Prior to joining the MBA program, Stephanie worked with Michaels Stores Inc., the largest art and craft retailer in the United States. She participated in many supply chain improvement projects and worked with multiple teams to limit disruptions to product flow. She is the Vice President of Communications for the Purdue University Consulting Club, a member of the City Trek committee, and is actively involved in both the Energy and Operations Clubs.



Graduate Assistants

[CONT'D]

Daniel Terayanont

MBA 2015 | VP of APICS and Budget – Krannert Operations Club | President of Student Managed Investment Funds | President of Wine Club

Daniel Terayanont is a second year MBA student at the Krannert School of Management specializing in Operations. During the summer of 2014, Daniel had the opportunity to exercise his Operations Management knowledge at Amazon as a Pathway Operations intern. Prior to his MBA program he worked at Toyota Motor Thailand Co., Ltd. as an engineer under the Product Planning and Development department. Additionally, Daniel also started his own property management company based in Thailand focusing on long term lease management, small scale boutique hotel, and retail space development. He is currently a Graduate Assistant at the DCMME- GSCMI Centers and Vice President of Operations Club at Krannert. Daniel's goal is to enhance his Operations Management skill in order to fully exploit his diverse and global background.

Brandon Titelbaum

MBA 2015 | President – Krannert Operations Club

Brandon Titelbaum is a second year MBA student concentrating in Operations and Supply Chain Management. He spent the summer interning for Cummins Inc. at their Eastern Distribution Center as an intern for their Global Logistics Improvement Group working on various process improvement projects for their operations.

Prior to coming to Krannert, Brandon worked for C&S Wholesale Grocers, the largest food wholesaler in the United States. He spent three years in various roles within operations management. He graduated in 2010 from Babson College with concentrations in Entrepreneurship and Retail Supply Chain Management. Brandon is actively involved in Krannert and is President of the Operations Club. In his spare time he enjoys mountain biking, skiing, and traveling.



DCMME- GSCMI CENTER VOLUNTEER OPPORTUNITIES

The Center offers many occasions for both undergraduate and graduate students to experience action-based activities which give real-world experience and provide vital leadership preparation. Our events utilize and enhance their skills and provide excellent networking opportunities with potential employers.

- DCMME Fall Operations Conference
- GSCMI Spring Conference
- GSCMI Spring Case Competition

To our many student volunteers,

Thank you.

You help make our events a success.



↑ बंगलौर Bangalore



2015 TVS India Internship

"The TVS Internship experience is an outstanding opportunity to explore the Indian business culture and broaden your view on international business. This study abroad program is a fast paced problem-solving scenario with unique challenges faced by a developing nation. You are given the opportunity to travel, experience a new culture, and test your skills developed during year one of the MBA program."

-Ryan P. Case, MBA 2016



...AN OUTSTANDING OPPORTUNITY

-Ryan P. Case, MBA 2016

The TVS India Internship organized by the DCMME-GSCMI Center in conjunction with the TVS Motor Company was developed in 2006. Providing a unique study abroad internship opportunity in Bangalore, India, this trip assists students in developing a global business perspective while enhancing their resume profiles. Participants have a distinctive occasion to take concepts learned in the classroom and apply them to real life business situations.

This innovative and challenging global program is celebrating its ninth year of success with a total of 118 students having participated, represented by MBAs, MSHRMs, and engineering students. Work on this two credit course begins in mid-February when students begin communication with their mentors. Discussions with their mentors regarding project objectives and completion of research pre-departure for India help to ensure a productive and successful internship for everyone involved. The course culminates in May with a three week visit to Bangalore, India where students continue work on their projects with TVS mentors and present their final work to TVS Company representatives.

This year eleven students headed for the airport on May 10th to begin their flight to Bangalore, India, the location of their TVS internship. Students were accompanied by professors of management, Professor Suresh Chand and Professor Tom Brush. The internship lasted three weeks ending after final presentations on May 30th. Students received intimate exposure to TVS Motors and its strong culture through presentations and discussions from company leadership, a plant tour, and a visit to one of their corporate social responsibility villages. TVS also ensures that students get a taste of Indian culture outside of the office by coordinating dinner for the students to meet

with various Indian families in their homes as well as provide an evening of classical Indian music and dance. A weekend trip to the Taj Mahal is yet another highlight to the trip. TVS arranged a visit to the beautiful Bangalore Infosys campus where students learned about how the company develops its human talent. Students also enjoyed dinner with Purdue alum Rohan Chandrashekar; Rohan is the CEO of data-driven content marketing boutique BUZZVALVE, a columnist for the Wall Street Journal, and serves as the President of the Purdue Alumni Association in India.

TVS selects their projects primarily based on meaningful work product. Part of the success of the program rests on the fact that students are aware that the consulting projects carry great importance to the firm, and if done well, they will likely become part of an adoption and implementation strategy. The projects that the firm ultimately offers tend to have a unique balance of the following qualities: analytical complexity, urgency for resolution, lack of available resources to assign internally, and a desire to test a current business situation against international best practices. Projects cover many different management areas including Operations and Supply Chain Management, Human Resources Management, Sales, and Management Information Systems, naming just a few.





SHANE MCGUIRE
DAIGO TATSUHIKO

Project Objective: The purpose is to understand the consumer-brand relationship across a range of categories to better appreciate the personality dimension in the brand positioning equations and its value.



YAFENG HU
PABLO MARTINEZ

Project Objective: Improving employee satisfaction of middle managers in operations by studying employee engagement indices.



YING LI
GINI-DENISE SANCHEZ

Project Objective: Enhancing performance management systems in operations by studying target setting and alignment-to-policy targets. The goal is improved target achievement levels and established performance management systems in operations.

2015 TVS PROJECT CHARTER

TVS is a Deming Prize winning two-wheeler manufacturing company producing motorcycles, scooters, and mopeds. TVS has been credited with many innovations in the Indian automobile industry, notable among them being the introduction of India's first two-seater moped. Krannert alumnus Venu Srinivasan (MSM '77) is the chairman and managing director of TVS Motor Company.

WHO IS TVS?





RYAN CASE JAMES POINDEXTER

Project Objective: Reducing waste in outbound supply chain and improve profitability. Study handling, loading and unloading, packing methods and truck configurations. Suggest and implement actions to address the root causes for transit damage.



AMIT KUMAR

Project Objective: Contributing to an improved work order service level by improving the planning and supply chain systems. Improving model production by benchmarking best-in-class planning and supply chain practices.



AIMEE KAPPES-ARMSTRONG GEORGE SYMONS

Project Objective: Preparing an efficient and comprehensive demand supply map that will enable efficient operations under a potential Goods and Services Tax.





Taj Mahal weekend excursion
Agra, Uttar Pradesh, India



"My TVS internship was an extraordinary opportunity. I gained valuable professional and business skills, broadened my intercultural understanding, and furthered my educational experience. As a weekend MBA student working for a non-profit institution, I observed how business principles learned in the classroom are implemented in an international commercial firm through company site visits and meetings with TVS personnel. I gained greater appreciation for India's culture not only while touring historical landmarks and visiting rural villages, but also by observing the behaviors, customs, beauty, and diversity inherent in Indian daily life. I also became increasingly aware of the political, religious, and technological influences on Indian society and its economy. In retrospect my TVS internship was an invaluable opportunity through which I cultivated not only

long-term professional relationships with my TVS mentors and full-time MBA peers, but also gleaned firsthand knowledge of the key dynamics and complexities of international business."

--Aimee Kappes-Armstrong, MBA 2016

"The TVS internship has been a great learning experience for me. It has given me an opportunity to apply classroom knowledge in real time business problems. At the Hosur plant, I had the opportunity to see and learn from the TVS manufacturing practices which have won many international awards. We also received briefing from many senior officials at the company who gave us insight on the core business principles, history, and the company's vision going forward. I feel this to be a great opportunity to contribute towards TVS's



success story. I am really satisfied with everything I have learned and experienced during this internship."

--Amit Kumar, MBA 2016

"Having the opportunity to travel to a new country is one thing-being able to work and dive into the culture is so much more. Through the TVS India internship I was not only able to apply what I've learned in the classroom but also interact and learn about a new culture through this hands on experience. My daily activities and work allowed me to better understand India as a country and as a leading developing country."

--Gini- Denise Sanchez, MBA 2016

"I have found the TVS Motors internship to be one of the richest and most fulfilling experiences in my life. At every stage, I have been challenged in different aspects, not only professionally, but personally as well. This internship has proven to be a must for anyone interested in doing business abroad. TVS Motors was a great supporter, and the project I undertook was a great opportunity to push myself to think outside the box. What an amazing opportunity as a foreigner overseas in an exotic country, challenging myself to understand the culture, to learn at every step, to work under pressure and to formulate the best recommendation in a short period of time."

--Pablo Martinez, MBA 2016

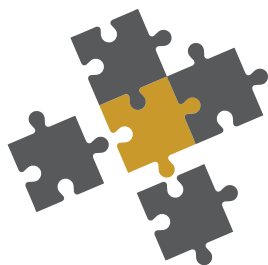




2015 GSCMI SPRING CONFERENCE

“Collaboration: Strengthening the Links in Your Supply Chain”

April 24, 2015



Collaboration: Strengthening the Links in Your Supply Chain

The 2015 GSCMI Spring Conference gathered students, faculty, and industry participants for a focused discussion on the topic of “Collaboration: Strengthening the Links in Your Supply Chain.” Executives from Amway, Bechtel, Conexus Indiana, Cummins, Evonik, FedEx, and Ingram Micro shared their unique experience and insight on this topic.



“QUOTABLES”

Through this conference, I had the opportunity to learn several new ideas and strategies presented by various companies.

Jesse Mudd (Undergraduate)

This conference was extremely informative as I was able to hear different ideas from top executives. After attending the conference, I was able to better understand how complicated supply chain is and just how many pieces are interconnected in it.

Lawson Drury (Undergraduate)

I really enjoyed this conference and learned a variety of different strategies of supply chain. It was very motivating listening to executives from several different companies. It was also very interesting to hear all of the different strategies of supply chain and logistics.

Lauren Guilford (Undergraduate)



JORDAN HOWELL, AMWAY "COLLABORATION IN A GLOBAL SUPPLY CHAIN"

Amway operates in over fifty-six markets worldwide. Gaining visibility to demand fluctuations and supply disruptions requires a high level of collaboration. How are markets trending? What products are over-selling, and which ones are lagging? Amway's collaboration initiative seeks to answer those questions and build relationships with their customers at the same time.

Student Summary-Gisela Condado (MBA 2016)

Amway is a multinational company that sells a variety of products in beauty, health and home care markets in more than 85 countries and territories worldwide. This American company leader in direct selling has more than 21,000 employees worldwide, as well as 9 million distributors around the world. Jordan Howell, Senior Supply Chain manager, has lead multiple teams including the Cultural Change team for the Supply Chain Planning department. During his presentation, he explained some of the biggest challenges that the company has faced in terms of collaboration in their Global Supply Chain Operations.

I found very interesting the three main needs that he highlighted to improve collaboration within the company. He mentioned the need for better visibility in market dynamics, the requirement for better communication from affiliates, and the necessity to respond faster to global demand fluctuations. Amway's solution to these challenges included calibration sessions with master schedulers at the corporate level and local distribution planners. This plan consisted of sharing information and making adjustments and important leadership decisions to enhance collaboration in order to optimize supply chain profit and processes for the company and their partners. Jordan Howell explained in detail the dynamics of such meetings in which they discuss their main challenges and possible solutions with internal employees and external partners. This is a formalized mechanism to foster collaboration along their processes in order to increase efficiency in their supply chain.



Student Summary-Stephanie Kruse (MBA 2015)

Jordan Howell, Senior Supply Chain Planner from Amway, presented on collaboration within Amway. Amway was founded in 1959 in Ada, Michigan with sales around \$10.4 billion. It is an international organization operating in over 85 countries with 21,000 employees and 9 million distributors. Amway's product line focus is in the health, beauty, and home care markets. A few of Amway's primary competitors are Mary Kay, Avon, and Herbalife. The case study Jordan presented was based on the premise that three regions needed products made in Ada, MI. There are many factors that played into the distribution decisions such as fast changing consumer climates. Jordan spoke about a few of the differences such as the Russia-Ukraine conflict effecting the European market, large swings in demand in Asia and a mature North American market that requires heavy promotion to be successful. Consumer preference and macroeconomic factors are constantly changing, and Amway must adjust to those factors to maintain competitive in the CPG market. The solution involves three parts: better visibility in market dynamics, better communication from the affiliates, and a faster response time to global demand fluctuation. To make these improvements better, collaboration among key players is highly important. Those key players are the master scheduler at the corporate headquarters and distribution planners at the local locations. A lack of effective communication has led to poor product distribution in the past. The plan for improvement is to share the information following a "two way street" mentality, to make proactive adjustments in order to keep products well stocked and in the right locations, and to alert leadership when troubles arise to make the necessary future changes. The results of these improvements are still to be determined as they are a work in progress. Jordan's presentation showed the importance of collaboration and how major issues can arise when collaboration is not utilized effectively. He

also presented the macroeconomic factors which affected his business decisions. I found his presentation particularly insightful in that it shows a real world example of identifying a process that is not working and developing a plan to make a change. As MBA students we will be tasked with very similar projects when we leave the program.

Student Summary-Lawson Drury (Undergraduate)

Mr. Howell discussed many ideas about how a company can improve their supply chain. One of the most important aspects that he mentioned was the idea of better visibility. Individuals in a business are not able to read others minds, and there is a need to have better visibility. You need to know what other individuals are doing so then you can avoid waste and be as efficient as possible. When you are more efficient, you will avoid mistakes and also save money. Many products now have very large lead times. Different parts of the company need to collaborate in order to make sure that everyone is on the same page. He explained an example of a company putting on a promotion for a product. There will be extra demand for that item so the marketing department needs to make sure they order more products, but this needs to be done months before the actual promotion. Visibility is a vital part of a company and one that many could improve on.

Student Summary-Jiayun Shi (Undergraduate)

The information that I gathered from the Amway presentation was very interesting. I've always wondered if the door-to-door business model can still fit in today's business world, which is led by e-commerce and omni-channel management. Jordan Howell, a Supply Chain Planner of Amway, explained his job in the global supply chain planning department, which operates Amway products in over fifty-six countries. They originated as a U.S. based company, but they are moving their manufacturing closer to the different sale regions. As a result of this adjustment in the supply chain strategy, the products will be closer to demand. I felt inspired by Amway's huge business and its supply chain, and I want to read more cases similar to Amway's to learn about this new supply chain strategy.



Bio: Supply Chain Planner

Jordan spent seven years in the Army as a Logistics and Explosive Ordnance Disposal Officer serving tours in both Iraq and Afghanistan. In 2013 he honorably exited the service and joined Amway as a distribution replenishment planner. After a year into that role, Jordan moved over to become a master scheduler and production scheduler for Amway's Laundry Powders Plant. While at Amway, Jordan has led multiple teams to include the Culture Change team for the Global Supply Chain Planning department.



TENNEY WAY JR., BECHTEL

Tenney Way Jr discussed seven steps of material management and the necessary collaboration between Engineering, Procurement and Construction (EPC) teams to support the end-to-end supply chain.

Student Summary-Gustavo Amorim (MBA 2015)

Bechtel is a respected global engineering, project management, and construction company with headquarters in San Francisco, CA. With over twenty-five thousand projects completed since 1989 and a presence in one hundred sixty countries in seven continents, they consistently innovate the industry, reaching new levels of excellence. Currently, Bechtel has many divisions including infrastructure, defense and security, mining and metals, oil, gas and chemicals. They are committed to "leaving a legacy of progress by developing local skills for sustained economic opportunity and volunteering our time and talent to the communities where we work." Tenney explained how in this corporation there must be both external and internal collaboration. He also discussed how EPC (engineering procurement construction) is important to Bechtel. Procurement is the glue that bonds engineering and construction together. He discussed the seven steps of Bechtel's supply chain.

The first key areas are specify, identify and quantify. These areas occur in the engineering side of the organization where they define the scope and plan the project. All of the details are ready to go to the suppliers, and this process requires a significant amount of collaboration.

The next two key areas are purchase and supply which is part of the acquisition phase. In this phase, they make sure that they have the right supplier base. This involves many offices around the world to find the best deal for the company in order to create value to their customers. Negotiation is critical in this step.

For the construction phase, the last two key areas are delivery and installation. Collaboration is essential to give the customer a high



quality product. Bechtel is in the service business, and they need people to collaborate both externally with customers and suppliers and also internally in order to be successful. Tenney stressed that "it is key to have people that differentiate themselves. This is about people."

Student Summary-Eric Sattler (Undergraduate)

In his presentation, Tenney Way Jr. discussed seven steps of material management and how essential to supply chain the collaboration between engineering, procurement, and the construction teams is. What really interested me in this presentation was how collaboration between the different teams and disciplines is so essential to supply chain. Since I used to be an engineering major, I found it intriguing in his presentation that he talked about the necessity of all of these facets of the company to work together to better the supply chain of the company.

It was very beneficial to hear about the experience that Tenney Way Jr. had in the field and some of the projects that he had worked on. The final thing I found intriguing about the presentation was his discussion of the seven steps of Material Management. I previously was in Materials Engineering and the fact that he talked about the importance of the correct materials systems in a project really interested me. I agreed with the facets of Tenney Way Jr.'s presentation and thought that his presentation was very useful.



Bio: Procurement Manager, OG&C

Tenney Way Jr is a Procurement Manager for Bechtel's Oil, Gas and Chemical (OG&C) Business Unit located in Houston, Texas. In this role, he is responsible for managing Project Procurement (Purchasing, Expediting, Traffic and Logistics, Supplier Quality and Material Management, Field Procurement) by mobilizing and retaining quality resources on projects and providing oversight of all procurement activities for successful execution of the project. Tenney brings twenty-two years of industry experience and sixteen years of EPC Project Execution experience in OG&C, Power and Pipeline business sectors. He has executed complex EPC lump-sum and reimbursable projects very successfully for Bechtel and has led multi-office and multi-cultural teams for projects from various Bechtel offices. In addition to working as Project Procurement Manager on projects, Tenney has also worked in functional procurement management as Expediting Manager for OG&C. This role involved the training, developing, and placing of personnel on projects and in the field (Domestic and International). Tenney is a part of the One Bechtel Recruiting Team and is currently the Bechtel Management Representative for the University of Houston.

Student Summary-Brandon Titelbaum (MBA 2015)

Bechtel is a global company that is split into four business units: infrastructure, mining and metals, nuclear and security, and chemicals. Supply Chain falls into the procurement function and links the end-to-end to deliver final products to customers. The company is privately held and is still run by the family.

Collaboration is key to their success both internally and externally. Their key to procurement is purchasing, expediting, materials management, quality, and field expediting. Contract formation and administration are also vital to the process. Internal collaboration between construction, procurement, and engineering is essential for successful projects. It is interesting to see how Bechtel has developed a rigorous seven-step process to their supply chain in order to make projects successful and to understand how all of the different links are able to collaborate.



CHIP E. EDGINGTON & DAVID HOLT, CONEXUS INDIANA “ENHANCING INDIANA’S LOGISTICS SECTOR”

Chip Edgington and David Holt provided an overview of the Conexus Indiana Logistics Council and the development of strategic plans for identifying the needs for infrastructure, public policy and workforce development. Conexus discussed how the tactics being implemented in the plans are enhancing logistics companies to grow, relocate and/or expand in Indiana and are creating high paying logistics jobs for Hoosiers.

Student Summary-Gisela Condado (MBA 2016)

The Conexus Indiana Logistics Council (CILC) is a forum of fifty-five logistics executives and leaders from throughout Indiana, representing logistics sectors such as air, infrastructure, rail, trucking, warehousing/distribution, waterborne, and advanced manufacturing and service firms. In this way, CILC enhances the growth of companies in advanced manufacturing and logistics, creates an attractive environment for logistics companies to relocate or expand in Indiana, as well as creates unique employment opportunities for Hoosiers. David Holt, Vice President of Operations and Business Development at Conexus Indiana, discussed a plan for Indiana’s logistics future- one that might not be possible without collaboration through the industry and members of the council. Some of the main limitations they have faced in this project include transportation bottlenecks, lack of efficient mode-to-mode connectivity, and decaying locks infrastructures. Therefore, they have supported important projects to guarantee the expansion of infrastructure in the area as well as public policies and workforce development plans to work with logistics executives to support education and identify key solutions for logistics job shortage areas. As Executive Vice President of Operations at FULLBEAUTY Brands and Chairman of Conexus Indiana Logistics Council, Chip Edgington talked about FULLBEAUTY brands business strategies including their unique



marketing campaign with Megan Trainor and their logistics features that have supported their growth throughout the years. An interesting logistics challenge that they have thanks to collaboration in their supply chain includes importing products through the port of Los Angeles and Long Beach, as North America’s busiest port complex where forty percent of the nation’s goods load. Another challenge includes the congestion in the Chicago rail lines with 1260 freight and commuter train passing through daily. Finally, I also found interesting the Conexus workforce development initiative, which increases awareness of Indiana Logistics opportunities, influences curriculum to better match industry needs, as well as establishes mutually-beneficial relationships with students and schools in order to expose students to new and challenging positions in the interesting field of supply chain and operations.

Student Summary-Brandon Titelbaum (MBA 2015)

Indiana is the proud home to over 300,000 employees in Logistics and has a \$10.3 billion impact to Indiana’s GDP (2012). The Conexus Indiana Logistics Council is a forum of fifty-five logistics executives that collaborate to enhance the environment for companies in advanced manufacturing and logistics in order to grow their businesses. The council developed two different plans to help grow the logistics future of Indiana. The first plan included infrastructure for transportation, public policy, and workforce development. Many of the projects are underway or have been completed such as an intermodal facility and a plan to attract more air freight businesses to the state. The second phase includes plans for separated truck lines, high-speed freight rails, and integrated ports of entry to facilitate movement of goods.



Bio: Executive Vice President of Operations, FULLBEAUTY Brands and Chairman, Conexus Indiana Logistics Council

Chip E. Edgington has more than thirty years of operational experience working in leadership and executive level positions. He joined FULLBEAUTY Brands in 1999 and is currently the Executive Vice President of Operations. Prior to FULLBEAUTY Brands, Chip held senior level operations positions with Time Inc. and The Limited. Chip's responsibilities at FULLBEAUTY Brands include the daily operation of 1.5 million square feet of highly automated fulfillment center space located in Central Indiana, directing all international and domestic logistics support and FULLBEAUTY Brands' customer contact center based in El Paso, Texas. His total team represents approximately 1,500 associates located throughout three states. Chip has strategically integrated systems, engineering and lean processes in large-scale operations, while at the same time, successfully building strong cross-functional teams. He has traveled extensively throughout the U.S., Europe and Asia. Chip is a member of the Executive Team for FULLBEAUTY Brands and has played a key operational role in the acquisition, integration and divestitures of a number of businesses over the past decade. Within the industry Chip sits on the board of Conexus Indiana, an industry-driven advanced manufacturing and logistics initiative. He serves as Chair of the Conexus Logistics Council which is responsible for developing and implementing a strategic plan to leverage supply chain assets and identify opportunities for growth within the State of Indiana. He serves on the Board of Directors for the Central Indiana Corporate Partnership (CICP), a coalition of Indiana Executives and University Presidents focused on long-term growth and prosperity for the State through initiatives focused on manufacturing, life science, logistics, energy, and information technology.



Bio: Vice President of Operations and Business Development, Conexus Indiana

In his role with Conexus, David Holt drives the logistics agenda and developed, recruited, and led the formation of the Conexus Indiana Logistics Council, a forum of prominent logistics executives throughout the state of Indiana and six regional logistics council in Northwest, North Central, Northeast, Central, Southwest, and Southeast Indiana. Under his guidance and leadership, Holt developed Phase I: A Plan for Indiana's Logistics Future and Delivering Indiana's Logistics Future- two strategic plans ensuring that those things necessary for Indiana's transportation network are in place to enhance the environment for companies to grow their business, create a more attractive business environment to locate in Indiana, and create high paying jobs for Hoosiers. He also moderated Indiana Governor Mike Pence's Blue Ribbon Panel for Transportation Infrastructure. Holt formerly served as the Indiana Chamber of Commerce's Vice-President of Health and Education Policy and Federal Relations, acting as an integral part of that organization's governmental relations team at the federal and state levels. David Holt's professional career has also included service in Washington DC as Chief of Staff in the Office of Vocational and Adult Education at the U.S. Department of Education and as a Senior Legislative Aide to a U.S. Representative on Capitol Hill. Holt was awarded his Bachelor of Science from Ball State University in 1993 and a Masters in Business Administration from the University of Notre Dame in 2006.

CONEXUS
INDIANA

Event Sponsor, Thank you.



THEODOSIA RUSH, CUMMINS, INC. “CUMMINS SUPPLY CHAIN TRANSFORMATION VISION”

The Cummins supply chain transformation vision is to establish reliable, market driven supply chains that enable profitable growth. Achieving enterprise logistics optimization and end to end network synchronization requires an integrated logistics network that extends beyond the four walls of the manufacturing plants to their customers and suppliers. Theodosia shared the story of the recent implementation of the Cummins Southern Indiana Logistics Center – a collaborative effort in transforming the Cummins supply chain and “Winning at the Hand-offs”!

Student Summary-Daniel Terayanont (MBA 2015)

Theodosia Rush, currently the Executive Director of Global Supply Chain Planning and Logistics at Cummins, Inc., spoke about collaboration during her “Supply Chain Innovation, The Journey Continues” presentation. Today, Cummins currently operates four main business units as follows:

- 1) Engine Business – Range of diesel, Natural Gas, and other engines for on and off-highway applications
- 2) Power Generation – Designs, develops, and manufactures products for the auxiliary power unit
- 3) Components – Turbo, emission, fuel systems, etc.
- 4) Distribution

Since its inception in 1919 by Celessie Cummins and W.G. Irwin in Columbus, Indiana, Cummins Inc. has grown globally to cover over 190 countries along with 55k employees under the Cummins Inc. umbrella. Theodosia highlighted the key question of “Why do we need to transform our supply chain?”. Theodosia focused on five main reasons of why Cummins Inc. cannot continue operating in the same manner it has been doing in the past but must recognize how the environments are changing. First, globalization and expansion have created a much more complex sourcing strategy where Cummins Inc. can no longer rely on only a single region supply chain strategy.



Secondly, the needs from customers which Cummins must deliver are increasing, ranging from price, to quality, to lead time. Also, decreases in vertical integration lead to an increase in sourcing complexity where components for simple machinery could come from various corners of the world. Fourthly, product complexity requiring specialized parts also increases the strain on the supply chain. And lastly, intra-company dependencies are increasing. Because of these unique requirements, Cummins Inc. must react by increasing the level of collaboration through network optimization in order to fulfill its vision of “Establishing reliable market driven supply chains to enable profitable growth.” Within this optimization, Cummins divided its supply chain into three distinct areas including network, transportation, and inventory. Under network, Cummins Inc. aims to integrate the various business units, increase the number of cross-docks, and manage its carbon footprint along the way. Within the transportation area, route optimization plays a critical role where continuous flow and increase visibility are crucial. A final element is inventory. Cummins Inc. will integrate its inventory planning, optimize the delivery frequencies and inventory policies, and employ the most suitable flow models for its product lines.

Student Summary-Jesse Mudd (Undergraduate)

One speaker that really stood out to me was Theodosia Rush, the Executive Director of Global Supply Chain Planning and Logistics at Cummins. After providing a brief background on her experience with Cummins, she then went on to talk about how synchronized business planning and aggregate materials planning are changing supply chain for the better. Each of these consisted of several steps. For example, with synchronized business planning, the process brings together all of the plans that each system in the business has. By bringing each plan together, they are able to work together to make their work at Cummins more efficient,

productive, easier, and pleasing to their customers. In the aggregate materials planning, Cummins is able to decide which raw materials to order in the correct amount as well as to deal with both internal and external suppliers in the best way. This way Cummins is able to supply their customers in their greatest ability, and their suppliers are able to receive better communication, information, and capacity management when dealing with Cummins. Theodosia explained how important it is to be able to communicate and collaborate with both their suppliers and customers, as doing this presents the highest possibility of creating the most profit. Without this communication and collaboration, the supply chain as a whole will slow down and become less efficient which in turn can hurt everyone in the system.

Student Summary-Brandon Titelbaum (MBA 2015)

Cummins is a Global Power Leader in diesel engines, power generation, components, and distribution. The company has a global presence in over 190 countries, has 55,000 employees, and they manufacturer on 6 continents. It was founded in 1919 by Clessie Cummins and W.G. Irwin who pioneered the development of diesel engines. Globalization is driving the need for increased collaboration among the company. Every entity ships to four continents and receives supplies from five different continents. This requires a lot of coordination through transportation. They have decided to focus on market driven supply chains based on customer requirements and alignment of lead times from source to delivery. One way that the company has looked at improving efficiency is through transportation both in trucks and containers to ensure that they are filled at maximum capacity to reduce costs. They also have redesigned their warehouse network to be closer to manufacturing locations to not only reduce transportation costs but also to reduce harm to the environment. It is interesting how Cummins has transformed from being solely a manufacturer to more of an assembly company as they source parts from many suppliers globally. This creates huge challenges to managing the supply chain globally, but they have been very successful at it.



Bio: Executive Director of Global Supply Chain Planning and Logistics

Theodosia Rush is the Executive Director of Global Supply Chain Planning and Logistics at Cummins where she leads several key supply chain functions for the company including logistics, warehousing, transportation, trade compliance, packaging, materials management and enterprise planning for Cummins locations around the world. She is active in driving and supporting several company-wide supply chain transformation programs across these functions. These initiatives are multi-disciplinary and cross every corner of the Cummins enterprise. Ensuring they are implemented on time and so as to facilitate smooth hand-offs amongst all of the planning and logistics functions is core to the company's vision of market driven supply chains. Theodosia began her career with Cummins in 1999 and during her tenure has held a number of key roles in purchasing, manufacturing, human resources and marketing.

Outside of Cummins, she is on the board at Mill Race Senior Services in Columbus, an active member of her church, and a busy mom of three.

She earned a bachelor's degree in liberal arts from Lenoir-Rhyne College in 1993 and completed her Masters in Business Administration at Indiana University in 1999.



BILL ENSIGN & DAVID WILLIARD, EVONIK INDUSTRIES "SHHH.....COLLABORATION IS EVERYWHERE IN CHEMICAL MANUFACTURING"

Evonik Industries is a multinational company based in Germany that is involved in multiple different chemical manufacturing platforms, one being contract pharmaceutical manufacturing at the Tippecanoe Laboratories in Lafayette, Indiana.

Bill Ensign and Dave Williard bring extensive experience in the pharmaceutical and chemical manufacturing business. In their respective roles at Evonik Industries they collaborate daily with internal resources, customers, and suppliers. During their presentation they utilized a recent example of a new equipment purchase and manufacturing process to demonstrate the importance of best practices of collaboration. Bill first shared the external partnerships with suppliers and the Evonik technical and commercial alliance in equipment and construction services. Dave then focused on the internal manufacturing planning and supply chain flow along with describing departmental collaborations and the sales and operations planning process.

Student Summary-Gustavo Amorim (MBA 2015)

With over \$14 billion in sales and 33,000 employees, Evonik is watching close high-growth megatrends such as health, nutrition, resource efficiency and globalization. The mission of the company is "to deliver high-quality products which consistently meet or exceed customer requirements in a safe and environmentally responsible manner." During the 2015 GSCMI Spring Conference, Bill Ensign and Dave Williard explained how collaboration plays a crucial role at Evonik. Both Dave and Bill work at the Tippecanoe Laboratories (formally owned by Eli Lilly and acquired in 2010), located in Lafayette, IN close to Purdue campus. This is a pharmaceutical plant that operates as a contract manufacturer and is the second largest Evonik plant in the United States. One of the unique features of this plant is the capacity to make high-



potency ingredients for cancer treatment. They explained how collaboration helps them deliver their mission when a customer asks them to develop and manufacture a new drug. Bill explained how his responsibilities include working with product managers and engineers to make sure that the plant has all the equipment that they need in order to develop and produce this new drug. There is also collaboration between Evonik procurement and vendors to make sure the equipment and materials are available on time. David focused more on the internal collaboration for producing a new drug. The manufacturing part of the business starts with an order where the raw material and equipment is matched, then the drug is manufactured and all the documentation related to it is issued. At the end the drug is either stored or sent to the customer. Collaboration is essential to this industry. Coordination between sales, procurement, and manufacturing (including quality control) is key to this company success. Evonik is working in a highly regulated industry, and they need to be effectively collaborating externally and internally in order to be a world leader.

Student Summary- Stephanie Kruse (MBA 2015)

Bill Ensign and David Williard started the presentation with "Shh... Collaboration is Everywhere in Chemical Manufacturing". To make their mission a reality, collaboration is key. Bill spoke briefly about the process of manufacturing a new drug before handing off the presentation to David. The manufacturing process has three categories of activities: pre-manufacturing activities, manufacturing activities, and post manufacturing activities. In all three categories there is an enormous amount of collaboration. David first focused on external collaboration in production planning and scheduling. One example David used was that manufacturing orders have both a time and quantity element that are then passed on to purchasing. Each

department must work together to keep all the components aligned and on schedule. On the manufacturing side, the operation depends on the forecast, raw materials, correct documentation, and many other crucial items. As actual manufacturing is a relatively short period of time, each group must work together to ensure accuracy and timely production. After manufacturing, collaboration is also very important as the product needs to be packaged, documented and transported. There is also an intensive sampling and analysis process during and after production. Only after this entire process is complete is the final product approved for distribution. Each step relies on the other to get to this point. At Evonik, internal collaboration is more informal and external collaboration is more formal. Internally, the team meets weekly and monthly to determine short and long term goals to ensure everyone is on the same page. My biggest takeaway was the level of detail that goes into manufacturing one batch of a product and then one thousand batches could be produced at their 24/7 facility a day. It became quickly apparent how important collaboration was to maintain smooth operation. I believe it is more important in the pharmaceutical industry than most as one mistake can have very harmful effects. Another point I found particularly interesting was the need to specialize equipment and rooms to produce some chemotherapy medications to avoid harmful affects to the workers. Manufacturing in the pharmaceutical industry requires not only collaboration but a tremendous amount of strategic and actual planning.



Bio: Manager of Production Planning

Dave Williard is the Manager of Production Planning for Evonik Industries at the Lafayette, IN site. Dave has worked at this site with Evonik and Eli Lilly and Co. for twenty years. During these years he has held several roles in Master Scheduling and spent three years with Lilly implementing a corporate ERP system. Prior to Lilly, Dave worked in the automobile industry at the Lafayette SIA plant, and the food industry with The Pillsbury Company in various Master Scheduling, purchasing, and production and inventory Control roles. Dave received his BS in Business Administration from Bowling Green State University and was APICS Certified in 2006.



Bio: Senior Procurement Agent

Bill Ensign is currently responsible for the purchasing of equipment, supplies, and services for Evonik Corporation Tippecanoe Laboratories (formerly owned by Eli Lilly). He has worked in supply chain roles during his entire twenty-four years of employment. He received his bachelor's degree from Krannert in Industrial Management with an Industrial Engineering minor in December 1990. He has established the academic/business partnership between Evonik Corporation and Purdue. He is the co-founder of the Supplier Diversity Development (SDD) Coalition of Greater Lafayette - a group of major employers that for the last thirteen years has invited diversely owned firms to present their capabilities to the major community firms. The coalition also shares procurement best practices amongst the members. Bill is recognized for his negotiating skills, his networking capabilities, and his ability to "think outside of the box". One of his most challenging career opportunities was leading the supply chain component of Tippecanoe Laboratories through the changes associated with the sale and purchase of the facility from Eli Lilly to Evonik. This included the establishment of all new supply chains for the products and services that the site requires to meet its mission. Bill has received many awards associated with his procurement role including the 2003 Eli Lilly Global Chief Procurement Officer Award, the 2008 Small Business Administration (SBA) Minority Small Business Co-Champion Award (along with Larry Pherson of Purdue), the 2007 Leadership and Vision Award from the SDD Coalition of Lafayette, and the 2003 Indiana Minority Supplier Diversity Council Buyer of the Year Award.



DAVID POLLARD, FEDEX CUSTOMER SOLUTIONS “COLLABORATION: STRENGTHENING THE LINKS OF YOUR SUPPLY CHAIN”

Businesses need to be laser-focused on critical initiatives such as achieving nimble, sustainable supply chains and achieving top-line growth. Companies are challenged with managing both lower inventory levels while at the same time satisfying customer demand. In today's global economy, companies must create supply chains that are both nimble and more responsive. To accomplish this, businesses must rely more and more on their business partners to manage components of the supply chains, making collaboration and communication critical success factors. Collaboration ensures all parties upstream and downstream in the supply chain are more attuned to how changes to components of the supply chain affect profitability, competitive advantage, growth opportunities, and risk exposure. Cross-functional collaboration, to both grow top-line revenue and drive efficiencies in the supply chain, are top of mind, and Mr. Pollard shared his experiences which demonstrate the value of collaboration as one of the key cornerstones to an efficient supply chain and an effective business environment.

Student Summary-Gisela Condado (MBA 2016)

FedEx is a global service delivery company that for years has focused on identifying innovative logistics solutions for their customers in order to improve an efficient supply chain and guarantee growth under a current challenging global economy. As Managing Director of FedEx customer solutions, David Pollard has lead a team of supply chain consultants in order to provide end to end business solutions that connect customers and companies worldwide. In his presentation David Pollard explained the importance of collaboration among different links of the supply chain, especially under current world challenges. Some of the main challenges of collaboration that he mentioned included managing businesses in more than 220 countries and territories, creating adequate services and processes that support



customers and their different business models, as well as assisting partners in the latest best practices and supply chain trends. He also stressed the relevance of collaboration with the quote, “You don't need to be the smartest person in the world, just pick the smartest colleagues.” In this way, he highlighted that collaboration has to be part of the business culture and part of each employee's values. Personally, I found very interesting his explanation about the three pillars of a collaborative supply chain. According to Mr. Pollard, the primary supply chain catalysts are connectivity, culture, and innovation. Connectivity supports time sensitive information, is necessary for training people and analyzing systems and developing valuable employee performance evaluations. Also, he mentioned that collaboration is what really drives innovation. Collaboration needs to take place with external and internal partners in order to combine the knowledge, expertise and skills throughout the whole supply chain. Finally, culture refers to guaranteeing a trusted component in the overall business environment so that people will feel comfortable while working with each other and creating synergies in efforts and unique projects. Finally, he highlighted how collaboration is leveraged today through technology, economy and culture. With the latest expansion of ecommerce, companies need to find innovative logistic solutions to compete under challenging international economic conditions and to still have a strong united culture that will allow all employees of the organization to have the same level of knowledge and collaborative skills regardless of their location.

Student Summary-Daniel Terayanont (MBA 2015)

Currently the Managing Director of FedEx Customer Solutions for FedEx Services, David Pollard returned to speak at the 2015 GSCMI Spring Conference. In his role at FedEx Services, he is responsible for providing customers with customized logistics

solutions at a global level through a team of consultants while delivering quantified business values to customers' bottom line. During his presentation David noted that today's supply chain has become much more complicated given the level of globalization businesses face. This has led to the fact of why Collaboration is important and not merely just a buzzword, especially at FedEx Services. He then went on further to highlight the "Three Pillars" that are the foundation to Collaboration:

- i) Connectivity is critical because it connects pieces of information that are time sensitive.
- ii) Culture – Companies absolutely must have a culture that drives for collaboration.
- iii) Innovation – Through collaboration, the company will create new innovation.

Today's collaboration has been leveraged in the form of e-commerce where the end-consumer now has the ability to drive the design of the supply chain. Instead of shipping a bulk package from a factory to a store front, today's end-consumer now dictates exactly when the product must arrive at the doorstep, and that has caused a major alteration within the supply chain system where products must be transferred between factory, distribution center, cross dock, store front, and then to the customer's door step. At the end of his presentation, David brought up an actual example of a mom-and-pop toy manufacturer who had to face a stern challenge from the likes of Amazon by launching an e-commerce platform that they had no experience of. Throughout the e-commerce transition, this manufacturer decided to collaborate with a supplier from China, port in Mexico, and even its own distribution center with the help of FedEx. The collaboration eventually paid off as it helped the manufacturer survive in today's e-commerce filled economy. Lastly, the most important link David highlighted as the key between a successful collaboration and the "Three Pillars" is the people, because without people nothing will ever be executed.



Bio: Managing Director

As a Managing Director of FedEx Customer Solutions for FedEx Services, Dave Pollard understands the critical role that an optimized supply chain plays in every company's competitive strength and long term success. His intense focus on identifying innovative, customized solutions for FedEx customers has delivered supply chain improvements that enable growth, efficiency, and sustainability in the global economy. Dave is responsible for leading a team of supply chain consultants charged with understanding a customer's global business strategies and supply chain goals in order to design, develop and execute customized logistics solutions. These improvements deliver quantified business value to a customer's bottom line through improvements to revenue, expense, and current or fixed assets. Pollard encourages his organization to work across all aspects of a customer's business requirements to determine how FedEx can provide unique solutions for any supply chain component. Under his leadership FedEx Customer Solutions assesses the three flows that are essential to any component of the supply chain (physical, information, and financial) and then develops comprehensive solutions. The results range from strategy development, global supply chain optimization, mode optimization, direct distribution, network modeling, and system integration that can improve the inbound, outbound, and returns stages of distribution. Since joining FedEx in 1999, Pollard has been a strategic contributor in the creation of the Customer Solutions team. Through the FedEx portfolio of operating companies, Pollard and his organization provide end-to-end business solutions that connect companies and their customers to over 220 economic markets throughout the world. Pollard is an author and frequent speaker on topics including optimizing global supply chains and supply chain risk management. He earned his Bachelor's degree in Business Administration-Finance from Auburn University and is the past Vice Chairman of the Supply Chain Risk Leadership Council.



SRISU SUBRAHMANYAM, INGRAM MICRO “SUPPLY CHAIN COLLABORATION IN THE TECHNOLOGY INDUSTRY”

The tech industry is one of the most rapidly changing and fast evolving of all industries. Supply chains are complex based on geographies, product development timelines, short product life cycles, and extreme innovation and competition. This presentation examined cases where Ingram Micro, as a technology distributor, depends and thrives on collaboration for success for consumers as well as manufacturers.

Student Summary-Daniel Terayanont (MBA 2015)

A Fortune 100 company with over \$40 billion in revenue and 20,000 associates with operations in 38 countries, Ingram Micro is the world's largest wholesale technology distributor. Srisu Subrahmanyam, currently the Vice President of Global Engineering, began his presentation of “Supply Chain Collaboration in the Technology Industry” by highlighting the differences between the normal and technology industry supply chain challenges. The technology industry involves a supply chain that is much more complex because of the “Constant Churn” in the supply chain, diverse product portfolio, and the reverse logistics conundrum where required capabilities are very complex (triage, diagnose, and repair). Aside from the unique set of challenges within the technology industry, Srisu also highlighted the barriers that Ingram Micro currently faces towards collaboration, and these are:

i) Perceived “Zero Sum Game” – The lack of both incentives and goal alignment. ii) What have you done for me lately? This forces a short term thinking mentality and leads to non-sustainable small wins. iii) Flying blind – Disparate infrastructure, technologies, and visibility. iv) Too busy to collaborate – The industry unique high “Churn- Rate.” Srisu discussed two real life examples of collaboration that led to success. The first one was collaboration in network optimization where Ingram Micro's customer has two locations supporting all of Europe, and it was believed that they were operating below par. In the end Ingram



Micro was able to utilize the customer's data and leverage Ingram's broad footprint to support the customer's requirements leading to a savings of twenty-nine percent over baseline network. The second example was collaboration in packaging optimization and sustainability where Ingram handles approximately over 150 SKUs on a daily basis with fill rate approximated to be only fifty to sixty percent leading to customers' dissatisfaction towards environmentally unfriendly packaging. With collaboration from suppliers, in terms of product dimensions and end-consumer's satisfaction, Ingram was able to implement a “Carton On Demand” technology thus eliminating “void fill” and increased the fill rate to eighty percent. In the end, Srisu solidified the importance of focusing on long term value creation, leveraging your company's size, and optimizing your solutions based on the intelligence within the company.

Student Summary-Stephanie Kruse (MBA 2015)

Ingram Micro is “the global leader in technology and supply chain services with an extensive array of resources to drive market and customer growth, while bringing unique insights that enable businesses to Realize the Promise of Technology”. A leader in technology and supply chain services, Ingram Micro is 69 on the Fortune 100 list with over \$46 billion in revenue. They service over 200,000 customers by utilizing 1,700 vendors. With sales in over 160 countries, Ingram Micro ships more than 200 million units per year. Sriram Subrahmanyam, the Vice President of Global Engineering, presented a few of the mega trends in their industry. I found particularly insightful the idea that the number of connected mobile devices will be triple the world's population by 2017 and the wearable technology market will be worth \$19 billion by 2016. He then spoke about challenges in technology such as data transparency, cost pressures particularly in the supply chain, getting the right product in the right place

at the right time and seamless integration in the network. In a technology supply chain, there are many unique challenges such as the “constant churning” of the supply chain in which contracts and lead times are getting shorter, shorter product lifecycle, and problems in reverse logistics. Ingram Micro cannot simply put returns back on the shelf like an average retailer. Srisu then spoke about obstacles with collaboration. The four he mentioned were 1) it can be a zero sum game, 2) the “what have you done for me lately?” mentality, 3) flying blind by not knowing how to use data effectively and 4) people are too busy to collaborate. But collaboration can be successful. One example was in network optimization where the European network was supported in two suboptimal locations. To determine and solve the problem, many teams and departments had to work together to analyze the data and develop a solution. How does one make collaboration work? Srisu recommended finding win-win-win scenarios across the value chain, focusing on the long term, and utilizing sustainability will be increasingly important. They win by leveraging their size and business intelligence and focusing on the long term. I was impressed by the vast number of locations and opportunities. I also found the collaboration example of the European network particularly insightful. Often speakers talk about the general benefits of collaboration, but Srisu’s real world case shows how powerful collaboration can be to solve problems. I also enjoyed his explanation on how to make collaboration work by creating wins and focusing on the long term. As I look past my MBA, this advice will be extremely helpful in my professional career.



Bio: Vice President of Global Engineering

Srisu Subrahmanyam is currently Vice President, Global Engineering for Ingram Micro (NYSE:IM), a Fortune 100 company recognized as the world’s largest wholesale technology distributor and a global leader in IT supply-chain, mobile device lifecycle services, and logistics solutions with over \$40B in revenue and operating in almost 40 countries. In this role, he leads global functions in supply chain planning, operations and customer solution engineering, real estate, quality, continuous improvement, EH&S, sustainability, and overall program management. Prior to this he served as Executive Vice President and Chief Operations Officer for BrightPoint Americas, a business unit of Ingram Micro based in Indianapolis, Indiana. Subrahmanyam was previously co-founder and Principal at Orchard Group, a consulting firm focused on business performance improvement and execution of business improvement initiatives. Prior to his role at Orchard Group, Subrahmanyam was Senior Vice President and Chief Procurement Officer at Career Education Corporation (NASDAQ:CECO), Vice President of Continuous Improvement and Business Transformation for United Airlines (NYSE:UAL), and Managing Director in Information Technology at United. Before joining United Airlines, Subrahmanyam was a practice leader in process modeling at Advanced Process Combinatorics, a supply chain consulting firm that specializes in advanced planning and scheduling, pharmaceutical pipeline management, portfolio management, capacity analysis, batch process design, and planning of research and development to maximize return. Subrahmanyam holds a doctorate in chemical engineering from Purdue University and a bachelor’s degree in chemical engineering from Birla Institute of Technology and Science in Pilani, India. Subrahmanyam has taught courses and given lectures on topics in optimization, design and scheduling in the process industry and supply chain at Purdue University and the American Production and Inventory Control Society (APICS). He has published a number of papers and presented at industry conferences on these topics, as well as business transformation, developing productive cultures, and organizational change management. He serves on the Logistics Council of Conexus Indiana and is also a member of the Airline Group of the International Federation of Operational Research Societies (AGIFORS), Institute of Supply Management (ISM), and McKinsey’s CPO Roundtable in Chicago. Subrahmanyam serves on the board of the Boys and Girls Club of Indianapolis. He currently sits on the executive committee for Corporate Social Responsibility at Ingram Micro.



Industry Engagement Opportunities

Thank you.

Dedicated industry partnerships are at the heart of success for the DCMME- GSCMI Center. We thank our many distinguished partners for their significant and ongoing involvement and support.





To our current industry partners,

Thank you.

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DCMME-GSCMI CENTER

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Faculty Involvement

Faculty Directed.

We are grateful for the many faculty at Krannert who participate in Center sponsored events, projects and research. Thanks to each one of them for their efforts to progress the scholarly works in Operations and Global Supply Chain Management.



Faculty Bios

Gemma Berenguar

Professor Berenguar is an Assistant Professor of Management. Gemma received her Ph.D. in Operations Research from the University of California, Berkeley in 2012. Her research interests include supply chain design and operations research resolution methods, sustainable and socially responsible operations, analysis of nonprofit supply chains, and benchmarking studies in global health supply chains. She was a recipient of the 2012 Doug and

Maria DeVos Faculty Summer Support Award in Global Supply Chain Management.

Tom Brush

Thomas H. Brush is a Professor of Management in the Strategic Management Area at the Krannert School of Management, Purdue University. He is Senior Associate Dean, and Head of the Management Department. He received his Ph.d in Economics and Business Administration at the University of Michigan where his doctoral dissertation received the 1991 Free Press Award for Outstanding Dissertation Research in Business Policy

and Strategy. Before coming to Purdue University, Dr. Brush spent two years on the faculty at the University of Minnesota's Carlson School of Management and a sabbatical year in 2001 as a Visiting Research Scholar at the Watson Research Center of the IBM Corporation. His research focuses on corporate strategy and manufacturing strategy topics such as acquisitions, diversification, manufacturing capability exploitation within companies, and supplier relationships and alliances. Connections between these streams include the disintermediation of existing business models with IT initiatives and the rise of new outsourcing opportunities in both primary activities and business processes. Some specific applications include HR outsourcing, knowledge

management in outsourcing, e-commerce marketplaces, and the effect of customer capabilities on performance in online banking. His current research focuses on technology diffusion and the competitive choices of standards selection by incumbents and potential disruptors as well as corporate governance in acquisitions. He has published in *Management Science*, *Strategic Management Journal*, *Academy of Management Journal*, *Organization Science*, *Production and Operations Management*, *Journal of Operations Management*, *Journal of Economic Behavior and Organization*, *Managerial and Decision Economics*, and *Explorations in Economic History*. He is an active member of the Academy of Management and the Strategic Management Society.

Faculty Bios

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Tom has done consulting and teaching for such firms as IBM, Dow Corning, Pioneer Hi-Bred, Navistar International, the American Animal Hospital Association, and American Axle and Manufacturing and is on the Board of Directors of Mackey Bancorp.

Suresh Chand

Professor Chand is the Professor and Louis A. Weil Jr. Chair of Management and the Associate Dean of Graduate Studies. He teaches Operations Management. His current research interests include the application of Operations Management principles in improving health-care delivery processes, supply chain models to match supply with demand with multiple orders, and investigating characteristics of batch sizes in the presence of learning and forgetting. Professor Chand has been with Krannert since 1979. He has taught a variety of OM courses at Krannert ranging from core courses for the MBA (both regular and executive) and undergraduate students to electives for undergraduate and MBA students on topics such as Factory Physics, Technology Management, Supply Chain Management, and Service Operations Management. He also teaches doctoral seminars. He is currently senior editor for Production and Operations Management. He served as Associate Editor for Management Science (1986-2008). He was area editor for Production and Operations Management (1988-2003). He was also senior editor for Manufacturing and Service Operations Management (1999-2003). He was the general chair for POM 2005, the annual international conference of the Production and Operations Management Society.

Amy David

Amy David joined the Krannert School of Management as a Clinical Assistant Professor in August 2014 after completing her Ph.D. in Industrial Engineering and Operations Research at the University

of Illinois at Chicago. She teaches the faculty-directed student project course, as well as undergraduate and graduate courses in production planning and control and supply chain management. Previously, Professor David worked as Logistics Planning and Process Development Manager at USG and a Logistics Analyst at Medline Industries. She holds an MBA from Lake Forest Graduate School of Management and the APICS CPIM designation.

Annabelle (Qi) Feng

Q. Annabelle Feng is John and Donna Krenicki Chair in Operations Management, Professor of Operations Management. She joined the Krannert School of Management as an associate professor in June 2012. She was a faculty member at McCombs School of Business, The University of Texas at Austin since 2006. Her main research interest lies in studying firms' sourcing decisions in the broad context of supply chain management. Her work focuses on individual firm's procurement planning in uncertain environment and multiple firms' interactions in sourcing relationships. She received the first prize in the INFORMS Junior Faculty Paper Competition in 2009 and the Wickham Skinner Early-Career Research Accompaniment Award in 2012. Her work with Hewlett-Packard on product proliferation management won the 2009 Edelman Award.

Greg Hundley

Professor Hundley's interests include human resource management, compensation and reward, international human resource management, and entrepreneurship. His current areas of research include strategic human resource management, self employment, and international compensation. Professor Hundley is also interested in the effects of national culture on human resource outcomes. Professor Hundley has been on the faculties of the

University of Oregon, University of Western Australia and Xavier University. He is on the editorial board of the Asia-Pacific Journal of Human Resources. He is a member of the Academy of Management and the Industrial Relations Research Association. In 2001, he received the John and Mary Willis Young Faculty Scholar Award.

Ananth Iyer

Professor Iyer is the Susan Bulkeley Butler Chair in Operations Management at the Krannert School of Management. He is also the Director of Purdue NEXt - a University wide modular online interactive courses for global distribution. He was the Associate Dean for Graduate Programs (2011-2013) and Director of DCMME (Dauch Center for the Management of Manufacturing Enterprises) and the founding Director of GSCMI (the Global Supply Chain Management Initiative) (2006-2011) at the Krannert School of Management. Previously, he was Purdue University Faculty Scholar from 1999-2004. His teaching and research interests are operations and supply chain management. Professor Iyer's research currently focuses on the analysis of supply chains including the impact of promotions on logistics systems in the grocery industry, and analysis of the impact of competitors on operational management models and the role of supply contracts. His other topics of study include inventory management in the fashion industry, effect of supplier contracts, and use of empirical data sets in operations management model building. He has four books ranging from a textbook on Managing Supply chains to trade books on Toyota Supply Chains, Supply Chains on the Silk Road and Orchestrating Supply Chain Opportunities. He has published in MandSOM, Operations Research, Management Science, Naval Research Logistics, Networks, and Manufacturing and Service Operations Management. He was the FMC Scholar in 1990-91. He has served as a Department Editor of Management Science, Associate Editor of Operations Research, is on the editorial boards of Operations Research Letters, IIE Transactions, the ECR Journal and Manufacturing and Service Operations Management editorial board, and member of INFORMS. He was president-elect of the MSOM Society of INFORMS in 2001-02 and served as president for the year 2002-03. Prior to joining the Krannert faculty in 1996, Professor Iyer taught at the University of Chicago. He has been affiliated with the Production and Distribution Research Center at

Georgia Tech, and a consultant to Daymon Associates, Sara Lee, Turner Broadcasting and others. He served his Chicago community as a pro bono consultant to the Chicago School System and the Chicago Streets and Sanitation Department.

Justin Jia

Professor Jia joined the Operations Management group in the Krannert School of Management in fall 2011 after completing his Ph.D. in Supply Chain and Information Systems at the Pennsylvania State University Smeal College of Business. He conducts research on pharmaceutical supply chain, closed-loop supply chain, and procurement auctions. Professor Jia teaches the core undergraduate Operations Management course and an elective undergraduate course, Supply Chain Analytics.

Karthik Kannan

Karthik Kannan is an Associate Professor at Purdue's Krannert School of Management. He has pioneered the concept of "Design for Instincts" as a way to organize businesses in the current age. To learn more about the concept, visit <http://www.designforinstincts.com>. His research also can be themed along the same dimension "design for instincts." His research work tries to understand and sometimes even manipulate human's instinctive behavior in specific contexts through the use of information technology. He works on two primary research streams markets and pricing of information goods and services through auctions, and economics of information security. His papers have been accepted in several leading conferences and journals in the information systems area, including Management Science, Information Systems Research, Workshop on Information Technology and Systems, Workshop on Information Systems Economics, International Conference on Information Systems, and Conference on Information System and Technology. His papers have won the Best Paper Awards in the 10th and the 15th Annual Workshop on Information Technology and Systems. He currently serves/has served as an Associate Editor for Management Science, Information Systems Research, and MIS Quarterly. He is a member of AIS and INFORMS. He is also a CERIAS Fellow and Krannert's Faculty Fellow. At Purdue, he teaches the IT course in the MBA programs (in the regular, weekend, and Exec Ed

Faculty Bios

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MBA). He has also been a visiting faculty member at GISMA and ISB. Previously he taught undergraduate required courses as well as a database course. Prior to joining Purdue, Karthik obtained his PhD in information systems, his MS in Electrical and Computer Engineering, and MPhil in Public Policy and Management all from Carnegie Mellon University. His undergraduate degree is in Electrical and Electronics Engineering from NIT Trichy (formerly, REC Trichy). Before joining the graduate school, Karthik worked with Infosys Technologies.

Yanjun Li

Professor Li's teaching interests include management science, statistics, production, optimization models, and algorithms. His current research includes discrete optimization and application, approximation algorithms, network and graph, location and distribution, vehicle routing, lot sizing and scheduling, inventory and supply chain management, and financial optimization. He received the Jay N. Ross Young Faculty Scholar Award (2005), John and Mary Willis Young Faculty Award (2008), and Krannert Faculty Fellow (2008) at the Krannert School of Management, Purdue University. He is a member of the Institute for Operations Research and the Management Sciences (INFORMS), Mathematical Optimization Society (MOS), and Society for Industrial and Applied Mathematics (SIAM).

Yaroslav Rosokha

Dr. Rosokha received his Ph.D. in Economics from the University of Texas at Austin in 2013. His research interests concern individual and social learning under uncertainty. Also among his interests are Behavioral Operations Management, Experimental Economics, and

Game Theory. He has taught courses in Operations Management and Economics.

George Shanthikumar

Professor Shanthikumar is the Richard E. Dauch Distinguished Professor in Manufacturing and Operations Management and the Director of the Dauch Center for the Management of Manufacturing Enterprises and Global Supply Chain Management Initiative. He joined the Krannert faculty in 2009. Prior to coming to Purdue, he was a Chancellor's Professor of Industrial Engineering and Operations Research at the University of California, Berkeley. His research interests are in integrated interdisciplinary decision making, model uncertainty and learning, production systems modeling and analysis, queueing theory, reliability, scheduling, semiconductor yield management, simulation stochastic processes, and sustainable supply chain management. He has written or co-written more than 250 papers on these topics. He is a co-author (with John A. Buzacott) of the book *Stochastic Models of Manufacturing Systems* and a co-author (with Moshe Shaked) of the books *Stochastic Orders and Their Applications* and *Stochastic Orders*. He was a co-editor of *Flexible Services & Manufacturing Journal* and is (or was) a member of the editorial boards of the *Asia-Pacific Journal of Operations Research*, *IEEE Transactions on Automation Sciences and Engineering*, *IIE Transactions*, *International Journal of Flexible Management Systems*, *Journal of Discrete Event Dynamic Systems*, *Journal of the Production and Operations Management Society*, *Operations Research*, *Operations Research Letters*, *OPSEARCH*, *Probability in the Engineering and Information Sciences*, and *Queueing Systems: Theory and Applications*. Professor Shanthikumar has extensively consulted for various companies, including Applied Materials (AMAT), Bellcore,

IBM, KLA-Tencor, NTT (Japan), Intel, Intermolecular, ReelSolar, Safeway, and Southern Pacific. Through KLA-Tencor, he has worked on joint development projects for Advanced Micro Devices, IBM, Intel, LSI, Motorola, Texas Instruments, Toshiba, Fujitsu, Taiwan Semiconductor Manufacturing Company, and UMC.

Masha Shunko

Professor Shunko joined the faculty at the Krannert School of Management in July 2011. Her primary professional interest is in tax efficient global supply chain management, where she focuses on the effective usage of transfer prices and sourcing policies to take advantage of operating in favorable tax jurisdictions. The second area of interest is healthcare operations where she focuses on the effect of ambulance traffic coordination to improve performance of the emergency departments. Professor Shunko has worked on consulting and research projects with Caterpillar Inc. and University of Pittsburgh Medical Center, which have shaped her research areas. Prior to the academic career, she worked for Deloitte. in Estonia, where she audited and consulted various manufacturing and banking clients in Estonia, Latvia, Belarus, and Russia. Professor Shunko teaches the core Operations Management course in the MBA program and an elective MBA course in Supply Chain Management. Professor Shunko completed her PhD in Operations Management at the Tepper School of Business, Carnegie Mellon University, during which she received the 1st prize in the POM Supply Chain Management student paper competition in 2009.





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Krannert Building, Room 414
403 West State Street
West Lafayette, IN 47907-2056
765-494-4322
gscmi@purdue.edu
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