Oklahoma State University

School of Industrial Engineering and Management

COWBOY CONNECTIONS

FALL 2018

College of
Engineering, Architecture and Technology

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and Associate Professor
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Undergraduate Program
Director

A Message from the School Head

Greetings!

IEM graduated its largest undergraduate class ever this past academic year. Forty-four students received their BS degrees in AY 2017-18. This is more than the average number of graduates IEM has produced in recent years! Our undergraduate enrollment is hovering around 185 (compared to 125 in recent years) and we are well on our way towards our goal of 240 undergraduate students.

This Fall we welcomed 43 new students who want to pursue their major in Industrial Engineering and Management, two of whom are National Merit Scholars!

Demolition of the interior walls of IEM's home – the third floor of Engineering North – is underway. Refurbishing of that space into a modern, 21st century space has already commenced. While the University is paying for $2.5 million of the expenses, IEM needs to raise $1 million in upgrades. We are pleased to report that we have already raised $165,000 towards upgrades. We do have an uphill task ahead, but knowing our alumni, I am confident we can meet this challenge. I will take this opportunity to thank Webco Industries, Katherine McCollom, Jamie Matlock (see page 10), Brenda Shumate, and Tom Britton for their generosity in helping with the fund-raising efforts. It is particularly touching that Jamie has named the reception in honor of Dr. David Pratt and Brenda Shumate has named an office in honor of Dr. John Nazemetz. My wife and I are honored to name the Head's office in recognition of the contributions of Ken and Lynn Case to IEM over the past fifty-plus years.

In addition to endowing a Chair in IEM for $1 million, Ken and Lynn Case just pledged $50,000 in student scholarships! This and other scholarships will help IEM recruit more CEAT scholars into the program.

IEM continues to grow and we will be hiring three Assistant Professors in the 2018-19 academic year. Search is underway to recruit top talent that will help propel the world's third oldest IE program to the top 20. Recall that IEM currently has a US News graduate ranking of #24 among public universities.

IEM alumni, faculty, staff, and students continue to receive awards and this is a testament to not only the current and emeritus faculty, but also our outstanding alumni and students.

The Cowboy Academy of Industrial Engineering and Management (TCA), led by Bill Dueease, inducted 12 new members and one honorary member this Fall on September 13th. A bio of the current and new TCA members is available **here**. Dr. Allen Schuermann, former Head of IEM, was inducted into the Academy as an honorary member.

Led by Dave Boyer, a subgroup of the TCA including Tom Britton, Ken Case, Bill Dueease, John Harrington, Stuart Keeton and Sunderesh Heragu, has developed a marketing plan for IEM. See page 30 for more details. Jene Harmon, marketing director Webco and Mandy Vavrinak, owner of Crossroads Communications helped this subgroup turn ideas into a concrete marketing plan, which IEM hopes to roll out in a few months.

The Industrial Advisory Board of IEM also welcomed three new members this fall. See page 12 for details. The above is just a very small subset of all the great things happening in IEM @ OSU.

As is the case, there are many more exciting things happening in IEM than can be described in one or two pages of a newsletter. We are therefore sending small pieces of information periodically through social media. Please watch out for them and share amongst your friends.

Go Pokes!

Sunderesh S. Heragu
Regents Professor, Head, and Humphreys Chair

IEM Mission, Vision & Goals

Vision

IEM's vision is to place industrial engineers in a wide variety of industries including manufacturing, service, energy, healthcare, humanitarian and others, so that our society at large can benefit from systems that effectively use an optimal set of resources, efficiently produce goods or provide services and enrich the quality of life for all.

Mission

IEM's mission is to develop a diverse group of professionals and leaders in industrial engineering and management by being a leader in education, research, and outreach.

Educational Goals

IEM's educational goals are to educate and produce a new generation of diverse students who are proficient in theoretical, applied, and technology relevant concepts and practices that will have a global reach and global impact. IEM will continue to monitor and enhance the student recruiting, learning, retention, advising, mentoring, internship, and placement processes.

Research Goal

IEM's research goals are to engage in cutting edge research of global importance and to produce innovators as well as next generation engineering, education, and societal leaders.

Outreach Goals

IEM's outreach goals are to actively engage in community projects, economic development, and service for the greater good. The outreach goals also include enhancement of IEM's image within CEAT and OSU and the world at large.

The Next Five Generations

IEM has been fortunate to have had the resources and the support that have made it possible to recruit, train and produce leaders in our society.

To benefit the next five generations, we launched a $20 million by 2020 campaign in December 2014 and have made good progress toward that goal. From $2.4 million in Fall 2013, our endowments (including deferred gifts) have risen to $7 million. The remaining $13 million must be raised in a little under two years.

The School of Industrial Engineering and Management looks to alumni and friends, like you, who make the next steps in our innovative future possible. We appreciate every donation, big or small, that supports our school. However, we have listed below several priorities for you to make the most impact.

Space on donor wall in refurbished IEM space | $1,000
- IEM spaces will be fully renovated in 2019

Study Abroad Scholarship | $2,000 per student
- scholarships can be awarded to up to 12 students

Annual contribution to two IEM billboards | $15,000 per year

Sponsorship of IEM networking events | $25,000

Annual sponsorship of student travel | $40,000
- IISE conferences, INFORMS conferences, commencement lunches, IAB-student luncheons and IEM reception at annual IISE meeting

Annual sponsorship of the weekly seminar series with a naming opportunity | $75,000

Endowing a professorship | $500,000

Endowing a chaired professorship | $1,000,000

Naming and endowing opportunity of IEM | $20,000,000

If you wish to donate, please send a check payable to the "Industrial Engineering and Management Excellence Fund" at Oklahoma State University, 322 Engineering North, Stillwater, OK 74078 or make a gift online (click the GIVE button at iem.okstate.edu).

For more information please contact

Bryce Killingsworth – Associate Development Director

Office: 405-385-5623
Cell: 405-385-3497
Email: bkillingsworth@osugiving.com

To learn more about The Next Five Generations campaign, ***click here.***

Faculty & Staff Spotlight

Dr. Juan Borrero

Assistant Professor

Dr. Juan S. Borrero received his Ph.D in Industrial Engineering from the University of Pittsburgh in summer 2017. He also received both an MS degree in Industrial Engineering and a BS degree in Mathematics from Universidad de los Andes, Bogota, Colombia. His research areas of interest include: decision making under uncertainty; bilevel optimization; robust optimization; online optimization; and non-linear 0-1 optimization. Dr. Borrero has published papers in journals including Operations Research, IEEE Transanctions on Network Science and Engineering, Operations Research Letters, Journal of Global Optimization, Decision Analysis, Annals of Operations Research, and the European Journal of Operational Research. He has taught a graduate course in manufacturing systems and undegraduate courses in systems simulation and design of experiments.

"The reward for work well done is the opportunity to do more."
-Jonas Salk

Matt Taylor

Administrative Assistant
Assistant to the Graduate Program Director

Matt Taylor grew up in northwest Kansas. He got his Bachelor's Degree in Elementary Education from Fort Hays State University in Hays, Kansas and his Master's Degree in Academic Advising from Kansas State University in Manhattan, Kansas. Before moving to Stillwater, he spent over seven years teaching English at a university in China in Henan province. He moved to Stillwater last October and started working in IEM in January 2018. He is excited to be working for Oklahoma State University and enjoys working with the IEM faculty, staff, and students.

Hope deferred makes the heart sick, but a longing fulfilled is a tree of life.
-Proverbs 13:12

Student Spotlight

Lauren Leto

Undergraduate student

Lauren was born and raised in Plano, TX. She chose to attend Oklahoma State University after watching her sister graduate from OSU with her Master's degree in 2014. At OSU, she has been heavily involved with Kappa Delta, her sorority on campus, as well as two student run philanthropies – Cowboython and Up Til' Dawn. Outside of studying, Lauren enjoys yoga, running, and reading any fiction book she can get her hands on. After graduation in December, Lauren will be moving to Bartlesville, OK to begin her career with Phillips 66. She will be a part of the Procurement New-Hire rotational program. She is thankful for all Oklahoma State University and the IEM department has done to help her achieve her dream of becoming a college graduate. GO POKES!

"Go confidently in the direction of your dreams. Live the life you have imagined."
-Henry David Thoreau

Sathisskumar Udayakumar

Master's student

Sathisskumar grew up in Karaikudi, Tamilnadu, India. He is currently working as a TA for Dr. Jennifer Glenn. Prior to his graduate studies, he worked as a design engineer and team leader with TATA Consultancy Services, working for the client Rockwell Collins. Those experiences led him to pursue his graduate studies in Industrial Engineering. He is also an active member of APICS and IISE. When he's not studying, he enjoys playing chess (he was part of his college team in undergrad!) and going on road trips, to experience new places and get out in nature.

"Success is no accident. It is hard work, perseverance, learning, studying, sacrifice and most of all, love of what you are doing or learning to do."
- Pele

Student Spotlight

William Shifflet

Master's ETM distance education graduate

Will Shifflett is a graduate of the Engineering and Technology Management program. He is currently the Director of Engineering at Wisconsin Public Television. He gives credit to the ETM program for facilitating the possibility to acquire the title of Director of Engineering. As Director he is in charge of the PBS affiliated state wide television coverage servicing the entire state of Wisconsin. He enjoys running, weightlifting, playing guitar and spending time with his wife and three kids.

"Life isn't about waiting for the storm to pass,
it's about learning how to dance in the rain."

Sadra Babaei

Doctoral Student

Sadra Babaei joined the IEM department to pursue his Ph.D. degree in 2015. He received his bachelor's degree from Iran University of Science and Technology (2009) and his Master's degree from Amirkabir University (2012), both in Industrial Engineering. Sadra's previous research primarily dealt with decision making models under uncertainty with applications in financial markets and upstream petroleum projects, and his work has appeared in the European Journal of Operational Research. Currently, he is conducting his Ph.D. under the supervision of Dr. Chaoyue Zhao, and his research integrates statistical and optimization methods for leveraging big data in the power system industry. Sadra's work was given the best paper award at the IEEE PES general meeting held in Chicago in 2017. He currently serves as a lecturer for an undergraduate-level IEM course. In his free time, he enjoys camping, travelling, watching comedies, and listening to music.

"I have not failed. I've just found 10,000 ways that won't work."
-Thomas A. Edison

Alumni Spotlight

Q & A With IEM Alumnus Kerry Gannaway

Tell us a little bit about yourself:
I've been married to my college sweetheart Donna for 37 years with a daughter (Keri), son and three granddaughters. My son Bradley graduated from OSU in 2014, my father graduated from OSU in 1954 (with an MS in 1955), and my grandfather attended OSU.

After graduating in 1981, I worked for USG Corporation in Southard, OK and El Centro, CA, starting as a project engineer and progressing up to engineering and production manager positions. I moved to American Gypsum Company in Albuquerque, NM and then eventually Dallas, TX, progressing up to Executive Vice President of Manufacturing and Engineering. I was a Key Executive in a management team that executed a strategy that pushed the company growth from a small single location, regional manufacturer into a multi-location national provider of wallboard becoming one of North America's largest producers of wallboard. In 2012, I became the President of a new company called Northern White Sand which processed and sold sand to oil and gas companies for fracking wells. I had to build this company from the ground up hiring employees, building process and storage facilities, implementing business systems, and building a customer base from scratch. Now I have recently retired in Frisco, Texas and am enjoying traveling, fishing, golfing, and attending all OSU home football games!

How has your IEM degree helped you?
It provided a solid base for me to grow and expand from. I felt it gave me a well-grounded, structured approach to problem solving and insight into dealing with people in a manufacturing organization.

List some highlights of your career:

- Designed and built a $150 million synthetic gypsum manufacturing facility utilizing flu gas by-product waste from a utility power plant. This was the company's first facility to utilize synthetic gypsum and it became the most efficient.
- Spearheaded process improvement programs at all American Gypsum company locations which improved productivity and decreased manufacturing cost inputs by over 20%, saving millions annually leading to the company being well recognized by competitors and the investment community as being the lowest cost producer in the wallboard industry.
- Starting up a sand company from the ground up and building it into a multi-million-dollar revenue company.
- Lead inventor of 2 patents–method and system for generating foam for the manufacture of gypsum products (patent numbers 7654807 and 7404917).

Why is international exposure important for today's engineers? How would they benefit from availing of study abroad opportunities?
The fast-paced advancement of technology makes it easier for companies to conduct business anywhere and everywhere. Most companies are competing against globally based corporations even if their target market is local. Different approaches, attitudes, processes, and technologies exist in different parts of the world. Because of the global economy we are in, it is important to learn these differences which can broaden a student's knowledge base and potentially make them a more desirable employment candidate.

Alumni Spotlight

Jamie Matlock

Tell us a little bit about yourself:
I never thought I would marry a Sooner, but I have been successfully married to one for 10 years! My husband, James, and I both work at Devon Energy in Oklahoma City. We have three small children: Bobby is nine, our daughter Jordan is seven, and our daughter Blaire is two. When I'm not busy working or cheering on my oldest kids at soccer games, I enjoy reading and traveling. I have enjoyed serving on the Board of Directors for the Greater Oklahoma Chapter of the Women's Energy Network for the past few years, and I look forward to serving as President-Elect in 2019.

I'm passionate about mentoring men and women in the workforce, and I volunteer and contribute toward local organizations such as Hearts for Hearing, Girl Scouts of Western Oklahoma, Regional Food Bank of Oklahoma, Allied Arts, Alzheimer's Association and Make a Wish Foundation. I'm serving as a Girl Scouts troop leader for my daughter's Daisies troop, and my family stays connected to an organization expanding across Oklahoma called Hearts for Hearing. Two of our children were born with hearing loss and wear hearing aids, so they receive incredible hearing and speech therapy at Hearts for Hearing. It is actually the philanthropy for OSU's Freshman Follies, so my family and I will be on stage at Freshman Follies this year to talk about our experience and to ask for contributions for Hearts for Hearing. It is always great to get back to Stillwater!

How has your IEM degree helped you?
My IEM coursework and experiences taught me how to work on collaborative teams and how to solve problems. These are critical skills regardless of what type of engineering degree you obtain and what industry you work in.

What aspects of your OSU affiliation while you were a student stand out?
I had so many rewarding experiences as an IEM student and also as a member of Pi Beta Phi. My favorite experiences were serving as an executive director of Camp Cowboy and Varsity Revue. And of course, nothing can beat the memory of standing on the field in Boone Pickens Stadium and hearing my name called as the Homecoming Queen! It was such an unexpected honor.

What has motivated you to stay engaged with OSU, years after graduation?
My time at OSU played a significant role in molding me into the person I am today. I learned so much, and it prepared me for the business world, leadership, and life in general. My husband, James, shares my passion for giving back to the people and places who have made a difference in our lives. We consider ourselves to be blessed, and it's such a wonderful feeling to pay it forward to the current students and faculty at OSU. At all times, I try to give back to the university through either my time or financial contributions. Right now, with my role at Devon and with three young children, I haven't been as involved as I would like to be, but I look forward to getting more connected with IEM in the near future. I will continue with financial contributions to make a difference in the meantime.

What do you think the future holds for the IEM student?
The future is going to be very exciting with the rapid progression of technology! I believe an IEM degree provides a strong foundation for success in so many different industries.

List one or two highlights of your career:
I'm currently the planning manager for the Rockies Business Unit at Devon. Over the past 15 years, I have held various technical and leadership roles at Devon in reservoir engineering, completions, corporate acquisitions and divestitures, drilling, operations, and regulatory affairs. I can't think of any particular highlight, but I am proud of the diverse experience I have gained. I thrive on leading people to achieve shared goals. I enjoy connecting the engineering and strategic planning aspects of our business.

Why is international exposure important for today's engineers? How would they benefit from availing of study abroad opportunities?
To be honest, I did not have an appreciation for international experiences when I was a student. My husband, who became fluent in the Russian language at OU, studied abroad in St. Petersburg, and now I regret not taking advantage of similar opportunities while at OSU. Life is short, and it is much easier to experience the world before you have full-time employment and a family. If you are thinking about studying abroad, do it!

Seminar Series

Spring 2018

Feb. 28: *Characterizing the Worst-Case Performance of Algortithms for Nonconvex Optimization*, Dr. Frank E. Curtis, Lehigh University

April 11: *Patchwork Kriging for Large Datasets*, Dr. Chiwoo Park, Florida State University

April 18: *Obtaining Deterministic Rates of Convergence via Smoothing and Acceleration in Variable Sample-Size Stochastic Approximation Schemes for Stochastic Convex Optimization and Stochastic Nash games*, Dr. Uday V. Shanbhag, Pennsylvania State University

Fall 2018

Aug 29: *Bayesian Optimization in the Tech Sector,* Dr. Peter Frazier, Cornell University

Oct. 10: *A Binary Decision Diagram Based Algorithm for Solving a Class of Binary Two-Stage Stochastic Programs*, Dr. Leonardo Lozano, University of Cincinnati

Nov. 14: *Online Balancing of Bias-Variance Tradeoff in Stochastic Gradient Estimation*, Dr. Henry Lam, Columbia University

Nov. 28: *TBD*, Dr. Pratik Parikh, Wright State University

Letter from the IAB

Greetings OSU IEM Enthusiasts,

We were very pleased to welcome three new Board members this Fall at our meeting in Stillwater on September 14th: Michael Foss, Steve Kiester, and Tom Saunders. Also, a very special thanks goes to Dan Crawford for serving as the IAB Chair for the last two years and advancing the mission of the IAB!

As you may know, the Industrial Advisory Board (IAB) serves the IEM program by:

- Fulfilling its accreditation responsibilities as an independent stakeholder for the ABET accreditation process
- Maintaining a strong pipeline of candidates for IAB membership
- Providing support to both faculty and students by conveying trends and opportunities within their respective industries to help provide a better educational experience to IEM students, both undergraduate and graduate

A few recent activities include:

- Providing mentorship to the Fall 2018 senior design teams:
  - Reduction of Workload in Warehouse Operations at the Community Food Bank of Eastern Oklahoma
  - Assembly Line Throughput Improvement for Pregis Intellipack
  - Optimization of Shuttle Services for FAA Academy at Mike Monroney Aeronautical Center
- Serving as panelists together with the Cowboy Academy at the IISE panel discussion in the new Endeavor Lab building on September 13th
- Awarding the annual IAB scholarship ($1,000) to Logan Price

We look forward to providing mentorship to a record number of senior design projects in Spring 2019 as the program continues to expand!

If you have ideas for future senior design projects and/or internships for either undergraduate or graduate students, please reach out to:

Mr. Allen Glenn – Senior Design Instructor – Allen.glenn@okstate.edu
Dr. Baski Balasundaram – Graduate Program Director – baski@okstate.edu

With warm regards,
The OSU IEM Industrial Advisory Board

Members

Brian Adams
Textron Aviation

Syam Anthony
Nike, Inc

Stephanie Criner
Lockheed Martin

Kevin Doeksen
American Airlines

Bill Dueease
The Coach Connection

Ashley Estes
Zeus Industrial Products

Michael Foss
Amazon

Matt Freeman
Burns & McDonnell

Jack Goertz
Tandems, Ltd

Steve Kiester
Bell

Stephanie Royce
Weamco

G. Satish
Connixt Inc.

Tom Saunders
Pioneer Natural Resources

Brenda Shumate
Williams Companies

Jack Watts
The Portola Company

Jon Womack
The Wilcox Company

Jack Watts

Jack Watts has been a partner of The Portola Company, a private equity firm, since 1980. Portola Company private equity partnerships have acquired platform companies and taken an active management role in building them through follow-on acquisitions and internal growth. Jack was Chairman of manufacturing intensive portfolio companies including Flextronics, a global supplier of Electronic Manufacturing Services with operations in 40 countries; and Portola Packaging, which in 2004 produced over 12 billion tamper evident closures. Jack was a Founder of Faraday Electronics, which supplied PC software, ICs, and board-level computers to original equipment manufacturers (OEM) customers including IBM and Dell. Jack has a DPhil (2014) and MSt. (2002) in archaeology from Oxford, an MBA (1972) from Stanford, and a BSIE (1970), from OSU. He serves on the boards for Boys and Girls Club of the Peninsula and Kids Hearing Games.

IEM is temporarily located in the General Academic Building while Engineering North is being renovated, but we've brought our traditions along with us! We recently celebrated new members of the Cowboy Academy and the IAB, as well as faculty and student accomplishments.

Welcome New IEM Students

Welcome! We look forward to getting to know all of you and helping you on your way to becoming successful industrial engineers!

BS IEM
Jason Abernathy
Shafi Alajmi
Ahmed Aljedeed
Abdalah Aldeefy
Hawra Alsaihati
Abudllah Alzaqah
Ali Ashkanani
Caleb Baker
Benjamin Burchard
Kylie Dowers
Jay Eischen
Nathan Elliott
Kimberly Garcia
Ryne Garrison
Kendel Hart
Blake Heil
Michael Kemmerly
Abigail Leach
Luke Major
Jason Mason
Sarah McNutt
Kramer Pascal
Griffin Poage
Murray Powers
Mohammed Salman
Laney Smith
Tyler Wedel
Tyrese Williams
Chas Wright

MS IEM
Abhimanyu Sah
Devarshi Tharwala
Viplav Patil
Mahabub Zaman
Samantha Huckabay
Sheikh Shahed Uddin
Seng Hooi Lim

MS ETM
Chad Ashworth
Adam Bowersox
David Boyle
Jared DeSellier
Arlis Dodson
Travis Dollar
Cody Eden
Ashley Estes
Austin Hamm
Jason Jeffers
Jerrod Lewis
Alexander Manco
Clay McAlester
Ryan McIver
Jared Naylor
Luke O'Hara
Justin Pascoe
Jaron Redmond
Robert St. Marie
Robert Stracener
Austin Voss
James Wheeker
Brandon Wrobbel

PhD IEM
Suhao Chen
Niloufar Daemi
Ahmadreza Homayouni

Congratulations Graduates

OSU held its commencement ceremony on May 12th, 2018. We would like to congratulate the following IEM students for their hard work and dedication in completing their degree.

BS IEM
Brennan Adams
Will Amro
Sarah Anderson
William Boyes
Collin Campbell
Stephan Cochran
Radford Davis
Lindsay Dickerson
Ashley Fouts
Sydney Hinegardner
Stephanie Jones
Breanna Kimblern
Christopher Lacey
Wendy Lau Wong
Austin Ludden
Joshua Mabin
Joseph McGrath
Albert Meza
Katie Morrison
Talor Newville
Benjamin Reynolds
Rodolfo Sandoval
Zhiwei Shao
Zechariah Shrum
Ashton Upshaw
Rhett Upthegrove
Oscar Veliz
Mitchel Villa
Jiashu Zhou

MS IEM
Ashutosh Atre
Sanchal Bakale
Praveen Kumar--Bharathidasan
Abhijyot Bhat
Kunal Bhosale
Harshal Bhuse
Pratik Burkule
Praveen Chakka
Viraj Chavan
Venkat Ramya Chilikuri
Shounak Gadwal
Prachiti Ghag
Akshay Godse
Lacy Greening
Rishabh Gupta
Shravan Iyer
Sourabh Jadhav
Priyanka Jaiswal
Aditya Jamdar
Kartik Josyula
Ashutosh Lohar
Venkatesh Manohar
Swaraj Meher
Raghu Muthusamy
Akshay Nigade
Aditya Nikam
Pranit Pabalkar
Ajinkya Pangaonkar
Swapnil Patki
Mitul Pimpale
Saimanikandan-Ramesh
Jatin Selmokar
Fuzelahmed Shaikh
Anupam Sohni
Haarish Soundararajan
Venkanna Takasi
Pritesh Wankhede
Jia Yang

MS ETM
Jordan Barber
Madeline Burger
Amanda Drabek
Brittney Emerson
James Franlin
Dalton Hamilton
Chris Karambizi
Stephanie Krause
Timur Kudyakov
Mathew Lovett
Max Metcalf
Cody Potts
Ian Rivera
William Shifflett
Dylan Sirbaugh
Wil Skeen

PhD
Ali Bagheri
Babak Farmanesh
David Hansen

OSU Outstanding Student Organization Advisor

Jennifer Glenn

Lecturer

Dr. Jennifer Glenn was recognized for her work as the Faculty Advisor for the OSU Student Chapter of the Society of Women Engineers. This award is given by the Office of the President and the Department of Leadership and Campus Life. Dr Glenn says, "The Society of Women Engineers is an organization that has positively influenced me throughout the years. I was president of the student section when I was an undergraduate at OSU and the relationships and professional development it provided then was a tremendous foundation for starting my career. To continue to be involved in this group as the faculty advisor and be a part of the chapter's continued growth is very rewarding. I am grateful that President Hargis and the Department of Leadership and Campus Life recognize faculty contributions to guiding and developing our student organizations, which enrich the education, professional development and overall college experience of our students."

Dr. Balasundaram Named Wilson Bentley Chair

Baski Balasundaram

Wilson Bentley Chair and Associate Professor,
Graduate Program Coordinator

Dr. Baski Balasundaram was appointed as the Wilson Bentley Chair for a three year term starting July 2018. The Chair is named after Dr. Wilson Bentley, a 1939 graduate of Oklahoma State University (then Oklahoma A&M College), who served as a faculty member for more than 23 years until his passing in 1971. During this time, he served as the Head of the School of Industrial Engineering and Management, and as chairman of the OSU Faculty Council.

Dr. Bentley influenced a generation of engineers and pioneers of industry nationwide. The College of Engineering, Architecture and Technology established the Wilson Bentley Professorship in Industrial Engineering and Management in his honor, with support from several corporations and individual donors, whose gifts were matched by the Oklahoma State Regents for Higher Education.

The current holder of the Bentley Chair, Dr. Balasundaram, conducts research on the theoretical and computational aspects of mathematical optimization, to solve problems involving large-scale networks. He has published over 30 peer-reviewed articles in journals, conference proceedings, and handbooks, and his work has been cited over 500 times. He has secured more than $3.5 million in competitive research grants and is a co-principal investigator on a $950,000 National Science Foundation grant funding a new supercomputer cluster at OSU. His academic honors include the Regents Distinguished Research Award, two Research Excellence Awards from the College of Engineering, Architecture, and Technology, the Award for Excellence in the Teaching of Operations Research from the Institute of Industrial and Systems Engineers, and the Halliburton Outstanding Young Faculty Award.

IEM Spring 2018 Commencement Luncheon

IEM held its Spring 2018 commencement luncheon on Saturday, May 12 at the Conoco Phillips Alumni Center. It was our largest commencement celebration ever, with about 250 guests, including graduating BS, MS, and PhD students and their families, along with faculty and staff from IEM in attendance.

Above: Graduating Master's and PhD students with IEM staff

We celebrate with all our graduates. We are proud of the work you have done and cannot wait to see what you will accomplish in your careers!

Alumni Accolades

IEM Alumnus Receives Gilbreth Award

Dr. Leland Blank

Dr. Leland Blank, member of the Cowboy Academy of Industrial Engineering and Management at Oklahoma State University, received the Frank and Lillian Gilbreth award from the Institute of Industrial and Systems Engineers (IISE) on May 21, 2018 in Orlando, Florida.

The Frank and Lillian Gilbreth Industrial Engineering Award is the highest and most esteemed honor bestowed by IISE. It recognizes those who have distinguished themselves through contributions to the welfare of mankind in the field of industrial engineering. The contributions are of the highest caliber and nationally or internationally recognized.

After earning his Master's and PhD in industrial engineering at OSU, Blank started his teaching career at the University of Texas-El Paso. He recently retired as the Interim Provost and Chief Academic Officer at the American University of Sharjah (AUS) in the United Arab Emirates. He was a professor of Industrial Engineering with expertise in the areas of engineering economics and international higher education development and assessment. He was the dean of engineering at AUS from 2001-05 and 2013-16, and holds the title of Dean Emeritus at AUS. Additionally, Blank is Professor Emeritus of industrial and systems engineering at Texas A&M University.

Besides UAE, he has served higher education internationally in Qatar, Kuwait, Australia, China, Japan, Mexico, and South Africa. He has worked in leadership roles in continuous improvement of academic systems, research center development, and strategic planning facilitation. His industrial experience includes Southwestern Bell Telephone, GTE (now Verizon), and San Antonio Public Service. He served as a congressional appointee to the US Department of Commerce, International Trade Administration, and is a licensed Professional Engineer in Texas.

He is Past President and Fellow of IISE, a Past President of Alpha Pi Mu and received IISE's Wellington Award for service to the engineering economy profession. Besides technical journal and research articles, he has co-authored 11 engineering textbooks and eBooks on the subjects of engineering economy and statistics.

Blank joins Ken Case, Joe Mize, and H.G. Thuesen from OSU who have received this award. A total of 44 awards have been given since 1962.

Who's New in IEM

Mya Jackson
Student Worker

Mya was born and raised in Stillwater, Oklahoma, so she has been a cowboy for life! Her mother attended Oklahoma State University and graduated in 1999, and is one of the main reasons that Mya chose to attend OSU. She attended Stillwater High School and Meridian Technology Center focusing on Graphic Design. She now attends Oklahoma State University majoring in Human Development and Family Sciences with a focus in Child and Family Services. She is super involved in her sorority, Pi Beta Phi--doing philanthropy events, attending other houses' philanthropy events, and participating in homecoming which is a major part of the fall semester!

Her hobbies include dancing, teaching dance, painting, drawing, hiking, kayaking, and camping. She really enjoys being outdoors with her dogs! She loves working with people of all ages and loves all things to do with photography, designing, and PR. In the future, Mya hopes to be Head of Media for a summer camp or a nonprofit organization.

"Find the good."

Valerie Quirey
Senior Administrative Support Assistant

Valerie Quirey never knows how to answer the question, "Where are you from?" She grew up in Winnipeg, Canada, where she learned how to avoid frostbite. She is a graduate of Oklahoma Christian University, where she learned to stay calm during tornado season. She spent eight years living near the beach in Salvador, Brazil, where she learned to make sunscreen a daily part of her routine. She moved to Stillwater five years ago and is learning to incorporate orange into her wardrobe. Valerie is married to Russell and is mom to a ten year old son, Jackson. She enjoys Bravo, podcasts and Broadway musicals.

"Fight for the things that you care about,
but do it in a way that will lead others to join you."
-Ruth Bader Ginsburg

APICS

APICS OSU Student Chapter focuses on enhancing knowledge and competency of its members in the field of supply chain and operations management. To work towards its objectives, APICS Student chapter encourages certifications and organize events to provide our members with industrial exposure and networking opportunities.

One of the main purposes of APICS OSU Student Chapter is to encourage and guide its members to pursue APICS certifications and we are looking forward to actively promote that by organizing various events. Along with the encouraging certifications, we are also planning to arrange Industrial visits during our fall semester which will give Industrial exposure and provide us with networking opportunities.

The Student members of the APICS OSU Student Chapter are also planning to compete in 2018-2019 APICS case competition. We are also trying to reach out to masses by collaborating with INFORMS, IISE and other student chapters in Industrial Engineering and Management to achieve our mutual goals of conducting events that will help students in their professional career.

We are looking forward to an exciting semester and hopefully we are able to meet the goals that we have set for ourselves.

Faculty Advisor: Dr. Tieming Liu

Committee Members:

- Pranav Muttha, President
- Arunprakash Elavarasan, Secretary
- Sourabh Nashte, VP Education and Program Planning
- Paritosh Mehta, VP Membership and Networking
- Ishita Gupta, VP Finance
- Sreeja Malka, Webmaster

INFORMS

The Institute for Operations Research and the Management Sciences (INFORMS) is the largest society in the world for professionals in the field of operations research, management science, and analytics. The OSU Student Chapter of INFORMS is a student lead campus organization focused on promoting student learning, professional advancement, and camaraderie with fellow students and faculty within the field of operations research and the management sciences. Our goal is to enable students to go beyond the bounds of coursework as they engage in research and extracurricular activities that lay the groundwork for their future as OR/MS professionals. Upcoming activities for Fall 2018 include:

- Setting up IEM seminars
- Social events for IEM PhD students
- A competition for research presentations for IEM PhD students

The INFORMS student chapter advisor is Dr. Juan Borrero and the Fall 2018 student officers are:

- Hamidreza Validi, President
- Mohammad Javad Naderi, Treasurer

If you have any questions or would like to connect with the student chapter, please feel free to email Hamid Validi at hvalidi@okstate.edu Also, don't forget to check out our Facebook page "INFORMS Student Chapter – Oklahoma State University" for more updates on events and chapter activities.

Institute of Industrial and Systems Engineers

The Institute of Industrial and Systems Engineers' mission is to be a premier organization at Oklahoma State University that cultivates and encourages professional development and personal growth; including leadership development, academic enrichment, and networking opportunities for Industrial Engineering students and faculty. Our goal is to create and sustain interest and involvement in Industrial Engineering events and activities at OSU in an effort to produce well-rounded Industrial Engineering graduates. Throughout the year, we sponsor, plan, organize, and execute events that promote student and faculty engagement through professional development programs, academic enrichment seminars, networking forums, social events, and community involvement activities. IISE also helps manage alumni and company relations for the benefit of Industrial Engineering students. We look forward to assisting all OSU IEM graduates in achieving the most out of their educational, professional, and social experiences with the Industrial Engineering and Management department. Become a student member at www.iise.org and watch your email for information on upcoming events!

We would also like to recognize the students who freely give their time and effort to make this organization great. The officers this academic year are:

- Logan Price, President
- Brittany Grubert, Vice President of Internal Affairs
- Lane Workman, Vice President of External Affairs
- Ashlynn Hughes, Secretary
- Matt Burchard, Treasurer
- Susan Weckler, Events Chair
- Matthew Wilkinson, Speaker Chair
- Cynthia Craig, Merchandise Chair
- Mallory Newell, Alumni Chair
- Victoria Stow, Communications Chair
- Aspen Dixon, Fundraising Chair
- Paula Sarmiento, Recruiting Chair
- Cristina Montemayor, Mentorship Chair
- Cole Luetkemeyer, Website Chair

Faculty Advisor: Dr. Sunderesh Heragu

There is a lot going on with IISE, and we would love for you to be a part of it! If you are an alumni or student who would like to get more involved with IISE, please feel free to reach out at our Facebook page, IISE Oklahoma State, or send an email to Logan Price at logp@okstate.edu.

Alpha Pi Mu Industrial Engineering Honor Society

The purpose of Alpha Pi Mu is to recognize students who have achieved academic excellence, promote scholarly activities, and foster an atmosphere to facilitate social interaction between students and faculty. Being a part of Alpha Pi Mu gives an individual scholarship and volunteer opportunities. The society is open to juniors, seniors, and graduate students who meet the membership requirements. Last semester, Alpha Pi Mu inducted the largest group of scholars in chapter history. This semester, Alpha Pi Mu is involved in taking senior class pictures and looking into IEM tutoring opportunities. For more information about Alpha Pi Mu, you can visit their new website at apm.okstate.edu

Faculty Advisor: Dr. Manjunath Kamath

- Jordan Spencer, President
- Hannah Anthony, Vice President
- Devaraj Radha Krishnan, Secretary
- Ronny Pacheco, Treasurer
- Tyler Tinker, President Elect

RESEARCH

Learning from the Adversary: An Approach to Inderdiction with Incomplete Information

Dr. Juan Borrero
Assistant Professor

From Borrero, Juan S., Oleg A. Prokopyev, and Denis Sauré. `Sequential Interdiction with Incomplete Information and Learning,' forthcoming at Operations Research.

Bilevel optimization deals with problems where a subset of the lower-level decisions is constrained to be a solution of another mathematical program that depends on the remaining upper-level decisions. This general structure makes bilevel programs useful for modeling hierarchical decision-making problems between multiple, typically, two actors, commonly referred to as the leader (an upper-level decision-maker) and the follower (a lower-level decision-maker) [1]. In this perspective, the leader solves an optimization problem that depends on the optimal solution to the follower's problem, and this latter problem is, in turn, parameterized by the leader's decisions. Bilevel programs are used in several application areas such as law enforcement [2], defense [3], economics [4], transportation [5], energy [6], revenue management [7], among others; see [1] and the references therein.

An important class of bilevel programs, known as max-min bilevel problems or interdiction problems, deals with settings where the leader and follower are adversaries. More precisely, in these problems the leader's objective is to maximally degrade the performance of the follower. As an example, consider network flow interdiction problems, which have applications in military and smuggling prevention settings. Here, the follower operates a network with the objective to move between two vertices through a shortest path [8], to send the maximum flow possible between two vertices [9], or more generally, to move flow in the network at minimum cost subject to some demand balance constraints [10]. The leader, by using the resources at her disposition, can block (either totally or partially) a limited number of arcs and nodes in the network. Her objective is to allocate her resources to maximize the length of the follower's shortest path, minimize the maximum flow, or maximize the minimum cost incurred by the follower, respectively. These types of models are also used in surveillance settings, where the leader places resources (e.g., sensors) in a network to minimize the follower's probability of evasion, see [2].

Typical formulations of interdiction problems in the literature assume a single interaction between the leader and the follower, and that either the leader knows all the parameters of the follower's problem (as in the references discussed above), or that she knows a probability distribution over the set of problem configurations and parameters (see, e.g., [11]). Hence, these models solve a single (possibly stochastic) interdiction problem, assuming that even if the leader and the follower interact across several periods, the leader would implement the resulting full-information solution at every time period. In contrast, many applications inherently involve multiple interactions between the leader and the follower (e.g., as in smuggling interdiction and Defender-Attacker problems [3]). More importantly, in these problems the leader does not always know with certainty the system that the follower operates, and cannot estimate it (a priori) reliably due to the adversarial nature of their confrontation. Consequently, she has incomplete information of the problem solved by the follower at each time period, and has to learn about it through time by observing the follower's reactions to her actions. Departing from the existing literature, this paper studies sequential interdiction problems with incomplete information (SIPI). In these problems, the leader and follower interact repeatedly: at each stage the leader implements a set of actions and then observes the follower's reaction; from the information, or feedback, she gets from the follower's response, the leader (potentially) updates her knowledge of the follower's problem, and incorporates this information into her decision-making process.

Observe that in SIPI, besides determining how to allocate her resources, the leader faces additional questions outside the scope of traditional bilevel models, as she needs to recognize whether a given upper-level solution is the best possible, she needs to force the follower to disclose as much information as possible, and needs to exploit this newly learned information to best re-allocate her resources in future periods. Therefore, given the leader's limited knowledge of the follower's problem, at each time period she faces a form of the exploitation vs. exploration trade-off: she must choose either to exploit the current information so as to maximize her immediate reward, or to explore solutions that albeit not being maximally rewarding, may reveal new information that can be used to implement better solutions in future periods.

We measure the performance of the leader's decision-making policy in terms of its time-stability. This is defined as the first time period by which the cost the follower incurs coincides with the best possible cost an oracle leader with complete knowledge of the problem attains from there on. Time-stability is closely related to the notion of regret used in online optimization; in particular, any upper bound on the time-stability of a policy implies an upper bound in the regret of that policy.

In this paper we analyze a set of greedy and robust policies, which we denote by Λ. The policies are greedy because at any time they exploit the leader's information of the follower's problem to maximize the follower's costs at the current time period, and they are robust because they assume that the follower's cost vector realizes its worst case for the follower. For these reasons, implementing the policies in Λ involves solving at each time a max-min bilevel problem with lower-level robustness constraints. Hence their computation requires both bilevel and robust optimization techniques: we develop a method that first replaces the lower-level robust optimization problem by its equivalent linear program counterpart [12], and then reformulates the resulting linear bilevel program as a one-level mixed integer program.

We demonstrate that the time-stability of policies in Λ under particular feedback types is upper bounded by the number of follower's activities. We show that these policies are optimal in the sense that they attain the best possible worst-case time-stability across all possible problem instances. Furthermore, they provide a certificate of optimality in real time. We also develop a method to provide a lower bound for the time-stability of any policy based on the concept of a semi-oracle. The semi-oracle has full information of the problem beforehand, but can only use the leader's resources whose existence has been revealed by the follower's actions. As such, the semi-oracle combines the knowledge of the standard oracle with the practical limitations of the leader and thus, provides an informative lower bound on the performance of any policy. Our numerical results show that the policies in Λ consistently outperform a reasonable benchmark, and perform reasonably close to the semi-oracle.

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Research Grants

Active in 2017 or 2018

B. Balasundaram, and I. V. Hicks, Collaborative Research: Risk-Averse Cluster Detection in Network Models of Big Data Under Measurement Uncertainty, National Science Foundation, 4/15/2014 - 3/31/2017, $271,649.

D. Brunson, **B. Balasundaram**, M. Borunda, C. Fennell, P. Hoyt, MRI: Acquisition of Shared High Performance Compute Cluster for Multidisciplinary Computational and Data-Intensive Research, National Science Foundation, 10/1/2015 - 9/30/2018, $951,570.

B. Balasundaram, A. Buchanan, and S. Heragu. Optimization-Based Aggregate Master Planning Tools for Bay Valley Foods, LLC, Bay Valley Foods, LLC, 10/1/2017–9/30/2018, $209,090.

A. Buchanan, Imposing Connectivity Constraints in Large-Scale Network Problems, National Science Foundation, 6/15/2017 – 5/31/2020, $258,586.

M. Kamath, **F. Yousefian**, S. Frazier, Developing a Modeling Framework for Hazardous Material Movement in Oklahoma, Oklahoma Department of Emergency Management, 10/1/2016 - 9/31/2017, $89,961.

M. Kamath, F. Yousefian, and S. Frazier, "Flow Visualization and Risk Assessment of Hazardous Material Movement in Oklahoma," Oklahoma Department of Emergency Management, 10/1/2017 - 9/31/2018, $119,985.

M. Kamath, **F. Yousefian**, and S. Frazier, Development of a GIS Application for Analyzing HazMat Flows in Oklahoma, Oklahoma Department of Emergency Management, 10/1/2018 - 9/31/2019, $131,620.

W. Kolarik, Industrial Assessment Center Program, U.S. Department of Energy, 9/1/2016 - 9/31/2021, $1,500,000.

T. Liu and **C. Zhao**, Studying the Impacts of Freight Consolidation and Truck Sharing on Freight Mobility, Transportation Consortium of South Central States (TranSET), 5/1/2017 - 10/31/2018, $55,000.

C. Zhao, Data-Driven Optimization on Power Grid Investment, Operation and Resilience, Argonne National Laboratory, 9/01/2016 - 8/31/2019, $30,000.

C. Zhao and Y. Guan, Collaborative Research: Data-driven Risk-Averse Models and Algorithms for Power Generation Scheduling with Renewable Energy Integration, National Science Foundation, 10/1/2016 - 9/30/2019, $403,519.

C. Zhao and R. Jiang, Collaborative Research: Enhancing Power System Resilience via Data-Driven Optimization, National Science Foundation, 09/01/2017 – 8/31/2020, $401,796.

Journal Publications

Papers published or accepted in 2017 or 2018

J. Ma and **B. Balasundaram.** On the chance-constrained minimum spanning k-core problem. *Journal of Global Optimization*, 2018. Accepted for publication.

Z. Miao and **B. Balasundaram**. Approaches for finding cohesive subgroups in large-scale social networks via maximum k-plex detection. *Networks*, 69(4):388–407, 2017.

F. Mahdavi Pajouh, E. Moradi, and **B. Balasundaram**. Detecting large risk-averse 2-clubs in graphs with random edge failures. *Annals of Operations Research*, 249(1):55–73, 2017.

J.S. Borrero, O.A. Prokopyev, P. Krokhmal, Optimization of Cascading Processes in Arbitrary Networks with Stochastic Interactions. *IEEE Transactions on Network Science and Engineering*, 2018. Accepted for publication.

J.S. Borrero, O.A. Prokopyev, D. Saure, Sequential Interdiction with Incomplete Information and Learning. *Operations Research*, 2018. Accepted for publication.

J.S. Borrero, C. Gillen, and O.A. Prokopyev, Fractional 0–1 programming: applications and algorithms, *Journal of Global Optimization*, 69(1): 255-282, 2017.

H. Validi, **A. Buchanan**. A Note on "A linear-size zero-one programming model for the minimum spanning tree problem in planar graphs". Accepted at *Networks*, 2018.

Y. Wang, **A. Buchanan**, S. Butenko, On imposing connectivity constraints in integer programs, *Mathematical Programming A*, 166(1): 241-271, 2017.

A. Buchanan, Y. Wang, S. Butenko. Algorithms for node-weighted Steiner tree and maximum-weight connected subgraph. *Networks*, 72(2): 238-248, 2018.

J. S. Usher, M. Aslam, **C. T. Hardin** and C. H. Jun, Repetitive Availability Demonstration Testing Procedure, *ASTM Journal of Testing and Evaluation*, 45(3):1016-1021, 2017.

J. Usher, R. Aslam, **T. Hardin**. Repetitive Availability Demonstration Testing Procedure. *ASTM Journal of Testing and Evaluation*, vol. 45(3), May 2017, DOI: 10.1520/JTE20150415

E. Khodabandeh, L. Bai, **S.S. Heragu,** G.W. Evans T. Elrod and M. Shirkness, Modeling and solution of a largescale vehicle routing problem at GE Appliances and Lighting, *International Journal of Production Research*, 55(4): 1100-1116, 2017.

A. Paleshi, K.H. Bae, G.W. Evans, and **S.S. Heragu**, A simulation-based optimization approach for mitigation of pandemic influenza, *IISE Transactions on Healthcare Systems Engineering*, 7(2): 107-120, 2017.

D. Roy, A. Krishnamurthy, **S.S. Heragu**, and C.J. Malmborg, A multi-tier linking approach to analyze performance of autonomous vehicle-based storage and retrieval systems, *Computers and Operations Research*, 83: 173- 188, 2017.

S. Srivathsan and **M. Kamath**, Performance modeling of a two-echelon supply chain under different levels of upstream inventory information sharing, *Computers and Operations Research*, 77: 210-225, 2017.

Srivathsan, S. and **M. Kamath**, Understanding the Value of Upstream Inventory Information Sharing in Supply Chain Networks, *Applied Mathematical Modelling*, Volume 54, Pages 393-412, https://doi.org/10.1016/j.apm.2017.09.004. 2018.

Journal Publications

Zhou, Y., **T. Liu**, **C. Zhao**. Backup Capacity Coordination with Renewable Energy Certificates in a Regional Electricity Market. *IISE Transactions*, 50(8), 711– 719, 2018.

Piri, S., Delen, D., **Liu, T.** A Synthetic Informative Minority Over-Sampling (SIMO) Algorithm Embedded into Support Vector Machine to Learn from Imbalanced Datasets. *Decision Support Systems,* 106, 15-29, 2018.

Piri, S., Delen, D., **Liu, T.**, Paiva, W. Development of a New Metric to Identify Rare Patterns in Association Analysis: The Case of Analyzing Diabetic Comorbidities. *Expert Systems with Applications*, 94, 112-125, 2018.

Gupta, A., **T. Liu**, S. Shepherd, W. Paiva. Using Statistical and Machine Learning Methods to Evaluate the Prognostic Accuracy of SIRS and qSOFA. *Healthcare Informatics Research*. 24(2), 139-147, 2018.

T. Liu, Q. Pan, J. Sanchez, S. Sun, N. Wang, and H. Yu, Prototype decision support system for black ice detection and road closure control, *IEEE Intelligent Transportation Systems Magazine*, 9(2): 91-102, 2017.

S. Piri, D. Delen, **T. Liu**, and H.M. Zolbanin, A Data Analytics Approach to Building a Clinical Decision Support System for Diabetic Retinopathy: Developing and Deploying a Model Ensemble, *Decision Support Systems*, 101: 12-27, 2017.

D. Mai, **T. Liu**, M.D. Morris and S. Sun, Quality coordination with extended warranty for store-brand products, *European Journal of Operational Research*, 256(2): 524-532, 2017.

F. Yousefian, A. Nedich, and U.V. Shanbhag, On stochastic mirror-prox algorithms for stochastic Cartesian variational inequalities: randomized block coordinate and optimal averaging schemes, *Set-Valued and Variational Analysis*, to appear

D. Newton, **F. Yousefian**, R. Pasupathy, Stochastic Gradient Descent: Recent Trends, *INFORMS Tutorials*, accepted for publication.

F. Yousefian, A. Nedich, and U.V. Shanbhag, On Stochastic Mirror-prox Algorithms for Stochastic Cartesian Variational Inequalities: Randomized Block Coordinate and Optimal Averaging Schemes, Set-Valued and Variational Analysis, 2018

C. Zhao, R. Jiang, Distributionally robust contingency-constrained unit commitment, *IEEE Transactions on Power Systems*, 33(1): 94-102, 2018.

A. Bagheri, **C. Zhao**, F. Qiu, J. Wang, Resilient transmission hardening planning in a high renewable penetration erra, *Accepted for publication of IEEE Transactions on Power Systems*, 2018.

C. Zhao, Y. Guan, Data-driven risk-averse stochastic optimization with Wasserstein metric, *Operations Research Letters*, 46(2), 262-267, 2018.

Y. Guo, **C. Zhao**, Islanding-aware robust energy management for microgrids, *IEEE Transactions on Smart Grid*, 9(2): 1301-1309, 2018.

A. Bagheri, J. Wang, **C. Zhao**, Data-driven stochastic transmission expansion problem, *IEEE Transactions on Power Systems*, 32(5): 3461-3470, 2017.

T. Ding, **C. Zhao**, Robust total supply capability considering distribution network reconfiguration under N - k transformer contingency and the decomposition method, *IET Generation, Transmission & Distribution*, 11(5): 1212-1222, 2017.

T. Ding, **C. Zhao,** T. Chen, R. Liu Conic programming based Lagrangian relaxation method for DCOPF with transmission losses and its zero-gap sufficient condition, *IEEE Transactions on Power Systems*, 32(5): 3852-3861, 2017.

IEM Tailgate

The annual IEM Tailgate was held on September 15th. Current students, alumni, and members of both the Industrial Advisory Board and the Cowboy Academy gathered to savor food from Mexico Joe's and cheer the Pokes on to a 44-21 victory over Boise State.

The Cowboy Academy

Report by Bill Dueease, TCA President

The Cowboy Academy Vision: **For graduates to achieve their most valued and rewarding careers!**

TCA had its annual meeting in Stillwater on Thursday, September 13, 2018. Many topics were covered and are summarized below. This report also lists the results achieved and the proposed next steps to move TCA further towards its vision of enabling OSU IEM graduates achieve their most valued and rewarding careers.

Sunderesh Heragu, the Head of IEM gave the state of the IEM School presentation and was proud to report the largest freshman class of 43 students in history to also include two of the estimated nine National Merit Scholarship award winners who started at OSU this semester. Graduate student enrollment appears to be on the decline because of the perception by many foreign-based students that the US has become much more difficult to enter and attain work visas.

Paul Tikalsky, the Dean of the College of Engineering and Architecture (CEAT) gave an update on the status of CEAT and proudly reported the completion of the entirely new and very up-to-date and very flexible Engineering Laboratory building named "Endeavor".

Dave Boyer of Webco and the chairperson of the "Enhance external visibility" committee brought his team of Jene Harmon, the Marketing Director of Webco, and an OSU Graduate and Mandy Vavrinak, the outside marketing provider for Webco and managing partner of Comm•Arts, to present a very comprehensive marketing plan for IEM. Ken Case, Tom Britton, Bill Dueease, John Harrington, Sunderesh Heragu, and Stuart Keeton also contributed to the development of this plan over the past nine months.

This plan was developed to achieve the IEM's goal of becoming a top 20 IE School by 2020. It was extensive, well developed, and provided a host of ways TCA members can directly contribute to help achieve the 20/20 Goal, personally, with influence, and in other ways. The members endorsed the plan and many members offered excellent suggestions to best execute various sections of the plan. The overall estimated cost to complete the plan in about 18 months was $300,000. Sunderesh, with his consistent optimism, stated that somehow he will find the funds to have this plan executed. The plan calls for a separate OSU IEM web site, an extensive media presentation, financing projects with high schools to build connections and entice top students to join IEM, and other in-depth marketing efforts, to enhance IEM's visibility, its reputation, and ranking.

A special forum between TCA Members and IEM students was organized by Sunderesh to be conducted on Friday, September 14. The forum went over very well by breaking up into smaller groups. An IEM student panel career discussion was also organized by the IISE student chapter on Thursday, September 13 to include TCA Members and IEM IAB members to answer questions posed by the IISE student chapter members. The reviews I received from the students were very good. Some even wished the comments by the panel members had been recorded.

The TCA banquet was held on September 13th at 6:30 PM. Nine of the twelve new TCA members were inducted into the TCA. A lot has been happening and even more was accomplished during the September 13th and 14th activities.

Board Members:

- Tom Britton
- Denny Carreker
- Bill Dueease
- Jack Goertz
- John Harrington
- Mitch Myers
- Rick Webb
- Stacie Wrobbel

Officers:

- Bill Dueease, President
- Mitch Myers, President-Elect
- Tom Britton, Treasurer
- John Harrington, Secretary
- Rick Webb, IEM Liaison

TCA congratulates the above officers and Board members and thanks them for their willingness to serve their alma mater.

Current Members Include:

Jaxon Axtell
Tony Bacher
Michael Bartlett
Terrance Beaumariage
Leland Blank
David Boyer
Shay Braun
Thomas Britton
Denny Carreker
Kenneth Case
Samuel Combs
Johann Demmel
Bill Dueease
Laura Raiman DuPont
Laura Easley
John English
Wolter Fabrycky
Jack Goertz
Jeff Greer
John Harrington
Dave Hartmann
Gary Hogsett
Don Humphreys
Stuart Keeton
Behrokh Khoshnevis
William Kolarik
David Kyle
John Lewis
Rasaratnam Logendran
Gary Maxwell
Neal McCollom
Mitch Myers
Ron Orr
Kent Powers
David Pratt
Bill Remy
Jack ReVelle
Stephanie Royce
Allen Schuermann
Ting Nee Su
Leva Swim
Shy Ching Tay *(distinguished past member)*
Lyndon Taylor
Silvanus Udoka
Randy Watson
Jack Watts
Rick Webb
Lawrence Whitman
Marion Williams
Eric Woodroof
Stacie Wrobbel

IEM faculty and staff proudly wearing Webco polo shirts to celebrate Webco Industries' gift for the renovation of the third floor of Engineering North and their ongoing support of IEM at OSU.

2018 Cowboy Academy Inductees


Randy Watson


Stephanie Stewart Royce


Gary Hogsett


Jason Axtell


Allen Schuermann


William Kolarik


Laura Raiman DuPont


Leva Swim


John Lewis


Wolter Fabrycky


Silvanus Udoka


Gary Maxwell


Dave Hartmann

COLLEGE OF
Engineering, Architecture
& Technology

INDUSTRIAL ENGINEERING AND MANAGEMENT

Engineering North 3rd Floor Renovation

Naming Opportunities

Office Spaces
Faculty Office (26) | $10,000
Department Head Office | NAMED

Classrooms
30-Person Classroom | $100,000
50-Person Classroom | $150,000
80-Person Classroom | $250,000

School | $20M
Program | $10M
Floor | $2M

Meeting Spaces
Board Room | $100,000
Conference Room | $30,000
Reception | NAMED
Faculty Commons | NAMED
TA Office | $30,000
Mini Conference Room (2) | NAMED
Staff Office (3) | $10,000
Student Center | $75,000
Student Lounge | NAMED

How to *Give*

- Go to **IEM.okstate.edu**
- Click the **GIVE** button
- Complete the secure, online form
- Include instructions regarding use of your gift in the "Comments" field

For more information contact:
Bryce Killingsworth, Assistant Director of Development, at bkillingsworth@OSUgiving.com or 405.385.5623.

EN 3RD Floor Renovations

Senior Design

IEM Fall 2018 Senior Design Class

Graduating Industrial Engineering and Management (IEM) seniors conclude their academic studies with a capstone course called Senior Design, taken in their last semester. During this course, student teams work as outside 'consultants' on real-world problems for clients in the manufacturing and service sectors. The projects provide students the opportunity to apply the theories and tools they have learned to provide clients with innovative solutions to a problem.

RECENT SENIOR DESIGN PROJECT CLIENTS

Clients are typically located within a two-hour drive from the OSU-Stillwater campus. This fall's projects include:

-Community Food Bank of Eastern Oklahoma: *Reduction of Workload in Warehouse Operations*

-Pregis Intellipack: *Assembly Line Throughput Improvement*

-FAA: *Optimization of Shuttle Services for FAA Academy at Mike Monroney Aeronautical Center*

Back: Oluwafemi Ishola, Shihan Ma, Alexander Pick, Farhan Israk

Front: Jordan Katherine Hood, Lauren Leto, Holly Palmer, Tara Hall, Rikiyah Fletcher, Ahmed Alsabban

IEM Student Awards and Scholarships

At the May 2018 Annual IISE Conference in Orlando, FL, IEM students were recognized for their contributions.

Erica Crain

UPS Scholarship for Female Students

Hamidreza Validi

E.J. Sierleja Memorial Fellowship

Logan Price

IISE President's Scholarship

IEM Faculty

Dr. Baski Balasundaram
Wilson Bentley Chair and Associate Professor
Graduate Program Director

Dr. Juan S. Borrero
Assistant Professor

Dr. Austin Buchanan
Assistant Professor

Dr. Terry Collins
Associate Professor and Undergraduate Program Director

Dr. Camille DeYong
Associate Professor

Dr. Jennifer Glenn
Lecturer

Dr. Tim Hardin
Lecturer and ETM Director

Dr. Sunderesh Heragu
Regents Professor and School Head
Donald and Cathey Humphreys Chair

Dr. Manjunath Kamath
Professor

Dr. Tieming Liu
Associate Professor

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