Oklahoma State University

School of Industrial Engineering and Management

College of
Engineering, Architecture and Technology

COWBOY CONNECTIONS

SPRING 2020

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Dr. Sunderesh S. Heragu
School Head
Regents Professor and
Humphreys Chair

Dr. Tieming Liu
Graduate Program Director
Associate Professor

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Undergraduate Program
Director
Associate Professor

Hello,

Our thoughts and wishes are with you as you are grappling with the COVID-19 pandemic. We hope Cowboys, families, and friends everywhere are staying safe and healthy.

Like many other organizations, OSU and IEM quickly moved our operations online. Immediately after Spring break, classes were fully online. As I write this message, we are in the finals week with an online graduation ceremony on Friday. Kudos to all the faculty, staff, and students for working through this difficult period, while ensuring the integrity of a high quality education–something that IEM has been known for over a hundred year period–was not compromised.

Senior design projects and presentations as well as lectures, quizzes, homework assignments and exams in all the classes were fully done online without a glitch. We will have virtual graduation ceremony for graduates of the BS, MS IEM, MS ETM, and PhD programs in IEM on May 8, 2020. Although students who toiled arduously for four years or more will not be able to have a traditional commencement in May, they will have an opportunity to come back in December for the real experience, assuming COVID-19 is at bay by then.

Despite the uncertainty and difficulty COVID-19 has brought upon us, the IEM family has a lot to be thankful for and celebrate. I will outline a few below.

- IEM was once again ranked highly by US News. Among public universities, IEM was ranked #23, up from #29 in 2012-13.
- The MS ETM program was ranked #11 among public universities.
- The online MS IEM program was ranked #2 by Guide to Online Schools.
- Two of our faculty–Dr. Austin Buchanan and Dr. Farzad Yousefian–received the NSF CAREER award in Spring 2020.
- We will be graduating our largest class ever–53 in academic year 2019-20.

The list of accomplishments of our alumni, faculty, staff, and students goes on and on. We are fully settled in our new home and students are enjoying the fully renovated space and classrooms.

Our students attended the IISE South Central Regional student paper competition. Jackson Baker, former undergraduate and current MS student, won second place. Elizabeth Bunting, a graduating senior, was selected as the 2nd Place winner in the undergraduate 2020 IISE Logistics and Supply Chain (LSC) Division Student Case Competition. A graduate student team comprising of Anshul Maheshwari, Loksagar Rudraraju Subramanyam, and Md Mahabub Uz Zaman was selected as the 2nd Place winner in the 2020 IISE Logistics and Supply Chain (LSC) Division Student Case Competition.

Alpha Pi Mu inducted new members in February. The Industrial Advisory Board (IAB) had its semiannual meeting on February 7th. The IAB continues to mentor senior design teams.

We are excited that two new faculty Dr. Katie Jurewicz and Dr. Joseph Nuamah will be joining IEM in the fall. Both have research interests in human factors and ergonomics and will be a great addition to our faculty. We now have an opportunity to significantly grow that area. Welcome Katie and Joseph!

The six-year strategic plan we launched in 2014 is coming to an end in December. Our main goals were to be a top 20 program, double undergraduate enrollment to 240, graduate 60 BS students, increase research expenditures to $1.5 million, hire 20 faculty members, and increase endowment to $20 million. These were very ambitious goals, but I am pleased to report we have come close to accomplishing many of them. We have also fallen short on some of the metrics. However, our constituents agree that we have made significant progress overall. We have increased the undergraduate population to 220, BS graduates to 52, faculty size to 14, endowments to $8 million (including deferred gifts), research expenditures to $0.5 million, and improved program ranking to 23. We could not have accomplished all these without the support of the alumni (via the advisory board and Cowboy Academy), employers, faculty (current and emeritus), staff, and students.

We will be launching a new strategic plan towards the end of this year and encourage you to provide input on that plan via a survey we will be sending out in the summer.

Go Pokes!

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

IEM Mission, Vision, and 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 $8 million. The remaining $12 million must be raised in 0.5 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.

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 by clicking 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

http://iem.okstate.edu/sites/default/files/TheNextFiveGenerations.pdf

New Faculty

Dr. Katie Jurewicz
Assistant Professor

Katie Jurewicz received her PhD from the Department of Industrial Engineering at Clemson University under Dr. David Neyens. Her research interests are centered around the application of industrial engineering and data analytics to healthcare application. Specifically, her work includes examining the design of 3D gestural humancomputer interaction via Bayesian statistical modeling to predict the gestural behavior of anesthesiologists, evaluating anesthetic workflow in the operating room to improve physical workspace design, and investigating anesthesia work patterns across different surgical phases. She also contributes to an interdisciplinary AHRQ Patient Safety Learning Lab investigating operating room redesign to improve patient safety. Katie's work has been formally commended several times at the department level, university level, and nationally within the Human Factors and Ergonomics Society's healthcare technical group. Her work is published in several high quality journals within human factors including Human Factors and Applied Ergonomics.

New Faculty

Dr. Joseph Nuamah
Assistant Professor

Dr. Joseph Nuamah is a Human Factors Engineering Research Associate in the Department of Radiation Oncology within the School of Medicine at the University of North Carolina, Chapel Hill. His primary research focuses on quantification of physiological and behavioral states during the performance of complex tasks in operational environments. His current research efforts are focused on measuring the effectiveness of simulation-based training, and investigating the consequences of health care information technology design, neurofeedback protocols and burnout on health care providers' cognitive workload and performance. Previously, Dr. Nuamah worked as a Postdoctoral Researcher in the NeuroErgonomics Lab within the Industrial and Systems Engineering Department at Texas A&M University where he conducted research pertaining to wearable sensors, aerial systems, and healthcare. He holds a Ph.D. in Industrial and Systems Engineering from the North Carolina A&T State University. Dr. Nuamah was the recipient of the 2019 Houston Human Factors and Ergonomics Society Professional Poster Award, and the 2017 HFES Augmented Cognition Technical Group Grant Award. His works appear in a wide range of journals including IEEE Transactions on Human Machine Systems, Frontiers in Human Neuroscience, Brain-Computer Interfaces, and BMC Medical Informatics and Decision Making. Furthermore, he has two forthcoming book chapters –one titled "Design for Stress, Fatigue, and Workload Management", and the other titled "Neuroergonomic Applications in Information Visualization". Dr. Nuamah is also a certified Project Management Professional.

Student Spotlight

Lauren Lenaburg
Undergraduate Student

This month, Lauren will join her peers in graduating with a Bachelor's degree in Industrial Engineering and Management. She is especially proud of this accomplishment because in doing so, she is following in the footsteps of her grandpa, Lavern Lenaburg. He graduated with a Master's degree in Industrial Engineering from Oklahoma State University in 1965. This summer, she will be interning with Parkland Health and Hospital system in Dallas, TX in the Operations Excellence department. She is especially excited for this opportunity because it provides a chance to use the IEM tools in her belt to advance the capabilities of a healthcare system dedicated to serving low-income members of the community. Starting in August, her internship will end, and she will begin two new chapters of my life: marriage to her best friend Michael Hara and study in the Master's program for Business Analytics and Data Science here at OSU. She is excited to leverage her background in IEM and the new skills she will learn in the Master's program to advance the capabilities of health systems in the United States.

"It's hard to beat a person who never gives up." –Babe Ruth

Student Spotlight

Landon Bakhsh
Undergraduate Student

Landon comes from Tulsa, Oklahoma where he lived with his mother and older brother. Coming from Edison Preparatory High School, he has always pushed himself academically whenever and wherever possible with the trend continuing into college. When not working on classwork or doing papercrafts in his freetime, he is diving headfirst into long-term projects—namely Dreaminq, a student organization he founded on campus that will begin its programming during the Fall 2020 semester. Dreaminq will provide mentor-based support programs to make the opportunity of higher-education the norm, not the exception for high school students across the state of Oklahoma. His passion is to provide opportunity to others and he looks forward to devoting his future to help others realize their own aspirations in life.

"Too many of us are not living our dreams because we are living our fears." –Les Brown

Eric Wright
Master's ETM Distance Education Student

Eric Wright is the Senior Director of Certification and Compliance and a member of the Executive Staff at Piper Aircraft Inc. He has lived and worked for over 8 years in Vero Beach Florida. His position encompasses companywide engineering and production regulatory compliance systems. Eric is a veteran of the US Air Force and served in the Oklahoma Air National Guard. He holds a Bachelor of Science in Mechanical Engineering from The University of Oklahoma and a Graduate Certificate in Engineering Technology Management from Oklahoma State University. Eric enjoys flying, camping with family & friends, motorcycling and bicycling. The ETM program has helped him to develop critical tools, strategies, and processes for business development and leadership.

"If we worked on the assumption that what is accepted as true really is true, then there would be little hope for advance." – Orville Wright

Student Spotlight

Samantha Huckabay
Master's Student

Samantha is a second year Masters Student, graduating this may in Industrial Engineering & Management in the Engineering Management track. Originally from Norman, OK, and with her mom being a Chemical Engineering graduate of OU, Samantha was stirring the pot when she chose to wear orange – not just once, but twice. In May of 2018, Samantha graduated from Oklahoma State with degrees in Aerospace and Mechanical Engineering, and decided she liked the Cowboy family so much that she had to stick around for a third degree.

As an undergraduate student, Samantha was an Ambassador for the College of Engineering, Architecture, and Technology, a Community Mentor for Housing and Residential Life, Vice President of the student chapter of the American Institute for Aeronautics and Astronautics, and a member of the high-power rocketry team. As a graduate student, Samantha has continued to serve as a mentor for AIAA and the rocketry team.

Outside of the classroom, Samantha reads as many books as she can, crochets, and loves to spend time with her rescue pup, Kenzie. After graduation, Samantha is moving to Wichita, KS to pursue a career as a Process Engineer at Textron Aviation – having found a way to marry her undergraduate passion with her graduate talents.

"I would like to be remembered as someone who was not afraid to do what she wanted to do, as someone who took risks alone the way in order to achieve her goals." –Sally Ride

Student Spotlight

Nahid Majlesinasab
Doctoral Student

Nahid Majlesinasab is an IEM doctoral student from Iran. She received her Master's degree in Industrial Engineering from Isfahan University of Technology, Iran, in 2013. She joined the IEM department at OSU in 2015. She is pursuing her Ph.D. under the supervision of Dr. Farzad Yousefian. Her research interests lie in two areas. The first area is motivated by applications in machine learning and signal processing and is focused on designing computational algorithms for solving stochastic convex optimization problems and Nash games. The second area is motivated by applications in healthcare and transportation and is focused on modeling and analysis of facility location problems. Her research has been published in peer reviewed journals such as IEEE Transactions on Automatic Control and Computers and Industrial Engineering. During her time at OSU, Nahid has served as an instructor of the IEM Engineering Economics Analysis course. Currently, she is an intern at the MODE Transportation company working on an Artificial Intelligence-driven lead generation project. In her free time, she enjoys walking, reading history books, and watching documentaries.

"Turn yourself not away from three best things: Good Thought, Good Word, and Good Deed." –Zarathushtra

Alumni Spotlight

Jared Green

Tell us a little bit about yourself.
I live in Owasso, Oklahoma on the Patriot Golf Course with my wife Vanessa and our 3 boys. Vanessa is also an OSU graduate and has worked for ConocoPhillips for 15 years. Our boys are Colton – 9, Aiden – 6 , and Mason – 2. We have lived here since 2007 and intend to stay in Oklahoma. After graduation, I went to work for Accenture for 2 years before transitioning to a technical sales career with Nalco, going from District Rep to Area Manager, District Manager and Corporate Account Manager. After 12 years of sales and sales management, I left Nalco for ChemTreat, a Danaher Company, in April 2019. As our strategic account manager, I am responsible for maintaining and growing our portfolio of refining and chemical plant customers. Our company provides industrial water treatment chemicals and engineering services for cooling, boiler, wastewater, and raw water clarification. In my spare time I am devoted to multiple other businesses that I own. I love real estate and run a small real estate company and cattle ranch along with partners in a hay operation. I love the outdoors and spend all my time watching my kids play golf and soccer and love to play golf myself.

How has your IEM degree helped you?
My IEM degree has helped me tremendously over the years. The idea of "optimization" and how to utilize and optimize anything to its fullest potential is how I approach every situation in life. I have utilized IEM concepts throughout my sales career in optimizing travel schedules to get the most sales calls in or how to optimize a plant's water treatment to deliver the largest cost savings. In my personal life, I analyze every business adventure through the eyes of an IE. IE taught me a way to think, a way to analyze, model, and predict future outcomes. I truly owe a lot to my degree and time at Oklahoma State.

List one or two highlights of your career.
The two biggest highlights of my professional career from a personal standpoint were when I was Sales Rep of the Year for the US and Sales Manager of the Year for the US. Outside of that, my highlights continue and will always be about the people that I have come in contact with and helped mentor their lives. Relationships are the key to life and I believe 100% in them. My biggest professional accomplishments have been the people's lives I've been able to positively impact and seeing what that does for them and their families years later.

What has motivated you to stay engaged with OSU, years after graduation?
A love for OSU, a passion for OSU and what it has provided myself and my family is why I stay engaged. When I sit back and reflect at the blessings I've been provided, I would be remiss to not include OSU and specifically the IEM college as part of those. My family bleeds orange and that fire continues today. I love being a part of future generations success and it's that passion that has kept me motivated to stay engaged.

What do you think the future holds for the IEM student?
As with anything in life, I think the future can hold whatever someone wants it to be, especially for an IEM student. The degree is so well rounded, so versatile that I don't believe it's fully recognized or understood the way it should be. I think one constant in this world is change, the other is advancement, and finally optimization. IEM students should be more prepared than most to deal with these three things. If they learn, utilize, and leverage those basic principles, I think an IEM student will be able to provide value to a company or to their own private business adventure in a big way.

Seminar Series

Fall 2019

Sep. 25: *Physical-Statistical Modeling and Optimization of Complex Systems—Healthcare and Manufacturing Applications*, Dr. Bing Yao, Oklahoma State University

Oct. 9: *Smart Additive Manufacturing Using Advanced Sensing and Data Analytics*, Dr. Chenang Liu, Oklahoma State University

Oct. 16: *Imposing Contiguity Constraints in Political Districting Models*, Hamidreza Validi, Oklahoma State University

Oct. 30: *Control of False Discoveries in Grouped Hypothesis Testing for eQTL Data*, Dr. Pratyaydipta Rudra, Oklahoma State University

Nov. 13: *Data Science for Wind Energy: Power Curve Modeling and Production Performance Analysis*, Dr. Yu Ding, Texas A&M University

Nov. 15: *Criminal Justice in the United States: A Systems Perspective*, Dr. Gerald Evans, University of Louisville

Nov. 20: *Stochastic Mirror Descent Methods for Multi-Agent Systems over Semidefinite Matrix Spaces and High-Dimensional Stochastic Optimization Problems*, Nahid Majlesinasab, Oklahoma State University

Spring 2020

Jan. 15: *Graph Analytics for Streaming Image Date in Smart Manufacturing*, Ashif Iquebal, Texas A&M University

Jan 21: *Improving Human-System Interaction via Physiological Measures*, Dr. Joseph Nuamah, University of North Carolina

Jan. 27: *Using a Bayesian Framework to Develop Gestural Input Systems for Anesthesia*, Katie Jurewicz, Clemson University

Jan. 29: *Towards Smart Sustainable Tolerance Design and Quality Assurance in Additive and Hybrid Manufacturing*, Azadeh Haghighi, University of Illinois at Chicago

Feb. 19: *Paving the Way to the Next-Generation Virtual Lung Model for Personalized Pulmonary Healthcare*, Dr. Yu Feng, Oklahoma State University

Mar. 11: *Creating Flow in High-Mix/Low-Volume Production Environments with POLCA*, Dr. Charlene Yauch, University of Wisconsin-Madison

Industry Advisory Board

Hello OSU IEM Family!

We all have experienced a heck of a start to 2020 and so much has happened since our last meeting in Stillwater. On February 6th and 7th, the IAB conducted our Spring meeting on the beautiful 3rd floor of Engineering North. Below are a few of the highlights/topics that were of focus:

- Great discussion with students about job markets, challenges, and "why IEM"
- Brainstorming ways we can help support legislature for OSU and the funding of higher education
- Reflection of the past 5 years and how the department has improved and grown! Up 91% in the number of BS degrees!
- Educational discussion led by Dr. Kamath around big data and how AI is changing many industries
- Opportunity to mentor and coach the senior design teams on the projects listed below:

The other highlight was meeting with the senior design teams working on the following projects:

Webco Industries: New Facility Economic Decision Analysis and Layout Design

OSU Flight Center: Maintenance Process Improvement and Scheduling

INTEGRIS: Develop Patient/Physician Scheduling Model for Healthcare Clinic

SWEP: Process Improvement to Reduce Rework/Defects

Duncan Ticking: Develop Facility Layout for New Warehouse Space

OK Tourism and Recreation Dept: Operations Model Review and Enhancement

Ameristar Fence: Optimize Distribution Network Plan to Reduce Order Fulfillment Time

CRC-Evans: Analyze Part Refurbishment Process to Enhance Profitability

OSU Foundation: Design Lean Project Management Methodology to Improve Organizational Project Outcomes

While this semester was one for the books, the board continues to be impressed by the caliber of students that are being produced through OSU, especially for this group of seniors who did a great job of rising above the challenges and being flexible to support their clients.

One of the beautiful things about being an IE is the ability to bring order to the chaos. We are all going through challenging times and trying to define what is the new "standard". There is so much data/talk around the pandemic but one thing that keeps coming to mind is people and how they interact. As IE's, we are trained to evaluate these things in work environments but we want to encourage you to evaluate these same concepts in your own life. What changes will you make for the good and what are you looking forward to? As for the IAB, we all can truly not wait to be back on campus together in the fall with our people. Go Pokes!

With warm regards,

The OSU IE&M Industrial Advisory Board

IAB Members

Brian Adams
Textron Aviation

Syam Anthony
Nike, Inc

Kevin Doeksen
American Airlines

Bill Dueease
Findyourcoach.com

Ashley Estes
Zeus Industrial Products

Michael Foss
Caterpillar

Jack Goertz
Tandems, Ltd

Frank Groenteman
TMAC

Steve Kiester
Bell Flight

Ed Pohl
University of Arkansas

Zach Roberts
J.B. Hunt Transport Inc.

Stephanie Royce
Oklahoma State University

G. Satish
Connixt Inc.

Tom Saunders
Pioneer Natural Resources

Brenda Shumate
Williams Companies

Jack Watts
The Portola Company

Jon Womack
Third City Properties

Welcome

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

BS IEM
Hallie Blanton
Jared Crawford
Samantha Harizal
Erin Lewis
Landon Lucas
Aaron McKnight
Lauren Millis
Cameron Oliver
Marco Pina-Perez
Luke Ratke
Brenna Rodgers
Anusha Saraf
Emma Shook
Victoria Smith
Calvin Ward

ETM Certificate
Brooks Dow

MS ETM
Shashi Dulal
Jonathan Smith
Guillermo Taylor
Dejanae Berry
Jared Hindman
Michael Noojin
Brendan Gilligan
Mark Ivey
Stepfanie Shaulis Garrett
Cecilia Herrara Garza
Matthew Curran
Faran Maalik
Paul Gerow
Warren Pettaway
Vignesh Raghuraman
Daniel Shively
Andrea Kacynski
Andrew Restivo
Stephen Shin
Matthew Wiley

MS IEM
Jackson Baker

Congratulations Graduates

OSU held its fall commencement ceremony on December 14, 2019. We would like to congratulate the following IEM students for their hard work and dedication in completing their degree.

BS IEM
Kathryn Fulton
Alexander Pick
Omar Algannas
Tyler Tinker
Aaron Madden
Dylan Rowan
Nathan Green
David Everly
Whitney Fillmore
Molly Day
Jackson Baker
Sarah Moore
Mitchel Loiseau
Justin Hamilton
Ashlynn Hughes
Omar Zain Abeden

ETM Certificate
Julie Blatt
Michael Horowitz
Eric Wright

MS ETM
Benjamin Boswell
Aaron Dixon
Berek Dostie
Levi Edens
Nicholas Gill
Daniel Joseph Mellor
Heath Roberts
Richard Rush
Victor Salum
Eric Sears
Travis Smith

MS IEM
Neeraj Ahuja
Maximillian Reuning

IAB Spotlight

Syam Antony

Syam graduated from OSU's IEM program in December 2004 and earned his MBA from Georgia Tech in 2014. Following graduation from OSU, Syam joined Walmart as an Industrial Engineer and worked at the company for over 13 years. He held various positions within Walmart and learned different parts of the business, from Logistics to Store Operations to Merchandising. Even though he diversified quite a bit, all of his work stayed true to his IE roots, creating process efficiencies and leveraging technology to solve complex business problems.

In 2018, Syam joined Nike where he currently works as Senior Director of Supply Chain Innovation for North America. In this role, he leads a team focused on enabling Supply Chain capacity to meet future demand and continuing to serve the consumer in a sustainable way.

Syam lives in Portland with his wife of 10 years, Elsa, and their two kids, Isabel (age 8) and Elijah (age 6). Syam has a served on the IAB since 2015 and continues to have a strong passion to give back to OSU and help develop future leaders. He specifically enjoys mentoring students to help them make the adjustment to the workforce after graduation and offers advice to develop their careers.

Student Awards

Luke Loughren
Storage Manufacturers Association (SMA) Honor Scholarship, MHEFI, $3,000.

Miranda Almen
Irving M. Footlik, P.E. Memorial Scholarship, MHEFI $2,700.

Abby Revoir
Society of Women Engineers Outstanding Member

Samuel Lewallen
OSU Student Employee of the Year

Matthew Burchard
Expert Crane Honor Scholarship, MHEFI, $2,250.

Ben Burchard
UNEX Manufacturing Honor Scholarship, MHEFI, $2,250.

Hamidreza Validi
Honorary Graduate Commencement Marshal, CEAT

Jackson Baker
2nd Place, IISE South Central Regional Conference Student Paper Competition

NSF CAREER AWARD

Dr. Austin Buchanan

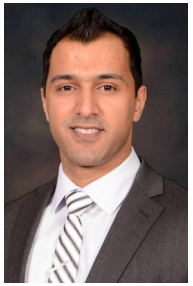
Dr. Austin Buchanan joined OSU IEM as an assistant professor in August 2015. Prior to that, he earned a BS in IEM from OSU and a PhD in Industrial and Systems Engineering from Texas A&M University. He works in operations research, and is particularly interested in network optimization problems that have connectivity or distance constraints. He currently serves as an associate editor for the academic journals Networks and Optimization Letters. He is an active member of INFORMS and has served in leadership roles in the Optimization Society, the Subdivisions Council, and the Section on Telecommunications & Network Analytics. His research is funded by the National Science Foundation (NSF) and private industry.

Beginning in June 2020, Dr. Buchanan will lead a 5-year research project funded by the NSF entitled "CAREER: Parsimonious Models for Redistricting." As part of this project, the research team will develop new integer programming models and methods for designing political redistricting plans. These models will be able to answer questions such as: (1) what is the most compact redistricting plan for a given state? (2) how many counties can be kept whole? (3) how might a redistricting plan ensure minority-opportunity districts? This work will lead to a better understanding of the trade-offs encountered when designing districts and establish politically neutral baselines for comparison.

Faculty Awards

NSF CAREER AWARD

Dr. Farzad Yousefian



Dr. Farzad Yousefian has been an assistant professor in the School of Industrial Engineering and Management (IEM) at OSU since August 2015. Before joining IEM, he was a postdoctoral researcher at Penn State. He received his Ph.D. in Industrial Engineering from the University of Illinois in 2013. His research focus is on the design and analysis of algorithms for addressing large-scale optimization and equilibrium problems arising from machine learning and multi-agent systems.

Dr. Yousefian's research has appeared in leading journals in optimization and control, such as Mathematical Programming, Automatica, and several IEEE journals and conference proceedings. He is a member of Mathematical Optimization Society (MOS), Society for Industrial and Applied Mathematics (SIAM), Institute of Electrical and Electronics Engineers (IEEE), and Institute for Operations Research and the Management Sciences (INFORMS).

Dr. Yousefian has received an NSF Faculty Early Career Development (CAREER) award for his proposal "Advancing Mathematical Models and Algorithms for Decentralized Optimization in Complex Multi-agent Networks". With support from this NSF grant, Dr. Yousefian and his research group aim to advance the state of the art in distributed optimization by development of new models, mathematical tools, and computational methods to address emerging complex multi-agent applications over the next five years. Examples of such applications include distributed remote sensing, decentralized economic dispatch models with renewable energy, and distributed efficiency estimation in transportation networks. This award will also support increasing awareness and interest among high school students in Stillwater, formal and informal educators, and college students through several fully integrated educational and outreach activities.

US News Rankings

US News and World Report has once again recognized the outstanding quality of IEM's programs.

The online graduate MS ETM was ranked #11 among public universities.

US News also ranked IEM among the top 25 graduate programs in industrial/manufacturing/systems among public universities. Among public universities, IEM was ranked number 23, up from number 29 in 2012-13.

Alumni Accolade

Congratulations to IEM alumnus and Cowboy Academy member Dr. Behrokh (Berok) Khoshnevis on his appointment as a Distinguished Professor at the University of Southern California. A member of the National Academy of Engineering, Dr. Koshnevis' scholarship in the fields of robotic and large-scale 3-D building and printing technologies, with its wide range of applications–affordable housing, national infrastructure, and construction in space–is a testament to his career-long efforts toward the betterment of the human condition.

Highlights

Before the rest of the spring semester moved online, our students, faculty and alumni had opportunities to spend time together, gaining knowledge and deepening relationships.

IISE South Central Regional Conference at Wichita State University

Reception in Honor of Graduating Students in the Heragus' Home

Mentoring Lunch with the Industrial Advisory Board

Alpha Pi Mu Induction

The Institute of Industrial and Systems Engineers

The Institute of Industrial and Systems Engineers has had an extremely successful Spring semester! Our organization is a global association committed to connecting students and professionals in the Industrial and Systems Engineering field. Everything we do is centered around creating stronger connections between students and faculty in the School of Industrial Engineering and Management as well as facilitating networking opportunities across the industry and our region. Our mission is to further our IEM undergraduate and graduate students' success in the academic and professional worlds.

Although this semester was cut short, we still hosted our certified Lean Green Belt Training workshop as well as several opportunities for our IEM students to network with our Industrial Advisory Board. Additionally, several of our IISE members had the opportunity to attend the IISE South Central Regional Conference hosted by Wichita State University. This was an exceptional learning opportunity as our IISE chapter will have the privilege of hosting the conference in the Spring of 2021. We are currently working on creating more IISE service opportunities, finalizing a mentorship program that will connect IEM freshmen with seniors, and promoting general membership in our club!

We would like to recognize the students who have worked so hard to make this organization so successful. The officers this academic year are:

- Lane Workman, President
- Matthew Wilkinson, Vice President
- Cole Luetkemeyer, Secretary
- Matt Burchard, Treasurer
- Brittany Grubert, Merchandise Chair
- Mallory Newell, Communications Chair
- Ben Burchard, Recruiting Chair
- Sam Koscelny, Fundraising Chair
- Amrit Chugani, Social Chair
- Brandon McKisick, Mentorship Chair
- Susan Weckler, CEAT Student Council Club Rep Faculty

Faculty Advisor: Dr. Chenang Liu

If you want more information about IISE or want to become a member, please email Brandon McKisick at brandon.mckisick@okstate.edu.

APICS

APICS OSU student chapter aims to provide a training platform for new supply chain enthusiasts by creating a learning environment and building competencies on different supply chain operations and management topics. Our goal is to encourage certifications and provide networking opportunities such that it will create a bridge between academics and supply chain industrial work environment.

The APICS OSU student chapter had successfully organized elections for next term of 2020-2021. In April we had planned to organize an industrial visit and an interactive meeting session with industry experience personnel from The Boeing Company/Spirit AeroSystems, Inc. but due to the pandemic, it was all delayed. We hope our new committee members will organize all the planned tasks as soon as the situation improves. We also encourage students who are looking for professional supply chain certifications like Certified in Production and Inventory Management (CPIM) and Certified Supply Chain Professional (CSCP). Apart from organizing events and certifications, we are constantly in touch with our alumni who are already working in the area of supply chain to build a networking opportunities.

We are currently looking for new students interested in supply chain who can join our student chapter. In this way we hope to extend our horizon and build the supply chain community.

Committee Members (2020-2021):

- Kushal Shah, President
- Siddhiraj Kadam, Vice President-Education and Program Planning
- Vijay Kanase, Vice President-Finance (Treasurer)
- Samrat Meher, Vice President – Membership & Networking

Faculty Advisor: Dr. Tieming Liu

INFORMS

The Institute for Operations Research and the Management Sciences (INFORMS) is the world's largest professional association dedicated to and promoting best practices and advances in operations research, management science, and analytics to improve operational processes, decision-making, and outcomes. The Oklahoma State University Student Chapter of INFORMS is a student-led campus organization focused on promoting student learning and professional advancement with fellow students and faculty within the field of operations research and 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. Activities done by INFORMS Student Chapter in Spring 2020 before COVID-19 quarantine were:

- Hosting the seminar series
- Social gathering of graduate students

The INFORMS student chapter advisor is **Dr. Juan Borrero** and the Spring 2020 student officers are:

Hosseinali Salemi, President
Wuyang Qian, Vice President

If you have any questions or would like to connect with the student chapter, please feel free to email Hosseinali Salemi at hosseinali.salemi@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 and atmosphere to facilitate social interactions between students and faculty. Being a part of Alpha Pi Mu gives individual scholarship and volunteer opportunities. The society is open to juniors, seniors, and graduate students who meet the membership requirements. For more information about Alpha Pi Mu, you can visit their new website at apm.okstate.edu

Faculty Advisor: Dr. Manjunath Kamath

Smart Additive Manufacturing Using Data Analytics and Closed-loop Control

Dr. Chenang Liu
Assistant Professor

From: Liu, C., Law, C., Roberson, D., & Kong, Z. (2019). Image analysis-based closed loop quality control for additive manufacturing with fused filament fabrication. Journal of Manufacturing Systems, 51, 75-86.

Additive manufacturing (AM), also known as 3D printing, refers to a family of manufacturing processes that fabricates the product in a layer-by-layer fashion [1]. As an emerging technology, it has great potential in a large variety of applications, such as aerospace, automotive industry and healthcare [2]. Nowadays, various technologies, such as fused filament fabrication (FFF), selective laser sintering (SLS), and stereolithography (SLA), can implement AM processes using different kinds of materials [3]. With the rapid development of AM, more products with complex geometries and novel materials can be fabricated effectively.

However, despite promising potential, one of the major challenges in the AM industry is how to ensure product quality and consistency by minimizing or eliminating the defects, which otherwise can severely deteriorate the quality of AM components and even the sustainability of AM technology. Although optimizing machine parameter settings offline and post-processing of AM products such as polishing and machining can improve the quality, the effects may be still limited, particularly for the parts with complex geometries.

To ensure the quality of AM parts, an effective real-time in situ closed-loop quality control system for AM processes is needed to diagnose the defects and adjust the machine parameters automatically to mitigate defects. Currently the rapid-growing sensor technology is capable of generating a massive amount of in-process data, which provides an excellent opportunity to address this challenge. Therefore, this research developed an image analysis-based online closed-loop quality control

approach, which was applied to a fused filament fabrication (FFF) based AM platform.

In this research, a desktop FFF 3D printer with a developed online image acquisition system was used to conduct the experiments (see Figure 1). The image acquisition system consists of two digital microscopes with an adjustable sampling frequency, which were mounted near the extruder of the 3D printer to collect high quality images of the surface of the printed part. Then based on the developed experimental platform, the proposed research methodology for online defect detection and mitigation consists of three major steps:

1. Experimental design study: the relationship between the selected common surface defects in FFF and machine parameters was investigated using experimental design;

2. Online defect diagnosis approach based on image data analysis and machine learning: an image textural analysis-based feature extraction and classification algorithm was developed for online surface defect recognition;

3. Online defect mitigation strategy: a closed-loop online quality control approach for automatic machine parameter adjustment was implemented to mitigate the occurring defects.

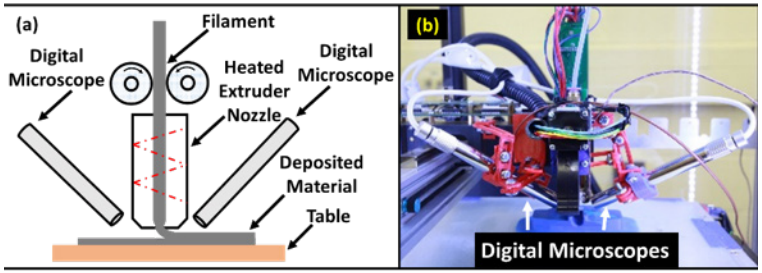


Figure 1: *The developed image acquisition system for online closed-loop quality control*

To verify the performance of the developed image-based closed-loop quality control method for online automatic machine parameter adjustment, two case studies for the commonly occurred surface defects in FFF are performed. The first case is for the flow rate-caused defects. During printing, the desired flow rate and actual setting may not be consistent. In this case, 50% under-fill defects are generated. After running the developed closed-loop quality control system, the surface quality appears to return to normal after an additional 30-40 seconds of printing based on the adjustment of flow rate (see Figure 2a). The second case is for the cooling system caused defects. In practice, the low temperature of nozzle will cause that the filament cannot be fully melted and extruded. In this case, the optimal temperature target is 230oC and the real-time temperature of the nozzle is also measured as verification. The result indicates that the system correctly identifies the type of defects and the temperature comes back to the optimal target with a better printing quality in a short time (see Figure 2b).

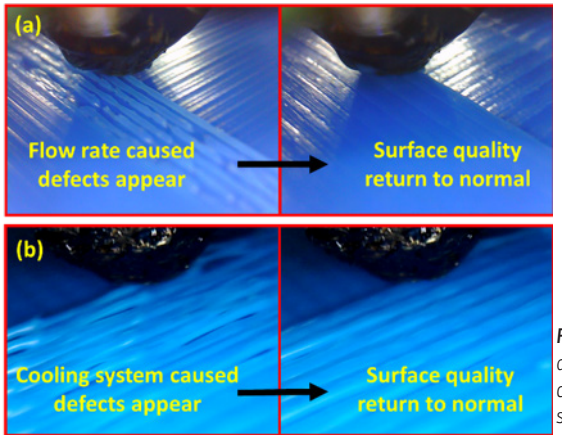


Figure 2: *Performance demonstration of the developed closed-loop quality control system.*

In summary, our research developed an image analysis-based online defect mitigation approach for an AM process, in which the machine parameters can be online adjusted automatically once detects occur. As a preliminary work for online closed-loop quality control system development in AM process, the results demonstrate that this research direction is quite promising for significant improvement of the quality of AM parts.

References:

[1] *Standard terminology for additive manufacturing technologies*, 2012.

[2] C. Beyer, "Strategic implications of current trends in additive manufacturing," *Journal of Manufacturing Science Engineering*, vol. 136, no. 6, 2014.

[3] I. Gibson, D. W. Rosen, and B. Stucker, *Additive manufacturing technologies*. Springer, 2014.

Research Grants

Active in 2018-2020

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.S. Heragu**, FLAT: Freight Lane Assignment Tool, Tree-House Foods, Inc., 1/13/2020–8/16/2020, $163,730.

B. Balasundaram, **A. Buchanan**, and **S.S. Heragu**, Optimization-Based Aggregate Master Planning Tools for Bay Valley Foods, LLC, Bay Valley Foods, LLC, 10/1/2017–9/30/2018, $250,599.

J. Borrero and L. Lozano, Modeling Worst-case Defender-Attacker Problems as Robust Linear Programs with Mixed-Integer Uncertainty Sets, Office of Naval Research, 05/01/19 - 02/30/22, $300,000.

A. Buchanan, CAREER: Parismonius Models for Redistricting, National Science Foundation, 6/1/2020 – 5/31/2025, $500,000.

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

S.S. Heragu and R. Wilson (PIs), The Conoco Phillips/OSU Data Analytics Collaboration, ConocoPhillips, 7/1/19 - 6/30/22 $670,000.

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.

M. Kamath, **F. Yousefian**, and S. Frazier, Using HazMat Flow Analyzer and Risk Assessment Tools to Support Emerency Resource Planning and HazMat Training Activities in Oklahoma, Oklahoma Department of Emergency Management, 10/1/2019 - 9/31/2020, $131,341.

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

T. Liu, W. Paiva and Ye Liang. "Validating a clinical decision support algorithm developed with big data to diagnose, state, prevent, and monitor a patient's diabetic retinopathy," OCAST, 8/1/2018 - 7/31/2020, $90,000.

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.

F. Yousefian, "CAREER: Advancing Mathematical Models and Algorithms for Decentralized Optimization in Complex Multi-agent Networks", National Science Foundation, 3/1/2020 – 2/28/2025, $500,000.

Journal Publications

Papers published or accepted in 2018-2020

F. Nasirian, F. Mahdavi Pajouh, and **B. Balasundaram**. Detecting a most closeness-central clique in complex networks. *European Journal of Operational Research*, 283(2):461–475, June 2020.

Z. Miao and **B. Balasundaram**. An ellipsoidal bounding scheme for the quasi-clique number of a graph. *INFORMS Journal on Computing*. To appear in 2020.

J. Ma and **B. Balasundaram.** On the chance-constrained minimum spanning k-core problem. *Journal of Global Optimization*, 74(4):783-801, 2019.

S. Sun, Z. Miao, B. Ratcliffe, P. Campbell, B. Pasch, Y. A. El-Kassaby, **B. Balasundaram**, and C. Chen. SNP variable selection by generalized graph domination. *PLOS ONE*, 14(1):1–18, 2019.

Y. Lu, E. Moradi, and **B. Balasundaram**. Correction to: Finding a maximum k-club using the k-clique formulation and canonical hypercube cuts. *Optimization Letters*, 12(8):1959–1969, 2018.

E. Moradi and **B. Balasundaram**. Finding a maximum k-club using the k-clique formulation and canonical hypercube cuts. *Optimization Letters*, 12(8):1947–1957, 2018.

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*. Accepted for Publication.

J.S. Borrero, O.A. Prokopyev, D. Saure, Sequential interdiction with incomplete information and learning. *Operations Research*, 67(1): 72-89, 2019.

H. Salemi and **A. Buchanan**. Parsimonius formulations for low-diameter clusters. *Mathematical Programming Computation*. Accepted for Publication.

H. Validi, **A. Buchanan**. The optimal design of low-latency virtual backbones. *INFORMS Journal on Computing*. Accepted for Publication.

H. Validi, **A. Buchanan**. A Note on "A linear-size zero-one programming model for the minimum spanning tree problem in planar graphs". *Networks*, 73(1): 135-142, 2019.

J.L. Walteros, **A. Buchanan**. Why is maximum clique often easy in practice? *Operations Research*. Accepted for Publication. Honorable Mention in the 2019 JFIG Paper Competition.

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

O. Battaia, A. Dolgui, **S.S. Heragu**, S.M. Meerkov, and M. K. Tiwari, Design for manufacturing and assembly/disassembly: joint design of products and production systems, *International Journal of Production Research*, 56(24): 7181-7189, 2018.

Srivathsan, S. and **M. Kamath**, Understanding the value of upstream inventory information sharing in supply chain networks, *Applied Mathematical Modelling*, 54:393-412, 2018.

Ma, J., Y.T. Leung, and **M. Kamath**, 2019, Service system design under uncertainty: Insights from an M/G/1 model, *Service Science*. 11(1):40-56, 2019.

C. Liu, A. Law, D. Roberson, and Z, Kong, Image analysis-based closed loop quality control for additive manufacturing with fused filament fabrication. *Journal of Manufacturing Systems*. 51: 75-86, 2019

J. Liu, **C. Liu**, Y. Bai, P. Rao, Z. Kong, and C. Williams, Layer-wise spatial modeling of porosity in additive manufacturing. *IISE Transactions*. 51(2):109-123, 2019.

C. Liu, A. Kapoor, J. VanOsdol,K. Ektate, Z. Kong, and A. Ranjan, A spectral fiedler field-based contrast platform for Imaging of nanoparticles in colon tumor, *Scientific Reports*. 8(11390):1-8, 2018.

Gupta, A., **T. Liu**, C. Crick. 2020. Utilizing Time Series Data Embedded in Electronic Health Records to Develop Continuous Mortality Risk Prediction Models using Hidden Markov Models: A Sepsis Case Study. Accepted by ***Statistical Methods in Medical Research***.

Hariharan S., **T. Liu**, M. Z. Shen. 2019. Role of Resource Flexibility and Responsive Pricing in Mitigating the Uncertainties in Production Systems. Accepted by ***European Journal of Operational Research***.

S. Piri, D. Delen, **T. Liu**, 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.

S. Piri, D. Delen, **T. Liu**, W. Paiva, 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.

A. Gupta, **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.

Y. Zhou, **T. Liu**, C. Zhao. Backup capacity coordination with renewable energy certificates in a regional electricity market. *IISE Transactions*, 50(8): 711– 719, 2018.

Zhou, Y., **T. Liu**, G. Cai. Impact of In-store Promotion and Spillover Effect on Private Label Introduction. ***Service Science***, 11(2), 96 – 112, 2019

S. Babaei, C. Zhao, L. Fan, **T. Liu**. Incentive-based coordination mechanism for renewable and conventional energy suppliers. *IEEE Transactions on Power Systems*, 34(3): 1761-1770: 2018.

A. Gupta, **T. Liu**, S. Shepherd. 2019. Clinical decision support system to assess the risk of sepsis using tree augmented Bayesian networks and electronic medical record data. *Health Informatics Journal*. Published Online 13 Jun 2019.

B. Yao, C. McLean, and H. Yang, Robust optimization of dynamic route planning in same-day delivery networks with one-time observation of new demand. *Networks*, 73(4): 434-452, 2019.

F. Imani, **B. Yao**, R. Chen, P. Rao, and H. Yang, Joint multifractal and lacunarity analysis of image profiles for manufacturing quality control. *ASME Journal of Manufacturing Science and Engineering*, 141 (4): 044501, 2019.

B. Yao and H. Yang, Constrained Markov Decision Process modeling for sequential optimization of additive manufacturing build quality. *IEEE Access*, 6 (1): 54786-54794, 2018.

B. Yao, F. Imani, and H. Yang, Markov Decision Process for image-guided additive manufacturing. *IEEE Robotics and Automation Letters*, 3(4): 2792-2798, 2018.

B. Yao, F. Imani, A. Sakpal, E. W. Reutzel and H. Yang, Multifractal analysis of image profiles for the characterization and detection of defects in additive manufacturing, *ASME Journal of Manufacturing Science and Engineering*, 140 (3): 031014, 2018.

R. Zhu, **B. Yao**, F. Leonelli, and H. Yang, Optimal sensor placement for space-time potential mapping and data fusion, *IEEE Sensors Letters*, 3 (1), 2018.

F. Yousefian, A. Nedich, and U.V. Shanbhag, On stochastic and deterministic quasi-Newton methods for non-strongly convex optimization: Asymptotic convergence and rate analysis, *SIAM Journal on Optimization*, to appear, 2021.

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*, 26 (4), 789-819, 2018.

D. Newton, **F. Yousefian**, R. Pasupathy, Stochastic gradient descent: recent trends, *INFORMS Tutorials in Operations Research*. Published Online: 19 Oct 2018; 193-220.

N. Majlesinasab, **F. Yousefian**, A. Pourhabib, Self-tuned stochastic mirror descent methods for smooth and nonsmooth high-dimensional stochastic optimization. *IEEE Transactions on Automatic Control*, 64 (10), 4377-4384, 2019.

The Cowboy Academy

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

As we all know, it has been a crazy start to the year but the Cowboy Academy committees have been hard at work! The Academy has recurring administrative committees and committees focused on advancing the IEM program. They have been working to move our organization forward throughout the Spring.

The Career Opportunities Committee was formed to help graduates enhance their future thereby enhancing the OSU IEM program's national rankings; student and parent satisfaction; and faculty rewards. The committee has initially been focused in two areas: 1) Providing substantive webinars to students and graduates as an educational tool and open a dialogue with IE's in industry; 2) Developing an ACTIVE mentoring program for seasoned IE's to work primarily with students and some recent graduates to provide a more intimate coaching and sounding board experience. Preparation for the webinars continues and the first webinars will likely occur in Fall 2020. The mentoring program was co-developed with TCA and a Fall 2019 Senior Design group. A pilot version of this program will be launched in May 2020.

The Fundraising Committee was formed to coordinate and assist "friends of the program" in providing financial support individually, and through the active pursuit of business contributions to enhance the overall financial strength of the school providing maximum operating flexibility. As you can imagine, fundraising can be a delicate and daunting task–many of the program's "friends" are approached regularly for support from various causes within and outside the University. The committee's first priority was to establish strong coordination and planning with the OSU Foundation which already works with many of the people who can support the program. The coordination effort between the two has been excellent and has assisted TCA prepare a framework for moving our financial support objective forward. Now that the committee has established a clear framework to operate within, its current work is putting together reasonable and achievable goals which tie directly back to the Academy's Mission and a plan to achieve them.

Additional progress of note, over the past year, the Marketing Committee has been developing multimedia content to connect with and attract new students and faculty. The product is solid but now needs to be "pushed" into the social media platforms and other opportunities for advertisement. The Academy has decided to hire a part time temporary marketing intern to work together with the department to coordinate and manage a targeted campaign. The hiring process is underway and we expect the intern to begin in June 2020. Also, the Center of Excellence Committee has been working with the Governor's office and the OSU Riatta Center to develop a strategy to assist in our objective of Fostering a unique and beneficial partnership between the business community and OSU IEM. The expectation is that by September 2020, the committee will have enough information and consideration to provide a clear strategy.
On the administrative front, the Academy recently nominated, appointed, and confirmed Jack Goertz to be the President Elect. Jack's term will begin September 2021. As President, I am ecstatic to have Jack on the team. Thanks to the Nominating Committee for their hard work to get this position filled. The Membership Committee has been hard at work recruiting nominations for new TCA members. The committee has faced some early challenges such as an incomplete Alumni database and finding qualified candidates. However, recently several solid candidates have been submitted for review. We are looking forward to connect with the new Academy members in September. The Finance Committee has been working to establish a budget and an improved and more intuitive membership dues/statement process.

There are many moving parts within the Academy–a group of people who selflessly have decided to give back to a program that has made a substantial contribution to their success. I am proud to be connected with this team and look forward to the fruit of our efforts very soon.

In service to the program,
Mitch Myers
President, The Cowboy Academy

Board Members

Tom Britton
Bill Dueease
Laura Easley
Jack Goertz
Jeff Greer
Dave Hartmann
John Lewis
Mitch Myers
Brenda Shumate
Leva Swim
Stacie Wrobbel

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President-Elect
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Tom Britton, *Treasurer*

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Leland Blank
David Boyer
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Megan Crozier
Jerry Dechert
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Behrokh Khoshnevis
William Kolarik
David Kyle
John Lewis
Rasaratnam Logendran
Gary Maxwell
Neal McCollom
Mitch Myers
David Nittler
Ron Orr
Kent Powers
David Pratt
Stephanie Royce
Allen Schuermann
Brenda Shumate
Ting Nee Su
Leva Swim
Lyndon Taylor
Silvanus Udoka
Gregory Watson
Randy Watson
Jack Watts
Rick Webb
Lawrence Whitman
Marion Williams
Eric Woodroof
Stacie Wrobbel

Spring 2020 Senior Design Teams

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.

Ameristar Fence Team:

Hunter West
Christopher Looney
Christopher Clark
Elizabeth Bunting

Faculty Mentor:
Dr. Tieming Liu

IAB Mentor:
Tom Saunders

CRC-Evans Team:

Victoria Stow
Justin Paxson
Ibrahim Abuemah
Nathan Echols

Faculty Mentor:
Dr. Yousefian

IAB Mentor:
Brian Adams

Duncan Ticking Team:

Brett Mallon
Derek Dixon
Macie Hull
Alex Cannon

Faculty Mentor:
Dr. Heragu

IAB Mentor:
Frank Groenteman

INTEGRIS Team:

Kasey Hendrick
Saud Alotaibi
Erin Kraft
Lauren Lenaburg

Faculty Mentor:
Dr. Borrero

IAB Mentor:
Jack Watts

OSU Flight Center Team:

Rylee Hunter
Jennifer Fallon
Charles Robson
Brittany Grubert

Faculty Mentor:
Dr. Baski Balasundaram

IAB Mentor:
G Satish

OSU Foundation Team:

Madison Rundell
Swapnil Gajjar
Paula Sarmiento Henicke

Faculty Mentor:
Dr. Glenn

IAB Mentor:
Steve Kiester

Oklahoma Tourism & Recreation Department Team:

Molly Cannon
Cora Watts
Cristina Montemayor Garcia
Mahdi Alzaki

Faculty Mentor:
Dr. Hardin

IAB Mentor:
Ashley Estes

SWEP Team:

Lane Workman
Breonna Sattre
Cade Timmons

Faculty Mentor:
Dr. Chenang Liu

IAB Mentor:
Brenda Shumate

Webco Industries Team:

Samuel Lewallen
Evan Rackley
Allison Hines
Michaela Reimonenq

Faculty Mentor:
Dr. Kamath

IAB Mentor:
Syam Antony

IEM Faculty

Dr. Baski Balasundaram
Wilson Bentley Chair and Associate Professor

Dr. Juan S. Borrero
Assistant Professor

Dr. Austin Buchanan
Assistant Professor

Dr. Terry Collins
Associate Professor

Dr. Camille DeYong
Associate Professor
Undergraduate Program Director

Dr. Jennifer Glenn
Teaching Assistant Professor

Dr. Tim Hardin
Teaching Assistant Professor

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

Dr. Manjunath Kamath
Professor

Dr. Chenang Liu
Assistant Professor

Dr. Tieming Liu
Associate Professor
Graduate Program Director

Dr. Bing Yao
Assistant Professor

Dr. Farzad Yousefian
Assistant Professor

IEM Staff

Laura Brown
Senior Financial Assistant
Administrative Support Supervisor

Mya Jackson
Student Worker

Valerie Quirey
Graduate Programs Coordinator

Cara Sides
Student Worker

Matt Taylor
IEM Undergraduate Academic Advisor

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