

OPTIMUM

**UH DEPARTMENT OF
INDUSTRIAL ENGINEERING**

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Department of Industrial Engineering

Letter from the Chair



Dear Alumni and Friends of the UH IE Department,

I am proud to highlight the many exciting accomplishments of the UH IE community.

Our department offers excellent educational programs for students who are interested in careers that apply mathematical knowledge to improving system performance. Both of our undergraduate and graduate programs are highly ranked in various national rankings, including U.S. News and World Report. Our undergraduate program has been successfully producing highly trained smart female engineering students. The newly revamped Masters in Engineering Management program has been attracting many local talent.

Our faculty and staff are dedicated to serving students and working for their success. Our world-renowned faculty members work on cutting-edge research in data analytics, optimization, reliability, health, energy, homeland security, manufacturing, supply chain and safety engineering. They collaborate with strategic partners in the Texas Medical Center and other private industry members in the Greater Houston area.

Thank you for being a friend of the UH IE Department. I look forward to hearing from you and seeing you at upcoming departmental, college and University events!

Warm Regards,

Gino J. Lim, Ph.D.

Professor & Chair
Department of Industrial Engineering
Cullen College of Engineering
University of Houston

UH IE BY THE NUMBERS

#48

Best Industrial Engineering Program in the U.S.

(Source: U.S. News and World Report)



Best Engineering Program of **2020**



22:1

 University-wide Student to Faculty Ratio

80%

of UH Engineering Undergrads are Employed Within

1

Year of Graduation

133 + 105 = 238

Graduate Students

Undergraduate Students

Total Students

CORE RESEARCH AREAS:

- Medical Decision Making
- Homeland Security, Port Security
- Energy
- Reliability and Maintenance
- Logistics and Transportation, Supply Chain
- Manufacturing

UH ENGINEERING BUILDING NAMED

for Prominent Industrial Engineering Alumnus in Honor of Recent Gift



An engineering building at the University of Houston has been renamed the Durga D. and Sushila Agrawal Engineering Research Building in recognition of a gift that is providing ongoing support for faculty, students, research and building operations.

The \$51 million building, which opened in 2017, already had a floor named for the couple. **Durga D. Agrawal (M.S. '69, Ph.D. '74)**, founder of Piping Technology & Products Inc., is a member of the University of Houston System Board of Regents and a former member of the Texas Higher Education Coordinating Board. After arriving in Houston from India in 1968 with a bachelor's degree in mechanical engineering from the Delhi College of Engineering, Agrawal earned a master's degree and a Ph.D. in industrial engineering from the UH Cullen College of Engineering.

Agrawal's message to Cullen College students is "to always be optimistic; one can achieve any goal with hard work, persistence and determination. As alumni, we must keep the torch of knowledge, excellence and innovation growing and glowing."

Joseph W. Tedesco, Elizabeth D. Rockwell Dean of the Cullen College, said the gift's impact "will be nothing short of transformational."

"It will allow us to expand and enhance our laboratory and classroom facilities, recruit some of the world's greatest engineering minds as students and faculty members, and develop new and innovative academic programs," he said. "This gift will boost our capacity to conduct research that directly impacts the quality of life across the greater



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UH IE ALUMNUS LEADS UHCL'S COLLEGE of Science and Engineering



UH Cullen College of Engineering alumnus **Miguel A. Gonzalez** ('83, MSIE '85, Ph.D. IE '95) recently took the helm as the new dean of the College of Science and Engineering at University of Houston-Clear Lake. He will also serve as a professor of engineering. Accepting the appointment brought Gonzalez full circle to his roots. For him, his new job is more of a homecoming.



Through these activities, he fostered university partnerships with existing and developing industries — something he also wants to do at University of Houston-Clear Lake.

Gonzalez eventually became an endowed professor, dean of UTPA's College of Engineering and Computer Science, and associate vice president for research at what is now the UT Rio Grande Valley — a result of UTPA's 2015 merger with UT Brownsville.

He brings all this vast and diverse experience to his position at UHCL with the aim of making a difference. He wants the college to support students, the institution and the surrounding community by building on existing programs and forging new partnerships to make the most of opportuni-

Gonzalez earned his bachelor's and master's degrees in industrial engineering, as well as his Ph.D. in the same discipline, from the UH Cullen College of Engineering. It's also where he got the teaching bug after working as a teaching fellow during 1983-85. He served as an instructor of industrial engineering 1986-88 and 1993-95, and then as a visiting assistant professor for part of 1995 at the Cullen College. From 1986 to 1994, Gonzalez joined the family business Citro Mexico, one of Mexico's largest citrus processing operations. There, he served in various roles, rising to the position of Citro Mexico's president and chief corporate executive officer. He also served as assistant professor of industrial and systems engineering at the University of Memphis from 1996 to 1998.

Prior to joining University of Houston-Clear Lake, Gonzalez spent 20 years at the University of Texas Rio Grande Valley — and its legacy institution, The University of Texas - Pan American in Edinburg. He first served as an assistant professor and then director of UTPA's manufacturing engineering program. Later, Gonzalez was involved in several initiatives in the community, including serving as director of the Rio Grande Regional Center for Innovation and Commercialization.



MITIGATING DISASTER:

Paper on Mass Evacuation Receives International Recognition

Industrial engineers make things and systems better for people. In **Gino Lim's** case, it can involve reliable mass evacuation planning in situations of critical emergencies. According to Lim, who is a professor and the chair of the Industrial Engineering Department at the UH Cullen College of Engineering and Hari and Anjali Agrawal Faculty Fellow, a reliable evacuation plan is key to successful mass evacuation.

Lim, his doctoral student **Ayda Darvishan** and his former doctoral student **Mukesh Rungta** (MSEE '09, Ph.D. IE '12), now with the international company AirLiquide, have been working with engineers at the city of Houston and Texas Transportation Institute to better understand traffic congestion triggered by mass evacuation in the Greater Houston area.

Their work has resulted in a paper that was published by the Institute of Industrial and Systems Engineers (IISE) in two of its prestigious publications. It appeared in the June 2019 issue of *IISE Transactions* and was also featured in the Research section of the institute's Industrial and Systems Engineer magazine.

Titled "A robust chance constraint programming approach for evacuation planning under uncertain demand distribution," the paper focuses on an evacuation planning problem where the number of actual evacuees (demand) is unknown. It then develops a comprehensive network flow-based evacuation planning approach to address demand uncertainty not only for the case that mean and variance of demand distribution are known, but also for the case that additional information — such as the demand uncertainty with symmetry and/or support information — are available.

Using this additional information, the authors prove that tighter bounds can be achieved on evacuation clearance time while providing an optimal evacuation plan with essential information like route selection, time to evacuate and how many cars should each evacuation path accommodate at each time interval during the course of evacuation.

UH INDUSTRIAL STUDENTS

Apply Their Skills to Health Care



A collaboration between the University of Houston and the Harris Health System Center for Innovation offered undergraduate and graduate students with the UH Department of Industrial Engineering department an opportunity to help solve a real-world problem in a hospital emergency center.

Suresh Khator, professor of industrial engineering and associate dean for graduate programs and computing facilities in the UH Cullen College of Engineering, and Dr. Stephen Spann, founding dean of the UH College of Medicine, were recognized at the Harris Health System Innovation Summit for a project to improve the flow of psychiatric patients through the emergency center at Ben Taub Hospital.

Khator said the project grew from conversations between Spann and Harris Health executives and began last fall with undergraduate students in his simulation science class studying patient flow and talking with hospital staff to understand how things worked. Areas of study included searching for bottlenecks and ways to increase efficiency and productivity.

Graduate students from Khator's class have continued the project. According to **Poria Dorali**, a doctoral student in industrial engineering, he and other graduate students have gathered patient information and other data, as well as spent time in the waiting room and outside the hospital, observing and talking with patients. The information will be added to a computer model, allowing them to incorporate proposed changes — adding a staff member, for example, or combining some functions — to determine the impact.





2019 INDUSTRIAL ENGINEERING

Alumni Banquet

On April 25, the UH Cullen College's industrial engineering (IE) department hosted its annual Honors and Awards Banquet at the UH Hilton. The formal affair brought together IE students, alumni, faculty and staff to celebrate the outstanding achievements made by students with scholarships and awards.

Department Chairman Gino Lim welcomed guests with opening remarks and provided department updates. UH Board of Regents member, Durga D. Agrawal (M.S. '69, Ph.D. '74), served as the keynote speaker for the evening. The event also recognized outstanding staff and faculty members in the department.

John Vasek, UH Institute of Industrial Engineers student chapter treasurer, recognized instructional associate professor Taewoo Lee with the Outstanding Teacher Award. Instructional assistant professor, Yaping Wang, welcomed IE student chapter officers and introduced the new 2019-2020 officers for the organization.

The event was sponsored by Cintas, Tenaris and the UH Cullen College of Engineering.



Meet the 2018-2019 Honorees:

Brij & Sunita Agrawal Scholarship

Poria Dorali
David Luo
Shengbin Wang

Dr. Ben Amaba Scholarship

Tue Tran

Durga & Sushila Agrawal Scholarship

Navid Ahmadian
Ayda Darvishan
Saba Ebrahimi
Chunhui Ji
Sachin Kathiriya
Dan Qiao
Vishal Sachdeva
Harsh Shah
Andrew Smith
Maryam Torabbeigi

George & Myrajane Hall in IE Scholarship

Rosangel Limongi Cifelli

Prem Dewan Scholarship

Anishkumar Patel

PVF Roundtable Scholarship

Celine Gebara
Layal Hajou
Karla Grimas Teira

Sam Scharff Scholarship

Michele George
Christian Grant
Shalini Lakshmi

Shoaleh Shirvani Nosrati & Asghar Nosrati Endowed Scholarship

Zahed Shahmoradi

Outstanding Graduate Teaching Assistant-Award Finalists

Navid Ahmadian
Poria Dorali
Amanda Khem
Zahed Shahmoradi

Outstanding Teacher Award

Dr. Taewoo Lee

TAEWOO LEE

Awarded Two NSF Grants to Improve Health Care Delivery



Taewoo Lee, assistant professor of industrial engineering at the UH Cullen College of Engineering, was awarded two grants to address critical issues in health care by the National Science Foundation.

The first grant, totaling \$254,672, will support Lee's studies on making eye care more accessible to at-risk patients with diabetic complications. Lee's direct portion of the grant totals \$169,792. The project, titled "Collaborative Research:

Optimal Design of a Teleretinal Screening Program for At-Risk Patients," will aim to develop a comprehensive, quantitative modeling framework for an optimal design of a teleretinal screening program from both societal and an individual patient's perspectives. The ultimate hope is that the results of research will provide insights into how clinical guidelines can adapt to advances in retinal imaging and how the resources can be shifted to high-risk population in the next-generation of DR screening systems.

The second grant will fund a project titled, "Performance Incentives for Organ Transplantation Centers". The total funding for the project is \$386,251, of which \$84,880 is allocated to Lee, who is the lead UH investigator. The project's goal is to ensure more effective use of donor transplant organs. The hope is to gain a deeper understanding of current pay-for-performance initiatives in the transplantation system and in other healthcare settings by examining the interplay between societal goals and provider incentives. This research will build a bilevel optimization framework to model the interaction between the societal perspective and the goals of individual transplant centers to determine incentives that simultaneously maximize societal and center-level benefits. This framework (1) formulates the societal perspective (the leader) that quantifies the utility-adjusted, national benefit and determines societal-



ly optimal incentive parameters, and (2) models each transplant center's perspective (the followers) as a sequential, stochastic decision-making problem so as to maximize its transplant volume subject to the societal incentives. By aligning the different views and agendas, and smartly designing systems to make better, more efficient processes, patients will be able to experience a higher level of care.





Inspired by Hollywood's 'Deepwater Horizon,' RESEARCHER TARGETS EQUIPMENT

Deepwater Horizon, the worst oil spill in U.S. history, was caused by a mix of factors including human error, confusing policies and equipment failure. According to a New York Times article, poor maintenance and disregarded inspection schedules was part of the problem. The 2016 movie of the same name inspired **Qianmei (May) Feng**, a UH Cullen College associate professor of industrial engineering, to try to make a difference. She realized that her research about failure analysis, failure time prediction, reliability modeling and maintenance work could be applied to drilling equipment that operate in harsh and dynamic environments. As a result, Feng was awarded \$627,102 for a four-year research project from the National Science Foundation to explore equipment failures in capital-intensive industries, specifically the oil and gas industry, to come up with better models for maintain-

ing equipment and reducing failures. Feng and her team are working with Schlumberger, American Bureau of Shipping (ABS) and General Electric (GE) on the project.

Feng hopes the research project will provide insight about how to predict the failure time of equipment from signs of fatigue or other degradation signals, so that the problem can be addressed before the equipment breaks. She also hopes to help find definitive answers on when and what preventive action — such as an inspection or a part replacement — should be taken. All this information should help achieve greater efficiencies and help extend the equipment life while creating a safer work environment.

DEPARTMENT OF INDUSTRIAL ENGINEERING

Selected IE Faculty Publications

FENG, QIANMEI PUBLICATIONS

Hu, L., Zhou, M., Xiang, F., Feng, Q., Modeling and Recognition of Steel-Plate Surface Defects Based on a New Backward Boosting Algorithm, *The International Journal of Advanced Manufacturing Technology*, 94(9-12): 4317-4328, February 2018.

Rafiee, K., Feng, Q., Coit, D.W., Reliability Analysis and Condition-based Maintenance for Failure Processes under Degradation-Dependent Hard Failure Threshold. *Quality and Reliability Engineering International* 33(7): 1351-1366, November 2017.

Xiang, Y., Zhu, Z., Coit, D.W., Feng, Q., Condition-based Maintenance under Performance-based Contracting. *Computers & Industrial Engineering*, 111: 391-402, September 2017.

M. Zhou, L. Kong, L. Xie, T. Fu, G. Jiang, Q. Feng, Design and Optimization of Non-circular Mortar Nozzles Using Finite Volume Method and Taguchi Method. *International Journal of Advanced Manufacturing Technology*, 90(9), 3543-3553, June 2017.

Rafiee, K., Feng, Q., Coit, D.W., Reliability Assessment of Dependent Competing Risks with Generalized Mixed Shock Model. *Reliability Engineering & System Safety*, 159:1-11, March 2017.

M. Zhou, L. Kong, L. Xie, T. Fu, G. Jiang, Q. Feng, Design and Optimization of Non-circular Mortar Nozzles Using Finite Volume Method and Taguchi Method. *International Journal of Advanced Manufacturing Technology*, 90(9), 3543-3553, May 2017.

Xiang, Y. Coit, D.W., Feng, Q., Zhu, Z., Condition-based Maintenance under Performance-based Contracting. Submitted to *Computers & Industrial Engineering*. (Accepted, July 25, 2017)

Rafiee, K., Feng, Q., Coit, D.W., Reliability Assessment of Dependent Competing Risks with Generalized Mixed Shock Model. *Reliability Engineering & System Safety*, 159:1-11, March 2017.

KAMRANI, ALI PUBLICATIONS

Kamrani, Ali K.; Abouel Nasr, Emad; Al-Ahmari, Abdurahman Mushabab; Moiduddin, Khaja; Al Kindi, Mohammed; "A Digital design methodology for surgical planning and Fabrication of Customized Mandible Implants", *Rapid Prototyping Journal*, Vol. 23(1), pp. 101-109, 2017.

LEE, TAEWOO PUBLICATIONS

*T. C. Y. Chan, T. Lee, "Trade-off preservation in inverse multi-objective

convex optimization," *European Journal of Operational Research*, 270 (1), 25-39, 2018

*K. Ghobadi, T. Lee, H. Mahmoudzadeh, D. Terekhov "Robust inverse optimization," *Operations Research Letters*, 46 (3), 339-344, 2018 (authors ordered alphabetically)

O. Tavaslioglu, T. Lee, S. Valeva, A. J. Schaefer, "On the structure of the inverse-feasible region of a linear program," *Operations Research Letters*, 46 (1), 147-152, 2018

*T. C. Y. Chan, T. Lee, D. Terekhov, "Inverse Optimization: Closed-form Solutions, Geometry and Goodness of fit," *Management Science*, Available online, 2018

LIM, GINO PUBLICATIONS

Y. Wu, M. Barati, and G.J. Lim, "A Pool Strategy of Microgrid in Power Distribution Electricity Market," in press, *IEEE Transactions on Power Systems*, June 2019. DOI: 10.1109/TPWRS.2019.2916144.

G.J. Lim, L. Kardar, S. Ebrahimi, and W. Cao, "A Risk-based Modeling Approach for Radiation Therapy Treatment Planning under Tumor Shrinkage Uncertainty," in press, *European Journal of Operational Research*, June 2019. <https://doi.org/10.1016/j.ejor.2019.06.041>

A. Khabazian, M. Zaghian, and G.J. Lim, "A feasibility study of a risk-based stochastic optimization approach for radiation treatment planning under setup uncertainty," *Computers and Industrial Engineering*, vol 135, pp67-78, September 2019.

M. Torabbeigi, G.J. Lim, and S. J., Kim, "Drone Delivery Scheduling Optimization Considering Payload-induced Battery Consumption Rates," in press, *Journal of Intelligent & Robotic Systems*, May 2019. DOI: <https://doi.org/10.1007/s10846-019-01034-w>

A. Molavi, G. Lim, and B. Race, "A Framework for Building a Smart Port and Smart Port Index," in press, *International Journal of Sustainable Transportation*, April 2019. DOI:10.1080/15568318.2019.1610919

G.J. Lim, M. Rungta, and A. Darvishan, "A Robust Chance Constraint Programming Approach for Evacuation Planning under Uncertain Demand Distribution," *Featured Article, IISE Transactions*, 51(6), pp 589-604, March 2019.

H. Luo, X. Bai, G. Lim, and J. Peng, "New Global Algorithms for Quadratic Programming with A Few Negative Eigenvalues Based on Alternative Direction Method and Convex Relaxation," *Mathematical Programming Computation*, 11(1), pp 119-171, March 2019.

S. Abbasi, M. Barati, and G.J. Lim, "A Parallel Sectionalized Restoration Scheme for Resilient Smart Grid Systems," *IEEE Transactions on Smart Grid*, 10(2), pp 1660-1670, March 2019.

A. Najjarbashi and G. J. Lim, "A Variability Reduction Method for the Operating Room Scheduling Problem under Uncertainty using CVaR," *Operations Research for Health Care*, vol 20, pp 25-32, March 2019.

M. Najarian and G.J. Lim, "Design and assessment methodology for system

resilience metrics," in press, *Risk Analysis*, February 2019. DOI: <https://doi.org/10.1111/risa.13274>

W. Cao, A. Khabazian, P. Yepes, G. Lim, F. Poenisch, D. Grosshans, and R. Mohan, "Reply to Comment on 'Linear energy transfer incorporated intensity modulated proton therapy optimization'," *Physics in Medicine and Biology*, vol. 64, 058002, February 2019.

Bai, Xuemin; Lim, Gino; Grosshans, David; Mohan, Radhe; Cao, Wenhua, "Robust optimization to reduce the impact of biological effect variation from physical uncertainties in intensity-modulated proton therapy," *Physics in Medicine and Biology*, 64(2), #025004, January 2019.

G.J. Lim, J. Cho, S. Bora*, T. Biobaku, and H. Parsaei, "Models and Computational Algorithms for Maritime Risk Analysis: A review," *Annals of Operations Research*, 271(2), 765-786, December 2018.

S. Kim and G.J. Lim, "Drone-aided border surveillance with an electrification line battery charging system," *Journal of Intelligent & Robotic Systems*, 92(3), 657-670, December 2018.

S.J. Kim, and G. Lim, "A Hybrid Battery Charging Approach for Drone-aided Border Surveillance Scheduling," *Drones*, 2(4), 38; doi: 10.3390/drones2040038, November 2018.

J. Cho, G. Lim, T. Biobaku, and S. Kim, "Liquefied Natural Gas Inventory Routing Problem under Uncertain Weather Condition," *International Journal of Production Economics*, vol 204, pp 18-29, October 2018.

G.J. Lim, S. Kim, J. Cho, Y. Gong, and A. Khodaei, "Multi-UAV Pre-positioning and Routing for Power Network Damage Assessment," *IEEE Transactions on Smart Grid*, 9(4), pp 3643-3651, July 2018.

A. Khayatian, M. Barati, and G.J. Lim, "Integrated Microgrid Expansion Planning in Electricity Market with Uncertainty," *IEEE Transactions on Power Systems*, 33(4), pp 3634-3643, July 2018.

M. Zaghian, G.J. Lim, and A. Khabazian, "A Chance-Constrained Programming Framework to Handle Uncertainties in Radiation Therapy Treatment Planning," *European Journal of Operational Research*, vol 266, pp 736-745, April, 2018.

S. Kim, G. J. Lim, and J. Cho, "Drone Flight Scheduling Under Uncertainty on Battery Duration and Air Temperature," *Computers and Industrial Engineering*, 117, pp 291-302, February 2018.

W. Cao, A. Khabazian, P. Yepes, G. Lim, F. Poenisch, D. Grosshans, and R. Mohan, "Linear energy transfer incorporated intensity modulated proton therapy optimization," *Featured Article, Physics in Medicine and Biology*, vol. 63, no. 1, Article #: 015013(10pp), January 2018.

S. Kim, G. J. Lim, J. Cho, and M. Cote, "Drone-aided Healthcare Services for Patients with Chronic Diseases in Rural Areas," *Journal of Intelligent & Robotic Systems*, vol 88 (1), pp 163-180, October 2017.

M. Zaghian, W. Cao, W. Liu, L. Kardar, K. S. Randeniya, R. Mohan, G. Lim, "Comparison of linear and nonlinear

programming approaches for "worst case dose" and "minmax" robust optimization of intensity-modulated proton therapy dose distributions," *Journal of Applied Clinical Medical Physics*, vol. 18, no. 2, pp. 15-25, March 2017.

PENG, JIMING PUBLICATIONS

R. Batta and J. Peng. *Leading Developments from Informs Communities. Informs Tutorial Series on OR*, October, 2017.

Thorsten Koch, Ya-Feng Liu and Jiming Peng. *Special Issue: MOA 2016. J. Global Optimization*, Volume 70, Issue 1, 1-306. January 2018

M. Yang, Y. Xia, J. Wang and J. Peng. Efficiently solving total least squares with Tikhonov regularization. *Computational Optimization and Applications*, Volume 70, Issue 2, pp 571-592. June, 2018

H. Luo, X. Bai and J. Peng. Enhancing Semidenite Relaxation for Quadratically Constrained Quadratic Programming via Penalty Methods. *Journal of Optimization Theory and Applications*, 180(3), 964-992, March, 2019.

M. Yang, Y. Xia, J. Wang and J. Peng. Efficiently solving total least squares with Tikhonov regularization. *Computational Optimization and Applications*, Volume 70(2), 571-592. June 2018.

J.Q. Hale, E.L. Zhou and J. Peng. A Lagrangian Search Method for the K-Median Problem. *J. Global Optimization*, 69(1), 137-156, 2017.

J. Birge, A. Khabazian and J. Peng. *Optimization Modeling and Techniques for Systemic Risk Assessment and Control in Financial Networks. In Informs Tutorials 2018: Recent Advances in Optimization and Modeling of Contemporary Problems*, Edited by E. Gel and L. Ntaimo. 2018.

L. Mujkerjee, J. Peng and V. Singh et al. A Bi-resolution Spectral framework for Product Quantization. *Proceedings of CVPR*, 2018.

H. Luo, X. Bai, G. Lim and J. Peng. Global Algorithms for Quadratic Programming with A Few Negative Eigenvalues Based on Successive Linear Optimization and Con-vex Relaxation. *Mathematical Programming Computation*, Volume 11(1), 119-171, March, 2019.

Aein Khabazian and J. Peng. *Vulnerability Analysis of the Financial Network. Management Science*, 2019. (in publication)

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