A Message from the Chair

Welcome to the Quality, Statistics and Reliability Section. I would like to begin with expressing my sincere appreciation for your continuous support of the INFORMS QSR Section. This year, at INFORMS Annual Meeting, we will celebrate the 20th birthday of our precious QSR community by holding a pre-conference workshop on Saturday, November 3. The workshop program includes three keynote speeches by Professor Jianjun Shi (Quality), Professor C. F. Jeff Wu (Statistics) and Professor Elsayed A. Elsayed (Reliability), and two panel discussions by prominent members of QSR discussing the past, present, and future of our section. The reception of the workshop is scheduled for 16:10 – 18:00 and is open to all QSR members. The workshop is co-organized by Dr. Kaibo Wang (Tsinghua University), Dr. Kaibo Liu (University of Wisconsin – Madison), Dr. Hao Yan (Arizona State University) and Dr. Kamran Paynabar (Georgia Tech).

This year, the QSR cluster continues the tradition of being one of the largest clusters at the INFORMS Annual Meeting. QSR is sponsoring 41 sessions in total, including 26 research sessions, one QSR refereed session (best paper competition), two QSR student sessions (best student paper competition and student interaction/poster competition), four journal sponsored sessions (IIESE Transactions, Technometrics, JQT, and IEEE-TASE), one panel discussion session on funding opportunities, and seven joint sessions with Data Mining and Simulation. The sessions will cover a broad spectrum of topics including machine learning, spatial-temporal data analysis, prognostic health management, and cyber-manufacturing. I would like to thank all the session organizers and especially, the QSR cluster chair and chair-elect Dr. Ran Jin (Virginia Tech) and the academic and conference subcommittee members Dr. Xiao Liu (University of Arkansas), Dr. Matthew Plumlee (Northwestern University), and Dr. Yisha Xiang (Texas Tech University) for organizing this year’s program. For the first time, the data of QSR conference activities and sessions will be collected to the QSR Database, which will be used for future planning and decision-making.

I would like to highlight the QSR Best Student Paper Competition that received 33 high-quality submissions this year. Many thanks to Dr. Youngjun Choe (University of Washington) and Dr. Matthew Plumlee (Northwestern University) for organizing the competition, and to the referees for reviewing the papers. Four selected papers will be presented on Sunday, SA68 (8:00 - 9:30AM), and the winner will be chosen by a panel of judges. All the finalists and the winner will be recognized at the QSR business meeting.

The QSR Best Refereed Paper Competition received 15 excellent papers, which were blindly reviewed and scored by 16 referees. I would like to thank Dr. Haitao Liao (University of Arkansas) and Dr. Tirthankar Dasgupta (Rutgers University) for organizing the competition, and the reviewers for their help in reviewing the papers. Four selected papers will be presented in the refereed track session on Sunday, SB68 (11:00AM - 12:30PM), and the winner will be chosen by a panel of judges. All the finalists and the winner will be recognized at the QSR business meeting.

This year, the Student Interaction session, together with the QSR Student Poster Competition is organized by Dr. Raed Al Kontar (University of Michigan) and Dr. Dongping Du (Texas Tech University). This session provides a unique opportunity for QSR student members to introduce their research to the QSR community and potential employers. The Student Interaction session is scheduled for Sunday, SC70 (13:30PM - 15:00PM). All QSR members are welcome to meet with QSR young talents! I would also like to thank Raed and Dongping for organizing this session.

In addition to the academic and conference committee led by Dr. Ran Jin and Dr. Matthew Plumlee, other QSR officers formed new committees to improve the experience of QSR members. The Membership committee led by Dr. Qiong Zhang (Clemson University) and Dr.
Xinwei Deng (Virginia Tech) along with the volunteer member Dr. Mingyang Li (University of South Florida) focused on membership affairs, and the industry-relation committee led by Dr. Linkan Bian (Mississippi State University) and Dr. Youngjun Choe (University of Washington) along with the volunteer members Dr. Jian Liu (University of Arizona) and Hongyue Sun (University at Buffalo) studied effective interactions of the QSR community with industry. I would like to thank all committee members for their efforts and leadership.

Finally, I am excited to announce that we launched the QSR webinar series last month. The first webinar of this series, which will be held quarterly, was given by Dr. Yu Ding (Texas A&M University) on “Wind Turbine Reliability and Performance Assessment” on September 26. Special thanks to Dr. Ding for the exciting webinar and to Dr. Linkan Bian and Dr. Youngjun Choe for organizing it.

I look forward to seeing you all at the QSR 20th Anniversary Celebration Workshop and INFORMS Annual Meeting in Phoenix, and thank you for your dedication to QSR.

Kamran Paynabar
Chair of the QSR Section, INFORMS

Houston Conference Review
INFORMS Annual Meeting. October 22-25, 2017

The 2017 Annual Meeting in Houston featured a QSR Sponsored Cluster with 41 sessions, including 30 research sessions, one QSR refereed session (best paper competition), two QSR student sessions (best student paper competition and student interaction/poster competition), five journal sponsored sessions (Technometrics, IIE Transactions, Quality Engineering, Journal of Quality Technology, and Quality Technology & Quantitative Management), two panel sessions (funding opportunities, publishing in quality and reliability journals), and one tutorial session (Analytics in Additive Manufacturing). Among the 30 research sessions, nineteen sessions focused on statistical modeling/analytics; five on reliability and maintenance; three on design of experiment and uncertainty quantification; two on process monitoring; and one on forecasting. The following word cloud generated from the session titles depicts the broad spectrum of topics covered in the QSR sessions.

The Annual Meeting in Houston also included finalist presentations for the 2017 QSR Best Student Paper Award. The winner was Raed Al Kontar from the University of Wisconsin-Madison (Advisor: Shiyu Zhou) for his article entitled “Nonparametric Modeling and Prognosis of Condition Monitoring Signals: A Transfer Learning Approach Based on Multivariate Gaussian Convolution Processes”. Other 2017 finalists included Junzhou Chen (Georgia Institute of Technology, Advisors: Seong-Hee Kim and Yao Xie), Qiyun Pan (University of Michigan, Advisor: Eunshin Byon), and Bo Wang (Rensselaer Polytechnic Institute, Advisor: Wei Xie).

2017 QSR Best Student Paper Award Finalists in the middle (Junzhou Chen, Raed Al Kontar, and Bo Wang from left to right) with Dr. Kaibo Wang (left-most) and Dr. Ran Jin (right-most).

The Annual Meeting in Houston also included finalist presentations for the 2017 QSR Best Paper Award. The winners are Chenang Liu and Zhenyu (James) Kong for their article entitled “An Integrated Manifold Learning Approach for Online Process Monitoring of Additive Manufacturing Processes”. Other 2017 finalists included Cynthia Rudin and Yining Wang for their article entitled “Direct Learning to Rank and Rerank”; Wujun Si, Qingyu Yang, and Xin Wu for their article entitled “A Functional Covariate Degradation Model with Application to Degradation Analysis of Dual-phase Steel by Utilizing Its Microstructure Images”; and Yan Wang, Xiaowei
Yue, Rui Tuo, Jeffrey H. Hunt, and Jianjun Shi for their article entitled “Effective Model Calibration via Sensible Variable Identification and Adjustment, with Application to Composite Fuselage Simulation”.

2017 QSR Best Paper Award Finalists in the middle (Wujun Si, Xiaowei Yue, and Chenang Liu from left to right) with Dr. Prabalad K. Rao (left-most) and Kaibo Wang (right-most).

Member Updates

- **Honors and Awards Received**

  Zhe Gao, Weihong “Grace” Guo (Rutgers University), and Jingjing Li (Penn State University) received the Best Paper Award for the paper titled “Sensor Fusion and Online Monitoring of Friction Stir Blind Riveting for Lightweight Materials Manufacturing” presented at the ASME 2018 Manufacturing Science and Engineering Conference (MSEC), College Station, TX, June 18-22, 2018.

  Mojtaba Khanzadeh, Wemmeng Tian, and Linkan Bian from Mississippi State University received the 2018 IIEE Manufacturing and Design Best Student Paper Award for the paper entitled “Establishing the Process-Structure Relationship Using Tensor Decomposition of Thermal Images.”

  Chenang Liu received the Gilbreth Memorial Fellowship in 2018 IISE Annual Conference (Advisor: Zhenyu (James) Kong).

  Wenbo Sun at the University of Michigan received the 2018 IISE QCRE Best Student Paper Award with the paper entitled “Robust Design Using an Inexact Simulation Model With Physical Experiment Data” (Advisors: Judy Jin and Matthew Plumlee).

  Xiaowei Yue, Kan Wang, Hao Yan, Jin Gyu Park, Zhiyong Liang, Chuck Zhang, Ben Wang and Jianjun Shi received the 2018 IEEE Transactions on Automation Science and Engineering Best Paper Award (with $1000 cash honorarium) from the IEEE Robotics & Automation Society for their paper entitled “Generalized Wavelet Shrinkage of Inline Raman Spectroscopy for Quality Monitoring of Continuous Manufacturing of Carbon Nanotube Buckypaper”.

  Xiaowei Yue received the Mary G. and Joseph Natrella Scholarship from the American Statistical Association (ASA). It was awarded to two Ph.D. students each year by ASA for engagement and experience in statistical applications, and for service and leadership in the statistics community.

- **Grants Received**

  Eunshin Byron received a grant from the National Science Foundation, for the proposal entitled “Non-Intrusive Interpretation and Improvement of Multi-Occupancy Human Thermal Comfort through Analysis of Facial Infrared Thermography.”

  Youngjun Choe received a grant from the National Science Foundation (PI, $508,631, 10/01/2018 - 9/30/2021) for the proposal entitled “Participatory Statistical Inference of Interdependent Critical Infrastructure Recovery Times” with Scott B. Miles at the University of Washington.

  Weihong “Grace” Guo received a grant from the U.S. Department of Transportation, National University Transportation Center Consortium led by CAIT (PI, $248,143, 09/01/2018 - 06/30/2019) for the proposal entitled “Development of Vehicle Fleet Mix Forecast Models for Life Cycle Cost Forecast for Tunnel Ventilation Systems”.

  Weihong “Grace” Guo received a grant from the Ford Motor Company University Research Program (PI, $50,000, 04/01/2018 - 03/31/2019) for the proposal entitled “Methods and Tools for Equipment Diagnostics, Prognostics, and Health Management”.

  Zhenyu (James) Kong and his collaborators from five other universities received a grant from the Office of Naval Research’s Multidisciplinary University Research Initiative (MURI) for a proposal entitled “Rationalization of Liquid/Solid and Solid/Solid Interphase Instabilities during Thermal Mechanical Transients of Metal Additive Manufacturing.” The total funding is $4.5M for three years.

  Zhenyu (James) Kong and his collaborators received a grant from the Department of Energy’s Clean Energy Smart Manufacturing Innovation Institute (CESMII), for a proposal entitled “Energy Efficient Material Processing through Automated Process Monitoring and Controls.” The total funding is $1M for two years.

  Zhenyu (James) Kong and his collaborators received a grant from the Department of Education, for a proposal entitled “An Interdisciplinary Program in Multifunctional Material Synthesis and Advanced Manufacturing (MM-SAM).” The total funding is $746,250 for three years.
Zhenyu (James) Kong and C. Williams received a grant from the Office of Naval Research, for a proposal entitled “Ensuring Additive Manufacturing Quality and Cyber Physical Security via Side Channel Data Fusion and the Cyber Physical Hash.” The total funding is $250,000 for two years.

Mingyang Li received a grant from the National Science Foundation ($261,055, CMMI #1825761) for the proposal entitled “GOALI/Collaborative Research: Consistent Nursing Home Staff Planning under Heterogeneous Service Demand”.

Kaibo Liu and Shuai Huang received a grant ($169,994) from AFOSR for the proposal entitled “Dynamic Data-Driven Modeling, Sampling and Monitoring of Big Spatial-Temporal Data Streams”.

Kaibo Liu received a grant ($797,820) from DOE for the proposal entitled “Big data analytics solutions to improve nuclear power plant efficiency” in collaboration with T. Allen, P. Loh, and C. Comfort.

Chiwoo Park received a grant from the Air Force Office of Scientific Research (Dynamic Data Driven Application Systems Program) as the PI for the proposal entitled “Dynamic Data Driven Control of Nanoparticle Self-Assembly Processes” with Hedi Mattoussi (FSU) and Yu Ding and Jianhua Huang (TAMU), $539,208, 2018 – 2021.

Chiwoo Park received a grant from the Brookhaven National Laboratory as the single PI for the proposal entitled “Near Realtime Analysis of In-situ Microscope Experiments”, $250,000, 2018 – 2021.

Kamran Paynabar received a grant from the National Science Foundation (CMMI-1839591), for the proposal “EAGER: Real-D: Integrating Data-Driven Methods and Engineering Models in Manufacturing Systems”.

Prahalad K. Rao received a grant from the National Science Foundation (CMMI #1752069) for the proposal entitled “CAREER: Smart Additive Manufacturing - Fundamental Research in Sensing, Data Science, and Modeling Toward Zero Part Defects”.

Hao Yan received a grant from the National Science Foundation (PI, 9/01/2018 - 08/31/2021) for the proposal entitled “ATD: Collaborative Research: Adaptive and Rapid Spatial-Temporal Threat Detection over Networks” in collaboration with Yajun Mei and Sarah Holte.

• **Ph.D. Degrees Earned**


  Bing Si (2018), Arizona State University, Advisor: Jing Li. Current Position: Assistant Professor in the State University of New York at Binghamton.


• **Promotions and News**

  Adel Alaeddini was promoted to Associate Professor in Mechanical Engineering at the University of Texas at San Antonio.

  Linkan Bian was promoted to Associate Professor at Mississippi State University.
Heeyoung Kim was promoted to Associate Professor in the Department of Industrial and Systems Engineering at Korea Advanced Institute of Science and Technology (KAIST).

Kamran Paynabar was promoted to Associate Professor with Tenure in the Stewart School of Industrial and System Engineering at Georgia Tech.

Kamran Paynabar has been appointed to the Fouts Family Early Career Professorship in the Stewart School of Industrial and System Engineering at Georgia Tech.

Alice E. Smith was recently named Editor in Chief of INFORMS Journal on Computing effective Jan 1, 2019.

Fugee Tsung has been elected the Vice President (Conferences) of the International Academy for Quality (IAQ) from 2018.

Murat Yildirim joined the Department of Industrial and Systems Engineering at the Wayne State University as an Assistant Professor. This position is tied to the initiative on cyber physical systems.


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To subscribe to INFORMS QSR email list, send an email to informss-quality-statistics-reliability+subscribe@googlegroups.com

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https://www.linkedin.com/groups/3793057

INFORMS QSR YouTube Channel:
https://www.youtube.com/channel/UCRscxnV_WgAGU6S0oTo0UJQ

INFORMS QSR Twitter:
https://twitter.com/INFORMS_QSR

An Interview with the Founding Chair of the INFORMS QSR Section: History, Impact, and Future

Dr. Jianjun Shi is the founding chairperson of the Quality, Statistics and Reliability (QSR) Subdivision at the Institute for Operations Research and Management Science (INFORMS). As the QSR subdivision is turning 20 this year, on behalf of the QSR Council, Dr. Kaibo Liu has taken this great opportunity to have an interview with Dr. Shi on Oct. 20, 2018:

Kaibo Liu: How did you decide to establish a new QSR subdivision at INFORMS?

Jianjun Shi: My main motivation was seeing the need for a new QSR subdivision at INFORMS. Also, I had personal reasons. Personally, I received my Ph.D. in Mechanical Engineering at the University of Michigan in 1992 and then stayed as a research scientist for three years. Although my training had predominantly focused on mechanical engineering, I joined the faculty of Industrial and Operations Engineering in 1995. To be honest, I started with very little experience in industrial engineering and strove to learn as much as I could. I approached Dr. John Birge, who was my department chair and Vice President of INFORMS at that time, and asked him where to go for IE conferences. John proposed two conferences: Industrial Engineering Research Conference (IERC) and INFORMS. I noticed that there was a division in IERC called Quality Control and Reliability Engineering (QCRE) that was the home for people in the quality and reliability field. However, in INFORMS, there was no section or home for people working on quality, statistics, and reliability (QSR) research. Because of this, people doing research in QSR did not come to INFORMS regularly and even if they did, they did not have a home to get together. Thus, people submitted papers to different sessions and they did not get to know each other very well. On the other hand, INFORMS had a lot of highly regarded IE faculty members who did research in QSR. Thus, I felt it was very important for researchers in QSR to participate in INFORMS and try to get to know other existing groups in operations research and management science (OR/MS). Indeed, OR/MS is closely related with QSR in the IE society. Therefore, there is a need for developing a new subdivision of QSR in INFORMS to serve this community and promote this kind of research. For these reasons, I believed that creating a QSR subdivision would better serve the research community, especially for faculty and students in IE working in the QSR research area.
Kaibo Liu: How was the QSR subdivision created? What was your approach?

Jianjun Shi: There are two steps in creation of the subdivision. The first step was to ascertain the need. This involved defining specific needs, contacting core people in the area, and convincing the existing leaders and societies to agree with the idea of creating a new QSR subdivision at INFORMS. To approach potential members, I first talked with Dr. Susan Albin, who was the first chair of the QSR Advisory Committee. She and I worked together to develop an agenda and a list of researchers and thought leaders to contact. I reached out to all the society leaders who were related to quality and reliability in ASQ, ASA, and IE societies, and talked with all the journal editors such as JQT, Technometrics, and IIE Transactions to discuss the need. It was not easy in the beginning. People said there were so many conferences, journals, and societies already, and questioned why we needed a new QSR subdivision in INFORMS. I explained to them the need of QSR in INFORMS as a home and also emphasized the importance for the QSR community in IE to interact more with the OR/MS communities and create synergy. There were unique needs to create a QSR subdivision in INFORMS, benefiting QSR researchers within INFORMS as well as the society in general. With a continuous effort of communication, people finally agreed with this idea and the wheels continued to turn.

The second step was to go through the procedure of subdivision creation. INFORMS required two years of invited sessions to create a new subdivision in order to show that there was consistent demand for a cluster in the conference. For the first two years, i.e., in 1996 and 1997, we organized invited sessions focusing on QSR topics. In 1998, I drafted the bylaw for the QSR subdivision and submitted the proposal to the INFORMS Board, which was officially approved in August 1998. That was how we got this all started. During the process, we received incredible help from Dr. John Birge; Dr. Susan Albin; the members of the first QSR Advisory Board (Chairperson: Susan Albin; Advisory Board Members: Soren Bisgaard, Elsayed A. Elsayed, Kailash Kapur, Way Kuo, Douglas Montgomery, Lawrence Seford, Marlin Thomas, and Jeff Wu). With their blessing and support, we appointed the first set of officers for the QSR subdivision, who are chairperson: Jan Shi; chair-elect: Kwok Tsui; secretary/treasurer: Enrique del Castillo; council members: Bruce Ankenman, David Coit, Harriet Black Nembhard, Hoang Pham; and webmaster/newsletter: Darek Ceglarek. After that, we approached more faculty members and students to participate in the QSR subdivision. In the beginning, we had about 3 to 5 sessions at each INFORMS annual conference. Soon after, the number rose up to 35~40 sessions. The QSR cluster became one of the largest clusters in terms of the number of sessions in the INFORMS annual conference.

Kaibo Liu: What benefits one can expect by being a member of QSR?

Jianjun Shi: I believe QSR serves members at all levels of their career development. Students can join “the Ph.D. student interactive session” on the first day at the INFORMS conference and introduce themselves to fellow students and to senior faculty members. In this way, they socialize with and learn from each other. In addition, there are opportunities to listen to different panels, discussions, and paper presentations, and present their own research. In particular, participating in the best student paper competition is a great experience to students. The best student paper competition is a very nice platform to recognize the leading research activities, researchers and graduate students. At the 10th QSR anniversary, I conducted a survey. At that time, there were 20 people who got best student paper awards, either as an awardee or as a finalist. Among them, 14 joined the faculty in a top university and have been very successful in their academic careers. Many of them are full professors or even endowed professors today. Serving as an officer such as Chair, Chair-elect, and council members in the QSR subdivision also provides a platform for mid-career and junior faculty to exercise leadership skills. These opportunities really let them be known by the society and help them become potential leaders in academia or industry. For senior members, QSR serves as a platform for them to interact with students and junior faculty members, so that they can provide mentorships to nurture the next-generation researchers who are working in this area. Another very important aspect is that the QSR subdivision is within INFORMS. INFORMS is a very big society. Being an active member of QSR enables interaction with others in the broad INFORMS communities. This interaction is critical and helpful for building a successful career, as it promotes research, synergizes potential collaborative activities, and publicizes what we do as members of QSR.

Kaibo Liu: When you look back over the last 20 years, what do you believe that QSR should do better in the near future?

Jianjun Shi: QSR as a subdivision has been running very well and provided an excellent platform to serve its members. There are several things we can do better and we should do better.

First, we can interact more deeply and profoundly with other subdivisions within INFORMS. In this way, we can not only let other people know what we are doing, but also learn from each other and work with each other to develop better methods, achieve better results, and make greater impact. I think this is one thing we should do better.
Second, QSR should get more visibility within INFORMS. I think members in the QSR subdivision have been doing high quality research, but the visibility of QSR within INFORMS is still limited. Very few QSR members serve in the leadership positions in INFORMS and very few QSR members are elected as INFORMS fellows. Here is a suggestion: For QSR officers, when they finish their terms, they should not see themselves as retired, but volunteer to serve in a leadership role in INFORMS like the Board of Directors. This is very important for QSR members and also QSR as a community. Another suggestion is that we should increase co-sponsored sessions with other subdivisions. QSR members should present their papers in the same (co-sponsored) session with members from other subdivisions such as simulation and OR analytics. This will promote collaborative relationships and also naturally increase the awareness for people to get to know how good we are as a QSR researcher. This kind of activity needs to be persistent. It is easy to do it once, but making it sustainable year by year to become a tradition is very important. In regards to increasing visibility outside INFORMS, QSR can do better by trying to invite policy makers, decision making persons from the government and the industry to join the QSR subdivision and also serve the panelists. Another thing is that we should promote members, especially senior members, to serve in different professional societies to bring the QSR spirit to other research communities.

Third, QSR should try to get more participation from industrial members through organized sessions and case study competitions. Most of our current active members are from academia. However, there are indeed numerous QSR researchers in industry and QSR research has tremendous need from various industry sectors. Not all students graduating from a QSR ends up in academia. For those who took an industrial job, we should still engage them and invite them back to QSR and INFORMS.

Fourth, there are always discussions on whether we should have a conference of QSR. There are pros and cons to do that. So, this may need to be further discussed.

Last but not the least, the researchers in QSR do not have a home journal to submit their research to. This has really limited the visibility and appreciation of QSR members by the broad INFORMS communities. INFORMS as a society did not serve QSR well in terms of publication needs. Right now Dr. Jeff Wu and Dr. Yu Ding are leading an effort, which I am also part of that effort, to start a new INFORMS journal. This effort has been jointly supported by multiple subdivisions including QSR, Data Mining, Simulation, and Artificial Intelligence. The temporary name is INFORMS Journal on Data Science. If this could be established and approved by the INFORMS Board of Directors, it would definitely help the QSR communities and other societies who sponsor or support the new journal. I hope this can happen next year.

Kaibo Liu: **In your mind, what are the major achievements that QSR has made in the last 20 years?**

Jianjun Shi: The mission of the QSR subdivision is to provide a platform for its members to share ideas, improve research quality, and nurture junior researchers to grow. In the past 20 years, multiple generations of members have grown from being a graduate student, to a junior faculty member, and to a senior faculty member. The QSR sessions have played a very important role for members to exchange research ideas and promote new research frontiers. New methodologies have been developed such as wavelets, functional data, multivariate analysis, stream of variation, high-dimensional streaming data, prognostics, etc. Many new applications have emerged such as nano-manufacturing, MEMS, healthcare, renewable energy, multistage systems, distributed sensing networks, and IoT. Because of the best student paper competition and the recently established general best paper competition, high quality research has been promoted. Due to the high quality and competitive nature of these competitions, the sessions that hold the competitions have become a major venue for academic recruiters to come to look for competitive faculty candidates in the QSR area. This has served as a platform for people to find the talents and for people to show the talents to the community. QSR co-sponsored sections with other subdivisions, which provides an effective way to exchange ideas, get to know each other, and expand the research boundaries. Due to these activities, many QSR members received NSF CAREER awards in the past 20 years. Many QSR members serve as editors, associate editors, or members of editorial board of QSR-related journals. QSR members also serve as the panelists in various proposal review panels in different programs at the funding agencies.

Kaibo Liu: **Can you comment on the uniqueness of QSR research comparing with other data-focused disciplines?**

Jianjun Shi: I think data science and data focused research has become more and more important. Many different research disciplines have data focused activities. QSR members who work on data focused research have a special and unique strength in the sense that they try to integrate engineering knowledge with data science, and try to solve the quality and reliability problems by leveraging this unique strength. Integration between engineering domain knowledge and data science is one unique aspect. Another unique aspect is that most of the QSR members are from an IE department. We are doing data focused research motivated by real-world problems. We try to solve problems in which there is a significant gap between methodological innovation and the application need. Filling in the gap by developing novel methodologies...
driven by engineering needs is another unique aspect of QSR.

**Kaibo Liu:** What do you see as the brightest future of QSR for the next 10 years?

**Jianjun Shi:** The QSR subdivision indeed has a bright future. Research needs for quality, statistics, and reliability in IE will always be there and QSR will always be an important engineering field. No matter what kind of processes or systems, there will always be challenging problems that need QSR methodologies to solve. Enhanced computational capabilities and machine learning algorithms provide new opportunities. QSR will take advantage of these advancements and lead the frontier of data science related research and development. It will continuously contribute to new methodological development and provide solutions for emerging, challenging problems in various application domains. This would be my expectation for QSR for the next ten years.

**Kaibo Liu:** You may have noticed the evolution of research interests of QSR in the past years. How do you comment on these changes, and what do you think are potential areas that the QSR community will jump in the future?

**Jianjun Shi:** QSR is a research area that always goes with two aspects: one is on new methodological development and the other is on new applications. Regarding potential new methodologies, modeling high dimensional, streaming data has become a very important problem. Also, “real-time” “data-driven” decision making for quality and productivity improvement is very important. Another topic is uncertainty quantification, which has become a crucial issue especially with the broad adoption of machine learning algorithms to tackle data science challenges. One missing piece in solving the puzzle is how you quantify the uncertainty of the model output, without which it would be hard for us to move from predictive analytics to prescriptive analytics, i.e., to have the capability of not only making predictions but also making decisions upon the predictions. In the past few years, there have been important breakthroughs in machine learning such as deep learning and reinforcement learning. These emerging methods could be adapted to solve quality and reliability problems, but again shall emphasize the unique aspect of QSR research that integrates engineering domain knowledge to empower these methods to solve problems better and faster.

Regarding applications, there are many important applications areas for which QSR research can have great impacts. For example, in many cities, roads and bridges are outdated. Thus, one great research opportunity for QSR researchers is to help with development of novel methods for infrastructure monitoring, diagnosis, prognosis, control, and re-design. Many emerging areas such as personalized healthcare, bio-manufacturing, additive manufacturing, IoT, and renewable energy, all have challenging questions for QSR researchers to tackle. In-depth integration of engineering domain knowledge with data analytics, statistics, and machine learning will provide new opportunities for QSR research to achieve another level of sophistication in terms of methodological innovation and application impacts.

**Announcements**

**Job Opening**

**Georgia Institute of Technology**

The H. Milton Stewart School of Industrial & Systems Engineering of Georgia Tech in Atlanta, Georgia invites applications for multiple faculty positions. Qualified applicants with diverse backgrounds and interests are welcome. Appointments can be made at the Assistant Professor, Associate Professor, and Professor rank, commensurate with the individual's record. The School will consider applicants from all research areas, including statistics, data sciences, machine learning, analytics, and optimization; applied probability, stochastics, simulation, and system informatics and control; health systems, energy and sustainability, supply chains and logistics, and advanced manufacturing. Successful candidates will be expected to lead independent research at the cutting edge of their field, build a strong sponsored-research program, successfully mentor graduate students, and develop and teach undergraduate and graduate courses. Applicants must possess a Ph.D. in Industrial Engineering, Operations Research, Statistics, or a related field. Georgia Tech is building a culturally diverse faculty and strongly encourages applications from female and minority candidates. Interested individuals should: (1) Fill out the "Faculty Candidate Application" page found at: [https://apply.isye.gatech.edu/apply](https://apply.isye.gatech.edu/apply), and (2) Upload current curriculum vitae and letter of application, including a list of references. The review process will commence in September 2018. Georgia Tech is an Affirmative Action/Equal Opportunity Employer, a Unit of the University System of Georgia.

**Rutgers University-New Brunswick**

The Department of Industrial and Systems Engineering at Rutgers University-New Brunswick invites applications for multiple faculty positions, at all ranks, with a start date of fall 2019. We welcome applicants pursuing fundamental, original research applied to compelling, interdisciplinary problems. In particular we encourage applicants with research strength in machine learning / AI, reliability engineering / testing, optimization, and manufacturing /
automation sciences. Application areas of interest include smart cities and transportation, energy, biomedical devices and healthcare delivery systems, and advanced manufacturing. Please submit your application online at http://jobs.rutgers.edu/postings/74008.

University of Michigan

The Department of Industrial and Operations Engineering at the University of Michigan invites applications and nominations for faculty positions beginning September 2019. We seek outstanding candidates for faculty positions at all ranks. We will be considering candidates in all areas of Industrial and Operations Engineering including Operations Research, Analytics, Data Science, Human Factors, Machine Learning, and related disciplines. Candidates must have a Ph.D. and must demonstrate a strong commitment to high-quality research and evidence of teaching potential.

Candidates should provide (i) a current C.V., (ii) a list of references; and one-page summary statements describing: (iii) career teaching plans, (iv) research plans, and (v) course (teaching) evaluations for candidates with prior teaching experience. Candidates are strongly encouraged to describe their commitments to diversity, equity, and inclusion in their teaching and/or research statements. Please submit your application to the following: Web: https://ioe.engin.umich.edu/careers/faculty-opening/

Candidates should have their references send three recommendations to us directly at IOEFacultySearch@umich.edu. The deadline for ensuring full consideration of applications is October 17, 2018, but the positions will remain open, and applications may still be considered until appointments are made.

University of Wisconsin-Madison

The Department of Industrial and Systems Engineering at the University of Wisconsin-Madison invites applicants for a tenure-track or tenured faculty position beginning August 2019 to complement our existing research programs in manufacturing and production systems, decision sciences/operations research, health systems engineering, and human factors. At this time, we are specifically interested in candidates who can contribute to our department’s vision of building, analyzing, and leveraging smart, interconnected systems, with a focus on data science and artificial intelligence solutions for industrial applications. Specific research areas of interest include but are not limited to data-driven smart manufacturing including product/process/service design and optimization; system automation and process control; human-automation interaction and human-robot interaction; data-driven modeling, analysis and improvement of system operations and decision making; and the security of cyber-physical industrial systems. Industrial domains of interest include, but are not limited to, advanced manufacturing, energy, healthcare, transportation, and service systems. The review process will begin immediately, and the deadline for ensuring full consideration for the position is November 1, 2018. Please see full position description, requirements, and application instructions in the official position vacancy listing: https://www.ohr.wisc.edu/weblisting/External/PVLSummaryPrint.aspx?pvl_num=95935
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