

Kamran Paynabar

Assistant Professor

H. Milton Stewart School of Industrial and Systems Engineering

Table of Contents		
Section	Description	Page
I.	Earned Degrees	2
II.	Employment History	2
III.	Teaching	2
IV.	Scholarly Accomplishments	3
V.	Service	6
VI.	Grants and Contracts	7
VII.	Honors and Awards	8

I. EARNED DEGREES

The University of Michigan, Ann Arbor, MI Ph.D. in Industrial and Operations Engineering	April 2012
The University of Michigan, Ann Arbor, MI M.A. in Statistics	May 2010
Azad University, South Branch of Tehran, Tehran, Iran M.Sc. in Industrial Engineering	January 2004
Iran University of Science and Technology, Tehran, Iran B.Sc. in Industrial Engineering	September 2002

II. EMPLOYMENT

07/12-Present	<i>Assistant Professor</i> - H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology , Atlanta, GA
01/08-06/12	<i>Graduate Student Instructor/Research Assistant</i> , Industrial and Operations Eng. Department, University of Michigan , Ann Arbor, MI
09/04-09/07	<i>Lecturer</i> , Industrial Engineering Department, Azad University North Branch of Tehran , Tehran, Iran

III. TEACHING

A. INDIVIDUAL STUDENT GUIDANCE

Doctoral students

1. Chitta Ranjan. Started Research in September 2012. Completed comprehensive exam in September 2012.
 - Tentative dissertation topic: Statistical learning applications in healthcare planning and medical decision-making.
 - Finalist and first runner-up for the 2013 INFORMS Data Mining Best Student Paper Award Competition.
 - Winner of the 2015 POMS Best Paper Award Competition – College of Healthcare Operations Management
2. Hao Yan (with Jan Shi). Started Research in September 2012. Completed comprehensive exam in January 2013.
 - Tentative dissertation topic: Scalable methods for image-based process monitoring and defect detection.
 - Winner of the 2015 INFORMS QSR Best Paper Award Competition
 - Winner of the 2015 QCRE Best Student Paper Award Competition at ISERC
 - Winner of the 2014 INFORMS Data Mining Best Student Paper Award Competition
3. Samaneh Ebrahimi. Started Research in September 2013.

4. Xiaolei Fang (with Nagi Gebraeel). Started Research in January 2014.
5. Mostafa Reisi. Started Research in August 2015.

Independent study with undergraduate

- Kimberly Diaz, Summer 2015, Summer Undergraduate Research in Engineering/Science (SURE), “Study Process and Design Factors for Additive Manufacturing Improvement.”
- Chinaza Ochiobi, Summer 2015, Summer Undergraduate Research in Engineering/Science (SURE), “Minimizing 3D Printer Error.”
- Ahmad Azhan, Summer 2014, “Process Capability Analysis for CSM Bakery Products.”
- Timothy Lin, Summer 2014, “Process Capability Analysis for CSM Bakery Products.”
- Andres Martinez, Summer 2013, Summer Undergraduate Research in Engineering/Science (SURE), “Image-based process monitoring using CUSUM control charts.”

Independent study high-school students

- Nick Ahern, Spring 2015, Chamblee Charter High School, “Improving the functionality of trash cans in student food court using factorial designs”.
- Mitchell Gant, Spring 2015, Chamblee Charter High School, “Increasing the speed of skateboards through factorial designs”.
- Shuvajit Dey, Spring 2014, Chamblee Charter High School, “Statistical Analysis for Systems Performance Improvement”.

B. OTHER TEACHING ACTIVITIES

Curriculum development – Graduate education

ISyE 6810 - *Systems Monitoring and Prognostics*: This course was originally developed by N. Gebraeel in 2008 and was revised jointly by N. Gebraeel and K. Paynabar in Spring 2014. Paynabar significantly modified and updated the contents of the first module of the course on process monitoring.

Teaching

1. Instructor in ISyE at Georgia Tech (Average CIOS score: 4.9 out of 5)
 - ISyE 3039 - *Statistical Methods for Quality Improvement*, Spring 2015. (CIOS score: 4.9)
 - ISyE 6810 - *Systems Monitoring and Prognostics*, Spring 2015. (CIOS score: 5)
 - ISyE 3039 - *Statistical Methods for Quality Improvement*, Spring 2014. (CIOS score: 5)
 - ISyE 3039 - *Statistical Methods for Quality Improvement*, Fall 2013. (CIOS score: 4.9)
 - ISyE 6739 - *Statistical Methods*, Spring 2012. (CIOS score: 4.7)
 - ISyE 2028 - *Basic Statistical Methods*, Fall 2012. (CIOS score: 4.9)
2. Instructor in IOE at University of Michigan
 - IOE 466 - *Statistical Quality Control*, Fall 2011 and Winter 2012.
3. Graduate Student Instructor (TA) in IOE at University of Michigan
 - IOE 466 - *Statistical Quality Control*, Fall 2010.

IV. SCHOLARLY ACCOMPLISHMENTS

A. REFEREED PUBLICATIONS

A1. JOURNAL PUBLICATIONS (Published/Accepted)

- J1. Mesnil O., Yan, H.[†], Ruzzene M., Paynabar, K., Shi J., (2015). “Fast wavenumber measurement for accurate and automatic location and quantification of defect in composite”, *Structural Health Monitoring* (Accepted with minor revision).
- J2. Yan, H.[†], Paynabar, K., Shi, J., “Image Denoising and Anomaly Detection Via Smooth-Sparse Decomposition,” *Technometrics*, (Accepted).
- J3. Guo, W., Paynabar, K., Jin, J., Miller, B., Carpenter, J., “A decision support system on surgical treatments for rotator cuff tears”, *IIE Transactions on Healthcare Systems Engineering*, (Accepted).
- J4. Paynabar, K., Peihua, Q., and Zou C., (2015) “A Change Point Approach for Phase-I Analysis in Multivariate Profiles Monitoring and Diagnosis,” *Technometrics*, (Accepted).
- J5. Jafari-Khouzani¹, K., Emblem, E., Kalpathy-Cramer¹, K., Bjørnerud, A., Vangell, M., Gerstner, E., Schmainda K., Paynabar K., Batchelor, T., Wen, P., Rosen¹, B., Stuffelbeam¹, S., (2015) “Repeatability of cerebral perfusion measurements using susceptibility contrast MRI,” *Translational Oncology*, 8(3), 137–146.
- J6. Yan, H.[†], Paynabar, K., Shi, J., (2015) “Image-Based Process Monitoring Using Low Rank Tensor Decomposition,” *IEEE Transactions on Automation Science and Engineering*, Vol. 12, Issue 1, pp. 216-227.
- J7. Azarnoush, B., Paynabar K., Runger G., (2015) “Monitoring Temporal Homogeneity in Network Streams,” *Journal of Quality Technology*, (Accepted).
- J8. Paynabar, K., Jin, J., and M. Reed, (2014) “Hierarchical Non-Negative Garrote for Group Variable Selection,” *Technometrics*, (Accepted).
 - Best Student Paper Award in Data Mining Section of INFORMS in 2011
- J9. Paynabar, K., Jin, J., and M. Pacella, (2013) “Monitoring and Diagnosis of Multichannel Nonlinear Profile Variations Using Uncorrelated Multilinear Principal Component Analysis,” *IIE Transactions on Quality and Reliability Engineering*, Vol. 45, 1235-1247.
- J10. Shao, C., Paynabar, K., Kim, T., Jin J., Hu, J., Spicer, P., Wang H., and Abell, J., (2013) “Feature Selection for Manufacturing Process Monitoring Using Cross-Validation,” *Journal of Manufacturing Systems*, Vol. 32, Issue 4, pp. 550–555.
- J11. Paynabar, K., Jin, J., Agapiou, J., and Deeds, P. (2012) “Robust Leak Tests for Transmission Systems Using Nonlinear Mixed-Effect Models,” *Journal of Quality Technology*, Vol. 44, 265–278.
- J12. Paynabar, K., Jin, J., and Yeh. B. A. (2012) “Phase I Risk-Adjusted Control Charts for Monitoring Surgical Performance by Considering Categorical Covariates,” *Journal of Quality Tech.*, Vol. 44, 39-53.
- J13. Guo, H., Paynabar, K., and Jin, J. (2011) “Multiscale Monitoring of Autocorrelated Processes Using Wavelets Analysis,” *IIE Transactions on Quality and Reliability Engineering*, Vol. 44, 312-326.

[†]The author was a graduate student at Georgia Tech when (part of) this research was completed.

- J14. Paynabar, K., Jin, J. (2011) “Characterization of Nonlinear Profiles Variations using Mixed-effect Models and Wavelets,” *IIE Transactions on Quality and Reliability Engineering*, Vol. 43, 275–290.
- Best Application Paper Award from IIE Transactions in 2011
 - Richard C. Wilson Prize for The Best Student Paper in Manufacturing Systems in 2010
- J15. Abad, A., Paynabar, K., and Jin, J. (2011) “Modeling and Analysis of Operators Effect on Process Quality and Throughput in Mixed Model Assembly Systems,” *ASME Transactions, Journal of Manufacturing Science and Engineering*, Vol. 133, 021016-1~9.
- J16. Lei, Y., Paynabar, K., Jin, J. and Agapiou, J. (2009) “Cyclic Waveform Signal Analysis for Online Monitoring of Valve Seat Assembly Processes,” *Transactions of the NAMRI/SME*, 2009, Vol. 37. 459-466.
- J17. Noorossana, R., Saghaei, A., Paynabar, K., and Abdi, S. (2009) “Identifying the Time of a Change in High Quality Processes,” *Quality and Reliability Engineering International Journal*. Vol. 25, 875–883.
- J18. Noorossana, R., Saghaei, A., Paynabar, K., and Samimi, Y., (2007) “On the Conditional Decision Procedure for High Yield Processes,” *Computers and Industrial Engineering*. Vol. 53, 469–477.

A2. JOURNAL PUBLICATIONS (Submitted/Under review)

- J19. Yan, H.[†], Paynabar, K., Shi, J., “Monitoring of High-Dimensional Functional Data Streams Via Smooth-Sparse Decomposition,” (Under review).
- Best Quality, Statistics, and Reliability (QSR) Paper Award at INFORMS 2015.
- J20. Rahmandad H., Jalali M., Paynabar, K., “Quantitative Aggregation of Prior Statistical Findings”. (Under review)
- J21. Fang, X.[†], Paynabar, K., Gebraeel, N., “Multistream Sensor Fusion Based Prognostics Model for Systems with Single Failure Modes.” (Under review)
- J22. Woodall, W. H., Zhao, M., Paynabar, K., Sparks, R., and Wilson, J. D. (2015). “An Overview and Perspective on Social Network Monitoring”, (Under review).
- J23. Fang, X.[†], Paynabar, K., Gebraeel, N., “Scalable Prognostic Models for Big (sensor) Data Condition Monitoring Applications.” (Under review)
- J24. Ranjan C.[†], Paynabar, K., Helm, J., Pan J. “A new Semi-Markov model based clustering for Patient Flow Modeling and Optimization”, (Under review).
- POMS Best Paper Award – College of Healthcare Operations Management

A3. REFEREED CONFERENCE PROCEEDINGS

- C1. Mesnil O., Yan, H.[†], Ruzzene M., Paynabar, K., Shi J., (2015) “Guided Wavefield Reconstruction From Sparse Measurements Using Compressed Sensing,” 10th International Workshop on Structural Health Monitoring, Stanford, CA.
- C2. Mesnil O., Yan, H.[†], Ruzzene M., Paynabar, K., Shi J., (2014) “Frequency Domain Instantaneous Wavenumber Estimation for Damage Quantification in Layered Plate

- Structures,” 7th European Workshop on Structural Health Monitoring, Nantes, France.
- C3. Aminnayeri, M., Noorossana, R., Haghghi, M., and Paynabar, K., (2007) “Economic Statistical Design of T2 Control Charts for Systems with Gamma In-control Times,” 37th International Conference on Computers and Industrial Eng., Egypt.
- C4. M., Aminnayeri, Paynabar, K., and Arbabzade N., (2005) “Designing Geometric Zone Control Charts in High Quality Processes,” 35th International Conference on Computers and Industrial Eng., Turkey.

B. PRESENTATIONS

B1. CONFERENCE PRESENTATIONS (each paper is invited or abstract-reviewed)

- “Monitoring of High-Dimensional Image Streams Via Smooth-Sparse Decomposition,” Spring Research Conference, Cincinnati, May 2015.
- “Image Denoising and Defect Detection Via Smooth-Sparse Decomposition,” Joint Research Conference, Seattle, June 2014
- “A Change-point Approach for System Monitoring and Diagnosis Using Multichannel Profiles,”
 - ISBIS 2014 and SLDM Joint Meeting, Durham, June 2014.
 - Fourth International Workshop in Sequential Methodologies, Athens, July 2013.
 - INFORMS Annual Meeting, Phoenix, Oct. 2012.
- “Robust Leak Tests for Transmission Systems Using Nonlinear Mixed-Effect Models,” Invited talk in the Journal of Quality Technology session, INFORMS Annual Meeting, Phoenix, Oct. 2012.
- “Hierarchical Non-Negative Garrote for Group Variable Selection,” Best student paper competition in Data Mining section, INFORMS Annual Meeting, Charlotte, Nov. 2011 (Winner).
- “Characterization of Nonlinear Profiles Variations using Mixed-effect Models and Wavelets,”
 - Invited talk in the IIE Transactions session, INFORMS Annual Meeting, Charlotte, Nov. 2011.
 - Invited talk in the Department of Statistics, The University of Michigan, Dec. 2009.
- “Analysis of Heterogeneous Mortality Data for Assessing Surgical Operation Risk,” Department of Industrial and Systems Engineering, Rutgers University, Feb. 2011
- “Uncorrelated Multilinear Principal Component for Analysis of Multi-Channel Sensing Data,” QSR section on Functional Data Analysis Methods and Applications, INFORMS Annual Meeting, Charlotte, Nov. 2011.
- “Characterization of Nonlinear Profiles Variations using Mixed-effect Models and Wavelets,” QSR session on Advancements in Data Analysis, INFORMS Annual Meeting, San Diego, Oct. 2009.
- “Phase I Risk-Adjusted Control Charts for Monitoring Surgical Performance by Considering Categorical Covariates,”
 - Pierskalla Finalists, INFORMS Annual Meeting, Austin, Nov. 2010.

- Joint Session QSR/DM: Statistical Decision Making in Health Care Applications, INFORMS Annual Meeting, Austin, Nov. 2010.
- “Cyclic Waveform Signal Analysis for Online Monitoring of Valve Seat Assembly Processes,” The North American Manufacturing Research Conference (NAMRC), May, 2009.
- “Developing Run Rules Geometric Control Charts in High Yield Processes,” INFORMS Annual Meeting, Washington D.C., Oct. 2008.
- “Individual and Moving Range Control Charts Problems,” International Industrial Engineering Conference (IIEC), 2005.

B2. INVITED TALKS

- “Image Denoising and Defect Detection via Smooth-Sparse Decomposition,” Department of Statistics, Florida State University, Oct 2014.
- “Multistream Sensor Fusion Based Prognostics Model for Systems with Single Failure Modes,” Department of Industrial and Manufacturing Engineering, Florida State University, Oct 2014.
- “A Change-point Approach for System Monitoring and Diagnosis Using Multichannel Profiles,” Center for Signal and Information Processing, Georgia Tech, April. 2014.
- “A Change-point Approach for System Monitoring and Diagnosis Using Multichannel Profiles,” School of Computer Science, Georgia Tech, Nov. 2013.
- “Big Data Fusion Applications in Quality Improvement”, School of Building Construction, Georgia Tech, March 2013.
- “New Opportunities and Challenges in Quality Engineering,” Keynote Speaker, First International Quality Engineering Conference, Dec 2012
- “Waveform Signal Analysis for System Performance Improvement,” Department of Computer Science, Georgia State University, Nov. 2012
- “Waveform Signal Analysis for System Performance Improvement,” Industrial and Management Systems Engineering, University of South Florida, Jan 2012.
- “Waveform Signal Analysis for System Performance Improvement,” School of Industrial and Systems Engineering, Industrial Engineering Department, University of Arkansas, Feb 2012.
- “Waveform Signal Analysis for System Performance Improvement,” School of Industrial and Systems Engineering, Georgia Tech, Nov. 2011.

V. SERVICE

A. PROFESSIONAL CONTRIBUTIONS

- Board Member of Quality Control and Reliability Engineering Division of IIE since June 2013.
- Co-organizer of QCRE Track at ISERC 2016.
- Chair and organizer of 2014 and 2015 QCRE Best Student Paper Competition at ISERC conference.
- Chair and organizer of 2015 Data Mining Best Student Paper Competition at INFORMS Annual Meeting.
- Conference Session Organization

- Co-Chair and Co-organizer (with Chitta Ranjan) a session titled “Data Mining in Medical and Sociological Decision Making” at Data Mining Sections of INFORMS Annual Meeting, Nov. 2015.
- Chair and organizer a session titled “Image and Functional Data Analysis: Methods and Applications” at Quality, Statistics and Reliability Section of INFORMS Annual Meeting, Nov. 2015.
- Chair and organizer a session titled “Data Mining in Medical Decision Making and Bioinformatics Applications” at Data Mining and Health Applications Society Sections of INFORMS Annual Meeting, Nov. 2014.
- Chair and organizer a session titled “Image and Functional Data Analysis: Methods and Applications” at Quality, Statistics and Reliability Section of INFORMS Annual Meeting, Nov. 2014.
- Co-Chair and organizer (with Ran Jin) a session titled “Data Fusion in Healthcare Applications” at Quality, Statistics and Reliability Section of INFORMS Annual Meeting, Oct2013.
- Chair and organizer a session titled “Data Mining in Medical Decision Making and Bioinformatics Applications” at Data Mining and Health Applications Society Sections of INFORMS Annual Meeting, Oct. 2013.
- Chair and organizer two sessions titled “Image and Functional Data Analysis: Methods and Applications” at Quality, Statistics and Reliability Section of INFORMS Annual Meeting, Oct. 2013.
- Chair and organizer a session titled “Image and Functional Data Analysis: Methods and Applications” at Quality, Statistics and Reliability Section of INFORMS Annual Meeting, Oct. 2012.
- Chair and organizer a session titled “Data Mining in Medical Decision Making and Bioinformatics Applications” at Data Mining Section of INFORMS Annual Meeting, Oct. 2012.
- Co-Chair and organizer (with Judy Jin) a session titled “Profile Data Analysis: Methods and Applications” at Quality, Statistics and Reliability Section of INFORMS Annual Meeting, Nov. 2011.
- Refereeing for Journals
 - Technometrics, IIE Transactions – Quality and Reliability Engineering, Journal of Quality Technology, IIE Transactions – Design and Manufacturing, Journal of Applied Statistics, IEEE Transactions on Automation Science and Engineering, IEEE Transactions on Human-Machine Systems, Journal of Manufacturing Systems, Production and Operations Management (POM), Quality and Reliability Engineering International, International Journal of Quality in Health Care
- Guest Associate Editor for International Journal Quality Technology & Quantitative Management.
- Member of Institute for Operations Research and the Management Sciences (INFORMS), Quality, Statistics, and Reliability and Data mining section of INFORMS, Institute of Industrial Engineers (IIE), American Society for Quality (ASQ).

B. CAMPUS CONTRIBUTIONS

- Seminar Organizer: Georgia Tech ISyE 2012-Present. System Informatics and Control Seminars.
- Comprehensive PhD Exam committee for SIAC Track, Since 2013.
- Undergraduate advising: Research advisor in SURE (Summer Undergraduate Research in Engineering and Science) program in Summer 2013.
- PhD Thesis committee
 - Olivier Mensil (Aerospace, 2016)
 - Yuan Wang (ISyE 2016)
 - Tonya Woods (ISyE 2015)
 - Li Hao (ISyE, 2015)
 - Justin Vastola (ISyE, 2013)
 - Hin Kyeol Woo (ISyE, 2012)

C. OTHER CONTRIBUTIONS

- Mentoring and advising high-school interns, Chamblee Charter High School, 2014-present.
- Mentoring and advising under-represented minorities for undergraduate research, Gatech Summer Undergraduate Research Program, Summer 2013 and 2015.

VI. GRANTS AND CONTRACTS

A. AS PRINCIPAL AND CO-PRINCIPAL INVESTIGATOR

- Variation Analysis for Composite Manufacturing, Source: Boeing Company, PI: Paynabar, amount: \$300,000, Date: 1/1/2016 to 12/31/2018.
- A Prognostic Modeling Methodology for Multistream Degradation-based Signals: National Science Foundation (NSF), PI: Gebraeel (50%), co-PI: Paynabar (50%), amount \$320,000, Date: 12/1/2015 to 11/30/2018.
- EAGER: Big Data Analytics for Advanced Manufacturing Improvement, Source: National Science Foundation (NSF), PI: Paynabar, amount \$300,000, Date: 9/1/2014 to 8/31/2016.
- REU: Big Data Analytics for Advanced Manufacturing Improvement, Source: Sandia National Lab, PI: Paynabar, K., amount: \$22,000, Date: 6/1/2015.
- Variation Analysis for Composite Manufacturing, Source: Boeing Company, PI: Shi (50%), co-PI: Paynabar (50% : \$135,000), amount: \$270,000, Date: 1/1/2013 to 12/31/2015.
- Reliability Modeling, Analysis, and Improvement of FUSE Video System (April 2014 ~ April 2015), Source: Endochoice Company, PI: Paynabar, K. (50%: \$40,000), Co-PI: Shi, J. (50%), amount: \$80,000, Date: 3/1/2014 to 2/30/2015.
- Process Capability Analysis and Improvement, Source: CSM Bakery, PI: Paynabar, K., amount: \$22,000, Date: 4/1/2014 to 1/1/2015.
- A Statistical Framework for Modeling & Prediction of Hospital Readmissions, Source: George Family Foundation grant, PI: Paynabar, K., amount: \$5,000, Date: 6/1/2015.

- An Integrated Statistical-Optimization Approach for Hosital Census Model, Source: George Family Foundation grant, PI: Paynabar, K., amount: \$10,000, Date: 6/1/2015.
- A Decision Support System for Treatment Determination of Rotator Cuff Tears Patients, Source: George Family Foundation grant, PI: Paynabar, K., amount: \$5,000, Date: 3/1/2014.

VII. HONORS AND AWARDS

- QSR Best Paper Award – INFORMS Annual Meeting (2015) for the paper “Monitoring of High-Dimensional Functional Data Streams Via Smooth-Sparse Decomposition.”
- POMS Best Paper Award – College of Healthcare Operations Management (2015) for the paper “A new Semi-Markov model based clustering for Patient Flow Modeling and Optimization.”
- CETL/BP Junior Faculty Teaching Excellence Award (2014), A Georgia Tech award to recognize excellent teaching and educational innovation that Junior Faculty bring to campus.
- Nominated and Invited to 2014 Frontiers of Engineering Education Symposium (2014), by National Academy of Engineering (acceptance rate ~20%).
- Class of 1969 Teaching Fellow (2013), Center for the Enhancement of Teaching and Learning (CETL), Georgia Institute of Technology
- Best Application Paper Award from IIE Transactions (2011), for paper “Characterization of Nonlinear Profiles Variations using Mixed-Effect Models and Wavelets,” IIE Transactions on Quality and Reliability Engineering, Vol. 43, 275–290.
- Best Student Paper Award in Data Mining Section of INFORMS (2011) for the paper; “Hierarchical Non-Negative Garrote for Group Variable Selection”.
- “Thank a Teacher Certificates” for teaching ISyE 2028 (Fall 2012) and ISyE 3039 (Fall 2013), Center for the Enhancement of Teaching and Learning, Georgia Institute of Technology.
- Richard C. Wilson Prize (2010) for The Best Student Paper in Manufacturing Systems; “Characterization of Nonlinear Profiles Variations using Mixed-Effect Models and Wavelets”. Industrial and Operations Engineering Department, University of Michigan.
- Future Academician Colloquium attendee at INFORMS Annual Meeting (2010).
- National Elite recognized by Iranian National Elite Society (2008) for distinguished academic performance and research activities.
- Second Place in Ph.D. Entrance Exam (2004), Department of Industrial Engineering, Amirkabir University of Technology, Tehran, Iran.
- Outstanding M.Sc. Student Award (2003), Azad University, South branch of Tehran, Iran.