The Systems Realization Laboratory @ OU
Carson Engineering Building 218
Fast Facts
September 7, 2017

FAST FACTS
Co-Directors
Professor Janet K. Allen. John and Mary Moore Chair. ISE
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Professor Farrokh Mistree. L.A. Comp Chair. AME
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Fall 2017
Doctoral Candidates
1. Jelena Milisavljevic. ME
2. Anand Balu Nellipalliil. ME

Doctoral Students
3. Reza Alizadeh. ISE
4. Jackson Autrey. ME
5. Shalaka Ghiasas. Education. Supervised with Xun Ge and Zahed Siddique
6. Lin Guo. ISE
7. Abhishek Yadav. ISE

MS students
8. Ali Shahbazi (ME)
9. Gehendra Sharma (ME)

Undergraduate Honors College
10. Pranav Mohan (ME)

Visiting Scholars from Beijing Institute of Technology. Co-supervised with Dr. Guoxin Wang.
11. Xiwen Shang. MS
12. Ru Wang. PhD

Collaborators Academia
1. Florida International University, Miami. Dr. Shabnam Rezapour.
2. Indian Institute of Technology, Kanpur, India. Professor Amarendra K. Singh.
3. Indian Institute of Technology, Kharagpur, India. Dr. Ram Babu Roy.
4. Institute for Industrial Engineering, Beijing Institute of Technology, Beijing, China. Dr. Guoxin Wang and Dr. Zhenjun Ming.
5. Mississippi State University. Professor Mark. F. Horstemeyer.
6. National Institute of Science and Technology (India). Dr. Ashok Das and Sangram Mudali.
7. Purdue University, West Lafayette, IN. Dr. Jitesh Panchal.
8. University of Nevada, Reno, NV. Dr. Sesh Commuri.
11. University of Texas at Tyler. Dr. Chung-Hyun Goh.

Collaborators Industry
13. Tata Consultancy Services Research, Pune, India: Dr. BP Gautham, Dr. Vinay Kulkarni, Souvik Barat, Nagesh Kulkarni, Rishabh Shukla and Pramod Zagade.
**SRL FAMILY MISSION**
We are a multicultural, multidisciplinary academic family focused on educating the next generation of professors. We provide an opportunity for each person to learn how to dream and rise to his/her full potential and contribute to the scholarship associated with the realization of complex engineered systems.

**BIG PICTURE RESEARCH FOCUS**
*IT/OT convergence* is the integration of information technology (IT) systems used for data-centric computing with operational technology (OT) systems used to monitor events, processes and devices and make adjustments in enterprise and industrial operations.

**PDSIDES**
A decision-based computational framework to manage (off-line and in real-time) complexity and risk associated with the realization of complex (cyber-physical-social) systems that necessitate the integration of information technology and operational technology.

**RESEARCH THRUST**
Define the emerging frontier for “intelligent” decision-based realization of complex (cyber-physical-social systems) when the computational models are incomplete and inaccurate.

**PROJECTS AND ANTICIPATED OUTCOMES**
For relationship between collaborators on projects see Poster on Page 7.

| Project 1: Knowledge-Based Platform for Decision Support in the Design of Engineered Systems (PDSIDES) |
| Collaborators |
| OU: Janet K. Allen (ISE), Farrokh Mistree (AME) |
| Institute for Industrial Engineering, Beijing Institute of Technology: Drs. Zhenjun Ming and Guoxin Wang |
| **Funded by** |
| Beijing Institute of Technology, China |
| L.A. Comp Chair, School of Aerospace and Mechanical Engineering |
| **Anticipated Outcome** |
| A decision-based computational framework to manage (off-line and in real-time) complexity and risk associated with the realization of complex (cyber-physical-social) systems that necessitate the integration of information technology and operational technology. |

| Project 2: Integrated Realization of Engineered Materials, Products, and Associated Manufacturing Processes |
| Collaborators |
| OU: Janet K. Allen (ISE), Farrokh Mistree (AME) |
| Purdue: Dr. Jitesh H. Panchal |
| Indian Institute of Technology, Kanpur, India: Professor Amarendra K. Singh |
| Tata Consultancy Services: Dr. BP Gautham |
| **Funded by** |
| Tata Consultancy Services, Pune, India |
Anticipated Outcomes
A computational framework within PDSIDES to facilitate the vertical and horizontal integration of models by means of a goal-oriented, simulation-assisted, decision-based inverse design exploration of a material hierarchy to satisfy a ranged set of product and manufacturing process-level performance requirements.

Project 3: Knowledge-Based Management of Computational Complexity and Risk, and the Exploration of the Solution Space
Collaborators
OU: Janet K. Allen (ISE), Farrokh Mistree (AME), Thomas Neeson (Geography and Environmental Sustainability)
Florida International University: Dr. Shabnam Rezapour

Funded By
John and Mary Moore Chair, School of Industrial and Systems Engineering
L.A. Comp Chair, School of Aerospace and Mechanical Engineering

Anticipated Outcome
A module within PDSIDES to facilitate rapid execution of decision workflows associated with the realization of complex (cyber-physical-social) systems and the exploration of the solution space to manage risk.

Project 4: Knowledge-Based Dynamic Management of Multi-stage Complex Processes
Collaborators
OU: Janet K. Allen (ISE), Farrokh Mistree (AME)
Institute for Industrial Engineering, Beijing Institute of Technology: Drs. Zhenjun Ming and Guoxin Wang
Tata Consultancy Services: Dr. BP Gautham

Funded by
Tata Consultancy Services, Pune, India

Anticipated Outcome
A data-centric computational module within PDSIDES to monitor devices and manufacturing processes while making adjustments in multi-stage industrial operations to improve operating performance and quality across the system.

Project 5: Enterprise Modeling of Society Systems and Socio-Techno Systems for Rural Development
Collaborators
OU: Janet K. Allen (ISE), Farrokh Mistree (AME)
Tata Consultancy Services: Dr. Vinay Kulkarni
SunMoksha Power Pvt. Ltd.: Dr. Ashok Das

Funded by
L.A. Comp Chair, School of Aerospace and Mechanical Engineering
Anticipated Outcomes
A computational framework for corporate social responsibility and other financiers to work with social entrepreneurs to invest in the realization of smart nano-power in Indian off-grid villages, aimed at improving the quality of villagers’ life to mainstream future generations and arrest environmental degradation.

Project 6: Contextual Assessment of Student Learning through Reflection on Doing
Collaborators
OU: Janet K. Allen (ISE), Farrokh Mistree (AME), Zahed Siddique (AME), Xun Ge (Education)

Anticipated Outcomes
A framework for evaluating student learning in engineering design, build and test courses through text mining and linguistic analysis of MadLibs in the form of Learning Statements.
A data-driven method for instructors of engineering design, build and text courses to improve the course to facilitate and interpret learning.

PUBLICATIONS Since January 2016.
Accessed September 1, 2017
Citations 11,112. h-index 51. i10-index 201. Since 2012: Citations 3543. h-index 27. i10-index 78.

Refereed Chapters in Books

Refereed Journal Articles


Articles in Refereed Conference Proceedings


1 Recognized as a Paper of Distinction.


The SYSTEMS REALIZATION LABORATORY @ OU
Fall 2017

SRL Family Mission
We are a multicultural, multidisciplinary academic family focused on educating the next generation of professionals.

We provide an opportunity for each person to learn how to dream and rise to his/her full potential and contribute to the scholarship associated with the realization of complex engineered systems.

Research Focus
Shape the emerging frontier for “intelligent” decision-based realization of complex (cyber-physical-social) systems when the computational models are incomplete and inaccurate.

SRL Family Learning Community

Anticipated Outcomes
- A data-centric computational model to monitor devices and manufacturing processes while making adjustments in real time.

Knowledge-Based Dynamic Management of Multi-stage Complex Processes

Anticipated Outcome
- Knowledge-based framework to manage complex (cyber-physical-social) systems that facilitates the integration of information technology and operational technology.

Enterprise Modeling of Society Systems and Socio-Techno Systems for Rural Development

Anticipated Outcome
- A computational framework for corporate social responsibility and other initiatives to work with social entrepreneurs to improve the realization of smart nano-power in rural Indian villages, aimed at improving the quality of village life and maintaining future generations and natural environmental degradation.

International Systems Realization Partnership
Design Engineering Laboratory, Purdue University, West Lafayette, Indiana, USA

Institute of Industrial Engineering, Zhejiang, China

Systems Realization Laboratory, University of Oklahoma, Norman, Oklahoma, USA

Collaborators at Academic Institutions
- Beijing Institute of Technology, China
- Indian Institute of Technology, Kanpur, India
- Indian Institute of Technology, Kharagpur, India
- Mississippi State University, Starkville, Mississippi, USA
- National Institute of Science and Technology, Bhopal, India
- National Institute of Science and Technology, Berhampur, India
- Purdue University, West Lafayette, Indiana, USA
- University of Nevada, Reno, Nevada, USA
- University of New South Wales, Sydney, Australia
- University of Texas, Tyler, USA

Industrial Partners
SCL Consulting Services Research, Pune, India
Surinacham Power Pvt. Ltd., Bangalore, India

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SRL@OU FAST FACTS AND ANTICIPATED OUTCOMES