

# Harsha Gangammanavar

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<b>Education</b>	<b>Ohio State University</b> Ph.D. Integrated Systems Engineering, <i>Dissertation Title:</i> Multiple Timescale Stochastic Optimization with Application to Integrating Renewable Resources in Power Systems <i>Advisor:</i> Prof. Suvrajeet Sen <i>Minors:</i> Computer Science and Statistics	<b>Columbus, OH</b> August 2013
	M.S. Electrical and Computer Engineering	December 2009
	<b>Visvesvaraya Technological University</b> B.E. Electronics and Communications Engineering	<b>Bangalore, India</b> May 2007
<b>Appointments</b>	<b>Southern Methodist University</b> Operations Research and Engineering Management <i>Assistant Professor</i>	<b>Dallas, TX</b> August 2016 - present
	<b>Clemson University</b> Industrial Engineering <i>Adjunct Assistant Professor</i>	<b>Clemson, SC</b> April 2017 - July 2021
	<b>Clemson University</b> Industrial Engineering <i>Postdoctoral Fellow</i>	<b>Clemson, SC</b> July 2015 - July 2016
	<b>University of Southern California</b> Industrial and Systems Engineering <i>Visiting Assistant Professor</i>	<b>Los Angeles, CA</b> August 2013 - May 2015
	<b>Ohio State University</b> Integrated Systems Engineering <i>Graduate Research and Teaching Assistant</i>	<b>Columbus, OH</b> January 2010 - July 2013
<b>Research Interests</b>	<i>Methodologies:</i> Multistage stochastic programming, large scale data-driven optimization, approximate dynamic programming. <i>Applications:</i> Renewable energy integration in power systems, communication networks, health care logistics.	
<b>Journal Publications</b>	J14. S. Ariyaratne <sup>†</sup> , H. Gangammanavar, and R. Sundararajan, Change Point Detection in Nonstationary Sub-Hourly Wind Time Series, <i>Applied Energy</i> , Volume 310, 118501, 2022.	
	J13. S. Atakan, H. Gangammanavar and S. Sen, Stochastic Hierarchical Planning for High Renewable Power Systems, accepted for publication in <i>European Journal on Operational Research</i> , December 2021.	

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<sup>†</sup>Undergraduate student advisee

- J12. D. Troxell<sup>‡</sup>, H. Ahn, and H. Gangammanavar, A Cardinality Minimization Approach to Security-Constrained Economic Dispatch, accepted for publication in *IEEE Transactions on Power Systems*, November 2021.
- J11. A. Alobaidi, M. Khodayar, A. Vafamehr, H. Gangammanavar, and M. Khodayar, Security Constrained Expansion Planning of Battery Energy Storage in Distribution Network with Data Centers, in *International Journal of Electrical Power and Energy Systems*, Volume 133, 107231, December 2021.
- J10. H. Gangammanavar and S. Sen, Stochastic Dynamic Linear Program: A Distribution-free Multistage Stochastic Programming Algorithm, *SIAM Journal on Optimization*, 31:3, 2111-2140, 2021.
- J9. S. Yin, J. Wang, and H. Gangammanavar, Stochastic Market Operation for Coordinated Transmission and Distribution Systems, in *IEEE Transactions on Sustainable Energy*, vol. 12, no. 4, pp. 1996-2007, October 2021.
- J8. H. Gangammanavar, Y. Liu, and S. Sen, Stochastic decomposition for two-stage stochastic linear programs with random cost coefficients, *INFORMS Journal on Computing*, 33(1):51-71, January 2021.
- J7. S. Wang<sup>§</sup>, S. J. Mason, and H. Gangammanavar, Stochastic optimization for flow-shop scheduling with on-site renewable energy generation using a case in the United States, *Computers and Industrial Engineering*, 149:106812, 2020.
- J6. S. Wang<sup>§</sup>, H. Gangammanavar, S. Ekşioğlu, and S. J. Mason, Statistical estimation of operating reserve requirements using rolling horizon stochastic optimization, *Annals of Operations Research*, 292(1): 371-397, 2020.
- J5. Z. Azadi<sup>§</sup>, H. Gangammanavar, and S. Ekşioğlu, Developing childhood vaccine administration and inventory replenishment policies that minimize open vial wastage. *Annals of Operations Research*, 292(1): 215-247, 2020.
- J4. S. Wang<sup>§</sup>, H. Gangammanavar, S. D. Eksioğlu and S. J. Mason, Stochastic Optimization for Energy Management in Power Systems With Multiple Microgrids, in *IEEE Transactions on Smart Grid*, vol. 10, no. 1, pp. 1068-1079, Jan. 2019.
- J3. H. Gangammanavar and S. Sen, Two-scale Stochastic Optimization for Controlling Distributed Storage Devices, in *IEEE Transactions on Smart Grid*, vol. 9, no. 4, pp. 2691-2702, July 2018.
- J2. H. Gangammanavar, S. Sen and V. M. Zavala, Stochastic Optimization of Sub-Hourly Economic Dispatch With Wind Energy, in *IEEE Transactions on Power Systems*, 31(2), 949-959, March 2016.
- J1. R. Li, H. Gangammanavar and A. Eryilmaz, Optimal Dynamic Coding and Rate-Control for Serving Deadline-Constrained Traffic over Time-Varying Channels, in *IEEE Transactions on Information Theory*, 58(10):6556-6571, 2012.
- P2. Z. Azadi<sup>§</sup>, H. Gangammanavar and S. D. Ekşioğlu, Stochastic Optimization for Vaccine Vial Replenishment, in *Proceedings of the 2016 Industrial and Systems Engineering Research Conference (ISERC)*, Anaheim, CA.
- P1. H. Gangammanavar and A. Eryilmaz, Dynamic Coding and Rate-Control for Serving Deadline-Constrained Traffic over Fading Channels, in *Proceedings of IEEE International Symposium on Information Theory (ISIT)* Austin TX, pp. 1788-1792, 13-18 June 2010.

## Conference Proceedings

<sup>‡</sup>Graduate student advisee

## Papers Under Review

- R4. D. Wood, S. Çetinkaya, H. Gangammanavar, L. Weigu, and J./ Wang, On the Value of a Multistage Optimization Approach for Intensity-Modulated Radiation Therapy Planning, 2022 (submitted).
- R3. S. Tabrizian<sup>†</sup>, H. Gangammanavar, and H. Üster, An Adaptive Cluster Sampling-based Solution Method for Two-stage Stochastic Linear Programs, 2020 (under review).
- R2. H. Gangammanavar and M. Bansal, Stochastic Hierarchical Planning for High Renewable Power Systems, 2020 (under review).
- R1. N. Sakhavand<sup>†</sup> and H. Gangammanavar, Subproblem Sampling-based Stochastic Programming Method for Power Systems Planning and Operations Problems, 2020 (under review).

## Grants

- G1. “Data Assimilation for Radiation Therapy Planning via Optimization: Adaptive Deterministic Models”, Role: PI (with S. Çetinkaya), SMU Lyle School Research Seed Funding, \$30,500.00, March - December 2020.
- G2. “Multi-temporal Flexibility Services in Transactive Energy Architecture”, Role: Co-PI (with M. Khodayar), SMU Lyle School Research Seed Funding, \$23,760.00, March - December 2018.
- G3. “A Data-Driven Support System for Coordinated Operation of Electricity and Natural Gas Infrastructure”, Role: PI (with M. Khodayar), SMU Lyle School Research Seed Funding, \$25,080.00, March - December 2017.
- G4. “Statistical Optimality, Algorithms and Resilience in Time-Staged Stochastic Systems”, Role: Co-PI (with S. Sen (PI)), Air Force Office of Scientific Research, #FA9550-15-1-0267, \$450,000, August 2015 - December 2018.

## Honors

- Honorable mention at Undergraduate Operations Research Prize (for UG student D. Troxell and M. Ahn), INFORMS Annual Meeting, Anaheim, Oct. 2021;
- Fellow of the Dedman College Interdisciplinary Institute 2017-18, Southern Methodist University;
- Honorable mention at Minority Issues Forum poster competition (with Z. Azadi\* and S. Eksioglu), INFORMS Annual Meeting, Nashville, Nov. 2016;
- Postdoctoral Fellowship, Clemson University, 2015-16;
- Travel grant recipient, PhD Winter School, 2011;
- Travel grant recipient, Illinois Wireless Summer School, 2009.

## Courses taught

At Southern Methodist University\*

- EMIS 3360 Operations Research (UG): Spring 2017 (26), 2018 (20), 2019 (24), Fall 2021 (25);
- EMIS 8360 Operations Research Models (G): Fall 2016 (26), 2017 (13), 2018 (15), 2020 (4), Spring 2020 (10), 2021 (2);
- EMIS 8371 Linear Programming (G): Fall 2018 (6), 2019 (9);
- EMIS 8384 Stochastic Programming (G): Spring 2018 (13), Spring 2020 (6);

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\*Parenthetical terms indicate course enrollment size.

At University of Southern California

- ISE 310 Facilities and Logistics (UG): Spring 2015;
- ISE 330 Introduction to Operations Research: Deterministic Models (UG): Spring 2015, 2014; Fall 2014, 2013;
- ISE 499 Special Topics: Integrative Systems Engineering (UG): Spring 2015, 2014;
- ISE 536 Linear Programming and Extensions (G): Fall 2014.

**Ph.D.  
Supervision**

- Sakitha Ariyaratne, PhD Candidate  
OREM, SMU.
- Niloofar Fadavi, PhD Student  
OREM, SMU.
- Mahsa Sheikhihafshajani, PhD Student  
OREM, SMU (co-advised with Sila Çetinkaya).
- Siavash Tabrizian, PhD, December 2021  
OREM, SMU (co-advised with Halit Uster)  
Thesis: “Sampling-based Algorithms for Two-stage Stochastic Programs and Applications”.

**Masters  
Supervision**

- Nahal Sakhavand, MS  
EMIS, Southern Methodist University. Graduated: Summer 2018.

**Undergraduate  
Mentoring**

- David Troxell, BS-MS  
OREM, Southern Methodist University. Graduated: Spring 2021.

**Professional  
Society Service**

- *Organization Committee Member:*
  - Program committee (Energy System Track) at IISE Annual Conference and Expo 2022;
  - NSF Operations Engineering Workshop, SMU, March 2019.
- *Conference Session Chair:*
  - INFORMS Annual Meetings 2021 (Anaheim), 2019 (Seattle), INFORMS 2018 (Phoenix), 2014 (San Francisco).
- *Referee:* *Operations Research*, *INFORMS Journal on Computing*, *INFORMS Journal on Optimization*, *SIAM Journal on Optimization*, *Computational Optimization and Applications*, *IISE Transactions*, *Optimization Letters*, *Energy Systems*, *Omega: International Journal of Management Science*, *IEEE Transaction on Power Systems*, *IEEE Transactions on Smart Grid*, *IEEE Transactions on Sustainable Energy*, *Electric Power Systems Research*, *IET Generation, Transmission and Distribution*.
- *Panelist:* National Science Foundation, 2017.
- *Committee Member:* George Nicholson Student Paper Competition, INFORMS 2020, 2021; INFORMS-ENRE Student Paper Competition, INFORMS, 2018.
- *Faculty Advisor:* SMU INFORMS Student Chapter, 2018-Present.
- *Vice-President:* Ohio State University INFORMS Student Chapter, 2011-2012.

**Professional  
Society  
Membership**

- Institute for Operations Research and Management Science (INFORMS): Optimization Society and Computing Society
- Society of Industrial and Applied Mathematics (SIAM)
- Mathematical Optimization Society (MOS).

**Graduate  
Committee  
Service**

- Abdulraheem Alobaidi, EE-Ph.D., Southern Methodist University (ongoing)
- Hedieh Ashrafi, OREM-Ph.D., Southern Methodist University (ongoing)
- Justin B. Brown, OREM-Ph.D., Southern Methodist University (ongoing)
- Bin Huang, EE-Ph.D., Southern Methodist University (ongoing)
- Toby Huskinson, OREM-Ph.D., Southern Methodist University (ongoing)
- Chengyu Ke, OREM-Ph.D., Southern Methodist University (ongoing)
- Yanling Lin, EE-Ph.D., Southern Methodist University (ongoing)
- You Lin, EE-Ph.D., Southern Methodist University (ongoing)
- Xinyun Lu, EE-Ph.D., Southern Methodist University (ongoing)
- Emily McIntosh, OREM (Praxis Proposal), Southern Methodist University (ongoing)
- Tao Wu, EE-Ph.D., Southern Methodist University (ongoing)
- Shengfei Yin, EE-Ph.D., Southern Methodist University (2021)
- Shasha Wang, IE-Ph.D., Clemson University (2020)
- Mohammed Abdul Qaudeer (Praxis Proposal), Southern Methodist University (2020)
- Mahdi Khodayar, EE-Ph.D., Southern Methodist University (2020)
- Mohammed A Qaudeer, EMIS (Praxis Proposal), Southern Methodist University (2020)
- Xinan Wang, EE, Southern Methodist University (2020)
- Ying Zhang, EE, Southern Methodist University (2020)
- Naderehsadat Mansouri, EMIS-Ph.D., Southern Methodist University (2019)
- Peng Yang, EMIS (Praxis Proposal), Southern Methodist University (2019)
- Amin Ziaiefar, EMIS-Ph.D., Southern Methodist University (2019)
- Site Wang, IE-Ph.D., Clemson University (2018).

**Administrative  
Service**

- Member and chair, Course Coordination Committee on OR Methods, 2019 – present;
- Member, Accreditation and Academic Programs, 2020 – present;
- Member, Faculty search committee, 2018 – present.

- Invited Seminars**
- Decision Sciences Area Seminar, Indian Institute of Management, Bangalore, December 2021.
  - Industrial Engineering, University of Houston, March 2021.
  - Industrial, Manufacturing, and Systems Engineering, University of Texas at Arlington, December 2018.
  - Center for Applicable Mathematics, Tata Institute of Fundamental Research, Bangalore, July 2018.
  - Department of Mechanical Engineering, University of Texas at Dallas, June 2018.
  - Dedman College Interdisciplinary Institute (DCII), Operations Research and Statistics Cluster towards Integrative Analytics, SMU, February 2017.
  - Department of Engineering Management, Information, and Systems, Southern Methodist University, February 2016.
  - Industrial Engineering Technical Innovation Seminar Series, Clemson University, November 2016.
  - Ming Hsieh Department of Electrical Engineering, University of Southern California, October 2014.
  - Daniel J Epstein Department of Industrial and Systems Engineering, University of Southern California, October 2014.

- Conference Presentations**
- *A Sampling-based Branch And Cut Algorithm For Two-stage Stochastic Mixed Integer Programs*,
    - INFORMS Annual Meeting, Anaheim, 2021.
  - *A Sequential Sampling Method For Distributionally Robust Stochastic Programs*,
    - INFORMS Optimization Society Conference, Greenville, SC, March 2020.
    - International Conference on Stochastic Programming, Trondheim, July 2019.
  - *Stochastic Decomposition for Two-stage Stochastic Linear Programs with Random Cost Coefficients*,
    - INFORMS Annual Meeting, Phoenix, Nov. 2018.
  - *Stochastic Programming Framework for Coordinated Operation of Power Systems with Multiple Microgrids*,
    - International Symposium on Mathematical Programming, Bordeaux, July 2018.
    - INFORMS Optimization Society Conference, Denver, March 2018.
  - *Sequential Sampling Based Optimization for Power Systems Application*, INFORMS Annual Meeting, Nashville, Nov. 2016.
  - *Convergence Proofs of SDDP and Multi-stage Stochastic Decomposition* with S. Sen, International Conference on Stochastic Programming, Buzios, Brazil, June 2016.
  - *Stochastic Dynamic Linear Programming: A Sequential Sampling Algorithm* with S. Sen,
    - INFORMS Optimization Society Conference, Greenville, SC, March 2020.
    - 21st Conference of the International Federation of Operational Research Societies, Quebec City, Canada, July 2017,

- SIAM Conference on Optimization, Vancouver, Canada, May 2017,
- International Conference on Stochastic Programming, Buzios, Brazil, June 2016.
- *Stochastic Optimization for Vaccine Vial Replenishment* with Z. Azadi and S. D. Eksiöglu:
  - INFORMS Annual Meeting, Nashville, Nov. 2016 (Honorable mention at MIF poster competition)
  - IIE Annual Conference, Anaheim, May 2016.
- *A Rolling-Horizon Stochastic Optimization with Application in Power System* with S. Wang, S. D. Eksiöglu and S. Mason, IIE Annual Conference, Anaheim, May 2016.
  - INFORMS Annual Meeting, Nashville, Nov. 2016
  - IIE Annual Conference, Anaheim, May 2016.
- *A Stochastic Optimization Framework for Distributed Decision-Making in Power Systems* with S. Wang, S. D. Eksiöglu and S. Mason, IIE Annual Conference, Anaheim, 2016.
  - INFORMS Annual Meeting, Nashville, Nov. 2016
  - IIE Annual Conference, Anaheim, May 2016.
- *Multiple Timescale Stochastic Optimization for Integrating Renewable Resources* with S. Sen:
  - INFORMS Annual Meeting, San Francisco, Nov. 2014
  - Workshop on Optimization Under Uncertainty: Energy, Transportation and Natural Resources, University of California-Davis, Nov. 2014
  - Smartgrid Challenges, University of Arizona, Tucson, Mar. 2013.
- *Stochastic Optimization of Sub-hourly Economic Dispatch with Wind Generation*
  - INFORMS Annual Meeting, San Francisco, Nov. 2014
  - INFORMS Annual Meeting, Minneapolis, Oct. 2013.
- *Dynamic Coding and Rate-Control for Serving Deadline-Constrained Traffic over Fading Channels*, with A. Eryilmaz, IEEE International Symposium on Information Theory (ISIT), Austin, Jun. 2010.

#### Workshops Attended

- “Deep Learning”, 25th Annual Teaching Effectiveness Symposium, Center for Teaching Excellence, Southern Methodist University, August 2017.
- New Faculty Colloquium, INFORMS Annual Meeting 2016, Nashville, October 2016.
- “A Conversation between Artificial Intelligence, Operations Research and Control Theory on Stochastic Optimization”, NSF Workshop at Rutgers University, 2012.
- “Managing Uncertainty in Energy Infrastructure Investments”, Ph.D. Winter School, Oppdal, Norway, 2011 (recipient of workshop travel grant).
- Ph.D. Workshop at 12th International Conference on Stochastic Programming, Halifax, NS, Canada, 2010.
- Illinois Wireless Summer School, University of Illinois, Urbana-Champaign, IL, 2010 (recipient of summer school travel grant).