

Avimanyu Sahoo, Ph.D.

Assistant Professor, Electrical Engineering

EDUCATION

Ph.D. Electrical Engineering	2015
<i>Missouri University of Science and Technology (MS&T), Rolla, MO</i>	
M.Tech. Electrical Engineering	2011
<i>Indian Institute of Technology (BHU), Varanasi, Uttar Pradesh, India</i>	
B.S. Electrical Technology	2008
<i>Cochin University of Science and Technology, Kochi, Kerala, India</i>	

PROFESSIONAL APPOINTMENTS

Assistant Professor	2022-Present
<i>Electrical and Computer Engineering, University of Alabama, Huntsville, AL</i>	
Associate Professor	2022
<i>Electrical Engineering Technology, DET, OSU, Stillwater, OK</i>	
Graduate Advisor	2020-2022
<i>MSET with option in Mechatronics and Robotics (MSET-MERO), Division of Engineering Technology (DET), Oklahoma State University (OSU), Stillwater, OK</i>	
Program Coordinator	2019-2022
<i>BSET Electrical Engineering Technology, DET, OSU, Stillwater, OK</i>	
Assistant Professor (Mechatronics)	2016-2022
<i>Electrical Engineering Technology, DET, OSU, Stillwater, OK</i>	
Adjunct Assistant Professor	2016-present
<i>School of Electrical and Computer Engineering, OSU, Stillwater, OK</i>	
Senior Application Engineer	2015-2016
<i>The DEI Group, Millersville, MD</i>	

HONORS AND AWARDS

- **2021: UAT Award**, Excellence in Academic Program Assessment for demonstrating innovation, excellence, and dedication to program outcomes assessment planning, reporting, and implementation, 2020-2021.
- **2021: Faculty Award**, Leadership and Abiding Commitment to Diversity, Equity, Inclusion, and Awareness, April 22, 2021.
- **2020: Associate Editor**, Nonlinear Control, Frontiers in Control Engineering Journal from 2020 to present.
- **2019: Keynote Speaker**, 1st International Conference on Advancement in Engineering Sciences, Shri Mata Vaishno Devi University, Jammu, India, Sep. 29, 2019.
- **2019: General and Program Chair**, International Mechatronics Conference and Exhibition, Stillwater, OK, Oct. 23-25, 2019.
- **2018: Academic Editor**, Complexity Journal, Hindwai Publications from 2017 to 2020.

- **2017: Task Force Member**, IEEE Computational Intelligence Society for Adaptive Dynamic Programming and Reinforcement Learning from 2017 to present.
- **2011: IIT(BHU), Varanasi Gold Medal**, First Position in Department of Electrical Engineering Examination (Masters of Technology).

TEACHING

Undergraduate and Graduate Courses, UAH, AL 2022-present

- EE 486/586 Modern Control Systems (Graduate and Undergraduate - F'22)

Undergraduate and Graduate Courses, DET, OSU, Stillwater 2016-present

- MERO 5060: Special Topics in Mechatronic (Robot Operating Systems) (Graduate - S'22)
- MERO 5123: Mechatronic System Design II (Graduate - S'22)
- MERO 5113: Mechatronic System Design I (Graduate - F'21)
- EET 4314: Elements of Control (Undergraduate - F'20)
- EET/MET 3803: Fundamentals of Mechatronics (Undergraduate - S' 17, F'17, S'18, F'18, S'19, F'19, S'20, F'20, S'21)
- EET 4833/MET 4103: Industrial Design Project I/Senior Design I (Undergraduate - F'17, F'18, F'19, F' 20, F'21)
- EET 4843/MET4123: Industrial Design Project II/Senior Design II (Undergraduate - S'18, S'19, S'20, S'21, S'22)
- EET 3104: Elements of Electrical and Electronics (Undergraduate - F'16, S'17, F'17, S'18, F'19)
- MET 3413 Fundamentals of Pneumatic Fluid Power (Undergraduate - F'16)

RESEARCH INTERESTS

- Resource aware learning-based optimal adaptive control of large scale systems
- Secure-by-design controllers for cyber-physical learning control system
- Smart battery management system for electric vehicles
- Health conscious fast-charging of electric vehicle battery packs
- Life-cycle management of lithium-ion battery and health-conscious decision making
- Health monitoring and life-cycle management of electrical machinery

INDUSTRY EXPERIENCE

Senior Application Engineer, The DEI Group, MD, USA 2015-2016

- Condition based maintenance system development for marine electrical equipment
- Development of advanced diagnostic and prognostic algorithms for circuit breakers and transformers

Electrical Maintenance Engineer, Indian Navy, India 1999-2009

- Overseeing the generation and distribution of power onboard naval ships
- Maintenance of marine electrical equipment including navigational and control systems
- Maintenance of electro-hydraulic systems used for onboard heavy machinery

RESEARCH AND TRAVEL GRANTS

Funding Summary at OSU

2016-2022

- **Total Project Dollars: \$1,312,251**
 - From Sponsor **\$692,251** (my share \$325,359)
 - Cost share **\$620,000** (\$500,000 by industry partner and \$120,000 OSU internal)
- **Number of Proposals Funded: 07** (5 as PI and 2 as Co-PI)
- **Funding Sources:** 2-Federal (LSU for US DOT), 1-State (OCAST-ORAS), 2-Industry (The DEI Group & Innovative IDM), 2- OSU Internal, and 2-Travel grants

Proposals Funded

1. Meta and multimodal learning for smart visual borescope inspection

Role: Co-PI (50% share)
Funding Agency: OCAST
Funding: \$496,531 (+ \$500,000 cost share by industry)
Period: Jan. 2022 - Jan. 2025

2. Intelligent incipient fault detection system for electric vehicle battery: Fault isolation schemes and prototype development

Role: PI
Funding Agency: Transportation Consortium of South-Central States (Tran-SET)
Funding: \$65,000 (+ \$65,00 cost share)
Period: Aug. 2021 - Jan. 2023

3. Potentiostat (Versastat 4-500) for Maccor lithium-ion battery tester

Role: PI
Funding Agency: Dean of Research, CEAT, OSU and DET Head
Funding: \$12,665
Period: One time

4. Sawyer: Industrial collaborative robot manipulator

Role: PI
Funding Agency: Innovative IDM, Tulsa
Funding: \$28,000
Period: One time donation

5. Smart battery management system for electric vehicles: Self-learning algorithms for simultaneous state and parameter estimation, and stress detection

Role: PI
Funding Agency: Transportation Consortium of South-Central States (Tran-SET)
Funding: \$55,000 (+\$55,000 cost share)
Period: Aug. 2020 - Jan. 2022

6. State space modeling and parameter identification of induction motors for fault diagnostics and prognostics

Role: PI
Funding Agency: The DEI Group, Millersville, MD
Funding: \$15,087
Period: May. 2019 - Apr. 2020

7. Development of wireless heat flux gauge for fire conditions

Role: Co-PI (30% share)
Funding Agency: Technology Business and Development Program (TBDP), OSU, Stillwater
Funding: \$19,968
Period: Nov. 2017 - Dec. 2020

8. Travel Support of \$385 to participate in “The Future of Mechatronics & Robotics Education (FoMRE)” workshop held in conjunction with ASME’s Dynamic Systems and Control Conference, DSCC 2018, at Atlanta, GA, on Sep. 30, 2018.

9. Travel Support of \$500 to participate in the workshop on “Advanced Automation, Robotics, and Manufacturing Education for 21st Century Workforce Needs” at Alamo College in San Antonio, TX, July 21, 2018.

PUBLICATIONS [\[Google Scholar\]](#)

Summary of Publications

Overall: (A total of 51)

- 14 Journal articles + 3 book chapters + 28 Peer-reviewed conference proceedings + 6 abstracts

Articles Under Preparation

1. G. Vennam and A. Sahoo, “Internal fault diagnosis of lithium-ion batteries using SOH-coupled electro-Thermal-Aging Model,” *IEEE Transactions on Vehicular Technology* , Under Preparation, June. 2022.

Articles Under Review

1. G. Vennam and A. Sahoo, “A dynamic SOH-coupled lithium-ion cell model for state and parameter estimation,” *IEEE Transactions on Energy Conversion*, Under Review, May 2022.

Peer-reviewed Journal Publications (^a Publication at OSU, ^bCorresponding author)

14. G. Vennam, A. Sahoo^{a,b}, and S. Ahmed, “[A survey on lithium-ion battery internal and external degradation modeling and state of health estimation](#),” *Journal of Energy Storage*, Vol.52, part A, Aug. 22.
13. A Sahoo^{ab}, V. Narayanan and S Jaganathan, “[Resource aware learning-based optimal control of cyber-physical systems](#),” *IEEE Technical Committee on Cyber-Physical Systems* , Vol.6, no.1, pp.24-34, Mar. 2021.
12. L. Li, G. Yen, A Sahoo^a, L Chang, and T Gu, “[On the estimation of Pareto front and dimensional similarity in many-objective evolutionary algorithm](#),” *Information Sciences, Elsevier*, Vol. 563, pp.375-400 Jul. 2021.

11. [A. Sahoo^{ab}](#) and V. Narayanan, “Differential-game for resource aware approximate optimal control of large-scale nonlinear systems with multiple players,” *Neural Network*, vol. 124, pp. 95-108, 2020.
10. H. Niu, [A. Sahoo^a](#), C. Bhowmick, and S. Jagannathan, “An optimal hybrid learning approach for attack detection in linear networked control systems,” *IEEE/CAA Journal of Automatica Sinica*, vol. 6, no. 6, pp. 1404-1416, 2019.
9. [A. Sahoo^{ab}](#) and V. Narayanan, “Optimization of sampling intervals for tracking control of nonlinear systems: A game theoretic approach,” *Neural Networks*, vol. 114, pp. 78-90, 2019.
8. V. Narayanan, [A. Sahoo^a](#), S. Jagannathan, and K. George, “Approximate optimal distributed control of nonlinear interconnected systems using event-triggered nonzero-sum games,” *IEEE Transaction of Neural Network and Learning Systems*, vol. 30, no. 5, pp. 1512 - 1522, 2018.
7. [A. Sahoo^{ab}](#), V. Narayanan, and S. Jagannathan, “A min-max approach to event and self-triggered sampling and regulation of linear systems,” *IEEE Transaction on Industrial Electronics*, vol. 66, no. 7, pp. 5433 - 5440, 2018.
6. [A. Sahoo^b](#), Hao Xu, and S. Jagannathan, “Approximate optimal control of affine nonlinear continuous time systems by using event-sampled neuro-dynamic programming,” *IEEE Transaction of Neural Network and Learning Systems*, vol. 28, no. 3, pp. 639 - 652, 2017 .
5. [A. Sahoo^b](#), Hao Xu, and S. Jagannathan, “Stochastic optimal regulation of nonlinear networked control systems by using event-driven adaptive dynamic programming,” *IEEE Transaction on Cybernetics*, vol. 47, no. 2, pp. 425-438, 2017.
4. [A. Sahoo^b](#), Hao Xu, and S. Jagannathan, “Adaptive neural network-based event-triggered control of single-input single-output nonlinear discrete time systems,” *IEEE Transaction on Neural Networks and Learning Systems*, vol. 27, no. 1 , pp. 151-164, 2016.
3. [A. Sahoo^b](#), Hao Xu, and S. Jagannathan, “Near optimal event-triggered control of nonlinear discrete-time systems using neuro-dynamic programming,” *IEEE Transaction on Neural Networks and Learning Systems*, vol. 27, no. 9, pp. 1801-1815, 2016.
2. [A. Sahoo^b](#), Hao Xu, and S. Jagannathan, “Neural network-based event-triggered state feedback control of nonlinear continuous time systems,” *IEEE Transaction on Neural Networks and Learning Systems*, vol. 27, no. 3, pp. 497-509, 2016.
1. Hao Xu, [A. Sahoo](#), and S. Jagannathan, “Stochastic adaptive event-triggered control and network scheduling protocol co-design for distributed networked systems,” *IET Control Theory & Applications*, vol. 8, no. 18, pp. 2253-2262, 2014.

Book Chapters (^a Publication at OSU, ^bCorresponding author)

3. H. Xu, [A. Sahoo^a](#), and S. Jagannathan, “Joint scheduling and optimal event-triggered control of distributed cyber-physical systems,” *Principles of Cyber-Physical Systems* (Cambridge University Press), p. 104, 2020.
2. [A. Sahoo^b](#) and S. Jagannathan, “Adaptive optimal regulation of a class of uncertain nonlinear systems using event sampled neural network approximators,” *Control of Complex Systems: Theory and Applications* (Elsevier), 2016.

1. H. Xu, A. Sahoo, and S. Jagannathan, “[Neural network control of nonlinear discrete-time systems in affine form in the presence of communication network](#),” *Frontiers of Intelligent Control and Information Processing* (World Scientific Publishing), pp. 1510-0191, 2014.

Conference Publications

Fully Peer Reviewed Proceedings (^a Publication at OSU, ^bCorresponding author)

28. Geetika Vennam and A. Sahoo^{ab}, “A novel coupled electro-thermal-aging Model for simultaneous SOC,SOH, and parameter estimation of lithium-ion batteries,” in *Proceedings of the American Control Conference*, Accepted, Jun. 2022.
27. A. Sahoo^c, C. Yang, and Y. Chang, “[Graduate curriculum in mechatronics and robotics: Development and implementation challenges for engineering technology](#),” in *Virtual ASEE Annual Conference and Exposition*, Virtual Online, Jul. 2021.
26. A. Sahoo^{ab}, V. Narayanan, and Q. Zhao, “[Adaptive gain observers for distributed state estimation of linear systems](#),” in *Proceedings of the American Control Conference*, New Orleans, USA, May. 2021.
25. A. Sahoo^{ab}, V. Narayanan, and Q. Zhao, “[Finite-time adaptive optimal output feedback control of linear systems with intermittent feedback](#),” in *Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI)*, Virtual, Sydney, Australia , Dec. 2020.
24. L. Li, A. Sahoo^a, Liang Chang, “[A multi-objective evolutionary algorithm based on R2 indicator for pickup and delivery problem with time windows](#),” in *Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI)*, Virtual, Sydney, Australia, Dec. 2020.
23. H. Vora, Y. Chang, C. Yang, A. Alexander, I. Park, and A. Sahoo^a, “[Roll-The-Roller 3D printing design contest: The experience-based summer bridge program to improve the success of incoming engineering freshmen students. \(Work in Progress\)](#),” in *Proceedings of the ASEE Annual Conference and Exposition*, Virtual Online, Apr. 2020, pp. 1-14.
22. A. Sahoo^{ab}, A. Alexander, and J. Hahn, “[Exposure of engineering technology students to cutting-edge technology: A multi-major senior design experience](#),” in *Proceedings of the ASEE Annual Conference and Exposition*, Virtual Online, Mar. 2020, pp. 1-23.
21. L. Li, A. Sahoo^a, and L. Chang, “[A novel evolutionary algorithm with Pareto front adaption for many-objective optimization](#),” in *Proceedings of the American Control Conference (ACC)*, Virtual, Jul. 2020, pp. 3607-3612.
20. V. Kumar, A. Sahoo^a and F W Liou, “[Cyber-enabled product life-cycle management: a Multi-agent framework](#),” in *Procedia Manufacturing*, Chicago, IL, USA, Aug. 12-14, 2019, vol. 39, pp.123-131.
19. A. Sahoo^{ab} and Y. Chang, “[Laboratory activities of fundamentals of mechatronics course for undergraduate technology students](#),” in *Proceedings of the ASEE Annual Conference and Exposition*, Tampa, FL, June 15-19, 2019, pp. 1-17.
18. H. Niu, A. Sahoo^a, C. Bhowmick and S. Jagannathan, “[Attack detection in linear networked control systems by using learning methodology](#),” in *Proceedings of the IEEE Conference on Control Technology and Applications*, Hong Kong, China, Dec. 2019, pp. 148-153.
17. G. Vennam and A. Sahoo^a, “[Simultaneous state and parameter estimation of lithium-ion battery: An observer based approach](#),” in *Proceedings of the American Control Conference (ACC)*, 2019, Philadelphia, PA, USA, 2019, pp. 4485-4490.

16. [A. Sahoo^{ab}](#) and V. Narayanan, and S. Jagannathan, “[Event-triggered control of N-player nonlinear systems using nonzero-sum games](#),” in *Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI)*, Bengaluru, India, Nov. 20, 2018, pp. 1-6.
15. V. Narayanan, [A. Sahoo^{ab}](#), and S. Jagannathan, “[Adaptive optimal distributed control of Linear interconnected systems](#),” in *Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI)*, Bengaluru, India, Nov. 20, 2018, pp. 1-6.
14. V. Narayanan, [A. Sahoo^{ab}](#), and S. Jagannathan, “[Approximate optimal distributed control of nonlinear interconnected systems using nonzero-sum games](#),” in *Proceedings of the IEEE Conference on Decision and Control (CDC)*, Miami, FL, USA, Dec. 18, 2018, pp. 2872 -2877.
13. [A. Sahoo^{ab}](#) and V. Narayanan, “[Event-based near optimal sampling and tracking control of nonlinear systems](#),” in *Proceedings of the IEEE Conference on Decision and Control (CDC)*, Miami, FL, USA, Dec. 18, 2018, pp. 55-60.
12. V. Narayanan, [A. Sahoo^{ab}](#), and S. Jagannathan, “[Optimal event-triggered control of nonlinear systems: A min-max approach](#),” in *Proceedings of the American Control Conference (ACC)*, Milwaukee, WI, 2018, pp. 3441-3446.
11. [A. Sahoo^{ab}](#), V. Narayanan and S. Jagannathan, “[Optimal event-triggered control of uncertain linear networked control systems: A co-design approach](#),” in *Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI)*, Honolulu, HI, 2017, pp. 1-6.
10. [A. Sahoo^{ab}](#), V. Narayanan and S. Jagannathan, “[Optimal sampling and regulation of uncertain interconnected linear continuous time systems](#),” in *Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI)*, Honolulu, HI, 2017, pp. 1-6.
9. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Event-based neural network approximation and control of uncertain nonlinear continuous-time systems](#),” in *Proceedings of the American Control Conference (ACC)*, Chicago, IL, 2015, pp. 1567-1572.
8. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Event-triggered optimal regulation of uncertain linear discrete-time systems by using Q-learning scheme](#),” in *Proceedings of the IEEE Conference on Decision and Control (CDC)*, Los Angeles, CA, 2014, pp. 1227 - 1232.
7. [A. Sahoo^b](#) and S. Jagannathan, “[Event-triggered optimal control of nonlinear continuous-time systems in affine form by using neural network](#),” in *Proceedings of the IEEE Conference on Decision and Control (CDC)*, Los Angeles, CA, 2014, pp. 1233 - 1238.
6. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Event-based optimal regulator design for nonlinear networked control systems](#),” in *Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI)*, Orlando, FL, 2014, pp. 1-8.
5. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Near optimal event-based control of nonlinear discrete time systems in affine form with measured input output data](#),” in *Proceedings of the International Joint Conference on Neural Networks (IJCNN)*, Beijing, China, 2014, pp. 3671 - 3676.
4. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Neural network approximation-based event-triggered control of uncertain MIMO nonlinear discrete time systems](#),” in *Proceedings of the American Control Conference (ACC)*, Portland, OR, 2014, pp. 2017 - 2022.
3. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Neural network-based adaptive event-trigger control of affine nonlinear continuous time systems](#),” in *Proceedings of the IEEE International Symposium on Intelligent Control (ISIC)*, Hyderabad, India, 2013, pp. 35-40.

2. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Neural network-based adaptive event-triggered control of affine nonlinear discrete time systems with unknown internal dynamics](#),” in *Proceedings of the American Control Conference (ACC)*, Washington, DC, 2013, pp. 6418-6423.
1. [A. Sahoo^b](#), H. Xu, and S. Jagannathan, “[Adaptive event-triggered control of an uncertain linear discrete time system using measured input and output data](#),” in *Proceedings of the American Control Conference (ACC)*, Washington, DC, 2013, pp. 5672-5677.

Abstracts

6. G. Vennam^c and [A Sahoo^a](#), State of Health Inclusive Aging Model of Lithium-ion Batteries, *Virtual International Mechatronics Conference and Exhibition*, Oct. 01, 2021.
5. G. Vennam^c and [A Sahoo^a](#), State of health estimation of lithium-ion batteries for electric vehicles: The state of the art, *Virtual International Mechatronics Conference and Exhibition*, Oct. 21, 2020.
4. G. Vennam^c, [A Sahoo^a](#), and Vignesh Narayana, Neural network control of inter-connected inverted pendulum with uncertain dynamics: A Survey, *Virtual Society of Open Innovation (SOI) and Oklahoma State University 2020 Conference*, Daegu, Korea, July 10-13, 2020.
3. L. Li^c, and [A Sahoo^a](#), Multi-objective optimization and its applications: The state of the art, *Virtual Society of Open Innovation (SOI) and Oklahoma State University 2020 Conference*, Daegu, Korea, July 10-13, 2020.
2. G. Vennam^c, and [A Sahoo^a](#), Self learning battery management systems for lithium-ion battery, *Virtual Society of Open Innovation (SOI) and Oklahoma State University 2020 Conference*, Daegu, Korea, July 10-13, 2020.
1. G. Vennam and [A. Sahoo^a](#), “SOC and parameter estimation of lithium-ion battery for fault diagnostics,” in *Proceedings of the Frontier in Power*, Stillwater, Oct. 29, 2018.

PRESENTATIONS

Keynotes/Invited Talk

3. [A. Sahoo](#), “Resource aware control with real-time machine learning,” *Computer Science Colloquium*, OSU, Stillwater, Mar. 12, 2021.
2. [A. Sahoo](#), “Real Talk with CEAT Students,” *CEAT Diversity, Equity and Inclusion Student Program*, Oct. 21, 2021 (Virtual).
1. [A. Sahoo](#), “Advances in self-learning control of cyber-physical systems,” *Mata Vaisno Devi University, Katra (Online via Skype)*, India, Sep. 29, 2019.

Conference Presentations (^c presenter)

40. Geetika Vennam^c and [A. Sahoo](#), “A novel coupled electro-thermal-aging model for simultaneous SOC, SOH, and parameter estimation of lithium-ion batteries, *American Control Conference*, Jun. 10 2022.
39. G. Vennam^c and [A Sahoo](#), “State of health inclusive aging model of lithium-ion batteries,” *Virtual International Mechatronics Conference and Exhibition*, Oct. 01, 2021.

38. A. Sahoo^c, C. Yang, and Y. Chang, "Graduate curriculum in mechatronics and robotics: Development and implementation challenges for engineering technology," *Virtual ASEE Annual Conference and Exposition*, Jul. 26, 2021.
37. A. Sahoo^c, V. Narayanan, and Q. Zhao, "Adaptive gain observers for distributed state estimation of linear systems," *Virtual American Control Conference*, Jun. 25, 2021.
36. A. Sahoo^c, V. Narayanan, and Q. Zhao, "Finite-time adaptive optimal output feedback control of linear systems with intermittent feedback," *IEEE Symposium Series on Computational Intelligence (SSCI)*, Dec. 1, 2020.
35. L. Li^c, A. Sahoo, Liang Chang, "A multi-objective evolutionary algorithm based on R2 indicator for pickup and delivery problem with time windows," *IEEE Symposium Series on Computational Intelligence (SSCI)*, Virtual, Sydney, Australia, Dec. 2, 2020.
34. Logan Shreve, Killian Bussey^c, A Sahoo, and Haejun Park, "Development of IoT based hat flux sensor," *Virtual International Mechatronics Conference and Exhibition*, Oct. 22, 2020. **Best Presentation Award for the session.**
33. G. Vennam^c and A Sahoo, "State of health estimation of lithium-ion batteries for electric vehicles: The state of the art," *Virtual International Mechatronics Conference and Exhibition*, Oct. 21, 2020.
32. Young Chang^c, Chulho Yang, and A Sahoo, "Effects of shock and vibration on electronic components," *International Mechatronics Conference and Exhibition*, Oct. 21, 2020.
31. G. Vennam^c, and A Sahoo, "Self learning battery management systems for lithium-ion battery," *Virtual Society of Open Innovation (SOI) and Oklahoma State University Conference*, Daegu, Korea, July 10-13, 2020.
30. L. Li^c and A Sahoo, "Multi-objective optimization and its applications: The state of the art," *Virtual Society of Open Innovation (SOI) and Oklahoma State University Conference*, Daegu, Korea, July 10-13, 2020.
29. H. Vora^c, Y. Chang, C. Yang, A. Alexander, I. Park, and A. Sahoo, "Roll-The-Roller 3D printing design contest: The experience-based summer bridge program to improve the success of incoming engineering freshmen students (Work in Progress)," *Virtual ASEE Annual Conference and Exposition*, Jun. 2020.
28. A. Sahoo^c, A. Alexander, and J. Hahn, "Exposure of engineering technology students to cutting-edge technology: A multi-major senior design experience," *Virtual ASEE Annual Conference and Exposition*, Jun. 24, 2020.
27. L. Li^c, A. Sahoo, and L. Chang, "A novel evolutionary algorithm with Pareto front adaption for many-objective optimization," *Virtual American Control Conference (ACC)*, Jul. 2020.
26. V. Kumar^c, A. Sahoo and F W Liou, "Cyber-enabled product life-cycle management: A multi-agent framework," *Procedia Manufacturing*, Chicago, IL, USA, Aug. 12, 2019.
25. A. Sahoo^c and Y. Chang, "Laboratory activities of fundamentals of mechatronics course for undergraduate technology students," *ASEE Annual Conference and Exposition*, Tampa, FL, USA, Jun. 16, 2019.
24. H. Niu, A. Sahoo, C. Bhowmick and S. Jagannathan^c, "Attack detection in linear networked control systems by using learning methodology," *IEEE Conference on Control Technology and Applications*, Hong Kong, China, Dec. 2019.

23. G. Vennam^c and A. Sahoo, "Simultaneous state and parameter estimation of lithium-ion battery: An observer based approach," *American Control Conference (ACC)*, Philadelphia, PA, USA, Jun. 2019.
22. A. Sahoo and V. Narayanan, and S. Jagannathan^c, "Event-triggered control of N-player nonlinear systems using nonzero-sum games," *IEEE Symposium Series on Computational Intelligence (SSCI)*, Bengaluru, India, Nov. 20, 2018.
21. V. Narayanan, A. Sahoo, and S. Jagannathan^c, "Adaptive optimal distributed control of linear interconnected systems," *IEEE Symposium Series on Computational Intelligence (SSCI)*, Bengaluru, India, Nov. 20, 2018.
20. V. Narayanan, A. Sahoo^c, and S. Jagannathan, "Approximate optimal distributed control of nonlinear interconnected systems using nonzero-sum games," *IEEE Conference on Decision and Control*, Miami, FL, USA, 17 Dec. 2018.
19. A. Sahoo^c and V. Narayanan, Event-based near optimal sampling and tracking control of nonlinear systems , *IEEE Conference on Decision and Control*, Miami, FL, USA, Dec. 18, 2018.
18. V. Narayanan, A. Sahoo^c, and S. Jagannathan, "Optimal event-triggered control of nonlinear systems: A min-max approach," *American Control Conference*, Milwaukee, WI, Jun. 27, 2018.
17. A. Sahoo^c, V. Narayanan and S. Jagannathan, "Optimal event-triggered control of uncertain linear networked control systems: A co-design approach," *IEEE Symposium Series on Computational Intelligence*, Honolulu, Hawaii, USA, Nov. 28, 2017.
16. A. Sahoo^c, V. Narayanan and S. Jagannathan, "Optimal sampling and regulation of uncertain interconnected linear continuous time systems," *IEEE Symposium Series on Computational Intelligence*, Honolulu, Hawaii, USA Nov. 29, 2017.
15. A. Sahoo, H. Xu, and S. Jagannathan, "Event-based neural network approximation and control of uncertain nonlinear continuous-time systems," *American Control Conference (ACC)*, Chicago, IL, Jun. 2015
14. A. Sahoo, H. Xu^c, and S. Jagannathan, "Event-triggered optimal regulation of uncertain linear discrete-time systems by using Q-learning scheme," *IEEE Conference on Decision Control*, Los Angeles, USA, Dec. 18, 2014.
13. A. Sahoo^c and S. Jagannathan, "Event-triggered optimal control of nonlinear continuous-time systems in affine form by using neural network," *IEEE Conference on Decision and Control (CDC)*, Los Angeles, CA, Dec. 2014.
12. A. Sahoo^c, H. Xu, and S. Jagannathan, "Near optimal event-based control of uncertain nonlinear discrete time system using input and output data," *IEEE WCCI*, Beijing, China, Jul. 11, 2014.
11. H. Zargarzadeh, "Extremum-seeking for nonlinear discrete-time systems with application to HCCI engines," *American Control Conference*, Portland, OR, USA, Jun. 4, 2014, (Presented by A. Sahoo).
10. A. Sahoo^c, H. Xu, and S. Jagannathan, "Neural network approximation-based event-triggered control of uncertain MIMO nonlinear discrete time systems," *American Control Conference*, Portland, OR, USA, Jun. 5, 2014.
9. Qiming Zhao, Hao Xu, S. Jagannathan, "Fixed final-time near optimal regulation of nonlinear discrete-time systems in affine form using output feedback," *American Control Conference*, Portland, OR, USA, Jun. 6, 2014, (Presented by A. Sahoo).

8. A. Sahoo^c, “Event-triggered control of cyber-physical systems,” *Intelligent Systems Center Symposium*, Missouri University of Science and Technology, Rolla, MO, USA, Apr. 22, 2014.
7. A. Sahoo^b, H. Xu, and S. Jagannathan^c, “Neural network-based adaptive event-trigger control of affine nonlinear continuous time systems,” *IEEE International Symposium on Intelligent Control (ISIC)*, Hyderabad, India, Dec. 2013.
6. A. Sahoo^c, H. Xu, and S. Jagannathan, “Neural network-based adaptive event-triggered control of affine nonlinear discrete time systems with unknown internal dynamics,” *American Control Conference*, Washington, DC, USA, Jun. 19, 2013.
5. A. Sahoo^c, H. Xu, and S. Jagannathan, “Adaptive event-triggered control of an uncertain linear discrete time system using measured input-output data,” *American Control Conference*, Washington, DC, USA, Jun. 19, 2013.
4. A. Sahoo^c, “Event-triggered control of non-linear discrete time systems,” *Intelligent Systems Center Symposium*, Missouri University of Science and Technology, Rolla, MO, USA, Apr. 25, 2013.
3. A. Sahoo^c, “Online real-time fault detection of lithium-ion battery,” *24th Industry Advisory Board (IAB) Meeting*, Austin, TX, USA, Nov. 29, 2012.
2. Qiming Zhao, Hao Xu, S. Jagannathan, “Adaptive dynamic programming-based state quantized networked control system without value and/or policy iteration,” *IEEE World Congress on Computational Intelligence*, Brisbane, Australia, Jun 11, 2012, (Presented by A. Sahoo).
1. A. Sahoo^c, “Model-based diagnostic and prognostic of induction motors,” *23rd Industry Advisory Board Meeting*, Warren, MI, USA, May 17, 2012.

MENTORSHIP

Graduate Students (Primary advisor and committee chair)

1. **Geetika Vennam**, pursuing Ph.D. at the School of Electrical and Computer Engineering from Aug. 2017. **Dissertation:** Lifecycle management of Lithium-ion batteries and fault diagnosis. Expected graduation Fall 2022. *Funded by Tran-SET and Startup fund*
2. **Suman Rath**, Pursuing Ph.D. at the School of Electrical and Computer Engineering from Aug. 2021. **Dissertation:** Secure-by-design controllers for learning control systems. *Funded as a GTA by DET*
3. **Atik Faysal**, pursuing Ph.D. at the School of Electrical and Computer Engineering from Jan. 2022 **Dissertation:** Metal-learning applications to fault diagnostics. Expected graduation Fall 2024. *Funded by OCAST*
4. **Bussey Killian**, pursuing MSET with an option in Mechatronics and Robotics at the Division of Engineering Technology from Aug. 2021. **Thesis:** Voice activated assistive robots. *Funded as a GTA by Endeavor*
5. **Habeeb Idrees**, previous Ph.D. Student at the School of Electrical and Computer Engineering from Aug. 2017 to Dec. 2017. *Student left the Ph.D. program. Funded by OSU Startup package.*

Visiting Faculty (Total 1)

1. **Li Li**, Ph.D. - Visiting Scholar, 11/2018 -10/2020, **Research Topic:** Multi-objective optimization using evolutionary algorithms.

Dissertation/Thesis Committee Member

1. **Majid Dehghani**, pursuing Ph.D. at the School of Electrical and Computer Engineering from Jan. 2022. **Dissertation:** Security and privacy preserving control of microgrids, Advisor: Hamidreza Nazaripouya.
2. **Shubham Trehan**, pursuing Ph.D. at the Computer Science Department from Aug. 2021. **Dissertation:** Multimodal learning, Advisor: Sathyanarayanan Aakur Narasimhan.
3. **J. Kui**, pursuing Ph.D. at the School of Electrical and Computer Engineering from Aug. 2021. **Dissertation:** AI in distributed communication, Advisor: Huaxia Wang.
4. **Mazharul Islam**, pursuing Ph.D. at the School of Mechanical and Aerospace Engineering from Aug. 2020. **Dissertation:** Development of a novel peristaltic compressor for air-conditioning and refrigeration applications, Advisor: Bradshaw Craig R.
5. **Michael Harlan**, MS in Mechanical and Aerospace Engineering, **Thesis:** A method for solving switched optimal Control problems with dwell time constraints, Advisor: R. Kamlapurkar, *Graduated in fall 2019.*

Undergraduate Students

1. **Killan Bussey**, BSET in Electrical Engineering Technology. Research Topic: Wireless heat flux sensor. *Funded by OKLSAMP and TBDP, Graduated in summer 2021.*
2. **Ben Worwag**, BSET in Mechanical Engineering Technology. Research Topic: Vibration analysis of electronics circuit boards. *Funded by CEAT, Graduated in spring 2021*
3. **Logan Shreve**, BSET in Electrical Engineering Technology. Research Topic: Wireless heat flux sensor, *Funded by TBDP, Graduated in spring 2019.*

ADMINISTRATIVE SERVICES

- Graduate Advisor, MSET in Mechatronics and Robotics, 2020 - present
- Program Coordinator, BSET Electrical Engineering Technology, 2019 - present

PROFESSIONAL AFFILIATIONS

- Institute of Electrical and Electronics Engineers (IEEE), *Member*
- IEEE Control System Society (IEEE CSS), *Member*
- IEEE Computational Intelligence Society (IEEE CIS), *Member*
- Industrial Electronics Society (IEEE IES), *Member*
- IEEE Council on Electronic Design Automation (IEE CEDA), *Member*
- American Society for Engineering Education, *Member*

PROFESSIONAL SERVICES

Departmental Committee

- Chair, EET Faculty Search Committee, 2019

- Member, MET Faculty Search Committee, 2019
- Chair, Newsletter Committee, 2018 - 2019
- Member, Facility Committee, 2016 - 2018
- Member, Faculty Search Committee, 2018
- Member, Division Head Search Committee, 2017

Departmental Outreach Activities

- 2022 Mechatronics and Robotics Summer Camp – *Obstacle Avoidance Robot*, Organizer: Avimanyu Sahoo, Number of participants: 18, Jun. 27- Jul. 1, 2022.
- 2021 CEAT Summer Bridge Program – *Line Following Robot*, Organizer: Avimanyu Sahoo, Number of participants: 15, Jul. 30- Aug. 4, 2021.
- 2021 CEAT Virtual Discovery Days – *Line Following Robot*, Organizer: Avimanyu Sahoo, Number of participants:8, Oct. 2021.
- 2020 CEAT Summer Bridge Program – *Line Following Robot*, Organizer: Avimanyu Sahoo and Huaxia Wang, Number of participants: 15, Jul. 31- Aug. 2, 2020.
- 2020 CEAT Virtual Discovery Days – *Introduction to EET, virtual presentation*, Organizer: Avimanyu Sahoo, Oct. 7, 2020.
- 2019 4H Round-Up – *Line Following Robot*, Organizer: Avimanyu Sahoo, and EET undergraduate student (Bryant Jackson), Number of participants: 28, July 24-25, 2019.
- 2019 CEAT Summer Bridge Program – *Ladder logic programming using AB CompatLogix PLC*, Organizer: Avimanyu Sahoo and EET undergraduate student (Bryant Jackson), Participants: 16, Aug. 02-06, 2019.
- 2019 Women in Science Conference - *EET poster and booth*, Participants– Avimanyu Sahoo (EET) with Rachel Mosier (CET) and other DET faculty, Oct. 22, 2019.
- 2018 High School Junior Day – *EET Poster and Booth*, Organizer: Imad Abouzahr and Avimanyu Sahoo, April 21, 2018.
- 2018 OSU Major Fair – *EET Poster and Booth*, Organizer: Avimanyu Sahoo and Imad Abouzahr, 30 Oct, 2018.
- 2017 CEAT Summer Bridge Program – *Roll-The-Roller 3D Printing Design Contest*, Organizer: Chang young, Chulho Yang, Hitesh D. Vora, Avimanyu Sahoo, and 4 MET undergraduate students. Hosted two sessions. First session: August 1-3 and Middle session: August 4,7-8, 2017.

Editorial Activities

- Associate Editor, Nonlinear Control in the Frontier in Control Systems Journal, 2020 - Present.
- Review Editor, Frontier in Robotics Journal, 2020 - Present.
- Academic Editor, Complexity Journal from Hindwai Publications, 2017 - 2020.

Conference Organizer

- Program Committee, The Virtual 2020 International Mechatronics Conference and Exhibition, Oklahoma State University, Stillwater, OK, Oct 20-22, 2020.
- General Chair and Organizer, The 2019 International Mechatronics Conference and Exhibition, Oklahoma State University, Stillwater, OK, Oct 23-25, 2019.

Conference Session Organizer

- Invited session on “Deep reinforcement learning designs for uncertain networked multi-autonomous systems,” *IEEE Symposium Series on Computational Intelligence, Adaptive Dynamic Programming and Reinforcement Learning*, Bangaluru, India, Nov 2018.
- Invited session on “Novel distributed adaptive dynamic programming and reinforcement learning designs for networked multi-agent systems,” *IEEE Symposium Series on Computational Intelligence, Adaptive Dynamic Programming and Reinforcement Learning*, Honolulu, HI, USA, Nov 2017.

Conference Session Chair

- Session chair for “Innovation performance” at *Virtual Society of Open Innovation (SOI) and Oklahoma State University 2020 Conference*, Daegu, Korea, July 10-13, 2020.
- Session chair for “Optimal control III,” *IEEE Conference on Decision and Control*, Miami, FL, USA, Dec 2018.
- Session chair for “Optimal control,” *American Control Conference*, Milwaukee, WI, USA, Jun 2018.
- Session chair for “ADPRL2: Adaptive dynamic programming and reinforcement learning II,” *IEEE Symposium Series on Computational Intelligence, Adaptive Dynamic Programming and Reinforcement Learning*, Honolulu, HI, USA, Nov 2017.
- Session chair for “ADPRL6: Adaptive dynamic programming and reinforcement learning VI,” *IEEE Symposium Series on Computational Intelligence, Adaptive Dynamic Programming and Reinforcement Learning*, Honolulu, HI, USA, Nov 2017.
- Session chair for “Output feedback control,” *American Control Conference (ACC)*, Portland, OR, USA, Jun 2014.

Papers and Proposal Reviewer (Aug 2016 - Current)

- Participated in NSF panels
- Reviewed journal and conference papers from the following publishers:
 - Automatica
 - IEEE Transactions on Neural Network and Learning systems
 - IEEE Transactions on Automatic Control
 - IEEE Transactions on Cybernetics
 - IEEE Transactions on Systems Man and Cybernetics: Systems
 - IEEE Transactions on Fuzzy Systems
 - IEEE Transactions on Industrial Electronics

- IEEE Letter of Control Systems Society
- Physics Letter A, Elsevier
- IET Control Theory & Applications
- Concurrency and Computation: Practice and Experience
- IEEE Symposium Series in Computational Intelligence
- American Control Conference
- IEEE Conference on Robotics and Automation

PROFESSIONAL DEVELOPMENT ACTIVITIES

Teaching and Research Developmental Activities

- NSF CAREER Workshop, 2021
- DARPA YFA, Webinar, 2020
- National Effective Teaching Institute (NETI) workshop from Jan. 3-5, 2020 in San Diego, CA
- DOD EPSCoR Southern region workshop at the Louisiana State University, Batten Rouge, 2019
- Write Winning Grant Proposals Seminar, Oklahoma State University, Stillwater, September 2019
- DOD EPSCoR Northeast region workshop at the University of Rhode Island on Sep. 26, 2019
- Preparing online instructors, ITLE Oklahoma State University, Stillwater, from September 30, 2018 to November 9, 2018
- OSU faculty reads, ITLE Oklahoma State University, Stillwater, from September 30, 2018 to October 31, 2018.
- Practical hydraulic workshop, Fluid Power Training Institute, Salt Lake City, Utah, from May 8, 2017 to May 12, 2017
- Hydraulic troubleshooting workshop, Fluid Power Training Institute, Salt Lake City, Utah, from May 15, 2017 to May 19, 2017
- Effective college teaching workshop, by Dr. Richard M. Felder and Dr. Rebecca Brent, ITLE Oklahoma State University, Stillwater, from March 30, 2017 to March 31, 2017
- Grant writing workshop, Oklahoma State University, Stillwater, September 2016