

Curriculum Vitae¹

Sangram Redkar, Associate Professor

The Polytechnic School

Arizona State University at the Polytechnic Campus,

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(a) Professional Preparation:

1. Doctor of Philosophy, Mechanical Engineering, Auburn University, GPA: 4.0/4.0

Advisor: Dr. S. C. Sinha.

Jan'02-Jan'05

Doctoral research: Some techniques for order reduction of parametrically excited nonlinear systems.

- Study of nonlinear dynamical systems (structures and machines), simulation, and stability analysis.
- Development of new techniques for reduced order modeling of large-scale systems with time periodic coefficients.
- Control algorithm development for large-scale systems via order reduction.
- FEM analysis and optimal order modeling of large models via adaptive modal basis.
- Dynamics, bifurcation studies, and control of Micro-Electro Mechanical Systems (MEMS).

2. M.S., Mechanical Engineering Design, Indian Institute of Technology (IIT), India GPA: 3.8/4.0

Advisor: Dr. K. N. Gupta.

Aug' 00 –Dec '01

Thesis: Design and Simulation of Automobile Restraint System (Seat Belts).

- Development of 2 point and 3 point restraint systems for automobiles.
- Design, kinematic and dynamic analysis of automatic locking retractor.
- FEM Simulation and optimization of the occupant restraint systems.
- Crash testing experimental setup development.

3. B.S., Mechanical Engineering, University of Mumbai, India. GPA: 3.8/4.0

Advisor: Prof. V. V. R. S. Rao.

Aug '96-Jul '99

Project: Design and Commissioning of a leak testing machine.

- Designed, fabricated and commissioned a special purpose leak-testing machine for Aerosol containers.
- Performed kinematic and dynamic analysis of the same for MIDAS Pharma., India

¹ Updated Dec 12, 2020

4. L.M.E. (Diploma in Mechanical Engineering), V.J.T.I., India. GPA: 3.9/4.0

Aug '92-July '96

Industrial Project 1: Design and Commissioning of Single spindle hydraulic honing machine

- Designed and commissioned a honing machine at Vickers System International, Kandivali, India
- Designed hydraulic circuits and mechanical components of the same.

Industrial Project 2: Design of Process and Equipment for single minute tool change for a multi-spindle drilling machine.

- As an effort to reduce machine set up time, developed an optimal tool changing strategy and designed jigs and fixtures for the same at Vickers Systems International. As a result, the set up time was reduced from 30 minutes to 7 minutes, thus increasing the machine productivity by 25%.

Industrial Project 3: Investigation of wire rod defects and their causes.

- Investigated various wire rod defects, suggested remedial measures by means of the Pareto analysis at Mukund Limited, Kalwe, India.
- Suggested improvements in the roll pass design and maintenance schedules that rectified the problems.

(b) Professional Experience:

1. Associate Professor, The Polytechnic School, ASU Poly, Mesa, AZ

Aug'14-Present

Associate Professor, Department of Engineering and Computing Sys., ASU Poly, Mesa, AZ

Aug'13-Aug'14

Assistant Professor, Department of Engineering, ASU Poly, Mesa, AZ

May'12-Aug'13

Assistant Professor, Engineering Technology Department, ASU Poly, Mesa, AZ

Aug'07-May'12

Graduate Faculty, School of Mechanical, Aerospace, Chemical, and Material Engineering

Aug'08-Present

- Duties include Teaching, Research and Service
- Courses teaching: Measurement and Testing- Fall-07,Fall-08,Fall-09, Applied Mechanics of Materials Spring-08, Spring-09, Computer Aided Design and Drafting Fall-08, Non-Destructive Testing and Quality Assurance Fall-09.
- Research in the area of MEMS sensing, dynamics and Control (Supported by Sandia)
- Research in Modeling, Simulation, and Control of Nonlinear Dynamical Systems- with application to wearable robots. (funded by DARPA, AFRL)
- Research in Inertial Navigation and Tracking with application to Robotics (funded by DARPA)

- Development of wearable motion capture system with physiological sensors to develop human “**Digital Twin**”. (project funded by the US DoD, SOCOM, US Army)
<https://www.youtube.com/watch?v=TET8IoPybAk>

(Please refer to section (m) of the CV for brief project descriptions and videos)

2. Mechanical Engineer, Archangel Systems, Auburn, AL

Jan'05– Aug'07

- Duties include Design and Development of MEM Sensors and Gyroscopes
- Finite element analysis, Pyro-shock simulation, Gun Hardening of MEM Sensors and Gyroscopes
- Linear and Nonlinear Controller Algorithm Development for MEMS
- Algorithm development for tight and ultra-tight IMU-GPS coupling
- Design and development of Inertial Navigation System for Bell Helicopter BHT- 609,
- Working with MIL 810, DO160E standards
- Development of Inertial Measurement Unit to be used for Night Vision Goggles for SAIC (Huntsville)

3. Researcher, Dept. of Mech. Engineering, Auburn University, AL

Jan '05 – Aug '07

- Instructor for Mechanical Engineering Courses
- Researcher, Nonlinear systems Research Lab

4. Graduate Teaching/Research Assistant, Dept. of Mech. Engineering, Auburn University

Jan '02 - Jan '05

- Instructor for Statics and Dynamics course (ME 2110), Fall 03
- Instructor for Kinematics and Dynamics course (ME 2120), Summer 04
- Instructor for Dynamics course (ENGR 2350), Fall 04
- Teaching assistant for Machine Design, Kinematics, and Dynamics of machines, Statics and Dynamics, Mechanical Vibrations and System Dynamics and Controls. Duties included assisting students, conducting classes, labs and development of course material.

5. Visiting Faculty, VJTI and K.J. Somaiya College of Engineering, University of Mumbai, India

Sept'00-Dec'01

- Duties included – student advising and counseling.
- Supervising student projects.
- Conducting industrial seminars and continuing education programs.
- Collaborative work on industrial consultancy projects.

6. Design Engineer, Bond Safety Belts, Mumbai, India

Sept'99 - July '00

- Designed and developed automatic and emergency locking retractors.

- Designed and Performed Failure Analysis (FMEA) of Seat Belt Assemblies.
- Contributed in the Development of Company's Website.
- Performed Finite Element Analysis of Seat Belt Components.

7. Project Trainee Engineer, Swami Samarth Consultants, Thane, India

July '98 - June '99

- Involved in Design, Analysis and Fabrication of Special Purpose Machines.
- Shouldered responsibilities like Customer Support, Maintenance and after Sales Service for clients like MIDAS Pharma., Virtue Glass, Mahindra and Mahindra Limited.

8. In plant Trainee Engineer, Vickers System International, India

Jan '96 - June '96

- Duties included Shop Floor Management, Maintenance of Machines, and Production Scheduling.
- Conducted Seminars at Vickers School of Hydraulics, India.

9. In plant Trainee Engineer, Mukand Limited, India

July '94 - Jan '95

- Duties included Failure Data Collection and Analysis.
- Involved in Maintenance of Production Database.

(c) Principal Areas of Teaching and Research

1. Teaching Undergraduate and Graduate Students:

- **EGR219:** Computational Modelling of Engineering Systems
- **EGR445:** Mechanical Engineering Systems
- **AET 210:** Measurement and Testing
- **MET 313/314, EGR 334:** Applied Mechanics of Material (Lecture/Lab)
- **MET 160:** Computer Aided Design and Drafting
- **MET 309:** Non-Destructive Testing and Quality Assurance
- **MET 591:** Advanced Vehicle Dynamics

2. Research Areas/Interests

a) Mathematical Modeling, Nonlinear Dynamics, and Control of Robots/Wearable Robots

- Wearable robots, Human-Machine-Integrated System (HMIS), bio-sensing, robotic systems for human performance augmentation.
- Nonlinear Dynamics, Resonances, and Chaos in Parametrically Excited Systems with Applications to Micro and Nano Systems.
- Development of Mathematical Tools to Study and Control Dynamics of Complex Systems.

b) Inertial Navigation and Tracking

- Development of Novel Navigation and Tracking Systems (Hardware and Software)
- Blending Algorithms for Inertial Navigation, GPS and Vision Guided Systems for Aircraft and Ground Vehicle Navigation for Unmanned Aerial and Ground Vehicles.
- Development of IMU based motion capture system

c) Learning, Teaching and Engagement for Societal Change:

- Development of Novel Techniques for Teaching and Learning.
- Development of Novel Instructional Tools for Class Engagement and Assessment.
- Championing ASU's New American University model based on Access, Excellence and Impact to other academic institutions.

(d) Research Publications²:

Student Name(s) in Italics. Author order is in the order of significant contributions to the paper.

H index via Google Scholar: 9. *It is respectfully noted that many of our DoD funded programs have disclosure limitations. Often, results emanated from DoD funded research were designated CUI and could not be disseminated in the public domain.*

Peer Reviewed Journal Publications (Published):

1. *Cherangara Subramanian, S., and Redkar, S.* (2020). "Comparison of Poincare Normal Forms and Floquet Theory for Analysis of Linear Time Periodic Systems." *ASME. J. Comput. Nonlinear Dynam.* doi: <https://doi.org/10.1115/1.4048715>
(Journal Impact Factor:1.66)
2. *Waswa, P. M. B., and Redkar, S.* (July 16, 2020). "Reducibility and Analysis of Linear Quasi-Periodic Systems Via Normal Forms." *ASME. J. Comput. Nonlinear Dynam.* September 2020; 15(9): 091010. <https://doi.org/10.1115/1.4046899>
(Journal Impact Factor:1.66)
3. *Jason Olson, Sambarta Ray, Thomas Sugar, Claire Honeycutt and Sangram Redkar* "Design of active ankle foot orthotics for gait assistance and fall prevention" *Int Rob Auto J.* 2020;6(3):106–113.
4. *C. Subramanian, S., Dye, M., & Redkar, S.* (2020). Dynamic Analysis of Suction Stabilized Floating Platforms. *Journal of Marine Science and Engineering*, 8(8), 587.

² For SBU publications, data and other material related to projects, please contact at sredkar@asu.edu

5. *De La Fuente, J., Subramanian, S. C., Sugar, T. G., & Redkar, S. (2020). A robust phase oscillator design for wearable robotic systems. Robotics and Autonomous Systems, 103514.*
(Journal Impact Factor: 2.82)
6. *Waswa, P. M., Redkar, S., & Subramanian, S. C. (2020). A plain approach for center manifold reduction of nonlinear systems with external periodic excitations. Journal of Vibration and Control, 26(11-12), 929-940*
(Journal Impact Factor: 2.82)
7. T. G. Sugar, E. H. Sinitiski, J. M. Wilken, **S. Redkar**, M. A. Holgate, "Phase plane analysis of walking with applications in controlling bipeds and prostheses," International Robotics & Automation Journal, 6(1), 2020.
8. *New P, Bates A, Fuente JD, S. Redkar and T. Sugar Adaptive oscillator controller for quadrupled hopping robots. MOJ App Bio Biomech. 2019;3(4):85–94. DOI: 10.15406/mojabb.2019.03.00109*
9. *Waswa, P. M. B., and Redkar, S. (2019). Control of nonlinear spacecraft attitude motion via state augmentation, Lyapunov-Floquet transformation and normal forms. Advances in Space Research. <https://doi.org/10.1016/j.asr.2019.05.013>. (Journal Impact Factor:1.746)*
10. *P. T. Chinimilli, S. Redkar and T. Sugar, "A Two-Dimensional Feature Space-Based Approach for Human Locomotion Recognition," in IEEE Sensors Journal, vol. 19, no. 11, pp. 4271-4282, 1 June 2019. doi: 10.1109/JSEN.2019.2895289 (Journal Impact Factor: 3.076)*
11. *Waswa, P.M.B. and Redkar, S., A Direct Approach for Simplifying Nonlinear Systems with External Periodic Excitation Using Normal Forms, Nonlinear Dynamics. (2019). <https://doi.org/10.1007/s11071-019-05334-6> (Journal Impact Factor: 4.604)*
12. *Waswa, P. M., Redkar, S., & Subramanian, S. C. (2019). A plain approach for center manifold reduction of nonlinear systems with external periodic excitations. Journal of Vibration and Control. <https://doi.org/10.1177/> (Journal Impact Factor: 2.865)*
13. *Sandesh Bhat and Sangram Redkar, 'Volitional control of an active prosthetic ankle: a Survey', International Robotics and Automation Journal, 4(6), 2018.*
14. *Jason S. Olson and Sangram Redkar, 'A Survey of Wearable Sensor Networks in Health and Entertainment', Applied Bionics and Biomechanics, 2(5), 2018*

15. *De la Fuente J, Sugar TG, Redkar S. Nonlinear, Phase-Based Oscillator to Generate and Assist Periodic Motions. ASME. J. Mechanisms Robotics. 2017;9(2):024502-024502-7. doi:10.1115/1.4036023. (Journal Impact Factor: 2.233)*
16. *De la Fuente J, Sugar TG, Redkar S. Nonlinear, Phase-Based Oscillator to Generate and Assist Periodic Motions. ASME. J. Mechanisms Robotics. 2017;9(2):024502-024502-7. doi:10.1115/1.4036023. (Journal Impact Factor: 2.233)*
17. *PT Chinmilli, S Redkar, W Zhang, T Sugar, 'A Review on Wearable Inertial Tracking based Human Gait Analysis and Control Strategies of Lower-Limb Exoskeletons' Int Rob Auto J 3(7), 2017.*
18. *PMB Waswa, S Redkar A survey of space mission architecture and system actualization methodologies, International Journal of Space Science and Engineering 4 (3), 234-252, 2017*
19. *Chase Wheeler, Thomas Sugar, Eduardo Fernandez, Arjun Narayanan, Sangram Redkar, 'Load Carrying Assistance Device Pogo Suit', IAES International Journal of Robotics and Automation (IJRA) 5 (3), 2016*
20. *R. Sayyad and Sangram Redkar, 'Failure Analysis and Reliability Study of NAND Flash-Based Solid-State Drives', Journal of Electrical Engineering and Computer Science, Vol 2:2 2016. DOI: <http://dx.doi.org/10.11591/ijeecs.v2.i2.pp315-327>*
21. *Vamsi Manchala, Sangram Redkar and Tom Sugar, 'Using Deep Learning for Human Computer interface via Electroencephalography', IAES International Journal of Robotics and Automation (IJRA) Vol 4, No 4: December 2015*
22. *CS Susheel Kumar, Sangram Redkar and Tom Sugar, "Parametric Resonance and Energy Transfer in Suction Stabilized Floating Platforms-A Brief Survey". International Journal of Nonlinear Dynamics, October 2015. DOI: 10.1007/s40435-015-0210-1*
23. *Aaditi Joshi, Tom Sugar and Sangram Redkar, 'Characterization of Sandia MEMS Accelerometer', Bulletin of Electrical Engineering and Informatics, Vol. 4, No. 4, December 2015, pp. 320~333.*
24. *Alvaro Vargas-Clara and Sangram Redkar 'Unmanned Ground Vehicle Navigation Using Brain Emotional Learning Based Intelligent Controller (BELBIC)', Smart Science, , [Vol 3, No 1 \(2015\)](#), DOI: 10.6493/SmartSci.2015.288*
25. *Thomas G. Sugar; Andrew Bates; Matthew Holgate; Jason Kerestes; Marc Mignolet; Philip New; Ragesh K. Ramachandran; Sangram Redkar; Chase Wheeler, "Limit Cycles to*

Enhance Human Performance Based on Phase Oscillators” *J. Mechanisms Robotics*. 2015; 7(1):011001-011001-8. (*Journal Impact Factor: 2.233*)

26. P. Ray and **Sangram Redkar**, ‘Analysis and Simulation of Wiseman Engine’, *Cogent Engineering*, 1(1), DOI: 10.1080/23311916.2014.988402, Dec 2014 (*Journal Impact Factor: 1.35*)
27. *Alvaro Vargas-Clara* and **Sangram Redkar**, ‘Sensor Fusion via Brain Emotional Learning for Ground Vehicle’, *TELKOMNIKA*, [Vol 12, No 7: July 2014](#)
28. *Pooja Velaskar, Osama Jameel, Alvaro Vargas-Clara* and **Sangram Redkar**, ‘Guided Navigation Control of an Unmanned Ground Vehicle (UGV) using Global Positioning Systems (GPS) and Inertial Navigation Systems (INS)’ *International Journal of Electrical and Computer Engineering*, Vol 4. No 3, June 2014
29. O. Jameel, Dipika Subramanian and Sangram Redkar, “Non-Destructive Resonance Testing using Time and Frequency Domain Techniques”, *Materials Evaluation*, Vol. 72 - No. 4, Apr.-14
30. *Ezekiel E.* and **Sangram Redkar**, “Reducibility of Quasiperiodic Systems”, *International Journal of Modern Nonlinear Theory and Application*, [Vol.3 No.1, March 2014](#)
DOI: [10.4236/ijmnta.2014.31002](#) (*Journal Impact Factor: 1.06*)
31. . P. Waugh, **Sangram Redkar**, J. Gintz and Brad Rogers, ' Predicting Manpower Requirement for a Truck Building Facility Using Simulation Techniques', *International Journal of Engineering Research and Innovation (IJERI) Fall/Winter 2012* (*Journal Impact Factor: 0.689*)
32. *A Vargas-Clara*, and **Sangram Redkar**, “Dynamics and Control of a Vertical Takeoff and Landing (VTOL) Stop Rotor Unmanned Ariel Vehicle”, *International Journal of Electrical and Computer Engineering (IJECE)*, 2012, Vol 2, Issue 5 Pages 598-605
33. **Sangram Redkar**, ‘Lyapunov Stability of Quasiperiodic Systems”, *Mathematical Problems in Engineering* Volume 2012 (2012), Article ID 721382, 10 pages
doi:10.1155/2012/721382 (*Journal Impact Factor: 1.383*)
34. **Sangram Redkar**, ' Teaching Advanced Vehicle Dynamics Using a Project Based Learning (PBL) Approach ', *Journal of STEM Education*, Volume 13, Issue 3, May-June 2012.
35. **Sangram Redkar**, *J. Liu* and S. C. Sinha, 'Stability and Robustness Analysis of a Linear Time-Periodic System Subjected to Random Perturbations', *Journal of Nonlinear Science and Numerical Simulations*, Volume 17, Issue 3, March 2012, Pages 1430-1437. (*Journal Impact Factor: 2.697*)

36. U. Koneru, **Sangram Redkar** and Anshuman Razdan, "Fuzzy logic based sensor fusion for accurate tracking". Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), vol. 6939, PART 2, pp. 209–218, 2011. (Note: This is an expanded version of the conference paper by same authors)
37. A Vargas-Clara and **Sangram Redkar**, 'Dynamics of a Vertical takeoff and Landing Unmanned Aerial Vehicle', International Journal of Engineering Research and Innovation, Vol 3 :1 Spring/summer-2011. (Journal Impact Factor: 0.689)
38. **Sangram Redkar** and S.C. Sinha, ' Order Reduction of Parametrically Excited Nonlinear Systems Subjected to external excitations', Journal of Nonlinear Science and Numerical Simulations, Feb. 2011. doi:10.1016/j.cnsns.2011.02.002 (Journal Impact Factor: 2.697)
39. Thomas Conner and **Sangram Redkar**, 'Design and Development of a Hypocycloid Engine', International Journal of Modern Engineering, August 2010 (Journal Impact Factor: 1.63)
40. Bhargav Shah and **Sangram Redkar**, 'Design and Development of Durability Testing Machine', The Technology Interface Journal, Fall-10, Vol. 11(1) Pages: 14-20. (Journal Impact Factor: 0.732)
41. **Sangram Redkar**, 'Reduced Order Modeling of Parametrically Excited Micro Electro Mechanical Systems (MEMS)', Advances in Mechanical Engineering, Hindawi Publication Corporation, Volume 2010 (2010), Article ID 632831 (Journal Impact Factor:1.062)
42. **Sangram Redkar**, Tom Sugar, Anshuman Razdan, Ujjwal Koneru, Bill Dillard, and Karthik Narayanan, ' Using Inertial Measurement to Sense Crash Test Dummy Kinematics', International Journal of Modern Engineering, Volume 10, Number 2, Spring/Summer 2010 Pages: 17-25. (Journal Impact Factor: 1.63)
43. J. Samuel, **Sangram Redkar** and R. Biekert, 'Evaluation and Reliability Analysis of an Electric Altimeter- A Case Study' International Journal of Engineering Research and Innovation (IJERI), Volume 1, No. 2, Fall/Winter 2009, Pages: 23-32. (Journal Impact Factor: 0.689)
44. **Sangram Redkar** and Sinha, S.C. 'A Direct Approach for Order Reduction of Nonlinear Systems Subjected to External Periodic Excitation.' ASME Journal of Computational and Nonlinear Dynamics, Volume 3, Issue 3, July-2008, Pages: 031011-1- 8. Amongst top 10 downloaded articles for June and August 2008. (Journal Impact Factor: 1.996, Acceptance Rate: 25%)

(Publications before joining ASU are listed below)

45. Sinha, S.C., **Sangram Redkar** and E. A. Butcher 'On Macro modeling of Nonlinear Time Periodic Systems.' *Communications in Nonlinear Science and Numerical Simulation*, Volume 11, Issue 4, July 2006, Pages: 510-530. (Journal Impact Factor: 2.697)
46. Sinha, S.C., **Sangram Redkar**, E. A. Butcher and V. Deshmukh, V. 'Order Reduction of Parametrically Excited Nonlinear Systems: Techniques and Applications.' *Nonlinear Dynamics*, Volume 41; Number 1-3, 2005, Pages: 237-273. (Journal Impact Factor: 3.706)
47. Sinha, S.C., **Sangram Redkar**, and E. A. Butcher, 'Order reduction of nonlinear time periodic systems using invariant manifolds.' *Journal of Sound and Vibration*, Volume 284, Issues 3-5 June 2005, Pages: 985-1002. (Journal Impact Factor: 1.332)

Peer Reviewed Journal Publications (Accepted for Publication):

N/A

Peer Reviewed Journal Publications (In Review):

N/A

Book/Book Chapters:

*1 P Waswa and Sangram Redkar, 'Dynamics and Control of Nonlinear Attitude Motion of Gravity Gradient Stabilized Spacecraft via State Augmentation, Lyapunov-Floquet Transformation and Normal Forms' *Advances in Spacecraft Attitude Control*, Intechopen Accepted.

*2. TG Sugar, **S Redkar**, Bioinspired Controller Based on a Phase Oscillator, *Converging Clinical and Engineering Research on Neurorehabilitation II*, Volume 15 of the series Biosystems & Biorobotics pp 1371-1376, 2017

*3. **Sangram Redkar**, 'Order Reduction of Parametrically Excited Nonlinear Systems: Techniques and Applications', ISBN-10: 3838311892, ISBN-13: 978-3838311890, LAP Lambert Academic Publishing (September 2, 2009)

(e) Peer Reviewed Conference Publications (Accepted/Published):

1. *Subramanian, S. C., & Redkar, S.* (2020, October). Stability Analysis and Controller Design for Linear Time Periodic Systems Using Normal Forms. In *Dynamic Systems and Control Conference*. American Society of Mechanical Engineers. (Accepted)

2. *Subramanian, S. C., Redkar, S., & Waswa, P. M.* (2020, August). Lyapunov Perron Transformation for Linear Quasi-Periodic Systems. In International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers.
3. *Bhat, SG, Sugar, TG, & Redkar, S.* "Reconstruction of Ground Reaction Force Data Using Lyapunov Floquet Theory and Invariant Manifold Theory." *Proceedings of the ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 10: 44th Mechanisms and Robotics Conference (MR).* Virtual, Online. August 17–19, 2020. V010T10A047. ASME. <https://doi.org/10.1115/DETC2020-22521>
4. *Subramanian, S. C., & Redkar, S.* (2020, August). Unification of Poincare And Floquet Theory for Time Periodic Systems. In International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers.
5. *Bhat, SG, Sugar, TG, & Redkar, S.* "Invariant Manifolds in Human Joint Angle Analysis During Walking Gait." *Proceedings of the ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 2: 16th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC).* Virtual, Online. August 17–19, 2020. V002T02A031. ASME. <https://doi.org/10.1115/DETC2020-22241>
6. *Waswa P.M.B. and S. Redkar,* "Lucid Analysis of Periodically Forced Nonlinear Systems via Normal Forms Forms," *Proceedings of the ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC/CIE 2019.* August 18-21, 2019, Anaheim, California, USA.
7. *Manchala, V., Clara, A., Subramanian, S., Redkar, S., & Sugar, T.* (2019,). Human Computer Interface Using Electroencephalography for Driver Behavior Classification. In *ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference.* American Society of Mechanical Engineers Digital Collection.
8. *Fuente, J., Subramanian, S., Chinimilli, P., Redkar, S., & Sugar, T.* (2019,). The Design of Robust Phase Oscillator for Wearable Robotic Systems. In *ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference.* American Society of Mechanical Engineers Digital Collection.
9. *Le, T., Bhat, S., Subramanian, S., Waswa, P., & Redkar, S.* (2019,). Design and Analysis of An Auto-Parametrically Excited Platform for Active Vibration Control. In *ASME 2019*

International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers Digital Collection.

10. *CS Susheel Kumar, PT Chinimilli, Sangram Redkar* and Tom Sugar, 'Human Locomotion Assistance using $A - \omega$ Features Based Adaptive Oscillator', accepted for publication in the Proceedings of 2019 IEEE Wearable Robotics Association Conference (WearRAcon), March 26-28, 2019, Scottsdale, AZ, USA.
11. *Sandesh Bhat, CS Susheel, Jason Olson, Sangram Redkar*, Thomas Sugar, 'Analysis of a Periodic Force Applied to the Trunk to Assist Walking Gait', accepted for publication in the Proceedings of 2019 IEEE Wearable Robotics Association Conference (WearRAcon), March 26-28, 2019, Scottsdale, AZ, USA.
12. *Sandesh Bhat, Sangram Redkar* and Thomas Sugar, 'Development of a Passive Prosthetic Ankle with Slope Adapting Capabilities', In the proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition, November 9-15, 2018, Pittsburgh, PA, USA, IMECE2018-86593.
13. *CS Susheel Kumar, Sandesh Bhat, Jason Olson, Thao Le* and **Sangram Redkar**, 'Design and Development of an Unmanned Underwater Vehicle (UUV) in the form of a Cuttlefish', In the proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition, November 9-15, 2018, Pittsburgh, PA, USA, IMECE2018-86530
14. *PT Chinimilli, S Redkar, W Zhang*, 'Human activity recognition using inertial measurement units and smart shoes', American Control Conference (ACC), 2017, 1462-1467.
15. TG Sugar, *E Fernandez*, D Kinney, KW Hollander, **S Redkar** HeSA, Hip Exoskeleton for Superior Assistance Wearable Robotics: Challenges and Trends, pp 319-323, 2017
16. *Juan De la Fuente*, Thomas Sugar, **Sangram Redkar** and *Andrew Bates*, 'Nonlinear Phase based oscillator to generate and assist periodic motions', ASME IDETC2016, Charlotte, NC, USA, May 2016
17. *Evi Ezekiel* and **Sangram Redkar**, 'Reducibility of Quasiperiodic Systems', in the proceedings of ASME IMECE, November 9-12, 2012, Houston, Texas, Paper No. IMECE2012-86471.
18. *Ujjwal Koneru, Sangram Redkar*, and Anshuman Razdan, 'Fuzzy Logic based Sensor Fusion for Accurate Tracking', paper no. 759, In the proceeding of 7th International Symposium on Visual Computing, September 26-28, 2011, Las Vegas, Nevada, USA

19. A. *Vargas-Clara* and **Sangram Redkar**, 'Development of a Stop Rotor UAV', paper no. 141 ENG101 in the proceedings of IAJC ASEE IEEE Joint Conference 2011, Hartford Connecticut.
20. **Sangram Redkar**, 'Stability of Quasiperiodic Systems' paper no. 148 ENG101 in the proceedings of IAJC ASEE IEEE Joint Conference 2011, Hartford Connecticut.
21. *Thomas Conner* and **Sangram Redkar**, 'Design and Development of a Hypocycloid Engine for Unmanned Aerial Vehicles (UAVs)', IMECE2010-40448, ASME 2010 International Mechanical Engineering Congress & Exposition, Nov 12-18, 2010 Vancouver, Canada.
22. **Sangram Redkar** and S.C. Sinha, ' Order Reduction of Parametrically Excited Nonlinear Systems Subjected to External periodic Excitations', In the Proceedings of ASME 2009 International Design Engineering Technical Conferences (IDETC) & Computers and Information in Engineering Conference (CIE) 2009, San Diego, CA, August 30-September 2, Paper No.: IDETC2009-86886.
23. **Sangram Redkar**, Tom Sugar, Bill Dillard and Karthik Narayanan, ' Determination of Kinematic Parameters using inertial Sensing', In the Proceedings of ASME 2009 International Design Engineering Technical Conferences (IDETC) & Computers and Information in Engineering Conference (CIE) 2009, San Diego, CA, August 30-September 2, San Diego, CA, August 30-September 2, Paper No: IDETC2009-86533.
24. **Sangram Redkar**, 'AC2009-2344: Advanced Vehicle Dynamics: Theory in Practice', In the Proceedings of ASEE Conference and Exposition, Austin, TX, June-2009, Paper No.: AC2009-2344.
25. **Sangram Redkar**, Trian G., B Rogers and Scott Danielson, 'AC 2008-2243: Automotive Engineering Technology: A Counter Intuitive Path to Greater Technology Enrollment', In the Proceedings of ASEE Annual Conference & Exposition, Pittsburgh, PA, Jun- 2008, Paper No.: AC 2008-2243.
26. B. Dillard, K. Narayanan, M Greene and **Sangram Redkar**, 'Issues in Wearable Biomechanical Inertial Sensor Systems', In the Proceedings of IEEE/ION Position Location and Navigation Symposium, Monterey, CA, May-2008, Pages 210-216.
27. **Sangram Redkar** and S. C. Sinha, 'Order reduction of nonlinear systems subjected to periodic excitations', In the Proceedings of ASME IMECE 05, Orlando, FL, Paper No.: IMECE 2005-82354.
28. **Sangram Redkar** and S. C. Sinha, 'Order reduction of large-scale nonlinear systems with periodic-quasiperiodic coefficients', In the Proceedings of ASME DETC 05, Long Beach, CA, Paper No.: DETC2005-85306

29. **Sangram Redkar** and S. C. Sinha, 'Order reduction of periodic-quasiperiodic systems', in the Proceedings of ENOC 05, Eindhoven, the Netherlands, Paper No.: ENOC05-469.
30. **Sangram Redkar**, 'Order reduction of parametrically excited MEMS', In the Proceedings of SECTAM XXII, Tuskegee, Alabama August '04, Pages: 412-422.
31. **Sangram Redkar**, Sinha, S.C. and E. A. Butcher, 'Some Techniques for Order Reduction of Nonlinear Time Periodic Systems.', In the Proceedings of ASME- IMECE 03, Washington D.C., USA, Paper No: IMECE 2003/42559,
32. Sinha, S.C., **Sangram Redkar**, Deshmukh, V. and E. A. Butcher, 'Order reduction of nonlinear time periodic systems using invariant manifolds', In the Proceedings of ASME- DETC 03, Chicago, IL, Paper No.: VIB-48445
33. Sinha, S.C., **Sangram Redkar**, and E. A. Butcher, 'Order Reduction of Nonlinear Systems', In the proceedings of 10th International Congress on Sound and Vibration, July '03, Stockholm, Sweden.

(f) Presentations at Professional Meetings/Invited Talks:

- *1. **Sangram Redkar**, 'Development of a Stop Rotor UAV', IAJC ASEE IEEE Joint Conference 2011, Hartford Connecticut
- *2. **Sangram Redkar**, 'Order Reduction and Control of Parametrically Excited Nonlinear MEM Systems', World Congress of Nonlinear Analysts, July-2008, Orlando, Florida.
- *3. **Sangram Redkar**, 'Application of Inertial Measurement in Body Orientation Sensing', National Highway Traffic Safety Administration, U.S. Department of Transportation, Mar-08, Washington, DC.
- *4. **Sangram Redkar**, 'Application of Inertial Measurement in Biomechanics', Archangel Systems, Oct-2007, Auburn, AL
5. **Sangram Redkar**, 'Order reduction of nonlinear parametrically excited MEMS'. Presentation at SECTAM XXII, August '04, Tuskegee University, Alabama
6. **Sangram Redkar**, S.C. Sinha and E. Butcher, 'Order reduction of periodic-quasiperiodic nonlinear systems'. Presentation at tenth Conference on Nonlinear Vibrations, Stability and Dynamics of Structures, July '04, Virginia Tech., Blacksburg, Virginia

7. **Sangram Redkar**, 'New Approaches for Analysis and Reduced Order Modeling for Parametrically Excited Systems', Presentation at GSC Research Forum Conference, March '04, Auburn University, Alabama,

8. Milek, G. L., **Sangram Redkar**, and S.C. Sinha, 'Stability, Robustness and Lyapunov Redesign of Nonlinear Time-Periodic Dynamical Systems subjected to Parametric Perturbation'. Presentation at ninth Conference on Nonlinear Vibrations, Stability and Dynamics of Structures, August '02, Virginia Tech., Blacksburg, Virginia.

9. **Sangram Redkar**, 'Simulation and optimization of occupant restraint system', Automotive Research Association of India, September-01, Pune, India.

10. **Sangram Redkar**, 'The philosophy of Total Productive maintenance (TPM)', Presentation at Vickers School of Hydraulics, May-96, Mumbai, India.

11. **Sangram Redkar**, 'Some studies in PLC logic gates applied to mechanical system', Presentation at Vickers School of Hydraulics, March -96 Mumbai, India.

(g) Service:

1. University

Committee Name	University Level (program, School, University)	Role (member, chair)	Years
Interplanetary Initiative Steering Committee	University	Member	2017 – Present
Undergraduate Curriculum Committee	TPS	Member	2017-Present
Systems Engineering Executive Committee	TPS	Member	2017-Present
Systems Engineering PhD graduate committee	TPS	Member	2017-present
Faculty Hiring	TPS	Chair	2014-2015

Committee			
Faculty Hiring Committee	FSE	Member	2014-2015
Deans Faculty Advisory Committee	CTI	Member	2011-2012
Curriculum and academic program Committee	CTI	Member	2010-2012
Curriculum Committee	CTI	Member	2009-2012

2. Professional

1. **Member**, ASME, ASEE, Review Board Member-International Association of Journals and Conferences (IAJC).
2. **Session Organizer**: ASME- IMECE-2011, Advances in Aerospace Technology: Unmanned Aerial Vehicles, Denver, Colorado, November 11-17, 2011.
3. **Session Co-chair**: ASME IDETC-2007, MSNDC-15-1 Applications to Microsystems, Session Sponsor: ASME, Technical Committee on Multi-body Systems and Nonlinear Dynamics Sept 4-7, 2007, Las Vegas NV.
4. **Organizer**: Student paper competition ASME IDETC-08, San Diego, CA, Session Organizer, ASME-IMECE-2010
5. **Reviewer for following international journals**: Nonlinear Dynamics, Journal of Vibration and Acoustics, Communications in Nonlinear Science, ASME Journal of Computation and Nonlinear Dynamics
6. **Reviewer for Springer Publishing**: Review books, book proposals, and book chapters for Springer.
7. **Consultant**: Able Engineering and Component Services, Phoenix, AZ, U-Haul Technical Center, Phoenix, AZ, Archangel Systems Inc, Auburn, AL, Accuwright Industries, Gilbert.

3. Community

I have been serving as Subject Matter Expert (SME) to various DoD agencies like AFRL, ARO, DTRA, NSWC and SOCOM in the areas of physiological sensing, inertial navigation, wearable robots etc. The duties typically involve discussing current and future needs with stakeholders, help DoD leadership set research priorities, provide assistance in articulating needs, requirements so that an engineering solution can be explored, help evaluate risks in various DoD initiatives and programs and suggest risk mitigation strategies.

Since 2018, I have been engaged with US Army outreach program to host students, cadets, recruits and veterans at ASU poly. They intern in our lab under my supervision and get familiar with DoD supported research programs in our lab.

I have participated in student recruiting activities in form of hosting visitors, provide lab tours, visiting high schools, meeting with k-12 teachers. I regularly mentor high school students throughout the year.

I have established research collaborations in the US and abroad. Specifically, I have helped engineering schools in India to develop “hands on engineering” curriculum that is relevant to local communities. As part of this effort, I have travelled to India in 2019 to meet with leaders of engineering schools.

I have participated in student recruiting activities in form of hosting visitors, provide lab tours, visiting high schools, meeting with k-12 teachers. I regularly mentor high school students throughout the year.

I also engage with industry like Intel, NXP, Northrup etc. by providing input to their engineering issues, help define research problem, help them recruit ASU students and help them solve difficult engineering problems.

I have represented ASU and TPS at various tradeshows like CES, industry conferences like Wearacon and showcased our capabilities, teaching and research initiatives. I have mentored junior faculty in various issues regarding research and teaching. I have also helped junior faculty secure research funding from DoD and university.

(h) Scholarly Activities and Sponsored Projects:

1. Successful Grants and Contracts Awarded/Selected for funding:

No.	Title	Funding Source	Time Period	Dollar Amount	PI/Co-PI	Individual Share	Managing Unit

1.	AFRL-UDC	AFRL	8/1/20 To 7/30/21	\$25,000	PI	100%	TPS
2.	BRAIN center Grant	ASU-BRAIN	7/15/20 To 6/30/21	\$25,000	Co-PI	50%	FSE
3.	Development of EWD	DTRA/NSWC	01/02/20 To 12/31/23	\$1,350,000	PI	100%	TPS
4.	AFRL-UDC	AFRL	8/1/2019- 7/30/2020	\$25,000	PI	50%	TPS
5.	RIMUS-MD	DHA	7/1/2019- 12/31/2019	\$27,000	PI	100%	TPS
6.	Rapid Responsive Space-Phase-III	ASU	7/1/2019 To 6/30/2020	\$15,000	PI	100%	SESE
7.	Space-Robotics-Phase-III	ASU	7/1/2019 To 6/30/2020	\$30,000	Co-PI	50%	SESE
8.	Development of an ePoD	DoD-Rapid Innovation Fund	8/1/19 To 7/30/21	\$1,014,738	PI	50%	TPS
9.	Loadmaster Exoskeleton for Aerial Port Delivery	DoD-Rapid Innovation Fund	7/1/19 To 6/30/21	\$1,251,599	Co-PI	50%	TPS
10.	Development of Upper-Arm Exso	Mayo-ASU	1/15/19 To 12/31/19	\$31,000	Co-PI	50%	TPS
11.	AFRL-University Design Challenge	DoD- AFRL	7/1/18 To 7/1/19	\$25,000	PI	50%	TPS
12.	Development of Ultra High Range UAV	SRP	6/30/18 To 7/1/19	\$60,000	PI	100%	TPS
13.	Rapid	ASU	5/31/18	\$25,000	PI	100%	SESE

	Responsive Space-II pilot		To 7/30/19				
14.	Space Robotics -II Pilot	ASU	5/31/18 To 7/30/18	\$20,000	Co-PI	25%	SESE
15.	Keen Professorship	ASU	1/8/18 To 5/20/18	\$12,000	PI	50%	TPS
16.	Innovative Dynamic Tire Sensor	DoD- AF	8/22/17 To 5/1/18	\$43,194	PI	100%	TPS
17.	Exsosense	DoD - SOCOM	8/23/17 To 7/30/19	\$74,986	PI	100%	TPS
18.	Development of a Passive Ankle	DHP/DoD	8/1/2017 To 3/13/18	\$54,000	Co-PI	50%	TPS
19.	Development of a wireless IMU	DHP/DoD	7/1/2017 To 1/31/18	\$63,000	Co-PI	50%	TPS
20.	sUAS challenge (Undergraduate Project-REU)	ASU	7/1/2017 To 5/20/2018	\$3,000	PI	100%	TPS
21.	University Design Challenge	AFOSR/TSC	8/15/2012 To 8/14/2019	\$140,000	PI	50%	TPS
22.	Flexible Hybrid Electronics (Undergrad Project)	NextGen Aeronautics	10/1/2016 To 12/31/2018	\$40,500	PI	100%	TPS
23.	Hip Exoskeleton for Special Assistance (HeSA)	DARPA	6/23/15 To 7/1/2017	\$537,000	Co-PI	50%	EGR
24.	Four Minute Mile Running (4MM), year 2	DARPA	1/1/14 To 5/31/15	\$266,004	Co-PI	50%	EGR

25.	Four Minute Mile Running (4MM)	DARPA	7/13/12 To 5/31/14	\$204,076	Co-PI	20%	EGR
26.	UI Development for Suction Stabilized Floats	J. Montgomery Group LLC	12/15/13 To 5/15/14	\$4,200	PI	100%	EGR
27.	Blended Redundant Array of Inertial Navigation Systems (BRAINS)	CTI-SSE	10/15/12 To 6/30/13	\$12,000	PI	100%	EGR
28.	Validation of an Advanced Hybrid Electric Propulsion System Configurations Using Hardware In-the-loop	CTI-SSE	10/15/12 To 6/30/13	\$12,000	Co-PI	15%	EGR
29.	Analysis and design of Suction Stabilized Floats	Mr. Jim Montgomery	10/15/2012 To 10/15/2013	\$25,000	PI	100%	EGR
30.	Analysis of an Air Motor	Bonner Enterprises	4/22/2012 To 6/22/2012	\$2000	PI	100%	ET/ATIC
31.	Design of a Hyperbaric Chamber Research Experience for Undergraduates Project	Ryder Enterprises	1/9/2012 To 3/9/2012	\$508	PI	100%	ET
32.	Process Compensated Resonance Testing (PCRT)	CTI-SSE	10/15/11 To 5/30/12	\$12,536	PI	100%	ET
33.	Feasibility Study: Energy	Ryder Enterprises	6/1/2011 To	\$1000	PI	100%	ET/ATIC

	Harvesting in Central Arizona Project Research Experience for Undergraduates Project		8/1/2011				
34.	Modeling and Simulation of NextGen Wiseman engine	Wiseman Technologies	9/1/2011 To 8/30/2012	\$15,000	PI	100%	ET/ATIC
35.	Development of a Wiseman UAV Engine Industry Match/Cost Share by Wiseman Technologies Inc	Science Foundation Az Wiseman Tech. Inc, MS	11/1/2010 To 9/30/2011	Project Share: \$120,000 Total Funding: \$1,000,000 \$120,000	PI Co-PI PI	100% 14% 100%	ET ORSPA, ASU ET
36.	Development of Rotary Engine	Campbell Lukas Research	10/18/2010 To 3/15/2011	\$4988	PI	100%	ET
37.	ASME Ishow Travel Grant	ASME	6/5/2010	\$1500	Co-PI	50%	ET
38.	Modeling and Simulation of tilt-rotor/stop rotor	Naval Air Warfare Center	1/15/2010 To 6/15/2010	\$21,000	PI	100%	ET/ATIC
39.	Development of UAV and MAV for remote surveillance	Kutta Technologies, Phoenix AZ	8/15/2008 To 5/15/2009	\$7,500	Co-PI	40%	ET/ATIC
40.	Faculty Grant	American Society of Non-	4/15/2008 To 4/15/2009	\$8,000	PI	50%	ET

		Destructive Testing (ASNT)					
41.	Course Development and Student Project Support	U-Haul International	2/1/2008 To 2/1/2009	\$6,500	PI	100%	ET
42.	Body Orientation Sensing System (BOSS) Proposal No. 07-028	US Department of Trans. (DOT)	1/15/2007 To 6/15/2007	\$ 99,999.28	PI	N/A	Archangel Systems
43.	Head Alignment and Orientation (HALO) Sensing System	USAF/AFMC , DET 1 AF Research Laboratory	1/1/2006 To 1/6/2006	\$99,999.48	Co-PI	N/A	Archangel Systems

2. Pending Proposals

N/A

3. Gifts in Kind

No.	Title	Sponsor	Date	Dollar Amount	PI/Co-PI	Individual Share	Managing Unit
1.	Polytec Laser Vibrometer Setup	Honeywell	5/22/2012	\$250,000	PI	100%	EGR
2.	Resonance Testing Setup	Vibrant	4/14/2012	\$45,000	PI	100%	ET
3.	Four 1034X Vacuum Pumps for Spiderman Capstone Project	Dynaflo Inc.	2/17/2012	\$1200	PI	100%	ET
4.	Two VW TDI Engines,	VW APG	12/13/2011	\$15,000	PI	100%	ET

	Harness assembly and Front engine mounting and suspension system						
5.	MSC University Software Bundle -150 Academic licenses	MSC Software	8/15/2008 8/15/2009	\$4,500 (Software Discount)	PI	50%	ET

(i) Graduate Students:

1. Graduated PhD Students (Served as a Committee Chair/Co-Chair):

1. Mr. Peter MB Waswa, 'Analysis and Control of Space Systems Dynamics via Floquet Theory, Normal Forms and Center Manifold Reduction', Graduation Date Fall 2019, served as a **committee Chair**.
2. Mr. PT Chinimilli, 'Human Activity Recognition and Control of Wearable Robots', Graduation Date Fall-2018 served as a **committee Co-Chair**
3. Mr. Juan De la Fuente, ', 'Nonlinear Phase Based control to Generate and Assist Oscillatory Motion with Wearable Robotics' served as a **committee Co-Chair** Graduation Date: Fall 2016.
4. Mr. Alvaro Vargas-Clara, Development of an Intelligent Control System Utilizing a Human Emotion Recognition System for an Unmanned Ground Vehicle' served as a **committee Chair**, Graduation Date: Spring 2015.
5. Mr. Matthew Holgate, 'Control of a Robotic Transtibial Prosthesis'. Graduation Date: Fall-09, Served as a **committee Co-Chair**

2. Current PhD Students (Serving as a Committee Chair/Co-Chair)

1. Mr. Kevin Nichols, serving as **committee Chair** Expected Date of Graduation: Spring 2021.
2. Mr. Jason Olson, serving as a **committee Chair**, Expected Date of Graduation: Spring 2021

ABD

3. Mr. Sandesh Bhat, serving as a **committee Chair**, Expected Date of Graduation: Spring 2021
ABD
4. Mr. Susheel Kumar, serving as a **committee Chair**, Expected Date of Graduation: Spring 2021
ABD
5. Ms. Kendra Kim, serving as a **committee Chair**, Expected Date of Graduation: Fall 2021
6. Mr. Brett Fielder, serving as a **committee Chair**, Expected Date of Graduation: Fall 2021
7. Mr. Patrick Grates, serving as a **committee Chair**, Expected Date of Graduation: Fall 2021
8. Mr. Xunguang Li, serving as a **committee Chair**, Expected Date of Graduation: Fall 2021
9. Ms. Jeslin Samuel, serving as a **committee Chair**, Expected Date of Graduation: Fall 2022
10. Mr. Jacob Sindorf, serving as a committee Chair, Expected Date of Graduation: Fall 2022

3. Graduated MS Students (Served as a Committee Chair/Co-Chair, P-Applied Project, T-Thesis):

1. Ms. Michaela Dye (T), " ' Tracking System based on UWB' Spring 2020".
2. Mr. Joe McMillian (P), 'Augmented reality with IMU and smart glasses', Fall-19
3. Calvin Coldwell (P), 'Development of a baseball robot', Spring -19
4. Mr. Travis Grimm(P) , 'Exoskeleton for back support', Spring-19
5. Jason Vaughn (P)- 'Dynamics of planer grinding of turbine blades', Spring -19
6. Mr. Maxwell Lombardi (P), 'AR/VR IMU fusion for Tracking'. Spring-19
7. Mr. Kevin Nichols (T), 'Sensor Development for Physiological and Environmental Signals monitoring' served as a **committee Chair**, Spring-18
8. Mr. Lucas Casanova (T), 'Design and Development of Flexible Sensors using Non-Conventional Methods', served as a **committee Chair**, Spring-18
9. Ms. Thao Le (T), 'Design and Analysis of Auto-parametrically Excited Platform for Active vibration control'. served as a **committee Chair**, Spring-18

10. Ms. Katy Fefolt (P), 'Design of a wearable air-conditioner', Fall-17
11. Mr. Sandesh Bhat (T), 'Design and development of passive prosthetic ankle', Fall-17 served as a **committee Chair**
12. Mr. Miguell Estrella (P), 'Design of passive ankle exoskeleton for walk assist', Fall-17
13. Mr. Mike Del Favero (P), 'Design of an Ankle Testing Machine', Fall-17
14. Mr. Rashad Maady (T), 'SQP Supervisory Control for Parallel Hybrid Vehicle with Synchronous Rate Power Sources', served as a **committee co-Chair**, Spring-17
15. Mr. Cole Seeley (P), 'Mechanical Design of an Autonomous Load Carrying Mule', Spring-17
16. Mr. Jason Olson (P), 'Design and Development of Reconfigurable Ground Vehicle'- Spring-17
17. Mr. Mitch Janson (P), 'Development and Testing of Unmanned Ground Vehicle' Spring-17
18. Mr. Dangli Yang (P), 'Development of GRF Sensing Insole', Spring 17
19. Ms. Seana O'Railey (P), 'Dynamics and Control of an Autonomous Load Carrier', Spring-17
20. Mr. Yariraj Shetty (T), 'Robust Human Motion Tracking using low cost Inertial sensors', Fall 2016- MS served as a **committee Chair**.
21. Mr. Ravin Jay Kumar (P), 'Development and validation of a lower extremity passive walk Assist Exoskeleton', Spring-16
22. Mr. Vamsi Manchala (T), 'Human Machine Interface using EEG', Spring 15, served as a **committee Chair**.
23. Mr. Chase Wheeler (T), 'Load Carrying Assistance Device: Pogo Suit', Fall-14, served as a **committee co-chair**.
24. Mr. Sushil Kumar (T), 'Hydrodynamics of Suction Stabilized Floats (SSF)', Fall-14, served as a **committee Chair**

25. Ms. Rakashanda Sayeed (P), 'NAND Flash SSD, performance and reliability study', Summer-14,
26. Mr. Priyesh Ray (T), 'Modelling, Simulation and Scalability analysis of Internal Combustion Engine', Spring 14, served as a **committee chair**
27. Ms. Aaditi Joshi (P), 'Characterization of a MEMS Comb-finger Accelerometer', Spring 14 served as **committee Co-chair**.
28. Osama Jameel (T), 'Resonance Testing Using Time and Frequency Domain Techniques', Spring-13, served as a **committee chair**.
29. Ms. Pooja Velaskar (T), 'Navigation and Control of Unmanned Ground Vehicle', Summer-13, served as a **committee Chair**.
30. Mr. Bao Ho (T), 'Characterization of a MEMS accelerometer', Spring-13, served as a **committee Chair**.
31. Ms. Dipika Subramaniam (T), 'Process Compensated Resonance Testing', Spring -13, Served as a **committee Chair**
32. Mr. Asa Holly (T), 'Development of a Quad-Copter UAV', Spring -13, served as a **committee Chair**
33. Mr. Evi Ezekiel (T), 'Stability and Reducibility of Quasiperiodic Systems', Summer-12, Served as a **committee Chair**
34. Mr. Tom Conner (T), 'Critical Evaluation of a Hypocycloid Engine', Fall-11, Served as a **committee Chair**
35. Mr. Werner Osorio (T), 'Design of a Cornering Fatigue Testing Machine', Fall-11, Served as a **committee Chair**.
36. Mr. Alvaro Vargas-Clara (T), 'Design and Analysis of a Multimode Stop rotor Unmanned Aerial Vehicle (UAV), in Spring-11, Served as a **committee Chair**.
37. Mr. Shreyas Palkar (T), 'Energy Analysis and design of Environmental Test Chambers', Graduation Date: Spring-11, Served as a **committee Chair**
38. Mr. Ujjwal Koneru (T), 'Integration of IMU and Vision Based techniques', Graduation Date: Spring-10, Served as a **committee co-Chair**.
39. Ms. Jeslin Samuel (T), 'Performance and Reliability Analysis of an Electric Altimeter- A Case Study', Graduation Date: Spring-09, Served as a **committee Chair**.

40. Mr. Bhargav Shah(P), 'Design, Simulation and Testing of Surge Brake Test stand'.
Graduation Date: Spring-09, Served as a **committee Chair**,

41. Mr. Sandeep Gupta (P), 'Design of Surge Brake Master Cylinder for UHaul International',
Graduation Date: Summer 08, Served as a **committee co-Chair**

4. Current MS Students (serving as a Committee Chair/Co-chair):

5. PhD and MS Students- served/serving as a committee member.

1. Jason Kerestes, 'Robotic Augmentation of Human Locomotion For High Speed Running',
Graduation Date: Fall-14.

2. Jason Finch, 'Fuel Cell Analysis', Graduation Date: Fall-12

3. Gokay Deniz, 'Creating a lean environment in solar and wind inverter manufacturing company',
Graduation Date: Fall-12.

4. Himanshu Patel, 'Lean Manufacturing at a local manufacturing company', Graduation Date:
Fall-12.

5. Ben Shams,' Effect of air gap on building applied photovoltaic modules:
An energy and economic analysis', Graduation Date: Fall-10

6. Jagannath Baskaradoss (MS), 'Airport Noise Analysis', Graduation Date: Spring -10.

7. Mr. Prashant Waugh (MS), 'Simulation –A tool for predicting manpower requirement for the
truck body building facility of U-Haul International', Graduation Date: Summer 08.

8. Mr. Jeffery Ward (PhD), 'Robotic System for Stroke Rehabilitation'. Graduation Date: Fall-09

(j) Achievements and Awards:

- Recipient of Graduate Research Fellowship of Auburn University.
- Stood 11th in the University of Mumbai, B.S. (Mechanical Engineering) final exam in 1999.
- Recipient of the 'Best Student Project' award of University of Mumbai in 1999.
- Stood 3rd in the state of Maharashtra L.M.E final exam in 1996.

- Recipient of Indian National Talent Search (NTS) and Bombay Talent Search (BTS) fellowships.

(k) Skills:

- FEM Software : ANSYS
- Multibody Dynamics Software: Working Model 3D, ADAMS
- Programming languages: C, C++
- Modeling software: PRO-E, Working Model, Solid Works
- Mathematics software: Mathematica, MATLAB.
- Computer skills: MS Office, Corel WordPerfect, Win-latex, Multi-SIM, LabVIEW, LabWindows

(l) Invention Disclosures

1. PT Chinimilli, **Sangram Redkar** and Thomas Sugar, 'System and Method for Human Gait and intent recognition' AzTE ref. M17-215P, Provisional Patent filed on 8/11/2017
2. **Sangram Redkar**, Thomas Sugar, *Zach Wilson, Robert Morales, K.C. Scott, Ralph R., Kyle Barrett, John Wright, Scott Goodling*, 'A vacuum cup-based wall climbing device for first responders', Provisional Patent Number 61/661,754 filed on 6/19/2012

BestBuy Commercial featuring SM7 (Spiderman Capstone) Invention (retrieved 6/21/12)

<https://www.youtube.com/watch?v=sgpmSF6WDck>

Spiderman Test Video (retrieved 5/6/12):

<http://www.youtube.com/watch?v=R4SYWhiW4jM>

News Coverage (National Geographic):

<https://www.youtube.com/watch?v=rDPpQU60AEw>

(m) Selected Projects

1. **SM7 Wall climbing system:** With funding from AFRL we designed, built and successfully tested suction cup based wall climbing system.
<https://www.youtube.com/watch?v=4iCa5vBIU4o>
2. **Wearable Air Conditioner:** With funding from AFRL we designed, built and successfully tested a wearable air conditioner using vapor compression system.
https://www.youtube.com/watch?v=Z-6NAjQZj_0
3. **Autonomous Mule:** With funding from AFRL we designed, built and tested an autonomous load carrying mule.
<https://www.youtube.com/watch?v=yGCypIJ5xxk>
4. **UAV with manipulator:** We designed, built and tested an autonomous UAV with manipulator.
<https://www.youtube.com/watch?v=xNzi2TcTB-w&list=PLfGa299gsTzSqh2FLGYBomRa4ZzmDGFkB>
5. **Pogo Suit:** With funding from DARPA we designed, built and tested an oscillating backpack that pumps energy in human gait.
<https://www.youtube.com/watch?v=wIUctgO6Lbc>
6. **Autonomous parasail UAV:** With funding from SRP we designed, built and tested autonomous parasail UAV.
https://www.youtube.com/watch?v=Jzs_KeJ0SNA
7. **Passive Walk Assist:** With funding from DARPA we built a passive exoskeleton for walking.
<https://www.youtube.com/watch?v=HTXOMVjY4V4>
8. **Digital Twin:** We are developing a wireless sensor network system to develop human Digital Twin
<https://www.youtube.com/watch?v=TET8IoPybAk>