Dr. Rungun Nathan

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CAREER SUMMARY

He has 1 patent, published 23 journal papers in top-tiered journals, 20 refereed conference papers, 22 conference papers with 513 citations (ref: Google Scholar).

Over 25 combined years of increasing responsibilities in industry/academia in C-DOT, Indian Institute of Science (IISc.), Villanova University and Penn State Berks. Starting with over 3 years of industrial experience as a Group Leader in Centre for Development of Telematics (C-DOT) managing about 20 people with a large budget, a large prototype shop and an ambitious goal. Major achievements include - Design of electronic packaging of telephone exchanges from scratch, establishing documentation process and in-house codes/standards/processes, creating a prototype shop for in house development. Development of prototypes and developing vendors to indigenously manufacture these equipment for bulk supply to modernize Indian telecommunication. Then was involved in Robotics research during tenure at IISc. - designing and developing robot and researching into artificial intelligence, automation etc. Then worked on development of a robotics gripper using 3D printing with MRI data of human hand as thesis in MS while at LSU. PhD work was involved in the study of control of Powered Orthosis for upper arm and the work has been cited over 200 times since its publication. Developed Haptic primitives during the postdoc year at UPenn. At Villanova university developed Mechatronics elective and minor which is still going strong. Founding and current Program Chair for the Mechanical Engineering program at Berks (ME@Berks). Responsible for setting up program courses, technical electives, necessary laboratories and course scheduling. Setup laboratories required by the ME program by buying, specifying and ordering the necessary equipment, and setting up experiments. Program has grown from seven students in 2013 to about 180 now. Hired several faculty, 1 technician, mentored several new tenure and non-tenure faculty and have taken increasing leadership roles since joining Penn State Berks in 2007. Provided the leadership in the program achieving its first six-year accreditation in 2015. Actively involved in professional society like ASEE, ASME, AGMA and APS with leadership roles, and providing service by reviewing manuscripts, serving on committees etc. Volunteering my services to the community at large.

EDUCATION

Ph. D. Mechanical Engineering, March 1999. GPA 4.0/4.0
Drexel University, Philadelphia, Pennsylvania.
Dissertation Advisor : Dr. R. Seliktar and Dr. T. Rahman.
Dissertation Title : Criteria for interface and control of a powered upper arm orthosis.

M.S. System Science, May 1993. GPA 3.8/4.0
Louisiana State University, Baton Rouge, Louisiana
Thesis Advisor : Dr. D. E. Thompson.
Thesis: Anthropomorphic Gripper Design from CT Scan Data.

Post Graduate Diploma, Electronics Design Technology, August 1985. GPA 6.4/8.0
Indian Institute of Science,Bangalore, India.
Project Advisors : Dr. J. E. Diwakar & Dr. N. S. Dinesh.
Project Title : Design of the First Image Scanner for processing INSAT (INdian SATellite) images.

B.S. Mechanical Engineering, May 1984. GPA 69.4%
PESCE, Mysore University, India.
Project Title : Improved vomiting type pulp digester.

WORK EXPERIENCES

1. Professor of Engineering — May 2021 – Present
   Program Chair Mechanical Engineering — Jan 2013 – Present
   Associate Professor of Engineering — May 2012 – May 2021
   Assistant Professor of Engineering — Aug 2007 – May 2012
   Penn State Berks, Reading, PA 19610.
2. Visiting Assistant Professor in Mechanical Engineering — Aug 1999 – May 2007
   Villanova University, Villanova, PA 19085
3. Post Doctoral Fellow — Jan 1999 – Aug 2000
   VAST Lab, University of Pennsylvania, Philadelphia, PA 19104
4. Research Assistant — May 1993 – Dec 1998
   Alfred I duPont Institute Wilmington, DE 19899
5. Graduate Assistant — Jan 1991 – Dec 1992
   Remote Sensing and Image Processing Laboratory
   Career Planning and Placement Center
   Louisiana State University, Baton Rouge, LA 70803
6. Research Assistant — Sep 1988 - Aug 1990
   Robotics Laboratory, Department of Computer Science and Automation
   Indian Institute of Science, Bangalore, India.
7. Group Leader – Electronic Packaging Group — Sep 1985 - Sep 1988
   Center for Development of Telematics (C-DOT)
   Bangalore, India

TEACHING EXPERIENCE

1. Penn State Berks — Aug 2007 – Present
   Taught several times EET 105, MCH T 111, EMCH 211, EMCH 212, EMCH 213
   EMET 230, EMET 222, CMPSC 200, EMET 326, ME 349, ME 355, ME 367,
   ME 448, ME 449, EMET 403, EMET 410, EMET 448, EMET 452, ME 495.
   Guided several undergraduate research projects
   Supervised MC-REU, Ericksson Discovery Grants, Franco Grants, Faculty Project Funds.
   Guided several capstone design projects (average of 10 each year).
   Guided Schreyer's honors students.
   Developed or significantly modified following courses EMET 230, EMET 222, EMET 326, EMET 432, ME 355, ME 468, ME 349, ME 367, ME 448, ME 449, ME 495.
   Developed an interdisciplinary semester long project in adaptive device with students and faculty from Occupational Therapy and Engineering initially and included Business, Professional writing & Berks Launch Box.
2. Villanova University — Aug 1999 – May 2007
   Taught several times with multiple sections MAT 1320, CE 2101/ME 2100,
   CE 2102, ME 3901, ME 2501, ME 2900, ME 2901, ME 3802, ME 4102, ME 4901, ME 5411.
   Advised and guided several Capstone Projects
   Developed several courses and labs, Mechatronics elective and minor.
3. Drexel University — Jan 1993 – May 1999
   Taught (not just teaching assistant) many time MEM 202, MEM 235,
   MEM 230, MEM 250, MEM 330, MEM 335, MEM 450, MEM 666, MEM 667,
   MEM 668, MEM 800
   Advised undergraduate projects and capstone design related to my research

PUBLICATIONS - (ORCID Link)

Patents

1. Wu, W., Kei-Peng, J., **Nathan, R.**, and Townend, C. W. *Method and apparatus for examining brain injury due to impact.* United States Patent 10145677, December 4, 2018.

Refereed Journal Articles[1]

1. *Lang, J.*, **Nathan, R.**, *Zhou, D. Zhang, X.*, Li, B., and Wu, Q. *Cavitation causes brain injury*, Physics of Fluids 33, 031908 (2021). DOI:/10.1063/5.0041139
2. *Lang, J.*, **Nathan, R.**, and Wu, Q. *How to deform an egg yolk? On the study of soft matter deformation in a liquid environment.* Physics of Fluids Volume 33, Issue 1 (2021). DOI: 10.1063/5.0035314
3. *Zhu, Z.*, **Nathan, R.**, and Wu, Q. *On the Gravity-Driven Sliding Motion of a Planar Board on a Tilted Soft Porous Layer*, Tribology Letters Volume 67 (2019) Issue 4, pp 126 (1-12). DOI: 10.1007/s1124 9-019-1238-8
4. *Zhu, Z.*, **Nathan, R.**, and Wu, Q. *Multiscale Soft Porous Lubrication*, Tribology International Volume 137 (2019) pp 246-253. DOI: 10.1016/j.triboint.2019.05.003
5. *Ji, L.*, **Nathan, R.**, and Wu, Q. *Experimental Study of Transient Squeezing Film Flow.* Journal of Fluids Engineering, Volume 141 (2019) Issue 8, DOI: 10.1115/1.4042758
6. *Wang, Q.*, *Zhu, Z.*, **Nathan, R.**, and Wu, Q. *On the study of fluid flow in a soft porous media using a scaled-up indenter.* European Journal of Mechanics - B/Fluids, Volume 76 (July-August 2019), pp 332 – 339 DOI:10.1016/j.euromechflu.2019.03.012
7. *Ji, L.*, **Nathan, R.**, and Wu, Q. *Theoretical and experimental study of transient squeezing flow in a highly porous film.* Tribology International, Volume 135 2019, pp 259-268. DOI:10.1016/ j.triboint.2019.02.046
8. *Wang, Q.*, **Nathan, R.**, and Wu, Q. Wang, Q. *On the Fluid Pressurization in Soft Porous Media, a Correction to the Current Theoretical Models.* Journal of Porous Media, Volume 22 (2019) Issue 11. DOI: 10.1615/JPorMedia.2019024717
9. *Zhu, Z.*, **Nathan, R.**, and Wu, Q. *An experimental study of the lubrication theory for highly compressible porous media, with and without lateral leakage*, Tribology International Volume 127 (2018), pp 324-332 DOI: 10.1016/ j.triboint.2018.06.016
10. Mahoney, J., and **Nathan, R.** *Mechanical Vibrations Modal Analysis Project with Arduinos.* ASEE Computers in Education, Volume 8 (2017) Issue 4.
11. *Gacka, T.*, *Zhu, Z.*, *Crawford, R.*, **Nathan, R.**, and Wu, Q. *From red cells to soft lubrication, an experimental study of lift generation inside a compressible porous layer.* Journal of Fluid Mechanics, Volume 818 (2017), pp 5-25. DOI:10.1017/jfm.2017.133
12. Wu, Q., Santhanam, S., **Nathan, R.**, and Wang, Q. *A biphasic approach for the study of lift generation in soft porous media.* Physics of Fluids, Volume 29 (2017) Issue 4. DOI: 10.1063/1.4981223
13. *Qato, L.*, Santhanam, S., Jones, G. F., and **Nathan, R.** *A fluid structure interaction study of a viscous mechanism for energy absorption in protective structural panels.* Finite Elements in Analysis and Design Volume 83 (2014), pp 22-32. DOI: 10.1016/ j.finel.2014.01.005
14. *Crawford, R.*, **Nathan, R.**, Wang, L., and Wu, Q. *Experimental Study on the Lift Generation inside a Random Synthetic Porous Layer under Rapid Compaction.* Experimental Thermal and Fluid Science Volume 36 (2012), pp 205-216.
15. Arnold, J. M., Ordonez, R., Copeland, D. A., **Nathan, R.**, Scornavacchi, J and Oswald, S. A. *Simple and inexpensive devices to measure heart rate of incubating birds.* Journal of Field Ornithology, Volume 82, Issue 3, September 2011, pp: 288 - 296. DOI: 10.1111/j.1557-9263.2011.00332.x

[1] *Author in Italics - Supervised Undergraduate/Graduate student*

16. *Crawford, R.*, **Nathan, R.**, Jen, K. P., and Wu, Q. *Dynamic Compression of Soft Porous Media; From Finite to Infinite Domain.* Journal of Porous Media, Volume 14 (2011), Issue 1, pp: 51 - 64.
17. *Avis, J. M.*, Nersesov, S., and **Nathan, R.** *Energy-Based Hybrid Control for the Multi-RTAC System.* International Journal of Control, Volume 83, Issue 8, August 2010, pp: 1701 - 1709. DOI: 10.1080/00207179.2010.490598
18. *Avis, J. M.*, Nersesov, S., **Nathan, R.**, Ashrafioun, H., and Muske, K. *A Comparison Study of Nonlinear Control Techniques for the RTAC System.* Nonlinear Analysis: Real World Applications. Volume 11, Issue 4, August 2010, pp: 2647 - 2658. DOI:10.1016/j.nonrwa.2009.09.012
19. *Barbadi, B.*, **Nathan, R.**, Jen, K. P., and Wu, Q. *On the Characterization of Lifting Forces During the Rapid Compaction of Deformable Porous Media.* Journal of Heat Transfer, Vol. 131, Issue 10, pp: 101006-1 – 101006-12, 2009. DOI:10.1115/1.3167543
20. Rahman, T., **Nathan, R.**, Stroud, S., Sample, W., Seliktar, R., Harwin, W., Alexander, M., and Scavina, M. *Towards the Control of a Powered Orthosis for People with Muscular Dystrophy.* Proceedings of Institution of Mechanical Engineers, Vol. 215, Part H, Journal of Engineering Medicine, pp: 267 - 274, 2001. (Was published under the name R. Ramanathan).
21. **Nathan, R.**, Eberhard, S., Rahman, T., Seliktar, R. and Alexander, M. *Analysis of Arm Trajectories of Everyday Tasks for the Development of an Upper-Limb Orthosis.* IEEE transaction on Rehabilitation Engineering, Vol. 8(1), pp: 60 - 70, March 2000. (Was published under the name R. Ramanathan). DOI: 10.1109/86.830950
22. Rahman, T., Stroud, S., **Nathan, R.**, Alexander, M., Seliktar, R., and Harwin, W. *Task Priorities and Design for an Arm Orthosis.* Technology and Disability Journal, Vol 5(2), pp: 197 - 203, 1996. (Was published under the name R. Ramanathan). DOI:10.3233/ TAD-1996-5207
23. Rahman, T., **Nathan, R.**, Seliktar, R., and Harwin, W. *A Simple Technique to Passively Gravity-Balance Articulated Mechanisms.* Journal of Mechanical Design, Vol. 117(4), pp: 655 - 658, December 1995. (Was published under the name R. Ramanathan). DOI:10.1115/1.2826738

Refereed Conference Publications[1]

1. Pierce, R. S., **Nathan, R.**, Howard, W. E., Sylcott,B. *Machine design: Different pedagogical approaches to achieve targeted outcomes*, Proceedings of the 2018 ASEE Annual Conference & Exposition, Tampa, FL.
2. Mahoney, J. M., **Nathan, R.** *Mechanical vibrations modal analysis project with Arduinos*, Proceedings of the 2017 ASEE Annual Conference & Exposition, Columbus, OH. June 25-28, 2017.
3. Rhudy, M., **Nathan, R.** *Integrated development of programming skills using MATLAB within an undergraduate dynamics course*, Proceedings of the 2016 ASEE Annual Conference & Exposition, New Orleans, LA. New Orleans, June 26 – 29, 2016.
4. Rhudy, M., **Nathan, R.** *Fluids friday! A method for improving student attentiveness and learning in the classroom*, Proceedings of the 2016 ASEE Annual Conference & Exposition, New Orleans, LA. New Orleans, June 26 – 29, 2016.
5. *Nagl, A.*, **Nathan, R.** *Work-in-progress: iOS Devices as DAQ and hardware for experiments in class to enhance the real touch, feel and see experiences.* Proceedings of the 2013 ASEE Annual Conference & Exposition, Atlanta, GA, June 23-26, 2013.
6. Chattopadhyay,S., **Nathan, R.** *Illustrating rotating principal stresses in a materials science course*, Proceedings of the 2013 ASEE Annual Conference & Exposition, Atlanta, GA, June 23-26, 2013.
7. Shannon, J., **Nathan, R.** *Report-smithing: Developing effective written communication skills*, Proceedings of the 2012 ASEE Annual Conference & Exposition, San Antonio, TX, June 10-13, 2012.

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8. **Nathan. R.**, *Fill-In Worksheets: A Tool To Increase Student Engagement.* Proceedings of the 2010 ASEE Annual Conference & Exposition, Louisville, KY, June 20 – 23, 2010.
9. **Nathan. R.** *Using Fill-In Worksheets In Mechanics Classes.* Proceedings of the 2010 ASEE Annual Conference & Exposition, Louisville, KY, June 20 – 23, 2010.
10. **Nathan. R.** *Faculty's Use of Tablet-PC to Enhance Learning For Technology Students.* Proceedings of the 2010 ASEE Annual Conference & Exposition, Louisville, KY, June 20 – 23, 2010.
11. *Avis, J. M.*, Nersesov. S. G., and **Nathan, R.** *Decentralized Energy-Based Hybrid Control for the Multi-RTAC System.* Proceedings of American Control Conference (ACC), pp. 895-900, St. Louis, MO, June, 2009.
12. *Barbadi. B.*, **Nathan, R.**, and Wu, Q. *Lift Generation in Soft Porous Media under Rapid Compaction.* Proceedings of ASME IMECE 2008, Paper # IMECE2008-66639, Boston, MA, November 2008.
13. *Avis, J. M.*, Nersesov. S. G., and **Nathan, R.** Energy-Based Hybrid Control for the RTAC System: Experimental Results. Proceedings of American Control Conference, pp: 3331 - 3336, Seattle, WA, June, 2008.
14. **Nathan, R.** *Differentiated Instruction in Statics Learning.* Proceedings of the 2007 Annual Conference & Exposition, Honolulu, HI, June 24-27, 2007.
15. **Nathan, R.** *Kinematic Requirements for an Upper-Arm Orthosis Based on Activities of Daily Living (ADL).* Proceedings of the ASME Summer Bioengineering Conference, Amelia Islands, Florida, 2006.
16. **Nathan, R.** *Integrating Multi-media Aids (Tablet-pc, Streaming Videos, Electronic Slides) to the Fundamental Instruction in Mechanics.* Proceedings of the 2006 ASEE Annual Conference & Exposition, Chicago, IL. June 18-21, 2006.
17. **Nathan, R.**, and D. Metaxes. *Dynamic Deformable Models for Enhanced Haptic Rendering in Virtual Environments.* Proceedings of Virtual Reality 2000, pp: 31 - 35, 2000.
18. Seliktar, R., **Nathan, R.**, Rahman, T., and Alexander, M. *Evaluation of Functional Capabilities of People with Muscular Dystrophy as Potential Users of Powered Orthoses.* ASME Summer Bioengineering Conference 1999, Big Sky, Montana.
19. Sample, W., **Nathan, R.**, Eberhardt, S. P., Rahman, T., and Selikar, R. *Design and Preliminary Evaluation of Functional Upper Arm Orthoses.* Proceedings of the Rehabilitation Engineering Society of North America (RESNA) Conference 1999. pp: 137 - 139.
20. Rahman, T., **Nathan, R.**, Stroud, S, Seliktar, R., and Harwin, W. *Analysis and Design of an Arm orthosis for Individuals with Muscular Dystrophy.* Proceedings of the RESNA Conference, pp: 517 - 519, 1995.

Conference Publications[1]

1. **Nathan, R.**,*Zhu, Z.*, and Wu, Q. *Gravity-driven sliding motion on soft porous layer.* 72nd Annual Meeting of the American Physical Society Division of Fluid Dynamics, Nov.22-25, Seattle, WA.
2. *Zhu, Z.*, **Nathan, R.**, and Wu, Q. *A study in multi-scale soft porous lubrication.* 71st Annual Meeting of the American Physical Society Division of Fluid Dynamics, Nov. 18-20, 2018, Atlanta, GA.
3. **Nathan, R.**, *Lang, J.*, and Wu, Q. *Experimental Study of Transient Squeezing Film Flow.* 71st Annual Meeting of the American Physical Society Division of Fluid Dynamics, Nov.18-20, 2018, Atlanta, GA
4. *Lang, J.*, **Nathan, R.**, and Wu, Q. *Experimental Study of Transient Squeezing Flow in a Thin Porous Gap.* 71st Annual Meeting of the American Physical Society Division of Fluid Dynamics, Nov. 18-20, 2018, Atlanta, GA.

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5. *Lang, J.*, **Nathan, R.**, Santhanam, S., and Wu, Q. *Theoretical and Experimental Study of Transient Squeezing Flow.* 2018 International Mechanical Engineering Congress and Exposition (IMECE), Nov. 9-15, Pittsburg, PA.
6. **Nathan, R.**, *Wang, Q.*, Wu, Q. *On the Pressure Generation and Relaxation in a Porous Media under a Spherical Loading Surface.* 10th Annual Meeting of Interpore (International Society of Porous Media), May 16-18, 2018 New Orleans, LA.
7. **Nathan, R.**, *Zhu, Z.*, Wu, Q. *From Red Cells to Soft Porous Lubrication*, 10th Annual Meeting of Interpore (International Society of Porous Media), May 16-18, 2018 New Orleans, LA.
8. *Khan, M.*, Deb, A., Yu, H., Wu, Q., *Murray, M.*, **Nathan, R.**, and Sawchuck, A. P. *Noninvasive Quantification of Patient-Specific Blood Pressure Gradient Via Concurrent Computational and Experimental Fluid Dynamics.* Proceedings of the 30th International Conference on Parallel Computational Fluid Dynamics. 2018
9. **Nathan, R.**, *Lang, J.*, Wu, Q., *An Experimental and numerical Study for squeezing flow*, The American Physical Society 70th Annual Meeting of the Division of Fluid Dynamics, Denver, CO, November 18-21, 2017.
10. *Wang, Q.*, *Zhu, Z.*, **Nathan, R.**, Wu, Q., On the Pressure Distribution in a Porous Media under a Spherical Loading Surface, The American Physical Society 70th Annual Meeting of the Division of Fluid Dynamics", Denver, CO, November 18-21, 2017.
11. *Zhu, Z.*, **Nathan, R.**, Wu, Q., *From red cells to soft porous lubrication*, The American Physical Society 70th Annual Meeting of the Division of Fluid Dynamics, Denver, CO, November 18-21, 2017.
12. *Wengel, J.*, **Nathan, R.**, Cheng, B., and Eslam Panah, A. *Flow Measurements of a Plunging Wing in Unsteady Environment.* The American Physical Society 70th Annual Meeting of the Division of Fluid Dynamics, Denver, CO, November 18-21, 2017.
13. *Fatzinger, C. R.*, **Nathan, R.**, Langelaan, J., and Barakati, A. *Carbon Fiber Composite Wings for Flapping Mechanism.* ASEE Mid Atlantic Section Fall 2017 Conference. ASEE Mid Atlantic Section Fall 2017 Conference.
14. *Lang, J.*, Jen, K, **Nathan, R.**, and Wu, Q., *A Theoretical and Experimental Study for a Developing Flow in a Thin Fluid Gap.* The American Physical Society 69th Annual Meeting of the Division of Fluid Dynamics, Portland, OR, November 20-22, 2016.
15. *Zhu, Z.*, *Gacka, T.*, **Nathan, R.**, and Wu, Q.,*From Red Cells to Soft Porous Lubrication.* 8th International Conference on Porous Media and Annual Meeting, May 9 - 12, 2016, Cincinnati, Ohio, USA
16. Wu, Q., Santhanam, S., **Nathan, R.**, *Gacka, T. On the Study of Lifting Mechanism of a Soft Porous Media under Fast Compression.* The American Physical Society 68th Annual Meeting of the Division of Fluid Dynamics, Boston, MA, November 22-24, 2015.
17. Wu, Q., *Gacka, T.*, **Nathan, R.**, *Crawford, R. From Red Cells to Soft Porous Lubrication.* 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, November 22-26, 2014
18. Wu, Q., **Nathan, R.**, *Crawford, R. A comprehensive study of the lift generation in soft porous media under rapid compression.* The American Physical Society 66th Annual Meeting of the Division of Fluid Dynamics., Pittsburgh, PA. November 24-26, 2013
19. *Gacka, T.*, **Nathan, R.**, Wu, L-Z., Wu, Q. *Experimental Study of Soft Lubrication.* The American Physical Society 65th Annual Meeting of the Division of Fluid Dynamics., San Diego, CA. November 24-26, 2012.
20. *Gacka, T.*, **Nathan, R.**, Wu, L-Z., and Wu, Q., *From Red Cells to Soft Porous Lubrication.* The American Physical Society 64th Annual Meeting of the Division of Fluid Dynamics, November 20-22, 2011, Baltimore, MD.

21. *Crawford, R.*, *Bueti, G.*, **Nathan, R.**, Wang, L., and Wu, Q. *Permeability Measurement for a Soft Porous Medium and its Application to Lift Generation.* American Institute of Physics Conference Proceedings 1254 - Porous Media and its Applications in Science, Engineering, and Industry: 3rd International Conference, pp: 143 - 148, July 2010.
22. *Barabadi, B.*, **Nathan, R.**, and Wu, Q. *Lift Generation in Soft Porous Media Under Rapid Compaction.* Volume 10: Heat Transfer, Fluid Flows, and Thermal Systems, Parts A, B, and C. ASME.

Papers Under Review[1]

1. *Lang, J.*, **Nathan, R.**, and Wu, Q. *Cavitation causes brain injury.* Science Advances. (Submitted October 2020)
2. **Nathan, R.** and Pierce, R. *Use of Vendor-Supplied Engineering Guides to Augment Textbook in Machine Design. Mechanical Division*, Proceedings of the 2021 ASEE Annual Conference & Exposition, Long Beach, CA. (Submitted September 2020)
3. **Nathan, R.** *Computer Interfacing to Real world: Low cost approach.* Engineering Technology Division, Proceedings of the 2021 ASEE Annual Conference & Exposition, Long Beach, CA. (Submitted September 2020)

Invited Talks

1. **Nathan, R.** (April 2020). "Breakout Rooms - Tools for Remote Teaching", Teaching and Learning with Technology - Webinar Series, Penn State Berks, Reading, PA.
2. **Nathan, R.** (June 2019). "Samara/Maple Seed Research", Engineering Ahead, Penn State Berks, Reading, PA
3. **Nathan, R.** (April 2019). "PADEP and Powered Orthosis," National Biomechanics Day - 2019, American Society of Biomechanics, Reading, PA.
4. **Nathan, R.** (June 2018). "Samara/Maple Seed Research", Engineering Ahead, Penn State Berks, Reading, PA
5. **Nathan, R.** (April 2018). "PADEP and Powered Orthosis," National Biomechanics Day - 2018, American Society of Biomechanics, Reading, PA.
6. **Nathan, R.** (June 2017). "Samara/Maple Seed Research", Engineering Ahead, Penn State Berks, Reading, PA
7. **Nathan, R.** (April 2017). "Powered Orthosis," National Biomechanics Day - 2017, American Society of Biomechanics, Reading, PA.
8. **Nathan, R.** On the Pressure Generation and Relaxation in a Porous Media under a Spherical Loading Surface. 10th Annual Meeting of Interpore (International Society of Porous Media), May 16-18, 2018 New Orleans, LA.
9. **Nathan, R.** From Red Cells to Soft Porous Lubrication, 10th Annual Meeting of Interpore (International Society of Porous Media), May 16-18, 2018 New Orleans, LA.
10. **Nathan, R.** (May 22, 2015). "Frisbee Dynamics," Center for Product Design and Manufacturing, Bengaluru, India.
11. **Nathan, R.** (May 21, 2015). "Frisbee Dynamics," PES College of Engineering, Mandya, India.
12. **Nathan, R.** (March 21, 2015) "E-Collaborative Board: An Electronic Board for Group Involvement", TLT Symposium, Penn State University, University Park, USA.
13. **Nathan, R.** (April 11, 2013) "Research at Penn State Berks", ASME Lehigh Anthracite Chapter presentation for Professional Engineers, Reading PA

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14. **Nathan, R.** (March 11, 2009) "Autonomous Ornithopters", Berks Advisory Board, Penn State Berks, Reading, PA.

Posters[1]

1. *Lang, J.*, **Nathan, R.**, & Wu, Q. (2020). How to deform an egg yolk-Soft matter deformation in liquid environment? ASME 2020 International Mechanical Engineering Congress and Exposition, Virtual. 2020.
2. *Wise, D.*, Moore, J.. Haptics: Adding a sense of touch to virtual reality. Multi-Campus REU Research Symposium, University Park. 2018
3. *Murray, M.*. Study of Frisbee Aerodynamics. Multi-Campus REU Research Symposium, University Park. 2018
4. *Bonner, L.* Low-Cost Impact Testing Machine for Carbon Fiber Reinforced Plastics. Multi-Campus REU Research Symposium, University Park, 2018
5. *Fatzinger, C. R.*. Carbon Fiber Composite Wings for Flapping Mechanism, ASEE Mid Atlantic Section Fall 2017 Conference., 2017
6. *Wengel, J.*. (2017). Plunging-Wing Hydrodynamics, ASEE Mid Atlantic Section Fall 2017 Conference.
7. *Fatzinger, C. R.*. Carbon Fiber Composite Wings for Flapping Mechanism, Multi-Campus REU Research Symposium, University Park, 2017
8. *Murray, M.*. Frisbee Launcher for Study of Frisbee Flight Dynamics, Multi-Campus REU Research Symposium, University Park. 2017
9. *Wengel, J.*. (2017). Fundamental Fluid Dynamics of Flapping Wings. Multi-Campus REU Research Symposium, University Park. 2017
10. *Kimmel, N.*. Determining Stability of a Biomimetic Monocopter Using Simulation. Multi-Campus REU Research Symposium, University Park. 2016
11. *Moser, T.*. (September 2015). "Undergraduate Research Experience in First Year Seminar courses – A student's perspective," ASEE Middle Atlantic Section Fall 2015 Conference, ASEE, Lewisburg, PA,
12. *Wetzel, J.*. Electronic Stethoscope with Programmable Biological Signal Processing. Multi-Campus REU Research Symposium, University Park. 2015

AWARDS & HONORS

1. Danielle Richards Outstanding Advising Award, Penn State Berks (June 2020).
2. Nominated for Service Award, Penn State Berks. (June 2016)

GRANTS[1]

1. **Nathan, R.** Teaching Tinkering back to Engineering, Teaching, Transformation and Innovation Grant, Schreyer Institute for Teaching Excellence. $4900, September 2020
2. Multi-Campus Research Experience for Undergraduates (REU) *Wylie, A.*, Miller, M. A.., **Nathan, R.** Study Recreation of Bird Wings Using Composite Materials $ 4,200. 2020
3. Multi-Campus Research Experience for Undergraduates (REU) *Nazaryan, B.*, Haque, M. A., **Nathan, R.** Biomechanical energy harvesting methods,. $ 4,200. 2020
4. **Nathan, R.** ASEE Grant Registration grant for ASEE Virtual Conference 2020 – $500, 2020-21
5. **Nathan, R.** Harold W. And Jeanne D. Perkins Endowment Fund Travel Grant for ASEE Virtual Conference 2020 – $300, 2020-21

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6. **Nathan, R.** Berks Research Development Grant Brain Traumatic Injury, Haptic Device, Frisbee Aerodynamics – $2,000, 2020-21
7. **Nathan, R.** Berks Research Development Grant Brain Traumatic Injury, Frisbee Aerodynamics, Ornithopter Test Bed – $1,500, 2019-20
8. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $2,750. 2019-20
9. **Nathan, R.** Donation of PICKit 4 - In Circuit Debugger/Programmer and development boards, Microchip. $100, AZ. 2018-19
10. **Nathan, R.** Donation of gear box for Capstone Design project. $600, Boston Gears, Boston, MA. 2018-19
11. Multi-Campus Research Experience for Undergraduates (REU) *Wise, D.*, Moore, J., **Nathan, R.** Haptics: Adding a sense of touch to virtual reality. $ 5,200. 2018
12. Multi-Campus Research Experience for Undergraduates (REU) *Murray, M.*, **Nathan, R.**, Langelaan, J. Study of Frisbee Aerodynamics. $5,200. 2018
13. Multi-Campus Research Experience for Undergraduates (REU) *Bonner,L.*, Cortes, D., Barakati, A., and **Nathan, R.**, Low-Cost Impact Testing Machine for Carbon Fiber Reinforced Plastics $5,200. 2018
14. **Nathan, R.** Berks Research Development Grant Brain Traumatic Injury, Frisbee Aerodynamics, Ornithopter Test Bed – $1,500, 2018-19
15. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $2,750. 2018-19
16. Multi-Campus Research Experience for Undergraduates (REU) Carbon Fiber Composite Wings for Flapping Mechanism with *Fatzinger,C.,* Langelaan, J., Barakati,A., **Nathan, R.** - $5,200 2017.
17. Multi-Campus Research Experience for Undergraduates (REU) Frisbee Launcher for Study of Frisbee Flight Dynamics with *Murray, M.*, Langelaan, J. and **Nathan, R.** $5,200 2017
18. Multi-Campus Research Experience for Undergraduates (REU) Fundamental Fluic Dynamics of Flapping Wings with *Wengel, J.*, Cheng, B., Panah, A. and **Nathan, R.** $5,200 2017
19. **Nathan, R.** Berks Research Development Grant Modify Frisbee Launcher, add sensors to the launcher, update speed controller – $1,000, 2017-18
20. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $2,750. 2017-18
21. **Nathan, R.**, Faculty Grant - Penn State Berks, Force Sensor Purchase, Penn State Berks – $2,550.00. 2016-17
22. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $2,750. 2016-17
23. **Nathan, R.**, Franco Grant, Penn State Berks. To acquire DAQ for flapping experiments. $3,000.00. Oct 2016 - Jun 2017.
24. **Nathan, R.** and Arnold, J. Franco Grant - Penn State Berks. Design and Development of Bird Recapture pole, $3,000 2016-17
25. **Nathan, R.** and Rhudy, M. Berks TLI Grant Incorporating Simple Experiments into a Dynamics Course to Compare Classroom Theory to Real Systems. –$2,500. 2016-17
26. **Nathan, R.** Donation in kind of MyRIO - FPGA platform for real time control, National Instruments. $600, June 2015.
27. Multi-Campus Research Experience for Undergraduates (REU) Determining Stability of a Biomimetic Monocopter using Simulation and experiments with *Kimmel, N.* and Catanach, W. – $6,500. 2016
28. **Nathan, R.**, Banerjee, A. (Co-Investigator), Framework for experiments for online and inline engineering classes, COIL, Penn State. $27,981.00. Aug 2015 - Dec 2017. Video

29. **Nathan, R.** Low cost personal/individualized hardware for in-class experiments to enhance kinesthetic and visual immersion in and outside the classroom. American Society for Engineering Education (ASEE) - Engineering Technology Division. $ 4,901 March 2015 - Jan 2017
30. **Nathan, R.**, Berks Research Development Grant - Human Movement Research Center Start-up Funds, – $2,550.00. 2015-16.
31. **Nathan, R.**, Berks Assessment Grant - Measures and Evaluation in Engineering (MEE at Berks), – $2,000. 2015-16
32. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $3,250. 2015-16
33. Summer Discovery Grant SwimFly Robot: Design and Development of Water swimming and aerial Flying Ornithopter – *Evan Dunkus*, **Nathan, R.** – $3,000
34. Multi-Campus Research Experience for Undergraduates (REU) Acoustic and Digital Stethoscope – *Wetzel, J.* **Nathan, R.** and Manning, K. – $6,500, 2014
35. **Nathan, R.**, Berks Research Development Grant - Testbed for flapping flight and Design of Spher-o-copter,– $2,500. 2014-15.
36. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $3,250. 2014-15
37. **Nathan, R.** Hands-on experiment for use in classroom as part of lecture and for online classes, Faculty Project Fund, Universities and Colleges. – $3,000. Oct 2014 - Jun 30, 2015. Video.
38. **Nathan, R.** Donation of 9-DOF sensors, ST Microelectronics, Corporations. $300 Dec 2014
39. **Nathan, R.** Swivl - Video Pioneers Grant of equipment, Swivl Corporations. $400. Apr 2014.
40. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $2,900. 2013-14
41. **Nathan, R.**, Berks Research Development Grant - Sensors for Frisbee to study aerodynamics of Frisbee ,– $2,250. 2013-14
42. **Nathan, R.** Tri-ply cross weave Carbon Fiber Fabric (BRM 7076) - 400 yards from Bally Ribbon Mill. $3,300 - 2012
43. **Nathan, R.**, Travel Grant, Attend APS Dynamic Fluid Division and ASEE Annual Conference and Exposition – $2,900. 2012-13
44. **Nathan, R.**, Berks Research Development Grant - Develop ornithopter mechanism and close loop control,– $2,250. 2012-13
45. **Nathan, R.** Teaching and Learning with Technology Innovation Grant - Equipment IPad and associated software - $3,000 - 2012.
46. **Nathan, R.** Donation of WREX Orthosis for Mobile Arm Support project from Jaeco Orthopedics, CA. $1,800. 2011
47. **Nathan, R.**, Sub Contract, Improving students problem-solving in engineering dynamics through interactive web-based simulation and animation modules, Utah State University, Universities and Colleges. NSF DUE : 1122654 –$21,529. August 2011 – July 31, 2015.
48. **Nathan, R.**, Berks Research Development Grant - Develop ornithopter test bed,– $2,4000.2011-12
49. **Nathan, R.**, Travel Grant, Attend ASEE Annual Conference and Exposition – $2,500. 2011-12
50. **Nathan, R.** Undesignated Gift Funds (Penn State Berks). Feb 2010. Iphone® and Ipod® as engineering education tool. $3000 Jan 2010-11
51. **Nathan, R.**, Berks Research Development Grant - Research Computer, Experiments on Ornithopter, Haptic Device. $2,4000.2010-11
52. **Nathan, R.**, Travel Grant, Attend ASEE Annual Conference and Exposition – $2,250. 2010-11

53. **Nathan, R.** Berks Research Development Grant Morphing wing development for ornithopter – $2,000, 2009-10
54. **Nathan, R.**, Travel Grant, Attend American Control Conference, and ASEE Annual Conference and Exposition – $2,560. 2009-10
55. **Nathan, R.** Donation of several components for the development of Ornithopter flight test bed from IGUS Corporation - $500, 2009
56. **Nathan, R.** Summer Faculty Research Fellowship (Penn State University) - Summer 2008. Conduct research at University Park with other faculty on MEMS device and Nano-air vehicle. $10,000
57. **Nathan, R.** Berks Research Development Grant Instrumented Test-bed for onrithopter V1, Wings development – $1,500, 2008-09
58. **Nathan, R.**, Travel Grant, Attend American Control Conference, ASME IMechE and ASEE Annual Conference and Exposition – $3,150. 2008-09
59. **Nathan, R.**, Faculty Professional Development Funds to attend ASME IMechE – $1,800. 2008-09
60. **Nathan, R.** Donation of pressure sensor model MIC-062, Kulite Semi Conductor Products. $800. 2008
61. Undesignated Gift Funds (Penn State Berks) - Fall 2007. Towards an autonomous ornithopter: A platform for surveillance applications and field study of bird behavior. (With Dr. Arnold and Dr. Oswald) and **Nathan, R.**. $3,000
62. **Nathan, R.**, Travel Grant, Attend ASEE Annual Conference and Exposition – $4,450. 2007
63. **Nathan, R.**, Startup Grant - Penn State Berks. $5,000. 2007
64. Bridgebuilder's award - Fall 2003, Spring 2004. Villanova University. $1,000
65. Vital Grant - Summer 2002. Multi-modal oriented education model for introductory mechanical engineering course. Villanova University. $ 1,200.

ADVISING

Undergraduate

1. Academic Advisor for 70 (average) Undergraduate Students per Semester upto maximum of 100. Have laid our advising process for students in the ME program. Students walk out with a complete semester by semester course schedule till they graduate.
2. Undergraduate research advisor to 2 or more students every semester.
3. Transfer coordinator for all ME students. Laid our process for ME transfer students.
4. Course substitution process laid out to assist students with smooth transfer.
5. Faculty advisor for Robotics Club (2019-present), ASME cluf (2014 - present), Electric Motorcycle (2013-2014), Robotics Club (2007 - 2014)

Graduate Students

1. *Lang Ji* - Thesis titled 'Concussive Brain Injury: From Egg Yolk to Artificial Brain to Real Brain' towards the Doctoral degree of PhD (Engineering) in Mechanical Engineering at Villanova University. Expected defense in Fall 2020.
2. *Qiuyun Wang* - Thesis titled 'A Comprehensive Study of Fluid Flow in a Soft Porous Material under Compaction' towards the Doctoral degree of PhD (Engineering) in Mechanical Engineering at Villanova University. Graduated Summer 2019

3. *Zenghao Zhu* - Thesis titled 'From Red Cells to Soft Lubrication' towards the Doctoral degree of PhD (Engineering) in Mechanical Engineering at Villanova University. Graduated Summer 2019
4. *Thomas Gacka* - Thesis titled 'From Red Cells to Soft Lubrication' towards the Master's of Science (Engineering) in Mechanical Engineering at Villanova University. Graduated Summer 2012. Student currently working with Honda R&D Americas Inc.
5. *Robert Crawford* - Thesis titled 'A Systematic Experimental Approach in the Study of Lift Generation in Highly Compressible Porous Media and its Application for Soft Lubrication' towards the Master's of Science (Engineering) in Mechanical Engineering at Villanova University. Graduated Fall 2010. Student currently pursuing PhD.
6. *Jevon M. Avis* - Thesis titled 'Hybrid and Finite-Time Control Design for Nonlinear Dynamical Systems' towards the Master's of Science (Engineering) in Mechanical Engineering at Villanova University. Graduated March 2009. Student currently pursuing PhD.
7. *Banafsheh Barbadi* - Thesis titled 'Study on the Dynamic Compression of Highly Compressible Porous Media', towards the Master's of Science (Engineering) in Mechanical Engineering at Villanova University. Graduated August 2008. Student currently pursuing PhD.
8. *Anil John* - Thesis titled 'Design of pneumatic muscle actuated haptic device', towards the Master's of Science (Engineering) in Mechanical Engineering at Villanova University. Graduated August 2006.

SERVICE

Service to Profession

1. American Gear Manufacturing Association AGMA. Member of Emerging Technology Committee
2. American Gear Manufacturing Association AGMA. Member of Plastic Gear Technology
3. Associate Editor (Aug 2018 - present) ASEE Computers in Education Journal
4. Assistant Editor (Aug 2017 - Aug 2018) ASEE Computers in Education Journal
5. Associate Editor (Aug 2011 - present) American Journal of Engineering and Technology Research
6. Panel Member Department of Defense Graduate Scholarship (Jan 2012 - present)
7. Reviewer - NSF Graduate Research Fellowship Program (2012 - present)
8. Serving as Program Chair for ASEE Mechanical Division. (Starting as treasurer in 2019, a 4 year leadership position)
9. Coordinator of Engineering Panel, Harriton High School Radnor, PA. (2008 - Present)
10. Organizer of Symposium - Interpore, New Orleans, LA USA. 2018.
11. Member of Task force on Best practices in tech support, ASME, Mechanical Engineering Head of Department Education Committee. (2017).
12. Judge for Annual Science Fail, Reading Berks Science and Engineering Fair, Reading. (2010 - 2016)
13. Reviewer for ASEE International and regional conferences, ABS regional conference,Journal of Computing and Information Science in Engineering, Review of Scientific Instruments, COIL, Erickson Summer Discovery Grant, Journal of Engineering Technology, Multi-conference on Systems and Control, Recent Advances in Robotics and Mechatronics, Frontiers in Education, Schreyer's honors college, Journal of Fluid Mechanics, Journal of Porous Medium, Physics of Fluids, Journal
14. Organizer of symposium Interpore New Orleans, LA. May 2018
15. Chairing Sessions in ASEE conference, HECBC, ACC and others.
16. Served as Division Chair for ASEE Mechanics Division. (Starting as program-chair elect, a 4 year leadership position)
17. External reviewer for PhD dissertation for different Indian Universities (2015,2017, 2019)
18. External reviewer for Promotion and Tenure for three different universities.

Service to University

19. Founding Member of Berks Human Movement Research Center (HMRC) (2014-Present)
20. Chair of Faculty Search Committees (Three Mechanical Engineering searches, 2013-2015;)
21. Member of Full Time Faculty Search Committees (2012, 2019-2020)
22. Member of Dean Search Committees (2018-2019)
23. Member and Chair of Promotion and Tenure Committee (2014-2016; 2017-2019)
24. Member of Faculty Senate Committee for Academic Affairs (2014-2016) and Technology for Research Advisory Committee (2016-2017)
25. Reviewer for Program specific courses in Penn State (2014 - present). Reviewed about 100 courses so far.
26. Chair of Sabbatical committee - Berks (2017-18)
27. Reviewer Faculty/Staff Achievement Review Committee 2016 - 2018
28. Faculty Chair of IAC 2010-2012
29. Faculty Mentor to several new faculty 2015 - 2019
30. Member of Advisory Board for Penn State Berks IT 2010-12
31. Presenter for Penn State Berks at Admission events since 2007

MEMBERSHIPS

- American Gear Manufacturing Association AGMA (since 2018)
- American Society of Mechanical Engineers ASME (since 1994)
- American Society of Engineering Educators ASEE (since 2006)
- American Physics Society - Dymanics Fluid Division (since 2011)