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Assistant Professor & Director
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Department of Mechanical & Aerospace Engineering
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PROFESSIONAL EXPERIENCE

Assistant Professor, Mechanical & Aerospace Engineering, **CWRU**, Cleveland, OH	2022-Present
Investigator, Advanced Platform Technology (APT) Center, Louis Stokes Cleveland VA Medical Center, Cleveland, OH	2022-Present
Assistant Professor, Packaging & Mechanical Engineering, **Michigan State University**, East Lansing, MI	2017-2021
Postdoc Associate, Mechanical & Electrical Engineering, **Duke University**, Durham, NC	2014-2017

EDUCATION & TRAINING

Ph.D. in Mechanical Engineering & Materials Science, **Australian National University**, Australia	2014
M.E. in Civil & Environmental Engineering, **National University of Singapore**, Singapore	2010
M.E. in Transportation Engineering, **Dalian University of Technology**, Dalian, China	2008
B.E. in Civil & Environmental Engineering, **Chang'an University**, Xi'an, China	2005

RESEARCH INTERESTS

- Printed/Flexible/Stretchable/Wearable/Bio-integrated electronics, Sensors & actuators, Energy harvesting & storage devices, Internet of Things (IoTs), Smart & Precision Agriculture
- Soft robotics, Autonomous robotics, Collaborative robotics, Biomedical robotics, Agriculture Robotics
- Soft materials, Smart materials & structures, Metamaterials, Multifunctional composites, Programmable materials, Bioinspired materials, 3D & 4D printing
- Solid mechanics, Biomechanics, Computational mechanics, Fluid-structure-interaction (FSI)

PROFESSIONAL SERVICE

- **Associate Editor**, ***IEEE Robotics and Automation Letters*** (2020-Present)
- **Associate Editor**, ***Frontiers in Mechanical Engineering*** (2022-Present)
- **Guest Editor**, Special Issue "*Mechanics and Manufacturing of Soft Materials and Soft Machines*", ***Forces in Mechanics*** (Elsevier), 2020-2022
- **Guest Editor**, Special Issue "*Soft Sensors for Industrial Processes*", ***Sensors*** (**IF 3.576**, 2022-)
- **Editorial Board Member** for
  - *Advanced Electronic Materials* (Wiley) (**IF: 7.633**, 2022-Present)
  - *Soft Science* (2022-Present)
  - *Forces in Mechanics* (Elsevier) (2020-Present)
  - *Frontiers in Robotics and AI* (**IF: 4.330**, 2021-Present)
  - *Frontiers in Mechanical Engineering* (**IF: 2.448**, 2021-Present)
  - *Micromachines* (MDPI) (**IF: 2.891**, 2020-Present)
- **Vice President**, Electronic Materials Technical Committee, ASME Material Division (2021-2023)
- **Secretary**, Electronic Materials Technical Committee, ASME Material Division (2019-2021)
- Regular **Reviewer** for **50+ prestigious journals**, including *Science Robotics*, *Science Advances*, *Nature Electronics*, *Nature Communication*, *Nature Food*, *Soft Robotics*, *Advanced Materials, ACS Nano, Nano Letters, Advanced Energy Materials, Advanced Functional Materials, Advanced Electrical Materials, Soft Matter, Extreme Mechanics Letters, Small, Advanced Science, Advanced Materials Technologies, International Journal for Numerical Methods in Engineering, Journal of Composites, Journal of*

the Mechanical Behavior of Biomedical Materials, Micromachines, ACS Applied Materials and Interfaces, ACS Energy Letters, Sensors.

- **Grant Reviewer** for
  - **NSF** (AM, MEP, CIC, NRI2.0, NRI 3.0), **NIH, USDA-NIFA,** Canada Foundation for Innovation (**CFI**), Natural Sciences and Engineering Research Council of Canada (**NSERC**), Swiss National Science Foundation (**SNSF**), Chilean National Science and Technology Commission, Petroleum Research Fund of American Chemical Society (**ACS-PRF**), King Abdullah University of Science & Technology (**KAUST**), Saudi Arabia.
- **Conference Service as Symposium Organizer** for
  - *2022 TMS Annual Meeting and Exhibition, ASME 2021 International Mechanical Engineering Congress and Exposition, ASME 2020 International Mechanical Engineering Congress and Exposition, ASME 2019 International Mechanical Engineering Congress and Exposition, The 4th International Conference on Nanoenergy and Mesosystems (2019), 13th World Congress in Computational Mechanics (2018), 18th US National Congress for Theoretical and Applied Mechanics (2018).*

PROFESSIONAL ASSOCIATIONS

- Member, American Society of Mechanical Engineers (ASME)
- Member, Materials Research Society (MRS)
- Member, Institute of Electrical and Electronics Engineers (IEEE)
- Member, Society of Engineering Science (SES)
- Member, American Chemical Society (ACS)

PUBLICATIONS (**Google Scholar: https://scholar.google.com/citations?user=qjtW7ZgAAAAJ&hl=en**)

Published Refereed Journal Papers: **65**; Book Chapter: **2**; Conference Papers: **8**; Total Citations: **2480+**, H-index: **25**. (*Corresponding Author, #Equal Contribution)

Refereed Journal Papers (65)

1. Yaokun Pang, Shoue Chen, Yunteng Cao, Zhida Huang, Xianchen Xu, Yuhui Fang, Changyong Cao*. Self-powered multifunctional human-machine interfaces for respiratory monitoring and smart system control, ***Advanced Materials Interfaces***, online, 2022. (**Impact Factor: 6.147**) DOI:10.1002/admi.202201202

   Reported by ***The Daily, Nanowerk, NewsWise, Tech Xplore, ilmiwap, TheBlog101, News8Plus, AZO Materials, DailyInFormat, Flipboard, etc.***

2. Wenkai Yu, Xin Li, Dunyu Chen, Jingyi Liu, Jiaji Su, Ju Liu, Changyong Cao, Hongyan Yuan*. A Minimally-designed Soft Crawling Robot for Robust Locomotion in Unstructured Pipes, ***Bioinspiration & Biomimetics***, in press, 2022. (**Impact Factor: 3.062**) https://doi.org/10.1088/1748-3190/ac7492

3. Zhiqiang Yu, Yue Guo, Jiaji Su, Qiang Huang, Toshio Fukuda, Qing Shi*, Changyong Cao*. Bioinspired, Multifunctional, Active Whisker Sensors for Tactile Sensing of Mobile Robots, ***IEEE Robotics and Automation Letters***, online, 2022. (**Impact Factor: 3.740**) DOI: 10.1109/LRA.2022.3191172

4. Yaokun Pang, Xianchen Xu, Shoue Chen, Yuhui Fang, Yiming Deng, Zhong-Lin Wang, Changyong Cao*. Skin-Inspired Textile-Based Tactile Sensors Enable Multifunctional Sensing of Wearables and Soft Robots. ***Nano Energy***, 96, 107137, 2022. (**Impact Factor: 17.881**) https://doi.org/10.1016/j.nanoen.2022.107137

5. Bin Tian, Yuhui Fang, Jing Liang, Ke Zheng, Panwang Guo, Xinyu Zhang, Youfusheng Wu, Qun Liu, Zhida Huang, Changyong Cao*, Wei Wu*. Fully printed stretchable and multifunctional E-textiles for aesthetic wearable electronic systems. ***Small***, 2107298, 2022. (**Impact Factor: 13.281**) https://doi.org/10.1002/smll.202107298

   Reported by ***The Daily***, ***Nanowerk, Tech Xplore, AZO Materials, Flipboard,*** etc.

6. Xin Li, Mehdi Baghaee, Changyong Cao, Wenkai Yu, Dunyu Chen, Ju Liu, Hongyan Yuan*, Geometrically Exact Finite Element Formulations for Modelling Tendon-driven Continuum Robots. ***Acta Mechanica Solida Sinica***, in press, 2022. (**Impact Factor: 2.161**) https://doi.org/10.1007/s10338-022-00311-w

7. Xianchen Xu, Qian Wu, Yaokun Pang, Yunteng Cao, Yuhui Fang, Guoliang Huang*, Changyong Cao*. Multifunctional Metamaterials for Energy Harvesting and Vibration Control. ***Advanced Functional Materials***, 2107896, 2021. (**Impact Factor: 18.808**). DOI: 10.1002/adfm.202107896
8. Ling Li, Jianyu Zhang, Xiaohui Wang, Le Huang, Jun Zhang, Carl Redshaw, Xing Feng*, Changyong Cao*, Nengjie Huo, Jingbo Li, Ben Zhong Tang*. Stimuli-responsive Materials from Ferrocene-based Organic Small Molecule for Wearable Sensors. ***Small***, 2103125, 2021. (**Impact Factor: 13.281**) DOI: 10.1002/smll.202103125.
9. Xiaomin Liu, Maozheng Song, Yuhui Fang, Yunwei Zhao* and Changyong Cao*. Worm-inspired Soft Robots Enable Adaptive Pipeline and Tunnel Inspection. ***Advanced Intelligent Systems***, 2100128, 2021. DOI: 10.1002/aisy.202100128 (**Invited paper**)
10. Xiaohui Wang, Lirong Wang, Xiaoyu Mao, Qingsong Wang, Zhongfei Mu, Li An, Wan Zhang, Xing Feng*, Carl Redshaw, Changyong Cao, Anjun Qin, Ben Zhong Tang*. Pyrene-based Aggregation-induced Emission Luminogens (AIEgens) with Less Color Migration for Anti-counterfeiting Applications. ***Journal of Materials Chemistry C***, 9(37), 12828, 2021. (**Impact Factor: 7.393**) DOI: 10.1039/D1TC03022A
11. Yunteng Cao#, Masoud Derakhshani#, Yuhui Fang, Guoliang Huang, Changyong Cao*. Bistable Structures for Advanced Functional Systems. ***Advanced Functional Materials***, 2106231, 2021. (**Impact Factor: 18.808**) DOI: 10.1002/adfm.202106231
12. Heyu Yin#, Yunteng Cao#, Benedetto Marelli, Xiangqun Zeng, Andrew Mason, Changyong Cao*. Soil Sensors and Plant Wearables for Smart and Precision Agriculture. ***Advanced Materials***, 2007764, 2021. (**Impact Factor: 30.849**) DOI:10.1002/adma.202007764 (Featured as the **Frontispiece** of the issue)
13. Shoue Chen, Yaokun Pang, Yunteng Cao, Wei Gao, Xiaobo Tan, Changyong Cao*. Soft Robotic Manipulation System Capable of Stiffness Variation and Dexterous Operation for Safe Human-Machine Interactions. ***Advanced Materials Technologies***, 2100084, 2021. (**Impact Factor: 7.848**) https://doi.org/10.1002/admt.202100084 (Featured as the **inside cover** of the issue)
14. Lixing Wang*, Zhenning Wu, Changyong Cao*. Integrated Optimization of Routing and Energy Management for Electric Vehicles in Delivery Scheduling. ***Energies***, *14*(6), 1762, 2021. (**Impact Factor: 2.702**) https://doi.org/10.3390/en14061762
15. Yihao Zhou, Charles B. Parker, Pooran Joshi, Amit K. Naskar, Jeffrey T. Glass, Changyong Cao*. 4D Printing of Stretchable Supercapacitors via Hybrid Composite Materials. ***Advanced Materials Technologies***, 202001055, 2020. (**Impact Factor: 7.848**) DOI: 10.1002/admt.202001055

    Reported by ***MSU Today, EurekAlert, Phys.org, ScienceDaily, Nanowerk, Yahoo News, Advanced Science News, CaiLiaoRen***, etc.
16. Yunwei Zhao, Xiaomin Liu*, Yuhui Fang, Changyong Cao*. Ultra-Precision Processing of Conductive Materials via Electrorheological Fluid-Assisted Polishing. ***Advanced Engineering Materials***, 2001109, 2020. (**Impact Factor: 3.880**). DOI: 10.1002/adem.202001109
17. Yaokun Pang, Yunteng Cao, Masoud Derakhshani, Yuhui Fang, Zhong Lin Wang, Changyong Cao*. Hybrid Energy Harvesting Systems based on Triboelectric Nanogenerators. ***Matter***, 4(1), 116-143, 2021. (**Impact Factor: 15.589**). https://doi.org/10.1016/j.matt.2020.10.018
18. Yaokun Pang, Shoue Chen, Junchi An, Keliang Wang, Yiming Deng, Andre Benard, Nizar Lajnef, Changyong Cao*. Multilayered Cylindrical Triboelectric Nanogenerator to Harvest Kinetic Energy of Tree Branches for Monitoring Environment Condition and Forest Fire. ***Advanced Functional Materials***, 2003598, 2020. (**Impact Factor: 18.808**) DOI: 10.1002/adfm.202003598

    Featured as the **Frontispiece** of the issue; Reported by ***Science, MSU Today, Yahoo News, Advanced Science News, EurekAlert, Phys.org, ScienceDaily, ENN, Nanowerk, AZO Sensors, IDTechEx, SunriseTechno***, etc.

19. Xiaomin Liu, Yunwei Zhao*, Dexu Geng, Shoue Chen, Xiaobo Tan, Changyong Cao*. Soft Humanoid Hands with Large Grasping Force Enabled by Flexible Hybrid Pneumatic Actuators, ***Soft Robotics***, online, 2020. (**Impact Factor: 8.071**) https://doi.org/10.1089/soro.2020.0001

    Reported by ***MSU Today, RoboticReport, Nanowerk, Phys.org, ScienceDaily, EurekAlert, New Atlas,*** etc.

20. Yihao Zhou, Changyong Cao*, Yunteng Cao, Qiwei Han, Charles B. Parker, Jeffrey T. Glass*. Robust and High-Performance Electrodes Made by Crumpled Au-CNT Forests for Stretchable Supercapacitors, ***Matter***, 2 (5), 1307-1323, 2020. (**Impact Factor: 18.808**) https://doi.org/10.1016/j.matt.2020.02.024

    Reported by ***Nature Briefing, ScienceDaily, Phys.org, USDA-NIFA News, Nanowerk, News Break, Duke Research, United Press International, ID TechEx (Wearable Technology Insights), CaiLiaoNiu, Frontiers of Polymer Science***, etc.

21. Yihao Zhou, Kathleen Maleski, Babak Anasori, Jimmy Thostenson, Yaokun Pang, Yaying Feng, Charles Parker, Stefan Zauscher, Yury Gogosti, Jeffrey Glass*, Changyong Cao*. MXene-Reduced Graphene Oxide Composite Electrodes for Highly Stretchable Supercapacitors with Improved Performance, ***ACS Nano***, 14 (3), 3576-3586, 2020. (**Impact Factor: 14.588**) https://doi.org/10.1021/acsnano.9b10066

    Reported by ***Frontiers of Polymer Science***, ***CaiLiaoNiu, Research & Technology World***, etc.

22. Kexin Zeng, Juan Gu, Changyong Cao*. Facile Approach for Ecofriendly, Low-Cost, and Water-Resistant Paper Coatings via Palm Kernel Oil, ***ACS Applied Materials and Interfaces***, 12 (16), 18987, 2020. (**Impact Factor: 8.758**) https://doi.org/10.1021/acsami.0c00067

23. Shoue Chen, Yaokun Pang, Hongyan Yuan, Xiaobo Tan, Changyong Cao*. Smart Soft Actuators and Grippers Enabled by Self-Powered Tribo-Skins, ***Advanced Materials Technologies***, 1901075, 2020. (**Impact Factor: 7.848**) DOI:10.1002/admt.201901075

    Featured as the **Inside Cover** of the issue; Reported by ***Nanowerk***, ***NewsBreak, Pinterest, CaiLiaoNiu***, ***Frontiers of Polymer Science***, etc.

24. Yin Liu, Shoue Chen, Xiaobo Tan, Changyong Cao*. A Finite Element Framework for Magneto-Actuated Large Deformation and Instability of Slender Magneto-Active Elastomers, ***International Journal of Applied Mechanics***, 12 (1), 2050013, 2020. (**Impact Factor: 2.449**) https://doi.org/10.1142/S1758825120500131

25. Shoue Chen, Yunteng Cao, M. Sarparast, Kexin Zeng, Hongyan Yuan, Lixin Dong, Xiaobo Tan, Changyong Cao*. Soft Crawling Robots: Design, Actuation and Locomotion, ***Advanced Materials Technologies***, 1900837, 2019. (**Impact Factor: 7.848**) https://doi.org/10.1002/admt.201900837.

26. Shoue Chen, S. Brahmab, J. Mackayc, Changyong Cao, B. Aliakbarian*. The Role of Smart Packaging System in Food Supply Chain, ***Journal of Food Science***, 85 (3), 517-525, 2020. (**Impact Factor: 2.478**) doi:10.1111/1750-3841.15046

27. L. Wang*, Z. Wu, Changyong Cao*. Technologies and Fabrication of Intelligent Packaging for Perishable Products. ***Applied Science***, *9* (22), 4858, 2019. (**Impact Factor: 2.474**) https://doi.org/10.3390/app9224858.

28. Yaokun Pang, Shoue Chen, Zhong Lin Wang, Changyong Cao*. Matryoshka-Inspired Hierarchically Structured Triboelectric Nanogenerator for Wave Energy Harvesting. ***Nano Energy***, 66, 104131, 2019. (**Impact Factor: 16.602)** https://doi.org/10.1016/j.nanoen.2019.104131.

    Highlighted by ***USDA Weekly News***; Featured as the **Front Cover** of the issue; Reported by ***ScienceDaily, NanoWerk, Pinterest, Reddit.com, CaiLiaoRen***, ***Research & Technology World***, etc.

29. Yaokun Pang, Minghong Liu, Kent Snyder, Yihang Chu, Devin MacKenzie, Changyong Cao*. Additive Manufacturing of Batteries, ***Advanced Functional Materials***, 1906244, 2019. (**Impact Factor: 18.808**) https://doi.org/10.1002/adfm.201906244

30. Ling Li, Qiangqiang Yun, Zhiqiang Li, Yin Liu, Changyong Cao*. A New Contact Model of Joint Surfaces Accounting for Surface Waviness and Substrate Deformation, ***International Journal of Applied Mechanics***, 11 (08), 1950079, 2019. (**Impact Factor: 2.449**) https://doi.org/10.1142/S1758825119500790

31. O. Nabinejad*, Y. H. Liew, D. Sujan, M. E. Rahman, Changyong Cao, Ian J. Davies. Tribological Behavior of Unsaturated Polyester Hybrid Composites Containing Wood Flour and Carbon Nanotubes, ***SN Applied Sciences***, 1, 777, 2019. https://doi.org/10.1007/s42452-019-0792-x

32. Ling Li*, Qiangqiang Yun, Haifei Tian, Anjiang Cai, Changyong Cao. Investigation into The Contact Characteristics of Rough Surfaces with Surface Tension. ***Journal of the Brazilian Society of Mechanical Sciences and Engineering***, 41, 343, 2019. https://doi.org/10.1007/s40430-019-1847-z (**Impact Factor: 1.743**)

33. M. M. Roozbahani, M. M. Zand*, M. M. Mashhadi, M. D. Banadaki, S. J. Ghalekohneh, C. Cao*. Dynamic Pull-In Instability and Snap-Through Buckling of Curved Microbeams Under Combined Squeeze Film Damping, Mechanical Shock and Axial Force. ***Smart Materials and Structures***, 28, 097001, 2019. (**Impact Factor: 3.613**) http://iopscience.iop.org/10.1088/1361-665X/ab2c40

34. Changyong Cao*, Yihao Zhou, Stephen Ubnoske, Jianfeng Zang, Yunteng Cao, Philémon Henry, Charles Parker, Jeffrey Glass*. Highly Stretchable and Flexible Supercapacitors with Aligned CNTs Forests, ***Advanced Energy Materials***, 1900618, 2019. https://doi.org/10.1002/aenm.201900618 (**Impact Factor: 26.520**)

    Featured as the **Frontispiece** of the Issue in ***Advanced Energy Materials***, and reported by ***MSU Today, ScienceDaily, NanoWerk, Techxplore, EurekAlert, Agenparl, PioneeringMinds, MakeMeFeed, AZONano, EINnews, Medgadget, Energist, USDA Weekly News, etc.***

35. Yin Liu, Yunteng Cao, Xi-Qiao Feng, Changyong Cao*. Phase Transition and Optimal Actuation of Active Bilayer Structures. ***Extreme Mechanics Letters***, 29, 100467, 2019. https://doi.org/10.1016/j.eml.2019.100467 (**Impact Factor: 4.567**)

36. Yihang Chu, Chunqi Qian, Prem Chahal, Changyong Cao*. Printed Diodes: Materials Processing, Fabrication and Applications, ***Advanced Science***, 1801653, 2018. https://doi.org/10.1002/advs.201801653 (**Impact Factor: 15.840**)

37. Glass Kia Dastani, Mahdi Moghimi Zand*, Amin Hadi, Changyong Cao*. Revealing Electrocompressive Stresses Acting on The Surface of Protoplast Cell under Electric Field, ***European Journal of Mechanics-B Fluid***, 76, 292-302, 2019. DOI: 10.1016/j.euromechflu.2019.02.010 (**Impact Factor: 2.183**)

38. Changyong Cao*, Yihang Chu, Yihao Zhou, Chi Zhang, Shaoxing Qu. Recent Advances in Stretchable Supercapacitors Enabled by Low-Dimensional Nanomaterials, ***Small***, 1803976, 2018. (**Impact Factor: 13.281**) https://doi.org/10.1002/smll.201803976

    Top Downloaded Paper 2018-2019, recognized as one of the most read in ***SMALL***, Wiley Press.

39. Xianchun Zeng, Shengqiang Xu, Changyong Cao, Jian Wang, Chunqi Qian*. Wireless Amplified NMR Detector (WAND) for Improved Visibility of Image Contrast in Heterogeneous Lesions, ***NMR in Biomedicine***, e3963, 2018. doi:10.1002/nbm.3963 (**Impact Factor: 3.221**)

40. Yangxiaolu Cao, Yaying Feng, Marc D. Ryser, Kui Zhu, Gregory Herschlag, Changyong Cao, Katherine Marusak, Stefan Zauscher, Lingchong You. Programmed Assembly of Pressure Sensors Using Pattern-Forming Bacteria, ***Nature Biotechnology***, 35, 1087–1093, 2017. https://doi.org/10.1038/nbt.3978 (**Impact Factor: 54.908**)

    Reported by ***Science Daily, Topix, EurekAlert, ScienceNewsline, TheRegister, Technovelgy, Kurzwei, Medgadget Advanced Manufacturing, etc.***

41. Qiwei Han, Yusong Bai, Jie Liu, Dong Ji, Kezhao Du, Yihao Zhou, Changyong Cao, Donghyeop Shin, Xuan Huang, Tianyang Li, Aaron Franklin, Jeffery T. Glass, Jinsong Hu, Michael Therien, David B. Mitzi, and Jie Liu. Additive Engineering for High-Performance Room-Temperature-Processed Perovskite Absorbers with Micron-Size Grains and Microsecond-Range Carrier Lifetimes, ***Energy & Environmental Science***, 10, 2365-2371, 2017. doi:10.1039/C7EE02272G (**Impact Factor: 30.289**)

Selected as 2017 ***Energy and Environmental Science*** HOT articles.

42. Changyong Cao, Joseph Andrews, Aaron Franklin. Completely Printed, Flexible, Stable and Hysteresis-Free Carbon Nanotube Thin Film Transistors Via Aerosol Jet Printing, ***Advanced Electronic Materials***, 3(5), 1700057, 2017. https://doi.org/10.1002/aelm.201700057 (**Impact Factor: 6.593**)

43. Matthew Catenacci, Patrick Flowers, Changyong Cao, Aaron Franklin, Benjamin Wiley. Fully printed memristors from Cu-SiO_2 core-shell nanowire composites, ***Journal of Electronic Materials***, 46 (7), 4596-4603, 2017. doi:10.1007/s11664-017-5445-5 (**Impact Factor: 1.774**)

Reported by ***ScienceDaily, Duke Research, Atma 360, Eastday, PEOL***.

44. Joseph Andrews, Changyong Cao, Martin A. Brooke, Aaron D. Franklin. Printed, Noninvasive sensors for detecting material thickness enhanced by nanomaterial inks, ***IEEE Sensors***, 17, 4612-4618, 2017. (**Impact Factor: 3.073**) doi: 10.1109/JSEN.2017.2710085

Reported by ***ScienceDaily, Phys.org, Science Newsline, Duke Pratt News, Engineering 360, Droidress***.

45. Zhuojia Fu, Qiang Xi, Leevan Ling, Changyong Cao, Numerical investigation on the effect of tumor on the thermal behavior inside the skin tissue, ***International Journal of Heat and Mass Transfer***, 108, 1154-1163, 2017. https://doi.org/10.1016/j.ijheatmasstransfer.2016.11.109 (**Impact Factor: 4.947**)

46. Phani Shivapooja#, Changyong Cao# (#**Equal Contribution**), Beatriz Orihuela, Vrad Levering, Xuanhe Zhao, Daniel Rittschof, Gabriel P. Lopez. Performance of silicone oil infused elastomers for detaching barnacles in marine environments via active surface deformation, ***Biofouling***, 32 (9), 1017-28, 2016. (**Impact Factor: 3.051**) https://doi.org/10.1080/08927014.2016.1209186

47. Changyong Cao, Joseph Andrews, Abhinay Kumar, Aaron Franklin. Improving contact interfaces in fully printed, carbon nanotube transistors, ***ACS Nano***, 10 (5), 5221-5229, 2016. DOI: 10.1021/acsnano.6b00877. (**Impact Factor: 14.588**)

48. Vrad Levering#, Changyong Cao# (#**Equal Contribution**), Howard Levinson, Xuanhe Zhao, Gabriel P. Lopez. Urinary catheter capable of repeated on-demand removal of infectious biofilms via active deformations, ***Biomaterials***, 77, 77-86, 2016. https://doi.org/10.1016/j.biomaterials.2015.10.070 (**Impact Factor: 10.317**)

49. Changyong Cao, Yaying Feng, Jianfeng Zang, Xuanhe Zhao. Tunable lotus-leaf and rose-petal effects via graphene paper origami, ***Extreme Mechanics Letters***, 4, 18-25, 2015. (**Impact Factor: 4.567**) https://doi.org/10.1016/j.eml.2015.07.006

50. Xiao-Yu Sun, Heng Hu, Changyong Cao, and Yuan-Jie Xu. Chirality effect on vacancy-defect-induced fracture strength loss of graphene, ***RSC Advances***, 5, 13623-13627, 2015. DOI:10.1039/C4RA14044C (**Impact Factor: 3.360**)

51. Changyong Cao, Xiaoyu Sun, Yuhui Fang, Qinghua Qin, Aibing Yu, Xi-Qiao Feng. Theoretical model and design of electroadhesive pad with interdigital electrodes, ***Materials and Design***, 89, 485–491, 2015. (**Impact Factor: 6.289**) https://doi.org/10.1016/j.matdes.2015.09.162

52. Changyong Cao, Qinghua Qin. Hybrid fundamental solution based finite element method: theory and applications, ***Advances in Mathematical Physics***, 38(916029), 2015. http://dx.doi.org/10.1155/2015/916029 (**Impact Factor: 1.130**)

53. Jianfeng Zang#, Changyong Cao# (#**Equal Contribution**), Yaying Feng, Jie Liu, Xuanhe Zhao. Stretchable and high-performance supercapacitors via crumpled graphene-paper, ***Nature Scientific Reports***, 4, 6492, 2014. (**Impact Factor: 4.61**) https://doi.org/10.1038/srep06492

Reported by ***MIT Featured News, Nanowerk News, Science Daily etc.***

54. Shaoting Lin, Changyong Cao, Qiming Wang, Mark Gonzalez, John E. Dolbow, Xuanhe Zhao. Design stiff, tough and stretchy hydrogels via nanoscale hybrid crosslinking and macroscale fiber reinforcement, ***Soft Matter***, 10(38), 7519-7527, 2014. doi:10.1039/C4SM01039F (**Impact Factor: 3.140**)

Most read articles of ***Soft Matter*** in July and August 2014.

55. Changyong Cao, Honfai Chan, Jianfeng Zang, Kam W. Leong and Xuanhe Zhao. Harnessing localized ridges for high-aspect-ratio hierarchical patterns with dynamic tunability and multifunctionality, ***Advanced Materials***, 26, 1633, 2014. https://doi.org/10.1002/adma.201304589 (**Impact Factor: 30.849**)

    Selected as **Front Cover** of ***Advanced Materials*** and reported by ***Duke Research*** etc.

56. Changyong Cao, Xuanhe Zhao. Tunable stiffness of electrorheological elastomers by designing mesostructures. ***Applied Physics Letter***, 103, 041901, 2013. https://doi.org/10.1063/1.4816287 (**Impact Factor: 3.791**)

57. Changyong Cao, Aibing Yu, Qinghua Qin. A new efficient hybrid finite element approach for plane piezo-electricity with defects. ***Acta Mechanica***, 224:41-61, 2013. https://doi.org/10.1007/s00707-012-0741-x (**Impact Factor: 2.102**)

58. Changyong Cao, Qinghua Qin, Aibing Yu. Micromechanical analysis of heterogeneous composites by HT- FEM and HFS-FEM. ***Journal of Mechanics***, 29(4):661-674, 2013. https://doi.org/10.1017/jmech.2013.54 (**Impact Factor: 1.293**)

59. Changyong Cao, Aibing Yu, Qinghua Qin. A novel hybrid approach for modeling anisotropic composites. ***Finite Elements in Analysis and Design***, 64:36-47, 2013. https://doi.org/10.1016/j.finel.2012.09.007 (**Impact Factor: 2.949**)

60. Changyong Cao, Qinghua Qin, Aibing Yu. New hybrid finite element approach for three-dimensional elastic problems. ***Archive of Mechanics***, 64(3):261-292, 2012. DOI: 10.24423/aom.550 (**Impact Factor: 1.85**)

61. Changyong Cao, Qinghua Qin, Aibing Yu. A novel boundary-integral based finite element method for 2D and 3D thermo-elasticity problems. ***Journal of Thermal Stresses***, 35:849-876, 2012. (**Impact Factor: 2.626**) https://doi.org/10.1080/01495739.2012.720204

62. Changyong Cao, Qinghua Qin, Aibing Yu. Hybrid Fundamental-Solution-based FEM for Piezoelectric Materials. ***Computational Mechanics***, 50(4): 397-412, 2012. https://doi.org/10.1007/s00466-012-0680-3 (**Impact Factor: 3.459**)

63. Changyong Cao, Aibing Yu, Qinghua Qin. Evaluation of effective thermal conductivity of fiber-reinforced composites. ***International Journal of Architecture, Engineering and Construction***, 1(1):14-29, 2012. DOI: 10.7492/IJAEC.2012.002

64. Changyong Cao, Yang Zhong. Dynamic response of a beam on Pasternak foundation under a moving load. ***Journal of Chongqing University***, 7(4):311-316, 2008. http://DocID=16718224-200812-7-4-311-316-a

65. Changyong Cao, Yang Zhong. Dynamic response of airport pavements when airplane takes off or lands. ***Journal of Dynamics and Control***, 6(1):28-35, 2008. (In Chinese) doi:CJFDTotal-DLXK200801017

Book Chapters (2):

1. Yaokun Pang, Yeqiang Tan, Changyong Cao*, Advanced Triboelectric Nanogenerators for Wave Energy Harvesting. ***Recent Progress and Strategies for Wave Energy***, Nova Science Publishers, Inc., 2022.
2. Changyong Cao* and Qing-Hua Qin, Hybrid fundamental-solution-based FEM for piezoelectric materials. ***Trefftz and Fundamental Solution-Based Finite Element Methods***, Bentham Books, 2020.

Refereed Conference Papers (8):

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3. Changyong Cao, Qinghua Qin*, Aibing Yu. Modeling of anisotropic composite materials by newly developed HFS-FEM. Proceedings of the 23rd International Congress of Theoretical and Applied Mechanics (ICTAM2012), SM08-016, Beijing, China, 2012.
4. Changyong Cao, T.F. Fwa* and G.P. Ong. Comparing hydroplaning characteristics of trucks with wide-base and conventional dual tires. Proceedings of the TRB 90th Annual Meeting, 11-0755, Washington DC, 2011.
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7. Changyong Cao, Yang Zhong*, Gen-Hua Shi. DDA-FEM Coupling method application in pavement analysis, Proceeding of the 8th International Conference on Analysis of Discontinuous Deformation (ICADD-8), pp:111-116, Beijing, China, 2007.
8. Changyong Cao, Yang Zhong*, and Aimin Sun. Dynamic response of rigid airport pavements under a moving aircraft load with variable velocities. Proceedings of International Conference on Transportation Engineering, 192-197, Chengdu, China, 2007.

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1. Vrad Levering, Changyong Cao, Gabriel P. Lopez, Xuanhe Zhao, *Howard Levinson. Catheters for debonding fouling agents from an interior surface thereof and related methods*. Assignee: United States Patent and Trademark Office, **US Patent Application No. 15/769,592,** May 11, 2017.
2. Changyong Cao, Yihao Zhou, Jeffery Glass, Aaron Franklin. *Stretchable Electrically Conductive Layer Formation by Aerosol Jet Printing on Flexible Substrate*. Assignee: United States Patent and Trademark Office, **US Patent Application No. 15/230,588**, August 8, 2016.
3. Changyong Cao, Yaokun Pang. *Hybrid Triboelectric and Electromagnetic Generator*. **US Patent Application No. 63/170,639**, Assignee: United States Patent and Trademark Office, April 5, 2021.
4. Changyong Cao, Shoue Chen, Xiaobo Tan, Yaokun Pang. *Soft Gripper Apparatus*. **US Patent Application No. 17/515,628,** Assignee: United States Patent and Trademark Office, November 16, 2021.
5. Changyong Cao, Yaokun Pang. *Power Generator, Wave Energy Converter or Sensor Apparatus for Water Wave Energy Harvesting*. **US Patent Application No. 17/132,459**, Assignee: United States Patent and Trademark Office, January 8, 2020.
6. Changyong Cao, Yaokun Pang. *Self-powered multifunctional human-machine interface for personalized respiratory monitoring and smart system control*, **Case No. 2022-4034**, 3/19/2022.
7. Changyong Cao, Yaokun Pang, Yuhui Fang. *Self-Powered Integrated Smart Packaging System via Desiccant-based Triboelectric Nanogenerators*. **Case No. 2022-4035**, 3/18/2022.
8. Changyong Cao, Wei Wu, Bin Tian. *Stretchable and multifunctional E-textiles and fabrication process*. **Case No. 2022-4036**, 3/21/2022.
9. Changyong Cao, Jiaji Su. *A novel lightweight, fast-response, hybrid actuation approach and design and their use for soft actuators and soft robotics*, **Case No. 2022-4040**, 4/5/2022.
10. Changyong Cao, Yuhui Fang. *A TENG-based Lightweight Wave Energy Converter for Marine Energy Harvesting and Sensing*. **Case No. 2022-4041**, 3/30/2022.
11. Changyong Cao, Kenneth A. Loparo, Yaokun Pang. *Multifunctional smart mask/shield for personalized healthcare monitoring, telemedicine, treatment and beyond*, **Case No. 2022-4046,** 4/19/2022.

12. Changyong Cao, *Soft Electromagnetic Actuators Capable of Large Force Density and Fast Stiffness Tuning,* **Case No. 2022-4052,** 5/2/2022.

SELECTED HONORS AND AWARDS

- Top Downloaded Paper 2018-2019 in SMALL, Wiley Press, 2020
- The 3rd Prize of "The 4th China Sustainable Packaging and Safety Design Innovation Contest", China Packaging Federation (CPF), 2019 (*among Top 10 in the 1700+ submissions to the Contest from both industry and academia*)
- Paper ranked as the HOT articles of "*Energy and Environmental Science*", 2017
- Mahato Memorial Research Image Award, Duke University, 2017
- Duke Outstanding Postdocs, Duke University, 2016
- Emerging Leaders of Postgraduates and Postdocs, Duke University, 2016
- Best Poster Award Nominee, 2015 MRS Fall Meeting, Boston, MA, 2015
- Elsevier Outstanding Reviewer for *Materials & Design*, Elsevier, 2015
- Best Poster Award, 2014 MRS Fall Meeting, Boston, MA, 2014
- Best Poster Award (*1st place*) of the 8th Triangle Soft Matter Workshop, UNC/Duke/NCSU, 2014
- USNCCM12 Travel Award, 12th U.S. National Congress on Computational Mechanics, 2013
- Chinese Government Award for Outstanding Self-Financed Students Abroad, 2013
- Best Poster Award (*1st place*) of the 7th Triangle Soft Matter Workshop, Duke/UNC/NCSU, 2013
- Vice Chancellor's Travel Grant Award, Australian National University, 2013
- Dean's Fellowship Award, ANU College of Engineering and Computer Science, 2012
- ANU International PhD Research Scholarship, ANU, 2010-2014
- NUS University Research Scholarship, National University of Singapore, 2008-2010

TEACHING EXPERIENCE

- EMAE 450 - Advanced Engineering Analysis, SS2022, CWRU
- Summer School - Smart and Active Packaging Materials and Systems (Online), July 2021, Wuhan University
- PKG 805 - Advanced Packaging Dynamics, SS2021, MSU
- PKG 985 - Numerical Methods, FS2020, MSU
- PKG 805 - Advanced Packaging Dynamics, SS2020, MSU
- ECE 819 - Smart Material Sensors and Actuators, Guest Lecturer, FS 2019, MSU
- PKG 805 - Advanced Packaging Dynamics, SS2019, MSU
- PKG 985 - Numerical Methods, SS2018, MSU
- ECE 590 - Emerging Nanoelectronics Devices, SS2015, Duke
- ENG 435 - Composite Materials, SS2011, ANU