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Mechanical Engineering / Theoretical and Applied Mechanics

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EDUCATION

Northwestern University PhD, Mechanical Engineering Dissertation: "Multiphysics Modeling of Bio-integrated Electronics"	Evanston, IL 2017 – 2023 (expected)
The University of Texas at El Paso BS, Mechanical Engineering <i>Summa Cum Laude</i>	El Paso, TX 2013 – 2017

GRANTS AND AWARDS

AAAS Joshua E. Neimark Memorial Award American Association for the Advancement of Science	2019
Outstanding Researcher Award International Institute of Nanotechnology, Northwestern University	2019
National Science Foundation Graduate Research Fellowship Division of Graduate Education, National Science Foundation	2018-2022
Ford Foundation Pre-Doctoral Fellowship The National Academies of Science, Engineering, and Medicine	2018-2022

RESEACH EXPERIENCE

Querrey Simpson Institute for Bioelectronics, Northwestern University Graduate Research Fellow; Advisor: Yonggang Huang <ul style="list-style-type: none">Conducted theoretical and computational research in mechanics and electromagnetics design and optimization of epidermal and injectable bioelectronics technology for health and biomedical applications.Portfolio of designed bioelectronics includes dissolvable pacemakers, sweat collection microfluidics, ultra-soft biosensors for NICU and PICU patients, implantable optogenetic devices, physiological tracking biosensors, pressure sensors for prosthetics, and drug delivery technologies.	Evanston, IL 2017 – 2022
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My work has been published in Science, Nature, PNAS, Advanced Materials, Nature Medicine, Nature Biotechnology, Nature Biomedical Engineering, Nature Neuroscience, Science Translational Medicine, Journal of the Mechanics and Physics of Solids, and Journal of Applied Mechanics, among others.

TEACHING EXPERIENCE

Northwestern University

Teaching Assistant, Mechanics of Thin Films (Graduate Course)

Teaching Assistant, Fracture Mechanics (Graduate Course)

Evanston, IL

Winter 2019

Winter 2018

Center for Integration of Research, Teaching, and Learning

Mentored Discussion of Teaching Program

Evanston, IL

Winter 2018

RELATED PROFESSIONAL EXPERIENCE

Physics World, Institute of Physics

Biophysics and Bioengineering Contributor

2021-Present

- Identify the latest developments of biomedical technology that might be of interest for the magazine of the Institute of Physics audience.
- Research, edit, and communicate the scientific findings in the form of news pieces.

MENTORED STUDENTS

Northwestern University

Chenhang Li

MS, Theoretical and Applied Mechanics

Current: PhD student at Duke University

Evanston, IL

2020-2021

PROFESSIONAL ASSOCIATIONS

American Society of Mechanical Engineers

American Association for the Advancement of Science

Institute of Electrical and Electronic Engineers

REVIEWER

Proceedings of the National Academy of Sciences

Journal of Applied Mechanics

Journal of Applied Thermal Engineering

Cell Press Heliyon

REVIEW ARTICLES

*Denotes Equal Contribution

- 1 Xie Z.*, **Avila R.***, Huang Y., and Rogers J.A., “Flexible and stretchable antennas for biointegrated electronics,” *Advanced Materials*, 2020, 32, 1902767.
- 2 Guo X.*, **Avila R.***, Huang, Y., and Xie Z., “Flexible electronics with dynamic interfaces for biomedical monitoring, stimulation, and characterization,” *International Journal of Mechanical System Dynamics*. 2021; 1: 52-70.

JOURNAL ARTICLES – (FIRST AUTHOR)

- 1 **Avila R.**, Li C., Xue Y., Rogers J.A., and Huang Y., “Modeling programmable drug delivery in bioelectronics with electrochemical actuation,” *Proceedings of the National Academy of Sciences*, 2021, 118(11), e2026405118.
- 2 **Avila R.**, Wu Y., Rogers J.A., and Huang Y., “A mechanics model for injectable microsystems in drug delivery,” *Journal of the Mechanics and Physics of Solids*, 2021, 156, 104622.
- 3 **Avila R.**, Ciatti J.L., Vazquez-Guardado A., Wu Y., Zhang Y., Garziera R., Rogers J.A., and Huang Y., “Electrochemical bioelectronics in drug delivery – effect of the initial gas volume,” *Journal of Applied Mechanics*, 2022, 89(1), 011012.
- 4 **Avila R.**, Wu Y., Garziera R., Rogers J.A., and Huang Y., “Analytical Modeling of Flowrate and Its Maxima in Electrochemical Bioelectronics with Drug Delivery Capabilities,” *Research*, 2022, Article ID 9805932.
- 5 Kwak S.S.*, Yoo S.*, **Avila R.***, Chung H.U.*, Jeong H., Liu C., Vogl J.L., Kim J., Park Y., Ryu H., Yoon H.J., Kim J., Koo J., Oh Y.S., Kim S.B., Xu S., Xie Z., Huang Y., and Rogers J.A., “Skin-integrated devices with soft, holey architectures for wireless physiological monitoring, with applications in the neonatal intensive care unit,” *Advanced Materials*, 2021, 2103974.
- 6 **Avila R.**, and Xue Y., “Torsional buckling by joining prestrained and unstrained elastomeric strips with application as bilinear elastic spring,” *Journal of Applied Mechanics*, 2017, 84(10), 104502.

JOURNAL ARTICLES – (CO-AUTHOR)

- 1 Choi Y.S., Jeong H., Yin R.T., **Avila R.**, Pfenniger A., Tzavelis A., Lee J.Y., Lee Y.J., Chen S.W., Kim S., Yoo J., Knight H.S., Ahn H., Wickerson G., Higbee-Dempsey E., Russo B.A., Napolitano M.A., Holleran T.J., Miniovich A.N, Lee G., Vázquez-Guardado A., Geist B., Kim B., Han S., Brennan J.A., Aras K., Kwak S.S., Kim J., Yang X., Burrell A., Chun K.S., Wu C., Rwei A.Y., Spann A.N., Banks A., Johnson D., Zhang Z.J., Haney C.R., Jin S.H., Sahakian A.V., Huang Y., Trachtotis G.D., Knight B.P., Arora R.K., Efimov I.R., and Rogers J.A., “A closed-loop network of wireless, body integrated devices for temporary electrotherapy,” *Science*. 2022 (in Press).
- 2 Jung Y.H., Yoo J.Y., Vázquez-Guardado A., Kim J.H., Kim J.T., Luan H., Park M., Lim J., Shin H.S., Su C.J., Schloen R., Trueb J., **Avila R.**, Yang D., Park Y., Ryu H.J., Yoon H.J., Lee G., Jeong H., Kim J.U., Huang Y., and Rogers J.A., “An advanced haptic interface for high resolution, programmable patterns of touch across large areas of the skin,” *Nature Electronics*. 2022 (in Press).

- 3 Jeong H., Kwak S.S., Sohn S., Lee Y.L., O'Brien M.K., Park Y., **Avila R.**, Kim J.T., Lee J.Y., Irie M., Jang H., Shawen N., Lee K., Andersen R.A., Huang Y., Jayaraman A., Davis M.M., Shanley T., Wakschlag L.S., Krogh-Jespersen S., Xu S., Ryan S.W., Lieber R., and Rogers J.A., "Miniaturized wireless, skin-integrated sensor networks for quantifying full-body movement behaviors and vital signs in infants," *Proceedings of the National Academy of Sciences*, 2021, 118(43), e2104925118.
- 4 Choi Y.S., Yin R.T., Pfenniger A., Koo J., **Avila R.**, Lee K.B., Chen S.W., Lee G., Li G., Qiao Y., Murillo-Berlioz A., Kiss A., Han S., Lee S.M., Li C., Xie Z., Chen Y.Y., Burrell A., Geist B., Jeong H., Kim J., Yoon H.J., Banks A., Kang S.K., Zhang Z.J., Haney C.R., Sahakian A.V., Johnson D., Efimova T., Huang Y., Trachiotis G.D., Knight B.P., Arora R.K., Efimov I.R., and Rogers J.A., "Fully implantable and bioresorbable cardiac pacemakers without leads or batteries," *Nature Biotechnology*, 2021. – **Cover Article.**
- 5 Kim B.H., Li K., Kim J.T., Park Y., Jang H., Wang X., Xie Z., Won S.M., Yoon H.J., Lee G., Jang W.J., Lee K.H., Chung T.S., Jung Y.H., Heo S.Y., Lee Y., Kim J., Cai T., Kim Y., Prasopsukh P., Yu Y., Yu X., **Avila R.**, Luan H., Song H., Zhu F., Zhao Y., Chen L., Han S.H., Kim J., Oh S.J., Lee H., Lee C.H., Huang Y., Chamorro L.P., Zhang Y., and Rogers J.A., "Three-dimensional electronic microfliers inspired by wind-dispersed seeds," *Nature*, 597, 503–510 2021. – **Cover Article.**
- 6 Oh Y.S., Kim J.H., Xie Z., Cho S., Han H., Jeon S.W., Park M., Namkoong M., **Avila R.**, Song Z., Lee S.U., Ko K., Lee J., Lee J.S., Min W.G., Lee B.J., Choi M., Chung H.U., Kim J., Han M., Koo J., Choi Y.S., Kwak S.S., Kim S.B., Kim J., Choi J., Kang C.M., Kim J.U., Kwon K., Won S.M., Baek J.M., Lee Y., Kim S.Y., Lu W., Vazquez-Guardado A., Jeong H., Ryu H.J., Lee G., Kim K., Kim S., Kim M.S., Choi J., Choi D.Y., Yang Q., Zhao H., Bai W., Jang H., Yu Y., Lim J., Guo X., Kim B.H., Jeon S., Davies C., Banks A., Sung H.J., Huang Y., Park I., and Rogers J.A., "Battery-free, wireless soft sensors for continuous multi-site measurements of pressure and temperature for patients at risk for pressure injuries," *Nature Communications*, 12, 5008, 2021.
- 7 Yang Q., Wei T., Yin R.T., Wu M., Xu Y., Koo J., Choi Y.S., Xie Z., Chen S.W., Kandela I., Yao S., Deng Y., **Avila R.**, Liu T.L., Bai W., Yang Y., Han M., Zhang Q., Haney C.R., Lee K.B., Aras K., Wang T., Seo M.H., Luan H., Lee S.M., Brikha A., Ghoreishi-Haack N., Tran L., Stepien I., Aird F., Waters E.A., Yu X., Banks A., Trachiotis G.D., Torkelson J.M., Huang Y., Kozorovitskiy Y., Efimov I.R., and Rogers J.A., "Photocurable bioresorbable adhesives as functional interfaces between flexible bioelectronic devices and soft biological tissues," *Nature Materials*, 2021.
- 8 Ausra J., Wu M., Zhang X., Vázquez-Guardado A., Skelton P., Peralta R., **Avila R.**, Murickan T., Haney C.R., Huang Y., Rogers J.A., Kozorovitskiy Y., and Gutruf P., "Wireless, battery-free, subdermally implantable platforms for transcranial and long-range optogenetics in freely moving animals," *Proceedings of the National Academy of Sciences*, 118 (30), e2025775118.
- 9 Jeong H., Lee J.Y., Lee K., Kang Y.J., Kim J.T., **Avila R.**, Tzavelis A., Kim J., Ryu H., Kwak S.S., Kim J.U., Banks A., Jang H., Chang J.K., Li S., Mummidisetty C.K., Park Y., Nappi S., Chun K.S., Lee Y.J., Kwon K., Ni X., Chung H.U., Luan H., Kim J.H., Wu C., Xu S., Banks A., Jayaraman A., Huang Y., and Rogers J.A., "Differential cardiopulmonary monitoring system for artifact-canceled physiological tracking of athletes, workers, and COVID-19 patients," *Science Advances*, 2021, 7(20), eabg3092. – **Cover Article.**
- 10 Liu C., Kim J.T., Kwak S.S., Hourlier-Fargette A., **Avila R.**, Vogl J., Tzavelis A., Chung H.U., Lee J.Y., Kim D.H., Ryu D., Fields K.B., Ciatti J.L., Li S., Irie M., Bradley A., Shukla A., Chavez

- J., Dunne E.C., Kim S.S., Kim J., Park J.B., Jo H.H., Kim J., Johnson M.C., Kwak J.W., Madhvapathy S.R., Xu S., Rand C.M., Marsillio L.E., Hong S.J., Huang Y., Weese-Mayer D.E., and Rogers J.A., “Wireless, skin-interfaced devices for pediatric critical care: application to continuous, noninvasive blood pressure monitoring,” *Advanced Healthcare Materials*, 2021, 2100383. – **Cover Article.**
- 11 Song E., Xie Z., Bai W., Luan H., Ji B., Ning X., Xia Y., Baek J.M., Lee Y., **Avila R.**, Chen H.Y., Kim J.H., Madhvapathy S., Yao K., Li D., Zhou J., Han M., Won S.M., Zhang X., Myers D. J., Mei Y., Guo X., Xu S., Chang J.K., Yu X., Huang Y., and Rogers J.A., “Miniaturized electromechanical devices for the characterization of the biomechanics of deep tissue,” *Nature Biomedical Engineering*, 2021.
 - 12 Grajales-Reyes J.G., Copits B.A., Lie F., Yu Y.J., **Avila R.**, Vogt S.K., Huang Y., Banks A.R., Rogers J.A., Gereau R.W., and Golden J.P., “Surgical implantation of wireless, battery-free optoelectronic epidural implants for optogenetic manipulation of spinal cord circuits,” *Nature Protocols*, 16, 3072-3088, 2021.
 - 13 Yang Y., Xie Z., Wu M., Vazquez-Guardado A., Wegner A.J., Grajales J., Deng Y., **Avila R.**, Wang T., Moreno J.A., Minkowicz S., Lee J., Zhang S., Legaria A., Ma Y., Mehta S., Franklin D., Han M., Zhao H., Lu W., Yu Y., Yu X., Gereau R., Good C.H., Huang Y., Kozorovitskiy Y., and Rogers J.A., “Wireless multilateral devices for optogenetic studies of individual and social behaviors,” *Nature Neuroscience*, 2021.
 - 14 Lu W., Bai W.B., Zhang H., Xu C.K., Chiarelli A.M., Vazquez-Guardado A., Xie Z.Q., Shen H.X., Nandoliya K., Zhao H.B., Lee K.H., Wu Y.X., Franklin D., **Avila R.**, Xu S., Rwei A., Han M.D., Kwon K.H., Deng Y.J., Yu X.G., Thorp E.B., Feng X., Huang Y., Forbess J., Ge Z-D., and Rogers J.A., “Wireless, implantable catheter-type oximeter designed for cardiac oxygen saturation,” *Science Advances*, 2021, 7(7), eabe0579.
 - 15 Park Y.S., Franz C.K., Ryu H.J., Luan H.W., Cotton K.Y., Kim J.U., Chung T.S., Zhao S.W., Vazquez-Guardado A., Yang D.S., Li K., **Avila R.**, Phillips J.K., Quezada M.J., Jang H.K., Kwak S.S., Won S.M., Kwon K.H., Jeong H.Y., Bandonkar A.J., Han M.D., Zhao H.B., Osher G.R., Wang H.L., Lee K.H., Zhang Y.H., Huang Y., Finan J.D., and Rogers J.A., “Three dimensional, multifunctional neural interfaces for cortical spheroids and engineered assembloids,” *Science Advances*, 2021, 7(12), eabf9153. – **Cover Article.**
 - 16 Kwak J.W., Han M., Xie Z., Chung H.U., Lee J.Y., **Avila R.**, Yohay J., Chen X., Liang C., Patel M., Jung I., Kim J., Namkoong M., Kwon K., Guo X., Ogle C., Grande D., Ryu D., Kim D.H., Madhvapathy S., Liu C., Park Y., Caldwell R., Banks A., Xu S., Huang Y., Fatone S., and Rogers J.A., “Wireless sensors for continuous, multimodal measurements at the skin interface with lower limb prostheses,” *Science Translational Medicine*, 2020, 12(574).
 - 17 Madhvapathy S.R., Wang H., Kong J., Zhang M., Lee J.Y., Park J.B., Jang H., Xie Z., Cao J., **Avila R.**, Wei C., D’Angelo V., Zhu J., Chung H.U., Coughlin S., Patel M., Winograd J., Lim J., Banks A., Xu S., Huang Y., Rogers J.A., “Reliable, low-cost, fully integrated hydration sensors for monitoring and diagnosis of inflammatory skin diseases in any environment,” *Science Advances*, 2020, 6(49), eabd7146.
 - 18 Choi Y.S., Hsueh Y.Y., Koo J., Yang Q., **Avila R.**, Hu B., Xie Z., Lee G., Ning Z., Liu C., Xu Y., Lee Y.J., Zhao W., Fang J., Deng Y., Lee S.M., Vázquez-Guardado A., Stepien I., Yan Y., Song J.W., Haney C., Oh Y.S., Liu W., Yun H.J., Banks A., MacEwan M.R., Ameer G.A., Ray W.Z.,

- Huang Y., Xie T., Franz C.K., Li S., Rogers J.A., “Stretchable, dynamic covalent polymers for soft, long-lived bioresorbable electronic stimulators designed to facilitate neuromuscular regeneration,” *Nature Communications*, 11, 1-14, 2020.
- 19 Liu Y., Zheng H., Zhao L., Liu S., Yao K., Li D., Yiu C., Gao S., **Avila R.**, Pakpong C., Chang L., Wang Z., Huang X., Xie Z., Yang Z., and Yu X., “Electronic skin from high-throughput fabrication of intrinsically stretchable lead zirconate titanate elastomer,” *Research*, 2020, 1085417.
 - 20 Hourlier-Fargette A., Schon S., Xue Y., **Avila R.**, Li W., Gao Y., Liu C., Kim S.B., Raj M.S., Fields K.B., Parsons B.V., Lee K., Lee J.H., Chung H.U., Lee S.P., Johnson M., Bandodkar A.J., Gutruf P., Model J.B., Aranyosi A.J., Choi J., Ray T.R., Ghaffari R., Huang Y., and Rogers J.A., “Skin-interfaced soft microfluidic systems with modular and reusable electronics for in situ capacitive sensing of sweat loss, rate and conductivity,” *Lab on a Chip*, 20, 4391-4403, 2020.
 - 21 Lu D., Yan Y., **Avila R.**, Kandela I., Stepien I., Seo M.G., Bai W., Yang Q., Li C., Haney C.R., Waters E.A., MacEwan M.R., Huang Y., Ray W.Z., and Rogers J.A., “Bioresorbable, wireless, passive sensors as temporary implants for monitoring regional body temperature,” *Advanced Healthcare Materials*, 2020, 2000942.
 - 22 Choi Y.S., Koo J., Y.J., Lee G., **Avila R.**, Ying H., Reeder J.T., Hambitzer L., Im K., Kim J., Lee K.M., Cheng J., Huang Y., Kang S.K., Rogers J.A., “Biodegradable polyanhydrides as encapsulation layers for transient electronics,” *Advanced Functional Materials*, 2020, 2000941.
 - 23 Liu Y., Zhao L., **Avila R.**, Yiu C., Wong T., Chan Y., Yao K., Li D., Zhang Y., Li W., Xie Z., and Yu X., “Epidermal electronics for respiration monitoring via thermo-sensitive measuring,” *Material Today Physics*, 13, 100199, 2020.
 - 24 Chung H.U., Rwei A., Hourlier-Fargette A., Lee K., Dunne E., Xie Z., Liu C., Carlini A., Kim D.H., Ryu D., Kulikova E., Cao J., Odland I.C., Fields K.B., Hopkins B., Banks A., Ogle C., Grande D., Park J.B., Kim J., Irie M., Jang H., Lee J., Park Y., Jo H.H., Hahm H., Namkoong M., Kwak J.W., Suen E., Paulus M.A., Kim R.J., Parsons B.V., Human K.A., Kim S.S., Patel M., Reuther W., Kim H.S., Lee S.H., Leedle J.D., **Avila R.**, Xu Y., Yun Y., Rigali S., Son T., Jung I., Soundararajan V.R., Ollech A., Shukla A., Bradley A., Schau M., Rand C.M., Marsillio L.E., Harris Z.L., Huang Y., Hamvas A., Paller A.S., Weese-Mayer D.E., Xu S., Lee J.Y., and Rogers J.A., “Skin-interfaced biosensors and pilot studies for advanced wireless physiological monitoring in neonatal and pediatric intensive care units,” *Nature Medicine*, 26, 418–429, 2020. – **Cover Article**.
 - 25 Reeder J.T., Xue Y., Franklin D., Deng Y., Choi J., Prado O., Kim R., Liu C., Hanson J., Ciraldo J., Bandodkar A.J., Krishnan S., Johnson A., Patnaude E., **Avila R.**, Huang Y., and Rogers J.A., “Resettable, skin-interfaced microfluidic sweat collection devices with chemesthetic hydration feedback enabled by soft, monolithic valves and pumps,” *Nature Communications*, 10, 5513 2019.
 - 26 Lee K., Ni X., Lee J.Y., Arafa H., Pe D., Xu S., **Avila R.**, Irie M., Lee J.H., Easterlin R.L., Kim D.H., Chung H.U., Olabisi O.O., Getaneh S., Chung E., Hill M., Bell J., Jang H., Liu C., Park J.B., Kim J., Kim S.B., Mehta S., Pharr M., Tzavelis A., Reeder J.T., Huang I., Deng Y., Xie Z., Davies C.R., Huang Y., and Rogers J.A., “Mechano-acoustic sensing of physiological processes and body motions using soft, wireless devices interfaced to the skin at the suprasternal notch,” *Nature Biomedical Engineering*, 2019. – **Cover Article**.

- 27 Liu Y., Zhao L., Wang L., Zheng H., Li D., **Avila R.**, Lai K.W.C., Wang Z., Xie Z., Zi Y., and Yu X., “Skin-Integrated Graphene Embedded Lead Zirconate Titanate Rubber for Energy Harvesting and Mechanical Sensing,” *Advanced Materials Technologies*, 2019, 1900744.
- 28 Guo Q., Koo J., Xie Z., **Avila R.**, Yu X., Ning X., Zhang H., Liang X., Kim S.B., Yan Y., MacEwan M.R., Lee H.M, Song A., Di Z., Huang Y., Mei Y., and Rogers J.A., “A bioresorbable magnetically coupled system for low frequency wireless power transfer,” *Advanced Functional Materials*, 2019, 1905451.
- 29 Liu Y., Xu Y., **Avila R.**, Liu C., Xie Z., Wang L., and Yu X., “3D printed microstructures for flexible electronic devices,” *Nanotechnology*, 2019, 30 (41) 414001.
- 30 Reeder J.T., Choi J., Xue Y., Gutruf P., Hanson J., Liu M., Ray T., Bandodkar A.J., **Avila R.**, Xia W., Krishnan S., Xu S., Barnes K., Pahnke M., Ghaffari R., Huang Y., and Rogers J.A., “Waterproof, electronics-enabled, epidermal microfluidic devices for sweat collection, biomarker analysis, and thermography in aquatic settings,” *Science Advances*, 2019; 5(1), eaau6356.
- 31 Wang A., **Avila R.**, and Ma Y., “Mechanics design for buckling of thin ribbons on an elastomeric substrate without material failure,” *Journal of Applied Mechanics*, 2017; 84(9), 094501.

JOURNAL ARTICLES – (UNDER REVIEW)

- 1 Reeder J.T., Xie Z., Yang Q., Seo M.H., Yan Y., Deng Y., Jinkins K.R., Krishnan S.R., Liu C., McKay S., Patnaude E., Johnson A., Zhao Z., Kim M.J., Xu Y., Huang I., **Avila R.**, Ray E., Guo X., Ray W.Z., Huang Y., MacEwan M.R., Rogers J.A., “Soft, bioresorbable, evaporative microfluidic coolers for reversible conduction block of peripheral nerves,” *Science*.
- 2 Kwon K., Kim J., Won S.M., Zhao J., Wang H., **Avila R.**, Chun K.S., Jang H., Lee K.H., Kim J.H., Kim J., Lim J., Park Y., Lu W., Kim T., Banks A., Huang Y., and Rogers J.A., “Battery-free, cardiovascular implant for wireless monitoring of arterial/ventricular pressure, flow rate and temperature in real-time fashion,” *Nature Biomedical Engineering*.
- 3 Wu Y., Wu M., Vázquez-Guardado A., Kim J., Zhang X, **Avila R.**, Kim J.T., Deng Y., Melzer S., Bai Y., Meng L., Zhang Y., Guo H., Yu Y., Hong L., Kanatzidis E., Haney C., Waters E., Banks A., Hu Z., Lie F., Chamorro L., Sabatini B., Huang Y., Kozorovitskiy Y., and Rogers J.A., “Real-time programmable gene delivery, optogenetics and photopharmacology enabled by wireless multi-lateral optofluidic microsystems,” *Nature Methods*.
- 4 Wang X, Huang J., Liu Y., Tan J., Chen S., **Avila R.**, and Xie Z., “Design of protective and high sensitivity encapsulation layers in wearable devices,” *International Journal of Solids and Structures*.

INVITED SEMINARS

- 1 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” Department of Mechanical Science and Engineering, *The University of Illinois at Urbana-Champaign*, April 2022.

- 2 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” Department of Mechanical & Industrial Engineering, *Louisiana State University*, March 2022.
- 3 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” Department of Mechanical Engineering, *The University of Texas at Austin*, February 2022.
- 4 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” Department of Mechanical Engineering and Mechanics, *Drexel University*, December 2021. (virtual)
- 5 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” The 3rd International Conference on Flexible Electronics, *Tsinghua University, Qiantang Science and Technology Innovation Center, Institute of Flexible Electronics Technology of THU Zhejiang*, November 2021. (virtual)
- 6 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” Department of Mechanical and Aerospace Engineering, *University of Miami*, October 2021. (virtual)
- 7 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” Future Leaders in Mechanical and Aerospace Engineering, *Nationwide Seminar Series*, April 2021. (virtual)
- 8 **Avila R.**, “Modeling programmable delivery in bioelectronics with electrochemical actuation,” Department of Civil and Environmental Engineering, *Northwestern University*, March 2021. (virtual)

REFERENCES

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