

Raudel Avila

Assistant Professor
Department of Mechanical Engineering
George R. Brown School of Engineering
William Marsh Rice University

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RANK

Rice University

Assistant Professor, Mechanical Engineering, Rice University
Data of appointment: July 1, 2023

Principal Investigator: Computational Mechanics and Bioelectromagnetic Lab

Faculty Member: Ken Kennedy Institute
Faculty Affiliate: Rice Advanced Materials Institute
Faculty Affiliate: Smalley-Curl Institute
Faculty Affiliate: Rice Space Institute
Faculty Affiliate: Medical Humanities Institute

EDUCATION

Northwestern University

Ph.D., Mechanical Engineering
Dissertation: "Mechanics and Electromagnetic Modeling of Injectable, Implantable, and Skin Integrated Electronics"
Advisor: Yonggang Huang, Ph.D.

Evanston, IL
2017 – 2023

The University of Texas at El Paso

B.S., Mechanical Engineering
Summa Cum Laude

El Paso, TX
2013 – 2017

EMPLOYMENT

Rice University

Assistant Professor of Mechanical Engineering

Houston, TX
2023 – Present

Northwestern University

NSF Graduate Research Fellow / Ford Pre-Doctoral Fellow

Evanston, IL
2017 – 2023

OTHER ACTIVITIES

Gaia Health

Technical advisor for start-up company developing drug delivery technologies

Houston, TX
2023 – Present

HONORS AND AWARDS

ASME – Pi Tau Sigma Gold Medal	2024
American Society of Mechanical Engineering	
Terminal Year Fellowship	2022 – 2023
Department of Mechanical Engineering, Northwestern University	
Trailblazers in Engineering – LATINE Fellow	2022
College of Engineering, Purdue University	
Outstanding Researcher Award	2019
International Institute of Nanotechnology, Northwestern University	
National Science Foundation Graduate Research Fellowship	2018 – 2022
Division of Graduate Education, National Science Foundation	
Ford Foundation Pre-Doctoral Fellowship	2018 – 2022
The National Academies of Science, Engineering, and Medicine	

STUDENT ADVISING

Rice University Houston, TX

Postdoctoral Research Associate

1. Ritika Menghani, Postdoc – Rice Academy of Fellows Fall 2024 –

PhD Advisees in Progress

1. Pei Li – Mechanical Engineering Fall 2024 –
2. Yulin Zhou – Mechanical Engineering Fall 2024 –

MS Student

1. Jair Gonzalez – Bioengineering Fall 2023 – Spring 2024

Undergraduate Student

1. Kirubel Ghebreab – Mechanical Engineering Fall 2023 – Spring 2024
2. Komal Tallo – Bioengineering Spring 2024 –
3. Cadan Hansen – Mechanical Engineering Spring 2024
4. Elena Carruseta – Mechanical Engineering Spring 2024 –
5. Vedha Penmetcha – Biosciences Spring 2024 –
6. Chihtong (Lily) Lee – Civil Engineering Summer 2024 –
7. Mert Culcu – Mechanical Engineering Summer 2024 –
8. Stenio Alves de Assis – Computer Science and Biology Summer 2024 –

Committee Member

1. Elizabeth Clarke Wilkirson (Ph.D., Supervised by Peter Lillehoj)
2. Claire V. Hammond (Ph.D., Supervised by Benjamin Fregly)
3. Stephen Simko (M.S., Supervised by Matthew Brake)

TEACHING

Rice University

Houston, TX

MECH 2022

Primary Instructor, Statics/Mechanics of Materials (Undergraduate Course)
Enrollment: 30 Undergraduates

Fall 2024

MECH 417/517

Primary Instructor, Finite Element Analysis (Undergraduate/Graduate Course)
Enrollment: 55 Undergraduates + 15 Graduate Students

Spring 2024

- Effectiveness as a Teacher **1.20** / 5.00 (1 = outstanding)
- Overall Course Quality **1.30** / 5.00 (1 = outstanding)

Technical Advisor, Senior Design (Undergraduate Course)

Fall/Spring
2023 - 2024

SERVICE

Rice University, Mechanical Engineering Department

Graduate Student Committee

2023 –

Mechanical Engineering Faculty Search Committee

2023 –

Diversity Equity and Inclusion Chair

2024 –

Technical Reviewer

1. Journal of Applied Mechanics
2. International Journal of Mechanical System Dynamics
3. Journal of Applied Thermal Engineering
4. Proceedings of the National Academy of Sciences
5. Computer Methods in Biomechanics and Biomedical Engineering
6. Digital Biomarkers
7. PNAS Nexus
8. Acta Mechanica Sinica

RESEARCH

FUNDED RESEARCH – AS PI

**Applied Mechanics Division – Haythornthwaite Foundation Research
Initiation Grants**

\$20,000
2023 – Current

American Society of Mechanical Engineers	
Rice Space Institute Seed Funding Initiative	\$25,000
Rice University	2024 – Current
Rice University Provost – TMC Collaboration Fund	\$25,000
Rice University	2024 – Current
Brown Teaching Grant	\$5,000
Rice University	2024 – Current

[Google Scholar](#) (August 2024): 4010 citations, h-index (32)

SINCE JOINING RICE UNIVERSITY

*Denotes Equal Contribution, † Corresponding Author

- Gonzalez J., Lee C., Tallo K., Manjarrez V., and **Avila R**†, “[Engineering electronic inks for bioelectronics with tunable directional mechanics](#),” *Matter*, 7(2): 2700-2704.
- Kim S.H. *, Basir A. *, **Avila R.** *, Lim J., Hong S.W., Choe G., Shin J.H., Hwang J.H., Park S.J., Joo J., Lee C., Choi J., Lee B., Choi K.S., Jung S., Kim T.I., Yoo H., and Jung Y. H., “[Strain-invariant stretchable radio-frequency electronics](#)” *Nature*. 629, 1047-1054 (2024).
- Hwangbo J., Seo H., Sim G., **Avila R.**, Nair M., Kim B., and Choi Y., “[Bioresorbable polymers for electronic medicine](#)”, *Cell Reports Physical Science*, 102099 (2024).
- Zhao Z. **Avila R.***, Bai D., Xia D., She E., Huang Y., Rogers J.A., and Xie Z., “[A mechanics and electromagnetic scaling law for highly stretchable radio frequency electronics](#)” *Journal of the Mechanics and Physics of Solids*, October 2024; 191: 105784.
- Bai D., Zhao Z. **Avila R.**, Xia D., Huang Y., Rogers J.A., and Xie Z., “[Mechanics and thermal analyses of microfluidic nerve-cooler system](#)” *Journal of the Mechanics and Physics of Solids*, September 2024; 190: 105741.
- Kim J.H., Vázquez-Guardado A., Luan H., Kim J.T., Yang D.S., Zhang H., Chang J.K., Yoo S., Park C., Wei Y., Christiansen Z., Kim S., **Avila R.**, Kim J.U., Lee Y.J., Shin H.S., Zhou M., Jeon S.W., Baek J.M., Lee Y., Kim S.Y., Lim J., Park M., Jeong H., Won S.M., Chen R., Huang Y., Jung Y.H., Yoo J.H., and Rogers J.A. “[A wirelessly programmable, skin-integrated thermos-haptic stimulator system for virtual reality](#)” *Proceedings of the National Academy of Sciences*, 2024, 121(22), e2404007121.
- Madhvapathy S.R., Bury M.I., Wang L.W., Ciatti J.L., **Avila R.**, Huang Y., Arun K. Sharma A.K., Rogers J.A. “[Implantable, Miniaturized Temperature Sensors for Long-Term Monitoring of Chronic Intestinal Inflammation](#)” *Nature Biomedical Engineering*, (2024).
- Avila R.*** †, “[Curvature Matching Mechanics in Skin-based Bioelectronics to Minimize Interfacial Stresses](#)” *Journal of Applied Mechanics*, April 2024; 91(4): 045001.
- Yang D.S., Wu Y., Kanatzidis E.E., **Avila R.**, Zhou M., Bai Y., Chen S., Sekine Y., Kim J., Deng Y., Guo H., Zhang Y., Ghaffari R., Huang Y., and Rogers J.A., “[3D-printed epidermal sweat microfluidic systems with integrated microcuvettes for precise spectroscopic and fluorometric biochemical assays](#),” *Materials Horizons.*, 2023, **10**, 4992-5003.

BEFORE RICE UNIVERSITY

As First Author or Co-First Author

Review Articles

- 10 Xie Z.*, Avila R.*, Huang Y., and Rogers J.A., "[Flexible and stretchable antennas for biointegrated electronics](#)," *Advanced Materials*, 2020, 32, 1902767. – Cited 180+ times
- 11 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.

Research Articles

- 12 Lee G.*, Does M.D.*, Avila R.*, Kang J., Harkins K.D., Wu Y., Banks W.E., Park M., Lu D., Yan X., Kim J.U., Won S.M., Evans A.G., Joseph J.T., Kalmar C.L., Pollins A. C., Karagoz H., Thayer W. P., Huang Y., Rogers J. A., "[Implantable, Bioresorbable Radio Frequency Resonant Circuits for Magnetic Resonance Imaging](#)". *Advanced Science* 2023, 2301232.
- 13 Kim J.*, Shin H.*, Yoo J.*, Avila R.*, Huang Y., Jung Y., Colgate J., and Rogers J.A., "[Mechanics of Vibrotactile Sensors for Applications in Skin-Interfaced Haptic Systems](#)," *Extreme Mechanics Letters*. 2022, 101940.
- 14 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.
- 15 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.
- 16 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.
- 17 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.
- 18 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.
- 19 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.

As Co-Author

- 20 Li S., Lu D., Li S., Liu J., Xu Y., Yan Y., Rodriguez J., Bai H., **Avila R.**, Kang S., Ni X., Luan H., Guo H., Bai W., Wu C., Zhou X., Hu Z., Pet M., Hammill C., MacEwan M., Ray W., Huang Y., and Rogers J.A., "[Bioresorbable, wireless, passive sensors for continuous pH measurements and early detection of gastric leakage](#)," *Science Advances*, *10*, eadj0268 (2024).
- 21 Liu C., Kim J.-T., Yang D.S., Cho D., Yoo S., Madhvapathy S.R., Jeong H., Yang T., Luan H., **Avila R.**, Park J., Wu Y., Bryant K., Cho M., Lee J., Kwak J.Y., Ryu W., Huang Y., Nuzzo R.G. and Rogers J.A. (2023), "[Multifunctional Materials Strategies for Enhanced Safety of Wireless, Skin-Interfaced Bioelectronic Devices](#)," *Advanced Functional Materials*, **33**: 2302256 (2023) – **Cover Article**
- 22 Kim S., Oh Y. S., Lee K., Kim S., Maeng W.-Y., Kim K. S., Kim G.-B., Cho S., Han H., Park H., Wang M., **Avila R.**, Xie Z., Ko K., Choi J., Je M., Lee H., Lee S., Koo J., Park I., "[Battery-Free, Wireless, Cuff-Type, Multimodal Physical Sensor for Continuous Temperature and Strain Monitoring of Nerve](#)," *Small* 2023, **19**, 2206839.
- 23 Cho S., Han H., Park H., Lee S.U., Kim J.H., Jeon S.W., Wang M., **Avila R.**, Xie Z., Ko K., Park M., Lee J., Choi M., Lee J.S., Min W.G., Lee B.J., Lee S., Choi J., Gu J., Park J., Kim M.S., Ahn J., Gul O., Han C., Lee K., Kim S., Kim K., Kim J., Kang C.M., Koo J., Kwak S.S., Kim S., Choi D.Y., Jeon S., H.J., Park Y.B., Je M., Cho Y.T., Oh Y.S., Park I., "[Wireless, Multimodal Sensors for Continuous Measurement of Pressure, Temperature, and Hydration of Patients in Wheelchair](#)," *npj Flexible Electronics*, **7**, 8 (2023).
- 24 Song J. W., Ryu H., Bai W., Xie Z., Vázquez-Guardado A., Nandoliya K., **Avila R.**, Lee G., Song Z., Kim J., Lee M.K., Liu Y., Kim M., Wang H., Wu Y., Yoon H.J., Kwak S. S., Shin J., Kwon K., Lu W., Chen X., Huang Y., Ameer G.A., and Rogers J.A., "[Bioresorbable, wireless, and battery-free system for electrotherapy and impedance sensing at wound sites](#)," *Science Advances*, **9**, eade4687 (2023).
- 25 Kwon K., Kim J., Won S.M., Zhao J., **Avila R.**, Wang H., 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., "[A battery-less wireless implant for the continuous monitoring of vascular pressure, flow rate and temperature](#)," *Nature Biomedical Engineering*, **7**, 1215-1228 (2023).
- 26 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](#)," *Science China Technological Sciences*, (2022).
- 27 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., "[Wireless multi-lateral optofluidic microsystems for real-time programmable optogenetics and photopharmacology](#)," *Nature Communications*, **13**, 5571 (2022).
- 28 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., Trachiotis 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*, **376**, 1006 (2022).
- 29 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., and Rogers J.A., “[Soft, bioresorbable, evaporative microfluidic coolers for reversible conduction block of peripheral nerves](#),” *Science*, **377**, 6601(2022).
- 30 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., “[A wireless haptic interface for programmable patterns of touch across large areas of the skin](#),” *Nature Electronics*, 2022.
- 31 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.
- 32 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**.
- 33 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**.
- 34 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.
- 35 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.
- 36 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.
- 37 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.**
- 38 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.**
- 39 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.
- 40 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.
- 41 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.
- 42 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.
- 43 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., Bandodkar 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.**

- 44 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).
- 45 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.
- 46 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.
- 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.
- 47 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., Bhandodkar 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.
- 48 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.
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INVITED PRESENTATIONS

- 1 **Avila R.**, “Mechanical and Electromagnetic Modeling in Bio-integrated Electronics,”
 - a) Electronics Engineering, *Hanyang University*, Seoul, South Korea, August 2024. – **as PI**
 - b) Material Science and Engineering, *Yonsei University*, Seoul, South Korea, August 2024. – **as PI**
 - c) Advanced Materials Engineering for Information and Electronics, *Kyung Hee University*, Seoul, South Korea, August 2024. – **as PI**

- 2 **Avila R.**, “Mechanics and Materials Modeling in Bioelectronics: Injectable, Implantable, and Epidermal Applications.,”
 - a) Biomedical Engineering, *University of Houston*, Houston Texas, November 2023. – **as PI**
 - b) Society for Engineering Science, October 2023 – **as PI**
 - c) Mechanical Engineering, *Rice University*, Houston Texas, October 2023. – **as PI (Keynote GCURS)**
 - d) Material Science and Nanoengineering, *Rice University*, Houston Texas, October 2023. – **as PI**

- 3 **Avila R.**, “Mechanics of bioelectronics: engineering drug delivery devices and bioresorbable pacemakers,”
 - a) Bioengineering, *University of Washington*, March 2023.
 - b) Mechanical Engineering & Material Science, *WashU in St. Louis*, February 2023.
 - c) Biomedical Engineering, *Dartmouth University*, February 2023.
 - d) Mechanical and Industrial Engineering, *Northeastern University*, February 2023.
 - e) Material Science and Engineering, *University of Washington*, February 2023.
 - f) Mechanical Engineering, *University of Houston*, February 2023.
 - g) Mechanical Engineering, *Rice University*, January 2023
 - h) Biomedical Engineering and Mechanics, *Virginia Tech*, Blacksburg Virginia, October 2022.