

# David Restrepo, Ph.D.

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## Research Interests

My primary research interest is to advance in the fundamental understanding of nonlinear behavior and failure mechanisms observed in materials and structures, with the aim of designing new materials that exhibit unique properties and functionalities. To achieve this goal, my research approach combines computational simulations, theoretical analysis, fabrication, and experimental testing. Applications of interest are in broad areas including healthcare, defense, robotics, civil infrastructure, and aerospace engineering.

## Education

- Purdue University, Ph.D. in Engineering** (West Lafayette, IN) 8/2011-12/2015  
**Major concentration:** Materials Engineering.  
**PhD dissertation:** Programmable Cellular Materials. **Advisor:** Prof. Pablo D. Zavattieri
- Universidad EAFIT, M.Sc. in Engineering** (Medellin, Colombia) 8/2010-12/2012  
**Major concentration:** Applied mechanics.  
**Master's thesis:** Shape Memory Polymer-based Cellular Materials. **Advisor:** Prof. Pablo D. Zavattieri
- Universidad EAFIT, B.Sc. in Mechanical Engineering** (Medellin, Colombia) 1/2005-6/2010  
**Major concentration:** Design of technical systems.  
**Bachelor's thesis:** Experiment Design in Compliant Mechanisms and Kinematic Identification of Parallel Mechanisms. **Advisor:** Prof. Oscar E. Ruiz

## Professional Appointments

- University of Texas at San Antonio, Assistant Professor** (San Antonio, TX) 8/2018 -  
Department of Mechanical Engineering. College of Engineering. *University of Texas at San Antonio.*  
**Research areas:** Materials by design, architected materials, advanced materials, bioinspired materials and structures, additive manufacturing.
- Northwestern University, Postdoctoral Fellow** (Evanston, IL) 8/2017-7/2018  
Department of Mechanical Engineering. McCormick School of Engineering & Applied Science.  
*Northwestern University.*  
**Research area:** Biological and biomimetic material research
- Purdue University, Postdoctoral Associate** (West Lafayette, IN) 12/2015- 7/2017  
Lyles School of Civil Engineering. *Purdue University.*  
**Research area:** Biological and biomimetic material research: (1) Identification, understanding, and analysis of the fundamental structures and mechanisms used by Nature to obtain materials with exceptional mechanical properties. (2) Design and modeling of synthetic nano/micro-composites mimicking hard biological materials using bioinspired damage mitigation strategies.
- Purdue University, Graduate Research Assistant** (West Lafayette, IN) 8/2011-12/2015  
Lyles School of Civil Engineering. *Purdue University.*  
**Research area:** Design and analysis of materials with the capability to (1) change and adapt their effective properties to changes in the loading and environmental conditions, (2) to adapt their shapes to new configurations, and (3) induce motion for specific tasks.
- Purdue University, Purdue University/GM R&D Collaborative Project** 8/2012-12/2014  
General Motors Global Research & Development  
Lyles School of Civil Engineering. *Purdue University.*

**Research area:** Design and development of sandwich composite panels with a periodic cellular core that exhibit higher sound transmission and/or lower sound radiation efficiency than baseline composite panels of comparable mass.

**Purdue University Project Leaders:** Prof. Pablo Zavattieri, and Prof. Douglas Adams.

**GM R&D Project leaders:** Dr. Nilesh D. Mankame and Dr. Chong Wang.

**Purdue University, Visiting Scholar**

7/2010-8/2011

Lyles School of Civil Engineering. *Purdue University*.

**Research area:** Design of Cellular Materials with programmable effective properties using Shape Memory Polymer as a base material.

**Fellowships, Awards, and Honors**

**2019 Professor of the Year (Assistant Professor Level), The University of Texas at San Antonio** 8/2020

Awarded by the Department of Mechanical Engineering at UTSA based on student evaluations of the course ME-5453

**2019 Most Prolific Researcher of the Year (Assistant Professor Level), The University of Texas at San Antonio** 8/2020

Awarded by the Department of Mechanical Engineering at UTSA in recognition of high publication output during 2019

**Top Downloaded Paper in Advanced Materials 2018-2019** 5/2020

Recognition for one of the most read papers in the Advanced Materials Journal:

Huang, W., Restrepo, D., Jung, J.Y., Su, F.Y., Liu, Z., Ritchie, R.O., McKittrick, J., Zavattieri, P. and Kisailus, D., 2019. Multiscale toughening mechanisms in biological materials and bioinspired designs. *Advanced Materials*, 31(43): 1901561

**College of Engineering Travel Grant, The University of Texas at San Antonio** 11/2019

Awarded by the College of Engineering at UTSA to present research findings in national and international conferences.

**Best Lab Exhibit, Engineering Week, The University of Texas at San Antonio** 5/2019

Voted as best lab exhibit during E-week spring 2019. Topic: Advanced and Smart Materials

**Civil Engineering Best Dissertation Award Fall 2015, Purdue University** 4/2016

Granted by the faculty at the Lyles School of Civil Engineering for my PhD thesis about Programmable Cellular Materials.

**Travel grant – Multiscale/3D printing cement workshop** 7/2016

NSF travel grant to attend the Multiscale/3D Printing Cement Workshop at Vanderbilt University, July 16-17, 2016

**William and Mary Goetz Graduate Fellowship, Lyles School of Civil Engineering, Purdue University** 10/2014

Merit-based award given to a graduate student pursuing an advanced degree in the field of materials.

**Graduate student fellowship, Department of Mechanical Engineering, Universidad EAFIT, Colombia** 7/2010

Graduate student fellowship to pursue Master of Science in Engineering at Universidad EAFIT. Total stipend: \$20,000

**Visiting Scholar Grant: 12-month research internship at Purdue University** 7/2010

Granted by the Lyles school of civil engineering and the department of Mechanical Engineering at Universidad EAFIT. Amount granted: \$14,000

**School of Engineering Best Bachelor's Dissertation Award, Universidad EAFIT, Colombia** 6/2010

Granted by the faculty at the School of Engineering (Universidad EAFIT, Medellin, Colombia) for my bachelor's thesis about compliant mechanisms and kinematic identification of parallel manipulator

### Student Distinctions

1. **Jens Knudsen**, UTSA U-GREAT (Undergraduate Research, Education and Training) program Spring Scholarship 2020 funded by REEU/NIFA through TSERI
2. **Luis Mendoza**, UTSA U-GREAT (Undergraduate Research, Education and Training) program Spring Scholarship 2020 funded by REEU/NIFA through TSERI
3. **Luis Mendoza**, UTSA Undergraduate Research Scholarship, Spring 2020
4. **Hayden Bilbo**, NSF Undergraduate Research Fellowship, Through UTSA College of Engineering, Fall 2019
5. **Hayden Bilbo**, UTSA Undergraduate Research Scholarship, Fall 2019.
6. **Jens Knudsen**, UTSA Undergraduate Research Scholarship, Fall 2019.
7. **Joshua Gale**, UTSA Undergraduate Research Scholarship, Summer 2019.
8. **Joshua Gale**, Best-In-Show Award: A Novel and Active Bandage for Accelerating the Healing of Chronic Wounds, Undergraduate Research Showcase, Spring 2019
9. **Joshua Gale**, UTSA Undergraduate Research Scholarship, Spring 2019.

### Publications

#### Refereed Journal Papers

1. Pohl, A., Herrera, S.A., **Restrepo, D.**, Negishi, R., Jung, J.Y., Salinas, C., Wuhrer, R., Yoshino, T., McKittrick, J., Arakaki, A. and Nemoto, M., 2020. Radular stylus of *Cryptochiton stelleri*: A multifunctional lightweight and flexible fiber-reinforced composite. *Journal of the Mechanical Behavior of Biomedical Materials*, p.103991.
2. Naleway, S.E., Thomas, V., **Restrepo, D.**, and Schniepp, H.C., 2020. Advanced Manufacturing for Biomaterials and Biological Materials, Part II. *JOM*, 72(4), pp.1432-1434.
3. **Restrepo, D.**, Naleway, S.E., Thomas, V., and Schniepp, H.C., 2020. Advanced Manufacturing for Biomaterials and Biological Materials, Part I. *JOM*, 72(3), pp.1151-1153.
4. Valencia, C., **Restrepo, D.**, Mankame, N.D., Zavattieri, P.D. and Gomez, J., 2019. Computational characterization of the wave propagation behavior of multi-stable periodic cellular materials. *Extreme Mechanics Letters*, 33, 100565
5. Espinosa, H. D., Zaheri, A., Nguyen, H., **Restrepo, D.**, Daly, M., Frank, M., & McKittrick, J., 2019. In situ Wear Study Reveals Role of Microstructure on Self-Sharpening Mechanism in Sea Urchin Teeth. *Matter*, 1(5): 1246
6. Valencia, C., **Restrepo, D.**, Mankame, N. D., Zavattieri, P. D., & Gomez, J., 2019. Computational characterization of the wave propagation behavior of multi-stable periodic cellular materials. *Extreme Mechanics Letters*, 33: 100565
7. Hector, K. W., **Restrepo, D.**, Tejedor Bonilla, C., Hector, L. G., Mankame, N., & Zavattieri, P. D., 2019. Mechanics of Chiral Honeycomb Architectures with Phase Transformations. *Journal of Applied Mechanics*, 86(11): 111014
8. Huang, W., **Restrepo, D.**, Jung, J.Y., Su, F.Y., Liu, Z., Ritchie, R.O., McKittrick, J., Zavattieri, P. and Kisailus, D., 2019. Multiscale toughening mechanisms in biological materials and bioinspired designs. *Advanced Materials*, 31(43): 1901561
9. Zhang, Y., **Restrepo, D.**, Velay-Lizancos, M., Mankame, N. D., & Zavattieri, P. D., 2019. Energy dissipation in functionally two-dimensional phase transforming cellular materials. *Scientific reports*, 9(1): 12581

10. Yaraghi, N.A., Trikanad, A.A., **Restrepo, D.**, Huang, W., Rivera, J., Herrera, S., Zhernenkov, M., Parkinson, D.Y., Caldwell, R.L., Zavattieri, P.D. and Kisailus, D., 2019, Multiscale Biological Composites: The Stomatopod Telson: Convergent Evolution in the Development of a Biological Shield (Adv. Funct. Mater. 34/2019). *Advanced Functional Materials*, 29: 1970232
11. Yaraghi, N.A., Trikanad, A.A., **Restrepo, D.**, Huang, W., Rivera, J., Herrera, S., Zhernenkov, M., Parkinson, D.Y., Caldwell, R.L., Zavattieri, P.D. and Kisailus, D., 2019. The Stomatopod Telson: Convergent Evolution in the Development of a Biological Shield. *Advanced Functional Materials*, 29: 1902238.
12. Jung, J.Y., Pissarenko, A., Trikanad, A.A., **Restrepo, D.**, Su, F.Y., Marquez, A., Gonzalez, D., Naleway, S.E., Zavattieri, P. and McKittrick, J., 2019. A Natural Stress Deflector on the Head? Mechanical and Functional Evaluation of the Woodpecker Skull Bones. *Advanced Theory and Simulations*, 2(4), p.1800152.
13. Velay-Lizancos M., Vazquez-Burgos P., **Restrepo D.**, Martinez-Lage I. Effect of fine and coarse recycled concrete aggregate on the mechanical behavior of precast reinforced beams: Comparison of FE simulations, theoretical, and experimental results on real scale beams. *Construction and Building Materials*, 191(10), pp. 1109-1119.
14. Zaheri A., Fenner J., Russel B., **Restrepo D.**, Daly M., Wang D., Hayashi C., Meyers M. A., Zavattieri P.D., Espinosa H.D., 2018. Revealing the Mechanics of Helicoidal Composites through Additive Manufacturing and Beetle Developmental Stage Analysis. *Advanced Functional Materials*, 33, pp. 1803073
15. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., 2016. Programmable materials based on periodic cellular solids. Part I: Experiments. *International Journal of Solids and Structures*, 100, pp.485-504.
16. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., 2016. Programmable materials based on periodic cellular solids. Part II: Numerical analysis. *International Journal of Solids and Structures*, 100, pp.505-522.
17. Suzuki Y., Cardone G., **Restrepo D.**, Zavattieri P.D., Baker T.S., and Tezcan F.A., 2016. Self-assembly of coherently dynamic, auxetic, two-dimensional protein crystals. *Nature*.
18. **Restrepo D.**, Mankame N.D. and Zavattieri P.D., 2015. Phase transforming cellular materials. *Extreme Mechanics Letters*, 4, pp.52-60.
19. Acosta D.A., **Restrepo D.**, Durango S., and Ruiz O.E., 2013. Design of computer experiments applied to modeling of compliant mechanisms for real-time control. *Engineering with Computers*, 29(3), pp.329-343.

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### Refereed Conference Papers

20. Fennel W.H., Coutinho Silva G., Magana A., **Restrepo D.**, and Zavattieri P.D. 2017. Enhancing Student Meaning-Making of Threshold Concepts via Computation: The Case of Mohr's Circle. Proceedings from the 124th ASEE Annual Conference and Exposition, Columbus, OH.
21. Durango S., **Restrepo D.**, Ruiz O.E., Restrepo-Giraldo J., and Achiche S, 2012. Symmetrical observability of kinematic parameters in symmetrical-parallel mechanisms. *10th World Congress on Computational Mechanics*. ISBN 978-85-86686-70-2.
22. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., 2011. Shape memory polymer based cellular materials. In *Mechanics of Time-Dependent Materials and Processes in Conventional and Multifunctional Materials*, Volume 3 (pp. 105-111). Springer New York.
23. Durango S., **Restrepo D.**, Ruiz O., Restrepo-Giraldo J.D., and Achiche, S., 2010. Kinematic identification of parallel mechanisms by a divide and conquer strategy. In *International Conference on Informatics in Control, Automation and Robotics* (pp. 167-173). ISBN 978-989-8425-01-0.
24. **Restrepo D.**, Acosta D.A., Durango S., and Ruiz, O.E. 2010. Design of computer experiments applied to modeling of compliant mechanisms for real-time control. *8th International symposium on Tools and Methods of Competitive Engineering*. ISBN 978-90-5155-060-3.

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### Intellectual Property Filing

25. Feng Y., De Lorenzo R., Hood R.L., Berard D., Trevino L., **Restrepo D.**, *Endotracheal Tube*, Provisional Patent: 62/916,011,2020

### **Selected Presentations in Conferences (As Presenting Author)**

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1. **Restrepo D.**, Navarro J.D., Montoya A., Millwater H.R., *Sensitivity and Uncertainty Quantification Analysis in Metamaterials through Complex-Variable Finite Element Method*. Engineering Mechanics Institute Conference. New York, NY. May 2020. --Canceled due to COVID-19--
2. **Restrepo D.**, Rincon J.S., Velasquez J.C., Bilbo H., Han H.C., *Architected Material with Local Negative Compressibility for Novel Cardiac Patches*. TMS annual meeting and exhibition. San Diego, CA. February 2020.
3. **Restrepo D.**, Valencia C., Gomez J.D., *Characterization of Wave Propagation in Multi-Stable Periodic Cellular Materials*. 15<sup>th</sup> U.S National Congress on Computational Mechanics. Austin. TX, USA, July 2019.
4. **Restrepo D.**, Daly M., Zaheri A., Espinosa H.D., *Revealing the Self-sharpening Mechanisms of Sea Urchin Teeth: In Situ Testing and Modeling*. TMS annual meeting and exhibition. San Antonio, TX. March 2019.
5. **Restrepo D.**, Jarrold G., Mankame N.D., Zavattieri P.D., *Exploiting Double Curvature in the Design of Architected Cellular Material with Snap-through Instabilities*. 18<sup>th</sup> U.S National Congress for Theoretical and Applied Mechanics. Chicago. IL, USA, June 2018.
6. **Restrepo D.**, Yaraghi N., Rivera J., Kisailus D., Zavattieri P.D. *Naturally-occurring impact resistant protective systems*. SEM Annual Conference & Exposition on Experimental and Applied Mechanics. Indianapolis. IN, USA, June 2017
7. **Restrepo D.**, Zhang Y., Mankame N.D., Zavattieri P.D. *2D and 3D Architectures with Snap-trough Behavior*. SEM Annual Conference & Exposition on Experimental and Applied Mechanics. Indianapolis. IN, USA, June 2017.
8. **Restrepo D.**, Yaraghi N., Rivera J., Kisailus D., and Zavattieri P.D. *Naturally-occurring impact resistant systems*. Society of engineering science, 53rd annual technical meeting. College Park, MD. October 2016.
9. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., *Programmable materials based on periodic cellular solids*. Society of engineering science, 53rd annual technical meeting. College Park, MD. October 2016.
10. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., *Bio-inspired phase transforming materials for energy dissipation*. TMS annual meeting and exhibition. Nashville, TN. February 2016.
11. Suksangpanya N., Guarin N., **Restrepo D.**, Jones M., Yaraghi N., Kisailus D., and Zavattieri, P.D. *Mechanical investigation of Bouligand microstructures*. 13th U.S National Congress on Computational Mechanics. San Diego, CA. July 2015.
12. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., *Cellular materials that exhibit phase transformations*. 15<sup>th</sup> Pan-American congress of applied mechanics. Champaign, IL. May 2015.
13. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., *Phase transforming cellular materials*. 51<sup>st</sup> Annual Society of Engineering Science Meeting. West Lafayette, IN. October 2014.
14. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., *Bio-inspired cellular materials that exhibit phase transformations*. SEM Annual Conference and Exposition on Experimental and Applied Mechanics. Greenville, SC. June 2014.
15. **Restrepo D.**, Mankame N.D., and Zavattieri P.D., *Active programmable shape memory Polymer-based cellular materials*. 49<sup>th</sup> Annual Technical Meeting of the Society of Engineering Science. Atlanta, GA. October 2012.

### **Invited Talks**

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1. **Restrepo D.** Design and Synthesis of Advanced Materials by Following Nature's Cookbook. St Mary's University. San Antonio, TX. September 2019.
2. **Restrepo D.** Design and Synthesis of Advanced Materials by Following Nature's Cookbook. University of Texas at San Antonio. San Antonio, TX. April 2019.

3. **Restrepo D.** Design and Synthesis of Advanced Materials by Following Nature's Cookbook. *Keynote speaker:* IV Congreso Internacional de Tecnologías Avanzadas de Mecatronica, Diseño y Manufactura. Universidad Autonoma de Manizales. Manizales, Colombia. November 2018.
4. **Restrepo D.** Design and Synthesis of Advanced Materials by Following Nature's Cookbook. University of Texas at San Antonio. San Antonio, TX. January 2018.
5. **Restrepo D.** Approaches for the Modeling and Analysis of Architected and Biological Materials. Northwestern University. Evanston, IL. May 2017.

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## Teaching and Mentoring Experiences

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### Presentations and Publications with Undergraduate Students

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1. Bilbo H., Rincon J.S., Chan H.C., **Restrepo D.**, Poster: A Novel Cardiac Patch for Treating Myocardial Infarction. (June 25, 2020). San Antonio Military Health System and Universities Research Forum.
2. Enebechi C. N., Zhang Y., **Restrepo D.**, Zavattieri P.D. Modelling of Phase Transforming Cellular Materials (PXXM) <https://nanohub.org/resources/26939>.
3. Jarrold G.F, **Restrepo D.**, Mankame N.D., Zavattieri P.D. Cylindrical Shell based Phase Transforming Cellular Materials: Designing a Recoverable Energy Dissipating Material. (August 3, 2017). *The Summer Undergraduate Research Fellowship (SURF) Symposium*. Paper 9.
4. Cleveland J.M., **Restrepo D.**, Zhang Y., Zavattieri P.D., Mankame N.D., Mechanical Investigation of Phase-Transforming Cellular and Origami Materials. (August 4, 2016). *The Summer Undergraduate Research Fellowship (SURF) Symposium*. Paper 30.
5. Aljabi N.N., Zavattieri P.D., **Restrepo D.**, Phase Transforming Cellular Materials (PXXMs) Design and Assembly. *The Journal of Purdue Undergraduate Research*: Vol. 6, Article 21.

### Courses Taught

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#### Graduate

- **ME 5453: Advanced Strength of Materials** Fall 2019, Fall 2020
- **ME 5173: Mechanical Behavior of Materials** Spring 2020

#### Undergraduate

- **EGR 2103: Statics** Fall 2018, Spring 2019

#### Independent Study

- **ME 6953: Design and Optimization of an Expanding Lattice Cylinder** Fall 2019
- **ME 7943: Wave Propagation in Periodic Media** Spring 2020
- **ME 7943: Modeling Aspects of Additive Manufacturing** Spring 2020

### Thesis Dissertation

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#### Committee Chair

1. **Juan Sebastian Rincon**, Doctoral Thesis:, In progress
2. **Juan David Navarro**, Doctoral Thesis:, In progress
3. **David Berard**, Master's Thesis: *Novel Endotracheal Tube System: A Reimagined Approach to a Popular but Dated Life Saving Device*. Completed: May 2020. Co-advised with Dr. Lyle Hood
4. **James White**, Master's Thesis: *An Innovative Approach to Airway Securement in Civilian and Military Trauma*. In Progress. Co-advised with Dr. Lyle Hood

5. **Drishya Dahal**, Master's Thesis: *Adhesion Durability of Epoxy-Bonded Aluminum*. In Progress. Co-Advised with Dr. Brendy Rincon

#### **Committee Member**

1. **Nafiseh Ebrahimi**, Department of Mechanical Engineering. Doctoral Thesis: *A Network of Electromagnetic Based Soft Actuator: Design, Optimization, Development, Fabrication and Test*. In progress
2. **Forhad Akhter**, Department of Mechanical Engineering. Doctoral Thesis: *Experimental Analysis of a Fiberoptic Microneedle Device for Treatment of Pancreatic Cancer Through Plasmonic Photothermal Therapy*. In progress
3. **Andres Aguirre**, Department of Mechanical Engineering. Doctoral Thesis: *Efficient and Accurate 3D Mixed-Mode Fracture and Shape Sensitivity Analysis Using the Hypercomplex Finite Element Method*. In progress
4. **Venkata Pavan Pillalamarri**, Department of Mechanical Engineering. Doctoral Thesis: *Patient Specific Fluid and Solid Mechanics Modeling of Pulmonary Hypertension*. Completed: July 2020.

#### **Committee Member - External**

1. **Susana M Estrada**, School of Engineering Universidad EAFIT. Doctoral Thesis: *Impact Tolerant Bioinspired Materials*. Completed: May 2020
2. **Ahmed Saleh Dalaq**, Department of Mechanical Engineering, McGill University. Doctoral Thesis: *Analytical, Computational, and Experimental Investigations of Architected Beams and Panels*. Completed: January 2020
3. **Camilo Valencia**, School of Engineering Universidad EAFIT. Doctoral Thesis: *Wave Propagation in 2D Elastic Periodic Materials: Theoretical and Computational Analysis*. Completed: October 2020

#### **Other Student Mentoring**

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##### **Graduate Students**

1. **Brandon Perez**, Master Student, Department of Mechanical Engineering, Fall 2019

##### **Undergraduate Students**

1. **Alex Mendoza**, Department of Mechanical Engineering, Fall 2019 – Current
2. **Jens Knudsen**, Department of Mechanical Engineering, Fall 2019 - Current
3. **Hayden Bilbo**, Department of Mechanical Engineering, Spring 2019 – Spring 2020
4. **Joshua Gale**, Department of Biomedical Engineering, Spring 2019 – Fall 2019.
5. **Walter Billard**, Department of Mechanical Engineering, Spring 2019 – Fall 2019.

##### **Visiting Students**

1. **Juan Camilo Velasquez**, Department of Mechanical Engineering, Spring 2020.
2. **Lyann Serrano**, Northwest Lakeview, Fall 2019 - Current

##### **Senior Design Teams**

1. **Thermofuse**, Heat Resistant Gloves. Melissa Cadena, Brenda Carrillo, Joshua Gale, Peter Gueldner. Fall 2019 – Spring 2020
2. **Salty Solutions**, Retractable Pier. Nicholas Lopez, Brenton Clark, Nicholas Lopez, Jacob Thornbury, Francisco Medina. Fall 2018 – Spring 2019
3. **DEBT**, Safe Jack. Brandon Perez, Edgar Ramirez, Theresa San Andres, Dylan Martin. Fall 2018 – Spring 2019
4. **TES**, Portable, Quick-Deploying Emergency Shelter. Anuraag Shah, Victor Avila, John Wilson, Joshua Saenz. Fall 2018 – Spring 2019

## Professional Memberships, Activities, and Services

### University Service Activities

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- Mechanical Engineering Faculty Advisory Committee. Fall 2019 – Current
- Mechanical Engineering Graduate Student Committee. Fall 2018 – Current
- Advisor student organization Formula SAE. Spring 2020 – Current

### Membership in Professional Organizations

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- The Minerals, Metals and Materials Society (TMS).
- Society of Experimental Mechanics (SEM).
- Society of Engineering Science (SES).
- Society of Hispanic Professional Engineers (SHPE).
- Society for Industrial and Applied Mathematics (SIAM).
- Golden Key International Honour Society.

### Reviewer of Professional Journals

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- ACS Nano (ACS Publications).
- Acta Biomaterialia (Elsevier).
- Advanced Engineering Materials (Wiley).
- Advanced Functional Materials (Wiley).
- Advanced Materials (Wiley).
- Annals of Biomedical Engineering (Springer).
- Composites Part B (Elsevier)
- Composites Science and Technology (Elsevier).
- International Journal of Mechanical Sciences (Elsevier).
- International Journal of Solids and Structures (Elsevier).
- Journal of Applied Mechanics (ASME).
- Journal of Sandwich Structures and Materials (SAGE).
- Materials (MDPI)
- Micron (Elsevier)
- Scientific Reports (Nature Publishing Group).
- Small (Wiley).
- Smart Materials and Structures (IOPscience).

### Grant/ Funding Reviewer

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- Army Research Office. August 2020.
- NSF – Graduate Research Fellowship, Materials Engineering. January 2020
- ConTex Collaborative Research Grants Competition. April 2019.
- NSF – Leading Engineering for America’s Prosperity, Health and Infrastructure. February 2019.
- NSF – Graduate Research Fellowship, Materials Engineering. January 2019

### Professional Service Activities

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- **TMS Annual Conference 2021:** Symposia Organizer (Chair). Track: Biological & Biomimetic Materials. Orlando. FL, USA, March 14-18, 2021.
- **JOM – Guest Editor:** Advanced Manufacturing for Biomaterials and Biological Materials: Part I. March 2020.
- **JOM – Guest Editor:** Advanced Manufacturing for Biomaterials and Biological Materials: Part II. March 2020.
- **TMS Annual Conference 2020:** Symposia Organizer (Co-Chair). Track: Biological & Biomimetic Materials. San Diego. CA, USA, February 23-27, 2020.
- **TMS Annual Conference 2019:** Session Chair. Track: Biological & Biomimetic Materials. San Antonio. TX, USA, March 10-13, 2019.

- **SACNAS 2018, Panelist for Leverage Program: Effectively Navigating Academic Engineering Pathways.** San Antonio, TX, USA, October 11, 2018.
- **SEM Annual Conference 2017: Session Chair.** Track: Biological & Biomimetic Materials. Indianapolis, IN, USA, June 12-15, 2017.

### Outreach Activities

- **Volunteer at UTSA College of Engineering Welcome Week Events,** August 26, 2020.
- **Volunteer at UTSA College of Engineering Virtual Recruiting Sessions,** Summer 2020.
- **Hand-on activities for UTSA Engineering Summer Camps,** July 2019.
- **Judge at UTSA undergraduate Research Showcase,** April 25, 2019
- **Attendee Top Scholars Banquet,** February 24, 2019
- **Organizer Hands-on Experience for UTSA E-Week 2019.** March 1, 2019
- **Volunteer at 2019 STEM Degree Exploration Luncheon.** January 26, 2019
- **Recruitment for Department of Mechanical Engineering at SACNAS 2018.** October 10, 2018.
- **Volunteer at UTSA Days.** October 20, 2018.

### Selected Professional Training

- **Purdue University, Preparing Future Faculty** Spring 2015  
Purdue University, West Lafayette, IN
  - Covered topics: (1) successful teaching, (2) tips to avoid giving a disastrous lecture, (3) engaging today's undergraduate students in the higher education experience, (4) 13 things in effective teaching strategies, (5) engaging industry into classroom mentoring, (6) innovative approach to active learning, (7) enhanced student learning and well-being, (8) diversity in race and ethnicity: communicating in teaching and mentoring, and (9) reducing cheating and plagiarism in the classroom
- **Stratasys: Additive manufacturing and 3D printing Essentials** May 2015  
Stratasys Inc., Rancho Cucamonga, CA
  - Covered topics: (1) Additive manufacturing technologies, (2) Project-based learning 3D printing, (3) best practices in additive manufacturing, (4) additive manufacturing applications, and (5) additive manufacturing materials.

### Selected Media Coverage

- **Novel Endotracheal Tube for Military and COVID-19 Patients:**
  - UTSA engineers develop new breathing tube used in ventilators to treat COVID-19 patients (<https://bit.ly/2R4hr3C>)
  - UTSA engineers create innovative breathing tube in effort to battle COVID-19 in future (<https://bit.ly/3lWrshf>)
- **Novel Materials for Increasing Resilience in Critical Infrastructure:**
  - UTSA wins funding to develop new technology for earthquake resistant buildings. (<https://bit.ly/2NDDA6G>)
  - Buscan material de construcción que en un temblor se deforme, atrape la energía y la disipe (<https://bit.ly/33g729d>)