

David R. Maestas, Jr.

Curriculum Vitae, September 2026

Postdoctoral Associate · NHLBI K99/R00 Awardee · University of Pittsburgh
IMMUNOENGINEERING · REGENERATIVE MEDICINE · MECHANOBIOLOGY
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RESEARCH MISSION

Defining the mechanisms between immune-stromal-biomechanical reciprocity that direct functional tissue regeneration. My interdisciplinary program will integrate immunoengineering, biomechanics, biomaterials, live tissue models, spatial transcriptomics/proteomics, and longitudinal imaging modalities to identify and engineer therapeutic control of tissue repair.

ACADEMIC APPOINTMENTS

University of Pittsburgh — *Pittsburgh, Pennsylvania* 2022–Present
Postdoctoral Associate, Department of Bioengineering, Swanson School of Engineering

EDUCATION

Johns Hopkins University — *Baltimore, Maryland* 2016-2022

Doctor of Philosophy: Biomedical Engineering

Focus Areas: Regenerative Medicine, Fibrosis, Immunoengineering

- National Science Foundation Graduate Research Fellowship Award
- Drescher Graduate Student Medical Research Award

The University of Arizona — *Tucson, Arizona* 2013-2016

Bachelor of Science with Honors: Biomedical Engineering

Focus Areas: Regenerative Medicine, Cell & Tissue Engineering

- Danny Brower Scholar Award
- Galileo Circle Scholar Award

Pima Community College — *Tucson, Arizona* 2010-2013

Associate of Science & General Studies with Honors: Biomedical Engineering

Focus Areas: Biology and Engineering

- Governor's Board Special Recognition Scholar Award
- Analytical Math Association (AMATYC) Scholar Award

RESEARCH EXPERIENCE

Soft-Tissue Biomechanics Laboratory — *University of Pittsburgh* *Pittsburgh, PA*
2022-Present

Post-doctoral Associate: Dr. Jonathan Vande Geest

- Development of pre-clinical tissue engineered vascular grafts
- Investigation of immunomechanical cues that impact vascular regeneration
- Development of a 3D Artery-Graft *Ex Vivo* Culture System

Elisseeff Lab — *Johns Hopkins University* *Baltimore, MD*

Pre-Doctoral Researcher: Dr. Jennifer H. Elisseeff 2016-2022

- Development of pro-regenerative immunotherapies from helminth antigens
- Utilized multiple preclinical murine surgery models to assess wound repair
- Engineered screening assays for pro-regenerative materials and agonists

Tax Lab for Model Plant Genetics — *The University of Arizona* *Tucson, AZ*

Undergraduate Researcher: Dr. Frans Tax 2013-2016

- Genotyping to assess the roles of receptor-like kinases in embryonic patterning.
- Confocal image screening for validation of knock-in reporter fluorophores.

Soft-Tissue Biomechanics Laboratory — *The University of Arizona* *Tucson, AZ*

Undergraduate Researcher: Dr. Jonathan Vande Geest 2013-2016

- Developed vascular grafts seeded with umbilical cord blood-derived stem cells
- Assessment of microstructure and thrombogenic activity of scaffolds

- Immune checkpoint inhibitors amplify type 2 immune mediated repair by pro-regenerative scaffolds.** Garcia, J., Ruta, A., Yu, F.H., Mejías, J.C., Peña, A.N., Rutkowski, N., Gray-Gaillard, E.F., Dubois, C., Cherry, C., Browne, M., Stivers, K., [Maestas, Jr., D.R.](#), Krishnan, K., Bell, A.T.F., Fertig, E.J., Cooney, C.M., Cooney, D., Byrne, P., Hillel, A.T., Smith, K.N., Ji, H., Anders, R., Pardoll, D.M. and Elisseeff, J.H., *bioRxiv*, 2026. DOI: [10.64898/2026.01.31.703034](#)
- Tissue Injury and Biomaterial Treatment Modulate Tumor Growth and Response to Immunotherapy.** Ruta, A., Gray-Gaillard, E.F., Garcia, J.A., Davenport Huyer, L., Mathkour, Y., Cherry, C., Patatanian, M., Mejias, J.C., [Maestas, Jr., D.R.](#), Krishnan, K., Abraham, P., Wolf, M.T., Pardoll, D.M., and Elisseeff, J.H., *bioRxiv*, 2026. DOI: [10.64898/2026.02.02.703323](#)
- Regulatory T cells clonally expand and contribute to stromal cell function in fibrotic response to synthetic implants.** Mejías, J.C., Krishnan, K., Ruta, A., Ramanujam, A.S., Gray-Gaillard, E.F., Huyer, L.D., [Maestas, D.R.](#), Nagaraj, S., Yu, F.H., Rindone, A.N., Abraham, P., Browne, M., Fertig, E.J., Pardoll, D.M., and Elisseeff, J.H., *bioRxiv*, 2026. DOI: [10.64898/2026.01.05.697727](#)

PEER-REVIEWED PUBLICATIONS

- Resolving differential vascular graft remodeling using longitudinal multiphoton tracking in a 3D culture platform.** [Maestas, Jr., D.R.](#), T.R. Murphy, K.M. Martinet, T. Moyston, L.X. Min, A. Behrangzade, B.J. Pemberton, J. Joy, S. Ye, G.S. Hussey, Mohamad Azhar, WR Wagner, and JP Vande Geest. *Materials Today Bio* DOI: [10.1016/j.mtbio.2026.103626](#)
- Helminth egg derivatives as pro-regenerative immunotherapies.** [Maestas Jr., D.R.](#), Chung, L., Han, J., Wang, X., Sommerfeld, S.D., Kelly, S.H., Moore, E., Nguyen, H.H., Mejías, J.C., Peña, A.N. and Zhang, H., 2023. *Proceedings of the National Academy of Sciences*, 120(8), p.e2211703120. DOI: [10.1073/pnas.2211703120](#)
- Long-term remodeling of compliance-matched tissue engineered vascular grafts is sex specific.** Martinet, K.M., [Maestas, Jr., D.R.](#), Kohyama, K., Min, L.X., Gholami, R., Avila, J.L., Ye, S.H., Kim, K., Wagner, W.R. and Vande Geest, J.P., *Acta Biomaterialia*. 2026. DOI: [10.1016/j.actbio.2026.06.042](#).
- γδ T cell-stromal networks modulate matrix composition and vascularity in foreign body response.** Ruta, A., Krishnan, K., Woo, J., Mejías, J. C., Gray-Gaillard, E. F., [Maestas Jr., D.R.](#), & Elisseeff, J. H. *Nature Communications* (2026). DOI: [10.1038/s41467-026-71540-7](#)
- Innate and adaptive immune responses to clinical hyaluronic acid fillers.** Hooks, J.S., Yang, B., [Maestas Jr., D.R.](#), Andorko, J.I., Ruta, A., Mejias, J.C., Kelly, S.H., Hee, C.K. and Elisseeff, J.H., 2025. *Journal of cosmetic dermatology*, 24(7), p.e70292. DOI: [doi.org/10.1111/jocd.70292](#)
- Murine gut microbiota dysbiosis via enteric infection modulates the foreign body response to a distal biomaterial implant.** Yang, B., Rutkowski, N., Ruta, A., Gray-Gaillard, E., [Maestas Jr., D.R.](#), Kelly, S.H., Krishnan, K., Wu, X., Wu, S., Chen, A. and Mejías, J.C., 2025. *Proceedings of the National Academy of Sciences*, 122(20), p.e2422169122. DOI: [doi.org/10.1073/pnas.2422169122](#)
- Age-associated senescent-T cell signaling promotes type 3 immunity that inhibits the biomaterial regenerative response.** Han, J., Cherry, C., Mejías, J.C., Krishnan, K., Ruta, A., [Maestas Jr., D.R.](#), Peña, A.N., Nguyen, H.H., Nagaraj, S., Yang, B. and Gray-Gaillard, E.F., 2024. *Advanced Materials*, 36(43), p.2310476. DOI: [10.1002/adma.202310476](#)
- Improving the hemocompatibility of a porohyperelastic layered vascular graft using luminal reversal microflows.** Behrangzade, A., Ye, S.H., [Maestas Jr., D.R.](#), Wagner, W.R. and Geest, J.P.V., 2024. *Journal of the mechanical behavior of biomedical materials*, 157, p.106638. DOI: [10.1016/j.jmbbm.2024.106638](#)
- Design of cell-type-specific hyperstable IL-4 mimetics via modular de novo scaffolds.** Yang, H., Ulge, U.Y., Quijano-Rubio, A., Bernstein, Z.J., [Maestas, D.R.](#), Chun, J.H., Wang, W., Lin, J.X., Jude, K.M., Singh, S. and Orcutt-Jahns, B.T., 2023. *Nature chemical biology*, pp.1-11. DOI: [10.1038/s41589-023-01313-6](#)
- Creation and preclinical evaluation of a novel mussel-inspired, biomimetic, bioactive bone graft scaffold: direct comparison with Infuse bone graft using a rat model of spinal fusion.** Cottrill, E., Pennington, Z., Wolf, M.T., Dirckx, N., Ehresman, J., Perdomo-Pantoja, A., Rajkovic, C., Lin, J., [Maestas, D.R.](#), Mageau, A. and Lambrechts, D., *Journal of Neurosurgery: Spine*, 2023. DOI: [10.3171/2023.2.SPINE22936](#)
- Autologous protein solution processing alters lymphoid and myeloid cell populations and modulates gene expression dependent on cell type.** Pena, A.N., Sommerfeld, S.D., Anderson, A.E., Han, J., [Maestas, D.R.](#), Mejias, J.C., Woodell-May, J., King, W., Ganguly, S., Elisseeff, J.H., *Arthritis Research & Therapy*, 2022. DOI: [10.1186/s13075-022-02875-x](#)
- Biomaterials-based immunomodulation enhances survival of murine vascularized composite allografts.** Sommerfeld, S.D., Zhou, X., Mejías, J.C., Oh, B.C., [Maestas, D.R.](#), Furtmüller, G.J., Laffont, P.A., Elisseeff, J.H. and Brandacher, G., *Biomaterials science*, 2023. DOI: [10.1039/D2BM01845D](#)
- Biomaterials direct functional B cell response in a material specific manner.** Moore, E., [Maestas, D.R.](#), Cherry, C.C., Garcia, J.A., Comeau, H.Y., Davenport Huyer, L., Kelly, S., Pena, A.N., Blosser, R., Rosson, G., Elisseeff, J.H., *Science Advances*, 2021. DOI: [10.1126/sciadv.abj5830](#)
- An immunologically active, adipose-derived extracellular matrix biomaterial for soft tissue reconstruction: concept to clinical trial.** Anderson, A.E., Parrillo, A.J., Wolf, M.T., [Maestas, D.R.](#), Graham, I.,

- Tam, A., Payne, R., Aston, J., Cooney, C., Byrne, P., Cooney, D., Elisseeff, J.H., 2021. *npj Regenerative Medicine*. DOI:[10.1038/s41536-021-00197-1](https://doi.org/10.1038/s41536-021-00197-1)
15. **Computational reconstruction of the signaling networks surrounding implanted biomaterials from single-cell transcriptomics.** Cherry, C.C., [Maestas, D.R.](#), Han, J., Andorko, J.I., Cahan, P., Fertig, E., Garmire, L.X., Elisseeff, J.H., *Nature Biomedical Engineering*, 2021. DOI:[10.1038/s41551-021-00770-5](https://doi.org/10.1038/s41551-021-00770-5)
 16. **Type 2 immunity induced by bladder extracellular matrix enhances corneal wound healing.** Wang, X., Chung, L., Hooks, J., [Maestas, D.R.](#), Lebid, A., Andorko, J.I., Huleihel, L., Chin, A.F., Wolf, M., Remlinger, N.T., Stepp, M.A., *Science Advances*, 2021, 7(16), p.eabe2635. DOI: [10.1126/sciadv.abe2635](https://doi.org/10.1126/sciadv.abe2635)
 17. **The immune system and its contribution to variability in regenerative medicine.** Moore, E.M., [Maestas, D.R.](#), Comeau, H.Y. and Elisseeff, J.H., *Tissue Engineering Part B: Reviews*, 2021. DOI: [10.1089/ten.teb.2019.0335](https://doi.org/10.1089/ten.teb.2019.0335).
 18. **IL-17 and immunologically induced senescence regulate response to injury in osteoarthritis.** Faust, H.J., Zhang, H., Han, J., Wolf, M.T., Jeon, O.H., Sadtler, K., Peña, A.N., Chung, L., [Maestas, D.R.](#), Tam, A.J. and Pardoll, D.M., Elisseeff, J.H., 2020. *Journal of Clinical Investigation*, 130(10), pp.5493-5507. DOI: [10.1172/JCI134091](https://doi.org/10.1172/JCI134091).
 19. **Interleukin 17 and senescent cells regulate the foreign body response to synthetic material implants in mice and humans.** Chung, L., [Maestas, D.R.](#), Lebid, A., Mageau, A., Rosson, G.D., Wu, X., Wolf, M.T., Tam, A.J., Vanderzee, I., Wang, X., Andorko, J.I., & Elisseeff, J.H., *Science translational medicine*, 2020. DOI: [10.1126/scitranslmed.aax3799](https://doi.org/10.1126/scitranslmed.aax3799).
 20. **Interleukin-36γ-producing macrophages drive IL-17-mediated fibrosis.** Sommerfeld, S.D., Cherry, C., Schwab, R.M., Chung, L., [Maestas, D.R.](#), Laffont, P., Stein, J.E., Tam, A., Ganguly, S., Housseau, F. Taube, J.M., Elisseeff, J.H., *Science immunology*, 2019. DOI:[10.1126/sciimmunol.aax4783](https://doi.org/10.1126/sciimmunol.aax4783).
 21. **Surface modification of electrospun scaffolds for endothelialization of tissue-engineered vascular grafts using human cord blood-derived endothelial cells.** Ardila, D.C., Liou, J.J., [Maestas, D.R.](#), Slepian, M.J., Badowski, M., Wagner, W.R., Harris, D. and Vande Geest, J.P., 2019. *Journal of clinical medicine*, 8(2), p.185. DOI: [10.3390/jcm8020185](https://doi.org/10.3390/jcm8020185).
 22. **Key players in the immune response to biomaterial scaffolds for regenerative medicine.** Chung, L., [Maestas, D.R.](#), Housseau, F. and Elisseeff, J.H., 2017. *Advanced drug delivery reviews*, 114, pp.184-192. DOI: [10.1016/j.addr.2017.07.006](https://doi.org/10.1016/j.addr.2017.07.006).
 23. **2-Photon characterization of optical proteolytic beacons for imaging changes in matrix-metalloprotease activity in a mouse model of aneurysm.** Haskett, D.G., [Maestas, D.R.](#), Howerton, S.J., Smith, T., Ardila, D.C., Doetschman, T., Utzinger, U., McGrath, D., McIntyre, J.O. Vande Geest, J.P., 2016. *Microscopy and Microanalysis*, 22(2), pp.349-360. DOI: [10.1017/S1431927616000088](https://doi.org/10.1017/S1431927616000088).

PATENTS AND PATENT APPLICATIONS

1. **Regenerative helminth containing compositions and uses thereof.** Elisseeff, J.H., Pardoll, D.M. and [Maestas, D.R.](#), Johns Hopkins University, 2025. U.S. Patent Application 18/894,513.

CONFERENCE PRESENTATIONS, POSTERS, & PRESENTED WORKSHOPS

1. **“Resolving differential vascular graft remodeling using longitudinal multiphoton tracking in a 3D culture platform,”** [Maestas, D.R.](#), T.R. Murphy, K.M. Martinet, T. Moyston, L.X. Min, S. Ye, WR Wagner, JP Vande Geest. *UPPDA Research Symposium*. Poster Presentation. Pittsburgh, PA. July 2026.
2. **“Vascular Engineering Workshop,”** [Maestas, D.R.](#) in lieu of Vande Geest, J.P. Presented and ran a hands-on workshop focused on the design of modern cutting-edge vascular grafts. *Vasculata 2025: Vascular Bioengineering – Next Gen Systems*. Pittsburgh, PA. July 2025.
3. **“2-Photon Intravital Imaging of Small Diameter Vascular Grafts in an Aortic 3D Culture System,”** [Maestas, D.R.](#), Murphy, T.R., Ye, S., Wagner, W.R., Vande Geest, J.P., NIH Diversity Scholar Workshop. Poster Presentation. October 2024.
4. **“Helminth Egg Antigens as Pro-Regenerative Immunotherapies,”** [Maestas, D.R.](#), Chung, L., Sommerfeld, S.D., Pardoll, D.M., Elisseeff, J.H., *The Tumor Immunology Research in Progress. Podium Presentation, Baltimore, MD, 2021 and again in 2022*.
5. **“Helminth Egg Antigens as Pro-Regenerative Immunotherapies,”** [Maestas, D.R.](#), Chung, L., Sommerfeld, S.D., Elisseeff, J.H., *BMES Conference Podium Presentation, 2021*.
6. **“Skeletal Muscle Regeneration Enhanced by Natural Immunomodulatory Scaffolds,”** [Maestas, D.R.](#), Chung, L., Sommerfeld, S.D., Pardoll, D.M., Elisseeff, J.H., *BMES Conference Podium Presentation, Atlanta, GA, 2019*.
7. **“Tissue Engineered Vascular Grafts Seeded with Human Umbilical Cord Blood Derived Endothelial Cells,”** [Maestas, D.R.](#), Ardilla, C., Harris, D.T., Slepian, M. Vande Geest, J.P. Paper and research poster presented at The Undergraduate Research Opportunities (UROC) Consortium’s Summer Colloquium; abstract published in the UROC Abstract Review, The University of Arizona, Tucson, AZ, 2015.
8. **“Automated Whole-Body Imaging Integrated with Dermoscopy Imaging,”** Poster presented at The University of Arizona Engineering Design Day Conference, University of Arizona, Tucson, AZ, 2015.

ACADEMIC LEADERSHIP ROLES

▪ Site Director, UPMC Hillman Cancer Center Academy — Co-direct site operations for more than 10 high-school scholars across laboratories, coordinate mentors, scholar placement, progress oversight, and research presentations.	2026–Present
▪ BioE Safety Committee Member, SSOE, University of Pittsburgh — Represent the Department of Bioengineering in school-wide laboratory safety planning, policy communication, and implementation.	2025–Present
▪ President, BME PhD Student Council, Johns Hopkins University — Co-led doctoral-student governance and represented trainee priorities to departmental faculty and leadership with Bioengineering.	2017–2018
▪ P-TECH Advisory Council Member & BME Recruitment Team Lead — Advised career-connected STEM programming, mentored participating students, and led biomedical engineering recruitment and outreach activities.	2016–2020
▪ BME PhD Recruitment Leader & Big Sibling Mentor, JHU — Led and coordinated doctoral recruitment activities and provided peer mentorship to incoming BME PhD students under the direction of BME department administrators.	2016–2021

ACADEMIC MENTORSHIP, TRAINING, AND SUPPORT ROLES

BioTechnical Institute Internship Mentor (six times)	2016-2019
BME PhD Recruitment Big Sibling	2016-2021
Mathematics Instructor: Upward Bound (TRiO), Pima Community College	2013-2016
CRLA Certified Master Tutor, Trainer, Pima Community College	2012-2016

EMPLOYMENT EXPERIENCES

▪ Mathematics Instructor — <i>Pima Community College</i> Upward Bound, TRiO program. Math instructor and tutor for high school students	2014–2015
▪ College Learning Center Tutor — <i>Pima Community College</i> Pima Community College East. CRLA Certified Level III Master Tutor for writing, Calculus III & Differential Equations, General & Organic Chemistry, & Physics	2013–2015
▪ Phase II Training Store General Manager — <i>Wendy's Old-Fashioned Hamburgers</i> Full store management overseeing restaurant operations, food safety, cleanliness, customer service, daily operations. Phase II Training Store Certified.	2008–2012

AWARDS AND RECOGNITIONS

▪ NIH/NHLBI K99 Pathway to Independence Awardee – <i>University of Pittsburgh</i> Grant: 1K99HL183755-01A1 Principal Investigator Immunomechanically Tuned Vascular Grafts to Mitigate Diabetic Inflammation. K99 mentored phase: 2026–2028 to complete Ais 1 & 2.	2026-2028
▪ NextProf Nexus Future Faculty Workshop — <i>Georgia Tech</i> Georgia Institute of Technology, University of California, Berkeley, and University of Michigan. Selected for a national faculty-development program focused on the engineering faculty search, research-program development, and transition to academic independence.	2023
▪ NHLBI Supplement Scholar to Parent R01 — <i>University of Pittsburgh</i> The NHLBI Diversity Supplement Award provides research support to permit individuals in the postdoctoral phase of their training to participate in ongoing research projects and career development experiences in preparation for an independent career in health-related research.	2023-2025
• P-TECH Outstanding Mentorship Team — <i>Johns Hopkins</i> Award to recognize the largest cohort and contribution of mentors, tutors, and participants recruited to volunteer for the community P-TECH program.	2019
• National Science Foundation Graduate Research Fellow — <i>Johns Hopkins</i> The National Science Foundation. Graduate research fellowship awarded to students who demonstrate potential to strengthen the vitality of the U.S.A.'s science and engineering enterprise.	2017-2022

- **Drescher Graduate Medical Research Award** — *Johns Hopkins*
Johns Hopkins University. Recognition award for outstanding first-year graduate students engaged in biomedical research.

2017
- **Galileo Circle Scholar Student Award** — *The University of Arizona*
A scholarship awarded to undergraduate students who demonstrate exceptional potential in the physical, mathematical, environmental, cognitive, or life sciences.

2016
- **BIO5 Institute Innovator Award** — *The BIO5 Institute*
The University of Arizona. Awarded at The Undergraduate and Professional Student Council Showcase. Recognizes a student exhibitor whose work most embodied multidisciplinary research, innovation in education & entrepreneurship.

2016
- **Danny Brower Memorial Scholar** — *The University of Arizona*
The University of Arizona. A scholarship awarded to students who demonstrated strong research experience and demonstrated financial need.

2015
- **Highest Academic Distinction** — *The University of Arizona*
Awarded to students with more than 30 units in an academic year and attained a 4.0 grade point average during this period.

2014-2015
- **Dean's List with Distinction** — *The University of Arizona*
Awarded to students who attained a 4.0 grade point average.

2014-2015
- **Tutor of the Year-Pima East** — *Pima Community College*
Named outstanding tutor of the year for the Pima College East Learning Center.

2013
- **Art Alberdine Math Scholar Award** — *Pima Community College*
A Pima Community College East Campus Scholarship award for students demonstrating high skill and potential with mathematics.

2012
- **Board of Governor's Special Recognition** — *Pima Community College*
A Pima Community College Special Recognition Award for students demonstrating outstanding performance at the two-year college level.

2012
- **AMATYC Award** — *Pima Community College*
American Mathematical Association of Two-Year Colleges Math Scholar Award. Award for outstanding performance on the annual student mathematics league.

2011 & 2012