

Jason L. Guo

Postdoctoral Scholar, Stanford University School of Medicine

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EDUCATION

Rice University, Houston, TX, August 2015 – December 2020

Ph.D. in Bioengineering, Advisor: Dr. Antonios G. Mikos

Thesis: Injectable, Click Functionalized Hydrogels for Osteochondral Tissue Engineering

Northwestern University, Evanston, IL, September 2011 – June 2014

B.S. in Biomedical Engineering. Graduated 1 year early with honors (*Magna Cum Laude*)

Final GPA: 3.78, Concentration in Biological Materials and Molecular Engineering

HONORS & RECOGNITION

Society For Biomaterials Postdoctoral Recognition Award, 2022

Wound Healing Society Trainee Travel Award, 2022

Transplant and Tissue Engineering Center of Excellence Fellowship, 2021

Rice University Bioengineering Outstanding Thesis Award, 2021

Tissue Engineering SIG Student Abstract Award, World Biomaterials Congress, 2020

President, Society For Biomaterials – National Student Section, 2019-2020

Society For Biomaterials Graduate Student Award for Outstanding Research, 2020

Wake Forest Institute for Regenerative Medicine Young Investigator Award, 2019

Rice University Future Faculty Fellow, 2019

Robert Lowry Patten Award, 2019

IBB O'Rear and Morse Travel Award, 2019

President, Rice University Graduate Student Association, 2018-2019

University service recognized on Forbes, Houston Chronicle, 2019

Envision Rice: Featured Graduate Student, 2018

Smalley-Curl Institute STAR Fellowship, 2017

TERMIS Student Scientist Award, 2017

Northwestern Undergraduate Research Grant, 2014

S. N. Bose Scholars Program, 2013

Tau Beta Pi – Engineering Honor Society, 2013

Northwestern BME Research Award, 2012

Thomas H. Garrett St. Jude Medical Scholarship, 2012 - 2014

RESEARCH EXPERIENCE

Stanford University School of Medicine, Department of Surgery

January 2021 – Present

Postdoctoral Research, Advisor: Dr. Michael T. Longaker

- Investigation of chronic fibrotic diseases using high-throughput multi-omic (transcriptomic, epigenomic, ultrastructural) analysis of animal models and clinical specimens
- Development of machine learning algorithms for prognosis of fibrotic conditions such as

pulmonary/dermal fibrosis and pancreatic ductal adenocarcinoma

Rice University, Department of Bioengineering

December 2015 – December 2020

Doctoral Research, Advisor: Dr. Antonios G. Mikos

- Development of modular, click-functionalized hydrogels for osteochondral tissue engineering
- Polymer synthesis and characterization of novel biofunctionalized crosslinkers
- Investigation of *in vitro* chondrogenesis and osteogenesis by cell-encapsulated hydrogels
- Characterization of *in vivo* tissue repair produced by bilayered, tissue-specific hydrogels

University of Minnesota, Department of Biomedical Engineering

June 2014 – August 2014

Post-Baccalaureate Research, Advisor: Dr. Wei Shen

- Fabrication of cell membrane-mimetic lipid bilayers for studying nanoparticle interactions
- Design of polymer-supported lipid bilayers using adhesive polyphenol films

Northwestern University, Department of Biomedical Engineering

April 2012 – June 2014

Undergraduate Research, Advisor: Dr. Phillip B. Messersmith

- Development of polyphenol thin films for biomedical applications
- Surface characterization of adhesive thin films on various substrates
- Investigation of *in vitro* antibacterial, antifouling, and biomineralizing properties of thin films

IIT Bombay, Department of Chemical Engineering

June 2013 – September 2013

Undergraduate Summer Research, Advisor: Dr. Chandra Venkataraman

- Synthesis of drug-loaded nanoparticles by aerosol dispersion of biological lipids
- Characterization of physicochemical properties and drug release by lipid nanoparticles

TEACHING EXPERIENCE

Rice University, BIOE 620: Tissue Engineering

January 2020 – May 2020

Instructor (Future Faculty Fellow)

- Design of new course curriculum in collaboration with Dr. Antonios G. Mikos
- Creation and presentation of lecture material for 50% of course
- Development of case studies and emerging literature discussions to foster critical analysis and students' ability to design solutions for clinical and engineering problems

OCA Students and Mentors Achieving Readiness Together (SMART)

August 2016 – June 2018

Founder and Program Leader

- Creation of a year-long communication and leadership skills program for underserved middle school students in the Sharpstown neighborhood of Houston
- Design of 20 lesson curriculum on critical analysis of information, public speaking, and debate
- Leadership of program operations, recruitment, and training of academic mentors

Rice University, BIOE 370: Biomaterials

August 2016 – December 2016

Teaching Assistant

- Presentation of three original guest lectures to a class of 35 students
- Teaching assistant duties including office hours and grading of assignments and exams

PROFESSIONAL EXPERIENCE

Technical Project Manager

August 2014 – August 2015

Epic Systems Corporation, Madison, WI

- Leadership over implementation of medical data interfaces at major healthcare providers
- Management of installation timelines, workflow analysis, and software testing
- Training in project management skills and oversight of technical teams

MANUSCRIPTS IN REVIEW

Guo, J.L.[†]; Mascharak, S.M.[†]; Foster, D.S.; Khan, A.; Davitt, M.F.; Nguyen, A.T.; Burcham, A.R.; Chinta, M.S.; Guardino, N.J.; Griffin, M.; Januszyk, M.; Miller, E.; Raghavan, S.; Longacre, T.A.; Norton, J.A.; Longaker, M.T. “Desmoplastic Stromal Signatures Predict Patient Outcomes in Pancreatic Ductal Adenocarcinoma.” *In Review*.

PUBLICATIONS

Lintel, H; Abbas, D.B.; Lavin, C.V.; Griffin, M.; **Guo, J.L.**; Guardino, N.; Churukian, A.; Gurtner, G.C.; Momeni, A.; Longaker, M.T.; Wan, D.C. (2022). “Transdermal Deferoxamine Administration Improves Excisional Wound Healing in Chronically Irradiated Murine Skin.” *Journal of Translational Medicine*. DOI: 10.1186/s12967-022-03479-4.

Abbas, D.B.; Lintel, H; Griffin, M; Guardino, N.J.; **Guo, J.L.**; Spielman, A.F.; Cotterell, A.C.; Parker, J.B.L.; Januszyk, M; Wan, D.C. (2022). “Tension Offloading Improves Cutaneous Scar Formation in Achilles Tendon Repair.” *Journal of Surgical Case Reports*. DOI: 10.1093/jscr/rjac066.

Pearce, H.A.; Jiang, E.Y.; Swain, J.W.R.; Navara, A.M.; **Guo, J.L.**; Kim, Y.S.; Woehr, A.; Hartgerink, J.D.; Mikos, A.G. (2021). “Evaluating the Physicochemical Effects of Conjugating Peptides into Thermogelling Hydrogels for Regenerative Biomaterials Applications.” *Regenerative Biomaterials*. DOI: 10.1093/rb/rbab073.

Navara, A.M.; Kim, Y.S.; Xu, Y.; Crafton, C.L.; Diba, M.; **Guo, J.L.**; Mikos, A.G. (2021). “A Dual-Gelling Poly(N-isopropylacrylamide)-Based Ink and Thermoreversible Poloxamer Support Bath for High-Resolution Bioprinting.” *Bioactive Materials*. DOI: 10.1016/j.bioactmat.2021.11.016.

Kim, Y.S.; Mehta, S.M.; **Guo, J.L.**; Pearce, H.A.; Smith, B.T.; Watson, E.; Koons, G.L.; Navara, A.M.; Lam, J.; Grande-Allen, K.J.; Mikos, A.G. (2021). “Evaluation of Tissue Integration of Injectable, Cell-Laden Hydrogels of Cocultures of Mesenchymal Stem Cells and Articular Chondrocytes with an Ex Vivo Cartilage Explant Model.” *Biotechnology & Bioengineering*. DOI: 10.1002/bit.27804.

Guo, J.L.[†]; Kim, Y.S.[†]; Koons, G.L.; Lam, J.; Navara, A.M.; Barrios, S.B.; Xie, V.Y.; Watson, E.; Smith, B.T.; Pearce, H.A.; Orchard, E.A.; van den Beucken, J.J.J.P; Jansen, J.A.; Wong, M.E.; Mikos, A.G. (2021). “Bilayered, Peptide-Biofunctionalized Hydrogels for In Vivo Osteochondral Tissue Repair.” *Acta Biomaterialia*. DOI: 10.1016/j.actbio.2021.04.038.

Guo, J.L.; Diaz-Gomez, L.; Xie, V.Y.; Bittner, S.M.; Jiang, E.Y.; Wang, B.; Mikos, A.G. (2021). “Three-Dimensional Printing of Click Functionalized, Peptide Patterned Scaffolds for Osteochondral Tissue Engineering.” *Bioprinting*, 9pp. DOI: 10.1016/j.bprint.2021.e00136.

Bittner, S.M.; Pearce, H.A.; Hogan, K.J.; Smoak, M.M.; **Guo, J.L.**; Melchiorri, A.J.; Scott, D.W.; Mikos, A. G. (2021). “Swelling Behaviors of 3D Printed Hydrogel and Hydrogel-Microcarrier Composite Scaffolds.” *Tissue Engineering Part A*, 14pp. DOI: 10.1089/ten.tea.2020.0377.

Guo, J.L.[†]; Kim, Y.S.[†]; Orchard, E.A.; van den Beucken, J.J.J.P; Jansen, J.A.; Wong, M.E.; Mikos, A.G. (2020). “A Rabbit Femoral Condyle Defect Model for Assessment of Osteochondral Tissue Regeneration.” *Tissue Engineering Part C: Methods*, 26, 554-564. DOI: 10.1089/ten.TEC.2020.0261.

Kim, Y.S.; Chien, A.J.; **Guo, J.L.**; Smith, B.T.; Watson, E.; Pearce, H.A.; Koons, G.L.; Navara, A.M.; Lam, J.; Scott, D.W.; Grande-Allen, K.J.; Mikos, A.G. (2020). “Chondrogenesis of Cocultures of Mesenchymal Stem Cells and Articular Chondrocytes in Poly(L-Lysine)-Loaded Hydrogels.” *Journal of Controlled Release*, 328, 710-721. DOI: 10.1016/j.jconrel.2020.09.048.

Guo, J.L.; Li, A.; Kim, Y.S.; Xie, V.Y.; Smith, B.T.; Watson, E.; Bao, G.; Mikos, A.G. (2020). “Click Functionalized, Tissue-Specific Hydrogels for Osteochondral Tissue Engineering.” *Journal of Biomedical Materials Research Part A*, 108, 684-693. DOI: 10.1002/jbm.a.36848.
Winner of 2020 Society For Biomaterials Student Award for Outstanding Research.

Kim, Y.S.; **Guo, J.L.**; Lam, J.; Grande-Allen, K.J.; Engel, P.; Mikos, A.G. (2019). “Synthesis of Injectable, Thermally Responsive, Chondroitin Sulfate-Cross-Linked Poly(N-isopropylacrylamide) Hydrogels.” *ACS Biomaterials Science & Engineering*, 5, 6405-6413. DOI: 10.1021/acsbiomaterials.9b01450.

Guo, J.L.[†]; Kim, Y.S.[†]; Mikos, A.G. (2019). “Biomacromolecules for Tissue Engineering: Emerging Biomimetic Strategies.” *Biomacromolecules*, 20, 2904-2912. DOI: 10.1021/acs.biomac.9b00792.

Du, Y.[†]; **Guo, J.L.**[†]; Wang, J.; Mikos, A.G.; Zhang, S. (2019). “Hierarchically Designed Bone Scaffolds: From Internal Cues to External Stimuli.” *Biomaterials*, 218, 20pp. DOI: 10.1016/j.biomaterials.2019.119334.

Guo, J.L.; Kim, Y.S.; Xie, V.Y.; Smith, B.T.; Watson, E.; Lam, J.; Pearce, H.A.; Engel, P.S.; Mikos, A.G. (2019). “Modular, Tissue-Specific, and Biodegradable Hydrogel Cross-Linkers for Tissue Engineering.” *Science Advances*, 5, 11pp. DOI: 10.1126/sciadv.aaw7396.

Bittner, S. M.[†]; **Guo, J. L.**[†]; Mikos, A. G. (2018). “Spatiotemporal Control of Growth Factors in Three-Dimensional Printed Scaffolds.” *Bioprinting*, 12, 10pp. DOI: 10.1016/j.bprint.2018.e00032.

Yang, J.; **Guo, J. L.**; Mikos, A. G.; He, C.; Cheng, G. (2018). “Material Processing and Design of Biodegradable Metal Matrix Composites for Biomedical Applications.” *Annals of Biomedical Engineering*, 46, 1229-1240. DOI: 10.1007/s10439-018-2058-y.

Bittner, S. M.[†]; **Guo, J. L.**[†]; Melchiorri, A.; Mikos, A. G. (2018). “Three-Dimensional Printing of Multilayered Tissue Engineering Scaffolds.” *Materials Today*, 21, 861-874. DOI: 10.1016/j.mattod.2018.02.006.

Kuang, J.; **Guo, J. L.**; Messersmith, P. B. (2014). “High Ionic Strength Formation of DOPA-Melanin Coating for Loading and Release of Cationic Antimicrobial Compounds.” *Advanced Materials Interfaces*, 1, 6pp. DOI: 10.1002/admi.201400145.

[†] These authors contributed equally.

BOOK CHAPTERS

Majid, M.[†]; **Guo, J.L.**[†]; Kim, Y.S.; Melchiorri, A.J.; Mikos, A.G. (2021). “Chapter 11: Bioprinting Hydrogels and Tissue Engineering.” *Injectable Hydrogels for 3D Bioprinting*. Royal Society of Chemistry. DOI: 10.1039/9781839163975-00292.

Bedell, M.L.[†]; **Guo, J.L.**[†]; Xie, V.Y.; Navara, A.M.; Mikos, A.G. (2020). “Chapter 17: Polymer Scaffold Fabrication.” *Principles of Tissue Engineering (5th ed.)*. Academic Press. DOI: 10.1016/B978-0-12-818422-6.00018-6.

Guo, J. L.[†]; Piepergerdes, T.C.[†]; Mikos, A.G. (2020). “Chapter 6: Bone Graft Engineering: Composite Scaffolds.” *Dental Implants and Bone Grafts: Materials and Biological Issues (1st ed.)*. Woodhead Publishing. DOI: 10.1016/B978-0-08-102478-2.00007-6.

PATENTS

Guo, J.L.; Mascharak, S.; Foster, D.S.; Norton, J.A.; Longaker, M.T. “A Prognostic Algorithm for Cancer Outcomes Using Machine Learning Analysis of Connective Tissue Networks and Cell Interactions.” Pending.

Mikos, A.G.; Diaz-Gomez, L; **Guo, J.L.** “Extrusion Printing of Peptide Patterned, Tissue-Specific Scaffolds.” Pending.

CONFERENCE PRESENTATIONS

Guo, J.L.; Griffin, M.; Guardino, N.J.; Chen, K.; Gurtner, G.C.; Longaker, M.T. *Mechanical Stimulation Reverses the Pro-Fibrotic Transcriptome of Senescent Dermal Fibroblasts*. Oral presentation at the annual meeting of the Plastic Surgery Research Council, Toronto, CA, June 2022.

Guo, J.L.; Griffin, M.; Guardino, N.J.; Chen, K.; Gurtner, G.C.; Longaker, M.T. *Stretchable Collagen I Hydrogels Reverse Pro-Fibrotic Transcriptome of Senescent Fibroblasts*. Oral presentation at the annual meeting of the Society For Biomaterials, Baltimore, MD, April 2022.

Guo, J.L.; Griffin, M.; Guardino, N.J.; Chen, K.; Gurtner, G.C.; Longaker, M.T. *Mechanical Stimulation Reverses Pro-Fibrotic Transcriptional States in Senescent Fibroblasts*. Oral presentation at the annual meeting of the Wound Healing Society, Phoenix, AZ, April 2022.

Guo, J.L.; Diaz-Gomez, L.; Xie, V.Y.; Bittner, S.M.; Jiang, E.; Wang, B.; Mikos, A.G. *3D Printing of Click Functionalized, Peptide Patterned Scaffolds for Osteochondral Tissue Engineering*. Oral presentation at the annual meeting of the Society For Biomaterials, Chicago, IL, April 2021.

Guo, J.L.; Kim, Y.S.; Koons, G.L.; Lam, J.; Barrios, S.B.; Navara, A.M.; Xie, V.Y.; Watson, E.; Smith, B.T.; Pearce, H.A.; Orchard, E.A.; van den Beucken, J.J.J.P; Jansen, J.A.; Mikos, A.G. *Bilayered, Click Biofunctionalized Hydrogels for Osteochondral Repair*. Oral presentation at the annual meeting of the Society For Biomaterials, Chicago, IL, April 2021.

Guo, J.L.; Diaz-Gomez, L.; Bittner, S.M.; Wang, B.; Mikos, A.G. *3D Printing of Click Functionalized, Peptide Patterned Scaffolds for Osteochondral Tissue Engineering*. Oral presentation at the World

Biomaterials Congress, Glasgow, Scotland, December 2020.

Guo, J.L.; Li, A.; Kim, Y.S.; Xie, V.Y.; Smith, B.T.; Watson, E.; Bao, G.; Mikos, A.G. *Click Functionalized, Tissue-Specific Hydrogels for Osteochondral Tissue Engineering*. Oral presentation at the World Biomaterials Congress, Glasgow, Scotland, December 2020. Winner of the Tissue Engineering SIG Student Abstract Award.

Guo, J.L.; Diaz-Gomez, L.; Bittner, S.M.; Wang, B.; Mikos, A.G. *Extrusion Printing of Peptide Patterned Scaffolds for Tissue Engineering*. Oral presentation at the annual Construct3D conference, Houston, TX, February 2020.

Guo, J.L.; Li, A.; Kim, Y.S.; Xie, V.Y.; Smith, B.T.; Watson, E.; Bao, G.; Mikos, A.G. *Injectable, Biofunctionalized Hydrogels for Repair of the Osteochondral Unit*. Oral presentation for the Wake Forest Institute for Regenerative Medicine Young Investigator Award at the annual meeting of the Tissue Engineering and Regenerative Medicine International Society - Americas, Orlando, FL, December 2019.

Guo, J.L.; Kim, Y.S.; Xie, V.Y.; Smith, B.T.; Watson, E.; Lam, J.; Pearce, H.A.; Engel, P.S.; Mikos, A.G. *Modular, Click Functionalized Hydrogels for Cartilage Tissue Engineering*. Poster presentation at the annual meeting of the Tissue Engineering and Regenerative Medicine International Society - Americas, Orlando, FL, December 2019.

Guo, J.L.; Kim, Y.S.; Xie, V.Y.; Smith, B.T.; Watson, E.; Lam, J.; Pearce, H.A.; Engel, P.S.; Mikos, A.G. *Evaluation of Thermoresponsive, Click Functionalized Hydrogels for Cartilage Tissue Engineering*. Poster presentation at the annual Advances in Tissue Engineering short course, Houston, TX, August 2019.

Guo, J.L.; Kim, Y.S.; Xie, V.Y.; Smith, B.T.; Watson, E.; Lam, J.; Pearce, H.A.; Engel, P.S.; Mikos, A.G. *Modular, Click Functionalized Hydrogels for Multilayered Tissue Engineering*. Oral presentation at the annual meeting of the Society For Biomaterials, Seattle, WA, April 2019.

Guo, J. L.; Kim, Y. S.; Lam, J.; Engel, P.S.; Mikos, A.G. *Biodegradable and “Clickable” Tissue-Specific Crosslinkers*. Poster presentation at the annual Advances in Tissue Engineering short course, Houston, TX, August 2018.

Guo, J. L.; Kim, Y. S.; Engel, P.S.; Mikos, A.G. *Biodegradable, “Clickable” Poly(Glycolic Acid) Macromers for Hydrogel Functionalization*. Poster presentation at the annual meeting of the Society For Biomaterials, Atlanta, GA, April 2018.

Guo, J. L.; Kim, Y. S.; Engel, P.S.; Mikos, A.G. *Thiolated Poly(Lactic-co-Glycolic Acid) Macromers for Biomolecule Conjugation by Alkyne-Azide Click Chemistry*. Poster presentation at the annual meeting of the Tissue Engineering and Regenerative Medicine International Society - Americas, Charlotte, NC, December 2017.

Guo, J. L.; Kim, Y. S.; Mikos, A.G. *Characterization of Novel Biological Macromers for Osteochondral Tissue Engineering*. Poster presentation at the annual Advances in Tissue Engineering short course, Houston, TX, August 2017.

Guo, J. L.; Kim, Y. S.; Lam, J.; Mikos, A.G. *Synthesis of Novel Thermally Gelling, Cross-Linkable Macromers for Osteochondral Tissue Engineering*. Poster presentation at the annual Advances in Tissue Engineering short course, Houston, TX, August 2016.

CONFERENCE SESSIONS

Organizer. *Mental Health and Wellbeing as a Scientist.* Workshop at the annual meeting of the Society For Biomaterials, Baltimore, MD, April 2022.

Panelist. *Biomaterials Education and Research in the Time of COVID.* Workshop at the annual meeting of the Society For Biomaterials, Chicago, IL, April 2021.

Organizer. *Transitioning Technology from Bench to Market.* Workshop at the annual meeting of the Society For Biomaterials, Chicago, IL, April 2021.

Organizer. *If I Were a Student Now: Life Lessons from Experts in Academia and Industry.* Workshop at the annual meeting of the Society For Biomaterials, Chicago, IL, April 2021.

Organizer. *Mental Health and Wellbeing as a Scientist.* Workshop at the annual meeting of the Society For Biomaterials, Chicago, IL, April 2021.

EDITORIAL CONTRIBUTIONS

Guest Editor	<i>Tissue Engineering: Part A</i> , Special Issue on Machine Learning in Tissue Engineering	2022
Guest Editor	<i>Gels</i> , Special Issue on Bioprinting Hydrogels	2022
Guest Editor	<i>Journal of Visualized Experiments</i> , Special Issue on Novel Tissue Engineering Approaches to Bone and Cartilage Regeneration	2022
Ad Hoc Reviewer	<i>Polymers</i>	2022

ACADEMIC LEADERSHIP

Chair	Society For Biomaterials – Young Scientist Group	2022-Present
Vice Chair	Society For Biomaterials – Young Scientist Group	2021-2022
Chair of Symposium Committee	Stanford University Postdoctoral Association	2021-2022
Committee Member	Society For Biomaterials – Education & Professional Development Committee	2021-2022
President	Society For Biomaterials – National Student Section	2019-2020
President	Rice University Graduate Student Association	2018-2019
Vice President of Student Advocacy	Rice University Graduate Student Association	2017-2018
Communications Chair	Rice University Bioengineering Graduate Student Association	2016-2017