Stanford

Fan Yang

Associate Professor of Orthopaedic Surgery and of Bioengineering

Bio

BIO

A bioengineer by training, Dr. Yang works at the interface of materials science, biology, engineering, and medicine. She is the Director and PI for Stem Cells and Biomaterials Engineering Laboratory at Stanford University, jointly supported by Departments of Orthopaedic Surgery and Bioengineering. Dr. Yang has extensive expertise in developing novel biomaterials and stem cell-based therapeutics for musculoskeletal tissue engineering, or engineering 3D in vitro cancer models for drug screening and mechanistic discovery. Her research group is particularly interested in developing biomaterials and cell-based therapeutics to improve regeneration of various musculoskeletal tissues including bone, cartilage, tendon, blood vessels etc.

ACADEMIC APPOINTMENTS

- Associate Professor, Orthopaedic Surgery
- Associate Professor, Bioengineering
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, SPARK at Stanford
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Co-Director, Stanford NIH Biotechnology Training Program, (2020-2026)
- Assistant Professor Appointment and Reappointment evaluation committee, Stanford University School of Medicine, (2018-2023)

HONORS AND AWARDS

- Elected AIMBE Fellow, American Institute of Medical and Biological Engineering (2021)
- Ellen Weaver Award for outstanding mentoring and support of other women in science, the Northern California Chapters of the Association for Women in Science (2017)
- Biomaterials Science Lectureship Award, Biomaterials Science (2016)
- Young Investigator Award from the Society for Biomaterials (one winner per year), Society for Bioamterials (2016)
- NSF Faculty Early Career Development (CAREER) award, National Science Foundation (2014-2019)
- Rising Star Award, Biomedical Engineering Society-Cellular and Molecular Engineering, Biomedical Engineering Society (2014)
- Mission for Learning Faculty Scholar Award in Pediatric Translational Medicine, Child Health Research Institute (2013-2015)

- Stanford Asian American Faculty Award, Stanford University (2013)
- Young Investigator Award, Alliance for Cancer and Gene Therapy, Alliance for Cancer and Gene Therapy (2013)
- 3M Nontenured Faculty Grant Award, 3M (2012-2015)
- Basil O'Connor Starter Scholar Research Award, March of Dimes Foundation (2012)
- 2011 TR35 Global Honoree, Recognized as one of the world's top innovators under age 35, Technology Review (2011)
- Donald E. and Delia B. BaxterFoundation Scholars Award, Baxter Foundation (2010)
- McCormick Faculty Award, Stanford University (2010)
- National Scientist Development Grant Award, American Heart Association (2009-2013)
- Ruth L. Kirschstein National Research Service Award Postdoctoral Fellowship, MIT (2008-2009)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, American Association for Cancer Research (2021 - present)
- Associate Editor, ACS Biomaterials Science & Engineering (2020 - present)
- Member, Tissue Engineering and Regenerative Medicine International Society (2004 - present)
- Member, Society for Biomaterials (2003 - present)
- Member, Biomedical Engineering Society (2002 - present)
- Member, Orthopaedic Research Society (2002 - present)

PROFESSIONAL EDUCATION

- Ph.D., Johns Hopkins University , Biomedical Engineering (2006)
- B.S., Shanghai Jiaotong University , Biomedical Engineering (2001)

PATENTS

- Keeney M, Yang F, Goodman S. "United States Patent US9682035B2 Injectable hydrogel system to modulate host response at the bone implant interface", Leland Stanford Junior University, Jun 20, 2017

LINKS

- Stem Cell and Biomaterials Engineering Laboratory: www.fanyanggroup.com

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our lab’s mission is to develop therapies for regenerating human tissues lost due to diseases or aging, and to build tissue engineered 3D models for understanding disease progression and informing drug discovery. We invent biomaterials and engineering tools to elucidate and modulate biology, and also use biology to inform materials and engineering design. Our work is highly interdisciplinary, and is driven by unmet clinical needs or key gaps in biology. We conduct rigorous and reproducible research with translational potential, and cultivate synergistic collaborations both within and outside of our lab. We are a “people first” team, and foster a lab culture that is supportive, diverse, inclusive, friendly, fun and creative! We are here to learn and help each other learn. We believe in the value of failures while taking high risk/high reward research, and support each other to keep going. We seek to positively impact the future of biotechnology and medicine via training future leaders in academia, industry, and government. Please visit our lab research page to learn more.

https://www.fanyanggroup.com/research

Teaching

COURSES

2023-24

- Orthopaedic Tissue Engineering: ORTHO 270 (Win)
- Tissue Engineering: BIOE 260 (Spr)

2022-23

- Orthopaedic Tissue Engineering: ORTHO 270 (Win)
- Tissue Engineering: BIOE 260 (Spr)

2021-22

- Orthopaedic Tissue Engineering: ORTHO 270 (Win)
- Tissue Engineering: BIOE 260 (Spr)

2020-21

- Orthopaedic Tissue Engineering: ORTHO 270 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Ben Ou

Postdoctoral Faculty Sponsor

Sungwon Kim, Hung Pang Lee, Jeehee Lee, Ni Su

Doctoral Dissertation Advisor (AC)

Manish Ayushman, Mark Fleck, Sarah Jones, Callan Monette, Abena Peasah, Heena Saqib, Sauradeep Sinha, Michelle Tai, Cassandra Villicana

Undergraduate Major Advisor

Ryann Ray

Doctoral (Program)

Naomi Alyafei, Andrea Flores Perez, Annie Nguyen, Sopida Pimcharoen, Netra Rajesh

Postdoctoral Research Mentor

Ni Su

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)

Publications

PUBLICATIONS

- **Aspirin synergizes with mineral particle-coated macroporous scaffolds for bone regeneration through immunomodulation.** *Theranostics*
  Su, N., Villicana, C., Zhang, C., Lee, J., Sinha, S., Yang, A., Yang, F.
  2023; 13 (13): 4512-4525

- **Del1 Is a Growth Factor for Skeletal Progenitor Cells in the Fracture Callus.** *Biomolecules*
  Sun, Y., Boyko, T., Marecic, O., Struck, D., Mann, R. K., Andrew, T. W., Lopez, M., Tong, X., Goodman, S. B., Yang, F., Longaker, M. T., Chan, C. K., Yang, et al

2023; 13 (8)

- **Spatially controlled construction of assembloids using bioprinting.** *Nature communications*
  Roth, J. G., Brunel, L. G., Huang, M. S., Liu, Y., Cai, B., Sinha, S., Yang, F., Pa#ca, S. P., Shin, S., Heilshorn, S. C.
  2023; 14 (1): 4346

- **Spatially patterned 3D model mimics key features of cancer metastasis to bone.** *Biomaterials*
  González Díaz, E. C., Tai, M., Monette, C. E., Wu, J. Y., Yang, F.
  2023; 299: 122163

- **Cell-Cell Interactions Enhance Cartilage Zonal Development in 3D Gradient Hydrogels.** *ACS biomaterials science & engineering*
  Zhu, D., Trinh, P., Liu, E., Yang, F.
  2023

- **Stem Cell Membrane-coated Microribbon Scaffolds Induce Regenerative Innate and Adaptive Immune Responses in a Critical-Size Cranial Bone Defect Model.** *Advanced materials (Deerfield Beach, Fla.)*
  Su, N., Villicana, C., Barati, D., Freeman, P., Luo, Y., Yang, F.
  2022: e2208781

- **Sexually dimorphic estrogen sensing in skeletal stem cells controls skeletal regeneration.** *Nature communications*
  Andrew, T. W., Koepke, L. S., Wang, Y., Lopez, M., Steininger, H., Struck, D., Boyko, T., Ambrosi, T. H., Tong, X., Sun, Y., Gulati, G. S., Murphy, M. P., Marecic, et al
  2022; 13 (1): 6491

- **Dynamically Crosslinked PEG Hydrogels Reveal a Critical Role of Viscoelasticity in Modulating Glioblastoma Fates and Drug Responses in 3D.** *Advanced healthcare materials*
  Sinha, S., Ayushman, M., Tong, X., Yang, F.
  2022: e2202147

- **Differential dynamics of bone graft transplantation and mesenchymal stem cell therapy during bone defect healing in a murine critical size defect.** *Journal of orthopaedic translation*
  Huang, E. E., Zhang, N., Ganio, E. A., Shen, H., Li, X., Ueno, M., Utsunomiya, T., Maruyama, M., Gao, Q., Su, N., Yao, Z., Yang, F., Gaudilliere, et al
  2022; 36: 64-74

- **Hydroxyapatite-coated gelatin microribbon scaffolds induce rapid endogenous cranial bone regeneration in vivo.** *Biomaterials advances*
  Conrad, B., Yang, F.
  2022; 140: 213050

- **A 3D Osteosarcoma Model with Bone-mimicking Cues Reveals a Critical Role of Bone Mineral and Informs Drug Discovery.** *Advanced healthcare materials*
  Díaz, E. C., Lee, A. G., Sayles, L. C., Feria, C., Sweet-Cordero, E. A., Yang, F.
  2022: e2200768

- **Spatially patterned, 3D in vitro models of cancer metastasis to bone for elucidating key drivers of metastasis and drug discovery**
  Diaz, E., Tai, M., Monette, C. E., Wu, J., Yang, F.
  AMER ASSOC CANCER RESEARCH.2022

- **Immunomodulatory strategies for bone regeneration: A review from the perspective of disease types.** *Biomaterials*
  Su, N., Villicana, C., Yang, F.
  2022; 286: 121604

- **Ageing attenuates bone healing by mesenchymal stem cellsin a microribbon hydrogelwith a murine long bone critical-size defect model.** *Immunity & ageing : I & A*
  Hirata, H., Zhang, N., Ueno, M., Barati, D., Kushioka, J., Shen, H., Tsubosaka, M., Toya, M., Lin, T., Huang, E., Yao, Z., Wu, J. Y., Zwingenberger, et al
  2022; 19 (1): 14

- **Aligned microribbon scaffolds with hydroxyapatite gradient for engineering bone-tendon interface.** *Tissue engineering. Part A*
  Stanton, A. E., Tong, X., Jing, S., Behn, A. W., Storaci, H., Yang, F.
  2022

- **Sliding hydrogels enhance MSC chondrogenesis by facilitating early stage cytoskeletal/nuclear dynamics and mechanical loading**

Ayushman, M., Tong, X., Yang, F.
CELL PRESS.2022: 265A

- **Aged skeletal stem cells generate an inflammatory degenerative niche.** *Nature*
  Ambrosi, T. H., Marecic, O., McArdle, A., Sinha, R., Gulati, G. S., Tong, X., Wang, Y., Steininger, H. M., Hoover, M. Y., Koepke, L. S., Murphy, M. P., Sokol, J., Seo, et al
  2021

- **Sex Differences in Mesenchymal Stem Cell Therapy With Gelatin-Based Microribbon Hydrogels in a Murine Long Bone Critical-Size Defect Model.** *Frontiers in bioengineering and biotechnology*
  Ueno, M., Zhang, N., Hirata, H., Barati, D., Utsunomiya, T., Shen, H., Lin, T., Maruyama, M., Huang, E., Yao, Z., Wu, J. Y., Zwingenberger, S., Yang, et al
  2021; 9: 755964

- **Articular cartilage regeneration by activated skeletal stem cells.** *Nature medicine*
  Murphy, M. P., Koepke, L. S., Lopez, M. T., Tong, X., Ambrosi, T. H., Gulati, G. S., Marecic, O., Wang, Y., Ransom, R. C., Hoover, M. Y., Steininger, H., Zhao, L., Walkiewicz, et al
  2020

- **Mixed Composition Microribbon Hydrogels Induce Rapid and Synergistic Cartilage Regeneration by Mesenchymal Stem Cells in 3D via Paracrine Signaling Exchange.** *ACS biomaterials science & engineering*
  Gegg, C., Tong, X., Yang, F.
  2020; 6 (7): 4166-4178

- **Mixed Composition Microribbon Hydrogels Induce Rapid and Synergistic Cartilage Regeneration by Mesenchymal Stem Cells in 3D via Paracrine Signaling Exchange** *ACS BIOMATERIALS SCIENCE & ENGINEERING*
  Gegg, C., Tong, X., Yang, F.
  2020; 6 (7): 4166–78

- **Gelatin-Based Microribbon Hydrogels Support Robust MSC Osteogenesis across a Broad Range of Stiffness.** *ACS biomaterials science & engineering*
  Conrad, B., Hayashi, C., Yang, F.
  2020; 6 (6): 3454-3463

- **Gelatin-Based Microribbon Hydrogels Support Robust MSC Osteogenesis across a Broad Range of Stiffness** *ACS BIOMATERIALS SCIENCE & ENGINEERING*
  Conrad, B., Hayashi, C., Yang, F.
  2020; 6 (6): 3454–63

- **Nanoparticle-Mediated TGF-beta Release from Microribbon-Based Hydrogels Accelerates Stem Cell-Based Cartilage Formation In Vivo.** *Annals of biomedical engineering*
  Barati, D., Gegg, C., Yang, F.
  2020

- **Injectable and Crosslinkable PLGA-Based Microribbons as 3D Macroporous Stem Cell Niche.** *Small (Weinheim an der Bergstrasse, Germany)*
  Barati, D., Watkins, K., Wang, Z., Yang, F.
  2020: e1905820

- **Matrix stiffness modulates patient-derived glioblastoma cell fates in 3D hydrogels.** *Tissue engineering. Part A*
  Wang, C. n., Sinha, S. n., Jiang, X. n., Murphy, L. n., Fitch, S. n., Wilson, C. n., Grant, G. n., Yang, F. n.
  2020

- **Gradient hydrogels for screening stiffness effects on patient-derived glioblastoma xenograft cellfates in 3D.** *Journal of biomedical materials research. Part A*
  Zhu, D. n., Trinh, P. n., Li, J. n., Grant, G. n., Yang, F. n.
  2020

- **IL-4 Overexpressing Mesenchymal Stem Cells within Gelatin-Based Microribbon Hydrogels Enhance Bone Healing in a Murine Long Bone Critical-size Defect Model.** *Journal of biomedical materials research. Part A*
  Ueno, M. n., Lo, C. W., Barati, D. n., Conrad, B. n., Lin, T. n., Kohno, Y. n., Utsunomiya, T. n., Zhang, N. n., Maruyama, M. n., Rhee, C. n., Huang, E. n., Romero-Lopez, M. n., Tong, et al
  2020

- **Gradient hydrogels for optimizing niche cues to enhance cell-based cartilage regeneration.** *Tissue engineering. Part A*

Liu, E. n., Zhu, D. n., Diaz, E. C., Tong, X. n., Yang, F. n.
2020

- **A comparative study of brain tumor cells from different age and anatomical locations using 3D biomimetic hydrogels.** *Acta biomaterialia*
  Wang, C. n., Sinha, S. n., Jiang, X. n., Fitch, S. n., Wilson, C. n., Caretti, V. n., Ponnuswami, A. n., Monje, M. n., Grant, G. n., Yang, F. n.
  2020
- **Injectable and in situ crosslinkable gelatin microribbon hydrogels for stem cell delivery and bone regeneration in vivo.** *Theranostics*
  Tang, Y., Tong, X., Conrad, B., Yang, F.
  2020; 10 (13): 6035–47
- **Gelatin-Based Microribbon Hydrogels Guided Mesenchymal Stem Cells to Undergo Endochondral Ossification In Vivo with Bone-Mimicking Mechanical Strength** *REGENERATIVE ENGINEERING AND TRANSLATIONAL MEDICINE*
  Conrad, B., Hayashi, C., Yang, F.
  2019
- **Spatially Patterned Microribbon-based Hydrogels Induce Zonally-Organized Cartilage Regeneration by Stem Cells in 3D.** *Acta biomaterialia*
  Gegg, C., Yang, F.
  2019
- **Optimizing 3D Co-culture Models to Enhance Synergy Between Adipose-Derived Stem Cells and Chondrocytes for Cartilage Tissue Regeneration** *REGENERATIVE ENGINEERING AND TRANSLATIONAL MEDICINE*
  Rogan, H., Yang, F.
  2019; 5 (3): 270–79
- **The effects of ROCK inhibition on mesenchymal stem cell chondrogenesis are culture model dependent.** *Tissue engineering. Part A*
  Gegg, C. A., Yang, F.
  2019
- **Comparing Single Cell Versus Pellet Encapsulation of Mesenchymal Stem Cells in Three-Dimensional Hydrogels for Cartilage Regeneration** *TISSUE ENGINEERING PART A*
  Rogan, H., Ilagan, F., Yang, F.
  2019
- **Hydrogels with enhanced protein conjugation efficiency reveal stiffness-induced YAP localization in stem cells depends on biochemical cues** *BIOMATERIALS*
  Lee, S., Stanton, A. E., Tong, X., Yang, F.
  2019; 202: 26–34
- **Mimicking brain tumor-vasculature microanatomical architecture via co-culture of brain tumor and endothelial cells in 3D hydrogels** *BIOMATERIALS*
  Wang, C., Li, J., Sinha, S., Peterson, A., Grant, G. A., Yang, F.
  2019; 202: 35–44
- **Preconditioned or IL4-Secreting Mesenchymal Stem Cells Enhanced Osteogenesis at Different Stages** *TISSUE ENGINEERING PART A*
  Lin, T., Kohno, Y., Huang, J., Romero-Lopez, M., Maruyama, M., Ueno, M., Pajarinen, J., Nathan, K., Yao, Z., Yang, F., Wu, J. Y., Goodman, S. B.
  2019
- **Biochemical Ligand Density Regulates Yes-Associated Protein Translocation in Stem Cells through Cytoskeletal Tension and Integrins** *ACS APPLIED MATERIALS & INTERFACES*
  Stanton, A. E., Tong, X., Lee, S., Yang, F.
  2019; 11 (9): 8849–57
- **Mimicking brain tumor-vasculature microanatomical architecture via co-culture of brain tumor and endothelial cells in 3D hydrogels.** *Biomaterials*
  Wang, C., Li, J., Sinha, S., Peterson, A., Grant, G. A., Yang, F.
  2019; 202: 35–44
- **Hydrogels with enhanced protein conjugation efficiency reveal stiffness-induced YAP localization in stem cells depends on biochemical cues.** *Biomaterials*
  Lee, S., Stanton, A. E., Tong, X., Yang, F.
  2019; 202: 26–34
- **Comparing Single Cell vs. Pellet Encapsulation of MSCs in 3D Hydrogels for Cartilage Regeneration.** *Tissue engineering. Part A*

Rogan, H., Ilagan, F., Yang, F.
2019

- **Preconditioned or IL4-Secreting Mesenchymal Stem Cells Enhanced Osteogenesis at Different Stages.** *Tissue engineering. Part A*
  Lin, T., Kohno, Y., Huang, J., Romero-Lopez, M., Maruyama, M., Ueno, M., Pajarinen, J., Nathan, K., Yao, Z., Yang, F., Wu, J., Goodman, S. B.
  2019
- **Extracellular matrix type modulates mechanotransduction of stem cells.** *Acta biomaterialia*
  Stanton, A. E., Tong, X. n., Yang, F. n.
  2019
- **Tissue-engineered 3D Models for Elucidating Primary and Metastatic Bone Cancer Progression.** *Acta biomaterialia*
  González Díaz, E. C., Sinha, S. n., Avedian, R. S., Yang, F. n.
  2019
- **Microribbon-hydrogel composite scaffold accelerates cartilage regeneration in vivo with enhanced mechanical properties using mixed stem cells and chondrocytes.** *Biomaterials*
  Rogan, H. n., Ilagan, F. n., Tong, X. n., Chu, C. R., Yang, F. n.
  2019; 228: 119579
- **Varying solvent type modulates collagen coating and stem cell mechanotransduction on hydrogel substrates.** *APL bioengineering*
  Stanton, A. E., Tong, X. n., Yang, F. n.
  2019; 3 (3): 036108
- **Direct reprogramming of mouse fibroblasts into functional osteoblasts by defined factors**
  Zhu, H., Conrad, B., Yang, F., Wu, J.
  WILEY.2018: 94
- **Biochemical and Mechanical Gradients Synergize To Enhance Cartilage Zonal Organization in 3D.** *ACS biomaterials science & engineering*
  Zhu, D., Trinh, P., Liu, E., Yang, F.
  2018; 4 (10): 3561-3569
- **Biochemical and Mechanical Gradients Synergize To Enhance Cartilage Zonal Organization in 3D** *ACS BIOMATERIALS SCIENCE & ENGINEERING*
  Zhu, D., Trinh, P., Liu, E., Yang, F.
  2018; 4 (10): 3561–69
- **Gelatin-based microribbon hydrogels accelerate cartilage formation by mesenchymal stem cells in 3D.** *Tissue engineering. Part A*
  Conrad, B., Han, L., Yang, F.
  2018
- **Recent Progress in Developing Injectable Matrices for Enhancing Cell Delivery and Tissue Regeneration** *ADVANCED HEALTHCARE MATERIALS*
  Tong, X., Yang, F.
  2018; 7 (7): e1701065
- **Targeting Tumor Hypoxia Using Nanoparticle-engineered CXCR4-overexpressing Adipose-derived Stem Cells** *THERANOSTICS*
  Jiang, X., Wang, C., Fitch, S., Yang, F.
  2018; 8 (5): 1350–60
- **A comparative study of chondroitin sulfate and heparan sulfate for directing three-dimensional chondrogenesis of mesenchymal stem cells** *STEM CELL RESEARCH & THERAPY*
  Wang, T., Yang, F.
  2017; 8: 284
- **Covalently adaptable elastin-like protein - hyaluronic acid (ELP - HA) hybrid hydrogels with secondary thermoresponsive crosslinking for injectable stem cell delivery.** *Advanced functional materials*
  Wang, H., Zhu, D., Paul, A., Cai, L., Enejder, A., Yang, F., Heilshorn, S. C.
  2017; 27 (28)
- **Bioacoustic-enabled patterning of human iPSC-derived cardiomyocytes into 3D cardiac tissue** *BIOMATERIALS*
  Serpooshan, V., Chen, P., Wu, H., Lee, S., Sharma, A., Hu, D. A., Venkatraman, S., Ganesan, A. V., Usta, O. B., Yarmush, M., Yang, F., Wu, J. C., Demirci, et al
  2017; 131: 47-57

- **Contractile force generation by 3D hiPSC-derived cardiac tissues is enhanced by rapid establishment of cellular interconnection in matrix with muscle-mimicking stiffness** *BIOMATERIALS*
  Lee, S., Serpooshan, V., Tong, X., Venkatraman, S., Lee, M., Lee, J., Chirikian, O., Wu, J. C., Wu, S. M., Yang, F.
  2017; 131: 111-120

- **Mimicking Cartilage Tissue Zonal Organization by Engineering Tissue-scale Gradient Hydrogels as 3D Cell Niche.** *Tissue engineering. Part A*
  Zhu, D., Tong, X., Trinh, P., Yang, F.
  2017

- **Elastin-like protein-hyaluronic acid (ELP-HA) hydrogels with decoupled mechanical and biochemical cues for cartilage regeneration.** *Biomaterials*
  Zhu, D., Wang, H., Trinh, P., Heilshorn, S. C., Yang, F.
  2017

- **Effect of matrix metalloproteinase-mediated matrix degradation on glioblastoma cell behavior in 3D PEG-based hydrogels** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Wang, C., Tong, X., Jiang, X., Yang, F.
  2017; 105 (3): 770-778

- **Mutant CCL2 protein coating mitigates wear particle-induced bone loss in a murine continuous polyethylene infusion model** *BIOMATERIALS*
  Nabeshima, A., Pajarinen, J., Lin, T., Jiang, X., Gibon, E., Cordova, L. A., Loi, F., Lu, L., Jamsen, E., Egashira, K., Yang, F., Yao, Z., Goodman, et al
  2017; 117: 1-9

- **Detection of Stem Cell Transplant Rejection with Ferumoxytol MR Imaging: Correlation of MR Imaging Findings with Those at Intravital Microscopy.** *Radiology*
  Daldrup-Link, H. E., Chan, C., Lenkov, O., Taghavigarmestani, S., Nazekati, T., Nejadnik, H., Chapelin, F., Khurana, A., Tong, X., Yang, F., Pisani, L., Longaker, M., Gambhir, et al
  2017: 161139-?

- **Pharmacological rescue of diabetic skeletal stem cell niches.** *Science translational medicine*
  Tevlin, R., Seo, E. Y., Marecic, O., McArdle, A., Tong, X., Zimdahl, B., Malkovskiy, A., Sinha, R., Gulati, G., Li, X., Wearda, T., Morganti, R., Lopez, et al
  2017; 9 (372)

- **Modulating stem cell-chondrocyte interactions for cartilage repair using combinatorial extracellular matrix-containing hydrogels** *JOURNAL OF MATERIALS CHEMISTRY B*
  Wang, T., Lai, J. H., Han, L., Tong, X., Yang, F.
  2016; 4 (47): 7641-7650

- **Modulating stem cell-chondrocyte interactions for cartilage repair using combinatorial extracellular matrix-containing hydrogels.** *Journal of materials chemistry. B*
  Wang, T., Lai, J. H., Han, L. H., Tong, X., Yang, F.
  2016; 4 (47): 7641-7650

- **Nanoparticle engineered TRAIL-overexpressing adipose-derived stem cells target and eradicate glioblastoma via intracranial delivery** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Jiang, X., Fitch, S., Wang, C., Wilson, C., Li, J., Grant, G. A., Yang, F.
  2016; 113 (48): 13857-13862

- **Effect of Matrix Metalloproteinase-Mediated Matrix Degradation on Glioblastoma Cell Behavior in 3D PEG-based Hydrogels.** *Journal of biomedical materials research. Part A*
  Wang, C., Tong, X., Jiang, X., Yang, F.
  2016

- **Effects of Hydrogel Stiffness and Extracellular Compositions on Modulating Cartilage Regeneration by Mixed Populations of Stem Cells and Chondrocytes In Vivo.** *Tissue engineering. Part A*
  Wang, T., Lai, J. H., Yang, F.
  2016: -?

- **The effect of local IL-4 delivery or CCL2 blockade on implant fixation and bone structural properties in a mouse model of wear particle induced osteolysis.** *Journal of biomedical materials research. Part A*
  Sato, T., Pajarinen, J., Behn, A., Jiang, X., Lin, T., Loi, F., Yao, Z., Egashira, K., Yang, F., Goodman, S. B.
  2016; 104 (9): 2255-2262

- **Sliding Hydrogels with Mobile Molecular Ligands and Crosslinks as 3D Stem Cell Niche.** *Advanced materials*
  Tong, X., Yang, F.
  2016; 28 (33): 7257-7263

- **Scaffold-mediated BMP-2 minicircle DNA delivery accelerated bone repair in a mouse critical-size calvarial defect model** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Keeney, M., Chung, M. T., Zielins, E. R., Paik, K. J., McArdle, A., Morrison, S. D., Ransom, R. C., Barbhaiya, N., Atashroo, D., Jacobson, G., Zare, R. N., Longaker, M. T., Wan, et al
  2016; 104 (8): 2099-2107

- **Winner of the Young Investigator Award of the Society for Biomaterials at the 10th World Biomaterials Congress, May 17-22, 2016, Montreal QC, Canada: Microribbon-based hydrogels accelerate stem cell-based bone regeneration in a mouse critical-size cranial defect model** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Han, L., Conrad, B., Chung, M. T., Deveza, L., Jiang, X., Wang, A., Butte, M. J., Longaker, M. T., Wan, D., Yang, F.
  2016; 104 (6): 1321-1331

- **Hydrogels with Dual Gradients of Mechanical and Biochemical Cues for Deciphering Cell-Niche Interactions.** *ACS biomaterials science & engineering*
  Tong, X., Jiang, J., Zhu, D., Yang, F.
  2016; 2 (5): 845-852

- **Winner of the Young Investigator Award of the Society for Biomaterials (USA) for 2016, 10th World Biomaterials Congress, May 17-22, 2016, Montreal QC, Canada: Aligned microribbon-like hydrogels for guiding three-dimensional smooth muscle tissue regeneration** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Lee, S., Tong, X., Han, L., Behn, A., Yang, F.
  2016; 104 (5): 1064-1071

- **Hydrogels with Dual Gradients of Mechanical and Biochemical Cues for Deciphering Cell-Niche Interactions** *ACS BIOMATERIALS-SCIENCE & ENGINEERING*
  Tong, X., Jiang, J., Zhu, D., Yang, F.
  2016; 2 (5): 845-852

- **Effects of the poly(ethylene glycol) hydrogel crosslinking mechanism on protein release.** *Biomaterials science*
  Lee, S., Tong, X., Yang, F.
  2016; 4 (3): 405-411

- **Local delivery of mutant CCL2 protein-reduced orthopaedic implant wear particle-induced osteolysis and inflammation in vivo.** *Journal of orthopaedic research*
  Jiang, X., Sato, T., Yao, Z., Keeney, M., Pajarinen, J., Lin, T., Loi, F., Egashira, K., Goodman, S., Yang, F.
  2016; 34 (1): 58-64

- **Polymer-DNA Nanoparticle-Induced CXCR4 Overexpression Improves Stem Cell Engraftment and Tissue Regeneration in a Mouse Hindlimb Ischemia Model** *THERANOSTICS*
  Deveza, L., Choi, J., Lee, J., Huang, N., Cooke, J., Yang, F.
  2016; 6 (8): 1176-1189

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