Stanford



Fang Chen (Rosy)

Instructor, Ophthalmology

Bio

BIO

Dr. Chen is an instructor in the Department of Ophthalmology at Stanford University. Her research focuses on materials science and engineering approaches to biological or biomedical problems. Specifically, she is dedicated to understanding the design principles and developing nanoscale and macroscale biomaterials for medical applications, experimental investigations of cell therapies, and integration across multiple disciplines including materials science, chemistry, medical imaging, and life science. Her ongoing projects are developing nanoparticles (funded by the NIH K99/R00 award) and hydrogels to treat various eye diseases. Dr. Chen has published over 30 peer-reviewed papers, contributed chapters to 2 books, given almost 30 presentations at professional conferences, and been included in 3 patents.

Before becoming an instructor, Dr. Chen was trained as a postdoc scholar at Stanford Ophthalmology Department. During this training, she invented several natural biopolymers based in situ forming hydrogels to promote corneal wound healing. She also established two corneal disease models in rodents and large animals with surgical tool-inner stopper trephines, which she invented to create consistent corneal defects in animal corneas. Her postdoctoral research in hydrogel and tissue engineering is complementary to her Ph.D. training in nanoparticles and cell tracking. Dr. Chen completed her Ph.D. in Materials Science and Engineering at UCSD, where she discovered several ultrasound-based contrast agents, revealed cytotoxicity and adsorption properties of various nanomaterials, and created a theranostic nanoparticle that improved the treatment efficacy of stem cell therapy for heart diseases. Beyond research, Dr. Chen has also served as a mentor, area safety coordinator, lab manager, animal protocol manager, and reviewer for multiple professional journals.

ACADEMIC APPOINTMENTS

• Instructor, Ophthalmology

HONORS AND AWARDS

- NIH K99/R00 Pathway to Independence Award, National Eye Institute (2023)
- Finalist, Dean's Postdoctoral Fellowship, Stanford School of Medicine (2021)
- Qais Farjo, MD Memorial Travel Grant, ARVO (2021)
- MATS Dissertation Year Fellowships, UCSD (2019)
- Rising Stars Women in Engineering, Asian Deans' Forum 2019 (2019)
- Chancellor's Research Excellence Scholarship, UCSD (2018)
- Nomination of Schmidt Science Fellows Program, UCSD (2018)
- Travel Award: 256th ACS National Meeting & Exposition, GSA, UCSD (2018)
- Travel Award: Xiangjiang Symposium for Global Young Scholars, CSU (2017)
- Alumni Association Scholarship, Southeast University (2007)

- Provincial Outstanding Student Leader, Jiangsu Province, China (2007)
- Outstanding Student Leader, Southeast University (2006)
- Outstanding Student Leader, School of Mater. Sci. & Eng. of Southeast University (2006)
- 10th 'All-in-one Card' Scholarship, China Merchants Bank Nanjing Branch (2005)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, SFB (2023 present)
- Member, ARVO (2021 present)
- Member, ACS (2016 present)

PROFESSIONAL EDUCATION

- Ph.D., UC San Diego, Materials Science & Engineering (2019)
- Master, Shanghai Institute of Ceramics, Chinese Academy of Sciences , Materials Science (2012)
- Bachelor, Southeast University, Materials Science & Engineering (2008)

PATENTS

- David Myung, Fang Chen, Gabriella Fernandes-Cunha, Sarah Hull, Sarah Heilshorn, Christopher Lindsay, Christopher Madl, Hyun Jong Lee. "United States Patent WO2021222612A1, US20230263943A1 Hydrogels for in situ-forming tissue constructs", Leland Stanford Junior University, US Department of Veterans Affairs VA, Aug 24, 2023
- Darren J. Lipomi, Charles Dhong, Samuel Edmunds, Fang Chen, Laure V. Kayser, Julian Ramirez, Jesse Jokerst. "United States Patent WO2019195618A1 Noncontact measurements of fluids, particles and bubbles", Oct 10, 2019
- Jesse Jokerst, Fang Chen, Junxin Wang. "United States Patent US20190029637A1 A wearable sensor, and method, to monitor anti-coagulation therapy", University of California, Jan 31, 2019

LINKS

• Google Scholar: https://scholar.google.com/citations?hl=en&user=8JYH12QAAAAJ

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Corneal regeneration via hydrogel-based cell scaffold and cell encapsulation

PROJECTS

• Nanoparticle-Based Tracking of Retinal Ganglion Cell Transplant - Stanford University (7/1/2023 - 6/30/2028)

Publications

technology

PUBLICATIONS

- Quantifying particle concentration via AI-enhanced optical coherence tomography. *Nanoscale* Ye, S., Xing, L., Myung, D., Chen, F. 2024
- In Situ-Forming Collagen-Hyaluronate Semi-Interpenetrating Network Hydrogel Enhances Corneal Defect Repair. Translational vision science &

Chen, F., Mundy, D. C., Le, P., Seo, Y. A., Logan, C. M., Fernandes-Cunha, G. M., Basco, C. A., Myung, D. 2022; 11 (10): 22

• Nanomedicine and drug delivery to the retina: current status and implications for gene therapy. *Naunyn-Schmiedeberg's archives of pharmacology* Tawfik, M., Chen, F., Goldberg, J. L., Sabel, B. A. 2022

- Fusogenic liposome-enhanced cytosolic delivery of magnetic nanoparticles *RSC ADVANCES* Chen, F., Bian, M., Nahmou, M., Myung, D., Goldberg, J. L. 2021; 11 (57): 35796-35805
- 3D Printable, Modified Trephine Designs for Consistent Anterior Lamellar Keratectomy Wounds in Rabbits. *Current eye research* Chen, F., Buickians, D., Le, P., Xia, X., Montague-Alamin, S. Q., Blanco Varela, I. B., Mundy, D. C., Logan, C. M., Myung, D. 2021: 1–10
- Gold nanoparticles to enhance ophthalmic imaging. *Biomaterials science* Chen, F., Si, P., de la Zerda, A., Jokerst, J. V., Myung, D. 2020
- Simultaneous Interpenetrating Polymer Network of Collagen and Hyaluronic Acid as an In Situ-Forming Corneal Defect Filler. Chemistry of materials : a publication of the American Chemical Society
 Chen, F., Le, P., Lai, K., Fernandes-Cunha, G. M., Myung, D.
 2020; 32 (12): 5208-5216
- Bio-orthogonally crosslinked hyaluronate-collagen hydrogel for suture-free corneal defect repair. *Biomaterials* Chen, F. n., Le, P. n., Fernandes-Cunha, G. M., Heilshorn, S. C., Myung, D. n. 2020; 255: 120176
- Listening for the therapeutic window: Advances in drug delivery utilizing photoacoustic imaging. Advanced drug delivery reviews Moore, C., Chen, F., Wang, J., Jokerst, J. V. 2019
- Increasing the Efficacy of Stem Cell Therapy via Triple-Function Inorganic Nanoparticles ACS NANO Chen, F., Zhao, E., Hableel, G., Hu, T., Kim, T., Li, J., Gonzalez-Pech, N., Cheng, D. J., Lemaster, J. E., Xie, Y., Grassian, V. H., Sen, G. L., Jokerst, et al 2019; 13 (6): 6605–17
- Cellular toxicity of silicon carbide nanomaterials as a function of morphology *BIOMATERIALS* Chen, F., Li, G., Zhao, E., Li, J., Hableel, G., Lemaster, J. E., Bai, Y., Sen, G. L., Jokerst, J. V. 2018; 179: 60–70
- Multifunctional nanomedicine with silica: Role of silica in nanoparticles for theranostic, imaging, and drug monitoring JOURNAL OF COLLOID AND INTERFACE SCIENCE

Chen, F., Hableel, G., Zhao, E., Jokerst, J. V. 2018; 521: 261–79

• Organosilica Nanoparticles with an Intrinsic Secondary Amine: An Efficient and Reusable Adsorbent for Dyes ACS APPLIED MATERIALS & INTERFACES

Chen, F., Zhao, E., Kim, T., Wang, J., Hableel, G., Reardon, P., Ananthakrishna, S., Wang, T., Arconada-Alvarez, S., Knowles, J. C., Jokerst, J. V. 2017; 9 (18): 15566–76

• Exosome-like silica nanoparticles: a novel ultrasound contrast agent for stem cell imaging *NANOSCALE* Chen, F., Ma, M., Wang, J., Wang, F., Chern, S., Zhao, E., Jhunjhunwala, A., Darmadi, S., Chen, H., Jokerst, J. V. 2017; 9 (1): 402–11

• Impact of crosslinking chemistry on corneal tissue regeneration after in situforming collagen-hyaluronate matrix therapy Wungcharoen, T., Chen, F., Seo, Y., Myung, D. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2023

- Collagen Gels Crosslinked by Photoactivation of Riboflavin for the Repair and Regeneration of Corneal Defects. ACS applied bio materials Fernandes-Cunha, G. M., Brunel, L. G., Arboleda, A., Manche, A., Seo, Y. A., Logan, C., Chen, F., Heilshorn, S. C., Myung, D. 2023
- In Situ-forming Collagen Hydrogels Crosslinked by Multifunctional Polyethylene Glycol as a Matrix Therapy for Corneal Defects: 2-Month Follow-Up In Vivo. Cornea

Logan, C. M., Fernandes-Cunha, G. M., Chen, F., Le, P., Mundy, D., Na, K. S., Myung, D. 2022

- Fusogenic liposome-enhanced cytosolic delivery of magnetic nanoparticles. *RSC advances* Chen, F., Bian, M., Nahmou, M., Myung, D., Goldberg, J. L. 2021; 11 (57): 35796-35805
- A Simple Inner-Stopper Guarded Trephine for Creation of Uniform Keratectomy Wounds in Rodents. *Journal of ophthalmic & vision research* Le, P. B., Chen, F., Myung, D. 2021; 16 (4): 544-551
- Supramolecular host-guest hyaluronic acid hydrogels enhance corneal wound healing through dynamic spatiotemporal effects. *The ocular surface* Fernandes-Cunha, G. M., Jeong, S. H., Logan, C. M., Le, P., Mundy, D., Chen, F., Chen, K. M., Kim, M., Lee, G., Na, K., Hahn, S. K., Myung, D. 2021
- Bio-orthogonally Crosslinked Matrix Therapies for Corneal Defect Repair Myung, D., Chen, F., Fernandes-Cunha, G., Le, P., Hull, S., Heilshorn, S. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- In vitro characterization of a novel in situ-forming semi-interpenetrating polymer network of crosslinked collagen and glycosaminoglycans for corneal defect repair

Mundy, D., Chen, F., Le, P., Myung, D. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021

- Collagen gels crosslinked by photoactivation of riboflavin for corneal defect repair Seo, Y., Fernandes-Cunha, G., Chen, F., Le, P., Logan, C., Mundy, D., Myung, D. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- In situ-forming semi-interpenetrating network hydrogels for corneal regeneration: in vivo biological response Chen, F., Le, P., Fernandes-Cunha, G., Mundy, D., Myung, D. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- In situ forming collagen-PEG hydrogel as a matrix therapy for corneal defects: 2 month in vivo response Rogers, G., Chen, F., Le, P., Mundy, D., Logan, C., Myung, D. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- Magnetic nanoparticles for subcellular organelle manipulation Bian, M., Chen, F., Nahmou, M., Myung, D., Goldberg, J. L. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- Bioengineered, In Situ-Crosslinked Collagen Gels for Suture-Free Stromal Defect Reconstruction of the Cornea Myung, D., Djalilian, A. R., Heilshorn, S., Chen, F., Le, P., Hull, S., Fernandes-Cunha, G., Na, K. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2020
- Optimization of an in situ-forming interpenetrating polymer network of collagen and hyaluronic acid hydrogel independently and simultaneously crosslinked by click chemistries

Le, P., Chen, F., Cunha, G., Lai, K., Myung, D. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2020

- In situ-forming bio-orthogonally crosslinked collagen-hyaluronate co-polymeric hydrogel to treat deep corneal stromal defects: in vivo biological response Chen, F., Le, P., Cunha, G., Myung, D. ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2020
- Stem Cell Tracking with Nanoparticle-Based Ultrasound Contrast Agents. *Methods in molecular biology (Clifton, N.J.)* Chen, F. n., Jokerst, J. V. 2020; 2126: 141–53
- In situ-forming collagen hydrogel crosslinked via multi-functional PEG as a matrix therapy for corneal defects. *Scientific reports* Fernandes-Cunha, G. M., Chen, K. M., Chen, F. n., Le, P. n., Han, J. H., Mahajan, L. A., Lee, H. J., Na, K. S., Myung, D. n. 2020; 10 (1): 16671
- Non-invasive Staging of Pressure Ulcers Using Photoacoustic Imaging. Wound repair and regeneration : official publication of the Wound Healing Society [and] the European Tissue Repair Society

Hariri, A., Chen, F., Moore, C., Jokerst, J. V. 2019

• Gadolinium Doping Enhances the Photoacoustic Signal of Synthetic Melanin Nanoparticles: A Dual Modality Contrast Agent for Stem Cell Imaging CHEMISTRY OF MATERIALS

Lemaster, J. E., Wang, Z., Hariri, A., Chen, F., Hu, Z., Huang, Y., Barback, C. V., Cochran, R., Gianneschi, N. C., Jokerst, J. V. 2019; 31 (1): 251–59

• Photoacoustic Imaging Quantifies Drug Release from Nanocarriers via Redox Chemistry of Dye-Labeled Cargo. Angewandte Chemie (International ed. in English)

Jeevarathinam, A. S., Lemaster, J. E., Chen, F. n., Zhao, E. n., Jokerst, J. V. 2019

- A Mechanistic Investigation of Methylene Blue and Heparin Interactions and Their Photoacoustic Enhancement *BIOCONJUGATE CHEMISTRY* Wang, J., Jeevarathinam, A., Humphries, K., Jhunjhunwala, A., Chen, F., Hariri, A., Miller, B. R., Jokerst, J. V. 2018; 29 (11): 3768–75
- Optics-Free, Non-Contact Measurements of Fluids, Bubbles, and Particles in Microchannels Using Metallic Nano-Islands on Graphene NANO LETTERS Dhong, C., Edmunds, S. J., Ramirez, J., Kayser, L. V., Chen, F., Jokerst, J. V., Lipomi, D. J. 2018; 18 (8): 5306–11
- Development of a Trimodal Contrast Agent for Acoustic and Magnetic Particle Imaging of Stem Cells ACS APPLIED NANO MATERIALS Lemaster, J. E., Chen, F., Kim, T., Hariri, A., Jokerst, J. 2018; 1 (3): 1321–31
- Photoacoustic Imaging for Noninvasive Periodontal Probing Depth Measurements *JOURNAL OF DENTAL RESEARCH* Lin, C. Y., Chen, F., Hariri, A., Chen, C. J., Wilder-Smith, P., Takesh, T., Jokerst, J. V. 2018; 97 (1): 23–30
- Photoacoustic Imaging of Human Mesenchymal Stem Cells Labeled with Prussian Blue-Poly(L-lysine) Nanocomplexes ACS NANO Kim, T., Lemaster, J. E., Chen, F., Li, J., Jokerst, J. V. 2017; 11 (9): 9022–32
- A Nanoscale Tool for Photoacoustic-Based Measurements of Clotting Time and Therapeutic Drug Monitoring of Heparin. *Nano letters* Wang, J., Chen, F., Arconada-Alvarez, S. J., Hartanto, J., Yap, L. P., Park, R., Wang, F., Vorobyova, I., Dagliyan, G., Conti, P. S., Jokerst, J. V. 2016; 16 (10): 6265-6271
- Chitosan enclosed mesoporous silica nanoparticles as drug nano-carriers: Sensitive response to the narrow pH range MICROPOROUS AND MESOPOROUS MATERIALS

Chen, F., Zhu, Y. 2012; 150 (1): 83–89

PRESENTATIONS

- Triple-functional nanomedicine increases stem cell therapy efficacy in ischemia reperfusion injury mice hearts Graduate Society of NanoEngineers Seminar, UCSD
- Triple-functional nanomedicine increases stem cell therapy efficacy in ischemia reperfusion injury mice hearts Chancellor's Research Excellence Scholarships (CRES) Symposium, UCSD
- Engineering cells with multifunctional nanomaterials to improve stem cell therapy efficacy in myocardial infarcted mice 16th International Nanomedicine & Drug Delivery Symposium (9/2018)
- Discoid silica nanoparticles for stem cells tracking by ultrasound imaging (8/2018)
- Tunable and repeatable dye adsorption/desorption via organosilica nanoparticles with an intrinsic amine (8/2018)
- Morphology-dependent cytotoxicity of SiC nanomaterials to human mesenchymal stem cells 256th National Meeting of the American Chemical Society, Boston (8/2018)
- Increasing stem cells therapy efficacy with engineered multi-functional nanoparticles Xiangjiang Symposium for Global Young Scholars in Materials Science, Changsha, China (12/2017)
- Measuring heparin activity with a nanoparticle-functionalized catheter 253st National Meeting of the American Chemical Society, San Francisco (4/2017)

- Increasing stem cells retention and survivability by engineering with magnetic porous nanoparticles 253st National Meeting of the American Chemical Society, San Francisco (4/2017)
- Effect of hydrophobicity on the ultrasound contrast of silica nanoparticles 253st National Meeting of the American Chemical Society, San Francisco (4/2017)
- Tracking and aiding the survival of stem cells by indocyanine green- and insulin growth factor-loaded mesoporous cellular foam The 1st SABPA Frontiers in Therapeutics and Diagnostics Forum (2/2017)
- Echogenicity of mesoporous and nonporous silica nanoparticles, Oral Presentation 251st National Meeting of the American Chemical Society, San Diego (3/2016)
- Tracking and aiding the survival of stem cells by indocyanine green- and insulin growth factor-loaded mesoporous cellular foam 251st National Meeting of the American Chemical Society, San Diego (3/2016)
- Ultrasound signal of mesocellular foam and mesoporous nanoparticles, Poster Presentation 251st National Meeting of the American Chemical Society, San Diego (3/2016)