

LiKang Chin, PhD

Education

- Jan 2011 **Case Western Reserve University**, Cleveland, OH
Doctorate of Philosophy, Biomedical Engineering
"Tyramine Substituted-Hyaluronan Enriched Fascia for Rotator Cuff Tendon Repair"
- Jan 2007 **Case Western Reserve University**, Cleveland, OH
Master of Science, Biomedical Engineering
"The Effects of Mechanical and Environmental Conditions on the Mechanical Properties of Rat Tail Tendon Fascicles"
- May 2001 **University of Pennsylvania**, Philadelphia, PA
Bachelor of Science in Engineering, Bioengineering, Minor in Mathematics

Research and Work Experience

- Jan 2021 **Widener University**, Chester, PA
Department of Biomedical Engineering
Teaching Assistant Professor
Expected courses: graduate-level biomaterials; undergraduate-level senior design, bioinstrumentation, seminar; student advising
- Dec 2015 – Jul 2020 **University of Pennsylvania**, Philadelphia, PA
Department of Medicine, Gastroenterology
Technical Director of PSOC@Penn Cell and Tissue Core
- Collaborated with investigators and clinicians from Penn and other institutions to design experiments, develop scientific techniques, and interpret data
 - Created and supervised centralized biorepository of liver cells and tissue
- Independent projects
- Investigated effects of lipid droplet on hepatocyte mechanosensing using hydrogels
 - Evaluated liver mechanics during disease in zebrafish, rodents, and humans
 - Investigated relationship between liver mechanics and cytoskeleton, extracellular matrix structures
- Notable techniques developed
- Mouse model of liver cancer using exosome delivery
 - Primary cell isolation from human cirrhotic liver and mouse liver tumors
 - Microscopic visualization of cell motion and deformation during mechanical compression of tissue
- Nov 2011 – Dec 2015 **University of Pennsylvania**, Philadelphia, PA
Institute for Medicine and Engineering, Department of Physiology
Tokushima University Hospital, Tokushima, Japan
Clinical Research Center for Diabetes
Postdoctoral research fellow
Postdoctoral advisors: Paul Janmey, PhD and Makoto Funaki, MD, PhD
- Investigated effects of mechanical environment on inflammation in adipocytes and adipose tissue
 - Evaluated adipose mechanics during obesity in rodents
 - Characterized mechanical properties of normal and diseased soft tissues, including brain, liver, and pulmonary artery
- Aug 2003 – Sep 2011 **Lerner Research Institute, Cleveland Clinic**, Cleveland, OH

Department of Biomedical Engineering and Orthopaedic Research Center
Graduate student, Postdoctoral research fellow

PhD advisors: Kathleen Derwin, PhD and the late Roger Marchant, PhD

PhD committee members: Eben Alsberg, PhD, Thomas Bauer, MD, PhD, Vince Hascall, PhD

- Designed, tested, and characterized methods to enrich human fascia with cross-linkable hyaluronan for tendon repair
- Evaluated chronic inflammatory response to and mechanical properties of hyaluronan-enriched fascia in rat abdominal wall model
- Investigated effects of mechanical unloading and inflammatory cytokines on mechanical properties of rat tail tendon fascicles
- Evaluated patient data of rotator cuff repair grafts in collaboration with pathologist
- Partnered with industry collaborators at Musculoskeletal Transplant Foundation

June 2001 – Aug 2003 **Cook Biotech Incorporated**, West Lafayette, IN

Product Development Engineer

- Led all aspects of design control from idea to transfer-to-manufacturing for two 510(k) FDA-cleared small intestinal submucosa devices
- Interacted with clinicians and clients to gain end-user requirements and design inputs
- Developed and mechanically tested prototypes
- Maintained design history files, performed risk analysis, authored quality system documents, and conducted design review meetings
- Developed methods for scale-up and trained manufacturing team
- Presented on SIS technology at internal and external conferences

Teaching Experience

Summer 2017 –
Spring 2020

University of Pennsylvania, Philadelphia, PA

Center for Engineering MechanoBiology Research Experience for Teachers (RET)

- Mentored teachers as part of summer professional development program
- Assisted in translating experiments from laboratory to classroom
- Provided introductory mechanobiology lecture and laboratory practical
- Invited lecturer on mechanobiology, Upper Perkiomen High School (Spring 2019)

Spring 2011

Case Western Reserve University, Cleveland, OH

EBME 318/319 Biomedical Engineering Laboratory

- Undergraduate level course, 6 students
- Held pre-lab and lab on mechanical testing of extracellular matrix scaffolds
- Developed questions and graded lab report

Fall 2006

Case Western Reserve University, Cleveland, OH

Teaching Assistant

EBME 317/417 Excitable Cells: Molecular Mechanisms, Kenneth Gustafson, PhD

- Combined undergraduate and graduate level course, 30 students
- Graded homework, semester project, midterm, and final exams

Spring 2006

Case Western Reserve University, Cleveland, OH

Teaching Assistant

EBME 310 Principles of Biomedical Instrumentation, Miklos Gratzl, PhD

- Large, undergraduate level course, 120 students
- Held weekly office hours
- Developed and graded homework and exam questions

Fall 2005

Case Western Reserve University, Cleveland, OH

Teaching Assistant

EBME 403 Biomedical Transducers, Miklos Gratzl, PhD

- Graduate level course, 30 students
- Held weekly office hours
- Developed and graded homework and exam questions

Mentoring Experience

Graduate students: Abigail Loneker (PhD candidate), Rachael Aubin (MSE candidate)

Undergraduate students: Gi Yun Lee, Abigail Loneker (Undergraduate Student Scholars Program), Sarah Kim, Michelle Chen, Mone't Nelson (Research Experience for Undergraduates), Adeeb Derakhshan, Steven Vilt

RET teachers: James Ciccarelli, Richard Staniec

Laboratory Technician: Shannon Tsai

Volunteer: Sameera Zaidi

Peer-reviewed Manuscripts

1. Affo S, Nair A, Brundu F, Ravichandra A, Bhattacharjee S, Matsuda M, **Chin L**, Filliol A, Wen W, Song X, Caviglia JM, Yu L, Yin D, Savage T, Wells RG, Mack M, Zender L, Arpaia N, Remotti HE, Rabadan R, Leblond A, Weber A, Llovet JM, Sia D, Seki E, Califano A, Chen X, Schwabe RF. *Promotion of cholangiocarcinoma growth by diverse cancer-associated fibroblast subpopulations*. Cancer Cell. In revision.
2. **Chin L**, Theise ND, Loneker AE, Janmey PA, Wells RG. *Lipid droplets disrupt mechanosensing in human hepatocytes*. Am J Physiol Gastrointest Liver Physiol. 2020 Jul; 1;319(1):G11-G22.
3. Janmey P, Mallick P, Weitz DA, Adusumilli R, Byfield FJ, **Chin L**, Cruz K, Dang KK, Flory M, Gafken P, Guinney J, Guo X, Hori M, Mendez MG, Nikolov M, Pegoraro AF, Pogoda K, Eljanne M. *Physical, genomics, and proteomics characterization of a cancer cell line panel*. Submitted to Nature Scientific Data.
4. van Oosten ASG, Chen X, **Chin L**, Cruz K, Patteson AE, Pogoda K, Shenoy V, Janmey PA. *Emergence of tissue-like mechanics from fibrous networks confined by close-packed cells*. Nature. 2019 Sept;573(7772):96-101.
5. **Chin L**, Xia Y, Discher DE, Janmey PA. *Mechanotransduction in cancer*. Current Opinion in Chemical Engineering. 2016 11:77-84.
6. Perepelyuk M, **Chin L (co-first author)**, van Oosten A, Shenoy VB, Janmey PA, Wells RG. *Normal and fibrotic rat livers demonstrate shear strain softening and compression stiffening: a model for soft tissue mechanics*. PLoS One. 2016 Jan 6;11(1):e0146588.
7. Mihai LA, **Chin L**, Janmey PA, Goriely A. *A comparison of hyperelastic constitutive models applicable to brain and fat tissues*. Journal of the Royal Society Interface. 2015 Sep 6;12(110):0486.
8. Bucki R, Cruz K, Pogoda K, Eggert A, **Chin L**, Ferrin M, Imbesi G, Hadjiladis D, Janmey PA. *Enhancement of pulmozyme activity in purulent sputum by combination with poly-aspartic acid or gelsolin*. J Cyst Fibros. 2015 Feb 12. pii:S1569-1993(15)00038-7.
9. Pogoda K, **Chin L**, Georges PC, Byfield FJ, Bucki R, Kim R, Weaver M, Wells RG, Marcinkiewicz C, Janmey PA. *Compression stiffening of brain and its effect on mechanosensing by glioma cells*. New Journal of Physics. 2014 Jul; 16:075002.
10. **Chin L**, Calabro A, Walker E, Derwin KA. *Mechanical properties of tyramine substituted-hyaluronan enriched fascia extracellular matrix*. J Biomed Mater Res A. 2012 Mar; 100(3):786-93.
11. **Chin L**, Calabro A, Rodriguez ER, Tan CD, Walker E, Derwin KA. *Characterization of and host response to tyramine substituted-hyaluronan enriched fascia extracellular matrix*. J Mater Sci Mater Med. 2011 Jun; 22(6):1465-77.

Grants Awarded and Fellowships

1. National Institutes of Health University of Pennsylvania Multidisciplinary Cardiovascular Biology Training Grant Fellowship NIH T32 HL007954, Nov 2011 – Oct 2013
2. National Institutes of Health Ruth L. Kirschstein National Research Service Award Predoctoral Fellowship F31 AR057305, Mar 2009 – Jan 2011
3. National Institutes of Health Cleveland Clinic Orthopaedic Research Training Grant Fellowship NIH T32 AR50959, Sep 2004 – Aug 2006

Patents

1. Pavcnik D, Kaufman, JA, Osborne T, Bates B, Patel U, Fette CD, **Chin L**, McAlexander CS, Shah B. "Vascular occlusion methods, systems and devices." US9414843 (Aug 16, 2016), EP1686903B1, CA2547088C, JP2007528237A, W02005053547A3.
2. Kennedy KC, **Chin L**. "Surgical implant." US8226730 (Jul 24, 2012), EP1656070B1, JP4673305B2, DE602004023302D1, W02005018468A3.
3. Derwin KA, Iannotti JP, **Chin L**, Calabro A. "Molecular enhancement of extracellular matrix and methods of use." US8080260 (Dec 20, 2011), EP2249891B1, ES2585483T3, W02009102967A3.
4. Bosley, Jr. RW, Patel UH, Andrews MO, **Chin L**, Fischer, Jr. FJ, Ryan WN, Rosenblatt, PL, Jones, JS. "Sling for supporting tissue." US7766926 (Aug 3, 2010), EP1501444B1, W02003092546A3A.

Podium Presentations - External

1. **Chin L**, Calabro A, Derwin KA. "Development and characterization of tyramine substituted-hyaluronan (TS-HA) enriched fascia for rotator cuff repair." *American Society of Mechanical Engineers Summer Bioengineering Conference* (Naples, FL), June 2010.
2. **Chin L**, Calabro A, Rodriguez ER, Tan CD, Walker E, Derwin KA. "Host response and mechanical properties of tyramine substituted-hyaluronan (TS-HA) enriched fascia extracellular matrix." *International Society for Hyaluronan Sciences 8th International Conference on Hyaluronan* (Kyoto, Japan), June 2010.
3. **Chin L**, Derwin KD. "Host cell response to hyaluronan treated fascia extracellular matrix." *Biological Scaffolds for Regenerative Medicine* (Phoenix, AZ), Feb 2008.

Posters Presentations - External

1. **Chin L**, Vega SL, Loneker AE, Burdick JA, Janmey PA, Wells RG. "Mechanics and hepatocyte behavior in non-alcoholic fatty liver disease." NCI-Physical Sciences in Oncology Symposium (Boston, MA), October 2017
2. **Chin L**, Kaplan DE, Furth EE, Funaki M, Janmey PA, Wells RG. "Lipid loading of hepatocytes abrogates stiffness sensitivity." NIH The Adipose Tissue Niche: Role in Health and Disease (Bethesda, MD), November 2016.
3. **Chin L**, Loneker AE, Tsai SJ, Kaplan DE, Furth EE, Janmey PA, Wells RG. "Rheological and biochemical characterization of diseased livers and hepatocellular carcinomas." FASEB Liver Biology (West Palm Beach, FL), June 2016.
4. **Chin L**, Monks B, Birnbaum MJ, Janmey PA, Funaki M. "Collagen VI knockout abrogates obesity-related adipose tissue stiffening." *American Diabetes Association 74th Scientific Sessions* (San Francisco, CA), June 2014, Abstract 4433.
5. **Chin L**, Bando Y, Monks B, Shikama Y, Birnbaum MJ, Janmey PA, Funaki M. "Tissue compression initiates proinflammatory response in adipocytes." *American Diabetes Association 73rd Scientific Sessions* (Chicago, IL), June 2013, Abstract 1761.

Academic Service

- Reviewer for Journal of Biomedical Materials Research:Part A, Soft Matter, Royal Society of Chemistry Advances
- Penn Reading Project discussion leader, 2014 – 2016
- Northeast Ohio's University of Pennsylvania Alumni Interview Program, Jan 2005 – Mar 2011
- Reviewer of summer funding applications for Case Western Reserve University Support of Undergraduate Research and Creative Endeavors (SOURCE), Mar 2011

Honors

- Cleveland Clinic Innovator Award, 2008