

Li-Hsin Han**Curriculum Vitae**
(Updated Sep/2014)

Department of Mechanical Engineering & Mechanics
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EDUCATION

Institute	Training	Year	Field of Study
Stanford University School of Medicine	Postdoctoral	2010-	Biomedical Product Design, Microfabrication, and Tissue Engineering
University of Texas at Austin	Postdoctoral	2009-2010	Microfabrication & Biomaterials Design
University of Texas at Austin	Ph.D.	2009	Micro & Nano-Actuators, Mechanical System and Design, Tissue Engineering,
Center of the Nano & Molecular Science & Technology	Certification	2008	Nano & Molecular Science & Technology
National Taiwan University	M.S.	1998	Robotics & Biomedical Engineering
National Taiwan University	B.S.	1996	Mechanical Engineering

PROFESSIONAL EMPLOYMENT

09/2014~present	Assistant Professor, Department of Mechanical Engineering & Mechanics, Drexel University.		
07/2010~08/2014	Postdoctoral Scientist, Department of Orthopaedic Surgery, Stanford University.		
10/2009~06/2010	Postdoctoral Scientist, Department of Mechanical Engineering, University of Texas at Austin.		
09/2002~09/2009	Graduate Research Assistant, Department of Mechanical Engineering, University of Texas at Austin.		

PUBLICATIONS

I. Peer-Reviewed Journal Articles

- (21) **L.H. Han**, X.M. Tong, F. Yang. "Photocrosslinkable PEG-based Microribbons for Forming 3D Macroporous Scaffolds with Decoupled Niche Properties," *Advanced Materials*, **26**, 1757-1762, 2014.
- (20) T.Y. Wang, J.H. Lai, **L.H. Han**, X.M. Tong, and F. Yang, "Chondrogenic differentiation of adipose-derived stromal cells in Combinatorial Hydrogels Containing Cartilage Matrix Proteins with Decoupled Mechanical Stiffnesses," *Tissue Engineering Part A*, accepted.
- (19) C.M. Madl, M. Keeney, X.L. Li, **L.H. Han**, and F. Yang, "Co-release of cells and polymeric nanoparticles from sacrificial microfibers enhances non-viral gene delivery inside 3D hydrogels," *Tissue Engineering Part C*, accepted.
- (18) **L.H. Han**, S. Yu, T.Y. Wang, A.W. Behn, F. Yang, "Microribbon-like Elastomers for Fabricating Macroporous and Highly Flexible Scaffolds that Support Cell Proliferation in 3D," *Advanced Functional Materials*, **23**, 346-358, 2013.
- (17) M. Keeney, S. Onyiah, Z. Zhang, X. Tong, **L.H. Han**, F. Yang, "Modulating Polymer Chemistry to Enhance Non-viral Gene Delivery inside Hydrogels with Tunable Matrix Stiffness," *Biomaterials* **34**, 9657-9665, 2013.
- (16) **L.H. Han**, J.H. Lai, S. Yu, F. Yang, "Dynamic Tissue Engineering Scaffolds with Stimuli-Responsive Macroporosity Formation," *Biomaterials*, **34**, 4251-4258, 2013.
- (15) [‡]J. Hammer, [‡]**L.H. Han** (‡equal contribution), X.M. Tong, F. Yang, "A Facile Method to Fabricate Hydrogels with Microchannel-like Porosity for Tissue Engineering," *Tissue Engineering Part C*, **20**, 169-176, 2013.
- (14) M. Nii, J.H. Lai, M. Keeney, **L.H. Han**, A.W. Behn, G. Imanbayev, F. Yang, "The Effects of Interactive Mechanical and Biochemical Niche Signaling on Osteogenic Differentiation of Adipose-derived Stem Cells Using Combinatorial Hydrogels," *Acta Biomaterialia*, **9**, 5475-5483, 2012.
- (13) D.Y. Fozdar, P. Soman, J.W. Lee, **L.H. Han**, S.C. Chen, "Three-dimensional Polymer Constructs Exhibiting a Tunable Negative Poisson's Ratio," *Advanced Functional Materials*, **21**, 2712-2720, 2011.
- (12) **L.H. Han**, S.M. Wu, J.C. Condit, N.J. Nate, M.D. Feldman T. Milner, S.C. Chen, "Light-Powered Micromotor: Design, Fabrication, and Mathematical Modeling," *Journal of Microelectromechanical Systems*, **20**, 487-496, 2011.
- (11) S. Suri, **L.H. Han**, W. Zhang, A. Singh, S. Chen, and C.E. Schmidt, "Solid Freeform Fabrication of Designer Scaffolds of Hyaluronic Acid for Nerve Tissue Engineering," *Biomedical Microdevices*, **13**, 983-993, 2011.
- (10) **L.H. Han**, S.M. Wu, J.C. Condit, N.J. Nate, M.D. Feldman T. Milner, S.C. Chen, "Light-Powered Micromotor Driven by Geometry-Assisted, Asymmetric Photon-heating and Subsequent Gas Convection," *Applied Physics Letters*, **96**, 213509 (1-3), 2010.
- (9) **L.H. Han**, J.A. Easley, C.J. Ellison, S.C. Chen, "Fluorinated Colloidal Emulsion of Photo-changeable Rheological Behavior as a Sacrificial Agent to Fabricate Organic, 3D Microstructures," *Langmuir*, **26**, 6108-6110, 2010.

- (8) **L.H. Han**, S. Suri, C. Schmidt, S.C. Chen, "Fabrication of three-dimensional Scaffold for Heterogeneous Tissue-engineering," *Biomedical Microdevices*, **12**, 721, 2010.
- (7) W. Zhang, **L.H. Han**, S.C. Chen, "Integrated Two-Photon Polymerization With Nanoimprinting for Direct Digital Nanomanufacturing," *Journal of Manufacturing Science and Engineering*, **132**, 030907 (1-5), 2010.
- (6) **L.H. Han**, W. Wang, Y. L. Lu, R. J. Knize, K. Reinhardt, J. R. Howell, S. C. Chen, "Analytical and Experimental Investigation of Electromagnetic Field Enhancement among Nanospheres with Varying Spacing," *Journal of Heat Transfer*, **131**, 033110, 2009.
- (5) S.M. Wu, **L.H. Han**, S. C. Chen, "Three Dimensional Selective Growth of Nanoparticles on a Polymer Microstructure," *Nanotechnology*, **20**, 285312 (1-4), 2009.
- (4) **L.H. Han**, G. Mapili, S.C. Chen, K. Roy, "Projection Micro-Printing of Three-Dimensional Scaffolds for Tissue Engineering," *Journal of Manufacturing Science and Engineering*, **130**, 021005-1-4, 2008.
- (3) K. C. Dickey, S. Subramanian, J. E. Anthony, **L. H. Han**, S.C. Chen, Y.L. Loo, "Large-area Patterning of A Solution-processable Organic Semiconductor to Reduce Parasitic Leakage and Off Currents in Thin-film Transistors," *Applied Physics Letters*, **90**, 244103, 2007.
- (2) **L.H. Han**, T.J. Tang, S.C. Chen, "Tuning the Absorption of Au Nanospheres on a Micro-Shell by Photo-Deformation," *Nanotechnology*, **17**, 4600-4605, 2006.
- (1) **L.H. Han**, S.C. Chen, "Wireless Bimorph Micro-actuators by Pulsed Laser Heating," *Sensors and Actuators A*, **121**, 35-43, 2005

II. Articles under Review

- (1) L. Deveza, J. Ashoken, G. Castaneda, M. Keeney, **L.H. Han**, X.M. Tong, F. Yang, "Rapid Synthesis of Monodisperse Microspheres for Controlled Release of Growth Factors," under review.

III. Book Chapter

M. Keeney, **L.H. Han**, J. Lai, S. Onyiah, F. Yang, "Tissue Engineering: Focus on musculoskeletal system," *Biomaterials Science-an integrated clinical and engineering approach*. CRC Press, 2011.

IV. Dissertation & Thesis

L.H. Han, *Light Driven Microactuators: Design, Fabrication, and Mathematical Modeling*, Ph.D. Dissertation, 2009, the University of Texas at Austin.

L.H. Han, *Development of a Prosthetic Hand*, M.S. Thesis, 1998, Nation Taiwan University.

PATENTS

I. Licensed Patents

- (3) M. D. Feldman, T.E. Milner, J.-H. Oh, E. Kim, K. Kumar, C. Condit, R. Grant, N. Kemp, J.H. Kim, S. C. Chen, **L.H. Han**. "OCT using spectrally resolved bandwidth," US Patent No. 8,540,627, September 24 2013.
- (2) M. D. Feldman, T.E. Milner, J.-H. Oh, E. Kim, K. Kumar, C. Condit, R. Grant, N. Kemp, J.H. Kim, S. C. Chen, **L.H. Han**. "OCT using spectrally resolved bandwidth," US Patent No. 7,783,337, August 24 2010.
- (1) M.D. Feldman, T.E. Milner, S.C. Chen, J.H. Kim, **L.H. Han**, J.-H. Oh, H. Lee. "Catheter Imaging Probe and Method", US Patent No. 7,711,413, May 4 2010.

II. Acquired Patent

- (1) M.D. Feldman, T.E. Milner, S.C. Chen, J.H. Kim, **L.H. Han**, J.-H. Oh, H. Lee. "Catheter Imaging Probe and Method", US Patent No. 7,711,413, May 4 2010. Acquired by Volcano Corporation (<http://www.volcanocorp.com/>).

III. Patents under Examination

- (2) F. Yang, **L.H. Han**, X.M. Tong, "Dynamic macropore formation using multiple porogens," US Provisional Patent Application No. 61/691,511, 2012; Continuing Application No. 13/970,456, Aug 19 2013.
- (1) F. Yang, **L.H. Han**, X.M. Tong, "Macroporous 3-D scaffolds for tissue engineering," US Provisional Patent Application No. 61/672,038, 2012; Continuing Application No. 13/943,738, July 16 2013.

IV. Past Provisional Patents

- (2) **L.H. Han**, S.C. Chen, "Sacrificial Material for Fabrication of Organic Three Dimensional Structures," US Provisional Patent Application No. 60/246,192, 2009.
- (1) S.C. Chen, M.D. Feldman, **L.H. Han**, C.A. Aguilar, "A Nanostructured Cardiovascular-Energized Power Source for Automatic Implantable Cardioverter Defibrillators (AICDs) and Biventricular Pacemakers", US Provisional Patent Application No. 60/883,497, 2008.

AWARDS AND HONORS

- 04/2013 Travel Award, Material Research Society Annual Meeting
- 2006-2007 Continuing Fellowship, University of Texas at Austin

ORAL PRESENTATIONS

- (13) **L.H. Han**, M.T. Chung, B. Conrad, L. Deveza, X.Y. Jiang, M.T. Longaker, F. Yang, "Microribbon-based Scaffolds Accelerate Bone Regeneration in a Cranial Defect Model," 2014, Society For Biomaterials (SFB) Annual Meeting, Denver, Colorado.
- (12) **L.H. Han**, X.M. Tong, F. Yang, "PEG-based, Crosslinkable Microribbons for Forming Macroporous Scaffolds with Decoupled Biochemical and Mechanical Properties," 2013 *Biomedical Engineering Society (BMES) Annual Meeting*, Seattle, Washington.
- (11) **L.H. Han**, J. Hammer, X.M. Tong, F. Yang, "A Cell-friendly Process to Fabricate Hydrogels with Microchannel-like Porosity for Tissue Engineering," 2013 *Biomedical Engineering Society (BMES) Annual Meeting*, Seattle, Washington.
- (10) **L.H. Han**, X.M. Tong, A.W. Behn, F. Yang, "Highly Flexible, Poly (ethylene glycol) Hydrogels with Decoupled Macroporosity, Biochemical and Mechanical Properties," 2013 *Materials Research Society (MRS) Spring Meeting*, San Francisco, California.
- (9) **L.H. Han**, S. Yu, T. Wang, A.W. Behn, F. Yang, "Microribbon-like Elastomers for Fabricating Macroporous and Highly Flexible Scaffolds that Support Cell Proliferation in 3D," 2012 *Biomedical Engineering Society (BMES) Annual Meeting*, Atlanta, Georgia.
- (8) **L.H. Han**, J.H. Lai, S. Yu, F. Yang, "Dynamic Tissue Engineering Scaffolds with Stimuli-Responsive Macroporosity Formation," 2012 *Biomedical Engineering Society (BMES) Annual Meeting*, Atlanta, Georgia.
- (7) **L.H. Han**, J.H. Lai, S. Yu, F. Yang, "Dynamic Tissue Engineering Scaffolds with Stimuli-responsive Macroporosity Formation," 2012 *Materials Research Society (MRS) Spring Meeting*, San Francisco, California.
- (6) **L.H. Han**, S.C. Chen, "Equipment and method for heterogeneous, 3D Fabrications at micro-meter scales," 2009 *Symposium of Free-form Fabrication*, Austin, Texas.
- (5) **L.H. Han**, D.B. Shao, S.C. Chen, "Surface Plasmons in Light Interaction with Metallic Nanostructures and Applications," 2008 *ASME Micro/Nanoscale Heat Transfer International Conference*, Tainan, Taiwan.
- (4) **L.H. Han**, S.C. Chen, "Freeform Fabrication of Biological Scaffolds by Projection Photopolymerization," 2007 *Symposium of Free-form Fabrication*, Austin, Texas.
- (3) **L.H. Han**, T.J. Tang, S.C. Chen, S.E. Webber, "Photo-deformable Micro-shells," 2005 *Conference of Nanoscale Devices and System Integration*, Houston, Texas.
- (2) **L.H. Han**, T.J. Tang, S.C. Chen, S.E. Webber, "Optically-deformable Micro-shells Formed by Photo-sensitive Polyelectrolytes," 2005 *International Conference on Bio-Nano-Information Fusion*, Los Angeles, California.
- (1) **L.H. Han**, S.C. Chen, "Photo-deformation of Microshells of Nanometer Thick," 2005 *ASME Integrated Nanosystems Conference*, Berkeley, California.

SERVICE TO THE PROFESSION

Session Chair "Targeted Delivery II", 2013 Biomedical Engineering Society (BMES) Annual Meeting, Seattle, Washington, Sept 28 2013.

Reviewer *Advanced Materials*, Jan 2014.
Biomedical Materials, June 2013.

MEDIA COVERAGE

Date	Work	Media
Nov 2013	Microribbons	Video Advertising, 2013 IEEE Global High Tech Congress on Electronics (http://www.ghctcongress.org/2013/), Shenzhen, China.
Jan 2013	Microribbons	Inside Front Cover, <i>Advanced Functional Materials</i> (23 , 346, 2013).
May 2011	Rapid prototyping	Nanoengineers Invent New Biomaterial That More Closely Mimics Human Tissue (http://www.sciencedaily.com/releases/2011/05/110526091806.htm)
June 2010	Light-driven Microturbine	"Researchers Turn Classic Children's Toy into Tiny Motor," <i>Inside Science Service</i> (www.insidescience.org).
Oct 2009	Rapid prototyping	"Biomaterials of the Month," <i>Society for Biomaterials</i> .
Aug 2009	Rapid prototyping	Lab Talk, <i>Nanotechweb.org</i> (nanotechweb.org).

NON-ACADEMIC WORK EXPERIENCE

06/2006~ Consultant, CardioSpectra, Inc. (Texas, USA)
 09/2006

02/2001~ Marketing and Patent Engineer, DoMEMS Co. Ltd., Taipei, Taiwan.
 03/2002

06/2000~ Patent Agent, Top-Team Trademark and Patent Office, Taipei, Taiwan.
 02/2001

10/1998~ Platoon commander, Second Lieutenant, Artillery, Taiwan.
 04/2000

RESEARCH PROJECTS**I. Biomaterials Design & Tissue Engineering, Stanford University (with Fan Yang, Ph.D.)**

- 04/2013~ present Autologous iPSC therapy for urinary incontinence, funded by California Institute for Regenerative Medicine (CIRM).
Collaborator: Renee Reijo Pera, Ph.D., Institute for Stem Cell Biology & Regenerative Medicine, Stanford University.
- 12/2012~ present Microribbon-based scaffolds for cartilage regeneration, funded by Wallace H. Coulter Foundation.
Collaborator: Heike Daldrup-Link, M.D., School of Medicine, Stanford University
- 12/2012~ present Microribbon-based scaffolds for bone regeneration: a cranial defect model
Collaborator: Michael Longaker, M.D., School of Medicine, Stanford University
- 08/2011~ present Crosslinkable, microribbon-like building-blocks for fabricating 3D, tissue engineering scaffolds
Collaborator: Manish Butte, M.D. Ph.D., Stanford University School of Medicine.
- 07/2010~ present Imaging-based, high-throughput screening of hydrogels for stem cell-based therapy

II. Microfabrication of tissue engineering scaffolds, UT Austin (with Shaochen Chen, Ph.D.)

- 12/2009~ 06/2010 Chitosan-polycaprolactone-nanofiber-based tissue engineering scaffolds
Collaborator: Miqin Zhang, Ph.D., Material Science & Engineering, U. Washington.
- 06/2009~ 06/2010 Free-form fabrication of gelatin-based tissue engineering scaffolds
Collaborator: Ali Khademhosseini, Ph.D., Harvard-MIT Health Science & Technology.
- 06/2007~ 06/2010 Free-form-fabrication of hyaluronan-based scaffolds for nerve regeneration
Collaborator: Christine Schmidt, Ph.D., Dept. Biomedical Engineering, UT Austin.
- 10/2006~ 08/2007 Free-form-fabrication of PEG-based scaffolds for cartilage regeneration.
Collaborator: Krishnendu Roy, Ph.D., Dept. Biomedical Engineering, UT Austin.

III. Micro/Nanoscale Actuators, UT Austin (with Shaochen Chen, Ph.D.)

- 08/2006~ 08/2009 Light-powered microturbine: design, fabrication, and mathematical modeling.
- 01/2008~ 06/2009 Sacrificial agent for organic-based microfabrication.
- 01/2008~ 07/2008 Two-photon polymerization of polymeric nanostructures.
- 09/2004~ 05/2007 Azobenzene-based, photo-deformable microshells: design, fabrication, and electromagnetic modeling.
- 10/2002~ 08/2003 Sudden bending of micro-cantilevers under pulsed laser: design, fabrication, and mathematical modeling.

IV. MEMS for cardiac device, UT Austin (with Shaochen Chen, Ph.D.)

- 09/2002~ 12/2006 Light-powered micromirrors for intravascular optical coherence tomography (OCT) catheterization.

Collaborator: Marc D. Feldman, M.D., San Antonio Medical Center.