

Claudia Loebel, M.D. Ph.D.

Assistant Professor of Materials Science & Engineering, starting Fall 2021
University of Michigan, Department of Materials Science & Engineering
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EDUCATION

Ph.D. Health Sciences and Technology, ETH Zurich, Switzerland - October 2016

Thesis: 'Engineering hyaluronan-tyramine hydrogels to modulate mesenchymal stem cell behavior'

Advisors: Professors Marcy Zenobi-Wong and David Eglin (AO Research Institute Davos)

M.D. Martin-Luther University Halle-Wittenberg, Germany - November 2011

Thesis: 'Detection and characterization of MDMX isoforms in human ovarian carcinoma'

Advisor: Dr. Frank Bartel

RESEARCH APPOINTMENTS

Assistant Professor, University of Michigan
Department of Materials Science & Engineering

starting Fall 2021

Postdoctoral Fellow, University of Pennsylvania

Department of Bioengineering
Lab of Professor Jason Burdick

2016-present

AWARDS AND HONORS

Biological Sciences Scholars Program, University of Michigan	2021
NIH NHLBI Pathway to Independence Award (K99/R00)	2020
Penn Health Tech Pilot Award	2020
ETH Silver Medal	2018
SNSF Early Postdoc Mobility Fellowship	2017
Julia Polak European Doctoral Award	2017
Research Award, Swiss Society for Biomaterials and Regenerative Medicine	2017
IBSA Foundation for Scientific Research Fellowship Award	2016
Racquel Z. LeGeros Award, European Society for Biomaterials	2015
Best Overall Oral Presentation Award, European Orthopaedic Research Society	2014
Travel Award, Swiss Society for Biomaterials and Regenerative Medicine	2014
Rapid-Fire Poster Award, Swiss Society for Biomaterials and Regenerative Medicine	2014

PUBLICATIONS

13. **Loebel, C.***; Kwon, M.*; Wang, C.; Han, L.; Mauck, R.L.; Burdick, J.A., Metabolic labeling to probe temporal changes in the pericellular matrix at the cell-hydrogel interface. **Advanced Functional Materials**, in press *equal contribution

12. **Loebel, C.**; Mauck, R.L.; and Burdick, J.A. (2019) Local nascent protein deposition and remodeling guide mesenchymal stromal cell mechanosensing and fate in three-dimensional hydrogels. **Nature Materials**, 18, 883-891

11. **Loebel, C.**; Ayoub A.; Galarraga J.H.; Kossover, O.; Simaan-Yameen, H.; Seliktar, D.; Burdick, J.A. (2019) Tailoring supramolecular guest-host hydrogel viscoelasticity with covalent fibrinogen double networks. **Journal of Materials Chemistry B**, 7, 1753-1760

10. **Loebel, C.** and Burdick, J.A. (2018) Engineering Stem and Stromal Cell Therapies for Musculoskeletal Tissue Repair. *Cell Stem Cell*, 22, 325-339
9. **Loebel, C.***; Rodell, C.B.*; Chen, M.H.; Burdick, J.A. (2017) Shear-thinning and self-healing hydrogels as injectable therapeutics and for 3D-printing. *Nature Protocols*, 12(8), 1521-1541 *equal contribution
8. **Loebel, C.**; Szczesny, S. E.; Cosgrove, B. D.; Alini, M.; Zenobi-Wong, M.; Mauck, R. L.; Eglin, D. (2017) Crosslinking Chemistry of Tyramine-Modified Hyaluronan Hydrogels Alters Mesenchymal Stem Cell Early Attachment and Behavior. *Biomacromolecules*, 18(3), 855-864
7. **Loebel, C.**; Stauber, T.; D'Este, M.; Alini, M.; Zenobi-Wong, M.; Eglin, D. (2017) Fabrication of cell-compatible hyaluronan hydrogels with a wide range of biophysical properties through high tyramine functionalization. *Journal of Materials Chemistry A*, 5(12), 2355-2363
6. Li, B.; Menzel, U.; **Loebel, C.**; Schmal, H.; Alini, M.; Stoddart, M. J. (2016) Monitoring live human mesenchymal stromal cell differentiation and subsequent selection using fluorescent RNA-based probes. *Scientific Reports*, 6, 26014
5. **Loebel, C.***; Broguiere, N.*; Alini, M.; Zenobi-Wong, M.; Eglin, D. (2015) Microfabrication of Photo-Cross-Linked Hyaluronan Hydrogels by Single- and Two-Photon Tyramine Oxidation. *Biomacromolecules*, 16(9), 2624-30 *equal contribution
4. Voss, J. O.; **Loebel, C.**; Bara, J. J.; Fussinger, M.A.; Duttenehofer, F.; Alini, M.; Stoddart, M.J. (2015) Effect of Short-Term Stimulation with Interleukin-1beta and Differentiation Medium on Human Mesenchymal Stromal Cell Paracrine Activity in Coculture with Osteoblasts. *BioMed Research International*, 714230
3. **Loebel, C.**; D'Este, M.; Alini, M.; Zenobi-Wong, M.; Eglin, D. (2015) Precise tailoring of tyramine-based hyaluronan hydrogel properties using DMTMM conjugation. *Carbohydrate Polymers*, 115, 325-33
2. **Loebel, C.**; Czekanska, E.M.; Bruderer, M.; Salzmann, G.; Alini, M.; Stoddart, M.J. (2014) In vitro osteogenic potential of human mesenchymal stem cells is predicted by Runx2/Sox9 ratio. *Tissue Engineering Part A*, 21(1-2), 115-23
1. **Loebel, C.**; Czekanska, E.M.; Staudacher, J.; Salzmann, G.; Richards, R.G.; Alini, M.; Stoddart, M. J. (2014) The calcification potential of human MSCs can be enhanced by interleukin-1beta in osteogenic medium. *Journal of Tissue Engineering and Regenerative Medicine*, 11(2), 564-571

INVITED PRESENTATIONS

6. **TERMIS World Congress. 'Osteochondral defects: engineering the cell-matrix interface with additive manufacturing'** Symposium. 'Engineering the cell-matrix interface - understanding and guiding cell function.' Maastrich, Netherlands, 2021.
5. **Virtual Seminars in Biomedical Science.** 'Metabolic labeling in 3D cell-hydrogel studies', 2020.
4. **Bioengineering Seminar Series, Temple University.** 'Engineering the cell-material interface to direct cell behavior and fate.' Philadelphia, PA, 2019.
3. **Martin-Luther University Halle-Wittenberg.** 'Engineering hyaluronan hydrogels to modulate cell behavior.' Halle-Saale, Germany, 2018.
2. **American Chemical Society Mid-Atlantic Student Chapter Seminar Series, Drexel University.** 'Engineered hydrogels for musculoskeletal tissue repair.' Philadelphia, PA, 2017.

1. **University Hospital Regensburg.** 'Engineering hyaluronan hydrogels to modulate stem cell behavior.' Regensburg, Germany, 2017.

CONTRIBUTED PRESENTATIONS

12. **Loebel, C.;** Zepp, J.A.; Morrisey, E.E.; Burdick, J.A., Microstructured Hydrogels for Scalable and Purified Production of Bronchial Organoids, Biomedical Engineering Society Annual Meeting, Philadelphia, PA USA, October 2019

11. **Loebel, C.;** Kwon, M.; Duan, T.; Mauck, R.L.; Burdick, J.A., Metabolic Labeling to Probe Temporal Changes in the Pericellular Matrix at the Cell-Hydrogel Interface, Biomedical Engineering Society Annual Meeting, Philadelphia, PA USA, October 2019

10. **Loebel, C.;** Mauck, R.L.; Burdick, J.A., Nascent protein secretion directs cell mechanosensing and function in three-dimensional hydrogels, Society for Biomaterials Annual Meeting, Seattle, WA USA, April 2019.

9. **Loebel, C.;** Mauck, R.L.; Burdick, J.A., Nascent protein secretion and remodeling guide mesenchymal stromal cell behavior and fate in three-dimensional hydrogels, Gordon Research Conference (Signal Transduction by Engineered Extracellular Matrices), Andover, NH USA, July 2018.

8. **Loebel, C.;** Mauck, R.L.; Burdick, J.A., Nascent protein secretion and remodeling guide mesenchymal stromal cell behavior and fate in three-dimensional hydrogels, Gordon Research Seminar (Signal Transduction by Engineered Extracellular Matrices), Andover, NH USA, July 2018.

7. **Loebel, C.;** Ayoub A.; Galarraga J.H.; Kossover, O.; Simaan-Yameen, H.; Seliktar, D.; Burdick, J.A., Tailoring supramolecular guest-host hydrogel viscoelasticity with covalent double networks, Society for Biomaterials Annual Meeting, Atlanta, GA USA, April 2018.

6. **Loebel, C.;** Ayoub A.; Galarraga J.H.; Kossover, O.; Simaan-Yameen, H.; Seliktar, D.; Burdick, J.A., Tailoring supramolecular guest-host hydrogel viscoelasticity with covalent double networks, Northeast Bioengineering Conference, Philadelphia, PA USA, March 2018.

5. **Loebel, C.;** Rodell, C.B.; Burdick, J.A., Injectable supramolecular double-network hyaluronic acid hydrogel towards stem cell chondrogenesis, Tissue Engineering and Regenerative Medicine Annual Meeting, Davos, Switzerland, June 2017.

4. **Loebel, C.;** Cosgrove, B.D.; Alini, M.; Zenobi-Wong M.; Mauck R.L.; Eglin E., Crosslinking Chemistry of Tyramine-Modified Hyaluronan Hydrogels Alters Mesenchymal Stem Cell Attachment and Behavior, World Biomaterial Conference, Montreal, Canada, May 2016.

3. **Loebel, C.;** Stauber, T.; D'Este, M.; Alini, M.; Zenobi-Wong, M.; Eglin, D., Tailoring of DMTMM conjugated HA-Tyr allows precise control of cellular environment, European Society for Biomaterials, Kraków, Poland, September 2015.

2. **Loebel, C.;** D'Este, M.; Alini, M.; Zenobi-Wong, M.; Eglin, D., Precise tailoring of tyramine based hyaluronan hydrogels using DMTMM conjugation, European Orthopaedic Research Society Annual Meeting, Nantès, France, July 2014.

1. **Loebel, C.;** Czekanska, E.M.; Alini, M.; Stoddart, M.J., Early prediction of osteogenic potential of human MSCs by Runx2/Sox9 ratio, European Orthopaedic Research Society Annual Meeting, Nantès, France, July 2014.

TEACHING AND MENTORING EXPERIENCE

Courses - University of Pennsylvania

Guest lecturer, BE 553 Principles, Methods, and Applications of Tissue Engineering	Spring 2020
Guest lecturer, CAMB703/BE640 The ECM, Adhesion Receptor Signaling, and Translational Biomechanics	Spring 2020
Guest lecturer, BE 553 Principles, Methods, and Applications of Tissue Engineering	Spring 2019

Students Mentored

Bruce Enzmann, Undergraduate Student, University of Pennsylvania	2020 -present
Christina Hummel, Undergraduate Student, University of Pennsylvania	2019
Nikolas DiCaprio, Undergraduate Student, University of Pennsylvania	2018
Karyll Davis, Master Student, University of Pennsylvania	2018
Ryan Daniels, PhD Rotation student, University of Pennsylvania	2018
Tianbi Duan, Master Student, University of Pennsylvania	2017-2019
Aleksandra Sadowska, Semester project, ETH Zurich	2016
Jan O. Voss, M.D., Medical Research Fellow, AO Research Institute	2014
Tino Stauber, Semester project, ETH Zurich	2014

PROFESSIONAL SERVICE

Conference Organization and Committees

- GRS STEEM Co-Chair 2022
- Vice Chair (Chair 2022), Society for Biomaterials, Young Scientist Group 2019-present
- Student Activity Chair, Tissue Engineering and Regenerative Medicine Annual Meeting, Davos, Switzerland 2017
- Young Scientist Secretary, Tissue Engineering and Regenerative Medicine Council 2016-2017
- Young Scientist Representative, European Society for Biomaterials 2016-2017
- Young Scientist Secretary, Swiss Society for Biomaterials and Regenerative Medicine 2014-2016
- Young Scientist Representative, Task Force Regenerative Medicine Swiss Society for Biomaterials and Regenerative Medicine 2014-2015

Journal Referee: Acta Biomaterialia, Carbohydrate Polymers, ACS Biomaterials Science & Engineering, Stem Cells, Nature Materials, Scientific Reports, Soft Matter, Tissue Engineering