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Kerim B. Kaylan

Education

2021 (expected) **M.D.**
University of Illinois College of Medicine, Chicago, IL.

2017 **Ph.D.**, *Bioengineering*.
University of Illinois at Urbana–Champaign, Urbana, IL.
Dissertation: Dissecting combinatorial microenvironmental regulation of cell fate and function using a multi-modal arraying platform.

2016 **M.S.**, *Bioengineering*.
University of Illinois at Urbana–Champaign, Urbana, IL.
Thesis: Engineered microenvironments for studying liver progenitor differentiation.

2012 **B.S.E.**, *Biomedical Engineering*.
University of Michigan, Ann Arbor, MI.
Graduated *magna cum laude*.

Research and Industry Experience

1/2018–Present **Microfabricated Tissue Models Laboratory**, Department of Bioengineering, University of Illinois at Chicago.
Advisor: Prof. Salman R. Khetani.

8/2012–7/2017 **Tissue Development and Engineering Laboratory**, *Graduate Research Assistant*, Department of Bioengineering, University of Illinois at Urbana–Champaign.
Advisor: Prof. Gregory H. Underhill.

6/2011–12/2011 **Genentech, Inc.**, *Cooperative*, Biological Technologies, South San Francisco, CA.
Manager: Dr. Guoying Jiang.

9/2010–5/2011 **NeuroNexus, Inc.**, *Student Engineer*, Ann Arbor, MI.
Manager: Dr. John Seymour.

9/2009–5/2011 **Micro/Nano/Molecular Biotechnology Laboratory**, *Undergraduate Research Assistant*, Department of Biomedical Engineering, University of Michigan.
Advisors: Prof. Shuichi Takayama, Dr. Hossein Tavana.

Awards and Honors

2019 **Chancellor's Student Service Award**, University of Illinois at Chicago.

2017 **Teacher Ranked as Excellent**, *Cell and Tissue Biology*, University of Illinois College of Medicine.

2016 **Teacher Ranked as Excellent**, *Cell and Tissue Biology*, University of Illinois College of Medicine.

2008 **Michigan Promise Scholarship**, *$1,000*, State of Michigan.

2008 **Michigan Competitive Scholarship**, *$1,300*, State of Michigan.

Grants and Fellowships

2016 **Medical Student Interest Group Matching Grant Program**, *$500*, Intersociety Council for Pathology Information.

2016 **National Science Foundation I-Corps**, *$2,000*, University of Illinois at Urbana–Champaign Site Cohort 11.

2015 **Medical Student Interest Group Matching Grant Program**, *$750*, Intersociety Council for Pathology Information.

2014 **O'Morchoe Leadership Fellowship**, *$1,500*, University of Illinois College of Medicine.

2010 **Summer Biomedical and Life Science Fellowship**, *$4,000*, University of Michigan Undergraduate Research Opportunity Program.

Publications

Journal Articles

Asterisk (*) indicates equal authorship.

[A1] **K. B. Kaylan**, I. C. Berg, M. J. Biehl, A. Brougham-Cook, I. Jain, S. M. Jamil, L. H. Sargeant, N. J. Cornell, L. T. Raetzman, and G. H. Underhill. "Spatial patterning of liver progenitor cell differentiation mediated by cellular contractility and Notch signaling". In: *eLife* 7 (Dec. 2018). DOI: 10.7554/elife.38536.

[A2] M. J. Biehl, **K. B. Kaylan**, R. J. Thompson, R. V. Gonzalez, K. E. Weis, G. H. Underhill, and L. T. Raetzman. "Cellular fate decisions in the developing female anteroventral periventricular nucleus are regulated by canonical Notch signaling". In: *Developmental Biology* 442.1 (June 2018), pp. 87–100. DOI: 10.1016/j.ydbio.2018.06.005.

[A3] R. C. A. Eguiluz, **K. B. Kaylan**, G. H. Underhill, and D. E. Leckband. "Substrate stiffness and VE-cadherin mechano-transduction coordinate to regulate endothelial monolayer integrity". In: *Biomaterials* 140 (Sept. 2017), pp. 45–57. DOI: 10.1016/j.biomaterials.2017.06.010.

[A4] **K. B. Kaylan**, A. P. Kourouklis, and G. H. Underhill. "A high-throughput cell microarray platform for correlative analysis of cell differentiation and traction forces". In: *Journal of Visualized Experiments: JoVE* 121 (Mar. 2017). DOI: 10.3791/55362.

[A5] **K. B. Kaylan**, S. D. Gentile, L. E. Milling, K. N. Bhinge, F. Kosari, and G. H. Underhill. "Mapping lung tumor cell drug responses as a function of matrix context and genotype using cell microarrays". In: *Integrative Biology* 8.12 (Oct. 2016), pp. 1221–1231. DOI: 10.1039/c6ib00179c.

[A6] A. P. Kourouklis*, **K. B. Kaylan***, and G. H. Underhill. "Substrate stiffness and matrix composition coordinately control the differentiation of liver progenitor cells". In: *Biomaterials* 99 (Aug. 2016), pp. 82–94. DOI: 10.1016/j.biomaterials.2016.05.016.

[A7] E. Atefi, D. Fyffe, **K. B. Kaylan**, and H. Tavana. "Characterization of aqueous two-phase systems from volume and density measurements". In: *Journal of Chemical & Engineering Data* 61.4 (Mar. 2016), pp. 1531–1539. DOI: 10.1021/acs.jced.5b00901.

[A8] **K. B. Kaylan***, V. Ermilova*, R. C. Yada, and G. H. Underhill. "Combinatorial microenvironmental regulation of liver progenitor differentiation by Notch ligands, TGFβ, and extracellular matrix". In: *Scientific Reports* 6.23490 (Mar. 2016). DOI: 10.1038/srep23490.

[A9] H. Tavana, **K. Kaylan**, T. Bersano-Begey, K. E. Luker, G. D. Luker, and S. Takayama. "Rehydration of polymeric, aqueous, biphasic system facilitates high throughput cell exclusion patterning for cell migration studies". In: *Advanced Functional Materials* 21.15 (Aug. 2011), pp. 2920–2926. DOI: 10.1002/adfm.201002559.

Book Chapters

[B1] **K. B. Kaylan** and G. H. Underhill. "Hydrogels for hepatic tissue engineering". In: *Gels Handbook: Fundamentals, Properties and Applications Volume 2: Applications of Hydrogels in Regenerative Medicine*. 2016, pp. 427–462. DOI: 10.1142/9789813140394_0015.

Conference Abstracts and Proceedings

[C1] G. Underhill and **K. B. Kaylan**. "Spatial patterning of liver progenitor cell differentiation mediated by cell contractility and Notch signaling". In: *Nanotechnology in Medicine II: Bridging Translational In Vitro and In Vivo Interfaces*. Ed. by M. Sullivan, J. Sznitman, I. L. Eniola-Adefeso, and S. Kidambi. ECI Symposium Series. June 2018. URL: http://dc.engconfintl.org/nanotech_med_ii/24/.

[C2] **K. Kaylan**, I. Berg, and G. Underhill. "Notch signaling coordinates with cell contractility to regulate biliary differentiation of liver progenitor cells". Biomedical Engineering Society: Cellular and Molecular Bioengineering Conference. Jan. 2018. URL: https://www.bmes.org/files/CMBE_P58.pdf.

[C3] **K. Kaylan**, I. Berg, and G. Underhill. "Notch Signaling Coordinates with Cell Contractility to Drive Biliary Differentiation of Liver Progenitor Cells". Biomedical Engineering Society Annual Meeting. Oct. 2017.

[C4] M. J. Biehl, **K. B. Kaylan**, G. H. Underhill, and L. T. Raetzman. "Cell Fate Decisions in the Developing Hypothalamic Anteroventral Periventricular Nucleus Are Regulated By Canonical Notch Signaling". In: *Endocrine Reviews*. Vol. 38. 3. June 2017. URL: https://endo.confex.com/endo/2017endo/meetingapp.cgi/Paper/32664.

[C5] R. A. Eguiluz, M. Munim, **K. B. Kaylan**, G. H. Underhill, and D. E. Leckband. "VE-Cadherin Signals and Substrate Stiffness Regulate Force Transduction through Endothelial Monolayers-Cadherin Signals and Substrate Stiffness Regulate Force Transduction through Endothelial Monolayers". In: *AIChE Annual Meeting Proceedings*. Nov. 2016. URL: https://www.aiche.org/conferences/aiche-annual-meeting/2016/proceeding/paper/68g-ve-cadherin-signals-and-substrate-stiffness-regulate-force-transduction-through-endothelial.

[C6] A. Kourouklis, **K. Kaylan**, and G. Underhill. "Combinatorial ECM Arrays Reveal the Role of Biomechanics in Liver Progenitor Differentiation". In: *AIChE Annual Meeting Proceedings*. Nov. 2016. URL: https://www.aiche.org/conferences/aiche-annual-meeting/2016/proceeding/paper/725e-combinatorial-ecm-arrays-reveal-role-biomechanics-liver-progenitor-differentiation.

[C7] A. Kourouklis, **K. Kaylan**, and G. Underhill. "The Role of ECM Biomechanics in Liver Progenitor Differentiation". In: *AIChE Annual Meeting Proceedings*. Nov. 2016. URL: https://www.aiche.org/conferences/aiche-annual-meeting/2016/proceeding/paper/136i-role-ecm-biomechanics-liver-progenitor-differentiation.

[C8] A. P. Kourouklis, **K. B. Kaylan**, and G. H. Underhill. "Combinatorial ECM Arrays Reveal the Effects of Biomechanics in Liver Progenitor Differentiation". Biomedical Engineering Society Annual Meeting. Oct. 2016.

[C9] L. T. Raetzman, M. J. Biehl, **K. B. Kaylan**, and G. H. Underhill. "Uncovering the role of Notch signaling in early hypothalamic fate choices using primary neurospheres and microenvironment arrays". Gordon Research Conference: Notch Signaling in Development, Regeneration and Disease. June 2016.

[C10] A. P. Kourouklis, **K. B. Kaylan**, and G. H. Underhill. "Matrix Composition and Biophysical Characteristics Coordinately Influence Liver Progenitor Differentiation". American Society of Mechanical Engineers NanoEngineering for Medicine and Biology Conference. Feb. 2016. URL: https://www.asme.org/wwwasmeorg/media/ResourceFiles/Events/NEMB/NEMB2016FinalProgram.pdf.

Presentations

Oral Presentations

[O1] **K. B. Kaylan**. "Dissecting mechanisms of liver progenitor fate specification using cellular microarrays". Medical Scholars Program Retreat in Monticello, IL. Aug. 2017.

[O2] **K. B. Kaylan**, S. D. Gentile, L. E. Milling, K. N. Bhinge, F. Kosari, and G. H. Underhill. "Mapping tumor cell drug response as a function of matrix context using combinatorial cell microarrays". Biomedical Engineering Society Annual Meeting in Minneapolis, MN. Oct. 2016.

[O3] **K. B. Kaylan**. "Combinatorial microenvironmental regulation of liver progenitor differentiation by Notch ligands, TGFβ, and extracellular matrix". oSTEM Minority Research Symposium in Urbana, IL. Apr. 2016.

[O4] **K. B. Kaylan**, V. Ermilova, R. C. Yada, and G. H. Underhill. "Cellular microarrays reveal combinatorial effects of Notch ligands, TGFβ, and extracellular matrix on liver progenitor differentiation". American Society of Mechanical Engineers NanoEngineering for Medicine and Biology Conference in Houston, TX. Feb. 2016. URL: https://www.asme.org/wwwasmeorg/media/ResourceFiles/Events/NEMB/NEMB2016FinalProgram.pdf.

[O5] **K. B. Kaylan**. "Combinatorial microenvironmental regulation of liver progenitor differentiation by Notch ligands, TGFβ, and extracellular matrix". Bioengineering Graduate Student Seminar Series in Urbana, IL. Sept. 2015.

Poster Presentations

[P1] **K. B. Kaylan**. "Engineering microenvironments for studying liver development". Ideas on Tap Research Mixer in Chicago, IL. July 2018.

[P2] **K. B. Kaylan**. "Engineering microenvironments for studying liver development". College of Medicine Research Day in Chicago, IL. Dec. 2017.

[P3] **K. B. Kaylan**, S. D. Gentile, L. E. Milling, K. N. Bhinge, F. Kosari, and G. H. Underhill. "Combinatorial cell microarrays for analyzing ECM regulation of tumor cell drug response". Medical Scholars Program Retreat in Monticello, IL. Aug. 2015.

[P4] **K. B. Kaylan**, S. D. Gentile, L. E. Milling, K. N. Bhinge, F. Kosari, and G. H. Underhill. "Combinatorial cell microarrays for analyzing ECM regulation of tumor cell drug response". College of Medicine Research Day in Urbana, IL. Apr. 2015.

[P5] **K. B. Kaylan**, S. D. Gentile, L. E. Milling, K. N. Bhinge, F. Kosari, and G. H. Underhill. "Combinatorial cell microarrays for analyzing ECM regulation of tumor cell drug response". American Physician Scientists Association Annual Meeting in Chicago, IL. Apr. 2015.

[P6] **K. Kaylan**, V. Ermilova, and G. Underhill. "Arrayed microenvironments for probing liver progenitor cell fate decisions". Biomedical Engineering Society Meeting in San Antonio, TX. Oct. 2014.

[P7] **K. Kaylan**, V. Ermilova, and G. Underhill. "Deconstructing combinatorial microenvironmental regulation in hepatoblastoma using cell microarrays". Graduate Cancer Community Fall Symposium in Urbana, IL. Sept. 2014.

[P8] **K. Kaylan**, V. Ermilova, and G. Underhill. "Deconstructing combinatorial microenvironmental regulation in hepatoblastoma using cell microarrays". Medical Scholars Program Retreat in Monticello, IL. Aug. 2014.

[P9] **K. Kaylan**, V. Ermilova, and G. Underhill. "Deconstructing combinatorial microenvironmental regulation in hepatoblastoma using cell microarrays". Bioengineering Days in Urbana, IL. Feb. 2014.

[P10] **K. Kaylan**, V. Ermilova, and G. Underhill. "Deconstructing combinatorial microenvironmental regulation in hepatoblastoma using cell microarrays". College of Medicine Research Day in Urbana, IL. Feb. 2014.

[P11] **K. Kaylan**, I. Lesaca, G. Jiang, and H. Gazzano-Santoro. "Development of a functional assay for MAb1 utilizing peptide uptake". Genentech Analytical Development and Quality Control Poster Mixer in South San Francisco, CA. Oct. 2011.

[P12] **K. Kaylan**, I. Lesaca, G. Jiang, and H. Gazzano-Santoro. "Development of a functional assay for MAb1". Genetech Intern Poster Day in South San Francisco, CA. Aug. 2011.

[P13] **K. Kaylan**, H. Tavana, and S. Takayama. "A novel cell migration assay utilizing polymeric aqueous two-phase systems". Student Biomedical Research Forum in Ann Arbor, MI. Nov. 2010.

Teaching Experience

Graduate and Professional

1/2016–5/2017 **Cell and Tissue Biology**, *Teaching Assistant*, University of Illinois College of Medicine.

2/2014 **Quantitative Biotechnology**, *Guest Lecturer*, Department of Bioengineering, University of Illinois at Urbana–Champaign.

Undergraduate

8/2015–12/2015 **Introduction to Bioengineering**, *Mentor*, Department of Bioengineering, University of Illinois at Urbana–Champaign.

1/2014-5/2014 **Stem Cell Bioengineering**, *Grader*, Department of Bioengineering, University of Illinois at Urbana–Champaign.

8/2012–7/2017 **Tissue Development and Engineering Laboratory**, *Undergraduate Mentor*, University of Illinois at Urbana–Champaign.

1/2012–4/2012 **Quantitative Cell Biology**, *Instructional Aid*, Department of Biomedical Engineering, University of Michigan.

8/2011–5/2012 **Peer Mentor Program**, *Peer Mentor*, Engineering Advising Center, University of Michigan.

K-12

7/2016 **Worldwide Youth in Science and Engineering Camp**, *Facilitator*, College of Engineering, University of Illinois at Urbana–Champaign.

7/2015, 7/2016 **Discover Bioengineering Camp**, *Facilitator*, College of Engineering, University of Illinois at Urbana–Champaign.

2/2013 **Bioengineering the Future**, *Organizer and Primary Instructor*, University Lab High School, Urbana, IL.

Service

Departmental, College, and University Service

University of Illinois College of Medicine

11/2018–3/2019 Search Committee for Associate Dean of Curriculum.

9/2017–9/2018 USMLE Preparedness Committee.

4/2017 Medical Scholars Program Steering Committee.

3/2017 Teaching Excellence and Innovation in Education Award Selection Committee.

9/2012–8/2014 Medical Scholars Program Retreat Committee.

University of Illinois at Urbana–Champaign

11/2012–12/2012 Climate Survey Steering Committee.

Extracurricular University Service

University of Illinois College of Medicine

5/2018–4/2019 Student Curricular Board, *Special Projects Chair*.

9/2017–Present Student Curricular Board, *Special Projects Team Member*.

9/2016–7/2017 Medical Scholars Program Advisory Committee, *Co-Chair*.

9/2015–7/2017 Pathology Interest Group, *Organizer*.

5/2014–7/2017 Out in Medicine at Illinois, *Co-President*.

9/2013–8/2014 Medical Scholars Program Retreat Committee, *Co-Chair*.

8/2012–7/2017 Medical Scholars Program Advisory Committee.

8/2012–7/2017 Medical Scholars Program Advisory Committee. *Secretary*.

University of Illinois at Urbana–Champaign

8/2013–5/2016 Graduate Cancer Community Illinois, *Organizer*.

9/2012–8/2013 Engineering Graduate Student Advisory Committee.

University of Michigan

9/2010–5/2011 Biomedical Engineering Society, *Webmaster*.

Professional Affiliations

2017 American College of Physicians.
Medical student member.

2014 Biomedical Engineering Society.

2014 Tau Beta Pi—The Engineering Honor Society.

2013 American Physician Scientists Association.