KERIM B. KAYLAN
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EDUCATION

University of Illinois at Chicago, Chicago, IL

M.D. candidate, College of Medicine 8/2012–5/2021

University of Illinois at Urbana–Champaign, Urbana, IL

Ph.D. candidate, Department of Bioengineering 8/2012–5/2017
M.S., Bioengineering 5/2016

- Thesis: Engineered Microenvironments for Studying Liver Progenitor Differentiation
- Advisor: Prof. Gregory H. Underhill

University of Michigan, Ann Arbor, MI

B.S.E., Biomedical Engineering 4/2012

AWARDS AND HONORS

University of Illinois at Urbana–Champaign, Urbana, IL

- I-Corps, Site Cohort 11 1/2016
  National Science Foundation, $2,000
- Medical SIG Matching Grant Program 9/2015
  Intersociety Council for Pathology Information, $750
- O'Morchoe Leadership Fellowship 8/2014
  University of Illinois College of Medicine, $1,500

University of Michigan, Ann Arbor, MI

- Magna Cum Laude 4/2012
- Summer Biomedical and Life Sciences Fellowship 5/2010
  University of Michigan UROP, $4,000
- Dean's List (×3) 12/2009–4/2012
- University Honors (×4) 12/2009–4/2012
- Michigan Promise Scholarship 9/2008
  State of Michigan, $1,000
- Michigan Competitive Scholarship 9/2008
  State of Michigan, $1,300

EXPERIENCE

University of Illinois at Urbana–Champaign, Urbana, IL

Research Assistant, Department of Bioengineering 8/2012–Present

Advisor: Prof. Gregory H. Underhill

- Designed engineered approaches to study microenvironmental cues
- Studied cell–cell and cell–substrate interactions in stem cell fate
- Identified cell–matrix interactions which modulate tumor cell drug response

Genentech, Inc., South San Francisco, CA

Co-op, Biological Technologies 6/2011–12/2011
Manager: Dr. Guoying Jiang

- Designed a functional cell-based assay for a therapeutic monoclonal antibody (MAb1)
- Investigated alternative assay formats reflective of the MOA of MAb1
- Screened alternative cell lines for response and efficacy in the assay

NeuroNexus, Inc., Ann Arbor, MI

Student Engineer 9/2010–5/2011
Managers: Dr. John Seymour, Dr. Gregory Gage

- Catalogued design requirements for new optical neural stimulation systems
- Prototyped a portable optical neural stimulation system
- Optimized diode coupling efficiency using simulations and experiments

University of Michigan, Ann Arbor, MI

Research Assistant, Department of Biomedical Engineering 9/2009–5/2011
Advisors: Prof. Shuichi Takayama, Dr. Hossein Tavana

- Applied polymeric aqueous two-phase systems (ATPS) to biomolecule patterning
- Designed and validated a high-throughput ATPS cell migration assay
- Formulated SOPs for automated lab equipment

Publications

Asterisk (*) indicates authors who contributed equally to the work

- **Kaylan KB**, Kourouklis AP, Underhill GU. "High-throughput cell microarray platform for correlative analysis of cell differentiation and traction forces." *J. Vis. Exp.* (In revision.)
- **Kaylan KB**, Gentile SD, Milling LE, Bhinge KN, Kosari F, Underhill GU. "Mapping tumor cell drug response as a function of matrix context and genotype using combinatorial cell microarrays." *Integr. Biol.* 2016, in press. DOI: 10.1039/C6IB00179C.
- **Kaylan KB***, Kourouklis AP*, Underhill GU. "Substrate stiffness and matrix composition coordinately control the differentiation of liver progenitor cells." *Biomaterials.* 2016; 99: 82–94. DOI: 10.1016/j.biomaterials.2016.05.016.
- **Kaylan KB***, Ermilova V*, Yada RC, Underhill GU. "Combinatorial microenvironmental regulation of liver progenitor differentiation by Notch ligands, TGFβ, and extracellular matrix." *Sci. Rep.* 2016; 6(23490). DOI: 10.1038/srep23490.
- Atefi A, Fyffe D, **Kaylan KB**, Tavana H. "Characterization of aqueous two-phase systems from volume and density measurements." *J. Chem. Eng. Data.* 2016; 61(4): 1531–1539. DOI: 10.1021/acs.jced.5b00901.

- **Kaylan KB**, Underhill GH. "Hydrogels for hepatic tissue engineering" in *Gels Handbook: Fundamentals, Properties and Applications, Volume 2: Applications of Hydrogels in Regenerative Medicine*, eds. Abidian MR, Gurkan U, Edalat F. 2016. Hackensack, NJ: World Scientific Publishing. DOI: 10.1142/9789813140394_0015.
- Tavana H, **Kaylan K**, Bersano-Begey T, Luker KE, Luker GD and Takayama S. "Rehydration of polymeric, aqueous, biphasic system facilitates high throughput cell exclusion patterning for cell migration studies." *Adv. Funct. Mater.* 2011; 21(15): 2920–2926. DOI: 10.1002/adfm.201002559. (Highlighted as frontispiece; DOI: 10.1002/adfm.201190062.)

Conference Activity

Oral Presentations

- **Kaylan KB**, Gentile SD, Milling LE, Bhinge KN, Kosari F, Underhill GU. "Mapping Tumor Cell Drug Response as a Function of Matrix Context Using Combinatorial Cell Microarrays." Biomedical Engineering Society Annual Meeting, Minneapolis, MN. 6 Oct 2016.
- **Kaylan KB**, Ermilova V, Yada RC, Underhill GH. "Cellular microarrays reveal combinatorial effects of Notch ligands, TGFβ, and extracellular matrix on liver progenitor differentiation." Technical presentation. American Society of Mechanical Engineers NanoEngineering for Medicine and Biology Conference, Houston, TX. 23 Feb 2016.
- **Kaylan KB**. "Combinatorial microenvironmental regulation of liver progenitor differentiation by Notch ligands, TGFβ, and extracellular matrix." Seminar.
    - oSTEM Minority Research Symposium, Urbana, IL. 28 Apr 2016.
    - Bioengineering Graduate Student Seminar Series, Urbana, IL. 28 Sep 2015.

Poster Presentations

- **Kaylan KB**, Gentile SD, Milling LE, Bhinge KN, Kosari F, Underhill GH. "Combinatorial cell microarrays for analyzing ECM regulation of tumor cell drug response." Poster.
    - American Physician Scientists Association Annual Meeting, Chicago, IL. Apr 25 2015.
    - College of Medicine Research Day, Urbana, IL. Apr 16 2015.
    - Medical Scholars Program Retreat, Monticello, IL. 23 Aug 2015.
- **Kaylan K**, Ermilova V, Underhill G. "Arrayed microenvironments for probing liver progenitor cell fate decisions." Poster. Biomedical Engineering Society Meeting, San Antonio, TX. Oct 25 2014.
- **Kaylan K**, Ermilova V, Underhill G. "Deconstructing combinatorial microenvironmental regulation in hepatoblastoma using cell microarrays." Poster.
    - Bioengineering Days, Urbana, IL. 21 Feb 2014.
    - College of Medicine Research Day, Urbana, IL. 17 Apr 2014.
    - Medical Scholars Program Retreat, Monticello, IL. 23 Aug 2014.
    - Graduate Cancer Community Fall Symposium, Urbana, IL. 16 Sep 2014.
- **Kaylan K**, Lesaca I, Jiang G, Gazzano-Santoro H. "Development of a functional assay for MAb1 utilizing peptide uptake." Poster. Genentech Analytical Development and Quality Control Poster Mixer, South San Francisco, CA. 3 Oct 2011.

- **Kaylan K**, Lesaca I, Jiang G, Gazzano-Santoro, H. "Development of a functional assay for MAb1." Poster. Genentech Intern Poster Day, South San Francisco, CA. 11 Aug 2011.
- **Kaylan K**, Tavana H, Takayama S. "A novel cell migration assay utilizing polymeric aqueous two-phase systems." Poster. Student Biomedical Research Forum, Ann Arbor, MI. 4 Nov 2010.

Organized Conferences and Seminars

Graduate Cancer Community @ Illinois Seminar Series 9/2014–3/2015

- Organized six monthly seminars by professors conducting cancer-related research

Teaching and Mentoring

University of Illinois at Urbana–Champaign, Urbana, IL

Teaching Assistant, Cell and Tissue Biology, College of Medicine 8/2016–5/2017
Primary instructor: Prof. Benjamin Williams

- Supervised regular lab sessions
- Provided structured, hands-on review of histology

Facilitator, Discover Bioengineering, WYSE 7/2016
Primary instructors: Prof. Gregory H. Underhill

- Designed and taught module about the fundamentals of PCR to high school students

Teaching Assistant, Cell and Tissue Biology, College of Medicine 1/2016–5/2016
Primary instructor: Prof. Benjamin Williams

- Supervised regular lab sessions
- Provided structured, hands-on review of histology

Mentor, BIOE 120, Introduction to Bioengineering 9/2015–12/2015
Primary instructor: Mark Gryka

- Introduced three mentees to bioengineering research

Facilitator, Discover Bioengineering, WYSE 7/2015
Primary instructors: Prof. Gregory H. Underhill, Prof. Jennifer Amos

- Designed and taught module about the fundamentals of PCR to high school students

Guest Lecturer, BIOE 598 SAM, Quantitative Biotechnology 2/2014
Primary instructor: Prof. Sua Myong

Grader, BIOE 498/598 GU, Stem Cell Bioengineering 1/2014–5/2014
Primary instructor: Prof. Gregory H. Underhill

- Graded and provided written feedback on problem sets

Organizer and lecturer, Agora Week: Bioengineering the Future 12/2012–2/2013

- Organized, taught a week-long bioengineering course at University Lab High School
- Engaged and coordinated multiple graduate and faculty speakers

Mentor, Laboratory of Prof. Gregory H. Underhill 8/2012–Present

- Trained new lab members regarding safety and experimental protocols
- Guided and counseled mentees regarding scientific thinking
- Undergraduate mentees: Ravi Chandra Yada (2012–2015), Lauren Milling (2012–2015), Alex Loiben (2013–2014), Aneysha Bhat (2013–2014), David Kukla (2014–2015), Megan Griebel (2014–2016), Benjamin Streeter (2014–2016), Erik Anderson (2014–2016), Divya Joshi (2015),

Anna Whelan (2015–2016), Nicholas Cornell (2014–Present), Lauren Sargeant (2015–Present), Sameed Jamil (2015–Present), Ravi Malpani (2015–2016), Ashley Dettlaff (2016–Present), M. Elizabeth Rhode (2016–Present)

University of Michigan, Ann Arbor, MI

Teaching Assistant, BIOMEDE 418-001, Quantitative Cell Biology 1/2012–4/2012
Primary instructor: Prof. Shuichi Takayama

- Graded and administered problem sets and exams
- Organized and office hours and high-content review sessions for exams

Peer Mentor, Engineering Advising Center 8/2010–5/2011

- Advised mentee on gaining research/industry experience
- Provided information regarding academics and course scheduling

University Service and Outreach

University of Illinois at Urbana–Champaign, Urbana, IL

- Pathology Interest Group 9/2015–Present
  Organizer
- Out in Medicine 5/2014–Present
  Co-Chair
- Graduate Cancer Community @ Illinois 8/2013–05/2016
  Project Organizer
- Climate Survey Steering Committee 11/2012–12/2012
- Medical Scholars Program Retreat Committee 9/2012–8/2014
  Program Subcommitttee 9/2012–8/2014
  Co-Chair 9/2013-8/2014
- Engineering Graduate Student Advisory Committee 9/2012–8/2013
  Secretary
  Seminars Subcommittee
- Medical Scholars Program Advisory Committee 8/2012–Present
  Secretary 8/2012–Present
  Entering Class Representative 8/2012–8/2013
  Class I Representative 8/2013–8/2015
  Class II Representative 8/2015–Present
  Co-Chair 9/2016–Present

University of Michigan, Ann Arbor, MI

- Biomedical Engineering Society 9/2010–5/2011
  Executive Board Member
  Webmaster

Professional Affiliations

- American Society of Mechanical Engineers 2016–Present

- Tau Beta Pi—The Engineering Honor Society 2014-Present
- Biomedical Engineering Society 2014–Present
- American Physician Scientists Association 2013–Present
- American Medical Student Association 2012–Present

Technical Skills

Software

OS: OS X, Windows, GNU/Linux (Ubuntu, Red Hat)
Programming languages: R, MATLAB, LaTeX, C++, Markdown, HTML, CSS
Applications: RStudio, NIH ImageJ (Fiji), CellProfiler, GIMP, Inkscape, LabVIEW, SolidWorks

Wet laboratory

Cell biology: cell culture, viral transduction, cell migration assays
Molecular biology: immunoblotting, immunocytochemistry/immunofluorescence, qRT-PCR, ELISA, biolayer interferometry
Imaging: phase contrast, fluorescence, and confocal microscopy
Materials and fabrication: protein microarraying, hydrogel fabrication (PDMS, PA)
Automation: automated microscopy, robotic liquid handling

Analytical

Statistics: basic hypothesis testing, single and multiple linear regression, ANOVA, clustering analysis
Image analysis: automated high-throughput image cytometry (ImageJ, CellProfiler)

Publicity

- Microenvironmental regulation of liver development
  Department of Bioengineering, University of Illinois at Urbana–Champaign. Growth Factors, July 2016. "Underhill working to decipher microenvironments of liver." Retrieved from http://bioengineering.illinois.edu/news/underhill-working-decipher-liver.
- Graduate Cancer Community @ Illinois
  Cancer Community at Illinois. *Pathways*, Spring 2015, p. 9. Retrieved from https://illinois.edu/lb/files/2015/04/13/56713.pdf.
  Cancer Community at Illinois. *Pathways*, Fall 2014, p. 13. Retrieved from https://illinois.edu/lb/files/2014/09/12/53941.pdf.