

Joshua H. Cook

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EDUCATION

Harvard University, Harvard Medical School (2017-Present)

Biological and Biomedical Sciences Ph.D. Program
GPA: 3.87

University of California, Irvine (2013-2017)

Biochemistry & Molecular Biology, B.S. (with Honors)
Chemistry, B.S.
Cumulative GPA: 3.94 (Magna Cum Laude)

CURRENT RESEARCH

Research Advisors

Professor Kevin Haigis

Chief Scientific Officer, Dana-Farber Cancer Institute
Associate Professor of Medicine, Harvard Medical School

Professor Peter Park

Director, Bioinformatics and Integrative Genomics PhD program, HMS
Director, Center for Stem Cell Bioinformatics, Harvard Stem Cell Institute
Co-leader, Cancer Data Sciences Program, Dana-Farber/Harvard Cancer Center

Investigating mutational relationships in colorectal cancer

With Dr. Giorgio Melloni in the Park Lab, I am working to dissect comutation networks with the goal of uncovering therapeutic targets that account for the precise mutations of a patient's tumor.

Tissue specificity of *KRAS* mutations

In collaboration with the Gygi (Dept. of Cell Bio., HMS) and Lauffenburger (MIT) Labs, we are searching for the reasons underpinning the results of *KRAS* mutations in different tissues. The question we are asking is, "Why are some *KRAS* mutations only oncogenic in a subset of tissues?" with the desire to better understand the mechanisms by which *KRAS* mutations induce oncogenesis.

PREVIOUS RESEARCH

***Toxoplasma gondii* disrupts β 1 integrin signaling and focal adhesion formation during monocyte hypermotility (PMID: 29295815)**

Undergraduate Researcher — August 2014 - August 2017 — UC Irvine

In the laboratory of Professor Melissa Lodoen, I investigated the patterns and mechanisms of dissemination by which *Toxoplasma gondii*, an obligate, intracellular parasite, infects a human host.

Loss of *Magel2* impairs the development of hypothalamic anorexigenic circuits (PMID: 27288456)

Research Internship — Summer of 2014 — Saban Research Institute, Los Angeles

I studied the underlying causes of developmental disruptions within the hypothalamus that are characteristic of Prader-Willi syndrome under Dr. Sebastien Bouret.

The role of hepatic stem cells in the development of Alagille syndrome and biliary atresia

Research Internship — Summer of 2012 — Saban Research Institute, Los Angeles

Under the guidance of Dr. Kasper Wang, I researched the role of liver progenitor cells in these two rare, yet deadly, early onset diseases.

PUBLICATIONS

Cook, Joshua H et al. "The origins and genetic interactions of *KRAS* mutations are allele- and tissue-specific." *Nature communications* vol. 12,1 1808. 22 Mar. 2021, doi:10.1038/s41467-021-22125-z (PMID: 33753749)

Poulin, Emily J et al. "Tissue-Specific Oncogenic Activity of KRASA146T." *Cancer discovery* vol. 9,6 (2019): 738-755. doi:10.1158/2159-8290.CD-18-1220 (PMID: 30952657)

Cook, Joshua H et al. "*Toxoplasma gondii* disrupts β 1 integrin signaling and focal adhesion formation during monocyte hypermotility." *The Journal of biological chemistry* vol. 293,9 (2018): 3374-3385. doi:10.1074/jbc.M117.793281 (PMID: 30952657)

Maillard, Julien et al. "Loss of *Magel2* impairs the development of hypothalamic Anorexigenic circuits." *Human molecular genetics* vol. 25,15 (2016): 3208-3215. doi:10.1093/hmg/ddw169 (PMID: 27288456)

HONORS & AWARDS

April 8, 2019 — NSF Graduate Research Fellowship Program Honorable Mention

June 19, 2017 — Honors in Biological Sciences

May 19, 2017 — Phi Lambda Upsilon

“A national chemistry honorary society into which a few select graduating chemistry students are invited.”

May 19, 2017 — American Chemical Society Polymer Education Award

May 10, 2017 — Jayne Unzelman Scholarship (\$3,000)

“Undergraduate student, academic excellence and service to the School of Biological Sciences and/or the University, and service to the community.”

May 5, 2017 — UC Irvine Chancellor’s Award of Distinction

May 3, 2017 — Phi Beta Kappa

March 15, 2017 — Fulbright Fellowship Alternate

January 19, 2017 — Undergraduate Research Opportunities Program (UROP) Fellow and Grant Recipient (\$400)

October 12, 2016 — Malcolm R. Stacey Memorial Scholarship (\$500)

“Awarded to meritorious students of Jewish descent with financial need.”

June 21, 2016 — UCI Alumni Association 2016-17 Distinguished Anteaters¹ Award (\$1,500)

June 14, 2016 — Summer Undergraduate Research Program (\$1,300)

May 11, 2016 — UCI School of Bio Sci Brian Atwood Scholarship (\$3,000)

“Awarded to a Junior-level Biological Sciences major who has demonstrated outstanding achievement in both scholarship and service to the UCI community.”

May 3, 2016 — Robert Ernst Prize for Excellence in Research in the Biological Sciences (\$250)

April 27, 2016 — Excellence in Research

A UCI School of Biological Sciences undergraduate competition whereby each student submits a manuscript of their research project, gives an oral presentation, and holds a poster session.

March 31, 2016 — Barry Goldwater Scholar (\$7,500)

January 13, 2016 — UROP Fellow and Grant Recipient (\$500)

June 15, 2015 — UROP Honorary Fellowship

January 9, 2015 — UROP Fellow and Grant Recipient (\$500)

2014-2016 — UCI Dean’s Honor List (all 12 academic quarters)

2014-present — UCI Campuswide Honors Program

¹ The anteater is the UC Irvine mascot.

PRESENTATIONS

March 4, 2020 — Brigham and Women's Hospital, Genetics Research in Progress (oral): The genetic interaction network of mutationally activated *KRAS*.

May 14, 2016 — UCI Undergraduate Research Opportunities Program Symposium (poster): *Toxoplasma gondii*-induced hypermotility in human primary monocytes through the dysregulation of β 1 integrins.

April 19, 2016 — UCI Excellence in Research (poster): *Toxoplasma gondii*-induced hypermotility in human primary monocytes through the dysregulation of β 1 integrins.

April 12, 2016 — UCI Excellence in Research (oral): *Toxoplasma gondii*-induced hypermotility in human primary monocytes through the dysregulation of β 1 integrins.

April 9, 2016 — West Coast Biological Sciences Undergraduate Research Conference (oral): Hypermotility of human primary monocytes through the dysregulation of β 1 integrins by *Toxoplasma gondii*.

May 16, 2015 — UCI Undergraduate Research Opportunities Program Symposium (oral): Destabilization of cell adhesion in human monocytes infected with *Toxoplasma gondii*.

LEADERSHIP EXPERIENCE

LARC Tutor

August 2015 - September 2016

I led group tutoring sessions for undergraduate students as part of the Learning and Academic Resource Center (LARC) at UCI. I have tutored an Introductory Biology course, Biochemistry, Molecular Biology, and Calculus.

LARC Tutor Advisor

March 2016 - June 2017

I instructed LARC tutors in improving their tutorials and teaching methods. In addition, I spent a lot of time interacting with the tutors to make sure they were managing their course load and job in an efficient and healthy manner. I had an administrative role, as well. In particular, I orchestrated the scheduling and creation of LARC tutorials and handled day-to-day problems that inevitably arose.

Irvine Little League Manager

February 2016 - June 2016, January 2017 - July 2017

My first year, I co-managed a Majors division (11 - 12 year olds) baseball team in the Irvine Ranch Little League and co-managed the 11 year-old's All Star Team over the summer. My second season, I managed my own team in the AA division (8-10 year olds). I fulfilled several administrative roles including attending league meetings, organizing parent volunteers, and scheduling practices and games. My goal as a manager of these young

boys was to emulate maturity, determination, and level-headedness, especially when under pressure. Excitingly, my AA team was season champion and won the Irvine City Championship Tournament!

Campuswide Honors Program Peer Mentor

August 2016 - June 2017

I assisted four incoming freshmen in acclimating to UC Irvine. I supported them by alerting them to useful resources, answering questions they have about classes, and helping them work through a stressful period in their academic career.

Scholarship and Opportunities Program (SOP) Peer Scholars Mentoring Program

September 2016 - January 2017

I helped three UCI Barry Goldwater Scholarship applicants prepare their applications. Though the applicants had research experience and strong academic standing, they are inexperienced in drafting national scholarship applications. As I have won the Goldwater Scholarship and applied for the Churchill Scholarship and Fulbright Fellowship, my goal was to guide these students through the process and assist them in crafting a strong application.

Private Tutoring

September 2018 - Current

I tutor a high school student every evening. In any one night, our topics will range from history to physics to computer science. Mainly, I ensure that he understands the material and help him grasp topics he finds difficult. While I have a good handle on most of the information covered, sometimes his course material stretches well beyond my comfort level (for example, his Mandarin course). When I find myself in these scenarios, I probe his understanding by asking questions and having him teach me the material.

PROGRAMMING LANGUAGES

- Python
- R
- Swift
- Bash

ADDITIONAL SKILLS

- Bayesian statistical analysis (with PyMC3)
- Basic electrical engineering
- 3D modeling and Printing/Rapid-prototyping
- iOS, macOS, watchOS app development
- Web APIs (with FastAPI)

REFERENCES²

Kevin Haigis, PhD.

Affiliation: Principal Investigator
Chief Scientific Officer, Dana-Farber Cancer
Institute
Associate Professor of Medicine, Harvard
Medical School
kevin_haigis@dfci.harvard.edu

Melissa B. Lodoen, PhD.

Affiliation: Principal Investigator
Dept. of Molecular Biology & Biochemistry
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² More available upon request.