



JOSHUA COOK





Graduent Student Researcher

As an undergrad, I studied the parasite *Toxoplasma gondii*, and I currently study cancer genetics using bioinformatics with a specific focus on Bayesian methods. I am looking to once again switch disciplines but continue utilizing and improving my Bayesian statistical analysis skills.

EDUCATION

- present | 2017 • **Harvard Medical School**
Biomedical and Biological Sciences PhD. program  Boston, MA
Studying cancer genetics with bioinformatics and statistical modeling.
- 2017 | 2013 • **University of California, Irvine**
B.S. in Biochemistry and Molecular Biology & B.S. in Chemistry  Irvine, CA
Magna Cum Laude with a cumulative GPA of 3.94 and Honors in Biology.






RESEARCH EXPERIENCE

- present | 2017 • **Graduate Research**
Harvard Medical School  Boston, MA
My first project was to study the tissue- and allele-specific genetic interactions of *KRAS* in cancer using thousands of human tumor samples. Currently, I am analyzing CRISPR-Cas9 loss-of-function screens using Bayesian hierarchical models.
- 2017 | 2014 • **Undergraduate Research**
Dept. of Molecular Biology and Biochemistry, UCI  Irvine, CA
I investigated the patterns and mechanisms of dissemination by which *Toxoplasma gondii*, an obligate, intracellular parasite, infects a human host.
- 2014 • **Research Internship**
Saban Research Institute, Los Angeles  Los Angeles, CA
I studied the underlying causes of developmental disruptions within the hypothalamus that are characteristic of Prader-Willi syndrome.
- 2012 • **Research Internship**
Saban Research Institute, Los Angeles  Los Angeles, CA
I researched the role of liver progenitor cells in Alagille syndrome and biliary atresia, two rare, yet deadly, early-onset liver diseases.




PUBLICATIONS

- 2021 • **The origins and genetic interactions of *KRAS* mutations are allele- and tissue-specific**
Nat. Commun.
Joshua H Cook, Giorgio E M Melloni, Doga C Gulhan, Peter J Park, Kevin M Haigis





CONTACT INFO

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SKILLS














 Bayesian statistical modelling
 Data visualization
 iOS, macOS, and watchOS app development

PROGRAMMING LANGUAGES

 R
 Python
 Swift
 Bash

- 2019 ● **Tissue-Specific Oncogenic Activity of *KRAS*A146T**
Cancer Discov.
Emily J Poulin, Asim K Bera, Jia Lu, Yi-Jang Lin, Samantha Dale Strasser, Joao A Paulo, Tannie Q Huang, Carolina Morales, Wei Yan, **Joshua Cook**, Jonathan A Nowak, Douglas K Brubaker, Brian A Joughin, Christian W Johnson, Rebecca A DeStefanis, Phaedra C Ghazi, Sudershan Gondi, Thomas E Wales, Roxana E Iacob, Lana Bogdanova, Jessica J Gierut, Yina Li, John R Engen, Pedro A Perez-Mancera, Benjamin S Braun, Steven P Gygi, Douglas A Lauffenburger, Kenneth D Westover, Kevin M Haigis
- 2018 ● ***Toxoplasma gondii* disrupts β 1 integrin signaling and focal adhesion formation during monocyte hypermotility**
J. Biol. Chem.
Joshua H Cook, Norikiyo Ueno, Melissa B Lodoen
- 2016 ● **Loss of Magel2 impairs the development of hypothalamic Anorexigenic circuits**
Hum. Mol. Genet.
Julien Maillard, Soyoung Park, Sophie Croizier, Charlotte Vanacker, **Joshua H Cook**, Vincent Prevot, Maithe Tauber, Sebastien G Bouret

SOFTWARE

- **ggasym**  
Plotting asymmetric heatmaps in R.
- **mustashe**  
Caching and restoring the results of long-running computations in R.
- **boston311**  
Python package for querying Boston's 311 non-emergency reporting service.
- **textrank** 
Swift package for using the PageRank algorithm for text summarization.
- **Germinate**  
An iOS app for tracking seedling germination rates.
- **WaterMe** 
An iOS app for recording and scheduling when to water plants.
- **Plant Tracker**  
An iOS app for keeping track of a plant collection.
- **Workout Spinner**
An Apple Watch app for randomly selecting an exercise.
- **Telemetry Recorder** 
An Apple Watch app that records the watches accelerometer and gyroscope values and saves them a CSV in iCloud.
- **Brief**
A macOS app for summarizing text.

PRESENTATIONS

- Sept 2021 ● Cancer Research UK Trainee Meeting (oral): Modeling CRISPR-Cas9 screens to identify tissue-specific patterns.

Bayesian data analysis portfolio

Here is a [collection of Bayesian data analyses](#) I have done for my graduate research and personal projects.

Data visualization examples

You can peruse some of my data visualizations and analyses in my [TidyTuesday repository](#).

For BMI 707 *Deep Learning for Biomedical Data*, my group trained a [Generative Adversarial Network](#) to produce high-resolution, realistic hand X-rays and then analyzed the latent space to control the age of the generated hand.

Examine the result in our [report](#) and watch this [video](#) of us controlling the GAN to make aging hand radiographs.

- May 2021 • Harvard Medical School Cancer Signaling Meeting (oral): Tissue- and allele-specific genetic interactions of *KRAS*.
- Mar 2020 • Brigham and Women's Hospital, Genetics Research in Progress (oral): The genetic interaction network of mutationally activated *KRAS*.
- Oct 2019 • Cancer Research UK Progress Meeting (oral): Genetic description of oncogenic *KRAS* mutations.
- May 2016 • UCI Undergraduate Research Opportunities Program Symposium (poster): *Toxoplasma gondii*-induced hypermotility in human primary monocytes through the dysregulation of $\beta 1$ integrins.
- Apr 2016 • UCI Excellence in Research (poster): *Toxoplasma gondii*-induced hypermotility in human primary monocytes through the dysregulation of $\beta 1$ integrins.
- Apr 2016 • UCI Excellence in Research (oral): *Toxoplasma gondii*-induced hypermotility in human primary monocytes through the dysregulation of $\beta 1$ integrins.
- Apr 2016 • West Coast Biological Sciences Undergraduate Research Conference (oral): Hypermotility of human primary monocytes through the dysregulation of $\beta 1$ integrins by *Toxoplasma gondii*.
- May 2015 • UCI Undergraduate Research Opportunities Program Symposium (oral): Destabilization of cell adhesion in human monocytes infected with *Toxoplasma gondii*.



TEACHING EXPERIENCE

- Sept 2018
|
June 2021 • **Private Tutoring** 📍 Cambridge, MA
 - Tutored a high school student every evening in a variety of topics
 - Ensured that assignments were completed and submitted in time
- Aug 2019
|
Nov 2019 • **Teaching Assistant for BMI 713 *Computing Skills for Biomedical Sciences*** 📍 Boston, MA

Department of Biomedical Informatics, Harvard Medical School

 - Assisted with instruction during lectures and helped students during periods of interactive group work
 - Held weekly office hours and occasionally 1-on-1 tutoring sessions
 - Created and graded problem sets
- Aug 2015
|
Sept 2016 • **Tutor** 📍 Irvine, CA

UCI Learning and Academic Resource Center

 - Organized and led group tutoring sessions for undergraduate students
 - Tutored for courses in introductory biology, biochemistry, molecular biology, and calculus



LEADERSHIP AND MENTORING

- Feb 2016
|
June 2016, Jan 2017

● **Irvine Little League Manager**
Little League Baseball 📍 Irvine, CA

 - Co-managed a Majors division (11-12 year-olds) baseball team
 - Co-managed the 11 year-old's All Star Team over the summer
 - Managed my own team in the AA division (8-10 year-olds); season champions and won the Irvine City Championship Tournament
 - Attended league meetings, organized parent volunteers, and scheduled practices and games
- Mar 2016
|
June 2017

● **Tutor Advisor**
UCI Learning and Academic Resource Center (LARC) 📍 Irvine, CA

 - Trained other LARC tutors
 - Met with tutors to make sure they were managing their course load and job in an efficient and healthy manner
 - Scheduled LARC tutorials and handled day-to-day problems
- Aug 2016
|
June 2017

● **Peer Mentor**
UCI Campuswide Honors Program 📍 Irvine, CA

 - Assisted and supported four incoming UC Irvine freshman
 - Notified them of useful resources, answered questions they had about classes, and helped them work through the stress of beginning their undergraduate studies
- Sept 2016
|
Jan 2017

● **Peer Scholars Mentor**
Scholarship and Opportunities Program 📍 Irvine, CA

 - Helped three UCI students apply for the Barry Goldwater Scholarship



HONORS AND AWARDS

- Apr 2019

● NSF Graduate Research Fellowship Program Honorable Mention
- June 2017

● Honors in Biological Sciences
- May 2017

● Phi Lambda Upsilon

A national chemistry honorary society into which a few select graduating chemistry students are invited.
- May 2017

● American Chemical Society Polymer Education Award
- May 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 2017

● UC Irvine Chancellor's Award of Distinction
- May 2017

● Phi Beta Kappa

Mar 2017	● Fulbright Fellowship Alternate
Jan 2017	● Undergraduate Research Opportunities Program (UROP) Fellow and Grant Recipient (\$400)
Oct 2016	● Malcolm R. Stacey Memorial Scholarship (\$500) Awarded to meritorious students of Jewish descent with financial need.
June 2016	● UCI Alumni Association 2016-17 Distinguished Anteaters Award (\$1,500) The anteater is the UCI mascot.
June 2016	● Summer Undergraduate Research Program (\$1,300)
May 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 2016	● Robert Ernst Prize for Excellence in Research in the Biological Sciences (\$250)
Apr 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.
Mar 2016	● Barry Goldwater Scholar (\$7,500)
Jan 2016	● UROP Fellow and Grant Recipient (\$500)
June 2015	● UROP Honorary Fellowship
Jan	● 2015 UROP Fellow and Grant Recipient (\$500)
2017 2014	● UCI Dean's Honor List (all 12 academic quarters)
2017 2014	● UCI Campuswide Honors Program