Jacob Calvert

www.jacobcalvert.com ◇ jacob_calvert@berkeley.edu ◇ Google Scholar profile

Education

2017–2022	**Ph.D.**, Statistics, University of California, Berkeley Thesis: *Harmonic Activation and Transport* Advisor: Prof. Alan Hammond
2016–2017	**M.Sc.**, Mathematical and Theoretical Physics, University of Oxford Thesis: *Integrable Probability and Kardar-Parisi-Zhang Universality* Advisor: Prof. Ben Hambly
2015–2016	**M.Sc.**, Mathematical Sciences, University of Bristol Thesis: *Interacting Particle System Models of Hillslope Formation* Advisor: Prof. Márton Balázs
2011–2015	**B.S.**, Bioengineering, University of Illinois at Urbana-Champaign

Employment

Dascena, Inc. 2015–2022

Dascena develops models that provide clinicians early warning of disease onset in hospitalized patients. Dascena grew from a few employees to several hundred from 2015 to 2021 and attracted over $50 million in financing, before its acquisition in 2022.

- My roles included **CTO** and **Chief Scientist**.
- I led the research team that developed the **first** sepsis alert system to significantly improve outcomes in a clinical trial, which was subsequently deployed to hospitals across the U.S.
- I coauthored and coinvestigated **nine** successful research proposals to U.S. government agencies, totaling **$12 million** in support.

Publications and Preprints

Probability theory

- **Jacob Calvert**. Existence of a phase transition in harmonic activation and transport. *Under review.* Preprint available at *arXiv:2110.13893*.
- **Jacob Calvert**, Shirshendu Ganguly, and Alan Hammond. Collapse and diffusion in harmonic activation and transport. *Under review.* Preprint available at *arXiv:2110.13895*.
- **Jacob Calvert**, Alan Hammond, and Milind Hegde. Brownian structure in the KPZ fixed point. *Accepted to Astérisque.* Preprint available at *arXiv:1912.00992*.
- **Jacob Calvert**, Márton Balázs, and Katerina Michaelides. Unifying particle-based and continuum models of hillslope evolution with a probabilistic scaling technique. *Journal of Geophysical Research: Earth Surface*, 123(12):3124–3146, 2018.

Selected work in clinical data science

- Fernando Lejarza, **Jacob Calvert**, Misty Attwood, Daniel Evans, and Qingqing Mao. Optimal discharge of patients from intensive care via a data-driven policy learning framework. *Under review.* Preprint available at *arXiv:2112.09315*.

- Angier Allen, Samson Mataraso, Anna Siefkas, Hoyt Burdick, Gregory Braden, R. Phillip Dellinger, Andrea McCoy, Emily Pellegrini, Jana Hoffman, Abigail Green-Saxena, Gina Barnes, **Jacob Calvert**, and Ritankar Das. A racially unbiased, machine learning approach to prediction of mortality: Algorithm development study. *JMIR Public Health Surveillance*, 6(4):e22400, 2020.

- Sidney Le, Emily Pellegrini, Abigail Green-Saxena, Charlotte Summers, Jana Hoffman, **Jacob Calvert**, and Ritankar Das. Supervised machine learning for the early prediction of acute respiratory distress syndrome (ARDS). *Journal of Critical Care*, 60:96–102, 2020.

- Hoyt Burdick, Carson Lam, Samson Mataraso, Anna Siefkas, Gregory Braden, R. Phillip Dellinger, Andrea McCoy, Jean-Louis Vincent, Abigail Green-Saxena, Gina Barnes, Jana Hoffman, **Jacob Calvert**, Emily Pellegrini, and Ritankar Das. Prediction of respiratory decompensation in COVID-19 patients using machine learning: The READY trial. *Computers in Biology and Medicine*, 124:103949, 2020.

- Christopher Barton, Uli Chettipally, Yifan Zhou, Zirui Jiang, Anna Lynn-Palevsky, Sidney Le, **Jacob Calvert**, and Ritankar Das. Evaluation of a machine learning algorithm for up to 48-hour advance prediction of sepsis using six vital signs. *Computers in Biology and Medicine*, 109:79–84, 2019.

- Qingqing Mao, Melissa Jay, Jana Hoffman, **Jacob Calvert**, Christopher Barton, David Shimabukuro, Lisa Shieh, Uli Chettipally, Grant Fletcher, Yaniv Kerem, Yifan Zhou, and Ritankar Das. Multicentre validation of a sepsis prediction algorithm using only vital sign data in the emergency department, general ward and ICU. *BMJ Open*, 8(1), 2018.

- Thomas Desautels, Ritankar Das, **Jacob Calvert**, Monica Trivedi, Charlotte Summers, David Wales, and Ari Ercole. Prediction of early unplanned intensive care unit readmission in a UK tertiary care hospital: a cross-sectional machine learning approach. *BMJ Open*, 7(9), 2017.

- Thomas Desautels, **Jacob Calvert**, Jana Hoffman, Melissa Jay, Yaniv Kerem, Lisa Shieh, David Shimabukuro, Uli Chettipally, Mitchell Feldman, Chris Barton, David Wales, and Ritankar Das. Prediction of sepsis in the intensive care unit with minimal electronic health record data: A machine learning approach. *JMIR Medical Informatics*, 4(3):e28, 2016.

- **Jacob Calvert**, Daniel Price, Christopher Barton, Uli Chettipally, and Ritankar Das. Discharge recommendation based on a novel technique of homeostatic analysis. *Journal of the American Medical Informatics Association*, 24(1):24–29, 2016.

- **Jacob Calvert**, Daniel Price, Uli Chettipally, Christopher Barton, Mitchell Feldman, Jana Hoffman, Melissa Jay, and Ritankar Das. A computational approach to early sepsis detection. *Computers in Biology and Medicine*, 74:69–73, 2016.

Molecular biology

- Minji Kim, Alex Kreig, Chun-Ying Lee, H. Tomas Rube, **Jacob Calvert**, Jun Song, and Sua Myong. Quantitative analysis and prediction of G-quadruplex forming sequences in double-stranded DNA. *Nucleic Acids Research*, 44(10):4807–4817, 2016.

- Alex Kreig, **Jacob Calvert**, Janet Sanoica, Emily Cullum, Ramreddy Tipanna, and Sua Myong. G-quadruplex formation in double strand DNA probed by NMM and CV fluorescence. *Nucleic Acids Research*, 43(16):7961–7970, 2015.

- Helen Hwang, Alex Kreig, **Jacob Calvert**, Justin Lormand, Yongho Kwon, James Daley, Patrick Sung, Patricia Opresko, and Sua Myong. Telomeric overhang length determines structural dynamics and accessibility to telomerase and ALT-associated proteins. *Structure*, 22(6):842–853, 2014.

Selected Honors and Awards

2021 **Star Research Achievement Award**, Society of Critical Care Medicine

Awarded to the top $< 5\%$ of abstracts based on reviewer scores.

2020 **Outstanding Graduate Student Instructor Award**, UC Berkeley

Awarded to the top $< 10\%$ of GSIs based on student evaluations and other criteria.

2020 **Star Research Achievement Award**, Society of Critical Care Medicine

2019 **Alternate, National Defense Science and Engineering Graduate Fellowship**

2016 **Esteemed Paper Award** for "A computational approach to sepsis detection" [7]

Awarded to the top $< 5\%$ of papers in Computers in Biology and Medicine in 2016.

2015–2017 **Marshall Scholarship**

Funded graduate studies at University of Bristol and University of Oxford.

2015 **NSF Graduate Research Fellowship** (declined)

2014 **Barry M. Goldwater Scholarship**

2011–2015 **Edmund J. James Scholar**, University of Illinois at Urbana-Champaign

Presentations

Invited Talks

[12] **Jacob Calvert**. Harmonic Activation and Transport. *University of Wisconsin–Madison Probability Seminar* (virtual), February 2022.

[11] **Jacob Calvert**. Harmonic Activation and Transport. *Berkeley Probability Seminar* (virtual), February 2022.

[10] **Jacob Calvert** and Milind Hegde. The Quantitatively Brownian Nature of the Airy Line Ensemble. *Online Open Probability School* (virtual), June 2020.

Conference Talks

[9] **Jacob Calvert**, Maxime Faucher, Satish Casie Chetty, Sepideh Shokouhi, Daniel Evans, Gina Barnes, and Qingqing Mao. Early Prediction of Ventilator-Associated Pneumonia in Intensive Care Unit Patients Using an Intelligible Machine Learning Algorithm. *American Thoracic Society (ATS) International Conference*, San Francisco, CA, May 2022.

[8] Logan Ryan, Samson Mataraso, Anna Lynn-Palevsky, Emily Pellegrini, Gina Barnes, Abigail Green-Saxena, Jana Hoffman, **Jacob Calvert**, and Ritankar Das. A Machine Learning Approach to Predict Deep Venous Thrombosis Among Hospitalized Patients. *Society of Critical Care Medicine (SCCM) Critical Care Congress* (virtual), May 2021.

[7] Logan Ryan, Samson Mataraso, Anna Lynn-Palevsky, Emily Pellegrini, Gina Barnes, Jana Hoffman, **Jacob Calvert**, and Ritankar Das. A Machine Learning Algorithm for Predicting Pulmonary Embolism Among Hospitalized Patients. *Society of Critical Care Medicine (SCCM) Critical Care Congress* (virtual), February 2021.

[6] Elliot Crouser, Samson Mataraso, Sidney Le, **Jacob Calvert**, Jana Hoffman, Sarah Kehoe, Liliana Tejidor, Michael Pan, Hoyt Burdick, Eduardo Pino, David Persing, and Ritankar Das. Improved Performance of Sepsis Prediction Algorithm with Addition of Monocyte Distribution Width and White Blood Cell Count Inputs. *American Thoracic Society (ATS) International Conference* (virtual), November 2020.

[5] Angier Allen, Sidney Le, **Jacob Calvert**, Paul Palevsky, Gregory Braden, Sharad Patel, Emily Pellegrini, Abigail Green-Saxena, Jana Hoffman, and Ritankar Das. Development and Validation of a Convolutional Neural Network Model for ICU Acute Kidney Injury Prediction. *American Society of Nephrology (ASN) Kidney Week* (virtual), October 2020.

[4] Sidney Le, Samson Mataraso, **Jacob Calvert**, Jana Hoffman, Sarah Kehoe, Liliana Tejidor, Elliot Crouser, Michael Pan, Dave Persing, and Ritankar Das. Effects of Monocyte Distribution Width and White Blood Cell Count on a Sepsis Prediction Algorithm. *Society of Critical Care Medicine (SCCM) Critical Care Congress* (virtual), February 2020.

[3] **Jacob Calvert**, Alex Kreig, Saurabh Sinha, and Sua Myong. Computational Prediction of G-quadruplex Formation. *Biophysical Society (BPS) Annual Meeting*, Baltimore, MD, February 2015.

[2] **Jacob Calvert**, Alex Kreig, Saurabh Sinha, and Sua Myong. Computational Prediction of G-quadruplex Formation. *Biomedical Engineering Society (BMES) Annual Meeting*, San Antonio, TX, October 2014.

[1] **Jacob Calvert**, Helen Hwang, Alex Kreig, and Sua Myong. Telomere Overhang Accessibility Depends on Telomeric Repeat Number. *Biomedical Engineering Society (BMES) Annual Meeting*, Seattle, WA, September 2013.

Conference Posters

[20] Fernando Lejarza, **Jacob Calvert**, Misty Attwood, Daniel Evans, and Qingqing Mao. Optimal Discharge of Patients from Intensive Care Via a Data-Driven Policy Learning Framework. *American Medical Informatics Association (AMIA) Clinical Informatics Conference*, Houston, TX, May 2022.

[19] **Jacob Calvert**, Jieru Shen, Satish Casie Chetty, Sepideh Shokouhi, and Qingqing Mao. Massive External Validation of a Machine Learning Algorithm to Predict Pulmonary Embolism in Hospitalized Patients. *American Thoracic Society (ATS) International Conference*, San Francisco, CA, May 2022.

[18] Jenish Maharjan, **Jacob Calvert**, Gina Barnes, and Abigail Green-Saxena. Enriching the Study Population for Ischemic Stroke Therapeutic Trials Using a Machine Learning Algorithm. *American Heart Association (AHA) Scientific Sessions* (virtual), November 2021.

[17] Jenish Maharjan, Gina Barnes, **Jacob Calvert**, and Qingqing Mao. Predicting Pulmonary Embolism Among Hospitalized Patients with Machine Learning Algorithms. *American Heart Association (AHA) Scientific Sessions* (virtual), November 2021.

[16] **Jacob Calvert**, Christine Giang, Gina Barnes, Anna Siefkas, Abigail Green-Saxena, Jana Hoffman, Qingqing Mao, and Ritankar Das. Machine Learning Algorithms to Identify Patients at Risk of Ventilator-Associated Pneumonia. *American Thoracic Society (ATS) International Conference* (virtual), May 2021.

[15] Anna Siefkas, Carson Lam, Nicole Zelin, Gina Barnes, Jana Hoffman, **Jacob Calvert**, Qingqing Mao, and Ritankar Das. A Machine Learning Approach to Precision Medicine for COVID-19 Therapeutics. *American Thoracic Society (ATS) International Conference* (virtual), May 2021.

[14] Angier Allen, Anna Siefkas, Emily Pellegrini, Gina Barnes, Jana Hoffman, **Jacob Calvert**, Qingqing Mao, and Ritankar Das. A Digital Twins Machine Learning Model to Forecast Stroke Progression. *American Medical Informatics Association (AMIA) Clinical Informatics Conference* (virtual), May 2021.

[13] Carson Lam, Emily Pellegrini, Gina Barnes, Anna Siefkas, Jana Hoffman, **Jacob Calvert**, Qingqing Mao, and Ritankar Das. Machine Learning for Predicting COVID-19 Complications. *American Medical Informatics Association (AMIA) Clinical Informatics Conference* (virtual), May 2021.

[12] Saarang Panchavati, Carson Lam, Anurag Garikipati, Nicole Zelin, Emily Pellegrini, Gina Barnes, Anna Siefkas, Jana Hoffman, Megan Handley, **Jacob Calvert**, Qingqing Mao, and Ritankar Das. A Machine Learning Clincal Decision Support Tool for Myocardial Infarction Diagnosis. *American College of Cardiology Annual Scientific Session* (virtual), May 2021.

[11] Anna Siefkas, Yasha Ektefaie, Samson Mataraso, Gina Barnes, Emily Pellegrini, Abigail Green-Saxena, Jana Hoffman, **Jacob Calvert**, and Ritankar Das. Enriching the Study Population for Ischemic Stroke Therapeutic Trials Using Machine Learning. *Society of Critical Care Medicine (SCCM) Critical Care Congress* (virtual), February 2021.

[10] Sina Ghandian, Samson Mataraso, Emily Pellegrini, Anna Lynn-Palevsky, Gina Barnes, Abigail Green-Saxena, Jana Hoffman, **Jacob Calvert**, and Ritankar Das. A Machine Learning Approach to Acute Heart Failure Risk Stratification. *American Heart Association (AHA) Scientific Sessions* (virtual), November 2020.

[9] Saarang Panchavati, Anurag Garikipati, Emily Pellegrini, Anna Lynn-Palevsky, Gina Barnes, Jana Hoffman, **Jacob Calvert**, and Ritankar Das. A Machine Learning Approach to Early Identification of Acute Coronary Syndrome. *Heart Failure Society of America (HFSA) Virtual Annual Scientific Meeting* (virtual), October 2020.

[8] Carson Lam, Samson Mataraso, Anna Lynn-Palevsky, Abigail Green-Saxena, Gina Barnes, Jana Hoffman, **Jacob Calvert**, Emily Pellegrini, and Ritankar Das. Identification of a COVID-19 Subpopulation Responsive to Hydroxychloroquine Using Machine Learning: the IDENTIFY Trial. *International Society on Thrombosis and Haemostasis (ISTH) Virtual Congress* (virtual), July 2020.

[7] Christopher Barton, Thomas Desautels, Jana Hoffman, Qingqing Mao, Melissa Jay, **Jacob Calvert**, and Ritankar Das. Predicting Pediatric Severe Sepsis with Machine Learning Techniques. *American Thoracic Society (ATS) 2018 International Conference*, San Diego, CA, May 2018.

[6] Janet Sanoica, **Jacob Calvert**, Alex Kreig, Ramreddy Tipanna, and Sua Myong. Rapid Characterization of G-quadruplexes in Double-Stranded DNA. *Biomedical Engineering Society (BMES) Annual Meeting*, San Antonio, TX, October 2014.

[5] **Jacob Calvert**, Alex Kreig, and Sua Myong. Computational Modeling and Prediction of G-quadruplex Formation. *Graduate Cancer Community Symposium*, Champaign, IL, September 2014.

[4] Alex Kreig, **Jacob Calvert**, Ramreddy Tippana, and Sua Myong. G-quadruplex DNA Folding and Dynamics within Duplex DNA. *Biophysical Society (BPS) Annual Meeting*, San Francisco, CA, February 2014.

[3] **Jacob Calvert**, Alex Kreig, Saurabh Sinha, and Sua Myong. Probabilistic Modeling of G-quadruplex Formation. *Illinois Bioengineering 10th Anniversary Symposium*, Champaign, IL, November 2013.

[2] **Jacob Calvert**, Helen Hwang, Alex Kreig, and Sua Myong. Regulation of Human Telomere Accessibility by G-quadruplex DNA. *Illinois Bioengineering 10th Anniversary Symposium*, Champaign, IL, November 2013.

[1] **Jacob Calvert**, Alex Kreig, and Sua Myong. Computational Modeling and Prediction of G-quadruplex Formation. *Biomedical Engineering Society (BMES) Annual Meeting*, Seattle, WA, September 2013.

Research Supervision (*I supervised the following students during their research associateships at Dascena.*)

Start Date	End Date	Name	Student Type	Institution	Next
Jun 2021	Sep 2021	**Jieru Shen**	master's	Columbia University	American Express
Jun 2021	Sep 2021	**Maxime Faucher**	master's	Columbia University	Nauto
Feb 2020	May 2021	**Saarang Panchavati**	undergraduate	UC Berkeley	UCLA PhD
Nov 2019	May 2020	**Jenish Maharjan**	master's	Villanova University	Dascena
May 2019	Aug 2019	**Rohan Narain**	undergraduate	UC Berkeley	Leidos
Sep 2018	Aug 2019	**Abhinav Bhardwaj**	undergraduate	UC Berkeley	Yale PhD
Aug 2018	Dec 2018	**Christopher Fan**	undergraduate	UC Berkeley	Zendesk
Jun 2018	Dec 2018	**Sidney Le**	undergraduate	UC Berkeley	Dascena
May 2018	Aug 2018	**Manan Khattar**	undergraduate	UC Berkeley	Amelia
May 2018	Aug 2018	**Ryan Roggenkemper**	undergraduate	UC Berkeley	UC Berkeley MA

Jan 2017	Aug 2018	**Yifan Zhou**	undergraduate	UC Berkeley	U. of Michigan MS
Jan 2017	Aug 2018	**Zirui Jiang**	undergraduate	UC Berkeley	Johns Hopkins PhD
Nov 2015	Aug 2016	**Melissa Jay**	undergraduate	Colorado College	Dascena

Teaching (*GSI = graduate student instructor, TA = teaching assistant*)

GSI for Introduction to Statistics (STAT 2), UC Berkeley
Spring 2022 (Dr. Eaman Jahani): Led discussion sections; held office hours; graded problem sets and exams.

GSI for Probability Theory (MATH C218A), UC Berkeley
Fall 2021 (Prof. Steven Evans and Prof. Shirshendu Ganguly): Prepared problem sets and solutions; held office hours; graded problem sets and exams.

GSI for Concepts of Probability (STAT 134), UC Berkeley
Spring 2021, Fall 2020, Spring 2019 (Dr. Adam Lucas): Led discussion sections and review sessions; prepared exams, quizzes, and discussion worksheets; graded quizzes and exams.

GSI for Stochastic Processes (STAT 150), UC Berkeley
Fall 2019 (Prof. Jim Pitman) Led discussion sections and review sessions; prepared problem sets, exams, and solutions; graded problem sets and exams.
Fall 2018 (Dr. Brett Kolesnik) Guest-lectured; graded problem sets and exams.

GSI for Game Theory (STAT 155), UC Berkeley
Fall 2018 (Prof. Shirshendu Ganguly): Graded problem sets and exams.

TA for Computational Tools for Biological Data (BIOE 310), University of Illinois at Urbana-Champaign
Spring 2015 (Prof. Jian Ma): Held office hours; graded problem sets.

TA for Tissue Engineering (BIOE 476), University of Illinois at Urbana-Champaign
Fall 2014 (Prof. Gregory Underhill): Graded problem sets and exams.

TA for Cellular Bioengineering (BIOE 206), University of Illinois at Urbana-Champaign
Fall 2013 (Prof. Sua Myong): Guest-lectured; hosted review sessions; advised final projects; graded problem sets.

TA for Bioenergetics (BIOE 220), University of Illinois at Urbana-Champaign
Fall 2013 (Prof. Andrew Smith): Prepared problem sets and solutions.

Academic and Community Service

- **Peer review.** Ad hoc peer review of medical informatics and machine learning papers for journals including *Scientific Reports*, *BMC Medical Informatics and Decision Making*, *Critical Care Medicine*, *Journal of Medical Internet Research*, *BMC Medicine*, and *BMC Medical Research and Methodology*.
- **Co-organizing the Berkeley Probability Seminar.** For the 2021–2022 academic year, I co-organized the Berkeley Probability Seminar with Prof. Alan Hammond.
- **Service to the Goldwater Scholarship community.** Since 2020, I have served as a mentor in the Goldwater Scholarship community's mentorship program. I meet one-on-one with current Goldwater scholars each month to discuss research and share career advice.
- **Service to the National and International Scholarships Program.** Since 2016, I have regularly served on panels, as a mock interviewer, and as an application reviewer for the office at the University of Illinois at Urbana-Champaign which prepares and nominates students to compete for prestigious fellowships.

- **Service to the Berkeley Statistics Department.** For the 2018–2019 academic year, I represented the Statistics Department at the Berkeley Graduate Assembly.
- **Service to the University of Bristol School of Mathematics.** For the 2015–2016 academic year, I served as the liaison between the taught-course graduate math students and the science faculty.
- **Instructor, Girls' Adventures in Math, Engineering, and Science (GAMES) Camp (Summer 2014).** Led 36 high school girls through muscle physiology experiments.
- **Service as an *Engineering Ambassador* at the University of Illinois at Urbana-Champaign (2013–2015).** Conducted educational outreach to K–12 students from backgrounds that are underrepresented in engineering; participated in after-school programs for fourth graders at Booker T. Washington STEM Academy (Champaign, IL).
- **Service as a *Student Consultant on Teaching* at the University of Illinois at Urbana-Champaign (2013–2015).** Led course policy discussions for new faculty orientation; observed classrooms to provide feedback to lecturers.
- **Dean's Student Advisory Committee (2013–2014).** Collaborated with deans of the College of Engineering at the University of Illinois at Urbana-Champaign to incorporate student feedback into the design of computer labs; organized informational sessions on undergraduate research opportunities, which drew several hundred students.
- **Quantitative Biology Outreach Program (2012–2015).** Organized 12-week quantitative biology lecture series for students at Jefferson Middle School (Champaign, IL) with Prof. Sua Myong; provided educational materials to teachers in the surrounding area.