

# John Marshall, PhD

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## Short Bio

I am a mathematical biologist with expertise in infectious disease modeling and the use of genetics-based strategies to control mosquito disease vectors. I am PI of a Bill & Melinda Gates Foundation grant to provide modeling support for mosquito genetic control strategies for malaria elimination, and of an NIH project to develop landscape genomics methods to better quantify movement patterns of *Aedes aegypti* mosquitoes. I collaborate with several groups exploring the use of genetics-based systems to control *Anopheles gambiae*, the main African malaria vector, and *Ae. aegypti*, the main vector of dengue and Zika virus. At the UC Berkeley School of Public Health, I lead a research group that specializes in modeling of mosquito vectors and the diseases they transmit, and teach a course on mathematical modeling of infectious diseases.

## Appointments

2022 (August)-: **Honorary Professor**

[Department of Statistics](#), [University of Auckland](#), Aotearoa/New Zealand

- Conducting research on mathematical and statistical aspects of genomic methods to infer demographic parameters of mosquitoes

2022 (July)-: **Professor in Residence**

Divisions of [Epidemiology](#) & [Biostatistics](#), [School of Public Health](#), [University of California, Berkeley](#), USA

- Conducting research on mathematical epidemiology, malaria elimination, mosquito ecology and novel vector control strategies
- Teaching graduate level courses on infectious disease modeling
- Mentoring graduate students in epidemiology, biostatistics, computational biology and mathematical modeling

2020 (July)-2022 (June): **Associate Professor in Residence**

2015 (January)-2020 (June): **Assistant Professor in Residence**

Divisions of [Epidemiology](#) & [Biostatistics](#), [School of Public Health](#), [University of California, Berkeley](#), USA

2012 (October)-2014 (December): **Medical Research Council Research Fellow**

[Department of Infectious Disease Epidemiology](#), [Imperial College London](#), UK

- Worked towards designing confined field trials of gene drive mosquitoes on islands off the coast of Africa
- Developed skills in analysis of large data sets – data cleaning, cluster analysis, model fitting and Markov chain Monte Carlo methods
- Mentored graduate students in global health and mathematical modeling

2013 (October)-2014 (April): **Visiting Scholar**

[Center for Theoretical Evolutionary Genomics](#), [University of California, Berkeley](#), USA

- Investigated methods to determine the structure and demographic history of malaria-transmitting mosquito populations from genomic data

2010 (August)-2012 (September): **Research Associate**

[Department of Infectious Disease Epidemiology](#), [Imperial College London](#), UK

- Conducted surveys of human movement patterns of relevance to malaria transmission in Mali, Burkina Faso, Zambia and Tanzania
- Developed models for mosquito control and malaria epidemiology
- Co-organized a course on mathematical modeling of infectious diseases for public health professionals

2009 (July)-2010 (July): **Postdoctoral Scholar**

[Division of Biology and Biological Engineering](#), [California Institute of Technology](#), USA

- Designed new gene drive systems and developed mathematical models describing their spread
- Developed skills in genetic engineering and maintaining laboratory mosquito lines
- Trained graduate and postdoctoral students in population genetics

2009 (January-June): **Postdoctoral Fellow**

[Center for Society & Genetics](#), [University of California, Los Angeles](#), USA

- Analyzed surveys on the perspectives of people in Mali, West Africa to genetically modified mosquitoes for malaria control
- Analyzed international regulations for the environmental release of genetically modified mosquitoes
- Developed/lectured class on "Genetic engineering in developing countries"

2008 (July-December): **Postdoctoral Researcher**

[Department of Ecology & Evolutionary Biology](#), [University of California, Los Angeles](#), USA

Based at: [Malaria Research and Training Center](#), [University of Bamako](#), Mali

- Led a research team surveying the perspectives of people in Mali, West Africa to gene drive mosquitoes for malaria control
- Participated in ecological studies of mosquito dispersal
- Lectured and helped organize a WHO-sponsored workshop on developing a regulatory framework for releasing GM mosquitoes in Africa

2001 (January-December): **Editor**

[Craccum magazine](#), [Auckland University Students' Association](#), Aotearoa/New Zealand

- Edited a 48-page weekly magazine for University of Auckland students
- Managed a staff of ~30 writers, photographers, distributors, designers, webmasters and advertising managers
- Developed skills in written and verbal communication and leadership

## Education

2003 (August)-2008 (June):

**PhD (Biomathematics)**

[University of California, Los Angeles](#), USA

PhD thesis: [The dynamics of transposable elements in genetically modified mosquito vectors](#)

2003 (August)-2005 (December):

**MS (Biomathematics)**

[University of California, Los Angeles](#), USA

2000 (February)-2002 (November):

**BTech (Hons) (Optoelectronics)**

[University of Auckland](#), Aotearoa/New Zealand

1997 (February)-1999 (November):

**BSc (Biological sciences)**

[University of Auckland](#), Aotearoa/New Zealand

## Technical Skills and Competences

### Mathematics:

- Multivariate calculus, linear algebra, vector calculus
- Ordinary and partial differential equations, reaction-diffusion systems
- Probability theory, Markov chains, branching processes

### Statistics:

- Generalized linear models, maximum likelihood estimation
- Bayesian statistics, Markov chain Monte Carlo model fitting methods

### Software and programming:

- Mathematics & statistics: R, Matlab, Mathematica, Berkeley Madonna
- Programming languages: C++, Python

### Biology:

- Molecular biology: manipulation of DNA, PCR, gel electrophoresis
- Ecology: mosquito husbandry, mark-release-recapture experiments

### Social science and ethics:

- Quantitative & qualitative survey design, ethnography
- Research protocols for Institutional Review Boards

### Languages:

- English (mother tongue)
- French, Bambara (African language spoken in Mali) (intermediate)
- Mandarin Chinese, Spanish (beginner)

## Teaching

2015-2023: Lecturer, [PH 252B: Infectious Disease Modeling](#), University of California, Berkeley (Fall semester, 3 units, ~20 students)

2015-2019: Lecturer, [PH 290: Infectious Disease Modeling Seminar](#), University of California, Berkeley (Fall semester, 2 units, ~16 students)

2015-2016: Lecturer, [PH 145: Statistical Analysis of Continuous Outcome Data](#), University of California, Berkeley (Fall semester, 4 units, ~45 students)

2011-2014: Co-organizer/lecturer/demonstrator, [Short Course in Epidemiology](#), Imperial College London (Summer, professional course, ~30 students)

2009: Lecturer, Genetic Engineering in Developing Countries, University of California, Los Angeles (Winter quarter, 2 units, ~20 students)

2008-2010: Lecturer, Biosafety training course for Africa related to the potential release of genetically modified disease vectors, University of Bamako, Mali (Summer, professional course, ~20 students)

2005: Lecturer/demonstrator, Hidden Markov Models for Bioacoustic Analysis, University of California, Los Angeles (Spring quarter, 2 units, ~15 students)

### Awards:

School of Public Health Committee on Teaching Excellence Award (Spring & Fall 2015, Spring & Fall 2016, Spring 2017, Spring & Fall 2018, Spring & Fall 2019, Spring 2020, Spring 2021, Spring 2022, Fall 2023)

### Postdocs supervised (advisor):

Dr. Rodrigo M. Corder (Bill & Melinda Gates Foundation-funded postdoc, 2021-2023)

Dr. Eileen H. Jeffrey Gutiérrez (NIH-funded postdoc, 2021-2023)

Dr. Sanjay Lamba (Tata Institute Fellow, 2019-2021)

Dr. Yogita Sharma (Innovative Genomics Institute-funded postdoc, 2018-2022)

Dr. Gordana Rašić (DARPA-funded postdoc, 2018-2021)  
Dr. Tomás León (DARPA-funded postdoc, 2018-2020)  
Dr. Victor Ferman (DARPA-funded postdoc, 2018-2019)  
Dr. Héctor M. Sánchez C. (UC Irvine Malaria Initiative-funded postdoc, 2017-2020)  
Dr. Samson S. Kiware (Wellcome Trust Fellow, 2015-2018)

**PhD students supervised (dissertation chair):**

Shuyi Yang (Biostatistics, 2024-)  
Victor Mero (Epidemiology, 2023-)  
Dr. Agastya Mondal (Epidemiology, 2020-2024)  
Dr. Valeri N. Vásquez (Energy & Resources, 2018-2023)  
Dr. Jared B. Bennett (Biophysics, 2017-2021)  
Dr. Sean L. Wu (Epidemiology, 2016-2020)

**MA/MPH students supervised (thesis advisor):**

Shuyi Yang (Biostatistics, 2023-2024)  
Emma Lonstrup (Epidemiology & Biostatistics, 2022-2024)  
Natasha Harrison (Epidemiology & Biostatistics, 2021-2022)  
Thien-An Ha (Epidemiology & Biostatistics, 2019-2020)  
Dr. Sean L. Wu (Epidemiology & Biostatistics, 2015-2016)  
Jaclyn Guerrero (Epidemiology & Biostatistics, 2015-2016)

**Undergraduate students supervised (thesis advisor):**

Darpa Anireddy (Public Health, 2021-2022)  
Biyonka Liang (Statistics, 2019-2020)

**Grants Awarded**

Social Capital Foundation grant, “Mozeroa 2030: Innovative mosquito control on Huahine Island.” (2024) Role: Co-PI (\$300,000 total).

Open Philanthropy grant, “Cost-effectiveness analysis of pgSIT technology for malaria control.” (2022) Role: Subaward PI (\$63,011 to Marshall Lab, \$190,000 total).

Bill & Melinda Gates Foundation grant, “Modeling support for genetics-based malaria vector control strategies.” (2021-2024) Role: PI (\$800,000 award to Marshall Lab).

EPA STAR grant, “Development of data-driven model of assessing benefits and risk: pgSIT for *Ae. aegypti* eradication in Hawaii.” (2021-2024) Role: Co-I (\$43,405 to Marshall Lab, \$750,000 total).

NIH R01 grant, “Understanding mosquito movement and its relevance to control through genetic analysis.” (2020-2025) Role: PI (\$914,356 to Marshall Lab, \$1,735,802 total).

NIH R01 grant, “Public engagement for gene drive technology.” (2020-2024) Role: Co-I (\$125,955 sub-award to Marshall Lab).

DARPA grant, “Safely engineering various classes of gene drives to control a major invasive disease vector, *Ae. aegypti*.” (2017-2021) Role: Co-PI (\$1,809,506 to Marshall Lab, \$14,949,052 total).

UC Irvine sub-contract, “UC Irvine Malaria Initiative.” (2017-2025) Role: Co-PI (\$1,029,311 sub-award to Marshall Lab).

Innovative Genomics Institute grant, “CRISPR-Cas9-based gene drive architecture for control of agricultural pests.” (2017-2020) Role: PI (\$246,000 award to Marshall Lab).

CITRIS and the Banatao Institute seed funding grant, “Machine Learning for Vector-

borne Disease Surveillance.” (2019-2020) Role: PI (\$12,500 to Marshall Lab, \$25,000 total).

NIAID grant, “Measuring spillover effects of reactive, focal malaria elimination interventions.” (2019-2023) Role: Co-I (\$586,474 total).

NVIDIA GPU grant, “Statistical and machine learning methods to predict mosquito population densities.” (2018) Role: PI (\$3,000 award to Marshall Lab).

University of Washington sub-contract, “Strategic planning tools for staging malaria elimination.” (2017-2020) Role: Subaward PI (\$117,740 sub-award to Marshall Lab)

UC Berkeley sub-contract, “Effects of agricultural expansion and intensification on infectious diseases.” (2017) Role: Sub-contractor (\$12,194 sub-award to Marshall Lab).

UC Davis SVM Vector-Borne Disease Pilot Grant Program, “Working toward the eradication of *Aedes aegypti*, an invasive arbovirus vector, in California.” (2016-2017) Role: Co-I (\$25,000 total).

Bill & Melinda Gates Foundation sub-contract, “Prototype of technology’s role to facilitate surveillance needs for malaria elimination.” (2015-2017) Role: Subaward PI (\$26,695 sub-award to Marshall Lab).

University of California Institute for Mexico and the United States grant, “Determining optimal strategies for the control of vectors of dengue and other vector borne diseases in Mexico and the United States.” (2015-2016) Role: PI (\$12,500 to Marshall Lab, \$25,000 total).

Sean Parker Foundation grant “Malaria Elimination Initiative on a new vector control for malaria elimination.” (2015-2016) Role: Subaward PI (\$80,832 sub-award to Marshall Lab).

UC Davis Signature Research in Genomics Program Award, “Advanced genomic tools for estimating dispersal of African malaria vectors.” (2015-2016) Role: Co-I (\$45,000 total).

UK Medical Research Council grant, “Optimal trial design for a confined release of malaria-refractory transgenic mosquitoes.” (2012-2015) Role: PI (£285,103 award to Marshall Lab).

## Peer-reviewed Publications

1. Wills P, **Marshall JM**, Smith P (2004) [Genetic information and self-organised criticality](#). *Europhysics Letters* 68: 901-907.
2. **Marshall JM**, Weiss R (2006) [A Bayesian heterogeneous analysis of variance approach to inferring recent selective sweeps](#). *Genetics* 173: 2357-2370.
3. **Marshall JM**, Morikawa K, Manoukis N, Taylor CE (2007) [Predicting the effectiveness of population replacement strategy using mathematical modeling](#). *J. Vis. Exp.* 5: 227.
4. **Marshall JM** (2008) [The impact of dissociation on transposon-mediated disease control strategies](#). *Genetics* 178: 1673-1682.
5. **Marshall JM** (2008) [A branching process model for the early spread of a transposable element in a diploid population](#). *J. Math. Biol.* 57: 811-840.
6. **Marshall JM** (2009) [The effect of gene drive on containment of transgenic mosquitoes](#). *J. Theor. Biol.* 258: 250-265.

7. **Marshall JM**, Taylor CE (2009) [Malaria control with transgenic mosquitoes](#). PLoS Medicine 6: e1000020.
8. **Marshall JM**, Touré MB, Traore MM, Taylor CE (2010) [Towards a quantitative assessment of public attitudes to transgenic mosquitoes: Questions based on a qualitative survey in Mali](#). AsPac. J. Mol. Biol. Biotechnol. 18: 251-273.
9. **Marshall JM**, Toure MB, Traore MM, Famenini S, Taylor CE (2010) [Perspectives of people in Mali toward genetically modified mosquitoes for malaria control](#). Malar. J 9: 128.
10. **Marshall JM** (2010) [The Cartagena Protocol and genetically modified mosquitoes](#). Nat. Biotech. 28: 896-897.
11. **Marshall JM** (2011) [The Cartagena Protocol in the context of recent releases of transgenic and Wolbachia-infected mosquitoes](#). AsPac. J. Mol. Biol. Biotechnol. 19: 93-100.
12. **Marshall JM** (2011) [The toxin and antidote puzzle: New ways to control insect pest populations through manipulating inheritance](#). Bioeng. Bugs. 2: 1-6.
13. **Marshall JM**, Hay BA (2011) [Inverse Medea as a novel gene drive system for local population replacement: A theoretical analysis](#). J. Hered. 102: 336-341.
14. **Marshall JM**, Pittman GW, Buchman AB, Hay BA (2011) [Semele: A killer-male, rescue-female system for suppression and replacement of insect disease vector populations](#). Genetics 187: 535-551.
15. Akbari OS\*, Chen CH\*, **Marshall JM\***, Huang H, Antoshechkin I, Hay BA (2012) [Novel synthetic Medea selfish genetic elements drive population replacement in Drosophila: a theoretical exploration of Medea-dependent population suppression](#). ACS Synth. Biol. 3: 915-928. \*Equal contribution
16. De Silva P, **Marshall JM** (2012) [Factors contributing to urban malaria transmission in sub-Saharan Africa: A systematic review](#). J. Trop. Med. 2012: 819563.
17. **Marshall JM**, Hay BA (2012) [General principles of single-construct chromosomal gene drive](#). Evolution. 66: 2150-2166.
18. **Marshall JM**, Hay BA (2012) [Confinement of gene drive systems to local populations: A comparative analysis](#). J. Theor. Biol. 294: 153-171.
19. Gattton ML, Chitnis N, Churcher T, Donnelly MJ, Ghani AC, Godfray HCJ, Gould F, Hastings I, **Marshall JM**, Ranson H, Rowland M, Shaman J, Lindsay SW (2013) [The importance of mosquito behavioral adaptations to malaria control in Africa](#). Evolution 67: 1218-1230.
20. Akbari OS\*, Matzen KD\*, **Marshall JM\***, Huang H, Ward CM, Hay BA (2013) [A synthetic gene drive system for local, reversible modification and suppression of insect populations](#). Curr. Biol. 23: 671-677. \*Equal contribution
21. **Marshall JM**, White MT, Ghani AC, Schlein Y, Muller GC, Beier JC (2013) [Quantifying the mosquito's sweet tooth: Modelling the effectiveness of attractive toxic sugar baits \(ATSB\) for malaria vector control](#). Malar. J. 12: 291.
22. White MT, Lwetoijera D, **Marshall JM**, Caron-Lormier G, Bohan DA, Denholm I, Devine GJ (2014) [Negative cross resistance mediated by co-treated bed nets: A potential means of restoring pyrethroid-susceptibility to malaria vectors](#). PLoS ONE 9: e95640.

23. Okorie PN, **Marshall JM**, Akpa MO, George AO (2014) [Perceptions and recommendations by scientists for a potential release of genetically modified mosquitoes in Nigeria](#). *Malar. J.* 13: 154.
24. **Marshall JM**, Hay BA (2014) [Medusa: A novel gene drive system for confined suppression of mosquito populations](#). *PLoS ONE* 9: e102694.
25. Zhu L, Qualls WA, **Marshall JM**, Arheart KL, DeAngelis DL, McManus JW, Traore SF, Doumbia S, Schlein Y, Müller GC, Beier JC (2015) [A spatial individual-based model predicting a great impact of copious sugar sources and resting sites on survival of \*Anopheles gambiae\* and malaria parasite transmission](#). *Malar. J.* 14: 59.
26. Zhu L, **Marshall JM**, Qualls WA, Schlein Y, McManus JW, Arheart KL, Hlaing WM, Traore SF, Doumbia S, Müller GC, Beier JC (2015) [Modelling optimum use of attractive toxic sugar bait stations for effective malaria vector control in Africa](#). *Malar. J.* 14: 492.
27. Cheng Q, Jing Q, Spear RC, **Marshall JM**, Yang Z, Gong P (2016) [Climate and timing of imported cases as determinants of the dengue outbreak in Guangzhou, 2014: Evidence from a mathematical model](#). *PLoS NTDs* 10: e0004417.
28. **Marshall JM**, Touré MB, Ouédraogo AL, Ndhlovu M, Kiware SS, Rezai A, Nkhama E, Griffin JT, Hollingsworth TD, Doumbia S, Govella NJ, Ferguson NM, Ghani AC (2016) [Key traveller groups of relevance to spatial malaria transmission: A survey of movement patterns in four sub-Saharan African countries](#). *Malar. J.* 15: 200.
29. **Marshall JM**, Bennett A, Kiware SS, Sturrock HJW (2016) [The hitchhiking parasite: Why human movement matters to malaria transmission and what we can do about it](#). *Trends Parasitol.* 32: 752–755.
30. Killeen GF, Kiware SS, Okumu FO, Sinka ME, Moyes CL, Massey NC, Gething PW, **Marshall JM**, Chaccour CJ, Tusting LS (2017) [Going beyond personal protection against mosquito bites to eliminate malaria transmission: population suppression of malaria vectors that exploit both human and animal blood](#). *BMJ Global Health* 2: e000198.
31. Killeen GF, Tatarsky A, Diabate A, Chaccour CJ, **Marshall JM**, Okumu FO, Brunner S, Newby G, Williams YA, Malone D, Tusting LS, Gosling RD (2017) [Developing an expanded vector control toolbox for malaria elimination](#). *BMJ Global Health* 2: e000211.
32. Killeen GF, **Marshall JM**, Kiware SS, Andy S, Chaki PP, Govella NJ (2017) [Measuring, manipulating and exploiting behaviors of adult mosquitoes to optimize malaria vector control impact](#). *BMJ Global Health* 2: e000212.
33. **Marshall JM**, Buchman B, Sanchez HM, Akbari OS (2017) [Overcoming evolved resistance to population-suppressing homing-based gene drives](#). *Nature Scientific Reports* 7: 3776.
34. Cheng Q, Jing Q, Spear RC, **Marshall JM**, Yang Z, Gong P (2017) [The interplay of climate, intervention and imported cases in determining the potential and final epidemic size of dengue outbreak in Guangzhou](#). *PLoS NTDs* 11: e0005701.
35. Zhu L, Muller GC, **Marshall JM**, Arheart KL, Qualls WA, Hlaing WM, Schlein Y, Traore SF, Doumbia S, Beier JC (2017) [Is outdoor vector control needed for malaria elimination? An individual-based modelling study](#). *Malaria Journal* 16: 266.
36. Adelman Z, Akbari O, Bauer J, Bier E, Bloss C, Carter SR, Callender C, Costero-Saint Denis A, Cowhey P, Dass B, Delborne J, Devereaux M, Ellsworth P,

- Friedman RM, Gantz V, Hay BA, Hoddle M, James AA, James S, Jorgenson L, Kalichman M, **Marshall JM**, McGinnis W, Newman J, Pearson A, Quemada H, Rudenko L, Shelton A, Vinetz JM, Weisman J, Wong B, Wozniak C (2017) [Rules of the road for insect gene drive research and testing](#). Nat. Biotech. 35: 716-718.
37. Kiware SS, Chitnis N, Tatarsky A, Wu SL, Sanchez HM, Gosling R, Smith DL, **Marshall JM** (2017) [Attacking the mosquito on multiple fronts: Insights from the Vector Control Optimization Model \(VCOM\) for malaria elimination](#). PLoS ONE 12: e0187680.
38. Benedict MQ, Bier E, Burt A, Capurro ML, De Barro P, Handler AM, Hayes KR, **Marshall JM**, Tabachnick WJ, Adelman ZN (2018) [Recommendations for laboratory containment and management of gene drive systems in arthropods](#). Vector Borne Zoonotic Dis 18: 2-13.
39. **Marshall JM**, Akbari OS (2018) [Can CRISPR-based gene drive be confined in the wild? A question for molecular and population biology](#). ACS Chemical Biology 13: 424-430.
40. Buchman A, Ivy T, **Marshall JM**, Akbari OS, Hay BA (2018) [Engineered reciprocal chromosome translocations drive high threshold, reversible population replacement in Drosophila](#). ACS Synthetic Biology 7: 1359-1370.
41. Buchman A, **Marshall JM**, Ostrovski D, Yang T, Akbari OS (2018) [Synthetically engineered Medea gene drive system in the worldwide crop pest D. sukukii](#). Proc Natl Acad Sci USA 115: 4725-4730.
42. Jing QL, Cheng Q, **Marshall JM**, Hu WB, Yang ZC, Lu JH (2018) [Imported cases and minimum temperature drive dengue transmission in Guangzhou, China: Evidence from an ARIMAX model](#). Epidemiology & Infection 146: 1226-1235.
43. **Marshall JM**, Wu SL, Sánchez HM, Kiware SS, Ndhlovu M, Ouédraogo AL, Touré MB, Sturrock HJ, Ghani AC, Ferguson NM (2018) [Mathematical models of human mobility of relevance to malaria transmission in Africa](#). Nature Scientific Reports 8: 7713.
44. Carami EM, Eckermann KN, Ahmed HMM, Sánchez HM, Dippel S, **Marshall JM**, Wimmer EA (2018) [Consequences of resistance evolution in a Cas9-based sex-conversion suppression gene drive for insect pest management](#). Proceedings of the National Academy of Sciences USA 115: 6189-6194.
45. Arakala A, Hoover CM, **Marshall JM**, Sokolow SH, De Leo GA, Rohr JR, Remais JV, Gambhir M (2018) [Estimating the elimination feasibility in the “end game” of control efforts for parasites subjected to regular mass drug administration: Methods and their application to schistosomiasis](#). PLoS Neglected Tropical Diseases 12: e0006794.
46. Kandul NP, Liu J, Sánchez HM, Wu SL, **Marshall JM**, Akbari OS (2019) [Transforming insect population control with precision guided sterile males](#). Nature Communications 10: 84.
47. Lee Y, Schmidt H, Collier TC, Conner WR, Hanemaaijer MJ, Slatkin M, **Marshall JM**, Chiu JC, Smartt CT, Lanzaro GC, Mulligan FS, Cornel AJ (2019) [Genome-wide divergence among invasive populations of Aedes aegypti in California](#). BMC Genomics 20: 204.
48. Kandul NP, Liu J, Sánchez HM, Wu SL, **Marshall JM**, Akbari OS (2019) [Reply to ‘Concerns about the feasibility of using “precision guided sterile males” to control insects’](#). Nature Communications 10: 3955.
49. Sánchez HM, Wu SL, Bennett JB, **Marshall JM** (2019) [MGDrivE: A modular](#)

- [simulation framework for the spread of gene drives through spatially-explicit mosquito populations](#). *Methods in Ecology and Evolution* 11: 229-239.
50. **Marshall JM**, Raban R, Kandul NP, Edula JR, León T, Akbari OS (2019) [Winning the tug-of-war between effector gene design and pathogen evolution in vector population replacement strategies](#). *Frontiers in Genetics* 10: 1072.
51. Zhang Z, Jing Q, Chen Z, Li T, Jiang L, Li Y, Luo L, **Marshall JM**, Yang Z (2019) [The increasing menace of dengue in Guangzhou, 2001–2016: The most important epicenter in mainland China](#). *BMC Infectious Diseases* 19: 1002.
52. Pham TB, Phong CH, Bennett JB, Hwang K, Jasinskiene N, Parker K, Stillinger D, **Marshall JM**, Carballar-Lejarazú R, James AA (2019) [Experimental population modification of the malaria vector mosquito, \*Anopheles stephensi\*](#). *PLoS Genetics* 15: e1008440.
53. López VD, Bishop AL, Sánchez HM, Bennett JB, Feng X, **Marshall JM**, Bier E, Gantz VM (2020) [A transcomplementing gene drive provides a flexible platform for laboratory investigation and potential field deployment](#). *Nature Communications* 11: 352.
54. Li M, Yang T, Kandul NP, Bui M, Gamez S, Raban R, Bennett JB, Sánchez HM, Lanzaro GC, Schmidt H, Lee Y, **Marshall JM**, Akbari OS (2020) [Development of a confinable gene-drive system in the human disease vector, \*Aedes aegypti\*](#). *eLife* 9: e51701.
55. Friedman RM, **Marshall JM**, Akbari OS (2020) [Gene drives: New and improved](#). *Issues in Science and Technology* 36: 72-78.
56. Raban RR, **Marshall JM**, Akbari OS (2020) [Progress toward engineering gene drives for population control](#). *Journal of Experimental Biology* 223: jeb208181.
57. James SL, **Marshall JM**, Christophides GK, Okumu FO, Nolan T (2020) [Toward the definition of efficacy and safety criteria for advancing gene drive-modified mosquitoes to field testing](#). *Vector-Borne and Zoonotic Diseases* 20: 237-251.
58. Wu SL, Sánchez HM, Henry JM, Citron DT, Zhang Q, Compton KE, Liang B, Verma A, Cummings DAT, Le Menach A, Scott TW, Wilson AL, Lindsay SW, Moyes CL, Hancock PA, Russell TL, Burkot TR, **Marshall JM**, Kiware S, Reiner RC, Smith DL (2020) [Vector bionomics and vectorial capacity as emergent properties of mosquito behaviors and ecology](#). *PLoS Computational Biology* 16: e1007446.
59. Sánchez HM, Bennett JB, Wu SL, Rašić G, Akbari OS, **Marshall JM** (2020) [Confinement and reversibility of threshold-dependent gene drive systems in spatially-explicit \*Aedes aegypti\* populations](#). *BMC Biology* 18: 50.
60. Cheung C, Gamez S, Carballar-Lejarazú R, Ferman V, Vásquez VN, Terradas G, Ishikawa J, Schairer CE, Bier E, **Marshall JM**, James AA, Akbari OS, Bloss CS (2020) [Translating gene drive science to promote linguistic diversity in community and stakeholder engagement](#). *Global Public Health* 15: 1551-1565.
61. Xu XS, Bulger EA, Gantz VM, Klanseck C, Heimler SR, Auradkar A, Bennett JB, Miller LA, Leahy S, Juste SS, Buchman A, Akbari OS, **Marshall JM**, Bier E (2020) [Active genetic neutralizing elements for halting or deleting gene drives](#). *Molecular Cell* 80: 246-262.
62. Adolphi A, Gantz VM, Jasinskiene N, Lee HF, Hwang K, Bulger EA, Ramaiah A, Bennett JB, Terradas G, Emerson JJ, **Marshall JM**, Bier E, James AA (2020) [Efficient population modification gene-drive rescue system in the malaria mosquito](#)

[Anopheles stephensi](#). Nature Communications 11: 5553.

63. Long KC, Alphey L, Annas GJ, Bloss CS, Campbell KJ, Champer J, Chen CH, Choudhary A, Church GM, Collins JP, Cooper KL, Delborne JA, Edwards OR, Emerson CI, Esvelt K, Evans SW, Friedman RM, Gantz VM, Gould F, Hartley S, Heitman E, Hemingway J, Kanuka H, Kuzma J, Lavery JV, Lee Y, Lorenzen M, Lunshof JE, **Marshall JM**, Messer PW, Montell C, Oye KA, Palmer MJ, Papatianos PA, Paradkar PN, Piaggio AJ, Rasgon JL, Rašić G, Rudenko L, Saah JR, Scott MJ, Sutton JT, Vorsino AE, Akbari OS (2020) [Core commitments for field trials of gene drive organisms](#). Science 370: 1417-1419.

64. Kormos A, Lanzaro GC, Bier E, Dimopoulos G, **Marshall JM**, Pinto J, dos Santos AA, Bacar A, Sacramento Rompão HSP, James AA (2020) [Application of the relationship-based model to engagement for field trials of genetically engineered malaria vectors](#). American Journal of Tropical Medicine and Hygiene 104: 805-811.

65. Ma M, Wu SL, He Z, Yuan L, Bai Z, Jiang L, **Marshall JM**, Lu J, Yang Z, Jing QL (2021) [New genotype invasion of dengue virus serotype 1 drove massive outbreak in Guangzhou, China](#). Parasites & Vectors 14: 126.

66. Kandul NP, Liu J, Bennett JB, **Marshall JM**, Akbari OS (2021) [A confinable home-and-rescue gene drive for population modification](#). eLife 10: e65939.

67. Terradas G, Buchman AB, Bennett JB, Shriner I, **Marshall JM**, Akbari OS, Bier E (2021) [Inherently confinable split-drive systems in Drosophila](#). Nature Communications 12: 1480.

68. Rerolle F, Dantzer E, Lover AA, **Marshall JM**, Hongvanthong B, Sturrock HJW, Bennett A (2021) [Spatio-temporal associations between deforestation and malaria incidence in Lao PDR](#). eLife 10: e56974.

69. Fraser KJ, Mwandigha L, Traore S, Traore M, Doumbia S, Junnila A, Revay E, Beier J, **Marshall JM**, Ghani AC, Muller G (2021) [Estimating the potential of Attractive Targeted Sugar Baits \(ATSBs\) as a new vector control tool for Plasmodium falciparum malaria](#). Malaria Journal 20: 151.

70. Wu SL, Bennett JB, Sánchez HM, Dolgert AJ, León TM, **Marshall JM** (2021) [MGDrive 2: A simulation framework for gene drive systems incorporating seasonality and epidemiological dynamics](#). PLoS Computational Biology 17: e1009030.

71. Buchman A, Shriner I, Yang T, Liu J, Antoshechkin I, **Marshall JM**, Perry MW, Akbari OS (2021) [Engineered reproductively isolated species drive reversible population replacement](#). Nature Communications 12: 3281.

72. Lanzaro GC, Sánchez HM, Collier TC, **Marshall JM**, James AA (2021) [Population modification strategies for malaria vector control are uniquely resilient to observed levels of gene drive resistance alleles](#). BioEssays 43: e2000282.

73. Rerolle F, Jacobson JO, Wesson P, Dantzer E, Lover AA, Hongvanthong B, Smith J, **Marshall JM**, Sturrock HJW, Bennett A (2021) [Population size estimation of seasonal forest-going populations in Southern Lao PDR](#). Nature Scientific Reports 11: 14816.

74. Wang GH, Gamez S, Raban RR, **Marshall JM**, Alphey L, Li M, Rasgon JL, Akbari OS (2021) [Combating mosquito-borne diseases using genetic control technologies](#). Nature Communications 12: 4388.

75. Legros M, **Marshall JM**, Macfadyen S, Hayes KR, Sheppard A, Barrett LG (2021) [Gene drive strategies of pest control in agricultural systems: Challenges and opportunities](#). Evolutionary Applications 14: 2162-2178.

76. Ha T, León TM, Lalangui K, Ponce P, **Marshall JM**, Cevallos V (2021) [Household-level risk factors for \*Aedes aegypti\* pupal density in Guayaquil, Ecuador](#). *Parasites & Vectors* 14: 458.
77. Li M, Yang T, Bui M, Gamez S, Wise T, Kandul NP, Liu J, Alcantara L, Lee H, Edula JR, Raban R, Zhan Y, Wang Y, DeBeaubien N, Chan J, Sánchez C. HM, Bennett JB, Antoshechkin I, Montell C, **Marshall JM**, Akbari OS (2021) [Eliminating mosquitoes with precision guided sterile males](#). *Nature Communications* 12: 5374.
78. Gamez S, Chaverra-Rodriguez D, Buchman A, Kandul NP, Mendez-Sanchez SC, Bennett JB, Sánchez C. HM, Yang T, Antoshechkin I, Duque JE, Papatianos PA, **Marshall JM**, Akbari OS (2021) [Exploiting a Y chromosome-linked Cas9 for sex selection and gene drive](#). *Nature Communications* 12: 7202.
79. Rašić G, Lobo NF, Jeffrey Gutiérrez EH, Sánchez C. HM, **Marshall JM** (2022) [Monitoring needs for gene drive mosquito projects: Lessons from vector control field trials and invasive species](#). *Frontiers in Genetics* 12: 780327.
80. Kaduskar B, Kushwah RBS, Auradkar A, Guichard A, Li M, Bennett JB, Ferreira Julio AH, **Marshall JM**, Montell C, Bier E (2022) [Reversing insecticide resistance with allelic-drive in \*Drosophila melanogaster\*](#). *Nature Communications* 13: 291.
81. Mondal A, Vásquez VN, **Marshall JM** (2022) [Target product profiles for mosquito gene drives: Incorporating insights from mathematical models](#). *Frontiers in Tropical Diseases* 3: 828876.
82. Hossain MP, Zhou W, Ren C, **Marshall JM**, Yuan HY (2022) [Determining the effects of preseasonal climate factors toward dengue early warning system in Bangladesh](#). *PLoS Global Public Health* 2: e0000047.
83. Connolly JB, Mumford JD, Glandorf DCM, Hartley S, Lewis OT, Evans SW, Turner G, Beech C, Sykes N, Coulibaly MB, Romeis J, Teem JL, Tonui W, Lovett B, Mankad A, Mnzava A, Fuchs S, Hackett TD, Landis WG, **Marshall JM**, Aboagye-Antwi F (2022) [Recommendations for environmental risk assessment of gene drive applications for malaria vector control](#). *Malaria Journal* 21: 152.
84. Vásquez VN, Reddy M, **Marshall JM** (2022) [Environmentally appropriate vector control is facilitated by standard metrics for simulation-based evaluation](#). *Frontiers in Tropical Diseases* 3: 953212.
85. Kandul NP, Liu J, Buchman A, Shriner IC, Corder RM, Warsinger-Pepe N, Yang T, Yadav AK, Scott MJ, **Marshall JM**, Akbari OS (2022) [Precision guided sterile males suppress populations of an invasive crop pest](#). *GEN Biotechnology* 1: 372-385.
86. Sharma Y, Bennett JB, Rašić G, **Marshall JM** (2022) [Close-kin mark-recapture methods to estimate demographic parameters of mosquitoes](#). *PLoS Computational Biology* 18: e1010755.
87. Taitingfong RI, Triplett C, Vásquez VN, Rajagopalan RM, Raban R, Roberts A, Terradas G, Baumgartner B, Emerson C, Gould F, Okumu F, Schairer CE, Bossin HC, Buchman L, Campbell KJ, Clark A, Delborne J, Esvelt K, Fisher J, Friedman RM, Gronvall G, Gurfield N, Heitman E, Kofler N, Kuiken T, Kuzma J, Manrique-Saide P, **Marshall JM**, Montague M, Morrison AC, Opesen CC, Phelan R, Piaggio A, Quemada H, Rudenko L, Sawadogo N, Smith R, Tuten H, Ullah A, Vorsino A, Windbichler N, Akbari OS, Long K, Lavery JV, Evans SW, Tountas K, Bloss CS (2022) [Exploring the value of a global gene drive project registry](#). *Nature Biotechnology* 41: 9-13.

88. Terradas G, Bennett JB, Li Z, **Marshall JM**, Bier E (2023) [Genetic conversion of a split-drive into a full-drive element](#). *Nature Communications* 14: 191.
89. Rerolle F, Dantzer E, Phimmakong T, Lover AA, Hongvanthong B, Phetsouvanh R, **Marshall JM**, Sturrock HJW, Bennett A (2023) [Characterizing mobility patterns of forest goers in southern Lao PDR using GPS loggers](#). *Malaria Journal* 22: 38.
90. Smidler AL, Pai JJ, Apte RA, Sánchez C. HM, Corder RM, Gutiérrez EJ, Thakre N, Antoshechkin I, **Marshall JM**, Akbari OS (2023) [A confinable female-lethal population suppression system in the malaria vector, \*Anopheles gambiae\*](#). *Science Advances* 9: eade890.
91. Carballar-Lejarazú R, Dong Y, Pham TB, Tushar T, Corder RM, Mondal A, Sánchez C. HM, Lee HF, **Marshall JM**, Dimopoulos G, James AA (2023) [Dual effector population modification gene-drive strains of the African malaria mosquitoes, \*Anopheles gambiae\* and \*Anopheles coluzzii\*](#). *Proceedings of the National Academy of Sciences USA* 120: e2221118120.
92. Li HH, Su MP, Wu SC, Tsou HH, Chang MC, Cheng YC, Tsai KN, Wang HW, Chen GH, Tang CK, Chung PJ, Tsai WT, Huang LR, Yueh YA, Chen HW, Pan CY, Akbari OS, Chang HH, Yu GY, **Marshall JM**, Chen CH (2023) [Mechanical transmission of dengue virus by \*Aedes aegypti\* may influence disease transmission dynamics during outbreaks](#). *eBioMedicine* 94: 104723.
93. Vásquez VN, Kueppers LM, Rašić G, **Marshall JM** (2023) [wMel replacement of dengue-competent mosquitoes is robust to near-term climate change](#). *Nature Climate Change* 13: 848–855.
94. Raban R, **Marshall JM**, Hay BA, Akbari OS (2023) [Manipulating the destiny of wild populations using CRISPR](#). *Annual Review of Genetics* 57: 1.
95. Vásquez VN, **Marshall JM** (2023) [Applications of mathematical programming to genetic biocontrol](#). *SIAM J Appl Math* S392-S411.
96. Kormos A, Dimopoulos G, Bier E, Lanzaro GC, **Marshall JM**, James AA (2023) [Conceptual risk assessment of mosquito population modification gene-drive systems to control malaria transmission: Preliminary hazards list workshops](#). *Frontiers in Bioengineering & Biotechnology* 11: 1261123.
97. Li M, Kandul N, Sun R, Yang T, Benetta ED, Brogan D, Antoshechkin I, **Sánchez C. HM**, Zhan YP, DeBeaubien N, Loh Y, Su M, Montell C, **Marshall JM**, Akbari OS (2024) [Targeting sex determination to suppress mosquito populations](#). *eLife* 12: RP90199.
98. Sánchez C. HM, Smith DL, **Marshall JM** (2024) [MGSurvE: A framework to optimize trap placement for genetic surveillance of mosquito populations](#). *PLoS Computational Biology* 20: e1012046.
99. Mondal A, Sánchez C. HM, **Marshall JM** (2024) [MGDrive 3: A decoupled vector-human framework for epidemiological simulation of mosquito genetic control tools and their surveillance](#). *PLoS Computational Biology* 20: e1012133.
100. Apte RA, Smidler AL, Pai JJ, Chow ML, Chen S, Mondal A, Sánchez C. HM, Antoshechkin I, **Marshall JM**, Akbari OS (2024) [Eliminating malaria vectors with precision guided sterile males](#). *Proceedings of the National Academy of Sciences USA* 121: e2312456121.

1. **Marshall JM**, Akbari OS (2015) [Gene drive systems in mosquitoes](#). In: Adelman ZN (editor) [Genetic Control of Dengue and Malaria](#). Elsevier/Academic Press, New York.
2. **Marshall JM** (2015) [Measuring public attitudes to releases of transgenic mosquitoes for disease control](#). In: Tyagi BK (editor) [WHO/TDR Training Manual: Biosafety for Human Health and the Environment in the Context of the Potential Use of Genetically Modified Mosquitoes](#). WHO Press, Geneva.
3. **Marshall JM** (2015) [The Cartagena Protocol and releases of transgenic mosquitoes](#). In: Tyagi BK (editor) [WHO/TDR Training Manual: Biosafety for Human Health and the Environment in the Context of the Potential Use of Genetically Modified Mosquitoes](#). WHO Press, Geneva.
4. Suarez-Ramirez CD, Duran-Vega MA, Sanchez C. HM, Gonzalez-Mendoza M, Chang L, **Marshall JM** (2021) [Deep learning architectures applied to mosquito count regressions in US datasets](#). In: Batyrshin I, Gelbukh A, Sidorov G (editors), [Advances in Computational Intelligence: MICAI 2021](#). Springer, Cham.
5. **Marshall JM**, Vásquez VN (2022) [Field trials of gene drive mosquitoes: Lessons from releases of genetically sterile males and \*Wolbachia\*-infected mosquitoes](#). In: Tyagi BK (editor), [Genetically Modified and other Innovative Vector Control Technologies](#). Springer, Singapore.
6. **Marshall JM**, North AR (2023) [Modeling priorities as gene drive mosquito projects transition from lab to field](#). In: Carballar-Lejarazú R (editor), [Mosquito Gene Drives and the Malaria Eradication Agenda](#). Jenny Stanford Publishing, Singapore.

## Pre-prints

1. Rašić G, Filipović I, Wu SL, León TM, Bennett JB, Sánchez C. HM, **Marshall JM**, Trewin BJ (2021) Eliminating *Aedes aegypti* from its southern margin in Australia: Insights from genomic data and simulation modeling. bioRxiv doi: <https://doi.org/10.1101/2021.08.21.457232>.
2. Gendron W, Raban R, Mondal A, Sánchez C. HM, Smidler A, Zilberman D, Ilboudo PG, D'Allesandro U, **Marshall JM**, Akbari OS (2023) Cost-effectiveness of precision guided SIT for control of *Anopheles gambiae* in the Upper River region, The Gambia. bioRxiv doi: <https://doi.org/10.1101/2023.07.20.549762>.
3. Filipović I, **Marshall JM**, Rašić G (2024) Finding divergent sequences of homomorphic sex chromosomes via diploidized nanopore-based assembly from a single male. bioRxiv doi: <https://doi.org/10.1101/2024.02.29.582759>.
4. Topazian HM, Charles GD, Schmit N, Pianella M, **Marshall JM**, Kleinschmidt I, Hauck K, Ghani AC (2024) Estimating the potential impact of surveillance test-and-treat posts to reduce malaria in border regions in sub-Saharan Africa: A modelling study. medRxiv doi: <https://doi.org/10.1101/2024.06.28.24309631>.
5. Mondal A, Sánchez C. HM, **Marshall JM** (2024) A model-informed target product profile for population modification gene drives for malaria control. medRxiv doi: <https://doi.org/10.1101/2024.08.16.24312136>.

## Scientific Meetings and Invited Presentations

- Marshall JM** (2005) [The dynamics of transposable elements in genetically modified mosquito vectors](#). Contributed talk at the Institute for Pure and Applied Mathematics Biophysical Modeling Workshop, Los Angeles, California (February 2005).
- Marshall JM**, Weiss R (2005) [A Bayesian approach to inferring recent selective sweeps in \*Anopheles gambiae\* populations](#). Contributed talk at the 2nd International

Meeting on Molecular and Population Biology of Mosquitoes and Other Disease Vectors, Kolymbari, Greece (July 2005).

**Marshall JM** (2006) [Successful conditions for the early spread of a transposable element in a disease vector population](#). Contributed talk at the 55<sup>th</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, Atlanta, Georgia (November 2006).

**Marshall JM** (2007) [The impact of dissociation on transposon-mediated disease control strategies](#). Contributed talk at:

- the 3rd International Meeting on Molecular and Population Biology of Mosquitoes and Other Disease Vectors, Kolymbari, Greece (July 2007),
- the Workshop for Young Researchers in Mathematical Biology, Columbus, Ohio (August 2007),
- the 56th Annual Meeting of the American Society for Tropical Medicine and Hygiene, Philadelphia, Pennsylvania (November 2007), and
- the 76th Annual Conference of the Mosquito and Vector Control Association of California, Palm Springs, California (February 2008).

**Marshall JM** (2008) [Modelling the potential outcomes of releasing GM mosquito vectors](#). Contributed talk at:

- the Malaria Research and Training Center, Bamako, Mali (July 2008),
- the Department of Mathematics, University of Bamako, Bamako, Mali (November 2008), and
- the 57th Annual Meeting of the American Society for Tropical Medicine and Hygiene, New Orleans, Louisiana (December 2008).

**Marshall JM, Touré MB, Traore MM, Taylor CE** (2009) [Perspectives of people in Mali, West Africa toward genetically modified mosquitoes for malaria control](#).

Contributed talk at:

- the Center for Society and Genetics, UCLA, Los Angeles, California (March 2009),
- the Malaria Research and Training Center, Bamako, Mali (June 2009),
- the 4th International Meeting on Molecular and Population Biology of Mosquitoes and Other Disease Vectors, Kolymbari, Greece (July 2009), and
- the 58th Annual Meeting of the American Society for Tropical Medicine and Hygiene, Washington, DC (November 2009).

**Marshall JM** (2009) [Releasing GM mosquitoes: Insights from mathematics and Malians](#). Invited talk at:

- the Department of Infectious Disease Epidemiology, Imperial College, London, England (April 2009), and
- the Division of Biology, California Institute of Technology, Pasadena, California (April 2009).

**Marshall JM** (2009) [Can mosquitoes engineered with gene drive systems be contained?](#) Contributed talk at the 58th Annual Meeting of the American Society for Tropical Medicine and Hygiene, Washington, DC (November 2009).

**Marshall JM, Hay BA** (2010) [General principles and novel possibilities for single-construct gene drive](#). Contributed talk at the 59th Annual Meeting of the American Society for Tropical Medicine and Hygiene, Atlanta, Georgia (November 2010).

**Marshall JM** (2010) [The Cartagena Protocol and genetically modified mosquitoes](#). Contributed poster at the 59th Annual Meeting of the American Society for Tropical Medicine and Hygiene, Atlanta, Georgia (November 2010).

**Marshall JM** (2011) [Genetic engineering of local populations](#). Invited talk at the

Department of Biological Sciences, Stanford University, Stanford, California  
(January 2011).

**Marshall JM** (2011) [The toxin and antidote puzzle: New ways to control insect pest populations through manipulating inheritance](#). Contributed talk at:

- the Department of Biological Sciences, Imperial College London, London, England (March 2011), and
- the 5th International Meeting on Molecular and Population Biology of Mosquitoes and Other Disease Vectors, Kolymbari, Greece (July 2011).

**Marshall JM** (2011) [Malaria and human movement: Beyond Newton's theory of gravity](#). Invited talk at the Department of Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine, London, England (September 2011).

**Marshall JM** (2011) [The Cartagena Protocol in the context of transgenic and Wolbachia-infected mosquitoes](#). Contributed talk at the 60th Annual Meeting of the American Society for Tropical Medicine and Hygiene, Philadelphia, Pennsylvania (December 2011).

**Marshall JM**, White MT, Ghani AC, Schlein Y, Muller GC, Beier JC (2012) [Quantifying the mosquito's sweet tooth: Modelling the effectiveness of attractive toxic sugar baits for vector control](#). Contributed talk at:

- the Malaria Centre, Imperial College London, London, England (March 2012),
- the 6th International Meeting on Molecular and Population Biology of Mosquitoes and Other Disease Vectors, Kolymbari, Greece (July 2012), and
- the 61<sup>st</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, Atlanta, Georgia (November 2012).

**Marshall JM** (2012) [If Mother Teresa was a Genetic Engineer](#). Invited talk at [TEDx LA Miracle Mile](#), Los Angeles, California (July 2012).

**Marshall JM**, Hay BA (2012) [Medusa: A novel gene drive system for confined suppression of mosquito populations](#). Contributed talk at:

- the Malaria Centre, Imperial College London, London, England (October 2012), and
- the 61<sup>st</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, Atlanta, Georgia (November 2012).

**Marshall JM** (2013) [If Mother Teresa was a genetic engineer: From golden rice to GM mosquitoes for malaria control](#). Invited talk at University College London, London, England (February 2013).

**Marshall JM** (2013) [What role should mathematical models and transgenic mosquitoes play in dengue control programs in India?](#) Invited talk at Brain Storming Conference on Dengue Scenario in India: Disease Burden, Surveillance and Control, Madurai, India (July 2013).

**Marshall JM** (2014) [Predicting the utility of novel strategies for vector-borne disease control using mathematical models](#). Invited talk at:

- the Division of Biostatistics, University of California, Berkeley, California (February 2014), and
- the Department of Medicine, University of California, San Francisco, California (April 2014).

**Marshall JM**, Touré MB, Ouédraogo AL, Ndhlovu M, Kiware SS, Rezai S, Nkhama E, Griffin JT, Hollingsworth TD, Doumbia S, Govella NJ, Ferguson NM,

Ghani AC (2014) [Contributions of women with children and youth workers to spatial malaria transmission in sub-Saharan Africa](#). Contributed talk/poster at:

- the MRC Centre for Outbreak Analysis and Modeling, Imperial College London, London, England (August 2014), and
- the 63<sup>rd</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, New Orleans, Louisiana (November 2014).

**Marshall JM** (2015) [The current global policy situation regarding GM insects for disease control](#). Invited talk at the House of Lords, London, England (February 2015).

**Marshall JM** (2015) [Mathematical modeling in a new era of malaria elimination](#). Invited talk at:

- the [Bay Area World Malaria Day Symposium](#), University of California, Berkeley, California (April 2015), and
- the Department of Entomology, University of Maryland, College Park, Maryland (September 2015).

**Marshall JM**, Bennett A, Midekisa A, Gosling R, Sturrock HJW (2015) [From risk maps to decision maps for malaria elimination](#). Contributed poster at the 64<sup>th</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, Philadelphia, Pennsylvania (October 2015).

**Marshall JM** (2016) [Gene drive: What is possible at the population level with currently-available molecular components?](#) Invited talk at:

- the Department of Medicine, University of California, San Francisco, California (February 2016),
- the Statistics and Genomics Seminar, Division of Biostatistics, University of California, Berkeley, California (March 2016),
- the 25<sup>th</sup> International Congress of Entomology, Orlando, Florida (September 2016),
- Henry Stewart Talks on “Gene Drives and Active Genetics”, <https://hstalks.com/t/3764/gene-drive-what-is-possible-at-the-population-level/> (November 2016),
- the Joint Genome Institute, Walnut Creek, California (December 2016),
- the Lorentz Center workshop on “Challenges for the Regulation of Gene Drive Technology”, Leiden, the Netherlands (March 2017).

**Marshall JM** (2016) [Designing disease control strategies using models and data from multiple sources](#). Invited talk at the ENAR 2016 Spring Meeting, Austin, Texas (March 2016).

**Marshall JM** (2016) [Zika virus: Insights from mathematical models](#). Invited talk at the Preparedness for Zika Virus Symposium, University of California, San Francisco, California (March 2016).

**Marshall JM** (2016) [Overcoming evolved resistance to population-suppressing homing-based gene drives](#). Contributed poster at the 65<sup>th</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, Atlanta, Georgia (November 2016).

**Marshall JM** (2017) [Parameter estimation in infectious disease epidemiology: Do you have any better ideas?](#) Invited talk at the Workshop in Biostatistics, Department of Biomedical Data Science, Stanford University, Stanford, California (January 2017).

**Marshall JM** (2017) [Gene drive: Modeling replacement, suppression and remediation in quantified ecosystems](#). Invited talk at the LAVIPAC workshop on

“Innovative Vector Control Strategies in the Pacific”, Moorea, French Polynesia (November 2017).

**Marshall JM** (2017) [Why has dengue resurged, why does malaria persist, and can these diseases be controlled by CRISPR-based gene drive and other novel tools?](#)

Invited talk at:

- the Guangzhou Center for Disease Control and Prevention, Guangdong, China (December 2017), and
- the National Health Research Institutes, Zhunan, Taiwan (December 2017).

**Marshall JM** (2018) [Can malaria, dengue and Zika be controlled by CRISPR-based gene drive and other novel tools?](#) Invited talk at:

- the Harvard Medical School, Harvard University, Boston, Massachusetts (March 2018),
- the Department of Biological Sciences, University of Notre Dame, Notre Dame, Indiana (March 2018),
- the Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California (March 2018), and
- the QIMR Berghofer Medical Research Institute, Brisbane, Australia (July 2018).

**Marshall JM** (2018) [Designing safe strategies to eliminate malaria using gene editing.](#) Invited talk at:

- the [School of Public Health 75<sup>th</sup> Anniversary Research Showcase](#), University of California, Berkeley, California (April 2018), and
- the Bay Area World Malaria Day Symposium, Zuckerberg San Francisco General Hospital, San Francisco, California (April 2018).

**Marshall JM** (2018) [CRISPR-Cas9-based gene drive architecture for control of agricultural pests.](#) Invited talk at the Plant Genome Engineering Symposium, University of California, Berkeley, California (May 2018).

Sánchez HM, Wu SL, Bennett JB, **Marshall JM** (2018) [MGDrive: A simulation framework for gene drive in spatially-explicit mosquito populations and its application to threshold-dependent systems.](#) Invited talk/poster at:

- the Annual Meeting of the Society for Mathematical Biology, Sydney, Australia (July 2018),
- the 67<sup>th</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, New Orleans, Louisiana (October 2018), and
- the Annual Meeting of the Entomological Society of America, Vancouver, Canada (November 2018).

**Marshall JM** (2018) [Fighting mosquito-borne diseases with genomics, machine learning and likelihood functions.](#) Invited talk at:

- the School of Public Health, University of California, Berkeley, California (September 2018),
- the Chan Zuckerberg Biohub, San Francisco, California (November 2018), and
- Verily Life Sciences, South San Francisco, California (November 2018).

**Marshall JM** (2019) [Can malaria, dengue and Zika be controlled by a CRISPR-based gene drive? Insights from mathematical models.](#) Invited talk at:

- the Innovative Genomics Institute, Berkeley, California (January 2019),
- the School of Public Health, University of California, Berkeley, California (January 2019),
- the David Geffen School of Medicine, University of California, Los Angeles, California (March 2019),
- Cal Day 2019, University of California, Berkeley, California (April 2019),

- the Arthropod-borne Diseases in the Age of Quantitative Biology Symposium, Gladstone Institutes, San Francisco, California (June 2019), and
- INSPI (Instituto Nacional de Investigación en Salud Pública), Quito, Ecuador (July 2019).

Vasquez VN, **Marshall JM** (2019) [Informing risk assessment with the Mosquito Gene Drive Explorer \(MGDrivE\)](#). Invited talk at the Gene Drive Modeling Conference, ILSI Research Foundation, Washington, DC (June 2019).

**Marshall JM** (2019) [Data sharing in gene drive research: Experiences of a mathematical modeler](#). Invited talk at the Gene Drive Research Forum, African Union, Addis Ababa, Ethiopia (November 2019).

**Marshall JM**, Sánchez HM, Bennett JB, Wu, SL, León TM, Rašić G, Akbari OS (2020) [Modeling novel genetic control strategies for \*Aedes aegypti\* disease vectors](#). Invited talk at:

- the 69<sup>th</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene (virtual) (November 2020), and
- the 90<sup>th</sup> Annual Conference of the Mosquito and Vector Control Association of California, Sacramento, California (February 2022).

**Marshall JM** (2021) [Current status of genetic strategies for mosquito-borne disease control](#). Invited talk at the School of Public Health, University of California, Berkeley, California (virtual) (March 2021).

**Marshall JM** (2021) [Modeling priorities as gene drive mosquito projects transition from lab to field](#). Invited talk at:

- the Annual Meeting of the Society for Mathematical Biology (virtual) (June 2021),
- the Interdisciplinary Workshop on Synthetic Gene Drives (virtual) (June 2021), and
- the Johns Hopkins Malaria Research Institute (virtual) (October 2022).

**Marshall JM** (2022) [A roadmap for monitoring gene drive field release scenarios over time and the role of models](#). Invited talk at a pre-meeting to the 8th Annual Conference of the Pan-African Mosquito Control Association in Kigali, Rwanda (September 2022).

Corder RM, **Marshall JM** (2023) Modeling and analytics to support the transition of gene drive mosquito projects from lab to field. Invited talk at the 72<sup>nd</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, Chicago, Illinois (October 2023).

**Marshall JM** (2023) [Close-kin mark-recapture methods to estimate demographic parameters of mosquitoes](#). Invited talk at:

- the 72<sup>nd</sup> Annual Meeting of the American Society for Tropical Medicine and Hygiene, Chicago, Illinois (October 2023),
- the Department of Statistics, University of Auckland, Aotearoa/New Zealand (January 2024), and
- the 2<sup>nd</sup> Genetic Biocontrol Gordon Research Conference, Barcelona, Spain (May 2024).

**Marshall JM** (2024) [Modeling needs for gene drive mosquito projects](#). Invited talk at the Gene Drive Research Forum, Marina del Rey, California (March 2024).

**Marshall JM** (2024) [Modeling approaches for mosquito surveillance](#). Invited talk at Workshop on Post-Release Monitoring of Gene-Drive Modified Mosquitoes, Reston, Virginia (June 2024).

**Marshall JM**, Mondal A, Corder RM, Sánchez C. HM (2024) [Modeling to support target product profiles for mosquito gene drives](#). Invited talk at the 27<sup>th</sup> International Congress of Entomology in Kyoto, Japan (August 2024).

## Memberships

2016-current: American Society for Tropical Medicine and Hygiene (ASTMH)

## Professional Service

### Reviewer for:

Science; Nature Biotechnology; Nature Communications; Proceedings of the National Academy of Sciences USA; Lancet Infectious Diseases; eLife; PLoS Computational Biology; PLoS Genetics; PLoS ONE; Journal of Theoretical Biology; Journal of the Royal Society Interface; Proceedings of the Royal Society B; Malaria Journal; American Journal of Tropical Medicine and Hygiene; BMC Biology; Mathematical Biosciences; Acta Tropica; BioSystems; Journal of Computational Science; Transactions of the Royal Society of Tropical Medicine and Hygiene; Infection, Genetics and Evolution; Electronic Journal of Biotechnology; Asia-Pacific Journal of Molecular Biology and Biotechnology; British Journal of Medicine and Medical Research; Evolutionary Applications

### Grant reviewer for:

European Research Council, UK Medical Research Council, NordForsk, France Berkeley Fund

### Expert advisor for:

US National Academy of Sciences, The Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Ad Hoc Technical Expert Group on Synthetic Biology to the Convention on Biological Diversity, Médecins Sans Frontières

## Referees

### Professor Bruce A. Hay

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