

# Rodrigo M. Corder

ASSISTANT PROFESSOR · INSTITUTE OF BIOMEDICAL SCIENCE · UNIVERSITY OF SÃO PAULO

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## Summary

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Dr. Rodrigo M. Corder is an Assistant Professor in the Department of Parasitology at the Institute of Biomedical Sciences of the University of São Paulo. His research primarily focuses on the development of mathematical models for infectious diseases, particularly malaria, to produce empirical evidence to inform strategic decision-making in the implementation of public policies targeting the control of infectious diseases. Before becoming a professor, Dr. Corder was a postdoctoral researcher at the University of California, Berkeley (2021-2023), following his doctorate in sciences from the University of São Paulo in 2021.

## Education

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### University of São Paulo

São Paulo, Brazil

#### PHD IN SCIENCE (BIOLOGY OF HOST-PATHOGEN INTERACTIONS)

2017 - 2021

Thesis: Risk heterogeneity in the modeling of infectious diseases: A malaria case study in the Amazon Basin.

Advisor: Prof. Marcelo Urbano Ferreira.

### Erasmus Mundus Consortium *MathMods*

L'Aquila, Italy

#### MS IN MATHEMATICAL MODELING IN ENGINEERING: THEORY, NUMERICS, APPLICATIONS

2014 - 2016

Thesis: Local sensitivity analysis of G1/S transition model in budding yeast cells.

Advisors: Prof. Pasquale Palumbo & Prof. Costanzo Manes.

### University of São Paulo

São Carlos, Brazil

#### BS IN ELECTRICAL ENGINEERING

2005 - 2009

Award (rank in entrance group): 5th of 53.

Specialization: Energy Systems and Automation.

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### ADDITIONAL COURSES:

- São Paulo School of Advanced Science on Epidemic Preparedness. USP. 2023 (80 hours).
- São Paulo School of Advanced Science on Singular Stochastic Partial Differential Equations and Their Applications. UNICAMP. 2022 (60 hours).
- Harvard-Brazil Collaborative Public Health Field Course. Harvard University. 2021 (42 hours).
- PH425x: MalariaX: Defeating Malaria from the Genes to the Globe. Harvard University - HarvardX. 2020 (32 hours).
- Malaria Massive Open Online Course. Institut Pasteur - FUN-MOOC. 2018 (20 hours).
- CRISM Summer School on Computational Statistics 2018. University of Warwick – Warwick, UK. 2018 (24 hours).
- VII Southern-Summer School on Mathematical Biology. Int'l Centre for Theoretical Physics – São Paulo, Brazil. 2018 (50 hours).
- VI Southern-Summer School on Mathematical Biology. Int'l Centre for Theoretical Physics – São Paulo, Brazil. 2018 (50 hours).
- 54th Graduate Study Program: Humanitarian assistance and Development. United Nations – Geneva, Switzerland. 2016 (80 hours).
- Cyber-Physical systems control: Algebraic and Optimization techniques. European Embedded Control Institute, EECI - L'Aquila, Italy. 2016 (20 hours).

## Professional Experience

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2021-2023 **Postdoctoral Scholar**, School of Public Health, University of California, Berkeley

2010-2014 **Application Engineer**, IAV - Automotive Engineering

## Research Projects

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Ferreira MU, Oliva SM, Ribolla PEM, Soler JMP, Sousa TN, Arez AP, Rosanas-Urgell A, Kattenberg JH, **Corder RM**. Individual variation in malaria risk: causes and consequences in Amazonian populations. FAPESP, Thematic Project Grant. Process 2022/11963-3.

## Publications

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### PUBLISHED

21. Montalbán A, **Corder RM**. The spark of synchronization in heterogeneous networks of chaotic maps. *Chaos* 2024 Feb 1; 34(2):021101. doi: 10.1063/5.0173546.
20. **Corder RM**, Bian Z, Pereira T, Montalbán A. Emergence of chaotic cluster synchronization in heterogeneous networks. *Chaos* 2023 Sep 1; 33(9):091103. doi: 10.1063/5.0169628.
19. Carballar-Lejarazú R, Dong Y, Pham TB, Tushar T, **Corder RM**, Mondal A, Sánchez C HM, Lee HF, Marshall JM, Dimopoulos G, James AA. Dual effector population modification gene-drive strains of the African malaria mosquitoes, *Anopheles gambiae* and *Anopheles coluzzii*. *Proc Natl Acad Sci U S A*. 2023 Jul 18;120(29):e222118120. doi: 10.1073/pnas.222118120. PMID: 37428915; PMCID: PMC10629562.
18. Smidler AL, Pai JJ, Apte RA, Sánchez C HM, **Corder RM**, Jeffrey Gutiérrez E, Thakre N, Antoshechkin I, Marshall JM, Akbari OS. A confinable female-lethal population suppression system in the malaria vector, *Anopheles gambiae*. *Sci Adv*. 2023 Jul 7;9(27):eade8903. doi: 10.1126/sciadv.ade8903. PMID: 37406109; PMCID: PMC10321730.
17. **Corder RM**, Arez AP, Ferreira MU. Individual variation in *Plasmodium vivax* malaria risk: Are repeatedly infected people just unlucky? *PLoS Negl Trop Dis*. 2023 Jan 12;17(1):e0011020. doi: 10.1371/journal.pntd.0011020. PMID: 36634044.
16. Torres K, Ferreira MU, Castro MC, Escalante AA, Conn JE, Villasis E, da Silva Araujo M, Almeida G, Rodrigues PT, **Corder RM**, Fernandes ARJ, Calil PR, Ladeia WA, Garcia-Castillo SS, Gomez J, do Valle Antonelli LR, Gazzinelli RT, Golenbock DT, Llanos-Cuentas A, Gamboa D, Vinetz JM. Malaria Resilience in South America: Epidemiology, Vector Biology, and Immunology Insights from the Amazonian International Center of Excellence in Malaria Research Network in Peru and Brazil. *Am J Trop Med Hyg*. 2022 Oct 11;107. doi: 10.4269/ajtmh.22-0127. PMID: 36228921.
15. Kandul NP, Liu J, Buchman A, Shriner IC, **Corder RM**, Warsinger-Pepe N, Yang T, Yadav AK, Scott MJ, Marshall JM, Akbari OS. Precision Guided Sterile Males Suppress Populations of an Invasive Crop Pest. *GEN Biotechnology*. 2022 Aug 18; 1(4):372-385. doi: 10.1089/genbio.2022.0019.
14. Montalbán A, **Corder RM**, Gomes MGM. Herd immunity under individual variation and reinfection. *J. Math. Biol.* 2022 Jun 30; 85(1):2. doi: 10.1007/s00285-022-01771-x.
13. Gomes MGM, Ferreira MU, **Corder RM**, King JG, Souto-Maior C, Penha-Gonçalves C, Gonçalves G, Chikina M, Pegden W, Aguas R. Individual variation in susceptibility or exposure to SARS-CoV-2 lowers the herd immunity threshold. *J Theor Biol*. 2022 May 7;540:111063. doi: 10.1016/j.jtbi.2022.111063.
12. Ferreira MU, **Corder RM**, Johansen IC, Kattenberg JH, Moreno M, Rosas-Aguirre A, Ladeia-Andrade S, Conn JE, Llanos-Cuentas A, Gamboa D, Rosanas-Urgell A, Vinetz JM. Relative contribution of low-density and asymptomatic infections to *Plasmodium vivax* transmission in the Amazon: pooled analysis of individual participant data from population-based cross-sectional surveys. *The Lancet Regional Health - Americas*. 2022 May;9: 100169. doi: 10.1016/j.lana.2021.100169.
11. Nicolette VC, Rodrigues PT, Fernandes ARJ, **Corder RM**, Tonini J, Buss LF, Sales FC, Faria NR, Sabino EC, Castro MC, Ferreira MU. Epidemiology of COVID-19 after Emergence of SARS-CoV-2 Gamma Variant, Brazilian Amazon, 2020-2021. *Emerg Infect Dis*. 2021 Dec 28;28(3). doi: 10.3201/eid2803.211993. Epub ahead of print. PMID: 34963505.
10. Pincelli A, Cardoso MA, Malta MB, Johansen IC, **Corder RM**, Nicolette VC, Soares IS, Castro MC, Ferreira MU; MINA-Brazil Study Working Group. Low-level *Plasmodium vivax* exposure, maternal antibodies, and anemia in early childhood: Population-based birth cohort study in Amazonian Brazil. *PLoS Negl Trop Dis*. 2021 Jul 15;15(7):e0009568. doi: 10.1371/journal.pntd.0009568. PMID: 34264946; PMCID: PMC8282015.
9. Nicolette VC, Rodrigues PT, Johansen IC, **Corder RM**, Tonini J, Cardoso MA, de Jesus JG, Claro IM, Faria NR, Sabino EC, Castro MC, Ferreira MU. Interacting Epidemics in Amazonian Brazil: Prior Dengue Infection Associated With Increased Coronavirus Disease 2019 (COVID-19) Risk in a Population-Based Cohort Study. *Clin Infect Dis*. 2021 Dec 6;73(11):2045-2054. doi: 10.1093/cid/ciab410. PMID: 33956939; PMCID: PMC8135953.
8. Salla LC, Rodrigues PT, **Corder RM**, Johansen IC, Ladeia-Andrade S, Ferreira MU. Molecular evidence of sustained urban malaria transmission in Amazonian Brazil, 2014-2015. *Epidemiol Infect*. 2020 Feb 21;148:e47. doi: 10.1017/S0950268820000515. PMID: 32079552; PMCID: PMC7078511.

7. **Corder RM**, Ferreira MU, Gomes MGM. Modelling the epidemiology of residual Plasmodium vivax malaria in a heterogeneous host population: A case study in the Amazon Basin. *PLoS Comput Biol*. 2020 Mar 13;16(3):e1007377. doi: 10.1371/journal.pcbi.1007377. PMID: 32168349; PMCID: PMC7108741.
6. **Corder RM**, de Lima ACP, Khoury DS, Docken SS, Davenport MP, Ferreira MU. Quantifying and preventing Plasmodium vivax recurrences in primaquine-untreated pregnant women: An observational and modeling study in Brazil. *PLoS Negl Trop Dis*. 2020 Jul 31;14(7):e0008526. doi: 10.1371/journal.pntd.0008526. PMID: 32735631; PMCID: PMC7423143.
5. de Oliveira TC, **Corder RM**, Early A, Rodrigues PT, Ladeia-Andrade S, Alves JMP, Neafsey DE, Ferreira MU. Population genomics reveals the expansion of highly inbred Plasmodium vivax lineages in the main malaria hotspot of Brazil. *PLoS Negl Trop Dis*. 2020 Oct 28;14(10):e0008808. doi: 10.1371/journal.pntd.0008808. PMID: 33112884; PMCID: PMC7592762.
4. Ferreira MU, Nobrega de Sousa T, Rangel GW, Johansen IC, **Corder RM**, Ladeia-Andrade S, Gil JP. Monitoring Plasmodium vivax resistance to antimalarials: Persisting challenges and future directions. *Int J Parasitol Drugs Drug Resist*. 2021 Apr;15:9-24. doi: 10.1016/j.ijpddr.2020.12.001. Epub 2020 Dec 5. PMID: 33360105; PMCID: PMC7770540.
3. Ladeia-Andrade S, Menezes MJ, de Sousa TN, Silvino ACR, de Carvalho JF Jr, Salla LC, Nery OA, de Melo GNP, **Corder RM**, Rodrigues PT, Ferreira MU. Monitoring the Efficacy of Chloroquine-Primaquine Therapy for Uncomplicated Plasmodium vivax Malaria in the Main Transmission Hot Spot of Brazil. *Antimicrob Agents Chemother*. 2019 Apr 25;63(5):e01965-18. doi: 10.1128/AAC.01965-18. PMID: 30782991; PMCID: PMC6496112.
2. **Corder RM**, Paula GA, Pincelli A, Ferreira MU. Statistical modeling of surveillance data to identify correlates of urban malaria risk: A population-based study in the Amazon Basin. *PLoS One*. 2019 Aug 9;14(8):e0220980. doi: 10.1371/journal.pone.0220980. PMID: 31398228; PMCID: PMC6688813.
1. Pincelli A, Neves PAR, Lourenço BH, **Corder RM**, Malta MB, Sampaio-Silva J, de Souza RM, Cardoso MA, Castro MC, Ferreira MU, For The Mina Brazil Working Group. The Hidden Burden of Plasmodium vivax Malaria in Pregnancy in the Amazon: An Observational Study in Northwestern Brazil. *Am J Trop Med Hyg*. 2018 Jul;99(1):73-83. doi: 10.4269/ajtmh.18-0135. Epub 2018 May 3. PMID: 29741155; PMCID: PMC6085809.

#### ACCEPTED FOR PUBLICATION

Fontoura PS, Macedo E, Calil P, **Corder RM**, Rodrigues PT, Tonini J, Esquivel FD, Ladeia WA, Fernandes A, Johansen IC, Silva M, Fernandes A, Andrade SL, Castro MC, Ferreira MU. Changing clinical epidemiology of Plasmodium vivax malaria as transmission decreases: population-based prospective panel survey in the Brazilian Amazon. *The Journal of Infectious Diseases*.

#### IN PREP

Auradkar A, **Corder RM**, Marshall JM, Bier E. Efficient allelic replacement to reverse insecticide resistance in Drosophila melanogaster using a transiently acting self-eliminating unitary drive system.

#### Awards, Fellowships, & Grants

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2022	<b>Conference Travel Award</b> , The 20th International Congress for Tropical Medicine and Malaria	<i>Thailand</i>
2021	<b>Conference Travel Award</b> , American Society of Tropical Medicine and Hygiene	<i>USA</i>
2021-2023	<b>Postdoctoral Scholarship</b> , University of California, Berkeley	<i>USA</i>
2017-2021	<b>PhD Research Fellowship</b> , Brazilian National Council for Scientific and Technological Development (CNPq)	<i>Brazil</i>
2014-2016	<b>MS Research Fellowship</b> , Azienda per il Diritto agli Studi Universitari de L'Aquila (ADSU)	<i>Italy</i>
2007-2008	<b>Undergraduate Research Fellowship</b> , Brazilian National Council for Scientific and Technological Development (CNPq)	<i>Brazil</i>

#### Presentations

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#### INVITED TALKS

Gomes MGM, Ferreira MU, **Corder RM**, King JG, Souto-Maior C, Penha-Gonçalves C, Gonçalves G, Chikina M, Pegden W, Aguas R. *Individual variation in susceptibility or exposure to SARS-CoV-2 lowers the herd immunity threshold*. Seminario de Probabilidad y Estadística. Centro de Matemática de la Facultad de Ciencias de la Universidad de La República Oriental del Uruguay. 2020. Online.

**Corder RM**, Ferreira MU, Gomes MGM. *Modelling the epidemiology of residual Plasmodium vivax malaria in a heterogeneous host population: a case study in the Amazon Basin*. Sessões Clínicas de Desenho e Análise de Estudos do Programa de Computação Científica (PROCC). 2019. Fiocruz, Rio de Janeiro, Brazil.

## ORAL PRESENTATIONS

**Corder RM**, Marshall JM. Modeling and analytics to support the transition of gene drive mosquito projects from lab to field. American Society of Tropical Medicine and Hygiene 72th Annual Meeting. 2023. Chicago, USA.

**Corder RM**, de Lima ACP, Khoury DS, Docken SS, Davenport MP, Ferreira MU. Quantifying and preventing *Plasmodium vivax* recurrences in primaquine-untreated pregnant women: an observational and modeling study in Brazil. The 20th International Congress for Tropical Medicine and Malaria. 2022. Bangkok, Thailand.

Ferreira MU, **Corder RM**, Johansen IC, Kattenberg JH, Moreno M, Rosas-Aguirre A, Ladeia-Andrade S, Conn JE, Llanos-Cuentas A, Gamboa D, Rosanas-Urgell A, Vinetz JM. Quantifying the contribution of low-density and asymptomatic infections to *Plasmodium vivax* transmission in the Amazon. American Society of Tropical Medicine and Hygiene 70th Annual Meeting. 2021. Online.

**Corder RM**, de Lima ACP, Khoury DS, Docken SS, Davenport MP, Ferreira MU. Quantifying and preventing *Plasmodium vivax* recurrences in primaquine-untreated pregnant women: an observational and modeling study in Brazil. American Society of Tropical Medicine and Hygiene 69th Annual Meeting. 2020. Online.

**Corder RM**, Paula GA, Pincelli A, Ferreira MU. Statistical modelling of surveillance data to identify correlates of urban malaria risk: a population-based study in the Amazon Basin. VIII Workshop on Probabilistic and Statistical Methods. 2020. Universidade Federal de São Carlos (Ufscar), São Carlos, Brazil.

**Corder RM**, Ferreira MU, Gomes MGM. Modelling the epidemiology of residual *Plasmodium vivax* malaria in a heterogeneous host population: a case study in the Amazon Basin. Workshop on Modelling of Infectious Diseases Dynamics. 2020. UNESP, São Paulo, Brazil

**Corder RM**, Ferreira MU, Gomes MGM. Mathematical modeling of malaria transmission considering heterogeneity in exposure and susceptibility of hosts. 6th International Conference on *Plasmodium vivax* Research. 2017. Manaus, Brazil.

## POSTER PRESENTATIONS

Ferreira MU, **Corder RM**, Johansen IC, Kattenberg JH, Moreno M, Rosas-Aguirre A, Ladeia-Andrade S, Conn JE, Llanos-Cuentas A, Gamboa D, Rosanas-Urgell A, Vinetz JM. Quantifying the contribution of low-density and asymptomatic infections to *Plasmodium vivax* transmission in the Amazon. 18th Ecology and Evolution of Infectious Diseases Meeting. 2021. Online.

**Corder RM**, Paula GA, Pincelli A, Ferreira MU. Statistical modelling of surveillance data to identify correlates of urban malaria risk: a population-based study in the Amazon Basin. American Society of Tropical Medicine and Hygiene 68th Annual Meeting. 2019. Washington D.C., USA.

**Corder RM**, Ferreira MU, Gomes MGM. Modelling the epidemiology of residual *Plasmodium vivax* malaria in a heterogeneous host population: A case study in the Amazon Basin. 7th International Conference on Infectious Disease Dynamics. 2019. Charleston, USA.

**Corder RM**, Ferreira MU, Gomes MGM, 2018. Modeling malaria transmission dynamics with heterogeneity in risk distribution. 16th Ecology and Evolution of Infectious Diseases. Glasgow, UK.

## Teaching Experience

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2019 **Systems Biology**, Graduate Teaching Assistant. Department of Computer Science, Institute of Mathematics and Statistics, University of São Paulo IME-USP

## Mentoring

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## Outreach & Professional Development

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### SERVICE AND OUTREACH

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|-----------|---|----------------|
| 2019-2020 | <b>University of São Paulo Research Council</b> , Committee Member                        | <i>USP</i>     |
| 2018-2019 | <b>University of São Paulo Institute of Biomedical Science Council</b> , Committee Member | <i>ICB-USP</i> |
| 2017-2018 | <b>Graduate Student Association</b> , Committee Member                                    | <i>ICB-USP</i> |
| 2013      | <b>Embaixadores USP</b> , Representative of the University of São in public high schools  |                |

### PEER REVIEW

Ecology Letters, Tropical Medicine and Infectious Disease, eLife, PLoS Pathogens, Wellcome Open Research, BMC Medicine, Plos Neglected Tropical Diseases, Plos Computational Biology, Antimicrobial Agents and Chemotherapy, Malaria Journal, PLOS One, Neotropical Entomology Journal.