

# Curriculum Vitæ

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## Summary

Natural biological processes emit signals, which are often too loud or too low for us to “hear”. My goal as a scientist is to develop and apply statistical and mathematical tools to decode and quantify these biological signals, specially those imprinted in pathogens’ – and their hosts’ – genomes. I hope a better understanding of these entities can contribute to the general theory of biology and also lead to a progressive reduction of the world’s disease burden.

I have a broad range of interests in quantitative biology, from complex networks to spatial analysis to statistical phylogenetics. Nevertheless, my main scientific interest is to understand the complex interaction between rapidly evolving pathogens, such as RNA viruses, and their hosts. I have published peer-reviewed papers in indexed international journals, such as *Infection*, *Genetics and Evolution* and *Transactions of the Royal Society of Tropical Medicine and Hygiene*. I have also attended to or had work presented at national and international conferences, such as the Brazilian Congress of Virology, the Brazilian Congress of Epidemiology, the International BioInformatics Workshop on Virus Evolution and Molecular Epidemiology and the Gordon Research Conference on Biology of Host-Parasite Interactions.

As you will notice if you continue reading this CV, I am a big fan of collaboration, interacting with colleagues around Brazil and overseas. My current interests are:

- Bayesian inference of deterministic models;
- Incorporating geographic structure (neighbourhood, natural barriers, etc.) into CMTC-based phylogeographic diffusion models (check <https://github.com/maxbiostat/PhylogeographeR>);
- Coupling mathematical models to coalescent-based population reconstructions;
- Applying complex networks to data mining and vizualization in large genomic databases;

Please feel free to contact me if your interests lie anywhere near these topics.

Linkedin: <http://www.linkedin.com/profile/view?id=171872451>

ResearchGate: [http://www.researchgate.net/profile/Luiz\\_Fagundes\\_de\\_Carvalho/](http://www.researchgate.net/profile/Luiz_Fagundes_de_Carvalho/)

Lattes CV: <http://lattes.cnpq.br/7282202947621572>

## Education

2009–2012 | BSc in Microbiology and Immunology, Federal University of Rio de Janeiro, Brazil.

## Professional Experience

2010–2013 | Pan American Health Organization (PAHO)  
Position: Statistical Assistant  
Role: Developed and analysed quality control experiments for veterinary diagnostic tests;  
Research on Foot-and-Mouth Disease virus phylodynamics

## Academic Experience

2009–2011 | Sector of Infectious Diseases Epidemiology (SEDI), Institute of Microbiology, Federal University of Rio de Janeiro  
Position: Scientific initiation student  
Advisor: Prof. Dr. Fernando Portela Câmara  
Role: Research on statistical methods in the epidemiology of AIDS, sylvatic yellow fever and dengue

2012–2013 | Program for Scientific Computing (PROCC), Oswaldo Cruz Foundation (Fiocruz)  
Position: Scientific initiation student  
Advisor: Prof. Dr. Oswaldo Gonçalves Cruz  
Role: Research on spatial partition methods for health areal data

2013– | Program for Scientific Computing (PROCC), Oswaldo Cruz Foundation (Fiocruz)  
Position: Scientific initiation student  
Advisors: Prof. Dr. Claudio Struchiner and Dr. Leonardo Bastos  
Role: Research on Bayesian inference of deterministic population growth models

## Conferences<sup>1</sup>

### Presented work

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|------|---|
| 2009 | Gomes, A.L.B.B.; Carvalho, L.M.; Camara, F.P. <b>Dinâmica Espacial da Dengue no Rio de Janeiro: 1986 a 2009 [Spatial dynamics of dengue in Rio de Janeiro: 1986 to 2009]</b> , 2009, II International Congress on Geography of Health, Uberlândia -MG, Brazil.  |
| 2011 | Vianez Jr., J.L.; Carvalho, L. M.; Bisch, P. <b>Development of a workflow for large-scale epitope prediction: dengue virus as a study of case.</b> In: X Meeting 2011, 2011, Florianópolis-SC, Brazil. X Meeting 2011 Abstract Book, 2011. v. ID 234.   |
| 2011 | Carvalho, L.M.; Santos, L.B.; Silveira, W.C. <b>Phylodynamics of Foot-and-Mouth Disease Virus: a Complex Network approach.</b> XXII Meeting of the Brazilian Society of Virology, Águas de Lindóia – SP, Brazil.  |
| 2012 | Carvalho, L. M.; Santos, L.B.; Faria, N.R.; Silveira, W.C. <b>Phylogeographic Dynamics of foot-and-mouth disease virus in Ecuador 2002 to 2010</b> , 2012 In 17th International BioInformatics Workshop on Virus Evolution and Molecular Epidemiology, Belgrade, Serbia.  |
| 2012 | Carvalho, L.M.; Faria, N.R.; Silveira, W.C. <b>Phylodynamics of Foot-and-Mouth Disease Virus in South America: a Comprehensive Analysis.</b> XXIII Brazilian Congress of Virology, Foz do Iguaçu – PR, Brazil.  |
| 2012 | Vasconcellos, L.R.C.; Dias, F.A.; Soares, J. B. R. C.; Carvalho, L. M.; Oliveira, M. M.; Alves e Silva, T. L.; Gonçalves, I.; Oliveira, M. F.; Lopes, F.G.; Lopes, A. H. C. S. <b>Interaction of the hemipteran <i>Oncopeltus fasciatus</i> with the trypanosomatid <i>Leptomonas wallacei</i>: an insight into parasitism.</b> In: Gordon Research Conference on Biology of Host-Parasite Interactions, 2012, Newport, RI, USA. Annals of the Gordon Research Conference on Biology of Host-Parasite Interactions, 2012. v. 1. p. 1-2. |
| 2013 | Zimmermann, L.T.; Carvalho, L.M.; Vasconcellos, L.R.; Bastos, L.S.; Struchiner, C.J.; Lopes, A.H. <b>Temperature-dependent oviposition and egg eclosion of Chagas disease vector <i>Rhodnius prolixus</i></b> In XXIX Annual Meeting of the Brazilian Society of Protozoology, 2013, Caxambu-MG, Brazil. Abstract book of the XXIX Annual Meeting of the SBPz, p. 159, ID V004.   |

### Participated

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|------|---|
| 2012 | VIII Brazilian Congress of Epidemiology, São Paulo-SP, Brazil.                      |
| 2013 | 1 <sup>st</sup> Symposium on Big Data and Public Health, Rio de Janeiro-RJ, Brazil. |

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<sup>1</sup>Main conferences I have attended to or had work presented at. For a complete list please visit my Lattes CV.

## Invited Talks

2011	<i>Phylogenetics of Foot-and-Mouth Disease Virus: a Complex Network approach.</i> XXII Meeting of the Brazilian Society of Virology
2011	<i>Playing Dumb: The Misuse of Statistics in Biology.</i> Institute of Microbiology, Federal University of Rio de Janeiro.
2012	<i>Knowledge Discovery in Databases through Complex Networks: application to phylogenetics.</i> WaFIS 2012

## Memberships

Brazilian Society for Virology (SBV), Brazilian Statistical Association (ABE), Brazilian Society for the Advancement of Science (SBPC).

## Teaching Experience

2007–2011	<b>High School Chemistry and Biology</b> I was a voluntary teacher of whole-year high school courses on organic chemistry, general chemistry and biology.
2010–2013	<b>Basics of Mathematics and Statistics for Microbiology</b> Federal University of Rio de Janeiro Supervisor: Prof. Dr. Fernando Portela Câmara Basics on descriptive statistics, Gaussian distribution and hypothesis testing. Lately, some basic calculus too.
2010	<b>Topics in Human Physiology</b> Federal University of Rio de Janeiro Supervisor: Prof. Dr. Pedro Paulo Elsas By means of seminars and group discussions, we discussed particular aspects of human physiology and stimulate the students to draw general conclusions about the subjacent biological processes going on.
2012	<b>Bioinformatics</b> Federal University of Rio de Janeiro Supervisor: Prof. Andrew Macrae, PhD Basics on Bioinformatics: basic genome annotation, databases, alignment, phylogenetics.

## Awards

2010	Honorable Mention - XVI Week of Microbiology and Immunology
2011	Honorable Mention - XVII Week of Microbiology and Immunology
2011	Selected for Oral presentation – XXII National Meeting of the Brazilian Society for Virology
2012	Honorable Mention - XVIII Week of Microbiology and Immunology

## Languages

Portuguese	Native
English	Fluent (CAE – Grade A)
Spanish	Advanced

## References

Reference	What for	email
Prof. Dr. Fernando Portela Câmara	Research and Teaching	<code>portela@micro.ufrj.br</code>
Prof. Ângela Hampshire Lopes, PhD	Research	<code>angela.lopes@micro.ufrj.br</code>
Prof. Andrew Macrae, PhD	Teaching	<code>amacrae@biologia.ufrj.br</code>
Prof. Dr. Pedro Paulo Xavier Elsas	Teaching	<code>pxelsas@micro.ufrj.br</code>
Prof. Claudio Struchiner, PhD	Research	<code>stru@fiocruz.br</code>
Prof. Leonardo Bastos, PhD	Research	<code>lsbastos@fiocruz.br</code>
Prof. Philippe Lemey, PhD	Research	<code>philippe.lemey@rega.kuleuven.be</code>

A list of PDFs of my publications can be found at <https://github.com/maxbiostat/papers/tree/master/PAPERS>

## Publications

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### Published/Accepted

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- [1] Carvalho, L.M.F., L. Santos, P. Pereira, and W. Silveira, “Phylogenetics of foot-and-mouth disease virus: a complex network approach,” in *Proceedings of the 10th Brazilian Conference on Dynamics, Control and Their Applications*, Brazilian Society for Applied and Computational Mathematics, 2011.
- [2] F. P. Camara, A. L. Gomes, Carvalho, L. M., and L. G. Castello, “Dynamic behavior of sylvatic yellow fever in Brazil (1954-2008),” *Rev. Soc. Bras. Med. Trop.*, vol. 44, no. 3, pp. 297–299, 2011.
- [3] Carvalho, L. M. and F. P. Camara, “Epidemiological aspects of acquired immunodeficiency syndrome in older Brazilians: a comparative approach,” *Braz J Infect Dis*, vol. 16, no. 1, pp. 34–37, 2012.
- [4] L. M. Carvalho, L. B. Santos, N. R. Faria, and W. de Castro Silveira, “Phylogeography of foot-and-mouth disease virus serotype O in Ecuador,” *Infect. Genet. Evol.*, vol. 13, pp. 76–88, Jan 2013.
- [5] F. P. Camara, Carvalho, L. M., and A. L. Gomes, “Demographic profile of sylvatic yellow fever in Brazil from 1973 to 2008,” *Trans. R. Soc. Trop. Med. Hyg.*, vol. 107, pp. 324–327, May 2013.
- [6] F. Camara and Carvalho, L. M., “Febres Hemorrágicas virais [Viral hemorrhagic fevers],” in *Introdução à Virologia Humana [Introduction to Human Virology]* (N. Santos, M. T. Romanos, and M. D. Wigg, eds.), Rio de Janeiro: Guanabara Koogan, 3rd ed., 2014.

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### Submitted

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- [7] F. Bielejec, P. Lemey, Carvalho, Luiz M., G. Baele, A. Rambaut, and M. A. Suchard, “ $\pi$ BUSS: a parallel BEAST/BEAGLE utility for sequence simulation under complex evolutionary scenarios,” *BMC Bioinformatics*, Submitted, <http://arxiv.org/pdf/1312.4699v1.pdf>.
- [8] D. Mir, H. Romero, Carvalho, L. M., and G. Bello, “Spatiotemporal dispersion pattern of dengue-2 Asian-American genotype in the Americas,” *Plos Neg Trop Dis*, Submitted.

## Work in progress<sup>2</sup>

Carvalho, L.M., G. Baele, N. Faria, A. M. Perez, P. Lemey, and W. C. Silveira, “Spatiotemporal Dynamics of foot-and-mouth disease virus in South America,” In preparation.

Carvalho, L.M., L. Santos, and W. C. Silveira, “A complex network approach to investigate foot-and-mouth virus phylogenetics,” In preparation.

L. Zimmermann, Carvalho, L.M., L. Vasconcellos, L. Bastos, C. Struchiner, and A. H. Lopes, “Temperature-dependent oviposition and egg eclosion of Chagas disease vector *Rhodnius prolixus*,” In preparation.

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<sup>2</sup>Articles in final phase of preparation