# Rafael Guimarães Ramos, PhD

**(Last updated in: December 8th 2023)**

*Email:* rafael.ramos@inpe.br; rafaelgramos@gmail.com
*Website:* http://rafaelgramos.github.io/PersonalWebpage/index.html
*Github:* https://github.com/rafaelgramos
*LinkedIn:* https://www.linkedin.com/in/rafaelgramos/

## Interests

I am interested in data analysis to solve human problems, and in using geographical information to empower these analyses.

***Key areas:*** Spatial Analysis, Geographical Information Science, Mapping & Data Visualization, Data Science, Geography of Crime, Urban Geography, Criminology, Spatial Models for Human Geography, Visual Computing.

## Education

● Ph.D. (Sep.2014-Sep.2019) at the Department of Geography, University of California Santa Barbara, USA.

● M.A. (Mar.2011-Jun.2013) in Electrical Engineering (emphasis in Computer Engineering), University of Campinas, Brazil.

● B.S. (Mar.2006-Dec.2010) in Computer Engineering, University of Campinas, Brazil.

## Experience

● Aug. 2023 - current. Consultant at Apriqot. https://www.apriqot.co/

● Mar. 2023 - current. Research Collaborator at Center for Studies on Violence at the University of São Paulo (NEV-USP). https://nev.prp.usp.br/equipe/rafael-ramos/

● Oct. 2019-Dec. 2022. Researcher at the National Institute of Space Research (INPE).

● Sep. 2015-Jun. 2019. Various Teaching Assistantships at the Department of Geography at the University of California Santa Barbara.

● Aug. 2013-Jul. 2014. Researcher at SimWorx Engineering, Research & Development.

● Aug. 2009-Dec. 2010. Research Internship at CTI Renato Archer.

● Aug. 2008-Jul. 2009. Research Internship at University of Campinas, School of Electrical and Computer Engineering.

## Skills

● Experience with R, Python, SQL, C/C++ and Matlab; familiar with Java, Javascript, Ruby, and others.

● Experience with Statistics, Data Science and Spatial Analysis, including regression models, cluster analysis, optimization methods (e.g., linear programming), time series analysis, spatial analysis, data visualization, and other data-mining tasks.

● Experience with ArcGIS, QGIS and other mapping tools.

● Experience with pertinent libraries, packages and toolboxes for Statistics, Data Science, Spatial Analysis, Mapping, etc., particularly in R, but also Python, ArcGIS & QGIS. Examples: Shiny, Leaftlet, US Census API, dplyr.

● Experience with developing and applying novel statistical & data-driven methodologies for real-world problems (see Publications).

● Experience with mathematical programming solvers (FICO Xpress, OSQP) and languages (Xpress Mosel, R implementation of OSQP).

● Experience with various datasets including Census data from the US and from Brazil, geocoded crime reports, OpenStreetMap (road network and infrastructure), MapBiomas (land-use/land-cover), DataSUS (health data from Brazil's Ministry of Health), OpenCellID (cellphone tower data), Oakridge Lab's LandScan (ambient population data).

● Experience with Criminological theories, particularly Spatial and/or Geographical Theories (e.g., Crime Pattern Theory, Routine Activity Theory, Social Disorganization Theory) and Quantitative Analysis of Crime (e.g., estimating robust crimes rates to remove noise and error, testing the effect of socio-economic variables on crime rates, identifying trends, clusters/hotspots, etc.)

● Experience with Visual Computing (i.e., Computer Graphics, Image Processing, Computer Vision) concepts and tools.

● Experience with fundamentals of Computer Science: Algorithms, Data Structures, Networks.

● Notions of high-performance computation & parallelization, including GPU processing.

## Publications

● Journal publications:

GOTO, E. A., DOMINGUE, S. J., KALAFATIS, S., RAMOS, R. G., & SALAP-AYCA, S. 2023. Do the type of impact and vulnerability dimension matter when assessing natural hazard vulnerability? *International Journal of Disaster Risk Reduction*, 104069.

RAMOS, R. G., SCARABELLO, M. C., COSTA, W., SOTERRONI, A., SIMOES, R., ANDRADE, P. R. & RAMOS, F. M. 2023 A mathematical programming approach to downscale land-use projections from the GLOBIOM-Brazil model. International Journal of Geographical Information Science, DOI: 10.1080/13658816.2023.2241144.

RAMOS, R. G., SCARABELLO, M. C., COSTA, W., SOTERRONI, A., ANDRADE, P. R., SIMOES, R., RUIVO, H. M. & RAMOS, F. M., 2023. Current policies are insufficient to protect or restore Brazil's cost-effective conservation priority zones. *Environmental Research Letters.*

CÂMARA, G., SIMOES, R., RUIVO, R. H., ANDRADE, P. R., SOTERRONI, A. C., RAMOS, F. M., RAMOS, R. G., SCARABELLO, M., ALMEIDA, C., SANCHES, I., MAURANO, L., COUTINHO, A., ESQUERDO, J., ANTUNES, J., VENTURIERI, A., ADAMI., M. 2023. Impact of land tenure on deforestation control and forest restoration in Brazilian Amazonia. *Environmental Research Letters.*

DE OLIVEIRA FOLHARINI, S., DE MELO, S. N., RAMOS, R. G., & BROWN, J. C. 2023. Land use and green crime: Assessing the edge effect. *Land Use Policy*, *129*, 106636.

RAMOS, R. G., MELO, S. 2022. Income inequality and the geography of residential burglaries in Campinas, Brazil. *Applied Geography*, *147*, 102787.

RAMOS, R.G. 2021. Improving Victimization Risk Estimation : A Geographically Weighted Regression Approach. ISPRS International J. Geo-Inf. 2021, 10(6), 364.

RAMOS, R. G., SILVA, B. F., CLARKE, K. C., & PRATES, M. 2020. Too Fine to be Good? Issues of Granularity, Uniformity and Error in Spatial Crime Analysis. *Journal of Quantitative Criminology*, 1-25.

RAMOS, R. G. 2019. Does income inequality explain the geography of residential burglaries? The case of Belo Horizonte, Brazil. ISPRS Int. J. Geo-Inf. 2019, 8(10), 439.

● Submitted for review:

RAMOS, R. G., NERY, M. B., ADORNO, S. 2023. Urban patterns and the geography of street robberies in the city of São Paulo, Brazil.

● Work in progress:

RAMOS, R. G. 2024. Mapping crime: what geographical unit to use? *SAGE Research Methods Video.* (recorded, to be published in 2024)

RAMOS, R. G. 2023. Finding an adequate areal unit to map crime: a spatial data perspective. In *New Research in Crime Modeling and Mapping Using Geospatial Technologies,* edited by LEITNER, M. (under review)

RAMOS, R. G., MELO, S., 2023. Examining the role of land-use types in the geography of residential burglaries in Campinas, Brazil.

RAMOS, R. G., 2023. An exploratory multiscale analysis of cellphone robberies in São Paulo.

RAMOS, R.G., BLAKELEY, S. L., MILLER, D. L. 2023. Predicting mosquito-borne illnesses using remote sensed imagery.

RAMOS, R. G., 2023. Uniformity and robustness in kernel density estimation.

● Theses and Dissertations:

RAMOS, R. G. 2019. Methodological contributions to the spatial analysis of crime, with an application to residential burglaries in Belo Horizonte, Brazil. Dissertation (PhD) - University of California Santa Barbara, Department of Geography, Santa Barbara, CA.

RAMOS, R. G. 2013. Ambiente virtual de simulação e visualização do comportamento de risers. 81 f. Dissertação (mestrado) - Universidade Estadual de Campinas, Faculdade de Engenharia Elétrica e de Computação, Campinas, SP.

● Conference Papers:

RAMOS, R. G. 2021. Income inequality and the geography of residential burglaries: an intra-urban analysis of two Brazilian cities. Anais do 1º Seminário Internacional de Editores e Pesquisadores na Área de Segurança Pública. Brasília, Brazil.

RAMOS, R. G.; MARTINO, J. M.; MOROOKA, C. 2013. Visualization Environment with Real-Time Interaction for Simulation of Vertical Rigid Risers. In: Rio Pipeline, 2013, Rio de Janeiro. Proceedings of the Rio Pipeline 2013 Conference.

LOTUFO, R. A.; MACHADO, R. C.; KORBES, A.; RAMOS, R. G. 2009. AdessoWiki - Online Collaborative Scientific Programming Platform. In: WikiSym 2009, 2009, Orlando. The Proceedings of the 5th International Symposium on Wikis and Open Collaboration (WikiSym '09).

● Other Publications:

RAMOS, R. G.; MARTINO, J. M. 2012 . Ambiente Interativo em Tempo Real para Visualização de Risers Rígidos. (in Portuguese)

RAMOS, R. G.; SILVEIRA, G. ; MORONI, Artemis 2011. Um Sistema de Visão Robótica mais flexível para o Projeto AURAL. (in Portuguese)

## Conferences

● AAG Annual Conference 2023, Denver. Paper presentation titled "The geography of cellphone robberies in São Paulo: an exploratory analysis". Authors: Rafael G. Ramos.

● 1o Seminário Internacional de Editores e Pesquisadores na Área de Segurança Pública (SEINTER) 2021. Presentation titled "Desigualdade de renda e a geografia dos furtos a residências: uma análise intra-urbana de duas cidades brasileiras". Authors: Rafael Guimaraes Ramos.

● AGU Annual Conference 2021. Poster presentation titled "Future prospects for native vegetation in Brazil's conservation priority areas". Authors: Rafael Guimaraes Ramos. Marluce da Cruz Scarabello, Aline Soterroni, Pedro R. Andrade, Rolf Simoes, Heloisa Ruivo, Fernando Ramos.

● AGU Annual Conference 2020. Poster presentation titled "A mathematical programming approach for downscaling projections from a land use change model". Authors: Rafael Guimaraes Ramos. Marluce da Cruz Scarabello, Wanderson Costa, Aline Soterroni, Rolf Simoes, Pedro R. Andrade, Fernando Ramos.

● Spatial Statistics 2019: Towards Spatial Data Science, Sitges, Spain. Poster presentation titled "Improving crime rate standardization: a geographically weighted regression approach". Authors: Rafael G. Ramos.

● AAG Annual Conference 2019, Washington D.C. Paper presentation titled "Social & Environmental Determinants of Urban Crime: residential burglaries in Belo Horizonte, Brazil". Authors: Rafael G. Ramos.

● AAG Annual Conference 2017, Boston. Paper presentation titled "Is finer better? On the limits of crime data aggregation". Authors: Rafael G. Ramos.

● AAG Annual Conference 2016, San Francisco. Poster presentation titled "Exploring the spatial-temporal relations between burglary and socioeconomic factors using GIS". Authors: Rafael G. Ramos, Keith Clarke, Bráulio F. A. da Silva.

## Presentations

● November 13th 2023. Seminar presentation (20 minute talk) for the Center for Studies on Violence at the University of São Paulo (NEV-USP). Presentation titled "Padrões Urbanos e a Geografia do roubo a transeuntes na cidade de São Paulo". Available at
https://www.youtube.com/watch?v=q4mFNeoHUl8&t=4746s

● March 26th 2023. Presentation (15 minute talk) at AAG Annual Conference 2023. Presentation titled "The geography of cellphone robberies in São Paulo: an exploratory analysis".

● November 25th 2021. Presentation (15 minute talk) at 1o Seminário Internacional de Editores e Pesquisadores na Área de Segurança Pública (SEINTER) 2021. Presentation titled "Desigualdade de renda e a geografia dos furtos a residências: uma análise intra-urbana de duas cidades brasileiras".

● December 7th 2020. Poster presentation at AGU Annual Conference 2020. Poster titled "A mathematical programming approach for downscaling projections from a land use change model".

● July 12th 2019. Poster presentation at Spatial Statistics 2019: Towards Spatial Data Science Conference. Poster titled "Improving crime rate standardization: a geographically weighted regression approach".

● April 26th 2019. Presentation (12 minute talk) for the Graduate Student Presentation Spring 2019, at Dept. of Geography, UCSB, titled "Social & Environmental Determinants of Urban Crime: residential burglaries in Belo Horizonte, Brazil".

● April 7th 2019. Paper presentation (15 minute talk) at AAG Annual Conference 2019. Paper session titled "Urban Crime Mapping and Analysis Using GIS II", paper presentation titled "Social & Environmental Determinants of Urban Crime: residential burglaries in Belo Horizonte, Brazil".

● April 9th 2017. Paper presentation (15 minute talk) at AAG Annual Conference 2017. Paper session titled "Approaches in Understanding Urban Precarity", paper presentation titled "Is finer better? On the limits of crime data aggregation".

● April 7th 2017. Presentation (15 minute) at Brown University, titled "Is finer better? On the limits of crime data aggregation".

● March 30th 2016. Poster presentation at AAG Annual Conference 2016. Poster titled "Exploring the spatial-temporal relations between burglary and socioeconomic factors using GIS".

● Oct 15th 2015. Geography Colloquium Presentation (15 minute talk) at University of California Santa Barbara, Department of Geography. Presentation titled "Crime and Income Inequality: a spatial simulation model".

## Teaching

● April. 2019-Jun. 2019. Teaching Assistant for Geog W12 "Maps and Spatial Reasoning" at the Department of Geography at UCSB.

● Jan. 2019-March. 2019. Teaching Assistant for Geog 191 "Optimization Methods for Geographic Problems" at the Department of Geography at UCSB.

● Sep. 2018-Dec. 2018. Teaching Assistant for Geog 140 "Historical Geography" at the Department of Geography at UCSB.

● April. 2018-Jun. 2018. Teaching Assistant for Geog 5 "People, Place, and Environment" at the Department of Geography at UCSB.

● Jan. 2018-March. 2018. Teaching Assistant for Geog 191L "Laboratory in Optimization Methods for Geographic Problems" at the Department of Geography at UCSB.

● April. 2017-Jun. 2017. Teaching Assistant for Geog W12 "Maps and Spatial Reasoning" at the Department of Geography at UCSB.

● Oct. 2015-Dec. 2015. Teaching Assistant for Geog 176A "Introduction to Geographical Information Systems" at the Department of Geography at UCSB.

## Grants & Awards

● Post-Doctoral Research part of the RESTORE+ project, part of the International Climate Initiative (IKI), funded by Germany's Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety.

● CAPES "Science without Borders Fellowship" for full PhD at University of California Santa Barbara. (Sep.2014-Aug.2018, ongoing).

● CNPq "RHAE, SET-F" Scholarship for Graduate Research at SimWorx Engenharia, Pesquisa & Desenvolvimento, Brazil. (Sep.2013-Jul.2014).

● CNPq Scholarship for MS at University of Campinas, Brazil. (Jun.2011-Jun.2013).

● PIBIC/CNPq Scholarship for Undergraduate Research at CTI Renato Archer, Brazil. (Aug.2009-Dec.2010).

● PIBIC/CNPq Scholarship for Undergraduate Research at University of Campinas, Brazil. (Aug.2008-Jul.2009).

## Languages

● Portuguese: native speaker.

● English: fluent.

● Spanish: advanced (reading), basic (speaking, writing).

● Japanese: basic, JLPT N5 certificate.

● French: basic.