Vitor Hirata Sanches

Email   vitor.hiratasanches@anu.edu.au
Address Canberra, Australia

Profile

I am a PhD student at the Fenner School of Environment and Society at the Australian National University (ANU). My research focuses on developing models of socio-ecological systems. By taking an interdisciplinary approach, I integrate computational and mathematical tools with social and biological knowledge to address environmental challenges. In my PhD, I am developing the concept of resilience as pathway diversity to operationalize resilience and support decision-making in water management. Before joining ANU, I earned a Bachelor's degree in Physics and a Master's degree in Complex Systems Modeling from the University of São Paulo, Brazil. I have previously worked with agricultural, forestry, and water systems, utilizing dynamic systems models, agent-based modeling, evolutionary game theory, and social network analysis.

Education

Ongoing	**PhD in Environmental Science - Australian National University**
	Thesis: Using pathway diversity to quantify resilience in natural resource use models. Primery Supervisor: Dr. Steven Lade. Co-supervisor: Dr. Joseph Guillaume, Dr. Sarah Clement, Dr. Takuya Iwanaga.
Oct 2019	**Master in Complex Systems Modeling - University of São Paulo**
	Thesis: Agent-Based Modeling for the study of Agrobiodiversity in Traditional Agroecosystems. Supervisor: Dr. Cristina Adams. Co-supervisor: Dr. Fernando Fagundes Ferreira.
Dec 2016	**Bachelor in Physics - University of São Paulo**

Professional Experience

2020 - 2022	**Back-end web-developer - Parafuzo**
	I developed APIs in Ruby and Node.js, with SQL (Postgres) and NoSQL (MongoDB) databases. Besides, I worked with React and data analysis.
2018 - 2019	**Consultant - World Resources Institute (WRI)**
	Work under the project "Unlocking economic opportunities to scale Forest and Landscape Restoration in Brazil" (Pro-Restaura Project). The project aimed to analyze and propose solutions to forest restoration governance in three landscapes in the Atlantic Forest (Brazil), a global biodiversity hotspot. We performed five local participatory workshops where we map the main institutions and their relationships. We had an interdisciplinary team and I was responsible for helping data collection in workshops, tabulating network data, producing network visualizations, and computing and writing reports on the results of the network analysis.

Complementary Education

Jan 2022   **International Winter School on ABM - CoMSES Net**

International Winter School for Agent-Based Modeling of Social-Ecological Systems.
CoMSES Net and Arizona State University, United States of America. Workload: 27h.

Jul 2020   **Course of Social and Ecological Network Analysis - SESYNC**

Introduction to Social and Ecological Network Analysis. SESYNC, United
States of America. Workload: 30h.

Dec 2017   **School of Data Science - ICTP-SAIFR**

CODATA-RDA School of Data Science. ICTP-SAIFR, Brazil. Workload: 70h.

Jan 2016   **Summer School on Mathematical Biology - ICTP-SAIFR**

V Southern-Summer School on Mathematical Biology and School on Physics
Applications in Biology. ICTP-SAIFR, Brazil. Workload: 202h.

Peer-review Publications

- Araujo, L.G.D., Sanches, R.A., Adams, C., Futemma, C., Buzati, J.R., **Sanches, V.H.**, Oliveira, M., Alves, L., Belote, T., 2024. Forest Landscape Restoration governance: a case study from Espírito Santo, Brazil. Desenvolvimento e Meio Ambiente, 63. DOI: 10.5380/dma.v63i0.86646.

- Ribeiro de Almeida, P., **Hirata Sanches, V.** and Goldman, C., 2024. Balancing the benefits of vaccination: An envy-free strategy. PNAS nexus, 3(3), p.pgae087. DOI: 10.1093/pnasnexus/pgae087.

- Buzati, J.R., Adams, C., Araujo, L.G.D., Sanches, R.A., Futemma, C.R.T., **Sanches, V.H.**, Glehn, H.D.Q.C.V., Guimarães, T.M.G. and Oliveira, M., 2023. Forest and landscape restoration governance: initiatives and the social actors' network in the São Paulo portion of the Paraíba Valley. Desenvolvimento e Meio Ambiente, 62, pp.639-665. DOI: 10.5380/dma.v62i0.83891.

- **Hirata Sanches, V.**, Adams, C., & Ferreira, F. F., 2022. An integrated model to study varietal diversity in traditional agroecosystems. Plos One, 17(1), e0263064. DOI: 10.1371/journal.pone.0263064.

- Adams, C., de Araujo, L. G., Sanches, R. A., Futemma, C. R. T., Buzati, J. R., **Sanches, V. H.**, & Macedo, G. S. S. R., 2021. Governance of forest landscape restoration in Brazil: challenges and opportunities. Desenvolvimento e Meio Ambiente, 58. DOI: 10.5380/dma.v58i0.78415.

- Bulai, I. M., Depickere, S., & **Sanches, V. H.**, 2020. Influence Of Asymptomatic People On Malaria Transmission: A Mathematical Model For A Low-transmission Area Case. Journal of Biological Systems, 28 (01), 167-182. DOI: 10.1142/S0218339020500072.

- **Sanches, V. H.**, Kuraoka, D. V., Almeida, P. R., & Goldman, C., 2018. A phenomenological analysis of eco-evolutionary coupling under dilution. Journal of Theoretical Biology, 438, 156-164. DOI: 10.1016/j.jtbi.2017.11.019.

Other Publications

- Oliveira, M., Alves, L., Buzati, J. R., **Sanches, V. H.**, Sanches, R. A., Adams, C., Araujo, L. G., Futemma, C. R. (2022). A paisagem social no planejamento da restauração: Estudos de caso sobre o papel da governança na restauração de paisagens e florestas no sudeste do Brasil. [Social landscape in restoration planning: case studies on the role of governance in landscape and forest restoration in Southeast Brazil]. WRI Brasil. DOI: 10.46830/wrirpt.18.00140pt.es.

Conferences

- **Sanches, V. H.**, Lade, S.J., J.F., Guillaume, J.H.A., Iwanaga, T., 2024. Applying resilience as pathway diversity in a lake eutrophication problem. In: 12th International Congress on Environmental Modelling and Software.

- **Sanches, V.H.**, Adams, C., Araujo, L.G.D., Buzati, J.R., Futemma, C.R.T., Sanches, R.A., 2023. Navigating Governance Networks for Forest Landscape Restoration: Insights from Brazilian Atlantic Forest. In: Seventh Annual Australian Social Network Analysis Conference.

- **Sanches, V. H.**, Crépin, A., Dakos, V., Donges, J.F., Guillaume, J.H.A., Haider, L.J., Iwanaga, T., Kawakkel, J.H., Lade, S.J., Quinlan, A.E., Quiñones, R., Rocha, J.C., Vivas, J., 2023. A review of quantitative resilience measurements: gaps on the operationalisation of agency and diversity in resilience metrics. In: 25th International Congress on Modelling and Simulation (MODSIM2023).

- **Sanches, V. H.**, Adams, C., & Ferreira, F. F., 2018. Modelagem Baseada em Agentes para o Estudo da Emergência de Agrobiodiversidade em Comunidades Tradicionais: um estudo sobre a mandioca [Agent-based modeling for the study of agrobiodiversity emergency in traditional communities]. In: XVII Congresso Brasileiro de Mandioca e II Congresso Latino-americano e Caribenho de Mandioca.

Teaching Experience

2023-2024   **Systems Thinking - Australian National University**

Teaching Assistant of the Systems Thinking graduate discipline.

2023-2024   **Environmental Policy - Australian National University**

Teaching Assistant of the Environmental Policy undergraduate discipline.

2018   **Human Ecology - University of São Paulo**

Teaching Assistant of the Human Ecology undergraduate discipline.