

# Pedro Henrique Silva Souza Barros

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Scholar

## Education

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**Federal University of Minas Gerais**

Mar 2021 – Present

*Ph.D. in Computer Science (Tied in Top 7 CS Graduate Programs in Brazil)*

*Belo Horizonte, Minas Gerais, Brazil*

**Federal University of Minas Gerais**

Mar 2019 – Mar 2021

*M.Sc. in Computer Science*

*Belo Horizonte, Minas Gerais, Brazil*

**Federal University of Alagoas**

Sep 2013 – Nov 2018

*B.Sc. in Computer Engineering*

*Maceió, Alagoas, Brazil*

## Experience

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**SPIN Laboratory - University of Massachusetts Amherst/US**

Jan 2024 – Dez 2024

*Ph.D Exchange Student*

*Massachusetts, US*

**International Conference on Machine Learning (ICML)**

2020

*Monitor Volunteer*

## Awards & Honors

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**Award for the best Brazilian MSc Thesis on Artificial and Computational Intelligence**

*11<sup>th</sup> Brazilian Conference on Intelligent Systems*

2022

**Award for Academic Excellence in Institutional Scholarship Programs**

*Federal University of Alagoas*

2018

**Award for Academic Excellence in Mathematics\***

*Brazilian Mathematical Society*

2014

## Selected Publications – Journals

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**Barros, Pedro H.**, Murai, Fabricio; Houmansadr, Amir; Frery, Alejandro C.; Ramos, Heitor Soares

**Variational Inference in Similarity Spaces: A Bayesian Approach to Personalized Federated Learning.**

*NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty (NeurIPS BDU Workshop)*, 2024. (To be appear)

**Barros, Pedro H.**; Guevara, J. C.; Villas, L.; Guidoni, D.; da Fonseca, N. L.; Ramos, H. S.

**A Novel Federated Meta-Learning Approach for Discriminating Sedentary Behavior From Wearable Data.**

*IEEE Internet of Things Journal (IEEE IoT Journal)*, 2024. (Click here)

**Barros, Pedro H.**; Queiroz Fabiane; Figueredo, Flavio ; Santos, Jefersson A. dos ; Ramos, Heitor S.

**A New Similarity Space Tailored for Supervised Deep Metric Learning.**

*ACM Transactions on Intelligent Systems and Technology (TIST)*, 2022. (Click here)

**Barros, Pedro H.**; Chagas, Eduarda T.C. ; Barbosa, Leonardo B. ; Queiroz Fabiane; Ramos, Heitor S.

**Malware-SMELL: A zero-shot learning strategy for detecting zero-day vulnerabilities.**

*Computers & Security*, 2022. (Click here)

Chagas, Eduarda T. C. ; **Barros, Pedro H.** ; Cardoso-Pereira, Isadora ; Ponte, Igor V. ; Ximenes, Pablo ;

Figueiredo, Flavio ; Murai, Fabricio ; Couto da Silva, Ana Paula ; Almeida, Jussara M. ; Loureiro, Antonio A.

F. ; Ramos, Heitor S.

**Effects of population mobility on the COVID-19 spread in Brazil.**

*PLoS One*, 2021. (Click here)

Cardoso, Isadora ; Borges, Joao B. ; **Barros, Pedro H.** ; Loureiro, Antonio F. ; Rosso, Osvaldo A. ; Ramos, Heitor S. . **Leveraging the self-transition probability of ordinal patterns transition network for transportation mode identification based on GPS data.**

*NonLinear Dynamics*, 2021. (Click here)

**Barros, Pedro H.**; Cardoso-Pereira, Isadora ; Cid, Hector Allende; Rosso, Osvaldo A. ; Ramos, Heitor S. **Leveraging Phase Transition of Topics for Event Detection in Social Media.**

*IEEE Access*, 2020. (Click here)

Argolo, C. ; **Barros, Pedro H.** ; Tome, T ; Arashiro, E ; Gleria, Iram ; Lyra, M L

**Threshold of coexistence and critical behavior of a predator-prey stochastic model in a fractal landscape.**

*Journal of Statistical Mechanics - Theory and Experiment*, 2016. (Click here)

Laise, T. ; **Barros, Pedro H.**; Argolo, C. ; Lyra, M. L.

**Continuously varying critical order-parameter fluctuations in a parity conserving absorbing-state transition with long-range diffusion.**

*Journal of Statistical Mechanics*, 2016. (Click here)

Argolo, C. ; **Barros, Pedro H.** ; Tome, T. ; Gleria, Iram ; Lyra, M. L.

**Stationary and dynamic critical behavior of the contact process on the Sierpinski carpet.**

*Physical Review E*, 2015. (Click here)

Argolo, C. ; **Barros, Pedro H.** ; Gleria, Iram ; dos Anjos, Fabiana Carvalho ; Lyra, M L .

**Critical behavior of the absorbing transition of branching and annihilating bosonic.**

*Journal of Statistical Mechanics - Theory and Experiment*, 2015. (Click here)

Argolo, C. ; Quintino, Yan ; **Barros, Pedro H.** ; Lyra, M. L.

**Vanishing order-parameter critical fluctuations of an absorbing-state transition driven by long-range interactions.**

*Physical Review E*, 2013. (Click here)

### *Selected Publications – Conferences*

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**Barros, Pedro H.**; Guevara, J. C.; Villas, L.; Guidoni, D.; da Fonseca, N. L.; Ramos, H. S.

**Hierarchical federated learning based on ordinal patterns for detecting sedentary behavior.**

*In: International Joint Conference on Neural Networks (IJCNN)*, 2024, to appear.

**Barros, Pedro H.**; Murai, Fabricio; Ramos, Heitor S.

**Bayes and Laplace Versus the World: A New Label Attack Approach in Federated Environments Based on Bayesian Neural Networks.**

*In: Brazilian Conference on Intelligent Systems (BRACIS)*, 2023. (Click here)

Jorge, J., ; **Barros, Pedro H.**; Yokoyama, R.; Guidoni, D.; Ramos, H. S.; Fonseca, N.; Villas, L.

**Applying Federated Learning in the detection of Freezing of Gait in Parkinson's disease.**

*In: IEEE/ACM 15th International Conference on Utility and Cloud Computing (UCC)*, 2023. (Click here)

**Barros, Pedro H.**; Ramos, Heitor S.

**A novel aggregation method to promote safety security for poisoning attacks in Federated Learning.**

*In: IEEE Global communications conference (GLOBECOM)*, 2022 (Click here)

**Barros, Pedro H.**; Cardoso-Pereira, Isadora ; Foschini, Luca; Corradi, Antonio ; Ramos, Heitor S.

**Load balancing in D2D networks Using Reinforcement Learning.**

*In: IEEE Symposium on Computers and Communications (ISCC)*, 2019, Barcelona. (Click here)

**Barros, Pedro H.**; Cardoso-Pereira, Isadora ; Loureiro, Antonio ; Ramos, Heitor S.

**Event Detection in Social Media Through Phase Transition of Bigrams Entropy.**

*In: IEEE Symposium on Computers and Communications (ISCC)*, 2018, Rio grande do Norte. (Click here)

### *Other Information*

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\*In addition, I participated actively in several School Olympics in the areas of Mathematics, Physics, and Astronomy, resulting in 20 awards over the years. In 2014, due to my placement in the Brazilian Mathematical Olympiad of the Public Schools (OBMEP), I received the silver medal from President Dilma Vana Rousseff at the Palace of Arts (Rio de Janeiro).