

FABRICIO MURAI

(H-index: 11)

Curriculum Vitae, September 18, 2022

Assistant Professor

Worcester Polytechnic Institute

Department of Computer Science

Data Science Program

100 Institute Rd

Worcester, MA, USA 01609

Office: +1 508-831-6490

Email: fmurai@wpi.edu

Homepage: <http://murai.dcc.ufmg.br>

ACADEMIC EXPERIENCE

Aug 2022 – Assistant Professor of Computer Science
Affiliations: Computer Science, Data Science
Worcester Polytechnic Institute

Jan 2020 – Aug 2022 Associate Professor of Computer Science
Universidade Federal de Minas Gerais

Jan 2017 – Jan 2020 Assistant Professor of Computer Science
Universidade Federal de Minas Gerais

EDUCATION

2016 Ph.D. Computer Science, University of Massachusetts Amherst. Adviser: Don Towsley

2014 M.Sc. Computer Science, University of Massachusetts Amherst. Adviser: Don Towsley

2011 M.Sc. Systems and Computer Engineering, Universidade Federal do Rio de Janeiro

2007 B.Sc. Computer Science, Universidade Federal do Rio de Janeiro

AWARDS AND HONORS

2014 Distinguished Ph.D. Candidate CICS UMass Amherst (2 awarded/year)

2014 Outstanding Synthesis Award CICS UMass Amherst (2 awarded/year)

2007 Graduated with honors (*magna cum laude*)

FELLOWSHIPS

- 2011–2015 Brazilian National Science Foundation (CNPq)
Full Ph.D. Fellowship (single one awarded to CS in 2011)
- 2011–2015 Brazilian Graduate Council of the Ministry of Education (CAPES)
Full Ph.D. Fellowship (applicant ranked 1st in STEM in 2011; *offered*)
- 2009–2010 Rio de Janeiro State Research Support Funding Agency, Brazil
M.Sc. Scholarship “Grade A Student” (2 awarded/year in the graduate program)
- 2008–2009 Brazilian National Science Foundation (CNPq)
M.Sc. Scholarship

RESEARCH EXPERIENCE

- 12/2018 – 02/2019 Politecnico di Torino, Italy.
Visiting Scholar (SmartData Research Group)
Host: Marco Mellia
- 08/2015 – 09/2016 University of Massachusetts Amherst.
Research Assistant
Research topic: Multivariate Heavy Tail Phenomena
Supervisor: Don Towsley
- 05/2015 – 08/2015 LinkedIn, Sunnyvale CA.
Social Network Analysis Intern (Experimentation Team)
Research topic: Network A/B testing
Manager: Ya Xu
- 07/2011 – 05/2015 University of Massachusetts Amherst.
Research Assistant
Research topic: Modeling and Analysis of Network Dynamics
Supervisor: Don Towsley

PUBLICATIONS*Journal Papers*

- Pedro H. Barros, **Fabricio Murai**, Antonio A. F. Loureiro, Heitor S. Ramos, NextGen IDS: Toward a Federated DDoS Intrusion Detection System Robust to Model Attacks, (*under review*).
- 2022 35. Carlos H. G. Ferreira, **Fabricio Murai**, Ana P. C. Silva, Martino Trevisan, Luca Vassio, Idilio Drago, Marco Mellia, and Jussara M. Almeida. On Network Backbone Extraction for Modeling Online Collective Behavior. *PLOS ONE*, 2022.

- 2021 34. Eduarda T. C. Chagas^G, Pedro H. Barros^G, Isadora Cardoso-Pereira^G, Igor V. Ponte, Pablo Ximenes, Flávio Figueiredo, **Fabricio Murai**, Ana Paula Couto da Silva, Jussara M. Almeida, Antonio A. F. Loureiro, and Heitor S. Ramos. Effects of Population Mobility on the COVID-19 Spread in Brazil. *PLOS ONE*, 2021.
33. Bárbara Silveira^G, Henrique S Silva^U, **Fabricio Murai**, and Ana Paula C da Silva. Predicting user emotional tone in mental disorder online communities. *Future Generation Computer Systems*, 2021.
32. Carlos H G Ferreira^G, **Fabricio Murai**, Ana P C Silva, Jussara M Almeida, Martino Trevisan, Luca Vassio, Marco Mellia, and Idilio Drago. On the dynamics of political discussions on Instagram: A network perspective. *Online Social Networks and Media*, 2021.
31. Francisco Galuppo Azevedo^U and **Fabricio Murai**. Evaluating the state-of-the-art in mapping research spaces: A Brazilian case study. *PLOS ONE*, 2021.
- 2019 30. Carlos Henrique Gomes Ferreira^G, **Fabricio Murai**, Breno de Sousa Matos^U, and Jussara M Almeida. Modeling Dynamic Ideological Behavior in Political Networks. *The Journal of Web Science*, 2019.
29. **Fabricio Murai**, Bruno Ribeiro, Don Towlsey, and Pinghui Wang. Characterizing Directed and Undirected Networks via Multidimensional Walks with Jumps. *ACM Trans. Knowl. Discov. Data*, 2019.
28. Julio C S Reis^G, André Correia^U, **Fabricio Murai**, Adriano Veloso, and Fabrício Benevenuto. Supervised Learning for Fake News Detection. *IEEE Intelligent Systems*, 2019.
- 2018 27. **Fabricio Murai**, Diogo Rennó^G, Bruno Ribeiro, Gisele L Pappa, Don Towsley, and Krista Gile. Selective harvesting over networks. *Data Mining and Knowledge Discovery*, 2018.
- Earlier work 26. **Fabricio Murai**, Bruno Ribeiro, Don Towsley, and Pinghui Wang. On Set Size Distribution Estimation and the Characterization of Large Networks via Sampling. *IEEE Journal on Selected Areas in Communications*, 2013.
25. **Fabricio Murai**, Antonio A de A. Rocha, Daniel R Figueiredo, and Edmundo A de Souza e Silva. Heterogeneous download times in a homogeneous BitTorrent swarm. *Computer Networks*, 2012.

Conference Papers

- Leonardo Teixeira, Mayank Kakodkar, **Fabricio Murai**, Bruno Ribeiro and Sanjay Rao. Counterfactual Inference in Computer Networking through Abduction, (*in preparation*).
- Henrique S. Assumpção^U, Fabrício Souza, Leandro L. Campos^G, Vinícius T. C. Pires, Paulo M. L. de Almeida, **Fabricio Murai**. DELATOR: Money Laundering Detection via Multi-Task Learning on Large Transaction Graphs, (*under review*).
- 2022 24. Renan S. Saldanha, José M. Rosa, Carlos H. G. Ferreira, Gabriel Nobre, **Fabricio Murai**, Jussara Almeida. Uncovering Coordinated Communities on Twitter During the 2020 U.S. Election. In *IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM)*, 2022 (8 pages , acceptance rate: 19.6%).
23. José M. Rosa, Renan S. Saldanha, Carlos H. G. Ferreira, Gabriel Nobre, **Fabricio Murai**, Jussara Almeida. Uncovering Discussion Groups on Claims of Election Fraud from Twitter. In *International Conference on Social Informatics (SocInfo)*, 2022 (15 pages).
22. Daniel Mello^G, Renato Assunção, and **Fabricio Murai**. Top-Down Deep Clustering with Multi-generator GANs In *AAAI Conference on Artificial Intelligence*, 2022 (11 pages, acceptance rate: 15%).
21. Karen B. Enes^G, Matheus Nunes, **Fabricio Murai**, Gisele L. Pappa. Evolving node embeddings for dynamic exploration of network topologies. In *Ibero-American Conference on Artificial Intelligence (IBERAMIA)*, 2022 (8 pages).
- 2021 20. Bruno Guilherme Gomes^G, **Fabricio Murai**, Olga Goussevskaia, and Ana Paula da Silva. Mixture Variational Autoencoder of Boltzmann Machines for Text Processing. In *Natural Language Processing and Information Systems (NLDB)*, 2021 (11 pages, acceptance rate: 23%).
19. Bruno Guilherme Gomes^G, **Fabricio Murai**, Olga Goussevskaia, and Ana Paula da Silva. Sequence-Based Word Embeddings for Effective Text Classification. In *Natural Language Processing and Information Systems (NLDB)*, 2021 (11 pages, acceptance rate: 23%).
18. Davi Pedrosa de Aguiar^G and **Fabricio Murai**. Encoding Physical Conditioning from Inertial Sensors for Multi-step Heart Rate Estimation. In *Brazilian Conference on Intelligent Systems (BRACIS)*, 2021 (15 pages).
- 2020 17. Carlos Henrique Gomes Ferreira^G, **Fabricio Murai**, Ana Paula da Silva, Jussara Marques de Almeida, Martino Trevisan, Luca Vassio, Idilio Drago, and Marco Mellia. Unveiling Community Dynamics on Instagram Political Network. In *ACM Conference on Web Science (WebSci)*, 2020 (10 pages, acceptance rate: 26%).

16. Lucas Lima^G, Julio C S Reis^G, Philippe Melo^G, **Fabricio Murai**, and Fabrício Benevenuto. Characterizing (Un)moderated Textual Data in Social Systems. In *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, 2020 (5 pages, full+short acceptance rate: 37%).
- 2019 15. Julio C S Reis^G, André Correia^G, **Fabricio Murai**, Adriano Veloso, and Fabrício Benevenuto. Explainable machine learning for fake news detection. In *ACM Conference on Web Science (WebSci)*, 2019 (10 pages, acceptance rate: 32%).
14. Martino Trevisan, Luca Vassio, Idilio Drago, Marco Mellia, **Fabricio Murai**, Flavio Figueiredo, Ana Paula da Silva, and Jussara M Almeida. Towards Understanding Political Interactions on Instagram. In *ACM Conference on Hypertext and Social Media (HT)*, 2019 (5 pages, acceptance rate: 29%).
13. Marco Lattuada, Eugenio Gianniti^G, Marjan Hosseini^G, Danilo Ardagna, Alexandre Maros^G, **Fabricio Murai**, Ana Couto da Silva, and Jussara Almeida. Gray-Box Models for Performance Assessment of Spark Applications. In *International Conference on Cloud Computing and Services Science (CLOSER)*, 2019 (10 pages).
12. Alexandre Maros^G, **Fabricio Murai**, Ana Paula da Silva, Jussara M. Almeida, Marco Lattuada, Eugenio Gianniti^G, Marjan Hosseini^G, and Danilo Ardagna. Machine Learning for Performance Prediction of Spark Cloud Applications. In *IEEE International Conference on Cloud Computing (CLOUD)*, 2019 (8 pages, acceptance rate: 20.8%).
- 2018 11. Bárbara Silveira Fraga^G, Ana Paula da Silva, and **Fabricio Murai**. Online Social Networks in Health Care: A Study of Mental Disorders on Reddit. In *IEEE/WIC/ACM International Conference on Web Intelligence (WI)*, 2018 (6 pages).
10. Francisco Galuppo Azevedo^U, Bruno Demattos Nogueira^U, **Fabricio Murai**, and Ana Paula C. Silva. Estimation Errors in Network A/B Testing Due to Sample Variance and Model Misspecification. In *IEEE/WIC/ACM International Conference on Web Intelligence (WI)*, 2018 (6 pages).
9. Karen Braga Enes^G, Pedro Paulo Valadares Brum^G, Tiago Oliveira Cunha, **Fabricio Murai**, Ana Paula da Silva, and Gisele Lobo Pappa. Reddit Weight Loss Communities: Do They Have What It Takes for Effective Health Interventions? In *IEEE/WIC/ACM International Conference on Web Intelligence (WI)*, 2018 (6 pages).
8. Lucas Lima^G, Julio C S Reis^G, Philippe Melo, **Fabricio Murai**, Leandro Araujo, Pantelis Vikatos^G, and Fabrício Benevenuto. Inside the Right-Leaning Echo Chambers: Characterizing Gab, an Unmoderated Social System. In *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, 2018 (8 pages, acceptance rate: 15%).

- | | |
|--------------|---|
| Earlier Work | 7. Bruno Ribeiro, Pinghui Wang, Fabricio Murai , and Don Towsley. Sampling directed graphs with random walks. In <i>IEEE INFOCOM</i> , 2012 (9 pages, acceptance rate: 18%). |
|--------------|---|

Refereed Workshop Papers

- | | |
|--------------|---|
| 2021 | 6. Shiri Dori-Hacohen, Roberto Montenegro, Fabricio Murai , Scott Hale, Keen Sung, Michela Blaine and Jennifer Edwards-Johnson. Fairness via AI: Bias Reduction in Medical Information. In <i>Fairness, Accountability and Transparency in Recommender Systems (FaccTRec@RecSys)</i> , 2021 (4 pages). |
| | 5. Davi Pedrosa de Aguiar ^G and Fabricio Murai . Encoding physical conditioning from inertial sensors for multi-step heart rate regression. In <i>ACM Conference on Health, Inference, and Learning (CHIL) Workshop</i> , 2021 (poster). |
| 2018 | 4. Levy de Souza Silva ^G , Fabricio Murai , Ana Paula Couto da Silva, and Mirella M Moro. Automatic Identification of Best Attributes for Indexing in Data Deduplication. In <i>Alberto Mendelzon International Workshop on Foundations of Data Management (AMW)</i> , 2018 (10 pages). |
| Earlier work | 3. Fabricio Murai , Bruno Ribeiro, Donald Towsley, and Krista Gile. Targeted Network Recruitment on a Budget. In <i>NetSci</i> , 2014 (poster). |
| | 2. Fabricio Murai , Bruno Ribeiro, Donald Towsley, and Krista Gile. Characterizing Branching Processes from Sampled Data. In <i>SIMPLEX@WWW</i> , 2013 (7 pages). |
| | 1. Fabricio Murai , and Daniel Ratton Figueiredo. Assortative Mixing in BitTorrent-Like Networks. In <i>IEEE INFOCOM Workshops</i> , 2009 (2 pages). |

TRAVEL GRANTS

2021 RecSys Inclusion Grant: for virtual participation in RecSys

2010 IFIP WG 7.3 Student Travel Grant: for participation in IFIP Performance

NATIONAL PAPER AWARDS

Paper Awards in BraSNAM (Brazil's Premier Social Network Analysis event, in Portuguese):

- 2022 **Best Paper Award (#1 of 19 accepted, 32 submissions).**
 DELATOR: Automatic Detection of Money Laundering Evidence via Neural Networks on Transaction Graphs.
- 2020 **Best Paper Award (#1 of 15 accepted, 49 submissions).**
 User Emotional Tone Prediction Models in Reddit Mental Health Communities.
- 2019 **Honorable Mention (#2–5 of 14 accepted, 51 submissions).**
 SEMPLICE: A Sequential Model for Proficiency in Online Language Learning Communities.
- 2018 **3rd Best Paper Award (#3 of 17 accepted, 61 submissions).**
 Social Interaction Analysis in Online Language Learning Communities: a Reddit case study.

CURRENT & PAST GRANTS

Active grants: 1 grant (1x NPO).

Total dollar amount in active grants with Murai as PI/CO-PI: \$98,050.

Past grants: 6 grants (2x state-owned industry, 2x private, 1x internationalization, 1x EU-Brazil).

1. Agency/Title of Grant:	Serrapilheira Institute (Science Support Program): WildPixels: Dense Labeling of Remote Sensing Images in the Wild (competitive, 12 awarded/505)
2. Duration of Funding:	Aug 2021 – Aug 2024
3. Total Amount of Award:	\$98,050
4. Your Role:	CO-PI
5. Percentage of funding responsible:	non-fixed percentage

1. Agency/Title of Grant:	PETROBRAS (Training): Artificial Intelligence Applied to Geosciences Course
2. Duration of Funding:	Jan 2021 – Dec 2023 (one 10-week course/year)
3. Total Amount of Award:	\$211,052
4. Your Role:	Coordinator (until Aug 2022)
5. Percentage of funding responsible:	66.7%

1. Agency/Title of Grant:	Usiminas (Training): Technological Residency in Data Science
2. Duration of Funding:	Sep 2021 – Dec 2022
3. Total Amount of Award:	\$83,795
4. Your Role:	Coordinator (until Aug 2022)
5. Percentage of funding responsible:	75%

1. Agency/Title of Grant:	Inter Bank (InterMINDS Research Lab): Artificial Intelligence for Automatic Detection of Evidences of Money Laundering and Terrorist Financing
2. Duration of Funding:	Aug 2021 – Feb 2022
3. Total Amount of Award:	\$23,925
4. Your Role:	PI
5. Percentage of funding responsible:	100%

1. Agency/Title of Grant:	Minasligas (R&D, federal support via EMBRAPPII): Machine Learning System for Predictive Maintenance.
2. Duration of Funding:	Oct 2020 – Jun 2021
3. Total Amount of Award:	\$91,515
4. Your Role:	Collaborator
5. Percentage of funding responsible:	not applicable

1. Agency/Title of Grant:	Compagnia di San Paolo (Internationalization): Artificial Intelligence for Spotting Fake Profiles and Anomalous Users' Behaviors on the Web. Politecnico di Torino & UFMG (competitive).
2. Duration of Funding:	Jul 2018 – Jun 2019
3. Total Amount of Award:	€47,386
4. Your Role:	Collaborator
5. Percentage of funding responsible:	not applicable

1. Agency/Title of Grant:	European Union (Cooperation Programme, H-2020): ATMOSPHERE - Adaptive, Trustworthy, Manageable, Orchestrated, Secure, Privacy-assuring, Hybrid Ecosystem for RESilient Cloud Computing (competitive).
2. Duration of Funding:	Nov 2017 – Oct 2019
3. Total Amount of Award:	€1,102,849
4. Your Role:	Collaborator
5. Percentage of funding responsible:	not applicable

STUDENTS

GRADUATED M.Sc. STUDENTS

Leandro Campos (M.Sc., Co-advisor Valle, UFMG, Mar 2019 – Jul 2022). Research topic: *A Generative Approach for for Multi-Step Prediction*.

Bruno Gomes [19, 20] (Murai was co-advisor with da Silva and Goussevskaia, UFMG, Mar 2018 – Nov 2021). Dissertation topic: *Efficient Natural Language Processing: Two Frameworks for Text Classification and Analysis*.

Ronald Pereira (UFMG, Aug 2019 – Oct 2021). Senior Data Scientist at iFood. Dissertation: *Automatic Detection of Frauds in Financial Transactions Networks using Graph Learning*.

Daniel Mello (Murai was Co-advisor with R. Assunção, UFMG, Aug 2018 – May 2021). Applying to PhDs. Dissertation: *Generative Adversarial Networks for Hierarchical Clustering*.

Davi Pedrosa de Aguiar [5, 18] (UFMG, Mar 2019 – Apr 2021). Software Engineer at Treinus. Dissertation: *Predicting Heart Rate During Physical Activities Using Artificial Neural Networks*.

Bárbara Silveira [11, 29] (Murai was Co-advisor with A. P. C. da Silva, UFMG, Mar 2017 – Nov 2019). Tech Lead at A3Data, Lecturer for MBA courses at PUC-Minas. Dissertation: *Characterizing and Predicting User Emotional Tone in Mental Health Disorder Online Communities*.

Rafael Sales Medina Ferreira (Co-advisor: A. P. C. da Silva, UFMG, Mar 2017 – May 2019). Software Engineer at Cadence Design Systems. Dissertation: *Impact of Online Social Communities in Language Learning*.

CURRENT GRADUATE STUDENTS

Bright Kyeremeh (Ph.D., WPI, Aug 2022 –). Research topic: TBD.

Sirshenduy Ganguly (M.Sc., WPI, Aug 2022 –). Research topic: TBD.

Rafael Sales Medina Ferreira (Ph.D., UFMG, Nov 2021 – expected Out 2025). Research topic: TBD.

Rodrigo Andrade Santos (Ph.D., UFMG, Mar 2022 – expected Feb 2026). Research topic: TBD.

Jackson de Faria Jr. (M.Sc., Co-advisor with Assunção, UFMG, Aug 2019 –). Research topic: *Fisher Information-based Adaptive DropConnect for Regularizing Neural Networks*.

Amanda Fagundes de Paula (M.Sc., UFMG, Dec 2021 –). Research topic: *Understanding the Online Spread of Biased Health Information*.

Gustavo Germano (M.Sc., UFMG, Mar 2020 – Fev 2023). Research topic: *Leveraging Sentence Embeddings for Improved Community Detection via GNNs*.

UNDERGRADUATE RESEARCH ASSISTANTS:

Francisco Galuppo Azevedo [10, 27] (UFMG CS Major, Mar 2017 – Mar 2021). **Now a M.Sc. student at UFMG.**

Bruno Demattos Nogueira [10] (UFMG CS Major, Mar 2017 – Aug 2021). **Now a M.Sc. student at UFMG.**

Henrique Soares Assumpção e Silva [29] (UFMG CS Major, Mar 2020 – Dec 2024). Supported by partnership with Inter Bank. Undergraduate research (with weekly meetings): GNNs for Automatic Detection of Money Laundering.

Diogo Oliveira Neiss (UFMG CS Major, May 2021 – Dec 2024). Undergraduate research (with weekly meetings): Learning research maps from scientists' publication trajectories.

TEACHING EXPERIENCE

2022/Fall | CS541/DS541 *Deep Learning* (35 students)

This course will offer a mathematical and practical perspective on artificial neural networks for machine learning. Students will learn about the most prominent network architectures including multilayer feedforward neural networks, convolutional neural networks (CNNs), auto-encoders, recurrent neural networks (RNNs), and generative-adversarial networks (GANs). This course will also teach students optimization and regularization techniques used to train them – such as back-propagation, stochastic gradient descent, dropout, pooling, and batch normalization. Connections to related machine learning techniques and algorithms, such as probabilistic graphical models, will be explored. In addition to understanding the mathematics behind deep learning, students will also engage in hands-on course projects. Students will have the opportunity to train neural networks for a wide range of applications, such as object detection, facial expression recognition, handwriting analysis, and natural language processing.

2021/2 | Graduate level *Seminar on Disinformation and Hate Speech in Digital Platforms* (10 students, co-instructed: 50%)

Digital platforms, such as online social networks and applications for exchanging messages such as WhatsApp, are widely popular and essential media spaces for communication in the contemporary world. Different digital platforms have been conducive environments for spreading disinformation, creating polarization and acting out hateful behaviors. Many disinformation campaigns exploit technological flaws associated with the algorithms that constitute such platforms. In this course, we will review recent literature and conduct in-depth discussions on short- and medium-term risks to the online information ecosystem, and the student will engage in a targeted project to analyze social media discourse using machine learning, processing of natural language, complex networks, as well as ethical aspects linked to topics such as polarization, algorithmic bias and its implications for misinformation, echo chambers, hate speech, and conspiracy theories.

Graduate level *Deep Learning Algorithms* (44 students, co-instructed: 20%)

Undergraduate level *Computational Linear Algebra* (85)

Developed as a permanent CS course in replacement to Numerical Analysis.

Linear Algebra (LA) is at the core of many important machine learning (ML) techniques today. While most students take a linear algebra course early in their undergraduate studies, by the time they enroll in ML, Computer Vision and Deep Learning classes, they have a difficult time connecting the abstract concepts learned before with the methods used to learn from data, especially, in the light of new concerns such as numerical precision, stability and scalability. To address these issues, I helped develop this new course, which provides the basis required for a full understanding of key ML methods and applications. This course covers vectors spaces, orthogonal matrices, positive definite matrices, eigendecomposition, singular value decomposition, vector and matrix norms, linear regression, linear least squares, efficient computation of eigenvalues/singular values, iterative methods for solving linear systems. It also covers important CS applications, such as Pagerank, Principal Component Analysis and bias removal.

2021/1	Undergraduate level <i>Computational Linear Algebra</i> (66 students)
	Undergraduate level <i>Numerical Analysis</i> (71 students)
2020/2	Undergraduate level <i>Computational Linear Algebra</i> (85 students)
	Undergraduate level <i>Numerical Analysis</i> (54 students)
2020/1	Undergraduate level <i>Computational Linear Algebra</i> (67 students)
	Undergraduate level <i>Numerical Analysis</i> (74 students)
2019/2	Graduate level <i>Deep Learning Algorithms</i> (66 students, co-instructed: 20%)

	Graduate level <i>Model Thinking</i> (10 students, co-instructed: 33%) Building models to represent real world phenomena allows us to reason about their outcomes, take informed decisions and design principled algorithms. This is a critical skill not only for STEM students and professionals, but also in social and life sciences. More generally, it enables any individual to be a better citizen of the world. This course is based on Scott Page's book <i>The Model Thinker: What You Need to Know to Make Data Work for You</i> and provides an overview of several types of models: Segregation and Peer Effects, Aggregation, Decision Models, Modeling People, Categorical and Linear Models, Tipping Points, Epidemiological Models, Diversity and Innovation, Markov Processes and Applications, Lyapunov Functions, Coordination and Culture, Path Dependence, Complex Networks, the Colonel Blotto Game, Randomness and Random Walks, Replicator Dynamics, Probabilistic Graphical Models and Time Series. Evaluation is based on seminar presentations and a course project.
	Undergraduate level <i>Computational Linear Algebra</i> (74 students)
2019/1	Graduate level <i>Seminar on Machine Learning for Graphs</i> (4 students) Many high impact social and computational phenomena take place over systems that can be naturally modeled as networks (e.g.: communication over the Internet, online social networking, fake news dissemination). In this seminar, we will cover state-of-the-art techniques developed for machine learning tasks in graphs (e.g., node classification, link prediction, community detection, etc). In the first part of the course, the instructor will give an overview of the field. In the second part, the students will present and discuss papers on: label propagation, node embeddings, graphs kernels, graph neural networks, graph bandits, active search & selective harvesting, and heuristics for link prediction. Optional topics include graph-based recommendation, graph-based text classification, probabilistic relational models, stochastic block models, influence maximization, etc.
	Undergraduate level <i>Computational Linear Algebra</i> (91 students)
2018/2	Graduate level <i>Model Thinking</i> (22 students, co-instructed: 33%)
	Undergraduate level <i>Numerical Analysis</i> (2 classes: 71 + 47 students)
2018/1	Undergraduate level <i>Numerical Analysis</i> (2 classes: 48 + 60 students)
2017/2	Graduate level <i>Model Thinking</i> (15 students, co-instructed: 33%)
	Undergraduate level <i>Numerical Analysis</i> (2 classes: 44 + 40 students)
2017/1	Undergraduate level <i>Numerical Analysis</i> (2 classes: 39 + 54 students)

Jan/2019 – Feb/2019 Graduate level *Data Science for Networks*
Politecnico di Torino, Italy.

INVITED TALKS

- | | |
|------|--|
| 2022 | (Invited Speaker) CS/DS Colloquium, WPI, Worcester, MA, “Harnessing the Power of Digital Platforms: a Networked Data Perspective”, September 9th. |
| 2021 | (Invited Speaker/Virtual) Online Seminars, Institute of Computing, UFF, Brazil, “How to use graphs to analyze political communities on Instagram and science in Brazil?”, April 13th. |
| 2020 | (Invited Lecturer) Computing Summer School, Belo Horizonte, Brazil, “Who hid my graph? Inference from partially observed networks”, February 20th. |
| 2019 | (Invited Speaker) Statistics Seminar, Dept. of Statistics, UFMG, Brazil, “Reasoning from Partially Observed Networks: Sampling, Estimation and Models”, October 4th. |
| 2018 | (Invited Speaker) SmartData Research Group Seminar, Politecnico di Torino, Italy, “Reasoning from Partially Observed Networks: Sampling, Estimation and Models”, December 12th. |
| | (Invited Lecturer) Computing Summer School, Belo Horizonte, Brazil, “Network Science: mathematics and algorithms”, February 20th. |
| 2016 | (Invited Lecturer) REU Lunch Series, UMass Amherst, “Data Science for Networks”, June 16th. |

INTERDISCIPLINARY OUTREACH

Ph.D. Committee of Álvaro Salgado de Abreu (BioInformatics, Luiz Carlos Jr. Alcântara and José Lourenço, 2022)

M.Sc. Committee of Wesley Henrique Silva Pereira (Statistics, Denise Duarte, 2020)

M.Sc. Committee of Marina Alves Amorim (Statistics, Denise Duarte, 2020)

M.Sc. Qualifying Committee of Wesley Henrique Silva Pereira (Statistics, Denise Duarte, 2019)

M.Sc. Qualifying Committee of Marina Alves Amorim (Statistics, Denise Duarte, 2019)

UNIVERSITY ACTIVITIES**Computer Science, Information Systems and Computational Mathematics B.Sc.'s:**

Undergraduate core course development: Computational Linear Algebra (4 credits, required course) (2019/1).

Departmental Service (at WPI):

Member, Diversity, Equity & Inclusion Committee for Data Science (2022–present)

Member, Diversity, Equity & Inclusion Committee for Computer Science (2022–present)

Faculty Advisor, Undergraduate Data Science Club, (2022–present)

Departmental Service (at UFMG):

Member, Teaching Faculty Search Committee (2022)

Member, Computer Science Graduate Program Committee (2021–2022)

Member, Departmental Committee (2019–2021)

Member, Advisory Board for the Information Systems Major (2017–2019)

Member, Ph.D. Admissions Committee (2021)

Chair, M.Sc. Admissions Committee for the Systems Area (2019)

Member, M.Sc. Admissions Committee (2017, 2018, 2019, 2021)

Chair, REU workshop evaluation committee (2018)

Member, University Undergraduate Exhibit evaluation committee (2018)

Member, University interchange program examining committee (2017)

Member, REU workshop evaluation committee (2017)

Ph.D. Committee Member:

External: João Ismael Pinheiro (Informatics, UFMG, Daniel Menasche), 2021.

Julio Cesar Soares dos Reis (CS, UFMG, Fabricio Benevenuto), 2020.

Ph.D. Proposal Committee Member:

External Member: Ronald Chiesse de Souza (Systems and Computer Engineering, UFRJ, Daniel Figueiredo), 2021.

Julio Cesar Soares dos Reis (CS, UFMG, Fabricio Benevenuto), 2019.

Rodrigo de Magalhães Silva (CS, UFMG, Marcos Gonçalves), 2019.

Edemir Ferreira de Andrade Junior (CS, UFMG, Jefersson Alex dos Santos), 2019.

M.Sc. Committee Member:

Marcos Felipe Vendramini Carvalho (CS, UFMG, Jefersson Alex dos Santos), 2021.

Matheus Henrique do Nascimento Nunes (CS, UFMG, Gisele Pappa), 2021.

Gabriel Peres Nobre (CS, UFMG, Jussara Almeida), 2021.

Pedro Dalla Vecchia (CS, UFMG, Rodrygo Santos), 2021.

Filipe Barreto do Nascimento (CS, UFMG, Rodrygo Santos), 2021.

External Member: Lucas Lopes Felipe (Informatics, UFRJ, Daniel Menasche), 2021.

Alexandre Maros (CS, UFMG, Jussara Almeida), 2019.

Túlio Braga Moreira Pinto (CS, UFMG, Jussara Almeida), 2019.

Tulio Lima Criscuolo (CS, UFMG, Wagner Meira Jr. and Renato Assunção), 2019.

Caio Cesar Viana da Silva (CS, UFMG, Jefersson dos Santos), 2019.

Lucas Henrique Costa de Lima (CS, UFMG, Fabricio Benevenuto), 2019.

Gabriel Lage Calegari (CS, UFMG, Ana Paula da Silva), 2019.

Tiago Pimentel Martins da Silva (CS, UFMG, Adriano Veloso), 2018.

Luis Fernando Miranda (CS, UFMG, Gisele Pappa), 2018.

Johnnatan Messias Peixoto Afonso (CS, UFMG, Fabricio Benevenuto), 2017.

M.Sc.. Proposal Committee Member:

External Member: Caio Lorenzetti Martinelli (CS, USP, Denis Mauá), 2022.

External Member: Caio Lente (CS, USP, Roberto Hirata Jr.), 2021.

Student Engagement Talks:

(Invited Speaker) Undergraduate Research Engagement Course, 2017/1.

Outreach:

(Instructor) 11 Data Science/ML virtual workshops organized by Pluralsight for Microsoft Reactor Sao Paulo (2020–2021).

(Co-chair) Computing Summer School, organized by UFMG, targeted at regional undergraduate students (2020).

(Co-chair) Computing Summer School, organized by UFMG, targeted at regional undergraduate students (2019).

PROFESSIONAL ACTIVITIES

General Co-Chair, CSBC WPerformance 2022 (Brazil's premier event on Perf. Evaluation).

Technical Program Committees:

KDD 2019, 2020, 2021

ECML-PKDD 2021, 2022

WWW 2021, 2022

WI-IAT 2018, 2020

INFOCOM 2019, **Distinguished TPC: 2020 (20.5%), 2021 (20.8%)**

CSBC WPerformance 2017, 2018, 2019, 2020

Journal Reviewer:

Information Processing and Management (2020, 2021, 2022)

IEEE TNNLS (2022)

IEEE Access (2020, 2021)

IEEE TKDE (2021)

Data and Knowledge Engineering (2021)

Brazilian Journal of Probability and Statistics (2021)

Computer Networks (2020)

ACM TOMPECS (2018, 2019)

Information Systems (2017)

Journal of Network and Systems Management (2017)

Professional Membership:

Association for Computing Machinery.