

## EDUCATION

- 2017 - 2022 **Federal University of Rio Grande do Sul (UFRGS)**, Brazil  
Ph.D., Computer Science  
Advised by Prof. Luciano Paschoal Gaspar
- 2019 - 2020 **University of Illinois at Urbana-Champaign (UIUC)**, USA  
Research Scholar  
Supervised by Prof. Kirill Levchenko
- 2015 - 2017 **Santa Catarina State University (UDESC)**, Brazil  
M.Sc., Applied Computing  
Advised by Prof. Rafael Rodrigues Obelheiro
- 2011 - 2015 **Santa Catarina State University (UDESC)**, Brazil  
B.Sc., Computer Science  
Final Project Advised by Prof. Rafael Rodrigues Obelheiro

## EXPERIENCE

- Jul, 2023 - **The University of Chicago**, Postdoctoral Scholar  
Present
  - Working within the Internet Equity Initiative at the Data Science Institute
- Jul, 2021 - **Federal University of Rio Grande do Sul (UFRGS)**, Research Assistant  
May, 2023 Project: SkyNet - Towards Smart Data Planes
  - Worked on bringing machine learning to programmable networking devices
  - Explored the use of machine learning models for networking tasks and problems
- Aug, 2021 - **Federal University of Rio Grande do Sul (UFRGS)**, Part-time Professor  
Aug, 2022
  - Taught introductory programming and algorithms (C and Python) to 250+ students
- Mar, 2021 - **Int6 Tech - Internet Service Provider**, R&D Intern  
May, 2021
  - Improved network operation practices with Open vSwitch
  - Evaluated the deployment of an Open vSwitch + DPDK solution
- Aug, 2017 - **Federal University of Rio Grande do Sul (UFRGS)**, Teaching Assistant  
Dec, 2017
  - Taught and helped prepare material on network communication protocols
  - Helped prepare material to guide classes on programming challenges
- Mar, 2016 - **Santa Catarina State University (UDESC)**, Teaching Assistant  
Jul, 2016
  - Taught and helped prepare material on operating systems
- Jul, 2014 - **Unimed Federação Santa Catarina**, Systems Analyst Intern  
Dec, 2014
  - Analyzed and developed new features for client billing module of hospital system serving 10+ hospitals across the nation and 1,000,000+ clients

## HONORS & AWARDS

2022 **Ph.D. Graduation with Honors**

Federal University of Rio Grande do Sul (UFRGS), Brazil

2019 **Best Student Paper Award**

IFIP/IEEE International Symposium on Integrated Network Management (IM 2019)

2018 **Best Paper Award**

Brazilian Symposium on Computer Networks and Distributed Systems (SBRC 2018)

2015 **B.Sc. Graduation with Honors,**

Santa Catarina State University (UDESC), Brazil

2013 **Honorable Mention**

ACM Brazilian Final of the International Computer Programming Contest (ICPC)

## RESEARCH INTERESTS

- Machine-Learning
- Programmable Networks
- Software-defined Networking
- Network, Service and Application Management

## PUBLICATIONS

- (1) **Jonatas Marques**, Kirill Levchenko, and Luciano Gasparly. 2023. Responding to Network Failures at Data-plane Speeds with Network Programmability. **2023 IEEE/IFIP Network Operations and Management Symposium (NOMS)**, 2023.
- (2) Gabriel Vassoler, **Jonatas Marques**, Luciano P. Gasparly. 2023. VERMONT: An In-band Telemetry-Based Approach for Live Network Property Verification. **2023 IEEE/IFIP Network Operations and Management Symposium (NOMS)**, 2023.
- (3) Guilherme R. Pretto, Bruno L. Dalmazo, **Jonatas A. Marques**, Zhongke Wu, Xingce Wang, Vladimir Korkhov, Philippe O. A. Navaux, and Luciano P. Gasparly. 2022. Janus: a framework to boost HPC applications in the cloud based on SDN path provisioning. **Cluster Computing** 25, 2 (Apr 2022), 947-964.
- (4) **Jonatas A. Marques**, Zhongke Wu, Xingce Wang, Ruslan Kuchumov, Vladimir Korkhov, Weverton L. C. Cordeiro, Philippe O. A. Navaux, and Luciano P. Gasparly. 2021. Harnessing Cloud Computing to Power Up HPC Applications: The BRICS CloudHPC Project. In **Computational Science and Its Applications - ICCSA 2021: 21st International Conference, Cagliari, Italy, September 13-16, 2021, Proceedings, Part VIII**. Springer-Verlag, Berlin, Heidelberg, 336-349.
- (5) Bruno L. Dalmazo, **Jonatas A. Marques**, Lucas R. Costa, Michel S. Bonfim, Ranyelson N. Carvalho, Anderson S. da Silva, Stenio Fernandes, Jacir L. Bordim, Eduardo Alchieri, Alberto Schaeffer-Filho, Luciano Paschoal Gasparly, and Weverton Cordeiro. 2021. A

systematic review on distributed denial of service attack defense mechanisms in programmable networks. **Int. J. Netw. Manag.** 31, 6 (November/December 2021).

- (6) L. A. Q. González, L. Castanheira, **J. A. Marques**, A. Schaeffer-Filho and L. P. Gasparly. 2021. BUNGEE: An Adaptive Pushback Mechanism for DDoS Detection and Mitigation in P4 Data Planes, **2021 IFIP/IEEE International Symposium on Integrated Network Management (IM)**, 2021, pp. 393-401.
- (7) A. d. S. Ilha, Â. C. Lapolli, **J. A. Marques** and L. P. Gasparly. 2021. Euclid: A Fully In-Network, P4-Based Approach for Real-Time DDoS Attack Detection and Mitigation, in **IEEE Transactions on Network and Service Management**, vol. 18, no. 3, pp. 3121-3139, Sept. 2021.
- (8) Marcus Vinicius Brito da Silva, **Jonatas A. Marques**, Luciano Paschoal Gasparly & Lisandro Zambenedetti Granville. 2020. Identifying elephant flows using dynamic thresholds in programmable IXP networks. **J Internet Serv Appl** 11, 10 (2020).
- (9) **Jonatas Marques**, Kirill Levchenko, and Luciano Gasparly. 2020. IntSight: diagnosing SLO violations with in-band network telemetry. In **Proceedings of the 16th International Conference on emerging Networking EXperiments and Technologies (CoNEXT '20)**. Association for Computing Machinery, New York, NY, USA, 421-434.
- (10) **Jonatas A. Marques**, Marcelo Caggiani Luizelli, Roberto Irajá Tavares da Costa Filho & Luciano Paschoal Gasparly. 2019. An optimization-based approach for efficient network monitoring using in-band network telemetry. **J Internet Serv Appl** 10, 12 (2019).
- (11) Guilherme R. Pretto, Bruno L. Dalmazo, **Jonatas A. Marques**, Zhongke Wu, Xingce Wang, Vladimir Korkhov, Philippe O. A. Navaux & Luciano P. Gasparly. 2019. Boosting HPC Applications in the Cloud Through JIT Traffic-Aware Path Provisioning. In: , et al. **Computational Science and Its Applications - ICCSA 2019**. ICCSA 2019. Lecture Notes in Computer Science, vol 11622. Springer, Cham.
- (12) Â. C. Lapolli, **J. A. Marques** and L. P. Gasparly. 2019. Offloading Real-time DDoS Attack Detection to Programmable Data Planes. **2019 IFIP/IEEE Symposium on Integrated Network and Service Management (IM)**, 2019, pp. 19-27.
- (13) **Jonatas A. Marques** and Luciano P. Gasparly. 2018. Explorando Estratégias de Orquestração de Telemetria em Planos de Dados Programáveis. In **Anais do XXXVI Simpósio Brasileiro de Redes de Computadores e Sistemas Distribuídos**, maio 10, 2018, Campos do Jordão, Brasil. SBC, Porto Alegre, Brasil, 1299-1312.
- (14) Marcus Vinicius Silva, **Jonatas A. Marques**, Luciano P. Gasparly, and Lisandro Zambenedetti Granville. 2018. Identificação de Fluxos Elefantes em Redes de Ponto de Troca de Tráfego com Suporte à Programabilidade P4. In **Anais do XXXVI Simpósio Brasileiro de Redes de Computadores e Sistemas Distribuídos**, maio 10, 2018, Campos do Jordão, Brasil. SBC, Porto Alegre, Brasil, 1131-1144.
- (15) Weverton Luis Costa Cordeiro, **Jonatas A. Marques**, and Luciano Paschoal Gasparly. 2017. Data Plane Programmability Beyond OpenFlow: Opportunities and Challenges

for Network and Service Operations and Management. **J. Netw. Syst. Manage.** 25, 4 (October 2017), 784-818.

- (16) **J. A. Marques** and R. R. Obelheiro, "Escada: Predicting Virtual Machine Network Bandwidth Demands for Elastic Provisioning in IaaS Clouds," **2017 International Conference on Cloud and Autonomic Computing (ICAC)**, 2017, pp. 10-21, doi: 10.1109/ICAC.2017.9.
- (17) **Jonatas A. Marques** and Rafael R. Obelheiro. 2017. Um Modelo de Estimação para Provisionamento de Rede de Máquinas Virtuais em Nuvens IaaS. In **Anais do XV Workshop em Clouds e Aplicações**, maio 19, 2017, Belém, Brasil. SBC, Porto Alegre, Brasil.

## THESES & DISSERTATIONS

- **Advancing Network Monitoring and Operation with In-band Network Telemetry and Data Plane Programmability**, 2022, Ph.D. Dissertation  
Federal University of Rio Grande do Sul (UFRGS)  
Advisor: Prof. Luciano Paschoal Gaspar
- **A Model for Virtual Machine Network Provisioning in IaaS Clouds**, 2017, Master Thesis  
Santa Catarina State University (UDESC)  
Advisor: Prof. Rafael Rodrigues Obelheiro
- **A Tool for Resource Provisioning Diagnosis in IaaS Clouds**, 2015, Bachelor's Thesis  
Santa Catarina State University (UDESC)  
Advisor: Prof. Rafael Rodrigues Obelheiro

## STUDENTS & MENTEES

- 2022 - Present **Gabriel Vassoler**, M.Sc. - Network verification
- 2021 - Present **J. Vicente Lessa**, M.Sc. - Machine learning meets networking
- 2021 - Present **Lucas Hagen**, Undergrad - Network monitoring
- 2019 - 2022 **L. Andrey Quintero González**, M.Sc. - Cybersecurity
- 2019 - 2022 **Alexandre Ilha**, M.Sc. - Network monitoring & intrusion detection
- 2017 - 2019 **Ângelo Lapolli**, M.Sc. - Network monitoring & intrusion detection
- 2017 - 2019 **Marcus Vinicius Brito da Silva**, M.Sc. - Programmable networks
- 2018 - 2018 **Fernando L. Spaniol**, Undergrad - In-band network telemetry & optimization

## TECHNICAL SKILLS

**Programming Languages** Python, P4, C., C++, PL/SQL, Java, Haskell, and Lua.

**Technologies** Scapy, Pandas, Numpy, matplotlib, scikit-learn, Git, Jupyter, LaTeX.

**Areas of Expertise** Computer Networks; Programmable Networks; Network, Service, and Application Management; Network Monitoring.

## PROJECTS & ACTIVITIES

### *Software Projects (Core Contributor)*

2022 **Felix**: A prototype system for responding to network failures at data-plane speeds

2020 **IntSight**: A prototype system for diagnosing service-level objective violations with in-band network telemetry

2015 **RePD**: A tool for resource provisioning diagnosis in cloud computing environments

### *Activities*

May, 2021 - **Student Researcher**

Present Project SkyNet: Towards Smart Data Planes

Mar, 2017 - **Student Researcher**

Dec, 2020 Project P4Sec: Securing Networks in the Programmable Data Plane Era

May, 2019 **Staff Volunteer**

Brazilian Symposium on Computer Networks and Distributed Systems (SBRC 2019)

Dec, 2013 - **Student Body Representation**

Nov, 2014 Department of Computer Science, Santa Catarina State University (UDESC)

Aug, 2013 - **Undergraduate Teaching Assistant**

Jul, 2014 Data Structures, Santa Catarina State University (UDESC)

Aug, 2012 - **Undergrad Research Assistant**

Dec, 2012 Geographic Information Systems, Santa Catarina State University (UDESC)

## INVITED TALKS & PRESENTATIONS

2022 Research Presentation: **Rising Stars in Data Science Workshop**,  
The University of Chicago, Chicago, USA

2020 Paper Presentation: **ACM CoNEXT'20**, Online Conference

2020 Invited Speaker: **P4 and Programmable Data Planes**, SENAC, Porto Alegre, Brazil

2019 Invited Speaker: **P4 and Programmable Data Planes**, SENAC, Porto Alegre, Brazil

2017 Paper Presentation: **IEEE ICCAC 2017**, Tucson, AZ, USA

2017 Paper Presentation: **SBC SBRC 2017**, São José dos Campos, Brazil

2016 Tutorial: **Introduction to Data Analysis with Python**, UDESC, Joinville, Brazil

2013 Tutorial: **Introduction to Programming Contests**, UDESC, Joinville, Brazil

## REVIEW SERVICE

- 2023** IEEE/IFIP Network Operations and Management Symposium (NOMS)
- 2022** ACM SIGCOMM Conference on emerging Networking EXperiments and Technologies (CoNEXT) (Artifact Evaluation)  
IEEE Transactions on Network and Service Management (TNSM)  
International Conference on Network and Service Management (CNSM)  
Computer Communications Journal (ComCom)  
Brazilian Symposium on Information and Computational Systems Security (SBSEg)
- 2021** IEEE Communications Magazine (ComMag)  
IEEE Transactions on Network and Service Management (TNSM)  
IFIP/IEEE International Symposium on Integrated Network Management (IM)  
International Conference on Network and Service Management (CNSM)  
IEEE Open Journal of the Communications Society (OJ-COMS)  
Brazilian Symposium on Computer Networks and Distributed Systems (SBRC)  
Brazilian Symposium on Information and Computational Systems Security (SBSEg)
- 2020** IEEE/IFIP Network Operations and Management Symposium (NOMS)  
IEEE Transactions on Network and Service Management (TNSM)  
International Conference on Network and Service Management (CNSM)  
Journal of Network and Systems Management (JNSM)  
IEEE Networking Letters  
Computers & Operations Research  
Wiley Networks  
Workshop on Flexible Network Data Plane Processing (NETPROC)  
Escola Regional de Redes de Computadores (ERRC)
- 2019** IFIP/IEEE International Symposium on Integrated Network Management (IM)  
Journal of Network and Systems Management (JNSM)
- 2018** Brazilian Symposium on Computer Networks and Distributed Systems (SBRC)  
International Conference on Information Science and Cloud Computing (ISCC)  
IEEE/IFIP Workshop on Security for Emerging Distributed Network Technologies (DISSECT)
- 2017** International Conference on Network and Service Management (CNSM)  
Journal of Network and Systems Management (JNSM)  
International Workshop on Management of SDN and NFV Systems (ManSDN/NFV)