Pedro de Botelho Marcos
Assistant Professor - Head@SYSTEMS/FURG

Center for Computational Science
Federal University of Rio Grande
Av. Italia, Km 8
Rio Grande, Brazil - 96203-900

Phone: +55 (53) 3237-3083
C3 Building, Office 230
pbmarcos@furg.br
https:/pedrobmarcos.github.io

I am an Assistant Professor at the Federal University of Rio Grande (FURG) in Brazil and the head of the SYSTEMS research group. My research interests lie at the crossroads of the theory and practice of computer networks. I am interested in measuring and analyzing Internet interconnection, peering ecosystem, and inter-domain routing. My current research topics include traffic engineering techniques, Internet routing security, best routing operational practices, Internet traffic delivery performance, interconnection, and peering. My research has been funded by University grants, LACNIC/FRIDA, Internet Society, FAPESP/MCTI/MCom/CGI.br, CNPq and Embrapii.

Academics

Ph.D. in Computer Science, (03/2016-09/2019)
Federal University of Rio Grande do Sul - UFRGS, Porto Alegre, Brazil
Advisor: Prof. Marinho Barcellos
Co-Advisor: Prof. Marco Canini (KAUST)
Thesis title: Towards a Dynamic Internet Interconnection Ecosystem for Improved Wide-Area Traffic Delivery
Keywords: peering, interconnection, IXP, Internet measurements, wide-area traffic delivery

M.Sc. in Computer Science, (03/2011-01/2013)
Federal University of Rio Grande do Sul - UFRGS, Porto Alegre, Brazil
Advisor: Prof. Claudio Geyer
Thesis title: Maresia: MapReduce in a simple architecture
Keywords: MapReduce, fault tolerance, Distributed Hash Tables

B.Eng. in Computer Engineering, (03/2006-12/2010)
Federal University of Rio Grande - FURG, Rio Grande, Brazil

Research Visits

Visiting Researcher (01/2020-02/2020)
Max Plack Institute for Informatics - MPI-INF, Saarbrücken, Germany
Host: Prof. Anja Feldmann
Keywords: Internet routing, routing security, AS-Path Prepending, Internet measurements

Visiting Ph.D. student (09/2017-12/2017)
King Abdullah University of Science and Technology - KAUST, Thuwal, Saudi Arabia
Host: Prof. Marco Canini
Keywords: peering, interconnection agreements, blockchain, wide-area traffic delivery

Research Scholarships

Research scholarship - 05/2017-04/2018
Scholarship from the Brazilian National Research and Education Network (RNP), Brazil, to work on the project GT-IPÊ-Analytics on activities related to network analytics and Internet measurements. Supervisor: Prof. Marinho Barcellos.

Master's scholarship - 03/2011-01/2013
Scholarship from the Coordination for the Improvement of Higher Education Personnel (CAPES), Brazil, to support studies during the masters. Supervisor: Prof. Claudio Geyer.

Undergraduate scholarship - 06/2006-12/2010
Scholarship from the National Council for Scientific and Technological Development (CNPq), Brazil, to work on the SIM-3D project on activities related to digital manufacturing. Supervisors: Prof. Nelson Lopes Duarte Filho and Prof. Silvia Silva da Costa Botelho.

Professional Activities

Assistant Professor, Federal University of Rio Grande - FURG, Brazil, 09/2019-present
Courses: Operating Systems; Computer Networks; Internet Architecture

Lecturer, Federal University of Rio Grande - FURG, Brazil, 09/2013-08/2019
Courses: Operating Systems; Computer Networks; Distributed Systems

CTO, Zetaflops - High-Performance Computing Ltda., Brazil, 04/2009-02/2011
Designing and developing solutions benefiting from GPU parallel processing capabilities

Funded Projects

On the network benefits of peering at IXPs - Internet Society ~75K BRL (~15K USD)*

DDoS mitigation with DPDK (2024-2025) - Embrapii - 650K BRL (~120K USD)*

Towards a more Secure Internet Routing System (2024-2026) - CNPq - 165K BRL (~32K USD) - with Italo Cunha (UFMG) and Ronaldo Ferreira (UFMS)

Improving inter-domain routing and interconnection infrastructure towards a more reliable Internet (2022-2025) - LACNIC*
> FURG is the only Brazilian University and one of two Universities in Latin America with an institutional cooperation agreement with LACNIC to do research towards improving the Internet infrastructure

Characterizing and modeling Internet routing security and traffic engineering aspects (2022-2024) - FAPESP/MCTI/MCom/CGI.br - 300K BRL (~60K USD) - with Italo Cunha (UFMG) and Ronaldo Ferreira (UFMS)

Investigating the impacts of Remote Peering on Internet routing (2021-2023) - LACNIC/FRIDA - 100K BRL (~20K USD)*

Understanding the impact of ASPP on Internet routing security (2020-2022) - LACNIC/FRIDA - 80K BRL (~16K USD)*

* Project Coordinator

Selected Publications (conferences and journals)

Mazzola, Fabricio; Setti, Augusto; **Marcos, Pedro**; Barcellos, Marinho. *Analyzing Remote Peering Deployment and Its Implications for Internet Routing*, In: IEEE/ACM Transactions on Networking, 2024.

Mazzola, Fabricio; **Marcos, Pedro**; Barcellos, Marinho. *Light, Camera, Actions: characterizing the usage of IXPs' action BGP communities*, In: ACM CoNEXT '22, December 2022.

Mazzola, Fabricio; **Marcos, Pedro**; Castro, Ignacio; Luckie, Matthew; Barcellos, Marinho. *On the Impacts of Remote Peering on Internet Traffic Delivery*, In: PAM 2022, March 2022.

Marcos, Pedro; Prehn, Lars; Leal, Lucas; Dainotti, Alberto; Feldmann, Anja; Barcellos, Marinho. *AS-Path Prepending: there is no rose without a thorn*, In: ACM IMC '20, October 2020.

Marcos, Pedro; Chiesa, Marco; Dietzel, Christoph; Canini, Marco; Barcellos, Marinho. *A Survey on the Current Internet Interconnection Practices*, In: ACM SIGCOMM Computer Communication Review, January 2020.

Marcos, Pedro; Chiesa, Marco; Muller, Lucas; Kathiravelu, Pradeeban; Dietzel, Christoph; Canini, Marco; Barcellos, Marinho. *Dynam-IX: a Dynamic Interconnection eXchange*, In: ACM CoNEXT '18, December 2018.

Alowayed, Yousef; Canini, Marco; **Marcos, Pedro**; Chiesa, Marco; Barcellos, Marinho. *Picking a Partner: A Fair Blockchain-Based Scoring Protocol for Autonomous Systems*, In: ACM, IRTF & ISOC Applied Networking Research Workshop 2018 (ANRW '18), July 2018.

Kathiravelu, Pradeeban; Chiesa, Marco; **Marcos, Pedro**; Canini, Marco; Veiga, Luís. *Moving Bits with a Fleet of Shared Virtual Routers*. In: IEEE/IFIP Networking '18, May 2018.

Kolberg, Wagner; **Marcos, Pedro**; Anjos, Julio; Miyazaki, Alexandre; Geyer, Claudio; Arantes, Luciana. *MRSG - A MapReduce simulator over SimGrid*. In: Parallel Computing, v. 39, p. 233-244, 2013.

Duarte Filho, Nelson; Botelho, Silvia; Carvalho, Jonata; **Marcos, Pedro**; Maffei, Renan; Remor, Rodrigo; Oliveira, Rodrigo; Hax, Vinicius. *An immersive and collaborative visualization system for digital manufacturing*. International Journal, In: Advanced Manufacturing Technology, v. 50, p. 1253-1261, 2010.

Posters

Marcos, Pedro; Barcellos, Marinho. *Understanding How AS-Path Prepending can compromise the security of Internet routing*, In: Ph.D. School of the Passive and Active Measurement Conference, PAM'19, March 2019.

Marcos, Pedro; Chiesa, Marco; Muller, Lucas; Kathiravelu, Pradeeban; Dietzel, Christoph; Canini, Marco; Barcellos, Marinho. *Dynam-IX: a Dynamic Interconnection eXchange*, In: Posters and Demos of ACM SIGCOMM'18, August 2018.

Marcos, Pedro; Chiesa, Marco; Muller, Lucas; Kathiravelu, Pradeeban; Dietzel, Christoph; Canini, Marco; Barcellos, Marinho. *Dynam-IX: a Dynamic Interconnection eXchange*, In: Posters and Demos of ANRW'18, July 2018.

Marcos, Pedro; Wermann, Alexandre; Bertholdo, Leandro; Barcellos, Marinho. *DYNAMIX: A Dynamic Agreement Marketplace on Internet eXchange Points*. In: Student Workshop ACM CoNEXT'16, December 2016.

Talks

Internet Resource Allocation: insights, trends and lessons - LACNIC 41, Panama City, Panama, May 2024

On the connectivity properties of Latin American IXPs - LACNIC 40/LACNOG 2023, Fortaleza, Brazil, October 2023

On the Impacts of Remote Peering on Internet Traffic Delivery - LACNIC 39, Mérida, Mexico, May 2023

Light, Camera, Actions: characterizing the usage of IXPs' action BGP communities - LACNIC 39, Mérida, Mexico, May 2023

AS Path Prepending: there is no rose without a thorn - NANOG 80, Virtual, October 2020

*Fellow researchers also presented results of our work in RIPE 76, 13th European Peering Forum (2018), BKNIX 2023

Service

TPC Member: SIGCOMM 2022 Posters and Demos; PAM 2021, Student Workshop CoNEXT' (2021, 2022, 2023, 2024)

Journal reviews: ACM SIGCOMM Computer Communication Reviews (2019-), Computer Networks (2020-)

External reviewer: ISCC'19, IMC'17, SBRC'17

Local organizing committee: ACM SIGCOMM'16

Juror: ACM SIGCOMM 2021 Student Research Competition

Awards

Publications: 3rd-place in the Student Research Competition of the ACM SIGCOMM'18

Travel grants award: PAM'19, ACM SIGCOMM'18, ACM IMC'17, ACM CoNEXT'16

Outstanding lecturer in Computer Engineering - FURG: 2014, 2015, 2016, 2022

Languages

Portuguese: Mothertongue

English: Proficient

Spanish: Beginner