

# Arthur Selle Jacobs

## Curriculum Vitae

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📄 <https://asjacobs92.github.io/>

Male, Brazilian, born on 10/Sep/1992.

Fifth-year Ph.D. student in Computer Science at the Federal University of Rio Grande do Sul, advised by Prof. Dr. Lisandro Granville and co-advised by Prof. Dr. Ronaldo Ferreira. I also worked as visiting scholar at Princeton University under the supervision of Prof. Dr. Jennifer Rexford and worked closely with Dr. Walter Willinger from NIKSUN Inc. My research interests include network management, Intent-based Networking, Natural Language Processing for network management, self-driving networks, programmable networks and Artificial Intelligence, and its application to network and security.

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### Education

- Sep 2019 – Jul 2020 Princeton University, Visiting Student Research Collaborator, Princeton, NJ – US.
- Aug 2017 – Aug 2022 (Expected) Federal University of Rio Grande do Sul, PhD in Computer Science, Porto Alegre, RS – Brazil.
- Jan 2014 – Dec 2014 University of Maryland, Study Abroad, Brazil Scientific Mobility Program, College Park, MD – US.
- Mar 2011 – Dec 2016 Federal University of Rio Grande do Sul, BSc in Computer Science, Porto Alegre, RS – Brazil.

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### Awards & Recognition

- 2020 IBM PhD Fellowship Award.
  - For academic excellence and expertise in pioneering research areas, including artificial intelligence, data science, and security.

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### Research Experience

- Aug 2017 – Current Networks Lab, Federal University of Rio Grande do Sul, Doctoral Researcher, Porto Alegre, RS – Brazil.
  - Worked under the supervision of Prof. Lisandro Z. Granville and Prof. Ronaldo A. Ferreira, researching network management topics, including Machine Learning applied to networking and Intent-based networking.
  - Researched the credibility of Machine Learning models applied to networking problems, and network security in particular, using a novel eXplainable Artificial Intelligence (XAI) technique to extract decision tree global explanations from black-box models, called Trustee.
  - Designed and implemented a refinement method for network intents expressed in natural language, enabling operators to deploy network configurations using a conversational interface, called Lumi.
  - Collaborated with researchers from many institutions and countries, which gave me the opportunity to work on a variety of topics and resulted in several publications.
- Sep 2019 – Jul 2020 Systems Lab, Princeton University, Doctoral Researcher, Princeton, NJ – US.
  - Worked under the supervision of Prof. Jennifer Rexford and Dr. Walter Willinger, from NIKSUN Inc., researching network profiling techniques and traffic behavior models in programmable data plane networks, using the P4 language. Also examined existing XAI tools and techniques to interpret black-box models applied to network and security.
  - Developed Proof-of-concept application for NIKSUN Inc. that applies Natural Language Processing techniques to querying performance and security related reports. Integrated PoC into existing NIKSUN's product.

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## Employment History

- May 2018 – Sep 2019 Brazilian Computer Society, Project Manager, Porto Alegre, RS – Brazil.
- Acted as Project Manager of a 6-person development team, coordinating the development of a Journal and Events Management System (JEMS), with support for peer-reviewing submissions.
  - Defined the architecture and system technologies, having the backend developed as Restful APIs, using Django Rest Framework, and the frontend developed with Angular 7. Also defined DevOps pipeline for continuous integration and deployment using GitLab CI.
  - Coordinated the tasks of the team members, providing technical support and knowledge to aid the growth of team members and the developing process.
- May 2015 – Sep 2017 ADP, LLC., Software Developer, Porto Alegre, RS – Brazil.
- Developed Java application to deploy ADP's database information for the government project eSocial, using Spring and SOAP web services.
  - Acted as Software Architect on agile Discovery Teams, alongside a Development Leader and a Senior Product Owner, carrying out a leadership position in the development process.
  - Worked with several different Scrum teams, supporting the development of designed solutions, both in Progress 4GL and Java.
  - Worked closely with infrastructure teams, both in Brazil and Chile, to configure and manage execution environments of developed applications.

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## Selected Research Publications

### Peer-Reviewed Conference Papers

- A. S. Jacobs, R. Beltiukov, W. Willinger, R. A. Ferreira, A. Gupta, L. Z. Granville, "AI/ML and Network Security: The Emperor has no Clothes", In 2022 ACM Conference on Computer and Communications Security (ACM CCS 2022), To appear, Los Angeles (2022).
- A. S. Jacobs, R. J. Pfitscher, R. H. Ribeiro, R. A. Ferreira, L. Z. Granville, W. Willinger, S. G. Rao, "Hey, Lumi! Using Natural Language for Intent-Based Network Management", In 2021 USENIX Annual Technical Conference (USENIX ATC 21), pages 625–639, Virtual Conference (2021).
- M. F. Franco, B. Rodrigues, E. J. Scheid, A. S. Jacobs, C. Killer, L. Z. Granville, B. Stiller, "SecBot: a Business-Driven Conversational Agent for Cybersecurity Planning and Management", In 2020 16th International Conference on Network and Service Management (CNSM), pages 1–7, Izmir, Turkey (2020).

### Peer-reviewed Journal Articles

- A. S. Jacobs, R. J. Pfitscher, R. A. Ferreira and L. Z. Granville, "Refining Network Intents for Self-driving Networks", In ACM SIGCOMM Computer Communication Review, Volume 48 Issue 5, pages 55 - 63 (2018).

### Posters, Workshops and Others

- A. S. Jacobs, R. J. Pfitscher, R. H. Ribeiro, R. A. Ferreira, L. Z. Granville, S. G. Rao, "Deploying Natural Language Intents with Lumi", In ACM SIGCOMM 2019 Conference Posters and Demos, pages 82-84, Beijing, China (2019).
- A. S. Jacobs, R. J. Pfitscher, R. A. Ferreira, L. Z. Granville, "Refining Network Intents for Self-driving Networks", In ACM SIGCOMM 2018 Workshop on Self-Driving Networks (SelfDN 2018), pages 15-21, Budapest, Hungary (2018).

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## Technical skills

- ⌘ Programming Languages: JavaScript, Python, Java, C#, C++, C and Progress 4GL.
- 🔧 Tools, Frameworks and Technologies: Spring and Django; Node.js, React, Angular and Vue; Ionic; Gitlab CI, Github CI, Jenkins, and AWS;
- 📖 Machine Learning and NLP: Scikit-learn, Tensorflow, Keras, PyTorch; Dialogflow, SpacyNLP and RasaNLP.
- ☁ Databases: Firebase, MongoDB, S3, ElasticSearch, MySQL, Oracle and Progress.

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## Language skills

- 🇵🇹 Portuguese: native.
- 🇬🇧 English: fluent.
- 🇪🇸 Spanish: advanced.

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## References

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| 👤 Lisandro Zambenedetti Granville         | 👤 Ronaldo Alves Ferreira                   |
| 🎓 Full Professor of Computer Science      | 🎓 Assoc. Professor of Computer Science     |
| 🏛 Federal University of Rio Grande do Sul | 🏛 Federal University of Mato Grosso do Sul |
| ✉ granville@inf.ufrgs.br                  | ✉ raf@facom.ufms.br                        |
| 👤 Walter Willinger                        | 👤 Daniel Braga Becker                      |
| 🎓 Chief Scientist                         | 🎓 Chief Technology Officer                 |
| 🏛 NIKSUN Inc.                             | 🏛 Health ID LAB                            |
| ✉ wwillinger@niksun.com                   | ✉ danielbragabecker@gmail.com              |