

# Abel Souza | Curriculum Vitæ

College of Information and Computer Sciences (CICS)

140 Governors Dr., LGRC A313 – Amherst, MA 01003

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👤 Abel Souza 📄 /abel-souza 🗣 /abelpc 📞 0000-0001-6952-1195

## Research Interests

Enhance the performance and sustainability of large distributed systems, including but not limited to high performance and edge computing, cloud datacenters, operating systems, and cyber-physical systems.

## Education

### Umeå University (Sweden)

Feb. 2015 – May 2020

*PhD in Computer Science*

*Advisors: Johan Tordsson and Erik Elmroth*

*Thesis: Autonomous Resource Management for High Performance Datacenters*

*Committee: Dr. Alexandru Iosup, Dr. Oxana Smirnova, Dr. Vladimir Vlassov, Dr. Paolo Bientinesi*

### Umeå University (Sweden)

Feb. 2015 – Dec. 2018

*PhLic. in Computer Science*

*Advisors: Johan Tordsson and Erik Elmroth*

*Thesis: Application-Aware Resource Management for Datacenters*

*Committee: Dr. Andreas Hellander, Dr. Per-Håkan Lundow, Dra. Lili Jiang*

### Fluminense Federal University (Brazil)

Mar. 2009 – Dec. 2014

*BSc. in Computer Science*

*Advisor: Dr. Antonio Augusto de Aragao Rocha*

*Thesis: An Architecture for Large-Scale Experiments on P2P Networks.*

*Committee: Dr. Igor Monteiro Moraes, Dr. Marcos Lage*

### University of Nebraska-Lincoln

Jan. – Dec. 2012

*BSc. in Computer Science*

*Exchange studies.*

## Awards

### NFS CloudBank

2023

*Cloud Computing Resource Credits*

Budget: \$15K

### Swedish National Infrastructure for Computing

2018

*HPC and Cloud Resources*

Budget: 100K core-hours (36 months)

### Lawrence Berkeley National Lab

2017

*Research Fellowship, Umeå University (Sweden)*

Budget: \$20K (7 months)

### Umeå University (Sweden)

2015

*Doctorate Fellowship, National Council for Scientific and Technological Development (Brazil)*

Budget: \$70K (3 years)

### Umeå University (Sweden)

2015

*Doctorate Fellowship, Umeå University*

Budget: \$30K (3 years)

### University of Nebraska, Lincoln

2012

*Doctorate Fellowship, Coordination for the Improvement of Higher Education Personnel (Brazil)*

Budget: \$70K (1 year)

## Academic Honors

### Best paper finalist

2023

*14th International Green and Sustainable Computing Conference (IGSC)*

### Best paper finalist

2018

*2018 IEEE International Conference on Cloud Engineering (IC2E)*

<b>Publications</b> .....	
<b>Conference Papers</b> .....	
<b>Going Green for Less Green: Optimizing the Cost of Reducing Cloud Carbon Emissions</b>	<b>2024</b>
<i>W. A. Hanafy, Q. Liang, N. Bashir, <b>Abel Souza</b>, D. Irwin, P. Shenoy</i>	
29th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)	
<b>Implications of Average versus Marginal Carbon Intensity Signals on Carbon-aware Optimizations</b>	<b>2024</b>
<i>T. Sukprasert, N. Bashir, <b>Abel Souza</b>, D. Irwin, P. Shenoy</i>	
15th ACM International Conference on Future and Sustainable Energy Systems (e-Energy)	
<b>On the Limitations of Carbon-Aware Temporal and Spatial Workload Shifting in the Cloud</b>	<b>2024</b>
<i>T. Sukprasert, <b>Abel Souza</b>, N. Bashir, D. Irwin, P. Shenoy</i>	
19th European Conference on Computer Systems (EuroSys)	
<b>SLO-Power: SLO and Power-aware Elastic Scaling for Web Services</b>	<b>2024</b>
<i>M. Savasci, <b>Abel Souza</b>, L. Wu, D. Irwin, A. Ali-Edin, P. Shenoy</i>	
24th IEEE/ACM International Symposium on Cluster, Cloud, and Internet Computing (CCGrid)	
<b>Empowering User-Centered Carbon Management</b>	<b>2023</b>
<i><b>Abel Souza</b>, Mihir Shenoy, Camellia Zakaria</i>	
10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys)	
<b>Unlocking Efficiency: Understanding End-to-End Performance in Distributed Analytics Pipelines</b>	<b>2023</b>
<i><b>Abel Souza</b>, N. Ng, T. Abdelzaher, D. Towsley, and P. Shenoy</i>	
41st IEEE Military Communications Conference (MILCOM)	
<b>CASPER: Carbon-Aware Scheduling and Provisioning for Distributed Web Services</b>	<b>2023</b>
<i><b>Abel Souza</b>, J. Shruti, B. Chakrabarty, A. Bridgwater, A. Lundberg, F. Skogh, A. Ali-Eldin, D. Irwin, P. Shenoy</i>	
14th International Green and Sustainable Computing Conference (IGSC), <i>Best Paper Runner Up</i>	
<b>Ecovisor: A Virtual Energy System for Carbon-Efficient Applications</b>	<b>2023</b>
<i><b>Abel Souza</b>, N. Bashir, J. Murillo, W. Hanafy, Q. Liang, D. Irwin, P. Shenoy</i>	
28th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)	
<b>Sustainable Computing - Without the Hot Air</b>	<b>2022</b>
<i>N. Bashir, D. Irwin, P. Shenoy, <b>Abel Souza</b></i>	
The Inaugural Workshop on Sustainable Computer Systems Design and Implementation (HotCarbon)	
<b>DARTS: Distributed IoT Architecture for Real-Time, Resilient and AI-Compressed Workflows</b>	<b>2022</b>
<i>R. Gupta, B. Chen, S. Liu, T. Wang, S. S. Sandha, <b>Abel Souza</b>, K. Nahrstedt, T. Abdelzaher, M. Srivastava, et al.</i>	
Workshop on Advanced tools, programming languages, and PPlatforms for Implementing and Evaluating algorithms for Distributed systems (ApPLIED)	
<b>Enabling sustainable clouds: The case for virtualizing the energy system</b>	<b>2021</b>
<i>N. Bashir, T. Guo, M. Hajiesmaili, D. Irwin, P. Shenoy, R. Sitaraman, <b>Abel Souza</b>, A. Wierman</i>	
ACM Symposium on Cloud Computing (SoCC)	
<b>AdCom: Adaptive Combiner for Streaming Aggregations</b>	<b>2021</b>
<i>F. Gutierrez, K. Beedkar, <b>Abel Souza</b>, V. Markl</i>	
24th International Conference on Extending Database Technology (EDBT)	
<b>A HPC Co-Scheduler with Reinforcement Learning</b>	<b>2021</b>
<i><b>Abel Souza</b>, K. Pelckmans, J. Tordsson</i>	
24th Job Scheduling Strategies for Parallel Processing (JSSPP)	
<b>The Adaptive Scheduling Architecture</b>	<b>2020</b>
<i><b>Abel Souza</b>, K. Pelckmans, J. Tordsson</i>	
29th International Symposium on High-Performance Parallel and Distributed Computing (HPDC)	
<b>The VASCO Project: 100 Red Transients and Their Follow Up</b>	<b>2020</b>
<i>B. Villarroel, K. Pelckmans, Enrique Solano, M. Laaksoharju, <b>Abel Souza</b>, and et al.</i>	
71st International Astronautical Congress (IAC)	
<b>Hybrid Resource Management for HPC and Data Intensive Workloads</b>	<b>2019</b>
<i><b>Abel Souza</b>, M. Rezaei, E. Laure, J. Tordsson</i>	
19th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID)	
<b>E-HPC: A Library for Elastic Resource Management in HPC Environments</b>	<b>2017</b>
<i>W. Fox, D. Ghoshal, <b>Abel Souza</b>, G. P. Rodrigo, L. Ramakrishnan</i>	
12th Workshop on Workflows in Support of Large-Scale Science (WORKS)	
<b>Hybrid Adaptive Checkpointing for Virtual Machine Fault Tolerance</b>	<b>2018</b>
<i><b>Abel Souza</b>, A. V. Papadopoulos, L. Tomas, D. Gilbert, J. Tordsson</i>	
2018 IEEE International Conference on Cloud Engineering (IC2E), <i>Best Paper Runner Up</i>	

<b>An Architecture for Large Scale Experiments in P2P Networks</b>	<b>2015</b>
<i>Abel Souza, A. A. A. Rocha</i>	
33rd Brazilian Symposium on Computer Networks and Distributed Systems (Tools Section)	
<b>Journal Papers</b> .....	
<b>Network synthesis for tactical environments: scenario, challenges, and opportunities</b>	<b>2022</b>
<i>T. Anevlavis, J. Bunton, J. Coleman, M. G. Dogan, E. Grippo, Abel Souza, C. Fragouli, et al.</i>	
Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications	
<b>Launching the VASCO Citizen Science Project</b>	<b>2021</b>
<i>B. Villarroel, K. Pelckmans, E. Solano, M. Laaksoharju, Abel Souza, et al.</i>	
Universe	
<b>Invited Papers</b> .....	
<b>Ecovisor: A Virtual Energy System for Carbon-Efficient Applications</b>	<b>2023</b>
<i>Abel Souza, N. Bashir, D. Irwin, P. Shenoy</i>	
1st Workshop on NetZero Carbon Computing (NetZero), <i>Invited</i>	
<b>Benefits and Limitations of Carbon Accounting Paradigms</b>	<b>2023</b>
<i>N. Bashir, Abel Souza, D. Irwin, P. Shenoy</i>	
1st Workshop on NetZero Carbon Computing (NetZero), <i>Invited</i>	
<b>Under Review</b> .....	
<b>An Analytical Model for Device-edge-cloud Applications</b>	<b>2024</b>
<i>N. Ng, Abel Souza, D. Towsley, D. Irwin, P. Shenoy</i>	
<b>Examining the adoption of electromobility concepts across social contexts for energy transition</b>	<b>2024</b>
<i>J. Köhlke, A. Lechowicz, O. Fabrikun, N. Bashir, Abel Souza, P. Shenoy, S. Lehnhoff</i>	
<b>TailTamer: Reducing Tail Response Time Through System-Wide Scheduling</b>	<b>2024</b>
<i>N. Ng, Abel Souza, A. Ali-Eldin, C. Klein, D. Irwin, D. Towsley, P. Shenoy</i>	
<b>Greening the Clouds: The Trade-offs for Customers and Providers</b>	<b>2024</b>
<i>W. Hanafy, T. Sukprasertm, Abel Souza, D. Irwin, P. Shenoy</i>	
<b>OpenCarbon: An API to Access and Visualize Carbon Forecasts</b>	<b>2024</b>
<i>Abel Souza, D. Maji, R. K. Sitaraman, P. Shenoy</i>	
<b>Posters</b> .....	
<b>Spatiotemporal Carbon-aware Scheduling in the Cloud: Limits and Benefits</b>	<b>2023</b>
<i>T. Sukprasert, Abel Souza, N. Bashir, D. Irwin, P. Shenoy</i>	
14th ACM International Conference on Future Energy Systems (E-Energy)	
<b>Visualizing the Impact of User Preferences and Habits on Carbon Emissions</b>	<b>2023</b>
<i>T. V Savadi, Abel Souza, C. Zakaria</i>	
MIT IEEE Undergraduate Research Technology Conference (URTC)	
<b>Real-time Carbon Intensity Forecasts for the Electric Grid in Europe</b>	<b>2023</b>
<i>C. Kim (Case Western Reserve University), D. Maji, Abel Souza, R. K. Sitaraman, P. Shenoy</i>	
UMass Research Experience for Undergraduates (REU)	
<b>Interpreting Average and Marginal Carbon Intensity Signals</b>	<b>2023</b>
<i>S. Berehe (Robert Morris University), Abel Souza, N. Bashir, P. Shenoy</i>	
UMass Research Experience for Undergraduates (REU)	
<b>ASA – Adaptive Scheduling Algorithm for Scientific Workflows</b>	<b>2019</b>
<i>Abel Souza, K. Pelckmans, and J. Tordsson</i>	
15th Cloud Control Workshop	
<b>Hybrid Resource Management for HPC and Data Intensive Workloads</b>	<b>2018</b>
<i>Abel Souza, J. Tordsson, M. Rezaei, and E. Laure</i>	
13th Cloud Control Workshop	
<b>Data Analytics for Scheduling in Hybrid HPC Environments</b>	<b>2016</b>
<i>Abel Souza, J. Tordsson, M. Rezaei, and E. Laure</i>	
6th Workshop on Cloud Data and Platforms (CloudDP)	

<b>Thesis</b> .....	
<b>Autonomous Resource Management for High Performance Datacenters</b>	<b>2020</b>
<i>Abel Souza</i>	
Umeå University, Ph.D. Thesis	
<b>Application-Aware Resource Management for Datacenters</b>	<b>2018</b>
<i>Abel Souza</i>	
Umeå University, Licentiate Thesis	
<b>An Architecture for Large-Scale Experiments on P2P Networks.</b>	<b>2014</b>
<i>Abel Souza</i>	
Fluminense Federal University, Bachelor Thesis	
<b>Research Experience</b> .....	
<b>University of Massachusetts Amherst</b>	<b>06/2021–Present</b>
<i>Postdoctoral Research Associate</i>	
Advisor: Dr. Prashant Shenoy	
◦ Research on Distributed Systems for AI, Edge, Cloud, Energy Informatics, and Sustainable Computing.	
<b>Umeå University</b>	<b>05/2020–05/2021</b>
<i>Research Associate</i>	
Advisor: Dr. Erik Elmroth	
◦ Research on Distributed, cloud, and high performance computing systems.	
<b>Lawrence Berkeley National Laboratory (LBL)</b>	<b>01/2017–08/2017</b>
<i>Research Affiliate</i>	
Advisor: Dra. Lavanya Ramakrishnan	
◦ Research on Resource Management for Scientific Workflows.	
<b>Umeå University</b>	<b>04/2015–05/2016</b>
<i>Research Assistant</i>	
Advisors: Dr. Luis Tomas & Dr. Johan Tordsson	
◦ Research on fault-tolerant mechanisms for cloud computing.	
◦ European Union FP7 Project (Grant ID 609828).	
<b>Fluminense Federal University</b>	<b>08/2013–12/2014</b>
<i>Research Assistant</i>	
Advisor: Dr. Eugene Vinod Rebello	
◦ Study and evaluation of techniques to parallelize cryptographic algorithms for the Brazilian Navy.	
<b>Fluminense Federal University</b>	<b>2014</b>
<i>Research Assistant</i>	
Advisor: Dr. Antonio Augusto de Aragao Rocha	
◦ Research on bioinformatic models to estimate networks sizes.	
◦ Bachelor's Thesis: An Architecture for Large-Scale Experiments on P2P Networks.	
<b>National Laboratory for Scientific Computing (LNCC)</b>	<b>01/2014–09/2014</b>
<i>Research Assistant</i>	
Advisor: Dr. Antonio Tadeu Gomes	
◦ Research on parallelization and optimization of numerical solvers.	
<b>Teaching</b> .....	
<b>University of Massachusetts Amherst</b>	<b>2022,2023,2024</b>
<i>UMass Turing Summer Program – <a href="https://lass.cs.umass.edu/turing/">https://lass.cs.umass.edu/turing/</a></i>	
◦ Coordinator, Teacher	
◦ Syllabus, class, assignments and tutorials preparation.	
◦ Project coordination and supervision.	
<b>Umeå University</b>	<b>09/2020–11/2020</b>
<i>Teaching Assistant: Advanced Distributed Systems</i>	
<b>Umeå University</b>	<b>11/2019–01/2020</b>
<i>Teaching Assistant: Cloud Computing</i>	
<b>Umeå University</b>	<b>11/2016–01/2017</b>
<i>Teaching Assistant: Operating Systems</i>	
<b>Federal Fluminense University</b>	<b>2008–2011,2013</b>
<i>Teaching Support in Undergraduate Computer Laboratories Program (Coordinator, Teacher)</i>	
◦ Syllabus, class, assignments and tutorials preparation.	
◦ Project coordination, supervision, and teacher.	

<b>Work Experience</b> .....	
<b>Fluminense Federal University</b> <i>Software Developer</i> Coordinator: Dra. Fabiana Rodrigues Leta ◦ Design and develop visual geological systems	<b>10/2013–02/2014</b>
<b>University of Nebraska-Lincoln</b> <i>System Administrator</i> Advisor: Dr. Fangrui Ma ◦ Operated and maintained a High Performance Compute cluster.	<b>10/2012–12/2012</b>
<b>Federal Fluminense University</b> <i>System Administrator and Coordinator</i> Advisor: Dr. Hamilton Faria Leckar ◦ University IT manager and coordinator for computer labs. ◦ Trained over 50 undergraduate students and professionals to operate the university computer labs.	<b>03/2007–12/2011</b>
<b>Invited Talks</b> .....	
<b>Practical Ways Towards Carbon-Efficient Systems and Applications</b> <i>Chalmers University of Technology, Computer and Network Systems Division</i>	<b>10/2023</b>
<b>TailTamer: Reducing Tail Response Time Through System-Wide Scheduling</b> <i>UMass Amherst, IoBT Boot Camp</i>	<b>08/2023</b>
<b>Benefits and Limitations of Carbon Accounting Paradigms</b> <i>Green Software Foundation, Standards Working Group</i>	<b>03/2023</b>
<b>Ecovisor: A Virtual Energy System for Carbon-Efficient Applications</b> <i>1st Workshop on NetZero Carbon Computing (NetZero)</i>	<b>02/2023</b>
<b>Enabling Sustainable Computing</b> <i>Umeå University, Autonomous Distributed Systems Lab.</i>	<b>03/2022</b>
<b>API-driven Infrastructure: K8S, Serverless, Disaggregation, Performance, and everything else</b> <i>14th Cloud Control Workshop.</i>	<b>04/2019</b>
<b>An extensible architecture for job schedule and control</b> <i>12th Cloud Control Workshop.</i>	<b>03/2018</b>
<b>Hybrid Adaptive Checkpointing for Virtual Machine Fault Tolerance</b> <i>9th Cloud Control Workshop.</i>	<b>06/2016</b>
<b>Data Analytics for Scheduling in Hybrid HPC Environments</b> <i>EuroSys'2016, 6th Workshop on Cloud Data and Platforms (CloudDP)</i>	<b>04/2016</b>
<b>Collaborative LaTeX: An Introduction</b> <i>Umeå University, PhD Student Branch.</i>	<b>03/2016</b>
<b>Industry Collaborations</b> .....	
<b>WattTime.org × UMass Amherst × CarbonFirst</b> <i>Free real-time carbon data access to UMass Amherst and members of the CarbonFirst project (NSF #2105564).</i>	<b>2023-2024</b>
<b>On the News</b> .....	
<b>Environment Variables (Minute 30'14", Featuring Research Work)</b> <a href="https://podcast.greensoftware.foundation/e/68rz0318-we-answer-your-questions">HTTPS://PODCAST.GREENSOFTWARE.FOUNDATION/E/68RZ0318-WE-ANSWER-YOUR-QUESTIONS</a>	<b>2023</b>
<b>Getting to a fossil free internet by 2030 (Featuring Research Work)</b> <a href="https://archive.fosdem.org/2023/schedule/event/energy_fossil_free_internet/">HTTPS://ARCHIVE.FOSDEM.ORG/2023/SCHEDULE/EVENT/ENERGY_FOSSIL_FREE_INTERNET/</a>	<b>2023</b>
<b>Autonomous tools for high performance in large datacentres (Featuring PhD thesis)</b> <a href="https://www.umu.se/en/news/autonomous-tools-for-high-performance-in-large-datacentres_9159275/">HTTPS://WWW.UMU.SE/EN/NEWS/AUTONOMOUS-TOOLS-FOR-HIGH-PERFORMANCE-IN-LARGE-DATACENTRES_9159275/</a>	<b>2020</b>
<b>Volunteers build world's most powerful network (Featuring Volunteering Work)</b> <a href="https://www.umu.se/en/news/volunteers-build-worlds-most-powerful-network_5842655/">HTTPS://WWW.UMU.SE/EN/NEWS/VOLUNTEERS-BUILD-WORLDS-MOST-POWERFUL-NETWORK_5842655/</a>	<b>2016</b>
<b>Advising &amp; Mentoring</b> .....	
<b>08/2022 - Present:</b> Thanathorn Sukprasert: <i>PhD.</i>	
<b>11/2022 - Present:</b> Nathan Kwan-Ho Ng: <i>PhD.</i>	
<b>08/2023 - Present:</b> Mehmet Savasci: <i>PhD.</i>	
<b>09/2023 - Present:</b> Swetha Eppalapally: <i>MSc.</i>	

**09/2023 - Present:** Sushrita Yerra: *MSc.*  
**09/2022 - 05/2023:** Basundhara Chakrabarty: *MSc.*  
**09/2022 - 05/2023:** Shruti Jasoria: *MSc.*  
**06/2023 - Present:** Tanush Vijayakumar Savadi: *BSc., REU.*  
**Summer, 2023:** Samuel Behere (Robert Morris): *BSc., REU.*  
**Summer, 2023:** Chaehyeon Kim (Case Western Reserve University): *BSc., REU.*  
**Summer, 2023:** Alexander Bridgwater (Chalmers University of Technology): *MSc., Exchange studies.*  
**Summer, 2023:** Axel Lundberg (Chalmers University of Technology University): *MSc., Exchange studies.*  
**Summer, 2023:** Filip Skogh (Chalmers University of Technology University): *MSc., Exchange studies.*  
**Summer, 2022:** Sebastien Brown (Amherst College): *BSc., Summer Intern.*  
**Summer, 2021:** Ahmed Aly (Amherst College): *BSc., Summer Intern.*  
**2022 – Present:** +12 MSc. students in their *Independent studies.*

## Service to Profession.....

**2024:** ACM Transactions on Autonomous and Adaptive Systems (TAAS-23-0147): *Reviewer*  
**2024:** Future Generation Computer Systems (FGCS-D-23-02240): *Reviewer*  
**2024:** International Symposium on Cluster, Cloud and Grid Computing (CCGRID): *Artifacts Evaluation Committee*  
**2023:** ACM Transactions on Autonomous and Adaptive Systems: *Reviewer*  
**2023:** International Green and Sustainable Computing Conference (IGSC): *Technical Program Committee*  
**2023,2024:** Job Scheduling Strategies for Parallel Processing (JSSPP): *Technical Program Committee*  
**2023:** BigDataService: *Technical Program Committee*  
**2023:** ACM CHI Conference on Human Factors in Computing Systems: *Reviewer*  
**2022:** BigDataService: *Publicity Chair, Technical Program Committee*  
**2022,2023:** International Conference on JointCloud Computing (JCC): *Technical Program Committee*  
**2021:** European Conference on Computer Systems (EuroSys): *Shadow Technical Program Committee*  
**2016,2018-2020:** Cloud Control Workshop Series: *Organizer, Program Committee*  
**2016:** SCinet, Supercomputing Conference: *Student Volunteer*

## References.....

1. Prof. Prashant Shenoy (UMass Amherst, Advisor) | ✉ [shenoy@cs.umass.edu](mailto:shenoy@cs.umass.edu) | ☎ +1 (413) 577-0850
2. Prof. Erik Elmroth (Umeå University, Advisor) | ✉ [elmroth@cs.umu.se](mailto:elmroth@cs.umu.se) | ☎ +46 (90) 786-6986, +46 (70) 315-3928
3. Prof. Klara Nahrstedt (UIUC, Collaborator) | ✉ [klara@illinois.edu](mailto:klara@illinois.edu) | ☎ +1 (217) 244-6624
4. Prof. Don Towsley (UMass Amherst, Collaborator) | ✉ [towsley@cs.umass.edu](mailto:towsley@cs.umass.edu) | ☎ +1 (413) 545-0207
5. Prof. David Irwin (UMass Amherst, Collaborator) | ✉ [deirwin@umass.edu](mailto:deirwin@umass.edu) | ☎ +1 (413) 545-5822
6. Dr. Johan Tordsson (Umeå University and Elastisys, Advisor) | ✉ [tordsson@cs.umu.se](mailto:tordsson@cs.umu.se) | ☎ +46 (10) 147-1000