

Abel Souza | Curriculum Vitæ

College of Information and Computer Sciences (CICS)

140 Governors Dr. – Amherst, MA 01003

☎ +1 (402) 937-0596 • ✉ asouza@cs.umass.edu • 🌐 asouza.io

👤 Abel Souza • 📺 /abel-souza • 🎧 /abelpc • 📞 0000-0001-6952-1195

Research Interest.....

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: \$11K

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)

Publications	
Vision Papers	
Empowering User-Centered Carbon Management	2023
<i>Abel Souza, Mihir Shenoy, Camellia Zakaria</i>	
10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys)	
Unlocking Efficiency: Understanding End-to-End Performance in Distributed Analytics Pipelines	2023
<i>Abel Souza, N. Ng, T. Abdelzaher, D. Towsley, and P. Shenoy</i>	
41st IEEE Military Communications Conference (MILCOM)	
Sustainable Computing - Without the Hot Air	2022
<i>N. Bashir, D. Irwin, P. Shenoy, Abel Souza</i>	
The Inaugural Workshop on Sustainable Computer Systems Design and Implementation (HotCarbon)	
Enabling sustainable clouds: The case for virtualizing the energy system	2021
<i>N. Bashir, T. Guo, M. Hajiesmaili, D. Irwin, P. Shenoy, R. Sitaraman, Abel Souza, A. Wierman</i>	
ACM Symposium on Cloud Computing (SoCC)	
Conference Papers	
CASPER: Carbon-Aware Scheduling and Provisioning for Distributed Web Services	2023
<i>Abel Souza, J. Shrutti, 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>	
Ecovisor: A Virtual Energy System for Carbon-Efficient Applications	2023
<i>Abel Souza, 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)	
AdCom: Adaptive Combiner for Streaming Aggregations	2021
<i>F. Gutierrez, K. Beedkar, Abel Souza, V. Markl</i>	
24th International Conference on Extending Database Technology (EDBT)	
A HPC Co-Scheduler with Reinforcement Learning	2021
<i>Abel Souza, K. Pelckmans, J. Tordsson</i>	
24th Job Scheduling Strategies for Parallel Processing (JSSPP)	
The Adaptive Scheduling Architecture	2020
<i>Abel Souza, K. Pelckmans, J. Tordsson</i>	
29th International Symposium on High-Performance Parallel and Distributed Computing (HPDC)	
The VASCO Project: 100 Red Transients and Their Follow Up	2020
<i>B. Villarroel, K. Pelckmans, Enrique Solano, M. Laaksoharju, Abel Souza, and et al.</i>	
71st International Astronautical Congress (IAC)	
Hybrid Resource Management for HPC and Data Intensive Workloads	2019
<i>Abel Souza, M. Rezaei, E. Laure, J. Tordsson</i>	
19th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID)	
Hybrid Adaptive Checkpointing for Virtual Machine Fault Tolerance	2018
<i>Abel Souza, A. V. Papadopoulos, L. Tomas, D. Gilbert, J. Tordsson</i>	
2018 IEEE International Conference on Cloud Engineering (IC2E), <i>Best Paper Runner Up</i>	
An Architecture for Large Scale Experiments in P2P Networks	2015
<i>Abel Souza, A. A. A. Rocha</i>	
33rd Brazilian Symposium on Computer Networks and Distributed Systems (Tools Section)	
Workshop Papers	
Ecovisor: A Virtual Energy System for Carbon-Efficient Applications	2023
<i>Abel Souza, N. Bashir, D. Irwin, P. Shenoy</i>	
1st Workshop on NetZero Carbon Computing (NetZero), <i>Invited</i>	
Benefits and Limitations of Carbon Accounting Paradigms	2023
<i>N. Bashir, Abel Souza, D. Irwin, P. Shenoy</i>	
1st Workshop on NetZero Carbon Computing (NetZero), <i>Invited</i>	
DARTS: Distributed IoT Architecture for Real-Time, Resilient and AI-Compressed Workflows	2022
<i>R. Gupta, B. Chen, S. Liu, T. Wang, S. S. Sandha, Abel Souza, K. Nahrstedt, T. Abdelzaher, M. Srivastava, et al.</i>	
2022 Workshop on Advanced tools, programming languages, and PLatforms for Implementing and Evaluating algorithms for Distributed systems (ApPLIED)	
E-HPC: A Library for Elastic Resource Management in HPC Environments	2017
<i>W. Fox, D. Ghoshal, Abel Souza, G. P. Rodrigo, L. Ramakrishnan</i>	
12th Workshop on Workflows in Support of Large-Scale Science (WORKS)	

Journal Papers	
Network synthesis for tactical environments: scenario, challenges, and opportunities	2022
<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	
Launching the VASCO Citizen Science Project	2021
<i>B. Villarroel, K. Pelckmans, E. Solano, M. Laaksoharju, Abel Souza, et al.</i>	
Universe	
Under Review	
Examining the adoption of electromobility concepts across social contexts for energy transition	2024
<i>J. Köhlke, A. Lechowicz, O. Fabikun, N. Bashir, Abel Souza, P. Shenoy, S. Lehnhoff</i>	
TailTamer: Reducing Tail Response Time Through System-Wide Scheduling	2024
<i>N. Ng, Abel Souza, A. Ali-Eldin, C. Klein, D. Irwin, D. Towsley, P. Shenoy</i>	
The Cloud Sustainability Price Tag: Customer and Provider Perspectives	2024
<i>W. Hanafy, T. Sukprasertm Abel Souza, D. Irwin, P. Shenoy</i>	
OpenCarbon: An API to Access and Visualize Carbon Forecasts	2024
<i>Abel Souza, D. Maji, R. K. Sitaraman, P. Shenoy</i>	
On the Limitations of Carbon-Aware Temporal and Spatial Workload Shifting in the Cloud	2024
<i>T. Sukprasert, Abel Souza, N. Bashir, D. Irwin, P. Shenoy</i>	
Optimizing the Cost of Reducing Cloud Carbon Emissions	2024
<i>W. A. Hanafy, Q. Liang, N. Bashir, Abel Souza, D. Irwin, P. Shenoy</i>	
SLO-Power: SLO and Power-aware Elastic Scaling for Web SeVICES	2024
<i>M. Savasci, Abel Souza, L. Wu, D. Irwin, A. Ali-Edin, P. Shenoy</i>	
How the Choice of Carbon Intensity Signal Shapes Carbon-Aware Scheduling Outcomes	2024
<i>T. Sukprasert, Abel Souza, N. Bashir, S. Berehe, P. Jain, D. Irwin, P. Shenoy</i>	
Posters	
Spatiotemporal Carbon-aware Scheduling in the Cloud: Limits and Benefits	2023
<i>T. Sukprasert, Abel Souza, N. Bashir, D. Irwin, P. Shenoy</i>	
14th ACM International Conference on Future Energy Systems (E-Energy)	
Visualizing the Impact of User Preferences and Habits on Carbon Emissions	2023
<i>T. V Savadi, Abel Souza, C. Zakaria</i>	
MIT IEEE Undergraduate Research Technology Conference (URTC)	
Real-time Carbon Intensity Forecasts for the Electric Grid in Europe	2023
<i>C. Kim (Case Western Reserve University), D. Maji, Abel Souza, R. K. Sitaraman, P. Shenoy</i>	
UMass Research Experience for Undergraduates (REU)	
Interpreting Average and Marginal Carbon Intensity Signals	2023
<i>S. Berehe (Robert Morris University), Abel Souza, N. Bashir, P. Shenoy</i>	
UMass Research Experience for Undergraduates (REU)	
ASA – Adaptive Scheduling Algorithm for Scientific Workflows	2019
<i>Abel Souza, K. Pelckmans, and J. Tordsson</i>	
15th Cloud Control Workshop	
Hybrid Resource Management for HPC and Data Intensive Workloads	2018
<i>Abel Souza, J. Tordsson, M. Rezaei, and E. Laure</i>	
13th Cloud Control Workshop	
Data Analytics for Scheduling in Hybrid HPC Environments	2016
<i>Abel Souza, J. Tordsson, M. Rezaei, and E. Laure</i>	
6th Workshop on Cloud Data and Platforms (CloudDP)	
Thesis	
Autonomous Resource Management for High Performance Datacenters	2020
<i>Abel Souza</i>	
Umeå University, Ph.D. Thesis	
Application-Aware Resource Management for Datacenters	2018
<i>Abel Souza</i>	
Umeå University, Licentiate Thesis	
An Architecture for Large-Scale Experiments on P2P Networks.	2014
<i>Abel Souza</i>	
Fluminense Federal University, Bachelor Thesis	

Research Experience	
University of Massachusetts Amherst <i>Postdoctoral Research Associate</i> Advisor: Dr. Prashant Shenoy ◦ Research on Distributed Systems for AI, Edge, Cloud, Energy Informatics, and Sustainable Computing.	06/2021–Present
Umeå University <i>Research Associate</i> Advisor: Dr. Erik Elmroth ◦ Research on Distributed, cloud, and high performance computing systems.	05/2020–05/2021
Lawrence Berkeley National Laboratory <i>Research Affiliate</i> Advisor: Dra. Lavanya Ramakrishnan ◦ Research on Resource Management for Scientific Workflows.	01/2017–08/2017
Umeå University <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).	04/2015–05/2016
Fluminense Federal University <i>Research Assistant</i> Advisor: Dr. Eugene Vinod Rebello ◦ Study and evaluation of techniques to parallelize cryptographic algorithms for the Brazilian Navy.	08/2013–12/2014
Fluminense Federal University <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.	2014
National Laboratory for Scientific Computing <i>Research Assistant</i> Advisor: Dr. Antonio Tadeu Gomes ◦ Research on parallelization and optimization of numerical solvers.	01/2014–09/2024
Teaching	
University of Massachusetts Amherst <i>UMass Turing Summer Program – https://lass.cs.umass.edu/turing/</i> ◦ Coordinator, Teacher ◦ Syllabus, class, assignments and tutorials preparation. ◦ Project coordination and supervision.	2022,2023,2024
Umeå University <i>Teaching Assistant: Advanced Distributed Systems</i>	09/2020–11/2020
Umeå University <i>Teaching Assistant: Cloud Computing</i>	11/2019–01/2020
Umeå University <i>Teaching Assistant: Operating Systems</i>	11/2016–01/2017
Federal Fluminense University <i>Teaching Support in Undergraduate Computer Laboratories Program (Coordinator, Teacher)</i> ◦ Syllabus, class, assignments and tutorials preparation. ◦ Project coordination, supervision, and teacher.	2008–2011,2013
Work Experience	
Fluminense Federal University <i>Software Developer</i> Coordinator: Dra. Fabiana Rodrigues Leta ◦ Design and develop visual geological systems	10/2013–02/2014
University of Nebraska-Lincoln <i>System Administrator</i> Advisor: Dr. Fangrui Ma ◦ Operated and maintained a High Performance Compute cluster.	10/2012–12/2012

System Administrator and Coordinator

Advisor: Dr. Hamilton Faria Leckar

- o University IT manager and coordinator for computer labs.
- o Trained over 50 undergraduate students and professionals to operate the university computer labs.

Invited Talks

Practical Ways Towards Carbon-Efficient Systems and Applications <i>Chalmers University of Technology, Computer and Network Systems Division</i>	10/2023
TailTamer: Reducing Tail Response Time Through System-Wide Scheduling <i>UMass Amherst, IoBT Boot Camp</i>	08/2023
Benefits and Limitations of Carbon Accounting Paradigms <i>Green Software Foundation, Standards Working Group</i>	03/2023
Ecovisor: A Virtual Energy System for Carbon-Efficient Applications <i>1st Workshop on NetZero Carbon Computing (NetZero)</i>	02/2023
Enabling Sustainable Computing <i>Umeå University, Autonomous Distributed Systems Lab.</i>	03/2022
API-driven Infrastructure: K8S, Serverless, Disaggregation, Performance, and everything else <i>14th Cloud Control Workshop.</i>	04/2019
An extensible architecture for job schedule and control <i>12th Cloud Control Workshop.</i>	03/2018
Hybrid Adaptive Checkpointing for Virtual Machine Fault Tolerance <i>9th Cloud Control Workshop.</i>	06/2016
Data Analytics for Scheduling in Hybrid HPC Environments <i>EuroSys'2016, 6th Workshop on Cloud Data and Platforms (CloudDP)</i>	04/2016
Collaborative TeX: An Introduction <i>Umeå University, PhD Student Branch.</i>	03/2016

Industry Collaborations

WattTime.org × UMass Amherst × CarbonFirst	2023-2024
<i>Free real-time carbon data access to UMass Amherst and members of the CarbonFirst project (NSF #2105564).</i>	

On the News

Environment Variables (Minute 30'14", Featuring Research Work) HTTPS://PODCAST.GREENSOFTWARE.FOUNDATION/E/68RZ0318-WE-ANSWER-YOUR-QUESTIONS	2023
Getting to a fossil free internet by 2030 (Featuring Research Work) HTTPS://ARCHIVE.FOSDEM.ORG/2023/SCHEDULE/EVENT/ENERGY_FOSSIL_FREE_INTERNET/	2023
Autonomous tools for high performance in large datacentres (Featuring PhD thesis) HTTPS://WWW.UMU.SE/EN/NEWS/AUTONOMOUS-TOOLS-FOR-HIGH-PERFORMANCE-IN-LARGE-DATACENTRES_9159275/	2020
Volunteers build world's most powerful network (Featuring Volunteering Work) HTTPS://WWW.UMU.SE/EN/NEWS/VOLUNTEERS-BUILD-WORLDS-MOST-POWERFUL-NETWORK_5842655/	2016

Advising & Mentoring

08/2022 - Present: Thanathorn Sukprasert: <i>PhD.</i>
11/2022 - Present: Nathan Kwan-Ho Ng: <i>PhD.</i>
08/2023 - Present: Mehmet Savasci: <i>PhD.</i>
09/2023 - Present: Swetha Eppalapally: <i>MSc.</i>
09/2023 - Present: Sushrita Yerra: <i>MSc.</i>
09/2022 - 05/2023: Basundhara Chakrabarty: <i>MSc.</i>
09/2022 - 05/2023: Shruti Jasoria: <i>MSc.</i>
06/2023 - Present: Tanush Vijayakumar Savadi: <i>BSc., REU.</i>
Summer, 2023: Samuel Behere (Robert Morris): <i>BSc., REU.</i>
Summer, 2023: Chaehyeon Kim (Case Western Reserve University): <i>BSc., REU.</i>
Summer, 2023: Alexander Bridgwater (Chalmers University of Technology): <i>MSc., Exchange studies.</i>
Summer, 2023: Axel Lundberg (Chalmers University of Technology University): <i>MSc., Exchange studies.</i>
Summer, 2023: Filip Skogh (Chalmers University of Technology University): <i>MSc., Exchange studies.</i>

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: Future Generation Computer Systems: *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.....

Prof. Prashant Shenoy (UMass Amherst, Advisor) | ✉ shenoy@cs.umass.edu | ☎ +1 (413) 577-0850

Prof. Klara Nahrstedt (UIUC, Collaborator) | ✉ klara@illinois.edu | ☎ +1 (217) 244-6624

Prof. Don Towsley (UMass Amherst, Collaborator) | ✉ towsley@cs.umass.edu | ☎ +1 (413) 545-0207

Prof. David Irwin (UMass Amherst, Collaborator) | ✉ deirwin@umass.edu | ☎ +1 (413) 545-5822

Prof. Erik Elmroth (Umeå University, Advisor) | ✉ elmroth@cs.umu.se | ☎ +46 (90) 786-6986, +46 (70) 315-3928

Dr. Johan Tordsson (Umeå University and Elastisys, Advisor) | ✉ tordsson@cs.umu.se | ☎ +46 (10) 147-1000