

JACK MARQUEZ

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Education

- 2017 – 2022 » **Ph.D. of Engineering.** University Autonoma de Occidente, Colombia.
Thesis: *Improving Heterogeneous Storage Performance in HPC Cloud Systems Using Efficient Storage Algorithms Informed by Statistical Models (Meritorious Mention).*
Advisor: Prof. Dr. Oscar Hernan Mondragon Martinez
- 2008 – 2013 » **B.Sc. in Informatics Engineering.**, University Autonoma de Occidente, Colombia.

Academic Positions

- 2023 – ... » **Research Assistant Professor.** Department of Electrical Engineering and Computer Science, University of Tennessee-Knoxville, USA.
- › Research in profiling application tools
 - › Research in scientific workflows
 - › Leading research in ANACIN-X: Analysis and modeling of Nondeterminism and Associated Costs in eXtreme scale applications.
 - › Research in situ data analytics for HPC applications like molecular dynamics.
 - › Mentor undergraduate and graduate students in topics covering scientific reproducibility, scheduling, performance modelling, better software practices, workflow management and cloud computing.
- Supervisor: Prof. Dr. Michela Taufer
- 2022 – 2023 » **Postdoctoral Research Associate.** Department of Electrical Engineering and Computer Science, University of Tennessee-Knoxville, USA.
- › Leading research in ANACIN-X: Analysis and modeling of Nondeterminism and Associated Costs in eXtreme scale applications.
 - › Research in situ data analytics for HPC applications like molecular dynamics.
 - › Mentor undergraduate and graduate students in topics covering scientific reproducibility, scheduling, performance modelling, better software practices, workflow management and cloud computing.
- Supervisor: Prof. Dr. Michela Taufer
- 2017 – 2021 » **Adjunct Professor.** Computer Science Department, University Autonoma de Occidente, Colombia.
- › Oriented Object Programming in Java and Python for Engineering programs.
 - › Data Structures for Software Engineering program.
 - › Algorithms and Programming for the Data Engineering program
- Supervisor: Prof. Dr. Lyda Peña
- 2021 » **Research Intern.** BISITE group, Computer Science Department, University of Salamanca, Spain.
- › Improve data placement allocation in hybrid clouds.
 - › Create REST APIs to collect data from different applications and improve their allocation using genetic algorithms.
- Supervisor: Prof. Dr. Juan M. Corchado

- 2020 » **Research Intern.** Software Systems Lab, Computer Science Department, University of Alberta, Canada.
› Reduce checkpoint overhead for heterogeneous storage systems in HPC Cloud using genetic algorithms and new storage technologies like NVRAM.
Supervisor: Prof. Dr. Jose Nelson Amaral
- 2019 » **Researcher.** Computer Science Division, SENA, Colombia.
› Performance comparison of virtualization technologies for Artificial Intelligence applications.
Supervisor: M.Sc. Jose Fernando Perez
- 2013 – 2016 » **Researcher.** Computer Science Division, University Autonoma de Occidente, Colombia.
› Research in integration model of Virtual Academic Communities with real-world objects through the Internet of things.
Supervisor: M.Sc. Alexander Garcia

Industry Positions

- 2022 » **Full-stack Software Developer.** Disney Media Technologies, USA.
› Development of new features for the MediaHub platform, which controls the flow of videos for the different streaming platforms.
› Software stack: VueJS, NodeJS, Python, AWS, Jenkins.
Supervisor: Kushal Choksi
- 2020 – 2022 » **Technical Team Lead.** Emcali S.A, Colombia.
› Team leader of analysis and development of web and mobile applications.
› Design the initial architecture for the software solutions.
› Get requirements from the clients.
› Define best practices and technologies for the solution.
› Responsible for applying scrum as the agile methodology to every process of software
› Software Stack: ReactJS, Angular, NodeJS, Python, AWS. development.
Supervisor: Jaime Osorio
- 2016 – 2019 » **Full-Stack Software Developer.** Kaismart Solutions S.A.S, Colombia.
› Development of web and mobile application to control KaisCloud, a system for crop monitoring.
› Development of the middleware for the nodes that provide information to KaisCloud.
› Software Stack: ReactJS, Java, C, Python, AWS.
Supervisor: Juan M. Nuñez

Research Publications

Journal Articles

- 1 Martinez, H., Mondragon, O., Rubio, H. and **Marquez, J.** ‘Computational and Communication Infrastructure Challenges for Resilient Cloud Services’. In: *Computers* 11.8 (2022), p. 118.
- 2 **Marquez, J.**, Mondragon, O. and Gonzalez, J. ‘An Intelligent Approach to Resource Allocation on Heterogeneous Cloud Infrastructures’. In: *Applied Sciences* 11.21 (2021), p. 9940.

Conference Proceedings

- 1 Caino-Lores, S., Cuendet, M., **Marquez, J.**, Estrada, T., Deelman, E., Weinstein, H. and Taufer, M. ‘Runtime Steering of Molecular Dynamics Simulations Through In Situ Analysis and Annotation of Collective Variables’. In: *Proceedings of the Platform for Advanced Scientific Computing Conference*. PASC '23. Davos, Switzerland: Association for Computing Machinery, 2023. ISBN: 9798400701900. DOI: 10.1145/3592979.3593420. URL: <https://doi.org/10.1145/3592979.3593420>.

- 2 Tan, N., Bogdan, N., Luettgau, J., **Marquez, J.**, Teranishi, K., Morales, N., Bhowmick, S., Taufer, M. and Cappello, F. 'Scalable Checkpointing of Applications with Sparsely Updated Data'. In: *Proceedings of the 52nd International Conference on Parallel Processing (ICPP)*. (Acceptance Rate: 29%). Salt Lake City, UT, USA: ACM, 2023, pp. 1–10.
- 3 **Marquez, J.** and Castillo, M. 'Performance comparison: Virtual machines and containers running artificial intelligence applications'. In: *Information Technology and Systems: ICITS 2021, Volume 1*. Springer International Publishing. 2021, pp. 199–209.
- 4 **Marquez, J.**, Gonzalez, J. and Mondragon, O. 'Heterogeneity-aware data placement in Hybrid Clouds'. In: *Cloud Computing–CLOUD 2019: 12th International Conference, Held as Part of the Services Conference Federation, SCF 2019, San Diego, CA, USA, June 25–30, 2019, Proceedings*. Springer International Publishing Cham. 2019, pp. 177–191.
- 5 **Marquez, J.**, Villanueva, J., Solarte, Z. and Garcia, A. 'IoT in education: Integration of objects with virtual academic communities'. In: *New advances in information systems and technologies*. Springer International Publishing. 2016, pp. 201–212.
- 6 Villanueva, J., **Marquez, J.**, Solarte, Z. and Dávalos, A. 'Architecture for integrating real objects with virtual academic communities'. In: *2015 Fifth International Conference on e-Learning (econf)*. IEEE. 2015, pp. 385–391.

Merits and Achievements

Awards and Grants

- 2023 » PI - BD Hubs: Collaborative Proposal: South: The Sough Big Data Innovation Hub (\$50.000): *Training Next-Generation Data Scientists in Non-Deterministic Scientific Data Generation*, National Science Foundation (NSF), USA.
 - » PI - Explorer Allocation Award ASC200035: *Analysis and modeling of Nondeterminism and Associated Costs in eXtreme scale applications*, ACCESS (former XSEDE), USA.
- 2020 » Outstanding Poster Presentation, FURCA 2020, Canada
 - » Student fellowship for MIT Cloud & Devops: Continuous Transformation.
 - » Student fellowship for MIT Leading Digital Transformation
- 2019 » Emerging Leaders in the Americas Program scholarship (ELAP), Canadian Bureau of International Education Scholarship (CBIE) , Canada.
 - » Visiting scholar grant, Fundacion Carolina, Spain.
- 2017 » Scholarship for Graduate Studies, University Autonoma de Occidente, Colombia.
- 2013 » Excellence Grant for Outstanding Student, University Autonoma de Occidente, Colombia.
- 2012 » Excellence Grant for Outstanding Student, University Autonoma de Occidente, Colombia.
- 2011 » Excellence Grant for Outstanding Student, University Autonoma de Occidente, Colombia.
- 2009 » Excellence Grant for Outstanding Student, University Autonoma de Occidente, Colombia.
- 2008 » Excellence Grant for Outstanding Student, University Autonoma de Occidente, Colombia.

Projects

- 2022 – ... » SHF: Medium: Collaborative Research: ANACINX: Analysis and Modeling of Nondeterminism and Associated Costs in eXtreme Scale Applications (NSF 1900888), National Science Foundation, USA.
 - » BIGDATA: IA: Collaborative Research: In Situ Data Analytics for Next Generation Molecular Dynamics Workflows (NSF 1841758), National Science Foundation, USA.

- 2017 – 2022 » Improving Heterogeneous Storage Performance in HPC Cloud Systems Using Efficient Storage Algorithms Informed by Statistical Models, University Autonoma de Occidente, Colombia.
- 2019 » Performance comparison: Virtual machines and containers running artificial intelligence applications, SENA, Colombia.
- 2013 – 2016 » Integration model of Virtual Academic Communities with real-world objects through the Internet of things, Colombian Ministry of Science, Technology and Innovation - ID: 125956933284, Colombia.

Academic Services

Technical Program Committee Memberships

- 2023 » 1st IEEE International Workshop on Workflows in Distributed Environments.
» Research Software Engineers in eScience (RSE-eScience-2023).
- 2019 » IEEE International Symposium on Parallel and Distributed Processing Workshops and Ph.D. Forum (IPDPSW).

Student Mentoring

- » Ashish Pandey, graduate Research Assistant (May 2023 - present).
- » Dhroov Pandey, Undergraduate Research Assistant (May 2023 - present).
- » Noah Dale, Undergraduate Research Assistant (Jan 2023 - present).
- » Befikir Bogale, Undergraduate Research Assistant (Nov 2022 - present).
- » Juan David Gonzalez, Undergraduate student (Nov 2019 - Nov 2020)

Professional Affiliations

- » IEEE