

Alberto Núñez Covarrubias

Curriculum Vitae

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Employment

02/2020–present *Profesor Titular de Universidad* (Associate Professor)
Testing and Performance Evaluation research group, Computer Science Faculty
Complutense University of Madrid, Spain

12/2014–01/2020 *Profesor Contratado Doctor* (Assistant Professor)
Testing and Performance Evaluation research group, Computer Science Faculty
Complutense University of Madrid, Spain

10/2011–12/2014 *Profesor Ayudante Doctor* (Teaching Assistant with PhD)
Testing and Performance Evaluation research group, Computer Science Faculty
Complutense University of Madrid, Spain

09/2005–09/2011 *Profesor Ayudante* (Teaching Assistant)
Computer Architecture group, Computer Science Department
Carlos III University of Madrid, Spain

Education

Ph.D., Computer Science, February 2011
Carlos III University of Madrid, Spain
Thesis: *New Contributions for Modeling and Simulating High Performance Computing Applications on Parallel and Distributed Architectures*
Grade: Sobresaliente Cum Laude

M.S., Computer Science and Technology, June 2008
Carlos III University of Madrid, Spain

M.S., Computer Science, July 2005
Carlos III University of Madrid, Spain
Final Year Project (FYP): *An heterogeneous Web service-based parallel file system*
Grade (FYP): A with honors

B.S., Computer Systems, July 2003
Polytechnic school of Computer Science
Final Year Project (FYP): *Adaptive learning tutor for Java programming*
Grade (FYP): A with honors

Industry Experience

06/2004–09/2004 *S.I.A. Spain*
Junior programmer

Honors

IBM PhD Fellowship, awarded in 2009

Publications

Journal Papers

P. C. Cañizares, **A. Núñez**, R. Filgueira, and J. de Lara, “Parallel mutation testing for large scale systems,” *Cluster Computing*, vol. 27, no. 2, pp. 2071–2097, 2024, JCR Ranking 2023: 29/144, (Q1), impact factor: 3.6, in Computer Science, Theory and Methods, DOI 10.1007/s10586-023-04074-y, ISSN 1386-7857.

P. Gómez-Abajo, P. C. Cañizares, **A. Núñez**, E. Guerra, and J. de Lara, “Automated engineering of domain-specific metamorphic testing environments,” *Information and Software Technology*, vol. 157, p. 107164, 2023, JCR Ranking 2023: 26/132, (Q1), impact factor: 3.8, in Computer Science, Software Engineering, DOI 10.1016/j.infsof.2023.107164, ISSN 0950-5849.

P. C. Cañizares, **A. Núñez**, A. Bernal, M. Cambronero, and A. Barker, “Simcan2Cloud: a discrete-event-based simulator for modelling and simulating cloud computing infrastructures,” *Journal of Cloud Computing*, vol. 12, no. 133, pp. 1–31, 2023, JCR Ranking 2023: 75/250, (Q2), impact factor: 3.7, in Computer Science, Information Systems, DOI 10.1186/s13677-023-00511-w, ISSN 2192-113X.

C. Camacho, P. C. Cañizares, L. Llana, and **A. Núñez**, “Chaos as a software product line – a platform for improving open hybrid-cloud systems resiliency,” *Software: Practice and Experience*, vol. 52, no. 7, pp. 1581–1614, 2022, JCR Ranking 2022: 34/108, (Q2), impact factor: 3.5, in Computer Science, Software Engineering, DOI 10.1002/spe.3076, ISSN 0038-0644.

A. Núñez, P. C. Cañizares, and J. de Lara, “Cloudexpert: An intelligent system for selecting cloud system simulators,” *Expert Systems with Applications*, vol. 187, p. 115955, 2022, JCR Ranking 2022: 22/145, (Q1), impact factor: 8.5, in Computer Science, Artificial Intelligence, DOI 10.1016/j.eswa.2021.115955, ISSN 0957-4174.

A. Bernal, M. E. Cambronero, **A. Núñez**, P. C. Cañizares, and V. Valero, “Evaluating cloud interactions with costs and SLAs,” *The Journal of Supercomputing*, vol. 78, pp. 7529–7555, 2022, JCR Ranking 2022: 37/111, (Q2), impact factor: 3.3, in Computer Science, Theory and Methods, DOI 10.1007/s11227-021-04197-2, ISSN 0920-8542.

A. Bernal, M. E. Cambronero, P. C. Cañizares, **A. Núñez**, V. Valero, and H. I. de la Cruz, “Analyzing the cloud performance using different user subscription times,” *International Journal of Software Engineering and Knowledge Engineering*, vol. 31, no. 11n12, pp. 1699–1720, 2021, JCR Ranking 2021: 99/110, (Q4), impact factor: 1.007, in Computer Science, Software Engineering, DOI 10.1142/S0218194021400180, ISSN 0218-1940.

M. E. Cambronero, A. Bernal, V. Valero, P. C. Cañizares, and **A. Núñez**, “Profiling SLAs for cloud system infrastructures and user interactions,” *PeerJ Computer Science*, vol. 7, p. e513, 2021, JCR Ranking 2021: 48/109, (Q2), impact factor: 2.411, in Computer Science, Theory and Methods, DOI 10.7717/peerj-cs.513, ISSN 2376-5992.

A. Núñez, P. C. Cañizares, M. Núñez, and R. M. Hierons, “TEA-Cloud: A formal framework for testing cloud computing systems,” *IEEE Transactions on Reliability*, vol. 70, no. 1, pp. 261–284, 2021, JCR Ranking 2021: 11/110, (Q1), impact factor: 5.883, in Computer Science, Software Engineering, DOI 10.1109/TR.2020.3011512, ISSN 0018-9529.

P. C. Cañizares, **A. Núñez**, J. de Lara, and L. Llana, “MT-EA4Cloud: A methodology for testing and optimising energy-aware cloud systems,” *Journal of Systems and Software*, vol. 163, p. 110522, 2020, JCR Ranking 2020: 27/110, (Q1), impact factor: 2.829, in Computer Science, Theory and Methods, DOI 10.1016/j.jss.2020.110522, ISSN 0164-1212.

A. Bernal, M. E. Cambronero, V. Valero, **A. Núñez**, and P. C. Cañizares, “A Framework for Modeling Cloud Infrastructures and User Interactions,” *IEEE Access*, vol. 7, pp. 43269 – 43285, 2019, JCR

Ranking 2019: 35/156, (Q1), impact factor: 3.745, in Computer Science, Information Systems DOI 10.1109/ACCESS.2019.2907180, ISSN 2169-3536.

A. Núñez, C. Mañoso, A. P. de Madrid, and S. Pickin, “SIMCAN: A simulator to improve the learning of distributed and high-performance computing systems in engineering degrees,” *Computer Applications in Engineering Education*, vol. 27, no. 5, pp. 1126 – 1138, 2019, JCR Ranking 2019: 35/42, (Q4), impact factor: 0.856, in Education, Scientific Disciplines, DOI 10.1002/cae.22141, ISSN 1061-3773.

P. C. Cañizares, **A. Núñez**, and J. de Lara, “An expert system for checking the correctness of memory systems using simulation and metamorphic testing,” *Expert Systems with Applications*, vol. 132, pp. 44 – 62, 2019, JCR Ranking 2019: 2/83, (Q1), impact factor: 5.452, in Operations Research & Management Science, DOI 10.1016/j.eswa.2019.04.070, ISSN 0957-4174.

C. Camacho, L. Llana, **A. Núñez**, and M. Bravetti, “Probabilistic software product lines,” *Journal of Logical and Algebraic Methods in Programming*, vol. 107, pp. 54 – 78, 2019, JCR Ranking 2019: 10/21, (Q2), impact factor: 0.685, in Logic, DOI 10.1016/j.jlamp.2019.05.007, ISSN 2352-2208.

A. Bernal, M. E. Cambronero, **A. Núñez**, P. C. Cañizares, and V. Valero, “Improving cloud architectures using UML profiles and M2T transformation techniques,” *The Journal of Supercomputing*, vol. 75, no. 12, pp. 8012 – 8058, 2019, JCR Ranking 2019: 31/108, (Q2), impact factor: 2.469, in Computer Science, Theory and Methods, DOI 10.1007/s11227-019-02980-w, ISSN 0920-8542.

P. C. Cañizares, **A. Núñez**, and M. G. Merayo, “MuTomVo: mutation testing framework for simulated cloud and HPC environments,” *Journal of Systems and Software*, vol. 143, pp. 187–207, 2018, JCR Ranking 2018: 25/105, (Q1), impact factor: 2.559, in Computer Science, Theory and Methods, DOI 10.1016/j.jss.2018.05.010, ISSN 0164-1212.

P. C. Cañizares, M. G. Merayo, and **A. Núñez**, “FORTIFIER: a FORMAL disTRIButed Framework to Improve the dETECTION of thREATening objects in baggage,” *Journal of Information Telecommunication*, vol. 2, no. 1, pp. 2–18, 2018, DOI 10.1080/24751839.2017.1347766, ISSN: 2475-1839.

C. Camacho, L. Llana, and **A. Núñez**, “Cost-related interface for software product lines,” *Journal of Logical and Algebraic Methods in Programming*, vol. 85, no. 1, pp. 227–244, 2016, JCR Ranking 2016: 8/21, (Q2), impact factor: 0.692, in Logic, DOI 10.1016/j.jlamp.2015.09.009, ISSN 2352-2208.

M. G. Merayo and **A. Núñez**, “Passive testing of communicating systems with timeouts,” *Information and Software Technology*, vol. 64, pp. 19–35, 2015, JCR Ranking 2015: 16/106, (Q1), impact factor: 1.569, in Computer Science, Software Engineering, DOI 10.1016/J.INFSOF.2015.03.009, ISSN 0950-5849.

A. Núñez and R. M. Hierons, “A methodology for validating cloud models using metamorphic testing,” *Annals of telecommunications*, vol. 70, no. 3-4, pp. 127–135, 2015, JCR Ranking 2015: 61/82, (Q3), impact factor: 0.722, in Telecommunications, DOI 10.1007/S12243-014-0442-7, ISSN 0003-4347.

A. Núñez and M. G. Merayo, “A formal framework to analyze cost and performance in Map-Reduce based applications,” *Journal of Computational Science*, vol. 5, no. 2, pp. 106–118, 2014, JCR Ranking 2014: 35/102 (Q2), impact factor: 1.231, in Computer Science, Theory & Methods, DOI 10.1016/j.jocs.2013.04.003, ISSN 1877-7503.

G. G. Castañé, **A. Núñez**, P. Llopis, and J. Carretero, “E-mc²: A formal framework for energy modelling in cloud computing,” *Simulation Modelling Practice and Theory*, vol. 39, pp. 56–75, 2013, JCR Ranking 2013: 49/105 (Q2), impact factor: 1.05, in Computer Science, Software Engineering, DOI 10.1016/j.simpat.2013.05.002, ISSN 1569-190X.

A. Núñez, M. G. Merayo, R. M. Hierons, and M. Núñez, “Using genetic algorithms to generate test sequences for complex timed systems,” *Journal of Soft Computing*, vol. 17, no. 2, pp. 301–315, 2013, JCR Ranking 2013: 59/121 (Q2), impact factor: 1.304, in Computer Science, Artificial Intelligence, DOI 10.1007/s00500-012-0894-5, ISSN 1432-7643.

A. Núñez, J. L. Vázquez-Poletti, A. C. Caminero, G. G. Castañé, J. Carretero, and I. M. Llorente, “iCanCloud: A Flexible and Scalable Cloud Infrastructure Simulator,” *Journal of Grid Computing*, vol. 10, no. 1, pp. 185–209, 2012, JCR Ranking 2012: 19/100 (Q1), impact factor: 1.603, in Computer Science, Theory & Methods, DOI 10.1007/s10723-012-9208-5, ISSN 1570-7873.

A. Núñez, J. Fernández, R. Filgueira, F. García, and J. Carretero, “SIMCAN: A flexible, scalable and expandable simulation platform for modelling and simulating distributed architectures and applications,” *Simulation Modelling Practice and Theory*, vol. 20, no. 1, pp. 12–32, 2012, JCR Ranking 2012: 40/104 (Q2), impact factor: 1.159, in Computer Science, Software Engineering, DOI: 10.1016/j.simpat.2011.08.009, ISSN 1569-190X.

R. Filgueira, J. Carretero, D. E. Singh, A. Calderón, and **A. Núñez**, “Dynamic-coMPI: Dynamic optimization techniques for MPI parallel applications,” *The Journal of Supercomputing*, vol. 59, no. 1, pp. 361–391, 2012, JCR Ranking 2012: 39/100 (Q2), impact factor: 0.917, in Computer Science, Theory & Methods, DOI: 10.1007/s11227-010-0440-0, ISSN 0920-8542.

A. Núñez, J. Fernández, J. D. García, F. García, and J. Carretero, “New techniques for simulating high performance MPI applications on large storage networks,” *The Journal of Supercomputing*, vol. 51, no. 1, pp. 40–57, 2010, JCR Ranking 2010: 176/247 (Q3), impact factor: 0.545, in Engineering, Electrical & Electronic, DOI: 10.1007/s11227-009-0279-4, ISSN 0920-8542.

Conference Papers

P. Gómez-Abajo, P. C. Cañizares, **A. Núñez**, E. Guerra, and J. de Lara, “Gotten: A model-driven solution to engineer domain-specific metamorphic testing environments,” in *ACM/IEEE International Conference on Model Driven Engineering Languages and Systems, MODELS’23*, pp. 65–69, IEEE, 2023.

A. Núñez, P. C. Cañizares, P. Gómez-Abajo, E. Guerra, and J. de Lara, “Analyzing the reliability of simulated distributed systems using metamorphic testing,” in *7th International Workshop on Metamorphic Testing, MET’22*, pp. 34–41, 2022.

H. I. de la Cruz, M. E. Cambronero, V. Valero, P. C. Cañizares, A. Bernal, and **A. Núñez**, “Studying the impact of the user subscription times in different cloud configurations,” in *33rd International Conference on Software Engineering and Knowledge Engineering, SEKE’21 (CORE B)*, pp. 211–216, 2021.

P. C. Cañizares, P. Gómez-Abajo, **A. Núñez**, E. Guerra, and J. de Lara, “New ideas: automated engineering of metamorphic testing environments for domain-specific languages,” in *14th ACM SIGPLAN International Conference on Software Language Engineering, SLE’21 (CORE B)*, pp. 49–54, 2021.

P. C. Cañizares, **A. Núñez**, and J. de Lara, “OUTRIDER: Optimizing the mUtation Testing pRocess In Distributed EnviRonments,” in *International Conference on Computational Science, ICCS’17 (CORE A)*, vol. 108, pp. 505–514, 2017.

P. C. Cañizares, M. G. Merayo, and **A. Núñez**, “Using ants to fight wildfire,” in *Advances in Computational Intelligence - 14th International Work-Conference on Artificial Neural Networks, IWANN’17 Proceedings Part II (CORE B)*, vol. LNTCS 10306, pp. 371–380, 2017.

P. C. Cañizares, **A. Núñez**, and J. de Lara, “MAGICIAN: model-based design for optimizing the configuration of data-centers,” in *International Conference on Software Engineering and Knowledge Engineering, SEKE’17 (CORE B)*, pp. 602–607, 2017.

- P. C. Cañizares, M. G. Merayo, and **A. Núñez**, “EMINENT: EMbarrassINGly parallel mutatioN Testing,” in *International Conference on Computational Science, ICCS’16 (CORE A)*, vol. 80, pp. 63–73, 2016.
- P. C. Cañizares, M. G. Merayo, and **A. Núñez**, “FARTHEST: FormAl distRibuTed scHema to dEtect Suspicious arTefacts,” in *Asian Conference on Intelligent Information and Database Systems, ACI-IDS’16*, vol. LNAI 9621, pp. 770–779, 2016.
- P. C. Cañizares, **A. Núñez**, M. Núñez, and J. J. Pardo, “A methodology for designing energy-aware systems for computational science,” in *International Conference on Computational Science, ICCS’15 (CORE A)*, vol. 51, pp. 2804 – 2808, 2015.
- A. Núñez**, P. C. Cañizares, and M. Núñez, “A methodology for aiding users to design and model cloud computing architectures,” in *International Conference on Signal-Image Technology and Internet-Based Systems, SITIS’14*, pp. 215–222, 2014.
- A. Núñez**, R. Filgueira, and M. G. Merayo, “SANComSim: A Scalable, Adaptive and Non-intrusive Framework to Optimize Performance in Computational Science Applications,” in *International Conference on Computational Science, ICCS’13 (CORE A)*, vol. 18, pp. 230–239, 2013.
- A. Núñez**, C. Andrés, and M. G. Merayo, “MAScloud: A Framework Based on Multi-Agent Systems for Optimizing Cost in Cloud Computing,” in *4th International Conference on Computational Collective Intelligence, Technologies and Applications, ICCCI’12 (CORE C)*, pp. 436–445, 2012.
- C. Andrés, **A. Núñez**, and M. Núñez, “Preventing Attacks by Classifying User Models in a Collaborative Scenario,” in *4th International Conference on Computational Collective Intelligence, Technologies and Applications, ICCCI’12 (CORE C)*, pp. 505–514, 2012.
- C. Andrés, R. Abreu, and **A. Núñez**, “OCE: An Online Colaborative Editor,” in *4th International Conference on Computational Collective Intelligence, Technologies and Applications, ICCCI’12 (CORE C)*, pp. 89–98, 2012.
- R. Filgueira, M. Atkinson, **A. Núñez**, and J. Fernández, “An adaptive, scalable, and portable technique for speeding up MPI-based applications,” in *18th International European Conference on Parallel and Distributed Computing, Euro-par’12 (CORE A) LNCS Volume 7484*, pp. 729–740, 2012.
- G. G. Castañé, **A. Núñez**, and J. Carretero, “iCanCloud: A Brief Architecture Overview,” in *10th IEEE International Symposium on Parallel and Distributed Processing with Applications, ISPA’12 (CORE B)*, pp. 853–854, 2012.
- A. Núñez**, C. Andrés, and M. G. Merayo, “Optimizing the Trade-offs Between Cost and Performance in Scientific Computing (Best paper award),” *Procedia Computer Science, International Conference on Computational Science, ICCS’12 (CORE A)*, vol. 9, no. 0, pp. 498–507, 2012.
- G. G. Castañé, **A. Núñez**, R. Filgueira, and J. Carretero, “Dimensioning Scientific Computing Systems to Improve Performance of Map-Reduce based Applications,” *Procedia Computer Science, International Conference on Computational Science, ICCS’12 (CORE A)*, vol. 9, no. 0, pp. 226–235, 2012.
- A. Núñez**, J. Fernández, J. Carretero, L. Prada, and M. Blaum, “Optimizing Distributed Architectures to Improve Performance on Checkpointing Applications,” in *13th IEEE International Conference on High Performance Computing and Communications, HPCC’11 (CORE B)*, pp. 487–492, Sept. 2011.
- L. Prada, J. G., J. D. Garcia, J. Carretero, and **A. Núñez**, “A Power-aware Based Storage Architecture for High Performance Computing,” in *13th IEEE International Conference on High Performance Computing and Communications, HPCC’11 (CORE B)*, pp. 17–24, Sept. 2011.
- A. Núñez**, G. Castane, J. Vázquez-Poletti, A. Caminero, J. Carretero, and I. Llorente, “Design of a flexible and scalable hypervisor module for simulating cloud computing environments,” in *Intern-*

tional Symposium on Performance Evaluation of Computer Telecommunication Systems, SPECTS'11, pp. 265–270, June 2011.

A. Núñez, J. Vázquez-Poletti, A. Caminero, J. Carretero, and I. Llorente, “Design of a new cloud computing simulation platform,” in *11th International conference on Computational science and its Applications, ICCSA'11 (CORE C)*, vol. 3, pp. 582–593, Springer-Verlag, June 2011.

A. Núñez, J. Fernández, and J. Carretero, “New contributions for simulating large distributed systems,” in *14th IEEE/ACM International Symposium on Distributed Simulation and Real Time Applications, DS-RT'10 (CORE B)*, pp. 227–230, Oct. 2010.

A. Núñez, J. Fernández, J. Carretero, and J. D. García, “Parallel Simulations of High Performance Computing Systems and Applications,” in *XXI Jornadas de Paralelismo*, (Valencia, Spain), pp. 407–414, Sept. 2010.

J. Fernández, L. Han, **A. Núñez**, J. Carretero, and J. V. Hemert, “Using architectural simulation models to aid the design of data intensive application,” in *3rd International Conference on Advanced Engineering Computing and Applications in Sciences, ADVCOMP'09*, (Sliema, Malta), pp. 163–168, Oct. 2009.

A. Rodríguez, J. Carretero, **A. Núñez**, B. Bergua, F. García, and J. D. García, “An Efficient Deployment Strategy for Large Sets of Virtual Appliances,” in *International Conference on Parallel and Distributed Processing Techniques and Applications, PDPTA'09 (CORE B)*, (Las Vegas, Nevada (USA)), pp. 645–651, July 2009.

A. Núñez, J. Fernández, J. D. García, and J. Carretero, “New techniques for simulating high performance MPI applications on large storage networks,” in *HiperIO workshop held within IEEE Cluster*, (Tsukuba, Japan), pp. 444–452, Oct. 2008.

A. Núñez, J. Fernández, J. D. García, L. Prada, and J. Carretero, “M-PLAT: Multi-Programming Language Adaptive Tutor,” in *8th IEEE International Conference on Advanced Learning Technologies, ICALT'08 (CORE A)*, (Santander, Spain), pp. 649–651, IEEE, July 2008.

A. Núñez, J. Fernández, J. D. García, and J. Carretero, “Analyzing Scalable High-Performance I/O Architectures,” in *International Conference on Parallel and Distributed Processing Techniques and Applications, PDPTA'08 (CORE B)*, (Las Vegas, Nevada, USA), pp. 631–637, July 2008.

A. Núñez, J. Fernández, J. D. García, L. Prada, and J. Carretero, “New Techniques for Modeling File Data Distribution on Storage Nodes,” in *41st Annual Simulation Symposium, ANNS'08 (CORE B)*, (Ottawa, Canada), pp. 175–182, IEEE, Apr. 2008.

J. D. García, L. Prada, J. Fernández, **A. Núñez**, and J. Carretero, “Using black-box modeling techniques for modern disk drives service time simulation,” in *41st Annual Simulation Symposium, ANNS'08 (CORE B)*, (Ottawa, Canada), pp. 139–145, IEEE, Apr. 2008.

A. Núñez, J. Fernández, J. Carretero, J. D. García, and L. Prada, “SIMCAN: A SIMulator Framework for Computer Architectures and Storage Networks,” in *1st International Conference on Simulation Tools and Techniques for Communications, Networks and Systems, SIMUTools'08*, (Marseille, France), pp. 1–8, ACM, Mar. 2008.

L. Prada, J. D. García, **A. Núñez**, J. Fernández, and J. Carretero, “Modelado estocástico de las operaciones de entrada/salida sobre un disco,” in *II Congreso Español de Informática (CEDI 2007). XVIII Jornadas de Paralelismo*, (Zaragoza, Spain), pp. 479–485, Sept. 2007.

A. Núñez, J. Fernández, J. Carretero, and J. D. García, “Nuevas Técnicas para Modelar la Distribución de los Datos de Ficheros en Nodos de Almacenamiento,” in *II Congreso Español de Informática (CEDI 2007). XVIII Jornadas de Paralelismo*, (Zaragoza, Spain), pp. 455–462, Sept. 2007.

A. Núñez, J. Carretero, F. García, and L. M. García, “Sistema de Ficheros Paralelo basado en Servicios Web,” in *XVII Jornadas de Paralelismo*, (Albacete, Spain), pp. 181–186, Sept. 2006.

Book chapters

Alberto Núñez, J. Fernández, and J. Carretero, *Advanced Learning. Book chapter, MPLAT: Multi-Programming Language Adaptive Tutor*, pp. 125-138, IN-TECH, 2009, ISBN: 978-953-7619-56-5.

Alberto Núñez, J. Fernández, and J. Carretero, *Science and Supercomputing in Europe. Book chapter, SIMCAN: A Highly Configurable Simulation Framework for HPC Architectures and Applications*, pp. 248-256, Monograf S.R.L., 2008, ISBN: 978-88-86037-22-8.

Principal Investigator in research projects

Desarrollo de técnicas y metodologías flexibles para la optimización de sistemas cloud

Reference: PR65/19-22452

Supported by: Comunidad de Madrid - UCM

Period: 01/07/2020 - 30/09/2022

Collaborator in research projects

Métodos rigurosos para el desarrollo de sistemas software fiables y eficientes

Reference: PID2023-149943OB-I00

Supported by: Ministry of Science, Innovation and Universities

Period: 01/09/2024 - 31/08/2028

Métodos rigurosos para el desarrollo de sistemas software de calidad y fiabilidad certificadas

Reference: PID2019-108528RB-C22

Supported by: Ministry of Science, Innovation and Universities

Period: 13/01/2023 - 31/05/2025

Contratos inteligentes y blockchains escalables y seguros mediante verificación y análisis

Reference: S2018/TCS-4339

Supported by: Comunidad de Madrid

Period: 01/01/2022 - 30/04/2023

Modelado formal y métodos avanzados de testing. Aplicaciones a medicina y sistemas computacionales (FAME)

Reference: RTI2018-093608-B-C31

Supported by: Ministry of Science, Innovation and Universities

Period: 01/01/2019 - 30/06/2022

FORmal models and Technologies for Emerging applications (FORTE-CM)

Reference: P2018/TCS-4314

Supported by: Comunidad de Madrid

Period: 01/01/2019 - 21/10/2021

Desarrollo y Análisis formal de sistemas complejos en contextos DistribuidOS: fundamentos, herramientas y aplicaciones (DARDOS)

Reference: TIN2015-65845-C3-1-R

Supported by: Ministry of Economy and Competitiveness

Period: 01/01/2016 - 31/12/2019

Desarrollo de sistemas confiables mediante modelos y herramientas avanzadas (SICOMORo-CM)

Reference: S2013/ICE-3006

Supported by: Comunidad de Madrid

Period: 01/10/2014 - 31/12/2018

Especificación y Testing de Sistemas Altamente Distribuidos (ESTUDIO)

Reference: TIN2012-36812-C02-01

Supported by: Ministry of Economy and Competitiveness

Period: 01/01/2013 - 31/12/2015

Advanced methodologies and tools for testing and services (TESIS)

Reference: TIN2009-14312-C02-01

Supported by: Ministry of Science and Innovation

Period: 01/10/2011 - 15/07/2013

Diseño e implantación de una arquitectura jerárquica de cachés para E/S de altas prestaciones

Reference: CCG10-UC3M/HUM-4947

Supported by: Comunidad de Madrid - UC3M

Period: 01/01/2011 - 31/12/2011

Técnicas escalables de entrada/salida en entornos distribuidos y de computación de altas prestaciones

Reference: TIN2010-16497

Supported by: Ministry of Science and Innovation

Period: 01/01/2011 - 30/09/2011

Scalable and robust architectures for supporting advanced network services

Reference: HI2008-0070

Supported by: Ministry of Science and Innovation

Period: 01/01/2009 - 31/12/2010

CP08: Computación de altas prestaciones en entornos de computación voluntaria

Reference: CCG08-UC3M/TIC-4059

Supported by: Comunidad de Madrid - UC3M

Period: 01/01/2009 - 31/12/2009

Sistema de bases de datos de tecnologías para el proyecto ETAP GLOBAL SYSTEM STUDY FASE II (GSS)

Reference: D8404768R (Art. 83)

Supported by: EADS CONSTRUCCIONES AERONAUTICAS S. A. U.

Period: 28/05/2008 - 27/11/2009

Nuevas técnicas de almacenamiento escalable en computación de altas prestaciones

Reference: TIN2007-63092

Supported by: Ministry of Education and Science

Period: 01/10/2007 - 30/09/2010

CP07: Sistema escalable de gestión de entrada/salida

Reference: CCG07-UC3M/TIC-3277

Supported by: Comunidad de Madrid - UC3M

Period: 01/01/2008 - 31/12/2008

CP06: Técnicas de optimización de la entrada/salida en aplicaciones para entornos de computación en altas prestaciones

Reference: CCG06-UC3M/TIC-0693

Supported by: Comunidad de Madrid - UC3M

Period: 01/01/2007 - 31/12/2007

Almacenamiento de altas prestaciones en Entornos GRID

Reference: TIN2004-02156

Supported by: Ministry of Education and Science

Period: 13/12/2004 - 12/12/2007

Ph.D. Student Supervision

Former students

- Adrián Bernal Bermejo, “Optimización y dimensionamiento de los sistemas de computación en la nube mediante técnicas de modelado y transformación”, Castilla-La Mancha University, Spain, 2022. Co-supervising with Dr. María Emilia Cambronero Piqueras.
- Pablo Cerro Cañizares, “Modelling and validation of cloud systems using model driven engineering, metamorphic and mutation testing”, Complutense University of Madrid, Spain, 2020. Co-supervising with Dr. Juan de Lara.
 - Premio extraordinario de doctorado 2021. ([Link](#))
 - Premio SISTEDES 2022 a la mejor tesis doctoral. ([Link](#))
- Carlos Delfín Camacho González, “Modelando la variabilidad: Métodos formales para la representación de líneas de productos de software”, Complutense University of Madrid, Spain, 2017. Co-supervising with Dr. Luis Llana Díaz.
- Gabriel González Castañé, “New simulation techniques for energy aware cloud computing environments”, Carlos III University of Madrid, Spain, 2015. Co-supervised with Prof. Jesús Carretero Pérez.

Research stay

EPCC, Edinburgh (UK)

Description: Research stay at Edinburgh Parallel Computing Centre (EPCC), University of Edinburgh.

Period: Jul/23/2018 - Aug/10/2018.

IBM, San Jose, California (USA)

Description: Internship at IBM Almaden Research Center, Storage department.

Period: June 2009 to September 2009

HLRS, Stuttgart, Germany

Description: The visit is funded by the HPC-Europa project, supported by the European Commission. The purpose of the visit is to carry out work on the project entitled “New strategies for Characterizing and Improving High Performance I/O Architectures” at the host department “Applications, Model Tools” of Alexander Schulz, for which High-Performance Computing (HPC) resources at HLRS would be used.

Period: July 2008 to October 2008

Patents

US 8,989,507 B2. Mario Blaum, Alberto Núñez and Steven R. Hetzler. *Bitmap compression for fast searches and updates*. March 24, 2015.

Periods of 6 years for research (sexenios)

Two periods of 6 years on research work (sexenios) recognized by the Ministry of Education and Science.

Scientific community participation

Conference Activities

- Track chair, 30th Annual ACM Symposium On Applied Computing (SAC), Track on Service-Oriented Architectures and Programming (SOAP'15).
- Special Session and Workshops chair, 7th International Conference on Computational Collective Intelligence Technologies and Applications (ICCCI'15).
- Organisation committee member, 20th International Workshop on Formal Methods for Industrial Critical Systems (FMICS'15).
- Organisation committee member, 26th IFIP International Conference on Testing Software and Systems (ICTSS'14).
- Organisation committee member, 11th International Conference on Software Engineering and Formal Methods (SEFM'13).

Program Committee member

- MET, International Workshop on Metamorphic Testing.
 - 2016, 2017, 2018, 2019, 2020, 2021, 2022 and 2023.
- MiDOS: Annual ACM Symposium On Applied Computing (SAC), Track on Microservices, DevOps, and Service-Oriented Architecture.
 - 2019.
- GECON: Conference on the Economics of Grids, Clouds, Systems, and Services.
 - 2019, 2020 and 2021.
- SAC-SOAP, Annual ACM Symposium On Applied Computing (SAC), Track on Service-Oriented Architectures and Programming.
 - 2016, 2017 and 2018.
- ICCCI, International Conference on Computational Collective Intelligence Technologies and Applications.
 - 2012, 2013, 2014, 2016, 2017, 2018, 2019, 2020, 2021, 2022 and 2023.
- ACIIDS, Asian Conference on Intelligent Information and Database Systems.
 - 2016, 2017, 2018, 2019, 2020, 2021, 2022 and 2023.
- IWANN, International Work-Conference on Artificial Neural Networks.
 - 2015, 2017, 2019, 2021 and 2023.
- SITIS, International Conference on Signal Image Technology & Internet Based Systems.
 - 2013, 2014 and 2015.
- ISTA, International Symposium on Intelligent Systems Technologies and Applications.
 - 2015 and 2016.
- C4BB4C, International Workshop on Clouds for Business and Business for Clouds.
 - 2012.

Reviewer for Conferences

- A-MOST'13, 9th Workshop on Advances in Model Based Testing.
- QSIC'13, 13th International Conference on Quality Software.

- Euro-par'11, 17th International European Conference on Parallel and Distributed Computing.
- ISCC'07, 12th IEEE Symposium on Computers and Communications.

Reviewer for Journals

- Journal of Systems and Software.
- Journal of Information and Software Technology.
- Journal of Supercomputing.
- Journal of Simulation Modelling Practice and Theory.
- Journal of Zhejiang University-SCIENCE A.

Teaching Experience

Taught courses at Complutense University of Madrid (2011 - Present)

- Formal methods in testing.
 - Academic years: 19/20.
- Web Applications.
 - Academic years: 16/17.
- Corporative software.
 - Academic years: 15/16.
- Programming (Java).
 - Academic years: 14/15, 15/16, 18/19, 19/20, 20/21, 21/22 and 22/23.
- Software tools for online gambling.
 - Academic years: 14/15, 15/16, 16/17, 17/18, 18/19, 19/20, 21/22, 22/23, 23/24 and 24/25.
- Fundamentals of Programming (C++).
 - Academic years: 13/14, 15/16, 16/17, 17/18, 18/19, 20/21 and 23/24.
- Programming of Distributed Systems.
 - Academic years: 12/13, 16/17, 17/18, 18/19, 19/20, 20/21, 21/22, 22/23, 23/24 and 24/25.
- Computer graphics II.
 - Academic years: 24/25.
- Data Bases.
 - Academic years: 12/13, 13/14, 14/15 and 16/17.
- Introduction to programming (Python).
 - Academic years: 11/12, 12/13, 13/14, 14/15 and 18/19.
- Discrete Mathematics.
 - Academic years: 11/12.

Teaching at Carlos III University of Madrid (2005-2011)

- Computer Architecture.
 - Academic years: 08/09, 09/10 and 10/11.
- Introduction to Operating Systems.

- Academic years: 05/06, 06/07, 07/08 and 08/09.
- Distributed Systems.
 - Academic years: 05/06.
- Operating System Design.
 - Academic years: 05/06, 06/07 and 07/08.

Periods of 5 years for teaching (quinquenios)

Three periods of 5 years on teaching (quinquenios) recognized by Complutense University of Madrid.

Master & Graduate Student Supervision

MSc Thesis

- Miguel Pérez de la Rubia, “Improving cloud architectures using Metamorphic Testing and Multi-Objective optimization techniques”, Complutense University of Madrid, Spain, 2023.
- Adrián Bernal Bermejo, “Modelado de Sistemas Cloud Computing usando Perfiles de UML y Técnicas de Transformación M2T”, Castilla - La Mancha University, Spain, 2019.
- Pablo C. Cañizares, “MuTomVo: Mutation Testing framework for omnet-based simulated environments”, Complutense University of Madrid, Spain, 2015.
- Gabriel González Castañé, “New Contributions for Modeling and Simulating Cloud Computing Environments”, Carlos III University of Madrid, Spain, 2011.

BSc Thesis

- I have supervised a total of 17 BSc students from 2006

Teaching innovation projects

2019/2020 - Performance analysis of MPI applications executed on Raspberries Pi3 clusters.

Role: Project leader.

2018/2019 - Executing MPI applications in simulated environments to analyze the overall performance of distributed architectures.

Role: Project leader.

2017/2018 - Design and deployment of a Raspberry Pi3 cluster for executing the exercises of PSD.

Role: Project leader.

2016/2017 - Using simulation tools for teaching distributed systems: exercises for modelling highly distributed systems.

Role: Project leader.

2013/2014 - Extensions of the FLOP system: interface teacher/student, expansion of the data base.

Role: Collaborator.

2008/2009 - Adapting first grade courses in Telecommunications and Industrial Engineering.

Role: Collaborator.

2005/2006 - Platform for interactive exercises of distributed systems.

Role: Collaborator.

Scholarships

Scholarship for Doctors trainee program in computer science department, computer architecture, communications and systems group. This scholarship is supported by the Carlos III University of Madrid and cover the academic year 2005/2006.

Scholarship for collaborating in the computer science department in the academic year 2004/2005. This scholarship is supported by the Spanish Ministry of education and science.

January 14, 2026