

Jónathan Heras

Curriculum Vitae

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Education and Qualifications

2007	BSc on Mathematics	University of La Rioja (Spain)
2007	BSc on Computer Science	University of La Rioja (Spain)
2008	MSc on Mathematics	University of Zaragoza (Spain)
2011	PhD on Mathematics/Computer Science	University of La Rioja (Spain)

Positions

September 2015 - Present	Lecturer at the Department of Mathematics and Computer Science, University of La Rioja.
October 2015 - December 2015	Software Developer at the company Formavolución.
August 2014 - September 2015	Postdoctoral Research Assistant at the Department of Mathematics and Computer Science, University of La Rioja. PI: César Domínguez.
August 2012 - June 2014	Postdoctoral Research Assistant at the School of Computing, University of Dundee. PI: E. Komendanskaya.
January 2012 - July 2012	Postdoctoral Research Assistant at the Department of Mathematics and Computer Science, University of La Rioja. PI: Thierry Coquand.
September 2008 - December 2011	PhD scholarship at the Department of Mathematics and Computer Science, University of La Rioja.
September 2007 - August 2008	Research Assistant at the Department of Mathematics and Computer Science, University of La Rioja. PI: Julio Rubio.

Publications

Journal papers

1. A. Del Canto Romero, A. Sanz-Saez, K. D. Health, M. A. Grillo, J. Heras, and M. Lacuesta (2024). Conventional management has a greater negative impact on Phaseolus vulgaris L. rhizobia diversity and abundance than water scarcity. *Frontiers in Plant Science* **15**, 1–16. doi: [10.3389/fpls.2024.1408125](https://doi.org/10.3389/fpls.2024.1408125).
2. A. Inés, C. Domínguez, J. Heras, G. Mata, and J. Rubio (2024). A Topological Approach for Semi-Supervised Learning. *Journal of Computational Science* **82**(102403), 1–9. doi: [10.1016/j.jocs.2024.102403](https://doi.org/10.1016/j.jocs.2024.102403).
3. M. Boisseaux, D. Nemetschek, C. Baraloto, B. Burban, A. Casado-Garcia, J. Cazal, J. Clement, G. Derroire, C. Fortunel, J.-Y. Goret, J. Heras, G. Jaouen, I. Maréchaux, C. Scoffoni, G. Vieilledent, J. Vleminckx, S. Coste, H. Schimann, and C. Stahl (2024). Shifting trait coordination along a soil-moisture-nutrient gradient in tropical forests. *Functional Ecology*.
4. M. San Martín, S. G. Seibane, J. Heras, and G. Mata (2024). Is ASR the right tool for the construction of Spoken Corpus Linguistics in European Spanish? *Revista Procesamiento del Lenguaje Natural* **73**, 165–176. doi: [10.26342/2024-73-12](https://doi.org/10.26342/2024-73-12).
5. P. Ascorbe, M. S. Campos, C. Domínguez, J. Heras, M. Pérez, and A. R. Terroba-Reinares (2024b). Automatic and Manual Evaluation of a Spanish Suicide Information Chatbot. *Revista Procesamiento del Lenguaje Natural* **73**, 151–164. doi: [10.26342/2024-73-11](https://doi.org/10.26342/2024-73-11).
6. A. Inés, A. Díaz-Pinto, C. Domínguez, J. Heras, E. Mata, and V. Pascual (2023). Analysing Semi-Supervised Learning for Image Classification using Compact Networks in the BioMedical Context. *Soft Computing*. doi: [10.1007/s00500-023-09109-5](https://doi.org/10.1007/s00500-023-09109-5).

7. C. de Vente et al. (2023). AIROGS: Artificial Intelligence for RObust Glaucoma Screening Challenge. *IEEE Transactions on Medical Imaging* **46**(1), 542–557. doi: 10.1109/TMI.2023.3313786.
8. C. Domínguez, J. Heras, E. Mata, V. Pascual, L. Fernández-Cedrón, M. Martínez-Lanchares, J. Pellejero-Espinosa, A. Rubio-Loscertales, and C. Tarragona-Perez (2023). Semi-Supervised Semantic Segmentation for Identification of Irrelevant Objects in a Waste Recycling Plant. *Journal of Universal Computer Science* **29**(5), 419–431. doi: 10.3897/jucs.87643.
9. C. Domínguez, J. Heras, E. Mata, V. Pascual, D. Royo, and M. A. Zapata (2023). Binary and Multi-Class Automated Detection of Age-Related Macular Degeneration using Convolutional- and Transformer-based Architectures. *Computer Methods and Programs in Biomedicine* **229**(107302). doi: 10.1016/j.cmpb.2022.107302.
10. H. Castro-Abril, J. Heras, J. del Barrio, L. Paz, C. Alcaine, M. Pérez-Aliácar, D. Garzón-Alvarado, M. Doblaré, and I. Ochoa (2023). The Role of Mechanical Properties and Structure of Type I Collagen Hydrogels on Colorectal Cancer Cell Migration. *Macro-Molecular Bioscience*. doi: 10.1002/mabi.202300108.
11. K. Sun, T. Patel, S.-G. Kang, A. Yarahmady, M. Srinivasan, O. Julien, J. Heras, and S.-A. Mok (2023). Disease associated mutations in tau encode for changes in aggregate structure conformation. *ACS Chemical Neuroscience* **2023**(14), 4282–4297.
12. M. García-Domínguez, C. Domínguez, J. Heras, E. Mata, and V. Pascual (2023). Deep Style Transfer to Deal with the Domain Shift Problem on Spheroid Segmentation. *NeuroComputing* **569**(127105). doi: 10.1016/j.neucom.2023.127105.
13. M. P. Agustín-Llach, J. Heras, G. Mata, and J. Rubio (2023). La perplejidad como herramienta para estimar la asignación de nivel de competencia en escritos de una lengua extranjera. *Revista Procesamiento del Lenguaje Natural* **71**, 29–38. doi: 10.26342/2023-71-2.
14. N. Ghassemia, A. Shoeibi, M. Khodatars, J. Heras, A. Rahimi, A. Zare, Y.-D. Zhang, R. B. Pachori, and J. M. Gorriz (2023). Automatic Diagnosis of COVID-19 from CT Images using CycleGAN and Transfer Learning. *Applied Soft Computing* **144**(110511). doi: 10.1016/j.asoc.2023.110511.
15. A. Casado-García, J. Heras, A. Milella, and R. Marani (2022). Semi-Supervised Deep Learning and Low-Cost Cameras for the Semantic Segmentation of Natural Images in Viticulture. *Precision Agriculture*. doi: 10.1007/s11119-022-09929-9.
16. C. Romera Castillo, J. Heras, M. Álvarez, X. A. Álvarez Salgado, G. Mata, and E. Sáenz-de-Cabezón (2022). Application of multi-regression machine learning algorithms to solve ocean water mass mixing in the Atlantic Ocean. *Frontiers in Marine Science*. doi: 10.3389/fmars.2022.904492.
17. G. Cicirelli, R. Marani, L. Romeo, M. García-Domínguez, J. Heras, A. G. Perri, and T. D’Orazio (2022). The HA4M dataset: Multi-Modal Monitoring of an assembly task for Human Action recognition in Manufacturing. *Scientific Data* **9**(745). doi: 10.1038/s41597-022-01843-z.
18. G. Santamaría, T. Cascudo, C. Domínguez, J. Heras, E. Mata, V. Pascual, and M. Villota (2022). Digitalización del libro “La música en la Catedral de Santo Domingo de la Calzada”. *Zubía* **40**(13–30).
19. A. Inés, C. Domínguez, J. Heras, E. Mata, and V. Pascual (2021a). Biomedical image classification made easier thanks to transfer and semi-supervised learning. *Computer Methods and Programs in Biomedicine* **198**, 105782. doi: 10.1016/j.cmpb.2020.105782.
20. A. Shoeibi, M. Khodatars, M. Jafari, P. Moridian, M. Rezaei, R. Alizadehsani, F. Khozeimeh, J. M. Gorriz, J. Heras, M. Panahiazar, S. Nahavandi, and U. R. Acharya (2021). Applications of Deep Learning Techniques for Automated Multiple Sclerosis Detection Using Magnetic Resonance Imaging: A Review. *Computers in Biology and Medicine* **136**, 104697. doi: 10.1016/j.combiomed.2021.104697.
21. A. Shoeibi, D. Sadegui, P. Moridian, N. Ghassemi, J. Heras, R. Alizadehsani, A. Khadem, Y. Kong, S. Nahavandi, Y.-D. Zhang, and J. M. Gorriz (2021). Automatic Diagnosis of Schizophrenia using EEG Signals and CNN-LSTM Models. *Frontiers in Neuroinformatics* **15**(777977). doi: 10.3389/fninf.2021.777977.

22. D. Lacalle, H. A. Castro-Abril, C. Domínguez, J. Heras, E. Mata, G. Mata, Y. Méndez, V. Pascual, I. Ochoa, and T. Randelovic (2021). SpheroidJ: An Open-Source Set of Tools for Spheroid Segmentation. *To be published in Computer Methods and Programs in Biomedicine*. doi: 10.1016/j.cmpb.2020.105837.
23. E. Paluzo-Hidalgo, R. Gonzalez-Diaz, M. A. Gutiérrez-Naranjo, and J. Heras (2021a). Optimizing the Simplicial-Map Neural Network Architecture. *Journal of Imaging* 7(9), 173. doi: 10.3390/jimaging7090173.
24. E. Paluzo-Hidalgo, R. Gonzalez-Diaz, M. A. Gutiérrez-Naranjo, and J. Heras (2021b). Simplicial-map neural networks robust to adversarial examples. *Mathematics* 9(2), 169. doi: 10.3390/math9020169.
25. M. García-Domínguez, C. Domínguez, J. Heras, E. Mata, and V. Pascual (2021). UFOD: An AutoML Framework for the Construction, Comparison, and Combination of Object Detection Models. *Pattern Recognition Letters* 145, 135–140. doi: 10.1016/j.patrec.2021.01.022.
26. Á. Casado-García, G. Chichón, C. Domínguez, M. García-Domínguez, J. Heras, A. Inés, M. López, E. Mata, V. Pascual, and Y. Sáenz (2021b). MotilityJ: An Open-Source Tool for the Classification and Segmentation of Bacteria on Motility Images. *Computers in Biology and Medicine* 136, 104673. doi: 10.1016/j.combiomed.2021.104673.
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28. M. García-Domínguez, C. Domínguez, J. Heras, E. Mata, and V. Pascual (2020a). FrImCla: A Framework for Image Classification using Traditional and Transfer Learning Techniques. *IEEE Access* 8(1), 53443–53455. doi: 10.1109/ACCESS.2020.2980798.
29. Á. Casado-García, A. del Canto Romero, U. P.-L. A. Sanz-Saez, A. Bilbao-Kareaga, F. Fritsch, J. Miranda-Apodaca, A. Muñoz-Rueda, A. Sillero-Martínez, A. Yoldi-Achalandabaso, M. Lacuesta, and J. Heras (2020). LabelStoma: A Tool for Stomata Detection based on the YOLO algorithm. *Computers and Electronics in Agriculture* 178, 105751. doi: 10.1016/j.compag.2020.105751.
30. A. Casado-García, C. Domínguez, M. García-Domínguez, J. Heras, A. Inés, E. Mata, and V. Pascual (2019). CLoDSA: A Tool for Augmentation in Classification, Localization, Detection, Semantic Segmentation and Instance Segmentation Tasks. *BMC Bioinformatics* 20(323). doi: 10.1186/s12859-019-2931-1.
31. A. Inés, C. Domínguez, J. Heras, E. Mata, and V. Pascual (2019a). DeepClas4Bio: Connecting Bioimaging Tools with Deep Learning Frameworks for Image Classification. *Computers in Biology and Medicine* 108, 49–56. doi: 10.1016/j.combiomed.2019.03.026.
32. C. Domínguez, J. López-Cuadrado, A. Armendariz, A. Jaime, J. Heras, and T. A. Pérez (2019). Exploring the differences between low-stakes proctored and unproctored language testing using an Internet-based application. *Computer Assisted Language Learning* 32(5–6), 483–509. doi: 10.1080/09588221.2018.1527360.
33. J. M. Blanco, C. Domínguez, A. Sánchez, A. Jaime, and J. Heras (2019). Managing Telecollaboration among Engineering Students and Faculty: A Case Study from Two Spanish Universities. *International Journal of Engineering Education* 35(1(A)), 273–285.
34. M. Arredondo-Santoyo, C. Domínguez, J. Heras, E. Mata, V. Pascual, S. Vázquez-Garcidueñas, and G. Vázquez-Marrufo (2019). Automatic Characterisation of Dye Decolorisation in Fungal Strains using Expert, Traditional, and Deep Features. *Soft Computing* 23(23), 12799–12812. doi: 10.1007/s00500-019-03832-8.
35. C. Domínguez, J. Heras, E. Mata, and V. Pascual (2018). DecoFungi: A web application for automatic characterisation of dye decolorisation in fungal strains. *BMC Bioinformatics* 19(66). doi: 10.1186/s12859-018-2082-9.
36. C. Domínguez, A. Jaime, F. García, and J. Heras (2018). The effects of adding non-compulsory exercises to an online learning tool on student performance and code copying. *ACM Transactions on Computing Education* 19(3). doi: 10.1145/3264507.

37. C. A. Alonso, C. Domínguez, J. Heras, E. Mata, V. Pascual, C. Torres, and M. Zarazaga (2017). An-tibiogramJ: a Tool for Analysing Images from Disk Diffusion Tests. *Computer Methods and Programs in Biomedicine* **143**, 159–169. doi: [10.1016/j.cmpb.2017.03.010](https://doi.org/10.1016/j.cmpb.2017.03.010).
38. C. Domínguez, J. Heras, E. Mata, V. Pascual, S. Vázquez-Garcidueñas, and G. Vázquez-Marrufo (2017). Extending GelJ for Interoperability: Filling the Gap in the Bioinformatics Resources for Population Genetics Analysis with Dominant Markers. *Computer Methods and Programs in Biomedicine* **140**, 69–76. doi: [10.1016/j.cmpb.2016.12.001](https://doi.org/10.1016/j.cmpb.2016.12.001).
39. C. Domínguez, J. Heras, and V. Pascual (2017). IJ-OpenCV: Combining ImageJ and OpenCV for Processing Images in Biomedicine. *Computer in Biology and Medicine* **84**, 189–194. doi: [10.1016/j.combiom.2017.03.027](https://doi.org/10.1016/j.combiom.2017.03.027).
40. G. Mata, G. Cuesto, J. Heras, M. Morales, A. Romero, and J. Rubio (2017). SynapCountJ: A Vali-dated Tool for Analyzing Synaptic Densities in Neurons. *Communications in Computer and Infor-mation Science* **690**, 41–55. doi: [10.1007/978-3-319-54717-6_3](https://doi.org/10.1007/978-3-319-54717-6_3).
41. A. Jaime, J. M. Blanco, C. Domínguez, A. Sánchez, J. Heras, and I. Usandizaga (2016). Spiral and Project Based Learning with Peer-Assessment in a Computer Science Project Management Course. *Journal of Science Education and Technology* **25**(3), 439–449. doi: [10.1007/s10956-016-9604-x](https://doi.org/10.1007/s10956-016-9604-x).
42. A. Jaime, A. Sánchez, C. Domínguez, J. Olarte, F. García-Izquierdo, and J. Heras (2016). El grupo de investigación en educación superior en informática de La Rioja y País Vasco: telecolaboración, PBL, valoración por pares y proyectos fin de carrera. *ReVisión* **9**(2), 17–26.
43. C. Domínguez, A. Jaime, A. Sánchez, J. M. Blanco, and J. Heras (2016). A comparative analysis of the consistency and difference among online self-, peer-, external- and instructor-assessments: the competitive effect. *Computers in Human Behavior* **60**, 112–120. doi: [10.1016/j.chb.2016.02.061](https://doi.org/10.1016/j.chb.2016.02.061).
44. J. Heras, C. Domínguez, E. Mata, and V. Pascual (2015). Surveying and Benchmarking Techniques to Analyse DNA Gel Fingerprint Images. *Briefings in Bioinformatics* **17**(6), 912–925. doi: [10.1093/bib/bbv102](https://doi.org/10.1093/bib/bbv102).
45. J. Heras, C. Domínguez, E. Mata, V. Pascual, C. Lozano, C. Torres, and M. Zarazaga (2015a). A Survey of Tools for Analysing DNA Fingerprints. *Briefings in Bioinformatics* **17**(6), 903–911. doi: [10.1093/bib/bbv016](https://doi.org/10.1093/bib/bbv016).
46. J. Heras, C. Domínguez, E. Mata, V. Pascual, C. Lozano, C. Torres, and M. Zarazaga (2015b). GelJ — a Tool for Analyzing DNA Fingerprint Gel Images. *BMC Bioinformatics* **16**(270). doi: [10.1186/s12859-015-0703-0](https://doi.org/10.1186/s12859-015-0703-0).
47. J. Heras, F. Martín-Mateos, and V. Pascual (2015). Modelling Algebraic Structures and Morphisms in ACL2. *Applicable Algebra in Engineering, Communication and Computing* **26**(3), 277–303. doi: [10.1007/s00200-015-0252-9](https://doi.org/10.1007/s00200-015-0252-9).
48. A. Romero, J. Heras, G. Mata, M. Morales, and J. Rubio (2014). Procesamiento Topo-Geométrico de Imágenes Neuronales. *Gaceta de la RSME* **17**(1), 109–128.
49. E. Komendantskaya, M. Schmidt, and J. Heras (2014). Exploiting Parallelism in Coalgebraic Logic Programming. *Electronic Notes in Theoretical Computer Science* **303**, 121–148. doi: [10.1016/j.entcs.2014.02.007](https://doi.org/10.1016/j.entcs.2014.02.007).
50. J. Heras and E. Komendantskaya (2014). Recycling Proof Patterns in Coq: Case Studies. *Mathe-matics in Computer Science* **8**(1), 99–116. doi: [10.1007/s11786-014-0173-1](https://doi.org/10.1007/s11786-014-0173-1).
51. M. Poza, C. Domínguez, J. Heras, and J. Rubio (2014a). A certified reduction strategy for homo-logical image processing. *ACM Transactions on Computational Logic* **15**(3). doi: [10.1145/2630789](https://doi.org/10.1145/2630789).
52. E. Komendantskaya, J. Heras, and G. Grov (2013). Machine learning in Proof General: interfacing interfaces. *Electronic Proceedings in Theoretical Computer Science* **118**, 15–42.
53. J. Heras, T. Coquand, A. Mörtberg, and V. Siles (2013). Computing Persistent Homology within Coq/SSReflect. *ACM Transactions on Computational Logic* **14**(4). doi: [10.1145/2528929](https://doi.org/10.1145/2528929).
54. J. Heras (2011a). Mathematical Knowledge Management in Algebraic Topology. *ACM Communi-cations in Computer Algebra* **45** (3/4), 236–237. doi: [10.1145/2110170.2110187](https://doi.org/10.1145/2110170.2110187).

55. J. Heras, G. Mata, M. Poza, and J. Rubio (2011b). On automation and certification of a homological method to process biomedical digital images. *Imagen-A* **4**, 29–31.
56. J. Heras, V. Pascual, J. Rubio, and F. Sergeraert (2011a). *fKenzo*: A user interface for computations in Algebraic Topology. *Journal of Symbolic Computation* **46**, 685–698. doi: 10.1016/j.jsc.2011.01.005.
57. J. Heras, V. Pascual, J. Rubio, and F. Sergeraert (2011b). *fKenzo*: Una interfaz de usuario para realizar cálculos en topología algebraica. *Gaceta de la RSME* **14**, 295–308.

Book chapters

1. J. Heras and V. Pascual (2010b). “Mediated Access To Symbolic Computation Systems: An OpenMath Approach”. In: *Contribuciones científicas en honor de Mirian Andrés Gómez*. Ed. by L. Lambán, A. Romero, and J. Rubio. Universidad de La Rioja, pp.85–105.

Papers in conference proceedings

1. A. Casado-García, J. Heras, R. Marani, and A. Milella (2024). Taking Advantage of Depth Information for Semantic Segmentation in Field-Measured Vineyards. In: *Proceedings of the Conferencia de la Asociación Española para la Inteligencia Artificial (CAEPIA'24)*. Vol. 14640. Lecture Notes in Artificial Intelligence, pp.1–8. doi: 10.1007/978-3-031-62799-6_1.
2. A. Casado-García, J. Heras, M. Ortega, and L. Ramos (2024). Deep Learning Models for Justified Referral in AI Glaucoma Screening. In: *Proceedings of the 21st IEEE International Symposium on Biomedical Imaging (ISBI 2024)*.
3. A. Inés, C. Domínguez, J. Heras, E. Mata, and V. Pascual (2024). Semi-supervised learning methods for Semantic Segmentation of Polyps. In: *Proceedings of the Conferencia de la Asociación Española para la Inteligencia Artificial (CAEPIA'24)*. Vol. 14640. Lecture Notes in Artificial Intelligence, pp.162–172. doi: 10.1007/978-3-031-62799-6_17.
4. C. Domínguez, J. Heras, E. Mata, V. Pascual, I. García-Chamorro, and R. Macía-Núñez (2024). Breast Cancer Detection by Fusing Thermal Images and Clinical Features. In: *Proceedings of the I Workshop de la Sociedad Española de Inteligencia Artificial en Biomedicina (IABimed)*.
5. J. Heras (2024). Semi-Supervised Learning for Myopic Maculopathy. In: *Proceedings of the Myopic Maculopathy Analysis Challenge 2023 co-located with 26th International Conference on Medical Image Computing and Computer Assisted Intervention*. Vol. 14563. Lecture Notes in Computer Science, pp.1–8. doi: 10.1007/978-3-031-54857-4_7.
6. L. Campillo-Llanos, A. R. Terroba, R. Bartolomé, A. Valverde-Mateos, C. González, A. Caplonch-Carrión, and J. Heras (2024). Replace, Paraphrase or Fine-tune? Evaluating Automatic Simplification for Medical Texts in Spanish. In: *Proceedings of the 2024 Joint International Conference on Computational Linguistics, Language Resources and Evaluation*.
7. M. García-Domínguez, J. Heras, R. Marani, and T. D'Orazio (2024). Multi-class and Multi-label Classification of an Assembly Task in Manufacturing. In: *Proceedings of the Conferencia de la Asociación Española para la Inteligencia Artificial (CAEPIA'24)*. Vol. 14640. Lecture Notes in Artificial Intelligence, pp.204–212. doi: 10.1007/978-3-031-62799-6_21.
8. M. Villota, J. Ayensa-Jiménez, M. Doblaré, and J. Heras (2024). Image Processing and Deep Learning Methods for the Semantic Segmentation of Blastocyst Structures. In: *Proceedings of the Conferencia de la Asociación Española para la Inteligencia Artificial (CAEPIA'24)*. Vol. 14640. Lecture Notes in Artificial Intelligence, pp.213–222. doi: 10.1007/978-3-031-62799-6_22.
9. P. Ascorbe, M. S. Campos, C. Domínguez, J. Heras, M. Pérez, and A. R. Terroba-Reinares (2024a). An Architecture Towards Building a Reliable Suicide Information Chatbot. In: *Proceedings of the Conferencia de la Asociación Española para la Inteligencia Artificial (CAEPIA'24)*. Vol. 14640. Lecture Notes in Artificial Intelligence, pp.29–39. doi: 10.1007/978-3-031-62799-6_4.
10. A. Casado-García, J. Heras, R. Marani, and A. Milella (2023). Generalization of deep learning models to the semantic segmentation of natural images in vineyards. In: *Proceedings of the 14th European Conference on Precision Agriculture (ECPA 2023)*.

11. C. Domínguez, J. Heras, F. Lanas, G. Mata, J. Rubio, and M. S. Martín (2023). Improving Accessibility in Public Web Pages. In: *Proceedings of the Annual Conference of the Spanish Association for Natural Language Processing 2023: Projects and System Demonstrations (SEPLN-PD 2023) co-located with the International Conference of the Spanish Society for Natural Language Processing (SEPLN 2023)*. Vol. 3516. CEUR Workshop proceedings, pp.21–25.
12. J. Heras (2023). Two-stage Fine-Tuning for Automatic Identification of Sections in Clinical Documents. In: *Proceedings of the Iberian Languages Evaluation Forum (IberLEF 2023)*. Vol. 3496.
13. M. P. Agustín, J. Heras, and G. Mata (2023). Herramientas de redes complejas y de aprendizaje profundo para el análisis de la disponibilidad léxica. In: *Proceedings of the 33º Congreso Internacional de la Asociación para la Enseñanza del Español como Lengua Extranjera*.
14. M. San Martín, J. Heras, and G. Mata (2023). Automatic Generation of Subtitles for Videos of the Government of La Rioja. In: *Proceedings of the International Conference in Optimization and Learning (OLA2023)*. Vol. 1824. Communications in Computer and Information Science, pp.393–402. doi: 10 . 1007/978-3-031-34020-8_30.
15. M. Villota, J. Ayensa, M. Doblaré, and J. Heras (2023). Segmentation of the blastocyst structures using Image Processing and Machine Learning tools. In: *Proceedings of the Seventeenth International Conference on Civil, Structural and Environmental Engineering Computing*.
16. P. Ascorbe, M. S. Campos, C. Domínguez, J. Heras, and A. R. Terroba-Reinares (2023a). prevenIA: a Chatbot for Information and Prevention of Suicide and other Mental Health Disorders. In: *Proceedings of the Annual Conference of the Spanish Association for Natural Language Processing 2023: Projects and System Demonstrations (SEPLN-PD 2023) co-located with the International Conference of the Spanish Society for Natural Language Processing (SEPLN 2023)*. Vol. 3516. CEUR Workshop proceedings, pp.26–30.
17. P. Ascorbe, M. S. Campos, C. Domínguez, J. Heras, and A. R. Terroba-Reinares (2023b). Towards a Retrieval Augmented Generation System for Information on Suicide Prevention. In: *Proceedings of the 2023 IEEE EMBS Special Topic Conference on Data Science and Engineering in Healthcare, Medicine and Biology*, pp.143–144.
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PhD thesis

1. J. Heras (2011b). “Mathematical Knowledge Management in Algebraic Topology”. PhD thesis. University of La Rioja.

Book editing

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Participation in Grants

1. *LSEAvatar*. Funded by Indra y Fundación Universia. PI: Jónathan Heras. 2024–2025.
2. *SegDAn: Motor para la segmentación semántica, la segmentación de instancias y la detección de anomalías en imágenes como soporte para la transformación digital de la industria*. Funded by Agencia de Desarrollo Económico de La Rioja. PI: César Domínguez. 2024–2026.
3. *Systematic manipulation of tau protein aggregation: bridging biochemical and pathological properties*. Funded by Canadian Institutes of Health Research. PI: Sue-Ann Mok. 2023–2028.
4. *Inteligencia artificial para el procesamiento de imágenes y textos: aplicaciones para el bien social*. Funded by Gobierno de La Rioja. PI: Gadea Mata. 2024–2026.
5. *Aspectos Matemáticos Del Procesamiento De Imágenes Biomedicas: Metodos Topológicos Y De Ciencia De Datos*. Funded by Ministerio de Ciencia e Innovación. PIs: C. Domínguez and V. Pascual. 2021–2024.
6. *HOLMS: Técnicas Avanzadas de Análisis de Imágenes para Categorización y Extracción de Información en Documentos*. Funded by Ministerio de Ciencia, Innovación y Universidades. PI: C. Domínguez. 2018–2021.
7. *Álgebra Computacional: formalización y aplicaciones a la fiabilidad de redes y al procesamiento de imágenes biomédicas*. Funded by Ministerio de Economía y Competitividad. PIs: E. Sáenz-de-Cabezón and V. Pascual. 2018–2020.
8. *CLODE: motor para la clasificación, localización y detección de objetos en imágenes y vídeos para la Industria 4.0*. Funded by an ADER grant. PI: César Domínguez. 2018–2020.
9. *Formalization of Mathematics: applications to symbolic computation and computer algebra*. Funded by Ministerio de Economía y Competitividad. PI: Julio Rubio. 2015–2017.
10. *DIGIBAC: Desarrollo de métodos automatizados para el análisis de imágenes digitales de patrones de electroforesis de bacterias*. Funded by an ADER grant. PI: César Domínguez. 2014–2016.
11. *Machine Learning for ACL2*. Funded by SICSA Proof of Concept programme. PI: Jónathan Heras. 2013–2014.
12. *Coalgebraic Logic Programming for Type Inference: parallelism and corecursion for a new generation of programming languages*. Funded by EPSRC. PI: Ekaterina Komendantskaya. 2013–2016.
13. *Machine-learning coalgebraic automated proofs*. Funded by EPSRC First Grant scheme. PI: Ekaterina Komendantskaya. 2011–2013.
14. *Formath: Formalization of Mathematics*. Funded by European Union. PI: Thierry Coquand. 2010–2013.
15. *Mathematical Knowledge Management: Algebraic Topology and Logic cases*. Funded by Ministerio de Ciencia e Innovación. PI: Julio Rubio. 2009–2012.
16. *Asistentes para la creación de aplicaciones cliente de sistemas de cálculo simbólico*. Funded by Comunidad Autónoma de La Rioja. PI: Vico Pascual. 2008–2010.
17. *Computer Algebra systems: new developments in Algebraic Topology and reliability*. Funded by Comunidad Autónoma de La Rioja. PI: Julio Rubio. 2007–2008.

Awards

- Award in the CAEPIA conference for the paper “Prediction of Epiretinal Membrane from Retinal Fundus Images using Deep Learning”. 2021.
- *Notable Article in Computing 2014* for the paper “A certified reduction strategy for homological image processing”. 2015.
- Awarded a diploma for one of the best PhD dissertations written at the University of La Rioja in academic year 2010/11. 2013.
- Best programming pearl award for the paper *Homological processing of biomedical images* at the 1st workshop of Industrial Applications of Computer Algebra (AICA’11). 2011.
- Received PhD scholarship at the Department of Mathematics and Computer Science, University of La Rioja. 2008–2011.

Contracts with companies

- Diagnosing diseases from images from retinal fundus. Company: OPTRetina. 2021. Principal Investigator.
- Predicting the production using temporal series. Company: Grupo Empresarial Palacios Alimentación. 2021. Collaborator.
- Detection of anomalous objects in industrial plants. Company: SpectralGeo. 2020–2023. Principal Investigator.
- Digitizing the musical archive of Santo Domingo’s Cathedral. Company: Instituto de Estudios Riojanos. 2020–2022. Principal Investigator.

Teaching

- Lecturer of the module “Inteligencia Artificial” (BSc course). Department of Mathematics and Computer Science, University of La Rioja. From Spring to present.
- Lecturer of the module “Programación Orientada a Objetos” (BSc course). Department of Mathematics and Computer Science, University of La Rioja. From Autumn 2016 to present.
- Lecturer of the module “Tecnología de la Programación” (BSc course). Department of Mathematics and Computer Science, University of La Rioja. From Spring 2016 to Spring 2017.
- Lecturer of the module “Herramientas TIC para docentes”. Diploma de Extensión Universitaria en Formación Pedagógica y Didáctica, University of La Rioja. Autumn 2015, Autumn 2016, Autumn 2017.
- Lecturer of the module “Taller Informática I”. Universidad de la Experiencia, University of La Rioja. Autumn 2015, Autumn 2016, Autumn 2017.
- Lecturer of the module “Desarrollo de Aplicaciones Web” (MSc course). Department of Mathematics and Computer Science, University of La Rioja. From Autumn 2015 to Autumn 2019.
- Lecturer of the module “Algorithms and Artificial Intelligence” (BSc course). University of Dundee. Spring 2014.
- Lecturer of the module “Introduction to Programming” (BSc course). University of Dundee. Autumn 2013.
- Lab assistant of the module “Architecture Fundamentals and Unix” (BSc course). School of Computing, University of Dundee. Autumn 2012.
- Lab assistant of the module “Metodología de la Programación” (BSc course). Department of Mathematics and Computer Science, University of La Rioja. Autumn 2011.

Academic visits

- Chalmers University. Goteborg, Sweden. May 2012.
- University of Seville. Seville, Spain. July 2011.
- INRIA-Sophia institure. Sophia, France, September 2010.
- University of Seville. Seville, Spain. February 2010.
- German Research Center for Artificial Intelligence. Saarbrucken, Germany. October 2009.

Further Academic Service

- Organisation Committee membership: MAP 2010, ARW13, SPLS14, EACA 2016.
- Programme Committee membership: CICM'13, CICM'14, Coq'16, IPAC'16.
- Reviewer: ILP'13, Journal of Automated Reasoning, Proceedings A, Journal of Symbolic Computation, Formal Aspects of Computing, Journal of Immunological Methods, Biochemical Genetics, Journal of Advanced Research, Applied Sciences, Computers in Biology and Medicine, Information Processing in Agriculture, Biometrics, Electronics (member of the reviewer board), Energies, PeerJ, Computers and Electronical Engineering, SoftwareX, Nature Communications, Journal of Ambient Intelligence and Humanized Computing, Frontiers in Psychology, IEEE Transactions on Emerging Topics in Computational Intelligence, Frontiers in Signal Processing, IEEE Access.

Software

- fKenzo: A system for computing and reasoning in Algebraic Topology. 2011.
- ML4PG: Machine Learning for Proof General. 2012–2014.
- ACL2(ml): Machine Learning for ACL2. 2013–2014.
- GelJ: a Java program for the analysis of DNA gel fingerprints images. 2015–2016.
- WekaBioSimilarity: binary measures in Weka. 2016.
- IJ-OpenCV: a Java library connecting ImageJ and OpenCV. 2016.
- AntibiogramJ: a Java program for reading antibiogram images. 2016.
- DetectionEvaluationJ: an ImageJ plugin that has been designed to evaluate the performance of object detection algorithms using several metrics. 2016.
- DecoFungi: a web application for measuring dye decolorisation from fungal strains. 2017.
- CLoDSA: an open-source image augmentation library for object classification, localization, detection, semantic segmentation and instance segmentation. 2019.