

# Miguel Hernández-Cabronero

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## *Curriculum Vitae* – July 2023


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### Contact




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### Profile

I am a postdoctoral computer scientist with over a decade of full-time research experience and more than 45 publications.

I have strong analytical, programming and communication skills (both oral and written). I have proved my autonomy and proficiency collaborating in multiple international, geographically disperse teams.

I am passionate about teaching and the learning process. I have taken part in several undergraduate and master level classes: my responsibilities included design of syllabus contents, creation of original learning materials and teaching of both theoretical and practical aspects of the classes.

I have also participated in the supervision of students, including final degree projects, PhD theses, student research projects, and divulgation of STEM in pre-college students.

My current research focuses on the following topics:

- Coding of visual content, including remote-sensing, and biomedical image data.
- Adaptation of coding architectures to domain-specific needs and constraints, in particular for the New Space.
- Perceptual and task-oriented data compression.
- Compression and image format standards.

## Education

- 2011–2015 **Ph.D. (Excellent Cum Laude) in Computer Science.**  
Awarded the UAB Special Award for Doctoral Studies ([certificate](#)).  
University: Universitat Autònoma de Barcelona, Spain  
Thesis title: “DNA Microarray Image Compression”  
Director: Joan Serra-Sagristà  
Co-Director: Michael W. Marcellin (University of Arizona)
- 2010–2011 **MSc Computer Science**, *Universitat Autònoma de Barcelona, Spain.*
- 2005–2010 **BSc Computer Science**, *Universidad Autónoma de Madrid, Spain.*
- 2005–2010 **BSc Mathematics**, *Universidad Autónoma de Madrid, Spain.*

## Professional Accreditations

- Jan. 2023 **Spanish Ministry of Science and Innovation (MICINN).**  
Research Activity Incorporation and Intensification (I3 program).
- Nov. 2020 **AQU**, *Accreditation of research (Acreditació de Recerca – Agregat).*
- Oct. 2019 **AQU**, *Positive report for tenure-track lecturer (Informe de Lector).*

## Employment

### Current:

- Feb. 2020–  
Jun. 2023 **Beatriu de Pinós BP2018 Postdoctoral Fellow**, *Universitat Autònoma de Barcelona, Spain.*

### Previous:

- Sep. 2019–  
Jan. 2020 **Associate Professor**, *Universitat Autònoma de Barcelona, Spain.*  
(Substituted by Beatriu de Pinós fellowship)
- Apr. 2019–  
Jan. 2020 **Postdoctoral Research Assistant**, *Universitat Autònoma de Barcelona, Spain.*  
(Substituted by Beatriu de Pinós fellowship)
- Jan. 2017–  
Dec. 2018 **Postdoctoral Research Associate**, *University of Arizona, Tucson, USA.*
- Jul. 2015–  
Dec. 2016 **Postdoctoral Research Assistant**, *University of Warwick, Coventry, UK.*
- Jan. 2015–  
Mar. 2015 **Visiting Scholar**, *University of Aveiro, Aveiro, Portugal.*
- Sep. 2014–  
Dec. 2014 **Visiting Scholar**, *University of Arizona, Tucson AZ, USA.*
- Sep. 2011–  
Jun. 2015 **Ph.D. Student**, *Universitat Autònoma de Barcelona, Barcelona, Spain.*
- Jul. 2008–  
Sep. 2008 **Student Research Assistant**, *Universidad Politécnica de Madrid, Madrid, Spain.*
- Jul. 2006–  
Sep. 2006 **Student Research Assistant**, *Universidad Politécnica de Madrid, Madrid, Spain.*

## Teaching Experience

### Courses

- Sep. 2022–  
Feb. 2023 **Invited Lecturer**, 105073 Data Compression Technologies,  
BSc, Computer Science, Universitat Autònoma de Barcelona.
- Sep. 2021–  
Feb. 2022 **Invited Lecturer**, 105073 Data Compression Technologies,  
BSc, Computer Science, Universitat Autònoma de Barcelona.
- Feb. 2020–  
Jun. 2020 **Subject Coordinator**, 104349 Graphs, topology and discrete geometry,  
BSc, Data Engineering, Universitat Autònoma de Barcelona.
- Sep. 2019–  
Feb. 2020 **Subject Coordinator**, 44020 Standards in e-Health and Interoperability,  
MSc, Internet of Things for e-Health, Universitat Autònoma de Barcelona.
- Feb. 2020–  
Jun. 2020 **Seminar Tutor**, 102772 Discrete Mathematics.  
BSc, Computer Science, Universitat Autònoma de Barcelona.
- Feb. 2015–  
Jun. 2015 **Seminar Tutor**, 102772 Discrete Mathematics.  
BSc, Computer Science, Universitat Autònoma de Barcelona.
- Feb. 2014–  
Jun. 2014 **Seminar Tutor**, 102772 Discrete Mathematics.  
BSc, Computer Science, Universitat Autònoma de Barcelona.
- Feb. 2013–  
Jun. 2013 **Seminar Tutor**, 102772 Discrete Mathematics.  
BSc, Computer Science, Universitat Autònoma de Barcelona.

### Formal PhD Student Supervision

- Jan. 2021 –  
Feb. 2024 **Co-Supervisor**, PhD degree.  
Oscar Maireles González, Universitat Autònoma de Barcelona.  
“Astronomical data compression”
- Jan. 2021 –  
Feb. 2024 **Co-Supervisor**, PhD degree.  
Sebastià Mijares Verdú, Universitat Autònoma de Barcelona.  
“Remote sensing data compression with neural networks”

### BSc Final Project Student Supervision

- Sep. 2020 –  
Feb. 2021 **Co-supervisor**, final BSc project in Computer Science.  
Paula Sarqui Altamirano, Universitat Autònoma de Barcelona.  
“Dades obertes, bona ciència i programari lliure”  
(Open data, good science and free software)
- Sep. 2019 –  
Feb. 2020 **Supervisor**, final BSc project in Computer Science.  
Diego Fraile Parra, Universitat Autònoma de Barcelona.  
“Automatic analysis of turns and pauses in speech for research  
in Alzheimer and other dementias”
- Feb. 2015 –  
Jun. 2015 **Co-supervisor**, final BSc project in Computer Science.  
Ivan Pueyo Navarro, Universitat Autònoma de Barcelona.  
“DNA Microarray Image Coding”
- Feb. 2014 –  
Jun. 2014 **Supervisor**, final BSc project in Computer Science.  
Manuel Ruibal Montoro, Universitat Autònoma de Barcelona.  
“Compression of DNA microarray images based on their autosimilarity”,

### Other supervisory tasks

- Oct. 2018 – **Mentoring tasks**, PhD in Computer Engineering.  
Dec. 2021 Eze Ahanonu, University of Arizona.
- Oct. 2016 – **Mentoring tasks**, PhD in Computer Engineering.  
Dec. 2019 Yuzhang Lin, University of Arizona.
- Sep. 2016 – **Mentoring tasks**, PhD in Computer Science.  
Jun. 2018 Lee Pragnell, University of Warwick.

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## Other Academic Appointments

### Intramural services

- 2022 – **Elected Member of the School Board.**  
ongoing Engineering School, Universitat Autònoma de Barcelona.
- 2021 – **Executive departamental commission member.**  
ongoing dEIC department, Universitat Autònoma de Barcelona.
- 2022 – **PhD monitoring commission member.**  
2023 dEIC department, Universitat Autònoma de Barcelona.
- 2021 – **PhD monitoring commission member.**  
2022 dEIC department, Universitat Autònoma de Barcelona.
- 2020 – **PhD monitoring commission member.**  
2021 dEIC department, Universitat Autònoma de Barcelona.
- 2019 – **Argó project** (divulgarion of STEM with catalan high schools).  
2020 dEIC department, Universitat Autònoma de Barcelona.

### Invited talks

- “Visual Coding” seminar  
Universidad Miguel Hernández, Elche, November 2019
- “Effect of Lightweight Image Compression on CNN-based Image Segmentation”  
Grenoble NewSpace Week, France, April 2019
- “Color transforms for the compression of Whole-Slide Images”  
University of Arizona, US, January 2017.
- “Lossless Compression of Bayer Color Filter Arrays”  
University of Warwick, UK, June 2015.
- “Relative Quantization and lossy compression of DNA microarray images”  
University of Aveiro, Portugal, January 2015.
- “DNA microarray image compression”  
University of Valencia, Spain, January 2013

### Reviewer for (selection):

- IEEE Transactions on Image Processing
- IEEE Data Compression Conference
- IEEE Transactions on Medical Imaging
- IEEE Transactions on Multimedia
- IEEE Signal Processing Letters
- IEEE Access

## Publications

### Journal Papers

1. F. Auli-Llinas, J. Bartrina-Rapesta and **M. Hernández-Cabronero**, "Probability models for highly parallel image coding architecture," ELSEVIER Signal Processing: Image Communication, vol. 112, pp. 116914, 2023.  
DOI: 10.1016/j.image.2022.116914. [IF: 3.453, Q2].
2. F. Auli-Llinas, C. De Cea-Dominguez and **M. Hernández-Cabronero**, "Accelerating BPC-PaCo through visually lossless techniques," ELSEVIER Journal of Visual Communication and Image Representation, vol. 89, no. 1, pp. 103672, 2022.  
DOI: 10.1016/j.jvcir.2022.103672. [IF: 2.887, Q2]
3. A. Sánchez, I. Blanes, Y. Barrios, **M. Hernández-Cabronero**, J. Bartrina-Rapesta, J. Serra-Sagristà and R. Sarmiento, "Reducing Data Dependencies in the Feedback Loop of the CCSDS 123.0-B-2 Predictor," IEEE Geoscience and Remote Sensing Letters, vol. 19, pp. 1-5, 2022.  
DOI: 10.1109/LGRS.2022.3213975. [IF: 5.343, Q1]
4. K. Chow, D. E. Olivier Tzamarias, **M. Hernández-Cabronero**, I. Blanes and J. Serra-Sagristà, "Performance Improvement on k2-raster Compact Data Structure for Hyperspectral Scenes," IEEE Geoscience and Remote Sensing Letters, vol. 19, no. 1, pp. 1-5, 2022.  
DOI: 10.1109/LGRS.2021.3084065. [IF: 5.343, Q1].
5. B. Kaddar, H. Fizazi, **M. Hernández-Cabronero**, V. Sanchez and J. Serra-Sagristà, "DivNet: Efficient Convolutional Neural Network via Multilevel Hierarchical Architecture Design," IEEE Access, vol. 9, pp. 105892-105901, 2021. DOI: 10.1109/ACCESS.2021.3099952. [IF: 3.476, Q2]
6. **M. Hernández-Cabronero**, A. Kiely, M. Klimesh, I. Blanes, J. Ligo, E. Magli and J. Serra-Sagristà, "The CCSDS 123.0-B-2 Low-Complexity Lossless and Near-Lossless Multispectral and Hyperspectral Image Compression Standard: A comprehensive review," IEEE Geoscience and Remote Sensing Magazine, vol. 9, no. 4, pp. 102-109, 2021. DOI: 10.1109/MGRS.2020.3048443. [IF: 13.925, Q1].
7. I. Blanes, **M. Hernández-Cabronero**, J. Serra-Sagristà and M. W. Marcellin, "Redundancy and Optimization of tANS Entropy Encoders," IEEE Trans. Multimedia, vol. 23, pp. 4341-4350, 2021. DOI: 10.1109/TMM.2020.3040547. [IF: 8.182, Q1].

8. **M. Hernández-Cabronero**, J. Portell, I. Blanes and J. Serra-Sagristà, "High-Performance Lossless Compression of Hyperspectral Remote Sensing Scenes Based on Spectral Decorrelation," *MDPI Remote Sensing*, vol. 12, no. 18, pp. 2955, 2020. [IF: 4.848, Q1]
9. K Chow, D. E. O. Tzamarías, **M. Hernández-Cabronero**, I. Blanes, J. Serra-Sagristà, "Analysis of Variable-Length Codes for Integer Encoding in Hyperspectral Data Compression with the k2-Raster Compact Data Structure", *MDPI Remote Sensing*, vol. 12, no. 12, pp. 1983, 2020. [IF: 4.848, Q1]
10. M. Martínez Torres, **M. Hernández-Cabronero**, I. Blanes, J. Serra-Sagristà, "High-throughput variable-to-fixed entropy codec using selective, stochastic code forests," *IEEE Access*, vol. 8, pp. 81283–81297, 2020. [IF: 3.367, Q2]
11. I. Blanes, **M. Hernández-Cabronero**, J. Serra-Sagristà and M.W. Marcellin, "Lower Bounds on the Redundancy of Huffman Codes with Known and Unknown Probabilities," *IEEE Access*, vol. 7, pp. 115857–115870, 2019. [IF: 3.745, Q1]
12. J. Bartrina-Rapesta, J. Serra-Sagristà, M.W. Marcellin and **M. Hernández-Cabronero**, "A Novel Rate-Control for Predictive Image Coding with Constant Quality," *IEEE Access*, vol. 7, pp. 103918 - 103930, 2019. [IF: 3.745, Q1]
13. I. Blanes, A. Kiely, **M. Hernández Cabronero**, J. Serra-Sagristà, "Performance Impact of Parameter Tuning on the CCSDS-123.0-B-2 Low-Complexity Lossless and Near-Lossless Multispectral and Hyperspectral Image Compression Standard", *MDPI Remote Sensing*, vol. 11, no. 11, art. 1390, 2019. [IF: 4.509, Q2]
14. **M. Hernández-Cabronero**, V. Sanchez, I. Blanes, F. Aulí-Llinàs, M. W. Marcellin, J. Serra-Sagristà. "Mosaic-Based Color Transform Optimization for Lossy and Lossy-to-Lossless Compression of Pathology Whole-Slide Images," *IEEE Transactions on Medical Imaging*, vol.38, no.1, pp 21-32, 2019. [IF: 6.685, Q1]
15. V. Sanchez, **M. Hernández-Cabronero**, "Graph-based Rate Control in Pathology Imaging with Lossless Region of Interest Coding," *IEEE Transactions on Medical Imaging*, vol.37, no. 10, pp. 2211-2223, 2018. [IF: 7.816, Q1]
16. **M. Hernández-Cabronero**, M. W. Marcellin, I. Blanes, J. Serra-Sagristà, "Lossless Compression of Color Filter Array Mosaic Images with Visualization via JPEG 2000," *IEEE Transactions on Multimedia*, vol. 20, no. 2, pp. 257-270, 2018. [IF: 5.452, Q1]
17. F. Aulí-Linàs, M. W. Marcellin, V. Sanchez, J. Bartrina-Rapesta, **M. Hernández-Cabronero**, "Dual Link Image Coding for Earth Observation Satellites," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 56, no. 9, pp. 5083-5096, 2018. [IF: 5.630, Q1]
18. F. Liu, **M. Hernández-Cabronero**, V. Sanchez, M. W. Marcellin, A. Bilgin, "The Current Role of Image Compression Standards in Medical Imaging," *MDPI Information*, vol. 8, no. 4, 2017.
19. S. Álvarez-Cortés, N. Amrani, **M. Hernández-Cabronero**, J. Serra-Sagristà, "Progressive Lossy-to-Lossless Coding of Hyperspectral Images through Regression Wavelet Analysis," *Taylor & Francis International Journal of Remote Sensing*, vol. 39, no. 7, pp. 1-21, 2017. [IF: 1.782, Q2]

20. **M. Hernández-Cabronero**, I. Blanes, A. J. Pinho, M. W. Marcellin, J. Serra-Sagrìsta, "Progressive Lossy-to-Lossless Compression of DNA Microarray Images," IEEE Signal Processing Letters, vol. 23, no. 5, pp. 698-702, May 2016. [IF: 2.53, Q1]
21. **M. Hernández-Cabronero**, I. Blanes, A. J. Pinho, M. W. Marcellin, J. Serra-Sagrìsta, "Analysis-Driven Lossy Compression of DNA Microarray Images," IEEE Transactions on Medical Imaging, vol. 35, no. 2, pp. 654-664, February 2016. [IF: 3.94, Q1]
22. I. Blanes, **M. Hernández-Cabronero**, F. Aulí-Llinàs, J. Serra-Sagrìsta and M.W. Marcellin, "Isorange Pairwise Orthogonal Transform," IEEE Transactions on Geoscience and Remote Sensing, vol. 53, no. 6, pp. 3361-3372, June 2015. [IF: 3.36, Q1]
23. **M. Hernández-Cabronero**, I. Blanes, M. W. Marcellin, J. Serra-Sagrìsta, "Standard and specific compression techniques for DNA microarray images," MDPI Algorithms, pp. 30-49, 2012.

(Impact factors computed using Clarivate Analytic's JCR

<https://clarivate.com/products/journal-citation-reports/>)

### Conference Contributions

1. I. Blanes, A. Kiely, M, Wong, B. Sundlie, **M. Hernández-Cabronero**, M. Klimesh and J. Serra-Sagrìsta, "CCSDS 123.0-B-2 compression standard cross-validation and fuzzing," In 8th International Workshop on On-Board Payload Data Compression (OBPDC), Sep 2022.
2. S. Mijares, J. Ballé, V. Laparra, J. Bartrina-Rapesta, **M. Hernández-Cabronero** and J. Serra-Sagrìsta, "Hyperspectral image compression using convolutional neural networks with local spectral transforms and non-uniform sample normalisation," In 8th International Workshop on On-Board Payload Data Compression (OBPDC), Sep 2022.
3. J. Bartrina-Rapesta, **M. Hernández-Cabronero**, A. Sanchez, Y. Barrios, R. Sarmiento, J. Serra-Sagrìsta and I. Blanes, "Coding Performance Impact on a Constant-Weight Predictor for CCSDS 123.0-B-2," In 8th International Workshop on On-Board Payload Data Compression (OBPDC), Sep 2022.
4. S. Mijares Verdu, J. Balle, V. Laparra, J. Bartrina Rapesta, **M. Hernández-Cabronero** and J. Serra-Sagrìsta, "Hyperspectral remote sensing data compression with neural networks," In 2022 Data Compression Conference (DCC), Mar 2022.
5. O. Maireles-Gonzalez, J. Bartrina-Rapesta, **M. Hernández-Cabronero** and J. Serra-Sagrìsta, "Analysis of Lossless Compressors Applied to Integer and Floating-Point Astronomical Data," In 2022 Data Compression Conference (DCC), Mar 2022.
6. V. Sanchez, **M. Hernández-Cabronero** and J. Serra-Sagrìsta, "Block-wise intra-prediction of imaging data based on overfitted neural networks with on-line learning," In IEEE International Workshop on Machine Learning for Signal Processing (MLSP), Oct 2021. DOI: 10.1109/MLSP52302.2021.9596526.
7. V. Sanchez, **M. Hernández-Cabronero** and J. Serra-Sagrìsta, "Hybrid Intra-Prediction in Lossless Video Coding using Overfitted Neural Networks," In IEEE Data Compression Conference (DCC), Mar. 2021.

8. A. Kumar Gururajan, **M. Hernández-Cabronero**, I. Blanes and J. Serra-Sagristà, "A Preliminary Approach Towards Satellite Constellation Data Compression," In 7th International Workshop on On-Board Payload Data Compression (OBPDC), Sep 2020.
9. J. Portell, R. Iudica, Alberto G. Villafranca, **M. Hernández-Cabronero**, I. Blanes and J. Serra-Sagristà, "CILLIC: Context Interpolation Lossless and Image Compressor," In 7th International Workshop on On-Board Payload Data Compression (OBPDC), Sep 2020.
10. I. Blanes, A. Kiely, L. Santos, **M. Hernández-Cabronero** and J. Serra-Sagristà, "The Hybrid Entropy Encoder of CCSDS 123.0-B-2: Insights and Decoding Process," In 7th International Workshop on On-Board Payload Data Compression (OBPDC), Sep 2020.
11. Y. Lin, F. Liu, **M. Hernandez-Cabronero**, E. Ahanonu, M. Marcellin, A. Bilgin and A. Ashok, "Perception-Optimized Encoding for Visually Lossy Image Compression", In Proceedings of the IEEE Data Compression Conference, DCC, pp. 424-424, March 2019. [CORE Ranking A\*].
12. **M. Hernández-Cabronero**, David Vilaseca, Guillermo Becker, Emilio Tyson, Joan Serra-Sagristà, "Effect of Lightweight Image compression on CNN-based Image Segmentation", Grenoble NewSpace Week (GNSW), April 2019.
13. A. Kiely, M. Klimesh, I. Blanes, J. Ligo, E. Magli, N. Aranki, M. Burl, R. Camarero, M. Cheng, S. Dolinar, D. Dolman, G. Flesch, H. Ghassemi, M. Gilbert, **M. Hernández-Cabronero**, D. Keymeulen, M. Le, H. Luong, C. McGuinness, G. Moury, T. Pham, M. Plintovic, F. Sala, L. Santos, A. Schaar, J. Serra-Sagristà, S. Shin, B. Sundlie, D. Valsesia, R. Vitulli, E. Wong, W. Wu, H. Xie, H. Zhou, "The new CCSDS Standard for Low-Complexity Lossless and Near-Lossless Multispectral and Hyperspectral Image Compression", In Proceedings of the ESA On-Board Payload Data Compression Workshop, OBPDC, September 2018.
14. J. Portell, I. Blanes, **M. Hernández-Cabronero**, J. Serra-Sagristà, R. Iudica, A. G. Villafranca, "Prepending Spectral Decorrelating Transforms to FAPEC: A competitive High-Performance approach for Remote Sensing Data Compression", In Proceedings of the ESA On-Board Payload Data Compression Workshop, OBPDC, September 2018.
15. I. Blanes, A. Kiely, **M. Hernández-Cabronero**, J. Serra-Sagristà, "Performance Impact of Parameter Tuning on the Emerging CCSDS-123.0-B-2 Low-Complexity Lossless and Near-Lossless Multispectral and Hyperspectral Image Compression Standard", In Proceedings of the ESA On-Board Payload Data Compression Workshop, OBPDC, September 2018.
16. F. Liu, Y. Lin, **M. Hernández-Cabronero**, E. Ahanonu, M. W. Marcellin, A. Ashok, A. Bilgin, "A Visual Discrimination Model for JPEG2000 Compression", In Proceedings of the IEEE Data Compression Conference, DCC, pp. 424-424, March 2018. [CORE Ranking A\*]
17. L. Prangnell, **M. Hernández-Cabronero**, V. Sanchez, "Coding Block-Level Perceptual Video Coding for 4:4:4 Data in HEVC", In Proceedings of the IEEE International Conference on Image Processing, ICIP, pp. 2488-2492, September 2017. [CORE Ranking B]
18. L. Prangnell, **M. Hernández-Cabronero**, V. Sanchez, "Cross-Color Channel Perceptually Adaptive Quantization for HEVC", In Proceedings of the IEEE Data Compression Conference, DCC, pp. 456-456, April 2017. [CORE Ranking A\*]



19. **M. Hernández-Cabronero**, F. Aulí-Llinàs, V. Sanchez, and J. Serra-Sagristà, "Fast MCT Optimization for the Compression of Whole-Slide Images," in Proc. IEEE International Conference on Image Processing, ICIP, pp. 2370-2374, September 2016. [CORE Ranking B]
20. S. Álvarez-Cortés, N. Amrani, **M. Hernández-Cabronero**, J. Serra-Sagristà, "Progressive-Lossy-to-Lossless Coding of Hyperspectral Images," in Proc. On-Board Payload Data Compression Workshop, OBPDC, September 2016.
21. **M. Hernández-Cabronero**, V. Sanchez, F. Aulí-Llinàs, J. Serra-Sagristà, "Lossy Compression of Natural HDR Content Based on Multi-Component Transform Optimization," in Proc. IEEE Digital Media Industry and Academy Forum, DMIAF, pp. 23-28, July 2016.
22. **M. Hernández-Cabronero**, F. Aulí-Llinàs, V. Sanchez, and J. Serra-Sagristà, "Transform Optimization for the Lossy Coding of Pathology Whole-Slide Images," in Proc. IEEE Data Compression Conference, DCC, pp. 131-140 March 2016. [CORE Ranking A\*]
23. N. Amrani, J. Serra-Sagristà, **M. Hernández-Cabronero**, and M. Marcellin, "Regression Wavelet Analysis for Progressive-Lossy-to-Lossless Coding of Remote-Sensing Data," in Proc. IEEE Data Compression Conference, DCC, pp. 121-130, March 2016. [CORE Ranking A\*]
24. V. Sanchez, **M. Hernández-Cabronero**, F. Aulí-Llinàs, and J. Serra-Sagristà, "Fast Lossless Compression Of Whole Slide Pathology Images Using HEVC Intra-Prediction," in Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 1456-1460 March 2016. [CORE Ranking B]
25. **M. Hernández-Cabronero**, V. Sanchez, M. W. Marcellin, J. Serra-Sagristà, "A distortion metric for the lossy compression of DNA microarray images," In proceedings of the IEEE Data Compression Conference, DCC, pp. 171-180, 2013. [CORE Ranking A\*]
26. **M. Hernández-Cabronero**, F. Aulí-Llinàs, J. Bartrina-Rapesta, I. Blanes, L. Jiménez-Rodríguez, M. W. Marcellin, Juan Muñoz-Gómez, V. Sanchez, J. Serra-Sagristà, Zhongwei Xu, "Multi-component compression of DNA microarray images," In Proceedings of the CEDI Workshop on Multimedia Data Coding and Transmission, WMDCT, 2012.
27. **M. Hernández-Cabronero**, Juan Muñoz-Gómez, I. Blanes, J. Serra-Sagristà, M. W. Marcellin, "DNA microarray image coding," In proceedings of the IEEE Data Compression Conference, DCC, pp. 32-41, 2012. [CORE Ranking A\*]
28. **M. Hernández-Cabronero**, F. Aulí-Llinàs, J. Bartrina-Rapesta, I. Blanes, L. Jimenez-Rodriguez, M. W. Marcellin, J. Muñoz-Gómez, V. Sanchez, J. Serra-Sagristà and Z. Xu, "Multicomponent compression of DNA microarray images," In Proceedings of the CEDI Workshop on Multimedia Data Coding and Transmission (WMDCT), Sep 2012.
29. **M. Hernández-Cabronero**, I. Blanes, M. W. Marcellin, J. Serra-Sagristà, "A review of DNA microarray image compression," In Proceedings of the International Conference on Data Compression, Communication and Processing, CCP, pp. 139-147, June 2011.

(Conference rankings provided by CORE, <http://portal.core.edu.au/conf-ranks/>)

## Book Chapters

1. **M. Hernández-Cabronero**, M. W. Marcellin, J. Serra-Sagristà, "Compression of DNA Microarray Images," In Book "Microarray Image and Data Analysis: Theory and Practice", CRC Press, ISBN 9781466586826, pp. 193-222, 2014.

## Participation in Projects

1. **Ministry of Science and Innovation.**  
**COTS and Learning in Nanosatellite Data Compression**  
Reference: PID2021-125258OB-I00  
Main researchers: Joan Serra-Sagristà, Ian Blanes  
Applicability: 01/09/2022 - 31/08/2025  
Funding body: Ministry of Science and Innovation, Spanish Government, FEDER  
Financial support: 212.839 €
2. **Huawei. Global Data Compression Contest.**  
Reference: GDCC3  
Main researcher: Joan Serra-Sagristà  
Applicability: 14/10/2022 - 13/10/2023  
Financial support: 79.746,83 €
3. **European Space Agency.**  
**Contribution to the Green Book for CCSDS 124.0-B-1.**  
Reference: ESA PO 5001034881  
Main researcher: Miguel Hernández-Cabronero  
Applicability: 01/07/2022 - 15/12/2022  
Financial support: 19.992,60 €
4. **European Space Agency.**  
**Lossless/lossy multispectral & hyperspectral compression IP core.**  
Reference: ESA Contract No. 4000136723/22/NL/CRS  
Partners: University of Las Palmas de Gran Canaria (main contractor), Thales Alenia Space Spain, National and Kapodistrian University of Athens, Universitat Autònoma de Barcelona  
Main researcher at UAB: Ian Blanes  
Funded by: ESA.  
Applicability: 03/03/2022 - 03/09/2023  
Financial support: 250.000 € total, 20.000 € UAB
5. **European Space Agency.**  
**WhiteDwarf 2.0 Maintenance of Compression Implementations.**  
Reference: ESA Contract No. 4000133664/20/NL/AS  
Main researcher: Miguel Hernández-Cabronero  
Responsible: Joan Serra-Sagristà  
Funded by: ESA.  
Applicability: 01/01/2021 - 31/12/2021  
Financial support: 34 993 €

6. **Centre National d'Études Spatiales. Invitation to Tender.**  
Reference: Raw SAR Compression - Prototyping of the Recommended Standard  
Main researcher: Miguel Hernández-Cabronero  
Responsible: Joan Serra-Sagristà  
Funded by: CNES.  
Applicability: 15/10/2020 - 31/10/2024  
Financial support: 69 185.63 €
7. **Framework para la evaluación de la calidad de imágenes para segmentación y clasificación con algoritmos de deep learning**  
Reference: RTC2019-007434-7  
Position: Researcher  
PI: Joan Serra-Sagristà  
Partners: Satellogic Solutions SL, Fundació EURECAT, Universitat Autònoma de Barcelona  
Applicability: 01/07/2020 - 31/12/2022  
Funding body: Ministerio de Ciencias e Innovación  
Financial support: 607 552 €
8. **Centre National d'Études Spatiales. Invitation to Tender.**  
Reference: Robust Compression of Fixed Length Housekeeping Data - Prototyping of the Recommended Standard, Complementary activities  
Main researcher: Miguel Hernández-Cabronero  
Responsible: Joan Serra-Sagristà  
Funded by: CNES.  
Applicability: 01/10/2020 - 31/12/2021  
Financial support: 51 661.10 €
9. **Beatriu de Pinós Fellowship**  
Reference: BP2018-00008  
Main researcher: Miguel Hernández-Cabronero  
Funded by: Catalan Government  
Applicability: 1/2/2020 – 30/6/2023  
Financial support: 132 300.00 €
10. **Centre National d'Études Spatiales. Invitation to Tender**  
Reference: Robust Compression of Fixed Length Housekeeping Data  
Main researcher: Miguel Hernández-Cabronero  
Funded by: CNES  
Applicability: 30/10/2019 – 1/06/2020  
Financial support: 19 455 €
11. **High-Speed Integrated Satellite Data Systems For Leading EU IndustrY (Hi-FLY)**  
Funded by: European Commission  
Position: Researcher  
PI: Joan Serra-Sagristà  
Applicability: 1/1/2018 – 30/6/2022  
Financial support: 6.997.016,25 €

12. **Visually Lossless Compression of Whole-Slide Images**  
Position: Postdoctoral Research Associate  
PI: Dr. Ali Bilgin (University of Arizona)  
Funded by: NIH, USA  
Applicability: 9/1/2017 – 31/12/2018
13. **Centre National d'Etudes Spatiales. Invitation to Tender**  
Reference: Low-Complexity Near-Lossless Multispectral & Hyperspectral Data Compression)  
Position: Postdoctoral Associate  
PI: Ian Blanes, Joan Serra-Sagrístà (Universitat Autònoma de Barcelona)  
Funded by: CNES  
Applicability: 01/10/2017 – 31/12/2018  
Financial support: 66 788 €
14. **Coding for Earth Observation Satellites (ICEOS)**  
Position: Researcher  
PI: Dr. Francesc Aulí-Llinàs and Dr. Joan Serra-Sagrístà (Universitat Autònoma de Barcelona)  
Funded by: Spanish Government  
Applicability: 1/1/2016 - 31/12/2018  
Dotación económica: 98 615 €
15. **Centre National d'Etudes Spatiales. Technical Study**  
Reference: Writing of the books for the standard CCSDS-122.1  
Position: Postdoctoral Associate  
PI: Ian Blanes, Joan Serra-Sagrístà (Universitat Autònoma de Barcelona)  
Funded by: CNES  
Applicability: 01/04/2016 – 31/03/2018  
Financial support: 61 533 €
16. **EPSRC First Grant Nov 2013**  
Position: Postdoctoral Research Fellow  
PI: Dr. Victor Sanchez (University of Warwick)  
Funded by: EPSRC  
Applicability: 1/7/2015 – 30/09/2016
17. **Santander Bank Iberoamerican Grants for Young Professors and Researchers 2014**  
Main researcher: Miguel Hernández-Cabronero  
Responsible: Armando J. Pinho, (Universidade de Aveiro)  
Funded by: Santander Bank  
Applicability: 12/1/2015 – 16/3/2015 Financial support: 5 000 €
18. **FPU 2013 Short Research Stays Grants**  
Main researcher: Miguel Hernández-Cabronero  
Responsible: Michael W. Marcellin (University of Arizona)  
Funded by: Spanish Government  
Applicability: 1/9/2014 – 30/11/2014 Financial support: 5 000 €

19. **Learning Image Features To Encode Visual Information (LIFE-VISION), TIN2012-38102-C03-03**  
 Position: Researcher  
 PI: Dr. Joan Serra-Sagristà (Universitat Autònoma de Barcelona)  
 Funded by: Spanish Government and FEDER  
 Applicability: 1/1/2013 – 31/12/2015  
 Financial support: 86 603.40 €
20. **FPU PhD Studentships**  
 Funded by: Spanish Government  
 Main researcher: Miguel Hernández-Cabronero  
 Responsible: Joan Serra-Sagristà  
 Applicability: 19/12/2011 – 30/6/2015  
 Financial support: 60 252 €
21. **Scalable compression and interactive transmission and processing of massive images, TIN2009-14426-C02**  
 Position: Assistant Researcher  
 PI: Dr. Joan Serra-Sagristà (Universitat Autònoma de Barcelona)  
 Funded by: Spanish Government and FEDER  
 Applicability: 1/1/2010 - 31/12/2012 Financial support: 113 014 €

## Grants and Awards

### Postdoctoral stage

- 2019 Beatriu de Pinós BP2018-00008. Catalan Government
- 2019 Juan de la Cierva-Incorporación. MINECO - Spanish Government (resigned in favor of BP2018-00008)

### Doctoral stage

- 2018 “Special Award for Doctoral Studies”. Universitat Autònoma de Barcelona
- 2014 “Iberoamerican Young Teachers and Researchers scholarship for short research stays”. Santander Bank. 5,000€.
- 2013 “FPU 2013 short research stays program”. Spanish Government. 5,000€.
- 2011–2015 “FPU 2010 studentship for Ph.D. studies”. Spanish Government. 60,252€.

### Undergraduate stage

- 2009–2010 “Excelent Academic Performance 2009”. Madrid Regional Government. 4,500€.
- 2008–2009 “Excelent Academic Performance 2008”. Madrid Regional Government. 4,500€.
- 2007–2008 “Excelent Academic Performance 2007”. Madrid Regional Government. 4,500€.
- 2006–2007 “Excelent Academic Performance 2006”. Madrid Regional Government. 4,500€.

## Released scientific free software

- June 2022 Variable-to-Fixed (V2F) entropy coder optimized for space COTS CPUs.  
Author: **M. Hernández-Cabronero**, Universitat Autònoma de Barcelona  
[https://github.com/gici-uab/v2f\\_codec](https://github.com/gici-uab/v2f_codec)
- January 2022 Experiment NoteBook (enb): A Python library for experiment reproducibility.  
Author: **M. Hernández-Cabronero**, Universitat Autònoma de Barcelona  
<https://github.com/miguelinux314/experiment-notebook>
- February 2021 Supplementary materials for paper  
“The CCSDS 123.0-B-2 'Low-Complexity Lossless and Near-Lossless Multispectral and Hyperspectral Image Compression' Standard: A comprehensive review”  
Author: **M. Hernández-Cabronero**, Universitat Autònoma de Barcelona  
<https://codeocean.com/capsule/9466901/tree>
- April 2020 Reproducible code capsule for “High-throughput variable-to-fixed entropy codec using selective, stochastic code forests”.  
Author: **M. Hernández-Cabronero**, Universitat Autònoma de Barcelona  
<https://codeocean.com/capsule/9466901/tree>
- August 2017 Public implementation and supplementary materials for paper  
“Lossless Compression of Color Filter Array Mosaic Images with Visualization via JPEG 20000”.  
Author: **M. Hernández-Cabronero**, Universitat Autònoma de Barcelona  
[http://gici.uab.cat/GiciApps/2021\\_updated\\_supplementary\\_materials\\_2017-IEEE\\_TMM-Compression\\_of\\_Bayer\\_CFA\\_images.zip](http://gici.uab.cat/GiciApps/2021_updated_supplementary_materials_2017-IEEE_TMM-Compression_of_Bayer_CFA_images.zip)
- March 2013 “Microarray distortion metric (MDM)”.  
Author: **M. Hernández-Cabronero**, Universitat Autònoma de Barcelona  
[http://gici.uab.cat/GiciApps/microarray\\_distortion\\_metric.zip](http://gici.uab.cat/GiciApps/microarray_distortion_metric.zip)

## Patents

- October 2019 “Prototype of an alternative pipeline for CCSDS 124.0”.  
Author: **M. Hernández-Cabronero**, Universitat Autònoma de Barcelona  
Benelux Office for Intellectual Property (BOIP) i-Depot #120779

March “GICI Compression Software Suite”.

2012 Authors: E. Auge; F. Aulí-Llinàs; J. Bartrina-Rapesta; I. Blanes; C. Fernandez-Cordoba; F. García-Vilchez; J. Gonzalez-Conejero; **M. Hernández-Cabronero**; L. Jimenez-Rodriguez; J. L. Monteagudo; J. Muñoz-Gómez; J. E. Sanchez-Moral; J. Santalo-Jordana; J. Serra-Sagristà; Z. Xu.