

# Pablo Andrés HUIJSE HEISE

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🏠 Inés Gebhard Paulus 733, Valdivia, Chile.



## Education

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- ▶ PhD in Electrical Engineering, *Universidad de Chile*. 2010-2014
- ▶ Electrical Engineering degree, *Universidad de Chile*. 2004-2010
- ▶ Bachelor of Science in Electrical Engineering, *Universidad de Chile*. 2004-2008

## Academic positions

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- ▶ Assistant professor, *Informatics Institute, Universidad Austral de Chile*. 2018-today
- ▶ Young researcher, *Millennium Institute of Astrophysics*. 2018-today
- ▶ Postdoc researcher, *Millennium Institute of Astrophysics*. 2015-2017

## Research - Interests

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Machine Learning, Deep Learning, Information Theory, Bayesian Inference, Statistical Signal Processing, Astrominformatics.

## Research - Projects and Grants

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As principal investigator:

- ▶ Novel Deep Learning Architectures for Astronomical Time Series, *Universidad Austral de Chile*.  
Funded by ANID FONDECYT regular 1211374 grant. 2021-2023
- ▶ Efficient methods based on information theory and machine learning for astronomical images and time series analysis, *Universidad de Chile/Universidad Austral de Chile*.  
Funded by CONICYT FONDECYT regular 1170305 grant. 2017-2020

- Development of methods for big-data astronomical problems based on Information Theory and Machine Learning, *Millennium Institute of Astrophysics*.  
Funded by CONICYT FONDECYT postdoctoral 3150460 grant. 2015-2017

As co-investigator:

- Sistema integrado de análisis de fuentes sonoras ambientales: Sistema FUSA, *Universidad Austral de Chile*, principal investigator: Enrique Suárez, [enriquesuarez\(at\)uach\(dot\)cl](mailto:enriquesuarez@uach.cl).  
Funded by ANID FONDEF ID20I10333 grant. 2020-2022
- Fortalecimiento de la ciencia de datos en la Universidad Austral de Chile, *Universidad Austral de Chile*, principal investigator: Eliana Scheihing, [escheihi\(at\)inf\(dot\)uach\(dot\)cl](mailto:escheihi@inf.uach.cl).  
Funded by grant CONICYT PAI 79170017 grant. 2018-2021
- Pesquisa temprana de alteraciones del desarrollo en bebés mediante el uso de machine learning, *Universidad Austral de Chile*, principal investigator: Victor Poblete.  
Funded by INNOVING 2030 internal grant. 2020-2020

As research assistant:

- Big-data based real-time astronomy applications for the LSST era, *Universidad Chile*, principal investigator: Pablo A. Estévez, [pestevez\(at\)yahoo\(dot\)com](mailto:pestevez@yahoo.com).  
Funded by CONICYT/NSF DPI20140090 grant. 2015-2018
- Advanced neural networks and information theoretic learning methods for time series: applications to astronomical light curves and biomedical signals, *Universidad Chile*, principal investigator: Pablo A. Estévez.  
Funded by CONICYT FONDECYT regular 1110701 grant. 2011-2014

Doctoral studies:

- Finding periodicities in astronomical light curves using information theoretic learning, *doctoral research at the Universidad de Chile*, supervisor: Prof. Pablo A. Estévez.  
Funded by CONICYT scholarship for PhD education in Chile. 2010-2014
- Design of an overcomplete decomposition for the correntropy function, *internship at the Computational Neuro-Engineering Laboratory, University of Florida*, supervisor: Prof. José Príncipe, [principe\(at\)cnel\(dot\)ufl\(dot\)edu](mailto:principe@cnel.ufl.edu).  
Funded by CONICYT travel grant for doctoral students. 2013-2013
- “Design of a pipeline for periodic light curve discrimination and its application to the EROS-2 database”, *internship at the Institute of Applied Computational Sciences, Harvard University*, supervisor: Prof. Pavlos Protopapas, [pavlos\(at\)seas\(dot\)harvard\(dot\)edu](mailto:pavlos@seas.harvard.edu).  
Funded by CONICYT travel grant for doctoral students. 2012-2012

## Research - Publications in WoS/ISI Journals

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- [1] F. Förster, G. Cabrera-Vives, E. Castillo-Navarrete, P. A. Estévez, P. Sánchez-Sáez, J. Arredondo, F. E. Bauer, R. Carrasco-Davis, M. Catelan, F. Elorrieta, S. Eyheramendy, P. **Huijse**, G. Pignata, E. Reyes, I. Reyes, D. Rodríguez-Mancini, D. Ruz-Mieres, et al. “The Automatic Learning for the Rapid Classification of Events (ALeRCE) Alert Broker”. In: *The Astronomical Journal* 161.5 (2021), p. 242. DOI: [10.3847/1538-3881/abe9bc](https://doi.org/10.3847/1538-3881/abe9bc). arXiv: [2008.03303](https://arxiv.org/abs/2008.03303).

- [2] F. Pérez-Galarce, K. Pichara, P. **Huijse**, M. Catelan, and D. Mery. “Informative Bayesian model selection for RR Lyrae star classifiers”. In: *Monthly Notices of the Royal Astronomical Society* 503.1 (2021), pp. 484–497. DOI: [10.1093/mnras/stab320](https://doi.org/10.1093/mnras/stab320). arXiv: [2105.11531](https://arxiv.org/abs/2105.11531).
- [3] V. Poblete, D. Espejo, V. Vargas, F. Otondo, and P. **Huijse**. “Characterization of Sonic Events Present in Natural-Urban Hybrid Habitats Using UMAP and SEDnet: The Case of the Urban Wetlands”. In: *Applied Sciences* 11.17 (2021), p. 8175. DOI: [10.3390/app11178175](https://doi.org/10.3390/app11178175).
- [4] P. Sánchez-Sáez, I. Reyes, C. Valenzuela, F. Förster, S. Eyheramendy, F. Elorrieta, F. E. Bauer, G. Cabrera-Vives, P. A. Estévez, M. Catelan, G. Pignata, P. **Huijse**, D. D. Cicco, P. Arévalo, R. Carrasco-Davis, J. Abril, R. Kurtev, et al. “Alert classification for the ALeRCE broker system: The light curve classifier”. In: *The Astronomical Journal* 161.3 (2021), p. 141. DOI: [10.3847/1538-3881/abd5c1](https://doi.org/10.3847/1538-3881/abd5c1). arXiv: [2008.03311](https://arxiv.org/abs/2008.03311).
- [5] J. Peña, C. Fuentes, F. Förster, J. Martínez-Palomera, G. Cabrera-Vives, J. C. Maureira, P. **Huijse**, P. A. Estévez, L. Galbany, S. González-Gaitán, and T. de Jaeger. “Asteroids’ Size Distribution and Colors from HITS”. In: *The Astronomical Journal* 159.4 (2020), p. 148. DOI: [10.3847/1538-3881/ab7338](https://doi.org/10.3847/1538-3881/ab7338). arXiv: [2003.05499](https://arxiv.org/abs/2003.05499).
- [6] F. Tobar, L. Araya-Hernández, P. **Huijse**, and P. M. Djurić. “Bayesian reconstruction of Fourier pairs”. In: *IEEE Transactions on Signal Processing* 69 (2020), pp. 73–87. DOI: [10.1109/TSP.2020.3038135](https://doi.org/10.1109/TSP.2020.3038135). arXiv: [2011.04585](https://arxiv.org/abs/2011.04585).
- [7] J. Astudillo, P. Protopapas, K. Pichara, and P. **Huijse**. “An Information Theory Approach on Deciding Spectroscopic Follow-ups”. In: *The Astronomical Journal* 159.1 (2019), p. 16. DOI: [10.3847/1538-3881/ab557d](https://doi.org/10.3847/1538-3881/ab557d). arXiv: [1911.02444](https://arxiv.org/abs/1911.02444).
- [8] R. Carrasco-Davis, G. Cabrera-Vives, F. Förster, P. A. Estevez, P. **Huijse**, P. Protopapas, I. Reyes, J. Martínez-Palomera, and C. Donoso. “Deep learning for image sequence classification of astronomical events”. In: *Publications of the Astronomical Society of the Pacific* 131.1004 (2019), p. 108006. DOI: [10.1088/1538-3873/aaef12](https://doi.org/10.1088/1538-3873/aaef12). arXiv: [1807.03869](https://arxiv.org/abs/1807.03869).
- [9] F. Förster, T. J. Moriya, J. C. Maureira, J. P. Anderson, S. Blinnikov, F. Bufano, G. Cabrera-Vives, A. Clocchiatti, T. de Jaeger, P. A. Estévez, L. Galbany, S. González-Gaitán, G. Gräfener, M. Hamuy, E. Y. Hsiao, P. Huentelemu, P. **Huijse**, et al. “The delay of shock breakout due to circumstellar material evident in most type II supernovae”. In: *Nature Astronomy* 2.10 (2018), pp. 808–818. DOI: [10.1038/s41550-018-0563-4](https://doi.org/10.1038/s41550-018-0563-4). arXiv: [1809.06379](https://arxiv.org/abs/1809.06379).
- [10] J. Martínez-Palomera, F. Förster, P. Protopapas, J. C. Maureira, P. Lira, G. Cabrera-Vives, P. **Huijse**, L. Galbany, T. de Jaeger, S. González-Gaitán, G. Medina, G. Pignata, J. S. Martín, M. Hamuy, and R. R. Muñoz. “The High Cadence Transit Survey (HiTS): Compilation and Characterization of Light-curve Catalogs”. In: *The Astronomical Journal* 156.5 (2018), p. 186. DOI: [10.3847/1538-3881/aadfd8](https://doi.org/10.3847/1538-3881/aadfd8). arXiv: [1609.03567](https://arxiv.org/abs/1609.03567).
- [11] J. Peña, C. Fuentes, F. Förster, J. C. Maureira, J. S. Martín, J. Littín, P. **Huijse**, G. Cabrera-Vives, P. A. Estévez, L. Galbany, S. González-Gaitán, J. Martínez, T. de Jaeger, and M. Hamuy. “Asteroids in the High Cadence Transient Survey”. In: *The Astronomical Journal* 155.3 (2018), p. 135. DOI: [10.3847/1538-3881/aaaaed](https://doi.org/10.3847/1538-3881/aaaaed). arXiv: [1806.03352](https://arxiv.org/abs/1806.03352).
- [12] R. C. Ramos, D. Minniti, F. Gran, M. Zoccali, J. Alonso-García, P. **Huijse**, M. G. Navarro, Á. Rojas-Arriagada, and E. Valenti. “The VVV survey RR Lyrae population in the galactic center region”. In: *The Astrophysical Journal* 863.1 (2018), p. 79. DOI: [10.3847/1538-4357/aacf90](https://doi.org/10.3847/1538-4357/aacf90). arXiv: [1807.04303](https://arxiv.org/abs/1807.04303).

- [13] P. **Huijse**, P. A. Estévez, F. Förster, S. F. Daniel, A. J. Connolly, P. Protopapas, R. Carrasco, and J. C. Príncipe. “Robust Period Estimation Using Mutual Information for Multiband Light Curves in the Synoptic Survey Era”. In: *The Astrophysical Journal Supplement Series* 236.1 (2018), p. 12. DOI: [10.3847/1538-4365/aab77c](https://doi.org/10.3847/1538-4365/aab77c). arXiv: [1709.03541](https://arxiv.org/abs/1709.03541).
- [14] R. C. Ramos, M. Zoccali, F. Rojas, A. Rojas-Arriagada, M. Gárate, P. **Huijse**, F. Gran, M. Soto, A. A. R. Valcarce, P. A. Estévez, and D. Minniti. “Proper motions in the VVV Survey: Results for more than 15 million stars across NGC 6544”. In: *Astronomy & Astrophysics* 608 (2017), A140. DOI: [10.1051/0004-6361/201731462](https://doi.org/10.1051/0004-6361/201731462). arXiv: [1709.07919](https://arxiv.org/abs/1709.07919).
- [15] F. Förster, J. C. Maureira, J. S. Martín, M. Hamuy, J. Martínez, P. **Huijse**, G. Cabrera, L. Galbany, T. de Jaeger, S. González-Gaitán, J. P. Anderson, H. Kunkarayakti, G. Pignata, F. Bufano, J. Littín, F. Olivares, G. Medina, et al. “The high cadence transient survey (hits). i. survey design and supernova shock breakout constraints”. In: *The Astrophysical Journal* 832.2 (2016), p. 155. DOI: [10.3847/0004-637X/832/2/155](https://doi.org/10.3847/0004-637X/832/2/155). arXiv: [1609.03567](https://arxiv.org/abs/1609.03567).
- [16] P. Protopapas, P. **Huijse**, P. A. Estevez, P. Zegers, J. C. Principe, and J.-B. Marquette. “A novel, fully automated pipeline for period estimation in the EROS 2 data set”. In: *The Astrophysical Journal Supplement Series* 216.2 (2015), p. 25. DOI: [10.1088/0067-0049/216/2/25](https://doi.org/10.1088/0067-0049/216/2/25). arXiv: [1412.1840](https://arxiv.org/abs/1412.1840).
- [17] P. **Huijse**, P. A. Estevez, P. Protopapas, J. C. Principe, and P. Zegers. “Computational intelligence challenges and applications on large-scale astronomical time series databases”. In: *IEEE Computational Intelligence Magazine* 9.3 (2014), pp. 27–39. DOI: [10.1109/MCI.2014.2326100](https://doi.org/10.1109/MCI.2014.2326100). arXiv: [1509.07823](https://arxiv.org/abs/1509.07823).
- [18] P. **Huijse**, P. A. Estevez, P. Protopapas, P. Zegers, and J. C. Principe. “An information theoretic algorithm for finding periodicities in stellar light curves”. In: *IEEE Transactions on Signal Processing* 60.10 (2012), pp. 5135–5145. DOI: [10.1109/TSP.2012.2204260](https://doi.org/10.1109/TSP.2012.2204260). arXiv: [1212.2398](https://arxiv.org/abs/1212.2398).
- [19] P. **Huijse**, P. A. Estévez, P. Zegers, J. C. Príncipe, and P. Protopapas. “Period estimation in astronomical time series using slotted correntropy”. In: *IEEE Signal Processing Letters* 18.6 (2011), pp. 371–374. DOI: [10.1109/LSP.2011.2141987](https://doi.org/10.1109/LSP.2011.2141987). arXiv: [1112.2962](https://arxiv.org/abs/1112.2962).

## Research - Publications in Conference Proceedings

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- [1] A. Morales, J. Rojas, P. **Huijse**, and R. C. Ramos. “A Comparison of Convolutional Neural Networks for RR Lyrae Light Curve Classification”. In: *2021 IEEE Latin American Conference on Computational Intelligence (LA-CCI)*. IEEE. 2021, pp. 1–6. DOI: [10.1109/LA-CCI48322.2021.9769795](https://doi.org/10.1109/LA-CCI48322.2021.9769795).
- [2] A. Sánchez, P. **Huijse**, F. Förster, and G. Cabrera-Vives. “Amortized Variational Inference (AVI) for Type Ia Supernova Light Curves”. In: *NeurIPS 2021, Machine Learning and the Physical Sciences Workshop*. 2021. URL: [https://ml4physicalsciences.github.io/2021/files/NeurIPS\\_ML4PS\\_2021\\_10.pdf](https://ml4physicalsciences.github.io/2021/files/NeurIPS_ML4PS_2021_10.pdf).
- [3] N. Astorga, P. **Huijse**, P. Protopapas, and P. Estévez. “MPCC: Matching Priors and Conditionals for Clustering”. In: *European Conference on Computer Vision*. Springer, Cham. 2020, pp. 658–677. DOI: [10.1007/978-3-030-58592-1\\_39](https://doi.org/10.1007/978-3-030-58592-1_39). arXiv: [2008.09641](https://arxiv.org/abs/2008.09641).

- [4] N. Astorga, P. **Huijse**, P. A. Estévez, and F. Förster. “Clustering of Astronomical Transient Candidates Using Deep Variational Embedding”. In: *2018 International Joint Conference on Neural Networks (IJCNN)*. IEEE. 2018, pp. 1–8. DOI: [10.1109/IJCNN.2018.8489358](https://doi.org/10.1109/IJCNN.2018.8489358).
- [5] E. Reyes, P. A. Estévez, I. Reyes, G. Cabrera-Vives, P. **Huijse**, R. Carrasco, and F. Forster. “Enhanced rotational invariant convolutional neural network for supernovae detection”. In: *2018 International Joint Conference on Neural Networks (IJCNN)*. IEEE. 2018, pp. 1–8. DOI: [10.1109/IJCNN.2018.8489627](https://doi.org/10.1109/IJCNN.2018.8489627). arXiv: [1808.03626](https://arxiv.org/abs/1808.03626).
- [6] P. **Huijse**, N. Astorga, P. Estévez, and G. Pignata. “Latent representations of transient candidates from an astronomical image difference pipeline using variational autoencoders”. In: *26th European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning, ESANN 2018*. i6doc.com publication. 2018, pp. 321–326. URL: <https://www.esann.org/sites/default/files/proceedings/legacy/es2018-130.pdf>.
- [7] S. Ulloa, P. A. Estevez, P. **Huijse**, C. M. Held, C. A. Perez, R. Chamorro, M. Garrido, C. Algarin, and P. Peirano. “Sleep-spindle identification on EEG signals from polysomnographie recordings using correntropy”. In: *2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE. 2016, pp. 3736–3739. DOI: [10.1109/EMBC.2016.7591540](https://doi.org/10.1109/EMBC.2016.7591540).
- [8] P. **Huijse**, P. A. Estévez, F. Förster, and E. Berrocal. “Discriminating variable star candidates in large image databases from the HiTS survey using NMF”. In: *Procedia Computer Science* 53 (2015), pp. 29–38. DOI: [10.1016/j.procs.2015.07.276](https://doi.org/10.1016/j.procs.2015.07.276).
- [9] D. Nova, P. A. Estévez, and P. **Huijse**. “K-Nearest Neighbor Nonnegative Matrix Factorization for Learning a Mixture of Local SOM Models”. In: *Advances in Self-Organizing Maps and Learning Vector Quantization*. Springer, Cham, 2014, pp. 229–238. DOI: [10.1007/978-3-319-07695-9\\_22](https://doi.org/10.1007/978-3-319-07695-9_22).
- [10] P. **Huijse**, P. A. Estévez, P. Protopapas, P. Zegers, and J. C. Príncipe. “Computational Challenges in Processing Very Large Astronomical Survey Databases”. In: *2012 9th Asia-Pacific Symposium on Information and Telecommunication Technologies (APSITT)*. IEEE. 2012, pp. 1–6. URL: <https://ieeexplore.ieee.org/document/6379705>.
- [11] P. A. Estévez, P. **Huijse**, P. Zegers, J. C. Principe, and P. Protopapas. “Period detection in light curves from astronomical objects using correntropy”. In: *The 2010 International Joint Conference on Neural Networks (IJCNN)*. IEEE. 2010, pp. 1–7. DOI: [10.1109/IJCNN.2010.5596557](https://doi.org/10.1109/IJCNN.2010.5596557).

## Research - Conference Organization

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- Neural and learning systems chair, IEEE Latin American Conference on Computational Intelligence (LA-CCI), Montevideo, Uruguay. 2022
- Neural and learning systems chair, IEEE Latin American Conference on Computational Intelligence (LA-CCI), Temuco, Chile. 2021
- General chair, IEEE Latin American Summer School on Computational Intelligence (EVIC), Valdivia, Chile. 2019

## Teaching - Courses

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- ▶ Bayesian Learning and Neural Networks, Master in Informatics, UACH. 2019-today  
<https://phuijse.github.io/BLNNbook/>
- ▶ Scientific Computing with Python, Informatics Eng., UACH. 2019-today  
<https://phuijse.github.io/PythonBook/>
- ▶ Simulation, Informatics Eng., UACH. 2020-today  
<https://phuijse.github.io/MonteCarloBook/>
- ▶ Artificial Intelligence, Informatics Eng., UACH. 2018-today  
<https://phuijse.github.io/MachineLearningBook/>
- ▶ Statistical tools for research, Master in Informatics, UACH 2018-today  
<http://magister-informatica-uach.github.io/INF0337>
- ▶ Linear systems analysis, Informatics Eng., UACH 2018-2021  
<https://phuijse.github.io/UACH-INF0183/>

As collaborator:

- ▶ Data mining, Master in Informatics, UACH. 2018-today  
<https://github.com/magister-informatica-uach/INF0343-unidad5>
- ▶ Communications, Informatics Eng., UACH. 2018-today  
<https://phuijse.github.io/UACH-INF0185/>

As teaching assistant:

- ▶ Neural Networks and Information Theoretic Learning, Electrical Eng., U. de Chile. 2013-2015
- ▶ Computational Intelligence, Electrical Eng., U. de Chile. 2010-2016

## Teaching - Alumni

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- ▶ Nicolas Astorga, “Generative-Inference models: theory and applications”, MSc in Electrical Engineering, U. de Chile. 2021
- ▶ Alfredo Morales, “Adaption layers for the classification of light curves using artificial neural networks”, Informatics Engineering, UACH. 2021
- ▶ Leonardo Bravo, “Deep Neural network to classify light curves simulated for the vera rubin observatory”, MSc on Informatics, UACH. 2021
- ▶ Luis Guzmán, “Development of an imaging tool to quantify 3D biomedical image sequences”, Informatics Engineering, UACH. 2021
- ▶ Javier Rojas, “Variational autoencoder with factorized covariance for astronomical images”, Informatics Engineering, UACH. 2020
- ▶ Gabriela Gonzalez, “Injury prediction on amateur runners using physical activity tracking data”, MSc on Informatics, UACH. 2020



- ▶ Victor Vargas, “Automatic gesture recognition for chilean sign language translation”, Informatics engineering, UACH. 2019

In co-supervision:

- ▶ Diego Espejo, “Tool for the monitoring of Valdivian wetlands using neural networks for polyphonic sound event detection”, Acoustics Eng., UACH. 2022
- ▶ Alexis Sánchez, “Bayesian parameter estimation using amortized variational inference”, MSc in Computer Science, U. de Concepción. 2021
- ▶ Luis Alvarado, “Application of deep neural networks for the automatic recognition of musical chords”, MSc on Acoustics, UACH. 2020
- ▶ Fabian Ruíz, “Characterizing gender bias in communication media by using dynamic topic models”, MSc on Informatics, UACH. 2019
- ▶ Yetzabeth Gonzalez, “Design and implementation of a translation system from voice or text to chilean sign language using a 3D avatar”, Acoustics Engineer, UACH. 2019
- ▶ Javiera Astudillo, “An Information Theory Approach on Deciding Spectroscopic Follow Ups”, MSc on Computer Science, PUC. 2019
- ▶ Pablo Saavedra, “Estudio de la utilización del potencial de información cruzado en el aprendizaje con ensamble de redes neuronales”, Electrical Engineering, U. de Chile. 2017
- ▶ Joaquín Sanchez, “Análisis morfológico utilizando matching pursuit para detección de husos sigma en registros polisomnográficos”, Electrical Engineering, U. de Chile. 2016
- ▶ Emanuel Berrocal, “Métodos de detección de estrellas variables en imágenes astronómicas basados en factorización no-negative de matrices”, Mathematical Engineering, U. de Chile. 2015
- ▶ Marianne Fiedler, “Optimización de la detección de periodos de estrellas variables en la nube de magallanes”, U. de los Andes. 2015

## Others - Technical skills

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- ▶ **Programming languages:** ○○○ Python, C and C++ ○ C#, CUDA and Bash ○ R, Rust, Julia, Lua, HTML/CSS and Javascript
- ▶ **Libraries and APIs:** ○○○ NumPy, SciPy, Pandas, Scikit-Learn, Matplotlib, Holoviews, PyTorch, JAX, Flax, NumPyro, PyMC ○ OpenMP, OpenCV
- ▶ **IDEs and VSc:** ○○○ VSCode, NeoVim and Git ○ Matlab ○ RStudio
- ▶ **OSs and platforms:** ○○○ GNU Linux and MS Windows ○ Arduino/AVR, Raspberry PI, Olimexino and Teensy (ARM)
- ▶ **Editorial/Multimedia:** ○○○ Latex and [Jupyter Book](#) ○ Libreoffice, GIMP, Inkscape, OBS studio, Shotcut, Blender, Unity and Godot

○○○ Proficient ○ Familiar ○ Basic

**Others - Languages**

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- ▶ Spanish (native)
- ▶ English (fluent)

**Others - Interests**

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Specialty coffee, PC video games, Board games, 3D printing, Video game design and Game engines, Japanese animation and culture, Karate-do, Hiking, Transverse flute and saxophone, Bread making.