Pablo Andrés Huijse Heise

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I Education

- 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

II Academic positions

- Assistant professor, Informatics Institute, Universidad Austral de Chile 2018-today

III Research - Interests

Machine Learning, Information Theory, Statistical Signal Processing, Astroinformatics

IV Research - Experience

- Postdoc research "Development of methods for big-data astronomical problems based on Information Theory and Machine Learning", Millennium Institute of Astrophysics, Chile 2014-2017
- Postgraduate research "Design of an overcomplete and sparse decomposition for the correntropy function", Computational Neuro-Engineering Laboratory, University of Florida, Gainesville, USA. Supervisor: Prof. José C. Príncipe 2013
- Postgraduate research "Design of a pipeline for periodic light curve discrimination and its application to the EROS-2 database", Institute of Applied Computational Sciences, Harvard University, Boston, USA. Supervisor: Dr. Pavlos Protopapas 2012
- PhD research "Finding Periodicities in astronomical light curves using information theoretic learning", Universidad de Chile, Chile. Supervisor: Prof. Pablo A. Estévez. URL: http://repositorio.uchile.cl/handle/2250/117099 2010-2014

- Research assistant "Information theoretic learning functionals programmed in graphical processing units", Universidad de Chile, Chile. Supervisor: Prof. Pablo A. Estévez 2009
- Research assistant "Robotic manipulator control and object recognition", Universidad de Chile, Chile. Supervisor: Prof. Javier Ruiz del Solar 2009

V Research - Publications in WoS/ISI Journals

- P. Sánchez-Sáez, I. Reyes, C. Valenzuela, F. Förster, S. Eyheramendy, F. Elorrieta, F. Bauer, G. Cabrera-Vives, P. Estévez, M. Catelan, et al. Alert classification for the alerce broker system: The light curve classifier. *The Astronomical Journal*, volume 161, page 141. IOP Publishing, 2021.
- F. Pérez-Galarce, K. Pichara, **P. Huijse**, M. Catelan, and D. Mery. Informative bayesian model selection for rr lyrae star classifiers. *Monthly Notices of the Royal Astronomical Society*, volume 503, pages 484–497. Oxford University Press, 2021.
- F. Förster, G. Cabrera-Vives, E. Castillo-Navarrete, P. Estévez, P. Sánchez-Sáez, J. Arredondo, F. Bauer, R. Carrasco-Davis, M. Catelan, F. Elorrieta, et al. The automatic learning for the rapid classification of events (alerce) alert broker. *The Astronomical Journal*, volume 161, page 242. IOP Publishing, 2021.
- F. Tobar, L. Araya-Hernández, **P. Huijse**, and P. M. Djurić. Bayesian reconstruction of fourier pairs. *IEEE Transactions on Signal Processing*, volume 69, pages 73–87. IEEE, 2020.
- J. Peña, C. Fuentes, F. Förster, J. Martínez-Palomera, G. Cabrera-Vives, J. Maureira, **P. Huijse**, P. Estévez, L. Galbany, S. González-Gaitán, et al. Asteroids' size distribution and colors from hits. *The Astronomical Journal*, volume 159, page 148. IOP Publishing, 2020.
- 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. *Publications of the Astronomical Society of the Pacific*, volume 131, page 108006. IOP Publishing, 2019.
- J. Astudillo, P. Protopapas, K. Pichara, and **P. Huijse**. An information theory approach on deciding spectroscopic follow-ups. *The Astronomical Journal*, volume 159, page 16. IOP Publishing, 2019.
- **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 multi-band light curves in the synoptic survey era. *The Astrophysical Journal Supplement Series*, volume 236, page 12. IOP Publishing, 2018.
- 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. *The Astrophysical Journal*, volume 863, page 79. IOP Publishing, 2018.

- J. Peña, C. Fuentes, F. Förster, J. C. Maureira, J. San Martín, J. Littín, **P. Huijse**, G. Cabrera-Vives, P. Estévez, L. Galbany, et al. Asteroids in the high cadence transient survey. *The Astronomical Journal*, volume 155, page 135. IOP Publishing, 2018.
- 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, et al. The high cadence transit survey (hits): Compilation and characterization of light-curve catalogs. *The Astronomical Journal*, volume 156, page 186. IOP Publishing, 2018.
- F. Förster, T. Moriya, J. Maureira, J. Anderson, S. Blinnikov, F. Bufano, G. Cabrera-Vives, A. Clocchiatti, T. De Jaeger, P. Estévez, et al. The delay of shock breakout due to circumstellar material evident in most type ii supernovae. *Nature Astronomy*, volume 2, pages 808–818. Nature Publishing Group, 2018.
- R. C. Ramos, M. Zoccali, F. Rojas, A. Rojas-Arriagada, M. Gárate, **P. Huijse**, F. Gran, M. Soto, A. Valcarce, P. Estévez, et al. Proper motions in the vvv survey: Results for more than 15 million stars across ngc 6544. *Astronomy & Astrophysics*, volume 608, page A140. EDP Sciences, 2017.
- F. Förster, J. C. Maureira, J. San Martín, M. Hamuy, J. Martínez, **P. Huijse**, G. Cabrera, L. Galbany, T. De Jaeger, S. González-Gaitán, et al. The high cadence transient survey (hits). i. survey design and supernova shock breakout constraints. *The Astrophysical Journal*, volume 832, page 155. IOP Publishing, 2016.
- 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. *The Astrophysical Journal Supplement Series*, volume 216, page 25. IOP Publishing, 2015.
- **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. *IEEE Computational Intelligence Magazine*, volume 9, pages 27–39. IEEE, 2014.
- **P. Huijse**, P. A. Estevez, P. Protopapas, P. Zegers, and J. C. Principe. An information theoretic algorithm for finding periodicities in stellar light curves. *IEEE Transactions on Signal Processing*, volume 60, pages 5135–5145. IEEE, 2012.
- **P. Huijse**, P. A. Estévez, P. Zegers, J. C. Príncipe, and P. Protopapas. Period estimation in astronomical time series using slotted correntropy. *IEEE Signal Processing Letters*, volume 18, pages 371–374. IEEE, 2011.

VI Research - Publications in Conference Proceedings

- N. Astorga, **P. Huijse**, P. Protopapas, and P. Estévez. Mpcc: Matching priors and conditionals for clustering. In *European Conference on Computer Vision*, pages 658–677. Springer, Cham, 2020.
- **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*, pages 321–326. i6doc. com publication, 2018.

- 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)*, pages 1–8. IEEE, 2018.
- 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)*, pages 1–8. IEEE, 2018.
- 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)*, pages 3736–3739. IEEE, 2016.
- **P. Huijse**, P. A. Estévez, F. Förster, and E. Berrocal. Discriminating variable star candidates in large image databases from the hits survey using nmf. *Procedia Computer Science*, volume 53, pages 29–38. Elsevier, 2015.
- 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*, pages 229–238. Springer, Cham, 2014.
- **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)*, pages 1–6. IEEE, 2012.
- 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)*, pages 1–7. IEEE, 2010.

VII Research - Grants and scholarships

- ANID FONDECYT regular 1211374, "Novel Deep Learning Architectures for Astronomical Time Series" 2021-2023
- CONICYT PAI 79170017, "Fortalecimiento de la ciencia de datos en la Universidad Austral de Chile" 2018-2021
- CONICYT FONDECYT regular 1170305, "Efficient methods based on information theory and machine learning for astronomical images and time series analysis" 2017-2020
- CONICYT FONDECYT postdoc 3150460, "Métodos eficientes de procesamiento de señales basados en teoría de la información y aprendizaje de máquinas para el análisis de series de tiempo astronómicas" 2014-2016
- CONICYT travel grant for doctoral students to visit the Computational Neuro-Engineering Laboratory at the University of Florida 2013
- CONICYT travel grant for doctoral students to visit the Institute of Applied Computational Sciences at Harvard university 2012
- CONICYT scholarship for PhD education at the Universidad de Chile 2010-2014

VIII Teaching - Courses

- Simulation, UACh 2020-today
  https://github.com/phuijse/INFO274/
- Neural Networks and Bayesian Learning, UACh 2019-today
  https://github.com/magister-informatica-uach/INFO320/
- Scientific computing with Python, UACh 2019-today
  https://magister-informatica-uach.github.io/INFO147/
- Statistical tools for research, UACh 2018-today
  https://github.com/magister-informatica-uach/INFO337
- Data mining (collaborator), UACh 2018-today
  https://github.com/magister-informatica-uach/INFO343-unidad5
- Artificial Intelligence (collaborator), UACh 2018-today
  https://github.com/phuijse/INFO257
- Communication systems (collaborator), UACh 2018-today
  https://phuijse.github.io/UACH-INFO185/
- Linear systems analysis, UACh 2018-today
  https://phuijse.github.io/UACH-INFO183/
- Neural Networks and Information Theoretic Learning (assistant), UChile 2013-2015
- Computational Intelligence (assistant), UChile 2010-2016

IX Teaching - Alumni

- Alfredo Morales, "Capas de adaptación para la clasificación de Curvas de Luz usando Redes Neuronales Artificiales", Informatics Engineering, UACh, 2021
- Leonardo Bravo, "Learning latent representations for multidimensional and sparse light curves", MSc on Informatics, UACh, 2021
- Javier Rojas, "Autoencoder Variacional con Covarianza Factorizada para Imágenes Astronómicas", Informatics Engineering, UACh, 2020
- Gabriela Gonzalez, "Injury prediction on amateur runners using physical activity tracking data", MSc on Informatics, UACh, 2020
- Carlos Blaña, "Analysis of Astronomical X-ray Time Series using Kernels and Gaussian Processes", MSc on Informatics, UACh, 2019
- Fabian Ruíz, "Characterizing gender bias in communication media by using dynamic topic models", MSc on Informatics, UACh, 2019 (co-supervisor)
- Victor Vargas, "Automatic gesture recongition for chilean sign language translation", Informatics engineering, UACh, 2019
- Javiera Astudillo, "An Information Theory Approach on Deciding Spectroscopic Follow Ups", MSc on Computer Science, PUC, 2019 (co-supervisor)

- Pablo Saavedra, "Estudio de la utilización del potencial de información cruzado en el aprendizaje con ensamble de redes neuronales", Department of Electrical Engineering, Universidad de Chile, 2017 (co-supervisor)
- Joaquín Sanchez, "Análisis morfológico utilizando matching pursuit para detección de husos sigma en registros polisomnográficos", Department of Electrical Engineering, Universidad de Chile, 2016 (co-supervisor)
- Emanuel Berrocal, "Métodos de detección de estrellas variables en imágenes astronómicas basados en factorización no-negative de matrices", Department of Mathematical Engineering, Universidad de Chile, 2015 (co-supervisor)
- Marianne Fiedler, "Optimización de la detección de periodos de estrellas variables en la nube de magallanes", Universidad de los Andes, 2015 (co-supervisor)

X Others - Technical skills

- **Programming languages:** ●●●● Python, C and C++ ●●● C#, CUDA and Bash ●● R and Julia ● HTML/CSS, Javascript and Verilog
- **IDEs:** ●●●● VSCode, Jupyter notebook/lab and Vim ●●● Matlab ●● RStudio
- **Version control systems:** ●●●● Git/Github
- **Operating systems and platforms:** ●●●● GNU Linux and MS Windows ●●● Arduino/AVR, Raspberry PI, Olimexino and Teensy (ARM)
- **Publishing:** ●●●● Latex and Jupyter Book ●●● Libreoffice, GIMP, Inkscape, Blender and Unity ●● Godot

●●●● Proficient ●●● Experienced ●● Familiar ● Basic

XI Others - Languages

- Spanish (native)
- English (fluent)

XII Others - Interests

Video game design, Game engines, Generative art, Music synthesis, 3D printing, Japanese animation and culture, Hiking, Karate-do, Transverse flute and saxophone, Bread making.