Francisco **Mena**

PhD Candidate · Computer Science

Kaiserslautern, Germany

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About Me

My commitment is to contribute to the understanding of machine learning by identifying the capabilities and limitations of the learning models. At present, the computational complexity of current solutions has grown notably, requiring more resources and data for the proper learning of them. For this reason, it is necessary to propose models with different approaches, changing the perspective of solutions in different areas.

Research Lines & Interests

Deep Learning	Artificial Neural Networks, Multi-view Learning, Data Fusion, Multi-sensor Modeling, (Variational) Autoencoders
Applications	Earth Observation, Vegetation Applications, Crowdsourcing, Neural Information Retrieval, Astroinformatics
Unsupervised Learning	Dimensionality Reduction, Representation Learning, Latent Variable Modeling, Deep Clustering

Education

PhD in Computer Science
Kaiserslautern, Germany

University of Kaiserslautern-Landau (RPTU) — *Jan. 2022 - Now*

- Thesis title: *Data Fusion in Multi-view Learning for Earth Observation Applications with Missing Views*.
- Description: This thesis addresses the challenge of handling missing views in multi-view learning models for Earth Observation data, which is often heterogeneous and inconsistently available. It focuses on three main areas: data fusion modeling, analysis of how missing data impacts model performance, and enhancing model robustness to such missing views.

Magíster en Ciencias de la Ingeniería Informática
Valparaíso, Chile

Federico Santa María Technical University (UTFSM) — *Mar. 2018 - Sep. 2020*

- Equivalent to *Master of Science in Computer Engineering*.
- Thesis title: *Mixture Models for Learning in Crowdsourcing Scenarios*.
- Description: The learning from crowds field was explored by using probabilistic model and neural networks. Two methods were proposed to learn from multiple inexpert annotations based on collective confusion patterns and the EM algorithm for inference. The results evidenced better scalabaility, in computationally and inference terms, for large-scale annotations.
- Grade Point Average: 94%.

Ingeniería Civil en Informática
Santiago, Chile

Federico Santa María Technical University (UTFSM) — *Mar. 2013 - Sep. 2020*

- Equivalent to *Computer Engineering*.
- Grade Point Average: 80%.
- Top 10% on Class Rank. – Rank #4 of 66 students.

Licenciado en Ciencias de la Ingeniería Informática
Santiago, Chile

Federico Santa María Technical University (UTFSM) — *Mar. 2013 - Nov. 2017*

- Equivalent to *Bachelor of Science in Computer Engineering*.
- Records linked to "*Ingeniería Civil en Informática*".

High School
Santiago, Chile

New Little College — *Mar. 2008 - Dec. 2012*

- Secondary education, humanities and sciences.

Experience

German Research Centre for Artificial Intelligence (DFKI)
Kaiserslautern, Germany

Student Research Assistant — *Mar. 2022 - Now*

- Working together with PhD on Earth Observation data for crop yield prediction.
- **Technologies**: Python, Confluence, Jira, Teams, OneDrive, Gitlab, QGIS, and Slurm.

University of Kaiserslautern-Landau (RPTU)
Kaiserslautern, Germany

Academic — *Oct. 2024 - Apr. 2025*

- (Lecturer) *Machine Learning for Earth Observation Applications* topic inside the Applications of Machine Learning and Data Science course.

Inria
Montpellier, France

PhD Visitor Researcher — *Nov. 2024 - Jan. 2025*

- Research exploration in topics of multi-modal co-learning, multi-task learning and mutual distillation.
- **Technologies**: Python, PyTorch, Overleaf, Slurm.

Federico Santa María Technical University (UTFSM) *Santiago, Chile*

Academic *2014 - 2021*

- (Lecturer) Computational Statistics, 3 times, since 2020.
- (Lecturer) Artificial Neural Networks, 1 time, in 2020.
- (Teacher Assistant) Computational Statistics, 2 time, since 2019.
- (Teacher Assistant) Artificial Neural Networks, 3 time, since 2018.
- (Teacher Assistant) Machine Learning, 3 time, since 2017.
- (Teacher Assistant) Fundamentals of Operations Research, 3 time, since 2017.
- (Laboratory Assistant) Mathematics, 1 time, in 2014.

Federico Santa María Technical University (UTFSM) *Santiago, Chile*

Research Assistant at Chilean virtual Observatory (ChiVO) *Jul. 2017 - May 2018*

- Professional practice as research assistant on different astroinformatics projects.
- **Technologies**: Jupyter Notebook, FITS, Python and Slurm.
- Working on the astronomical data reduction of ALMA and ESO observatories, and the creation of astronomical datasets.

Farmacia Las Rosas S.A. *Santiago, Chile*

Front-end & Back-end Developer *Jan. 2017 - Mar. 2017*

- Industrial practice as a desktop application developer.
- **Technologies**: Python, QT and Excel.
- Some operational functions of the pharmacy were automated.

Honors & Awards

2022	**PhD Scholarship,** RPTU in Kaiserslautern	*2022-present*
2019	**Incentive Program for Scientific Initiation (PIIC),** Federico Santa María Technical University	*2019-2020*
2018	**Master program scholarship,** Federico Santa María Technical University	*2018-2020*
2013	**Honor Roll,** *Institutional excellence*, Federico Santa María Technical University	*2013*

Research funding

2020	**Investigator,** DGIP PI_M_17_6, Federico Santa María Technical University (UTFSM)	*Chile*
2019	**Research Assistant,** BASAL FB-0008, Advanced center for Electrical & Electronic Engineering (AC3E)	*Chile*
2017-2018	**Research Assistant,** FONDEF IT15I10041, Chilean Virtual Observatory (ChiVO)	*Chile*

Publications

Peer-Reviewed Articles in Journal

Multi-sensor model for Earth observation robust to missing data via sensor dropout and mutual distillation *IEEE Access*

Francisco Mena, Dino Ienco, Cassio F. Dantas, Roberto Interdonato, Andreas Dengel *May 2025*

DOI 10.1109/ACCESS.2025.3568706

Missing data as augmentation in the Earth Observation domain: A multi-view learning approach *Neurocomputing*

Francisco Mena, Diego Arenas, Andreas Dengel *Jul. 2025*

DOI 10.1016/j.neucom.2025.130175

Adaptive fusion of multi-modal remote sensing data for optimal sub-field crop yield prediction *Remote Sensing of Enviroment*

Francisco Mena, Deepak Pathak, ..., Andreas Dengel *Mar. 2025*

DOI 10.1016/j.rse.2024.114547

Common practices and taxonomy in deep multiview fusion for remote sensing applications *IEEE JSTARS*

Francisco Mena, Diego Arenas, Marlon Nuske, Andreas Dengel *Feb. 2024*

DOI 10.1109/JSTARS.2024.3361556

On the quality of deep representations for Kepler light curves using variational auto-encoders *MDPI Signals*

Francisco Mena, Patricio Olivares, Margarita Bugueño, Gabriel Molina, Mauricio Araya *Oct. 2021*

DOI 10.3390/signals2040042

Harnessing the power of CNNs for unevenly-sampled light-curves using Markov transition field *Astronomy and Computing*

Margarita Bugueño, Gabriel Molina, **Francisco Mena**, Patricio Olivares, Mauricio Araya *Mar. 2021*

DOI 10.1016/j.ascom.2021.100461

Interpretable and effective hashing via Bernoulli variational auto-encoders *Intelligent Data Analysis*

Francisco Mena, Ricardo Ñanculef, Carlos Valle *Dec. 2020*

DOI 10.3233/IDA-200013

Collective annotation patterns in learning from crowds *Intelligent Data Analysis*

Francisco Mena, Ricardo Ñanculef, Carlos Valle *Dec. 2020*

DOI 10.3233/IDA-200009

Classical machine learning techniques in the search of extrasolar planets *CLEI Electronic Journal*

Francisco Mena, Margarita Bugueño, Mauricio Araya *Dec. 2019*

DOI 10.19153/cleiej.22.3.3

Peer-Reviewed Conferences

An analysis of temporal dropout in Earth observation time series for regression tasks — *IDA, Springer*, *May 2025*
Miro Miranda, **Francisco Mena**, Marcela Charfuelan, Andreas Dengel
DOI 10.1007/978-3-031-91398-3_29

Impact assessment of missing data in model predictions for Earth observation applications — *IGARSS, IEEE*, *Oct. 2024*
Francisco Mena, Diego Arenas, Marcela Charfuelan, Marlon Nuske, Andreas Dengel
DOI 10.1109/IGARSS53475.2024.10640375

A comparative assessment of multi-view fusion learning for crop classification — *IGARSS, IEEE*, *Oct. 2023*
Francisco Mena, Diego Arenas, Marlon Nuske, Andreas Dengel
DOI 10.1109/IGARSS52108.2023.10282138

Self-supervised Bernoulli autoencoders for semi-supervised hashing — *CIARP, Springer*, *Jan. 2022*
Ricardo Ñanculef, **Francisco Mena**, Antonio Macaluso, Steffano Lodi, Claudio Sartori
DOI 10.1007/978-3-030-93420-0_25

Revisiting machine learning from crowds a mixture model for grouping annotations — *CIARP, Springer*, *Oct. 2019*
Francisco Mena, Ricardo Ñanculef
DOI 10.1007/978-3-030-33904-3_46

A binary variational autoencoder for hashing — *CIARP, Springer*, *Oct. 2019*
Francisco Mena, Ricardo Ñanculef
DOI 10.1007/978-3-030-33904-3_12

Refining exoplanet detection using supervised learning and feature engineering — *CLEI, IEEE*, *Oct. 2018*
Margarita Bugueno, **Francisco Mena**, Mauricio Araya
DOI 10.1109/CLEI.2018.00041

Skills

Computer	Python, Keras, PyTorch, Jupyter Notebook, LaTeX, , C++, C, R, Sony Vegas
Supervision	Three Master theses, five student projects
Communication	Lecturer role at University, session chair at conferences, presentations in conferences and workshops
Personal	Teamwork, planning and organization, responsability, collaboration
Languages	Spanish (Native), English (IELTS 7.0)

References

Diego Arenas	diego.arenas@dfki.de, *Smart Data & Knowledge Services*, German Research Centre for Artificial Intelligence.
Andreas Dengel	andreas.dengel@dfki.de, *Department of Computer Science*, University of Kaiserslautern-Landau.
Dino Ienco	dino.ienco@inrae.fr, *INRAE*, University of Montpellier.
Ricardo Ñanculef	jnancu@inf.utfsm.cl, *Informatics Department*, Federico Santa María Technical University.
Mauricio Araya	mauricio.araya@usm.cl, *Electronics Department*, Federico Santa María Technical University.