Carlos Minutti

Curriculum Vitae

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carlos-minutti

Data Scientist and Researcher with extensive experience in the design of applied statistical and artificial intelligence models. Strong background in Statistics, Applied Mathematics, and Computer Science, specialized in Machine Learning, Deep Learning, Big Data, databases, and multivariate statistics. Recognized track record in academic research, with international publications and awards, as well as consulting experience for governmental institutions and industry.

Education

2015-2020 **PhD in Computer Science**, *National University of Mexico*, Field: Scientific Computing, Optimization, Machine Learning, Data Science, Institute of Research in Applied Mathematics and Systems
Cum Laude

2017-2018 **Research Internship**, *University of Waterloo*, Field: Scientific Computing and Optimization, Canada

2011-2013 **Master's in Applied Mathematics**, *National University of Mexico*, Field: Statistics, Probability, and Scientific Computing, Institute of Research in Applied Mathematics and Systems

2003-2007 **Bachelor in Statistics**, *University of Chapingo*, Department of Statistics, Mathematics, and Computing

Experience

2024- **Research Scientist and Professor at the Center for Research and Innovation in Information and Communication Technologies (INFOTEC)**, *Research in Data Science and Artificial Intelligence applications, and professor for the Master and PhD programs in Data Science*, INFOTEC, *https://www.infotec.mx*

2022-2024 **Postdoctoral researcher working on the use, classification and analysis of medical images using artificial intelligence methods to identify health problems.**, *CECAv - UNAM*, *https://cecav.unam.mx*

2021-2022 **Researcher associated at the Interdisciplinary Professional Unit in Engineering and Advanced Technologies at the National Polytechnic Institute (Mexico)**, *UPIITA - IPN*, *https://www.upiita.ipn.mx*

2022-2022 **Lecturer in the Data Science undergraduate program at the National Autonomous University of Mexico, for the subject "Time Series"**, *UNAM*, *https://cienciadatos.iimas.unam.mx/*

2022-2022 **Lecturer in the master's program in Data Science at the Center for Research and Innovation in Information and Communication Technologies, for the subject "Web Analytics"**, *INFOTEC*, *https://www.infotec.mx/MCDI/*

2020-2021 **Researcher associated at the Artificial Intelligence Consortium for the National Council of Science and Technology (Mexico), with the project: Automated prediction of air pollutant concentrations in the Mexico City area using Artificial Intelligence.**, *CONACyT*, *https://www.consorcioia.mx*

2020 **Software developer for Mayaf, an automated software for Pressure Transient Analysis (PTA) in well testing**, *Mayaf software*, *https://mayaf-software.com/*

2016-2020 **Developer of a machine-learning method to predict defaults for loans to small and medium enterprises**, *Fintech: Proyecto-PyME*, *http://proyecto-pyme.com/*

2017-2018 **Research project at the University of Waterloo to develop an hydraulic tomography algorithm**, *Earth and Environmental Sciences*, University of Waterloo, Canada

2015-2016 **Principal statistical consultant and analyst at the project: "National survey of perception and knowledge on climate change in Mexico"**, *Collaboration Platform on Climate Change and Green Growth Between Canada and Mexico*, National Institute of Ecology and Climate Change, INECC-PNUD

2014 **Data base validation in the reconstruction of the 1930 Mexican Census**, *National Institute of Statistics and Geography*, INEGI

2013 **Programmer of the software get-yahoo-db**, http://code.google.com/p/get-yahoo-db/

2013-2014 **Research project: Characterization of Natural Fractured Vuggy Oil Reservoirs**, *The National Mexican Petroleum Company and The Secretariat of Energy*, CONACYT-SENER

2012 **Platform development for the reconstruction of the 1930 Mexican Census**, *National Institute of Statistics and Geography*, INEGI

2008-2019 **Statistical consultant and data scientist at Minnova Consulting**, http://minnova-consulting.com

Languages

Spanish Native

English Advanced

Software and programming

OS Gnu/Linux (Gentoo, Slackware, Ubuntu), MS-Windows (XP, NT, Vista, 7, 10), MS-DOS, Mac OS X.

Office Microsoft Office (Word, PowerPoint, Excel, Access), LibreOffice.

Programming C/C++, Fortran+MPI, Python, Bash Scripting.

Scientific programming R 4.0, SAS V9, Minitab 15, Splus, SPSS 16, STATA 10, JMP 8, Octave, Matlab, SciLab, Maxima. Python (NumPy, SciPy, Pandas, PyTorch).

Graphics The GIMP 2.8, Blender, Inkscape.

Publishing LaTeX, Scribus.

Web HTML, PHP, JavaScript, XML, AWS.

Data bases MySQL, SQLite, Access.

Publications

- C. Minutti-Martinez, M. F. Mata-Rivera, M. Arellano-Vazquez, B. Escalante-Ramírez, J. Olveres. **"Air Pollution, Socioeconomic Status, and Avoidable Hospitalizations: A Multifaceted Analysis"**. Mathematical and Computational Applications, 30(4), 69. (2025).
- M. Arellano-Vazquez, M. Zamora-Machado, M. Robles Pérez, C. Minutti-Martinez, M. O. Jaramillo Salgado. **"Dynamic Wind Condition Detection in Baja California, Mexico: A Machine Learning Approach for Improved Wind Management"**. IEEE Latin America Transactions, 23(5), 387–396. (2025).
- C. Minutti-Martinez, M. F. Mata-Rivera, M. Arellano-Vazquez, B. Escalante-Ramírez, J. Olveres. **"Air Pollution, Socioeconomic Status, and Avoidable Hospitalizations in Mexico City: A Multifaceted Analysis"**. Lecture Notes in Computer Science, Springer, Cham. (2025).
- C. Minutti. **"Unraveling the Complex Interplay Between Socioeconomic Status, Air Pollution, and Heart Disease Hospitalizations in an Urban Population"**. Proceedings of the 21st International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE). (2024).
- R. Carrillo, C. Minutti, P. Lagunes. **"A Comprehensive Methodology for Performing Continued Process Verification"**. IEEE 37th International Symposium on Computer-Based Medical Systems (CBMS). (2024).
- C. Minutti-Martinez, B. Escalante-Ramírez, J. Olveres-Montiel. **"Enhancing Interpretability and Bias Control in Deep Learning Models for Medical Image Analysis Using Generative AI"**. Proceedings of SPIE. (2024).
- C. Minutti-Martinez, B. Escalante-Ramírez, J. Olveres-Montiel. **"PumaMedNet-CXR: An Explainable Generative Artificial Intelligence for the Analysis and Classification of Chest X-Ray Images"**. Lecture Notes in Computer Science, Springer, Cham, vol 14392, pp. 211–224, 2023.
- C. Minutti-Martinez, A. Galindo, L. F. Valdez-Garduño and M. F. Mata-Rivera, **"Exploring nonlinear effects of air pollution on hospital admissions by disease using gradient boosting machines"**. 19th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE). pp. 1-6. IEEE. 2022.
- C. Minutti-Martinez, M. Arellano-Vázquez, M. Zamora-Machado **"A Hybrid Model for the Prediction of Air Pollutants Concentration, Based on Statistical and Machine Learning Techniques"**. Lecture Notes in Computer Science, Springer, Cham, vol 13068, pp. 252–264, 2021.
- C. Minutti, W. A. Illman and S. Gomez. **"A New Inverse Modeling Approach for Hydraulic Conductivity Estimation Based on Gaussian Mixtures"**. Water Resources Research, 56, e2019WR026531. 2020.
- M. Arellano-Vazquez, C. Minutti-Martinez and M. Zamora-Machado. **"Automated Characterization and Prediction of Wind Conditions Using Gaussian Mixtures"**. Lecture Notes in Computer Science, Springer, Cham, 12468, pp. 1-11, 2020.
- C. Minutti, G. Ramos and S. Gomez. **"An Algorithm for Hydraulic Tomography Based on a Mixture Model"**. (Computational Science - ICCS 2019. Lecture Notes in Computer Science, vol 11538. Springer, Cham. 2019.
- C. Minutti, G. Ramos and S. Gomez. **"A machine-learning approach for noise reduction in parameter estimation inverse problems, applied to characterization of oil reservoirs"**. Journal of Physics: Conference Series. 2018.

- G. Ramos, J. Carrera, S. Gomez, C. Minutti and R. Camacho. **"A stable computation of log-derivatives from noisy drawdown data"**. Water Resour. Res., 53, 7904–7916. 2017.
- C. Minutti, G. Ramos and S. Gomez. **"Robust Characterization of Naturally Fractured Carbonate Reservoirs through Sensitivity Analysis and Noise Propagation Reduction"**. SPE-181182-MS. SPE Latin America and Caribbean Heavy and Extra Heavy Oil Conference, 19-20 October, Lima, Peru. 2016.
- Francisco J. Zamudio, Roxana I. Arana, Javier Jimenez, Carlos Minutti, Javier Santibanez, Robert McCaa. **"Muestreo Probabilístico para la Recuperación de los Microdatos del Censo General de Población de 1930"**. Instituto Nacional de Estadística y Geografía, 2015.
- R. Camacho-V, N. Fuenleal-M, T. Castillo-R, S. Gómez, G. Ramos, C. Minutti-M, M. Vásquez-C, A. Mesejo. G. Fuentes-C. **"Avances en la caracterización integral de un yacimiento naturalmente fracturado vugular, el caso Ayatsil-Tekel"**. Ingeniería Petrolera. VOL. 54, No. 10, Octubre 2014
- R. Camacho-V, S. Gómez, M. Vásquez-C, N. Fuenleal-M, T. Castillo-R, G. Ramos, C. Minutti-M, A. Mesejo, G. Fuentes-C. **"Well Testing Characterization of Heavy-Oil Naturally Fractured Vuggy Reservoirs"**. SPE-171078-MS. SPE Heavy and Extra Heavy Oil Conference: Latin America, 24-26 September, Medellín, Colombia. 2014.

International Conferences

- C. Minutti. **"Cyclo-VGAE: Dual-Mechanism Approach to GNN Robustness Against Noisy Labels"**. International Joint Conference on Neural Networks (IJCNN) 2025. Rome, Italy. (2025).
- C. Minutti. **"Unraveling the Complex Interplay Between Socioeconomic Status, Air Pollution, and Heart Disease Hospitalizations in an Urban Population"**. 21st International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE). Mexico City, Mexico. (2024).
- C. Minutti. **"Air Pollution, Socioeconomic Status, and Avoidable Hospitalizations in Mexico City: A Multifaceted Analysis"**. 6th Workshop on New Trends in Computational Intelligence and Applications. INAOE, Puebla, Mexico. (2024).
- C. Minutti. **"Enhancing interpretability and bias control in deep learning models for medical image analysis using generative AI"**. SPIE Photonics Europe 2024. Strasbourg, France. 7-11 April. (2024).
- C. Minutti. **"PumaMedNet-CXR: An Explainable Denoising Autoencoder for the Analysis and Classification of Chest X-Ray Images"**. 22th Mexican International Conference on Artificial Intelligence, 13-18 November, IIMAS-UNAM (UAEY) - UADY, Mérida, Yucatán, México. 2023.
- C. Minutti. **"Exploring nonlinear effects of air pollution on hospital admissions by disease using gradient boosting machines"**. 19th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE), Mexico City, Mexico. 2022.
- C. Minutti. **"Automated Prediction of Air Pollutant Concentrations in Mexico City, Using Artificial Intelligence Methods"**. 20th Mexican International Conference on Artificial Intelligence, 25-30 October, Mexico City, Mexico. 2021.

- C. Minutti. **"An algorithm to perform hydraulic tomography based on a mixture model"**. International Conference on Computational Science, 12-14 June, Faro, Algarve, Portugal. 2019.
- C. Minutti. **"An approach for noise reduction in inverse problems, applied to well-test data"**. 9th International Conference on Inverse Problems in Engineering, May 23-26, University of Waterloo, ON, Canada. 2017.
- C. Minutti. **"A Methodology for the Characterization of Naturally Fractured-Vuggy Carbonate Reservoirs Using Statistical Methods"**. Eighth International Conference "Inverse Problems: Modeling and Simulation", May 23-28, Ölüdeniz, Fethiye, Turkey. 2016.

Awards and distinctions

2025 **Second Place in the Natural Language Processing (NLP) Competition**, *"Researching Sentiment Evaluation in Text for Mexican Magical Towns" (Rest-Mex 2025) at the Iberian Languages Evaluation Forum (IberLEF) 2025*, IberLEF, Spain

2025 **First Place in the "Learning with Noisy Graph Labels Competition"**, *At the "International Joint Conference on Neural Networks 2025" of The International Neural Network Society (INNS)*, IJCNN, Rome, Italy

2024 **AFIRME-FUNAM award**, *3rd Place in the research category of the AFIRME-FUNAM award, which has the purpose of promoting and recognizing scientific research in the areas of Physical-Mathematical Sciences and Engineering through the National University of Mexico and AFIRME Financial Group*, UNAM Foundation, Mexico

2024 **INFOTEC-HUAWEI AI 1000 Talent Development Program Awardee**, *Out of 1000 participants, the AI 1000 program rewards the top 100 Huawei HCIA-AI certification results with a 2-week AI training program at Huawei's facilities in Hangzhou, China*, HUAWEI, China

2023 **1st Place in the the Best Paper Award at the 22nd Mexican International Conference on Artificial Intelligence**, *The Mexican Society for Artificial Intelligence*, `https://doi.org/10.1007/978-3-031-47640-2_18`, Mexico

2023 **Member of the National System of Researchers (SNI), Level C**, *Interdisciplinary Area*, `https://conacyt.mx/sistema-nacional-de-investigadores/`, Mexico

2021 **Top 3% (Silver medal) in the Kaggle competition: Google Smartphone Decimeter Challenge**, *Ranked in the top 3% of the Data science / AI competition "Google Smartphone Decimeter Challenge", with 810 teams and 985 competitors from around the world*, https://www.kaggle.com/c/google-smartphone-decimeter-challenge

2017 **Scholarship recipient of the Emerging Leaders in the Americas Program**, *The scholarship provide students from Latin America and the Caribbean with short-term exchange opportunities for study or research, in Canada*

2016 **Second place for the best master's thesis in statistics**, *National prize by the Mexican Association of Statistics (AME)*, The Francisco Aranda-Ordaz Prize