Carlos Minutti

Curriculum Vitae

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Experienced Data Scientist and Researcher with a strong background in Statistics, Applied Mathematics, and Computer Science. Expertise in Statistical Modeling, Machine Learning, Databases, Big Data Analytics, Multivariate Statistics, and Programming. Proven track record in research and consulting for academia, industry, and government.

Education

2015-2020 **PhD in Computer Science**, *Field of study: Scientific computing, optimization, Machine-Learning, Data Science*, National University of Mexico, Institute of Research in Applied Mathematics and Systems.
Cum laude

2017-2018 **PhD visiting student at the University of Waterloo**, *Field of study: Scientific computing, optimization, hydraulic tomography*, University of Waterloo, Canada.

2011-2013 **Master in applied Mathematics**, *Field of study: Statistics, probability and scientific computing*, National University of Mexico, Institute of Research in Applied Mathematics and Systems.

2003-2007 **Bachelor in Statistics**, *University of Chapingo, Department of statistics mathematics and computing.*

Experience

2022- **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.	Graphics	The GIMP 2.8, Blender, Inkscape.
Office	Microsoft Office (Word, PowerPoint, Excel, Access), LibreOffice.	Publishing	LaTeX, Scribus.
Programming	C/C++, Fortran+MPI, Python, Bash Scripting.	Web	HTML, PHP, JavaScript, XML, AWS.
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).	Data bases	MySQL, SQLite, Access.

Publications

○ 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. **"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

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.