Updated:

Rodrigo Lopez-Farias, Ph.D. *Computer Science and Engineering* *10/02/2022*

Personal Information

Birthday: 8/Jul/1984
Residence: Corregidora, Queretaro

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Current Job

Research fellow for the National Council on Science and Technology (CONACyT) commissioned at the Center for Research of Geospatial Information Sciences (CentroGeo) in the Geocomputational Intelligence department (Since Nov 2017).

Grants and Distinctions

Member of the Mexican System of Researchers (SNI - 1).

Interests & Skills

Programming and Data Base Managing Languages
Python, R, Matlab, Mathematica, Java, C/C++, PHP-HTML-MySQL(SQL), CassandraDB (NoSQL, Cassandra Query Language).

Research
Interest in producing novel time and spatio-temporal series modelling and prediction techniques using machine learning (Artificial Neural Networks, Nearest Neighbors, Support Vector Machines) applied to predict pollutants in the cities (PM2.5, light pollution), urban land change prediction, wind speed in sustainable energy generation, and water demand. Multi-Model Prediction with probabilistic model selection. Global and non-convex numerical optimization applied to System Identification in Biology Systems.

Current Research groups and projects
National Research Group: Network of Applied Computational Intelligence. https://ccc.inaoep.mx/~redica/#. (Certificate Pending).
Member of the Mexican Computation Society SMCC.
Project: Spatio-temporal modelling among cities.

Languages
English: 550 ITP TOEFL points.
Italian: B1 Common CEFRL Level.

Academic Degree

Ph.D. in Computer Science and Engineering. (With European Doctorate mention).
Institute: IMT School of Advanced Studies Lucca. Lucca, Italy. *(Feb/2012 - Jan/2016)*.
Thesis: Time Series Forecasting Based on Classification of Dynamic Patterns.
Advisors: Ph.D. Alberto Bemporad. Ph.D. Pantelis Sopasakis.
Field of study: Time series analysis and modelling with machine learning.
Taken Courses: Semantics and formal methods. Algorithmic complexity. Basic linear algebra. Principles of parallel and concurrent computing. Performance modelling applied to Computer Networks. Specification, modelling and verification of reactive systems. Introduction to global and local optimization. Model

checking. Optimum control, (Optimization Algorithms). Programming Methodologies with Python. Cloud Computing. Theory of complex networks. Machine Learning.

M.Sc. in Electrical Engineering (Computer Systems Group).
University: Michoacan University of San Nicolas de Hidalgo. (Universidad Michoacana de San Nicolas de Hidalgo). Morelia, Mexico. *(Mar/2008 - Aug/2010)*.
Thesis: Bifurcation Diagrams for Discontinuous or Non-differentiable Equations.
Advisors: Ph.D. Juan Jose Flores Romero, Ph.D. Claudio Fuerte E.
Field of study: Evolutionary computing, unconstrained global optimization, nonlinear dynamical systems, stability analysis.

B.Eng. in Computer Systems.
Institute: Morelia Institute of Technology (Instituto Tecnológico de Morelia). Morelia, Mexico. *(2002-2007)*.
Thesis: Implementation and performance analysis of **"Linux Terminal Server Project"** for educational purposes.
Field of Study: Applications of distributed operative systems.

Academic Experience

Teaching.

National Autonomous University of Mexico (UNAM - ENES). Morelia, Mexico.
- Object based image classification using neural networks *(Feb/2021 - Aug/2021)*.

Queretaro Institute of Technology. Queretaro, Mexico.
- Internet of things (Computer Systems Engineering). *(Jan/2020 - May/2020)*.

Morelia Institute of Technology. Morelia, Mexico.
- Programming (Electrical Engineering), Programming and Algorithms (Mechanical Engineering), Algorithms and Programming Languages (Industrial Engineering), Operative Systems II (Engineering Informatics)), Programming II (Electronic Engineering). *(Aug/2011 - Jan/2012)*.
- Data structure and Organization (Information and Communication Technologies Engineering),Database fundamentals (Computer Systems Engineering) and Evaluation of software projects (Engineering Informatics). *(Jan/2011 - Jul/2011)*.
- Operative systems, selected topics of programming and research fundamentals(Computer Systems Engineering). *(Aug/2010 - Dec/2010)*.

Human resources.

Michoacan University of San Nicolas de Hidalgo. (30/Aug/2021).

- Member of the MSc. thesis defense committee of Josué González Parra. Thesis Title: A First Study on Time Series Empirical Probability Distributions using Generative Artificial Neural Networks.

National Autonomous University of Mexico (UNAM) Campus Juriquilla. Juriquilla, Querétaro, México. (20/Aug/2020).

- **Coach of Social Service project.** Student: Ariel Cerón González. Title: ”Software para sistematizar validación de modelos de reconstrucción de series de tiempo con aplicación al estudio de concentraciones de contaminantes PM2.5”

Polytechnic University of Querétaro. Querétaro, México. (8/Apr/2019).

- **Coach of Social Service project.** Student: Josué Oropeza Juarez. Title: Ïmplementación de un servidor web para adquisición, almacenamiento y visualización de datos enviados por sensores para estudio de zonas metropolitanas”.
- **Coach of Social Service project.** Student: Luis Gutierrez Astudillo. Title: Ïmplementación de un prototipo de una unidad de monitoreo de contaminantes para las metrópolis de bajo costo conectada a una red local sencilla TCP/IP”.

Professional Experience

Center for Research and Advanced Studies of the National Polytechnic Institute (CINVESTAV)
Department: Coordination and administration of Information and Communication Technologies Services (CGSTIC)
Activity: Application of machine learning algorithms for commercial conversational agents. Mexico City. (Oct/2016 - July/2017).

Michoacan University of San Nicolas de Hidalgo. (Oct/2015 - Oct/2016)
Department: Computer Center and University Information processes.
Activity: Web manager, programmer and collaborator for decision making for an efficient administration of university information.
Ex-boss contact: Mtra. Elvia Lucina G. Arce Avila. + 52 (443) 322 3542, + 52 (443) 322 3500 ext. 1007. earce(at)umich.mx
https://bit.ly/3rkL3g9

Center for Information and Communications Technologies (CETIC). *(Mar/2007 - Jun/2007)*. Morelia, Mexico.
Department: Infrastructure department.
Activity: Professional training in the project Performance analysis of **Linux Terminal Server Project** applied to basic education.

Publications

Articles Published in Journal Citation Reports Journals

[Hernandez-Paniagua et al., 2021] **Application of network theory to study spatio-temporal evolution in the weekend effect in urban areas** *Iván Y. Hernández-Paniagua, Rodrigo López Farías, Juan A. Pichardo Corpus*. Atmósfera. (https://doi.org/10.20937/ATM.52993), (Feb/2021).

[Pichardo-Corpus et al., 2020]**Spatio-temporal Networks of light pollution** *Pichardo Corpus, Juan. A. and Solano-Lamphar, Hector and Lopez-Farias, Rodrigo, Delgadillo-Ruiz, Olivia*. Journal of Quantitative Spectroscopy and Radiative Transfer. (https://doi.org/10.1016/j.jqsrt.2020.107068), (June/2020).

[Flores et al., 2019] **Soft Computing Methods with Phase Space Reconstruction for Wind Speed Forecasting—A Performance Comparison**

Flores, Juan. J. and Cedeño González, José R. and Rodríguez, Héctor and Graff, Mario and Lopez-Farias, Rodrigo and Calderon, Felix. Energies. (https://doi.org/10.3390/en12183545), Sept/2019.

[Hernandez Paniagua et al., 2018] **Increasing weekend effect in ground-level O_3 in metropolitan areas of Mexico** *Iván Y. Hernández-Paniagua, Rodrigo Lopez-Farias, Jose J. Piña, Luis G. Ruíz-Suárez, Juan A. Pichardo-Corpus, Olivia Delgadillo, Agustín García-Reynoso, Arnoldo Flores-Torres, Alberto Mendoza*. Sustainability. (https://doi.org/10.3390/su10093330). (Aug / 2018).

[Lopez-Farias et al., 2018]**Multi-Model Prediction for Demand Forecast in Water Distribution Networks** *Rodrigo López Farías, Vicenc Puig, Héctor Rodriguez Rangel, Juan J. Flores* Energies. (https://doi.org/10.3390/en11030660). (Mar/2018).

[Flores et al., 2017] **Evolving Nearest Neighbor Time Series Forecasters.** *Juan J. Flores, José Cedeño Gonzalez, Rodrigo López Farías, Félix Calderón* . Journal of Soft Computing, (https://doi.org/10.1007/s00500-017-2822-1). (Sept/2017).

[Rodriguez et. al 2016] **Short-Term Demand Forecast using Bank of Neural Network Models Trained using Genetic Algorithms for the Optimal Management of Drinking Water Networks.***Hector Rodriguez Rangel, Vicenç Puig, Rodrigo López Farías, Juan J. Flores.* Journal of Hydroinformatics. (https://doi.org/10.2166/hydro.2016.199) (Nov/2016).

Book Chapters

[Guerrero-Hernandez et al., 2020] **Sarco-Endoplasmic Reticulum Calcium Release Model Based on Changes in the Luminal Calcium Content** *Agustín Guerrero-Hernández, Víctor Hugo Sánchez-Vázquez, Ericka Martínez-Martínez, Lizeth Sandoval-Vázquez, Norma C. Perez-Rosas, Rodrigo Lopez-Farias, and Adan Dagnino-Acosta.* Calcium Signaling, (https://link.springer.com/chapter/10.1007%2F978-3-030-12457-1_14), (2020)

Peer Reviewed Articles in Scientific and Technologic Divulgation Mexican Journals

[Rodriguez-Rangel et al., 2017] **Sistema de Medición de Flujos de Agua Tolerante a Fallos en Redes de Distribución de Agua Potable Utilizando Inteligencia Artificial**, *H. Rodríguez Rangel, R. López Farías, G. Manjarrez Montelongo*, L. A. Morales Rosales y G. E. Peralta Peñuñuri. Komputer Sapiens, KS año 9 vol. 2, KS92, 2017, (Latin index) (http://smia.mx/komputersapiens/publicaciones.php).

Articles in Peer Reviewed International Conferences

[Medrano et al., 2021]**Pronóstico de Series de Tiempo de Imágenes de Sequías Utilizando Autocodificadores y Redes Neuronales** *(Manuel Medrano, Juan J Flores Romero, Hector Rodríguez, Rodrigo López Farías, Carlos Lara Álvarez)*. (ISSN: 1870-4069). Research in Computing Science, DOI pendiente. Currently available in Hard Copy. https://www.rcs.cic.ipn.mx/ **Mexico City, July 2021**.

[Lopez-Farias et al., 2021]**Parameter Calibration of the Patch Growing Algorithm for Urban Land Change Simulations** *Rodrigo López-Farías, Sergio I. Valdez-Peña, Alberto García Robledo*. (ISSN: pendiente). IEEE Encuentro Nacional de Computación 2021, DOI pendiente. Verificar en: https:

//bit.ly/2WXOTPm. **Morelia, México, Agosto 2021**.

[Lamphar et al., 2021] **A methodology for a light pollution network with optimal sensor location** *Héctor Lamphar, Rodrigo López-Farías*. (ISSN: pendiente). Artificial Light At Night 2021, https://bit.ly/3xCXSn6. **España, Junio 2021**.

[Vazques-Vera et al., 2020] **Design of a Low-cost Air Quality Remote Monitoring System based on IOT and Sensor Sensitivity Validation.** *Jorge L. Vázquez-Vera, Javier Díaz-Carmona, Alejando Espinoza-Calderón, Rodrigo López-Farías, Iván Y. Hernández-Paniagua*. DOI:10.1109 / ROPEC50909.2020.9258685, https://ieeexplore.ieee.org/document/9258685. IEEE ROPEC 2020, **Ixtapa, México Octubre 2020**.

[Lopez Farias et al, 2019] **Automatic Modelling of Land Use Suitability Using Deep Feedforward Networks with Leon and Silao, Guanajuato Region Data** *Rodrigo López-Farías, Juan A. Pichardo-Corpus, Raúl A. Aguilar-Vilchis*. (ISSN: 2515-1762). International Conference on Geospatial Information Sciences 2019, http://bit.ly/2KHxelY,**Mérida, México, Octubre 2019**.

[Lopez-Farias et al., 2019]**Adaptive Nearest Neighbors Phase Space Reconstruction for Short-Time Prediction in Chaotic Time Series** *Rodrigo López-Farías, José R. Cedeño Gonzalez, Olivia Delgadillo Ruiz, Juan J. Flores*. .The 10th International Multi-Conference on Complexity, Informatics and Cybernetics, (ISBN-13: 9781941763957, https://bit.ly/2ZzV0uM), **Orlando, Estados Unidos, Marzo 2019**.

[Perez-Rosas et al., 2017] **Parameter Identification and Qualitative Analysis with Differential Evolution of the Calcium Standard Kinetics Model** *Norma C. Perez-Rosas, Rodrigo López-Farías, Agustín Guerrero-Hernández and Juan J. Flores*. .IEEE Autumn Meeting on Power, Electronics and Computing, (DOI: 10.1109/ROPEC.2017.8261647) (https://ieeexplore.ieee.org/document/8261647) **Ixtapa México, Noviembre 2017**.

[Flores et al., 2016] **Comparison of Time Series Forecasting Techniques with respect to Tolerance to Noise.** *Juan J. Flores, Felix Calderon Solorio, Jose Rafael Cedeño Gonzalez, Jose Ortiz Bejar and Rodrigo Lopez Farias*. (DOI: 10.1109/ROPEC.2016.7830618) IEEE Autumn Meeting on Power, Electronics and Computing, (https://ieeexplore.ieee.org/document/7830618), **Ixtapa México, Noviembre 2016**.

[Rodriguez-Rangel et al., 2016] **Combined holt-winters and GA trained ANN approach for sensor validation and reconstruction: Application to water demand flowmeters** *Hector Rodriguez-Rangel, Vicenç Puig, Juan J. Flores and , Rodrigo López* Farías. 10.1109/SYSTOL.2016.7739751. 3rd International Conference on Control and Fault-Tolerant Systems. (https://ieeexplore.ieee.org/document/7739751) .**Barcelona, España. Septiembre 2016**.

[Rodriguez-Rangel et al., 2016] **Flow meter Data Validation and Reconstruction using Neural Networks: Application to the Barcelona Water Network** *Hector Rodriguez Rangel, Vicenç Puig,Juan J. Flores and , Rodrigo López Farías.* European Control Conference, (https://ieeexplore.ieee.org/document/7810543/) Aalborg. Denmark, Junio 2016. .

[Lopez-Farias et al., 2015] **Qualitative and Quantitative Multi-Model Forecasting with Nonlinear Noise Filter Applied to Water Demand**, *Rodrigo López Farías, Juan J. Flores and Vicenç Puig*. *IEEE Autumn Meeting on Power, Electronics and Computing*. DOI: 10.1109/ROPEC.2015.7395122. (https://ieeexplore.ieee.org/document/7395122). **Ixtapa México, Noviembre 2015**.

[Flores et al., 2015]**FNN a Fuzzy Version of the Nearest Neighbour Ti-**

me Series Forecasting Technique *Juan J. Flores, Jose Ortiz Bejar, Jose Rafael Cedeño, Carlos Lara-Alvarez and Rodrigo López Farías*. IEEE Autumn Meeting on Power, Electronics and Computing. DOI: 10.1109/ROPEC.2015.7395125. (https://ieeexplore.ieee.org/document/7395125/), **Ixtapa México, Noviembre 2015** .

[Lopez-Farias et al., 2015b]**A Multiple-Model Predictor Approach Based on an On-Line Mode Recognition with Application to Water Demand Forecasting** *Rodrigo López Farías, Vicenç Puig*. International work-conference on Time Series 1. https://goo.gl/njWQ1e. **Granada España, Julio 2015**.

[Lopez-Farias et al., 2015a]**An implementation of a multi-model predictor based on the qualitative and quantitative decomposition of the time-series.** *Rodrigo. López, Vicenç Puig, Hector Rodriguez.* International work-conference on Time Series 1. (https://bit.ly/3xBmaxQ). **Granada España, Julio 2015**.

[Flores et al., 2011a] **Gravitational Interactions Optimization.** Juan Flores, Rodrigo Lopez, Julio Barrera. Learning and Intelligent OptimizatioN (LION 5) DOI 10.1007/978-3-642-25566-3_17. (https://bit.ly/3E9YUJO). **Roma, Italia - Enero 2011**.

[Flores et al., 2010] **Particle swarm optimization with gravitational interactions for multimodal and unimodal problems.** Juan J. Flores, Rodrigo Lopez and Julio Barrera. In Proceedings of the 9th Mexican International Conference on Artificial Intelligence (MICAI 2010), pages 3361-370. Springer-Verlag. DOI 10.1007/978-3-642-16773-7_31. (https://bit.ly/31aM5kc) **Pachuca, México. Noviembre 2010.**

Participation as organizer in Academic Events

Recent important academic events

- Coordinator of the track " Urban Sustainability and Environment" in Metropolitan Perspectives. **Queretaro, Feb/2019.**
- Coordinator of the track "Scientific Computing Applied to Geospatial Problems" in the 2021 "Computational National Meeting, ENC". **Morelia, Aug/2021**.