



Erith Muñoz

Curriculum Vitae

About myself

I am a self-motivated person interested in getting deeper knowledge about science and technology. My living experience has taught me that I am able to accomplish everything that I decide to fight for, even the hardest ones. My research interest include theoretical and computational Physics, Applied Physics, Engineering and Technology, Electronics and Telecommunication, Digital Signal and Image Processing, Scientific Programing, Big Data and Data Mining, Computational and Industry automation, Remote Sensing Applications Development, Data Analysis. Suddenly, It could seems a large number of disciplines for a person, however I am convinced that science is a big cake in which everything is connected, and this is the secret to be an innovator from my point of view, in order to find solutions to real problems through science and engineering. Also, I love baseball and basketball, and playing my acoustic guitar.

Education

- 2001-2007 **Degree in Physics (5 years)**, *Universidad de Carabobo*, Venezuela.
Final Research Report: Mesoscale Atmospheric Hydrostatic Model
- 2008-2012 **Master in Electrical Engineering**, *Universidad de Carabobo*, Venezuela.
- 2011-2014 **Master in Remote Sensing Techniques applied to Early Warning and Response to Natural Disasters**, *Universidad Nacional de Córdoba*, *National Commission for Space Activities*, Argentina.

Final Research Report for Master Degree

Master in Electrical Engineering

Title *Estimation of temperature variations in oil from the absorption of electromagnetic power using FDTD*

Advisers MSc. Paulino Del Pino & Dr. Alfonso Zozaya

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Description In this work, the Yee algorithm is implemented to solve numerically the Maxwell's equations in order to estimate variations of temperature in oil due to absorption of microwave power in a computational experiment. In this context, the finite difference method was used to solve the Fourier-Maxwell equation of heat transport to estimate the temperature in the oil medium, and likewise the Andrade equation is used to evaluate changes in viscosity, aimed to find a set of heating parameters, such as frequency and power, to facilitate the process of heavy oil extraction.

Master in Remote Sensing

Título *Rain Rate Estimates using ATMS Data and Artificial Neural Networks*

Advisers Dr. Francesco Di Paola & Prof. Mario Lanfri

Description In this work an algorithm to retrieve rain rate using the passive microwave sensor ATMS, aboard of the space-borne suomi-NPP of NOAA, is presented. The algorithm is based on a artificial neural network approach implemented in ALGLIB. ALGLIB is a C++ open source library which presents several facilities to train artificial neural networks. The algorithm was designed to retrieve rain rate using an artificial neural network trained using the L-BFGS method. The results shown good accuracy in precipitation patterns estimates

Teaching Experience

2015– **Partial Time Professor**, UNIVERSIDAD SAN FRANCISCO DE QUITO, Ecuador.
area: Mathematics

2007–2011 **Associated Professor**, UNIVERSIDAD JOSÉ ANTONIO PÁEZ, Venezuela.
area: Physics

2007–2010 **Assistant Professor**, POLITÉCNICO SANTIAGO MARIÑO, Venezuela.
area: Physics

2007–2010 **Assistant Professor**, UNIVERSIDAD DE CARABOBO, Venezuela.
area: Physics

2007–2008 **Assistant Professor**, UNIVERSIDAD EXPERIMENTAL DE LA FUERZA ARMADA, Venezuela.
area: Electromagnetic Theory 1 y 2, Transmissions Lines, Physics 4

Professional Experience

2015–Actual **Consultant**, THE FOOD AND AGRICULTURE ORGANIZATION, Ecuador.
Development of Allometric Models, Forest Change Detection, design of forest/Non-forest methodology, Carbon Map Generation, Assessor in M&MRV Strategies Design, Computational Automation, Numerical Modeling Algorithm Development, Uncertainties Computations of the Forest Reference Emission Levels

List of Products Generated:

1. A Script (C++ and C-shell/UNIX) set for automatic generation of a Carbon Map using a Landsat mosaic and data from permanent parcels for forest biomass measurement, using Open Foris Geospatial Toolkit, OPENCV, and GDAL.
2. A Script (C++ and C-shell/UNIX) set for automatic generation of Forest/Non-Forest map, and change detection map for deforestation, using Open Foris Geospatial Toolkit, OPENCV, and GDAL.

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3. A Script (C++ and C-shell/UNIX) set for both automatic preprocessing and processing of Landsat images including: radiometric calibration, TOA conversion, layerstack building, composites and mosaic generation, in an automatic way for large numerous path-row data sets, using Open Foris Geospatial Toolkit, OPENCV, and GDAL.

2013–2014 **Technical Head of Project**, ECUADORIAN SPACE INSTITUTE, Ecuador.
Management of research activities in Optical y SAR remote sensing, numerical modeling, climatic and hydro-meteorological characterization, developer of a morfoclimatic model.

2012 **Visiting Researcher**, NATIONAL RESEARCH COUNCIL(CNR), Bologna-Italia.
Training and Researches in weather numerical models and atmospheric remote sensing techniques

2010–2011 **Numerical Modeling Specialist**, METEOROLOGICAL AND HIDROMETEOROLOGICAL NATIONAL INSTITUTE(INAMEH), Venezuela.
Operational Automation of gauges networks data transfer, Parametrization of the weather numerical models, and Physical Instrumentation.

2007–2008 **Regional Adviser**, VENEZUELAN SOCIETY FOR SCIENCES ADVANCES.(ASOVAC- CAPÍTULO CARABOBO), Venezuela.

Miscellaneous

2013 **Consultant in Geostatistic**, *Grupo Turbo de Ecuador*, Ecuador, Advisor for a regional analysis of scientific and technical feasibility for wireless internet project development in Latin America.

2013–2014 **Consultant in the area of electronic security**, *Grupo Turbo de Ecuador*, Ecuador, RFID Technology Developer.

2009-2011 **Consultant in the area of programming microcontrollers**, *Electrónica 1*, Venezuela, Consultant in developing new technologies and implementing for PIC and PICAXE devices.

Academic Awards and Funding

2011 Research Training in the Italian Research Council (Bologna- Italy)

2011 Scholarship for graduate studies by the National Commission on Space Activities of Argentina and the Italian Space Agency

2011 Selected by the Venezuelan Agency for Space Activities (Venezuela), to compete in the call process for academic grants of the National Commission on Space Activities of Argentina and the Italian Space Agency

2007 Scholarship for Master by the National Endowment for Science and Technology, Venezuela

Membership and Associations

-Laboratory for Applied Electromagnetism, Universidad de Carabobo, Venezuela. (Researcher Member)

-Member of the National Commission for Geophysics of the Pan American Institute of Geography and History (PAIGH-Ecuador)

-Executive Member of the Latin American Group for Remote Sensing Applications on Epidemiology. (CONAE-Argentina)

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Computational Skills

- Basic JAVA, C#.
- Medium PYTHON, ARCGIS, ADS, IDRISI.
- Avanced L^AT_EX, Linux, Microsoft Windows, SPSS, ENVI-SARSCAPE-LIDAR, Shell/UNIX, CST-MWS, MULTISIM, C/C++, FORTRAN, R-CRAN, Matlab, IDL.

Update Professional courses

1. **Geospatial Information Modeling.** Realizado del 27 al 31 de Enero de 2014 en el Centro Panamericano de Estudios e Investigaciones Geográficas de Quito-Ecuador. (48 horas)
2. **Geophysical Information Management.** Realizado del 13 al 31 de Marzo de 2014 en el Centro Panamericano de Estudios e Investigaciones Geográficas de Quito- Ecuador. (40 horas).
3. **III School of Astroparticle LAKE: Cosmic Rays, GRBs and Solar Physics.** Realizada del 20 al 25 de Enero de 2014 en la Universidad San Francisco de Quito de Ecuador. (40 horas)
4. **Third International School: Advanced Training in Epidemiology Remote Sensing Techniques.** Desde el 27/05/2013 al 07/06/2013. 80 horas. Comisión Nacional de Actividades Espaciales. Córdoba- Argentina.
5. **Biophysical Parameters Extraction from SAR Images: Techniques and Applications.** From 03/12/2012 to 07/12/2012. 40 hours. Instructor: Dr. Claudia Notarnicola. Córdoba-Argentina.
6. **Trends Analysis in forest environments using Geographic Information Systems.** 22-26 de Octubre de 2012. 40 horas. Instituto de Altos Estudios Espaciales Mario Gulich. Falda del Carmen- Argentina

Papers Published in Peer-Review Journals

1. **Muñoz E.**, Di Paola F., Lanfri M. "Design of a rain rate retrieval algorithm using artificial neural network and the advanced technology microwave sounder". *Revista de la Facultad de Ingeniería*, August 2016, Vol 23, Nro 2, ISSN: 1316-6832.
2. **Muñoz E.**, Di Paola F., Lanfri M., Arteaga F. "Observing the Troposphere through the Advanced Microwave Technology Sensor (ATMS) to Retrieve Rain Rate". *IEEE Latin America Transactions*, February 2016, Vol 14, Nro 2, ISSN: 1548-0992.
3. **Muñoz E.**, Mundaray R., Falcón N. "A Simplified Analytical Method to Calculate the Lifting Condensation Level from a Skew-T Log-P Chart". *Avances en Ciencias e Ingeniería*, Vol 7, Nro 2, pag. C124-C129, December-2015
4. Palacios J., Falcón N, **Muñoz E.**, "Diseño y Construcción de Sensores Automatizados de Gases de Efecto de Invernadero en la Baja Tropósfera", *Ingenius*, Julio-Dicembre 2015, Nro 14, DOI: 10.17163/ings.n14.2015.03. pag. 21-29.
5. **Muñoz E.** , Di Paola F., Lanfri M. "Advances on Rain Rate Retrieval from Satellite Platforms

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using Artificial Neural Networks". *IEEE Latin America Transactions*, October 2015, Vol 13, Nro 10, ISSN: 1548-0992.

6. **Muñoz E.**, Del Pino P., Zozaya A. "Numerical Simulation of Electromagnetic Oil Heating Process by integrating The Maxwell Equations and Fourier Transport Model Using FDTD". *IEEE Latin America Transactions*, July 2015 Vol 13, Nro 7, ISSN: 1548-0992
7. **Muñoz E** and Seijas, C. "Análisis Comparativo de Ajuste en Entrenamiento de Redes Neuronales artificiales a partir de las Librerías Open NN y ALGLIB.", *La Granja*, pag 49-60, Vol 21. 2015.
8. **Muñoz E**, Chiriboga F. M., Caizaluisa A., Estrella C., Ramirez M., "Escenarios Climáticos en presencia del Fenómeno El Niño (FEN) en las Micro-cuencas Cristal, Potosí, Pechiche y Balsas del Ecuador", *Revista de Climatología*, ISSN 1578-8768, pag 7-25, Vol 15. 2015.
9. Caizaluisa A., Chiriboga F. M., Estrella C., **Muñoz E.**, "Caracterización de la Deformación Superficial Terrestre en una zona piloto del Ecuador, usando Interferometría Diferencial (DInSAR)", *Revista Geoespacial de Ecuador*, Nro. 11, pag 44-53, 2014.

Conference Proceedings

1. Davolio S., A. Buzzi, P. Malguzzi, D. Mastrangelo, S. Laviola, V. Levizzani, A. Lighezzolo, **E. Muñoz**, 2012: Analyses of heavy precipitation events over Ligurian region. Congress Proceedings, *Congreso Argentino de Teledeteccion 2012*, Sep. 18-21 2012, Cordoba, Argentina.
2. Falcón N, **Muñoz, E.** (2010), Dinámica de Gases Contaminantes bajo equilibrio hidrostático en atmosferas planetarias. Congress Proceedings, *Memorias del 1er Congreso Internacional de Investigación de la Universidad de Carabobo*, ISBN: 978-980-233-563-3, pag 1690
3. **Muñoz, E**, Falcón N. (2008), Modelo Hidrostático de Atmósfera en Mesoescala. *Memorias de la ULA*, E-revistas [on line], Geofísica

Papers in Writing Process

1. **Muñoz E.**, Lanfri M., Di Paola F. "Analysis of Heavy Precipitation Events using the ATMS Passive Microwave Sensor and the ANN183 Algorithm."
2. **Muñoz E.** "A Kalman Filter Approach to Perform the Relative Radiometric Normalization of Landsat 8"

Conferences without Proceedings

1. **Muñoz E.**, 2015: *Principios de Transferencia Radiativa y Electromagnetismo en Aplicaciones de Teledetección*. II Jornadas Internacionales de Ingeniería 2015 (FICA-2015), Universidad Técnica del Norte, Ibarra. Ecuador.
2. **Muñoz E.**, 2015: *Principios de Transferencia Radiativa en Aplicaciones de Teledetección Atmosférica*. Congreso Anual de Meteorología y Calidad del Aire 2015 (CAMCA-2015), Universidad

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San Francisco de Quito. Ecuador.

3. **Muñoz E.**, Caizaluisa A., Falcón N. 2015: *Lifting Condensation Level Computation and Its Relationship with Convective Cloud Physics*. Congreso Anual de Meteorología y Calidad del Aire 2015 (CAMCA-2015), Universidad San Francisco de Quito. Ecuador.
4. **Muñoz E.**, Lanfri M, Di Paola F. 2014: Análisis Comparativo de Ajuste de entrenamiento de Redes Neuronales Artificiales a partir de las Librerías Open NN y ALGLIB. XIV Encuentro de Matemáticas y sus Aplicaciones. Escuela Politécnica Nacional, Ecuador.
5. **Muñoz E.**, Mundaray R., Estrella C., 2014: Theoretical Estimation of the Lifting Condensation Level (LCL) for a rising air parcel in order to enhance the clouds seeding procedures in periods of low rain incidence. Third International Climate Change Adaptation Conference "Adaptation Futures 2014". 12-16 Mayo 2014. Fortaleza, Ceará-Brasil.
6. **Muñoz E.**, Condolo V., 2014: Potencialidades del sensor de Microondas Pasivas ATMS, abordó de la plataforma satelital Suomi-NPP de la NOAA, para la construcción de perfiles verticales y estimación de variables atmosféricas en el Ecuador. Congreso Anual de Meteorología y Calidad del Aire. 10-11 de Marzo de 2014. Universidad San Francisco de Quito, Quito-Ecuador

Chapters in Books

1. Falcón N., **Muñoz E.** 2007: Microfísica de Nubes e Inestabilidad Atmosférica, *Climatología y Física Atmosférica*, editado por la Universidad de Carabobo, capítulo 4 (2007). ISBN: 980-07-0801-4
2. **Muñoz E.**, Falcón N. 2007: Modelo Hidrostático de Atmósfera en Mesoescala, *Climatología y Física Atmosférica*, editado por la Universidad de Carabobo, capítulo 5 (2007). ISBN: 980-07-0801-4

Courses as Teacher

1. Diseño de Aplicaciones de Inteligencia Artificial para Modelos Geoidales. *Centro Panamericano de Estudios e Investigaciones Geográficas*. Quito del 03 al 19 de Diciembre de 2014. 40 horas
2. Interferometría Diferencial con Radar de Apertura Sintética (DInSAR). *Centro Panamericano de Estudios e Investigaciones Geográficas*. Quito del 07 al 17 de Abril de 2014. 80 horas
3. Implementación de Redes Neuronales para Estimación de Variables Geoespaciales. *I Congreso Internacional de Ciencias de la Tierra y de la Construcción*. Entre el 13 y 15 de Octubre de 2013, Organizado por la Universidad de las Fuerzas Armadas (ESPE) de Ecuador. Curso de 5 horas
4. Algoritmo de Estimación de Precipitación usando Teledetección. Sala de Seminarios del Instituto Mario Gulich, Falda del Carmen, Córdoba-Argentina 2012.
5. Biofísica. Primera edición del ciclo de seminarios del departamento de biología de la Facultad de Educación. Universidad de Carabobo 2008

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Technical Reports

1. A Dissertation on Crops Discrimination Researches Using SAR Data. Ciclo de Seminarios del Programa de Maestría AEARTE. (2013). Argentina.
2. Theoretical analysis and calculation of the Lifting Condensation Level for a rising air parcel in the atmosphere. Proyecto de Siembra de Nubes del Instituto Nacional de Meteorología(Consultoría).(2010) Caracas-Venezuela.
3. Final Report: Research Activities Developed in the National Research Center from January to July 2012.Bologna-Italy

References

- **Dr. Marcelo Scavuzzo** Director del programa de Maestría en Aplicaciones Espaciales a Alerta y Respuesta temprana a Emergencias. Instituto de Altos Estudios Espaciales *Mario Gulich* en la Comisión Nacional de Actividades Espaciales (CONAE-ARGENTINA). Contact: +54 9351 3397212
- **Dr. Vincenzo Levizzani** Jefe de la División de Meteorología del Consejo Nacional de Investigaciones y Profesor de Física de las Nubes en la Universidad de Bologna. ISAC CNR - Via P. Gobetti 101 - 40129 Bologna ITALIA - Tel. +39 051 6399619 - Fax +39 051 6399658
- **Dr. Nelson Falcón** Profesor Titular de la Facultad de Ciencias y Tecnología de la Universidad de Carabobo, Coordinador del Grupo de Física Teórica. Carabobo-Venezuela Contact +58 412 4099940
- **Dr. Alfonso Zozaya** Profesor Titular de la Facultad de Ingeniería de la Universidad de Carabobo, Coordinador del área de Postgrado de la Facultad de Ingeniería. Carabobo-Venezuela. Contact +58 412 1574068

Languages

Spanish **Native**

English **Advanced**

Italian **Medium**

German **Basic**

Speaking, Writing, Reading

Speaking, Reading

Reading