

# Marco MONTES DE OCA, Ph.D.

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## Summary

Computer scientist with experience on **data science, machine learning, numerical optimization** and **statistical analysis**.

Core expertise, skills, and other assets:

- **Data science** (specifically, **prediction** and **optimization**) applied to **cloud computing workloads** ( see <https://tinyurl.com/2p9yyr46>) and **audience-based TV advertising** (patent applications (two in pending status) on campaign and inventory price optimization (see <https://tinyurl.com/yhw7vrtf>))
  - **Optimization** using mathematical programming (modeling and solution using **CPLEX**, **GLPK**, and **Google's OR Tools**), and heuristic/stochastic methods (**Evolutionary Computation**, and others).
  - **Machine learning** for **automatic algorithm configuration, hyperparameter tuning, neural-network robot controllers, and time series forecasting**. (See list of publications below).
  - **Multi-agent systems design and control** in applications that range from simulation, to adaptive websites, data clustering, and multi-robot systems control.
  - **Software implementation and statistical data analysis** using R, Python, C/C++, Matlab, and other tools.
  - **Strong written and oral communication skills**. Have presented technical solutions to clients. – Published 40+ articles in top international conferences and journals. Two **best paper awards**. – Have taught at US universities. **Twice nominated for an excellence in teaching award**. – Have presented at various academic and professional conferences.
  - **Collaboration skills in multicultural environments**. Have studied and worked in the USA, Mexico, and Belgium and speak Spanish, English, and French.
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## Education

<i>Université libre de Bruxelles</i> (Free University of Brussels)	BRUSSELS, BELGIUM
<i>Docteur en Sciences de l'ingénieur</i> (Ph.D. in Engineering Sciences)	2006 – 2011
<i>Université libre de Bruxelles</i> (Free University of Brussels)	BRUSSELS, BELGIUM
<i>Diplôme d'Études Approfondies en Sciences Appliquées</i> (M.S. in Applied Sciences)	2005 – 2006
<i>Tecnológico de Monterrey</i> (Monterrey Tech, ITESM)	MONTERREY, MEXICO
<i>Maestro en Ciencias en Sistemas Inteligentes</i> (M.S. in Intelligent Systems)	2003 – 2005
<i>Instituto Politécnico Nacional</i> (National Polytechnic Institute)	MEXICO CITY, MEXICO
<i>Ingeniero en Sistemas Computacionales</i> (B.S. in Computer Systems Engineering)	1997 – 2001

### Specialized Courses

<b>International Doctoral School in Algorithmic Decision Theory: Computational Social Choice.</b>	<i>April '10</i>
<b>Summer School in Collective Robotics.</b>	<i>August '07</i>

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## Professional Experience

<b>Boston Fusion Corp.</b>	LEXINGTON, MA, USA
<b>Principal Research Scientist</b>	<i>November '22 – present</i>
Providing technical leadership (principal investigator role) on autonomous systems projects. Main activities include writing proposals, planning work, leading team members, and hands-on involvement to meet deliverables.	
<b>College of Professional Studies, Northeastern University</b>	BOSTON, MA, USA
<b>Lecturer (part-time)</b>	<i>January '18 – present</i>
Member of the faculty for the Master of Professional Studies in Analytics. Teaching predictive analytics topics such as Generalized Linear Models, Random Forests, Gradient Boosting, Neural Networks, Exponential Smoothing, ARIMA, Bayesian analysis.	
<b>Sync Computing Corp.</b>	CAMBRIDGE, MA, USA
<b>Research Scientist, Algorithm Engineer</b>	<i>July '22 – October '22, August '21 – July '22</i>
Design, analysis, prototyping, and empirical evaluation of scheduling algorithms for cloud computing platforms (e.g., Spark, AirFlow). Tools: Metaflow, Mlflow, Ray, AWS services.	

Xandr, Inc., an AT&T company

**Senior Data Scientist**

TV audience forecasting and campaign optimization. Technical Focus: Mathematical modeling, scheduling, prediction, revenue optimization.

SOMERVILLE, MA, USA

October '19 – August '21

clypd, Inc.

**Principal Data Scientist, Senior Data Scientist**

Mathematical and computational methods for automating and personalizing TV ad scheduling (also known as "programmatic TV advertising").

SOMERVILLE, MA, USA

January '16 – October '19, August '14 – December '15

Department of Mathematical Sciences, University of Delaware

**Postdoctoral Researcher**

Performed research on collective decision-making, swarm-based interpolation, and optimization. Taught four courses a year on single- and multi-variable calculus, as well as on nonlinear optimization.

NEWARK, DE, USA

September '11 – August '14

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## Skills

- **Programming languages:** C (15+ years experience<sup>‡</sup>), Java (3+ years<sup>‡</sup>), C++ (2+ years<sup>‡</sup>), Python ( 1 year<sup>\*</sup>)
- **Statistical data analysis and math:** R (10+ years<sup>\*</sup>), Matlab (3+ years<sup>‡</sup>), Maple (< 1 year<sup>‡</sup>), Mathematica (< 1 year<sup>‡</sup>)
- **Others:** Bash (10+ years<sup>\*</sup>), PostgreSQL (2+ years<sup>\*</sup>), MySQL (2 years<sup>‡</sup>)
- **Natural languages:** Spanish (Native speaker), English (Full professional proficiency), French (Can hold business conversations)

\* Currently using. <sup>†</sup>Have used in the past 3 years. <sup>‡</sup>Have used in past but more than 3 years ago.

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## Awards and Recognition

- **Active or former editorial board member** for the journals *Swarm Intelligence* and *Frontiers in Robotics and AI: Computational Intelligence*.
  - **Technical reviewer** of several research proposals and books.
  - Nominated for the **Teaching Excellence Award** at the College of Professional Studies at Northeastern University.
  - Four nominations for and two wins of **best paper awards** (fourth and fifth papers below) at international conferences.
  - **Program committee member or referee** for many (50+) international conferences and journals including the International Joint Conference in Artificial Intelligence (**IJCAI**), the European Conference on Artificial Intelligence (**ECAI**), and the IEEE Transactions on Evolutionary Computation.
  - **Technical program chair** for the International Conference on Swarm Intelligence (**ANTS 2014**). Co-chair of the track on Ant Colony Optimization and Swarm Intelligence for the Genetic and Evolutionary Computation Conference (**GECCO 2014**).
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## Selected Publications (2500+ citations so far) (visit my [Google Scholar profile](#) for the full list of publications)

- **M. A. Montes de Oca**, T. Stützle, M. Birattari, and M. Dorigo (2009). [Frankenstein's PSO: A Composite Particle Swarm Optimization Algorithm](#). *IEEE Transactions on Evolutionary Computation*. 13(5):1120–1132.
- **M. A. Montes de Oca**, E. Ferrante, A. Scheidler, C. Pinciroli, M. Birattari, and M. Dorigo (2011). [Majority-Rule Opinion Dynamics with Differential Latency: A Mechanism for Self-Organized Collective Decision-Making](#). *Swarm Intelligence*. 5(3–4):305–327.
- **M. A. Montes de Oca**, T. Stützle, K. Van den Enden, and M. Dorigo (2011). [Incremental Social Learning in Particle Swarms](#). *IEEE Transactions on Systems, Man, and Cybernetics – Part B: Cybernetics*. 41(2):368–384.
- **M. A. Montes de Oca**, D. Aydın, and T. Stützle (2011). [An Incremental Particle Swarm for Large-scale Optimization Problems: An Example of Tuning-in-the-loop \(Re\) Design of Continuous Optimization Algorithms](#). *Soft Computing* 15(11):2233–2255.

Please visit my [website](#) (see URL at the top) for more information.