

# Iván Jaen Márquez

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## EDUCATION

<b>University of Wisconsin – Madison</b>	Madison, WI, United States
Ph.D in Computer Sciences, Research interests: Optimization and Machine Learning	Aug 2022 – Ongoing
<b>Centro de Investigacion en Matematicas, CIMAT</b>	Guanajuato, GTO, Mexico
M.S. in Computer Science and Industrial Mathematics	Jul 2016
Thesis: “ <i>A Univariate Boltzmann based Estimation of Distribution Algorithm Using the Natural Gradient for Updating the Parameters</i> ” (in English)	
<b>Tecnologico Nacional de Mexico campus Veracruz</b>	Veracruz, VER, Mexico
B.S. in Computer Engineering	Jul 2013
Thesis: “ <i>Object Tracking via Particle Filtering and Stochastic Optimization Algorithms</i> ” (in Spanish)	
Awarded “ <i>Mención honorífica</i> ” (Distinction) on final oral defense. Ranked 1 <sup>st</sup> in the department	

## AWARDS

- Scholarship for doctoral studies abroad, Mexican Research Council (CONACYT) Sep 2022 – Aug 2026
- Fulbright-Garcia Robles fellowship for pursuing doctoral studies in the US Aug 2022 – Aug 2025
- Scholarship for academic visit abroad, Mexican Research Council (CONACYT) Jan – Jul 2015
- Scholarship for Master’s studies, Mexican Research Council (CONACYT) Aug 2013 – Jul 2015
- Best undergraduate thesis in Computer Science in Mexico (nationwide annual contest) Oct 2014  
*Asociacion Nacional de Instituciones de Educacion en Tecnologias de Informacion (ANIEI)*

## WORK EXPERIENCE

<b>Microsoft - Azure</b>	Remote
<i>Data and Applied Scientist</i>	Jul 2021 - Jul 2022
<ul style="list-style-type: none"> <li>◦ Applying a combination of approaches from Machine Learning/Optimization/Distributed Computing fields to gain insights on the quality of Azure Communication Services from user telemetry data.</li> </ul>	
<i>Software Engineer</i>	Nov 2020 – Jul 2021
<ul style="list-style-type: none"> <li>◦ Implemented (C#, Service Fabric) improvements for billing/monetization microservices in Azure communication</li> </ul>	
<b>BBVA bank in Mexico - Global Markets</b>	Mexico City
<i>Quant Developer - Senior Analyst</i>	Dec 2015 – Oct 2020
<ul style="list-style-type: none"> <li>◦ Productionized financial pricing/risk models for the front office trading platform (C/C++, C#, Python)</li> <li>◦ Researched and developed algorithmic trading strategies: optimization for portfolio compression (delta hedging)</li> </ul>	

## RESEARCH EXPERIENCE

<b>Robert Gordon University - Computational Intelligence Group</b>	Aberdeen, UK
<i>Visiting Graduate student</i>	Jan – Jul 2015
<ul style="list-style-type: none"> <li>◦ Worked with the formal mathematical approach of Estimation of Distribution Algorithms and explored connections with existing state-of-the-art methods (Covariance Matrix Adaptation, CMA-ES).</li> </ul>	
<b>CIMAT - Masters Research Thesis</b>	Guanajuato, Mexico
<i>Graduate student</i>	Jun – Dec 2014
<ul style="list-style-type: none"> <li>◦ Analyzed the Information Geometric Optimization scheme for continuous optimization.</li> <li>◦ Reformulated the higher expected fitness objective on these algorithms to support different search targets.</li> <li>◦ Proposed an update rule by minimizing the KL divergence of the probability densities w.r.t. the Boltzmann distribution associated with the objective function. Derived analytical expressions using the natural gradient.</li> </ul>	
<b>CIMAT - Undergraduate Research Thesis Program</b>	Guanajuato, Mexico
<i>Undergraduate student</i>	Aug 2012 – Jul 2013
<ul style="list-style-type: none"> <li>◦ Proposed an approach to combine population based metaheuristics with the particle filter method to enhance state estimation in the video object tracking problem. Implemented in MATLAB.</li> <li>◦ Presented the results in a Mexican conference in Numerical Analysis and Optimization (<i>ENOAN 2014</i>)</li> </ul>	
<b>Mexican Academy of Sciences - National Summer Research Program</b>	Guanajuato, Mexico
<i>Undergraduate student</i>	Jun – Jul 2012
<ul style="list-style-type: none"> <li>◦ Worked in a proposal for Particle Swarm Optimization algorithm involving historical information and parametric extrapolation. Attended short courses at CIMAT on Pattern Recognition, Image processing, Robotics.</li> </ul>	

## TEACHING EXPERIENCE

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### Lecturer:

UNAM - Faculty of Sciences - Mathematics Dept.

Mexico City

- **Genetic Algorithms:** elective undergraduate course

Spring 2018 & Spring 2019

### Teaching Assistant:

CIMAT - Computer Science Dept.

Guanajuato, Mexico

- **Algorithms and programming:** graduate course

Fall 2015

University of Wisconsin–Madison - Computer Sciences Dept.

Madison, USA

- **CS 320: Data Science Programming II:** undergraduate course

Fall 2022 & Spring 2023

## PUBLICATIONS

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- Leticia Palos-Sanchez, *Mario Ivan Jaen-Marquez*, Rafael Rivera-Lopez, “Object oriented modeling for solving the chemical equation balancing problem and its resolution using algebraic methods” (in Spanish), *Programacion Matematica y Software*, Vol. 7, pp. 52-63, 2015.
- *Mario Ivan Jaen-Marquez*, Arturo Hernandez-Aguirre, Rafael Rivera-Lopez, “Object tracking via bio-inspired optimization algorithms” (in Spanish), Talk at *XXIV Escuela Nacional de Optimización y Análisis Numérico*, (ENOAN 2014), Guanajuato, Mexico.
- *Mario Ivan Jaen-Marquez*, Arturo Hernandez-Aguirre, “A parallel numerical integration method based on the Particle Swarm Optimization algorithm” (in Spanish), Talk at *5th. International Supercomputing Conference in Mexico (ISUM 2014)*, Baja California, Mexico.

## RELEVANT COURSEWORK

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### • Graduate:

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|--------------------------------------|-----------------------------------|----------------------------------|
| ◦ Algorithms and Programming         | ◦ Artificial Intelligence         | ◦ Evolutionary Computation       |
| ◦ Applied Probability and Statistics | ◦ Signal Processing               | ◦ CS 760: Machine Learning       |
| ◦ Numerical Linear Algebra           | ◦ Statistical Inference           | ◦ CS 726: Nonlinear Optimization |
| ◦ Numerical Optimization             | ◦ Statistical Pattern Recognition |                                  |

### • Undergraduate:

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|---------------------------|-------------------------------|---------------------------------|
| ◦ Artificial Intelligence | ◦ Operations Research         | ◦ Computer Graphics             |
| ◦ Numerical Methods       | ◦ Object Oriented Programming | ◦ CS 524: Intro to Optimization |
| ◦ Simulation              | ◦ Distributed Computing       | ◦ CS 532: Matrix Methods in ML  |
| ◦ Database fundamentals   | ◦ Software Engineering        |                                 |

## TECHNICAL SKILLS SUMMARY

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- **Programming languages:** C/C++, C#, Python, Java, R, Matlab
- **Frameworks:** Scikit-learn, PyTorch
- **Tools:** PySpark, Git, Bash, Regexp, SQL, KQL, L<sup>A</sup>T<sub>E</sub>X
- **Languages:** Spanish (Native), English (Full professional)