

# José Abel Castellanos Joo

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## RESEARCH INTERESTS

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Formal Verification  
Archimedean Quadratic Modules  
Groebner basis algorithms  
Quantifier-free interpolation algorithms for decidable logics  
Non-classical logics

## EDUCATION

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<b>University of New Mexico</b> Ph.D. in Computer Science, Advisor: Prof. Deepak Kapur	Albuquerque, New Mexico 2020–Current
<b>University of New Mexico</b> M.S. in Computer Science, Advisor: Prof. Deepak Kapur, GPA: 4.05/4.00 – Thesis: Implementation of Uniform Interpolation Algorithms	Albuquerque, New Mexico 2016–2020
<b>Universidad de las Americas Puebla</b> B.S. in Electronics Engineering, Advisor: Prof. Mauricio Javier Osorio Galindo, GPA: 9.7/10 – Thesis: Revisiting $C_1$	Cholula, Puebla 2010–2015

## WORK EXPERIENCE

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<b>Microsoft Research</b> Research Intern; Mentor: Principal RSDE Mark Marron – Verification in Bosque – Developed a prototype of the verification engine for the Bosque programming language in $F^*$ . Bosque is a language that does not implement loops but offers to programmers transformers and functional programming constructions (limited fold operation) to do their programming tasks.	Redmond, Washington Summer 2019
<b>Universidad de las Americas Puebla</b> Research Student; Advisor: Prof. Mauricio J. Osorio Galindo – Research on Paraconsistent Logics – Collaboration with a group of researchers on Paraconsistent Logics. My activities included working on some theorems and generate models using the answer set solver Clasp.	Cholula, Puebla 2015–2017
<b>Universidad de las Americas Puebla</b> Intern; Advisor: Prof. Ofelia Cervantes Gutierrez – Innova4D – Analysed and implemented graph algorithms to compute Freeman centralities for the development of a recommendation system.	Cholula, Puebla Summer 2015

## PUBLICATIONS

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- [1] J Castellanos Joo, Silvio Ghilardi, Alessandro Gianola, and Deepak Kapur. Axdinterpolator: A tool for computing interpolants for arrays with maxdif. In *19th International Workshop on Satisfiability Modulo Theories co-located with 33rd International Conference on Computer Aided Verification (CAV 2021)*, volume 2908, pages 40–52. CEUR-WS. org, 2021.
- [2] Mauricio Osorio, J. L. Carballido, C. Zepeda, and J. A. Castellanos. Weakening and extending  $\mathbb{Z}$ . *Logica Universalis*, 9(3):383–409, Aug 2015.
- [3] Mauricio Osorio and José Abel Castellanos. A single proof of classical behaviour in da costa’s  $C_n$  systems. *Electronic Notes in Theoretical Computer Science*, 315:3–16, Sep 2015.
- [4] Mauricio Osorio and José Abel Castellanos Joo. Equivalence among rc-type paraconsistent logics. *Logic Journal of IGPL*, page jzw065, Jan 2017.

## TEACHING ASSISTANT EXPERIENCE

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<b>Head Teaching Assistant</b> at University of New Mexico <i>CS 241 - Data Organization using C with Prof. Soraya Abad-Mota</i>	Fall 2022
<b>Teaching Assistant</b> at University of New Mexico <i>CS 429/529 - Machine Learning with Prof. Trilce Estrada</i>	Spring 2022
<b>Teaching Assistant</b> at University of New Mexico <i>CS 530 - Geometric and Probabilistic Methods in Computer Science with Prof. Lance Williams</i>	Fall 2019
<b>Teaching Assistant</b> at University of New Mexico <i>CS 500 - Theory of Computation with Prof. Deepak Kapur</i>	Spring 2019
<b>Teaching Assistant</b> at University of New Mexico <i>CS 561 - Algorithms and Data Structures with Prof. Jared Saia</i>	Fall 2018

## SKILLS

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- Programming languages
  - Imperative: C/C++, Java, Go
  - Scripting: Python, Bash, Makefile
  - Logical/Functional: Haskell, Ocaml, Scala
  - Verification: Z3, Mathsat, SMTInterpol,  $F^*$ , Prover9, Mace4
  - Symbolic/Algebraic: Mathematica, Maple, Macaulay2, Singular
  - Document typesetting:  $\text{\LaTeX}$ , Pandoc, Madoko, Markdown, Org
  - Web design: HTML, CSS, Javascript, Typescript, Hugo

## LANGUAGES

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- **English:** Fluent
  - **TOELF iBT:** TODO: Find score
- **Spanish:** Native

## SOFTWARE PROJECTS

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AXDInterpolator	2021
<i>This project implements an interpolation algorithm proposed in FoSSaCS 2021 using the Z3 API. The project allows the user to choose Z3, Mathsat, or SMTInterpol as interpolation engines. The tool returns a formula in SMTLIB2 format, which allows compatibility with model checkers and invariant generators using such a format.</i>	
EUFInterpolator	2020
<i>Master thesis work implementing new interpolation algorithms for the theory of equality and uninterpreted functions (EUF), octagonal formulas, and its combination.</i>	
Bosque Transpiler to $F^*$	2019
<i>Prototypical implementation of a transpiler embedding the Bosque semantics into the Proof-oriented programming language <math>F^*</math>.</i>	

## WORKSHOPS ATTENDED

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Satisfiability: Theory, Practice, and Beyond <i>Beyond Satisfiability</i>	2021
Satisfiability: Theory, Practice, and Beyond <i>Theoretical Foundations of SAT/SMT Solving</i>	2021
AMS Short Course <i>Sum of Squares: Theory and Applications</i>	2019

## CONFERENCE REFEREEING

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Thirteen Latin America Workshop on New Methods of Reasoning <i>Reviewer</i>	2020
35th International Conference on Logic Programming <i>Reviewer</i>	2019
11th Latin American Workshop on New Methods of Reasoning <i>PC member</i>	2018
14th Annual Computer Science Student Conference <i>Reviewer</i>	2018
17th Latin American Symposium on Mathematical Logic <i>Reviewer</i>	2017
10th Latin American Workshop on Logic/Languages, Algorithms and New Methods of Reasoning <i>Reviewer</i>	2016
8th Mexican Congress on Artificial Intelligence <i>Reviewer</i>	2016
12th International Colloquium on Theoretical Aspects of Computing <i>Reviewer</i>	2015

## SCHOLARSHIPS AND AWARDS

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Travel Scholarship OPLSS <i>Travel scholarship to attend Oregon Programming Languages Summer School</i> <i><a href="https://www.cs.uoregon.edu/research/summerschool/summer17/">https://www.cs.uoregon.edu/research/summerschool/summer17/</a></i>	2017
AMIGO Scholarship <i>Scholarship for Graduate Studies at the University of New Mexico</i>	TODO
ANFEI <i>Best student of the Electronics Engineering 2015 class</i>	2015
Magna Cum Lauda (BSc) <i>Universidad de las Americas Puebla.</i>	2015
Roberto Rocca Scholarship <i>Scholarship for Undergraduate Studies at Universidad de las Americas Puebla</i>	TODO

## SOCIETY MEMBERSHIPS

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Women in Computing association at the University of New Mexico.

## SERVICE

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CS Board Graduate Student Representative <i>TODO</i>	2021 - 2022
CSGSA - Treasurer <i>Developed website for the Computer Science Student Conference 2018 at UNM and keep track of Internal Requisitions.</i>	2017 - 2018
Founder member of the Clique Student Organization <i>This organization provided students a proper environment to develop programming skills for programming competitions like the ACM ICPC.</i>	2014 - 2015