

## RESEARCH INTERESTS

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Formal Verification

Archimedean Quadratic Modules

Gröebner basis algorithms

Quantifier-free interpolation algorithms for decidable logics

Non-classical logics

## EDUCATION

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### University of New Mexico

Ph.D. in Computer Science, Advisor: Prof. Deepak Kapur

Albuquerque, New Mexico

2020–Current

### University of New Mexico

M.S. in Computer Science, Advisor: Prof. Deepak Kapur

Albuquerque, New Mexico

2016–2020

- Thesis: Implementation of Uniform Interpolation Algorithms

### Universidad de las Americas Puebla

B.S. in Electronics Engineering, Advisor: Prof. Mauricio Javier Osorio Galindo

Cholula, Puebla

2010–2015

- Thesis: Revisiting  $C_1$

## WORK EXPERIENCE

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### Microsoft Research

Research Intern; Mentor: Principal RSDE Mark Marron

Redmond, Washington

Summer 2019

- 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.

### Universidad de las Americas Puebla

Research Student; Advisor: Prof. Mauricio J. Osorio Galindo

Cholula, Puebla

2015–2017

- 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.

### Universidad de las Americas Puebla

Intern; Advisor: Prof. Ofelia Cervantes Gutierrez

Cholula, Puebla

Summer 2015

- Innova4D
- Analysed and implemented graph algorithms to compute Freeman centralities for the development of a recommendation system.

## 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
- **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 a subset of the <i>Bosque</i> 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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<b>Travel Scholarship for OPLSS</b> <i>Travel scholarship to attend <a href="#">Oregon Programming Languages Summer School</a></i>	2017
<b>AMIGO Scholarship</b> <i>Scholarship for Graduate Studies at the University of New Mexico</i>	2016 - 2018
<b>ANFEI</b> <i>Best student of the Electronics Engineering 2015 class</i>	2015
<b>Magna Cum Laude (BSc)</b> <i>Universidad de las Americas Puebla.</i>	2015
<b>Roberto Rocca Scholarship</b> <i>Scholarship for Undergraduate Studies at Universidad de las Americas Puebla</i>	2014

## SOCIETY MEMBERSHIPS

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Women in Computing association at the University of New Mexico.

## SERVICE

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<b>CS Advisory Board</b> Graduate Student Representative	University of New Mexico 2021 - 2022
– Participated in discussions about the state of the department and proposal of new initiatives. regarding graduate and undergraduate matters, as well as research and the position of the department within the university.	
<b>CS Graduate Student Association</b> Treasurer	University of New Mexico 2017 - 2018
– Developed website for the Computer Science Student Conference 2018 at UNM and keep track of Internal Requisitions.	
<b>Clique Student Organization</b> Founder Member	Universidad de las Américas Puebla 2014 - 2015
– This organization provided students a proper environment to develop programming skills for programming competitions like the ACM ICPC.	