

RESEARCH INTERESTS

Formal Verification

Archimedean Quadratic Modules

Gröebner basis algorithms

Quantifier-free interpolation algorithms for decidable logics

Non-classical logics

EDUCATION

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

RESEARCH EXPERIENCE

University of New Mexico

Research Assistant; Advisor: Prof. Deepak Kapur

Albuquerque, New Mexico

Fall 2020 -

- Research on Verification and Formal methods
- Assisted with research on symbolic computation and its application to program analysis.

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
- Collaborated 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

- [1] **J. Castellanos Joo**, S. Ghilardi, A. Gianola, and D. Kapur, “AXDInterpolator: A tool for computing interpolants for arrays with maxdiff”, in *19th International Workshop on Satisfiability Modulo Theories co-located with 33rd International Conference on Computer Aided Verification (CAV 2021)*, CEUR-WS.org, vol. 2908, 2021, pp. 40–52.
- [2] M. Osorio and **J. Castellanos Joo**, “Equivalence among RC -type paraconsistent logics”, *Logic Journal of IGPL*, jzw065, Jan. 2017, ISSN: 1368-9894. DOI: [10.1093/jigpal/jzw065](https://doi.org/10.1093/jigpal/jzw065).
- [3] M. Osorio, J. L. Carballido, C. Zepeda, and **J. Castellanos Joo**, “Weakening and extending \mathbb{Z} ”, *Logica Universalis*, vol. 9, no. 3, pp. 383–409, Aug. 2015, ISSN: 1661-8300. DOI: [10.1007/s11787-015-0128-6](https://doi.org/10.1007/s11787-015-0128-6).
- [4] M. Osorio and **J. Castellanos Joo**, “A single proof of classical behaviour in da Costa’s C_n systems”, *Electronic Notes in Theoretical Computer Science*, vol. 315, pp. 3–16, Sep. 2015, ISSN: 1571-0661. DOI: [10.1016/j.entcs.2015.06.002](https://doi.org/10.1016/j.entcs.2015.06.002).

CONFERENCE TALKS

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| AXDInterpolator: A Tool for Computing Interpolants for Arrays with MaxDiff 19th International Workshop on Satisfiability Modulo Theories. | July, 2021 |
| Implementation of Uniform Interpolation Algorithms Master Thesis Defense, University of New Mexico | October, 2020 |
| A new interpolation algorithm for the theory of Equality with Uninterpreted Functions Computer Science Colloquium Series, University of New Mexico | September, 2020 |
| A Single Proof of Classical Behaviour in da Costa’s C_n systems Ninth Latin American Workshop on Logic/Languages, Algorithms and New Methods of Reasoning LANMR | November, 2014 |

TEACHING ASSISTANT EXPERIENCE

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| Grader at University of New Mexico <i>CS 561 - Algorithms and Data Structures with Prof. Jared Saia</i> | Fall 2023 |
| Teaching Assistant at University of New Mexico <i>CS 105L - Introduction to Computer Programming with Prof. Soraya Abad-Mota</i> | Fall 2023 |
| Teaching Assistant at University of New Mexico <i>CS 357 - Declarative Programming with Prof. Lance Williams</i> | Spring 2023 |
| Head Teaching Assistant at University of New Mexico <i>CS 241 - Data Organization using C with Prof. Soraya Abad-Mota</i> | Fall 2022 |
| Teaching Assistant at University of New Mexico <i>CS 429/529 - Machine Learning with Prof. Trilce Estrada</i> | Spring 2022 |
| Teaching Assistant at University of New Mexico <i>CS 530 - Geometric and Probabilistic Methods in Computer Science with Prof. Lance Williams</i> | Fall 2019 |
| Teaching Assistant at University of New Mexico <i>CS 500 - Theory of Computation with Prof. Deepak Kapur</i> | Spring 2019 |
| Teaching Assistant at University of New Mexico <i>CS 561 - Algorithms and Data Structures with Prof. Jared Saia</i> | Fall 2018 |

MENTORSHIP

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| Abigail Pribisova (Bachelor) Computer Science department, University of New Mexico <i>Implementation of an algorithm for the theory of contiguous arrays equipped with a max diff operator . The deliverables of this project were a poster presented by the student Abigail at the 18th Annual Computer Science Student Conference 2023 at UNM and a working prototype of the interpolation algorithm.</i> | Fall 2022 - Spring 2023 |
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SKILLS

- 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: \LaTeX , Pandoc, Madoko, Markdown, Org
 - Web design: HTML, CSS, Javascript, Typescript, Hugo

LANGUAGES

- **English:** Fluent
- **Spanish:** Native

SOFTWARE PROJECTS

- [AXDInterpolator](#) 2021
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.
- [EUFInterpolator](#) 2020
Master thesis work implementing new interpolation algorithms for the theory of equality and uninterpreted functions (EUF), octagonal formulas, and its combination.
- [Bosque Transpiler to \$F^*\$](#) 2019
Prototypical implementation of a transpiler embedding a subset of the [Bosque](#) semantics into the Proof-oriented programming language F^ .*

WORKSHOPS ATTENDED

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

CONFERENCE REFEREEING

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

SCHOLARSHIPS AND AWARDS

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

SOCIETY MEMBERSHIPS

Women in Computing association at the University of New Mexico.

SERVICE

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| CS Advisory Board | University of New Mexico |
| Graduate Student Representative | 2021 - 2023 |
| – 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. | |
| CS Graduate Student Association | University of New Mexico |
| Treasurer | 2017 - 2018 |
| – Developed website for the Computer Science Student Conference 2018 at UNM and keep track of Internal Requisitions. | |
| Clique Student Organization | Universidad de las Américas Puebla |
| Founder Member | 2014 - 2015 |
| – This organization provided students a proper environment to develop programming skills for programming competitions like the ACM ICPC. | |