

Personal Data

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Isabel García Contreras

Work Experience

Sep 2023 - Present Software Engineer, Sr II at the **Software Integrity Group** in **Synopsys**, Canada
Nov 2021 - Sep 2023 Postdoctoral Fellow at **University of Waterloo**, Waterloo, Canada
Sep 2016 - Aug 2021 Research Student at the **IMDEA Software Institute**, Madrid, Spain
Aug 2019 - Dec 2019 International Fellow at **SRI International**, Menlo Park, CA, USA
Feb 2014 - Jul 2015 Intern at **HPCN, Universidad Autónoma de Madrid**, Spain

Education

Jul 2021 PhD in Artificial Intelligence, **Universidad Politécnica de Madrid**.
Thesis: *A scalable static analysis framework for reliable program development exploiting incrementality and modularity*
Jul 2016 MSc in Artificial Intelligence, **Universidad Politécnica de Madrid**.
Master Thesis: *Code Search: A Semantic, Abstract Interpretation-based Approach*
Jul 2015 Bachelor in Computer Engineering, **Universidad Autónoma de Madrid**
Final Project: *Accelerating Multigigabit Ethernet Network Flow Generation using Dedicated Hardware*
Top of class of 2015

Research Interests

My research interests include static analysis and verification of software, abstract interpretation, in particular, how to perform them in a scalable way, (constraint) logic programming, and semantic code search.

Selected Publications

- [1] Joseph Tafese, Isabel Garcia-Contreras, and Arie Gurfinkel. Btor2MLIR: A format for hardware verification. In *FMCAD 2023*, October 2023.
- [2] Isabel Garcia-Contreras, Hari Govind V K, Sharon Shoham, and Arie Gurfinkel. Fast approximations of quantifier elimination. In Constantin Enea and Akash Lal, editors, *Computer Aided Verification - 35th International Conference, CAV 2023, Paris, France, July 17-22, 2023, Proceedings, Part II*, volume 13965 of *Lecture Notes in Computer Science*, pages 64–86. Springer, 2023.
- [3] Isabel Garcia-Contreras, Arie Gurfinkel, and Jorge A. Navas. Efficient modular SMT-based model checking of pointer programs. In Gagandeep Singh and Caterina Urban, editors, *Static Analysis - 29th International Symposium, SAS 2022, Auckland, New Zealand, December 5-7, 2022, Proceedings*, volume 13790 of *Lecture Notes in Computer Science*, pages 227–246. Springer, 2022.
- [4] Isabel Garcia-Contreras, José F. Morales, and Manuel V. Hermenegildo. Incremental and modular context-sensitive analysis. *Theory Pract. Log. Program.*, 21(2):196–243, 2021.
- [5] Miguel A. Sanchez-Ordaz, Isabel Garcia-Contreras, Victor Perez-Carrasco, José F. Morales, Pedro López-García, and Manuel V. Hermenegildo. Verify: On-the-fly assertion checking via incrementality. *Theory Pract. Log. Program.*, 21(6):768–784, 2021.
- [6] Roberto Bruni, Roberto Giacobazzi, Roberta Gori, Isabel Garcia-Contreras, and Dusko Pavlovic. Abstract extensionality: on the properties of incomplete abstract interpretations. *Proc. ACM Program. Lang.*, 4(POPL):28:1–28:28, 2020.
- [7] Isabel Garcia-Contreras, José F. Morales, and Manuel V. Hermenegildo. Incremental analysis of logic programs with assertions and open predicates. In Maurizio Gabbriellini, editor, *Logic-Based Program Synthesis and Transformation - 29th International Symposium, LOPSTR 2019, Porto, Portugal, October 8-10, 2019, Revised Selected Papers*, volume 12042 of *Lecture Notes in Computer Science*, pages 36–56. Springer, 2019.

- [8] Isabel Garcia-Contreras, José F. Morales, and Manuel V. Hermenegildo. Multivariant assertion-based guidance in abstract interpretation. In Fred Mesnard and Peter J. Stuckey, editors, *Logic-Based Program Synthesis and Transformation - 28th International Symposium, LOPSTR 2018, Frankfurt/Main, Germany, September 4-6, 2018, Revised Selected Papers*, volume 11408 of *Lecture Notes in Computer Science*, pages 184–201. Springer, 2018.
- [9] Isabel Garcia-Contreras, José F. Morales, and Manuel V. Hermenegildo. Semantic code browsing. *Theory Pract. Log. Program.*, 16(5-6):721–737, 2016.

Scholarships and Awards

Sep 2023	Best PhD Thesis by SISTEDES, Spain
Jul 2023	Distinguished paper award, CAV'23
Jan 2023	Extraordinary PhD Thesis Award by Technical University of Madrid, Spain
2017 - 2021	FPU Grant 16/04811 by Spanish Ministerio de Educación y Ciencia
Oct 2018	1 st prize in womENcourage'18 Hackathon
Jul 2017	Best Ms. Thesis SISTEDES-Accenture Technology prize
2016	José Cuenca Award from the Department of Artificial Intelligence, UPM
2013 - 2014	Excellence Scholarship (Comunidad de Madrid, Spain)
2012 - 2013	Excellence Scholarship (Comunidad de Madrid, Spain)
Sep 2012	Effort Award EPS (Universidad Autónoma de Madrid, UAM)
Summer 2010	Scholarship of the German Embassy in Spain "Alumnos premio"
Jun 2010	2 nd prize of "Descubriendo la ciencia" from Auxilab

Teaching

Winter 2022	<i>Software Testing, Quality Assurance, and Maintenance</i> (TA), University of Waterloo, Canada
Feb - July of 2021/2020/2019	<i>Declarative programming: Logic and constraints</i> , School of Computer Science, UPM, Spain

Projects

I have participated in the projects:

2020 - 2021	PROCEDURE: <i>Rigorous methods for the development of software systems with certified quality and reliability</i> . Code: PID2019-108528RB-C21. Spanish MICIIN.
2018 - 2020	TRACES: <i>Technologies and tools for Resource-Aware, Correct, Efficient Software</i> . Code: TIN2015-67522-C3-1-R. Spanish MINECO.

Selected Talks

- Jul 2023 *Fast Approximations of Quantifier Elimination*, CAV'23, Paris, France.
- Jul 2023 *Uniform Interpolants for Efficient Domain Reduction*, Dagstuhl'23, Germany.
- Jul 2023 *Fast Approximations of Quantifier Elimination*, Dagstuhl'23, Germany.
- Jun 2023 *Partially Complete Quantifier Elimination*, EGRAPHS'23, Orlando, FA, USA.
- Dec 2022 *Efficient Modular SMT-based Model Checking of Pointer Programs*, SAS'22, Auckland, New Zealand (virtual).
- Sep 2021 *VeriFly: On-the-fly Assertion Checking via Incrementality*, ICLP'21, Porto, Portugal (virtual).
- May 2021 *Verify: On-the-fly assertion checking with CiaoPP*, F-IDE'21, Co-located with NASA Formal Methods (virtual).
- Mar 2021 *Incremental and Modular Context-sensitive Analysis*, HCVS'21, Luxembourg, Luxembourg (virtual).
- Dec 2019 *Modular Verification of C Programs*, SRI International, Menlo Park, CA, USA.
- Oct 2019 *Experiments in Context-Sensitive Incremental and Modular Static Analysis in CiaoPP*, TAPAS'19, Porto, Portugal.
- Oct 2019 *Incremental Analysis of Logic Programs with Assertions and Open Predicates*, LOPSTR'19, Porto, Portugal.
- Feb 2019 *Cocinando la informática*, Int'l Day of Women and Girls in Science, I.E.S. San Isidro, Madrid, Spain.
- Oct 2018 *Code. Analyze. Repeat. Incremental and Modular Static Program Analysis*, womENCourage'18, Belgrade, Serbia.
- Sep 2018 *Assertion-base Guidance in Abstract Interpretation*, LOPSTR'18, Frankfurt, Germany.
- Jul 2018 *Towards Incremental and Modular Context-sensitive Analysis*, ICLP'18 - FLoC'18, Oxford, UK.
- Jul 2017 *Code Search: A Semantic, Abstract Interpretation-based Approach*, SISTEDES'17, La Laguna, Spain.
- Jun 2017 *Incremental and Modular Context-sensitive Analysis*, IMDEA Software Institute, Madrid, Spain.
- Oct 2016 *Semantic Code Browsing*, ICLP'16, New York, USA.

Other Activities

- Nov 2020 Participated in the **Madrid Science Week** disseminating event.
- Feb 2020 Co-organized "**Rompiendo códigos: Mujeres y niñas en la ciencia**", celebrated in the framework of the International Day of Women and Girls in Science.
- Spring 2019 **Chair of the Software Seminar Series** (Spring season) at the IMDEA Software Institute.
- Mar 2019 Participated in the **Madrid Science Fair**, disseminating the research that takes place in the IMDEA Software Institute to students.
- Feb 2019 Co-organized "**I+D+M²: Mujeres en Montegancedo**", celebrated in the framework of the International Day of Women and Girls in Science, it is a local conference to disseminate the work of female scientists of the Technical University of Madrid.
- Feb 2018 Participated in a radio debate in the framework of the International Day of Women and Girls in Science.

Languages

Spanish: Native | English: Fluent | German: Basic