

Date of the CVA

29/04/2021

## Section A. PERSONAL DATA

|                                    |                         |                     |    |
|------------------------------------|-------------------------|---------------------|----|
| Name and Surname                   | Ignacio Fábregas Alfaro |                     |    |
| DNI                                | 51428377D               | Age                 | 39 |
| Researcher's identification number | Researcher ID           | W-4154-2017         |    |
|                                    | Scopus Author ID        |                     |    |
|                                    | ORCID                   | 0000-0002-3045-4180 |    |

\* Obligatorio

### A.1. Current professional situation

|                       |                                                               |            |                                                      |
|-----------------------|---------------------------------------------------------------|------------|------------------------------------------------------|
| Institution           | Universidad Complutense de Madrid                             |            |                                                      |
| Dpt. / Centre         | Sistemas Informáticos y Computación / Facultad de Informática |            |                                                      |
| Address               | Facultad de Matemáticas, Plaza de Ciencias 3, 28040, Madrid   |            |                                                      |
| Phone                 | (+34)<br>913944512                                            | Email      | <a href="mailto:fabregas@ucm.es">fabregas@ucm.es</a> |
| Professional category | Assistant Professor (Profesor Ayudante Doctor)                | Start date | 2021                                                 |
| Keywords              |                                                               |            |                                                      |

### A.2. Academic education (Degrees, institutions, dates)

| Bachelor/Master/PhD                                                   | University                        | Year |
|-----------------------------------------------------------------------|-----------------------------------|------|
| Programa Oficial de Doctorado en Ingeniería Informática               | Universidad Complutense de Madrid | 2012 |
| Licenciado en Ciencias Matemáticas Sección Ciencias de la Computación | Universidad Complutense de Madrid | 2004 |

### A.3. General quality indicators of scientific production

In the field of theoretical computer science it is an unquestioned practice to present our results in specialised conferences. The members of the program committee of that conference makes a thoroughly selection of the papers in order to accept only the best ones. This is why in the field of theoretical computer science, unlike other theoretical fields as mathematics and physics, a conference publications is an important scientific achievement. Also, this permits our contribution to be spread along the community faster than only with Journal papers.

My research includes papers in top conferences (see <http://portal.core.edu.au/conf-ranks/> for details) CORE A\* as POPL and OOPSLA, CORE A as CONCUR, MFCS and FORTE (during the years 2008 and 2010, now FORTE is a CORE B conference); and CORE B as ICTAC and SOFSEM. Also journal papers in Journal of Logical and Algebraic Methods in Programming (Q1-Q2 in Logic), Science of Computer Programming (Q3-Q4 in Computer Science, Software Engineering), Theoretical Computer Science (Q3 in Computer Science, Theory and Methods) and Logical Methods in Computer Science (Q3 in Logic).

- Citations: Google Scholar: 109 & Scopus: 58
- Average number of citations during the postdoc period (2012-2020) : Google Scholar: 8,33 & Scopus: 5,66
- h-index: Google Scholar: 7 & Scopus: 5

## Section B. SUMMARY OF THE CURRICULUM

Currently, I am an Associate Teacher (Profesor Ayudante Doctor) at the Computer Science department of the School of Informatics in the Universidad Complutense de Madrid in Spain. In 2012 I obtained my PhD in Computer Science by the Universidad Complutense de Madrid. The topic of my thesis was the study of coalgebraic and categorical techniques applied for process algebras. A line of research that was initiated in my Master's Thesis where I did a study of the coalgebraic simulations defined by Jesse Hughes and Bart Jacobs.

Following those lines in my PhD Thesis, my research is focused in the study of logical and categorical properties in order to obtain more reliable software. More specifically, my main interest in this topic is the study of process algebra logically. That is, the logical characterisations of different simulation notions and the relation between prime formulae and characteristic formulae, a topic closely related with the graphical representation of modal formula.

After doctoring, I expanded my research doing two postdocs abroad. From 2014 to 2016 I was a postdoc researcher at Reykjavik University (Iceland) where I worked under the supervision of Professor Luca Aceto in the Icelandic Research project NoSOS. Luca Aceto is a world renowned researcher and formerly the president of the European Association of Theoretical Computer Science.

In the project NoSOS I researched in the topic of nominal techniques for developing structural operational semantics. In particular, the study of nominal transition systems, and the definition of rule formats for various forms of bounded non-determinism properties based on the foundational formalism of Cimini and co-authors, and also rule formats for input output conformance simulation (iocos).

More recently, I worked as a postdoc researcher for 3 years at Fundación IMDEA Software under the supervision of Aleksandar Nanevski in the ERC Grant Mathador. Here I contributed at designing methods for integrating programming with pointers, concurrency, and other important imperative features, into dependent type systems such as that of the proof assistant Coq. In particular I developed notions of morphism and simulation in Concurrent Separation Logic and its implementation in Coq.

In addition, I have been in the Programme Committee of the combined 25th International Workshop on Expressiveness in Concurrency and 15th Workshop on Structural Operational Semantics in 2018; and recently in the Programme Committee of 19th International Conference on Relational and Algebraic Methods in Computer Science RAMICS 2021. I have also participated as an external referee of many International Conferences as CONCUR and Journals as Logical Methods in Computer Science or Acta Informatica. I am also a reviewer of Mathematical Reviews.

I have 5 years of teaching experience as a Teaching Assistant (Ayudante) in the UCM in the department of Computer Science (Sistemas Informáticos y Computación) mainly in the Faculty of Mathematics. I have also some experience in the organisation of conferences, since in 2015 I helped in the organisation of Madrid Meet (a collection of international conferences, among them the prestigious CONCUR and QEST) and the Nordic Workshop in Programming Theory.

## Section C. MOST RELEVANT MERITS (ordered by typology)

### C.1. Publications

AC: Autor de correspondencia; (nº x / nº y): posición firma solicitante / total autores

- 1 **Scientific paper.** Frantisek Farka; Aleksandar Nanevski; Anindya Banerjee; Germán Andrés Delbianco; Ignacio Fábregas. 2021. On algebraic abstractions for concurrent separation logics. Proceedings of the ACM on Programming Languages. ACM. 5, pp.1-32. ISSN 2475-1421.
- 2 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); Carlos Gregorio-Rodríguez; Anna Ingólfssdóttir. (2/4). 2019. Logical characterisations, rule formats and compositionality for input-output conformance simulation. The Journal of Logic and Algebraic Programming. Elsevier. 106, pp.78-106. ISSN 1567-8326.

- 3 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); Álvaro García-Pérez; Anna Ingólfssdóttir; Yolanda Ortega-Mallén. (2/5). 2019. Rule Formats for Nominal Process Calculi Logical Methods in Computer Science. Elsevier. 15-4. ISSN 1860-5974.
- 4 **Scientific paper.** Aleksandar Nanevski; Anindya Banerjee; Germán Andrés Delbianco; Ignacio Fábregas (AC). (4/4). 2019. Specifying concurrent programs in separation logic: morphisms and simulations Proceedings of the ACM on Programming Languages. ACM. 3, pp.3-31. ISSN 2475-1421.
- 5 **Scientific paper.** Luca Aceto; Dario Della Monica; Ignacio Fábregas (AC); Anna Ingólfssdóttir. (3/4). 2019. When are prime formulae characteristic? Theoretical Computer Science. Elsevier. 777, pp.3-31. ISSN 0304-3975.
- 6 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); Álvaro García-Pérez; Anna Ingólfssdóttir. (2/4). 2017. A unified rule format for bounded nondeterminism in SOS with terms as labels The Journal of Logic and Algebraic Programming. Elsevier. 92, pp.64-86. ISSN 1567-8326.
- 7 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); Álvaro García-Pérez; Anna Ingólfssdóttir; Yolanda Ortega-Mallén. (2/5). 2017. Rule Formats for Nominal Process Calculi 28th International Conference on Concurrency Theory - CONCUR 2017. LIPIcs (Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik). 85, pp.10:1-10:16. ISSN 1868-8969, ISBN 978-3-95977-048-4.
- 8 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); Carlos Gregorio-Rodríguez; Anna Ingólfssdóttir. (2/4). 2017. Logical Characterization and Compositionality of Input/Output Conformance Simulation 43rd International Conference on Current Trends in Theory and Practice of Computer Science, LNCS 10139. Springer. 10139, pp.37-48. ISBN 978-3-319-51962-3.
- 9 **Scientific paper.** Luca Aceto; Dario Della Monica; Ignacio Fábregas (AC); Anna Ingólfssdóttir. (3/4). 2015. When Are Prime Formulae Characteristic? Mathematical Foundations of Computer Science 2015 Proceedings, Part I., Lecture Notes in Computer Science. Springer. 9234, pp.76-88. ISBN 978-3-662-48056-4.
- 10 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); David de Frutos-Escrig; Anna Ingólfssdóttir; Miguel Palomino. (2/5). 2013. On the specification of modal systems: A comparison of three frameworks Science of Computer Programming. Elsevier. 78-12, pp.2468-2487. ISSN 0167-6423.
- 11 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); David de Frutos-Escrig; Anna Ingólfssdóttir; Miguel Palomino. (2/5). 2011. Graphical representation of covariant-contravariant modal formulae Proceedings 18th International Workshop on Expressiveness in Concurrency (EXPRESS) 2011. EPTCS. 64, pp.1-15. ISSN 2075-2180.
- 12 **Scientific paper.** Luca Aceto; Ignacio Fábregas (AC); David de Frutos-Escrig; Anna Ingólfssdóttir; Miguel Palomino. (2/5). 2011. Relating Modal Refinements, Covariant-Contravariant Simulations and Partial Bisimulations Proceedings Fundamentals of Software Engineering - 4th IPM International Conference (FSEN) 2011. Springer. 7141, pp.268-283. ISBN 978-3-642-29319-1.
- 13 **Scientific paper.** Ignacio Fábregas (AC); David de Frutos-Escrig; Miguel Palomino. (1/3). 2010. Equational Characterization of Covariant-Contravariant Simulation and Conformance Simulation Semantics Proceedings Seventh Workshop on Structural Operational Semantics (SOS) 2010. EPTCS. 32, pp.1-14. ISSN 2075-2180.
- 14 **Scientific paper.** Ignacio Fábregas (AC); David de Frutos-Escrig; Miguel Palomino. (1/3). 2010. Logics for Contravariant Simulations Proceedings Formal Techniques for Distributed Systems (FMOODS) 2010 and International Conference (FORTE) 2010. Lecture Notes in Computer Science. Springer. 6117, pp.224-231. ISBN 978-3-642-13463-0.
- 15 **Scientific paper.** Ignacio Fábregas (AC); David de Frutos-Escrig; Miguel Palomino. (1/3). 2009. Non-strongly Stable Orders Also Define Interesting Simulation Relations Proceedings of Algebra and Coalgebra in Computer Science, Third International Conference, (CALCO) 2009. Lecture Notes in Computer Science. Springer. 5728, pp.221-235. ISBN 978-3-642-03740-5.

- 16 Scientific paper.** David de Frutos-Escrig; Miguel Palomino; Ignacio Fábregas (AC). (3/3). 2008. Multiset Bisimulations as a Common Framework for Ordinary and Probabilistic Bisimulations Proceedings of Formal Techniques for Networked and Distributed Systems (FORTE). Lecture Notes in Computer Science.Springer. 5048, pp.283-298. ISBN 978-3-540-68854-9.
- 17 Scientific paper.** Ignacio Fábregas (AC); David de Frutos-Escrig; Miguel Palomino. (1/3). 2007. Reflection and preservation of properties in coalgebraic (bi)simulations Proceedings of Theoretical Aspects of Computing (ICTAC 2007). Lecture Notes in Computer Science.Springer. 4711, pp.231-245. ISBN 978-3-540-75290-5.
- 18 Scientific paper.** Ignacio Fábregas (AC); Luis Garmendia Salvador. (1/2). 2005. Sobre Redes de Petri Difusas In proceedings of Simposio Sobre Lógica Fuzzy y Soft Computing (CEDI). pp.125-132. ISBN 84-9732-433-1.
- 19 Scientific book or monograph.** Luca Aceto; Ignacio Fábregas (AC); Álvaro García-Pérez; Anna Ingólfssdóttir. (2/4). 2016. Proceedings of the 27th Nordic Workshop on Programming Theory, NWPT 2015 Proceedings of the 27th Nordic Workshop on Programming Theory, NWPT 2015. Technical report RUTR-SCS16001. ISSN 1670-5777.
- 20 Software.** Frantisek Farka; Aleksandar Nanevski; Anindya Banerjee; Germán Andrés Delbianco; Ignacio Fábregas (AC). (5/5). 2021. On Algebraic Abstractions for Concurrent Separation Logics (artefact) pp.31. ISSN 2475-1421.
- 21 Software.** Aleksandar Nanevski; Anindya Banerjee; Germán Andrés Delbianco; Ignacio Fábregas (AC). (4/4). 2019. Specifying concurrent programs in separation logic: morphisms and simulations (Artifact) 3, pp.3-31. ISSN 2475-1421.

## C.2. Participation in R&D and Innovation projects

- 1** 102210-B-I00, Madrid Program in Intelligent Contracts and Safe and Scalable Blockchains through Verification and Analysis (BLOQUES-CM) Comunidad de Madrid (S2018/TCS-4339). PGC2018. Juan Caballero. (FUNDACION IMDEA SOFTWARE). 01/01/2019-31/12/2022. Team member.
- 2** 724464, Mathador ERC-COG. ERC-2016-COG - ERC Consolidator Grant. Aleksandar Nanevski. (FUNDACION IMDEA SOFTWARE). 01/04/2017-31/03/2022. 1.999.895 €. Team member.
- 3** 102210-B-I00, Foundations for the development, analysis and understanding of BLock chains and Smart COntacts Ministerio de Economía, Industria y Competitividad. PGC2018. Pierre Ganty. (FUNDACION IMDEA SOFTWARE). 01/01/2019-31/12/2021. 94.380 €. Team member.
- 4** 71819-P, Rigorous Technologies for the Analysis and Verification of Sophisticated Concurrent Software Ministerio de Economía, Industria y Competitividad. TIN2015. Manuel Carro. (FUNDACION IMDEA SOFTWARE). 01/01/2016-31/12/2018. Team member.
- 5** 141558-041, Nominal Structural Operational Semantics The Icelandic Centre for Research (Rannís). ICELANDIC RESEARCH FUND. Luca Aceto. (Reykjavik University). 01/2014-12/2016. Member hired as a researcher.
- 6** S2009/TIC-1465, Programa de métodos rigurosos de desarrollo de software de la Comunidad de Madrid (PROMETIDOS) Consejería de Educación. Gilles Barthe. (Universidad Complutense de Madrid). 01/2010-05/2014. 825.249 €. Team member.
- 7** TIN2009-14599-C03-01, Desarrollo de Software de Alta Calidad, Fiable, Distribuido y Seguro (DESAFIOS10) Ministerio de Ciencia e Innovación. Narciso Martí Oliet. (Universidad Complutense de Madrid). 01/2010-06/2013. 323.433 €. Team member.
- 8** TIN2006-15660- C02-01, Desarrollo de software de alta calidad, fiable, distribuido y seguro (DESAFIOS) MINISTERIO DE EDUCACION Y CIENCIA. Narciso Martí Oliet. (Universidad Complutense de Madrid). 10/2006-30/09/2010. 193.600 €. Team member.

## C.3. Participation in R&D and Innovation contracts

## C.4. Patents