



# Josué Tonelli-Cueto

Mathematician

Postdoctoral Researcher



0000-0002-2904-1215



UT San Antonio



josue.tonelli.cueto@bizkaia.eu



tonellicueto.xyz



illsaidthoughts.xyz

## Interests

- \* Numerical algorithms and condition-based complexity
- \* Computational algebraic geometry
- \* Random geometry

## Languages

Castellano (Spanish) — [Native]



English



Euskera (Basque)



Deutsch (German)



(\*)[The scale follows the Common European Framework of Reference for Languages: Learning, Teaching, Assessment with the black lines indicating levels A2, B2 and C2 and the gray lines the levels A1, B1 and C1.]

## Programming

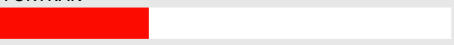
C



julia



FORTRAN



MatLab



R



(\*)[The skill scale for each program or programming language is from 0 (Fundamental Awareness) to 6 (Expert).]

Last update on the 28th of February of 2023.

Profile photo: © Inria / Photo B. Fourrier

## employment & education

- 2022-23 Postdoctoral Associate The University of Texas at San Antonio  
Under the mentorship of Alperen A. Ergür
- 2020-22 FSMP Postdoctoral Fellow Inria Paris & IMJ-PRG  
In the OURAGAN team mentored by F. Roullier and E. Tsigaridas
- 2020 Postdoctoral researcher Inria Paris & IMJ-PRG  
In the OURAGAN team mentored by F. Roullier and E. Tsigaridas
- 2017-19 Dr. rer. nat. Mathematik (PhD in Mathematics) BMS & TU Berlin  
Under the supervision of Prof. P. Bürgisser and Prof. F. Cucker.
- 2014-17 M.Sc. Mathematics BMS & TU Berlin  
M.'s t. "On the complexity of some Null-Cone Membership Problems" with Prof. P. Bürgisser.
- 2009-14 Licenciatura en Matemáticas con Premio Nacional Fin de Carrera UPV/EHU  
B. Mathematics in the University of the Basque Country.

## grants & awards

- 2021 MATH+ Dissertation Award 2020 MATH+, BMS & Einstein Foundation Berlin
- 2020 3rd Prize in the Tiburtius Prizes 2020 of the Berlin Universities LKRP Berlin
- 2020-22 FSMP Postdoctoral Fellowship Fondation Sciences Mathématiques de Paris  
Call of 2020 in the "interactions" program
- 2017-19 BMS Doctoral Fellowship BMS & Einstein Foundation Berlin
- 2019 Special Award to Young Researchers presenting Posters MEGA 2019  
One out of three given awards
- 2014-16 Beca de "la Caixa" para estudios de posgrado en universidades europeas  
Jointly awarded by Obra Social "la Caixa" and DAAD in 2014 for BMS Phase I.

## papers and preprints

- '22 + Generalized Perron Roots and Solvability of the Absolute Value Equation With Manuel Radons. arXiv:1912.08157
- '22 + A  $p$ -adic Descartes solver: the Strassman solver arXiv:2203.07016
- '22 + Probabilistic bounds on best rank-one approximation ratio With Khazhgali Kozhasov. arXiv:2201.02191
- 2023 Condition Numbers for the Cube. I: Univariate Polynomials and Hypersurfaces Journal of Symbolic Computation  
With Elias Tsigaridas. Conference version at ISSAC'20. arXiv:2006.04423
- 2022 Functional norms, condition numbers and numerical algorithms in algebraic geometry Forum Mathematics, Sigma  
With Felipe Cucker and Alperen A. Ergür. arXiv:2102.11727
- 2022 A Geometric Summation of the Geometric Series The American Mathematical Monthly  
hal-03779492
- 2022 On the Complexity of the Plantinga-Vegter Algorithm Disc. & Comp. Geometry  
With F. Cucker and A.A. Ergür. Journal version at ISSAC'19. arXiv:2004.06879
- 2022 Ultrametric Smale's  $\alpha$ -theory ACM Communications in Computer Algebra  
With Jazz G. Suchen. arXiv:2206.08392
- 2022 On the Error of Random Sampling: Uniformly Distributed Random Points on Parametric Curves ISSAC 2022  
With A. Chalkis and Ch. Katsamaki. arXiv:2203.02832
- 2022 Beyond Worst-Case Analysis for Root Isolation Algorithms ISSAC 2022  
With A.A. Ergür and E. Tsigaridas. arXiv:2202.06428
- 2021 Computing the Homology of Semialgebraic Sets. II: General Formulas J.FoCM  
With P. Bürgisser and F. Cucker. arXiv:1903.10710
- 2020 Condition numbers for the cube. I: Univariate polynomials and hypersurfaces ISSAC 2020  
With E. Tsigaridas. arXiv:2006.04423v1
- 2020 Computing the Homology of Semialgebraic Sets. I: Lax Formulas J.FoCM  
With P. Bürgisser and F. Cucker. arXiv:1807.06435
- 2019 On the Number of Real Zeros of Random Fewnomials SIAGA  
With P. Bürgisser and A.A. Ergür. arXiv:1811.09425

## selected talks

- 2022 MINDS & CIS Seminar Series John Hopkins University  
"Condition Numbers and Probability for Explaining Algorithms in Computational Geometry"
- 2021 Mathematical Congress of the Americas 2021 University of Buenos Aires (On-line)  
"Symbolic vs. Numerical: Allies or Enemies? (Introductory Talk)"
- 2021 SIAM Conference AAG 2021 Texas A&M (On-line)  
"What's new in Computational Real Algebraic Geometry? (Introductory Talk)"
- 2021 Tutorial-a-thon of the Applied Algebraic Topology Network On-line  
"The Niyogi-Smale-Weinberger Theorem & its relatives"

## selected organized activities

- 2023 AMS Special Session on JMM2023  
*Data Science at the Crossroads of Analysis, Geometry, and Topology*  
(a Mathematics Research Communities session)  
With Hitesh Gakhar and Harlin Lee
- 2022 Sesión Especial II Encuentro RSME-UMA  
*Computación y Aplicaciones en Geometría Algebraica*  
With Alicia Dickenstein, Gabriela Jerónimo and Beatriz Pascual Escudero
- 2022 Mini-Symposium 5th SIAM TX-LA Meeting  
*Applications and Computation in Algebraic Geometry*  
With Jordy Lopez and Thomas Yahl
- 2022 Sesión Especial RSME2022  
*Geometría Algebraica: la Aplicada, la Computacional y la Numérica*  
With Laura Brustenga i Moncusí and Roser Homs
- 2021 Minisymposium *Computational Real Algebraic Geometry* SIAM Conf. AAG '21  
With Cordian Riener
- 2021 S. Session *Symbolic and Numerical Computation with Polynomials* MCA2021  
With Diego Armentano, Matías Bender and Alperen A. Ergür
- 2020 3rd BYMAT Conference UV & UPV  
Member of the Scientific Committee and of the Poster Committee
- 2016-19 "What is...?" Seminar BMS  
Member of the Organizing Committee
- 2019 Minisymposium *Numerical methods for structured polynomial system solving* SIAM Conference AAG 2019  
With Alperen A. Ergür, Pierre Lairez and Gregorio Malajovich
- 2018 6th BMS Student Conference (21-23/2) BMS  
With BMS Student Representatives of 2017

## popularization of mathematics

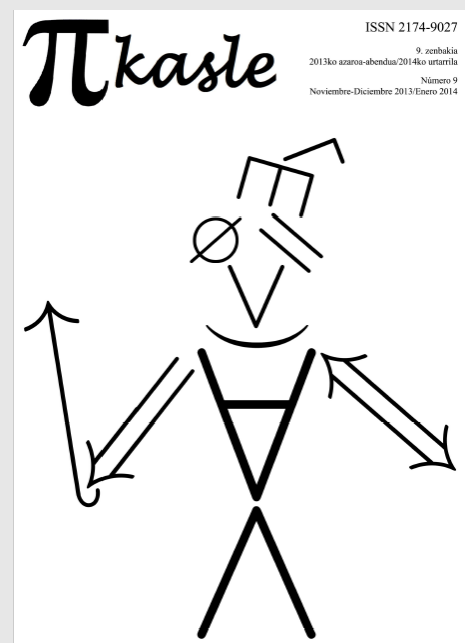
- 2022 *Fête de la Science 2022* [French & Spanish] Colegio de España en París  
Science week open to the general public. Co-organizer representing SIEF.
- 2022 Radio Interview *Sistemas de ecuaciones, ¿cómo resolverlas?* [Spanish]  
At *Investigadores por el mundo* (number 157) by Antonio G. Armas.
- 2015 *Emmy Noether, retrato alfabético* [Spanish] Poem  
Published in the blog "mujeres con ciencia" on the 5th of October.
- 2011-14  $\pi$ kasle [PIkasle] UPV/EHU Math Students' Magazine  
Mainly online (with ISSN 2174-9027), but with some issues also on paper.  
Founder (together with Ricardo Grande), editor, desktop publisher, cover designer  
(except in issue number 10), interviewer and sporadic author.  
2013 Honor mention in *Ciencia en Acción XIV*  
2012 One 1st Prize in the *Image Difussion Student Awards of the UPV/EHU*

## service

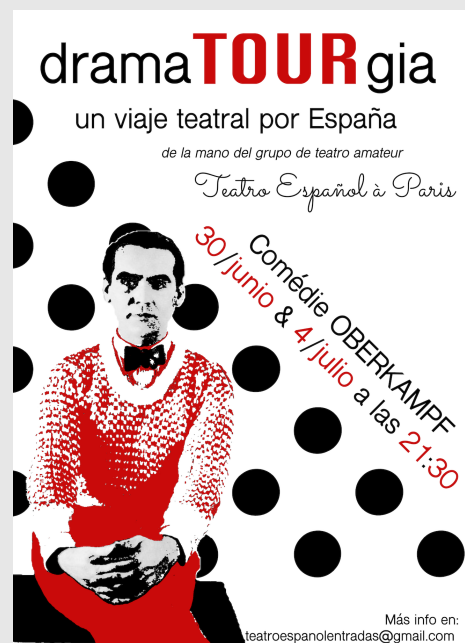
- 2015-18 Vocal del Comité de Evaluación de Titulaciones de Ciencias de UNIBASQ  
Student evaluator at Agency for Quality of the Basque University System
- 2017 Student Representative of the BMS Berlin Mathematical School  
Representation of students at BMS Executive Board and *Mentoring, Gender and Diversity* Committee and organization of students' social events



$\pi$ kasle No. 7



$\pi$ kasle No. 9



dramaTOURgia: un viaje teatral a través de España