

*Curriculum Vitae*

**DANNY ARLEN DE JESUS GÓMEZ RAMÍREZ**

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**CURRENT POSITIONS**

- Multidisciplinary Scientist, Scientific Consultant and Professor at the Center for Research, Innovation, Development and Transfer Parque Tech, Institución Universitaria Pascual Bravo. Member of the Research Groups GNOMON (knowledge management), GICEI (electronics and nanotechnology) and ICONO (Design, Image and Communication).
- Co-founding member of the High Performance Electronics Colombian Network (REAR-COLHIPEN).  
(U of A, Universidad EIA, U of M, I. U. Pascual Bravo, Universidad Antonio Nariño, among others).
- Leader of the International Multidisciplinary Consortium ARMAINTE and the Mathematical Artificial Intelligence, Research Meta-project  
<https://dagomez1982.wixsite.com/artmathintelligence>
- External Scientific Consultant of the Vivero del Software, Secretary of Education of Medellín.
- External Scientific Consultant and Cooperator of the Teacher Innovation Center, MOVA, Secretary of Education of Medellín.
- Member of the Advisory Board and the Academic Advisory Committee of the Education Award Program "Ser Mejor para la Calidad Educativa", Secretary of Education of Medellín.

- CEO and Founder of the multi-thematic Cognitive Intelligence and Artificial (Mathematical) Intelligence Consulting Company Visión Real Cognitiva (Cognivision) S.A.S.

## PREVIOUS POSITIONS

- Former General Leader of the Center for Research, Innovation, Development and Transfer Parque Tech, Institución Universitaria Pascual Bravo. February 2021-December 2022.
- Former Director of the Laboratories' Research Center Parque i, Instituto Tecnológico Metropolitano (ITM). August 2020-February 2021.
- Former member of the Research Group in Algebra and Set Theory at the Vienna University of Technology, Austria. August 2018-September 2020.
- Former member of the Computational Logic Research Group at the Vienna University of Technology, Austria. Within the Research Project "Structure and Expressivity", funded with 1.5 million Euros by the Vienna Science and Technology Fund. March 2017-August 2018.
- Former member of the Artificial Intelligence Group at the Institute for Cognitive Sciences, University of Osnabrück, Germany, August 2013-February 2017.
- Former member of the COINVENT (Concept Invention Theory) Project, funded by the European Union with 2.1 million Euros (within the Seventh Framework Programme) for research on formal models of Creativity, January 2014-September 2016.  
[http://www.coinventproject.eu/en/project\\_description.html](http://www.coinventproject.eu/en/project_description.html)
- Former member of the Research Group in Algebra and Discrete Mathematics at the Institute of Mathematics, University of Osnabrück, Germany, October 2010-July 2013.
- Former Visiting Research Fellow at the Institute of Informatics, University of Edinburgh, Scotland, UK, April 2014.
- Former member of the Research Group in Arithmetic Geometry at the Institute of Mathematics, University of Heidelberg, Germany, October 2007-April 2008.
- Former member and active co-investigator of the Commutative Algebra and Algebraic Geometry Research Group, School of Mathematics, Universidad Nacional de Colombia, July 2010-present.

## STUDIES

- Academic Baccalaureate, Colegio Carmelitano, Bello (Antioquia), 1999.
- Mathematician, Universidad Nacional de Colombia, Medellín, 2004.
- Master in Mathematical Sciences, Universidad Nacional de Colombia, Medellín, 2007.
- Postgraduate studies in Number Theory, Arithmetic Geometry Research Group (*Arbeitsgruppe Arithmetische Geometrie*), University of Heidelberg, Heidelberg (Germany), Winter Semester 2007-2008.
- PhD in Mathematical Sciences from the Universidad Nacional de Colombia (Medellin) in cooperation with the University of Osnabrueck (Germany) and the DAAD (German Academic Exchange Service). September 2013.
- Postdoc in Artificial Intelligence and Cognitive Science at the University of Osnabrück, Germany, October 2013- February 2017.
- Postdoc in Computational Logic, Vienna University of Technology, Austria, March 2017- August 2018.

## SCHOLARSHIPS AND AWARDS

- 50 First Places ICFES Examination (Colombian High Schools' General Examination) of the Municipality of Bello, Mayor of Bello, Bello, 1999.
- Outstanding Participation (top 10/open to undergraduate students from all over the country), V Colombian Olympiad of University Mathematics, Colombian Mathematics Olympiad and Colombian Mathematics Society, December 2001.
- Outstanding Participation (top 10/open to undergraduate students from all over the country), VI Colombian Olympiad of University Mathematics, Colombian Mathematics Olympiad and Colombian Mathematics Society, December 2002.
- Bronze Medal in the V Ibero-American Olympiad of University Mathematics, Brazilian Mathematics Olympiad, September 2002.
- Bronze Medal at the VI Ibero-American Olympiad of University Mathematics Brazilian Mathematics Olympiad, September 2003.
- Honorable Mention in the XI International Mathematics Competition for University Students, IMC (International Mathematics Competition for University Students), University College London, Saints Cyril and Methodius University, Skopje (Macedonia), July 2004.
- Tuition waiver for academic excellence, Universidad Nacional de Colombia, Medellín, Semesters 01 and 02 of 2000, 01 of 2001 and 01 of 2002.
- Recipient of the scholarships for outstanding graduate students, Universidad Nacional de Colombia (Bogotá and Medellín), to study for a Master's degree (2005-2006) and Doctorate (2008-2012) in Mathematical Sciences.

- Scholarship holder of the German Academic Exchange Service, DAAD (Deutscher Akademischer Austausch Dienst), Bonn (Germany), 2007-2013.
- Delegation leader of the Olympic team that represented the Universidad Nacional de Colombia (Medellin Campus) in the 1st Ibero-American Interuniversity Mathematics Competition, Girardot (Colombia), October 4-10, 2009. The team won two bronze medals.
- Winner of the Best Technical Abstract and Invited to give a Plenary Lecture at the Third European Curriculum of the European Human Brain Project, Graz, Austria, September 26-27, 2019.

## PUBLICATIONS

### **(Research) Book Chapters:**

- A Structural and Constructive Cognitive-ontological Critique of Certain Seminal Aspects of the Scientific Endeavor during the early 21st Century (original in Spanish). In *Materiales y ensayos de filosofía de la ciencia y del conocimiento*. López-López A. ed. Editorial Bonaventuriana, (2024). To appear.
- Public Transport Passenger's Density Estimation Tool for Supporting Policy Responses for Covid-19. Joint work with Nilton A. Henao-Calle, Mateo Arroyave-Quintero and Semaria Ruiz-Alvarez. In *Decisions Sciences for Covid-19*. In International Series in Operations Research & Management Science. Springer, (2022).

[https://link.springer.com/chapter/10.1007/978-3-030-87019-5\\_16](https://link.springer.com/chapter/10.1007/978-3-030-87019-5_16)

- A Hybrid Therapeutic Framework based on Chat bots and Classic Psychotherapy for Mental Issues raised by the Extended Pandemic originated by COVID-19. Joint work with Estefanía Hernandez-Carvajal. In *Studies in Systems, Decisions and Control: Special Version: Artificial Intelligence for COVID-19*. Springer, (2021).

[https://rd.springer.com/chapter/10.1007/978-3-030-69744-0\\_27](https://rd.springer.com/chapter/10.1007/978-3-030-69744-0_27)

- Some Pragmatic Prevention's Guidelines regarding SARS-CoV-2 and COVID-19 in Latin America inspired by Mixed Machine Learning Techniques and Artificial Mathematical Intelligence. Case Study: Colombia. Joint work with Yoe Herrera, Alex Ardila-Garcia and Johanna Ortega. In *Technological and Industrial Applications Associated with Intelligent Logistics*. In Lecture Notes in Intelligent Transportation and Logistics series. Springer. (2021).

Arxiv Preprint: <https://arxiv.org/pdf/2105.12213.pdf>

Official Version: [https://rd.springer.com/chapter/10.1007/978-3-030-68655-0\\_26](https://rd.springer.com/chapter/10.1007/978-3-030-68655-0_26)

- Semantic and Morpho-syntactic Prevention Guidelines for COVID-19 based on Cognitively Inspired Artificial Intelligence and Data Mining. Joint work with Yoe Herrera, Alex Ardila-Garcia and Johanna Ortega. In *Studies in Systems, Decisions and Control: Special Version: Artificial Intelligence for COVID-19*. Springer, (2021).

[https://rd.springer.com/chapter/10.1007/978-3-030-69744-0\\_28](https://rd.springer.com/chapter/10.1007/978-3-030-69744-0_28)

- On the Anti-pragmatism of Pure Mathematics at the beginning of the 21st Century in the light of Mathematical Artificial Intelligence (translation, original chapter in Spanish) In A. F. Suarez & Cesar A. Guerra, Ed. *Mathesis y Logoi: Contribuciones a la filosofía de la lógica y la filosofía de las matemáticas*. Editorial Bonaventuriana, (2022).

<https://www.libreriadelau.com/bw-mathesis-y-logoi-contribuciones-a-la-filosofia-de-la-logica-y-la-filosofia-de-la-matematica-editorial-bonaventuriano-matematica/p>

- General Introduction to the Artificial Mathematical Intelligence Program. In *Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations*. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).
- [https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_1](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_1)
- Some Basic Technical (Meta)Mathematical Considerations for Cognitive Metamathematics. In *Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations*. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).
- [https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_2](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_2)
- General Considerations for the New Cognitive Foundations' Program. In *Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations*. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).
- [https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_3](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_3)
- Towards the (Cognitive) Reality of Mathematics and the Mathematics of (Cognitive) Reality. In *Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations*. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).
- [https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_4](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_4)
- The Physical Numbers. In *Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations*. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).
- [https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_5](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_5)
- Dathematics: A Meta-Isomorphic Version of "Standard" Mathematics based of Proper Classes. In *Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations*. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).

[https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_6](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_6)

Preprint of an initial version: <https://arxiv.org/pdf/1804.02439.pdf>

- Conceptual Blending in Mathematical Creation/Invention. In Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).  
[https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_7](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_7)
- Formal Analogical Reasoning in Concrete Mathematical Research. In Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).  
[https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_8](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_8)
- Conceptual Substratum. In Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).  
[https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_9](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_9)
- (Initial) Global Taxonomy of the most Fundamental Cognitive (Metamathematical) Mechanisms used in Mathematical Creation/Invention. In Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).  
[https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_10](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_10)
- Meta-Modeling of Classic and Modern Mathematical Proofs and Concepts. In Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).  
[https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_11](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_11)
- The most Outstanding Challenges towards Global AMI and its Plausible Extensions. In Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).  
[https://link.springer.com/chapter/10.1007/978-3-030-50273-7\\_12](https://link.springer.com/chapter/10.1007/978-3-030-50273-7_12)
- A Multidisciplinary Approach towards the Formalization of the Local Ontological-Natural Substratum of Mathematical Structures (translation, original chapter in Spanish). Together with J. P. Cardona-Buitrago. In A. F. Suarez, Ed. Logos y Filosofía: Temas y Debates Contemporaneos. In Series Señales, Editorial Bonaventuriana, (2020).  
<http://www.editorialbonaventuriana.usb.edu.co/index.php/libros/inv/item/12-filosofia/532-logos-y-filosofia>

- Formal Conceptual Blending in the (Co-)Invention of Pure Mathematics. Joint paper with Alan Smaill. In Confalonieri R., Pease A., Schorlemmer M. eds. Concept Invention: Foundations, Implementations. In Series: Social Aspects and Applications. In Cognitive Technologies. Springer (2018). <https://rd.springer.com/book/10.1007%2F978-3-319-65602-1>
- Conceptual Blending in DOL, Evaluating Consistency, Conflict Resolution. Joint work with Michael Codescu, Fabian Neubaus, Till Mossakowski and Oliver Kutz. In Confalonieri R., Pease A., Schorlemmer M. eds. Concept Invention: Foundations, Implementations, Social Aspects and Applications. In Series: Cognitive Technologies. Springer (2018). <https://rd.springer.com/book/10.1007%2F978-3-319-65602-1>
- Towards a Computational Framework for Function-Driven Concept Invention. Joint with Nico Potyka, D. and Kai-Uwe. Kühnberger. In Lecture Notes in Artificial Intelligence 9782, Steunebrink et al. (Eds.). Springer, Cham (2016). [https://link.springer.com/chapter/10.1007/978-3-319-41649-6\\_21](https://link.springer.com/chapter/10.1007/978-3-319-41649-6_21)

### **Articles in specialized Journals:**

- On the Infinitely Generated Locus of Frobenius Algebras of Rings of Prime Characteristic. Joint work with Alberto F. Boix and Santiago Zarzuela. Acta Mathematica Vietnamica. (2023), to appear. Arxiv Preprint: <https://arxiv.org/pdf/2203.08511.pdf>
- Robust Control Approach for a Decision-Making System of a Shared EVs Aggregator. Joint work with Semaria Ruiz and Manuel Ospina-Alarcón. International Journal of Renewable Energy Research (2023), to appear.
- Optimal Management Strategy for a shared EVs Aggregator participating in Electricity and Frequency Regulation Reserve Markets. Joint work with Semaria Ruíz-Álvarez. Technology and Economics of Smart Grids and Sustainable Energies 7, 29 (2022). <https://link.springer.com/article/10.1007/s40866-022-00153-y>
- On the Topological Structure of the (Non-)Finitely-Generated Locus of Frobenius Algebras emerging from Stanley-Reisner Rings. Joint work with Edison Gallego, Juan P. Hernandez and Sergio Molina, (2022). DOI: 10.1080/00927872.2022.2099885 <https://www.tandfonline.com/doi/full/10.1080/00927872.2022.2099885>  
Arxiv Preprint: <https://arxiv.org/pdf/2105.04782.pdf>
- Conceptual Computation as a Paradigm-Shifting Technique in (Theoretical) Physics and (Computational) Mathematics. Together with Yoe A. Herrera. Journal of Physics: Conference Series, Vol. 1672, 012015, (2020). <https://iopscience.iop.org/article/10.1088/1742-6596/1672/1/012015/pdf>

- On the Elementary Preservation of the Noetherian Condition and its Potential Applications on Computational Physics. Together with Edison Gallego and Juan D. Vélez, Journal of Physics: Conference Series. Vol. 1645, 012005, (2020).  
Online Version: <https://iopscience.iop.org/article/10.1088/1742-6596/1645/1/012005/pdf>
- Towards a Homological Generalization of the Direct Summand Theorem, together with Juan D. Vélez. Open Mathematics, 18, 1352-1364 (2020).  
Preprint at Arxiv.org <https://arxiv.org/pdf/1707.09936.pdf>
- Artificially Hydrogen Molecule in vertically stacked Ga<sub>1-x</sub>Al<sub>x</sub>As Nanoscale Rings: Structural and External Probes Effects in their Quantum Levels. Joint work with J. D. Castrillón, J. L. Palacio, I. E. Rivera, Y. A. Suaza, M. R. Fulla and J. H. Marín. Physica E: Low-Dimensional Systems and Nanostructures, 117, 113765 (2020).  
<https://www.sciencedirect.com/science/article/abs/pii/S1386947719311798>
- Category-based Co-Generation of Basic Results and Concepts in Algebra and Number Theory: Containment-Division and Goldbach Rings. Joint work with Marlon Fulla, Ismael Rivera, Juan D. Vélez and Edison Gallego, JP Journal of Algebra, Number Theory and Applications Vol 40(5) pp. 887-901 (2018).  
<http://www.pphmj.com/abstract/12149.htm>
- A General Version of the Nullstellensatz for Arbitrary Fields. Joint work with Juan D. Vélez and Edison Gallego, Open Mathematics 17, 556-558 (2018).  
Arxiv preprint <https://arxiv.org/pdf/1708.04463.pdf>
- On Positive-Characteristic Semi-parametric Local Uniform Reductions of Varieties over Finitely Generated  $\mathbb{Q}$ -algebras. Joint work with Edison Gallego and Juan D. Vélez, Results in Mathematics, Vol. 72(1), Pages 937-945, (2017).  
<https://link.springer.com/content/pdf/10.1007%2Fs00025-017-0691-7.pdf>
- Theory Blending: Extended Algorithmic Aspects and Examples. Joint work with M. Martinez, A. M. H. Abdel-Fattah, U. Krumnack, A. Smaill, T. Besold, A. Pease, M. Guhe and K.-U. Kühnberger. Annals of Mathematics and Artificial Intelligence, Vol. 80(1), pages 65-89, (2016).  
<http://link.springer.com/article/10.1007/s10472-016-9505-y>
- Normality and Related Properties of Forcing Algebras. Joint paper with Holger Brenner, Communications in Algebra Vol. 44 (11) pp. 4769-4793, (2016).  
<http://www.tandfonline.com/eprint/jp4prBdiQykbGbhc4FE/full>  
Arxiv version: <https://arxiv.org/pdf/1707.08605.pdf>



- The Direct Summand Conjecture for some bi-generated extensions and a non-standard Version of Koh's Conjecture. Joint work with E. Gallego and J. D. Vélez, Beiträge in Algebra und Geometrie, (Communications in Algebra and Geometry), (2016).  
<http://link.springer.com/article/10.1007/s13366-015-0277-z>  
Arxiv version: <https://arxiv.org/pdf/1708.03393.pdf>
- On the connectedness of the Spectrum of Forcing Algebras. Joint work with Holger Brenner, Revista Colombiana de Matemáticas, Vol 48-1, Pag. 1-19, (2014).  
<http://www.scielo.org.co/pdf/rcm/v48n1/v48n1a01.pdf>

### **Books and Monographs:**

- Artificial Mathematical Intelligence: Philosophical, Metamathematical, Physical and Cognitive Foundations. Danny A. J. Gomez-Ramirez. Springer International Publishing, Cham (2020).  
<https://link.springer.com/book/10.1007/978-3-030-50273-7>
- Tractatus de Philosophia Pragmatica Universalis (Edition in Tribus Linguis) (2023), to appear, edition in 3 languages.
- Quantum Mechanics, Quantum Computing and Heat Computing: An Introduction. Joint with Juan D. Vélez and Juan P. Hernandez. Initial Preprint. [https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469\\_c8eb1fc54f0c4cd4820d212334c33671.pdf](https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469_c8eb1fc54f0c4cd4820d212334c33671.pdf)
- Homological Conjectures, Closure Operations, Forcing Algebras and Vector Bundles, PhD Thesis, National University of Colombia, 2023. [https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469\\_5815c11af3e743afabd8b9923835623e.pdf](https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469_5815c11af3e743afabd8b9923835623e.pdf)
- Tenth's Hilbert Problem and some related Questions (in Spanish), Master Thesis, National University of Colombia, 2007. [https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469\\_32f95ebbf094067af897df4686a6c32.pdf](https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469_32f95ebbf094067af897df4686a6c32.pdf)
- The Prime Number Theorem and Some Equivalences (in Spanish), Diploma Thesis, National University of Colombia, 2004. [https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469\\_30d6800503894a8ea17da079283080de.pdf](https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469_30d6800503894a8ea17da079283080de.pdf)

### **Conference Proceedings:**

- Conceptual Blending as a meta-generator of mathematical concepts: Prime Ideals and Dedekind Domains as a Blend. In T. Besold, K.-U. Kuehnberger, M. Schorlemmer and Alan Smaill (eds.), Kuehnberger K.-U., Koenig P. and Walter, S. (Ed. of the series). Proceedings of the workshop on Computational Creativity, Concept Invention, and General Intelligence 2015, C3GI. Cognitive Science Institute. Publications of the Institute for Cognitive Sciences, University of Osnabrück, Osnabrück, (2015).  
[https://docs.wixstatic.com/ugd/8ee469\\_c6687d2c9e814a57b443ef6609f5b97b.pdf](https://docs.wixstatic.com/ugd/8ee469_c6687d2c9e814a57b443ef6609f5b97b.pdf)

- The Role of Blending in mathematical invention. Joint paper with F. Bou, M. Schorlemmer, J. Corneli, E. Maclein, A. Smaill and A. Pease. In Proceedings of the Sixth International Conference on Computational Creativity (ICCC). S. Colton et. al., ed. Publisher: Brigham Young University, Provo, Utah. Pages 55-62. (2015).

[http://computationalcreativity.net/iccc2015/proceedings/3\\_2Bou.pdf](http://computationalcreativity.net/iccc2015/proceedings/3_2Bou.pdf)

### **Research Notes and Technical Abstracts (with new proofs and constructions of classical results)**

- An Explicit Set of Isolated Points in  $\mathbb{R}$  with Uncountable Closure, *Mathematization: Teaching University, Regional School of Mathematics*, Vol. XV, No 2, December (2007), Research Notes, 145-147.  
<http://www.redalyc.org/articulo.oa?id=46815211>
- A more direct Proof of Gerschgorin's Theorem, *Matemáticas: Enseñanza Universitaria, Regional School of Mathematics*, Vol. XIV, No 2, December (2006), Research Notes 119-122. <http://revistaerm.univalle.edu.co/VolXIV2/autor7.pdf>
- Dathematics: A Meta-Isomorphic Version of Classic Mathematics based on Proper Classes. Technical Abstract from the Logic Kolloquium 2017, Stockholm, Sweden. *The Bulletin of Symbolic Logic* 24 (2), 211-277 (2018).

### **Preprints and/or Articles (in the process of peer review)**

- Generalizing and Formalizing Musical Interval from Arbitrary Sizes over the Types Diminished, Minor, Perfect, Major and Augmented (2023). Projected for Patent and Software Registration.
- Towards an Experimental Science of Natural Consciousness from the First-Third-Person Perspective (2023). DOI: [10.13140/RG.2.2.23392.87048](https://doi.org/10.13140/RG.2.2.23392.87048)
- Towards A Universal, Multidimensional, Practical and Hybrid Grounding Theory Of Causation For The (Meta)Physical Realm (2023). DOI: [10.13140/RG.2.2.20116.07045](https://doi.org/10.13140/RG.2.2.20116.07045)
- A Holistic Test for (Artificial) General Intelligence. Joint with Judith Kieninger (2023). DOI: [10.13140/RG.2.2.28504.67842](https://doi.org/10.13140/RG.2.2.28504.67842)
- The Physical Numbers: A New Foundational Logic-Numerical Structure For Mathematics And Physics (2023). DOI: [10.13140/RG.2.2.17599.48805](https://doi.org/10.13140/RG.2.2.17599.48805)
- (General) Conceptual Substratum as A New Foundational Metamathematical Cognitive Mechanism In Artificial Mathematical Intelligence (2023). DOI: [10.13140/RG.2.2.18857.77922/1](https://doi.org/10.13140/RG.2.2.18857.77922/1)

- Book: Quantum Mechanics, Quantum Computing and Heat Computing: An Introduction. Joint with Juan D. Vélez and Juan P. Hernandez. Initial Preprint. [https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469\\_c8eb1fc54f0c4cd4820d212334c33671.pdf](https://802fb1a8-d018-4726-8637-dbe483046deb.filesusr.com/ugd/8ee469_c8eb1fc54f0c4cd4820d212334c33671.pdf)
- Towards a General Many-sorted Formal Framework for Describing Certain kinds of Legal Statues with a Potential Computational Realization, together with Egil Nordqvist, (2021). Arxiv Preprint:  
<https://arxiv.org/ftp/arxiv/papers/2105/2105.14212.pdf>
- Impact of STEM Group Activities on Mathematical Representations in University Students. Joint work with Dane Alexander, Sonia Moreno and Johny Alvarez. (2023).
- The Structurally Blended Ontological Nature of Mathematics and Its Ongoing Discovered-Created Structure. (2023).
- A New Multiple Intelligence Test for Artificial General Intelligence. Joint work with Judith Kieninger, Stephan Schneider and Nico Potyka (2020). Online Preprint:  
[https://docs.wixstatic.com/ugd/8ee469\\_6259e1620d6e499dae4372879ce1899d.pdf](https://docs.wixstatic.com/ugd/8ee469_6259e1620d6e499dae4372879ce1899d.pdf)
- Artificial Co-creative Generation of the Notion of Topological Group through Categorical Conceptual Blending. Joint work with Yoe Herrera-Jaramillo and Florian Geismann, (2019). Online Preprint:  
[https://docs.wixstatic.com/ugd/8ee469\\_9af2732902744556abf2b0e61e563e5e.pdf](https://docs.wixstatic.com/ugd/8ee469_9af2732902744556abf2b0e61e563e5e.pdf)
- Functional Conceptual Substratum as a New Cognitive Mechanism for Mathematical Creation, together with Stefan Hetzl (2017). Initial preprint at Arxiv  
<https://arxiv.org/pdf/1710.04022.pdf>
- Towards an Experimental Science of Natural Consciousness, together with Renato Garita and Franzisca Becker (2017). Online Preprint  
[https://docs.wixstatic.com/ugd/8ee469\\_a2b6fca8a0094fb3957a374d74e0ecce.pdf](https://docs.wixstatic.com/ugd/8ee469_a2b6fca8a0094fb3957a374d74e0ecce.pdf)
- Containment-Division Rings and New Characterizations of Dedekind Domains, together with Edison Gallego and Juan D. Velez (2017). Preprint at Arxiv:  
<https://arxiv.org/pdf/1708.00532.pdf>

### **Specialized Technical Reports (in Research Projects with the European Union)**

- Documentation of Examples (of Conceptual Blending) for Working Domains, COINVENT (Concept Invention Theory) EU Research Consortium Horizon 2020.  
<https://www.coinvent.uni-osnabrueck.de/fileadmin/publications/D1.2.pdf>
- Mathematical Blends in the Heterogeneous KR&R Framework, COINVENT (Concept Invention Theory) EU Research Consortium Horizon 2020.  
[https://www.coinvent.uni-osnabrueck.de/fileadmin/publications/COINVENT\\_D6.2.pdf](https://www.coinvent.uni-osnabrueck.de/fileadmin/publications/COINVENT_D6.2.pdf)

### **Technical posters at scientific events:**

- Optical response of a donor in a Ga<sub>1-x</sub>Al<sub>x</sub>As nanodisk, together with J. L. Palacio, E. Giraldo, G. L. Miranda, I. Rivera and M. Fulla. XXVIII Colombian Physics Congress 'Physics embedded in the Periodic Table'. September 9-12, 2019, Pereira, Colombia.
- Towards a coherent ethical foundation for the multidisciplinary program: Artificial Mathematical Intelligence, together with M. Fulla, I. Rivera and J. L. Palacio. 3rd Curriculum Workshop of the (European) Human Brain Project, Graz, Austria. September 26-27, 2019.
- Electro-optical properties of an ionized complex confined in a Ga<sub>1-x</sub>Al<sub>x</sub>As nanocone, together with J. L. Palacio, E. Giraldo, G. L. Miranda, I. Rivera and M. Fulla. XXVIII Colombian Physics Congress 'Physics embedded in the Periodic Table'. September 9-12, 2019, Pereira, Colombia.
- Electro-Optical Properties of an Artificial Molecule Confined in Self-Assembled Ga<sub>{1-x}</sub>Al<sub>x</sub>As Nanocone. Joint work with Juan L. Palacio, Eugenio Giraldo, Guillermo L. Miranda, Jairo H. Marín, Ismael E. Rivera and Marlon R. Fulla. At the 5th International Conference on the Physics of Optical Materials and Artifacts (ICOM), Igalo (Montenegro) August 2018.
- Blending in mathematical invention. Joint with F. Bou, M. Schorlemmer, J. Corneli, E. Macleain. A. Smail and A. Pease. COINVENT, Seventh Framework Programme, 2015. Exhibited at the event "Show, Tell, Imagine: A day to explore computational creativity together". PROSECCO CONTACT FORUM. The Octagon, Queen Mary, University of London. April 9, 2015.

### **Other contributions:**

- Substantial content contributions in the following entries of the free encyclopedia Wikipedia: "Dedekind Domains" and "Isolated Points".

### **Some Examples of Conceptual Computation in the Language CASL:**

- <https://github.com/DAJGomezRamirez>

### **LECTURES AND TALKS GIVEN/ORGANIZED AT NATIONAL AND INTERNATIONAL EVENTS**

- "Hilbert's tenth problem and some related problems". ALTENCOA 02, Encuentro Álgebra, Teoría de Números, Combinatoria y Aplicaciones, Universidad del Cauca and Grupo Altenua, Popayán, July 10-14, 2006.
- "A Normality Criterion for Forcing Algebras over the Ring of Polynomials in a Perfect Field". Colloquium of the School of Mathematics of the Universidad Nacional de Colombia (Branch Medellín), March 4, 2011.

- "Basic Properties of Forcing Algebras". Seminar *Graduiertenkolleg Kombinatorische Strukturen in Algebra und Topologie*. University of Osnabrück, Germany, October 18, 2011. "On the Connectivity of the Prime Spectrum of certain Forcing Algebras". Colloquium of the School of Mathematics of the Universidad Nacional de Colombia (Branch Medellín), March 5, 2012.
- "Connectedness of Forcing Schemes: A Criterion on dip-s and on their local nature". CIMPA-UNESCO MESR Research School. MICINN-COLOMBIA Algebraic Structures, their Representations and applications in Geometry and non-associative models. Cartagena, March 11-16, 2012.
- "On the Connectedness of Forcing Schemes". Geometry and Algebra Seminar. University of Basilia, Switzerland, June 1, 2012.
- "A normality Criterion for Forcing Algebras over the ring of Polynomials over a Perfect Field". Seminar *Graduiertenkolleg Kombinatorische Strukturen in Algebra und Topologie*. University of Osnabrück, Germany, December 18, 2012.
- "Some Seminal Foundations on Computational Models for Cognitive Mechanisms". Inaugural Meeting, COINVENT Project, IIIA (Artificial Intelligence Research Institute), Barcelona, Spain, October 8, 2013.
- "Toward a Meta-mathematization of Mathematical Creation". Lecturer and co-organizer (together with junior professor Dr. Markus Spitzweck) of the Colloquium "Toward the Main Formal Principles of Mathematical Creativity", University of Osnabrück, October 11, 2014.
- Organizer and main speaker of the workshop "Towards the Fundamental Principles of Mathematical Creativity: A Cognitive Approach. National University of Colombia (Medellin campus). December 12, 2014.
- Participant and lecturer at the Falling Walls Lab Osnabrück with the talk "Falling the Walls of local Conceptualizations of Human Being". Event organized by the University of Osnabrück, the Falling Wall Foundation, AtKearney, FESTO and DIL (Deutsches Institut für Lebensmitteltechnik e. V.). Osnabrück, July 14, 2014.
- "How much pure mathematics is algorithmic? Towards the construction of an Essentially Universal 'Demonstrator' of Mathematical Conjectures."). Colloquium of the School of Mathematics. National University of Colombia (Medellín branch. December 19, 2014.
- "Conceptual Blending as a meta-generator of mathematical concepts: Prime Ideals and Dedekind Domains as a Blend". Lecturer at the Fifth World Congress on Universal Logic, UNILOG'15. Istanbul, Turkey. June 26, 2015.
- "How does our mind create new mathematical concepts? Towards a meta-formalization of mathematical creativity". Colloquium of the School of Mathematics of the National University of Colombia, Medellin. August 24, 2015.
- "Towards a Universal Modeling of Mathematical Creation." Instituto Tecnológico Metropolitano ITM. Medellín, August 24, 2015.

- "The reality of mathematics and the mathematics of reality". Pilot Public Library. Conference addressed to the general public in the city of Medellín, August 24, 2015.
- "Towards the classification of meta-generators of mathematical theories: Formal Conceptual Fusion". Seminar on Logic and Computation. Eafit University. Medellín, December 16, 2015.
- "Creativity, Conceptual Fusion, mathematics, consciousness, human and artificial intelligence". Faculty of teaching in mathematics and physics of Unillanos University. Villavicencio, December 18, 2015.
- "Logical-Categorical Meta-models of Conceptual Creation in Mathematics." Talk given at the Logic Seminar of the Universidad de los Andes, Bogotá, Colombia, August 25, 2016.
- "Towards a Computational and Cognitively Inspired Metatheory for the Universal Logical Formalization of Decidable Mathematics" Institutional Colloquium in Mathematics at the University of Antioquia, August 29, 2016.
- "Meta-Mathematical Models of Basic Creative Mechanisms used in Mathematical Research." Department of Mathematics, Universidad Nacional de Colombia, Manizales, Colombia, September 8, 2016.
- "Towards Physical and Cognitively Inspired Natural Philosophy." Institute of Philosophy, University of Antioquia, Medellín, Colombia, September 9, 2016.
- "A Cognitively-Inspired Reformulation of Meta-mathematics." Zif Workshop "From Computational Creativity to Creativity Science." Zif Interdisciplinary Research Center (in cooperation with the University of Osnabrück), Bielefeld, Germany, September 22, 2016.
- "Towards a General Taxonomy and Meta-Formalization of the Seminal Cognitive Mechanisms used in Mathematical Concept formation". Colloquium of the Research Group "Logic and Theory" of the Faculty of Informatics, Vienna University of Technology, Vienna, Austria, November 23, 2016.
- "Cognitively-inspired Formal Models of Scientific Creation". J6' Spring School in Intelligence and Cognition Studies, Cairo, Egypt, March 30, 2017.
- "Dathematics: a Meta-Isomorphic Version of Classic Mathematics based on Proper Classes. (Translation: Datemathematics: A Meta-Isomorphic Version of Classic Mathematics based on Proper Classes). Logic Colloquium: Annual Summer Meeting of the Association for Symbolic Logic, Stockholm, Sweden, August 14, 2017.
- "Towards Artificial Mathematical Intelligence". Seminar of the IMAGE Research Group of the Faculty of Computer Science, Universidad de Los Andes, Bogotá, Colombia, October 14, 2017.
- "Functional Conceptual Substratum as a New Cognitive Mechanism for Mathematical Creation/Invention: Towards Artificial Mathematical Intelligence". Institutional Colloquium of the School of Mathematics, Universidad de Antioquia, Medellín, Colombia, September 26, 2017.

- "Datematics and Mathematical Artificial Intelligence". Institutional Colloquium of the School of Mathematics of the National University of Colombia, Medellín, September 27, 2017.
- "Mathematical Artificial Intelligence." Plenary lecture given at the XIII International Symposium on Energies, at the Expotecnológica Conference, Medellín, Colombia, September 28, 2017.
- "Artificial Mathematical Intelligence and the Foundations of Cognitive Metamathematics." Lecture delivered at the regular seminar of the Vienna Institute for Complex Systems Science SCH, Vienna, Austria, August 24, 2018.
- "Fundamental Pillars for the creation of Co-creative Mathematical Agents or Mathematical Artificial Intelligence". Lecture given at the Colloquium of the School of Mathematics of the University of Antioquia, Colombia, May 24, 2019.
- Keynote Organizer and Moderator of the Podium 'Artificial Intelligence and the Future of Business', Vienna International Business Club, Expat Vienna Business Agency, February 12, 2019.
- "How the fulfillment of artificial mathematical intelligence will shift the working purpose of formal researchers: A meta-analysis by means of the Human Values and Control's (Asilomar) principles". 3rd Curriculum Workshop of the (European) Human Brain Project, Graz, Austria. September 26-27, 2019.
- "Metamathematical Cognitively-inspired Modelling of highly Sophisticated Mathematical Notions based on Categorical Conceptual Blending: Topological Groups". Together with Yoe A. Herrera and F. Gaussman. 1st International Covalente Biennial, Universidad Francisco de Paula Santander. Cúcuta, Colombia. November 28-30, 2019.
- "On Preservation Properties and a Special Algebraic Characterization of Some Stronger Forms of the Noetherian Condition". Together with E. Gallego and J. D. Vélez. 1st International Covalent Biennial, University Francisco de Paula Santander. Cúcuta, Colombia. November 28-30, 2019.
- "Fundamentals of Human and Artificial Intelligence with an Introduction to Machine Learning". Keynote speaker (with Alex Narvaes) intensive one-week Bootcamp. Co-organized by Universidad Católica del Norte, Cedalc and ARMAINTE, Santa Rosa de Osos, Antioquia, Colombia. December 9-13, 2019.
- "Empowerment and Cognitive Mentoring as a Fundamental Viral Tool to Renew the Pedagogical Paradigm". Virtual Conference given at MOVA (El Centro de Innovación del Maestro), Medellín, May 29, 2020.
- "On the Multidisciplinary Foundations of Artificial Mathematical Intelligence". Cycle of 12 Virtual Conferences dictated with the Cooperation of Continuing Education and Extension of the I. U. Pascual Bravo, Medellin, May-July 2020.

- "Some Fundamental Principles of Mentoring and Cognitive Empowerment for a Total Improvement of Mental Performance". Cycle of 7 Virtual Conferences dictated with the cooperation of Continuing Education and Extension of the I. U. Pascual Bravo, Medellin, May-July 2020.
- "Cognitive Guidelines to achieve Inspiring Levels of Teaching and Learning". Conference given to 512 teachers of the Institución Universitaria Pascual Bravo as part of the Teaching Qualification Course "Teaching Sequences integrated to the CT". June 9, 2020.
- "Mental Laws and Fundamental Cognitive Pillars to Inspire in the Teaching-Learning Process". Conference given in the Official Virtual Channel of the Secretary of Education of Medellin. August 26, 2020.
- "The Being Component in the Being+STEM Approach". Invited panelist at the academic podium of the Secretary of Education of Medellín (Facebook Live). Together with Gianni Rozo. May 18, 2021.
- "New Global Trends in Cognitively Inspired Artificial Intelligence and its Optimal Ethical Guidelines: Mathematical Artificial Intelligence." II Virtual International Congress on Education, Plenary Conference, September 10, 2021.
- "A New Holistic Test for General Artificial Intelligence based on Multiple Intelligences." II Virtual International Congress on Education, Conference, September 11, 2021.
- "The Role of ICT to respond to the Challenges of the Educational System in Pandemic Times." XIII National Congress on Research Training for Preschool, Elementary and Middle School Teachers and Students. October 28 and 29, 2021.
- "On the Surprising Connections between (Percussive) Music, Cognitive Science and (Meta)Mathematics." Ser + STEM International Forum. November 4, 2021. Secretary of Education of Medellín.
- "On the New Cognitive-Computational Foundations of Mathematics and Physics Program in the Context of Mathematical Artificial Intelligence." Talk given at the Research Seminar in Elementary Particle Physics and Cosmology of the Universidad del Atlántico, Barranquilla, May 23, 2022.
- "Conceptual Computing as a New Research Paradigm for Artificial Mathematical Intelligence". Second Conference on Applied and Industrial Mathematics (MAPI 2), Medellín, June 8-10, 2022, Colombian Mathematical Society.
- "The (Qualitative) Potential Applications of Artificial Mathematical Intelligence to the Deep Underground Neutrino Experiment." Neutrinos in Colombia NUCO 2022. CONHEP, Medellín, July 27-29, 2022.



- "On The Multidisciplinary Foundations of Artificial Mathematical Intelligence." Lecture delivered at the Machine Learning Club of the University (RWTH) of Aachen, Germany. November 10, 2022.
- "On The Global Foundational Framework of Cognitive-Computational Metamathematics." Lecture delivered for the Computational Vision Group of the Institute for Cognitive Science, University of Osnabrueck, Germany. November 14, 2022.
- "On The Multidisciplinary Foundations of Cognitive-Computational Metamathematics." Lecture delivered for the Neuro-Robotics Group of the University of Chemnitz, Germany. November 17, 2022.
- "What is ChatGPT: Truths, Myths, Curiosities and Risks of this type of technology". Invited panelist of the Science Outreach Initiative "Ciencia Café Pa' Sumercé". Bogotá, Colombia. March 2, 2023.
- "On the Foundational Pillars of Cognitive-Computational Metamathematics or Artificial Mathematical Intelligence". Mathematical Colloquium at Los Andes University. May 8, 2023.
- "Commercial Challenges of the 21st Century: Neuromarketing." First Institutional Meeting, Panel Discussion. Participation as an Invited Panelist. Colegio Mayor de Antioquia University Institution. Medellín, September 19, 2023.
- "On the Multidisciplinary Pillars of Mathematical Artificial Intelligence: Reviving Alan Turing's Initial Dream." Sixth Meeting of Basic Sciences and Common Areas - We Are Science TdeA. University Institution Tecnológico de Antioquia. Medellín, September 29, 2023.

## **ACADEMIC REVIEWER**

- Book 'Catalan's Conjecture', Rene Schoof, Universitext Series, Springer Publishing House, 2008. ISBN 978-1- 84800-185-5.
- Specialized journal: 'Lecturas Matemáticas', Sociedad Colombiana de Matemáticas in cooperation with Los Andes University.
- Academic reviewer (for several universities) of research proposals and academic products for faculty promotions (e.g. Universidad Nacional de Colombia).
- Jury of the Academic Excellence Award Ser Mejor of the Mayor's Office of Medellin 2020.
- Jury of several doctoral thesis projects in Engineering Physics, Universidad Nacional de Colombia (branch Medellin).
- Technical Advisor on Technology and Artificial Intelligence for the newspaper *El Colombiano*. Medellín, Colombia.

## RESEARCH PROJECTS WITH A (CO-)INVESTIGATOR/(CO)-RAISER ROLE

- Co-investigator in "Combinatorics of Zero Measurement Sets." Joint project with researchers Ismael Rivera and Juan Luis Palacio. Project funded by the Institución Universitaria Pascual Bravo with a total budget of 114'256.000 COP, executed between May 11, 2022, and July 28, 2023.
- Co-investigator and lead formulator in "The Cognitive-Artificial Generation of the Structural Mathematical Notions of the Time-Dependent Schrödinger Equation." Joint project with researchers Ismael Rivera and Juan Luis Palacio. Project funded by the Institución Universitaria Pascual Bravo with a total budget of 149'000.000 COP, executed between March 11, 2020, and March 3, 2022.
- Co-investigator and main formulator in "Preliminary Developments in the Creation of Co-creative Assistants for Mathematical Research based on Artificial Intelligence: The Conceptual Factorization of Fundamental Notions of Lie Group Theory". Joint project with researchers Ismael Rivera and Marlon Fulla. Project funded by the Institución Universitaria Pascual Bravo with a total budget of 149'900.000 COP, executed between November 24, 2017, and June 12, 2019.
- Co-investigator on "Structure and Expressivity: The Mathematical Foundations of Inductive Reasoning." Project led by Stefan Hetzl, professor at the Vienna University of Technology, and funded by the Vienna Science and Technology Fund with 1'495,650 Euro. Participation between March 14, 2017, and August 13, 2018.
- Co-investigator and Leader of the Research Group in Cognitive-Artificial Mathematical Generation of "COINVENT: Concept Invention Theory". Project formed by 7 European Universities and funded by the European Union under the Seventh Framework Program with 2'100.000 Euros from January 2014 to September 2016.

## GRADUATE THESIS ADVISORIES

- Methodology to design an optimal decision-making system for the operator of a shared electric vehicle fleet providing electrical ancillary services. Semaria Ruíz Alvarez. Doctoral Thesis in Energy Systems, Universidad Nacional de Colombia. Thesis with Laureate Mention (the maximum recognition in the university), 2022.

<https://repositorio.unal.edu.co/handle/unal/80966>

## PARTICIPATION AS SCIENTIFIC ADVISOR FOR NEWSPAPERS' ARTICLES

- "Sam Altman the Genius behind ChatGPT", by Juan Alcaraz. *El Colombiano* newspaper, 2023.  
<https://www.elcolombiano.com/tecnologia/sam-altman-el-genio-que-esta-detras-de-chatgpt-FD20453633>
- "ChatGPT could take away your job, or help you first, by Juan Alcaraz. *El Colombiano* newspaper. 2023.  
<https://www.elcolombiano.com/tendencias/el-chat-gpt-le-podria-quitar-su-trabajo-o-antes-help-you-EG21058408>

## TEACHING EXPERIENCE

- Lecturer of the Discrete Mathematics Course, Institución Universitaria Pascual Bravo, Semester 01, 2023.
- Lecturer of the Research Seminar and Degree Work of the Specialization in Leadership and Organizational Skills, Universidad CES, 2022.
- Founder and Leader of the Permanent Seminar of Advanced Research in Algebraic Geometry and Modern Physics *Stacks & Physics*, Visión Real Cognitiva S.A.S. 2021.
- Teacher and Theme Creator of the Nano-degree "The Human Side of Artificial Intelligence" in the self-directed virtual education platform Kubrio (ex- Galileoxp), 2021.
- Teacher and Co-creator of the module "Introduction to Artificial Intelligence for Data Science" of the Diploma "Big Data and Business Intelligence" of the School of Talent 4.0. Institución Universitaria Pascual Bravo, January 2020.
- Teacher and Co-creator of the Massive Open Online Course (MOOC) "Cognitively Inspired Artificial and Human Intelligence", under construction in the digital platform MiriadaX. July 2019-present.
- Lecturer of the undergraduate course "Physics 2: Electromagnetism", Institución Universitaria Pascual Bravo, Medellín, Colombia. Semester 02 of 2019 and 01 of 2020.
- Lecturer of the multidisciplinary Seminar on Mathematical Artificial Intelligence of Consortium ARMAINTE, Medellín, Colombia. July 2019-present.
- Lecturer and Author of the currently running Seminar: "Seminar in Logic and Cognitive Sciences". Vienna University of Technology, Vienna, Austria. Winter Semester 2017/18.
- Lecturer and author of the seminar: "Creating Old and New Mathematical Concepts through a logic- categorical Formalization of Formal Conceptual Blending". University of Osnabrück, Osnabrück, Germany, Summer Semester 2016.
- Lecturer and author of the seminar: "Hypercomputation, Consciousness, Turing Machines, Qualia and Possible Worlds: On the Scope of Human and Artificial Intelligence". University of Osnabrück, Osnabrück, Germany, winter semester 2015/16.

- Scientific Assistant, Artificial Intelligence Group, Institute for Cognitive Sciences, University of Osnabrück. Summer Semester 2013.
- Tutor (Scientific Assistant). Linear Algebra 2, University of Osnabrück, Summer Semester 2013.
- Tutor (Scientific Assistant). Linear Algebra 1, University of Osnabrück, Winter Semester 2012/13.
- Tutor (Scientific Assistant). Mathematics for Applied Sciences, University of Osnabrück, Winter Semester 2011/12.
- Tutor (Scientific Assistant). Field Theory and Galois Theory, University of Osnabrück, Summer Semester 2011.
- Tutor (Scientific Assistant). Mathematics 3, University of Osnabrück, Winter Semester 2010/11.
- Professor of Basic Mathematics, School of Mathematics, Universidad Nacional de Colombia, Medellín, Semester 02 of 2009 and 01 of 2010.
- Professor of Numerical Systems, School of Mathematics, Universidad Nacional de Colombia, Medellín, Semester 01, 2009.
- Lecturer of Abstract Algebra III, School of Mathematics, Universidad Nacional de Colombia, Medellín, Special Semester, October-December 2008.
- Research and Teaching Assistant (Wissenschaftliche Hilfskraft), Abstract Algebra I Course, University of Heidelberg, Winter Semester 2007-2008, Heidelberg (Germany), October 2007-February 2008.
- Lecturer of Calculus I, Universidad Nacional de Colombia, Medellín, Semesters 01 and 02 of 2005, 01 and 02 of 2006.
- Occasional professor of Differential Equations, Universidad Nacional de Colombia, Medellín, October-December 2004.
- Mathematics teacher, Colegio Atanasio Girardot, September-December 2004.
- Teacher of the leveling course in Mathematics, Universidad Nacional de Colombia, Medellín, January 2004.
- Teacher of the leveling course in Mathematics, Universidad Nacional de Colombia, Medellín, July 2003.

## **INFORMATION AND RELEVANT ACHIEVEMENTS IN THE FIELDS OF ART, SPORTS AND OUTREACH ACTIVITIES**

- Actor and co-writer of the Musical "Hot Spot", with public performances on October 25 and 28, 2014, and during the festival "Maywoche", May 8 to 17, 2015, Osnabrück, Germany; in cooperation with Ziegenbrink Gesellschafthaus, Osnabrück.
- Dance Teacher and Lecturer (Merengue, Salsa, Bachata, Pop, Freestyle, Tango), KHG, Osnabrück, Germany, 2014-2015.

- Semi-professional basketball player in the BBC Black Bulls team, Osnabrück, Germany, 2012-2017.
- Founder of the Dance Studio "Cognitive Dancing" in Vienna, Austria, teaching various courses and workshops with emphasis on Latin American dance, 2017 and 2018.
- Drummer, Singer and Composer in several rock bands such as Rock Salon (Germany 2016-2017), Genuss (Colombia 2020-2021).
- Founder, Leader, Composer and Drummer of the Multidisciplinary Music Band World's Light, 2022-present.
- Guest Musician (drummer) in the part of Timo Tolkki's (founder and ex-member of Stratovarius) Concerts' Tour in Colombia, 2021.
- Central Figure of the article "Knowledge and a Transversal Life", Gente newspaper, El Colombiano Group, Medellin, Colombia. October 2022.

## **LANGUAGES**

- Spanish (native language)
- English (fluent)
- German (fluent)

## **EXPERIENCE IN THE USE OF SPECIALIZED SOFTWARE**

- Maple©
- Mathematica©
- Hets© (Heterogeneous Tool Set)
- Python
- HDTP© (Heuristic Driven Theory Projector)

## **FEATURED AUDIO-VISUAL MATERIAL**

- On the essence of Mathematical Artificial Intelligence (with the collaboration of the digital learning platform @Medellín).  
<https://www.youtube.com/watch?v=-RQFU4qWpp4&t=2s>
- What is the real limit of your Intelligence? Introduction to Cognitive Intelligence (with the collaboration of the digital learning platform @Medellín)  
<https://www.youtube.com/watch?v=A2HhIMtcgPI&feature=youtu.be>

## ACADEMIC REFERENCES

- Prof. Dr. Juan Diego Vélez Caicedo, Associate Professor, Universidad Nacional de Colombia, Medellín, E-mail: [jdvelez@unalmed.edu.co](mailto:jdvelez@unalmed.edu.co)  
Website: <https://sites.google.com/view/juandiegovelez/home>
- Prof. Dr. Kai-Uwe Kühnberger, Full Professor, Artificial Intelligence Group, Institute for Cognitive Sciences, University of Osnabrück.  
E-mail: [kkuehnbe@uos.de](mailto:kkuehnbe@uos.de) Website: [https://www.ikw.uni-osnabrueck.de/en/research\\_groups/artificial\\_intelligence/people/kai\\_uwe\\_kuehnberger.html](https://www.ikw.uni-osnabrueck.de/en/research_groups/artificial_intelligence/people/kai_uwe_kuehnberger.html)
- Prof. Dr. Marlon Fulla, Associate Professor, National University of Colombia (Branch Medellín) e-mail: [mrinconf@unal.edu.co](mailto:mrinconf@unal.edu.co)  
Website: <https://www.researchgate.net/profile/Marlon-Fulla-2>
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University. E-mail: [deymoreno@uan.edu.co](mailto:deymoreno@uan.edu.co)  
Website: <https://scholar.google.com.co/citations?user=bmK98IQAAAAJ&hl=en>
- Prof. Dr. Mario Acero, Associate Professor, Universidad del Atlántico, Barranquilla, Colombia.  
E-mail: [marioacero@mail.uniatlantico.edu.co](mailto:marioacero@mail.uniatlantico.edu.co)  
Website: <https://scholar.google.com/citations?user=HIEQFA4AAAAJ&hl=en>

Dr. Danny A. J. Gomez-Ramirez

Multidisciplinary Researcher

Professor and Scientific Consultant of

Tech Park Research and Technology Center

Pascual Bravo University Institution

[www.DAJ-GomezRamirez.com](http://www.DAJ-GomezRamirez.com)

Founder and leader of the ARMAINTE Network and the Meta-project

Artificial Intelligence Mathematics

<https://dagomez1982.wixsite.com/artmathintelligence>

CEO and Founder of Vision Real Cognitiva s.a.s. (Cognivisión).

[www.VisionReal.net](http://www.VisionReal.net)

