Curriculum Vitae

DANNY ARLEN DE JESUS GÓMEZ RAMÍREZ

Email: daj.gomezramirez@gmail.com
Danny.Gomez@pascualbravo.edu.co

PRESENTATION

The study of the mind is one of humanity's most fascinating and multifaceted concerns. Now, in order to obtain effective and useful models to explain and describe its essential features, a comprehensive inter- and multidisciplinary approach is needed. Moreover, mathematics is, among many other things, the language through which the laws of nature seem to be written with the utmost precision. Therefore, a strong and mature background in pure and applied mathematics represents an enormous advantage to start this scientific journey towards the formalisation of laws describing the global functioning of the mind.

My current research encompasses 1) Artificial Mathematical Intelligence (AMI), i.e. the theoretical and practical foundations of software capable of solving conjectures based on a mathematical formalisation with a human-style output that facilitates the understanding of mathematically structured scientific disciplines by students, professionals, business people, researchers and entrepreneurs. This is a new kind of artificial intelligence for the general good and peaceful, human-directed and interactive coexistence (see more on the official project website). www.ArtificialMathematicalIntelligence.com 2) The philosophical and formal foundations of an experimental science of natural consciousness. 3) The design of global intelligence tests. 4) The interdisciplinary study of the foundations of mathematics. 5) The design and formalisation of a general theory of mind with a solid mathematical framework enriched with some of the most outstanding results of contemporary philosophy of mind and physics. 6) The formal logical formalisation of legislative statutes of law. 7) The formal physical foundations of new types of quantum computation that facilitate the implementation of the new formal mathematical-cognitive models of deduction described in Artificial Mathematical Intelligence . 8) New cognitively inspired methods of improved techniques of organisational mental potentiation, cognitive-based coaching, effective and potentiating teaching-learning and cognitive pegadogy.

CURRENT POSITIONS

- General Director, Researcher and Professor at the Centre for Research, Innovation, Development and Transfer Parque Tech, Institución Universitaria Pascual Bravo. Member of the Research Groups GNOMON (knowledge management) and GICEI (electronics and nanotechnology).

- Vice-President of the Vienna International Business Club.

- Co-founding member of the High Performance Electronics Network (REAR-COLHIPEN).
  (U of A, EIA University, U of M, I. U. Pascual Bravo, Antonio Nariño University, among others).

- External Consultant (in pedagogy, coaching and cognitive empowerment) of Vivero del Software, Secretaria de Educación de Medellín.

- External Consultant and Co-operator (in pedagogy, coaching and cognitive empowerment) of the Teacher Innovation Centre, MOVA, Secretary of Education of Medellín.

- Member of the Advisory Board and the Academic Advisory Committee of the Recognition Programme "Ser Mejor para la Calidad Educativa", Secretary of Education of Medellín.

- Initial member of the Academic Committee of the University of the Americas and the Caribbean (Mexico) in cooperation with the Latin American Centre for Scientific Research and Innovation CLIIC.

- Leader of the International Multidisciplinary Consortium ARMAINTE and the Mathematical Artificial Intelligence Research Meta-project www.ArtificialMathematicalIntelligence.com

- CEO of the multi-thematic Cognitive Intelligence and Artificial Intelligence (Mathematics) Empowerment Company Cognitive Real Vision (Cognivisión) S.A.S.

PREVIOUS POSITIONS

- Former director of the Parque i Laboratory Centre, Instituto Tecnológico Metropolitano (ITM).

- 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
- 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 of the School of Mathematics of the National University of Colombia, July 2010-present.

ACADEMICAL 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 (Medellín) in agreement 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

- Top 50 at the National High School Colombian Exam ICFES del Mayor 's Office of Bello, , Bello, 1999.

- Outstanding Participation (top 10/open to undergraduate students from all over the country), V Olimpiada Colombiana de Matemática Universitaria, Olimpiada Colombiana de Matemáticas and Sociedad Colombiana de Matemáticas, December 2001.

- Outstanding Participation (top 10/open to undergraduate students from all over the country), Vl Olimpiada Colombiana de Matemática Universitaria, Olimpiada Colombiana de Matemáticas and Sociedad Colombiana de Matemáticas, December 2002.

- Bronze Medal at the V Ibero-American University Mathematics Olympiad, Brazilian Mathematics Olympiad, September 2002.

- Bronze Medal at the Vl Olimpiada Iberoamericana de Matemática Universitaria, Brazilian Mathematics Olympiad, September 2003.

- Honourable Mention at the Xl International Mathematics Competition for University Students (IMC), University College London, Saints Cyril and Methodius University, Skopje (Macedonia), July 2004.

- Exemption from tuition fees 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 postgraduate 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 Academischer Austausch Dienst), Bonn, Germany, 2007-2013.

- Delegation leader of the Olympic team that represented the Universidad Nacional de Colombia (Medellín Campus) at the l Iberoamerican Interuniversity Mathematics Competition, Girardot (Colombia), 4-10 October 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, 26-27 September 2019.

PUBLICATIONS

(Chapters of) Books:

- 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.

  https://link.springer.com/chapter/10.1007/978-3-030-87019-5_16

- A Hybrid Therapeutical 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

- 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 the series "Lecture Notes in Intelligent Transportation and Logistics". Springer. 2021.

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

  Versión Oficial: 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

- On the Anti-pragmatism of Pure Mathematics at the beginning of the 21st Century in the light of Mathematical Artificial Intelligence. 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

- Artificial Mathematical Intelligence: Cognitive, Metamathematical, Physical and Philosophical Foundations. Springer International Publishing (2020).

  https://www.springer.com/gp/book/9783030502720

For the sake of clarity and given the individual importance of each of the chapters, we present the chapter references of the book:

- 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

- 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

- 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

- 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

- 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

- 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
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

- 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

- 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

- (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

- 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

- 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

- 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

- A Multidisciplinary Approach towards the Formalisation of the Local Ontological-Natural Substratum of Mathematical Structures. 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

<u>Articles in specialised journals:</u>

- On the connectedness of the Spectrum of Forcing Algebras. Joint work with Holger Brenner, Revista Colombiana de Matemáticas, Vol 48(2014) 1, pp. 1-19.

  http://www.scielo.org.co/pdf/rcm/v48n1/v48n1a01.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

- 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. (Series Ed.). 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

- 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, (2016). (Communications in Algebra and Geometry).

  http://link.springer.com/article/10.1007/s13366-015-0277-z

  Arxiv version: https://arxiv.org/pdf/1708.03393.pdf

- 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/jp4prBdiQykbGbhrc4FE/full

  Arxiv version: https://arxiv.org/pdf/1707.08605.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

- 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).

  http://link.springer.com/chapter/10.1007%2F978-3-319-41649-6_21

- On Positive-Characteristic Semi-parametric Local Uniform Reductions of Varieties over Finitely Generated Q-algebras. Joint work with Edisson 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

- A General Version of the Nullstellensatz for Arbitrary Fields. Joint paper with Juan D. Vélez and Edisson Gallego, Open Mathematics 17, 556-558 (2018).

  Arxiv preprint https://arxiv. org/pdf/1708.04463.pdf

- 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 Edisson Gallego, JP Journal of Algebra, Number Theory and Applications Vol 40(5) pp. 887-901 (2018).

  http://www.pphmj.com/abstract/12149.htm

- Artificially Hydrogen Molecule in vertically stacked Ga1-xAlxAs 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

- Towards an Homological Generalization of the Direct Summand Theorem, together with Juan D. Vélez. Open Mathematics, 18, 1352-1364 (2020).

  Preprint on Arxiv.org https://arxiv.org/pdf/1707.09936.pdf

- On the Elementary Preservation of the Noetherian Condition and its Potential Applications on Computational Physics. With Edisson Gallego and Juan D. Vélez, Journal of Physics: Conference Series, 2020. Vol. 1645, 012005.

  Online Version: https://iopscience.iop.org/article/10.1088/1742-6596/1645/1/012005/pdf

- Conceptual Computation as a Paradigm-Shifting Technique in (Theoretical) Physics and (Computational) Mathematics. Together with Yoe A. Herrera. Journal of Physics: Conference Series, 2020, Vol. 1672, 012015.

  https://iopscience.iop.org/article/10.1088/1742-6596/1672/1/012015/pdf

- On the Topological Structure of the (Non-)Finitely-Generated Locus of Frobenius Algebras emerging from Stanley-Reisner Rings. Joint work with Edisson Gallego, Juan P. Hernandez and Sergio Molina. Communications in Algebra, 2022. DOI: 10.1080/00927872.2022.

  https://www.tandfonline.com/eprint/FYWZYPI27E5DQ8MSZNKD/full?target=10.1080/00927872.2022.2099885

  Arxiv Preprint:

  https://arxiv.org/pdf/2105.04782.pdf

- 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

Research Notes (with demonstrations and new constructions of classical results)

- An Explicit Set of Isolated Points in R with Uncountable Closure, Mathematiques: Teaching University, Regional School of Mathematics, Vol. XV, No 2, December (2007), Notas 145-147.

  http://www.redalyc.org/articulo.oa?id=46815211

- A more direct Proof of Gerschgorin's Theorem, Mathematics: University Teaching, Regional School of Mathematics, Vol. XIV, No 2, December (2006), Notes 119-122.

  http://revistaerm.univalle.edu.co/VolXIV2/autor7.pdf

Preprints and/or Articles (under peer review)

- Artificial Co-creative Generation of the Notion of Topological Group through Categorical Conceptual Blending. Joint paper co Yoe Herrera-Jaramillo and Florian Geismann, (2019). (Under review) Online Preprint:

  https://docs.wixstatic.com/ugd/8ee469_9af2732902744556abf2b0e61e563e5e.pdf

- Functional Conceptual Substratum as a New Cognitive Mechanism for Mathematical Creation, Initial Preprint at Arxiv.org https://arxiv.org/pdf/1710.04022.pdf

- Towards a General Many-sorted Formal Framework for Describing Certain kinds of Legal Statues with a Potential Computational Realization, together with Egil Nordqvist, (under review) (2021). Arxiv Preprint:

  https://arxiv.org/ftp/arxiv/papers/2105/2105.14212.pdf

- Towards an Experimental Science of Natural Consciousness, together with Renato Garita and Franzisca Becker.
  Online Preprint:

  https://docs.wixstatic.com/ugd/8ee469_a2b6fca8a0094fb3957a374d74e0ecce.pdf

- On the Infinitely Generated Locus of Frobenius Algebras of Rings of Prime Characteristic. Joint work with Alberto F. Boix and Santiago Zarzuela. Arxiv Preprint:

  https://arxiv.org/pdf/2203.08511.pdf

- Containment-Division Rings and New Characterizations of Dedekind Domains, together with Edisson Gallego and Juan D. Velez. Preprint at Arxiv.org: https://arxiv.org/pdf/1708.00532.pdf

- 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
- Book: "A Modern View of Relativity: A Rigorous Introduction for Mathematicians". Joint work with Juan D. Vélez, Camilo Abad and Alexander Quintero, (2020). Online Preprint: https://docs.wixstatic.com/ugd/8ee469_99e55ce20aab486da5853febb3f2cc89.pdf

Specialised 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

Technical posters at scientific events:

- Blending in mathematical invention. Joint with F. Bou, M. Schorlemmer, J. Corneli, E. Maclein. A. Smaill and A. Pease. COINVENT, Seventh Framework Programm, 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. 9 April 2015.

- Electro-Optical Properties of an Artificial Molecule Confined in Self-Assembled $Ga_{1-x}Al_xAs$ 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.

- Electro-optical properties of an ionised complex confined in a $Ga_{1-x}Al_xAs$ nanocone, together with J. L. Palacio, E. Giraldo, G. L. Miranda, I. Rivera and M. Fulla. XXVIII Congreso Colombiano de Física 'Physics embedded in the Periodic Table'. September 9-12, 2019, Pereira, Colombia.

- Optical response of a donor in a $Ga_{1-x}Al_xAs$ nanodisc, together with J. L. Palacio, E. Giraldo, G. L. Miranda, I. Rivera and M. Fulla. XXVIII Congreso Colombiano de Física '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. 3th Curriculum Workshop of the (European) Human Brain Project, Graz, Austria. September 26-27, 2019.

Other contributions:

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

LECTURES GIVEN/ORGANISED 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 y Grupo Altenua, Popayan, 10-14 July 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 (Medellín), 4 March 2011.

- "Basic Properties of Forcing Algebras". Seminario *Graduiertenkolleg Kombinatorische Strukturen in Algebra und Topologie.* University of Osnabrück, Germany, 18 October 2011.

- "On the Connectedness of the Prime Spectrum of certain Forcing Algebras". Colloquium of the School of Mathematics of the National University of Colombia (Medellín), 5 March 2012.

- "Forcing Schemes Connectedness: 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, 11-16 March 2012.

- "On the Connectedness of Forcing Schemes". Seminar on Geometry and Algebra. University of Basilia, Switzerland, 1 June 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, 18 December 2012.

- "Some Seminal Foundations on Computational Models for Cognitive Mechanisms". Inaugural Meeting, COINVENT Project, IIIA (Artificial Intelligence Research Institute), Barcelona, Spain, 8 October 2013.

- "Toward a Meta-mathematization of Mathematical Creation. (Toward a Meta-mathematization of Mathematical Creativity). Lecturer and co-organiser (together with junior professor Dr. Markus Spitzweck) of the Colloquium "Toward the Main Formal Pinciples of Mathematical Creativity", University of Osnabrück, October 11, 2014.

- Organiser and main speaker at the workshop "Towards the Fundamental Principles of Mathematical Creativity: A Cognitive Approach. National University of Colombia (Medellín 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 organised by the University of Osnabrück, the Falling Wall Foundation, AtKearney, FESTO and DIL (Deutsches Institut für Lebensmitteltechnick e. V.). Osnabrück, 14 July 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 campus. December 19, 2014.

- "Conceptual Blending as a meta-generator of mathematical concepts: Prime Ideals and Dedekind Domains as a Blend". Speaker at the Fifth World Congress on Universal Logic, UNILOG'15. Istanbul, Turkey. June 26th, 2015.

- "How does our mind create new mathematical concepts? Towards a meta-formalisation of mathematical creativity. Colloquium of the School of Mathematics of the National University of Colombia, Medellin. 24 August 2015.

- "Towards a universal modelling of mathematical creation." Instituto Tecnológico Metropolitano ITM. Medellín, 24 August 2015.

- "The reality of mathematics and the mathematics of reality". Pilot Public Library. Conference addressed to the general public in the city of Medellín, 24 August 2015.

- "Towards the classification of meta-generators of mathematical theories: Formal Conceptual Fusion". Seminar on Logic and Computation. Eafit University. Medellín, 16 December 2015.

- "Creativity, Conceptual Fusion, mathematics, consciousness, human and artificial intelligence". Faculty of mathematics and physics teaching at Unillanos University. Villavicencio, 18 December 2015.

- "Logical-Categorical Meta-models of Conceptual Creation in Mathematics." Talk given at the Logic Seminar of the Universidad de los Andes, Bogotá, Colombia, 25 August 2016.

- "Towards a Computational and Cognitively Inspired Metatheory for the Universal Logical Formalisation of Decidable Mathematics" Institutional Colloquium in Mathematics at the University of Antioquia, 29 August 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, 9 September 2016.

- "A Cognitively-Inspired Reformulation of Meta-mathematics." Zif Workshop "From Computational Creativity to Creativity Science". (Translation: A Cognitively-Inspired Reformulation of Meta-mathematics) Zif Interdisciplinary Research Centre (in cooperation with the University of Osnabrück), Bielefeld, Germany, 22 September 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 of the Vienna University of Technology, Vienna, Austria, 23 November 2016.

- "Cognitively-inspired Formal Models of Scientific Creation". J6' Spring School in Intelligence and Cognition Studies, Cairo, Egypt, 30 March 2017.

- "Dathematics: a Meta-Isomorphic Version of Classic Mathematics based on Proper Classes. (Translation: Datemáticas: A Meta-Isomorphic Version of Classic Mathematics based on Proper Classes). Logic Colloquium: Annual Summer Meeting of the Association for Symbolic Logic, Stockholm, Sweden, 14 August 2017.

- "Towards Mathematical Artificial Intelligence". Seminar of the IMAGE Research Group of the Faculty of Computer Science of the Universidad de Los Andes, Bogotá, Colombia, 14 October 2017.

- "Functional Conceptual Substratum as a New Cognitive Mechanism for Mathematical Creation/Invention: Towards Artificial Mathematical Intelligence. (Translation: Functional Conceptual Substratum as a New Cognitive Mechanism for Mathematical Creation/Invention: Towards Artificial Mathematical Intelligence). Coloquio Institucional de Matemáticas de la Universidad de Antioquia, Medellín, Colombia, 26 September 2017.

- "Datematics and Mathematical Artificial Intelligence". Institutional Colloquium of the School of Mathematics of the Universidad Nacional de Colombia, Medellín, 27 September 2017.

- "Mathematical Artificial Intelligence". Plenary lecture given at the XIII Simposio Internacional de Energías, at the Feria Expotecnológica, Medellín, Colombia, 28 September 2017.

- "Artificial Mathematical Intelligence and the Foundations of Cognitive Metamathematics". Lecture delivered at the regular seminar of the Vienna Institute for Complex Systems Sciences SCH, Vienna, Austria, 24 August 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, 24 May 2019.

- Main Organiser 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 fulfilment 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". 3th 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 for Renewing the Pedagogical Paradigm". Virtual Conference delivered at MOVA (El Centro de Innovación del Maestro), Medellín, May 29, 2020.

- "On the Multidisciplinary Foundations of Mathematical Artificial 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 Total Mental Performance Improvement". Cycle of 7 Virtual Conferences given 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". Lecture given to 512 teachers of the Institución Universitaria Pascual Bravo as part of the Teacher Qualification Course "Teaching Sequences integrated to the TAC". June 9, 2020.

- "Mental Laws and Fundamental Cognitive Pillars to be able to Inspire in the Teaching-Learning Process". Conference given in the Official Virtual Channel of the Secretary of Education of Medellín. August 26th, 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 Gianny Rozo. 18 May 2021.

- "New Global Trends in Cognitively Inspired Artificial Intelligence and its Optimal Ethical Guidelines: Mathematical Artificial Intelligence. "II International Virtual Education Congress, Plenary Conference, 10 September 2021.

- "A New Holistic Test for General Artificial Intelligence based on Multiple Intelligences." II Virtual International Congress on Education, Conference, 11 September 2021.

- "The Role of ICT in Responding to the Challenges of the Education System in Times of Pandemic". XIII National Congress on Research Training for Preschool, Basic and Secondary Education Teachers and Students. 28 and 29 October 2021.

- "On the Surprising Connections between (Percussive) Music, Cognitive Science and (Meta)Mathematics." Ser + STEM International Forum. 4 November 2022. Secretary of Education of Medellín.

- "About the Program of the New Cognitive-Computational Foundations for Mathematics and Physics in the Context of Artificial Mathematical Intelligence." Conference given at Research Seminar on Elementary Particle Physics and Cosmology of the University of Atlántico, Barranquilla, Colombia, 23 May of 2022.

- "Conceptual Computation as a new Research Paradigm for Artificial Mathematical Intelligence." Second Conference of Applied and Industrial Mathematics (MAPI 2), Medellín, 8-10 June 2022, Sociedad Colombiana de Matemáticas.

- "The (Qualitative) Potential Applications of Artificial Mathematical Intelligence to the Deep Underground Neutrino Experiment." Conference: Neutrinos in Colombia NUCO 2022. CONHEP, Medellín, 27-29 Julio 2022.

- "On The Multidisciplinary Foundations of Artificial Mathematical Intelligence." Conference given at the Machine Learning Club of Aachen University (RWTH), Aachen, Germany. 10 November 2022.

ACADEMIC REVIEWER

- Book 'Catalan's Conjecture', Rene Schoof, Universitext Series, Springer Publishing House, 2008. ISBN 978-1- 84800-185-5.

- Specialised journal: 'Lecturas Matemáticas', Sociedad Colombiana de Matemáticas in cooperation with the Universidad de Los Andes.

- Academic reviewer (for various universities) of research proposals and academic products for faculty promotions (e.g. National University of Colombia).

- Jury for the Mayor's Office of Medellín's Ser Mejor Academic Excellence Award, Teachers 2020 modality.

- Jury for several doctoral thesis projects in Engineering Physics, Universidad Nacional de Colombia (Medellín).

POSTGRADUATE THESIS ADVISING

- 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, 2022.

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

TEACHING EXPERIENCE

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

- Tutor (Scientific Assistant). Linear Algebra 2, University of Osnabrück, Summer Semester 2013.

- Scientific Assistant, Artificial Intelligence Group, Institute for Cognitive Sciences, University of Osnabrück. Summer Semester 2013.

- 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.

- 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 currently running Seminar: "Seminar in Logic and Cognitive Sciences". Vienna University of Technology, Vienna, Austria. Winter Semester 2017/18.

- Lecturer of the multidisciplinary Seminar in Mathematical Artificial Intelligence of Consorcio ARMAINTE, Medellín, Colombia. 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.

- 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.

- 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 Theme Creator of the Nano-degree "The Human Side of Artificial Intelligence" in the self-directed virtual education platform Galileoxp, 2021.

- 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.

- Lecturer of the Research Seminar and Degree Project of the Specialisation in Leadership and Organisational Skills, Universidad CES, 2022.

RELEVANT ARTISTIC AND SPORT INFORMATION AND ACHIEVEMENTS

- Actor and co-writer of the Musical "Hot Spot", with public performances on 25 and 28 October 2014, and during the festival "Maywoche", May 8-17, 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 for the BBC Black Bulls, 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 songwriter in various rock bands such as Rock Salon (Germany 2016-2017), Genuss (Colombia 2020-2021).

- Founder and leader of the music band World's Light, 2022.

- Guest musician (drummer) in the concert tour of Timo Tolkki (founder and ex-member of Stratovarius) in Colombia 2021.

LANGUAGES

- Spanish (mother tongue)

- English (fluent)

- German (fluent)

EXPERIENCE IN THE USE OF SPECIALISED SOFTWARE

- Maple©

- Mathematica©

- Hets© (Heterogeneous Tool Set)

- HDTP© (Heuristic Driven Theory Projector)

AUDIO-VISUAL HIGHLIGHTS

- On the essence of Mathematical Artificial Intelligence (with the collaboration of @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 @Medellín)
  https://www.youtube.com/watch?v=A2HhIMtcgPI&feature=youtu.be

ACADEMIC REFERENCES

- Dr. Juan Diego Vélez Caicedo, Associate Professor, Universidad Nacional de Colombia, Sede Medellín, E-mail: jdvelez@unalmed.edu.co
  Website: https://sites.google.com/view/juandiegovelez/home

- Prof. Dr. Kai-Uwe Kühnberger, Artificial Intelligence Group, Institute for Cognitive Sciences, University of Osnabrück.

  E-mail: kkuehnbe@uos.de Website:

  https://www.ikw.uni-osnabrueck.de/en/research_groups/artificial_intelligence/publications.html

- Prof. Dr. Otmar Venjakob, Institute of Mathematics, University of Heidelberg, Germany, E-mail: venjakob@mathi.uni-heidelberg.de

  Website: https://www.mathi.uni-heidelberg.de/~otmar/

- Prof. Dr. Rene Schoof, Department of Mathematics, University of Rome "Tor Vergata", Rome (Italy), e-mail: schoof@mat.uniroma2.it

  Website: http://www.mat.uniroma2.it/~schoof/

- Prof. Dr. Mark Turner, Founder of the Cognitive Science Network, Case Western Reserve University. E-mail: markbernardturner@gmail.com

  Website: http://markturner.org/

Dr. Danny A. J. Gomez-Ramirez

Multidisciplinary Researcher

Professor and Researcher

Institución Universitaria Pascual Bravo

www.DAJ-GomezRamirez.com

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

Artificial Mathematical Intelligence

https://dagomez1982.wixsite.com/artmathintelligence

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

www.VisionReal.net