# Renzo Massobrio

*Curriculum Vitæ*

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## Personal information

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|---|---|
| Full name | Renzo Martín Massobrio Lois |
| Birth | April $19^{th}$ 1992, Montevideo, Uruguay |
| Nationality | Uruguayan/Italian |

## Academic education

2016–present **Ph.D. in Computer Science**, *Universidad de Cádiz, Spain.*
Scholarships: Fundación Carolina (Spain) and National Agency of Research and Innovation (ANII, Uruguay)

2015–present **M.Sc. in Computer Science**, Faculty of Engineering, Universidad de la República, Uruguay.
Courses taken:
- High-Performance Computing
- Introduction to Information Theory
- Lossless Data Compression
- Application of Information Theory to Image Processing
- Advanced topics on Computer Networks
- Foundations of Computer Security
- Research Methodologies and Writing of Thesis and Scientific Articles

2010–2015 **Computer Science Engineering**, *Faculty of Engineering, Universidad de la República, Uruguay.*
Thesis: "Taxi sharing optimization using evolutionary algorithms"
Web: `www.fing.edu.uy/inco/grupos/cecal/hpc/AG-Taxi/`
Best thesis award in the $12^{th}$ final project exhibition, Faculty of Engineering, Universidad de la República, Uruguay.

## Academic experience

### Positions

2016–present **Assistant Professor**, *Department of Transport, Structures and Transport Institute, Faculty of Engineering, Universidad de la República, Uruguay.*

2014–2016 **Assistant Professor**, *Numerical Center, Computer Science Institute, Faculty of Engineering, Universidad de la República, Uruguay.*

Feb–Mar 2016 **Teaching Assistant**, *School of Computer Science & Informatics, Cardiff University*, Cardiff, Wales.

### Teaching experience

2015–present **Evolutionary algorithms**, *Computer Science Engineering*, Universidad de la República, Uruguay.
Teaching in theory classes, laboratory classes, and review sessions. Preparation of course material and exams. Assessment of exercises and final projects.

2017 **Foundations of urban informatics: data analysis and processing**, *Postgraduate course*, Universidad de la República, Montevideo, Uruguay.
Module co-leader.

2017 **Evolutionary Algorithms**, *Postgraduate course*, Universidad Tecnológica Nacional, Córdoba, Argentina.
Module co-leader.

2016 **Distributed and Cloud Computing**, *M.Sc. module*, Cardiff University, Cardiff, Wales.
Teaching Assistant.

2015 **Urban transport network design**, *Postgraduate course*, Universidad de la República, Uruguay.
Teaching assistant in practice and review sessions.

2014 **Distributed computing**, *M.Sc. in Computer Science*, Universidad de la República, Uruguay.
Teaching assistant in practice sessions.

### Research internships

Oct 2016 **Superior School of Engineering, Universidad de Cádiz**, *Cádiz, Spain.*
SAVANT: Automatic Generation of Parallel Approximation Algorithms for Low-power Architectures Based on Machine Learning

Jul 2016 **Computer Science Department, CICESE Research Center**, *Ensenada, Baja California, México.*
Transport planning in smart cities

Feb–Mar 2016 **School of Computer Science & Informatics, Cardiff University**, *Cardiff, Wales.*
Optimization of urban transit and related smart city problems using computational intelligence

Oct 2015 **Superior Technical School of Informatics, Universidad de Málaga**, *Málaga, Spain.*
Infrastructure location for vehicular networks

Sep–Oct 2015 **Superior School of Engineering, Universidad de Cádiz**, *Cádiz, Spain.*
SAVANT: Automatic Generation of Parallel Approximation Algorithms for Low-power Architectures Based on Machine Learning

### Research projects

2015–present **SAVANT: Automatic Generation of Parallel Approximation Algorithms for Low-power Architectures Based on Machine Learning**, *Superior School of Engineering, Universidad de Cádiz*, Spain.
Grants: Ministry of Education and Science of Spain
Role: Research group member

2016–present **Design of public transport networks for mid-sized and large cities**, *Operation Research Department, Computer Science Institute, Faculty of Engineering, Universidad de la República*, Uruguay.
Grants: Scientific Research Commission, Universidad de la República (CSIC–UdelaR)
Role: Research group member

2016–present **Traffic flow and urban infrastructure optimization using parallel and hybrid bio-inspired strategies**, *in collaboration with Universidad de la Patagonia Austral, Argentina.*
Grants: National Agency for Science and Technology Promotion (ANPCyT, Argentina)
Role: Research group member

2015–2016 **Optimization of urban transit and related smart city problems using computational intelligence**, *in collaboration with Cardiff University, Wales.*
Grants: Science and Innovation funds, British Embassy in Montevideo and National Agency of Research and Innovation (ANII, Uruguay)
Role: Research group member

2015–2016 **Smart placement of infrastructure for vehicular networks**, *in collaboration with Universidad de Málaga, Spain.*
Role: Research group member

2013–2015 **Taxi sharing optimization using evolutionary algorithms**.
Grants: "Introduction to research" grant, National Agency of Research and Innovation (ANII, Uruguay)
Role: Research group member

### Memberships

Jun 2017–present **Spanish Association of Pattern Recognition and Image Analysis (AERFAI)**, *Spain.*

## Languages

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|---|---|---|
| Spanish | Native | |
| English | Certificate of Proficiency in English, University of Cambridge | *2009* |
| Portuguese | Listening, Reading (Intermediate) / Speaking, Writing (Basic) | |

## Further education

### Short courses

2017 **High-performance computing school (ECAR–HPC School)**, *Universidad de Buenos Aires*, Buenos Aires, Argentina.
Grants: Centro Latinoamericano de Formación Interdisciplinaria (CELFI), Argentina

2017 **Summer School on Machine Learning**, *Institute of New Imaging Technologies (INIT) Universitat Jaume I and Spanish Association of Pattern Recognition and Image Analysis (AERFAI)*, Benicássim, Spain.

2016 **Geospatial data analysis using QGIS–Quantum GIS**, *REDES center*, Buenos Aires, Argentina.

2015 **Research connect: communication skills for researchers**, *British Council*, Montevideo, Uruguay.
Grant: British Embassy in Montevideo and National Agency of Research and Innovation (ANII, Uruguay)

2014 **High-performance computing school (ECAR–HPC School)**, *Universidad Técnica Federico Santa María*, Valparaiso, Chile.
Grants: High-Performance Computing Latin America Community (HPCLatAm)

### Conferences

2017 **Latin American High Performance Computing Conference (CARLA)**, *Universidad de Buenos Aires*, Buenos Aires, Argentina.

2017 **XLIII Conferencia Latinoamericana de Informática (CLEI) / Jornadas Argentinas de Informática (JAIIO)**, *Universidad Tecnológica Nacional*, Córdoba, Argentina.

2017 **$12^{th}$ Metaheuristics International Conference (MIC)**, *Universitat Pompeu Fabra*, Barcelona, Spain.

2016 **XIX Latin-american conference of urban and public transport (CLATPU)**, *Latin-american association of urban public transport (ALATPU) / Montevideo City Council*, Montevideo, Uruguay.

2015 **7$^{th}$ European Symposium on Computational Intelligence and Mathematics**, *Universidad de Cádiz*, Cádiz, Spain.

2014 **Foundations of Computational Mathematics conference**, *Society for Foundations of Computational Mathematics*, Montevideo, Uruguay.

2014 **VIII ALIO/EURO Workshop on Applied Combinatorial Optimization**, *Association of Latin-Iberoamerican Operational Research Societies and Association of European Operational Research Societies*, Montevideo, Uruguay.

2014 **XL Latin-american conference of informatics**, *Latin-american center of informatic studies*, Montevideo, Uruguay.

### Seminars

2016 **8$^{th}$ Latin-american and caribbean seminar on gvSIG**, *gvSIG Association*, Montevideo, Uruguay.

2015 **International workshop: transport planning and smart cities**, *Faculty of Engineering, Universidad de la República*, Montevideo, Uruguay.

2015 **Workshop: Big Data and Environment**, *French-argentinian institute for studies on climate and its impacts, Universidad de Buenos Aires*, Buenos Aires, Argentina.
Grant: Latin-american center for interdisciplinary training (CELFI, Argentina)

2015 **1$^{st}$ seminar on smart cities for inclusion and sustainability**, *Montevideo City Council*, Montevideo, Uruguay.

### Workshops

2017 **Exchange day: Montevideo City Council and Faculty of Engineering, Universidad de la República**, *Intendencia de Montevideo*, Montevideo, Uruguay.

2017 **Research talent attraction day**, *Universidad de Cádiz*, Cádiz, España.

2016 **Technological advances in smart cities – Eng. Roberto Saracco**, *IEEE/Universidad de Montevideo*, Montevideo, Uruguay.

2015 **Design Thinking by Richard Cox (Stanford University)**, *Innovation and Engineering Center*, Montevideo, Uruguay.

2014 **Microsoft Azure for Research Training**, *Microsoft Research*, Montevideo, Uruguay.

### Others

2015 **How to get published: structuring your article**, *Elsevier Publishing Campus*, Online.

## Publications

### Journal articles

D. Peña, A. Tchernykh, S. Nesmachnow, R. Massobrio, A. Feoktistov, I. Bychkov, and G. Radchenko. Operating Cost and Quality of Service Scheduling for Multi-Vehicle-Type Urban Bus Systems. *Journal of Parallel and Distributed Computing, Special issue on "Advances in Parallel and Distributed Computing and Optimization"*, -(-):1–21, [peer-review].

S. Nesmachnow, R. Massobrio, E. Arreche, C. Mumford, A. C. Olivera, P. J. Vidal, and A. Tchernykh. Traffic light synchronization for Bus Rapid Transit in Montevideo (Uruguay) using a parallel evolutionary algorithm. *IET Intelligent Transport Systems*,

-(-):1–7, [peer-review].

S. Nesmachnow, S. Baña, and R. Massobrio. A distributed platform for big data analysis in smart cities: combining Intelligent Transportation Systems and socioeconomic data for Montevideo, Uruguay. *EAI Endorsed Transactions on Smart Cities*, 2(5):1–18, 2017.

R. Massobrio, S. Nesmachnow, J. Toutouh, and E. Alba. Infrastructure deployment in vehicular communication networks using a parallel multiobjective evolutionary algorithm. *International Journal of Intelligent Systems*, 32(8):801–829, 2017.

R. Massobrio, G. Fagúndez, and S. Nesmachnow. Multiobjective evolutionary algorithms for the taxi sharing problem. *International Journal of Metaheuristics*, 5(1):67–90, 2016.

### Book chapters

R. Massobrio, S. Nesmachnow, and J. Toutouh. Multiobjective evolutionary algorithms for smart placement of roadside units in vehicular networks. In N. Nedjah, L. D. M. Mourelle, and H. S. Lopes, editors, *Evolutionary Multi-Objective System Design: Theory and Applications*, pages 1–36. Chapman & Hall/CRC Computer and Information Science Series, 2017.

### Thesis

G. Fagúndez de los Reyes and R. Massobrio. Optimización de viajes compartidos en taxis utilizando algoritmos evolutivos. Proyecto de grado, Universidad de la República, 2015.

### Articles in conference proceedings

R. Massobrio, B. Dorronsoro, S. Nesmachnow, and F. Palomo-Lozano. Automatic program generation: Virtual Savant for the knapsack problem. In *International Workshop on Optimization and Learning: Challenges and Applications*, pages 1–2, 2018.

D. Peña, A. Tchernykh, S. Nesmachnow, R. Massobrio, A. Feoktistov, and I. Bychkov. Multiobjective Vehicle-type Scheduling in Urban Public Transport. In *IEEE International Parallel and Distributed Processing Symposium Workshops*, pages 482–491, 2017.

D. Peña, A. Tchernykh, S. Nesmachnow, R. Massobrio, A. Y. Drozdov, and S. N. Garichev. Multiobjective Optimization of Urban Public Transport Using MOCell. In *8th International Supercomputing Conference in Mexico*, pages 1–3, 2017.

R. Massobrio, S. Nesmachnow, and B. Dorronsoro. Support Vector Machine Acceleration for Intel Xeon Phi Manycore Processors. In *High Performance Computing Latin America*, pages 1–14, 2017.

E. Fabbiani, P. Vidal, R. Massobrio, and S. Nesmachnow. Distributed Big Data Analysis for Mobility Estimation in Intelligent Transportation Systems. In C. J. B. Hernández, I. Gitler, and J. Klapp, editors, *High Performance Computing: Third Latin American Conference*, pages 146–160. Springer International Publishing, 2017.

M. E. Curi, L. Carozzi, R. Massobrio, S. Nesmachnow, G. Danoy, M. Ostaszewski, and P. Bouvry. Algoritmos evolutivos para agrupar información biomédica en un número desconocido de grupos. In *Simposio Argentino de Inteligencia Artificial, 46 Jornadas Argentinas de Informática*, pages 1–10, 2017.

J. P. Aguerre, R. Bayá, R. Massobrio, and S. Nesmachnow. An evolutionary algorithm for harmonic music composition. In *12$^{th}$ Metaheuristics International Conference*, pages 1–10, 2017.

D. Peña, A. Tchernykh, S. Nesmachnow, R. Massobrio, A. Y. Drozdov, and S. N. Garichev. Multiobjective Vehicle Type and Size Scheduling Problem in Urban Public Transport Using MOCell. In *IEEE International Conference on Engineering and Telecommunication*, pages 110–113, 2016.

S. Nesmachnow, E. Arreche, R. Massobrio, C. Mumford, A. C. Olivera, and P. Vidal. Traffic light optimization for bus rapid transit using a parallel evolutionary algorithm: the case of Garzon Avenue in Montevideo, Uruguay. In *XVIII Latin-Iberoamerican Conference on Operations Research*, pages 1–8, 2016.

R. Massobrio, A. Pías, N. Vázquez, and S. Nesmachnow. Map-Reduce for Processing GPS Data from Public Transport in Montevideo, Uruguay. In *Simposio Argentino de Grandes Datos, 45 Jornadas Argentinas de Informática*, pages 41–54, 2016.

R. Massobrio, S. Nesmachnow, A. Tchernykh, A. Avetisyan, and G. Radchenko. Towards a cloud computing paradigm for big data analysis in smart cities. In *Proceedings of the Institute for System Programming of the Russian Academy of Science*, volume 28, pages 121–140. Institute for System Programming of the Russian Academy of Sciences, 2016.

R. Massobrio and S. Nesmachnow. Análisis de datos de movilidad del transporte público de Montevideo. In *XIX Congreso Latinoamericano de Transporte Público y Urbano*, pages 1–11, 2016.

R. Massobrio, B. Dorronsoro, F. Palomo-Lozano, S. Nesmachnow, and F. Pinel. Generación automática de programas: Savant Virtual para el problema de la mochila. In *XI Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados*, pages 1–10, 2016.

R. Massobrio, J. Toutouh, and S. Nesmachnow. A multiobjective evolutionary algorithm for infrastructure location in vehicular networks. In *7th European Symposium on Computational Intelligence and Mathematics*, pages 1–6, 2015.

R. Massobrio, S. Nesmachnow, and G. Fagúndez. Multiobjective taxi sharing optimization using the NSGA-II evolutionary algorithm. In *11th Metaheuristic International Conference*, pages 1–10, 2015.

R. Massobrio, G. Fagúndez, and S. Nesmachnow. Planificación multiobjetivo de viajes compartidos en taxis utilizando un micro algoritmo evolutivo paralelo. In *X Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados*, pages 1–8, 2015.

R. Massobrio, S. Bertinat, S. Nesmachnow, J. Toutouh, and E. Alba. Smart placement of RSU for vehicular networks using multiobjective evolutionary algorithms. In *2nd Latin American Congress on Computational Intelligence*, pages 1–6, 2015.

R. Massobrio, G. Fagúndez, and S. Nesmachnow. A parallel micro evolutionary algorithm for taxi sharing optimization. In *VIII ALIO/EURO Workshop on Applied Combinatorial Optimization*, pages 1–6, 2014.

G. Fagúndez, R. Massobrio, and S. Nesmachnow. Online taxi sharing optimization using evolutionary algorithms. In *XL Latin American Computing Conference*, pages 1–12, 2014.

## Presentations

### Oral presentations

2017 **Mobility data analysis and optimization for public transport in Montevideo**, *Students seminar*, PEDECIBA-Informática, Montevideo, Uruguay.

2017 **"Support Vector Machine Acceleration for Intel Xeon Phi Manycore Processors"**, *High Performance Computing Latin America (CARLA)*, Universidad de Buenos Aires, Buenos Aires, Argentina.

2017 **"Single and multiobjective evolutionary algorithms for clustering biomedical information with unknown number of clusters"**, *Simposio Argentino de Inteligencia Artificial (ASAI), 46 Jornadas Argentinas de Informática (JAIIO)*, Universidad Tecnológica Nacional, Córdoba, Argentina.

2017 **"An evolutionary algorithm for harmonic music composition"**, *$12^{th}$ Metaheuristics International Conference*, Universitat Pompeu Fabra, Barcelona, Spain.

2016 **"Mobility data analysis for public transport in Montevideo"**, *XIX Latin-american conference of urban and public transport (CLATPU)*, Latin-american association of urban public transport (ALATPU) / Montevideo City Council, Montevideo, Uruguay.

2016 **"Mobility data analysis for public transport in Montevideo"**, *$8^{th}$ Latin-american and caribbean seminar on gvSIG*, gvSIG Association, Montevideo, Uruguay.

2016 **"Map-Reduce for Processing GPS Data from Public Transport in Montevideo, Uruguay"**, *Argentinian Symposium on Big Data*, Argentinian Society of Informatics (SADIO), Buenos Aires, Argentina.

2016 **"Research projects on smart cities"**, *Visit to Future Cities Catapult*, The Urban Innovation Centre, London, England.

2016 **"Taxi sharing optimization using evolutionary algorithms"**, *VLunch Seminars*, Visual Computing Group, School of Computer Science, Cardiff University, Cardiff, Wales.

2015 **"Smart placement of vehicular infrastructure and other related projects for smart cities"**, *International workshop: transport planning and smart cities*, Faculty of Engineering, Universidad de la República, Montevideo, Uruguay.

2015 **"Smart placement of infrastructure for vehicular networks"**, *$1^{st}$ seminar on smart cities for inclusion and sustainability*, Montevideo City Council, Montevideo, Uruguay.

2015 **"A multiobjective evolutionary algorithm for infrastructure location in vehicular networks"**, *$7^{th}$ European Symposium on Computational Intelligence and Mathematics*, Universidad de Cádiz, Cádiz, Spain.

2014 **"A parallel micro evolutionary algorithm for taxi sharing optimization"**, *VIII ALIO/EURO Workshop on Applied Combinatorial Optimization*, Association of Latin-Iberoamerican Operational Research Societies and Association of European Operational Research Societies, Montevideo, Uruguay.

Posters

2017 **"Machine learning for automatic program generation"**, *Final project exhibition*, Faculty of Engineering, Universidad de la República, Montevideo, Uruguay.
M. Silva, M. Picó, R. Massobrio, S. Nesmachnow

2017 **"A multiobjective model to optimize the location of garbage accumulation points in a real-world case"**, *High Performance Computing School*, Universidad de Buenos Aires, Buenos Aires, Argentina.
D. Rossit, S. Nesmachnow, R. Massobrio, F. Tohmé
Best poster award

2016 **"Computational intelligence applied to urban transport optimization problems"**, *Final project exhibition*, Faculty of Engineering, Universidad de la República, Montevideo, Uruguay.
E. Fabbiani, R. Massobrio, S. Nesmachnow

2015 **"Smart placement of infrastructure for vehicular networks"**, *Final project exhibition*, Faculty of Engineering, Universidad de la República, Montevideo, Uruguay.
R. Massobrio, S. Nesmachnow, J. Toutouh

2014 **"Taxi sharing optimization using evolutionary algorithms"**, *Final project exhibition*, Faculty of Engineering, Universidad de la República, Montevideo, Uruguay.
G. Fagúndez de los Reyes, R. Massobrio, S. Nesmachnow

## Student supervisions

Apr 2017–present **Co-advisor**, *Machine learning for automatic program generation*, Final thesis, Computer Science Engineering, Faculty of Engineering, Universidad de la República.
Students: Mauro Picó and Marccio Silva

Aug 2016–present **Co-advisor**, *Big data processing for urban mobility*, Final thesis, Computer Science Engineering, Faculty of Engineering, Universidad de la República.
Student: Jonathan Denis

Apr 2016–present **Co-advisor**, *Computational intelligence applied to urban transport optimization problems*, Final thesis, Computer Science Engineering, Faculty of Engineering, Universidad de la República.
Student: Enzo Fabbiani

## Evaluations

### Manuscript reviews

2017 **High Performance Computing Latin America (CARLA 2017)**, *Buenos Aires, Argentina.*
Technical program committee member

2016–present **International Journal of Metaheuristics**, *Inderscience Publishers.*

### Academic work assessments

2017 **Member of the examiners committee**, *Final thesis: "Neuroevolution applied to the automatic generation of artificial intelligence for videogame verification"*, Students: Facundo Parodi and Sebastián Rodríguez, Computer Science Engineering, Faculty of Engineering, Universidad de la República.
Committee: G. Moncecchi, S. De Cola, R. Massobrio

2016 **Member of the examiners committee**, *Final thesis: "Solving the clustering problem using evolutionary algorithms"*, Students: Lucía Carozzi and María Eugenia Curi, Computer Science Engineering, Faculty of Engineering, Universidad de la República.
Committee: D. Vallespir, M. Martínez, R.Massobrio

2016 **Member of the examiners committee**, *Final thesis: "Scheduling in heterogeneous systems using hwloc"*, Student: Diego Regueira, Computer Science Engineering, Faculty of Engineering, Universidad de la República.
Committee: P. Vidal, J. Merlino, R.Massobrio

2015 **Member of the examiners committee**, *Final thesis: "Cloud computing over open source infrastructures and the application to embryonic development study"*, Students: J. Martín, M. Escobar, G. Urrutia, S. Falero, Computer Science Engineering, Faculty of Engineering, Universidad de la República.
Committee: E. Mocskos, A. Sabiguero, R.Massobrio

## Other activities

2015 **Co-organizer**, *International workshop: transport planning and smart cities*, Faculty of Engineering, Universidad de la República, Montevideo, Uruguay.

2015 **Publicity chair**, *Special session: Metaheuristics for Smart Cities*, $11^{th}$ Metaheuristic International Conference, Agadir, Marruecos.

## Media coverage

2016 **An algorithm for taxi sharing**, *ScienceDaily*.
`https://www.sciencedaily.com/releases/2016/09/160926095812.htm`

2016 **An algorithm for taxi sharing**, *Phys.org*.
`http://phys.org/news/2016-09-algorithm-taxi.html`

2014 **Innovation in engineering (in spanish)**, *El Observador newspaper*, Uruguay.
`http://www.cromo.com.uy/creatividad-forma-ingenieria-n583610`

2014 **New app for ride sharing (in spanish)**, *El País newspaper*, Uruguay.
`http://www.elpais.com.uy/vida-actual/llega-nueva-aplicacion-compartir-viajes.html`