

Federico POUSA

PERSONAL DETAILS

BIRTH DATE: 27-Oct-1987
EMAIL: fedepousa@gmail.com

EDUCATION

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| 2018 | Ph.D. in Computer Science(Operations Research) at Universidad de Buenos Aires |
| 2013 | Thesis: Bin Packing Problem with Generalized Conflicts. In this thesis we developed heuristics and a Integer Programming model to tackle the Bin Packing Problem with Generalized Conflicts. We also presented several theoretical results for the polyhedron of the problem. |
| 2013 | Licenciatura (equivalent to Bs. and Ms.c Degree) in Computer Science at Universidad de Buenos Aires |
| 2007 | Thesis: An Integer Programming approach for the Angular Traveling Salesman Problem. We study the adaptations of several models for the TSP to the Angular version, where we can minimize a biobjective function (distance and angles). |

PROFESSIONAL EXPERIENCE

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| Present | Operations Researcher, Data Scientist and Partner at ERYX |
| 2018 | We solve complex problems based on data and math for different industries. Some examples of our projects are Retail: Pricing models, Demand forecasting, Willingness to pay and Churn prediction. Logistics: Vehicle Routing problems, Pick up and Delivery problems, Cross-docking, Inventory Management. Real state: Pattern recognition in tenants applications.
Brief of projects: <ul style="list-style-type: none">• Data scientist for Satellite Imagery AI: we develop image segmentation models from satellite images to control the water levels in rice fields, mainly focused in detecting droughts areas where rice is not developing correctly. We process several hundreds of PlanetScope satellite images per day to generate automatic alerts.• Operations Researcher for industrial bakery production: We conducted an in-depth analysis of the client's main manufacturing process to be able to generate a monthly production plan that could optimize the bread production while taking into account all the operational restrictions. Then we designed and implemented a Mixed Integer Programming model to tackle the problem successfully.• Machine Learning Engineer for AdTech: We worked two years along our client (a big player in adtech industry) to develop not only several machine learning models for ads recommendations but also all the data engineering pipeline around it. |
| Present | Argentina Director for International Collegiate Programming Contest (ICPC) |
| 2015 | From 2015 to 2019 I've been volunteering in the main organization of the Argentinian National Programming Contest. From 2018 I've been the Argentina Director, being the main organizer for the Argentina National Programming Contest and also for the Argentina Site of the Latin American Regional Finals. Also, I represented Argentina in the different Regional Contest Directors meetings at several ICPC World Finals.
Also, since 2024, I (with some colleagues) founded the Asociación Argentina de Programación Competitiva (Argentinian Association for Competitive Programming) where I have the role of Vice-President, from where we handle all the Competitive Programming events that happens through the year. |
| Apr-2016 | Machine Learning Intern at GOOGLE INC. |
| JAN-2016 | Research and Development on Natural Language Processing. We tackle the problem of Noun compound interpretation: Using a taxonomy of IsA relations to annotate noun compounds with semantic relations. |
| Sep-2014 | Image Processing Intern at GOOGLE INC. |
| JUN-2014 | Research and Development on Image Processing. We tackle the problem of the designing and the implementation of demosaicing algorithms in Halide on new color filter arrays. |
| Dec-2016 | Tsu Cosmetics |
| JAN-2016 | Our research group was hired by a cosmetic firm to solve their logistics problem. The firm has a central depot in the capital city of the country and they need to calculate the best routes and calendar to fulfill their orders across the country. |
| 2012 | Computer Science popularizer at Universidad de Buenos Aires |
| 2010 | In the period of 3 years we perform a lot of activities to popularize Computer Science in Argentina as we have a serious lack of students. |
| Oct-2010 | Software Engineer at RECURSIVA |
| APR-2010 | We developed a fantasy rugby league for ESPN using Java, Spring, Struts, Hibernate as main technologies. |

TEACHING EXPERIENCE

Present 2024	Professor Machine Learning Operations, Universidad Torcuato di Tella A very practical-focused course to introduce Master students to cloud computing and machine learning operations concepts with several hands-on examples like understanding and using many AWS tools, Airflow and web tools
Present 2023	Professor Machine Learning, Universidad Torcuato di Tella Main Machine Learning course within the Masters in Management and Analytics program. The course is about the main trending techniques in Machine Learning prior a neural network course
Present 2020	Professor Prescriptive Analytics and Optimization, Universidad de San Andrés Last course for the Masters in Data Science. In this course some basics notions for prescriptive analytics are covered in the first part (Graph Theory, Discrete Simulations, Decision Taking). The second part is mainly about some particular areas in the Operations Research spectrum like Linear Programming, Integer Programming and many derivatives
2024 2022	Professor Introduction to data analysis in Python, Universidad de San Andrés First course for the Masters in Data Science. In this course some basics notions for data analytics are covered by introducing the students to Python programming language and its data handling stack of libraries
2024 2020	Professor Advanced Programming for Big Data, Universidad de San Andrés This Course is part of the Masters in Data Science. Up to this point the students were mostly faced with the classics Python and R data science stack programming. In this course they are taught the tools to face real world problems and environments learning the basics for web programming, data science pipelines, cloud ecosystems, big data processing, etc.
2023 2019	Teaching assistant Decision Taking Optimization, Universidad Torcuato Di Tella This course is part of a Master in Management and Analytics. We teach the basics of Integer Programming to tackle hard optimization problems. We also present software tools such as CPLEX and GuRoBi.
2022 2015	Head of Teaching assistants Numerical Methods, FCEN, UBA This course tackle many numerical algorithms and problems such as matrix factorization, solving linear equations systems, minimum least squares among others. This course also serves as a Data Science 101 course where the students implement many linear algorithms like PCA and they learn to deal with big real datasets.
2019 2018	Head of Teaching assistants Algorithms and Data Structures III, FCEN, UBA This course is mainly about Graph Theory and Algorithms techniques such as Dynamic Programming, Backtracking, etc. I am the head of the section of the course where we deal with the technical issues of the implementation of the algorithms. In this course the students also learn to communicate and analyze their experiments in a scientific way.
2018 2018	Teaching assistant Integer Programming Modeling, Universidad Torcuato Di Tella This course is part of a Master in Management and Analytics. We teach the basics of Integer Programming to tackle hard optimization problems. We also present some tools such as CPLEX.
2018 2018	Head of Teaching assistants Operations Research, FCEN, UBA This course is both for undergraduate and graduate studies. We focus this course in the techniques of Linear Programming and Integer Programming. We also teach many tools to solve real-life instances of hard problems such as CPLEX and Google OR-tools.
2017 2015	Head of Teaching assistants Numerical Methods, FCEN, UBA This course tackle many numerical algorithms and problems such as matrix factorization, solving linear equations systems, minimum least squares among others. This course also serves as a Data Science 101 course where the students implement many linear algorithms like PCA and they learn to deal with big real datasets.
2015 2012	Teaching assistant Numerical Methods, FCEN, UBA This course tackle many numerical algorithms and problems such as matrix factorization, solving linear equations systems, minimum least squares among others. This course also serves as a Data Science 101 course where the students implement many linear algorithms like PCA and they learn to deal with big real datasets.
2013 2011	Teaching assistant Algorithms and Data Structures I, FCEN, UBA This course deals with the foundations and basics concepts of programming and software engineering.
2010 2010	Professor Mathematics, Instituto Junin Mathematics courses to prepare for Universidad de Buenos Aires admission exams.
2008 2006	Math Olympiads coach Colegio Ward Head coach of the math Olympiads team of my high school.

RESEARCH EXPERIENCE

Publications/Conferences

- 2017 | **Annals of Operations Research**
Paper: A cluster-first route-second approach for the swap body vehicle routing problem. Authors: Juan Jose Miranda-Bront, Brian Luis Curcio, Isabel Méndez-Díaz, Agustín Ismael Montero, Federico Pousa, Paula Zabala
- 2017 | **MIPAR (Argentinian Conference of Mixed Integer Programming)**
Talk: Polyhedral study fo the Bin Packing Problem with Conflicts. Authors: Federico Pousa, Isabel Mendez-Diaz, Paula Zabala
- 2016 | **MIPAR (Argentinian Conference of Mixed Integer Programming)**
Talk: ILP formulations for the railway rescheduling problem under large disruptions. Authors: Agustin Mosteiro, Juan Jose Miranda-Bront, Federico Pousa
- 2016 | **Internation Symposium on Combinatorial Optimization**
Talk: ILP formulations for the railway rescheduling problem under large disruptions. Authors: Agustin Mosteiro, Juan Jose Miranda-Bront, Federico Pousa
- 2016 | **Congreso Latino-Iberoamericano de Investigacion Operativa (Latin-Ibero American Operations Research Conference)**
Talk: ILP formulations for the railway rescheduling problem under large disruptions. Authors: Agustin Mosteiro, Juan Jose Miranda-Bront, Federico Pousa
- 2016 | **Argentinian Operations Research Symposium**
Talk: Heuristics for the Bin Packing Problem with Conflicts. Authors: Federico Pousa, Isabel Mendez-Diaz, Paula Zabala
- 2015 | **International Symposium of Mathematical Programming**
Talk: Heuristics for the Bin Packing Problem with Conflicts. Authors: Federico Pousa, Isabel Mendez-Diaz, Paula Zabala

Research projects

- 2020 | **Vehicle Routing Problems with variables traveling time**
2017 | PICT-2016-2667 project granted by National Agency for Promotion of Science and Technology (FONCYT)
- 2015 | **Vehicle routing problems with time dependent costs**
2012 | PICT-2011-0817 project granted by National Agency for Promotion of Science and Technology (FONCYT)
- 2014 | **Generalizations of the Traveling Salesman Problem**
2011 | UBACyT 20020100100666 project granted by Universidad de Buenos Aires

Advisor and referee

Present 2024	Universidad Torcuato Di Tella Masters Thesis Advisor Acting as advisor for Masters thesis related to data science projects
Present 2020	Universidad Torcuato Di Tella Masters Thesis Referee Acting as referee in several(10+) thesis for the Masters in Management and Analytics
2024 2024	Universidad de Buenos Aires Masters Thesis Advisor Acting as main advisor in Facundo Decroix's Licenciatura thesis about predictive and prescriptive models for battery-powered solar energy industry
Present 2018	Universidad de Buenos Aires Thesis Referee Member of the thesis jury for several(5+) Licenciatura thesis
2018 2016	Program committee member for Latin American Journal of Computing ISSN: 1390-9266 - e-ISSN: 1390-9134 - Latin American Journal of Computing
2019 2018	Program committee member for CLEI CLEI is the Latin American Computing Conference held annually
2017 2015	Reviewer for RAIRO journal ISSN: 0399-0559 - RAIRO - RECHERCHE OPERATIONNELLE (OPERATIONS RESEARCH)
2018 2018	Reviewer for SBPO 2018 SBPO is the Brazilian Operations Research Symposium held annually
2017 2015	Universidad de Buenos Aires Thesis Advisor Along with Juan Jose Miranda-Bront we co-advised the master thesis of Agustin Mosteiro to solve the Railway Rescheduling Problem Under Large Disruptions

Scholarships

2018 2013	PhD. Scholarship Scholarship granted by CONICET for the periods of five years to complete my PhD. program
2013 2012	Master Thesis Scholarship Scholarship granted by Ministry of Science to complete my Masters Thesis
2012 2011	Scholarships for academic initiation Scholarships granted by Universidad de Buenos Aires to immerse in a research group

LANGUAGES

SPANISH: Native language ENGLISH: Full professional proficiency

INTERESTS

Operations research, Science, Competitive Programming, Sports