E.T.S.I. y Diseño Industrial
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A.1. Academic Institution

Organismo	Universidad Politécnica de Madrid			
Dpto./Centro	Electrónica, Automática e Informática Industrial / E.T.S.I. de Ingeniería y Diseño Industrial			
Dirección	c/- Ronda de Valencia 3, 28012 MADRID			
Teléfono	913367729	correo electrónico	pablo.sansegundo@upm.es	
Categoría profesional	Profesor Titular de Universidad		Fecha inicio	2014
Espec. cód. UNESCO	1203-04			
Palabras clave	Artificial Intelligence, Combinatorial Optimization			

A.2. Academic training

Licenciatura/Grado/Doctorado	Universidad	Año
Degree Ingeniero Industrial	Universidad Politécnica de Madrid	1996
Ph.D. Ingeniero Industrial	Universidad Politécnica de Madrid	2003

A.3. General indicators of quality of the scientific production

h-index = 12 (Google Scholar)
i10-index =18 (Google Scholar)
Citatons in the last 5 years: 550 (Google Scholar)

PhD Dissertation

San Segundo Carrillo, Pablo (2003): *An ontology for linear planning*. PhD Dissertation, Universidad Politécnica de Madrid (UPM). Supervisor: Dr. Ramón Galán. Evaluation: Highest mark (*cum laude*).

RESEARCH INTERESTS

- Combinatorial Optimization
- Graphs and graph programming
- AI-search algorithms and games: N-Queens, Sudoku, chess, etc.
- Constraint Satisfaction (CSP)

LIST OF MOST RELEVANT PUBLICATIONS (last 10 years)

ISI Journal papers
(in chronological order)

A new branch-and-filter exact algorithm for binary constraint satisfaction problems, Pablo San Segundo, Fabio Furini, Rafael Leon. **European Journal of Operational Research** (ISSN: 0377-2217) (under review-2020).

Research trends in combinatorial optimisation, Jann Weinand, Kemmeth Sörensen, Pablo San Segundo, Russell Mackenna. **International Transactions in Operational Research**(ISSN: 1475-3995) (under review-2020).

A branch-and-cut algorithm for the Edge Interdiction Clique Problem.Fabio Furini, Ivana Ljubić, Pablo San Segundo, Yanlu Zhao.
European Journal of Operational Research(ISSN: 0377-2217) 2020 (accepted 01/2021, In Press).
doi.org/10.1016/j.ejor.2021.01.030

A new combinatorial branch-and-bound algorithm for the Knapsack Problem with Conflicts.Stefano Coniglio, Fabio Furini, Pablo San Segundo.
European Journal of Operational Research(ISSN: 0377-2217), 289:2, pp. 435-455, 2021.
doi: 10.1016/j.ejor.2020.07.023.

A new branch-and-bound algorithm for the Maximum Weighted Clique Problem.
Pablo San Segundo, Fabio Furini, Jorge Artieda.
Computers & Operations Research(ISSN: 0305-0548), 110, 18-33, 2019
doi: 10.1016/j.cor.2019.05.017

A new branch-and-bound algorithm for the maximum edge-weighted clique problem.
Pablo San Segundo, Stefano Coniglio, Fabio Furini, Ivana Ljubic.
European Journal of Operational Research(ISSN: 0377-2217), 278:1, 76-90, 2019.
doi: 10.1016/j.ejor.2019.03.047

The Maximum Clique Interdiction Problem.
Fabio Furini, Ivana Ljubic, Sebastien Martin, Pablo San Segundo
European Journal of OperationalResearch (ISSN: 0377-2217) 277:1, 112-127, 2019
doi: 10.1016/j.ejor.2019.02.028

Efficiently enumerating all maximal cliques with bit-parallelism
Pablo San Segundo, Jorge Artieda, Darren Strash,
Computers & Operations Research (ISSN: 0305-0548), 92, pp:37-46,2018,
doi:10.1016/j.cor.2017.12.006

An enhanced bitstring encoding for exact maximum clique search in sparse graphs
Pablo San Segundo, Jorge Artieda, Mikhail Batsyn, Panos M. Pardalos,
Optimization Methods & Software (ISSN: 1055-6788),32:2, 2017,pp 312-335.
doi:10.1080/10556788.2017.1281924

Improved infra-chromatic bound for exact maximum clique search
Pablo San Segundo, Alexey Nikolaev, Mikhail Batsyn, Alvaro Lopez
INFORMATICA (ISSN: 0868-4952), 27:2,April 2016, pp 463-487
doi: 10.15388/Informatica.2016.95.

A parallel maximum clique algorithm for large and massive sparse graphs
Pablo San Segundo, Alvaro Lopez, Jorge Artieda, Panos M. Pardalos
Optimization Letters (ISSN 1862-4472), 11(2),2017, 343-358.

doi: 10.1007/s11590-016-1019-3

Improved initial vertex ordering for exact maximum clique search
Pablo San Segundo, Alvaro Lopez, Mikhail Batsyn, Alexey Nikolaev and Panos M. Pardalos, **Applied Intelligence** (ISSN 0924-669X), 45:3, pp. 868-880, 2016.
doi: 10.1007/s10489-016-0796-9

A new exact maximum clique algorithm for large or massive sparse graphs
Pablo San Segundo, Alvaro Lopez, Panos Pardalos,
Computers & Operations Research(ISSN 0305-0548),66,2016, pp. 81-94
doi: 10.1016/j.cor.2015.07.013

Infra-chromatic bound for exact maximum clique search
Pablo San Segundo, Alexey Nikolaev, Mikhail Batsyn
Computers & Operations Research (ISSN 0305-0548), 64, 2015, pp. 293-303
doi: 10.1016/j.cor.2015.06.009

A fast greedy sequential heuristic for the vertex colouring problem based on bitwise operations, Larisa Komosko, Mikhail Batsyn, Pablo San Segundo, Panos M. Pardalos,
Journal of Combinatorial Optimization (ISSN: 1382-6905),31:4, pp. 1665-1677, 2016.
doi: 10.1007/s10878-015-9862-1

A novel clique formulation for the visual feature matching problem
Pablo San Segundo, Jorge Artieda
Applied Intelligence(ISSN 0924-669X), 43:2, 2015, pp. 325-342,
doi: 10.1007/s10489-015-0646-1

A real time rescheduling algorithm based in Lyapunov stability´s index for metro lines.
Berbey, A., Galna, R., San segudo, P., Sanz Bobi, J.D., Caballero, R.
Revista Iberoamericana de Aut.e Inf. Industrial (ISSN 1697-7912), 11:2, 2014, pp. 167-178
doi: 10.1016/j.riai.2014.03.005

Relaxed approximate coloring in exact maximum clique search.
Pablo San Segundo, Cristobal Tapia.
Computers and Operations Research (ISSN: 0305-0548), 44, 2014, pp. 185-192.
doi:10.1016/j.cor.2013.10.018

Robust Global Feature Based Data Association with a Sparse Bit Optimized Maximum Clique Algorithm.
Pablo San Segundo, Diego Rodriguez-Losada.
IEEE Transactions on Robotics (1552-3098), 29:5, 2013, pp. 1332-1339.
doi 10.1109/TRO.2013.2264869.

GPU-Mapping: Robotic Map Building with Graphical Multiprocessors.
Diego Rodriguez-Losada, Pablo San Segundo, Miguel Hernando, Paloma de la Puente, Alberto Valero.
Robotics and Automation Magazine (ISSN 1070-9932), 20:2, 2013, pp 40-51.
doi: 10.1109/MRA.2012.2220503

Arquitectura de integración basada en Servicios Web para sistemas heterogéneos y distribuidos: aplicación a robots móviles interactivos.
Alberto Valero-Gomez, Paloma de la Puente, Diego Rodriguez-Losada, Miguel Hernando, Pablo San Segundo.
Revista Iberoamericana de Aut.e Inf. Industrial (ISSN 1697-7912),10:1, 2013, pp. 85-95.
doi: 10.1016/j.riai.2012.11.008

An improved bit parallel exact maximum clique algorithm.
Pablo San Segundo, Fernando Matia, Diego Rodriguez-Losada, Miguel Hernando.
Optimization Letters (ISSN 1862-4472), 7:3, 2013, pp. 467-479

doi: 10.1007/s11590-011-0431-y

A new DSATUR-based algorithm for exact vertex coloring.
Pablo San Segundo.
Computers & Operations Research (ISSN: 0305-0548), 39:7, 2012, pp. 1724-1733.
doi:10.1016/j.cor.2011.10.008

An Affine Fuzzy Model with Local and Global Interpretations.
Fernando Matía, Basil M. Al-Hadithi, Agustín Jiménez, and Pablo San Segundo.
Applied Soft Computing(ISSN 1568-4946) 11:6, 2011, pp. 4226-4235, doi:10.1016/j.asoc.2011.03.018

An exact bit-parallel algorithm for the maximum clique problem.
Pablo San Segundo, Diego Rodriguez-Losada, Agustin Jimenez.
Computers & Operations Research(ISSN: 0305-0548), 38:2, 2011, pp. 571-581.
doi:10.1016/j.cor.2010.07.019

New decision rules for exact search in N-Queens.
Pablo San Segundo.
Journal of Global Optimization (ISSN 0925-5001). 51:3, 2011, pp. 497-514.
doi: 10.1007/s10898-011-9653-x

*Fast exact feature based data correspondence search with an efficient bit-parallel MCP solver.*Pablo San Segundo , Diego Rodriguez-Losada, Fernando Matia and Ramon Galan.
Applied Intelligence (ISSN 0924-669X), 32:3, 2010, pp. 311-329.
doi: 10.1007/s10489-008-0147-6

Dual FastSLAM: Dual Factorization of the Particle Filter Based Solution of the Simultaneous Localization and Mapping Problem.
D. Rodriguez-Losada , P. San Segundo, F. Matia and L. Pedraza.
Journal of Intelligent & Robotic Systems(ISSN 0921-0296), 55:2-3, 2009, pp:109-134
doi: 10.1007/s10846-008-9296-4

Thesis (2017 +)

Artieda Trigueros, Jorge (2017). *Graph search and its application to image matching*. Tesis (Doctoral), E.T.S.I. Industriales (UPM). doi: 10.20868/UPM.thesis.47346, http://oa.upm.es/47346/

Tapia García, Cristóbal (2017). *Diseño e implementación de un planificador para un agente autónomo*. Tesis (Doctoral), E.T.S.I. Industriales (UPM). doi.org/10.20868/UPM.thesis.46988. http://oa.upm.es/46988/

Books and Book Chapters

Massive Parallelization of the Maximum Clique Problem Using Subchromatic Functions¸ Pablo San Segundo, Bogdan Zavalnij, Sandor Szabo. In *Ultrascale Computing Systems,* Eds. Jesús Carretero, E. Jeannot, A. Y. Zomaya, 189 –244 (56), 2019.

An Enhanced Infra-Chromatic Bound for the Maximum Clique Problem,
Pablo San Segundo, Jorge Artieda, Rafael Leon, Cristobal Tapia
In Machine Learning, Optimization, and Big Data, LNCS 10122 , Springer, 2016, pp.306-316
doi: 10.1007/978-3-319-51469-7_26

Watching subgraphs to improve efficiency in maximum clique search.
Pablo San Segundo, Cristobal Tapia, Alvaro Lopez.
In *Contemporary Challenges and Solutions in Applied Artificial Intelligence* ISBN: 978-3-319-00650-5, Eds. Moonis Ali et al., vol. 489, 2013, pp. 115-122.

doi: 10.1007/978-3-319-00651-2_16

Programación de autómatas con STEP 7. Un enfoque práctico.
Pablo San Segundo.
Fundación General de la Universidad Politécnica de Madrid, ISBN 978-84-15302-03-2, 2011

Programación avanzada, concurrente y distribuida
D. Rodriguez-Losada y Pablo San Segundo.
Fundación General de la Universidad Politécnica de Madrid. ISBN 978-84-96737-57-0, 2009

Recent Developments in Bit-Parallel Algorithms
Pablo San Segundo, Diego Rodriguez-Losada, Claudio Rossi.
In *Tools in Artificial Intelligence*. Ed. Paula Fritzsche, ISBN 978-953-7619-03-9, 2008, pp 349-368.
doi: 10.5772/6076

Latest Developments in Feature Based Mapping and Navigation for Indoor Service Robots
Diego Rodriguez-Losada, Luis Pedraza, Fernando Matia, and Pablo San Segundo.
In *Robot Vision: Strategies, Algorithms and Motion Planning*. Editor: Daiki Itô, Nova Science Publishers, ISBN: 978-1-60692-471-6, 2009, pp. 123-170.

International Conferences(research)

Neural Model Applied to a Conversational Agent in a Closed Domain. Rodriguez-Cantelar, M., Matia, F., San Segundo, P. In 10th EUROSIM Congress on Modelling and Simulation, La Rioja, Spain, 2019.

A hybrid bit-encoding for SAT planning based on clique-partitioning, Tapia, C., San Segundo, P., Galan, R. In M*athematical Methods and Computational Techniques in science and engineering* (MMCTSE 17), AIP Proc.1872(1*),* UK, 2017. doi:10.1063/1.4996672,

A PDDL-based Simulation System. Tapia, C., San Segundo, P., Artieda, J. Intelligent Systems and Agents (ISA 2015), Canary Islands, Spain, 2015.

Reusing the Same Coloring in the Child Nodes of the Search Tree for the Maximum Clique Problem. Aleksey, N.; Batsyn, M.; San Segundo, P. IX Conf. on Learning and Intelligent Optimization (LION 9), France, 2015. **LNCS** 8994, 2015, 275-280.

Computing Subchromatic Bounds in Exact Maximum Clique Search. San Segundo, P., Batsyn, M., Nikolaev, A.; Conference on Optimization Control and Applications in the Information Age, Greece, 2014.

A Simple Approach for Essential Improvement of the State-of-the-art Exact Algorithms for the Maximum Clique Problem. Batsyn, M., Nikolaev, A., Pardalos, P. M., San Segundo, P. Conference on Optimization Control and Applications in the Information Age, Greece, 2014.

Initial sorting of vertices in the maximum clique problem reviewed. Pablo San Segundo, Alvaro Lopez, Mikhail Batsyn. Learning and Intelligent Optimization Conf (LION 8), P.M. Pardalos et al. (Eds.), Learning and Intelligent Optimization, LNCS 8426, pp. 111-120, Florida, 2014.
doi: 10.1007/978-3-319-09584-4_12.

Watching subgraphs to improve efficiency in maximum clique search. Pablo San Segundo, Cristobal Tapia, Alvaro Lopez. XVI Int. Conf. on Industrial Engineering & Other App. of Applied Intelligent Systems (IEA/AIE 13), June, 2013, Amsterdam (see related book chapter).

A New Implicit Branching Strategy for Exact Maximum Clique. Pablo San Segundo, Cristóbal Tapia. XXII IEEE International Conference on Tools with Artificial Intelligence, 2010 (ICTAI 10), Arras, France, October 2010, doi: 10.1109/ICTAI.2010.58

Fast processing of grid maps using graphical multiprocessors. Diego Rodriguez-Losada, Alberto Valero, Pablo San Segundo, Paloma de la Puente, Miguel Hernando. 7th IFAC Symposium on Intelligent Autonomous Vehicles (IAV 2010). ISBN: 978-1-61782-759-4, September , Lecce, Italy, 2010, doi: 10.3182/20100906-3-IT-2019.00060.

Computation of the optimal relative pose between overlapping grid maps through discrepancy minimization. Diego Rodriguez-Losada, Paloma de la Puente, Alberto Valero, Pablo San Segundo , Miguel Hernando. 7th IFAC Symposium on Intelligent Autonomous Vehicles (IAV 2010). ISBN: 978-1-61782-759-4, September, Lecce, Italy, 2010.
doi: 10.3182/20100906-3-IT-2019.00060.

Using Graphs to Derive CSP Heuristics and its Application to Sudoku. Pablo San Segundo, Agustin Jiménez. Proc. XXI IEEE International Conference on Tools with Artificial Intelligence (ICTAI 09). ISSN : 1082-3409, Newark, New Jersey, USA, 2-4 November 2009, pp. 538-545
doi: 10.1109/ICTAI.2009.78.

A New Exact Bit-Parallel Algorithm for SAT; Pablo San Segundo, Cristóbal Tapia, Julio Puente, Diego Rodríguez-Losada, XX IEEE Conference on Tools for Artificial Intelligence ICTAI 08 Dayton, Ohio, USA. vol 2, 3-5 Nov. 2008, pp. 59-65,
doi: 10.1109/ICTAI.2008.127

Building Maps of Large Environments Using Splines and Geometric análisis. Luis Pedraza, Diego Rodriguez-Losada, Pablo San Segundo, Fernando Matia. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 08). Niza, Francia, Sept. 2008 pp. 1600-1605. doi:10.1109/IROS.2008.4650976.

Lyapunov based stability analysis for metro lines, Arancha Berbey, Ramón Galán, Pablo San Segundo, J. Sanz-Bobi (COMPRAIL 08). XI on Computer System Design and Operations in the Railway and Other Transit Systems. September, 2008. Toledo, Spain. In*Urban Transport XIV transactions* ISSN 1743-3509, 15-17 Sept. 2008, pp. 111-119,
doi: 10.2495/UT080111.

*Dual Of The Factored Solution To The Simultaneous Localization And Mapping Problem.*Diego Rodriguez-Losada, Pablo San Segundo, Fernando Matia, Ramon Galan, Agustin Jimenez. Luis Pedraza. 6th IFAC Symposium on Intelligent Autonomous Vehicles (IAV 2007), ISBN: 978-3-902661-65-4, Toulouse, France, September 3-5 2007, pp. 542-548
doi: 10.3182/20070903-3-FR-2921.00092,

Efficient Algorithm For Global Localization By Searching A BitEncoded Graph. Pablo San Segundo, Diego Rodríguez-Losada, Ramón Galán, Fernando Matía, Agustín Jiménez. 6th IFAC Symposium on Intelligent Autonomous Vehicles (IAV 2007). ISBN: 978-3-902661-65-4, DOI,Toulouse, France, September 3-5 2007, pp. 125-131
doi:10.3182/20070903-3-FR-2921.00024

Exploiting CPU bit parallel operations to improve efficiency in search, Pablo San Segundo, Diego Rodríguez-Losada, Ramón Galán, Fernando Matía, Agustín Jiménez XIX International Conference on Tools for Artificial Intelligence (ICTAI 07). Patrás, Greece. October, 2007. ISBN: 0-7695-3015-X, vol. 1,2007, pp. 53-59
doi: 10.1109/ICTAI.2007.40

*Efficient Search Using Bitboard Models.*Pablo San Segundo, Ramon Galán, Fernando Matia, Diego Rodriguez-Losada, Agustin Jimenez. XVIII IEEE International Conference on Tools with Artificial Intelligence (ICTAI 06),Arlington, Washington, USA, November 2006, ISBN: 0-7695-2728-0, pp. 132 - 138.
doi:10.1109/ICTAI.2006.53

Bitboards, a new approach Pablo San Segundo, Ramón Galán. Artificial Intelligence and Applications (AIA-2005), IASTED , 14-16 Feb. Innsbruck, Austria 2005. In Proc. ISSN: 1925-7937, vol. 453, pp. 394-399.

Control heuristics for complex problems. Pablo San Segundo. VI Simposio CEA de Control Inteligente(CEA 2010), La Laguna, Canary Islands, Spain,November 2010, ISBN: 978-84-693-8471-8.

A simulation software for sequential control, San Segundo, P; Rodriguez-Losada, Diego. Education Engineering (EDUCON 10) 14-16 Abril 2010, pp. 553–557, ISBN: 978-1-4244-6569-9,
doi: 10.1109/EDUCON.2010.5492529

International / National Conferences(education)

SITED: Un laboratorio interactivo y portable de electrónica digital. Dávila, C. García, S. López, P. San Segundo y D. Rodríguez-Losada. IX Congreso de Tecnologías aplicadas a la enseñanza electrónica (TAEE 10). 13-15, Abril 2010, Madrid, ISBN: 978-84-96737-68-6.
Learning of the object oriented paradigm through interactive video-games development. D. Rodriguez-Losada, M. Hernando, R. Gonzalez, C. Platero, P. San Segundo, P.L. Castedo, L. Davila, S. Lopez. Int. Conf. of Educ. Research and Innovation (ICERI 2008), 2008, Proc. . ISBN: 978-84-612-5091-2.

An on-line weblab experience in control and electronics. L. Castedo, L. Dávila, R. González, S. López, D. Rodríguez-Losada, P. San Segundo. Int. Conf. of Educ. Research and Innovation (ICERI 2008). In Proc. ISBN: 978-84-612-5091-2.

Enseñanza de programación orientada a objetos mediante el desarrollo de aplicaciones gráficas interactivas. Diego Rodríguez-Losada, Miguel Hernando, Roberto Gonzalez, Carlos Platero, Pablo San Segundo, Luis Dávila, Pedro Luis Castedo, Sara Lopez, Carmen Santos. Tecnologías Aplicadas a la Enseñanza de la Electrónica TAEE 2008, July 2008, Zaragoza. ISBN: 978-84-7733-628-0.

Sistema hardware para la realización de prácticas remotas asistidas por ordenador. Luis Dávila, Pedro Castedo, Roberto González, Miguel Hernando, Sara López, Pablo Quesada, Diego Rodríguez, Carmen Santos, J. Muñoz, C. García, P. San Segundo. Tecnologías Aplicadas a la Enseñanza de la Electrónica TAEE 2008. Universidad de Zaragoza. Julio 2008. ISBN: 978-84-7733-628-0.

PLENARY/INVITED TALKS

Optimization and Data Science 2019, Workshop (plenary speaker). Sorbonne University, Paris, March 2019. Other speakers: Adrea Lodi, Emilio Carrizzosa, Dolores Romero (http://samm.univ-paris1.fr/Optimization-and-Data-Science).

Searching for large cliques of high order in large scale networks, (plenary talk) in the Workshop on Clustering and search techniques in large scale networks, Nizhny Novgorod, Russia, November 2014.

BITSCAN: A C++ library for bistring manipulation, Jornadas *using std*::*cpp*, Universidad Carlos III, Madrid, October, 2014. (http://usingstdcpp.org/)

Graph encoding using bitstrings with industrial applications. Jornadas *using std*::*cpp*, Universidad Carlos III, Madrid,November, 2015.(http://usingstdcpp.org/).

On branching strategies for exact maximum clique search. 20th European Conference on Mathematics for Industry (ECMI18), Budapest, June 2018.

Upper bounds on the maximum clique problem. University of Szeged, Hungary, June 2018

SOME RESEARCH PROJECTS

National funded projects

Title: AI Techniques for Autonomous Navigation (COGDRIVE)
Reference: DPI2017-86915-C3-3-R
Financial entity: Spanish Ministry of Economics and Competitiveness
Leading researcher: Prof. Pablo San Segundo
Budget: 108.900€
Participants: UPM, CSIC
Duration: 2018-2020

Title: Navegación Asistida mediante Lenguaje Natural (NAVEGASE)
Reference: DPI 2014-53525-C3-1-R.
Financial entity: Spanish Ministry of Economics and Competitiveness
Leading researcher: Prof. Fernando Matía
Budget: 128.260,000€
Participants: UPM, CSIC
Duration: 2015-2017

Title: "Integration of Knowledge Models in an Autonomous rational robot" (ARABOT)
Reference:DPI2010-21247-C02-01
Financial entity: Spanish Ministry of Economics and Competitiveness
Leadingresearcher: Prof. Pablo San Segundo
Budget: 169,000€
Participants: UPM
Duration: 2011-2014

Title: "Integration of Knowledge Models for the autonomous deployment of a robot" (ROBONAUTA)
Reference: DPI 2007-66846-C02-01
Financial entity: Spanish Ministry of Economics and Competitiveness
Leading researcher: Diego Rodriguez-Losada
Budget: 144,500€
Participants: UPM
Duration: 2007-2010

Title: "Integration of intelligent behaviours in a guiding robot" (RobINT)
Reference: DPI2004-07908- C02-01
Financial entity: Spanish Ministry of Science and Technology
Leading researcher: Prof. Ramón Galán
Budget: 141,000€
Participants: UPM
Duration: 2004-2007.

Title: "Integration of autonomous robots in Society using TIC" (URBANO)
Reference: DPI2001-3652-CO2-01
Financial entity: Spanish Ministry of Science and Technology
Leading researcher: Prof. Fernando Matía Espada
Budget: 70,500€
Participants: UPM
Duration: 2001-2004.

Title: "Control of complex systems for logistic and production of goods and services" (COSICOLOGI)
Reference: S-0505/DPI/000391
Financial entity: Autonomous Region of Madrid (Spain)
Leading researcher: Prof. Sebastián Dormido Bencomo (UNED).
Budget-UPM: 115,200€
Participants: UNED, UCM, UPM, IAI.

Duration: 2006- 2009.

Title: “High Speed Integrated System" (AVI-2015)
Reference: DPI2001-3652-CO2-01
Financial entity: CDTI
Leading researcher: Prof. Agustin Jimenez
Budget: 590,000€
Participants: UPM, CAF, Donewtech, Eliop, Metalocaucho, Sispra, Verkol.
Duration: 2006-2010.

Private funded projects

Title: Develpoment of a robust image association algorithm for an automated tax refund application
Financial entity: TRIPTAX LTD. (Singapur company)
Leading researcher: Prof. Pablo San Segundo
Budget: 15,000€
Participants: UPM, TRIPTAX LTD.
Duration: 3months (01/06/2019-01/09/2019)

Title: “Simulation Software for train signaling" (SIMCTC)
Financial entity: ALCATEL
Leading researcher: Prof. Ramón Galán
Budget: 50,000€
Participants: UPM, ALCATEL
Duration: 2004-2006.

Title: “Simulation of the effects of lightning on the wing of a plane "
Financial entity: EADS
Leading researcher: Prof. Agustín Jiménez
Budget: 50,000€
Participants: UPM, EADS
Duration: 2006-2008.

EU funded projects

Title: Masterplan for OPS in Spanish ports (MOPSS)
Reference: INEA/CEF/TRAN/M2015/1128893
Financial entity: European Comission
Leading researcher (IP): Prof. Roque Saltarén
Budget: 169,000€
Participants: Univ. Politécnica de Madrid, Universidad Palma de Gran Canaria, Organismo Público Puertos del Estado (OPPE).
Duration: 01/11/2016-31/12/2019 (38 months)

Tasks: Manufacture optimization processing: Development of a high level controller for a robotized crane, based in GEMMA guide. Implementation in TIA-PORTAL.

Title: “Web Access to Commercial Fairs Through Mobile Agents " (WEBFAIR)
Reference: IST-2000-29456, CICYT (DPI2001-4930-E).
Finantial entity: CE, Spanish Ministry of Science and Technology
Budget-UPM: 226,700€
Participants: UPM, University of Friburg, Hellas, Ideasis Epe, Ratio-Consulta SPA, Belgoioso Castle
Duration: 2001-2004

TECHNOLOGY TRANSFER

Founder of the technological start-up **Biicode S.L.** (2012-2015): Dependency manager tool for C/C++ development. Received in 2013 an award from IBM as best start-up of the year (see Prizes).

Software registry (2012)

a) Librería C++ para procesamiento eficiente de cadenas de bits (M-7335-11),
b) Programa eficiente para el coloreado mínimo exacto de grafos (M-7333-11)
c) Programa para resolver de manera exacta y muy eficiente el problema del *maximum clique* (M-7331-11)

(see also the Private Funded Projects Section).

PRIZES / HIGHLIGHTS

Achievement: Resolution of the open graph problem *2dc.2048* derived from coding theory. Entry in the Online Encyclopedia of Integer Sequences, 2015. (http://oeis.org/A057591, https://oeis.org/A265032).Consequently, candidate for the John Riordan Prize 2015 (nominated by Neil Sloane).

Achievement: main developer of exact algorithms BBMC for maximum clique and PASS for vertex coloring.

Achievement: main developer of BITSCAN and GRAPH C++ libraries for graph programming with bitstrings.

Prize: Best start-up of the year, IBM Smart Camp, 2013
Entity:IBM
Date: 24/10/2013 in Madrid
Start-up: Biicode SL
Founders: Pablo San Segundo, Diego Rodriguez-Losada, Miguel Hernando, Jose Luis Diaz, Manuel Arrufat.

INTERNATIONAL ACTIVITIES

Stays abroad

- LAMSADE research center (Université Dauphine), Paris: 1/10/16-31/10/16
- LAMSADE research center (Université Dauphine), Paris: 18/11/16-24/11/16
- LAMSADE research center (Université Dauphine), Paris: 01/10/18-02/11/18
- LAMSADE research center (Université Dauphine), Paris: 01/09/19 -01/12/19

Invited Speaker / Plenary conferences

- Universidad de la Sorbonne, Paris, 2019
- University of Szeged, Hungary, June 2018
- HSE Campus, Nizhny Novgorod, 2014
- Jornadas using std::cpp, Universidad Carlos III, Madrid, 2014 y 2015

Grants

- Salvador de Madariaga – 3 months (National) 2019
- Movilidad UPM (stays of 1 month at Université Dauphine, Paris- see Stays abroad section, above)

Hosts

- Hosted researcher Bogdan Zavalnij from University of Pecs, Hungary. Received NESUS grant for the hosting. Madrid (9/12/16-17/12-16)
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- Hosted researchers Fabio Furini (associate professor, Université Dauphine (Paris)) and Ivana Ljubic (full professor-ESSEC Business School, Grande École (Paris)) (10/7/17-15/7/17).

Reviewer

Reviewer in relevant international journals related to combinatorial optimization or AI, such as:

- Eurpean Journal of Operational Research
- Computers & Operations Research
- Applied Intelligence (member of review board)
- Computational Optimization & Applications
- Journal of Combinatorial Optimizations
- Journal of Optimization Theory and Applications
- Algorithms

Researchers

Some relevant researchers in my field of interest with whom I am in contact or share conjoint research interests are:

Panos M. Pardalos, Sergiy Butenko, Neil Sloane, Ali Moonis, Darren Strash, Mikhail Batsyn, Patrick Prosser, Stefan Nickel, Etsuji Tomita, Raphael Finkel, Rafael Marti, Chu-Min Li, Ryan Rossi, Enrico Malaguti, Fabio Furini, Bogdan Zavalnij, Ivana Ljubic.

OTHER RELEVANT ACTIVITIES

- International Chess GrandMaster in 2005.
- Spanish Chess Champion in 1997.
- Spanish Team Champion in 2008, 2011.
- Member of the Spanish Olympic Team: 1994-2008.
- Trainer 1997-2000 of former chess world champion *Viswanathan Anand*.