

CURRICULUM VITAE OF CHRISTIAN BLUM

Last updated: January 2017

PERSONAL INFORMATION

Job title Senior Research Scientist

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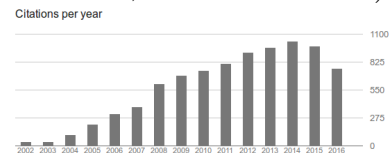
Email christian.blum@iiia.csic.es



MAIN SCIENTIFIC MEASURES (BASED ON GOOGLE SCHOLAR, OCTOBER 2016)

h-index 32

Total number of citations 8702



LATEST NEWS

- March 2017: I gave a **20-hour course** on metaheuristics and hybrids at the *Vienna Graduate School for Computational Optimization*.
- January 2017: I started a **new job** as *Senior Research Scientist* at the Spanish National Research Council (CSIC). Until the end of 2021 I will be on unpaid leave from my former job as *Ikerbasque Research Professor*.
- September 2016: I gave a **keynote talk** at *BeneLearn 2016*, Kortrijk, Belgium
- January 2016: I am acting as **area editor** for the journal *Computers & Operations Research*
- October 2015: I gave a **keynote talk** at *OPTIMA 2015*, Antofagasta, Chile (in Spanish).

RESEARCH INTERESTS

My research interests are twofold: On one side I am interested in **swarm intelligence**, which is an artificial intelligence discipline based on the inspiration taken, for example, from the collective behaviour of social insects, flocks of birds, and fish schools. On the other side I am also interested in the **hybridization of metaheuristics** with more classical artificial intelligence and operations research methods such as, for example, branch & bound techniques and dynamic programming.

I make use of swarm intelligence concepts both for solving challenging combinatorial optimization problems and for problem solving in distributed environments such as adhoc and sensor networks. Well-known swarm intelligence algorithms for combinatorial optimization are ant colony optimization (ACO) and particle swarm optimization (PSO). In distributed environments I have lately made use of the self-desynchronization of the calling periods of Japanese tree frogs for graph coloring and large independent set finding. Concerning the second research line, I am currently working mainly on two different types of hybridization. First, the hybridization of metaheuristics based on the construction of solutions with concepts from branch & bound. Second, I am working on the development of hybrid algorithms based on problem instance reduction.

Concerning applications, my work has a **strong interdisciplinary flavour**. In fact, optimization and control tasks arise in many important application areas such as telecommunications, bio-informatics, neuroscience, and robotics. A representative example of my interdisciplinary work concerns the collaboration with the EPFL (Lausanne, Switzerland) on the *automated reconstruction of dendritic and axonal trees*. Concerning the bio-informatics (respectively, bio-medical) field, some of my recent work has focused on string problems such as the *far from most strings problem* and the *repetition-free longest common subsequence problem*.

EDUCATION

02/2004

PhD in Applied Sciences

Institution: Université Libre de Bruxelles, Brussels, Belgium

Dissertation title: Theoretical and practical aspects of ant colony optimization

Supervisor: Prof. M. Dorigo

05/2002

DEA in Applied Sciences

(Belgian Diplôme d'Etudes Approfondies en Sciences Appliquées)

Institution: Université Libre de Bruxelles, Brussels, Belgium

Dissertation title: Metaheuristics for group shop scheduling

Supervisor: Prof. M. Dorigo

- 07/1998 **Diplom in Mathematik**
(German equivalent to a Masters degree in Mathematics)
- Institution:* Universität Kaiserslautern, Kaiserslautern, Germany
Dissertation title: Optimality criteria and local search methods for node-weighted k -cardinality tree and subgraph problems (in German)
Supervisor: Prof. H. W. Hamacher
- 10/1994 **Vordiplom in Mathematik**
(degree necessary to obtain a diploma)
- Institution:* Johannes-Gutenberg Universität Mainz, Mainz, Germany
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PROFESSIONAL EMPLOYMENT HISTORY

- From 01/2017 **Senior Research Scientist**
- Institution:* Artificial Intelligence Research Institute (IIIA-CSIC), Bellaterra, Spain
- 11/2012–12/2016 **Ikerbasque Research Professor**
- Institution:* University of the Basque Country, San Sebastian, Spain
Funding: Ikerbasque, Basque Foundation for Science
- 12/2011–10/2012 **Associate Professor (Profesor titular interino)**
- Institution:* Universitat Politècnica de Catalunya, Barcelona, Spain
- 12/2006–11/2011 **Tenure Track Research Fellow**
- Institution:* Universitat Politècnica de Catalunya, Barcelona, Spain
Funding: Programa **Ramon y Cajal**, a program of the Spanish Ministry of Science and Technology
- 12/2004–11/2006 **Post-doctoral Research Fellow**
- Institution:* Universitat Politècnica de Catalunya, Barcelona, Spain
Funding: Programa **Juan de la Cierva**, a program of the Spanish Ministry of Science and Technology
Remark: 1st place in the list of evaluated applications

- 07/2004–11/2004 **Post-doctoral Researcher**
- Institution:* Universitat Politècnica de Catalunya, Barcelona, Spain
Funding: Project “SegraVis”, a research training network funded by the European Commission
- 02/2004–06/2004 **Post-doctoral Researcher**
- Institution:* IRIDIA, Université Libre de Bruxelles, Brussels, Belgium
Funding: Project “Metaheuristics Network”, a research training network funded by the European Commission
- 11/2000–01/2004 **Pre-doctoral Researcher**
- Institution:* IRIDIA, Université Libre de Bruxelles, Brussels, Belgium
Funding: Project “Metaheuristics Network”, a research training network funded by the European Commission
- 10/1999–09/2000 **Scientific Officer**
- Institution:* Imperial Cancer Research Fund (ICRF), Advanced Computation Laboratory, London, United Kingdom
Task: Interfacing of a clinical decision support system with an electronic patient record systems
- 10/1997–04/1998 **Scientific Assistant**
- Institution:* Working group of Prof. H. W. Hamacher, Universität Kaiserslautern, Kaiserslautern, Germany
- 04/1997–06/1997 **Scientific Assistant**
- Institution:* DFKI (German Research Institute for Artificial Intelligence), Kaiserslautern, Germany
Funding: German project ”PRODUKTION 2000, GIPP-S1”
- 01/1996–04/1997 **Scientific Assistant**
- Institution:* Centre for Learning Systems and Applications, Kaiserslautern, Germany
Funding: Project “Diagnosis and monitoring of ulnar nerve lesions”
- 03/1995–04/1995 **Practical Training**
- Company:* BASF AG, Department of Molecular Modelling, Ludwigshafen, Germany
Task: Development of optimization software for the determination of molecule structures

AWARDS

- 06/2014 Director of a PhD thesis (by Dr. Hugo Hernández Pibernat) that has won the **premio extraordinario** in the 2014 call at the Universitat Politècnica de Catalunya (UPC).
- 01/2014 **Recognition of service award** bestowed by ACM (Association for Computing Machinery) for my service as editor-in-chief of the GECCO 2013 conference.
- 09/2013 **Best application-oriented paper award** at MAEB 2013 bestowed by the Spanish Association for Artificial Intelligence (AEPIA).
- 11/2012 Director of the thesis that won the **1st prize at the Certamen Arquímedes 2012**. Director's prize money: 2000 Euros
- 10/2011 **Wireless and Mobile Networking Conference Best Paper Award** for the best paper presented at the WMNC 2011 conference.
- 08/2010 **Theoretical Computer Science Top Cited Article 2005–2010 Award**, given to the most cited paper published in the journal *Theoretical Computer Science (Elsevier)* between 2005 and 2010.
- 06/2007 **IEEE Transactions on Evolutionary Computation Outstanding Paper Award 2005 (bestowed in 2007)**, given to the best paper published in the journal *IEEE Transactions on Evolutionary Computation* in 2005. Prize money: 1000 US dollars.
- 07/2006 **GECCO 2006 Best Paper Award** for the best paper presented in the *ECO track (Evolutionary Combinatorial Optimization)* of the Genetic and Evolutionary Computation (GECCO) conference.
- 12/2003 The paper *Local search algorithms for the k-cardinality tree problem* published in the journal *Discrete Applied Mathematics* was selected for the **Editors' choice volume of 2003**.

APPEARANCE IN THE MEDIA

- 09/2015 An **article about one of my papers** was published on SINC, the scientific news website of the Spanish Government (<http://www.agenciasinc.es/Noticias/Las-ranas-resuelven-problemas-de-computacion>). This has led to various interviews and articles in newspapers such as La Vanguardia, ABC, and La Voz de Galicia.

- 07/2012 An **article about one of my papers** was published on SINC, the scientific news website of the Spanish Government (<http://www.agenciasinc.es/Noticias/El-canto-de-una-rana-inspira-un-algoritmo-para-redes-inalambricas>).
- 02/2009 An **interview on swarm intelligence** was broadcasted as part of the popular science program Tres14 by the Spanish channel TVE2 (<http://www.rtve.es/alacarta/videos/tres14/tres14-hormigas-en-la-red/458567/>).

RESEARCH PROJECTS AS SCIENTIST IN CHARGE

- 02/2013–01/2016 MEC project with contract number TIN2012-37930-C02-02
Funding: 20.124 Euros
- 01/2009–12/2010 Integrated action grant **AI-ES-AT**, contract MEC HA2008-0005
Funding: 11.950 Euros

OTHER RESEARCH PROJECTS

- Since 2008 MICINN 6-year macro-project **FORMALISM**, contract TIN-2007-66523
Scientist in charge: Fernando Orejas (UPC, Barcelona)
Funding: 821.000 Euros
- Since 2008 EU-funded project **FRONTS**, contract EU FP7-ICT-2007-1
Scientist in charge: Josep Diaz (UPC, Barcelona)
- Since 2008 EU-funded project **WISEBED**, contract EU FP7-ICT-2007-1
Scientist in charge: Josep Diaz (UPC, Barcelona)
- Since 2006 CICYT project **OPLINK**, contract TIN-2005-08818-C04
Scientist in charge: Enrique Alba Torres (UMA, Málaga)
- 07/2004–11/2005 CICYT project **TRACER**, contract TIC-2002-04498-C05
Scientist in charge: Joaquim Gabarró (UPC, Barcelona)
- 07/2004–11/2004 EU-funded research training network **SegraVis**,
contract HPRN-CT-2002-00275
Scientist in charge: Fernando Orejas (UPC, Barcelona)

- 11/2000–06/2004 EU-funded research training network **Metaheuristics Network**,
contract HPRN-CT-1999-00106
Scientist in charge: Marco Dorigo (ULB, Belgium)
- 04/1997–06/1997 German project **PRODUKTION 2000, GIPP-S1**,
contract FKZ-02PV41092
Scientist in charge: Harold Boley (DFKI GmbH, Germany)
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SCIENTIFIC BOARDS AND STEERING COMMITTEES

- Since 05/2014 **Member of the Steering Committee** of the EvoCOP conference series
- Since 01/2010 **Member of the Steering Committee** of the LION conference series
- Since 03/2010 **Member of the Scientific Advisory Board** of the company Reactive Search S.r.l.
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EDITORIAL ACTIVITIES

- From 01/2016 **Area Editor** for the journal Computers & Operations Research (COR)
- Since 07/2015 **Associate Editor** for the journal Theoretical Computer Science (TCS)
- 05/2015 **Field Editor** for Swarm Intelligence concerning the Handbook of Computational Intelligence (Springer Verlag)
- Since 03/2015 **Associate Editor** for the journal Natural Computing (NACO)
- 05/2014 **Co-editor**, proceedings of HM 2014 (LNCS 8457)
- 04/2014 **Co-editor**, proceedings of EvoCOP 2014 (LNCS 8600)
- 07/2013 **Co-editor**, proceedings of GECCO 2013 (ACM)
- 05/2013 **Co-editor**, proceedings of HM 2013 (LNCS 7919)
- 04/2013 **Co-editor**, proceedings of EvoCOP 2013 (LNCS 7832)
- 09/2012 **Co-editor**, proceedings of ANTS 2012 (LNCS 7461)
- Since 07/2012 **Associate Editor** for the journal Applied Soft Computing (ASOC)

- Since 02/2012 **Member of the editorial board** of the journal Neural Computing & Applications (NC&A)
- Since 03/2011 **Field Editor for Swarm Intelligence** for a large book project on computational intelligence by Springer Verlag, Berlin, Germany
- 10/2010 **Co-editor**, proceedings of HM 2010 (LNCS 6373)
- 03/2010 **Co-editor** of a special issue on “Hybrid Metaheuristics” in the journal Computers & Operations Research (vol 37, issue 3, 2010)
- 01/2010 **Co-editor** of the proceedings of Learning and Intelligent Optimization (LION) 2010 (LNCS 6073)
- 10/2009 **Co-editor** of the proceedings of Hybrid Metaheuristics (HM) 2009 (LNCS 5818)
- 07/2009 **Co-editor** of the proceedings of the 2009 Genetic and Evolutionary Computation Conference (GECCO 2009), published by ACM press
- 10/2008 **Co-editor** of the proceedings of Hybrid Metaheuristics (HM) 2008 (LNCS 5296)
- 09/2008 **Co-editor** of the proceedings of ANTS 2008: Sixth International Workshop on Ant Colony Optimization and Swarm Intelligence (LNCS)
- 09/2008 **Co-editor** of the book *Swarm Intelligence–Introduction and Applications* published by Springer Verlag
- 05/2008 **Co-editor** of the book *Hybrid Metaheuristics–An Emerging Approach to Optimization* published by Springer Verlag
- 10/2007 **Co-editor** of the proceedings of Hybrid Metaheuristics (HM) 2007 (LNCS 4771)
- 12/2006-11/2011 **Associate editor** of the Swarm Intelligence journal (Springer)
- 10/2006 **Co-editor** of the proceedings of Hybrid Metaheuristics (HM) 2006 (LNCS 4030)
- 07/2006 **Co-editor** of the proceedings of the 2006 Genetic and Evolutionary Computation Conference (GECCO 2006), published by ACM press

- 04/2006 **Co-editor** of a special issue on “Hybrid Metaheuristics” in the Journal of Mathematical Modelling and Algorithms (vol 5, issue 1, 2006)
- Since 02/2006 **Member of the editorial board** of the ISE book series on Intelligent System Engineering (by NOVA publishers, NY, USA)
- 12/2005 **Co-editor** of a special issue on “Swarm Intelligence” in the journal Künstliche Intelligenz, the journal of the AI section of the German Society for Informatics (vol 4, 2005)
- 08/2005 **Co-editor** of the proceedings of Hybrid Metaheuristics (HM) 2005 (LNCS 3636)
- Since 08/2005 **Member of the editorial board** of the journal Computers & Operations Research (Elsevier)
- 06/2005 **Co-editor** of the proceedings of the 2005 Genetic and Evolutionary Computation Conference (GECCO 2005), published by ACM press.
- 09/2004 **Co-editor** of the proceedings of ANTS 2004: Fourth International Workshop on Ant Algorithms (LNCS 3172)
- 08/2004 **Co-editor** of the proceedings of Hybrid Metaheuristics (HM 2004) (ISBN 3-00-015331-4)

ORGANIZATIONAL ACTIVITIES

- 05/2014 **Program co-chair** of the 9th International Workshop on Hybrid Metaheuristics (HM 2014), (Hamburg, Germany)
- 04/2014 **Program co-chair** of the 14th International Conference on Evolutionary Computation in Combinatorial Optimization (EvoCOP 2014), (Granada, Spain)
- 07/2013 **Editor-In-Chief** of the Genetic and Evolutionary Computation Conference (GECCO 2013), (Amsterdam, The Netherlands)
- 05/2013 **Program co-chair** of the 8th International Workshop on Hybrid Metaheuristics (HM 2013), (Ischia, Italy)
- 04/2013 **Program co-chair** of the 13th International Conference on Evolutionary Computation in Combinatorial Optimization (EvoCOP 2013), (Vienna, Austria)

- 09/2012 **Program co-chair** of the Eight International Conference on Swarm Intelligence (ANTS 2012), (Brussels, Belgium)
- 07/2012 **Co-chair** of the “Combinatorial Optimization” track of GECCO 2012: Genetic and Evolutionary Computation Conference (Philadelphia, USA)
- 07/2012 **Co-chair** of the “Late-Breaking Abstracts” workshop at GECCO 2012: Genetic and Evolutionary Computation Conference (Philadelphia, USA)
- 07/2011 **Co-chair** of the 1st International Workshop on Bio-inspired Solutions for Wireless Sensor Networks, (Dublin, Ireland)
- 07/2011 **Co-chair** of the “Late-Breaking Abstracts” workshop at GECCO 2011: Genetic and Evolutionary Computation Conference (Dublin, Ireland)
- 10/2010 **Program co-chair** of the 7th International Workshop on Hybrid Metaheuristics (HM 2010), (Vienna, Austria)
- 01/2010 **Chair of the Program Committee** of Learning and Intelligent Optimization (LION 4), (Venice, Italy)
- 10/2009 **Program co-chair** of the 6th International Workshop on Hybrid Metaheuristics (HM 2009), (Udine, Italy)
- 07/2009 **Co-chair** of the “Combinatorial Optimization” track of GECCO 2009: Genetic and Evolutionary Computation Conference (Montreal, Canada)
- 10/2008 **Program co-chair** of the 5th International Workshop on Hybrid Metaheuristics (HM 2008), (Málaga, Spain)
- 09/2008 **Program co-chair** of the Sixth International Conference on Ant Colony Optimization and Swarm Intelligence (ANTS 2008), (Brussels, Belgium)
- 10/2007 **Program co-chair** of the 4th International Workshop on Hybrid Metaheuristics (HM 2007), (Dortmund, Germany)
- 02/2007 **Organizer** of a special session on *hybrid metaheuristics* at the Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (MAEB 2007), (Tenerife, Spain)
- 10/2006 **Co-organizer** of the 3rd international workshop on Hybrid Metaheuristics (HM 2006), (Gran Canaria, Spain)
- 07/2006 **Chair** of the “ACO”/“swarm intelligence” track of GECCO 2006: Genetic and Evolutionary Computation Conference (Seattle, USA)

- 08/2005 **Co-organizer** of the 2nd international workshop on Hybrid Metaheuristics (HM 2005), (Barcelona, Spain)
- 06/2005 **Chair** of the “ACO”/“swarm intelligence” track of GECCO 2005: Genetic and Evolutionary Computation Conference (Washington, USA)
- 09/2004 **Publication co-chair** of ANTS 2004: Fourth International Workshop on Ant Algorithms (Brussels, Belgium)
- 08/2004 **Co-organizer** of the workshop Hybrid Metaheuristics (HM 2004) at ECAI 2004 (Valencia, Spain)
- 09/2002 **Member** of the *Local Organizations Committee* of ANTS 2002: 3rd International Workshop on Ant Algorithms (Brussels, Belgium)
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PROGRAM COMMITTEES

Note: this list is only kept up to date until mid 2012. I am acting as member of the PC of about 10-15 conferences per year.

- 09/2012 **Member** of the *Program Committee* of PPSN 2012: Twelfth International Conference on Parallel Problem Solving From Nature (Taormina, Italy)
- 05/2012 **Member** of the *Program Committee* of OptMas 2012: Fifth International Workshop on Optimisation in Multi-Agent Systems (Valencia, Spain)
- 04/2012 **Member** of the *Program Committee* of EvoCOP 2012: 12th European Conference on Evolutionary Computation in Combinatorial Optimisation (Malaga, Spain)
- 01/2012 **Member** of the *Program Committee* of LION 6: The 6th International Conference on Learning and Intelligent Optimization (Paris, France)
- 11/2011 **Member** of the *Program Committee* of EMERGING 2011: The Third International Conference on Emerging Network Intelligence (Lisbon, Portugal)
- 11/2011 **Member** of the *Program Committee* of MEDES 2011: The 3rd International Conference on Management of Emergent Digital EcoSystems (San Francisco, USA)

- 11/2011 **Member** of the *Program Committee* of CAEPIA 2011: Conferencia de la Asociación Española para la Inteligencia Artificial (La Laguna, Spain)
- 10/2011 **Member** of the *Program Committee* of ECTA 2011: International Conference on Evolutionary Computation Theory and Applications (Paris, France)
- 07/2011 **Member** of the *Program Committee* of HEUNET 2011: 2nd Workshop on Heuristic Methods for the Design, Deployment, and Reliability of Networks and Network Applications (Munich, Germany)
- 07/2011 **Member** of the *Program Committee* of ICINCO 2011: 8th International Conference on Informatics in Control, Automation and Robotics (Noordwijkerhout, The Netherlands)
- 07/2011 **Member** of the *Program Committee* of GECCO 2011: Genetic and Evolutionary Computation Conference (Dublin, Ireland)
- 07/2011 **Member** of the *Program Committee* of MIC 2011: 9th Metaheuristics International Conference (Udine, Italy)
- 06/2011 **Member** of the *Program Committee* of ICSI 2011: 2th International Conference on Swarm Intelligence (Chonqing, China)
- 05/2011 **Member** of the *Program Committee* of OptMas 2011: Fourth International Workshop on Optimisation in Multi-Agent Systems (Taipei, Taiwan)
- 04/2011 **Member** of the *Program Committee* of EvoCOP 2011: 11th European Conference on Evolutionary Computation in Combinatorial Optimisation (Torino, Italy)
- 01/2011 **Member** of the *Program Committee* of LION 5: The 5th International Conference on Learning and Intelligent Optimization (Rome, Italy)
- 11/2010 **Member** of the *Program Committee* of ITBI 2010: 2nd International Conference on IT & Business Intelligence (Nagpur, India)
- 10/2010 **Member** of the *Program Committee* of EMERGING 2010: The Second International Conference on Emerging Network Intelligence (Florence, Italy)
- 10/2010 **Member** of the *Program Committee* of ICEC 2010: International Conference on Evolutionary Computation (Valencia, Spain)

- 10/2010 **Member** of the *Program Committee* of MEDES 2010: The 2nd International Conference on Management of Emergent Digital EcoSystems (Bangkok Thailand)
- 10/2010 **Member** of the *Program Committee* of META 2010: International Conference on Metaheuristics and Nature Inspired Computing (Djerba Island, Tunisia)
- 09/2010 **Member** of the *Program Committee* of MAEB 2010: VII Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (Valencia, Spain)
- 09/2010 **Member** of the *Program Committee* of PPSN 2010: Eleventh International Conference on Parallel Problem Solving From Nature (Krakow, Poland)
- 09/2010 **Member** of the *Program Committee* of ANTS 2010: Seventh International Conference on Swarm Intelligence (Brussels, Belgium)
- 08/2010 **Member** of the *Program Committee* of HIS 2010: 9th International Conference on Hybrid Intelligent Systems (Atlanta, USA)
- 08/2010 **Member** of the *Program Committee* of Alife XII: 12th International Conference on the Synthesis and Simulation of Living Systems (Odense, Denmark)
- 07/2010 **Member** of the *Program Committee* of GECCO 2010: Genetic and Evolutionary Computation Conference (Portland, USA)
- 06/2010 **Member** of the *Program Committee* of ICINCO 2010: 7th International Conference on Informatics in Control, Automation and Robotics (Funchal, Portugal)
- 06/2010 **Member** of the *Program Committee* of ICSI 2010: International Conference on Swarm Intelligence (Beijing, China)
- 05/2010 **Member** of the *Program Committee* of OptMas 2010: Third International Workshop on Optimisation in Multi-Agent Systems (Toronto, Canada)
- 05/2010 **Member** of the *Program Committee* of BIOMA 2010: The 4th International Conference on Bioinspired Optimization Methods and their Applications (Ljubljana, Slovenia)

- 04/2010 **Member** of the *Program Committee* of EvoTRANSLOG 2010: 2nd International Workshop on Evolutionary Computation in Logistics (Istanbul, Turkey)
- 03/2010 **Member** of the *Program Committee* of BIOTECH 2010: The Second International Conference on Advances in Biotechnologies (Cancun, Mexico)
- 11/2009 **Member** of the *Program Committee* of CAEPIA-TTIA 2009: 13th Conference of the Spanish Association of Artificial Intelligence (Seville, Spain)
- 10/2009 **Member** of the *Program Committee* of ICEC 2009: International Conference on Evolutionary Computation (Madeira, Portugal)
- 10/2009 **Member** of the *Program Committee* of EMERGING 2009: First International Conference on Emerging Network Intelligence (Sliema, Malta)
- 10/2009 **Member** of the *Program Committee* of MEDES 2009: The International ACM Conference on Management of Emergent Digital EcoSystems (Lyon, France)
- 09/2009 **Member** of the *Program Committee* of SLS 2009: 2nd International Workshop on Engineering Stochastic Local Search Algorithms (Brussels, Belgium)
- 05/2009 **Member** of the *Program Committee* of CEC 2009: IEEE Congress on Evolutionary Computation (Trondheim, Norway)
- 04/2009 **Member** of the *Program Committee* of EvoCOP 2009: 9th European Conference on Evolutionary Computation in Combinatorial Optimization (Tübingen, Germany)
- 03/2009 **Member** of the *Program Committee* of SIS 2009: IEEE Symposium on Swarm Intelligence (Nashville, USA)
- 02/2009 **Member** of the *Program Committee* of MAEB 2009: VI Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (Malaga, Spain)
- 01/2009 **Member** of the *Program Committee* of LION 3: Intelligent Learning and Optimization (Trento, Italy)
- 11/2008 **Member** of the *Program Committee* of ISDA 2008: International Conference on Intelligent Systems Design and Applications (Kachsiung, Taiwan)

- 10/2008 **Member** of the *Program Committee* of CSTST 2008: Fifth International Conference on Soft Computing as Transdisciplinary Science and Technology (Paris, France)
- 10/2008 **Member** of the *Program Committee* of META 2008: 2nd International Conference on Metaheuristics and Nature Inspired Computing (Hammamet, Tunisia)
- 09/2008 **Member** of the *Program Committee* of ANTS 2008: Sixth International Conference on Ant Colony Optimization and Swarm Intelligence (Brussels, Belgium)
- 09/2008 **Member** of the *Program Committee* of PPSN 2008: International Conference on Parallel Processing in Nature (Dortmund, Germany)
- 07/2008 **Member** of the *Program Committee* of GWAL 2008: 8th German Workshop on Artificial Life (Leipzig, Germany)
- 07/2008 **Member** of the *Program Committee* of HEUNET 2008: Workshop on Heuristic Methods for the Design, Deployment, and Reliability of Networks and Network Applications (Turku, Finland)
- 07/2008 **Member** of the *Program Committee* of GECCO 2008: Genetic and Evolutionary Computation Conference (Atlanta, USA)
- 04/2008 **Member** of the *Program Committee* of EvoCOP 2008: 7th European Conference on Evolutionary Computation in Combinatorial Optimization (Naples, Italy)
- 10/2007 **Member** of the *Program Committee* of WSC12: 12th Online World Conference on Soft Computing in Industrial Applications (World Wide Web)
- 10/2007 **Member** of the *Program Committee* of ISDA 2007: International Conference on Intelligent Systems Design and Applications (Rio de Janeiro, Brasil)
- 09/2007 **Member** of the *Program Committee* of CEC 2007: IEEE Congress on Evolutionary Computation (Singapore, Malaysia)
- 09/2007 **Member** of the *Program Committee* of SLS 2007: International Workshop on Stochastic Local Search (London, UK)
- 07/2007 **Member** of the *Program Committee* of GECCO 2007: Genetic and Evolutionary Computation Conference (London, UK)

- 04/2007 **Member** of the *Program Committee* of EvoCOP 2007: 6th European Conference on Evolutionary Computation in Combinatorial Optimization (Valencia, Spain)
- 04/2007 **Member** of the *Program Committee* of SIS 2007: IEEE Swarm Intelligence Symposium (Hawaii, US)
- 02/2007 **Member** of the *Program Committee* of MAEB 2007: IV Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (Tenerife, Spain)
- 11/2006 **Member** of the *Program Committee* of CIS 2006: International Conference on Computational Intelligence and Security (Guangzhou, China)
- 09/2006 **Member** of the *Program Committee* of ANTS 2006: Fifth International Conference on Ant Colony Optimization and Swarm Intelligence (Brussels, Belgium)
- 09/2006 **Member** of the *Program Committee* of PPSN 2006: International Conference on Parallel Processing in Nature (Reykjavik, Iceland)
- 09/2006 **Member** of the *Program Committee* of WSC11: 11th Online World Conference on Soft Computing in Industrial Applications (World Wide Web)
- 07/2006 **Member** of the *Program Committee* of CEC 2006: IEEE Congress on Evolutionary Computation (Vancouver, Canada)
- 05/2006 **Member** of the *Program Committee* of WEA 2006: 5th International Workshop on Efficient and Experimental Algorithms (Menorca Island, Spain)
- 04/2006 **Member** of the *Program Committee* of EvoCOP 2006: 5th European Conference on Evolutionary Computation in Combinatorial Optimization (Budapest, Hungary)
- 10/2005 **Member** of the *Program Committee* of LSCS 2005: Second International Workshop on Local Search Techniques in Constraint Satisfaction (Sitges, Spain)
- 10/2005 **Member** of the *Program Committee* of EA 2005: International Conference on Artificial Evolution (Lille, France)
- 09/2005 **Member** of the *Program Committee* of WSC10: 10th Online World Conference on Soft Computing in Industrial Applications (World Wide Web)

03/2005	Member of the <i>Program Committee</i> of EvoCOP 2005: 5th European Conference on Evolutionary Computation in Combinatorial Optimization (Lausanne, Switzerland)
09/2004	Member of the <i>Program Committee</i> of PPSN 2004: International Conference on Parallel Processing in Nature (Birmingham, UK)
09/2004	Member of the <i>Program Committee</i> of ANTS 2004: Fourth International Workshop on Ant Algorithms (Brussels, Belgium)
09/2005	Member of the <i>Program Committee</i> of MAEB 2005: IV Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (Granada, Spain)
08/2005	Member of the <i>Program Committee</i> of MIC 2005: 6th Metaheuristics International Conference (Vienna, Austria)
07/2005	Member of the <i>Program Committee</i> of AD 2005: Agent Days (Malaga, Spain)

REFeree ACTIVITIES

Projects	Project referee for the Spanish Ministry of Science and Innovation (MICINN) Project referee for the Austrian Science Fund Project referee for the Slovenian Research Agency Project referee for the Polish Ministry of Science and Higher Education Project referee for the Belgian Fonds de Recherche Scientifique (FNRS)
Journals	Annals of Operations Research Artificial Life Computational Optimization and Applications Computer Science Reviews Computers & Operations Research Constraints European Journal of Operational Research Evolutionary Computing IEEE Transactions on Evolutionary Computation

IEEE Transactions on Systems, Man and Cybernetics – Part B
Information Processing Letters
Information Sciences
INFORMS Journal on Computing
International Journal of Approximate Reasoning
International Journal of Control, Automation, and Systems
International Journal of Production Research
International Journal of Systems Science
Journal of Artificial Intelligence Reviews
Journal of Engineering Manufacture
Journal of Experimental Algorithmics
Journal of Heuristics
Journal of Mathematical Modelling and Algorithms
Journal of Scheduling
Journal of Sound and Vibration
Management Science
Memetic Computing
Networks
Neurocomputing
Novatica
Optimization Letters
Pattern Analysis and Applications
Soft Computing
Swarm Intelligence

TUTORIALS

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| 10/2014 | Invited tutorial on <i>swarm intelligence</i> at META 2014: International Conference on Metaheuristics and Bio-inspired Computing (Marrakesh, Morocco) |
| 10/2012 | Invited tutorial on <i>hybrid metaheuristics</i> at TPNC 2012: International Conference on Theory and Practice of Natural Computing (Tarragona, Spain) |
| 08/2012 | Invited tutorial on <i>swarm intelligence</i> at ICARIS 2012: International Conference on Artificial Immune Systems (Taromina, Italy) |
| 07/2011 | Invited tutorial on <i>ant colony optimization</i> at GECCO 2011: Genetic and Evolutionary Computation Conference (Dublin, Ireland) |

- 07/2009 Invited tutorial on *ant colony optimization* at GECCO 2009: Genetic and Evolutionary Computation Conference (Montreal, Canada)
- 09/2008 Invited tutorial *Swarm Intelligence* at PPSN 2008: Parallel Problem Solving in Nature (Dortmund, Germany)
- 09/2007 Invited tutorial *Ant colony optimization: Introduction and recent hybridizations* at HIS 2007: Hybrid Intelligent Systems (Kaiserslautern, Germany)
- 07/2007 Invited tutorial on *ant colony optimization* at GECCO 2007: Genetic and Evolutionary Computation Conference (London, UK)
- 07/2006 Invited tutorial on *ant colony optimization* at GECCO 2006: Genetic and Evolutionary Computation Conference (Seattle, USA)
- 11/2005 Tutorial *Ant colony optimization: Introduction and recent advances* at HIS 2005: Hybrid Intelligent Systems (Rio de Janeiro, Brasil)
- 06/2005 Invited tutorial on *ant colony optimization* at GECCO 2005: Genetic and Evolutionary Computation Conference (Washington, USA)

INVITED TALKS AND PANEL DISCUSSIONS

- 10/2015 Keynote talk titled *Combinación de Metaheurísticas con Solvers ILP en la Optimización Combinatoria* at OPTIMA 2015, Antofagasta, Chile. Invited by **Jordi Pereira**.
- 10/2015 Talk on *Optimization: Ants, Frogs, and Hybrids*, Universidad Adolfo Ibáñez, Santiago de Chile. Invited by **Jordi Pereira**.
- 09/2015 Keynote talk titled *Combining Metaheuristics with ILP Solvers in Combinatorial Optimization* at INISTA 2015, Madrid, Spain. Invited by **David Camacho**
- 09/2014 Talk on *Swarm Intelligence and Hybrid Metaheuristics*, Manchester University, UK. Invited by **Joshua Knowles**.
- 06/2012 Keynote talk on *Hybrid Metaheuristics* at OPTMAS 2012, Valencia, Spain. Invited by **Juan A. Rodríguez**

- 06/2012 Talk on *Hybridizing of Metaheuristics* at the multidisciplinary seminar of the Department of Chemical Engineering of the Universitat Rovira i Virgili, Tarragona, Spain. Invited by **Roger Guimerà**
- 12/2010 Talk on *Hybrid Metaheuristics*, Nature Inspired Computation and Applications Laboratory (NICAL), University of Science and Technology of China, Hefei, China. Invited by **Xin Yao**
- 05/2010 Keynote talk on *Hybrid Metaheuristics* at BIOMA 2010, Ljubljana, Slovenia. Invited by **Jurij Silc**
- 12/2009 Talk on *Solving the k-cardinality tree problem*, EPFL, Lausanne, Switzerland. Invited by **Pascal Fua**
- 06/2009 Talk on *Integrating Beam-ACO with constraint programming for single machine job scheduling*, University of Viena, Austria. Invited by **Richard Hartl**
- 06/2009 Talk on *Integrating Beam-ACO with constraint programming for single machine job scheduling*, Technical University of Viena, Austria. Invited by **Günther Raidl**
- 09/2008 Talk on *Ant colony optimization hybrids* at ANTS 2008, Brussels, Belgium. Invited by **Marco Dorigo**
- 07/2008 Talk on *Ant colony optimization*, Center for Genomic Regulation, Comparative Bioinformatics Group, Barcelona. Invited by **Cedric Notredame**
- 01/2008 Talk on *Beam-ACO: Hybridizing ant colony optimization with beam search*, University of Viena, Austria. Invited by **Karl Dörner and Richard Hartl**
- 12/2007 Talk on *Beam-ACO: A hybrid between ant colony optimization and beam search*, University of Porto, Portugal. Invited by **Joao Pedroso**
- 09/2007 Member of a panel discussion on *The future and challenges of stochastic local search engineering* at SLS 2007, Brussels, Belgium. Invited by **Holger Hoos and Thomas Stützle**
- 03/2006 Talk on *Introduction to ant colony optimization*, University of Trento, Italy. Invited by **Roberto Battiti**
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PARTICIPATION IN PHD DEFENSE JURIES

12/2014	Josu Ceberio , <i>Solving Permutation Problems with Estimation of Distribution Algorithms and Extensions Thereof</i> , University of the Basque Country UPV/EHU, San Sebastian, Spain
03/2013	Andrey Kostin , <i>Development of advanced mathematical programming methods for supply chain management</i> , Universitat Rovira i Virgili, Tarragona, Spain
11/2012	Francisco Javier Rodríguez , <i>Hybrid and constructive metaheuristics: methods and applications</i> , University of Granada, Spain
08/2012	Mustafa Misir , <i>Intelligent Hyper-heuristics: A tool for solving generic optimisation problems</i> , Catholic University of Leuven, Belgium
11/2010	Guillermo Molina Arribere , <i>Técnicas de optimización para redes de sensores</i> , Universidad de Málaga, Spain
06/2008	Todd James Treangen , <i>Novel Computational Methods for Large-Scale Genome Comparison</i> , Universitat Politècnica de Catalunya, Spain
05/2007	Stephen Gilmore , <i>Meshing Structural Knowledge And Heuristics: Improving Ant Colony Optimization Via Kernelization-Based Templates</i> , MacQuarie University, Australia

TEACHING

Fall 2011	Programming in C++ (PRO1), FIB, UPC, Barcelona (90 hours)
Fall 2011	Responsible professor for "Seminar of Algorithms and Programming" (SAP), Master program on software, Department LSI, UPC, Barcelona (12 hours)
Spring 2011	Algoritmia (ALG), Facultat d'Informàtica, UPC, Barcelona (28 hours)
Fall 2010	Programming in C++ (P1), FIB, UPC, Barcelona (90 hours)
Spring 2007	Algoritmia (ALG), Facultat d'Informàtica, UPC, Barcelona (20 hours)
Fall 2006	Informàtica I, Facultat de Matemàtiques i Estadístiques, UPC, Barcelona (28 hours)

Fall 2006	12 hours module on <i>metaheuristics</i> within the "Seminar of Algorithms and Programming" (SAP), Master program on software, Department LSI, UPC, Barcelona
03/2006	20 hours course on <i>metaheuristics</i> , Universidad de Málaga, Málaga, Spain (2 credits)
05/2004	2 hours course for undergraduate students on <i>metaheuristics in combinatorial optimization</i> , Universitat Politècnica de Catalunya, Barcelona, Spain
02/2004	2 hours course for PhD students on <i>metaheuristics in combinatorial optimization</i> at the Universitat Politècnica de Catalunya, Barcelona, Spain
11/2003	3 hours course for undergraduate students on <i>metaheuristics in combinatorial optimization</i> , Université Libre de Bruxelles, Brussels, Belgium
Fall 2010	Responsible professor for "Seminar of Algorithms and Programming" (SAP), Master program on software, Department LSI, UPC, Barcelona (12 hours)
Spring 2010	Programming in C++ (P1), Facultat d'Informàtica, UPC, Barcelona (28 hours)
Spring 2010	Algoritmia (ALG), Facultat d'Informàtica, UPC, Barcelona (20 hours)
Fall 2009	Programming in C++ (P1), Facultat d'Informàtica, UPC, Barcelona (56 hours)
Fall 2009	Responsible professor for "Seminar of Algorithms and Programming" (SAP), Master program on software, Department LSI, UPC, Barcelona (12 hours)
Spring 2009	Programming in C++ (P1), Facultat d'Informàtica, UPC, Barcelona (28 hours)
Spring 2009	Algoritmia (ALG), Facultat d'Informàtica, UPC, Barcelona (22 hours)
Fall 2009	Programming in C++ (P1), Facultat d'Informàtica, UPC, Barcelona (56 hours)
Fall 2009	16 hours module on <i>metaheuristics</i> within the "Seminar of Algorithms and Programming" (SAP), Master program on software, Department LSI, UPC, Barcelona

Spring 2008	Algoritmia (ALG), Facultat d'Informàtica, UPC, Barcelona (22 hours)
Fall 2007	16 hours module on <i>metaheuristics</i> within the "Seminar of Algorithms and Programming" (SAP), Master program on software, Department LSI, UPC, Barcelona

GRADUATE STUDENTS

07/2016	Aitor Alkorta , <i>Reverse Engineering in Polymerization Processes: Optimization of Reaction Conditions</i>
01/2012	Sergi Mateo Bellido , <i>Híbrido de optimización por colonia de hormigas para el problema de hallar la arborescencia enraizada con peso mínimo</i>
07/2008	Pedro Jesús Copado Méndez , <i>Hibridación de la Metaheurística ACO para el Shortest Capacitated Paths Problem</i>
07/2006	Mateu Yábar Vallès , <i>Ant Colony Optimization for DNA Sequencing by Hybridization</i>

MASTER STUDENTS

06/2016	Alex Hagg , <i>Hierarchical Training of Local Surrogate Models for Evolutionary Optimization of Streamlined 2D Shapes</i>
07/2010	Pedro Jesús Copado Méndez , <i>Development of a Hybrid Metaheuristic for the Efficient Solution of Strategic Supply Chain Management Problems: Application to the Energy Sector</i>
07/2008	Hugo Hernández Pibernat , <i>Ant Colony Optimization for Energy-Efficient Multi-Casting in Wireless Ad-Hoc Networks</i>

PHD STUDENTS

Since 09/2014	Evelia Lizarraga , currently working on combination of metaheuristics with exact solvers
Since 09/2013	Pedro Pinacho Davidson , currently working on combination of metaheuristics with exact solvers
06/2013	Salim Bouamama , <i>Design of a Learning Method for Automatic Data Extraction</i>

06/2012 **Hugo Hernández Pibernat**, *Swarm Intelligence Methods for Optimization and Management Tasks in Sensor Networks*

SUPERVISION OF OTHER PROJECTS

03/2004 **Co-supervisor** of a pilot project on hybridizing ant colony optimization and constraint programming. In cooperation with Bernd Meyer, Monash University, Australia

EVALUATIONS IN THE SPANISH RESEARCH SYSTEM

05/2011 *Agreditación de profesor titular (TU)* obtained from the Agencia Nacional de Evaluación de la Calidad y Acreditación (ANECA)

01/2011 Positive evaluation within the *I3 program* of the Spanish Ministry of Science and Innovation

12/2010 Validation of the equivalence of my PhD (in Spanish: *homologación*) at the Universitat Politècnica de Catalunya

07/2009 *Acreditació de recerca* obtained from the Agència per a la Qualitat del Sistema Universitari de Catalunya (AQU)

VARIOUS

Programming **Java** (Swing, RMI, Jini, CORBA, JDBC, XML DOM)
Experience: 3 years

C++ (development of optimization software)
Experience: 14 years

Smalltalk (development of AI applications)
Experience: 3 years

Basic knowledge of **Pascal, Modula2, Fortran, Lisp, Prolog**

Languages **German** (mother language)
English (fluent, written and spoken)
Spanish (fluent, written and spoken)
French (basic knowledge)

PUBLICATIONS

JOURNALS

- [1] M. J. Blesa and C. Blum. Finding edge-disjoint paths in networks: An ant colony optimization algorithm. *Journal of Mathematical Modelling and Algorithms*, 6(3):361–391, 2007. **Citations on Google Scholar: 14.**
- [2] C. Blum. Ant colony optimization: Introduction and recent trends. *Physics of Life Reviews*, 2(4):353–373, 2005. **Impact factor: 3.774, Rank 17 out of 74 journals in category BIOPHYSICS.**
- [3] C. Blum. Beam-ACO—Hybridizing ant colony optimization with beam search: An application to open shop scheduling. *Computers & Operations Research*, 32(6):1565–1591, 2005. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [4] C. Blum. Iterated local search and constructive heuristics for error correcting code design. *International Journal of Innovative Computing and Applications*, 1(1):14–22, 2007. **Citations on Google Scholar: 3.**
- [5] C. Blum. Revisiting dynamic programming for finding optimal subtrees in trees. *European Journal of Operational Research*, 177(1):102–115, 2007. **Impact factor: 2.093, Rank 10 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [6] C. Blum. Beam-ACO for simple assembly line balancing. *INFORMS Journal on Computing*, 20(4):618–627, 2008. **Impact factor: 1.318, Rank 23 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [7] C. Blum. Iterative beam search for simple assembly line balancing with a fixed number of work stations. *Statistics and Operations Research Transactions*, 35(2):145–164, 2011. **Impact factor: 0.250, Rank 71 out of 75 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [8] C. Blum, M. J. Blesa, and M. López Ibáñez. Beam search for the longest common subsequence problem. *Computers & Operations Research*, 36(12):3178–3186, 2009. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [9] C. Blum and M.J. Blesa. New metaheuristic approaches for the edge-weighted k -cardinality tree problem. *Computers & Operations Research*, 32(6):1355–1377, 2005. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [10] C. Blum and B. Calvo. A matheuristic for the minimum weight rooted arborescence problem. *Journal of Heuristics*, 21(4):479–499, 2015. **Impact factor: 1.359, Rank 27 out of 102 journals in category COMPUTER SCIENCE, THEORY & METHODS.**

- [11] C. Blum, B. Calvo, and M. J. Blesa. FrogCOL and FrogMIS: New decentralized algorithms for finding large independent sets in graphs. *Swarm Intelligence*, 9(2):205–227, 2015. **Impact factor: 1.833, Rank 35 out of 121 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [12] C. Blum and M. Dorigo. The hyper-cube framework for ant colony optimization. *IEEE Transactions on Systems, Man, and Cybernetics – Part B*, 34(2):1161–1172, 2004. **Impact factor: 3.007, Rank 11 out of 103 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [13] C. Blum and M. Dorigo. Search bias in ant colony optimization: On the role of competition-balanced systems. *IEEE Transactions on Evolutionary Computation*, 9(2):159–174, 2005. **Impact factor: 4.589, Rank 2 out of 103 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE. Winner of the IEEE Transactions on Evolutionary Computation Outstanding Paper Award (prize money: 1000 US dollars).**
- [14] C. Blum and M. Ehrgott. Local search algorithms for the k -cardinality tree problem. *Discrete Applied Mathematics*, 128:511–540, 2003. **Impact factor: 0.816, Rank 105 out of 204 journals in category MATHEMATICS, APPLIED. Selected for the Editors’ choice volume of 2003.**
- [15] C. Blum, J. A. Lozano, and P. Pinacho Davidson. An artificial bioindicator system for network intrusion detection. *Artificial Life*, 21(2):93–118, 2015. **Impact factor: 1.930, Rank 14 out of 102 journals in category COMPUTER SCIENCE, THEORY & METHODS.**
- [16] C. Blum, J. A. Lozano, and P. Pinacho Davidson. Mathematical programming strategies for solving the minimum common string partition problem. *European Journal of Operational Research*, 242(3):769–777, 2015. **Impact factor: 1.843, Rank 15 out of 79 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [17] C. Blum and C. Miralles. On solving the assembly line worker assignment and balancing problem via beam search. *Computers & Operations Research*, 38(1):328–339, 2011. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [18] C. Blum, P. Pinacho, M. López-Ibáñez, and J. A. Lozano. Construct, merge, solve & adapt: A new general algorithm for combinatorial optimization. *Computers & Operations Research*, 68:75–88, 2016. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [19] C. Blum, J. Puchinger, G. Raidl, and A. Roli. Hybrid metaheuristics in combinatorial optimization: A survey. *Applied Soft Computing*, 11(6):4135–4151, 2011. **Impact factor: 2.415, Rank 22 out of 103 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [20] C. Blum and G. R. Raidl. Computational performance evaluation of two integer linear programming models for the minimum common string partition problem. *Optimization*

- Letters*, 10(1):189–205, 2016. **Impact factor: 0.934, Rank 104 out of 257 journals in category APPLIED MATHEMATICS.**
- [21] C. Blum and A. Roli. Metaheuristics in combinatorial optimization: Overview and conceptual comparison. *ACM Computing Surveys*, 35(3):268–308, 2003. **Impact factor: 7.667, Rank 1 out of 92 journals in category COMPUTER SCIENCE, THEORY & METHODS, Citations on Google Scholar: 2159. Most cited survey paper on metaheuristics published in a journal.**
- [22] C. Blum and M. Sampels. An ant colony optimization algorithm for shop scheduling problems. *Journal of Mathematical Modelling and Algorithms*, 3(3):285–308, 2004. **Citations on Google Scholar: 215.**
- [23] C. Blum, M. Yabar, and M. J. Blesa. An ant colony optimization algorithm for DNA sequencing by hybridization. *Computers & Operations Research*, 35:3620–3635, 2008. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [24] S. Bouamama and C. Blum. A hybrid algorithmic model for the minimum weight dominating set problem. *Simulation Modelling Practice and Theory*, 64:57–68, 2016. **Impact factor: 1.383, Rank 32 out of 104 journals in category COMPUTER SCIENCE, SOFTWARE ENGINEERING.**
- [25] S. Bouamama, C. Blum, and A. Boukerram. A population-based iterated greedy algorithm for the minimum weight vertex cover problem. *Applied Soft Computing*, 12(6):1632–1639, 2012. **Impact factor: 2.415, Rank 22 out of 103 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [26] P. J. Copado-Méndez, C. Blum, G. Guillén-Gosálbez, and L. Jiménez. Large neighbourhood search applied to the efficient solution of spatially explicit strategic supply chain management problems. *Computers & Chemical Engineering*, 49(11):114–126, 2013. **Impact factor: 2.320, Rank 17 out of 99 journals in category COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS.**
- [27] M. Dorigo and C. Blum. Ant colony optimization theory: A survey. *Theoretical Computer Science*, 344(2-3):243–278, 2005. **Impact factor: 0.943, Rank 52 out of 92 journals in category COMPUTER SCIENCE, THEORY & METHODS. Winner of the Theoretical Computer Science Top Cited Article 2005–2014 Award.**
- [28] C. García-Martínez, C. Blum, F. J. Rodríguez, and M. Lozano. The firefighter problem: Empirical results on random graphs. *Computers & Operations Research*, 60:55–66, 2015. **Impact factor: 1.718, Rank 19 out of 79 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [29] V. Hemmelmayr, V. Schmid, and C. Blum. Variable neighbourhood search for the variable sized bin packing problem. *Computers & Operations Research*, 39(5):1097–1108, 2012. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**

- [30] H. Hernández and C. Blum. Ant colony optimization for multicasting in wireless ad hoc networks. *Swarm Intelligence*, 3(2):125–148, 2009. **Impact factor: 0.640, Rank 89 out of 114 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [31] H. Hernández and C. Blum. Foundations of ANTCYCLE: Self-synchronized duty-cycling in mobile sensor networks. *The Computer Journal*, 54(9):1427–1448, 2011. **Impact factor: 1.394, Rank 17 out of 49 journals in category COMPUTER SCIENCE, HARDWARE & ARCHITECTURE.**
- [32] H. Hernández and C. Blum. Minimum energy broadcasting in wireless sensor networks: An ant colony optimization approach for a realistic antenna model. *Applied Soft Computing*, 11(8):5684–5694, 2011. **Impact factor: 2.415, Rank 22 out of 103 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [33] H. Hernández and C. Blum. Distributed ant colony optimization for minimum energy broadcasting in sensor networks with realistic antennas. *Computers & Mathematics with Applications*, 64(12), 2012. **Impact factor: 1.472, Rank 33 out of 236 journals in category MATHEMATICS, APPLIED.**
- [34] H. Hernández and C. Blum. Distributed graph coloring: An approach based on the calling behavior of japanese tree frogs. *Swarm Intelligence*, 6(2):117–150, 2012. **Impact factor: 0.640, Rank 89 out of 114 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [35] H. Hernández and C. Blum. FrogSim: distributed graph coloring in wireless ad hoc networks — an algorithm inspired by the calling behavior of Japanese tree frogs. *Telecommunication Systems*, 55(2):211–223, 2014. **Impact factor: 1.027, Rank 37 out of 77 journals in category TELECOMMUNICATIONS.**
- [36] E. Lizárraga, M. J. Blesa, C. Blum, and G. R. Raidl. Large neighborhood search for the most strings with few bad columns problem. *Soft Computing*, 2016. In Press. **Impact factor: 1.630, Rank 56 out of 130 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [37] M. López Ibáñez and C. Blum. Beam-ACO for the travelling salesman problem with time windows. *Computers & Operations Research*, 37(9):1570–1583, 2010. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [38] M. López-Ibáñez, C. Blum, J. W. Ohlmann, and B. W. Thomas. The travelling salesman problem with time windows: Adapting algorithms from travel-time to makespan optimization. *Applied Soft Computing*, 13(9):3806–3815, 2013. **Impact factor: 2.679, Rank 20 out of 121 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [39] M. Mastrolilli and C. Blum. On the use of different types of knowledge in metaheuristics based on constructing solutions. *Engineering Applications of Artificial Intelligence*, 23(5):650–659, 2010. **Impact factor: 1.444, Rank 46 out of 103 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**

- [40] D. Merkle and C. Blum. Swarm intelligence – An optimization-based introduction. *Künstliche Intelligenz*, 4:5–10, 2005.
- [41] J. Rahmel, C. Blum, and P. Hahn. Diagnosis of finger dysfunction caused by ulnar nerve lesions. *Journal of Intelligent Systems*, 8(1/2), 1998.
- [42] F. J. Rodriguez, C. Blum, C. García-Martínez, and M. Lozano. GRASP with path-relinking for the non-identical parallel machine scheduling problem with minimising total weighted completion times. *Annals of Operations Research*, 201(1):383–401, 2012. **Impact factor: 1.029, Rank 36 out of 78 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [43] F. J. Rodriguez, M. Lozano, C. Blum, and C. García-Martínez. An iterated greedy algorithm for the large-scale unrelated parallel machines scheduling problem. *Computers & Operations Research*, 40(7):1829–1841, 2013. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [44] A. Roli, S. Benedettini, T. Stützle, and C. Blum. Large neighbourhood search algorithms for the founder sequence reconstruction problem. *Computers & Operations Research*, 39(2):213–224, 2012. **Impact factor: 2.116, Rank 9 out of 73 journals in category OPERATIONS RESEARCH & MANAGEMENT SCIENCE.**
- [45] K. Socha and C. Blum. An ant colony optimization algorithm for continuous optimization: Application to feed-forward neural network training. *Neural Computing & Applications*, 16(3):235–248, 2007. **Impact factor: 0.812, Rank 80 out of 103 journals in category COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE.**
- [46] E. Türetken, G. González, C. Blum, and P. Fua. Automated reconstruction of dendritic and axonal trees by global optimization with geometric priors. *Neuroinformatics*, 9(2-3):279–302, 2011. **Impact factor: 3.054, Rank 8 out of 95 journals in category COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS.**

CONFERENCES AND WORKSHOPS

- [47] L. Baumgartner, V. Schmid, and C. Blum. Solving the two-dimensional bin packing problem with a probabilistic multi-start heuristic. In C. Coello Coello, editor, *Proceedings of LION 5 – 5th International Conference on Learning and Intelligent Optimization*, Lecture Notes in Computer Science. Springer Verlag, Berlin, Germany, 2011. In press.
- [48] J. Bautista, C. Blum, and J. Pereira. Equilibrado de líneas de montaje mediante Beam ACO. In J. M. Moreno Vega et al., editor, *Actas del V Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados (MAEB 2007)*. Thomson Publishers, 2007.
- [49] S. Benedettini, C. Blum, and A. Roli. A randomized iterated greedy algorithm for the founder sequence reconstruction problem. In C. Blum and R. Battiti, editors, *Proceedings of LION 4 – Fourth International Conference on Learning and Intelligent Optimization*,

volume 6073 of *Lecture Notes in Computer Science*, pages 37–51. Springer Verlag, Berlin, Germany, 2010.

- [50] M. Blesa and C. Blum. A nature-inspired algorithm for the disjoint paths problem. In *9th International Workshop on Nature Inspired Distributed Computing (NIDISC'06)*, page 8 pp. (published 1 page as no. 239). IEEE Computer Society Press, 2006.
- [51] M. J. Blesa and C. Blum. Ant colony optimization for the maximum edge-disjoint paths problem. In G. R. Raidl et al., editor, *Applications of Evolutionary Computing, Proceedings of EvoWorkshops 2004*, volume 3005 of *Lecture Notes in Computer Science*, pages 160–169. Springer Verlag, Berlin, Germany, 2004.
- [52] C. Blum. ACO applied to group shop scheduling: A case study on intensification and diversification. In M. Dorigo, G. Di Caro, and M. Sampels, editors, *Proceedings of ANTS 2002 – From Ant Colonies to Artificial Ants: Third International Workshop on Ant Algorithms*, volume 2463 of *Lecture Notes in Computer Science*, pages 14–27. Springer Verlag, Berlin, Germany, 2002.
- [53] C. Blum. Ant colony optimization for the edge-weighted k -cardinality tree problem. In W. B. Langdon, E. Cantú-Paz, K. Mathias, R. Roy, D. Davis, R. Poli, K. Balakrishnan, V. Honavar, G. Rudolph, J. Wegener, L. Bull, M. A. Potter, A. C. Schultz, J. F. Miller, E. Burke, and N. Jonoska, editors, *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2002)*, pages 27–34. Morgan Kaufmann Publishers, San Mateo, CA, 2002.
- [54] C. Blum. A new hybrid evolutionary algorithm for the k -cardinality tree problem. In M. Keijzer, M. Cattolico, D. V. Arnold, V. Babovic, C. Blum P. Bosman, M. Butz, C. A. Coello Coello, D. Dasgupta, K. Deb, S. G. Ficici, J. A. Foster, A. Hernández-Aguirre, G. Hornby, H. Lipson, P. McMinn, J. Moore, G. R. Raidl, F. Rothlauf, C. Ryan, and D. Thierens, editors, *Proceedings of the Genetic and Evolutionary Computation Conference 2006 (GECCO'06)*, pages 515–522. ACM press, New York, NY, 2006. Winner of a best paper award.
- [55] C. Blum. Beam-ACO for the longest common subsequence problem. In G. Fogel et al., editor, *Proceedings of CEC 2010 – Congress on Evolutionary Computation*, volume 2. IEEE Press, Piscataway, NJ, 2010.
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