

Charlie Vanaret

RESEARCHER IN NONLINEAR OPTIMIZATION

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Experience

Fraunhofer ITWM, Optimization Division

Kaiserslautern, Germany

RESEARCHER

Sept 2018 - currently

Modeling and optimization for chemical processes, supervised by Michael Bortz

Argonne National Laboratory, Mathematics and Computer Science Division

Lemont, IL, USA

POSTDOCTORAL APPOINTEE

May 2017 - April 2018

Nonlinearly constrained optimization, supervised by Sven Leyffer

- Lead developer of a modular C++ framework for nonlinearly constrained optimization that combines step computation techniques (SQP, $S\ell_1$ QP) and globalization techniques (trust region, line search, penalty methods, filter), to be released as open source software
- Contributed to a survey on nonlinear robust optimization, submitted to Information Systems and Operational Research journal

IRT Saint Exupéry, Department of Embedded Systems

Toulouse, France

POSTDOCTORAL RESEARCHER

Sept 2015 - March 2017

Multidisciplinary Design Optimization for aeronautical optimization (TRL 3-5), supervised by Anne Gazaix (Airbus)

- Performed mathematical analysis of distributed resolution strategy, computation of coupled sensitivities, implementation and numerical comparison with other strategies
- Contributed to the design and implementation of an industrial-scale Python library

IRIT, Parallel Algorithms and Optimization Team

Toulouse, France

TEACHING AND RESEARCH FELLOW

Nov 2014 - Aug 2015

Supervised by Daniel Ruiz

- Co-supervised an undergraduate student in Python programming
- Participated in *Genomic Breeding decision support* project (correlation of genotypic and phenotypic measures of corn plants), suggested models for missing DNA information and validated them on real data provided by two French seed companies

Awards

2015 **Léopold Escande prize (15% best PhD theses of the year)**, INPT

Toulouse, France

2015 **Paul Sabatier prize (best research work in mathematics/computer science)**, Académie des Sciences de Toulouse

Toulouse, France

Education

INPT (Toulouse institute of technology) - ENAC (French civil aviation university)

Toulouse, France

PHD IN COMPUTER SCIENCE

2011 - 2014

Hybridization of evolutionary algorithms and interval-based methods for optimizing difficult problems, defended on 27 January 2015

Supervised by Nicolas Durand (ENAC)

ENSEEIH (Graduate school of engineering in computer science)

Toulouse, France

ENGINEERING DIPLOMA IN COMPUTER SCIENCE AND APPLIED MATHEMATICS

2008 - 2011

Differential calculus, linear algebra, operations research, imperative, functional and object-oriented programming

Alpen-Adria Universität Klagenfurt

Klagenfurt, Austria

ERASMUS SEMESTER

2010 - 2011

Soft computing, intelligent agents, computational intelligence, web technologies

Skills

Operating systems GNU/Linux, Microsoft Windows

Programming C++, C, Python, Matlab, Java, OCaml

Continuous integration Agile software development, Jenkins, unit testing (nose2, gtest)

Software Eclipse, Emacs

Version control Git, Mercurial, SVN

Typesetting \LaTeX , OpenOffice, Microsoft Office

Teaching experience (275 hours)

ENSEEIH	Tutor in operations research (44 hours), functional programming (156 hours), probability theory and statistics (12 hours) and middleware (22 hours) for first- and second-year engineering students in computer science and applied mathematics
INPT	Tutor in imperative programming in Python (16 hours) for undergraduate students preparing competitive entrance to engineering schools
ENAC	Project supervisor for first- and second-year engineering students in computer science Tutor in physics and chemistry for student pilots, taught course in English (25 hours)

Languages

English	Fluent. TOEIC score: 990/990 in June 2010. Spent a year in the USA
German	Advanced level. 10+ years learning, spent a year in Austria
French	Native speaker

Leisure activities

Electric bass	Playing since 2003. Opened for renowned French artists (Soldat Louis, Manau, Michael Jones)
Performing arts	Taking singing lessons since 2015. Put on a musical with a group of ten singers (two performances in Toulouse in 2016)
Table tennis	Playing since 2003. Ranked 4th in school team national championship in 2006. President of the INPT university club in 2009

Selected publications

BOOK CHAPTERS

- [1] N. Durand, D. Gianazza, J-B. Gotteland, C. Vanaret, and J-M. Alliot. *Metaheuristics. Applications to Air Traffic Management*. Springer International Publishing, 2016, pp. 439–484.

INTERNATIONAL JOURNALS

- [2] A. Bouchachia, A. Léna, and C. Vanaret. “Online and interactive self-adaptive learning of user profile using incremental evolutionary algorithms”. In: *Evolving Systems* (2013).
- [3] A. Bouchachia and C. Vanaret. “GT2FC: An online growing interval type-2 self-learning fuzzy classifier”. In: *IEEE Transactions on Fuzzy Systems* (2013).

INTERNATIONAL CONFERENCES AND WORKSHOPS

- [4] F. Gallard, C. Vanaret, D. Guénot, V. Gachelin, R. Lafage, and B. Pauwels. “GEMS: a Python library for automation of Multidisciplinary Design Optimization process generation”. In: *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*. 2018.
- [5] C. Vanaret, F. Gallard, and J. Martins. “On the Consequences of the “No Free Lunch” Theorem for Optimization on the Choice of an Appropriate MDO Architecture”. In: *18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*. 2017, p. 3148.
- [6] C. Vanaret, J-B. Gotteland, N. Durand, and J-M. Alliot. “Hybridization of Interval CP and Evolutionary Algorithms for Optimizing Difficult Problems”. In: *Principles and Practice of Constraint Programming (CP 2015)*. 2015, pp. 446–462.
- [7] C. Vanaret, J-B. Gotteland, N. Durand, and J-M. Alliot. “Preventing premature convergence and proving the optimality in evolutionary algorithms”. In: *Artificial Evolution (EA 2013)*. 2014, pp. 29–40.
- [8] J-M. Alliot, J-B. Gotteland, C. Vanaret, N. Durand, and D. Gianazza. “Implementing an interval computation library for OCaml on x86/amd64 architectures”. In: *17th ACM SIGPLAN International Conference on Functional Programming (ICFP 2012)*. 2012.
- [9] C. Vanaret, D. Gianazza, N. Durand, and J-B. Gotteland. “Benchmarking conflict resolution algorithms”. In: *5th International Conference on Research in Air Transportation (ICRAT 2012)*. 2012.
- [10] A. Bouchachia and C. Vanaret. “Incremental learning based on growing Gaussian mixture models”. In: *10th International Conference on Machine Learning and Applications and Workshops (ICMLA 2011)*. 2011, pp. 47–52.