

# Charlie Vanaret

POSTDOCTORAL RESEARCHER IN OPTIMIZATION

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## Experience

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### Argonne National Laboratory, Mathematics and Computer Science Division

Lemont, IL, USA

POSTDOCTORAL APPOINTEE

May 2017 - April 2018

*Nonlinear optimization*, supervised by Sven Leyffer

- Lead developer of a modular C++ solver for nonlinearly constrained optimization based on a combination of step computation methods (SQP,  $SL_1QP$ ) and globalization mechanisms (trust region, line search, filter, penalty), to be released as open source software
- Co-wrote 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

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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

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### 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

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**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)

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<b>ENSEEIH</b>	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
<b>INPT</b>	Tutor in imperative programming in Python (16 hours) for undergraduate students preparing competitive entrance to engineering schools
<b>ENAC</b>	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

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

## Leisure activities

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

## Selected publications

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### 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.