CLÉMENT W. ROYER

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Postdoctoral research associate in optimization and applications.

CURRENT POSITION AND PAST ACTIVITIES

Wisconsin Institute for Discovery Starting November 14, 2016
Postdoctoral research associate *Madison, WI, USA*

· In the group of Stephen J. Wright, part of the ***Data Science Hub***.
· Supported by the MACSER/M2ACS project on ***Mathematics of Complex Systems***.

Institute for Research in Computer Science in Toulouse (IRIT) October 2013-October 2016
Research Assistant *Toulouse, France*

· In the Parallel Algorithms and Optimization (APO) Team.

INPT-ENSEEIHT Engineering school October 2013-September 2016
Teaching Assistant *Toulouse, France*

· Practical courses: Parallel Programming with OpenMP (in C); Linear Algebra, PDE Discretization Techniques, Krylov Space Methods and Numerical Optimization (using MATLAB).
· Tutorial classes: Differential Calculus, Analysis Tutorials.

Argonne National Laboratory February-April 2016
Visiting scholar - Thesis Parts Appointment *Lemont, IL, USA*

· Supervised by Stefan Wild and Jeffrey Larson at the Mathematics and Computer Science Department.

PUBLICATIONS

Except in one case identified below, authors are always listed by alphabetical order.

Submitted for publication

· **A Newton-CG algorithm with complexity guarantees for unconstrained optimization**. C. W. Royer, M. O'Neill and S. J. Wright. Technical report arXiv:1803.02924, 2018.
· **A decoupled first/second-order steps technique for nonconvex nonlinear unconstrained optimization with improved complexity bounds**. S. Gratton, C. W. Royer and L. N. Vicente. *Preprint 17-21, Dept. Mathematics, Univ. Coimbra, 2017.*
· **Direct search based on probabilistic feasible descent for bound and linearly constrained problems**. S. Gratton, C. W. Royer, L. N. Vicente and Z. Zhang. *Preprint 17-10, Dept. Mathematics, Univ. Coimbra, 2017.*

Publications in refereed journals

· **Complexity analysis of second-order line-search algorithms for smooth nonconvex optimization**. C. W. Royer and S. J. Wright. *SIAM Journal on Optimization*, 28(2):1448-1477, 2018.
· **Complexity and global rates of trust-region methods based on probabilistic models**. S. Gratton, C. W. Royer, L. N. Vicente and Z. Zhang. *IMA Journal of Numerical Analysis*, online.
· **A second-order globally convergent direct-search method and its worst-case complexity**. S. Gratton, C. W. Royer and L. N. Vicente. *Optimization: A Journal of Mathematical Programming and Operations Research*, 65(6):1105-1128, 2016.

- **Direct search based on probabilistic descent**. S. Gratton, C. W. Royer, L. N. Vicente and Z. Zhang. *SIAM Journal on Optimization*, 25(3):1515-1541, 2015.

Conference proceedings

- **On the injectivity and nonfocal domains of the ellipsoid of revolution**. J.-B. Caillau and C. W. Royer. *Geometric Control Theory and sub-Riemannian Geometry*, 73-86, Springer-Verlag, 2014.

PhD Thesis

- *Derivative-Free Optimization Methods based on Probabilistic and Deterministic Properties: Complexity Analysis and Numerical Relevance.* C. W. Royer. University of Toulouse, November 2016.

EDUCATION

PhD in applied mathematics 2013-2016
Obtained November 4, 2016 *UPS, University of Toulouse, France*

- Topic: Probabilistic properties and complexity analysis in derivative-free optimization methods.
- Co-advised by Serge Gratton (Univ. Toulouse) and Luís Nunes Vicente (Univ. Coimbra, Portugal).

Engineering and Master's Degree in Computer Science 2010-2013
Two degrees equivalent to Master's degree *INPT, University of Toulouse, France*

- Engineering Degree in Computer Science and Applied Mathematics, minor in Scientific Computing.
- Master's Degree in Computer Science, minor in Distributed Computing and Critical Software.

RESEARCH PROJECTS

Mathematics for complex environmental and power systems US Department Of Energy

- Post-doctoral researcher funded by the project at the University of Wisconsin.
- In the nonconvex optimization axis, within the framework of *optimization under uncertainty*.

Institute for Fundamentals in Data Science US National Science Foundation

- Multidisciplinary center (computer science, maths, statistics, bio-informatics, biology).
- Active participant through the Wisconsin Institute of Discovery.
- Latest accepted paper was featured on the Institute's webpage.

RECENT PRESENTATION TOPICS

Complexity of Nonconvex Line Search Methods Invited talk

- *INFORMS Optimization Conference*, Denver (CO, USA), March 2018.

Probabilistic Properties in Optimization Methods Invited Seminar

- *SPOC Seminar*, Institut de Mathématiques de Bourgogne, Dijon (France), April 2017.

Direct Search using Probabilistic Feasible Descent Invited talk

- *SIAM Conference on Optimization*, Vancouver (BC, Canada), May 2017.

SKILLS

Main programming experience	Matlab, C, C++, Fortran.
Additional programming skills	Java, CamL, Maple, Julia.
Languages	French (native), English (fluent), Portuguese (intermediate), Spanish (scholar)