

CLÉMENT W. ROYER

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Associate professor in optimization and data science.

CURRENT POSITION

Paris Artificial Intelligence Research Institute (PRAIRIE)

Since May 2021

Springboard chair - Chaire tremplin

Paris, France

- Junior chair position in optimization for artificial intelligence.
- Topics: Derivative-free optimization, nonconvex optimization.

Université Paris Dauphine - PSL

Since September 1, 2019

Faculty - Maître de conférences

Paris, France

- Lecturer within the Mathematics and Computer Sciences (*MIDO*) department;
- Currently in charge of the courses *Optimization for Data and Decision Sciences* and *Optimization for Machine Learning* (Master level, in English).

LAMSADE Institute

Since September 1, 2019

Member - Permanent

Paris, France

- At the interface of the *Combinatorial optimization, algorithms* and *Data sciences* axes;
- Researcher in the Machine Learning and Intelligent Systems (*MILES*) team.

RESEARCH GROUP

Postdoctoral supervision

Université Paris Dauphine-PSL

- Florentin Goyens (started January 2022, funded through PRAIRIE).

PhD Thesis supervision

Université Paris Dauphine-PSL

- Sébastien Kerleau (started 2021, co-supervised with Denis Cornaz):
Discrete structures and applications to continuous optimization.
- Iskander Sabri Legheraba (Started 2020, co-supervised with Alexandre Allauzen):
Data-driven approaches for complex physical systems.

EDUCATION & PREVIOUS POSITIONS

University of Wisconsin-Madison

November 2016-August 2019

Postdoctoral research associate

Madison, WI, USA

- In the group of Stephen J. Wright, part of the *Data Science Hub*.

PhD in applied mathematics

2013-2016

Obtained November 4, 2016

UPS, University of Toulouse, France

- Parallel Algorithms and Optimization team, IRIT (Institute for Research in Computer Science of Toulouse).
- Co-advised by Serge Gratton (Univ. Toulouse) and Luís Nunes Vicente (Univ. Coimbra, Portugal).

SELECTED PUBLICATIONS

Submitted preprints

- **Direct search based on probabilistic descent in reduced spaces**, L. Roberts and C. W. Royer. Technical report arXiv:2204.01275, April 2022.
- **A nonlinear conjugate gradient method with complexity guarantees and its application to nonconvex regression**, R. Chan--Renous-Legoubin and C. W. Royer. Technical report arXiv:2201.08568, January 2022.

Publications in refereed journals

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

- **A subsampling line-search method with second-order results**, E. Bergou, Y. Diouane, V. Kunc, V. Kungurtsev and C. W. Royer, accepted in *INFORMS Journal on Optimization*, 2021.
- **A stochastic Levenberg-Marquardt method using random models with complexity results**, E. Bergou, Y. Diouane, V. Kungurtsev and C. W. Royer, *SIAM/ASA Journal on Uncertainty Quantification*, 10(1):507-536, 2022.
- **A nonmonotone matrix-free algorithm for nonlinear equality-constrained least-squares problems**, E. Bergou, Y. Diouane, V. Kungurtsev and C. W. Royer, *SIAM Journal on Scientific Computing*, 43(5):S743-S766, 2021.
- **Trust-region Newton-CG with strong second-order complexity guarantees for nonconvex optimization**, F. E. Curtis, D. P. Robinson, C. W. Royer, and S. J. Wright, *SIAM Journal on Optimization*, 31(1):518-544, 2021.
- **A Newton-CG algorithm with complexity guarantees for smooth unconstrained optimization**. C. W. Royer, M. O'Neill and S. J. Wright. *Mathematical Programming*, 180:451-488, 2020.
- **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. *Mathematical Programming*, 179(1):195-222, 2020.
- **Direct search based on probabilistic feasible descent for bound and linearly constrained problems**. S. Gratton, C. W. Royer, L. N. Vicente and Z. Zhang. *Computational Optimization and Applications*, 72(3):525-559, 2019 (COAP Best Paper prize in 2019).
- **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*, 38(3):1579-1597, 2018.
- **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.

SKILLS

Main programming experience
Additional programming skills
Languages

Matlab, C++, Python, C.
Fortran, Julia, Java, CamL.
French (native), English (fluent),
Portuguese (intermediate), Spanish (scholar)