

CLÉMENT W. ROYER

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Professor in optimization and data science.

CURRENT POSITION

Université Gustave Eiffel

Faculty - Professeur des universités

Since September 1, 2026

Champs-sur-Marne, France

- Affiliated with the MMSID (Methods and models for signal, image and data) team of *Laboratoire d'Informatique Gaspard Monge*.
- Teaching computer science and signal processing courses in *Institut Gaspard Monge* (bachelor) and *ESIEE Paris* (master).

EDUCATION & PREVIOUS POSITIONS

Université Paris Dauphine-PSL

Maître de conférences

Septembre 2019-Août 2026

Paris, France

- Member of *LAMSADE* at the interface of the *Optimization, structure, algorithms* and *Data sciences* axes
- Teaching optimization and mathematics for data science in the *MIDO* (Maths/CS) département.
- Habilitation to supervise research obtained in September 2025.

University of Wisconsin-Madison

Postdoctoral research associate

November 2016-August 2019

Madison, WI, USA

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

PhD in applied mathematics

Obtained November 4, 2016

2013-2016

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).

SKILLS

Main programming experience

Additional programming skills

Languages

Matlab, Python, C, C++.

Fortran, Julia, Java, CamL.

French (native), English (fluent),

Portuguese (intermediate), Spanish (scholar)

SELECTED PUBLICATIONS

Publications in refereed journals

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

- **A characterization of positive spanning sets with ties to strongly connected digraphs**, D. Cornaz, S. Kerleau and C. W. Royer. *Discrete Applied Mathematics*, 374:105-119, 2025.
- **Riemannian trust-region methods for strict saddle functions with complexity guarantees**, F. Goyens and C. W. Royer. *Mathematical Programming*, 213:863-905, 2025.
- **Expected decrease for derivative-free algorithms using random subspaces**, W. Hare, L. Roberts and C. W. Royer. *Mathematics of Computation*, 94:277-304, 2025.
- **Complexity analysis of regularization methods for implicitly constrained least squares**, A. Onwunta and C. W. Royer. *Journal of Scientific Computing*, 101:54, 2024.
- **Full-low evaluation methods for bound and linearly constrained derivative-free optimization**, C. W. Royer, O. Sohab and L. N. Vicente. *Computational Optimization and Applications*, 89:279-315, 2024.
- **Using orthogonally structured positive bases for constructing positive k -spanning sets with cosine measure guarantees**, W. Hare, G. Jarry-Bolduc, S. Kerleau and C. W. Royer. *Linear Algebra and Applications*, 680:183-207, 2024.
- **Direct search based on probabilistic descent in reduced spaces**, L. Roberts and C. W. Royer. *SIAM Journal on Optimization*, 33(4):3057-3082, 2023.
- **A nonlinear conjugate gradient method with complexity guarantees and its application to nonconvex regression**, R. Chan--Renous-Legoubin and C. W. Royer. *EURO Journal on Computational Optimization*, 10:100044, 2022.
- **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.
- **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.
- **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.

RESEARCH RESPONSIBILITIES

Main research projects

- *On Strict Saddle Optimization: Benchmarking, Unified Classification and COmplexity*, ANR Young Researcher Grant (JCJC), 2025-2029.
- *Blackbox Optimization with a Novel Use of Subspaces*, International Emerging Actions, CNRS, 2024-2026. Co-PI with Dr. Lindon Roberts (University of Sydney, Australia).
- *Optimization for high-performance artificial intelligence*. PRAIRIE Springboard chair, 2021-2026.

Editorial service

- Associate editor for the *Journal of Optimization Theory and Applications* (2022-).
- *Meritorious Service Award* in 2022 and 2024 for reviewing in the journal *Mathematical Programming*.