

# Internship proposal: Operational management for vehicle sharing systems.

**keywords:** Vehicle Sharing Systems, Operations Research, Stochastic Optimisation

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Shared vehicle systems induce complex saturation dynamics (unavailable vehicles or parking spaces). In order to minimize these saturations, different strategic and operational levers can be used :

- location and dimensioning of stations, dimensioning of the vehicle fleet,
- relocation of vehicles by operators (and by customers, possibly with incentives),
- segregation of demand (through subscriptions, fares and reservations), and analysis of complementarity/rivalry between modes of transport in a logic of collective efficiency.

This internship proposes to study the optimization of these levers in the face of random demand. The internship will be based on 3 pillars :

- determine the objectives useful for the optimization of self-service vehicle systems,
- model the problem to take into account the uncertainty in the demand,
- assess the relevance and resilience of solutions to the demand encountered.

You will mobilize your skills in Operations Research, Logistics and Stochastic Optimization. Depending on the modeling, the requests will be considered stochastic (of known laws) or dynamic (appearing progressively). You will work in collaboration with a PhD student from the Operations Research for Production Systems team of the G-SCOP laboratory. The thesis concerned, funded by the LabEx PERSYVAL-Lab (ANR-11-LABX-0025-01), focuses on the integration of the tools needed to study self-service vehicle systems into a reproducible methodology.

Your work will also be anchored in the reproducible research movement. You will therefore be attentive to working in an Open-Source context and to automating the procedures used.

This internship will allow you to improve your skills in stochastic optimization techniques. You will also be introduced to the constraints imposed by reproducible research.

**Profile :** Student in Master 2 Operations Research or Numerical Optimization

The internship will take place at the G-SCOP laboratory in Grenoble, for a period of 5 to 6 months starting in February 2021.

**Remuneration :** about 570€.

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## References

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