

**ID: MSCA-2020-CDRoover02**

**Title: Code Analysis and Manipulation**

Prof. Coen De Roover heads a focus group within the Software Languages Lab (SOFT) on Code Analysis and Manipulation (CAMP).

This group is eager to collaborate with Marie-Curie fellows on the design of static and dynamic program analyses, and their application to problems in assuring the quality of cloud-native applications.

Such applications feature a distributed architecture for which the computational resources are programmatically provisioned from cloud providers according to infrastructure-as-code files.

Quality attributes such as responsiveness (react in a timely manner to inputs), resilience (recover from unexpected failures), and elasticity (react to variable load conditions) are indispensable for cloud-native applications, but difficult to implement and test.

Automated tool support is in order.

Within this broader theme, the following topics are of particular interest:

- automated testing for cloud-native applications: concolic testing, fuzz testing, automated fault injection
- software quality tooling for infrastructure-as-code files: design metrics and smells, bug patterns, configuration errors
- compositional static analysis designs: improved scalability and precision for cloud-native applications with dynamically-created distributed processes
- incremental static analysis designs: improved applicability within continuous integration pipelines
- static analysis of commits: decomposition into smaller commits of related edits, semantic merge conflict detection, change contract verification

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