# Background and Motivation

**1. Background**

In this project, we would like to apply multiple design pattern to optimize a social network and forum that scientists collaborate and communicate on scientific workflows or scientific experiments. In this platform, a scientist publishes and shares her experiments, and other scientists may either communicate or comment on the entire workflow. In other words, the project provides a platform for scientists to post their scientific experiments and workflows, so that other scientists who are interested in the workflow can redo the experiments and make comments.

In this whole project, we mainly focus on implementing design pattern on workflow system and user system. Based on the former work, we make a more specific and powerful system. Until now, we have optimized several functions, like: user login and signup functionality, user profile, user group functionality, user access control, subscription functionality, workflow list, adding and deleting workflow, commenting, marking answers and so on.

The project can be divided into two parts - the frontend and the backend.

We made modification on both parts. We have implemented nine different design patterns on it - Iterator Pattern, Builder Pattern, Chains of Responsibility Pattern,  Flight Weight Pattern, Factory Pattern, Adapter Pattern, Decorator Pattern, Filter Pattern, State Pattern. In the whole process of this project, we also use many technique support to help the project work better. We use Docker as a virtualization platform to run the project. In this project, we use MVC framework to connect each part. And more specific, we use Hibernate for mapping all the object-oriented domain models to database in the backend. And we use Scala language to change programs in the front end.

2. **Motivication**

In the whole process of doing a software project, design is at the most essential and upmost place. There are two directions of design, architectural styles and design patterns. Architectural styles will decide a macro direction, while design patterns will decide a micro direction. In our project, we mainly deal with how to apply different design patterns to a workflow project.

When a designer wants to do a project, the first thing must be design. Good designers do not solve every problem from first principles. They reuse solutions. However, practitioners do not do a good job of recording experience in software design for others to use. Patterns help solve the problem. And there are benefits of using design patterns. Patterns are a common design vocabulary that allows engineers to abstract a problem and talk about that abstraction in isolation from its implementation. What’s more, patterns capture design expertise and allow that expertise to be communicated, which promotes design reuse and avoid mistakes. It will also improve documentation and understandability.

Thus, design pattern is an essential part of design and we will make a practical use and deeper understanding of it through this project.