Introduction
Due to ever increasing demands from emission legislation (NO\textsubscript{x} and Soot), fuel economy (CO\textsubscript{2}) and fuel flexibility (bio-fuels) diesel engines become more and more complex. Therefore, engine development and calibration becomes extremely expensive and time-consuming. For that reason, accurate and fast CFD is needed.

Key ingredients:
- Accurate spray formation models
- Advanced combustion models

Objectives
- Accurately and efficiently model non-reacting diesel spray formation
- Include ignition and combustion by means of a detailed though efficient, tabulated chemistry approach (FGM)

Spray Formation Modeling
Approaches:
- Euler-Lagrange (Fluent DPM)
- Euler-Euler (User-Defined Subroutine)

Euler-Euler: Model of Versaevel et al is implemented in Fluent. Spraylets are pre-computed.
- Spray formation much better (Figure 1)
- Mesh refinement restrictions are lifted
- Parallelization is straightforward

Spray Combustion Modeling
The approach is based on the flamelet concept using a PDF method.
Manifold is created using:
- Classical stationary counter-flow flames
- Extended by igniting non-premixed flamelets

Result: auto-igniting diesel spray

Outlook
- Make Euler-Euler spray model pressure dependent to use in reciprocating engine model
- Investigate the influence of preprocessing flamelet data to ignition and combustion behavior