



**The Materials Theme in the Synthesis and Solid State Pharmaceutical Research Centre, SSPC ([www.sspc.ie](http://www.sspc.ie)) is looking for 2 Physical Chemistry or Chemical Engineering graduates who want to do a PhD in the area of crystallisation.**

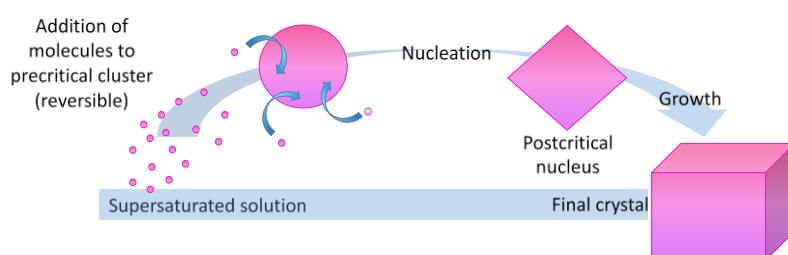
**Host Institute:** University of Limerick

**Start Date:** January 2020

**Supervisor Contact Details:** [ake.rasmuson@ul.ie](mailto:ake.rasmuson@ul.ie); [sarah.hudson@ul.ie](mailto:sarah.hudson@ul.ie);

**Project Title:** Fundamental understanding of crystal growth kinetics for the purpose of improved prediction and control of product crystal size distributions

**Brief Project Description:** At present, crystallization kinetics cannot be predicted from the properties of the crystallizing compound, and even experimental determination of kinetics that can be used for model based design of industrial processes is beyond the present capability. There is insufficient molecular level understanding of the underlying processes like molecular clustering in solution, the



actual nucleation of the crystalline phase, the crystal solution interface and the growth process.

An improved understanding of nucleation and the dependence on conditions, in order to improve on the predictability of product crystal size distributions will be developed during this project and will include investigation of molecular clustering in solution and its relation to primary nucleation. We will also develop an improved understanding of crystal growth and the dependence on conditions, in order to improve on the predictability of the product crystal size distributions. The project will include investigating the links between primary nucleation and the crystal growth behaviour for a range of crystallising compounds. The effects of excipients, substrates and solvents on these links will be probed and their influence on crystallisation kinetics quantified.