



## Flow Chemistry Highlights

### Flow Chemistry Network

Selected Topic: An Interview with Dominique Roberge, Lonza



For this Flow Chemistry Column, we are happy to interview **Dr. Dominique Roberge**, a Flow Chemistry Specialist Director Group Leader at Lonza and Adjunct Professor at University of Ottawa.

**Flow Chemistry Network:** What brought you to the field of flow chemistry, and what made you stay and contribute in the area?

**Dominique:** When we started a project at Lonza in 2003, we called it microreactor technology. Since then, microreactors have become central tools in continuous flow process development in the pharmaceutical industry. However, while the idea of simply running additional microreactors in parallel to increase throughput is a compelling one, it is not always practical. The broader concept of flow chemistry has the objective of achieving process intensification with best-in-class reactor technology. The field remains rather attractive to me as a scientist because it challenges the status quo of a relatively conservative and established industry.

**Flow Chemistry Network:** What, for you, have been the major developments in the field over the years?

**Dominique:** There are now established companies who supply reactor technology, ranging from plate-type to active mixing devices such as the continuous stirred tank reactor (CSTR). A new business has emerged, and it has proved viable. Surprisingly, the main business growth for these companies has been in India and China, showing that the industry in the western world is yet to embrace the technology to its full extent. Many interesting challenges remain!

**Flow Chemistry Network:** Are there any exciting innovations in the field today that you think could give it even greater impact?

**Dominique:** A key development has been in using loop-type reactors (recycle-flow) for photo- and electro-chemistry, where the vessel is used as holding tank (*i.e.* batch operation). Assuming that flow chemistry also encompasses these loop-type reactors, then its meaning is broader than continuous manufacturing. Consequently, flow chemistry has a wide-ranging field of application that will drive pharmaceutical manufacturing to a new age of efficient, green, and sustainable processes.

**Flow Chemistry Network:** What should a young researcher/industrial chemist keep in mind when embarking on a project using flow processing?

**Dominique:** Flow technology is mainly used for process intensification to enhance transport phenomena, namely heat and mass transfer rates. A young chemist should become familiar with the

basics of chemical engineering, which is available at institutes and universities working in this field. For example, the Swiss Chemical Society organized a seminar in 2022 where this topic was addressed.

**Flow Chemistry Network:** Flow chemistry is already being considered as a mature technology. What is left to do to turn it into a routine tool for chemists and chemical engineers?

**Dominique:** Is flow chemistry really a mature technology? In the manufacturing processes we still encounter a predominance of batch processing over flow chemistry, even where there are obvious benefits in making the change. It is often difficult to switch technology later on because of process risks such as new impurities in an API, and regulations. I will consider it a mature technology when scientists take into account using flow in process development from the start. The education process still needs to go on.

**Would you like to propose a Flow Chemistry Highlight topic here?**

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