Asynchronous communication requires message queues to store the messages that are yet to be consumed. Verification of interactions in asynchronously communicating systems is challenging since the sizes of these queues can grow arbitrarily large during execution.

In fact, behavioral models for asynchronously communicating systems typically have infinite state spaces, which makes many analysis and verification problems undecidable.

In this talk, I will present some recent results on decidable verification for a class of asynchronously communicating systems. In particular, I will present the necessary and sufficient condition under which asynchronously communicating systems with unbounded queues exhibit interaction behavior that is equivalent to their interactions over finitely bounded queues.

Interestingly, such conditions can be automatically checked, ensuring existence of a finite bound on the queue sizes, which can be also automatically computed.