Suboptimal parent-infant bonding negatively affects development. When infants are born prematurely, bonding is impaired by default due to necessary hospitalization. An important problem, since prematurity occurs in 1 in 10 infants worldwide. To understand parent-infant bonding, we studied the universal, biological principle of bonding. This principle offered opportunities to measure aspects of bonding and define strategies to enhance bonding. Strategies specifically included the use of technology since the initial purpose of the project was “to investigate the feasibility of using smart technological applications to enhance bonding in preterm infants”. Over the course of the project, that purpose became part of a bigger goal: “enhancing bonding by providing insight into its physiology”.

By measuring physiological parameters in the incubator versus during skin-to-skin contact with parents, we revealed unknown aspects of preterm infant physiology: Changes in neural and hormonal control systems initiated by parental co-regulation, and differences in preterm infant physiology compared to infant/adult physiology, holding potential to improve neonatal health care by discriminating discomfort from comfort, and health from disease. No technological application was able to simulate the enhanced physiology caused by parent-infant bonding during the project, but bonding did increase, since the amount of skin-to-skin contact more than doubled.

This picture shows the use of a product developed during this project: a 2-in-1 positioning material with heartbeat speaker (attached to the black wire in the bottom right corner) for in the incubator and blanket for during skin-to-skin contact. During skin-to-skin contact, parental stimuli (warmth, scent and heartbeat) are captured or recorded, so that these stimuli remain available to infants once back in the incubator.