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Prize for Industrial Applications of Physics: Reflective Cholesteric Liquid Crystals – Innovations in Materials, Display Technology, and Commercialization

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Reflective Cholesteric Liquid Crystals have been the subject of much research, development, and commercialization – in display technology as well as other embodiments, such as sensors, privacy films, etc. The liquid Crystal Institute (LCI) at Kent State University (KSU) served as a hot bed of much of the research and development in this field in the early 1990's. From here, the reflective technology was licensed to Kent Displays (KDI) to further develop and commercialize. The 90's saw some development in flexible technologies, drive scheme, display design, as well as materials. The early part of the century took a turn with a strong effort in encapsulation based flexible display development. In 2006, KDI engineers and technologists started firming up ambitious plans for the world's first roll-to-roll manufacturing line for bistable cholesteric displays. In 2009, this became a reality! In early 2010, the first eWriter product was launched into the consumer market under the brand Boogie Board®. Within months, this became a success forcing the rapid development of the manufacturing process for the flexible displays. Today, the company has two manufacturing lines, 24 hour roll-to-roll production of flexible displays, millions of Boogie Board products in the global market place, and a growing OEM business in the Boogie Board technology. KDI continues to do basic research, development, and exploration in the bistable display field. It also has had to become an expert in the supply chain management of the unique raw materials needed for flexible display manufacturing, while still managing global operations with sales offices in several continents and a growing and diversified group of individuals. In this presentation, we will present the story, research, development, technology, and latest trends in bistable cholesteric liquid crystal materials with a particular emphasis on the eWriter technology and market.