

# The Technology of Intelligent Packaging

## Thermochromic Ink

1970: Thermochromic inks are temperature sensitive that change colors with exposure to heat or cold.

Today beverage companies use thermochromic inks on their cans to indicate the can is cold.

## Capacitive Touch Inks

2004: At Novalia, Kate Stone and her team use ordinary printing presses to manufacture interactive electronics, which combine touch-sensitive ink technology and printed circuits into unique and cost-effective products.

## SPOILED

2007: Researchers at the Fraunhofer Research Institution for Modular Solid State Technologies developed a sensor film that is part of the food package that indicates food spoilage. The film changes color as food ages.

## Hello Ms. Smith.

I have a great suggestion for you that would work great with your daily regimen this month.

Jill Doe  
Brand Coordinator



1996: E Ink is a specific proprietary paper manufactured by E Ink Corp. based on research started by MIT.

E Ink is the creator of electrophoretic, or, electronic ink — the optical component of a film used in Electronic Paper Displays (EPD). Display provides real-time information when activated and can be flexible and thin in nature for various applications.



2012: Thin Film Electronics, a leader of printed electronics and Bemis Company, a fortune 500 supplier of flexible packaging and pressure sensitive materials, begin developing flexible sensing platform for the packaging market.

Time temperature sensor used for monitoring perishable goods and pharmaceuticals, while providing wirelessly communicating and collecting sensor information.



1990: The history of augmented reality can be traced back to work undertaken by Professor Tom Caudell as part of a neural systems project at Boeing.

With the help of advanced AR technology the information about the surrounding real world of the user becomes interactive and digitally manipulable. Artificial information about the environment and its objects can be overlaid on the real world.

In 2008, the first AR apps come to smartphones where the world can actually begin to enjoy the experience somewhere close to what it's supposed to be.



2012: Cynora develops flexible OLED (Organic Light-Emitting Diode) prototype aimed for smart packaging applications needing thin displays.

An OLED is a Light-Emitting Diode (LED) in which the emissive electroluminescent layer is a film of organic compound which emits light in response to an electric current.

OLED displays can be fabricated on flexible plastic substrates leading to the possible fabrication of flexible organic light-emitting diodes for other new applications, such as roll-up displays embedded in fabrics or clothing. As the substrate used can be flexible such as polyethylene terephthalate (PET), the displays may be produced inexpensively.



1994: Ericsson invented Bluetooth as a wireless technology standard for exchanging data over short distances.

2013: Apple introduces iBeacon to help the retail industry by simplifying payments and enabling on-site offers. Bluetooth LE beacons are a new class of low powered and low cost transmitters that provide proximity-base information of items nearby and competitor to NFC.

2014: Datzing provides Android competitor to iBeacon. Uses existing infrastructure for signaling. This technology will be the next frontier for discovering things in real time.



1997: 802.11 WiFi standard is established as a networking technology that allows computers, mobiles and other devices to communicate over a wireless signal.

2014: Broadcom Enables Pinpoint Indoor Location Technology with Latest 5G WiFi.



1974: The first U.P.C. scanner was installed at a Marsh's supermarket in Troy, Ohio. The first product to have a barcode was Wrigley's Gum.



1973: First true ancestor for the modern RFID was patented January 23rd.

The RFID tag can be affixed to an object and used to track and manage inventory, assets, people, etc.

The tag can be read inside a case, carton, box or other container, and unlike barcodes, RFID tags can be read hundreds at a time. Bar codes can only be read one at a time using current devices.



2002: Philips and Sony announce strategic cooperation to define next generation near field radio-frequency communications.

Near Field Communication (NFC) is a set of standards for smartphones and similar devices to establish radio communication with each other by touching them together or bringing them into proximity, usually no more than a few inches

Uses in commerce, social networking, identity docs, NFC tags, and wireless connection set-up.



1994: The QR code system was invented by Denso Wave. Originally designed for industrial uses, QR codes have become common in consumer advertising.

**For More Information or Sponsored Project Collaboration on Intelligent Packaging Systems, please contact:**

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# INDUSTRY COLLABORATIONS

Since Art Center was founded in 1930, engagement with industry has been a critical element of the student experience. Industry collaborations take on a variety of forms, but the intention and promise is always the same: high-quality, professional experiences that bring current industry challenges and opportunities into the classroom and provide students the context for imagining future solutions.

## Sponsored Projects

In one of the College's most exciting programs, partners have the opportunity to sponsor studios in which select groups of upper-term undergraduate and graduate students work in multi-disciplinary teams to explore a broad range of topics. These unique collaborations between design education and industry challenge students to envision the future and inspire partners to **create change**.

### Benefits To Sponsor

- Access to emerging talent
- Fresh creative perspective and innovative design solutions
- Networking with Art Center's design community

*Possible project deliverables could include: 2-D & 3-D models, prototypes, multi-media presentations, photo and film documentation.*

## DesignStorms®

DesignStorms® are 3-day immersive workshops that pair Art Center's expert faculty and select upper-term design students with Sponsors to form multi-disciplinary teams. Over the course of three days, the teams apply an intensive design methodology to identify opportunities for deeper exploration and create valuable shared experience.

### Benefits To Sponsor

- Access to emerging talent
- Rapid ideation and innovative design concepts
- Networking with Art Center's design community

*Possible project deliverables could include: 2-D & 3-D mock-ups, digital presentations, photo and film documentation.*

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