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## Cooking up a digital future

By Ian Hardy  
BBC Click Online in New York

### Counter intelligence usually conjures up images of MI5, the CIA or James Bond.

But at the Massachusetts Institute of Technology in the US, it is the name given to an entire department which invents new gadgets and gizmos for the kitchen.

In a crude mock-up of a Manhattan apartment kitchen, researchers are proving how, thanks to technology, everything is becoming more compact and functional, right down to the smallest objects.



Containers that tell you when food is off may be handy

In a plastic container, an item commonly found in an everyday kitchen, a sensor stuck to the lid can detect what is inside.

Taking temperature into account, it can automatically count down the hours left until what is inside goes bad.

In a fridge the countdown is slow, but leave the container on a counter top and the number drops quickly.

### Playing with ideas

"We're playing with temperature, with pH, and with salinity," MIT's Director of Counter Intelligence Research, Ted Selker, told BBC World's Click Online programme.

"We're really starting to think about what we can sense, but more importantly how we can use the sensors to change the way people do things, and improve them.

"My most exciting example of that is a spoon that literally teaches you how to cook, by watching and tasting, and noticing the temperature of the thing you're mixing."

The point, he explains, is to come up with ideas that nobody else is working on: some of these will work, others will not.

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"Then we do tests to see whether people can improve their performance with them, or increase their safety with them. We're not marketing things."

That is why many of the experiments have wires jutting out and appear half finished.

Once an idea is developed, it is usually taken up by a company that makes appliances.

To an outsider some of the concepts might seem far-fetched.



Some of the mock-ups are quite crude

One example is the pair of oven mitts that not only have temperature sensors built in, but also talk to you with phrases like "The food should be checked in 40 minutes".

Other projects might seem to have more practical uses, like the chameleon mug which is made from a combination of LCDs, bimetal strips, thermoresistors and thermochromic ink.

The result is a cup that tells you when it is hot. More sensors could be added to warn of too much sugar or bad milk.

One of other ideas involves using thin reusable meltable plastic wafers which could help reduce kitchen clutter by nearly one-third.

"The project is called the 'dishmaker'. When you're ready to eat and you have, say, cups but no plates, it will take a wafer and inflate it to the right shape and depth. It's like a variable mould," explained research assistant Leonardo Bonanni.

"Basically it's a machine that should replace your cabinets, cupboards and dishwasher. It automatically recycles your dishes and then stores them very compactly as thin discs.

"Right now, the machine is really primitive: just a heater and a pressure chamber.

"With a little bit of air pressure, we can now take a hot piece of plastic and form it, and with a lot more pressure it could become as deep as a glass or as shallow as a plate or saucer."

### **Everything and kitchen sink**

Even the kitchen sink has been reversioned. It can adjust its height automatically and the surface does not have to be porcelain or metal in a kitchen of the future.

"We looked at the biggest problems in industrial kitchens, and they were the noise and breaking of things," said Mr Bonanni.

"We've all experienced this when throwing dishes into the sink, which might break them.

"Here we're trying to replace a sink made out of steel or porcelain with silicon rubber. It's just as soft as human flesh but it will take water at around 700 degrees Fahrenheit, well over three times its boiling point.



Kettles that say how much longer you have to wait for tea

"That means it can resist breakages, and also preserve your silverware and favourite dishes in a regular kitchen."

Kitchens of the future will keep track of all kinds of things, according to the MIT researchers.

A kettle could display how long it is has left to boil, for example, or appliances could remind you what is inside and their status.

A fridge with a video camera and a computer that monitors the entire contents could alert you if the butter has run out the fridge, and automatically add it to the shopping list.

Spice racks could actually dictate which spice to use for any given recipe.

It is predicted the whole kitchen environment as we know it will change, including surfaces, as costs come down.

"We can probably make cheaper counters than we've been making in the past," said Mr Selker.

"It is quite likely that the materials we will have with smart things in them,.

"Plus the floor and counter materials are going to give more flexibility to designers and home-makers than the natural materials - hardwoods, granites, marble, stainless steel - that today are so in fashion."

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