

Faster DNA analysis at room temperature

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A palm-sized biochip for room temperature DNA detection developed by Paul Li at Simon Fraser University near Vancouver, Canada. The 4" diameter chip is roughly the same thickness as the Canadian one dollar coin, the Loonie (shown in the picture for scale). Credit: American Institute of Physics

DNA microarrays are one of the most powerful tools in molecular biology today. The devices, which can be used to probe biological samples and detect particular genes or genetic sequences, are employed in everything from forensic analysis to disease detection to drug development.

Now Paul Li and colleagues at Simon Fraser University in Burnaby, Canada have combined DNA microarrays with microfluidic devices, which are used for the precise control of liquids at the [nanoscale](#). In an upcoming issue of the journal *Biomicrofluidics*, Li and his colleagues describe how the first combined device can be used for probing and

detecting DNA.

The key to Li's result: [gold](#) nanoparticles. Suspended in liquid and mixed with DNA, the nanometer-scale spheres of gold act as mini magnets that adhere to each of the DNA's twin strands. When the DNA is heated, the two strands separate, and the gold nanoparticles keep them apart, which allows the single strands to be probed with other pieces of DNA that are engineered to recognize particular sequences.

Li, whose work is funded by the Natural Sciences and Engineering Research Council of Canada, is applying for a patent for his technique. He sees a host of benefits from the combination of [DNA microarrays](#) and microfluidics.

"It's faster and requires a relatively small sample," he says, adding in his paper that "the whole procedure is accomplished at room temperature in an hour and apparatus for high temperature... is not required"

More information: The article, "Gold nanoparticle-assisted single base-pair mismatch discrimination on a microfluidic microarray device" by Lin Wang and Paul C. Li will appear in the journal *Biomicrofluidics*. See: bmf.aip.org/

Provided by American Institute of Physics

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