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C. Bryan Daniels, home-based citizen scientist, father of three

Daniels Family Creates Home Molecular Laboratory with miniPCR™

Thirty-four years after leaving science for the greener pastures of finance, C. Bryan Daniels hadn't expected to find himself back in any kind of lab, much less a self-constructed one in the basement of his Illinois home. He had no reason to; after all, the former chemistry and math double major at Wabash College—now married and a father of three—had been heading a successful private equity firm since 1997.



But in the years after Prairie Capital's founding, Daniels had witnessed not only the advancement of his own career but also the meteoric rise of the STEM industries, and after decades, he wanted back in. So it wasn't long before he found himself studying DNA replication and repair through MIT's edX program alongside his oldest daughter Nicole—and soon after that, building a lab in his house to apply what he had learned (and, he quips, to keep his kids away from the Xbox for the summer).

Of course, constructing a lab proved easier said than done, especially since the equipment Daniels envisioned included cutting-edge technologies typically available only to universities and other established research facilities. But as luck would have it, Daniels soon stumbled upon the biotech startup Amplyus, which sold as its main product a portable thermal cycler called the miniPCR. The unit was a cheaper and more user-friendly version of the traditional bench-top PCR machine, but more importantly, it was also freely available to anyone who was willing to purchase it—and Daniels was.

In the following months, Daniels built the lab around the miniPCR, with additions like a gel electrophoresis setup, a cell incubator, and a centrifuge, along with crucial supplies like reagents, micropipettes, and micro-tubes. Learning the ropes of molecular biology was challenging at first, he admits—it's a sensitive process, and they have no instructor. He and the children spent hours honing their ability to run gels and amplify DNA through projects drawn from pre-written protocols and material Daniels has found online.

Even in these early stages, however, the kids have already been influenced by the new world of science that has opened to them. Nicole is now thinking of studying biochemistry in college, while Colin, inspired by a miniPCR Learning Lab that used DNA sampling to identify subjects at a crime scene, aspires to a career in forensics. Becky, the youngest, has not yet gravitated toward a particular field, but she takes great pride not only in the experiments she performs but also in her duty of keeping the lab clean and organized. What Daniels wants most, however, is for them to be able to move beyond kits to scientific exploration of their own, and under his guidance they have—a trip to the grocery store to identify genetically modified fruits and vegetables; a DNA sequencing project to determine the species of blood a tick found on the family dog had been drinking.

To learn more please visit our website www.minipcr.com or email us: team@minipcr.com

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When Daniels calls on a recent Saturday, the family is gearing up for an experiment series they term “DNA barcoding,” or phylogenetic mapping using certain genes. After poring over the existing literature, they have honed in on a highly conserved mitochondrial gene, mtCOI, that they hope to use to identify new species by taking the sequences of samples from their surrounding environment and comparing them to those already in the National Center for Biotechnology Information database. It’s an ambitious project for a financier and his three young children—but the four are ready, as always, to tackle the challenge.

– Victoria Lin

About miniPCR™

miniPCR™ is a groundbreaking miniaturized thermal cycler offering the power of genetic analysis to everyone, everywhere.

- **Powerful:** miniPCR thermal cyclers deliver high-end performance.
- **Simple:** Our easy to use software interface makes genetic analysis intuitive on Windows, Mac or Android devices.
- **Accessible:** miniPCR can fit in the palm of a hand and fits as seamlessly in your home as any other household appliance. Accessible to professionals and novices alike.
- **Universal:** miniPCR™ is fully compatible with standard PCR tubes and reagents, making it easy to adopt universally used protocols and assays.



| Feature | Specification |
|-----------------------------------|---|
| Sample format | 8 x 0.2ml PCR tubes (strip compatible) |
| Max heating ramp rate | 3.2°C / sec |
| Heated lid | Independent lid heater up to 120°C with PID control |
| Max cooling ramp rate | 2.2°C / sec |
| Program sharing and backup | Unlimited libraries, .pdf file format |
| Temperature control | Resistive heating; forced air cooling |
| Control system | Embedded thermistors and PID algorithm |
| Temperature range | 20°C – 99°C |
| Operating range | 9°C to 40°C ambient temp. |
| Dimensions | 2" x 5" x 4" |
| Power supply | AC 100-240V, 50-60hz, 70W |
| Battery operation | 4h – 6h uninterrupted run time on Li-Ion battery |

miniPCR is based at the Harvard Launch Lab, an incubator for innovative companies run by Harvard University alumni based in Boston, Massachusetts.

The miniPCR team of molecular biologists, engineers, and designers is dedicated to miniPCR’s mission of making science accessible to everyone, everywhere.

To learn more please visit our website www.minipcr.com or email us: team@minipcr.com

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