

# PCR Machine *by Alain A Perez*

Abstract Id: 459 Submitted: March 2, 2019 Event: **Conference for Undergraduate Research at FIU 2019**  
Topic: **Engineering/Engineering Technology**

This research aims to create and manufacture a smaller, economical Handheld PCR (Polymerase chain reaction) machine which is also known as a thermal cycler. The PCR machine is widely used in the area of molecular diagnostics, forensics, genetics as well as early detection of diseases. The function of a typical PCR machine is to amplify DNA using a polymerase enzyme which works by amplifying the DNA to several number of copies by cycling the temperature of the mixture.

The conventional PCR machine involves heating block or plates as a heater which is connected to a PID controller due to which the temperatures can be manipulated in a systematic process. The PCR machine cycles between different temperature zone due to which several thousand copies of DNA can be made from one copy. Current PCR machines are expensive due to the electric components involved, **limiting its availability to pathology labs, small hospitals and research facilities.**

We propose to translate the PCR machine on a microfluidic platform employing micro heaters which will drastically reduce the cost of the device. In addition, an Arduino platform would be used to control the component and temperature of micro heaters. The PCR machine will explore better ways to perform the same process while delivering precise results at a much lower cost. In the near future the device will be used as a point of care unit for onfield testing and diagnosis of several diseases.