JESSE ORELL, DAKOTA PARNELL, AUSTIN COLEMAN, CHANDLER RUSSELL, & JAMES WALTERS, Dept of Applied Science, Bluefield State College, Bluefield, WV, 24701. Constructing a high throughput novel microfluidic slide for *in vivo* imaging of larval zebrafish (*Danio rerio*).

Larval zebrafish (*Danio rerio*) are optically transparent up to fourteen days post fertilization (dpf) and have high synteny with *Homo sapiens* which makes them viable research models for the study of metabolic and physiological processes at a unicellular level. Preceding methods to image zebrafish larvae have been limited to single larvae and long-term imaging has been a challenge. The aim of this study is to design a micro-fluidic slide for mounting larvae that greatly extends the duration of time for *in vivo* imaging, while supplying selected drugs, modified/selected diets, and fresh embryo media. Fluorescently labeled material can be custom made or are commercially available. Examples are high fat diets spiked with fluorescently conjugated lipids such as BODIPY or fluorescent polystyrene beads. To improve upon our pervious chip design, we used the Zeiss Discovery V8 microscope to re-image five seven-dpf larvae in order to adjust the measurements of the chamber to properly accommodate an average seven-dpf larvae. The newest prototype slide is currently under testing to determine effectiveness and efficiency with fluorescent polystyrene beads to visualize consumption of a diet delivered while the larvae is in the microfluidic chip. We expect to record the transit of the beads through the intestine of the treated larvae. *This work was supported by NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence and NIH Grant P20GM103434 awarded to Bluefield State College and the McNair Scholars Program.*