

## Biography

Devanda Lek was born and grew up in Austin, TX. Upon graduation from High School Devanda enrolled at The University of Texas at San Antonio and received a B.S. in Mechanical Engineering in 2011. In 2012, Devanda enrolled in the Industrial Technology Program at Texas State University and joined the Nano and Microsystems Group as a Graduate Research Assistant. After completing his Master of Science in Industrial Technology he continued his studies at Texas State by enrolling in the MSEC program in the Fall of 2014.

### Development of a Kinematic Coupling for a Double-Sided Hot Embossing Process

The development of a modular microfluidic system would allow for the combination of differing analytical devices, into a complimentary system. To realize the full capability of a modular system the development and fabrication of interconnecting structures is important. Hot embossing is a suitable technology the fabrication of polymer microstructures on polymer substrates. To expand the functionality of hot embossing and fabricated devices there has been interest in applying a double sided hot embossing technique. A key step would be an alignment step wherein two mold inserts are aligned prior to thermal forming. The alignment of two mold inserts is significant to the quality of the fabricated micro-structures, and the life-cycle of the mold.

Passive alignment using a kinematic coupling design, can provide repeatable positioning between the two molds inserts for double-sided hot embossing. One mold insert was designed with an array of v-grooves, and the second mold was designed it an array of radial grooves. The molds were coupled by a set of stainless steel sphere. The kinematic couples controlled the position of each mold by repeatedly contacting each other at the same location. The designed coupling system allowed for an exact constraint design, restricting motion in all directions.