# Kilobotics Swarm Robotics

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**GOAL: To evenly disperse and converge a swarm of Kilobots to a light source using distance measurements and IR sensing.**

## Background

- We aim to push the boundaries of particle swarm optimization (PSO) algorithms
- Kilobots are inch-sized robots which sense with IR and move using vibration
- Programming done in C
- Limited by 10 cm communication range, 2 Hz frequency, and lack of directional awareness
- Limitations contribute to the uniqueness of our solution

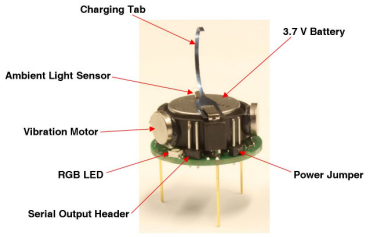


**Figure 1** Kilobot top

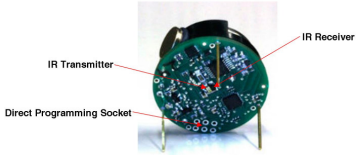


**Figure 2** Kilobot underside

## Procedure

- Create a dispersal program
- Draft a convergence program (converge to lowest unique ID number)
- Collect data on forward and turning movement
- Finalize convergence algorithm using movement data
- Implement light sensing into convergence program

**Figure 3** Kilobotics team: Richard Doner (left), Aaron Roggow (middle) and Eugene Jegal

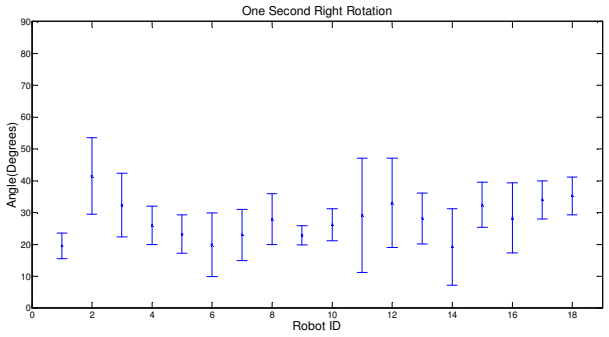


**Figure 4** Angle of rotation for 18 Kilobots after one second of turning right

## Preliminary Results

- Dispersion successfully implemented without revisions based on measurements
- Convergence conceptually viable, but in need of modifications developed from measurements
- Turning and forward movement measurements consistent for the swarm, can be used to standardize movement commands

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