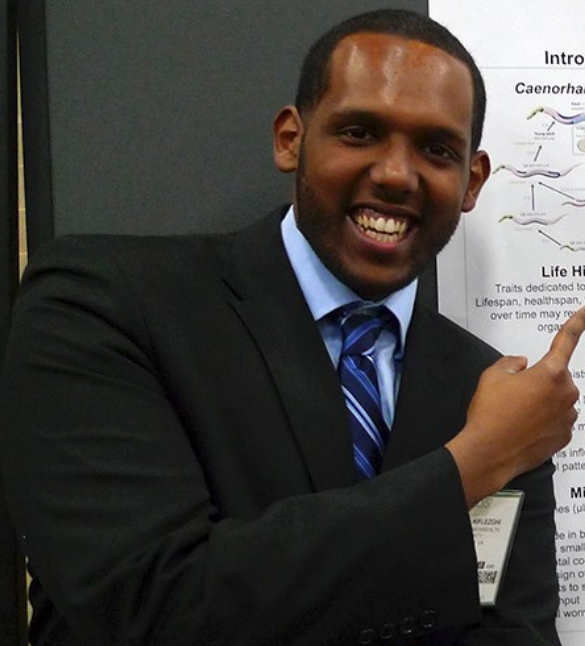


VCU Poster Symposium For Undergraduate Research and Creativity



Microfluidic Devices for the Study of Dietary Influences on Life History Traits in *Caenorhabditis elegans*

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Introduction
Caenorhabditis elegans

Life History Traits
Traits dedicated to survival and reproduction. Lifespan, healthspan, fecundity, etc. Change in traits over time may reveal useful ways to predict an organism's path through life.

Diet
Diet consists on bacteria like... leads to dauer formation and/or... may influence other life history... influence in many animals may... patterns.

Microfluidics
...es (µl)
...e in batches
...small as 10 microns
...tal control
...ign of arbitrarily complex
...s to simulate real world
...put.
... worm studies with individual

The Sorter

- Allows for easy and fast sorting of worms
- Inject worms into one end
- Shunt into 1 of 3 different channels based on criteria
- Can sort worms manually or automatically based on visual phenotypes like GFP expression patterns
- 100% GFP reporters display variance in expression
- Same environment, same diet

The Imager

- Allows for easy imaging of worms
- Inject worms into one end
- Rendered immobile in trap
- Worm can uptake bacteria from fluid flowing past it
- Allows for lifetime longitudinal studies of individual worms

The Arena

- Soil environment simulated on a chip
- Allows 4 different fluids to flow through a single chip
- Fluid flow is laminar
- Worms can act on dietary preferences
- Biodemography: Number of eggs laid in each flow counted by camera
- Provides insight on food preference vs food quality

Future Directions

- Grow animals under controlled dietary conditions
- Use reporters (eg accl-1 GFP) to follow relevant pathways
- Use sorter to separate animals into populations based on pathway activity
- Observe life-history traits like longevity and reproduction of large numbers of animals using the arena and/or imager chips
- Determine if variability in life history outcome is related to stochastic differences in pathway activities

Take Away
Use of these microfluidic devices may allow for elucidation of patterns that explain the stochastic biochemical differences between identical worms. These patterns will allow prediction of worm life history traits early in life. Because there are pathways conserved between *C. elegans* and humans, such predictive tools may be valuable to work on humans.

References

Acknowledgements

**Wednesday April 19th, 2017
Student Commons 2nd Floor
11am–2pm Keynote at 12pm**

**Submit abstracts at <http://go.vcu.edu/uropostersubmit>
Deadline is March 22nd, 2017**

Questions?

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