Lightning Talk - UNCG Mathematics Summer School 2019

Jenny Beck

UNC Greensboro

June 25, 2019

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- MA in Mathematics from UNC Greensboro (2019)
- First-year PhD student at UNC Greensboro beginning Fall 2019

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- In short, sometimes it pays to be wrong, especially if you're John Von Neumann.

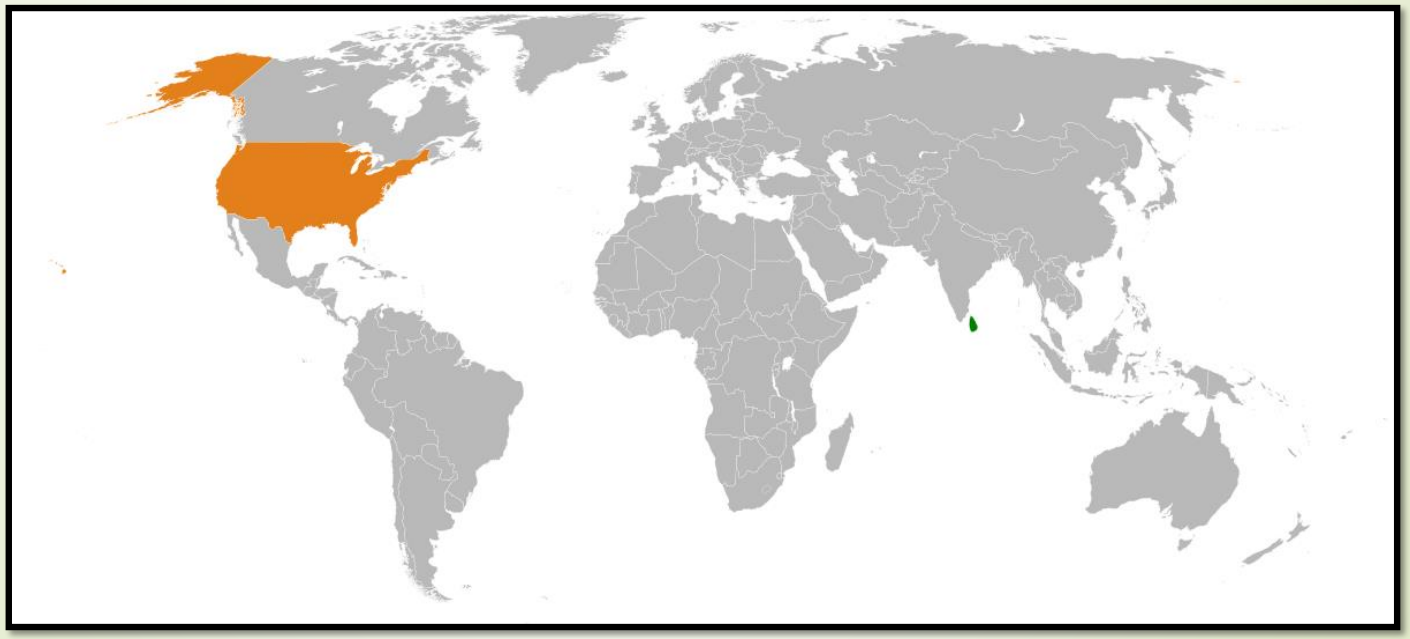
Lighting Talks

UNCG Summer School 2019

Kalani Thalagoda

Introduction

- I am an international student from Sri Lanka.
- I am a second-year graduate student at UNCG.



Previous Institutes

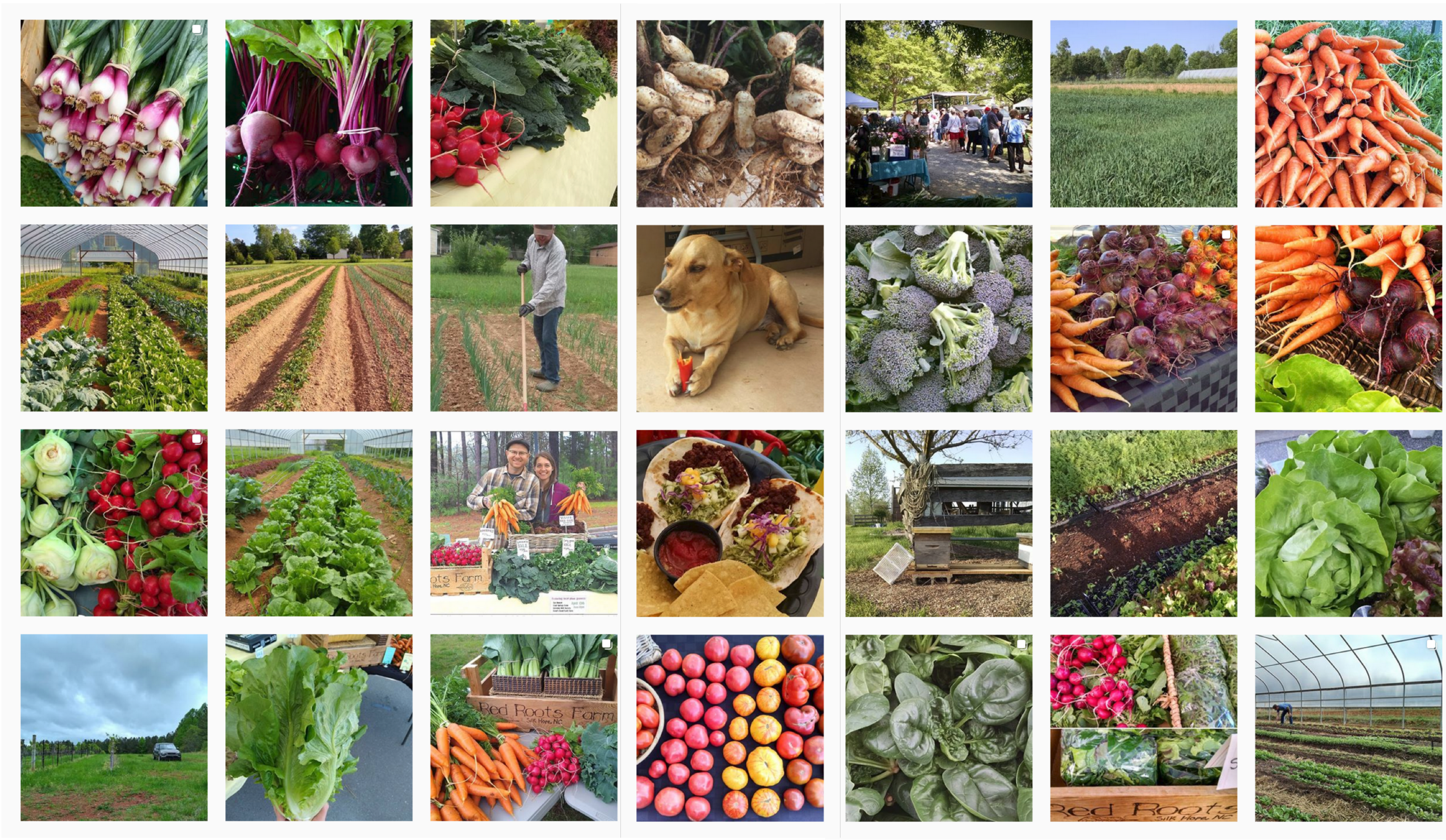
- **Bachelor's in Mechanical Engineering, University of Peradeniya.**
  - *Developing a micro-quadrotor safe for indoor use.*
- **Master's in Applied and Computational Mathematics, University of Minnesota Duluth.**
  - *Master Thesis: Continued fractions with Irrational numerator*

Current Research

- **I am currently working Dr. Dan Yasaki and Kristen Scheckelhoff.**

Research Problem

- *We are looking at Perfect Hermitian form over Quadratic Number Fields. There's a polytope attached to each Perfect form. This can be computed using Voronoi's Algorithm.*
- *We are working on showing that there are finitely many types of polytopes.*


Red Roots Farm
Red Roots

Balancing the cost of infection:

The effect of clean needle use on the spread of hepatitis C among injecting drug users

Epidemiological Model

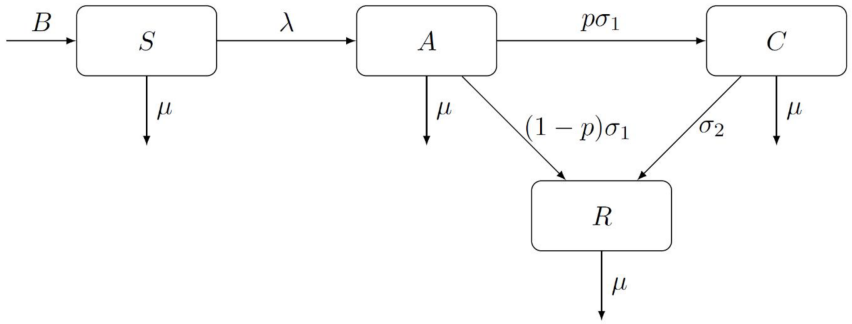


Figure 1. Compartmental model of hepatitis C. The population is divided into four compartments: susceptible (S), acutely infected (A), chronically infected (C), and recovered (R) individuals.

$$\lambda(t) = \kappa\left(b_a\frac{A(t)}{N(t)} + b_c\frac{C(t)}{N(t)}\right) \qquad R_o = \kappa\left(\frac{b_a}{\mu+\sigma_1} + \frac{b_c p\sigma_1}{(\mu+\sigma_1)(\mu+\sigma_2)}\right)$$

Nash Equilibrium

$$E(r, r_{pop}) = -\frac{\lambda(r, r_{pop})}{\lambda(r, r_{pop}) + \mu} - Dr$$

$$E(0, r_{pop}) = -\frac{\lambda(0, r_{pop})}{\lambda(0, r_{pop}) + \mu}$$

$$E(1, r_{pop}) = -D$$