

Chaos, Fractals, and the Arts

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Porter College 34B, UCSC
Winter 2016

Winter 2015, Series #10



Dedicated to HH the 14th Dalai Lama
on the occasion of his 80th birthday
July 5 2015

Meeting #1, January 05

- Course organization
- Begin the three threads
 - A. Vibrations and forms
 - B. Basic chaos theory, symmetric chaos
 - C. NetLogo programming

Course organization

- Class times
- Homework
- Projects
- Grading
- Tentative syllabus

Class Times

- Meetings will begin at 10:00 am, and end by 11:30 am
- Meetings will usually begin with calling the roll and discussion of the assigned readings
- Office hour after class, 11:30 to 11:45 am
- TA: Evan Schaffer

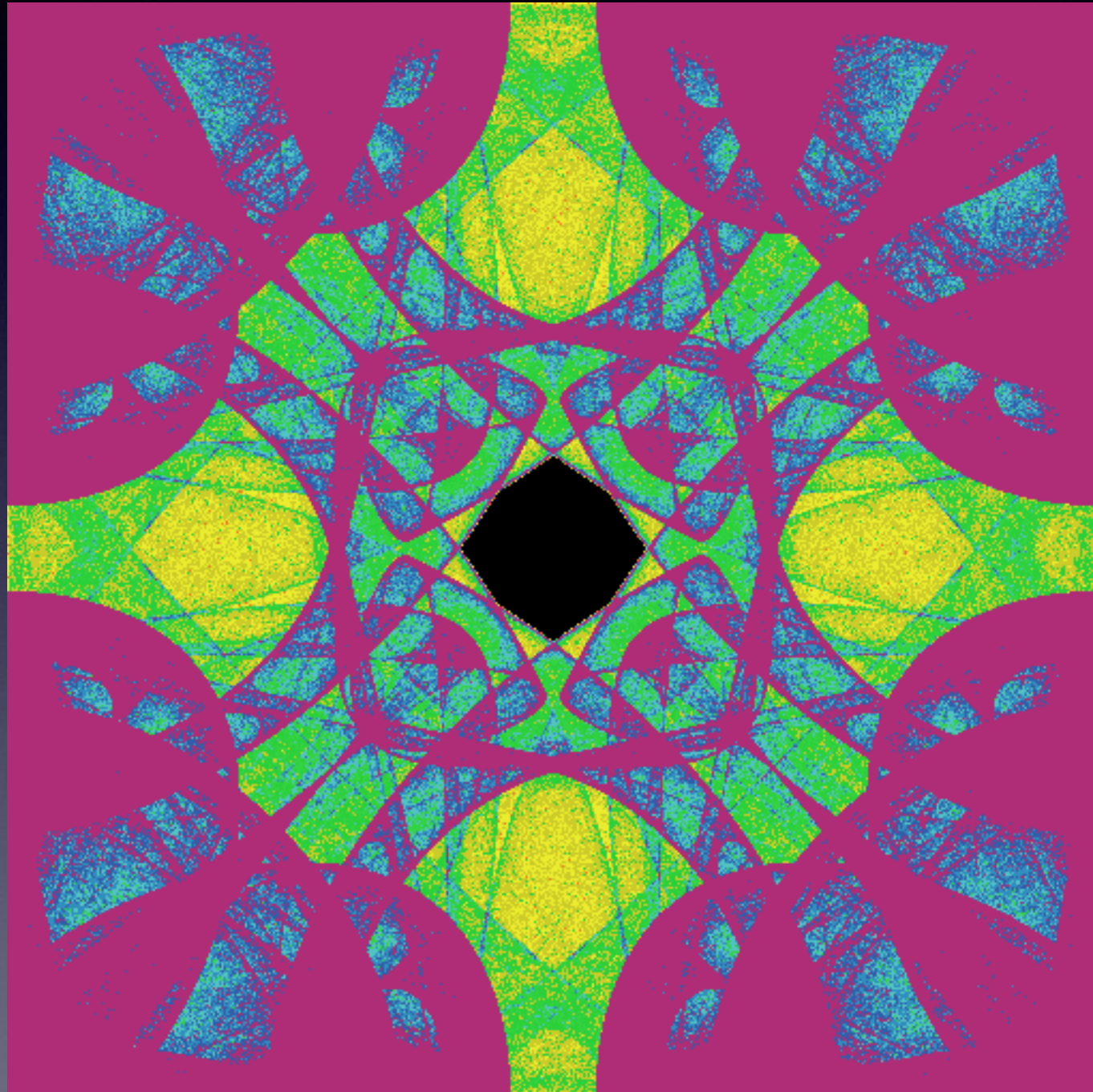
Homework

- Weekly homework:
 - Readings for discussion
 - Chaos theory experiments
 - NetLogo programming exercises
- Browse our website for assignments:
www.ralph-abraham.org/courses/porter34b16/

Projects

- Individual or team projects
 - Modify a given NetLogo model
 - Create a short movie of a periodic window in a model of symmetric chaos
 - Present in class near the end of the quarter

Symmetric Chaos



Grading

- Participation in classroom discussions
- Pop quizzes (perhaps)
- Projects
- Final (based upon homework)

Tentative Syllabus by Week

- A. Vibrations and Forms
 - A1. Models of Consciousness
 - A2. Cymatics
 - A3. Chaotic attractors
 - A4. Bifurcations and periodic windows
 - A5. Symmetric chaos
 - A6. Guest lecture

AI. Models of Consciousness

- Psychedelic spirituality
- Exemplary models of cosmic consciousness
- The akasha and the quantum vacuum
- Vibrations and forms

Psychedelic Spirituality

- Traditional vs psychedelic mysticism
 - Are they equivalent ???

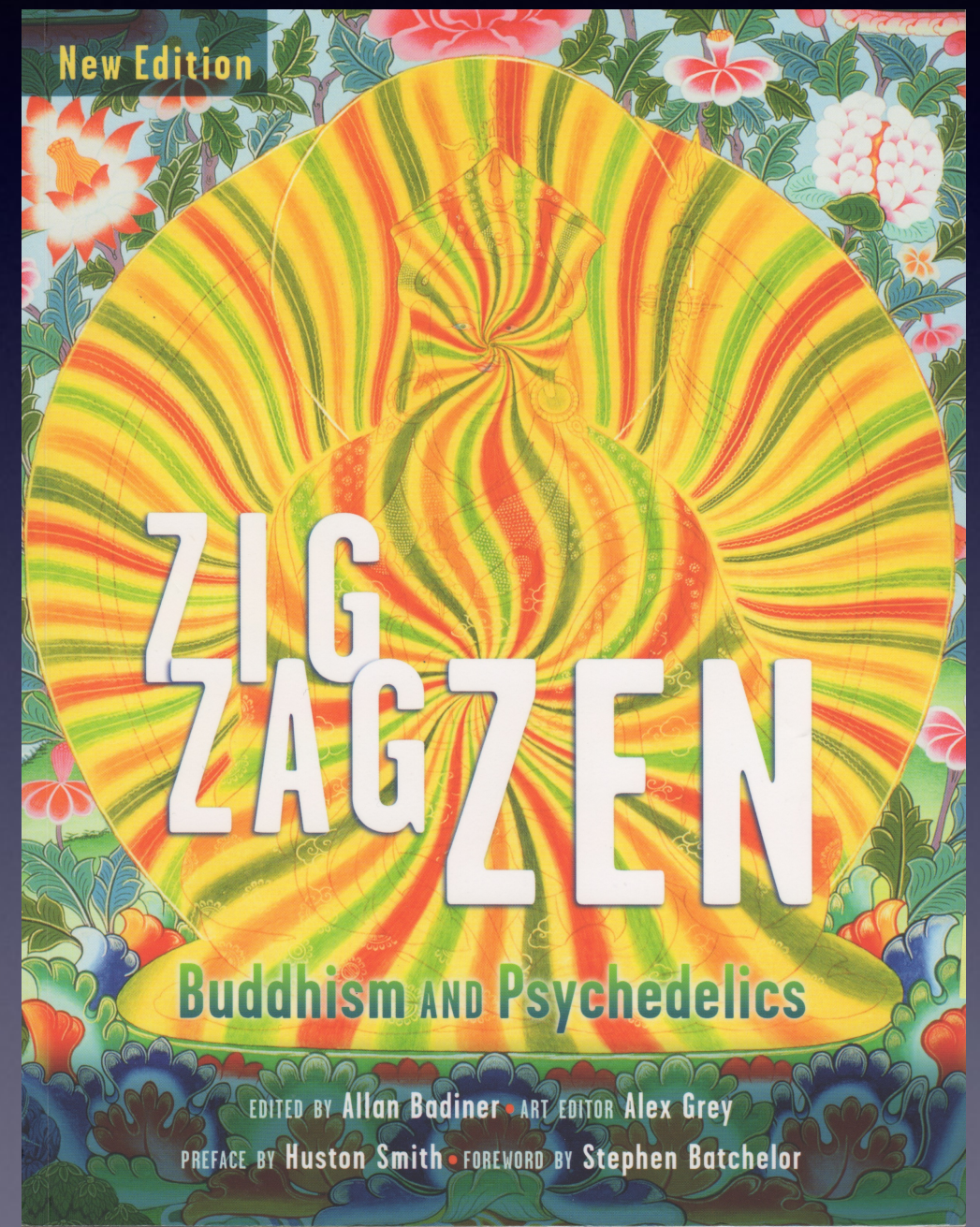
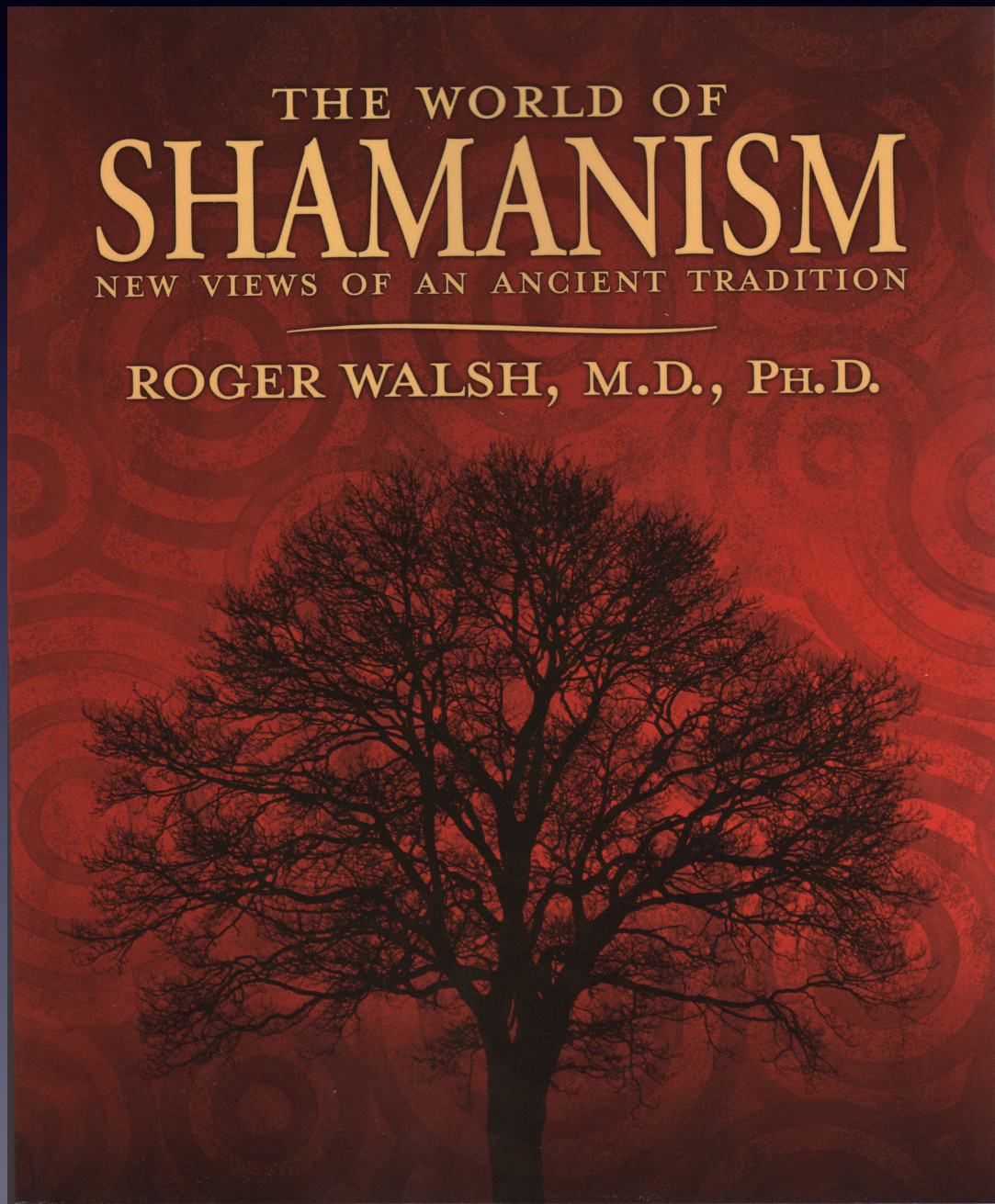
Ancient Spirituality

- Shamanism then and now
- Entheogenic hypothesis, maya, soma
- Mystical traditions and literature, the gurukula

Present Spirituality

- Summary: The case for psychedelic spirituality
 - How 50 micrograms of LSD might work
 - Rewiring maya temporarily

New Books



Exemplary models

- Pancha kosa, Plato, Ficino
- Kashmiri Shaivism, morphic resonance, spanda
- Discrete dynamical networks

Anandamaya
(Bliss)



Vijnanamaya
(Intellect)



Manomaya
(Mind)



Pranamaya
(Energy)



Annamaya
(Physical)



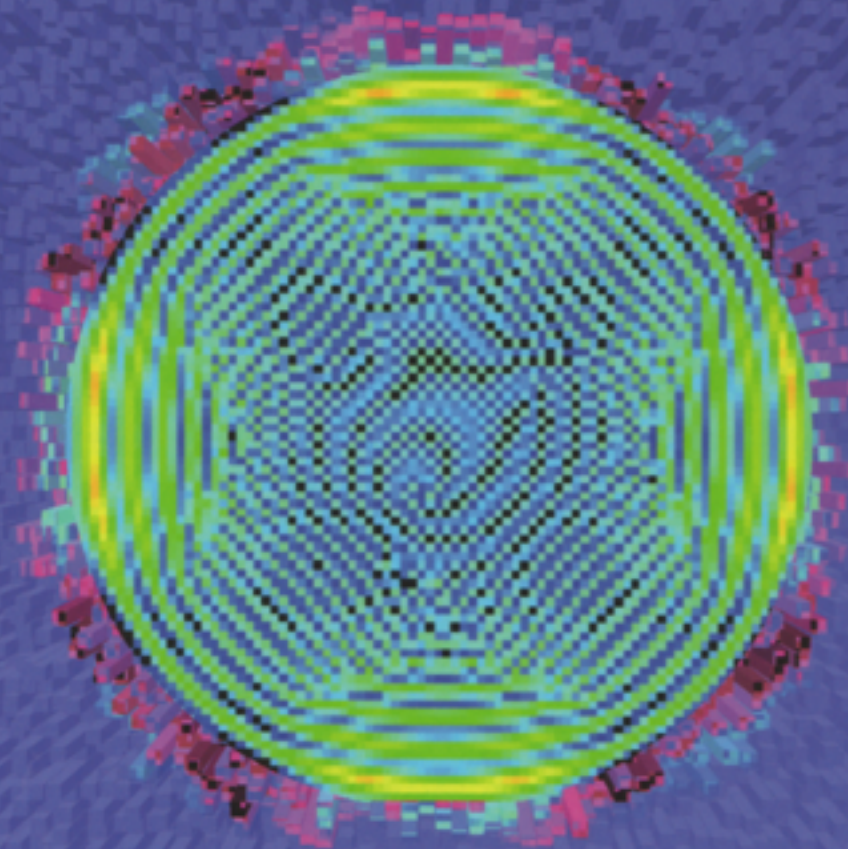
Panch Kosa, 800 BCE?

The akasha and the quantum vacuum

- Atomistic models of mind
- Discrete dynamical networks
- The akasha in Kashmiri Shaivism
- The quantum vacuum

Demystifying the **Akasha**

Consciousness and the Quantum Vacuum



Ralph Abraham
Sisir Roy

Vibrations and form

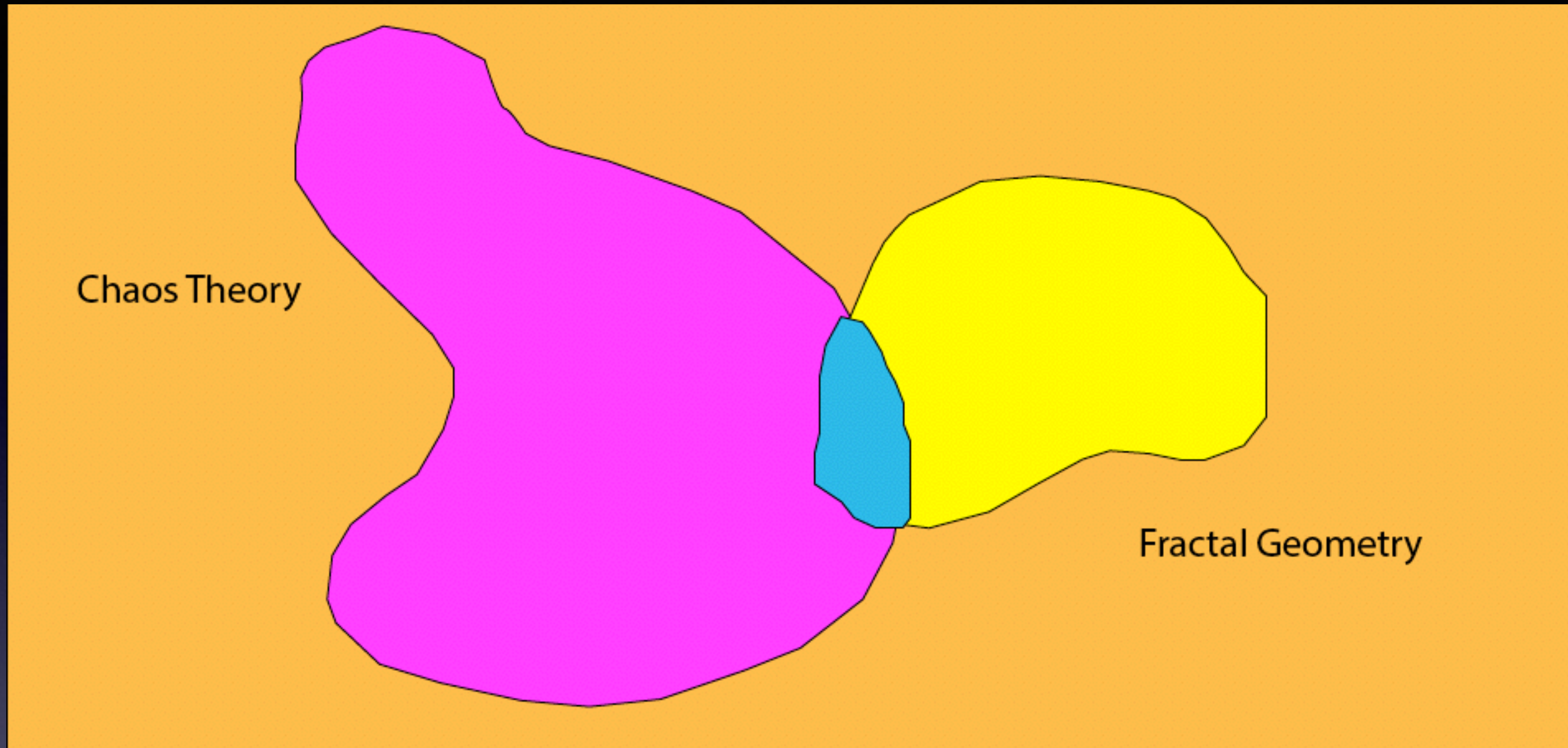
- Kashmiri Saivism and tattvas
- Morphic resonance, spanda
- Cymatics (Steiner, Jenny)

Cymatic demonstration













- Mickey Hart of the GratefulDead
- <https://www.youtube.com/watch?v=6pBbmOBxsvQ>

B. Basic Chaos Theory

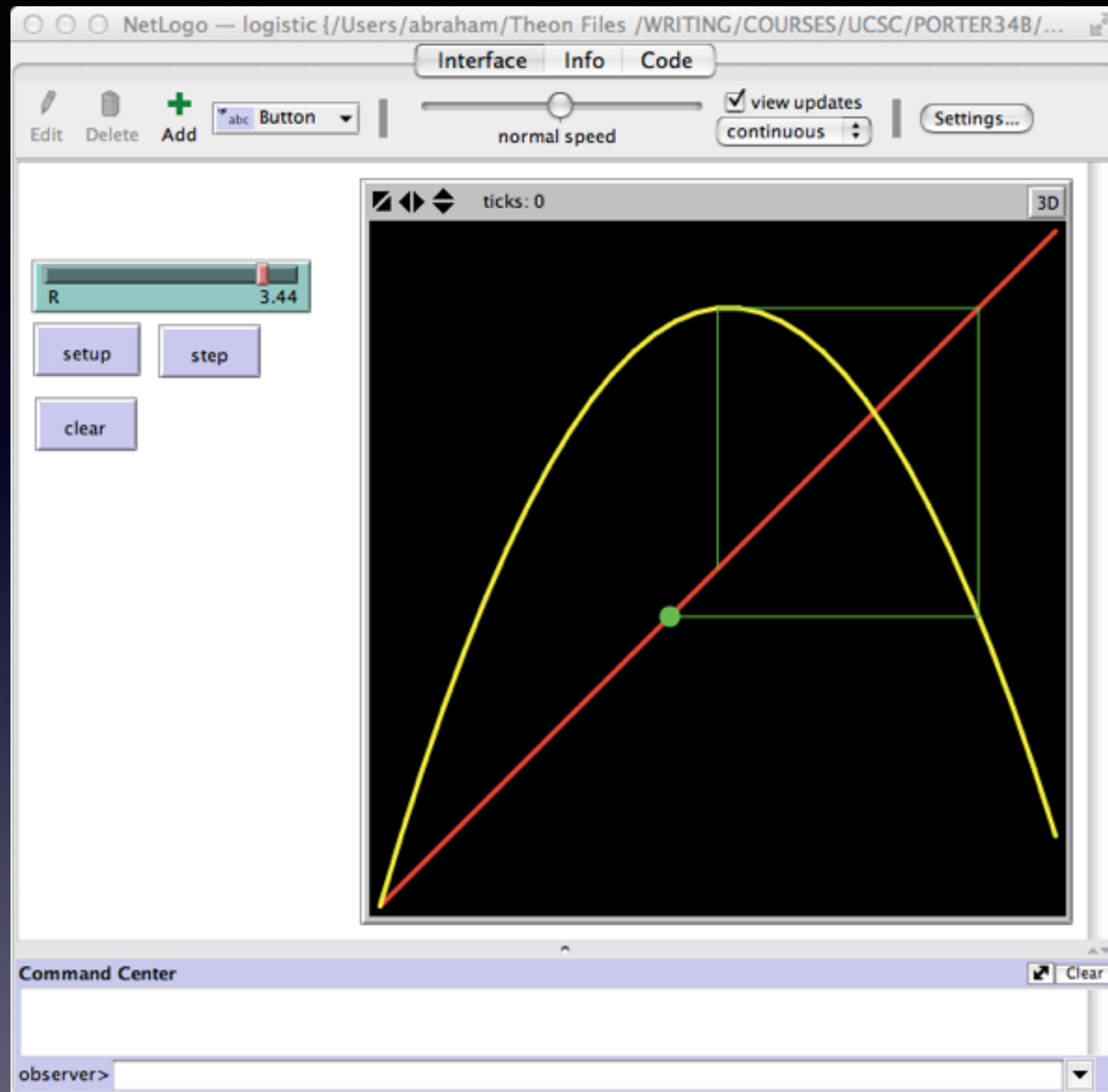
- Chaos and fractals
- Stairway to chaos
- Attractors, basins, and separatrices
- Bifurcations
- 1D: The logistic scheme
- NetLogo demo



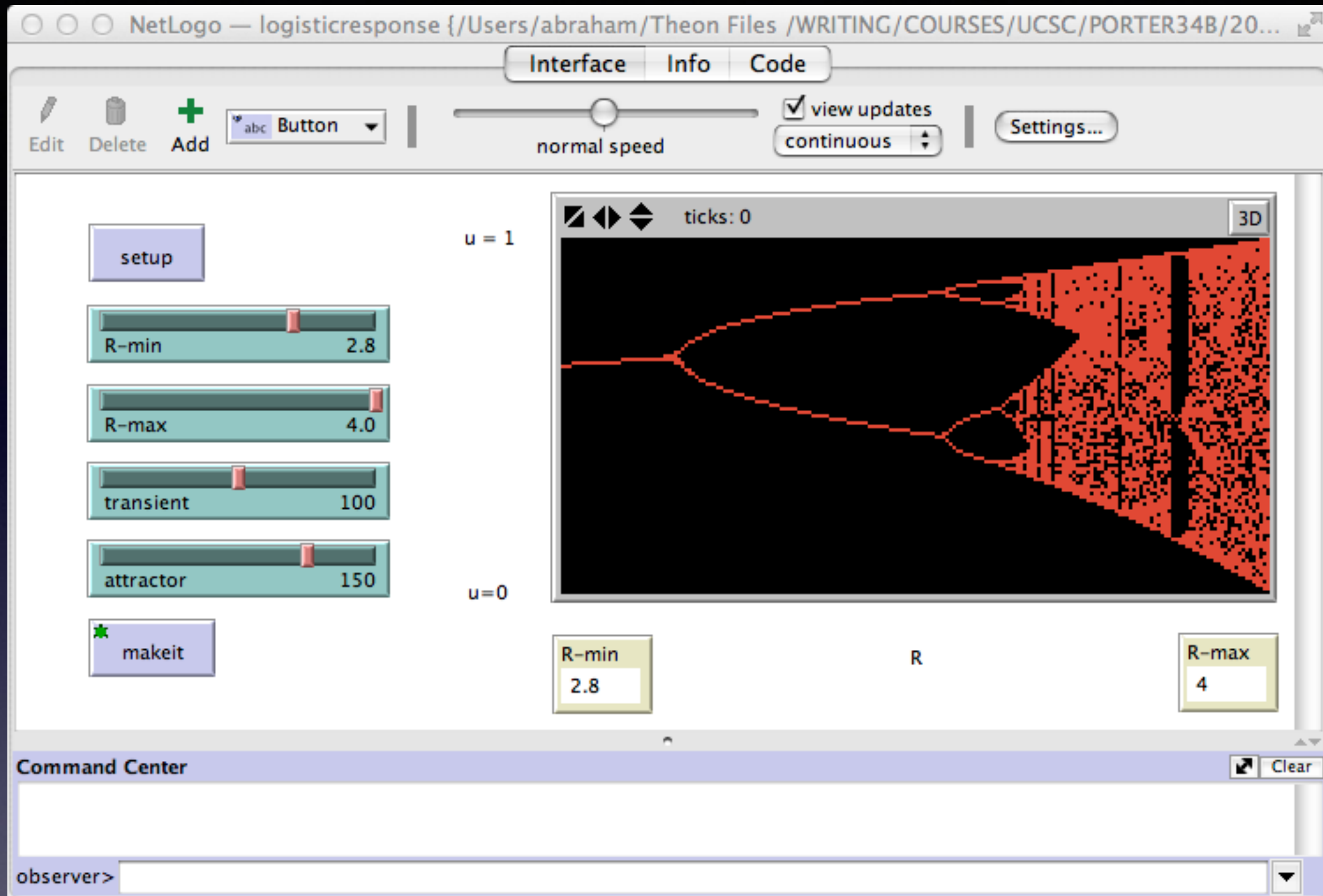
The Mathiverse

Dimension	0	1	2	3
Flows				
Cascades				
Iterations				

The Stairway to Chaos



Logistic
Map



Logistic Response Diagram

C. NetLogo Programming

- NetLogo models
- Agents, images, movies, sounds
- Performance, recordings, projects

Porter 34B 2016 Meeting #1

The End