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Introduction to Student Projects
SFI Complex Systems Summer School

Catriona Sissons

June 11, 2018

GROUP PROJECTS

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- Self-organised
- Inter/ multi/ trans-disciplinary
- Creative
- Ambitious
- Collaborative

GROUP PROJECTS

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- Starting now: work on coming up with project ideas and self-organising into groups
- For inspiration about project ideas
  - Talk to each other!
  - You can also look at previous years wikis and the proceedings from past schools at SFI website https://santafe.edu/engage/learn/resources
- This is a unique opportunity for collaboration and learning
  - Try something new
  - And most importantly have fun!

FORMING GROUPS - GUIDELINES

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- We prefer you to form multi-disciplinary (and cross-cultural) groups.
  - Take advantage of diverse range of people you are here with
- Groups should end up being between 3-6 people.
  - Groups may be bigger initially
- You can be in more than one group - but ultimately choose 1 or 2
  - Be aware of managing your time and try not to spread yourself too thin
- Don't feel shy about contacting SFI to join in.
  - We can help with these introductions.

GROUP PROJECTS

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- The concept of serious play

"It was effortless. It was easy to play with these things. It was like uncorking a bottle: Everything flowed out effortlessly. I almost tried to resist it! There was no importance to what I was doing, but ultimately there was. The diagrams and the whole business that I got the Nobel Prize for came from that piddling around with the wobbling plate"

- **Richard Feynman**

INTERDISCIPLINARY COLLABORATION AND COMMUNICATION

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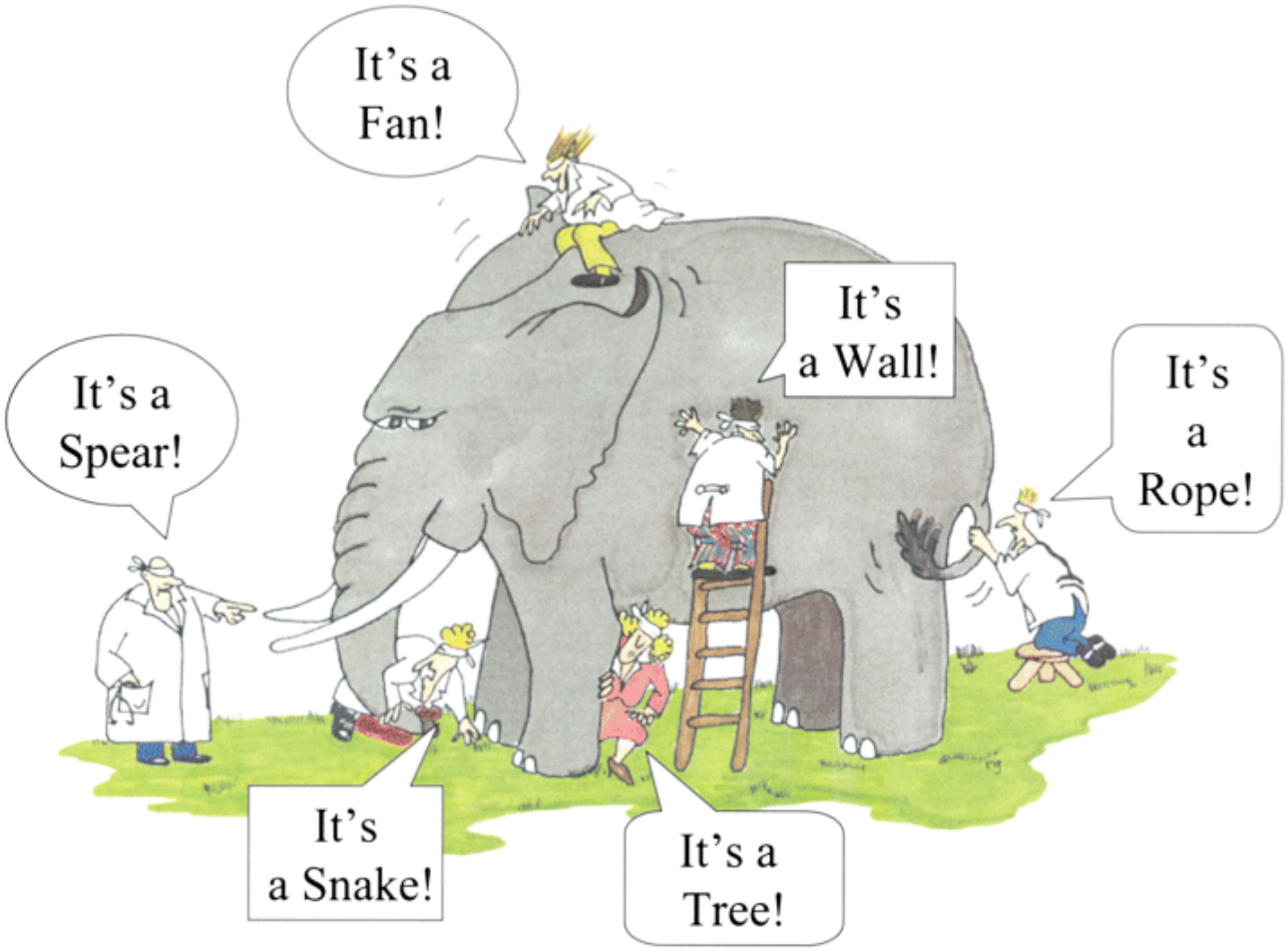

EFFECTIVE COLLABORATION

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- Communication
- Bridge the gap
- Collaborative spirit – be a team player
- Scientific disagreement vs interpersonal conflict
- Integrated teams
- We are here to help

PROJECT COORDINATOR

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- If you need guidance about your project **Catriona Sissons** (I) will be on campus to assist you
- I'm here to serve as your intellectual liaison so please don't hesitate to ask for assistance or advice or anything else.
- Send me an email
  - catsissons@gmail.com or c.sissons@auckland.ac.nz
- Come find me at the CSSS

PROJECT WORK

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- There are specific times scheduled to work in your groups, but please feel free to use unscheduled free time (e.g. evenings/ weekends) to work as well
- We recognize that 4-weeks isn't necessarily enough time to complete all the projects you will begin at the CSSS, and we hope you will continue collaboration with your fellow CSSS participants and CSSS faculty after your departure from the school.

TUTORIALS

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- If you would like to give a tutorial during the school and share your expertise, tools, and skills with the CSSS please email jp@santafe.edu to schedule your tutorial.
- **Only** outside normal summer school hours
- These should be 1 hour
- E.g., Git, R, Philosophy's role in science

PRESENTATION DAYS!

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- **July 4th and 5th** at IAIA.
- The presentations are a meant to be a quick overview of your projects, *they shouldn't be more than a few slides*.
- Presentations must be 10-15 minutes-long per group - this includes time for questions. Please practice and time your talk beforehand.
- A sign-up sheet for the presentation schedule will posted on the wiki
- SFI community will be in attendance during your presentations

REPORTS

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- Writing this should not be time consuming, just put everything you have in a file
- Organise your results and add the explanations
- Write down the details you might forget
- First rough sketch of the paper/ laboratory notes
- Should include a 300 word abstract, other than that no specific format
- No references required, plots do not need to be perfect, writing can be in draft form

FINAL PAPERS

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- A final paper from each group due 1 November 2018.
- We will not release CSSS letters of completion until papers are turned in.
- We will post all CSSS proceeding on the SFI Website. If you are in the process of publication please send Carla (carla@santafe.edu) your paper and she will **not** post the paper to the website, and will keep it in the private archive until notified of publication
- If you do publish a paper from a collaboration at the CSSS please let us know and send us a link
- To see examples of previous CSSS papers and processing's visit https://santafe.edu/engage/learn/resources

Group Project Meetings

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- **Week 2:**
  - 10 minute long “check ins” with me/ Dave
  - First 5 minutes pitch your project
  - 5ish minutes to discuss where to go with it
  - There will be a signup page on the wiki
- **End of Week 3:**
  - 5 minute long “check ins” to make sure everything is on track
- Additional meetings available
- Don’t forget to use the wiki!
  - Post up details about your project ideas and signup to projects
  - Please move projects to the archived section if you discontinue them

PROJECT EXAMPLES

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Measure for Measure: Quantifying Shakespeare

- Ashkaan Fahimipour: Ecology
- Abigail Jacobs: Computer Science
- Max Kleiman-Weiner: Artificial Intelligence
- Kyle Mahowald – Linguistics
- Eitan Pechenick – Applied Mathematics

- Changes in the networks of characters
- Predicting genre tragedy vs comedy based on the words used
- Generative model to write Shakespeare

PROJECT EXAMPLES

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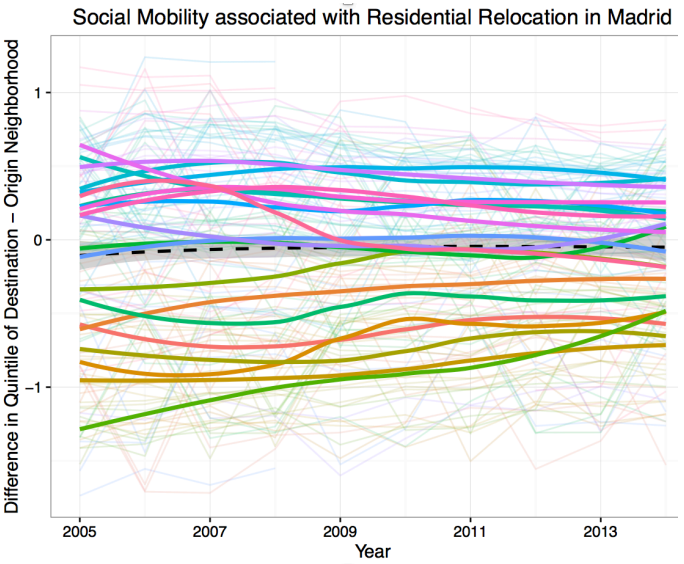
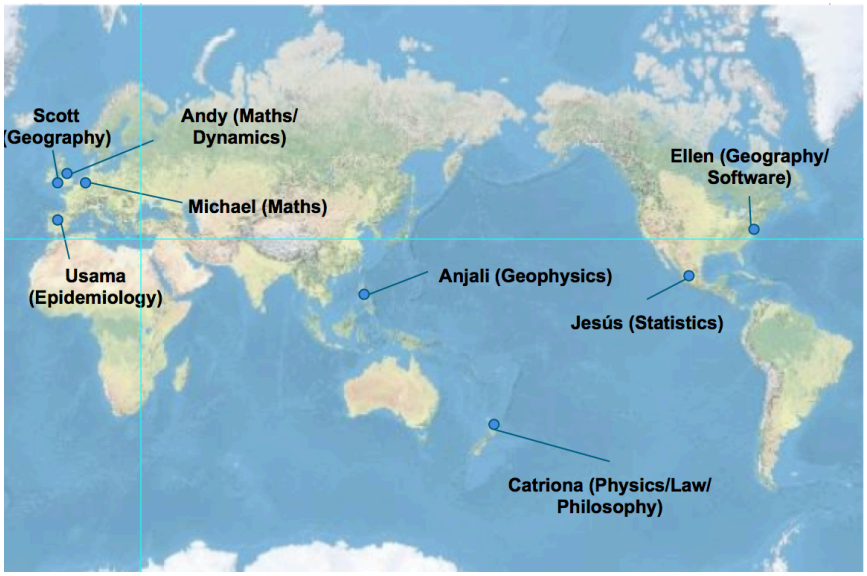
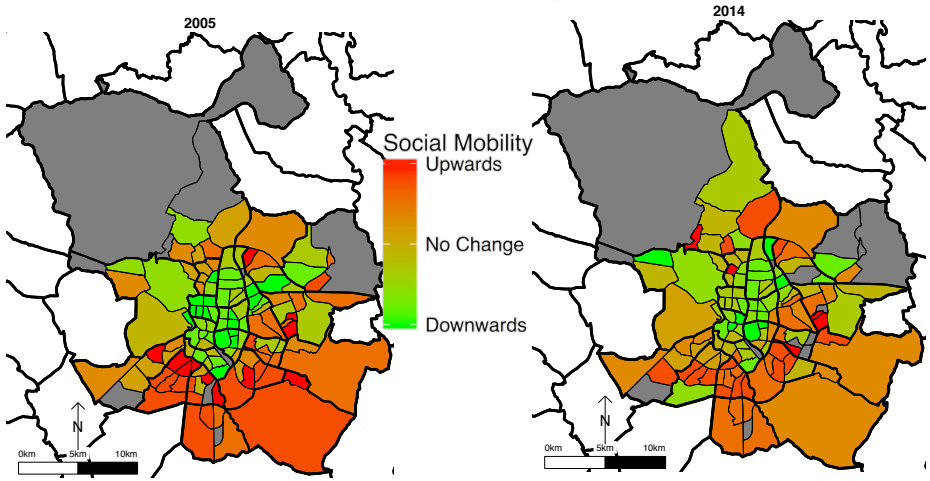
Characterized the residential mobility network in Madrid

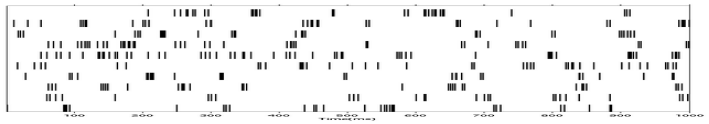
- 8 people, everyone from different disciplines, 8 countries, 3 continents.
- Mobility flows, effect of the 2008 GFC
- Identifying rapidly changing and gentrifying communities
- Presented at CCS'16 in Amsterdam

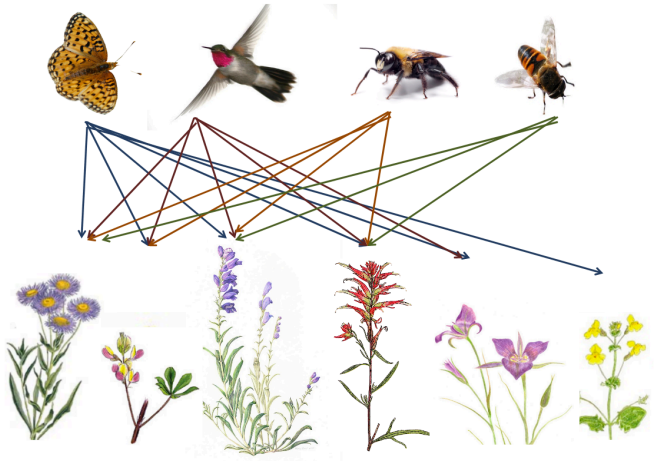






PROJECT EXAMPLES





Historical Narrative of Project Formation

- **History as Complex System**
  - Very big, very high level
  - ~5 person drinking group
- **Twitter Information Transmission**
  - 8 person group
  - Began with simple model and question
  - Extended *after* the summer school
- **Assembly of Plant Pollinator Networks**
  - Looked at how the change in positions of species using native plant restoration data
  - Attempted to apply a financial model during summer school…
  - But a subset continued collaboration after the summer school and have just submitted a publication

PROJECT EXAMPLES

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- Projects go on… and get published together!

PHYSICAL REVIEW LETTERS
moving physics forward

Highlights Recent Accepted Authors Referees Search About

Pathogen Mutation Modeled by Competition Between Site and Bond Percolation

Laurent Hébert-Dufresne, Oscar Patterson-Lomba, Georg M. Goerg, and Benjamin M. Althouse
Phys. Rev. Lett. **110**, 108103 – Published 5 March 2013

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OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

Optimizing Treatment Regimes to Hinder Antiviral Resistance in Influenza across Time Scales

Oscar Patterson-Lomba, Benjamin M. Althouse, Georg M. Goerg, Laurent Hébert-Dufresne

Published: March 29, 2013 • DOI: 10.1371/journal.pone.0059529

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OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

The Timing and Targeting of Treatment in Influenza Pandemics Influences the Emergence of Resistance in Structured Populations

Benjamin M. Althouse, Oscar Patterson-Lomba, Georg M. Goerg, Laurent Hébert-Dufresne

Published: February 7, 2013 • DOI: 10.1371/journal.pcbi.1002912

- However publication is not the primary goal here!
- Other groups continue great friendship and drink beer(s) around the world for years to come.

Intellectual Speed "Dating" Explained

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- This afternoon/ tomorrow afternoon
- Location – TBC
- Find someone you haven't spoken to yet
- 3-minutes per date, after which a bell will sound
  1. Summarise your research in 3 words (or 3 sentences if you prefer)
  2. Give one thing you want to get out of summer school
  3. Give one usual or interesting fact about yourself

THIS WEEK

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- Start coming up with project ideas
- Start talking to people
- Post your project ideas to the wiki – under the Project and Working Groups section there is space for you to put up the names, descriptions and people interested in each project
  - Please move projects to the archived section if you discontinue them
- There is also a tab on the wiki where you can post your group meeting schedule if you want to use it.

THANK YOU

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- Any questions?
- Catriona Sissons
  - c.sissons@auckland.ac.nz
  - Or contact me via slack/ whatsapp/ come find me around campus