



Introduction to Student Projects SFI Complex Systems Summer School

Catriona Sissons
June 12, 2017



GROUP PROJECTS

- 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!

GROUP PROJECTS

- 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**

FORMING GROUPS

- We prefer you to form multi-disciplinary (and cross-cultural) groups and try to work with people from different backgrounds to your own
 - Take advantage of diversity of people
 - Challenge yourself to learn and to work across disciplinary boundaries
 - Be a team player – collaboration is the goal
- Groups can be any size. They typically break down to about 3-10 people.
- You can be in more than one group - but 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.

PROJECT WORK

- 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

- 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 in ESL Building (at night)
- These should be 1 hour
- E.g., Git, R, Philosophy's role in science

PROJECT COORDINATOR

- 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
 - c.sissons@auckland.ac.nz
- Come find me at the CSSS

PRESENTATION DAY!



- **July 6th from 9:00am-5:00pm** in the Noyce Conference Room at SFI
- The presentations are 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.
- Email your slides to me the night before at c.sissons@auckland.ac.nz **July 5th by 7pm**
- A sign-up sheet for the presentation schedule will be posted on the wiki
- SFI community will be in attendance during your presentations

REPORTS

- Due to Carla by **midnight July 5th**.
- 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



- A final paper from each group is due to **Carla by November 1, 2017.**
- 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 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

■ **Week 2:**

- 10 minute long “check ins”
- With me/ Dave/ Josh Garland
- First 5 minutes pitch your project
- 5ish minutes to discuss where to go with it
- There will be a signup page on the wiki
- This is in 7 days!

■ **End of Week 3:**

- 5 minute long “check ins” to make sure everything is on track

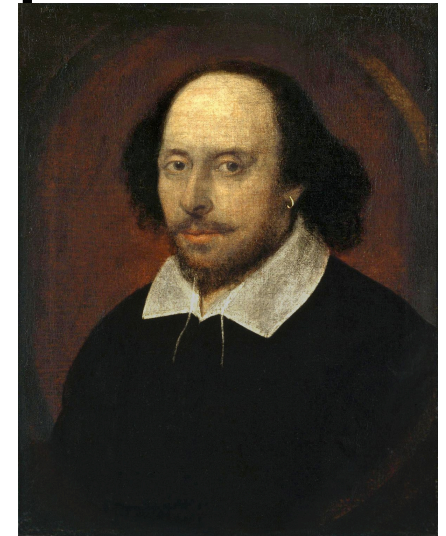
■ **Don't forget to use the wiki!**

- Post up details about your project ideas and signup to projects
- Please move projects to the archived section if you discontinue them

PROJECT EXAMPLES

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

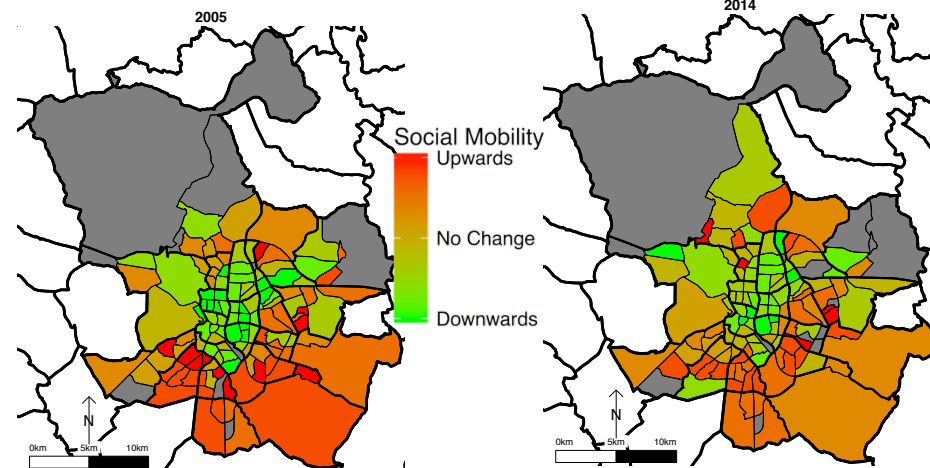
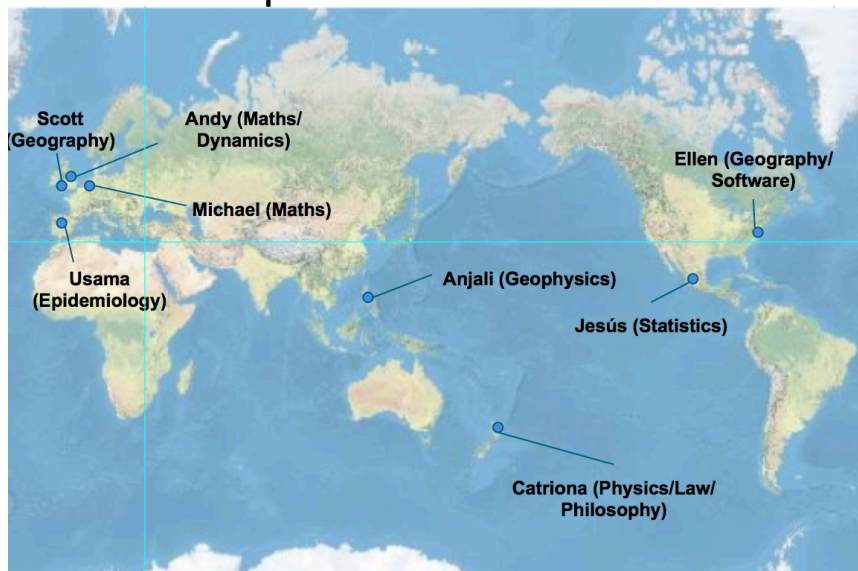
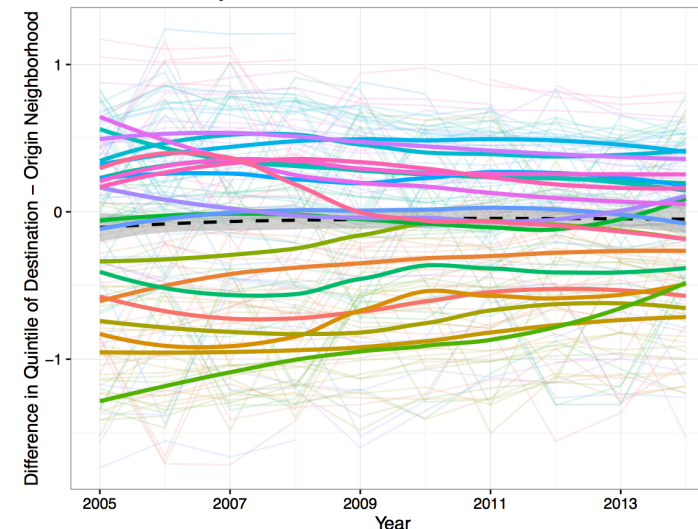


PROJECT EXAMPLES

Characterized the residential mobility network in Madrid

- 8 people, everyone from different disciplines, 8 countries, 3(-4) continents.
- Mobility flows, effect of the 2008 GFC
- Identifying rapidly changing and gentrifying communities
- Presented at CCS'16 in Amsterdam, plans for publication

Social Mobility associated with Residential Relocation in Madrid



PROJECT EXAMPLES

Historical Narrative of Project Formation

■ History as Complex System

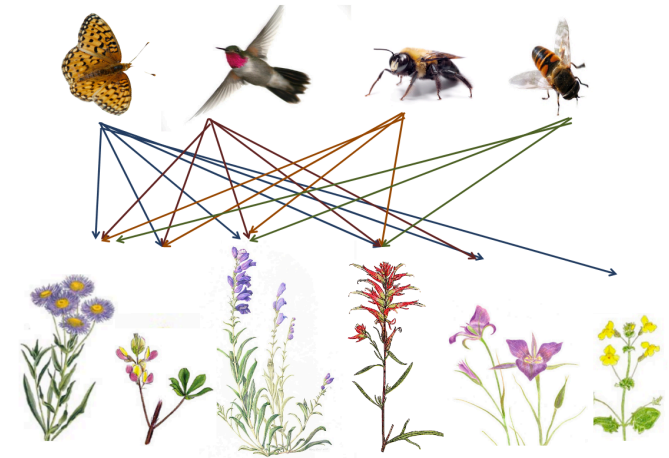
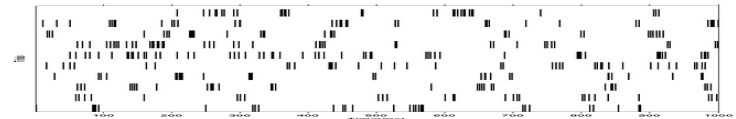
- Very big, very high level
- ~5 person drinking group

■ 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... which didn't work
- But a subset continued collaboration after the summer school and have just submitted a publication



PROJECT EXAMPLES

- Projects go on... and get published together!

PHYSICAL REVIEW LETTERS

moving physics forward

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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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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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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

- Other groups continue great friendship and drink beer(s) around the world for years to come.

Intellectual Speed “Dating” Explained

- 4pm today – in the courtyard behind where you checked in yesterday
- 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



THANK YOU



SANTA FE
INSTITUTE

- Any questions?
- Catriona Sissons
 - c.sissons@auckland.ac.nz