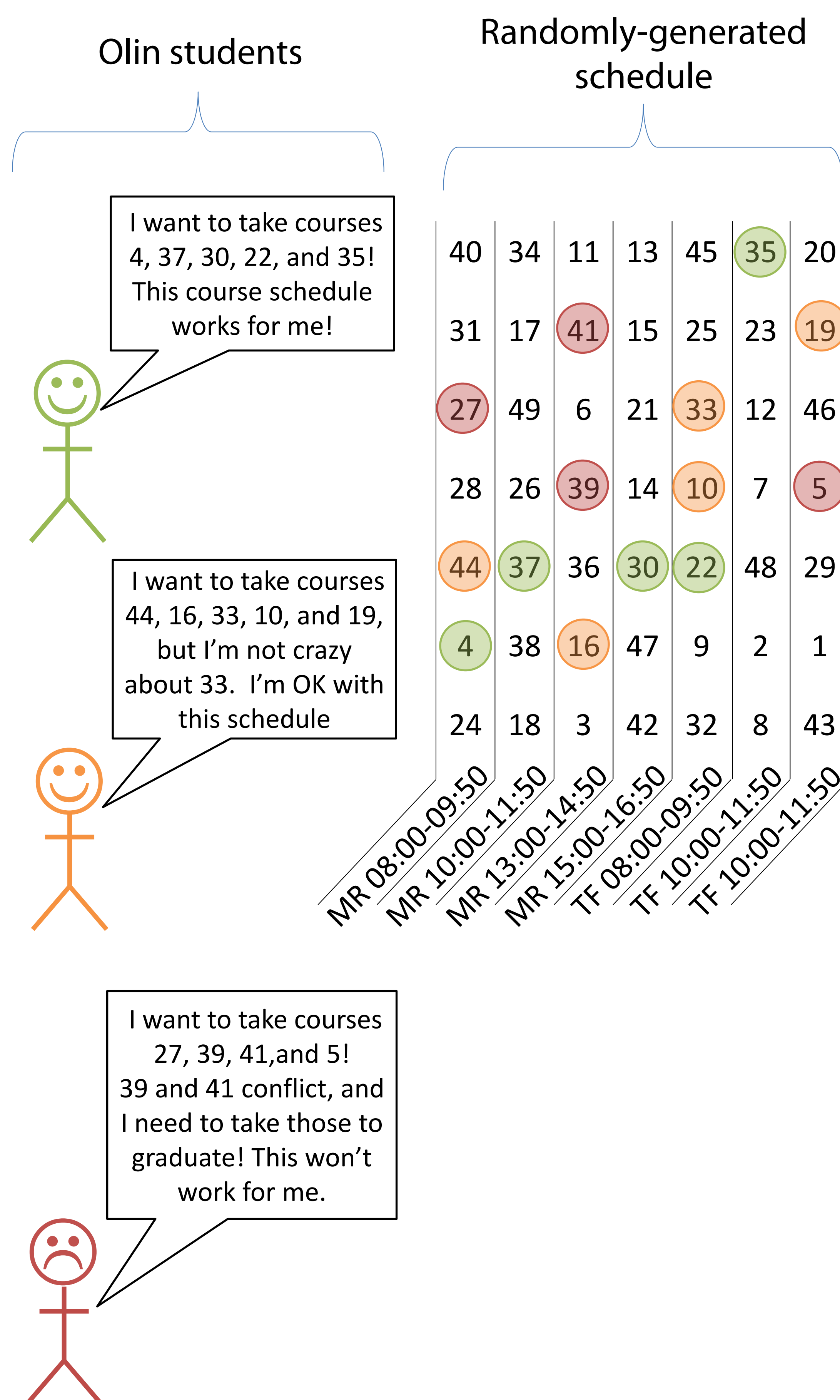


An Algorithm for Improving Class Scheduling at Olin

Katherine Elliott, 2010

For each randomly generated schedule, the percentage of students who are **happy**, **OK**, or **unhappy** with their schedules is calculated.

- Happy students have zero conflicts
- OK students have 1 unimportant* conflict
- Unhappy students have 1 important* conflict or 2+ important conflicts



Can we optimize the Olin schedule to minimize potential student course conflicts?

Currently, each semester's class schedule is hand-composed by the wonderful Linda Canavan. In order to help the StAR explore possible options for a course schedule, we are creating a tool that will generate an optimal schedule based on a student course preference survey. Our goal is to create a tool that will **find the course schedule with the minimum number of course conflicts**.

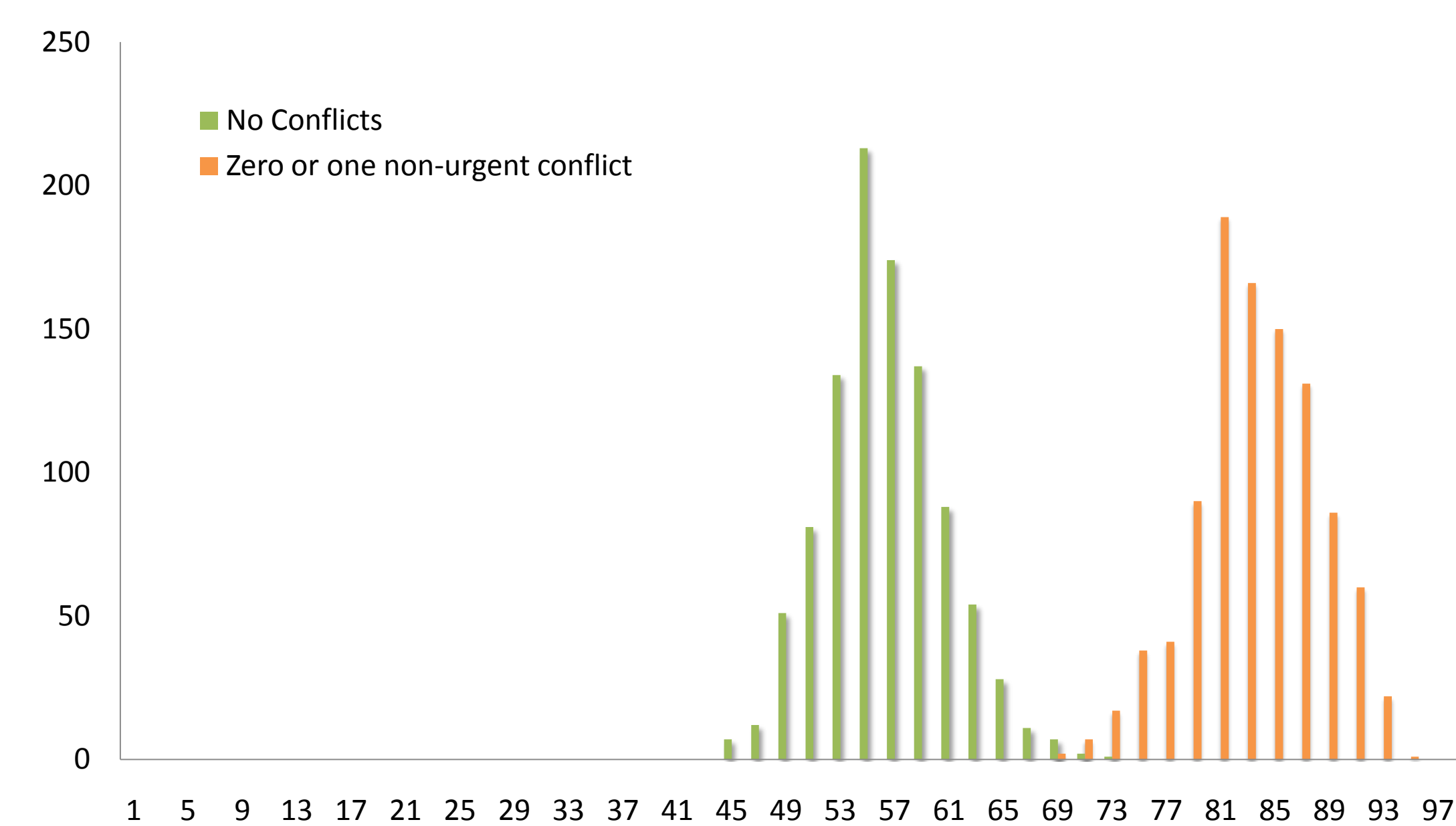
Results

Our algorithm came up with a schedule that gave **72% of students a conflict-free schedule**, with an additional **19% having one unimportant conflict for a total of 91% being happy or OK with their schedule**.

This is the "best-fit" schedule that came from testing 1000 random schedules. Other "best-fit" schedules may result from running another 1000 random schedules.

MR 8:00 - 9:50	MR 10:00 - 11:50	MR 13:00 - 14:50	MR 15:00 - 16:50	TF 8:00 - 9:50	TF 10:00 - 11:50	TF 13:00 - 14:50
What is Change?	SigSys	PoE	Theoretical E&M	AHS Capstone	Mobile Apps	Mech Prototyping
EDS	FOMSO	Circuits	Thermo	Project Mgmt Design since 1900	DFM	Software Design Modeling E&M
Mech Aero II	Metals & Alloys	Chem	DiffEq	UOCD	Bio	Sensors
Relativity	ProbStat	Leadership	Vector Calc	Wireless Comm	MAD VLSI II	Mech Solids
Orgo II	Process Eng	Microbial Diversity	El Capstone	Chaos	[blank]	Teaching and Learning Exp. Mechanics
Cell BioE	Archaeology	FBE	DSP	Bio-mechanics	MatSci	
DED	Controls	LinAlg	Six Topics E:C			

Number of schedules by the percentage of students satisfied



This histogram shows the different values of "percent happy" and "percent happy or OK" that result from 1000 random schedules. The mean percent happy is 56.8% and the mean percent OK or happy is 83.9%.

Methods

1. Conduct a survey: "If scheduling were not an issue, **which classes would you have taken for the spring 2010 semester?** Also, on a scale from 1 to 5, how much did you want to take each of those courses?"
2. Eliminate irrelevant courses (OSS, Research, etc.) and decide on 48 courses distributed among 7 timeslots
3. Generate thousands of random schedules
4. Calculate the percentage of students who are **happy**, **OK**, or **unhappy** with each randomly generated schedule
5. **Pick out the schedule with the fewest number of potential student conflicts**

Improvements

According to survey data, with the *actual* spring 2010 schedule, 84% of students have no conflicts and 97% are happy or OK with their schedules. This means our algorithm needs improvement.

1. More realistic timetable

We plan to allow certain classes to meet on Wednesday and after-hours. This will cut down on the number of conflicts.

2. Generate schedules more intelligently

We plan to implement an algorithm that learns which courses are likely to conflict and avoids putting them in the same column.

3. Flexible number of timeslots

4. Add visualization

Generate a graphical representation of the "best fit" schedule after the script is done running to aid in running sanity checks.

5. Faculty preferences for timeslots

6. Survey before schedule

We believe that the strong percentages above are partially due to a cognitive bias. To eliminate this bias, we should release this survey before any course registration materials are published.

* An "important" conflict is one between two classes that a student has ranked #1 or #1 and a #2 class. All others are "unimportant"