Maths as a career:
think about it

Ty Stanford

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School of Mathematical Sciences
The University of Adelaide
Maths isn’t just a subject at school!

Maths is something you can continue to do beyond school

- There is a shortage of STEM professionals
- Having mathematical training gives you the skills to work in all sorts of areas
Jobs

- Biostatistician
- Bioinformatician
- Actuary
- STEM teacher
- Meterologist
- Physicist/astronomer/cosmologist
- Data scientist
- […plenty more…]
Applications

- Health
- Predicting weather
- Algorithms/computing
- Optimising locations of emergency services
- Programming traffic signals
- Finding relationships between variables in large databases
- [...plenty more...]
Places you can work

- Hospitals
- Universities
- Government
- Financial institutions
- Tech companies
- Pharmaceutical companies
- [...plenty more...]
Why I chose maths

- Liked maths in school
- Found out you could do maths degree at uni
  - Bachelor of Mathematical & Computer Sciences
- Found out I loved it even more - maths, statistics, programming
Why maths is the best

- Problems solving
- You can answer questions very few can
- You can genuinely help other people
- Get to collaborate with people in different fields
- Teaches logic and critical thinking
Example 1: Safer hip replacements

Figure IP4(a) taken from the AOA NJRR Annual Report 2015
### Example 2: AFL home ground advantage

<table>
<thead>
<tr>
<th>Venue</th>
<th>Home Team</th>
<th>Home Score</th>
<th>Away Team</th>
<th>Away Score</th>
<th>Score Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>Richmond</td>
<td>20.17 (137)</td>
<td>Hawthorn</td>
<td>21.5 (131)</td>
<td>6</td>
</tr>
<tr>
<td>TD</td>
<td>W Bulldogs</td>
<td>21.15 (141)</td>
<td>Collingwood</td>
<td>14.16 (100)</td>
<td>41</td>
</tr>
<tr>
<td>MCG</td>
<td>Hawthorn</td>
<td>11.9 (75)</td>
<td>Sydney</td>
<td>20.9 (129)</td>
<td>-54</td>
</tr>
<tr>
<td>Sub</td>
<td>West Coast</td>
<td>10.14 (74)</td>
<td>Adelaide</td>
<td>12.10 (82)</td>
<td>-8</td>
</tr>
<tr>
<td>AAMI</td>
<td>Port Adel</td>
<td>18.12 (120)</td>
<td>Fremantle</td>
<td>11.9 (75)</td>
<td>45</td>
</tr>
<tr>
<td>TD</td>
<td>St Kilda</td>
<td>28.18 (186)</td>
<td>Bris Lions</td>
<td>7.5 (47)</td>
<td>139</td>
</tr>
<tr>
<td>SS</td>
<td>Geelong</td>
<td>10.9 (69)</td>
<td>Richmond</td>
<td>10.8 (68)</td>
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<tr>
<td>TD</td>
<td>Carlton</td>
<td>12.11 (83)</td>
<td>Kangaroos</td>
<td>17.11 (113)</td>
<td>-30</td>
</tr>
<tr>
<td>MCG</td>
<td>Essendon</td>
<td>12.13 (85)</td>
<td>Melbourne</td>
<td>13.17 (95)</td>
<td>-10</td>
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<tr>
<td>Home-ground advantage</td>
<td>Estimate</td>
<td>Standard error</td>
<td>$P$-value</td>
<td></td>
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<td>----------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>$\lambda_{Adel}$</td>
<td>19.0</td>
<td>4.1</td>
<td>0.000</td>
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</tr>
<tr>
<td>$\lambda_{Bris}$</td>
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<td>$\lambda_{Geelong}$</td>
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<td>$\lambda_{Melb}$</td>
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<td>4.1</td>
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<tr>
<td>$\lambda_{Sydney}$</td>
<td>10.6</td>
<td>4.8</td>
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</table>
Example 3: Maths to diagnose disease

<table>
<thead>
<tr>
<th>Sneezes</th>
<th>Sick</th>
<th>Healthy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td></td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
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<tr>
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<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Example 3: Maths to diagnose disease

Sneezes
0 1 2 3 4 5 6
Sick
Healthy

- Sick
- Healthy

Sneezes
0 1 2 3 4 5 6
What if we also use headaches as a factor?

- We have four factors
These are the different areas I have worked

- Cancer diagnosis
- Nutrition for infant development
- Scaling of year 12 subject scores
- Analysis of hip and knee replacement operations
- Analysing the home-ground advantages of AFL clubs
- Linking of databases for important health research
- Identifying ICUs with unusual performance