

Smart Campus Initiative

ADVANCED DATA ANALYTICS IN PLANNING AND MANAGEMENT

19.09.2017

JADE GERMANTIS – SPACE MANAGEMENT
DR JAN DETHLEFS – PROPERTY AND SUSTAINABILITY

Overview



Campus



Challenges



Approach



Data



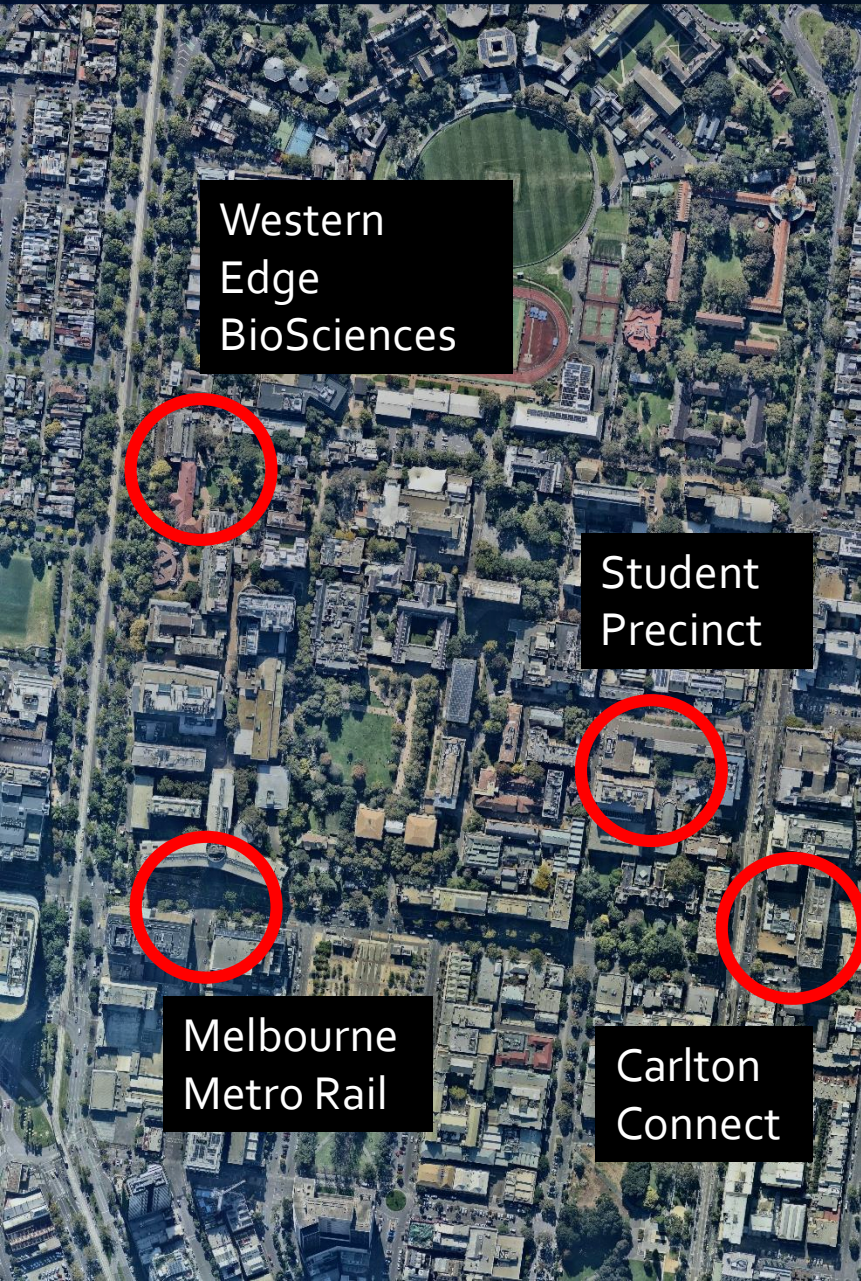
Examples





- 50,000 Students
- 7000 Staff
- 7 Campuses
- 2,500 hectares
- 800,000 GFA
- 500 Buildings
- 27,000 Spaces
- 200,000 Visitors per day
- Presence in 8 hospitals

The University of Melbourne is a city within a city. With around 200,000 visitors each day it is the 5th largest city in Victoria




Multiple simultaneous major projects combined with planned growth present challenges.

- Managing disruption to students and pedestrian flow.
- Minimizing potential impacts on timetable, research and student experience
- Mitigating impact on space

$$= \int e^{itx} \left(\frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}} \right) dx$$

 Approach

 Source more data than you think you need

$$= \int \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2+2itx}{2}} dx$$

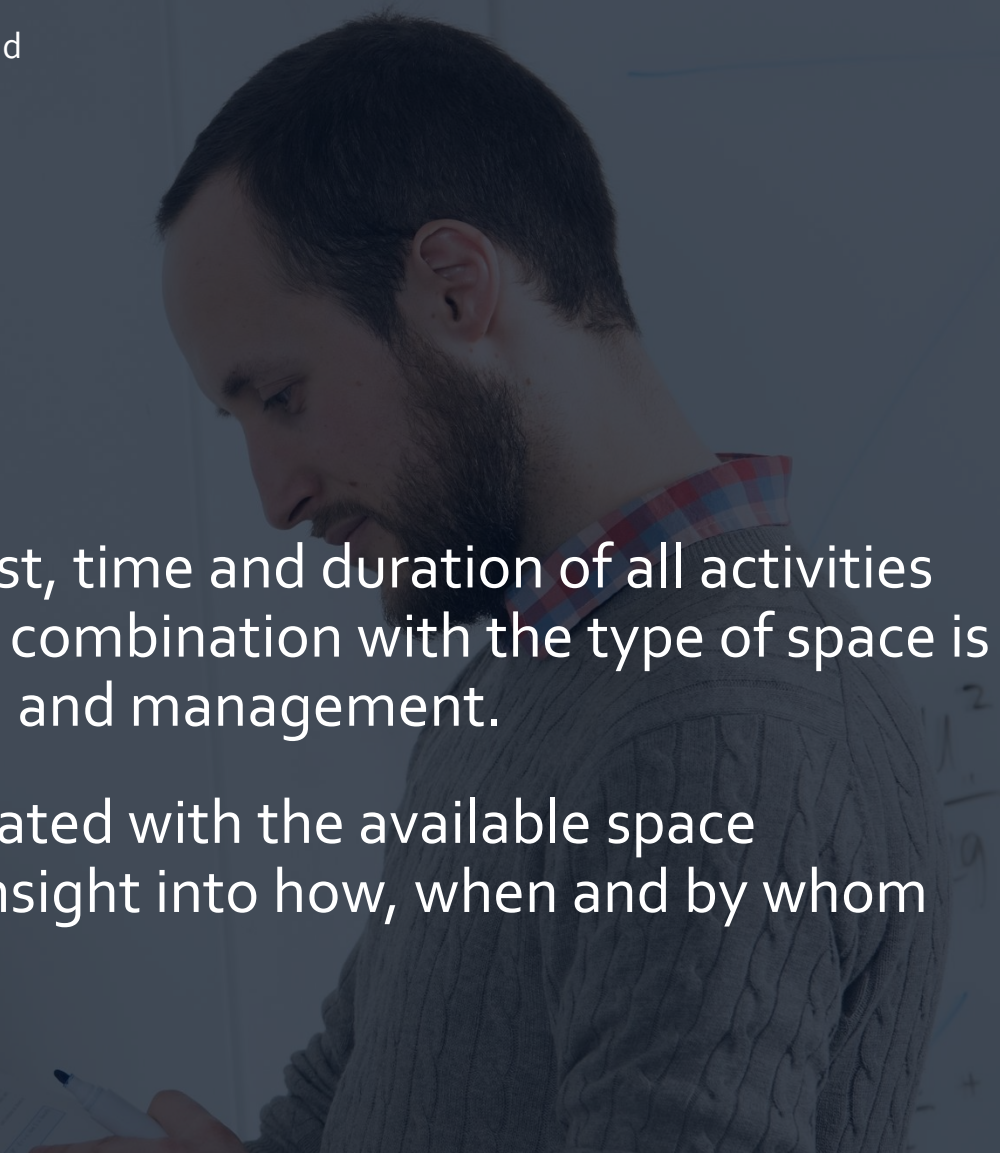
 Contextual Data

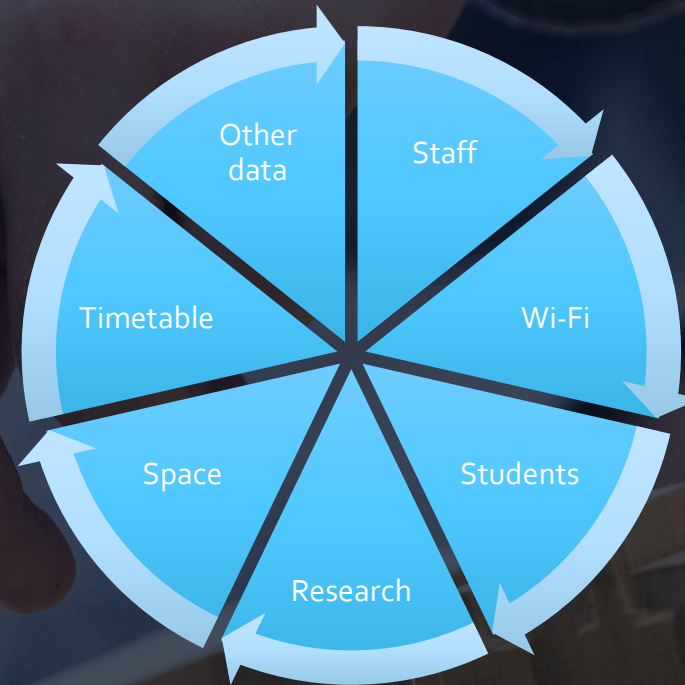
$$= \int \frac{1}{\sqrt{2\pi}} e^{-\frac{(x-it)^2}{2} - \frac{t^2}{2}} dx$$

$$= e^{-\frac{t^2}{2}} \int \frac{1}{\sqrt{2\pi}} e^{-\frac{(x-it)^2}{2}} dx$$

Understanding the type, cost, time and duration of all activities within the various spaces in combination with the type of space is essential for space planning and management.

Multiple datasets are correlated with the available space information to provide an insight into how, when and by whom space is used.








The amalgamation of multiple data sets provides additional insights and new dimensions for space planning and management.

Contextual data can substitute missing information and therefore enhance data accuracy.

Approach

 Ask the right question


 Design the matching data


 Bridge the gap




Examples






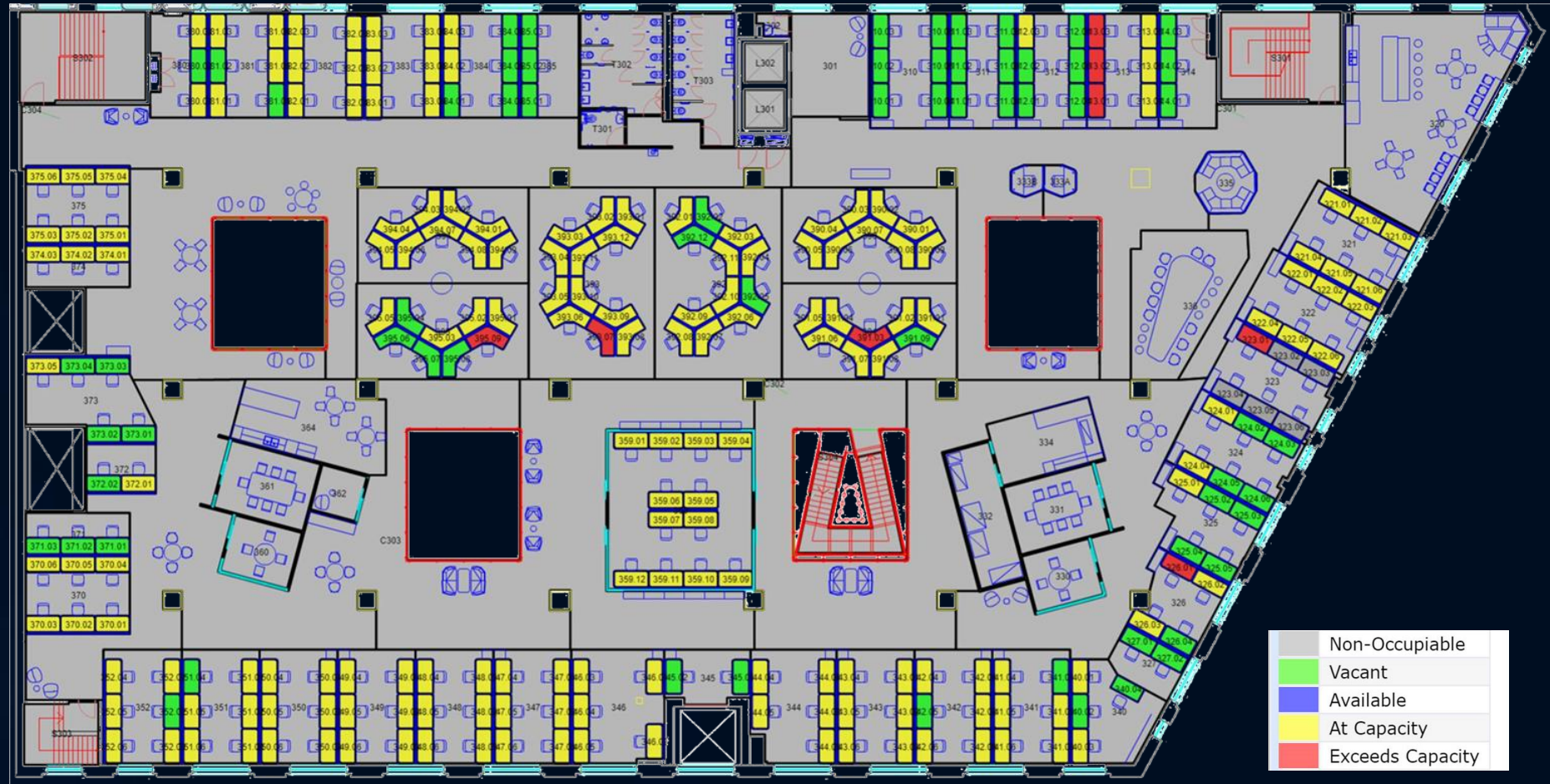
 Challenge

 Data

 Insight

Space Usage

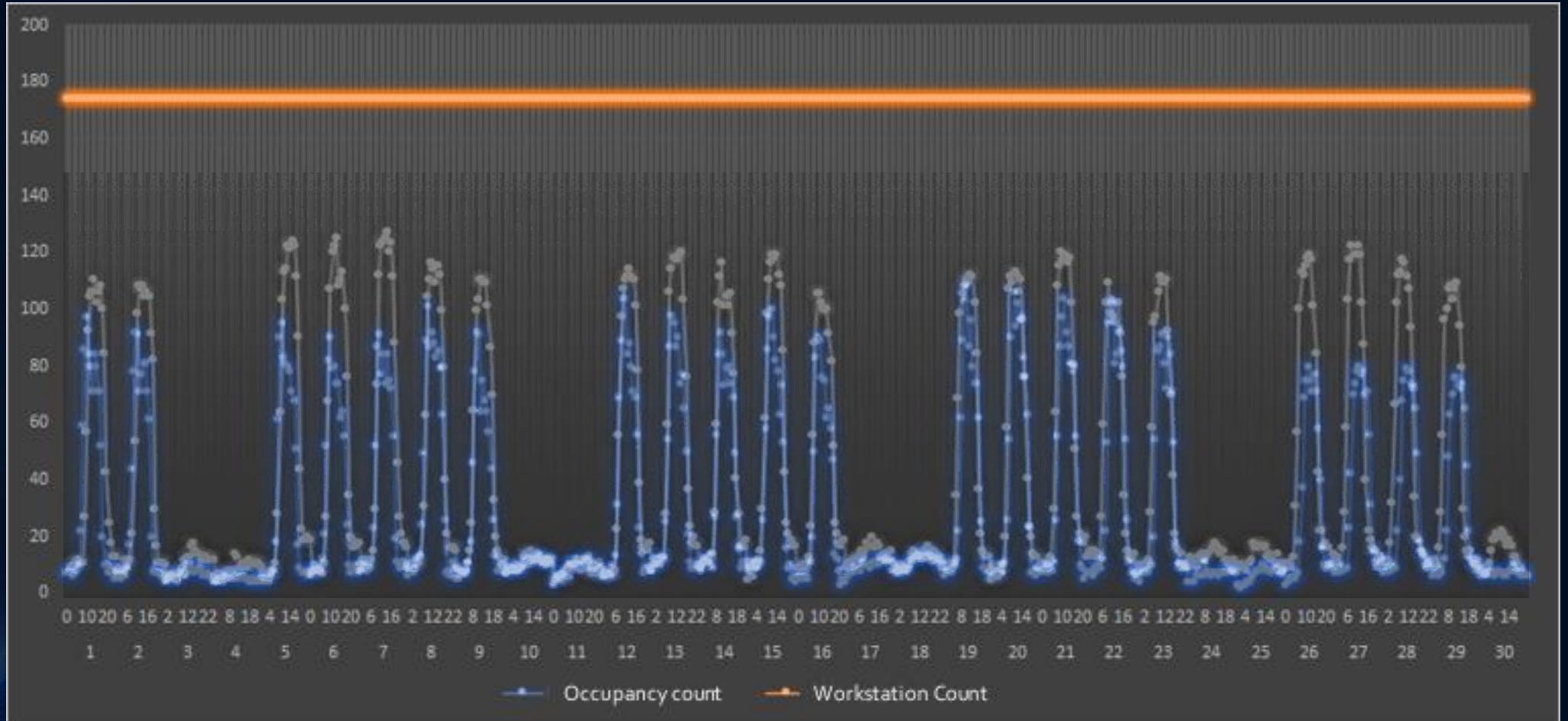
-  Space planning
-  Staff and Space Data
-  Space usage , Office planning



Space planning




Work Space Information, Wireless Data

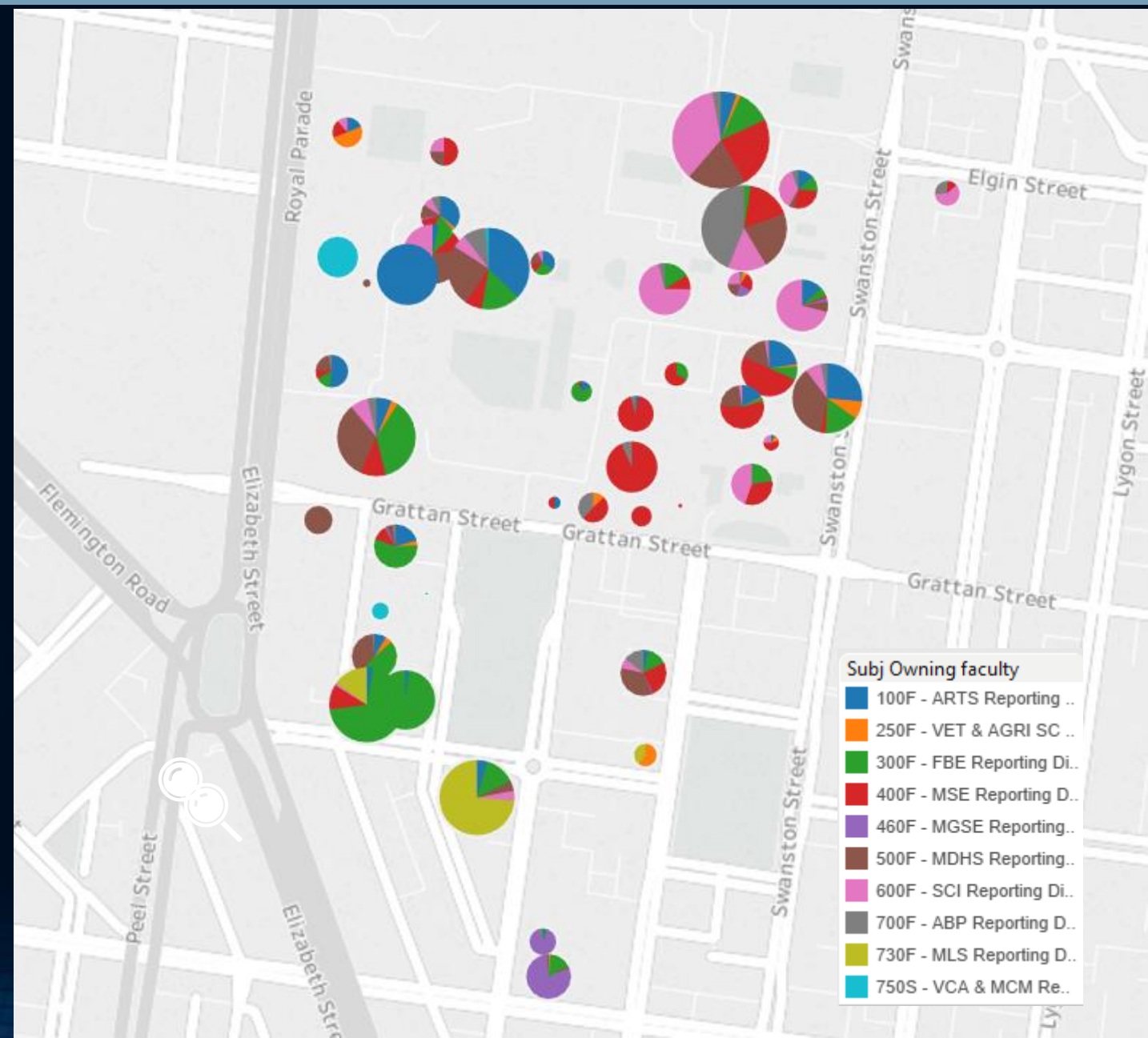
Utilisation



Daily 24 hour office space occupancy during September 2016


Space Usage


-  Space planning
-  Timetable and Space Data
-  Space usage and Student Interaction




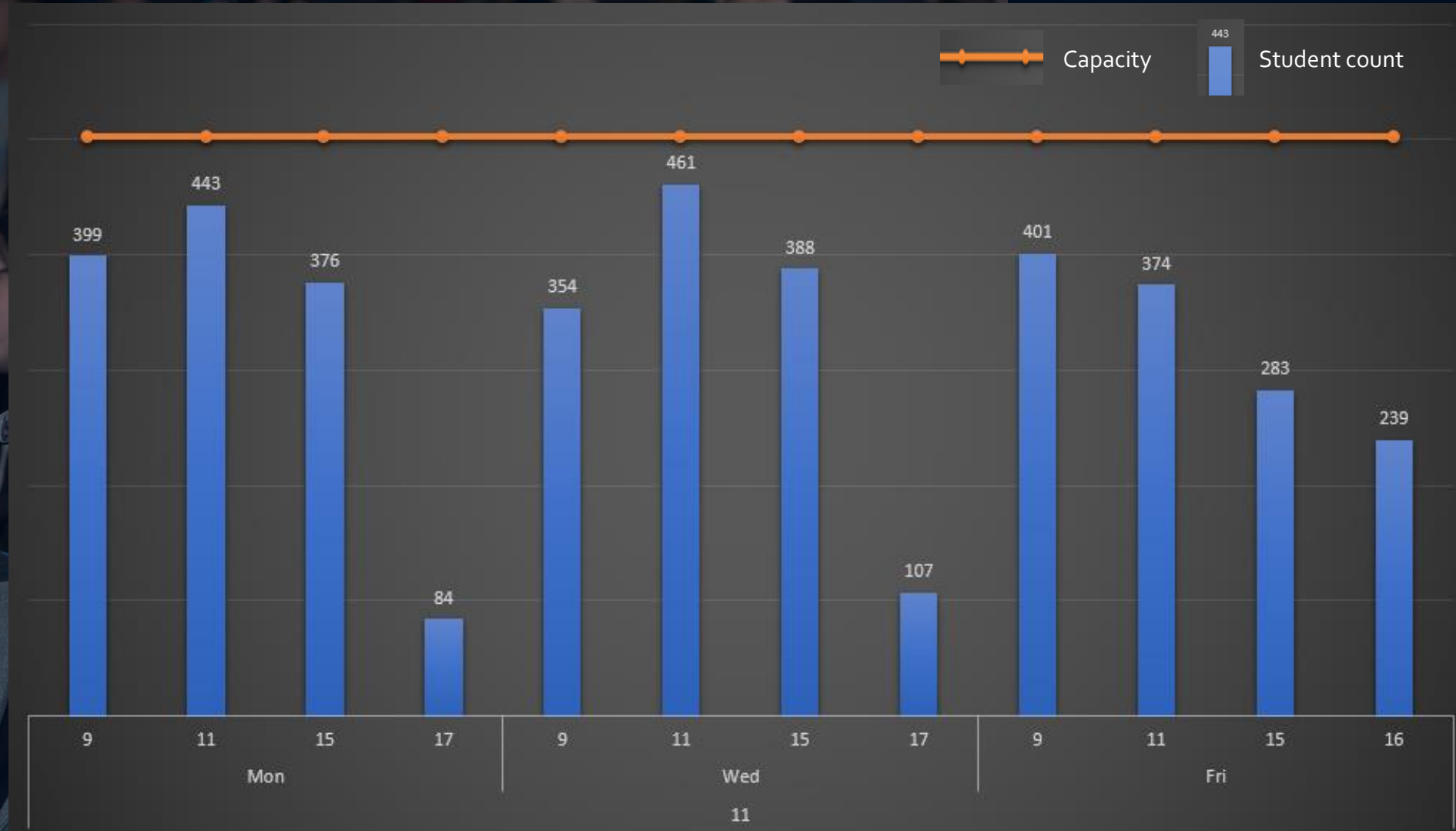
Teaching Space usage (capacity) by building and subject owning faculty.

Attendance Rates

 Space planning

 Timetable, Wireless Data

 Attendance rates



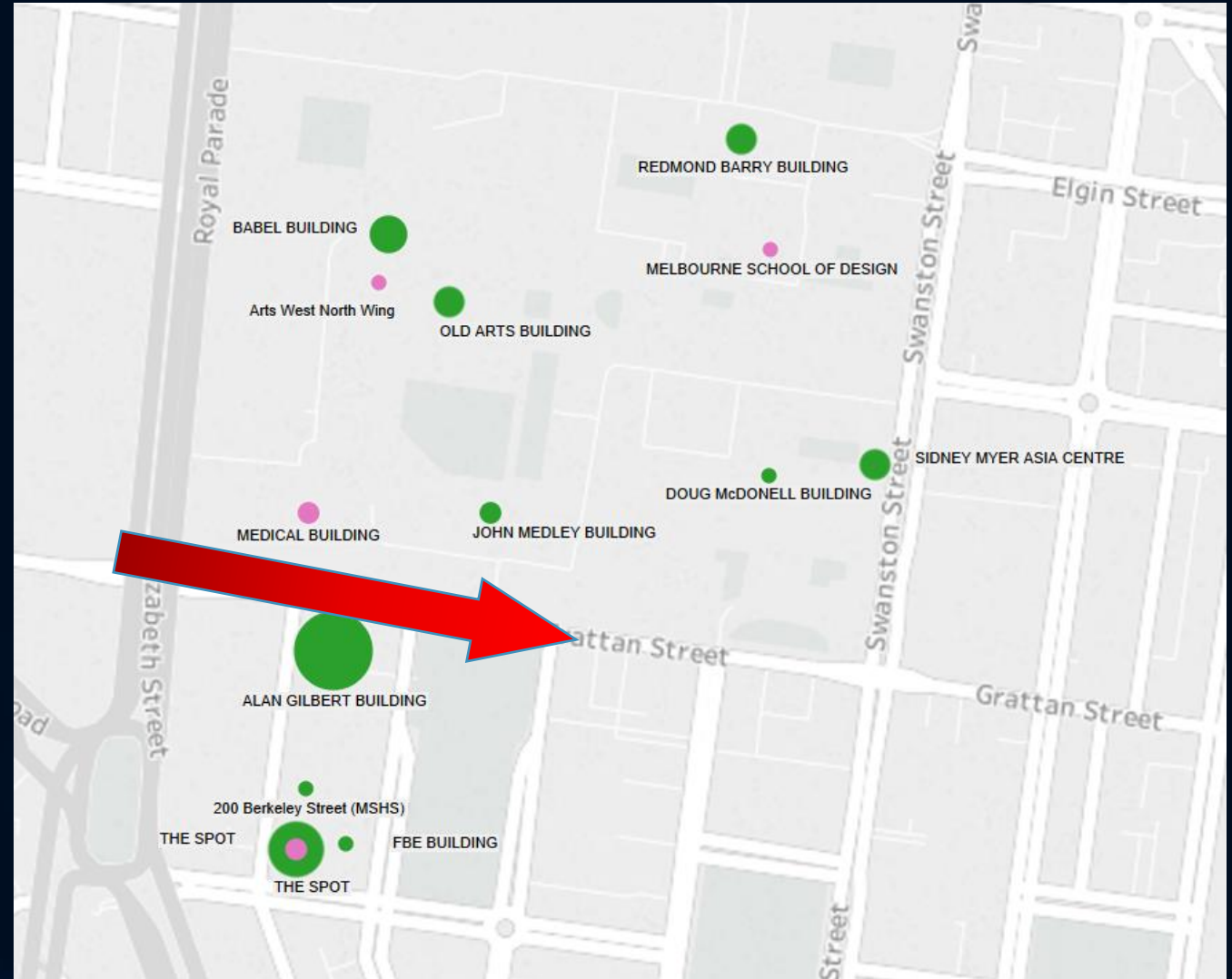
Day and hour of booked lecture theatre space for week 11, 4 streams of BioSciences Lecture

🔍 Cohort Fragmentation

🎯 Space planning

📊 Timetable and Subject data

🔍 Cohort fragmentation

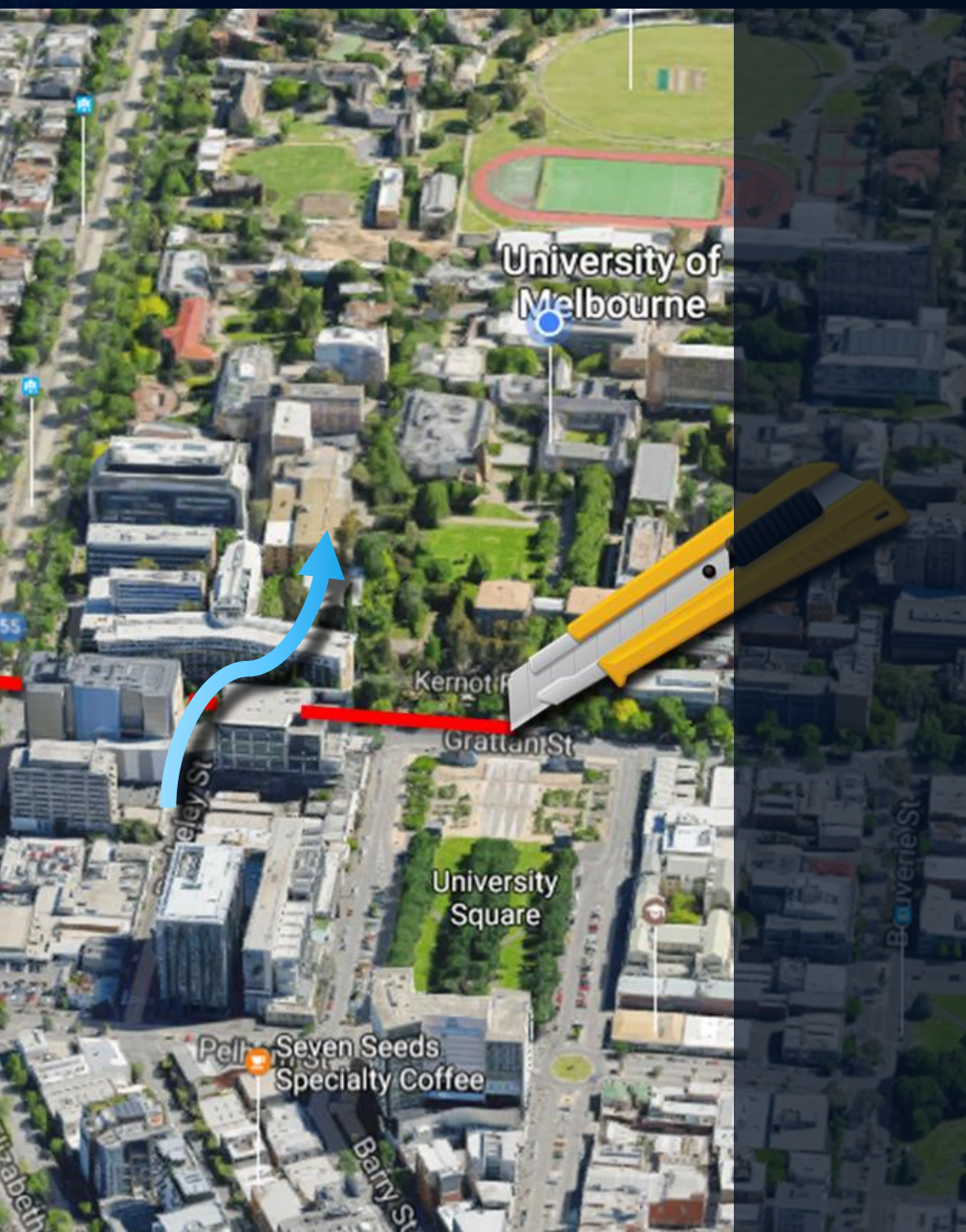


● Tutorial

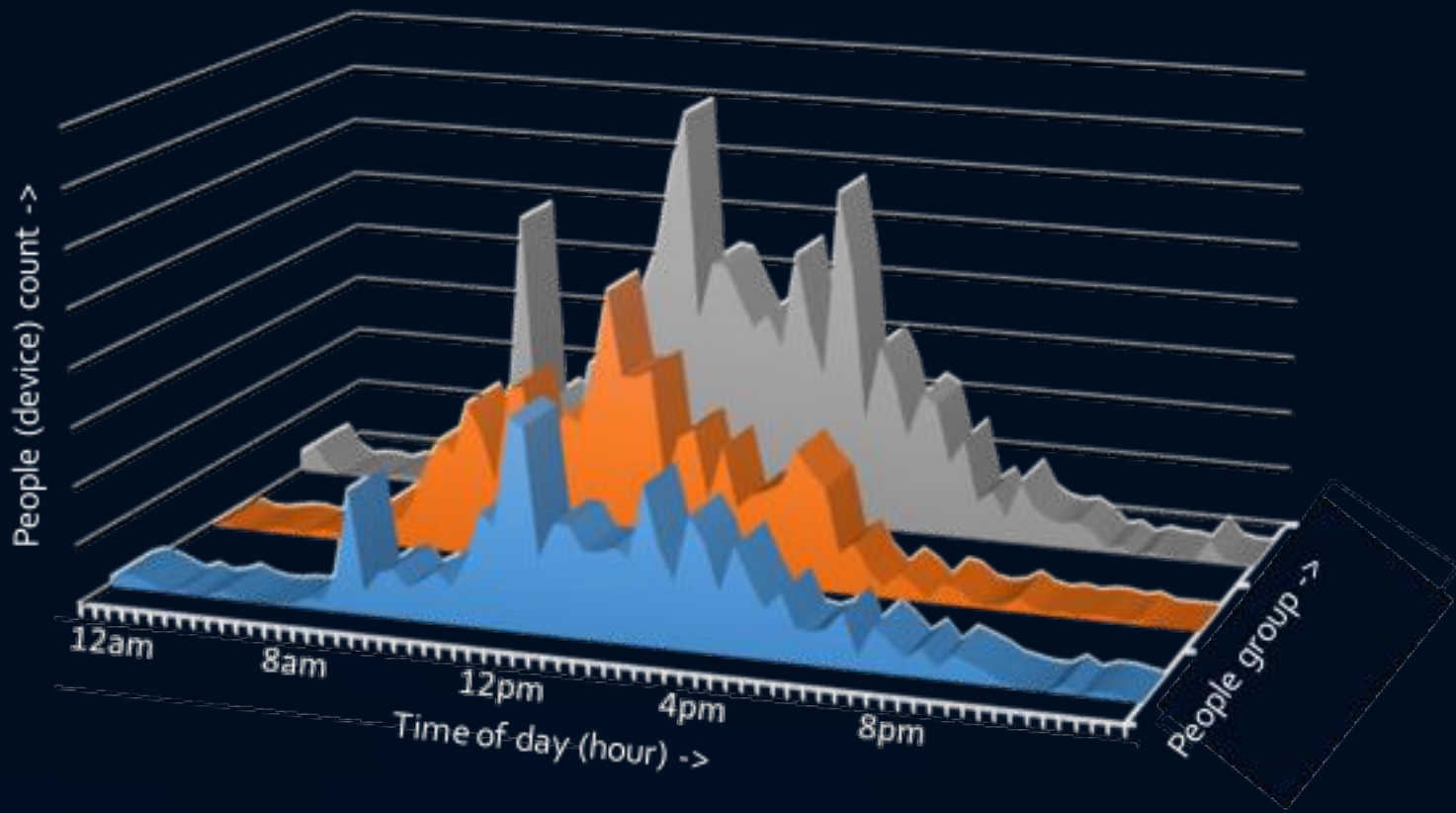
● Lecture

Teaching locations (booked hours) for Business subject with 1000+ students

TRAFFIC



- Melbourne Metro Rail
- Wireless Data
- Campus Traffic



More than 20,000 people cross Grattan Street on a daily basis.



We want to focus on big questions and big answers, not big data!

Top rules for effectively using data

$$\begin{aligned} &= \int e^{itx} f_x(x) dx \\ &= \int e^{itx} \left(\frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}} \right) dx \\ &= \int \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2 + 2itx}{2}} dx \\ &= \int \frac{1}{\sqrt{2\pi}} e^{-\frac{(x-it)^2}{2}} e^{-\frac{t^2}{2}} dx \\ &= e^{-\frac{t^2}{2}} \underbrace{\int \frac{1}{\sqrt{2\pi}} e^{-\frac{(x-it)^2}{2}} dx}_{=1} \end{aligned}$$

- Don't fall prey to marketing hype
- Use "Excel"
- Track more data than you think you need
- Think about conversion – data needs to talk to each other
- Be sceptical of the data
- Test it, test it, test it
- Repeat all the things (iterate)

Open Day 2016 11am



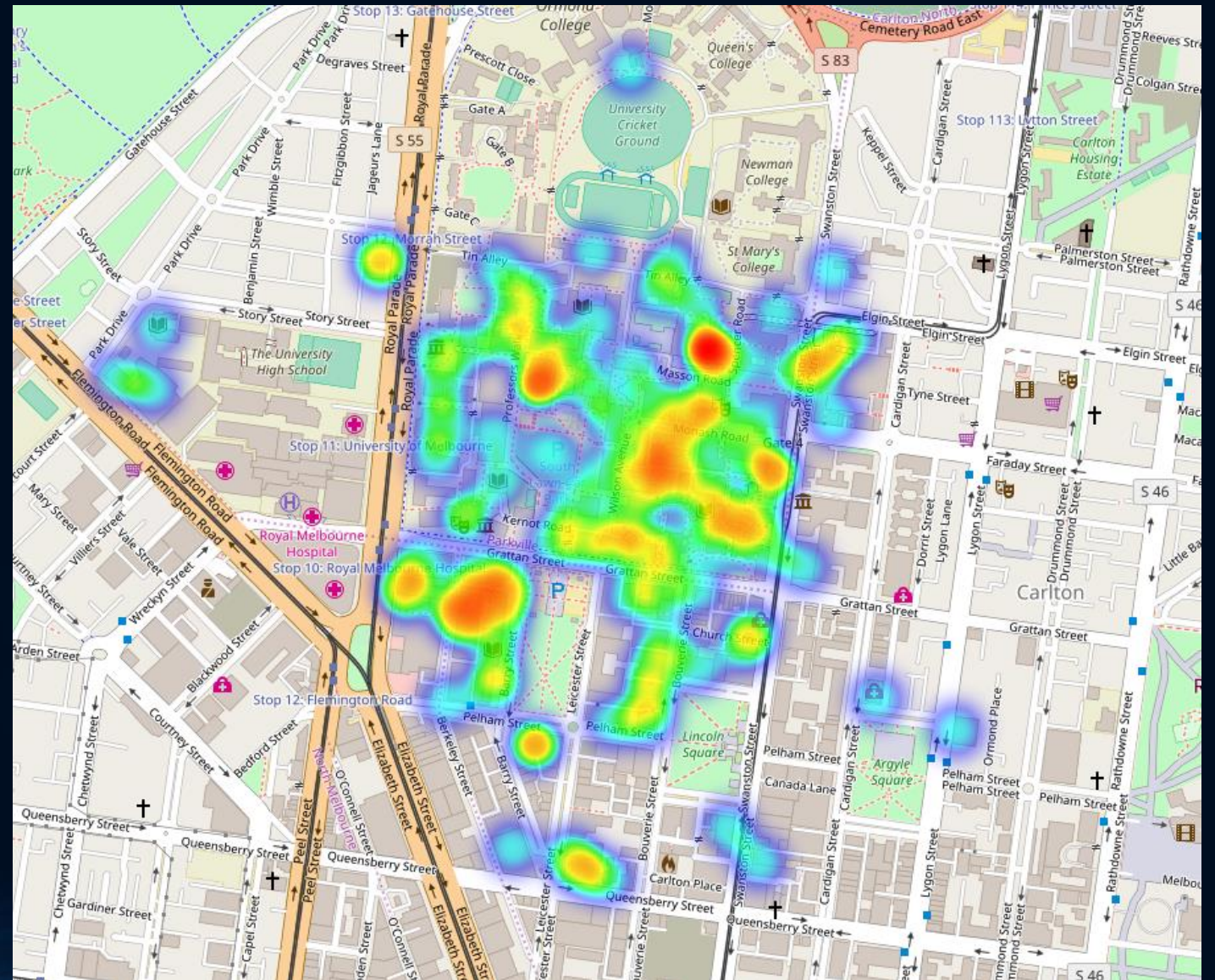
Campus visitation






Wireless, Space Data

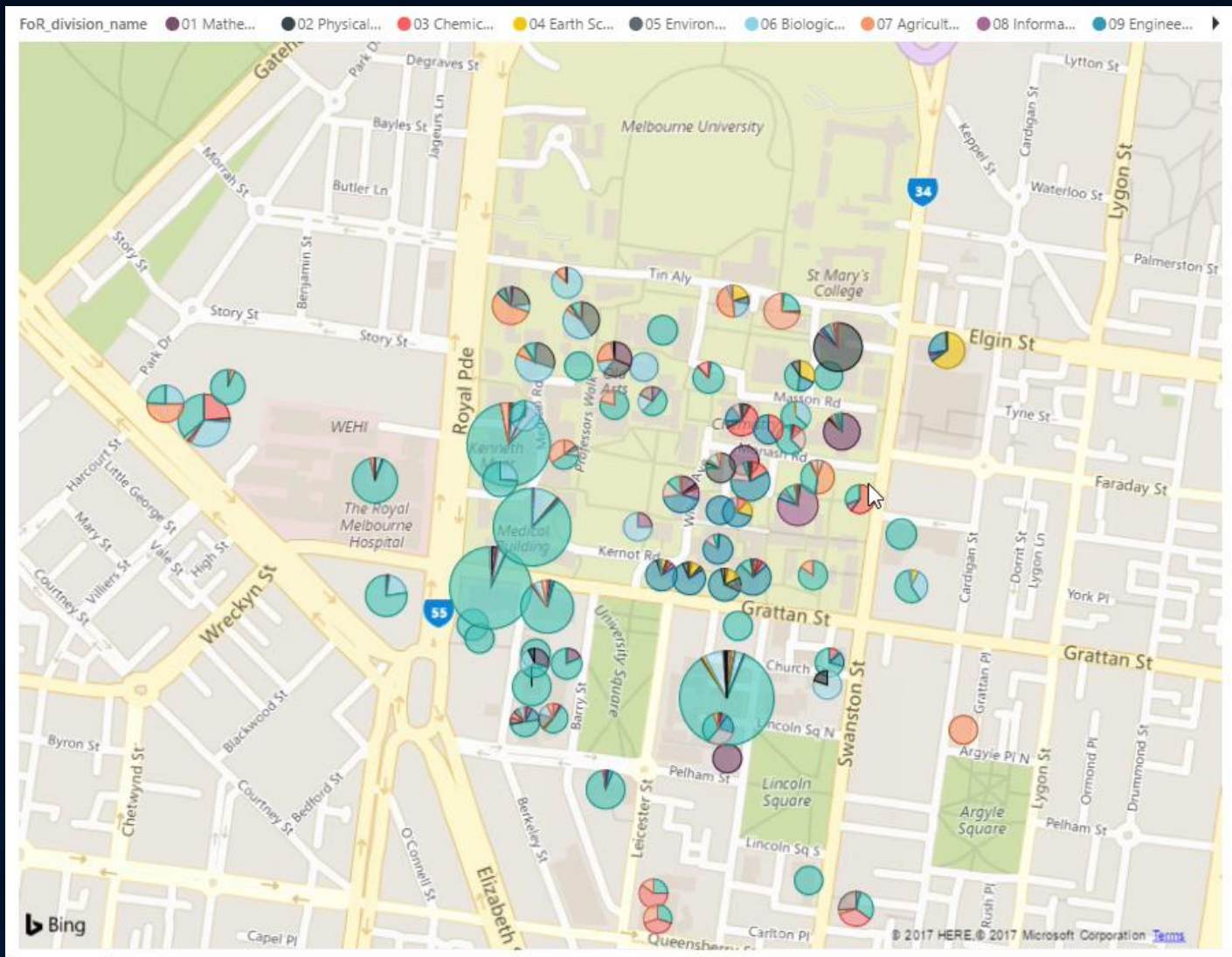


Key locations



Research Locations

-  Optimize Space
-  Research Income
-  Co-Location Opportunities



Type

- HASS
- STEM


FoR_division_name

- 01 Mathematical Sciences
- 02 Physical Sciences
- 03 Chemical Sciences
- 04 Earth Sciences
- 05 Environmental Sciences
- 06 Biological Sciences
- 07 Agricultural and Veterinary Sciences
- 08 Information and Computing Sciences
- 09 Engineering
- 10 Technology
- 11 Medical and Health Sciences
- 12 Built Environment and Design
- 13 Education
- 14 Economics
- 15 Commerce, Management, Tourism and Services
- 16 Studies in Human Society
- 17 Psychology and Cognitive Sciences
- 18 Law and Legal Studies
- 19 Studies in Creative Arts and Writing
- 20 Language, Communication and Culture

Faculty2

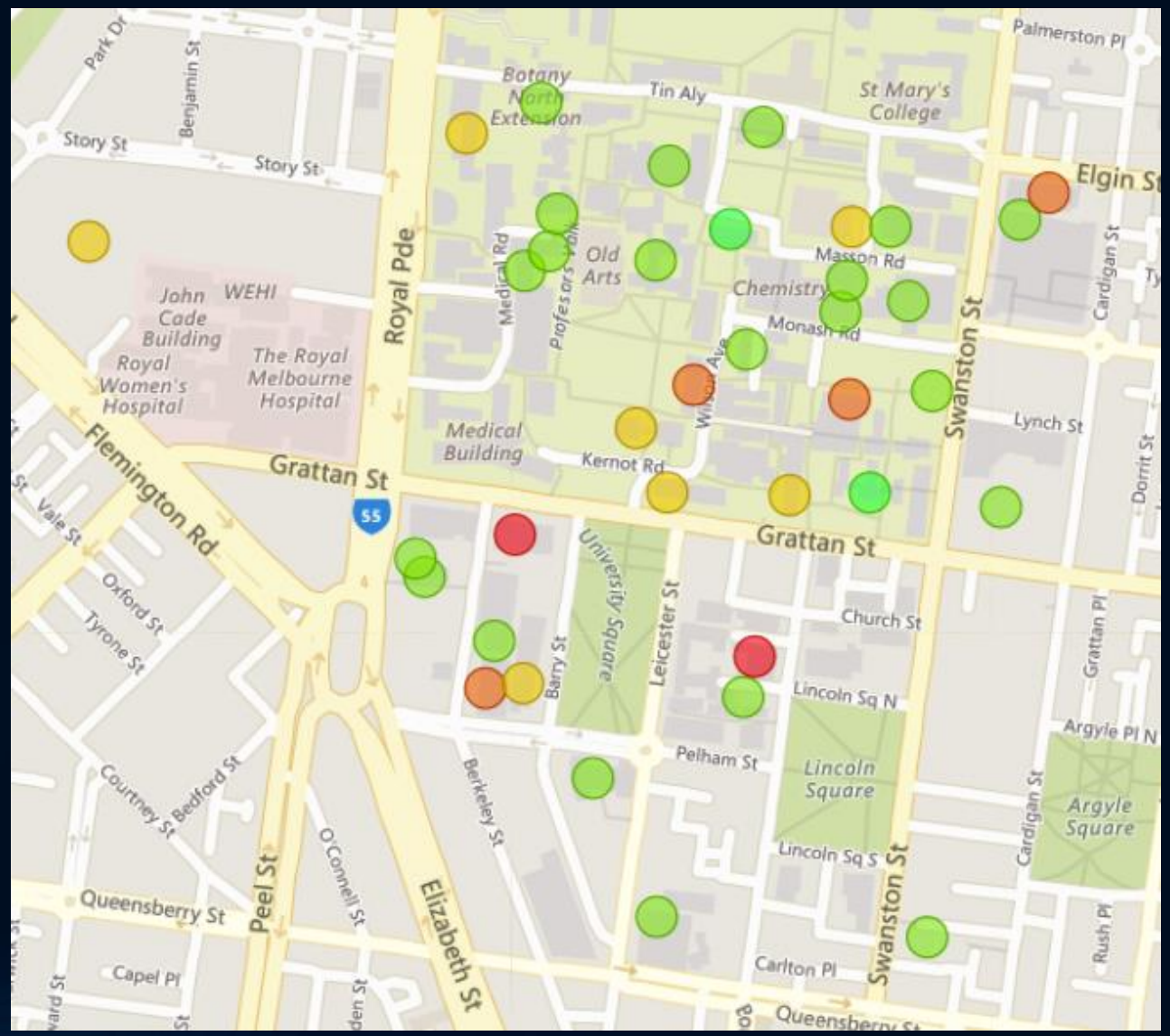
- FVAS
- MDHS
- MSE
- SCI

Decanting Potential

 Decanting


 Research data, Staff Locations, Space and Room types

 Risk Level



 High Risk
Medium Risk
Low Risk

Applications

 Challenge

 Data

 Insight



'A smart campus behaves
like a living organism and reacts
to stimuli in real time.'

Dr Jan Dethlefs – Smart Campus Initiative University of Melbourne



Thank you!

ADVANCED DATA ANALYTICS IN
PLANNING AND MANAGEMENT

19.09.2017

JADE GERMANTIS – SPACE MANAGEMENT
DR JAN DETHLEFS – PROPERTY AND SUSTAINABILITY

