

Geographic Data Science – Lecture I

Introduction

Dani Arribas-Bel

Today

- This course
- The (geo-)data revolution
- (Geo-)Data Science

This course

Quiz

- Can you think of a **real-world** context where data and statistics are being used to make a difference?
- Have you ever heard the term "**Data Science**"?
- Have you ever written a line of **computer code**?

More stats than a GIS course, more GIS than a stats course...

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...but in a fun way!

Philosophy

- (Lots of) methods and techniques
 - General overview
 - Intuition
 - Very little math
 - Lots of ways to continue on your own
- Emphasis on the application and use
- Close connection to "real world" applications

Logistics – Website

<http://darribas.org/gds18>

GDS18

≡

ENVS363/563

Geographic Data Science

Welcome to Geographic Data Science, a course taught by Dr. Dani Arribas-Bel in the Autumn of 2018 at the University of Liverpool.

The timetable for the course is:

- Lectures: Tuesdays 9:00am–10:00am, [ERB-HLT](#)
- Computer Labs: Fridays 9:00am–11:00am, [HHUGES-HHTC](#)

Locations

- [ERB-HLT](#): Eleanor Rathbone Building – Lesley Hearnshaw Theatre
[\[URL\]](#)
- [HHUGES-HHTC](#): Harrison Hughes Building (Engineering),
Computer lab (top floor) [\[URL\]](#)

Logistics – Format

11 weeks of:

- Prep. materials: videos, podcasts, articles... 1h.
approx. (most recommended!)
- 1h. Lecture: concepts, methods, examples
- 2h. Computer practical: hands-on, application of
concepts, Python (highly *employable*)
- Further readings: how to go beyond the minimum

Logistics – Content

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- Weeks 10–11: catch up + prepare an awesome Computational Esssay

Code

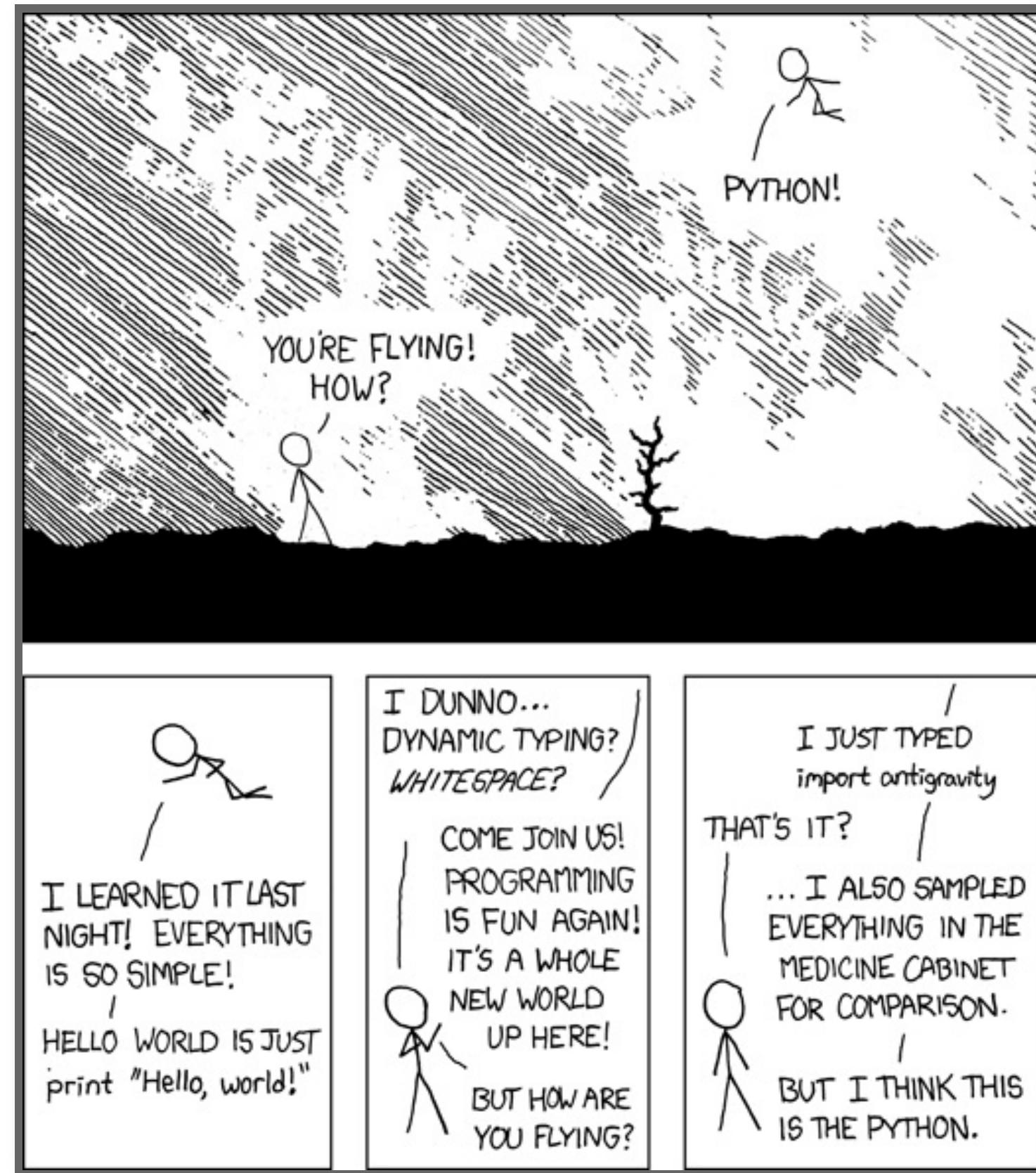


Your browser does not currently recognise any of the video formats available.
[Click here to visit our frequently asked questions about HTML5 video.](#)



Driving Vs automobile engineering

Python



Python

- General purpose programming language
- Sweet spot between "*proof-of-concept*" and "*production-ready*"
- Industry standard: GIS (Esri, QGIS) and Data Science (Google, Facebook, Amazon, Netflix, The New York Times, NASA...)

Self-directed learning

Prepare for the labs

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- Collaborate (it's NOT a zero-sum win!!!)

More help!!!

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- Learn to ask questions (but don't expect exact answers all the time!!!)
- Help others as much as you can (the best way to learn is to teach)
- Search heavily on Google + Stack Overflow

Assignments

- In-lab computer tests: W.5 (25%) and W.10 (25%)
- Computational essay (W.12, 50%)
 - Equivalent to 2,500 word
 - Report (*notebook*) with code, figures (e.g. maps), and text
- Discussion board (5%)

NOTE: recommendation letters only for great students (>70)

The (geo-)data revolution

The (geo-)data revolution

Exciting times to be a:

- Geographer
- Map fan
- Data fan

The world is being "datafied"...

"Datafication"

Quantification of phenomena through the systematic recording of data, "taking all aspects of life and turning them into data" (Cukier & Mayer-Schoenberg)

Examples: credit transactions, public transit, tweets, facebook likes, spotify songs, etc.

"Datafication"

Many implications:

- Window into human behaviour (this course)
- Opportunities for optimization of systems
(Industrial IoT, planning systems...)
- Issues with intentionality and privacy
- ...

Why now?

Why now?

Advances in:

- Computing power and storage
- Connectivity
- Geospatial technology

The (geo-)data revolution

The confluence of the three (computing, communication and geospatial) is creating large amounts of data.

Now, data in itself is not very valuable:

- Data --> Information --> Knowledge --> Action

Data Science

Methods, tools and techniques to turn data into actionable knowledge

Data Science

Statistics + ...

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- Computational tools --> Programming (hence this course's tutorials!)

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- Domain expertise --> Theories about why the data are the way they are (hence the rest of your degree)

Data Science

Statistics + ...

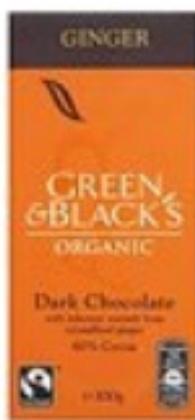
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- Communication skills --> "Story telling" (hence this course's assignments)
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Some examples...

Frequently Bought Together



+



+



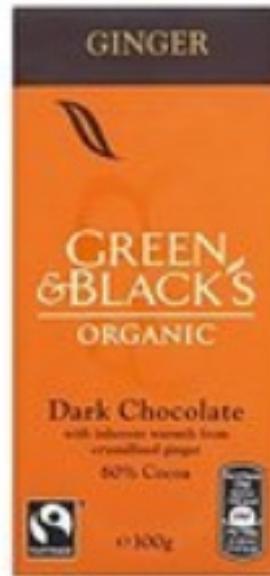
Total price: £32.97

Add all three to Basket

i These items are dispatched from and sold by different sellers. [Show details](#)

- This item:** Green and Black's Organic Dark Chocolate 85 Percent Cocoa 100 g (Pack of 5) £11.62 (£2.32 / 100 g)
- [Green and Black's Organic Ginger Dark 100 g \(Pack of 5\) £10.40](#) (£2.08 / 100 g)
- [Green and Black's Organic Dark Chocolate Maya Gold 100 g \(Pack of 5\) £10.95](#) (£2.19 / 100 g)

Customers Who Bought This Item Also Bought



Green and Black's Organic
Ginger Dark 100 g (Pack of
5)
 15
£10.40



Green and Black's Organic
Dark Chocolate Maya Gold
100 g (Pack of 5)
 5
£10.95



Green and Black's Organic
Dark Chocolate 100 g
(Pack of 5)
 22
£8.20



Vivani Organic Dark
Chocolate with 85% Coco
100 g (Pack of 5)
 25
£11.95

Free Online Dating | OkCupid - Mozilla Firefox (Private Browsing)

Free Online D... https://www.okcupid.com

Have an account? Sign in

okcupid

Join the best free dating site on Earth.

I am a Straight Woman Continue



Signing up takes two minutes and is totally free.



Our matching algorithm helps you find the right people.



iOS or Android?
You can take us to go.

Geo-Data Science

Geo-Data Science

- A (very) large portion of all these new data are inherently geographic or can be traced back to some location over space.
- Spatial is special.
- Some of the methods require an explicitly spatial treatment --> (Geo-)Data Science

Some examples...

London Neighbourhood Guide - Airbnb Neighbourhoods - Mozilla Firefox

London Neigh... +

Airbnb, Inc. (US) https://www.airbnb.co.uk/locations/london/neighbourhoods

Where are you going? Browse

Sign Up Log In Help List Your Space

Cities > London Saved Neighbourhoods 0

Find a Neighbourhood in London

What kind of neighbourhood are you looking for?

Dining × Artsy 7 Nightlife 9 Shopping 15 Loved by Londoners 11 Touristy 14

Great Transit 13 Museums & the Arts 10 Peace & Quiet 7 Along the River Thames 5 West End 7

23 neighbourhoods match Dining. See all listings

Soho
Giving the green light to its red light reputation.

Eclectic • Open-minded • China Town • Lgbt Friendly

Whitechapel/Brick Lane
Gritty outside with gallant insides.

Buzzing • Curry • Arty • Graffiti

Mayfair
Ostensibly decadent evening outings.

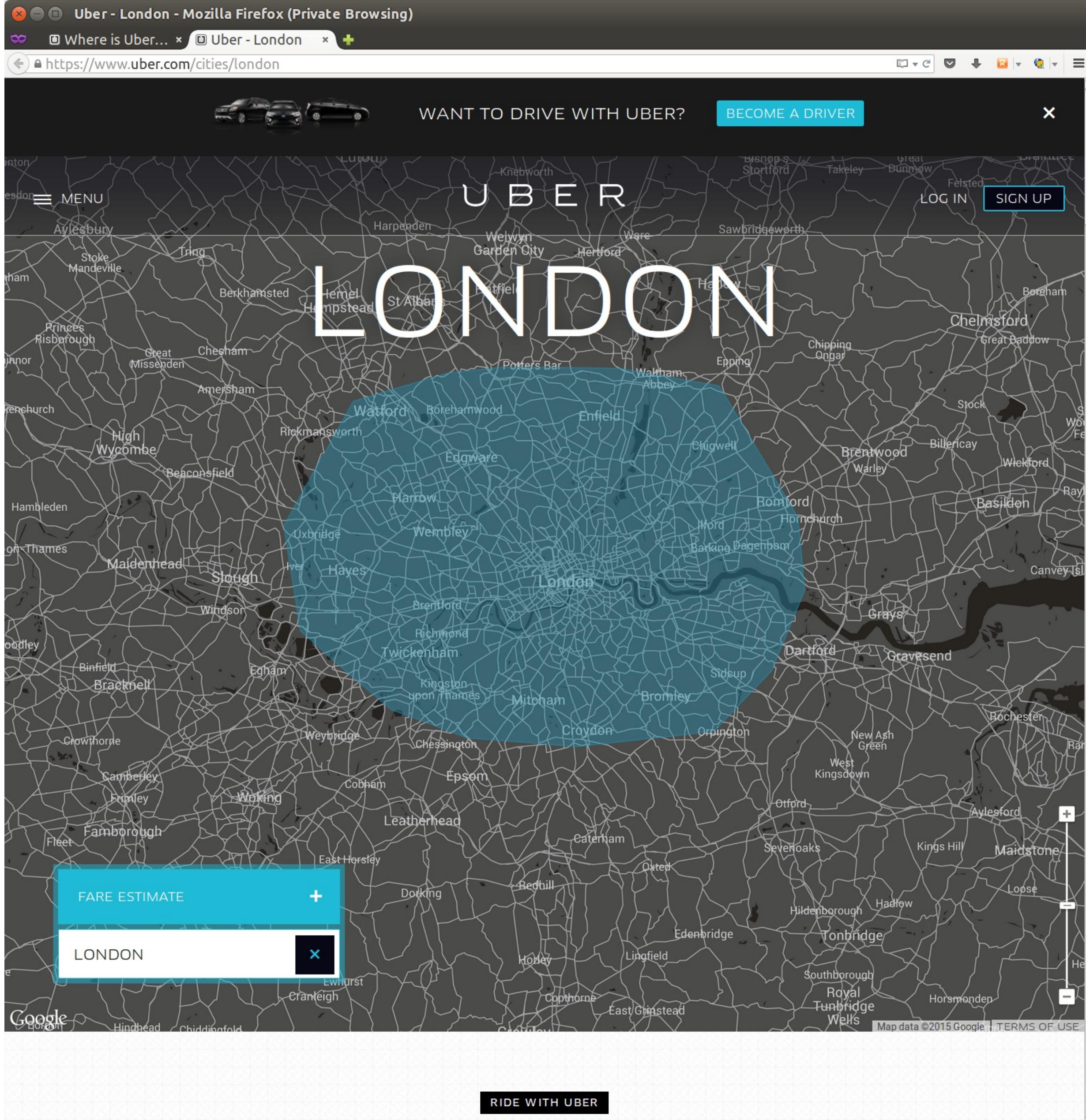
Luxury Shopping • Ballrooms • Heart Of London • Fashionable

Chelsea
Bohemians turned businessmen.

Fitzrovia
Commercial-creative hybrid community.

Islington
Fashionable from day to night.

<https://www.airbnb.co.uk/locations/london/soho>



Penny Ln, Liverpool L18 1DE, UK to University of Liverpool, Liverpool - Google Maps - Mozilla Firefox

Penny Ln, Live...

https://www.google.co.uk/maps/dir/Penny+Ln,+Liverpool+L18+1DE,+UK/University+of+Liverpool,+Liverpool/@53.3974201,-2.9788596,13z

Walking directions

via A562 49 min 2.4 miles

Show terrain

Use caution - may involve errors or sections not suited for walking

Penny Ln
Liverpool L18 1DE, UK

Head southwest on Penny Ln toward Russell Rd
79 ft

Turn right onto Russell Rd
0.2 mi

Turn left onto Smithdown Rd/A562
1.3 mi

Slight right to stay on Smithdown Rd/A562
i Continue to follow A562
364 ft

Turn right toward Smithdown Ln
325 ft

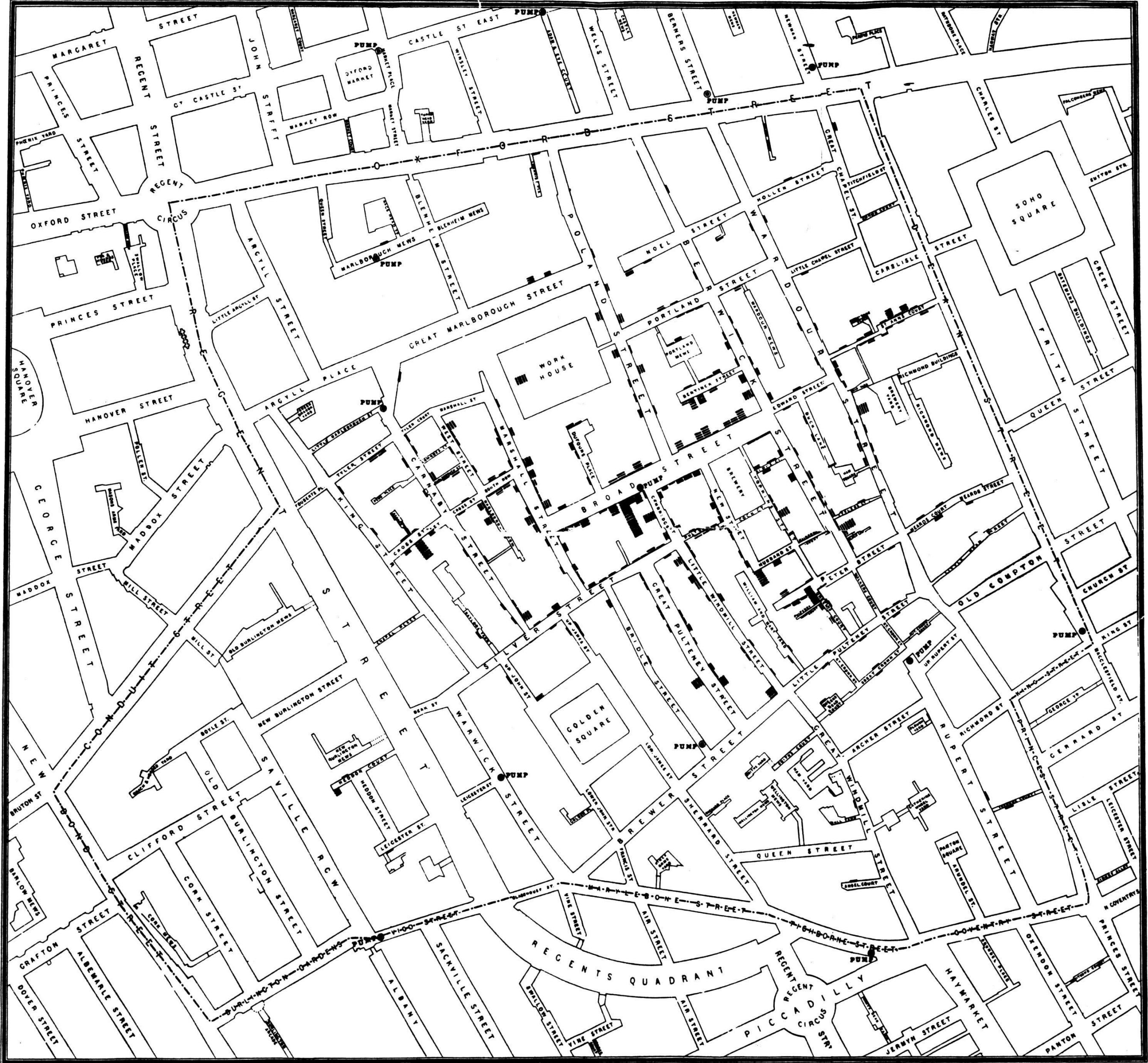
Continue onto Smithdown Ln
0.2 mi

Turn left to stay on Smithdown Ln
0.5 mi

Continue straight onto Brownlow Hill/A5048
i Continue to follow Brownlow Hill
325 ft

University of Liverpool
Liverpool, Merseyside L69 3BX, United Kingdom

The map shows the walking route from Penny Ln to the University of Liverpool. The route starts at Penny Ln and follows the A562 westward through the Baltic Triangle area, passing by Albert Dock and Sida. It then turns inland, crossing the River Mersey, and follows the A5048 (Brownlow Hill) through Sefton Park and Allerton Park. The route ends at the University of Liverpool. The total distance is 2.4 miles (3.8 km) and takes approximately 49 minutes. There are three segments highlighted with walking icons and times: 57 min for 2.8 miles (from the start to the junction with the A5089), 50 min for 2.5 miles (from the junction with the A5089 to the A562), and 49 min for 2.4 miles (the final segment along the A562 to the university). The map also shows the A5056, A59, A580, A5089, W Derby Rd, and M62 in the area.





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