Des worked as lead architect for a number of international award-winning architectural practices prior to working in academia, most recently as the Project Architect for the Olympic Village Scheme for London 2012 at Glenn Howells Architects, and as Lead Architect at Zaha Hadid Architects for the Glasgow Transport Museum – winner of the 2013 European Museum of the Year.
THE SOCIAL DISTANCE LAB, LANCASTER

1. SOCIAL DISTANCING
Discussion on what constitutes social distancing, and what impact it has on infection rates.

2. SIGNAGE
A precedent study of global signage, considering different approaches to regulation.

3. LANCASTER SOCIAL DISTANCE LAB
Development and assembly of the Social Distance Lab to test generative distancing.

4. CONCLUSION
Evaluation of the work, reflection and speculation on future trends of social distancing.
Edward Moore Kennedy (February 22, 1932 – August 25, 2009) was an American politician and lawyer who served as a U.S. Senator.

“WHAT DIVIDES US PALES IN COMPARISON TO WHAT UNITES US.”

- TED KENNEDY
SOCIAL DISTANCING

SCIENCE, HISTORY, CHANGE
Airborne particles, or aerosols, in the context of human to human transmission. It is also increasingly clear that airborne transmission is an important contributor to rapid spreading of the disease. The above diagram illustrates droplet generation by exhalation, their potential transformation into airborne particles by evaporation, transport over long distances by exhalation and by ambient air turbulence, and final inhalation by the receiving host as interconnected multiphase flow processes.
COVID-19 pandemic has demonstrated how important it is to develop fundamental knowledge related to generation, transport and inhalation of pathogen-laden droplets and their subsequent possible fate as airborne particles, or aerosols, in the context of human to human transmission.
The total number of infections in the US is projected to reach 287 million without social distancing and 188 million with social distancing. When combined with the differential mortality rates when the health system capacity threshold is exceeded versus when not, the difference between the infection curves translates into about 1.24 million lives saved. Using a $10 million value of reduced mortality risk (VSL) for the lives saved, the benefits of social distancing are $12.4 trillion. The cost of social distancing is the difference in present value terms of the GDP losses without ($6.49 trillion) and with ($13.7 trillion) the policy, which is $7.21 trillion.

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Uncontrolled</th>
<th>Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infections (million)</td>
<td>287</td>
<td>188</td>
</tr>
<tr>
<td>Deaths (million)</td>
<td>2.18</td>
<td>0.941</td>
</tr>
<tr>
<td>Present value of GDP loss (trillion US$)</td>
<td>6.49</td>
<td>13.7</td>
</tr>
<tr>
<td>Value of lives lost (trillion US$)</td>
<td>21.8</td>
<td>9.41</td>
</tr>
<tr>
<td>Net benefits (trillion US$)</td>
<td></td>
<td>5.16</td>
</tr>
</tbody>
</table>

Benchmark parameter values: $R_0 = 2.4$, infectious period = 6.5 days, low mortality rate = 0.5 %, high mortality rate = 1.5 %, reduction in contact rate = 38 %, VSL = $10 million, uncontrolled initial GDP decline = 2.0 %, controlled initial GDP decline = 6.2 %, medical capacity threshold = 36 million infected, equal proportional rates of recovery in uncontrolled and controlled scenario, discount rate = 3.0 % year$^{-1}$, planning horizon = 30 years.

*The Benefits and Costs of Using Social Distancing to Flatten the Curve for COVID-19*
• Initially, the scientific evidence for distancing varied across the world, from an initial 2m in the UK and Canada, to 1.8m in the US, 1.4m in South Korea and 1m in China, France and Hong Kong.

• Aggressive social distancing measures buy enough time to develop and distribute cost-effective COVID-19 treatments or vaccines.

• Distancing is, however, difficult to maintain for a long period of time and its' effectiveness decreases as time goes on. Long-term distancing breaches the limits of people's physical and mental endurance and the negative effects on socio-economics are enormous.
SIGNAGE
GLOBAL, TYPE, APPLICATION
GLOBAL SOCIAL DISTANCE SIGNAGE
**RESEARCH QUESTIONS**

Can social distancing guidance be effectively automated using generative software (Grasshopper w/python)

- Can automated software generate optimized building layouts successfully

- How does the design of signage impact the effectiveness of social distancing measures?
  - How do the complex variables of signage design influence behavior?

- How does branding impact signage – should signage be designed case by case?
  - Should signs be made to suit the building they are in, or be universal?

Can the outcomes be achieved cost-effectively?

- Can the project be scaled efficiently at economic cost for global use?
LANCASTER SOCIAL DISTANCE LAB
DESIGN TEAM, DEVELOPMENT, FABRICATION
SOCIAL DISTANCE LAB, THE STOREY BUILDING, LANCASTER
Plan of the Storey Building, Lancaster
SOCIAL DISTANCE LAB, THE STOREY BUILDING, LANCASTER
Q.7A how EFFECTIVE IS 'UNIVERSAL' signage AS SHOWN?

63% BELIEVE 'UNIVERSAL' SIGNAGE IS EFFECTIVE
Q.7B how EFFECTIVE IS 'UK GOVERNMENT' signage AS SHOWN?

60%

BELIEVE 'UK GOVERNMENT' SIGNAGE IS EFFECTIVE
Q.7C how EFFECTIVE IS 'LANCASTER CITY COUNCIL' signage AS SHOWN?

65%

BELIEVE 'LCC' SIGNAGE IS EFFECTIVE
0.7C how EFFECTIVE IS 'STORE SPECIFIC' signage AS SHOWN?

51% BELIEVE 'STORE SPECIFIC' SIGNAGE IS EFFECTIVE
Q.7E how EFFECTIVE IS 'DESIGNER BESPOKE' signage AS SHOWN?

72%

BELIEVE 'DESIGNER BESPOKE' SIGNAGE IS EFFECTIVE
COLOUR CONSIDERATION

Confidence & Integrity  
Warmth & Friendliness  
Safety & Freshness  
Peace & Calmness
Ready Set Go
TRAFFIC SIGNS, UK

MESSAGE

INSTRUCTION

DIRECTION
SHAPE AND SYMBOLS

The design is created out of three basic shapes. A circle, an octagon and a triangle - with each having its own purpose. Simplicity is key. Allowing these shapes to create a clear, precise and approachable design.

The rounded friendliness of a circle is used for general greeting messages. While the universal connotation of an octagon, flags more serious instructions; while the form of the triangle naturally lends itself to directional messaging.
ROUTE 2
As with route one - using colour to coordinate different instructions, this route uses basic shape to define different groups of information. The friendly connotations associated with a circle reflects the approachability of general ‘greeting’ messages. While the universal connotation of a hexagon, flags more serious questions and statements. Finally, the form of a triangle naturally lends itself to directional signage.

Using a mix of blue, green and yellow of mid tones from the palette creates a fresh, friendly and confident tone, without being too ‘flashy’.

Simplicity, is key in this route. Allowing basic shapes and language to create a clear, precise and approachable route.

---

Nice two metre you today

‘GREETING’ HANGING BANNER

Come clean Have you washed your hands

‘QUESTION STATEMENT’ HANGING BANNER

This way to getting back on track

‘DIRECTIONAL’ HANGING BANNER
CLIENT AND USER CHOSEN DESIGN

ROUTE 2

Nice two metre you today

Come clean Have you washed your hands

This way

‘GREETING’ WALL PLAQUE

‘QUESTION STATEMENT’ WALL PLAQUE

‘DIRECTIONAL’ WALL PLAQUE
CLIENT AND USER CHOSEN DESIGN

ROUTE 2

(AERIAL VIEW) SEAT DISTANCING FLOOR VINYL

DIRECTIONAL FLOOR VINYL AND MEDIAN LINE

STANDING FLOOR CIRCLE VINYL
ALGORITHM PLAN OUTCOME
VINYL CUTTING AND ASSEMBLY
FLOOR VINYL STICKERS
# Opening Week Schedule of Local Business Appointments

## Social Distance Lab @ The Storey

**Appointment Time 60mins**

<table>
<thead>
<tr>
<th>TIME</th>
<th>THU, June 25, 2020</th>
<th>FRI, June 26, 2020</th>
<th>MON, June 29, 2020</th>
<th>TUE, June 30, 2020</th>
<th>WED, July 1, 2020</th>
<th>THU, July 2, 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00am</td>
<td>Name/s: Kim Hodgson &amp; Julia Hodgson</td>
<td>Name/s: Joanna Roberts</td>
<td>Name/s: Will Griffiths &amp; Simon Kirby</td>
<td>Name/s: Nicola Smith</td>
<td>Name/s:</td>
<td>Name/s: 2 x people (names TBC)</td>
</tr>
<tr>
<td>Business Name: Saga Café</td>
<td>Business Name: Park Cottage Tearooms</td>
<td>Business Name: Lancaster City Council</td>
<td>Business Name: Grandinis Poppets</td>
<td>Business Name:</td>
<td>Business Name: Lancaster University</td>
<td></td>
</tr>
<tr>
<td>11:00am</td>
<td>Name/s: Chris Legge</td>
<td>Name/s: Deborah Gudinhey</td>
<td>Name/s:</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s: Lucie Cawston</td>
<td>Name/s: 11:30am Simon Ayley</td>
</tr>
<tr>
<td>Business Name: Aquila Plaza</td>
<td>Business Name: Mighty Blue</td>
<td>Business Name:</td>
<td>Business Name: Royal Kings Arms Hotel</td>
<td>Business Name: Herbarium</td>
<td>Business Name: Selecttouch Computers</td>
<td></td>
</tr>
<tr>
<td>12:00pm</td>
<td>Name/s: Robert Nixon</td>
<td>Name/s: Lauren Alister</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s:</td>
<td>Name/s:</td>
</tr>
<tr>
<td>Business Name: Wine Trade Office &amp; Village Store</td>
<td>Business Name: Lancaster Search &amp; Rescue</td>
<td>Business Name: Lancaster University</td>
<td>Business Name: Royal Kings Arms Hotel</td>
<td>Business Name:</td>
<td>Business Name:</td>
<td></td>
</tr>
<tr>
<td>1:00pm</td>
<td>Name/s: Martin Coates &amp; Louise McLaugh</td>
<td>Name/s:</td>
<td>Name/s:</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s:</td>
</tr>
<tr>
<td>Business Name: Lancaster University</td>
<td>Business Name:</td>
<td>Business Name:</td>
<td>Business Name: Lancaster University</td>
<td>Business Name: Lancaster City Council</td>
<td>Business Name: Lancaster City Council</td>
<td></td>
</tr>
<tr>
<td>2:00pm</td>
<td>Name/s:</td>
<td>Name/s:</td>
<td>Name/s: Carolyn Dalton</td>
<td>Name/s: Chloe</td>
<td>Name/s:</td>
<td>Name/s:</td>
</tr>
<tr>
<td>Business Name:</td>
<td>Business Name:</td>
<td>Business Name: Lancaster City Council Museum</td>
<td>Business Name:</td>
<td>Business Name:</td>
<td>Business Name:</td>
<td></td>
</tr>
<tr>
<td>3:00pm</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s: Tom Robinson</td>
<td>Name/s:</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s: 2 x people (names TBC)</td>
</tr>
<tr>
<td>Business Name: Lancaster University</td>
<td>Business Name: Horsham Tearooms</td>
<td>Business Name: The Wobbly Cobbler</td>
<td>Business Name:</td>
<td>Business Name: Lancaster University</td>
<td>Business Name: Lancaster City Council</td>
<td></td>
</tr>
<tr>
<td>4:00pm</td>
<td>Name/s: 2 x people (names TBC)</td>
<td>Name/s:</td>
<td>Name/s: Lorna Wood</td>
<td>Name/s:</td>
<td>Name/s:</td>
<td>Name/s:</td>
</tr>
<tr>
<td>Business Name: Lancaster City</td>
<td>Business Name:</td>
<td>Business Name: Brea</td>
<td>Business Name:</td>
<td>Business Name:</td>
<td>Business Name:</td>
<td></td>
</tr>
</tbody>
</table>
Q.3 How important is signage to maintain the government advised distance to reduce the risk of infection?

91%

Believe signage is important
Q.4 How **EFFECTIVE** is the signage at Storey?

93% believe the distancing signage @ Storey is effective.
Q.8A DO YOU BELIEVE THE CUSTOMER HAS SOME RESPONSIBILITY FOR SOCIAL DISTANCING?

86%

BELIEVE THE CUSTOMER HAS SOME RESPONSIBILITY
Q.8B DO YOU BELIEVE THE CUSTODIAN HAS SOME RESPONSIBILITY FOR SOCIAL DISTANCING?

76% BELIEVE THE CUSTODIAN HAS SOME RESPONSIBILITY
### Project Cost – Signage Cost /m²

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1 – Design 3Wks</td>
<td>£4,800.00</td>
</tr>
<tr>
<td>Stage 2 – Build 1 WK</td>
<td>£3,000.00</td>
</tr>
<tr>
<td>Stage 3 – Observation 2 Wks</td>
<td>£3,000.00</td>
</tr>
<tr>
<td>Stage 4 – Signage Report 2 Wks</td>
<td>£2,400.00</td>
</tr>
<tr>
<td><strong>Total Staff Cost</strong></td>
<td>£13,200.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll Up Banners</td>
<td>£600.00</td>
</tr>
<tr>
<td>Extension Cable</td>
<td>£13.00</td>
</tr>
<tr>
<td>Floor Vinyl</td>
<td>£100.00</td>
</tr>
<tr>
<td>Floor Tape Applicator</td>
<td>£130.50</td>
</tr>
<tr>
<td>Floor Standing Frame</td>
<td>£109.50</td>
</tr>
<tr>
<td>A2 Pavement Frame</td>
<td>£50.00</td>
</tr>
<tr>
<td>Printing and Mounting</td>
<td>£500.00</td>
</tr>
<tr>
<td><strong>Total Equipment Cost</strong></td>
<td>£1,503.00</td>
</tr>
</tbody>
</table>

£1503 / 245m² = £6.13 m² = $8.00 m²
Hello.

Social Distancing Signage Pack.

Open Source Designs for Social Distancing.
Design

Pull up banners [PULL]

Off the shelf size for PULL01 800mmx2000mm PAGE 27.
Off the shelf size for PULL02 800mmx2000mm PAGE 28.
Off the shelf size for PULL03 800mmx2000mm PAGE 29.
Off the shelf size for PULL04 800mmx2000mm PAGE 30.
Off the shelf size for PULL05 800mmx2000mm PAGE 31.

For bespoke sizes please read the instructions section.

We know keeping apart isn’t easy, but you’re doing a great job!

Please follow the signs, and remember keep your distance when passing others

Ready Set Go
Please keep your distance and use the hand sanitising stations available.

Ready Set Go
Please keep your distance, stick to the line and use the hand sanitising stations available.

This way to the reception desk ▲
Please keep your distance, stick to the line and use the hand sanitising stations available.

This way to the reception desk ▲
Turn right for the café and bar ▲
Please keep your distance, stick to the line and use the hand sanitising stations available.
OPEN SOURCE SIGNAGE PACK

Design

- Bye Straight ahead to exit
- Bye Turn left to exit
- Bye Turn right to exit
- Exit
- Entrance

Design

- Go! No queuing, keep moving
- Keep your distance when passing others

Design

- Hello Nice to meet you
- Hello Nice to see you again

Design

- We know keeping apart isn’t easy, but you’re doing a great job. Thank you.

Design

- Keep left
- Keep right
- One way
- No entry
- Hand washing station
IMPACT: SIGNS IN USE AROUND LANCASTER

Give way • No need to rush

Please follow the signs, and remember keep your distance when passing others.
SECONDARY TEST CASE: HEALTH INNOVATION CAMPUS, LANCASTER UNIVERSITY

An image of the Storey Building, Lancaster, UK
SECONDARY TEST CASE: HEALTH INNOVATION CAMPUS, LANCASTER UNIVERSITY

An image of the Storey Building, Lancaster, UK
NEXT STEPS: UKRI FUNDING BID FOR SCALING RESEARCH

ShapeDiver

MODEL PARAMETERS
- SPEAKS: 6
- SUBDIVISIONS: 5
- HOLES SIZE %: 0.4
- HOLES NORMAL OFFSET: -10
- SUBD DIVE GEOMETRY
- EDGE SMOOTHNESS: 20.1
- CONVEXITY/CONCAVITY: 0.45
NEXT STEPS: UKRI FUNDING BID FOR SCALING RESEARCH
CONCLUSION
EVALUATION, FUTURE, QUESTIONS
FUTURE OF SOCIAL DISTANCING?
WHAT DIVIDES US PALES IN COMPARISON TO WHAT UNITES US.

- TED KENNEDY
THANK YOU