



Adapting to perceived thermal comfort in urban parks and squares during heatwaves

Xizhen Huang
PhD candidate

University of Reading



Intro to Secondment

» Host institution

- Professor Prashant Kumar, Global Centre for Clean Air Research at the University of Surrey

» Reasons for secondment

- Knowledge exchange and like-minded people: fresh thinking and new approaches about green infrastructure
- Onsite visits: working with experts

» My expertise

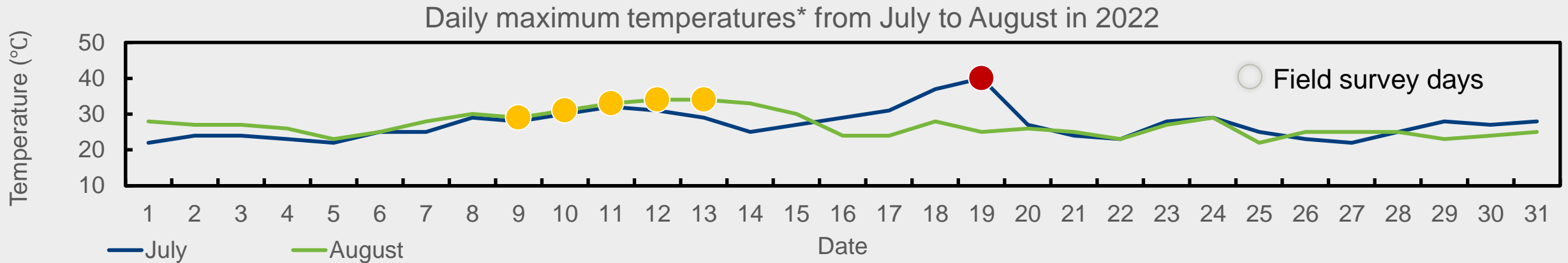
- Green Infrastructure planning and design
- Outdoor thermal comfort evaluation

» Project Aim

- Investigating Green Infrastructure approach to adapting to urban heatwaves

Heatwave survey in 2022

- » Field survey days: July 19 and August 9~13
- » * Temperatures recorded at the Heathrow station (MetOffice, 2022)



Heat-health alert levels in the Heatwave Plan for England (UKHSA et al., 2014)

- Level 4: cross-government assessment; resulted in national emergency (PressOffice, 2022)
- Level 3: threshold temperatures reached

MetOffice. 2022. *Daily Weather Summary 2022*. Retrieved 19 June 2023 from https://digital.nmla.metoffice.gov.uk/SO_29e7981d-12bb-4528-9213-cb4e7f0199b0/

PressOffice. 2022. *UK prepares for historic hot spell*. Met Office. Retrieved 26 November from <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2022/red-extreme-heat-warning>

UKHSA, DHSC, & NHS-England. (2014). *The Heatwave Plan for England: Protecting health and reducing harm from hot weather*.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1096593/heatwave-plan-for-England-2022-5-August-2022.pdf

Field survey in urban squares and parks

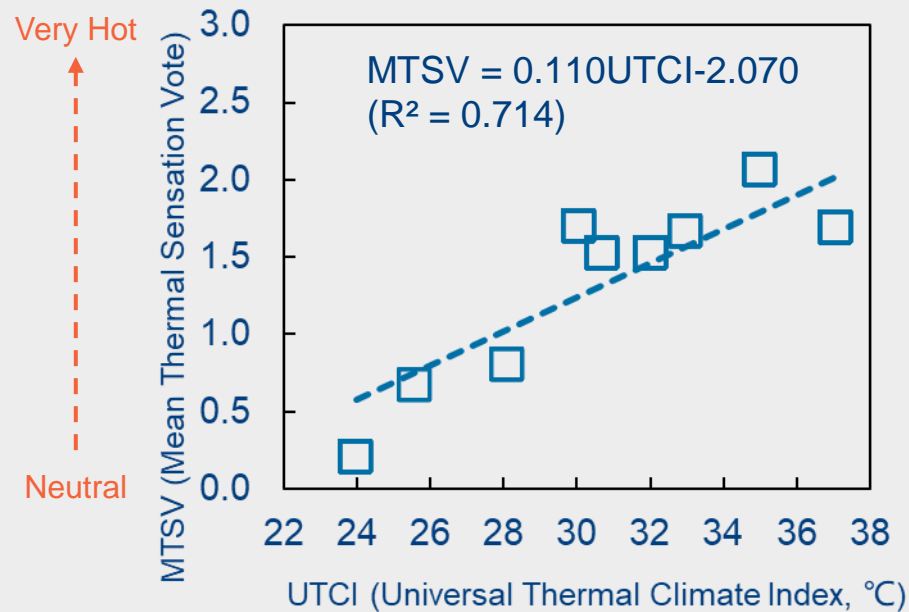
- » Microclimate measurement: air temperature, relative humidity, wind speed, and globe temperature
- » Questionnaires
 - Thermal Sensation Vote (TSV): Very hot, Hot, Warm, Neutral, Cool, Cold, Very cold
 - Adaptation behaviours for thermal comfort

Site locations in Reading (UK)	Respondents number
<p>Public squares</p>  <p>Parks</p>	<p>158</p>
 <p>4</p>  <p>167</p>	

Wider range of neutral temperatures in parks

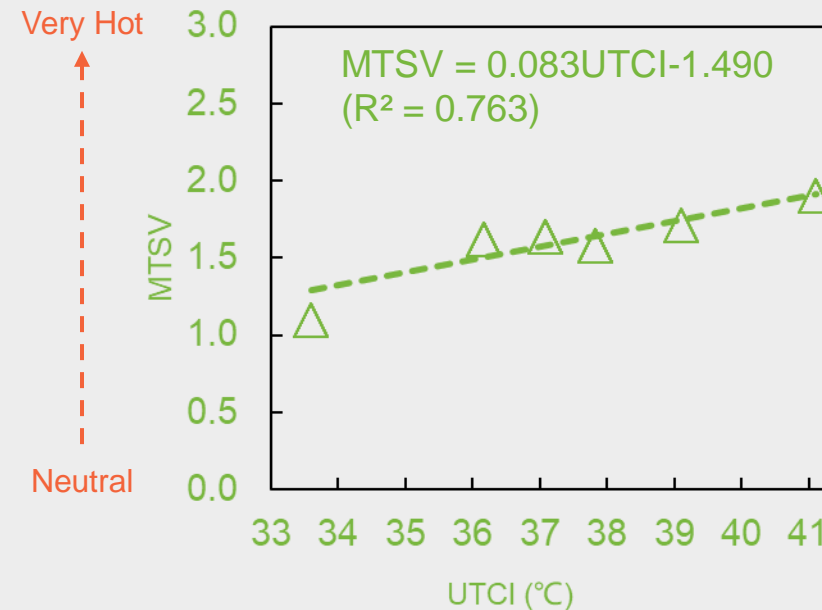
Squares

- » Neutral temperature range is 14.27~23.36°C, when MTSV = ±0.5 (slightly warm and cool)

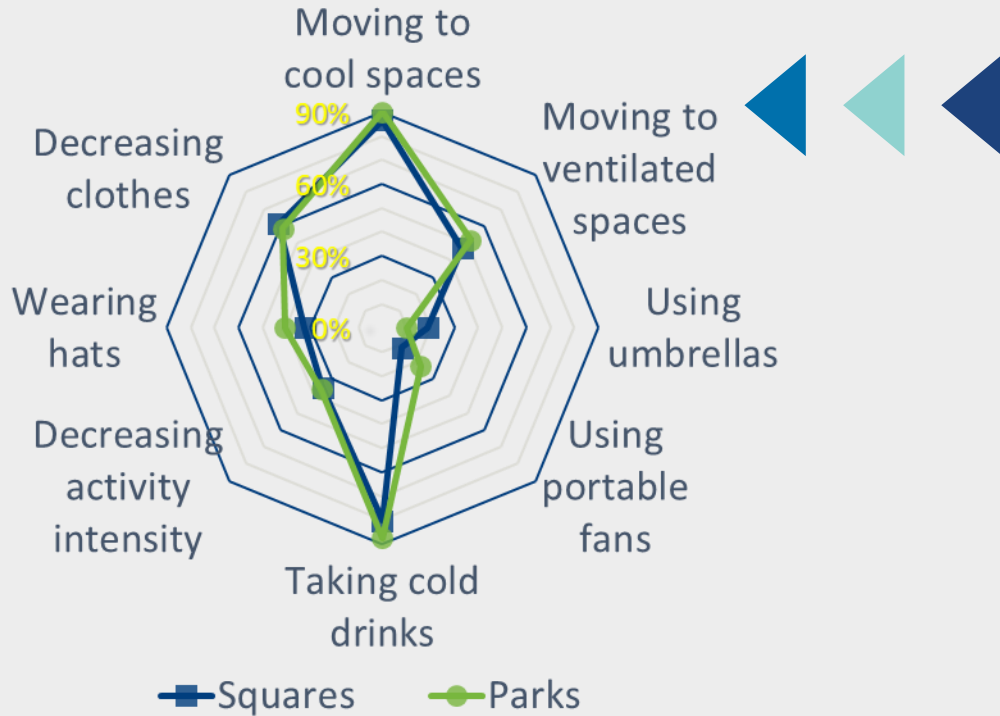


Parks

- » Neutral temperature range is 11.93~23.98°C, when MTSV = ±0.5 (slightly warm and cool)



Behavioural adaptation for outdoor thermal comfort



Outdoor thermal adaptation behaviours in Reading (UK)

“From the perspective of behavioural adaptation to thermal comfort, people are **active participants** to choose their thermal preferences, rather than passive recipients of the thermal environments.”

Professor Runming Yao

University of Reading

Keep inspiring people



“A very important aspect of the climate-education programme called the Heat-Cool Initiative is to **inspire people**. Bringing awareness and knowledge related to climate change, **heating, and cooling of planet Earth** is very important not only to the school teachers, the parents, and the researchers but also to the children.”

Professor Prashant Kumar

Global Centre for Clean Air Research,
University of Surrey