# From Visual Multiplexing to Zebra Maps

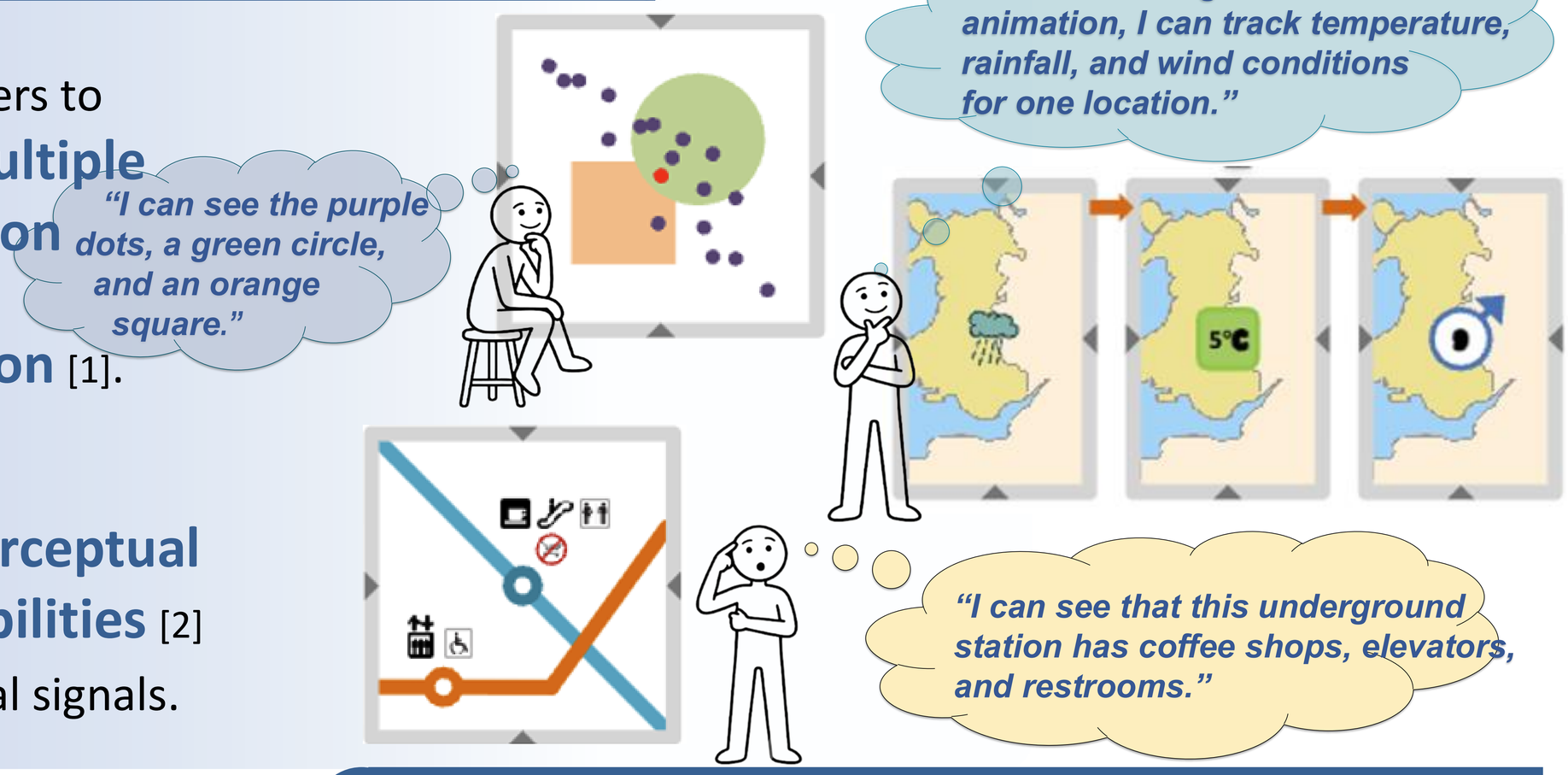
**Yiwen Xing**[1] **Afrah Farea**[2] **Saiful Khan**[3] **Min Chen**[1]

[1] University of Oxford [2] Istanbul Technical University [3] Science and Technology Facilities Council

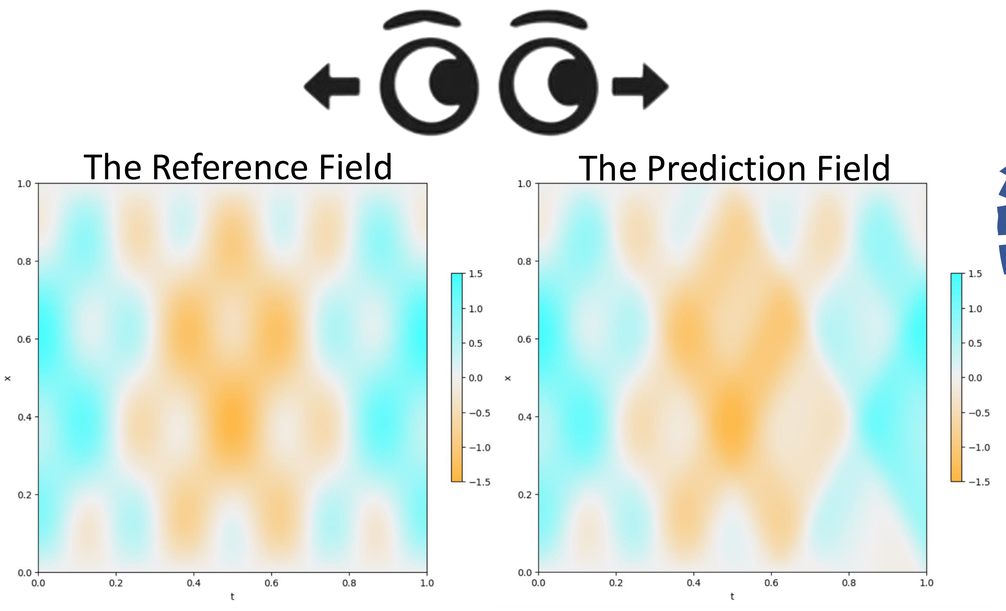
## What Is Visual Multiplexing?

- Visual multiplexing refers to the presentation of **multiple pieces of information** associated with the **same spatial location** [1].

- It relies on **human perceptual and cognitive capabilities** [2] to **de-multiplex** visual signals.




## Multiplexing in Practice

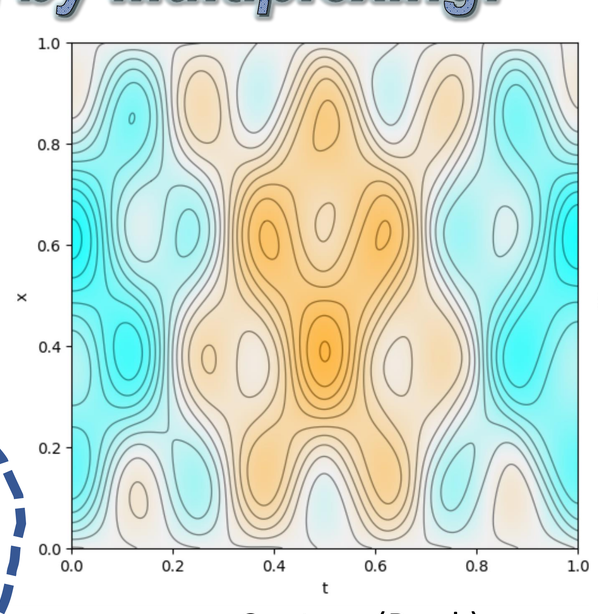



**PDE experts:**

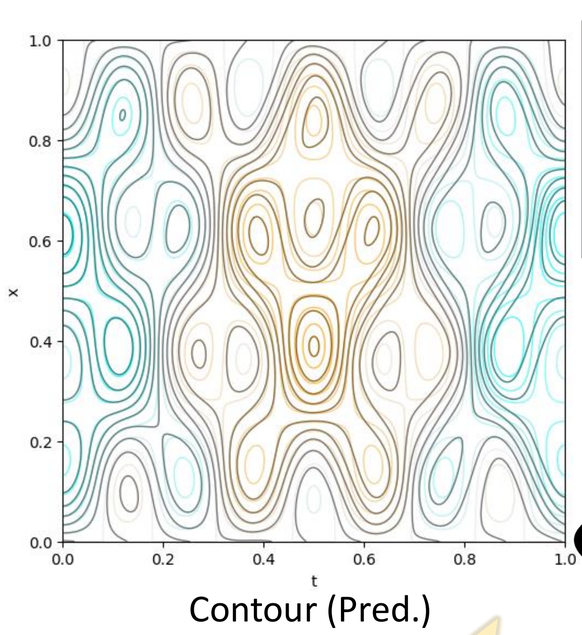
**"We want to compare the reference and prediction fields. BUT, it's hard to mentally align corresponding locations in 2 views."**

**Can we view them TOGETHER?**

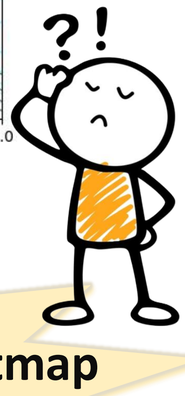
**Yes, by Multiplexing!**




Contour (Pred.) over Heatmap (Ref.)




Contour (Pred.) over Contour (Ref.)



**Can we preserve heatmap patterns and contour boundaries at the same time?**

## The Answer: Zebra Maps

- **Zebra Maps bridge the gap between heatmaps and contours.**




**Dense** → **Sparse**

- ✓ **Preserve heatmap color patterns**
- ✓ **Preserve contour-like value boundaries**
- ✓ **Support precise comparison between fields**




**Boundary Mismatch**

**Local Prediction Error**



**Shared iso-value levels support precise value comparison**

Scan To Explore Our Research :)

[1] M. Chen, S. Walton, K. Berger, J. Thiyagalingam, B. Duffy, H. Fang, C. Holloway, and A. E. Trefethen, "Visual multiplexing," CGF, vol. 33, no. 3, pp. 241–250, 2014.
[2] K. Koffka, Principles of Gestalt Psychology. New York, NY: Harcourt, Brace and Company, 1935.



Contact: yiwen.xing@eng.ox.ac.uk