



# Spatial wave measurements for a wave energy site

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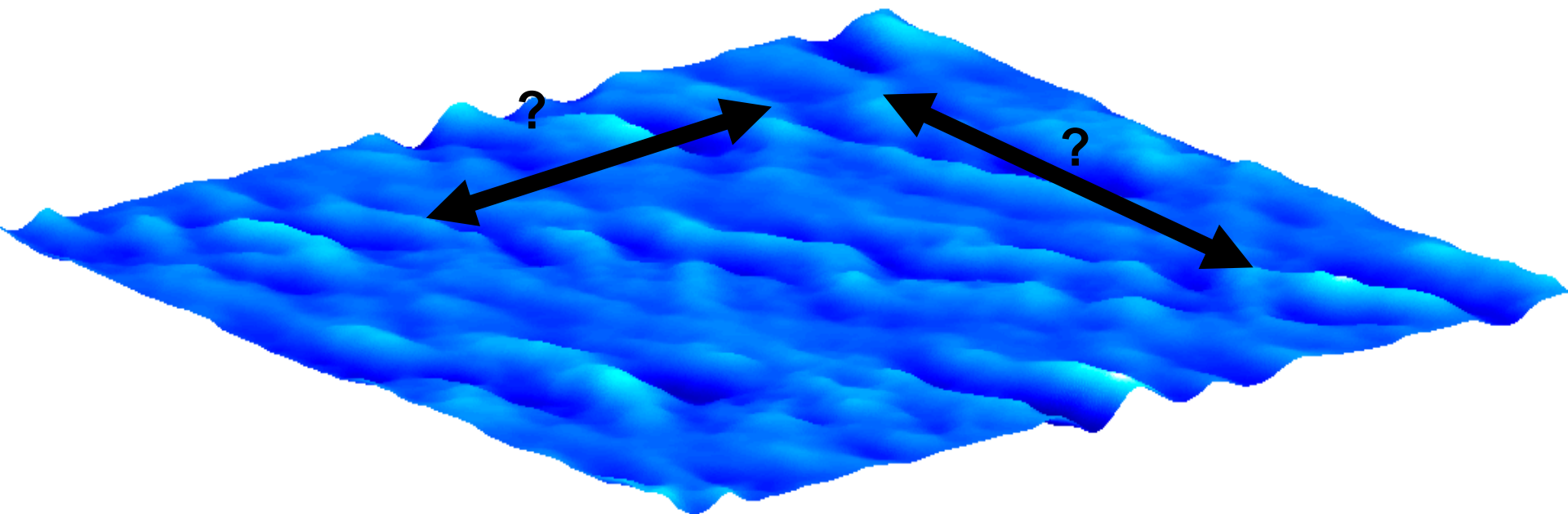
Supervisors, Prof. George Smith, Dr Dean Millar  
and Prof. Julian Wolfram



# Spatial wave measurements



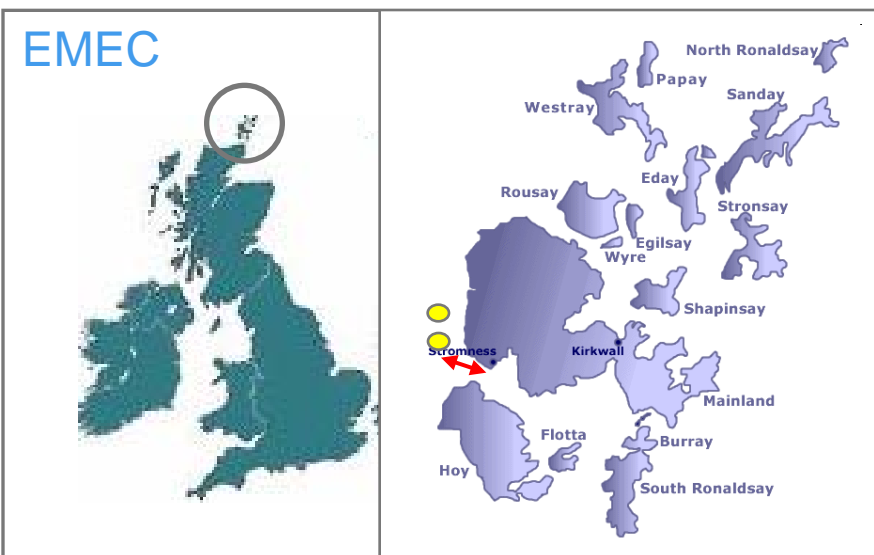
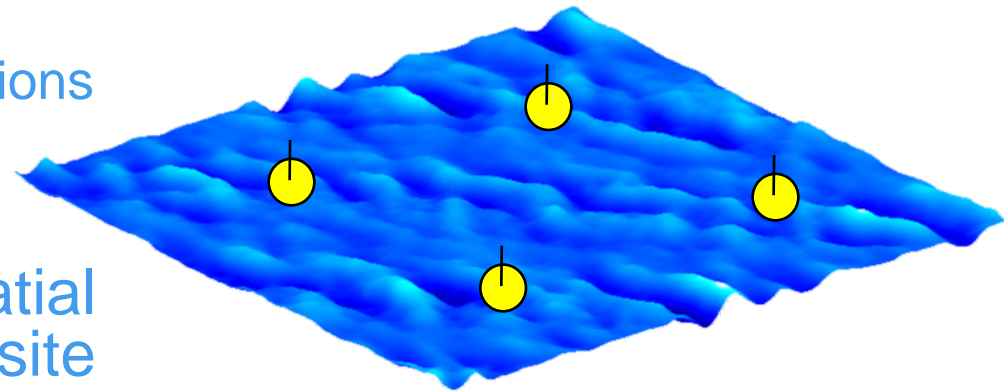
- Variability of wave resource around the site
- The effect of devices
  - Environmental impact assessment
  - Array design and placement



# Spatially separated wave measurements



- PRIMaRE buoy array
  - Variations in multiple directions
- EMEC wave test site
  - Strong tidal flow
- Direct measurement of spatial variability at a wave energy site

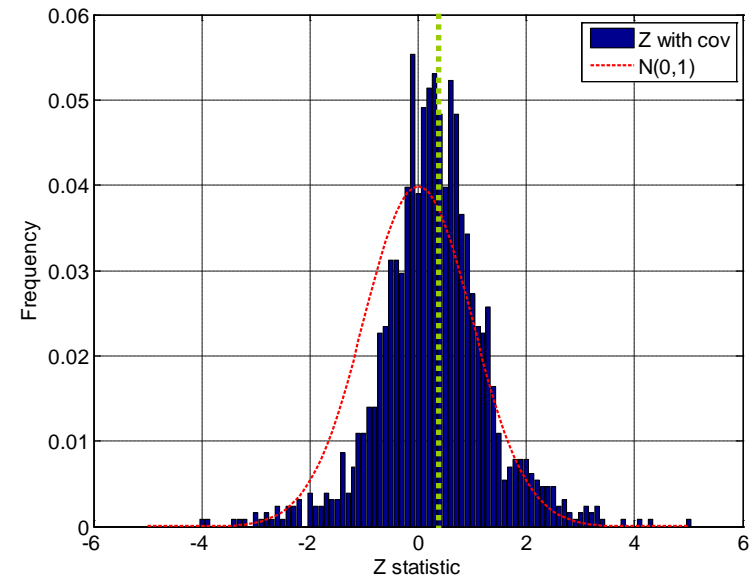


# Statistical modelling of spatial differences in significant wave height

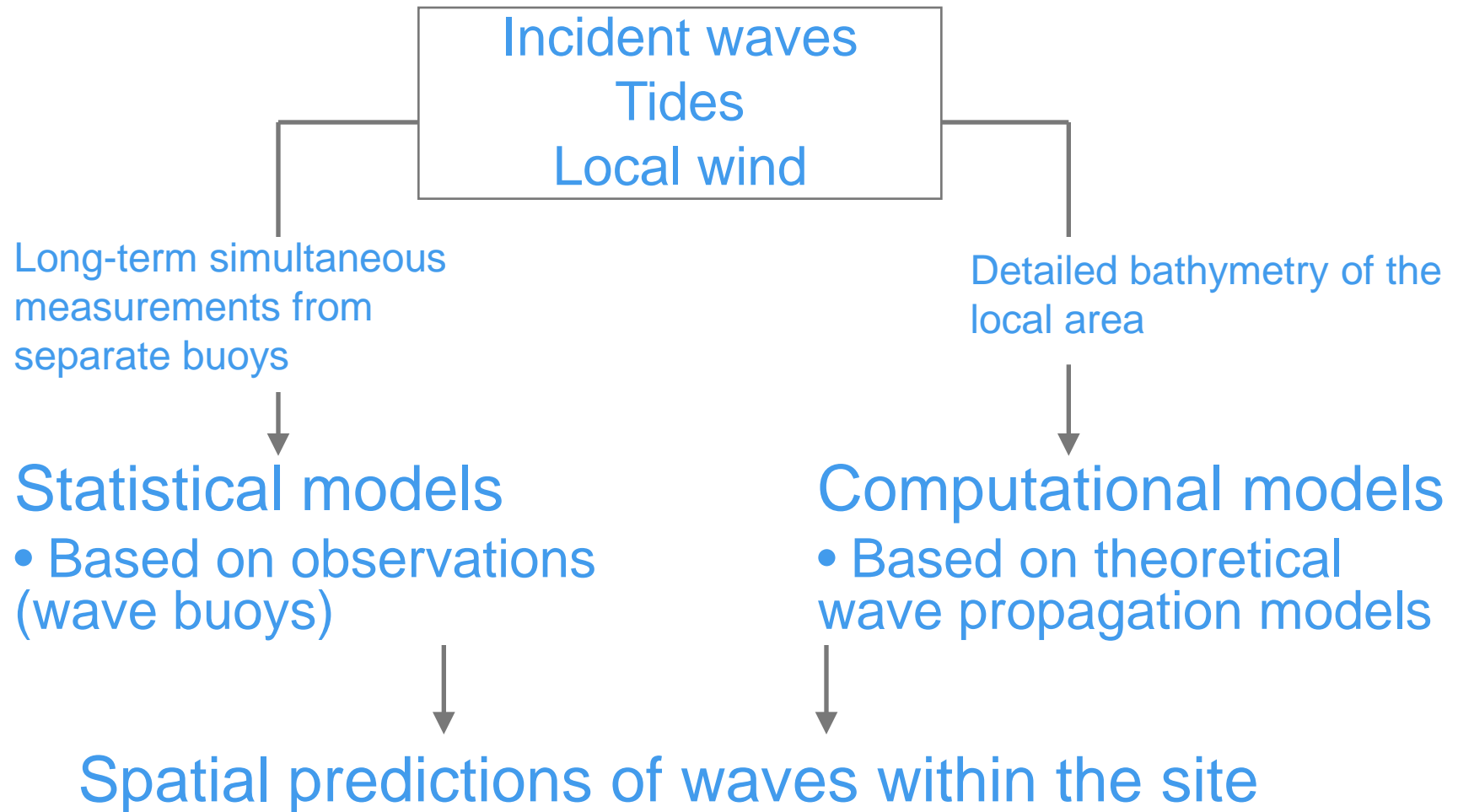


- Random statistical errors in wave measurements
  - Dependent on underlying wave state
- Deterministic effects due to physical factors
  - Tidal flow
  - Wavelength / period
  - Spatial coherence

$$Z = \frac{H_{S1} - H_{S2}}{\sqrt{\sigma_1^2 + \sigma_2^2}}$$



# Predicting the waves across the site using point measurements



# Summary



- Multiple wave measurements allow detailed spatial studies of waves
- Development of statistical tools to quantify the spatial variability of waves around the site
- Application to detailed resource assessment and performance monitoring
- Baseline for measuring changes in waves due to devices

# Spatial wave measurements for a wave energy site

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