**Collaboration with Katie**

# Introduction

1. Need for AR structures
2. **Main Novelty?**

### Application to Solar

# Result and discussion

## Fig.1:

### (a) Glasswing vs glass reflection

#### Two surfaces

### (b) Transmittance spectra

## Fig.2: Reflectance from PV cells

### GaAs, Silicon bare; glass cover on silicon; CdTe (with glass), GW on silicon

## Fig.3 Reflectance spectra for different geometries

### (a) Vs wavelength

### (b) Vs. angle of incidence

#### Incidence available modifier

## Fig. 4 Map

### Locations

## Fig. 5 Annual Energy gains

# **Theoretical Paper (end of April)**

## Reflection vs wavelength vs incidence angle

### Just compare standard AR glass to glasswing nanocone AR

## Four different locations; Pvsyst; open-source; create login and use software remotely

### Pittsburgh: 40.4 degrees North

### Penryn, UK: 50.1 degrees North

### Rockhampton, Australia: 23.4 South

### Chennai, India: 13.1 degrees North

#### Optimum tilt angle; documented (location specific; azimuth is not optimized)

## Fixed Tilts

### Assume optimal tilt

### Tilt flat

### Vertical (for windows)

# **Experimental**

## Reflection

### Dependence

#### vs wavelength

#### vs incidence angle

### Structures

#### Glass

#### Glasswing

#### Etched glass

## Reflectance on various structures vs wavelength; vs incidence angle?

### Silicon

#### Bare

#### Glass cover

#### Glass cover with AR

#### Glasswing

#### Etch glass for you and send to you

##### At least 1 cm by 1 cm; smaller than 3 cm by 3 cm

##### 2 cm by 2 cm is best

##### > 6 samples

##### Use NFCF to measure transmission (and reflection)

##### Check Jung-Kun Lee’s lab or Paul Ohodnicki’s

### ~~CdTe~~

### GaAs

## Power conversion efficiency vs incidence angle

### Same materials

### As function of wavelength

## Use data for various geographical locations

### Different locations

### Using data from C (PCE vs incidence angle)

### Estimate over an entire year; difference in power generation

# Journals

## Nature Communication: 17.69

## Solar Energy: 7.188

## Optica: 10.64

## Materials Horizons: 15.72

# Similar work