JINGLE Survey: An update from the UK

JCMT/EAO Users Meeting,
Seoul 2018

sheona.urquhart@open.ac.uk

Dr Sheona Urquhart, Open University

Who’s who here in Seoul

In no particular order:

- Ryan Cheale (University of Hertfordshire)
- Thomas Greve (UCL)
- Derek Ward-Thompson (UCLAN)
- Me 😀

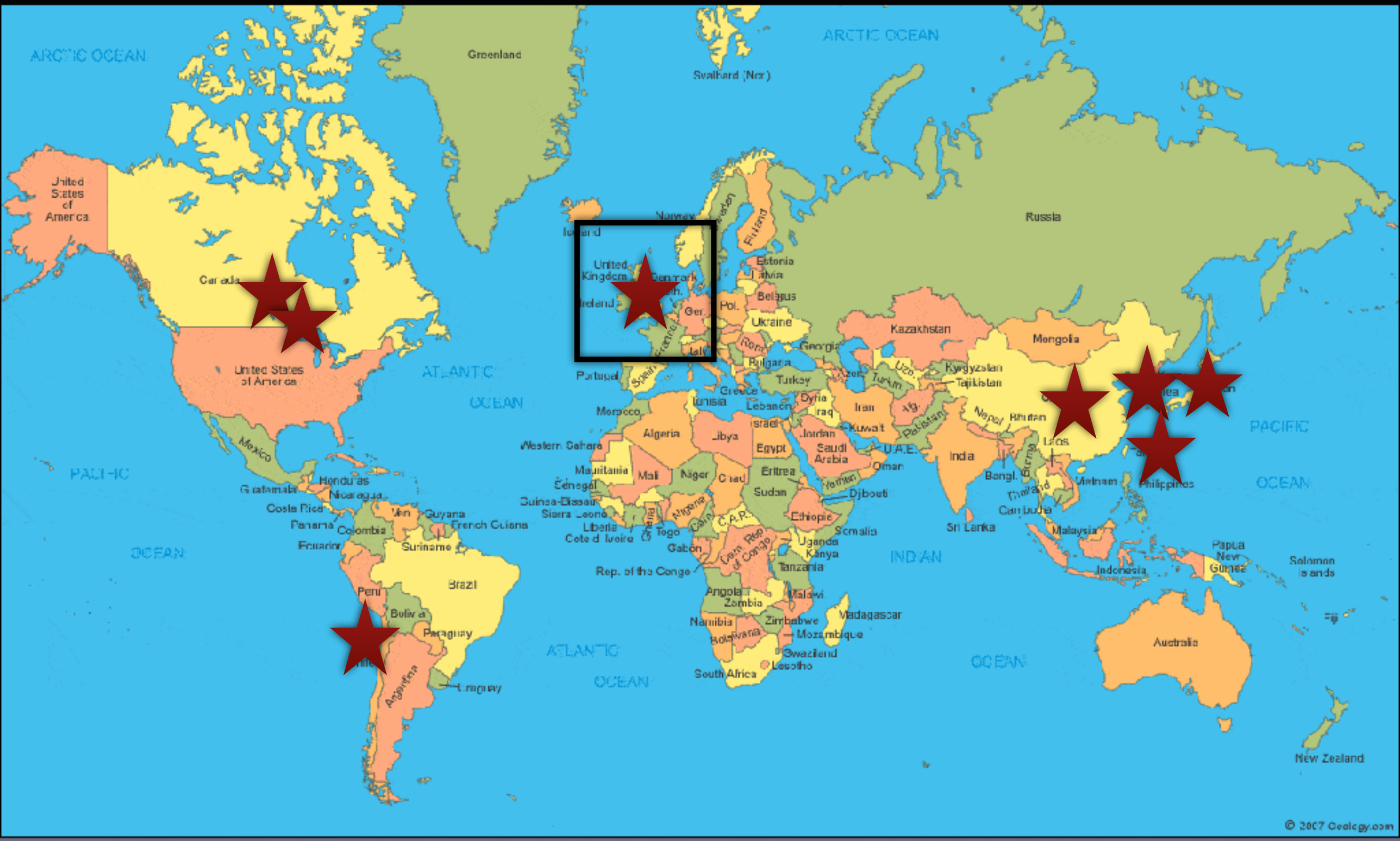
sheona.urquhart@open.ac.uk

- 102 scientists
- 38 institutions
- Covers all 6 EAO member and partner regions

UCL, Sussex, UCLan, Oxford, Durham, Cardiff, Imperial, Open University, Hertfordshire, Portsmouth, St Andrews, Edinburgh

Led by Amelie Saintonge (UCL)

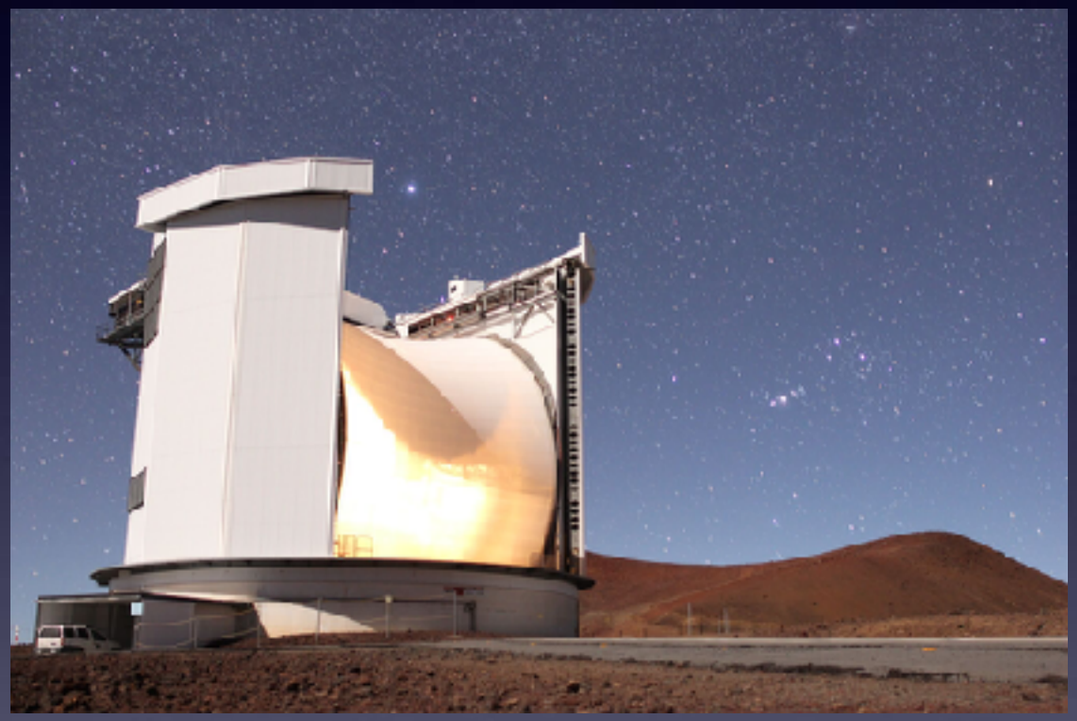
sheona.urquhart@open.ac.uk


ARCTIC OCEAN
Greenland
Svalbard (Nor)
ARCTIC OCEAN
United States of America
Canada
United States of America
Mexico
Guatemala
Honduras
Nicaragua
Costa Rica
Panama
Colombia
Ecuador
Venezuela
Guyana
Suriname
French Guiana
Brazil
Peru
Bolivia
Paraguay
Argentina
Uruguay
PACIFIC OCEAN
ATLANTIC OCEAN
Iceland
Norway
Sweden
Finland
United Kingdom
Ireland
Denmark
Ger.
Pol.
Belarus
Estonia
Latvia
Ukraine
Russia
Kazakhstan
Mongolia
Georgia
Bulgaria
Turkey
Uzb.
Turkm.
Kyrgyzstan
Tajikistan
Portugal
Spain
France
Italy
Greece
Tunisia
Lebanon
Syria
Iraq
Iran
Afg.
Pakistan
Nepal
Bhutan
India
Bangl.
Myanmar
Laos
Thailand
Cambodia
Vietnam
Philippines
Sri Lanka
Malaysia
Indonesia
Papua New Guinea
Solomon Islands
Fiji
Australia
New Zealand
Morocco
Western Sahara
Algeria
Libya
Egypt
Israel
Jordan
Kuwait
Saudi Arabia
U.A.E.
Oman
Yemen
Mauritania
Mali
Niger
Chad
Eritrea
Sudan
Djibouti
Ethiopia
Somalia
Senegal
Guinea-Bissau
Sierra Leone
Liberia
Cote d'Ivoire
Ghana
Togo
Nigeria
Cam.
C.A.R.
Gabon
Dem. Rep. of Congo
Rep. of the Congo
Uganda
Kenya
Tanzania
Angola
Zambia
Malawi
Namibia
Zimbabwe
Mozambique
Madagascar
Botswana
Swaziland
Lesotho
South Africa
INDIAN OCEAN
© 2007 Geology.com


Shetland Islands
Orkney Islands
Kirkwell
0 100 km
0 100 mi
Thurso
Stornoway
Lerwick
Hebrides
Inverness
Loch Ness
Aberdeen
Scotland
North Atlantic Ocean
North Sea
Perth
St. Andrews
Glasgow
Edinburgh
Ayr
Dumfries
Newcastle
Londonderry
Northern Ireland
Carlisle
Belfast
Darlington
Middlesbrough
Lisburn
Scarborough
Great Britain
York
Leeds
Kingston-upon-Hull
Shannon R.
Irish Sea
Manchester
Holyhead
Liverpool
Sheffield
Dublin
Trent R.
England
Nottingham
Ireland
Birmingham
Leicester
Norwich
Coventry
Ipswich
Waterford
Wye R.
Severn R.
Gloucester
Cork
Wales
St. George's Channel
Bristol
Thames
London
Bath
Canterbury
Southampton
Exeter
Plymouth
Dorchester
Truro
English Channel
France

The membrane….

- Recent observing run proved “interesting”…
- Hsi-An Pan (ASIAA, Taiwan)
- Eun Jung Chung (KASI, Korea)
- Daniel Molnar (Sussex, UK)
- Me (Open Uni, UK)

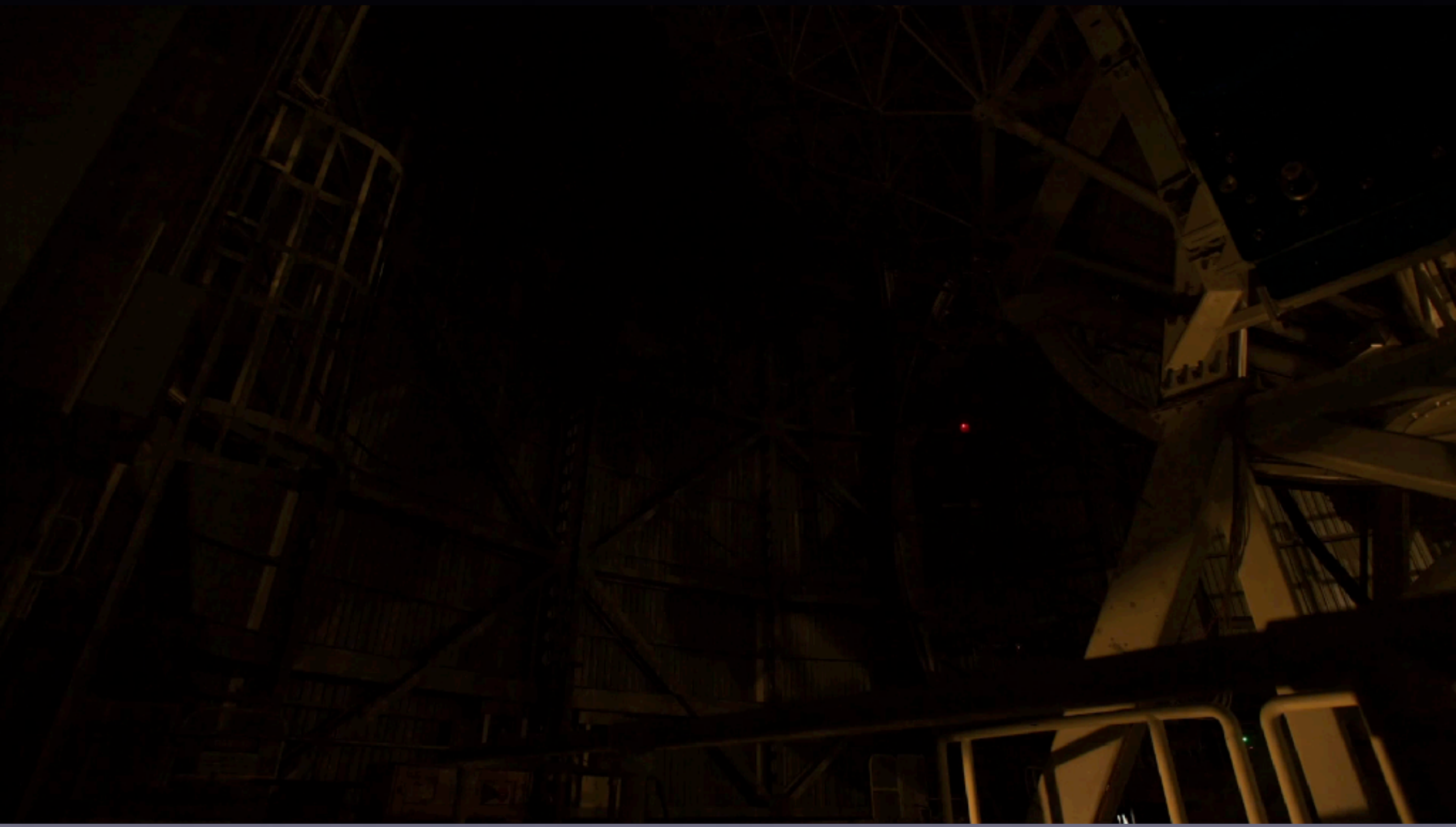


Credit: Will Montgomery

sheona.urquhart@open.ac.uk

- Not possible to use JCMT with wind speeds > 18mph
- Greatly limited JINGLE observing opportunities.
- Unfortunate timing
- However, it is undeniably beautiful…..

sheona.urquhart@open.ac.uk



Credit: Will Montgomery

Current areas of research

- From UCL, Isabella Lamperti, Dr de Looze, Amelie Saintonge
- If you wish for more details/contacts, please see me after

sheona.urquhart@open.ac.uk

JINGLE UK Example: JINGLE Dust Modelling

- JINGLE: JCMT Large programme to study cold ISM in local galaxies
- Observations allow for the characterisation of dust properties and measurements of total molecular gas masses
- Galaxies covered by MaNGA (optical IFU) and photometry from H-ATLAS

sheona.urquhart@open.ac.uk

Brief recap…

- 780 hours observing time
- Integrated 850micron continuum measurements using SCUBA2
- Representative sample of 193 Herschel-selected galaxies
- Integrated CO(2-1) line fluxes for subset of 75

Dust as a cold ISM tracer

- Measuring molecular gas content of galaxies is complex and time consuming
- Most popular cold molecular gas tracer, CO molecule, behaves poorly in dust-poor galaxies
- Need alternative tracers of cold ISM to calibrate measurement methods
- JINGLE targets both gas and dust content of nearby galaxies-benchmark relations between dusty ISM and global galaxy properties

Two very exciting projects in the pipeline

1. JINGLE Dust modelling
2. Dust properties from FIR SED fitting using modified black body models: T-beta relation

sheona.urquhart@open.ac.uk

1. JINGLE Dust Modelling

Dust scaling relations:

- JINGLE galaxies are “dustier” than HRS (Herschel Reference Survey) and KINGFISH (Key Insights on Nearby Galaxies: A Far Infrared Survey) at a given M_{star}
- higher JINGLE dust masses are in line with their higher sSFR (but maybe surprising that Tdust is unaffected)
- M_{dust}/M_{star} and M_{HI}/M_{star} correlates better with FUV-Ks (than sSFR)
  —> dust mass in these galaxies mostly associated with diffuse HI gas (?)

2. Dust properties from FIR SED fitting using modified black body models: T-beta relation

- 3 models:
  - single modified black body (SMBB)
  - broken emissivity power law MBB (BMBB)
  - two MBB (TMBB)

- Comparison between 3 models (SMBB, BMBB, TMBB): use information criteria to determine which model fit better the SEDs

- T-beta relation: using the hierarchical Bayesian approach, the anti-correlation between T and beta is very weak

If you want more detailed info on these projects, talk to me afterwards and I will point you in the right direction :-)

If you are interested in collaborating , give me a shout :-)

#Hashtag-we should talk!