

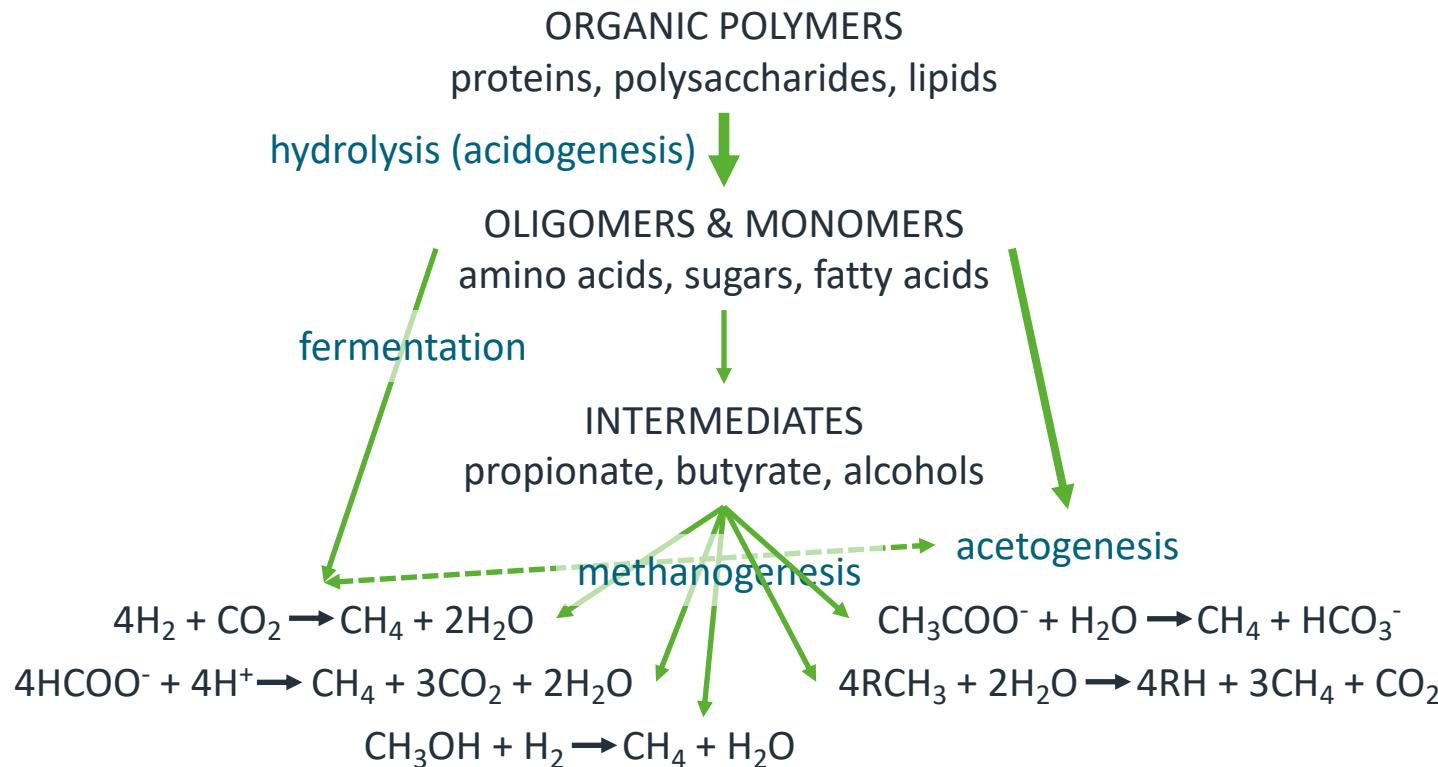
# Optimising AD microbes

Prof JAMES CHONG  
Royal Society Industry Fellow  
Department of Biology

james.chong@york.ac.uk  
@insanity\_one  
<https://goo.gl/c17LxT>

ADBA 15 June 2022

# Anaerobic digestion



# Measurement approaches

## The central dogma

DNA



RNA



protein



metabolites

metagenomics

## PROS

stable

## CONS

presence not activity  
copy number

metatranscriptomics

activity related

unstable  
copy number

metaproteomics

activity related

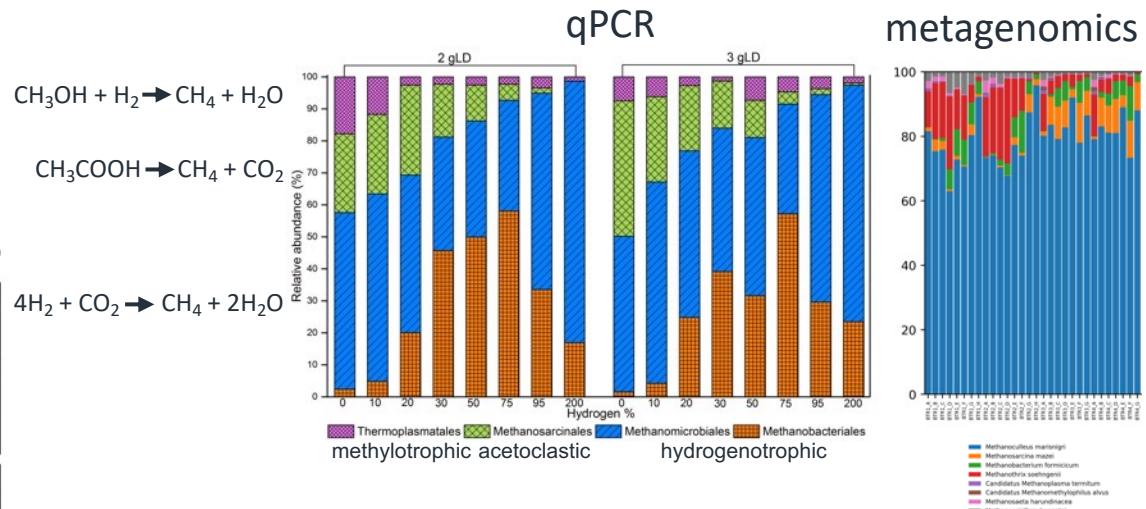
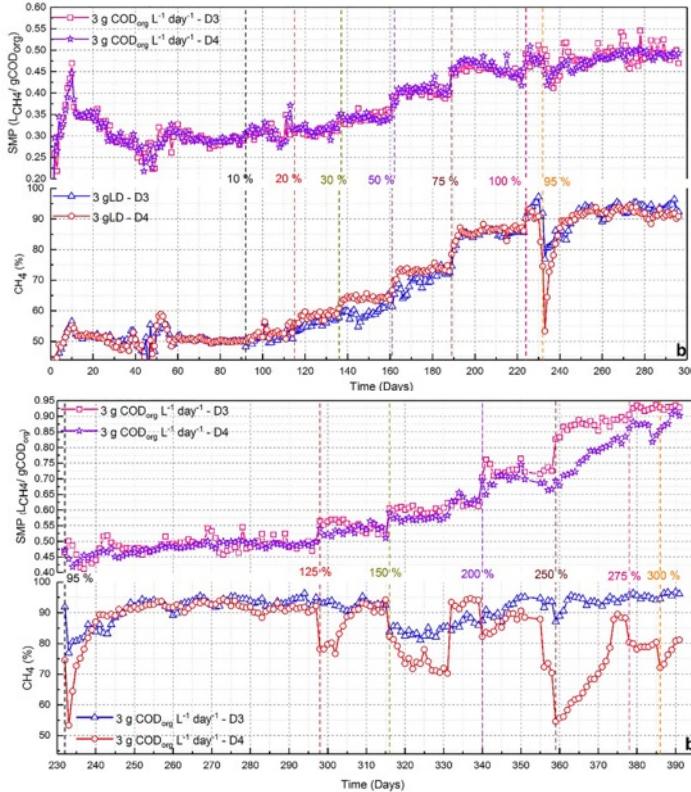
complex

metabolomics

responsive to  
rapid changes

rapid changes  
complex  
challenging analysis

# In situ biomethanisation

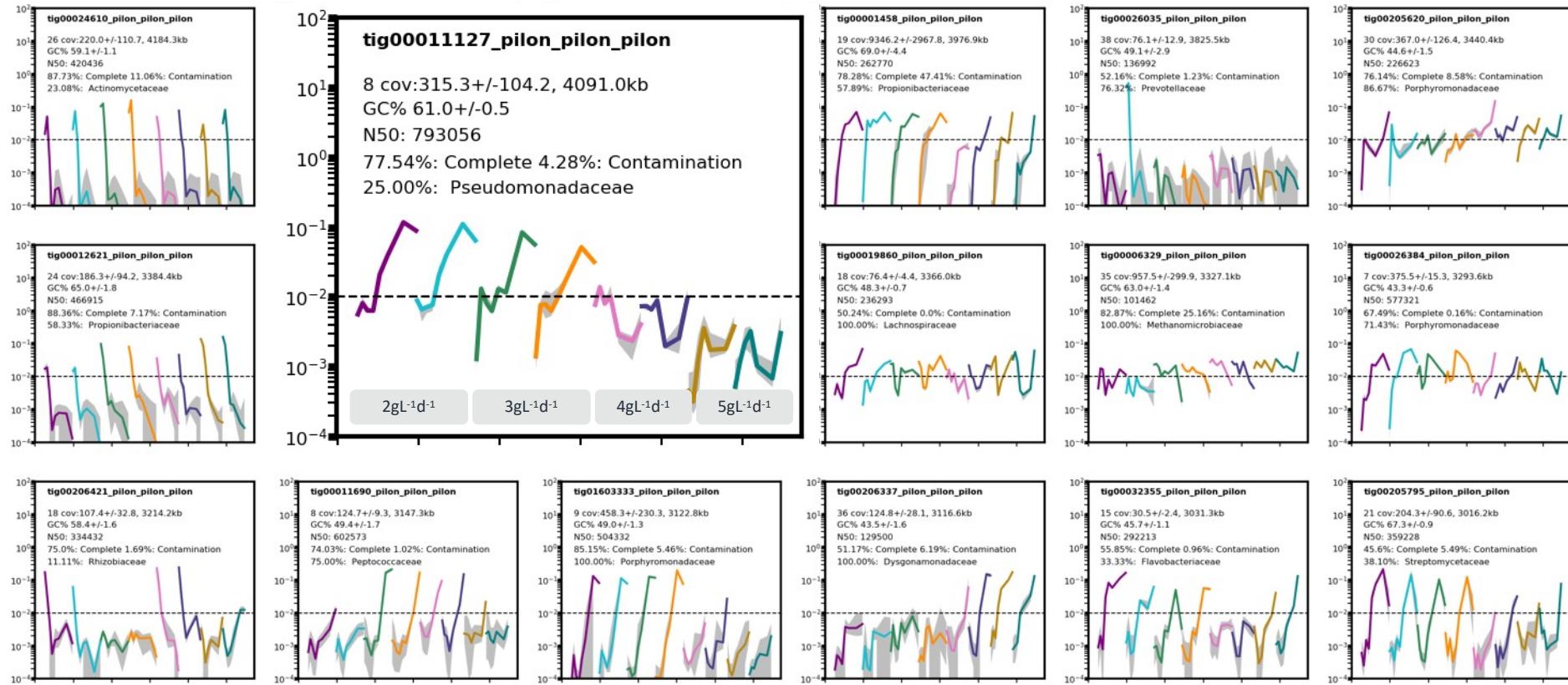


Tao et al (2019) Applied Energy 247:670-81

# Feed-rate dynamics



UNIVERSITY  
of York

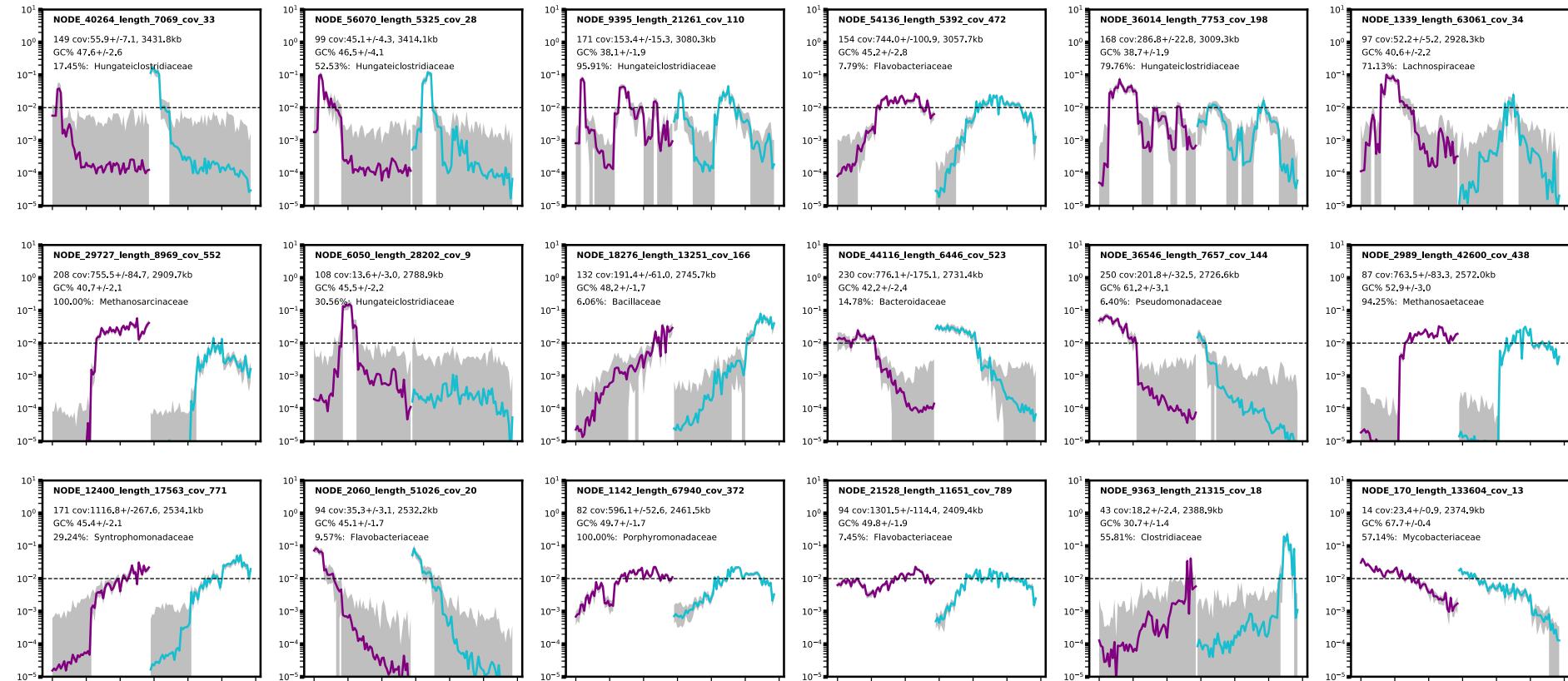


# Feed switch at scale

4 months



UNIVERSITY  
of York

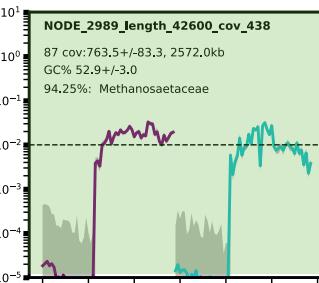
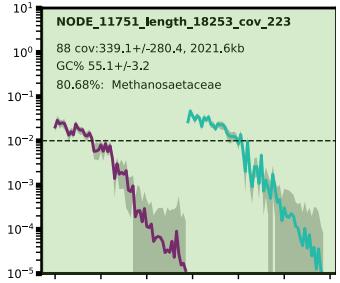


# Methanogen changes

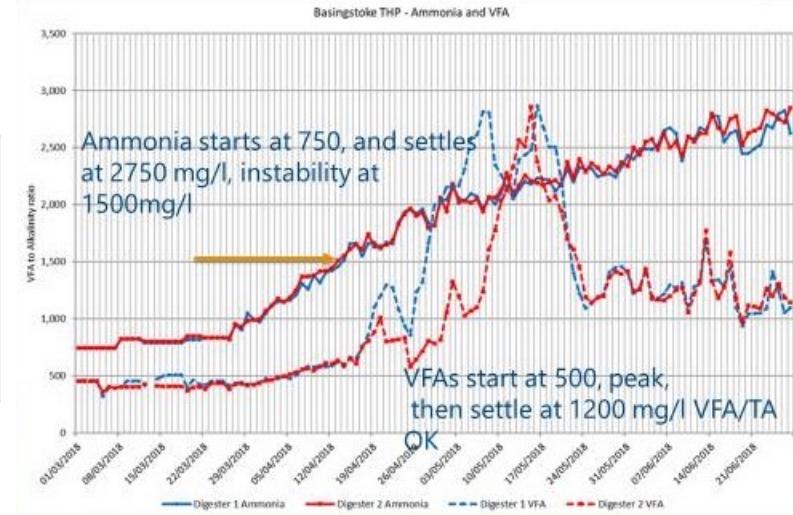
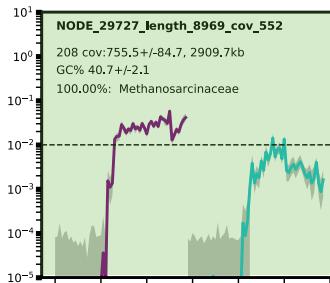


UNIVERSITY  
of York

Methanosaetaceae



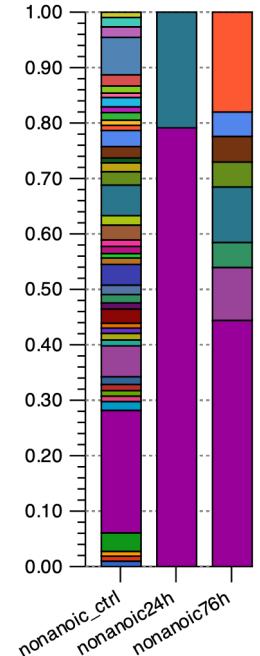
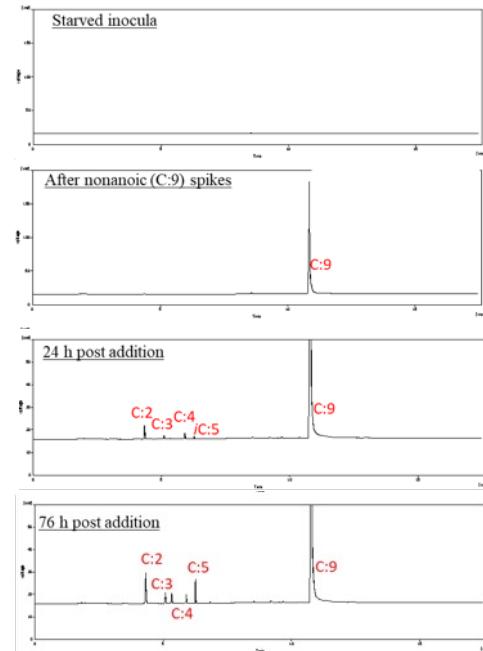
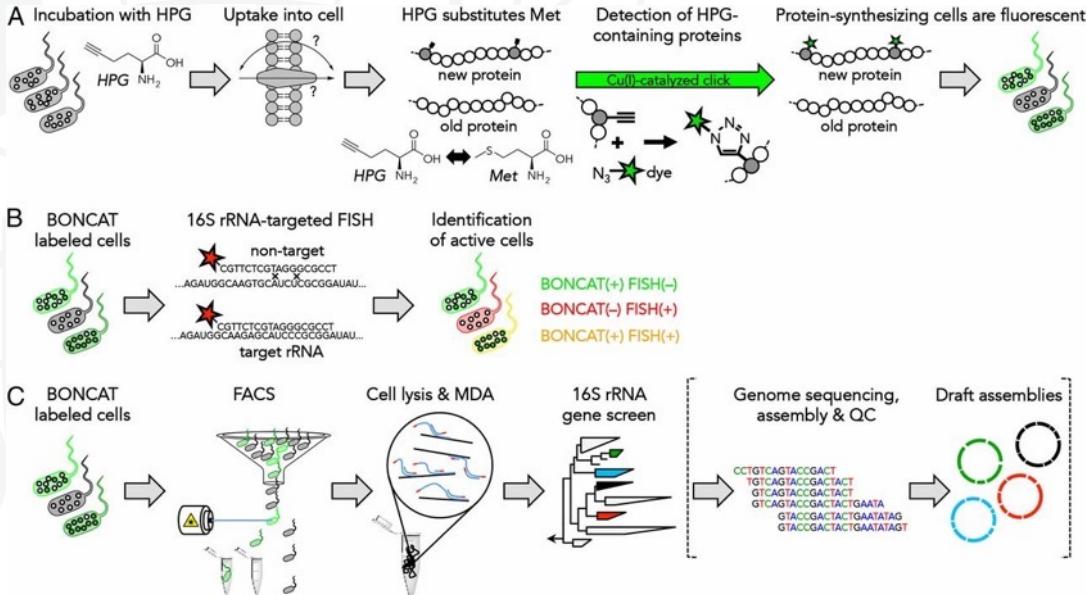
Methanosarcinaceae



# Future work - BONCAT



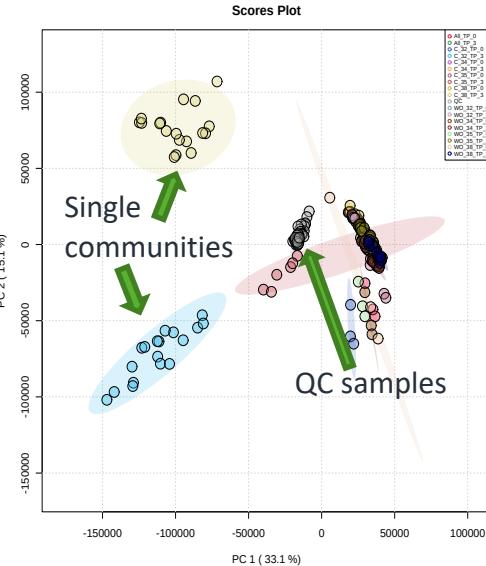
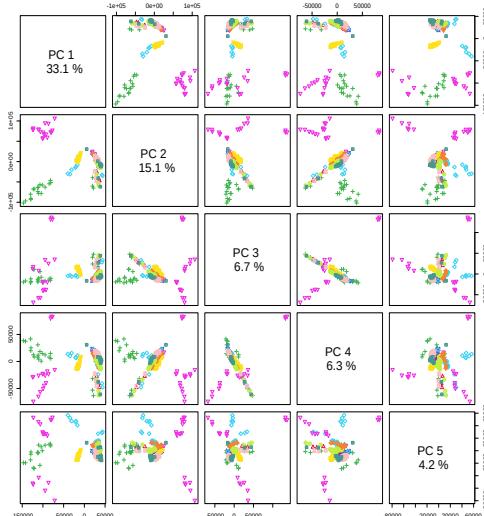
UNIVERSITY  
of York



Hatzenpichler *et al* (2016) PNAS 113:E4069-78

Yumechris Amekan

# Future work - Metabolomics



Sarah Forrester

# Thanks

Yumechris Amekan  
Kimberley Barnes  
Jane Bertram  
Annabel Cansdale  
Sarah Forrester  
Louise Grimble  
Charlotte Head  
Nathan Innard  
Oliver Noble  
Ornrumpha Sethanunt  
Avril Strachan  
David Willey  
Luna Yuan  
  
Matthew Reilly  
Luke Saye

## Previous

Anna Alessi  
Joshua Hope  
Henry Nicholls  
James Robson

## Collaborators

Southampton Teesside  
Sheffield Hull  
Lutra Amur Energy  
United Utilities  
Anglian Water  
Yorkshire Water

Biology Workshops

Genomics & Bioinformatics  
Metabolomics & Proteomics

Mathematics

Chemistry

Environment & Geography



**EPSRC**

Engineering and Physical Sciences  
Research Council

**THE ROYAL SOCIETY**

**BBSRC**  
bioscience for the future



**Oxford NANOPORE Technologies**

**Clearfleau™**

**AD NETWORK**  
Harnessing Anaerobic Digestion