Aims of “Future Science”

The overarching aim of this meeting is to explore the future research challenges for the UK Geoscience Community over the next generation.

We aim to define:

- **a vision** for the next 25 years, encompassing the major research questions and challenges we, the UK geoscience community, should be addressing.
- **a roadmap** to achieving this vision, using our collective strengths, in terms **of scientific capacity** and to map to and ultimately inform and influence policy makers and the funding landscape.

Outputs of this meeting

A report aimed at policy-makers, funders, laying out the vision for the next 25 years.

Writing group meets this afternoon

Yesterday:

- Perspectives from funders and industry
- Science challenges (drivers)
- Societal challenges (pulls)
- Technological drivers/aspirations

Solid Earth
How do planets work?
Processes and mechanisms
Imaging Earth
Deep Earth interfaces (base crust, LAB, CMB)
Nature of the core

Climate/Earth history
How will Earth evolve under conditions increasing pCO2?
How can we better understand records and signals - proxies?
Palaeoclimate to inform climate
How did life evolve?
Planetary science

What we need:
coordinated databases/management
Combine global data with targeted, interdisciplinary operations in 1 area, more multidisciplinarity - clear links w/ biology extinctions/evolution

What we need:
international collaboration critical - e.g. IODP, ICDP
NERC facilities -expansion, upgrade
Lack of modellers
Coordinated multidisciplinary approach - Earth as a system

Sediments and basins
A mix of "esoteric" and applied problems, long term versus short term.
Mineral reactions, CCS.
Cratonic basins as recorders of Earth processes

Environmental
Subsurface imaging, tracking water in catchments, fluxes.
Interactions within ice sheets, sensors, observations.

What we need
Ways to fund monitoring.
Well trained researchers in data management.

What we need:
a balance of discover/applied funding, ability to develop instrumentation and monitoring tech and follow it all the way to implementation

Generic points

- No lack of big **science challenges**
- Fundamental science underpins applied science - symbiotic
- General feeling that **coordination** within the community beneficial
- **Flexibility of fundin**g desirable – mix of discovery and applied, funding for monitoring/observation (not hypothesis-driven), funding to allow UK researchers to join big international projects
- **Training** of future scientists – data management, applied science
- **International** collaboration
- **Multidisciplinarity**
- **Technology drivers**

Society and Earth Sciences

Scientists find 'oldest human ancestor'

By Pallab Ghosh
Science correspondent, BBC News

30 January 2017 | Science & Environment

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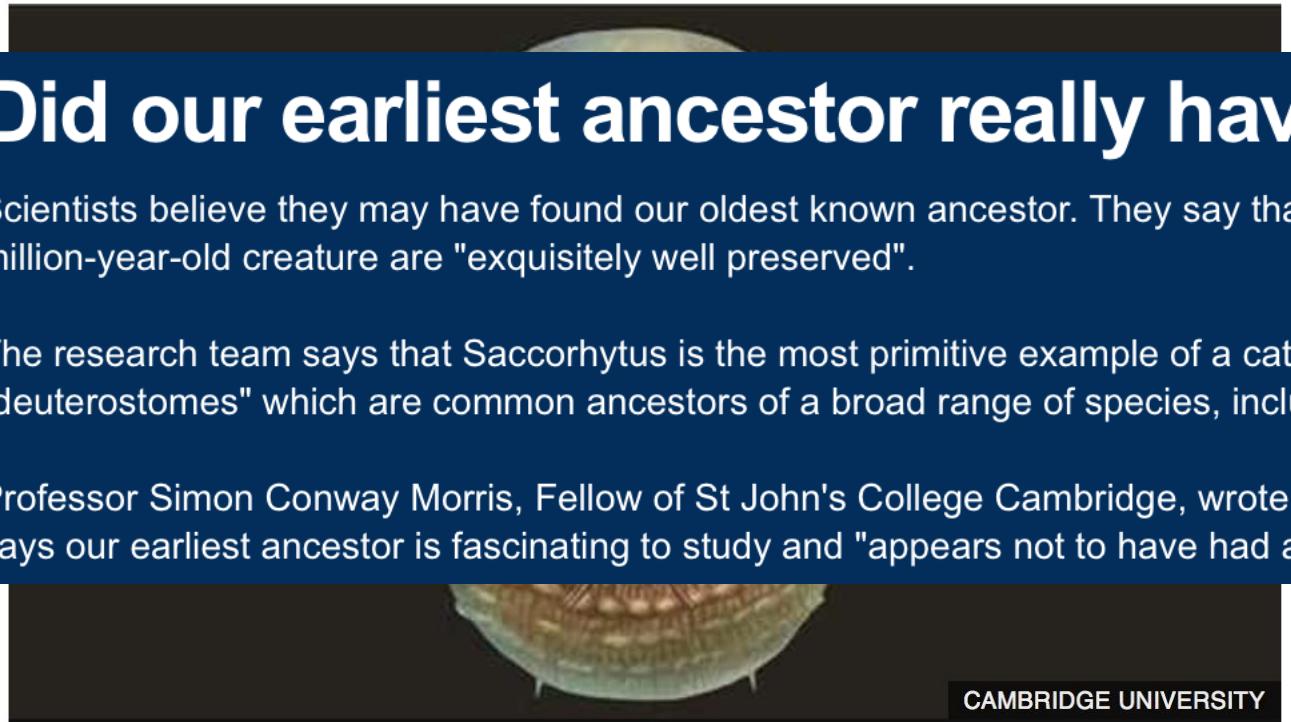
Did our earliest ancestor really have no bum?

Scientists believe they may have found our oldest known ancestor. They say that fossilised traces of the 540-million-year-old creature are "exquisitely well preserved".

The research team says that Saccorhytus is the most primitive example of a category of animals called "deuterostomes" which are common ancestors of a broad range of species, including vertebrates.

Professor Simon Conway Morris, Fellow of St John's College Cambridge, wrote the paper on Saccorhytus. He says our earliest ancestor is fascinating to study and "appears not to have had an anus"... in essence, no bum.



Artist's reconstruction of Saccorhytus coronarius, based on the original fossil finds. The actual creature was probably no more than a millimetre in size

nature International weekly journal of science

NATURE | EDITORIAL

Researchers should reach beyond the science bubble

Scientists in the United States and elsewhere ought to address the needs and employment prospects of taxpayers who have seen little benefit from scientific advances.

21 February 2017

Societal drivers

- Economic, resource provision, health, quality of life, environmental protection.
- Climate change (including ice sheet dynamics)
- Mining
- Urbanisation
- Energy
- Radioactive waste
- Food production
- Natural Hazards

Intangible values

- Scientists as impartial in post-truth era – political issues
- Societies adapting to change
- Science diplomacy as a way of bridging cultures
- Global social justice – how can we do our science as a global force for good?

Societal drivers: Ways forward/outstanding challenges

- Challenging to bring together diverse people — rapid responses to funding calls. Can we do better?
- Include more societally-relevant material in teaching and training
- Diversify funding streams – danger we erode our fundamental science base over next decades.
- Engage better with policy makers, industry, funders, public

Technology drivers

Technology aspirations

- Earth Observation/satellite-based observations-geodesy, topography
- UAVs/drones to access spatial and temporal data
- Sensors – ocean bottom geodetic, seismic, environmental, networks and associated tech
- Facilities and centres – new facilities, upgrades to existing ones. Making good use of non-NERC facilities
- Subscriptions to IODP and ICDP essential
- Modelling advances – computational, and training
- Better links with industry

Aims of today

Preparing the writing group, organising our thoughts:

- Grand Science Challenges
- Capacity
- Funders
- UK geoscience on the world stage
- Longer term picture
- **Who is our audience?**
- **What are our big messages?**
- **What have we missed?**