



# Department of Plant Sciences University of Cambridge



**Professor Alison Smith**  
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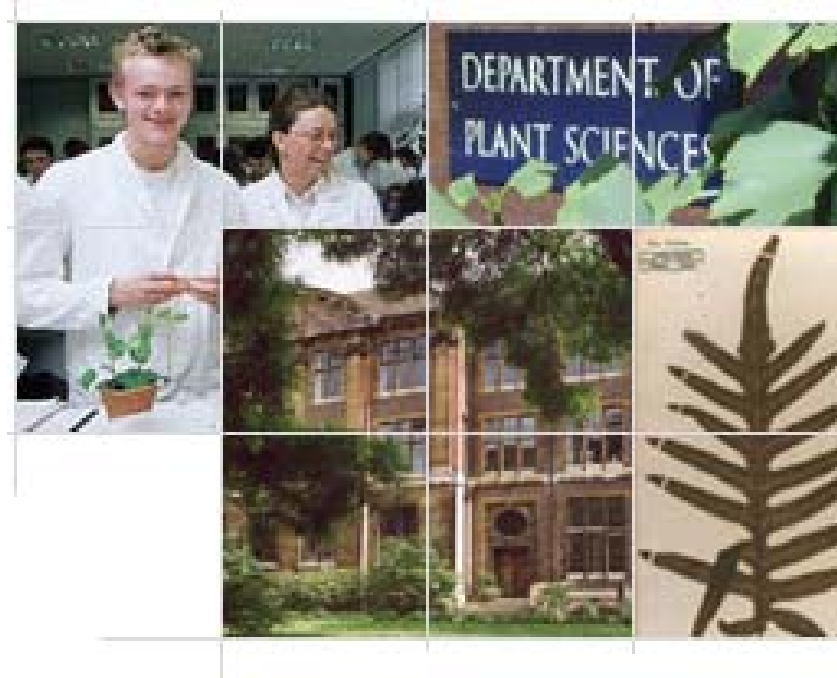
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# InCrops Partner Organisation

## Dept of Plant Sciences

- Major plant science department in UK
- Strengths in photosynthesis, plant pathology, molecular biology, biochemistry and algal research
- Beatrix Schlarb-Ridley - facilitate interactions with Industry



# Research relevant to Bioenergy

## **Plant Growth, Cell Cycle**

Dr Jim Haseloff  
Dr Alex Webb

## **C4 Photosynthesis, Carbon Partitioning, Water Use Efficiency**

Prof. Howard Griffiths  
Dr Julian Hibberd

## **Plant/algal metabolism and photosynthesis**

Prof. Alison Smith  
Dr Janneke Balk

## **Plant Pathology**

Prof. David Baulcombe  
Prof. Chris Gilligan  
Dr John Carr

## **Modelling**

Prof. Chris Gilligan  
Dr David Coomes

## **Agronomy**

Agronomy Unit  
& Cambridge Partnership  
for Plant Sciences

# Close links with other University Departments

- Dr Paul Dupree (Biochemistry)  
<http://www.bioc.cam.ac.uk/uto/dupree.html>
- Lignocellulosic bioenergy from plant cell walls  
Improve plant biomass quality and quantity  
Improve hydrolytic enzymes for biomass conversion to sugars

50% of UK wheat  
crop is straw



# Members of the **A**lgal **B**ioenergy **C**onsortium



**UNIVERSITY OF  
CAMBRIDGE**

**Prof Chris Howe**

**Dr Derek Bendall, Dr Beatrix Schlarb-Ridley**

Algal and cyanobacterial photosynthesis

**Dr John Dennis & Dr Stuart Scott**

Chemical engineering & bioprocessing  
Gasification & sustainable engineering

**Dr Adrian Fisher**

Photovoltaic devices

**Prof Alison Smith**

Algal molecular biology; regulation of metabolism

## Other Collaborators

Prof Nick Collings, Engineering, Cambridge  
Prof Malcolm Mackley, Chem Engineering, Cambridge  
Prof Sue Harrison, University of Cape Town

**Imperial College  
London**

**Prof Peter Nixon**

Biophysics of photosynthesis



**Dr Saul Purton**

Algal molecular biology

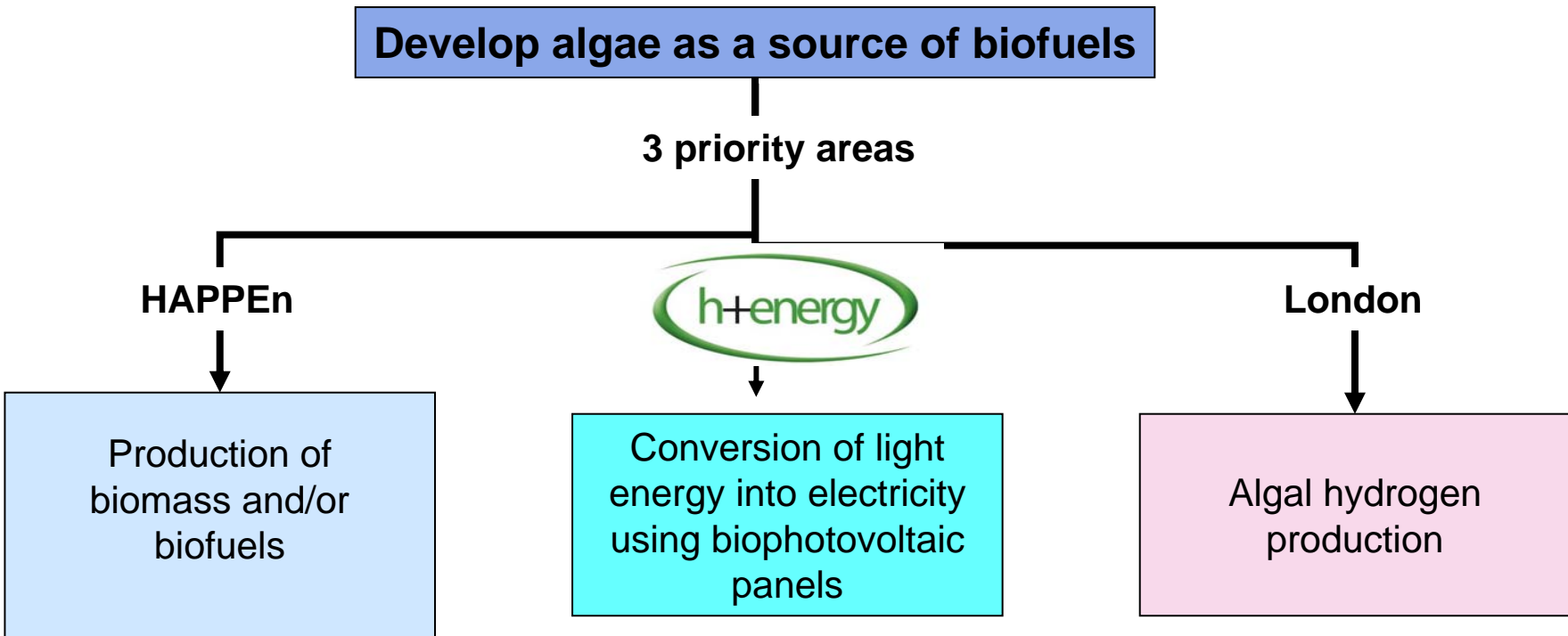


**ROTHAMSTED  
RESEARCH**

**Prof Johnathan  
Napier**

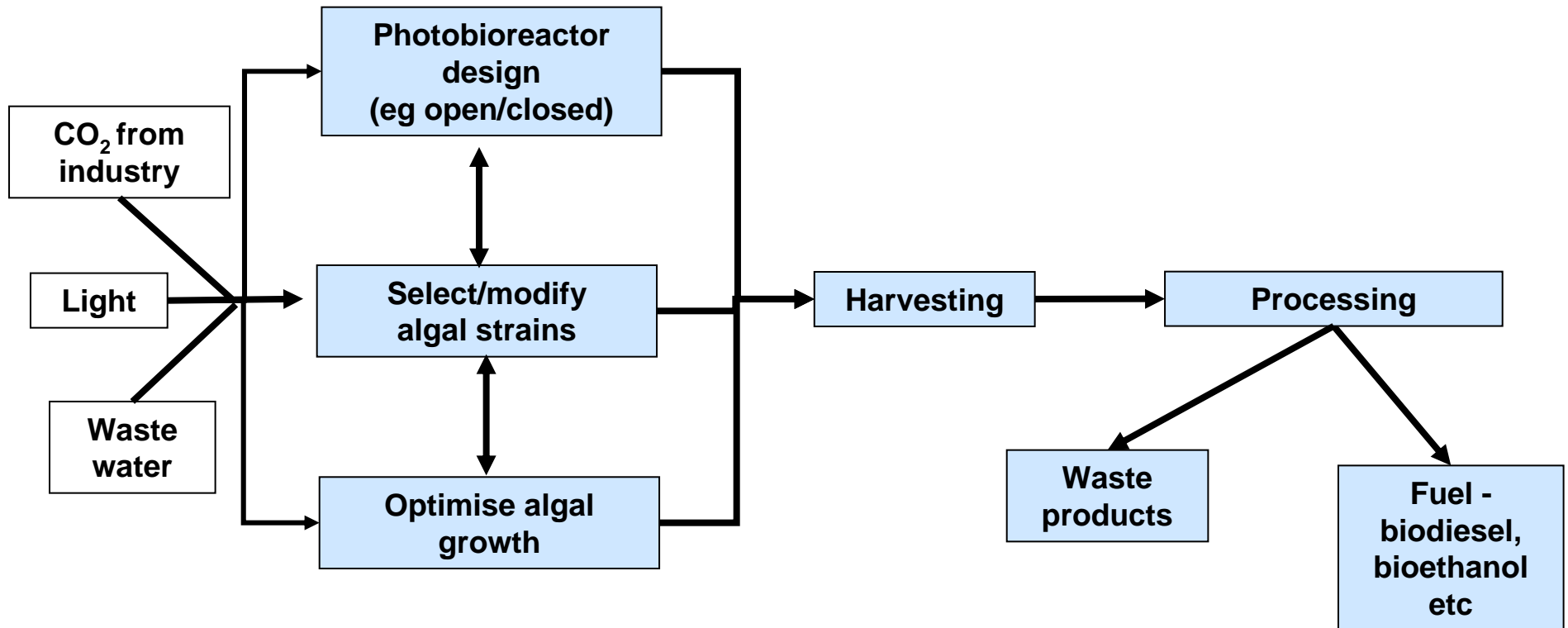
Lipid metabolism  
and metabolic  
engineering

# Strategic Aims of the Algal Bioenergy Consortium



**Collaborative projects initiated within last 2 years**

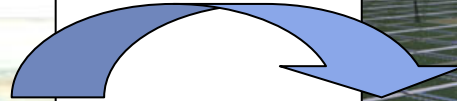
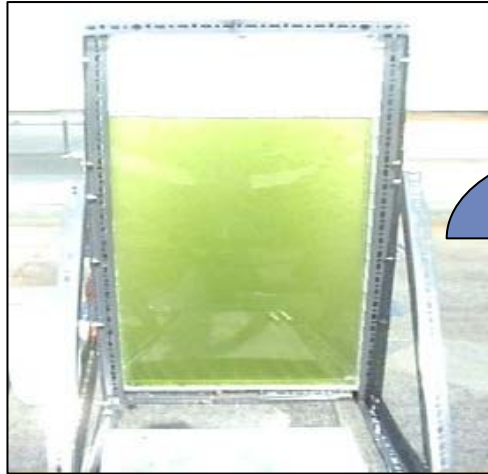
# Algal biomass as a source of biofuels



- Many considerations at each stage
- Collaboration between biologists and engineers to tackle them



# Cambridge ABC Research Areas



- **Photobioreactors**
  - parameters for optimal control, including energy requirements
- **Optimization of algal growth**
  - algal community biology and strategies to deal with contamination
- **Algal physiology and molecular biology**
  - lipids, high value products, cell walls
- **Harvesting, processing, waste products**
- **Public acceptance**

# Strategies to tackle these challenges

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**Level 1:** instal algal bioreactor/pond and monitor

**Level 2:** consider constraints holistically, design experiments to test various solutions

**Level 3:** Fundamental studies of algal biology and engineering design to provide generic information/solutions