



# AtlanticCC Alliance



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# Executive summary

- Established 2004
- Mission: To develop technology solutions to global energy challenges
- Key Achievements:
  - Technologies
    - New capabilities, new IP and commercialisation opportunities across all 20 project themes
  - Financial Leveraging
  - High potential UK-US collaborative outcomes
    - Unique tri-party Framework Agreement covering key parameters of collaboration
      - a model for UK-US collaboration
      - collaboration dynamics subject to Imperial College Tanaka Business School study
    - Unique complex capabilities bridging disciplines and institutions
      - including the Global Lab
    - Collaborative research papers and proposals
    - Advanced positions for other opportunities in the EU and US, like Department of Energy / BBSRC



# About the AtlanTICC Alliance

## VISION

To establish thought leadership in the energy debate and deliver advanced technologies to transition the world to a sustainable energy supply system to meet the needs of current and future generations

## REMIT

To develop and exploit the results of innovative research and training which plays to the complementary strengths of all three partner institutions



# Partnership

- An Alliance of World-class Researchers
  - ORNL is the largest U.S. energy research lab
  - GT is the largest U.S. engineering school with broad energy programs
  - Imperial College is a leader in Europe in energy science, technology, and policy
- The partnership exploits scientific complementarity in strategic research areas





# Leveraging the Advantages of UK-US Partnership

- Technology access
  - Leveraging ideas, expertise, equipment
- Policy and market insight
  - Access to diversity of positions to understand value drivers in different markets and meet needs of diverse stakeholders
- Strengths of Diversity
  - Developing collaborative skills that can be deployed outside the Alliance with stakeholders, investors
- Commercialisation
  - Wider options for winning investment in both US and EU markets
    - Strategic partnership – Theme-based research funding
    - Targeted investment via
      - Ring fenced research
      - Theme specific research
      - Specific IP ownership
      - Standard research investment in an area of mutual expertise/capability



# Strategy: Commercialisation

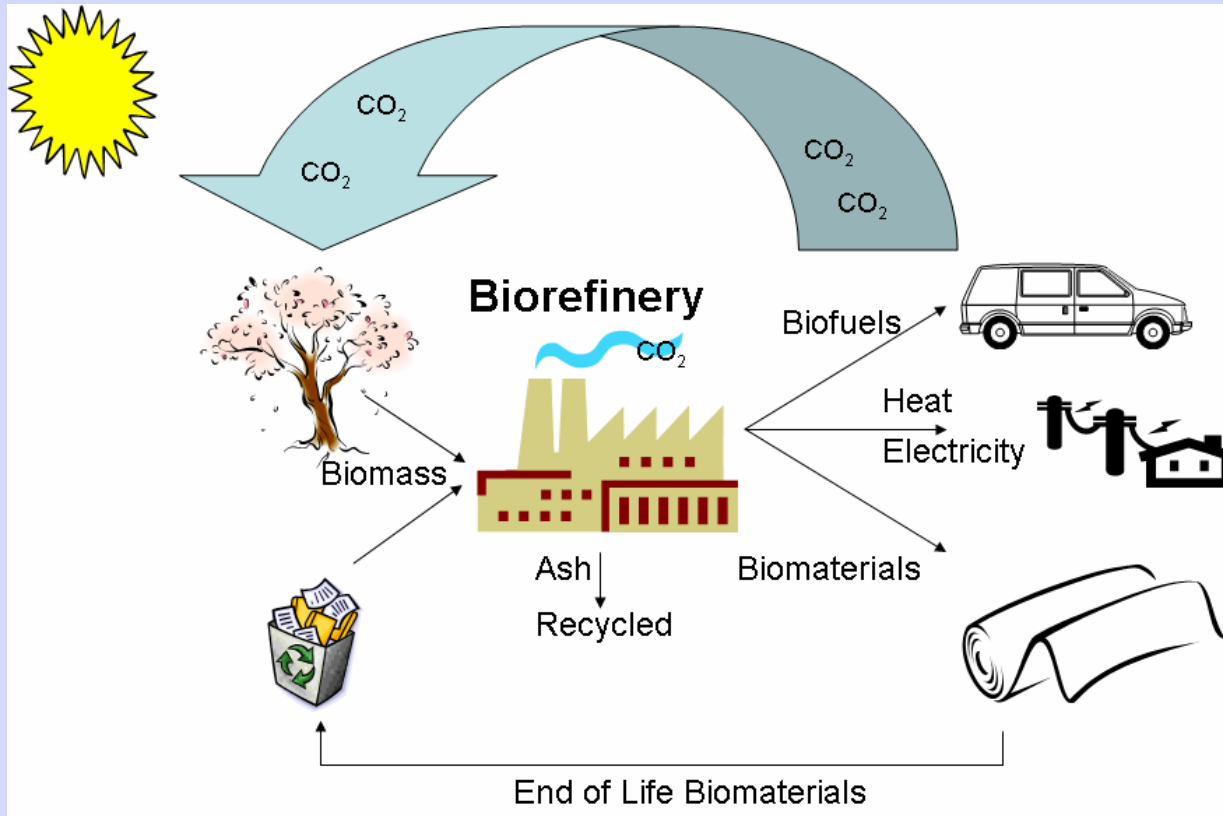
- Our potential investors include
  - Large corporations with and without renewables strategic positions
  - Venture capital investors
  - Public / government funds and programs
  - Philanthropic and charitable trusts
  - Philanthropic individuals
- Our potential industry investors include
  - Chemicals, Agrochemicals, Pharmaceuticals
  - Energy- fuels, heat and power
  - Materials
  - Engineering in all sectors
  - Finance
    - *plus* business end users of all the above who influence the supply chain

# Key Achievements

- Biomass to Bioproducts, Biofuels and Biopower: B2B3
- Materials for Energy
- Enabling Technologies



# Biomass to Bioproducts, Biofuels and Biopower: B2B3



## ***The Path Forward for Biofuels and Biomaterials.***

*Ragauskas, A.J.; Williams, C.K.; Davison, B.H.; Britovsek, G.; Cairney, J.; Eckert, C.A.; Frederick, W.J., Jr.; Hallett, J.P.; Leak, D.J.; Liotta, C. L.; Mielenz, J.R.; Murphy, R.; Templer, R.; Tschaplinski, T. **Science (2006), 311, 484-489***



# B2B3: Key Research Challenges

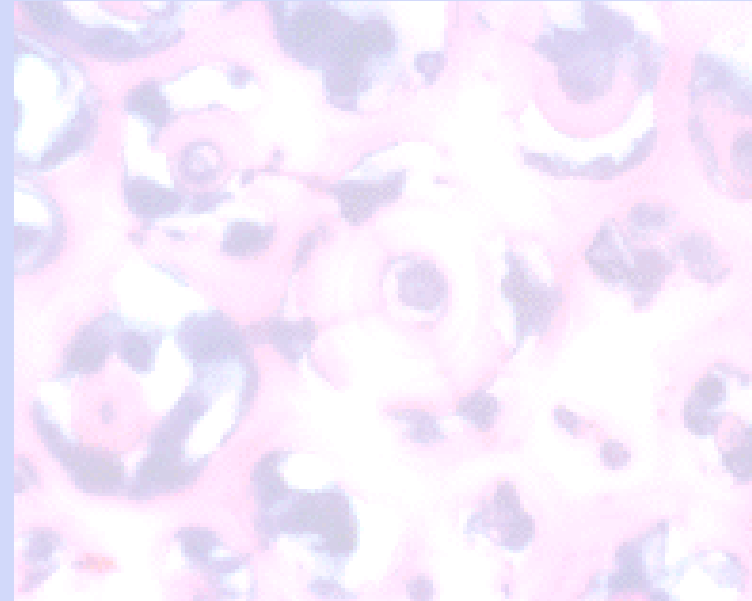
- Optimise lignocellulosic feedstocks positions and characteristics
  - Map and understand supply landscape and dynamics for target crops
  - Optimise target crops using genomics+
- Improve economics of lignocellulose precursor extraction
  - Develop novel pretreatment methods – lab based and modelling approach
  - Use new chemistry to access high value lignin-derived precursors
- Develop new routes from lignocellulose extracts to chemicals and materials
  - Engage with key industry players to understand long term value drivers
  - Develop new processes and products that create IP and meet industry needs
- Develop economic processes for heat and power generation from biomass
  - Optimise biomass fuel gas clean up and combustion process control instrumentation
  - Develop routes to long term biomass fuel targets “beyond ethanol”



# B2B3: Achievements

## Biomass to Bioproducts, Biofuels and Biopower

- 4 academic papers published or in preparation
- One patent application in preparation (biomass pre-treatment processes)
  - potential for 3-4 further patents in this area, catalysis and new materials
- Potential commercial partners identified and engaged



# Materials for Energy

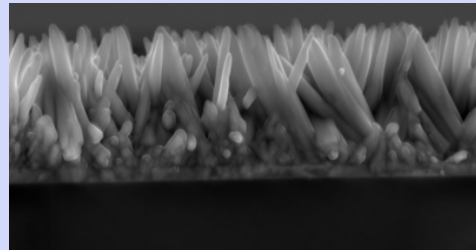


**Organic Photovoltaic Cells at Georgia Tech:** In the quest for renewable and clean energy sources, Bernard Kippelen is banking on the sun. By developing solar cells made from inexpensive, lightweight, flexible organic materials, Kippelen and colleagues at the [Center for Organic Photonics and Electronics](#) are working to open up new markets for solar energy. The paperthin, flexible organic solar cells have the potential to power everything from Radio-frequency Identification (RFID) tags to iPods and laptop computers.



# Materials for Energy: Aims and Projects

- Build on scientific advances in nanotechnology to develop the next generation of materials for tomorrow's sustainable and clean energy sources.
- Key Science and Technology Areas:
  - Organic Photovoltaic Technologies
  - Solid Oxide and Microbial Fuel Cells
  - Nanotechnology modelling and characterisation
  - Metal Nano particle Combustion



# Materials for Energy: Achievements

## Materials for Energy

- 5 academic papers published and in preparation
- One joint patent application in preparation (OPV):  
*Perylene diimides as electron acceptors in polymer / small molecular solar cells*
- Potential commercial partners identified and engaged



# Enabling Technologies: Aim and Projects

To create the technological infrastructure for tomorrow's leaders in science and technology

- Lambda Rail – establish gigabit connectivity between the three institutions
- Transmission electron microscopy – share use of the highest resolution electron microscopes, for research and education
- High performance computing – provide access to tera- and petaflop supercomputers
- Grid technologies – develop approaches for integration of distributed generation into power networks
- Neutron scattering – develop specialized instrumentation for research utilizing neutron scattering



# Enabling Technologies: Two key projects

- The Lambda Rail allows each of the institutions access to world class facilities and intellectual capital at the other institutions, helping to build collaborations, transcend borders and develop a global classroom ('Global Lab').



- The Electricity GRID project combines 3 centres of excellence to address the key issues in distributed power transmission and distribution



# Enabling Technologies: Achievements

## Enabling Technologies

- Launch of Global Lab, October 2007

*Imperial College London, October 10<sup>th</sup> 2007:* UK Minister for Science, Ian Pearson MP, examines gold-coated nanostructured materials by controlling the JEOL 2200 FS Aberration Controlled Transmission Electron Microscope 4000 miles away at the Oak Ridge National Laboratory, Tennessee.

Lambda Rail connectivity enables fast, secure, high content information transfer.

## Electricity Grid project :

- Positioning/targeted UK-US event planned for Q2 2008
- Potential Commercial partners identified and engaged



# Project Development Achievements

- 1 Investing in Collaboration

- Numerous collaborative relationships established through trans-Atlantic visits, exchanges and workshops
- Outcomes: joint research findings, publications, patents and potential routes to sources of funding

- 2 Promoting the Alliance

- High political visibility of Alliance via technology showcase events

- Global Lab launch

- UKT&I Biofuels Trade Mission Atlanta:

- strong relationship with UKT&I

- Outcome: increased profile has given increased buy in from UK government stakeholders and advantage to Imperial College and its Alliance partners



# Project Development Achievements

- 3 Understanding Collaboration
  - Two-year study of collaboration in academic research projects under the AtlanTICC Alliance (end '08)
  - Led by team from Innovation & Entrepreneurship Group at the Tanaka Business School
    - Virginia Acha, Linus Dahlander
  - Using social network analysis, survey and case study methods to explore collaborative patterns and practices





# Key Elements and Lessons Learnt

## People

- Finding personal and scientific complementarity
- Providing opportunities for discussion and collaboration e.g. Away Day
- Involvement increases with
  - Access to funds
  - Institutional support
  - Complimentary but new expertise at partner institution
  - Increased likelihood of winning new funding



# Key Elements and Lessons Learnt

## Processes

- Exchange of Staff and Students
- Lambda Link Connection
  - Enabling real time videoconferencing
  - Instrument sharing
- Agreements
  - Non Disclosure Agreements
  - Framework Agreement
- Key Management Structure
  - Board of High Powered of committed individuals
  - Management at theme level
  - Project Management



# Key Elements and Lessons Learnt

## Finance

- Simultaneous funding – both partners having funding at the same time
- Financial commitment from partners including their respective institutions
- Seed money as start-up is key
- Business development
- Promoting need for transatlantic shared funding

