

Energy Harvesting

An EPSRC Funded Network

www.eh-network.org

Energy Harvesting 2011

Dr Steve Beeby
7th February 2011
IET Savoy Place, London

Knowledge
Transfer
Network

Electronics, Sensors,
Photonics

Introduction

- Network Background
- Management and Membership
- Objectives and Activities
- 1st Workshop – Human Power
- Today's event

Network Background

- Strong R&D position of UK/Europe, a lead in commercialisation but still a huge unexplored promise of energy harvesting
- Inherently multidisciplinary but a fragmented community
- In need of new research challenges – applications focus to move on to more challenging scenarios beyond miniaturisation
- Need better knowledge exchange between industry and academia and between academic disciplines

Why a network?

- Dedicated network of interested organisations is required to help promote new areas of collaboration and disseminate developments
- More challenging applications will require the involvement of new players and new approaches
- Community prepared to participate in workshops to define the future research challenges

Network has been established

- Funded by EPSRC for 3 years
- Managed on behalf of the community by Southampton University (PI Dr Steve Beeby, CI Dr Geoff Merrett, Dr Kai Yang) plus Dr Simon Aliwell and Dr Costis Kompis
- Steering Board in place
- Link established with Electronics, Photonics and Sensors KTN

Steering Board Members

- Members drawn from across the community to cover all major technology areas
- Both academic and commercial representation
- Responsibilities:
 - Drive activities to define new research themes
 - Steer network management on interests and needs of energy harvesting community
 - Approve networks outputs
 - Champion the Energy Harvesting Network and help develop links with other key networks and organisations

Robert Dorey, Cranfield University (Chair)

Costis Kompis, Voderia Ltd

Martin Judd, University of Strathclyde

Steve Burrow, University of Bristol

Eric Yeatman, Imperial College London

Geoff Merrett, University of Southampton

Kenichi Soga, University of Cambridge

Markys Cain, National Physical Laboratory

Haydn Thompson, Rolls-Royce UTC

Roger Hazelden, TRW Conekt

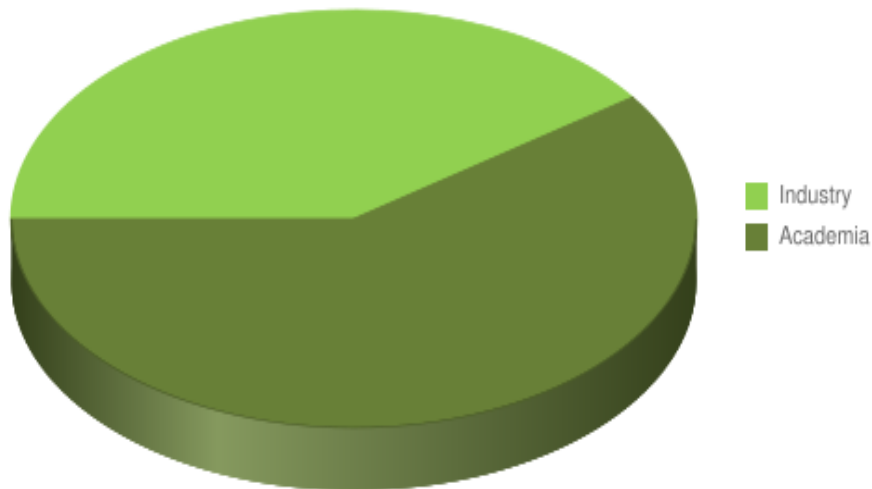
Simon Aliwell, Zartech Ltd

Steve Beeby, University of Southampton

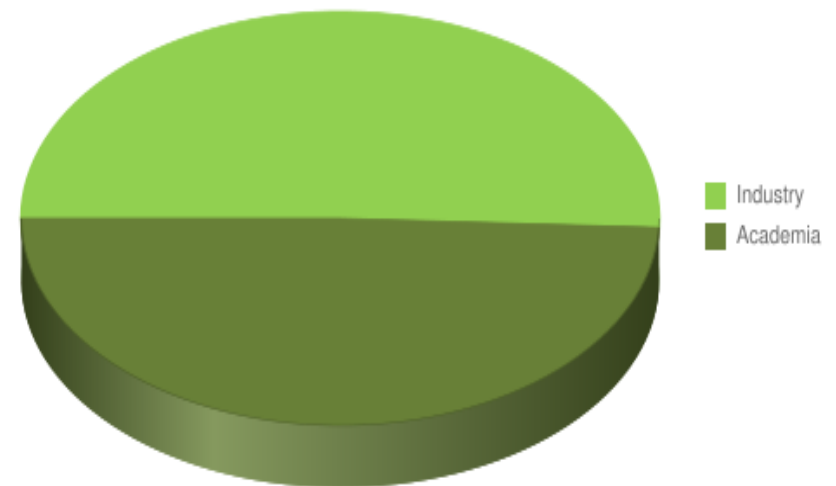
Membership

- Open to all with an interest in energy harvesting
- 185 people from 142 companies and institutions

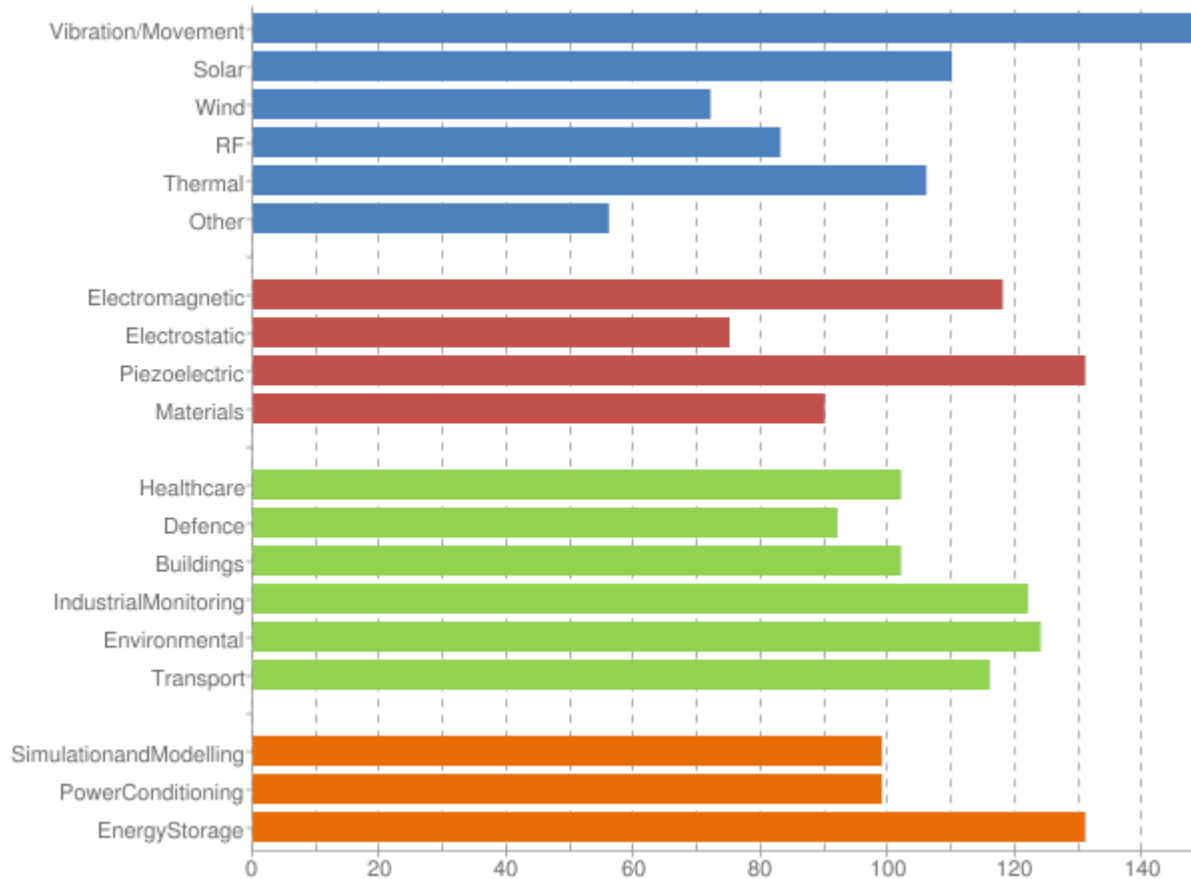
Registered Members



Registered Companies/Institutions



Member interests



Network Objectives

- Define new research challenges and catalyse new multidisciplinary collaborative research projects
- Facilitate the interaction and mobility of researchers
 - Important for wide range of expertise and facilities required
- Ensure that the advances in science and developments of the technology are more widely disseminated
 - Particularly to potential end user communities

Activities

- Define the research challenges
 - Steering Board led
 - Series of themed and facilitated workshops
 - Visits to key facilities
- Knowledge exchange
 - Website - a community resource (news, blogs, papers...)
 - Electronic newsletter
 - Annual industry-academia dissemination event
 - Continued promotion of the network (presentations, press, articles)
 - Case studies
 - Conference support to include EH sessions
 - Research theme briefings to funding agencies

1st Workshop – Human Power

- Workshop designed to facilitate the definition of the new research challenges for EH applications in, on or near the human body.
- Participants expertise included a range of energy harvesting technologies and approaches, materials, electronics, medical devices including implantables, wireless and body sensor networks, standards, energy storage.
- Short presentations and panel discussions to get delegates thinking about the practical challenges of energy harvesting both inside and outside of the human body.
- Two sessions: Outside and inside the human body

Workshop Outputs

- Identification of the drivers (Economic, Social, Technical and Policy)
- Statement of the vision and identification of applications
- Roadmaps for
 - Technology Development
 - Underpinning Science
- Resources and skills required
- Definition of the challenges

Technology Development

- Improved energy harvesters coupled to humans
 - Improved thermoelectric devices for smaller temperature gradients
 - Lower frequency/non-linear mechanical harvesters
 - ‘Soft’ and bio-compatible materials
 - Energy harvesting fabrics/clothing
- Underpinning science
 - Materials research
 - Microfabrication process development
 - Electronics development reducing power consumption

Workshop Report

- Available through the Network website

2nd Workshop: EH for building and infrastructure monitoring

- 4th May, TRW Conekt, Solihull
- Interested parties please let us know!

Agenda: AM

9.30	Arrival, Registration and Coffee
10.00	Introduction: The Energy Harvesting Network <i>Steve Beeby (University of Southampton)</i>
10.15	Keynote: Emerging Self Powered Systems <i>Rob van Schaijk (Holst Centre)</i>
10.45	Mobile Energy Harvesting Systems <i>Andrew Bell (University of Leeds)</i>
11.05	Thermoelectric Energy Harvesting <i>Gao Min (Cardiff University)</i>
11.25	Coffee Break and Networking
11.45	Next Generation Energy-Harvesting Electronics: A Holistic Approach <i>Paul Mitcheson (Imperial College London)</i>
12.05	'Elevator Pitches' from Companies with Stands at this Event <i>Perpetuum, Micropelt, Techni Measure, Arveni, IDTechEx</i>
12.30	Lunch and Poster Session

Agenda: PM

13.50	Keynote: Nonlinear Consideration in Energy Harvesting <i>Daniel J. Inman (Virginia Tech)</i>
14.20	Energy Harvesting in Aero Engines <i>Haydn Thompson (Rolls-Royce UTC in Control Systems)</i>
14.40	Energy Harvesting in Aeronautical Applications <i>Dibin Zhu (University of Southampton)</i>
15.00	Coffee Break and Networking
15.20	Energy Harvesting used for Wireless Condition Monitoring <i>Tom Berry (General Electric)</i>
15.40	ISA Standards for Energy Harvesting <i>Roy Freeland (Perpetuum)</i>
16.00	Open Discussion and Best Poster Award
16.15	End of Event

Please Complete the feedback form: help with identifying 3rd workshop theme and addressing sustainability of the Network.

Thanks for your attention

- To find out more or to register as a member:

www.eh-network.org

- To join the Energy Harvesting subgroup of the Electronics, Sensors, Photonics KTN

<https://ktn.innovateuk.org/web/eh1>