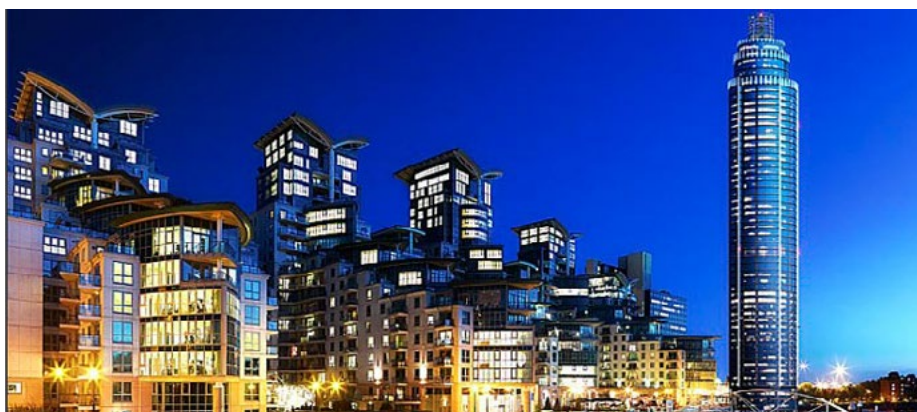


# footprint

The TSBE Centre newsletter

## Power on the Tower



**The tallest solely residential building in the UK integrates a novel wind turbine design to reduce reliance on fossil fuels. Research being carried out by TSBE Research Engineer Rosario Nobile aims to maximize the efficiency of the wind turbine.**

'Pegasus', a vertical axis wind turbine, has recently been integrated on the top of St. George Wharf (or Vauxhall Tower) in London. The tower is a residential skyscraper with 50 storeys and is 180m tall. The wind turbine will power the tower's common lighting and reduce the CO<sub>2</sub> emissions of the building.

'Pegasus is a design far more suited to urban environments than the more common horizontal wind turbines we are used to seeing' says Rosario.

'Vertical Axis turbines work much better in turbulent environments, are able to extract wind energy from any direction and are much quieter due to their slow rotational speed.'

Rosario is using a computational fluid dynamics (CFD) tool to predict and

improve the performance of Pegasus. The turbine was developed by his industry supervisor, Anthony Mewburn-Crook in collaboration with MatildasPlanet. It is expected to produce around 35,000 kWh per annum, the equivalent to the annual electricity consumption of 10 houses in the UK.

To find out more about Pegasus, visit:

[www.matildasplanet.com/our-products/wind-power.aspx](http://www.matildasplanet.com/our-products/wind-power.aspx)



Find out more about Rosario's work:  
[www.reading.ac.uk/tsbe/Current-research-projects/EngDProfiles/r-nobile.aspx](http://www.reading.ac.uk/tsbe/Current-research-projects/EngDProfiles/r-nobile.aspx)

### In this issue:

- Power on the Tower
- Set for Britain
- The 'Power' of the App
- Live WIRES
- What's Cooking?
- Power to the Poster
- Sports corner
- 60 seconds Kevin Couling



## Set for Britain

Three TSBE researchers have been shortlisted for the highly competitive SET for Britain poster finals. The national competition picks research projects that represent the very best research work in the fields of Engineering, Biological and Biomedical Science, and Physical Sciences.

Researchers Howard Darby, Marek Kubik and Samantha Mudie will all be showcasing their research to members of both houses at Westminster at an event on the 18th of March 2013, and are in the running to win a prestigious medal and substantial monetary prize.

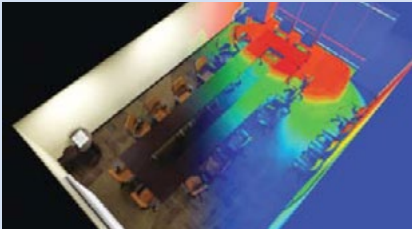
Read more at:  
[www.setforbritain.org.uk](http://www.setforbritain.org.uk)

## BIM for sustainable design

Faithful + Gould are the latest company to team up with the TSBE Centre to develop the use of BIM in the sustainable design and construction of buildings. They have launched a pioneering research project, which over the next four years will help guide their development of BIM capability as the industry works towards the UK Government's target to deliver Level 2 BIM for all publically funded projects by 2016.

Building Information Modelling (BIM) has the potential to enable multi-disciplinary information to be inputted into one model creating an opportunity to efficiently analyse and assess environmental data to ensure the best possible sustainable solution. Research is already underway at the Centre to use BIM to reduce waste and enable the realisation of 'designed-for-performance' new buildings and infrastructure.

For more information please visit: [www.reading.ac.uk/tsbe](http://www.reading.ac.uk/tsbe)



## CIBSE Young Energy Performers

Many supposedly energy efficient buildings do not perform to the levels predicted during the initial design process. Attempting to address this issue, the CIBSE Young Energy Performance Group was launched in October 2012 with the aim of providing a platform for the discussion of new ideas and research surrounding the energy consumption of buildings. The intention is that through networking and promoting collaboration between members this performance gap can be reduced resulting in truly sustainable buildings. EngD researcher Richard Tetlow is part of the steering committee for the new group and is looking forward to helping it develop over the coming years.

YEPG currently has around 1300 members from various disciplines including architecture, sustainability, and engineering. It will be looking to hold regular events throughout the year; with the next one scheduled for the 3rd of April.

For more information on the group, visit [www.cibse-epg.org/yepg](http://www.cibse-epg.org/yepg)

## The 'Power' of the App!

TSBE Centre researcher Dan Williams, sponsored by Microsoft UK, is the brains by the development of the new Windows 8 energy consumption app which has just been released to the Windows Store.

The app is designed to help small, medium or large organisations save energy from their PC's and is an output of Dan's EngD research project. The app also highlights the energy and cost benefits that can be realised by using virtualisation technologies through the Microsoft Windows Server Operating Systems. Dan describes the app as 'a taster to the real science which lies behind it'. The full model which powers the app contains over 150 variables that can be tweaked to refine the modelling results.

The app can be downloaded from the Windows 8 Store for use on any PC. Teams at Microsoft UK will be using it to demonstrate to

customers the energy efficiencies and cost benefits that can be gained by using the newest versions of the Microsoft Windows Operating Systems.

Find more information on Dan's work: [www.reading.ac.uk/tsbe/Current-research-projects/EngDProfiles/d-williams-tsbe-pgr.aspx](http://www.reading.ac.uk/tsbe/Current-research-projects/EngDProfiles/d-williams-tsbe-pgr.aspx)

To contact Dan: [d.williams@pgr.reading.ac.uk](mailto:d.williams@pgr.reading.ac.uk)



## Live WIRES

EngD researcher Tim McGinley has developed an online platform to support interdisciplinary practice in the TSBE. The platform is called 'We're Interdisciplinary Research Engineers' (WIRES).

Multidisciplinary collaborative research occurs when researchers from different disciplines research 'together' without stepping outside their native disciplines. In contrast, interdisciplinary research fuses the approaches and methods of different disciplines resulting in new interdisciplinary methods and approaches. Finally, transdisciplinary research extends interdisciplinary research by conducting the research within a real business context.

At the TSBE centre our brief is to conduct research that is both academically rigorous and relevant to business. Interdisciplinary research is the foundation of our transdisciplinary research; therefore, we have developed an approach to support interdisciplinary research in our centre. The persistent challenges of interdisciplinary research were reviewed in a collaborative

paper by TSBE researchers and staff which was presented at a conference on interdisciplinarity in Sheffield.

In response to the challenges identified in the paper, the platform WIRES was developed using a participatory design methodology input from our researchers. A central premise of WIRES is that research should be fun; one of the ways this is approached is to gamify the research process. This was achieved by asking researchers to enter their publications and rate them collaboratively. The intention was that WIRES would lead to researchers rewarding publication activities and identifying appropriate potential collaboration opportunities and research groups

WIRES is built upon Tim's EngD research project which proposes an architecture framework to enable the development of online tools to support community participation.

You can find out more about wires at [www.monsterattack.net/demo/wires/php](http://www.monsterattack.net/demo/wires/php) and more information on Tim's research on the TSBE website.





## Schools enjoy Eco-Christmas Workshop

As part of the Centres outreach and public engagement programme, five Research Engineers visited two schools in Reading to deliver a workshop based around the science and engineering issues surrounding Christmas.

Year 7 and 8 students at Bulmershe School and Reading Girls School took part in the workshops which looked at four Christmas themes: The effect of the Christmas holidays on the national electricity grid ; The issues surrounding waste of food and packaging; Calculating the electricity usage of Christmas lights and Calculating the amount of biofuel needed for Santa's sleigh ride!

Researcher Laura Daniels said 'Communicating our research is important in all environments but working with schools gives a chance to inspire the next generation of scientists and engineers, both in research and industry.'



Researchers Laura, Marek and Pete at Reading Girls School

## What's Cooking?

Commercial catering facilities are some of the UK's most profligate users of gas, electricity and water with an average annual electricity use of 250,000 kWh. Up to 70% of this consumption is from the kitchen alone!

Despite this, commercial catering has been a forgotten sector in terms of energy reduction strategies and very little research exists in the field. Mitchells & Butlers plc. have identified vast knowledge gaps in this area and teamed up with TSBE and researcher Samantha Mudie to investigate energy reduction from food preparation in pubs and restaurants. Recently, this exciting research project has been concerned with the development of more ambitious and robust benchmarking targets for the industry.

Sam commented 'Current benchmarking metrics and figures are based on data from the 1980s. The industry is known for being notoriously secretive with their energy use data; as such the current figures are massively outdated.'

Benchmarking allows for energy use to be compared between similar buildings and enables the most poorly performing ones to be identified and targeted for action. Most commercial facilities are benchmarked in terms of floorspace (kWh/m<sup>2</sup>); however this is largely ineffective for premises with large catering facilities. More reliable metrics, such as 'kWh/meal' are currently being investigated; automatic meter readings, together with a variety of other business data has been collected from over 800 premises. Individual appliance monitoring is being extensively carried out at 14 sites.

'We hope that by working with the Chartered Institute of Building Services (CIBSE) and providing them with a modern dataset, we can encourage the development of more ambitious but realistic energy use targets for the industry, to help the UK reduce its carbon footprint.'

Find out more about Sam's research by emailing her at [S.Mudie@pgr.reading.ac.uk](mailto:S.Mudie@pgr.reading.ac.uk)

## Power to the Poster

The latest posters to hit the walls of the University halls of residence are Power Posters.

'Power Poster' is a project investigating how energy demand can be reduced through energy-related technologies and services aimed at encouraging changes in occupant behaviour. TSBE Centre Research Engineer, Michelle Agha-Hosseini sponsored by Halcrow (A CH2M Hill Company), along with a psychologist from BRE and a designer from Novalia developed the idea for the power posters following a TSBE sandpit in 2010.

This project, currently in the evaluation phase, uses a variety of interactive posters to give feedback to occupants on their buildings' energy use in simple and engaging ways using attractive designs to appeal to different audiences. A number of buildings including the University of Reading's halls of residence are being used as case studies to explore how occupants react to these posters and the effect they have on energy awareness and behaviour..

If you would like to know more about this study, please contact Michelle on:

[AghahosseiniM@ch2m.com](mailto:AghahosseiniM@ch2m.com)



## Hot in the City

Most of us live or work in an urban area and have experienced the unique nature of an urban climate. The best known example is an Urban Heat Island, where the centre of a town can be several degrees warmer than its rural surroundings. But what causes the Urban Heat Island? Can we alter the design of our cities to beat the heat in the future? TSBE Centre Director, Professor Janet Barlow, gave a public lecture exploring some the myths and physics behind the Urban Heat Island, which was enthusiastically received by a full audience.

To see more on the lecture you can visit: [www.youtube.com/watch?v=Z4RmHmDFM](http://www.youtube.com/watch?v=Z4RmHmDFM)

Or to learn more about Janet's research: [www.met.rdg.ac.uk/~bl\\_met/people/janet.html](http://www.met.rdg.ac.uk/~bl_met/people/janet.html)





## 60 second interview with... Kevin Couling

Associate Director for AECOM's Sustainable Development Group (SDG)

### Cricket Without Boundaries

One of our researchers is lucky enough to have been selected as a volunteer with the charity Cricket Without Boundaries. In April, Laura Daniels will be travelling to Uganda to deliver community cricket coaching sessions as a platform to discuss HIV and AIDS awareness. Despite Uganda seeing falling HIV cases over the past 30 years, recent reports are suggestion that HIV infection rates are on the rise again.

Cricket Without Boundaries (CWB) is a UK cricket development and AIDS awareness charity dedicated to helping, educating and developing local communities around the world through the spread and growth of cricket. Laura has raised over £750 for the charity to pay for equipment that will be left with schools and cricket clubs across Uganda in order for the game of cricket as well as the HIV/AIDS messages to continue to be a part of the community. She will regularly be posting on the blog ([www.cwbuganda.co.uk](http://www.cwbuganda.co.uk)) so keep up to date with her journey starting 14th April!

Cricket Without Boundaries are recruiting for their next projects in Autumn 2013 and Spring 2014 so if you would like to volunteer, check out their website: [www.cricketwithoutboundaries.com](http://www.cricketwithoutboundaries.com)



### Silverstone driving down emissions

F1 circuit Silverstone aims to be at the heart of the global drive for sustainability and has teamed up with the TSBE Centre to undertake research which will help it achieve this goal. This research will be led by Dr Graeme Larsen and Professor Li Shao at the University of Reading in collaboration with Silverstone Circuits.

For further information on the vacancies see: [www.reading.ac.uk/tsbe/info-for-EngD-applicants/tsbe-EngD-vacancies.aspx](http://www.reading.ac.uk/tsbe/info-for-EngD-applicants/tsbe-EngD-vacancies.aspx)

#### Tell us in one sentence what your company does?

AECOM provide just about every built environment engineering service you could think of – from building engineering to coastal engineering, from contaminated land services to architecture and masterplanning plus a whole load of pure consultancy such as space planning and staff engagement. We pretty much have a consultant for every occasion!

#### What is the key sustainability/environmental issue your company faces at the moment?

I guess like lots of large organisations, a key challenge for us is ensuring that our own operations live up to the expertise we offer to our clients. Being so client driven, it can sometimes be easy to forget the things that are right under your nose. My advice is to take a second to look down every now and again.

#### Name the top three ideas or projects that your company has initiated to tackle sustainability and environmental issues.

Internally, we have a Sustainability Panel which meets regularly to identify opportunities for enhancing our own sustainability and we also assess each office's environmental performance every year. In terms of our external work, our Sustainable Development Group (SDG) includes some of the most skilled and experienced individuals in the field and the work they do means that we have a significant impact, nationally and globally, on moving the sustainability agenda forward.

#### If you had a million pounds to tackle environmental issues, what project or idea would you start or add to.

I'd love to create something where we could enhance three key issues for energy managers: 1) Data gathering – fit for purpose metering installations are surprisingly few and far between, 2) Monitoring regime – having a

regular and robust process of dealing with the data being generated is key to driving down energy consumption and 3) BMS review – the amount of Building Management Systems which are failing to control systems efficiently is pretty worrying. And with the change left over, I'd like to set up training and support for staff engagement. Our understanding of behaviour and how best to engage has developed significantly over the last few years and it'd be great to generate more opportunities to put that into practice.

#### Have deteriorating economic conditions eroded environmental projects in your company, and are they back on the agenda now?

I guess to some degree although the SDG only works on sustainability projects of one sort or another so, while we saw some scaling down, the environmental projects were still there.

#### How has the EngD partnership helped your organisation?

The purpose of Universities as I see it is not only transfer knowledge and skills but also to give people room to think. The EngD programme allows us to think about the detail of things we simply wouldn't have time for otherwise.

#### What part should academia play in aiding businesses with environmental issues and sustainability in the future?

A key issue for me is the accessibility and applicability of research. More Universities should develop programmes like the EngD so that research outcomes are far more readily applicable to industry context and needs.

#### Tell us one thing that not many people know about you.

I once appeared in a play in Cheltenham in nothing more than a pair of Elizabethan underpants and a ruff. I'd like to tell you more but the memory is still too painful!

## Stay Connected

### Keep up to date...



Follow us on Twitter  
[@ENG\\_D\\_TSBE](https://twitter.com/ENG_D_TSBE)



Like us on Facebook  
TSBE Centre

Visit our blog:  
[blogs.reading.ac.uk/tsbe](http://blogs.reading.ac.uk/tsbe)

Visit our website:  
[www.reading.ac.uk/tsbe](http://www.reading.ac.uk/tsbe)

### Upcoming events:

**TSBE Conference:**  
2nd July 2013

**Visit us at Ecobuild:**  
5-7th March Stand S453