Champion
the Researchers

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TRISTAN SMITH

JOB TITLE: Lecturer in Energy and Transport
EMPLOYER: UCL Energy Institute
HIGHEST QUALIFICATION: PhD

TRISTAN IS AN ENERGY AND TRANSPORT ENGINEERING RESEARCHER; HE RESEARCHES LOW CARBON SHIPPING

The idea

I love the sea and everything to do with it or on it – particularly windsurfing, sailing etc. This led me to an interest in boat design and then ship design. I had a brilliant time in the defence industry for a few years designing warships and submarines. But whilst hunting for a new and exciting challenge, I realised that there was a big need for research on how to reduce the CO_2 emissions of the shipping industry, so that it can contribute its fair share to the challenge we face around climate change.

Collaboration

We are a group of around 15 researchers focused on shipping and CO_2 emissions, and we're constantly seeking each other's advice and discussing research problems that we're working on. We also spend time working with fellow research organisations both in the UK, but also in Europe, Japan, China, US and Pacific Islands (to name but a few), and also with companies both in the UK and overseas. Our research not only looks at questions like "how do you change an industry", but also tries to apply what we've learnt to see if we can have a change. Because the best way to check a theory is to put it into practice.

Funding

Funding for my research comes from lots of different places. Most of it comes from UK Government grants but also from other independent multinational funders, and a number of private companies. It's really important for our group to undertake a mixture of pure research and applied research. The applied research crosses over into consultancy a lot of the time, and that also helps us.

Impact

The oil tankers, bulk carriers and container ships that carry goods around the world feel a bit detached from our day to day lives. But look beneath the surface of your day-to-day existence and nearly everything that you are using was (at some point) carried on a ship – the petrol in your car, the computer you're reading this on, the clothes that you're wearing, the lamb you had for lunch. Shipping is a crucial part of globalisation and ensure that we have affordable goods at low cost from all over the world. World trade of food, energy and manufactured goods is a fundamental part of our society and standard of living. It can help us head towards a more equal global society.

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Publication

We try lots of things to get our information out there. The worst thing that can happen is to write a paper that is important but that no-one reads because it's published in the wrong place. Increasingly this means that we work with our colleagues in media and communications who can help us target certain newspapers or other types of news outlets. But we've also made TV programmes (e.g. with Channel 4) about our research, done interviews on radio, and worked with journalists on features articles.

PUPIL QUESTIONS FROM THE EVENT ...

Would it be possible to use energy from nuclear sources to power ships? Do you think this is a realistic idea?

Yes it is a great idea and is already used (many icebreakers operating in the Arctic are nuclear powered, as are US air craft carriers). For commercial shipping, the difficulties are really about safety and risk – most ships need the flexibility to be able to call at any port. Because there are small, but very high impact (e.g. fallout) associated with reactors, many countries have absolute bans on the technology. So whilst they can make some sense, we think it may be more realistic to leave the nuclear reactor on land, but use it to make a synthetic and lower risk fuel that is then provided to the ship for its use.

Big ships must use a lot of fuel for long-haul trips. How can we make big ships more eco-friendly?

Lots of ways. We can slow them down, we can fit renewable technology (sails, solar power), we can put more efficient engines or propellers on them, and we can work on the shape of the hull to make them even more streamlined and smooth. And we can do a lot of careful thinking about the way ships are operated and maintained. Some of this comes at a price, but the technology is there, and so the only challenge is finding the political leadership to make the policy that will incentivise the right choices.

What are the main considerations in designing a huge ship like a container transporting ship?

How it can make profit! The hull needs to be strong (safe), but also low cost to build. The shape needs to be right, so that its stable (floats upright), can survive in storms and rough weather without capsizing, and also moves efficiently through the water with the lowest possible resistance. And the cargo needs to be able to fit, and be easily loaded and off-loaded. This myriad of considerations makes the design of ships really fascinating, because these competing aspects need to be traded off against each other to find some overall 'optimum'. The challenge is part art and part science, and unlike the design of aircraft, nearly every ship is bespoke or a one-off, so there's always a new challenge waiting for you a couple of years down the line...

What happens if another scientist disagrees with your research?

Mostly it's not 'if' but 'when'. Scientists challenge each other all the time and this is what helps make research as robust and reliable as it can be. So you have to think hard about their points (they're probably right) and then think how to modify your work or findings to reflect them. Often this turns into a discussion, maybe some collaboration, and hopefully a longstanding friendship!

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