

## **Research and Practice Informed Case Studies: Dr Joana Fonseca**

### **About Joana**

Joana is a Lecturer in Geotechnical Engineering in the School of Mathematics, Computer Science and Engineering. After graduating from the Technical University of Lisbon, Portugal, Joana spent four years working in industry, before undertaking doctoral research at Imperial College, London. She worked at Imperial College, London and the Laboratoire 3SR in Grenoble, France, before joining City, University of London in April 2013.

### **Interview**

#### **00.15 Who are you and where do you teach?**

My name is Joana Fonseca and I'm at the School of Mathematics, Computer Science and Engineering.

#### **00.26 Can you describe your academic speciality in relation to research and teaching?**

I work in Geo-technical engineering, that is a branch of Civil Engineering, that deals with the behaviour of the soil, so it is related to foundations, any part of the building or the house that goes below ground surface that we usually don't see. So, obviously foundations are important every time we build anything in the ground from a bridge, to a road, a house as I mentioned. The particularity of the research that I do is that it's a relatively novel area; it takes an approach of- so instead of looking at the soil as a continual material, it looks at individual grains. It takes a discrete approach and it uses images. We can make an analogy with the CAT scans that we use in medicine: we obtain 3D images, not of parts of the body, but of soil. And then I use those images to understand how the individual grains rearrange and interact between themselves when we apply a load in the ground.

#### **01.40 Who are your students?**

My students are undergraduate students of Civil Engineering, second and third year. I teach soil mechanics that is on a more fundamental level and then geotechnical engineering that is more applied: they have the chance to design foundations, so it's a more hand-on module. And also I have research students – PhD and post-docs – that are working more in-depth on the research I do.

#### **02.22 Who is the audience for your research?**

Academics and researchers, but having said that, since we are discovering new things about soil I can also use my research to inform textbooks and to also include it in the notes of my classes.

#### **02.49 What do you understand by the term “research and practice informed teaching”?**

In engineering we start with a problem, an engineering problem, and we use research to try to find the solution to the problem. And the way I see teaching is something in between the problem and the research. [...] By teaching the students we are giving them tools that then will allow them to either work in industry and to implement what comes from research, or they can research further investigating that. So, for me, teaching and research are not really dissociate: they complement each other and they should be always linked.

#### **03.37 How do you integrate your research and practice with your teaching?**

Because I have some consultancy experience in Engineering, for the third year module that I teach on Design of Foundations I use examples from the real world to show students what they can do with what they're learning, because it's good to show the students that there's a reason why they're learning theory. Obviously they appreciate that they have to have a strong background [in theory],

but it's also very helpful if they can understand better the implication of what they are doing and then we can make modules a little bit more practical and I think they like to hear these stories from people who work in the field before.

**04.30 How do you engage your students with your research and practice?**

By including findings from my research in the notes, or give examples during classes. And from practice definitely, showing examples. Now I'm doing a study that aims to assess feedback given by students: what are the keywords that they have in mind when they fill in the assessment forms of lectures. And there are words that constantly show up in the feedback and real, real-life examples of practical engineering, they are words that they use a lot.

[End]