Teesside's **Alan Clements** and Imperial's **Jeremy Bradley** find that despite

It's the same drive, but just a

'It's probably a set-up. You'll be eaten alive down South'

was more than a bit apprehensive when *The Times Higher* asked whether I'd like to shadow a lecturer from a Russell Group university for a day and write up my experiences. I thought about the request for a good five seconds and agreed. I hate declining new experiences because you never know where they may lead.

My colleagues in the School of Computing at Teesside raised a collective eyebrow when I told them about the invitation. "It's probably a set-up," they gleefully cried. "You'll be eaten alive down South." So I thought I'd better clear things with the vice-chancellor before going ahead. He seemed reasonably supportive but, as I left, I heard him say to his PA, "Karen, dust off Clements' P45 and have it ready. He might not be staying much longer."

I am to spend a day with Jeremy Bradley, a young lecturer; the basis of the swap being an exchange between a post-92 university and one from the Russell Group, and between someone starting their career and someone well established.

I follow Jeremy's directions to Imperial College through a beautiful part of London. Jeremy's note says. "It's the carbuncle at the end of the street." He's right. The computer science department is a chunk of concrete that can best be described as 1960s brutalism. Inside, I notice they have stuck what looks like someone's ageing swimming certificates over the entrance to a lecture theatre. On closer inspection I find that they are written in Swedish and are the Nobel prizes of people who have worked at Imperial. You don't see that every day.

Being in the UK's leading engineering establishment is a little daunting. How am I going to handle the exchange? I'll have to report that they take good students and let them watch as academics do research, whereas we take local people and give them an education they could not get anywhere else.

When I arrive, Jeremy is in the middle of a tutorial in his room. He is teaching matrix algebra to seven first-year students. It is a bit like stepping into the past, where students got to meet their tutors in groups of fewer than 20. Perhaps I was wrong about teaching at Imperial.

I tell Jeremy that I am surprised by such small tutorials in an age of mass education and large class sizes. He explains that small tutorial groups are used to support key courses such as mathematics. Other tutorials use groups of 120 students or so with about half a dozen lecturers or postgraduates in attendance.

One of these in the tutorial turns out to be a first-year student representative who is going to a meeting of reps. I tag along. The students are remarkably mature in the way they carry out their business. More than once they suggest that students with problems approach lecturers first rather than jumping into more formal procedures. And they are very supportive of the faculty, which tells me a lot about the atmosphere in the department.

Jeremy is clearly a first-class academic and he's also interested in education and teaching — he's not the type who regards students as irritants standing between him and research. I am so impressed that I ask him whether he would like to apply to be an external examiner at Teesside, which would probably make him one of the country's youngest external examiners.

We discuss life at Imperial and I am suitably gobsmacked by the very light loading in terms of student contact hours there. They have an approximately 8:1 student-to-staff ratio unlike our 22:1 ratio. Jeremy has a couple of courses to teach a year, whereas some of my colleagues have up to 20 hours a week contact time. Such a heavy loading makes it very difficult to be creative and to "reflect on the education process".

One of the most surprising aspects of Imperial is the homogeneity of the students. I see no mature students. At Teesside, many of our students are locals who have left school, worked for a few years and then decided to enter higher education to get a better life. Moreover, most of Imperial's students come from relatively privileged backgrounds with less than 15 per cent from working-class homes (according to *The Times Good University Guide*).

Jeremy introduces me to Susan Eisenbach who is responsible for teaching. Susan demonstrates a visual database that has been developed in-house by students and computer support staff. It tells you everything you would ever want to know about students. You can see, at a glance, what assignments each class is doing at any point in the semester. You can look at teaching by class, by lecturer or by course. Imperial's final-year project database is equally impressive. Academics put up project suggestions and are visited by students interested in taking the project. The potential supervisor can indicate the level of the student's interest and faculty can immediately see the status of all projects.

Susan is a passionate advocate of teaching. She makes it clear that an academic coming to Imperial who is interested only in research will not be accepted. She shows me the computing facilities students have access to. She explains that, unlike many universities, students have access to computers that are better than those they have at home. It is nice being in a place where money doesn't appear to be problem.

I also speak to the senior tutor, Margaret Cunningham, who is responsible for student welfare. If a student misses two tutorial sessions, they have to give an explanation. Although students at Imperial receive as much personal help as students at Teesside, Imperial's students are expected to hit the ground running when they arrive. I don't see evidence of the remedial help that Teesside's students can access; indeed, I am told that students who can't cope with the demanding workload are encouraged to move to another university.

The brightest and the best students are attracted to Imperial and they are carefully filtered to ensure that only those who can succeed make it through to the first year; only 20 per cent of those who apply are accepted. This shows in their minuscule dropout rate. These students are already
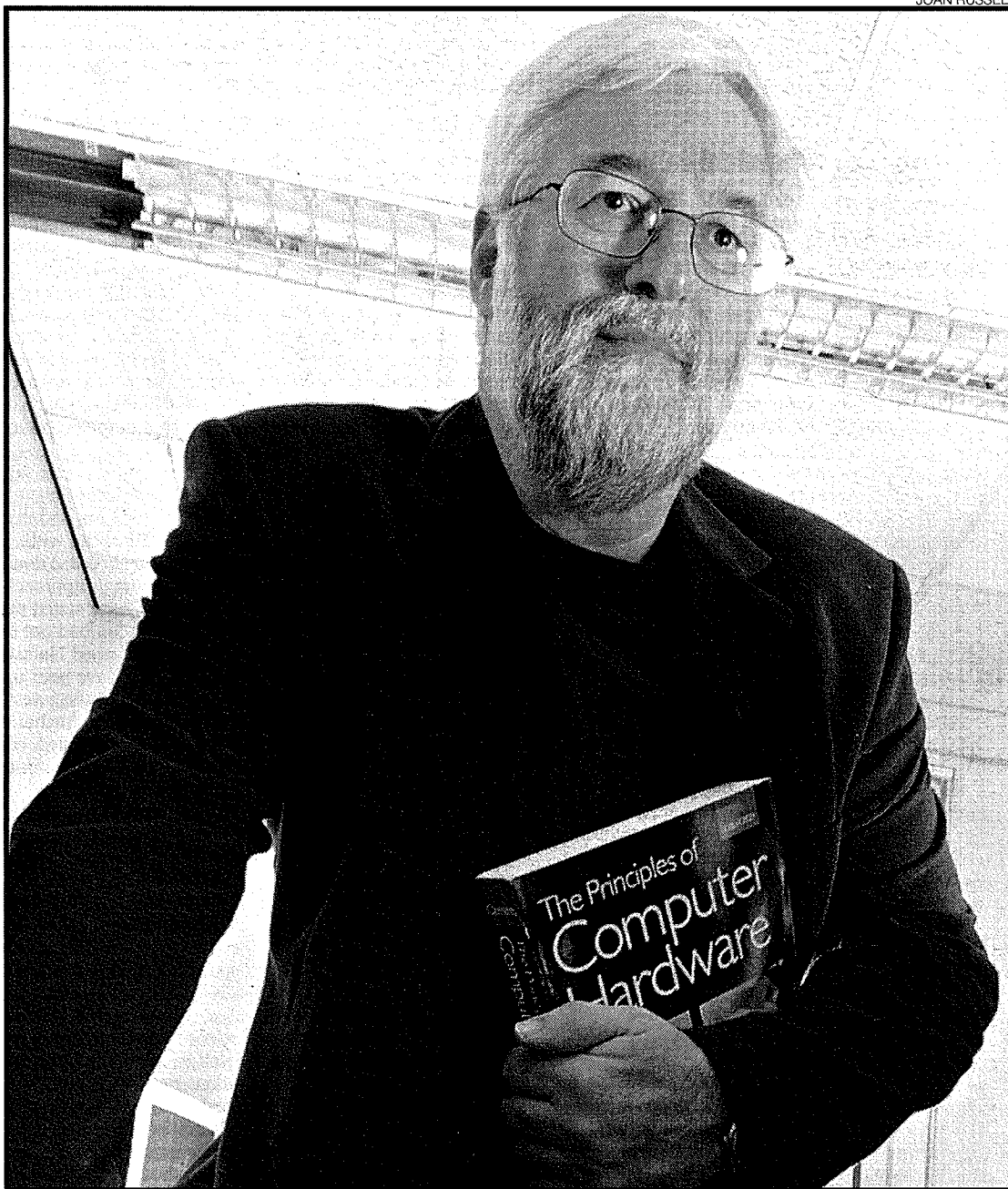
Clements (left) and Bradley: bringing out the best in students

highly motivated before they get to Imperial. But before coming here, I thought Imperial and its staff just let students develop on their own. They don't. They strive to bring out the best in their students. Students are given the opportunity to perform research in their first year and to do significant research in the second year. Final-year projects often become the subject of joint papers between student and supervisor. By the time they graduate, Imperial's students are often on a fast track to a PhD and an academic career.
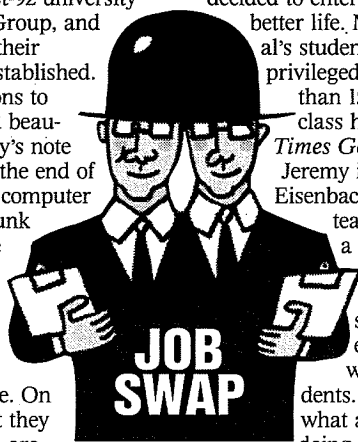
Before I left Teesside, someone suggested I ask Jeremy whether it is fair that both Teesside and Imperial might charge the full £3,000 when top-up fees are introduced. I don't need to ask the question. Both institutions are filled with dedicated people doing the best job they can. Both aim to bring out the best in their students. Both perform an important role in society. The faculty at both institutions are equally proud of their students: at Teesside we see people start from a low base and blossom as they progress; at Imperial, the best students become world-class scientists and engineers.

The only time I raise an eyebrow is when I try to sell the Institute of Electronics and Electrical Engineers Computer Society's International Computer Design Competition that I run. This is a major competition with a final event in Washington DC and a prize

of up to $18,000 (£9,350). When I ask the project tutor whether a group of Imperial's students can take part, I am told that students have little time for anything other than work directly related to their course. Discouraging students from carrying out independent work that promotes skills related to their course seems rather strange.
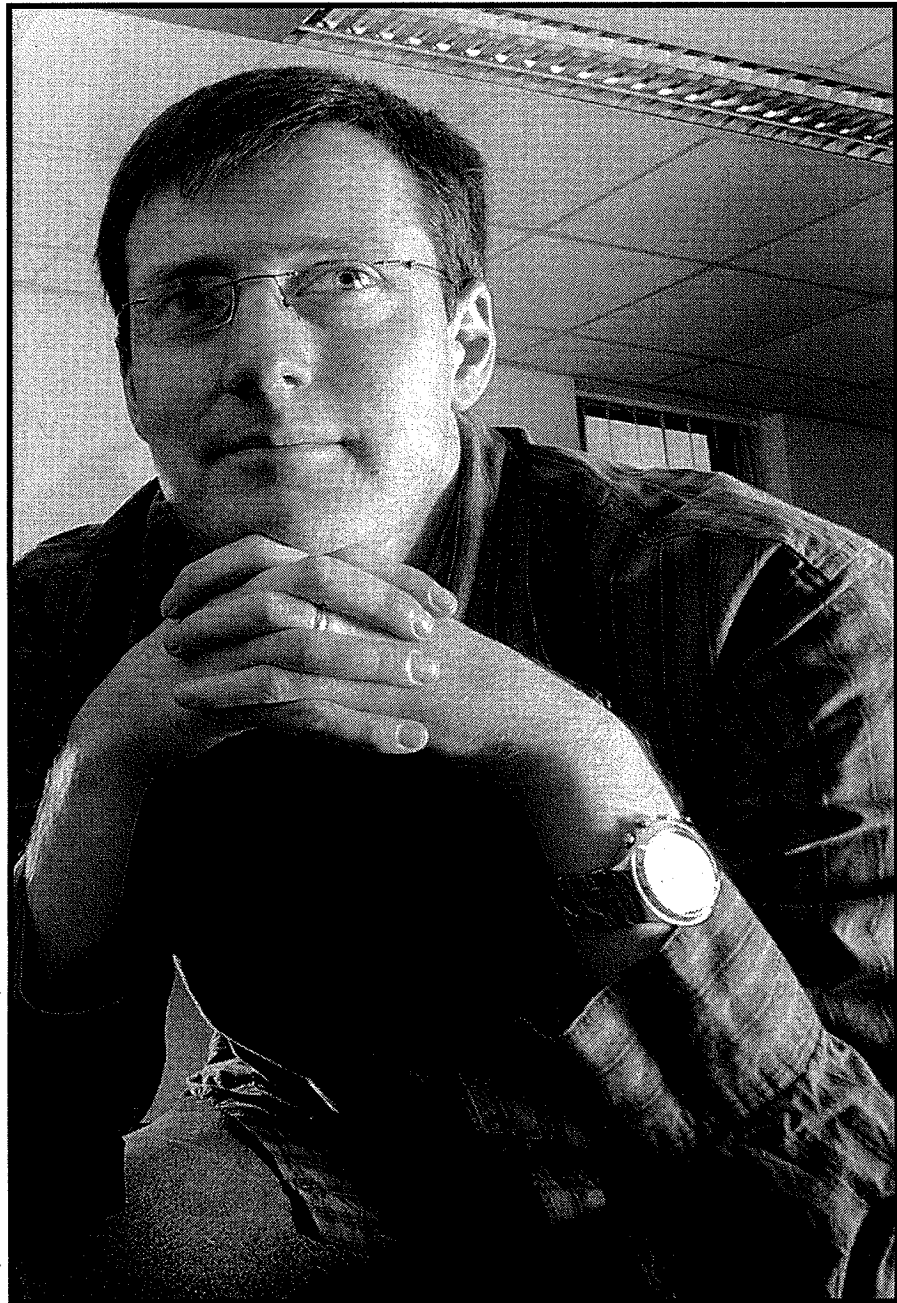
What have I got out of the exchange? I have met Jeremy and made a new friend. I have met Susan and seen how a person with vision and enthusiasm can mould the educational philosophy of a department and ensure that the best students are turned into awesome academics. I leave thinking that a post-92 university such as Teesside does a good job, too, and gives remarkably good value for money. My department has been at the cutting edge of computer science education with the development of many new courses in computing and we have two National Teaching fellows. But we can't be complacent. Worsening staff-to-student ratios and increasing bureaucracy could make it very difficult for universities such as Teesside to maintain excellence in the face of traditional universities that are now putting a lot of effort into delivering a first-class education.

Alan Clements is professor in the School of Computing, Teesside University.

JOB SWAP

catering for a dissimilar student body, they have a common dedication

different operating system

Hi-tech local hero is an industrial asset

As I pull into Middlesbrough station, I must admit that my heart sinks somewhat as the drizzle turns to a definite downpour and it becomes apparent that the most architecturally interesting building in the town centre is the multistorey car park. I am quite used to cultural heritage sitting cheek by jowl with industrial brown site development; unfortunately for Middlesbrough, there seems to be a lot of the latter and not so much of the former as you arrive by train.

I met Alan Clements two weeks earlier when he visited Imperial College London. He is a very outgoing and friendly person who was incredibly keen to meet students and staff and very enthusiastic about just about everything.

Teesside University itself is clearly one of Middlesbrough's major assets. As Middlesbrough's second biggest employer, it has been given something that no London college would ever get — room to expand. Several well-designed new buildings of the open-plan and flowing-glass variety speak of lots of investment and an impressive regional commitment to the university. The newness of development is borne out as we walk around the attractive and open campus; Alan keeps on commenting: "That wasn't there yesterday" — although as the something in question is usually three or more storeys high, this seems unlikely.

Sadly, Imperial's contribution to its architectural environs is not as laudable. Although recent developments have seen an improvement, the main South Kensington campus was built on a spot that required the demolition of a building of the ilk of the Natural History Museum. Clearly the architects of the day decided that London had more than enough of the Gothic and what it really needed was a bit of bare concrete.

Before Alan came to Imperial, I ran a "check" on him, courtesy of his website, so I already knew he was the recipient of an Institute of Electrical and Electronics Engineers Undergraduate Teaching Award, one of Teesside's four National Teaching fellowships, and he is also chairman of the IEEE International Computer Design Competition. Clearly a formidable person.

On arrival at Teesside, it quickly becomes apparent that he is also very keen on books. His office is filled with bookshelves. Books on architecture, books on microprocessors, books on complexity and computability. If I thought his office was impressive, it is nothing compared with the one he has at home, which is positively bulging with books.

He also writes books: ten in all and some in their fourth edition. Not wishy-washy books on eclectic software design patterns but rock-hard books on 68000 processor microcode.

My first experience of Teesside from a teaching perspective is Alan's third-year architecture course: a class of 12 students who are very motivated and inquisitive. Alan has a distinctive and open lecturing style, whereby he displays detailed overhead projector slides while expounding around the general area of interest. Not for him the digitally projected PowerPoint presentation accompanied by the look-I-can-read method of regurgitating bullet points in front of an audience. The students clearly enjoy it and could probably cope with more detailed and harder material in places. Alan has already told me the range of student ability at Teesside can be very wide. He thinks the students in his current class are of sufficiently high quality that, given warning, they could cope well with exam questions that involve personal research and background reading as well as testing lectured material.

I am slightly surprised that a department that has an undergraduate student intake of 550 can sustain a third-year course of only twelve people. I find out later that Teesside is very much at the cutting edge of the Government's 50 per cent participation target. And although the percentage of students who make it through the first year can be as high as 90 per cent, the percentage of students who complete the course can be as low as 60. The result is, I suspect, that Alan tends to see only the more motivated ones on the third year of his architecture course.

Talking to the students afterwards, it becomes clear that they very much appreciate the year in industry pursued by the university on their behalf. The students tell me they have only eight hours of timetabled lectures and tutorials a week, with the rest taken up with a large individual project component. A quick check of the Imperial timetable tells me that we put our third-years through 12 hours a week plus individual projects and group projects.

Teesside School of Computing runs 17 separate degree streams, which seems a huge number but is only a couple more than we run. The diversity of the programme is phenomenal, though, with some very clearly directed at employment trends — everything from computer programming (BSc) to computer games art (BA), digital music creation (BA) to web development (BSc). All told, they sustain a student body of close to 1,800 undergraduates and postgraduates, who are taught by more than 100 staff (twice the number in my own department). Clearly a massive logistical operation in terms of lecture theatre space and timetabling alone. Apparently the university doesn't have any lecture theatres large enough to take all 550 first-years so a lot of the common first-year courses have to be lectured twice.

The average lecturer in Teesside computing has a nominal student contact load of a whopping 540 hours a year. However, this is deceptive when making a comparison with pre-92 universities. To start with, loads at pre-92 universities tend to quote only lecturing hours, not time spent in tutorials, individual and group project support, marking or postgraduate supervision. At Teesside all

this is rolled into the equation, with the added bonus that as much as 50 per cent of the 540 hours can be written off against administrative duties. Alan is further excused by dint of his external teaching and promotional activities with the IEEE and his National Teaching Fellowship. Even so, his 60 hours of lecturing architecture is still double the 30 that I will lecture this year.

Teesside has strong connections with local hi-tech businesses for which it provides many future employees. Indeed, their courses are often very specifically tailored to software packages that local industry is using. This is fantastic for the students as they get specific training in exactly the package that the local web design company, say, uses. On the other hand, when the web design company changes package or DreamWeb Pro goes from version 15.2beta to 17.0, it could mean a lot of retraining and course redesign.

Teesside has specialisms in, among other things, multimedia, computer graphics, animation and digital music. I am shown several vibrant student projects — one an animation of a poem by Tim Burton with backing music that could grace any one of his movies. Clearly, integrating design with computing and technology is a key selling point for Teesside. They use this to good effect in marketing themselves, as they have a DVD of animated student portfolios as well as projecting prizewinning animations in the department reception.

As for Alan, his National Teaching fellowship allows him to buy out some of his teaching in the same way that an Engineering and Physical Sciences Research Council or Royal Society research fellowship would. This lets him develop his archive of online teaching resources on interests such as the history of computers and write yet more books.

The Teesside School of Computing is a growing institution with an eye on consolidating its strengths of multimedia, graphics and animation and enhancing its reputation as a producer of well-trained students in specific industry-relevant fields. Just like Imperial, it is full of very committed people who try incredibly hard under the burden of increasing bureaucracy and course regulation. But whereas Teesside clearly has very industrially focused degrees and produces students who are more than competent in using current technologies, Imperial has a much higher maths content in its courses, requiring an A at A-level maths. This produces students who are hopefully skilled in conceptual problem-solving, which can be applied to the technology problems of today and tomorrow. Then there is the research aspect to the department of computing at Imperial. There is a much heavier emphasis on this aspect for new lecturers than I get the impression there would be at Teesside. Career promotion at Imperial is based on the quality of research and the research funds raised as well as the quality of the teaching given. And as a result, the research-driven courses given in the third and fourth year are probably unique among computing departments. I think Imperial would like to think that, driven by its research endeavours, its best students would be internationally competitive with those of Cambridge and Stanford universities and the Massachusetts Institute of Technology. While we hope and strive to produce students who have industrially relevant skillsets in the same way that Teesside's do, we would also look to a few to be able to pioneer in new technology industries.

Jeremy Bradley is a lecturer in the department of computing at Imperial College.