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 **Software Apprentice Schemes: The Renishaw Story**

Apprentice schemes have existed for many years and in many forms; they can range from simply spending a year with a company who provide specific on the job training, through to more systematic organised schemes which see the apprentice gaining formal qualifications within the chosen field over a 2 to 4 year period. With such a wide choice it can be a daunting task for any young person to make that decision to go down the path of an apprenticeship rather than the traditional route of A-levels and then a Degree.

While Renishaw has offered a highly successful general Engineering Apprenticeship since 1979 and has run sponsored student schemes since the early 1980’s these have concentrated upon mechanical and production engineering, traditional electronics and commercial training.

By contrast, software skills were historically brought into the business as required, through a combination of specialist and graduate recruitment. Though this model worked for a number of years it became increasingly apparent in the 90’s and early ‘noughties’ that we had a significant growing demand for a supply of excellent software engineers, particularly in computer systems engineering, which we would find increasingly difficult to fill by these traditional recruitment methods.

This change has been driven by a number of factors: Changing business demands in which our customers increasingly demand a fully integrated measurement system, rather than just provision of a sensor; a drive to integrate measurement data throughout the process control pipeline and technology advances with high-end micros and FPGA’s meaning we can just do so much more in software.

Recognising that need we decided to act and in 2007 set out to create a Software Apprenticeship. Looking around there was little out there to model a scheme on and so we decided to build our own based on the model of our general apprenticeship which combines work with a formal day release study programme, allowing the apprentice to work towards a professional qualification.

One of the key aspects of the Engineering Apprenticeship is that the apprentice can gain a BSc or MSc in Engineering with the support of Renishaw. The ability to ‘earn while you learn’ is a very attractive option for young people. According to the Institute for Fiscal Studies the average graduate now comes out of University with in excess of £40,000 of debt for an undergraduate degree. The cost of tuition fees is set to rise and so young people are now starting to look for an alternative way to do their degree. By offering a BSc as part of the Software Apprenticeship it enabled us to attract people who would normally go straight to University. Below are quotes from some of our apprentices which support the change in approach to University that young people are starting to take:-

“Getting paid whilst doing a degree and getting excellent on the job training sounded like an opportunity that was too good to miss.” – Stewart Coulden-Smith, Software Apprentice

“Providing the means to gain a degree in a related subject, on the job training and the ability to develop products, were opportunities I couldn’t ignore.” – Tom Noble, Software Engineer

 “There has been a variety of overlap through embarking on [employment and University] simultaneously, enabling me to pull together elements from each side for a more rounded perspective.” – George Withey, Software Engineer

Our next challenge was to find a University who would be able to support us in providing a degree that covered software engineering and could be undertaken part time on a one day a week release basis. The course also needed to allow the apprentices to gain enough points so that a full BSC Honours degree could be achieved. We already had links with the University of Wales through our Engineering Apprenticeship and they were very happy to accommodate our needs. They provided a BSc(Hons) course in Systems Engineering which covered the interesting mix of software, electronics and mechatronics that is needed to satisfy our business.

In 2013 the University of Wales merged with the University of Glamorgan to become the University of South Wales. With the merger, the Systems Engineering degree became a bespoke Computer Science degree specifically for Renishaw, and this has enabled us to widen our ability to attract apprentices who would have ordinarily chosen to go to University to do this course. Going forward the University are happy to work with us to shape the course further by adding new modules, such as an electronics module and an embedded software module, as the course is run by the Faculty of Computing, Engineering and Science.

The course is also run from the University’s Treforest campus and this has provided an opportunity to extend the apprenticeship to a new pool of potential talent based in South Wales. For the past three years Renishaw has run an Open Day at our Miskin site (just outside Cardiff) for all of the local schools, colleges and universities to come and see our engineering processes. This year we were able to include a stand for software as a direct result of the University course moving to the Treforest campus. We currently have a software development team based in Miskin and over the next few years we hope to grow this team with the addition of apprentices.

The software apprenticeship scheme has been running for 6 years and our approach to training the apprentices has changed over those years. In the first few years the apprentices were allocated to teams and they were trained within those teams. While all of the apprentices were happy in their teams and enjoyed the challenges that the work offers, we realised that they needed to have a more rounded view of the company and the different types of software produced. A training scheme was introduced which allows the apprentices to spend time with the different software teams during their first year. This allows them to gain an appreciation of the type of work they will be allocated and to decide which they enjoy the most.

The training has been designed to take the apprentices on a journey. Initially attending our Graduate Induction Programme they learn about the company and the different types of products we produce. They then use this product knowledge to build up their skills on the different types of software used within our products. The journey starts with learning how to build a PC and moves on to application development in C#.net. The apprentices then focus deeper on software design, technical skills, project management, development methodologies, testing, database development, internet development and setting up software projects. They also learn embedded programming using procedural C, and this also introduces the electronics element of software. As a metrology company we need to use complex algorithms within the software to allow our products to measure accurately. This is also an important part of the apprentices training and they spend a quarter of their training time on this. At the end of their journey the apprentices are asked to setup and create their own project. We’ve had some very interesting results and one of the projects is now regularly used at career exhibitions and public events to encourage other young people to join our apprenticeship scheme.

After the first year of intensive training the apprentices then move into teams and they focus on specific types of software. We also encourage them to start to get involved in initiatives happening around the business. This can range from helping to build racing cars as part of the Greenpower competition, to promoting software apprenticeships through STEM activities. Renishaw also sponsors all of the apprentices to join the BCS (British Computer Society) and this enables the apprentices to keep abreast of the latest technologies, go to lectures and work towards becoming chartered if they so wish. This year we have also introduced an out of hours club called ‘Hackspace’ where Software, Electrical and Mechanical staff can meet, socialise and collaborate on any ideas they have. All of our apprentices are involved in one or more of these activities and they help to produce well rounded individuals.

On average our software apprenticeship lasts around 3 years. By this point we find that the apprentices are effective team members who can generally work on their own with minimal help. Promotion however is based on skills and expertise and we have had apprentices filing patents in their first or second year of working with us. It is important for both the business and the apprentices that they have a dedicated career path, which moves from apprentice, to software developer, to software engineer and so on. This not only helps to focus the apprentices on the type of career they want but also provides the motivation to keep going in that final year to get their degree, especially as the degree course lasts for 5 years. Despite the length of this day release degree a number of students have chosen to continue their studies to achieve an MSc. Going forward we are particularly interested in the NMI’s ESCO initiative to create a graduate apprenticeship scheme as this could be a useful way to extend our apprentice scheme.

Our software apprenticeship journey has been a unique one which has been at times exciting, and challenging, but always rewarding. Different companies will have different challenges to face. However it’s a journey worth undertaking both for the apprentice and the business, when those initial and subsequent apprentices graduate from University, including some with 1st class honours degrees.

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**About the Author**

Emma Portman, Renishaw plc, Test Manager – Group Engineering Software:

After Graduating from the University of Liverpool, Emma has worked in a number of industry sectors from Utilities to Telecommunications. She has been the Test Manager for Group Software within Renishaw for the past 5 years, a role which sees her coordinating all system test activity across 13 different business units and focussing on a wide range of precision measurement instrumentation products, from traditional machine tool probing software and geospatial laser mapping systems to 3D metal printing systems and neurological planning software. Beyond that Emma also works within the Renishaw Project HUB function which manages the Group Software development process and application lifecycle management (ALM) system, its software toolchain and project management activities. Most recently she has taken over the responsibility for the Apprentice, Graduate and Industrial Placement Schemes for Group Software.