

Interview with Chris Henderson



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Interview with Chris Henderson, Scientist 3M Personal Safety Division, and one of the scientists behind the 3M™ Aura™ 9300+Gen3 Respirator Series.

Mr. Chris Henderson works as Division Scientist in the 3M Personal Safety Division in Aycliffe, UK. During his 25+ years in 3M Mr. Henderson has conducted scientific and development work on several safety products. For two decades he has been one of the scientists behind 3M’s respirators.

In the 3M. Science. Applied to Life™ brand positioning, we want to give insight into the people driving 3M’s product innovations. The people applying the science to develop products that make life better.



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What is so fascinating about science?

I see science as a toolbox that you carry with you as an engineer. You have several technologies, and you can apply these in different ways and combinations to solve a problem. If occasionally you come across a problem you can’t apply these tools to, you have to go out and find new tools. That’s what fascinates me – applying tools to solve problems and discovering new stuff when what I’ve got doesn’t work.

How did you land in the science environment?

I have always been interested in science and engineering. When I was a child, I would take clocks and other mechanisms apart to see how they work, and then try and put them back together again. Sometimes they worked – sometimes they didn’t. From this I just continued my fascination in engineering, eventually studying it at university and my career just developed from there.

What has your career looked like so far?

I never had a clear idea of my path; I just knew I wanted to try different industries and environments until I found one I wanted to specialize in. After graduation, my first job was at Lucas Industries in the aerospace division, working as a production engineer on high precision, electro-mechanical assemblies. I then moved to something entirely different, working for Pirelli Telecommunications, making optical fiber for telecoms, which was absolutely fascinating. From there I joined 3M for a year as a production engineer in the PSD plant in Aycliffe. Before moving again to Harben, a small, high-quality precision engineering company. There I dealt a lot with customers, understanding their real needs. An important learning for me: as a scientist, it’s essential to talk to customers to understand what they want. Finally, I returned to 3M to take up a role in the development lab here in Aycliffe.

How did you come to work on respirators?

One of the first projects, when I came to the lab, was focused on finding ways to make an existing product more efficiently. But we turned the question around and started looking at what the product would need to be like if we used the most efficient method we could find. We began working on it our ‘15% time’ – a 3M concept where you are given the freedom to experiment with new ideas and solutions – and – over time, it grew into the original 9300-series respirator, the earliest version of Aura.

What specifically are the improvements in the Aura™ 9300+Gen3 Series Respirator?

We wanted to learn more about how the customers perceived our current product, so together with our customer facing teams we asked the customers for feedback on the current Aura product; what they liked and what they didn’t. Not unsurprisingly comfort was of paramount importance, but there were also some voices around the “ease of use” and durability. We took this input and after validation used it to direct our improvements of the product. To enhance the comfort the product is already currently recognized for, we introduced a new valve, which has a lower opening pressure drop, making the product easier to breathe through. To help with usability we added tabs to the upper and lower panels, allowing the users to open the product more easily and without putting fingers inside the respirator. We also modified the valve cap to make it easier to grasp.

3M is applying science to life. What is the biggest science applied in the Aura™ 9300+Gen3 Respirator?

Firstly, naturally, the filter technology which protects the user. We are world class in electrets media. Secondly, the understanding of the fit of a product. There is a whole world of science that goes into designing a product to fit well. And thirdly, the science of understanding the user. We sell to such a diverse group of users, understanding and addressing their needs is a science in itself.



John Bryant & Chris Henderson, 3M Divisional Scientists and inventors behind the 3 generations of Aura respirator.

“As long as people have reasons not to wear respirator, we will continue our work”.

In general, what do you consider essential in a product development process?

The main thing about product development is trying to understand the customer needs. Needs that maybe the customer doesn't even realize or understand themselves. When we started to search for improvements of the Aura respirator, those needs were the key areas we looked at. One thing I have always advocated is that if you develop a product, you should know how to use it. It's a matter of going out to the field and gaining experience in wearing the product for real and understanding what it is like to use it. For example, someone who works in a foundry or metal processing industry will have gloves on; you need to understand what it is like using a respirator with gloves to understand that user. We also spent a lot of effort ensuring that the changes we made were perceived beneficial and equally importantly did not detract from the existing product.

In a nutshell, what did the Aura™ 9300+Gen3 development process look like?

When we started with the development process, we generated a very large number of different concepts; multiple variants of the headband, various options for ease of use, other ways to pack it, etc.. Through customer work and internal testing, we funneled these down until we had a handful of concepts. Finally, further assessment led to an optimal product: the Aura™ 9300+Gen3 Respirator.

How do you keep motivated to continuously keep improving the Aura™ product?

My drive comes from the customer; nobody really likes wearing a respirator. People wear them because they must. If you ask customers why they don't wear respirators, they will give you a list of reasons: it's too hot, it's too uncomfortable, etc. and as long as they have these reasons, we will continue our work.

What are you most proud about in your work as a scientist in PSD?

It's a great feeling to contribute to a product that helps companies protect their workers. Every time I see products being used in an industrial environment or on television, I feel proud I can contribute to people's safety and health. You have an enormous amount of emotional involvement and commitment to a product and you always want to see people getting value from it.

What is so great about being a scientist in 3M?

One of the joys of being in 3M is that there is always somebody you can talk to. There is always an expert in almost every possible subject, within short reach. So I may not know the answer, but I know somebody who does.