



## APPG ON CYBER SECURITY MEETING MINUTES

13<sup>th</sup> June 2023 5.30 p.m.

**Title:** The purpose of the meeting is to explore how we can get more young people and in particular girls to study cyber related subjects at school to prepare them for University or apprenticeships in the jobs market.

**Chairman's welcome:** Baroness Pauline Neville Jones

**Present:** Lord McNally, James Morris MP, Paul Maynard MP. Andrew Henderson (Secretariat)

**Apologies:** Lord Mackenzie of Framwellgate, Lord Taylor of Warwick, Lord West, Simon Fell MP

### **Speakers:**

#### **1. Chris Ensor, GCHQ**

*Chris has worked in Cyber Security for over 30 years in a variety of roles, all of which have involved building new capabilities to help organisations protect themselves. As Deputy Director for Cyber Growth, he is charged with using NCSC's expertise and brand to build national cyber security capabilities in education, skills, research, innovation and industry.*

First looked at the challenge in 2015/16 after Lord Maude went to Israel to see what they did to identify and nurture talent there. Set up a pilot, used national competitions and found 20 students, 2 of whom were female. In 2017 obtained more funds and looked for 200 students, heavily dominated by white males with very little diversity of any sort. Started to create activities for schools such as Summer schools on a 50 /50 basis, more girls were successful in applying for places as there were fewer of them. Girls make a decision around Year 8 when they look at GCSEs.

See increasing numbers of girls showing interest but still small numbers, 8 – 12k around 4% of the year group. What lessons do we learn? We can do great stuff to encourage and inspire, the challenge is in the education system. Numbers are small so the only way to change the mix is through the school system.

#### **2. Sian John, Microsoft**

*Siân John MBE is a Senior Director in Security Business Development at Microsoft. She leads a team focusing on developing opportunities for Microsoft to deliver new security, compliance, identity, management and privacy offerings to market. Siân has worked in Cybersecurity for over 25 years across strategy, business risk, privacy, and technology. She is a Fellow of the UK Chartered Institute of Information Security and was awarded an MBE in the Queen's 2018 New Year's Honours List for services to Cybersecurity.*

Supported many of these initiatives such as TeenTech, Cyber First Girls, MS DigiGirlz. Knows what is like to be the only girl in the room doing tech. Boys tend put on pressure as well. Other pressure is not to be interested in tech, if you go down a tech route at school you tend to do Chemistry or Physics. Need to work on education.

We have been trying to move away from the popular image of the hooded, young white male hacker as the norm but it has been very sticky. There is a fulfilling and successful career in cyber security to be had. Not just hacking but also governance, building things. It is hard to teach these in a school curriculum context.

MS has a drive towards diversity in recruitment but we do need a more diverse pool of candidates to make that work. As employers can we create more earlier approaches in career development such as apprenticeships?

Baroness Neville Jones – what patterns did your careers take after leaving school?

SJ – did not work that hard in the sixth form at school and went to Nene College to do my first degree in Economics, Computing and Business, where put into practice learning about the need to work. Then worked in the IT in the education sector whilst studied for Masters in Economics at the same time. From that went to work for the Serjeant of Arms which exposed her to cyber security. From there went to consultancy, Symantec and MS. Parliament got me into cyber security. A very circuitous route and the challenge that we have is that senior people now took that route. Challenge is to work out a straighter approach for those entering the career today.

CE – Maths teacher at school who inspired me. Dr Who was one of my heroes and I enjoyed taking this apart and decided that I wanted to do technology in some shape or form. Always wanted to be a Govt Scientist and studied chip technology at University. 30 years ago DSTL RSRE and GCHQ were the only options for working with science in Government. When I started with GCHQ I had no idea what path I would follow, started in Information Security. GCHQ is divided into Intelligence and Security. CE is in the Security side. Did lots of different jobs under this banner.

BNJ – what are you doing now?

SJ – work in product development looking at investment into new products.

BNJ – This is a businesswoman.

SJ – yes. Started out deeply technical and gradually moved to talking to CISOs and then now business. To be seen as strategic, was advised to step away from the “keyboard”. There is a route to staying more technical and becoming senior such as being a Distinguished Engineers, they become VPs and Senior Managers at Microsoft but are often still individual contributors focused on delivering excellence in the technology. Windows security has distinguished engineers who are deep in understanding the challenges and developing a more secure OS. You have the choice to stay technical or go down the business line.

### **3. Pat Ryan - CYBER GIRLS FIRST**

*Born and raised in Cardiff but worked much of her life in London. After visiting her daughter in hospital in 1996, discovered there were no computers available for resident teachers and there were none available in any of the 249 hospitals throughout the UK which had children's wards Set up a charity to equip the wards, which rolled out completely in the UK after 16 years, when*

*the work was taken over by local Councils. Carried out volunteer fundraising at Bletchley Park National Museum of Computing where she sat in on classes from visiting schools and noticed that girls were sidelined by boys. Decided to do something about it. In nine years, Cyber Girls First has put on 43 all-day events in Universities and corporate offices with 4,400 girls from Year 8 listening and meeting women in the IT industry to show the girls that there are many career options available, including apprenticeships where they can obtain a degree and not build up student debt.*

No such thing as a career path, its “crazy paving” according to my father. At my first job interview it was assumed that I was male because I was Pat. I was initially directed to a receptionist or secretarial position. Father was inspirational in getting a job. Her professor at LSE found her her first job at the Admiralty in Naval Intelligence as an analyst, in pre-computer days. With an American father and therefore deemed as being trustworthy, Pat was made liaison officer with the US after the U2 spy plane incident in 1960. Worked on the Bay of Pigs abortive invitations, the Cuban Missile Crisis, the JFK assassination, Profumo scandal, Robert Kennedy assassination all in six years. The Profumo scandal came under our control because the Russian involved was known to be KGB, posing as their Naval Attache. No mobile phones, no satellites, no GPS tracking.

Went into the private sector in order to have time for a family. Her son Gregory was the only one with a laptop at Guys Hospital because Pat gave him one. Wanted to be more than someone’s wife and mother. Went to PWC on a five year contract. Daughter went into hospital and horrified to see no PCs in the ward. Got a laptop for her daughter which was revolutionary.

John Major gave the money to train hospital teachers in using computers in 1996. Set up a charity to push computers into hospitals. From then to 2016 we equipped every hospital in the UK with computers. With that job done, set up Cyber Girls First starting with Coopers Colborn school. We have completed 42 events to date in England & Wales, with 48,000 girls attending. Aim is to show girls what careers are available. Supported for instance by a lady from JP Morgan, one from COLT etc. Many of the girls attending our events come from deprived areas, where no-one in their family has been through higher education.

Baroness Neville-Jones – huge achievement.

**Molly Galvin, Coopers Colborn School:** When I started secondary school, I had no idea what I wanted to go on to study. My Computer Teacher encouraged me in Year Eight to attend a Cyber Girls First day at Field Fisher in London. Introduced the 80 girls present to take part in a CYBERFIRST competition. It completely changed my viewpoint on computer science and what a career in computer science actually meant. Thought it was all about graphic design. Found out through CyberFirst residential course that there is a lot more to it. Since then, I have taken part in multiple courses run by CyberFirst and Cyber Girls First to learn more about the digital skills I would need for a career in the industry. This led me to decide to study computer science at A Level, alongside maths, further maths and music. Realised that Computer Science leads to many

different fields. Done a lot of courses through Cyber First as well. For me learning about what Computer Science was, was the key. Once I started learning what the subject was, it was a different world. I am now looking at doing a degree in Computer Science and working in that sector.

**Seraphina Ciobanu, Coopers Colborn School:** Since Year Seven I have always been interested in computing, but I never considered taking it as an option. In Year Eight I competed in the CyberFirst Girls challenge (a completely off the cuff decision). Heard other students talking about it, so got 3 other students together to form a team which made it to the Regional Finals. From then on I knew I wanted to go into Computer Science. A couple of months later I was invited to a CGF event where I got to speak to many women who work in the tech industry. Moving to Slovakia so had to choose between Art and Computer Science, so chose Computer Science thanks to Pat. Since then I also participated in another CYBER GIRLS FIRST trip to Field Fisher LLP's offices in London and had the opportunity to thank the hosts of the event. I enjoyed it so much that it inspired me to take Computer Science for my GCSE's alongside Art and Geography.

#### **4. Eleni Markantonaki, Bishopsgate School**

It is safe to say that I have grown up around computers. I think the fact that technology has improved so rapidly during the last few decades has meant that I was always fascinated by computers and the amount of things you can create by coding. However, CyberFirst Girls has shown me that in the real world, there is so much more. There are so many diverse ways to work with technology and computing. It has enabled me to learn about various jobs and the differences between them and I believe that this has led me to be interested further in possibly following a career in cyber security in the future.

Mostly taught about block coding e.g. Scratch or designing HTML websites. Did not find it that interesting because has not been taught anything else. My parents found Cyber First Girls and got me to do a course online over half term. I was shocked to learn how many subjects there were under the Cyber heading. Also enjoyed the practical element as no-one had done that before.

We had to trace back a hack for instance into a website. Heard guest speakers, the most interesting was a lady who was sent an email purporting to come from her boss asking to transfer money. Contacted the boss to check and it turned out it was an attack on the company. Felt proud that she had figured this out herself and this made her go into cyber security.

You do not usually see women in technology. Cyber First Girls have given the option to girls in Primary and Secondary schools. Important to start in Year 8 when you start to think about GCSE.

BNJ – would like the three young people to say how they would persuade others to follow their path? What is the key to getting others interested?

EM – the practical side of it is important, learning about the different career paths persuades people to go down a specific path.

Ser – did not really know what I wanted to do. Found it super interesting to hear people explain what they did. In some cases found things that had not considered possible before. So many different aspects to it. Does not enjoy Maths that much, cyber security has many facets to it.

Molly – knowing about the opportunities available is key. In a class of 25, only 4 girls. Boys seem to know what they want to do in Cyber Security.

SJ – why do boys know what they want to do?

Molly – boys get a lot of information at Primary school about computing. Not expected that girls would do programming for instance.

PR – in Bletchley we have Bletchley Park with its museum where I volunteered. Would see boys moving girls away from computing.

SJ – same as what was happening to girls in 1980.

Molly – was encouraged to learn about computing but not at Primary school. Assumption was that a girl would do Art. Learnt at secondary school that boys had been exposed to computing for many years. More to it than meets the eye.

Ser – When I was at primary, very few opportunities with computers. Raised some funds to buy Chrome Books. In Primary children are influenced heavily and if we could do more things to make computing positive that would be good. Had a programming club which was amazing as we got to do Scratch.

Glenn Bluff – have three children and mentor in school and universities. Noticed that boys are more “have a go”. Not scared by this. Asked his daughter why she did not approach it in the same way, looking for structured learning. Boys seem to be happy to break, fail and learn whereas girls are not.

Ser – agrees. Girls like structure and knowing what they are doing from the beginning. Knows her brother would be happy to figure it out as he goes.

People learn differently. My wife is a maths teacher, my son just wants to break things and learn that way. Need more female role models.

Ser – agrees with that, lots of children use social media. It's about changing long standing social stigmas.

PR – when my son's friends came round to the house, they gravitated towards the computer. My two granddaughters had iPads bought for them to get them use to it. Not enough girls in the class to make a club. Got to overcome peer pressure.

With Cyber Girls First, see how articulate women can inspire girls. For example, the lady from COLT teaches about hacking. Try to get girls talking to each other and away from boys.

SJ – what should we be doing in schools and around it to encourage cyber security.

EM - Social aspects – most girls are friends with girls and we are social, depending on each other. If a girl says she is interested in computing, less chance that she will be supported by the peer group. Need a group around you. Boys will give it a go whereas girls are more reluctant.

SJ – nothing has changed.

Teacher – cyber security is very much geared towards social media. Need to find a way to make the subject relate more to girls. Answer is difficult, about understanding the value and general interest. How do you relate it to the wider world e.g. databases. Tries to gear teaching towards the wider world.

Daniel Aldridge, BCS – if we look at the fact that over 90% of girls will drop computer science at the first opportunity. At the current pace of change, will not reach parity for centuries. There is a window of opportunity in terms of awareness to reshape the curriculum. Been working on national programmes.

If you could speak to politicians and rewrite the curriculum, what would you do that is different.

PR – was contacted by a CISO from Deloitte who wanted to work in the community. Advised him to take on students for work experience. Have 2 boys and 2 girls going in, the girl told PR that she had no idea that it could be so interesting. At a recent meeting in Blackpool, it was an eye opener to the girls what can be done. Languages are important as well.

SJ – is it the curriculum or is it making it more engaging at primary school?

KM – how can we incentivize pupils? Cyber is more than just maths? We engage with linguists, psychologists, geographers in our department. There are many routes to engage with cyber security.

Every job has a computer embedded in it. What are the basic cyber literacy skills that we need to teach and to be embedded in the curriculum? We need these for the modern economy.

PR – one of the ladies from JP Morgan, who comes to our events and teaches them code-cracking skills, started as an historian. It was a love of puzzles which helped her to go into cyber. What about mothers going back to work, boot camps are a great opportunity to bring people back into the workplace. What about AI? Last year the Russians tried to hack the power grid 6 times without success, someone at GCHQ stopped them.

Girls are afraid that marriage means giving up everything. Not true now.

SJ – a lot of stories to get people into cyber are about hacking, people with hoodies. There are many other roles in security.

Ser – what you said about hackers rings true. Boys kept calling her a hacker as a joke. Upset by this and put off computing. Did not see hacking as “cool”.

KM – going back to the teachers who put in the extra mile, do they get recognition? Talked to one of his PhD students, did not engage at school with computing. What is stopping us?

PR – Did my work on my own. Gets huge help from JP Morgan, Field Fisher, Microsoft and Colt Technology. Runs it on a shoe string so funding is key, where Pat Ryan and Lady Parmley pick up their own expenses for travel and hotels. Maggie Thatcher – girl has to be better than a man to be equal. Girls are afraid of looking wrong in front of the boys.

Son and Daughter both gave up history. At A level daughter could not do maths, physics and chemistry. Had to change to a VIth form college. Only girl in her class and no one would partner with her. She did the experiment on her own and in the following lesson the boys wanted to partner with her. Boys have a concept that girls are no good at science topics.

Molly – surrounded by boys in computing class. Had to prove her right to be there.

Ser – true of many subjects. High jump example, girls unwilling to try in case they are laughed at.

SJ – mentored young men for Cyber First. Many of them have impostor syndrome just like the girls and need supporting to develop their confidence.

EM - had a computing lesson, told to make an app from Crib.org. Boy had written 600 lines of code, next day a girl had written 900 lines. Boys were surprised that a girl could do this.

**Conclusions:**

What interested / engaged the young girls in matters 'cyber'?:

Practical, 'hands on' experience in learning about cyber security and less emphasis at the outset on theory.

Learning of the detail behind and the different aspects of the roles that are available. They were much richer than commonly realised. 'Everything involves computing', it's not just about coding;

The range ("wealth") of opportunities possible that come from having some engagement with cyber / information security i.e., as an enabler or as part of a pathway to different occupations or careers.

What were seen as barriers to participation / how to redress them?:

Early engagement with the subject ('year 8'); this was something around what opportunities were available to boys and girls. Perhaps this is a more 'conventional' point about sex stereotyping; Culture and conditioning: difficult to articulate, but there was a sense that boys and girls behaved differently and that the pressure to conform in a certain way came from within respective peer groups as much as elsewhere;

Are boys and girls wired differently? The girls seemed to think so. Boys and girls were different in the way they approached the subject: boys were seen to be more willing to experiment at an earlier age and not be as concerned about 'breaking' things, as contrasted with girls who preferred a more structured approach to learning; Engagement at primary school level as is the teaching of digital skills at that age. It is important to try and expand the support network and interest prior to secondary school.

Cumulatively perhaps, the above three points taken together confers an advantage on boys who might then continue to engage with the subject in subsequent years;

Pat Ryan made a good point about showing what careers are open to girls and to reverse engineer how to get to that point. That may, if delivered early enough, go some way to mitigating whatever reluctance girls may have to engage and experiment with computing / matters cyber. Pat's experience shows that if people are given a chance to participate they have a greater chance of becoming enthused and engaged.

**Next meeting** – We are still liaising with the White House and the Foreign Office to try and re-schedule the meeting from May which was postponed.

**Non-Parliamentarians present:**

Speakers – see above

Prof K Markantonakis, RHUL

Lady Wendy Parmley - CYBER GIRLS FIRST



Colin Gillingham - NCC  
Verona Hulse – NCC  
Daniel Aldridge – BCS  
Apurva Saral – Private  
Nick Coppock - Private  
Dave Happy - Private  
Gerard Phillips - Private  
Steve Jones – SANS  
Andy Woolhead – CREST  
A Tourle – SANS  
Chloe Bugeja – Coopers Colborn School