

# THE TESTER

## SIGiST – We're back!

64

### IN THIS ISSUE

#### Conference

- Our new committee .....2
- Meet the Editor 6
- Our first event ..7
- BCS Office .....8
- Abstracts.....9

#### Articles

- Avoiding Disaster .  
..... 12
- Testing and  
Standards..... 14

#### Features

- Interview with Nicola  
Martin ..... 18

### From the Editor

Welcome to the *SIGiST* and *The Tester*. Following recent inactivity within the SIGiST group of the BCS, a new committee has been formed and we are planning some great events for 2020 and beyond. This issue introduces the new SIGiST committee, as well as myself Andy Shaw and three abstracts, about Dev/ops, testing and AI, from 3 amazing speakers, speaking at our first SIGiST event on the 31<sup>st</sup> of March.

We have some really great ideas which we will be implementing soon, and inviting people from all walks of life to become involved, from students, apprentices, to entrepreneurs and experienced professionals.

In *The Tester* review the abstracts for our first event in March, but also read articles on Avoiding Disaster with DevOps, and an invitation to collaborate on testing and standards.

The committee are grateful for the contributions from the sponsors of the SIGiST.

Andy Shaw  
The Tester Editor  
[andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)

### Join us on social media:

Join our Linked-In Group:

[LinkedIn/BCS SIGiST](#)



Follow us [@SIGiST](#)



Facebook: [BCS SIGiST](#)



Book online for our March 31<sup>st</sup> 2020 event:

<https://bcssig310320.eventbrite.co.uk>



## The new SIGiST Committee

Following a recent period of inactivity in 2019, we are pleased to announce there is a new SIGiST committee that was formed following the SIGiST AGM in February 2020. We have some really exciting ideas about running more software testing focused events, both online and around the UK (one the COVID-19 pandemic is over/controlled). We also want to put additional focus on inclusion, encouraging people from all backgrounds to consider software testing as a possible career path, and running amazing events so BCS members and the public can learn about the latest developments in testing.

We welcome any ideas for events, workshops and articles relating to software testing and interesting contributions that anyone may have.

The new SIGiST Committee are as follows:

Name	Role	Bio
Adam Leon Smith	Chair	<p>CTO of Dragonfly and standards-maker focused on testing and AI. With two decades in environments, development, testing, quality and project delivery.</p> <p>Most of Adam's experience is in the financial services sector, including senior roles at Barclays and Deutsche Bank. In addition to commercial experience he holds officer roles with ISO and IEEE in AI and quality related sub-committees.</p>
Geoff Thompson	Treasurer	<p>Geoff first spoke at the SIGiST way back in 1997, and since then has been a regular attender and contributor. I have been the Vice Chairman and Treasurer for the last 12 years.</p> <p>Presently, AVP of Delivery for Qualitest. Over the last 30 years he has a good track record in Test Management and Process Improvement. He is particularly passionate about Test Process Improvement. In 1997 he started working with ISEB developing the original Software Testing Foundation syllabus and exams, He then managed the development of the original Software Testing Practitioner syllabus and exam in 2002. He initiated the ISTQB (International Software Testing Qualification Board) and am currently the ISTQB Vice President. He is also the Chairman of the UK and Ireland Testing Board, and a founder member of the TMMi Foundation Executive Board (see <a href="http://www.tmmifoundation.org.uk">www.tmmifoundation.org.uk</a>), and currently its Chairman.</p>

		<p>He is also co-author of the biggest selling testing book on <a href="http://www.amazon.co.uk">www.amazon.co.uk</a> – ISEB – A Software Testing Foundation, and was awarded the 2008 European Testing Excellence award for my work in the field of testing.</p>
Phill Isles	Committee Secretary	<p>Phill has been working in the field of Software Testing for almost twenty years, and is currently the Head of Test for the UK branch of the private-banking portfolio of a large internal bank. He is passionate about Software Testing and the Testing Process, and is a volunteer for a number of Testing related organisations. He has been a SIGiST volunteer for over ten years, holding various roles, including Special Projects, Tester Editor, and latterly Secretary.</p> <p>He also volunteers for The BCS Professional Certification scheme, and as part of the ISTQB UK and Ireland Testing Board Accreditation Panel. He occasionally reviews other Testing-related material and books as well.</p> <p>He has co-presented workshops at a number of European Software Testing conferences on the subject of programming for Testers.</p>
Nicola Martin	Inclusion Officer	<p>Nicola has developed a very interesting career as a tester since the late 1990s/ early 2000s, working in both large companies like Walt Disney, Sony, The Home Office and Government Organisations, to SME organisations.</p> <p>During her career, Nicola has mentored professionals wishing to develop a career in testing, and has continually developed her skills, new ways of working and learning new ways of testing, including data sciences and AI, making her stand out as an outstanding tester.</p> <p>Nicola is a great role model to others who are interested in developing a career in the Tech Industry and Testing Industry. She is passionate about increasing diversity and inclusion in the Testing Industry.</p>
Stephen Hill	Marketing & Communications Secretary	<p>Stephen has been a member of the British Computer Society since the late 1990s and has served 2 terms as Social Media Secretary for the SIGiST.</p> <p>Having started the Facebook group and taken over the LinkedIn and Twitter accounts the social audience has grown. The intention is to continue making use of as many social channels as possible to spread the word about the SIGiST and its events and work. Stephen will also use his links with BCS to get greater</p>

		<p>promotion of SIGiST and events across the wider organisation and membership.</p> <p>Stephen works for a small company in Norfolk and values the sense of community within software testing. He has dedicated himself to learning new skills and techniques to remain in the forefront of the industry.</p>
Paul Mowat	Deputy Marketing & Communication Secretary	<p>Paul is a Director within Deloitte Consulting, specialising in Quality and Test advisory, and a TMMi Lead Assessor who has assessed organisations at formal and informal assessments. Mobilising onshore/offshore test teams to deliver outcomes. Leading improvement and innovation programmes. Paul Heads up Marketing and Eminence, part of the TMMi executive board responsible for TMMi Professional.</p>
Gita Malinskova	Programme Chair	<p>Having worked in various technology companies in the retail and banking sectors as well as running her own web development company in Ireland, Gita is now a Senior Consultant in Dragonfly. She has started and grown SyncHerts and Open Coffee Letchworth groups with regular meetups. Gita has also spoken at multiple testing conferences and is very involved in the community.</p>
Mike Harris MBCS CITP	Deputy Programme Chair	<p>Mike has been a tester for 20 years and is currently the lone tester for Geckoboard in Shoreditch. He has been a member of a test team, a lone Tester and a Test Lead. He has also worked as a part of waterfall, lean and agile teams.</p> <p>Mike has a BSc. (Hons) from Middlesex University and is an Associate of the University of Hertfordshire. He has set up and led a Testing Community of Practice and been part of a successful agile transition. He also is a conference speaker.</p>
Andy Shaw	The Tester - Editor	<p>Andrew is a software tester who has experience in testing web based and desktop software in the geographical, cargo and shipping, and lone worker industries. He focused on the software testing area following a redundancy at the end of 2013 and has not looked back since.</p> <p>He is an advocate of exploratory testing, and have gained experience of manual and automated testing, and continually developing his career as a professional software tester. He enjoys public speaking about software testing, at networking events and universities, as well as organising events for the BCS. He also supports the different BCS Student</p>

		Chapters and mentoring people considering software testing as a career.
Jonathon Wright	Sponsorship Co-Ordinator	<p>Jonathon Wright is a digital therapist, strategic thought leader and distinguished technology evangelist. He specializes in emerging technologies, innovation and automation, and has more than 20 years of international commercial experience within global organizations. He is currently the CTO of Digital-Assured based in Oxford in the UK. Jonathon combines his extensive practical experience and leadership with insights into real-world adoption of automation, performance and security testing. Thus, he is frequently in demand as a speaker at international conferences such as TEDx, Gartner, EuroSTAR, STAREast, STARWest, UKSTAR, Guild Conferences, Swiss Testing Days, Unicom, AI Summit, DevOps Summit, TestExpo and Vivit Community (of which he is currently the president of a not for profit, independent software community with over 70,000 members across 125 countries). Jonathon is also the podcast host of the QA lead (based in Canada) and the author of several award-winning books.</p>



# An Introduction to the New Editor of the Tester, Andy Shaw

Hello, hope you have enjoyed reading this issue of the Tester so far. As I am the new Editor of the Tester, I would like to introduce myself and tell you a little more about myself.

I started focusing on a career in software testing, following a redundancy in late 2013. I started attending networking events in Yorkshire related to software testing and discovered the testing profession really interested me because it was and still an evolving discipline.

I had undertaken software testing in previous roles, however I never really considered this until I was made redundant. I realised then that software testing was an area I felt my strengths were, and although I initially wanted to be a software developer, I really enjoyed this area of the Software Development Life Cycle.

I gained the ISTQB Foundation in Software Testing qualification after starting my first testing role in 2014, I have never looked back and continually enjoy developing my career as a tester. I also speak at regional and national events related to software testing, and have mentored people who want to develop their careers as testers.

When I heard the Specialist Interest Group in Software Testing (SIGiST) group was being revived with the formation of the new committee, I wanted to get involved with organising because I wanted to see networking events being organised in areas of the UK other than London. I also enjoy writing, as one of my aspirations is to be a writer as well as a tester, so I decided to become the Editor of the Tester.

My previous magazine experience has been writing for a student magazine at college, including writing film, computer game reviews and writing an article to help save a local park, as well as writing a previous article for the Tester back in March 2017.

I hope you enjoy this edition of the Tester magazine and if you have any ideas for article suggestions or submissions, event ideas, books you have written and like to be reviewed, please contact one of the SIGiST committee members or myself.

# Conference Agenda

BCS SIGiST – March 2020 Conference – Tuesday 31<sup>st</sup>  
March 2020

This event will now be online, due to the London BCS Office not being open.  
Bookings can be made at the following link: <https://bcssig310320.eventbrite.co.uk>

*Emerging trends in testing, dev/ops and AI, with 3 fantastic speakers*

Time	Session
18:00	Start
18:00	<b>Welcome – Adam Leon Smith, Chair, SIGiST</b>
18:10	<b>Behaviour-driven development and continuous delivery – how do they fit together?</b>  Lisa Crispin
18:40	Break
18:55	<b>Exploring a DevOps Transformation like a Tester</b>  Parveen Khan, Square Marble Technology
19:25	<b>Getting to grips with Artificial Intelligence and Robotics</b>  Ian Howles, IBM  A light hearted look at some of the mixed emotions of AI and Robotics and look at where we may be heading in the near future.
19:55	<b>Wrap up</b>  Adam Leon Smith, Chair, SIGiST
20:00	<b>End</b>

The SIGiST committee reserve the right to amend the programme if circumstances deem it necessary.

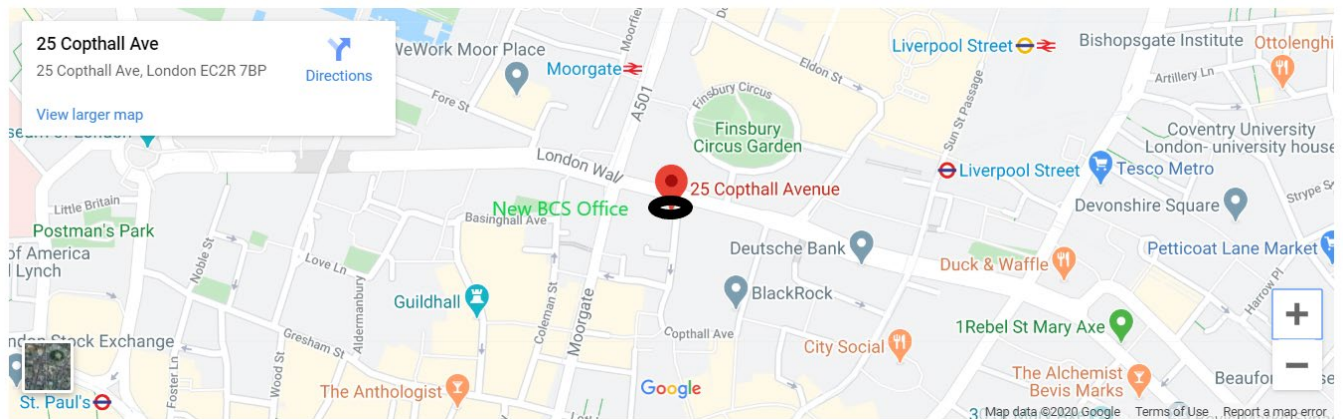
## Coronavirus

Due to the current Coronavirus outbreak we are responding by looking to make our events online for the foreseeable future, the benefits include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community.

# BCS London Venue

When the coronavirus pandemic is controlled/over, some events will be held at the new BCS London office.  
The location is below.

## London Office Guide



## Address

BCS, The Chartered Institute for IT  
Ground Floor  
25 Copthall Avenue  
London  
EC2R 7BP

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## Online events

We are responding by looking to make our events online for the foreseeable future, as a result of the coronavirus pandemic. The benefits of which include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community. It will also provide new and upcoming speakers with the opportunity to deliver a talk, some of which may not have the opportunity to do so. If you are interested in delivering a talk/ workshop/ etc online, simply contact one of the committee members or email the Editor at [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)



# Presentation Abstracts and Speaker Biographies

## Keynote One

### Parveen Khan, Square Marble Technology



#### Exploring a DevOps Transformation Like a Tester

Just when we, as testers, got a handle on what Agile means for us, the landscape changed yet again to a DevOps culture. Words like continuous integration (CI), continuous deployment (CD), and pipelines are now ones we're hearing on a daily basis. As a tester, I'll admit, I had no clue of what these words meant, and how was I to change the way I tested to fit within this DevOps culture.

Researching DevOps provided some information, but it was still fuzzy how testing fit into this process. As opposed to panicking about yet another shift in culture, I decided to approach this with a tester's mindset and explore it just as I would a new application.

In this talk, I'll share my journey of illustrating models to visualize and understand CI/CD pipelines; my various phases of exploration of the DevOps culture; and the thoughtful questions that I posed at each phase to learn more about this methodology. I'll also share how my new understanding of DevOps influenced my decisions on which automated tests should be contributed to the CI/CD pipeline and at which stages.

#### Key Takeaways:

- A visualization of the CI/CD pipeline
- How to approach understanding of CI/CD pipelines as a tester
- Which tests should be added to the CI/CD pipeline - when and why
- Understanding of how and when exploratory testing would fit into devops

*I'm **Parveen Khan** has and Senior Test Engineer at Square Marble Technology. I am very passionate about testing and very keen on learning new things so I can use it in testing and deliver better quality. I am always interested to share my testing experiences in the form of stories. I have been part of a few transitions like – waterfall to agile, agile to DevOps, from testing on monolith to microservices architecture. Apart from work, I'm a super mom of two lovely kids and I blog at <https://www.parveenkhans.com/>*

## Keynote Two

### Ian Howles, IBM

#### Getting to Grips with Artificial Intelligence and Robotics

A light hearted look at some of the mixed emotions of AI and Robotics and look at where we may be heading in the near future.

*Ian has many years of experience in the field of software testing, quality management and process improvement. He works at IBM as a Go To Market Pre Sales Consultant and additionally holds two external company directorships; Executive and Marketing Director for the UK and Ireland Testing Board (UKiTB) and Company Secretary for the Testing Maturity Model integration (TMMi) Foundation.*



## Keynote Three

### Lisa Crispin



### Behaviour-driven development and continuous delivery – how do they fit together?

Just when we, Continuous delivery (CD) is all about delivering small changes to customers frequently and without strain or stress for the team. A big part of this involves enabling shared understanding across the team of the capabilities to build, carving features into thin end-to-end slices (remember – small changes!), getting quick feedback, and using that feedback wisely to build confidence.

Behavior-driven development is a tried-and-true way to build shared understanding of features and stories among team members from different disciplines. In this talk, Lisa will explore ways that BDD fits into and enables CD, and how CD impacts BDD.

#### Learning takeaways:

- Insights around when our deployment pipeline begins
- Ways BDD can help shorten feedback loops and cycle time
- How CD amplifies the benefits of BDD
- Ways your team can take advantage of BDD and CD, one small step at a time

*Lisa Crispin is the co-author, with Janet Gregory, of three books: [Agile Testing Condensed: A Brief Introduction](#), [More Agile Testing: Learning Journeys for the Whole Team](#), [Agile Testing: A Practical Guide for Testers and Agile Teams](#); the [LiveLessons Agile Testing Essentials](#) video course, and “[The Whole Team Approach to Agile Testing](#)” 3-day training course offered through the [Agile Testing Fellowship](#). Lisa was voted by her peers as the [Most Influential Agile Testing Professional Person at Agile Testing Days in 2012](#). She is the co-founder with Janet of [Agile Testing Fellowship, Inc.](#) Please visit [www.lisacrispin.com](http://www.lisacrispin.com), [www.agiletestingfellow.com](http://www.agiletestingfellow.com), and [www.agiletester.ca](http://www.agiletester.ca) for more.*



The SIGiST Committee would like to bring the following DevOps article to the attention of our readers. (The full article was previously published in *IT Now*.)

# Avoiding Disaster

Stephen Castell

## Abstract

*DevOps brings new challenges to the professional IT project manager, particularly in avoiding a DevOps disaster project (DisPro). Thankfully, DisPro early warning signs remain constant and clear, so the DevOps project manager can learn them and have a good expectation of a successful project. Dr Stephen Castell, Chairman, CASTELL Consulting, explains how to recognise the signature of an IT disaster project.*

This is the abstract of the full paper previously published in the BCS magazine *IT Now*, 25<sup>th</sup> September 2017, by Dr Stephen Castell. Read the full article at: <https://www.bcs.org/content-hub/avoiding-disaster/>

Dr Stephen Castell CITP, Medallist, IT Consultant of the Year (BCS Professional Awards), is an internationally acknowledged independent ICT expert, management consultant and project manager, with extensive experience in risk assessment, quality assurance, and insurance and dispute resolution considerations, in regard to complex and large-scale ICT systems, technology, investment, contracts, implementation projects and operations. As a globally renowned Expert Witness in ICT disputes he has been involved in a wide range of systems & network development/installation, IP (e.g. patents, copyright, trade secrets), and data forensics litigation. These cases have included the largest and longest ICT systems contract actions to be tried in the English High Court.

Email: [stephen@castellconsulting.com](mailto:stephen@castellconsulting.com)

<http://www.CastellConsulting.com>

<http://www.e-expertwitness.com>

Stephen was recently honoured with an interview for *Archives of IT*: <https://archivesit.org.uk/> *Archives of IT Capturing the Past, Inspiring the Future*

*In-depth experiences of the people who influenced the development of IT in the UK*

<https://archivesit.org.uk/interviews/stephen-castell/>



# Interview with Dr Stephen Castell

***Dr Stephen Castell has worked in all four corners of the IT industry. He has worked on the computing side and in telecommunications. He has worked as a user implementing complex systems and as a vendor of information products and services. He spent years advising UK venture capitalists on what were and what were not the best companies to invest in. Finally he has spent decades as an expert witness in numerous legal disputes between vendors and users when the IT system supplied did not fit the expectations of the buyers. This gives him a unique insight into the failures of IT.***



# Testing & Standards – Participation – An Invitation to Collaborate

Adam Leon Smith, SIGiST Chair

## Abstract

Standards are important for testing, because they give us a common language. They standardise the terminology we use - it's crucial that testing professionals who might come from different backgrounds or industries have a common understanding of the meaning of basic terms like "defect". Building on this terminology, standards define techniques and methods, and outline how they fit into the overall testing process.

National and international standards drive productivity in a range of ways, from simply standardising terminology through to removing barriers to trade. Within software testing and quality, unsurprisingly the most important standards are probably those that define quality and testing:

- The ISO/IEC 250xx series SQuaRE (System and Software Quality Requirements and Evaluation), has the goal of creating a framework for the evaluation of software product quality.
- ISO / IEC 29119 is a five-part series that defines vocabulary, processes, documentation, techniques, and a process assessment model for testing that can be used within any software development lifecycle.

Standards are still very flexible, and standards-based approaches can be used in all types of delivery life cycle and environment. They don't take the thinking out of how you approach a testing activity, but they might give you some ideas about how to approach it more efficiently.

Standards are regularly reviewed, updated and extended and both of the above are undergoing change. Becoming involved in the development of deliverables is a way to give

something back to the profession, and can be facilitated through BCS and the British Standards Institute.

You may think that there are already testing related standards, do we really need to input to more? Standardisation takes a long time, as it should reflect international best working practices. For example, the first standard on issue management tools and their capabilities is only now under development. Standards also require regular revision, and the standard for quality models is being updated this year as technology has evolved.

Often, reports are put together that outline how topics should be approached, as a prelude to standardisation. Topics being worked include Agile, DevOps, Testing AI-based Systems, and various aspects of quality in an AI context, such as bias. These, less formal, technical reports allow for consultation while techniques are still developing, and not ready for full standards to be produced.

We are planning to put together a member meeting for those interested in contributing, please contact [adam@wearedragonfly.com](mailto:adam@wearedragonfly.com) if you are interested, with a bit of information about how you could contribute.

*Adam Smith is CTO at Dragonfly where he leads the company's technology innovation. Adam has held senior technology roles at Barclays, Deutsche Bank and the Piccadilly Group delivering large complex transformation projects. Adam also has extensive experience leading, driving and solutioning across a range of testing disciplines, including test automation, performance, penetration testing and artificial intelligence as well as the traditional functional testing. Dragonfly (which Piccadilly Group is now owned by) helps a range of financial institutions with large scale technology change programmes and Adam often leads large teams to reach complex goals. Adam is also the new Chair of the Specialist Interest Group in Software Testing*

[adam@wearedragonfly.com](mailto:adam@wearedragonfly.com)

[@adamleonsmith](https://twitter.com/adamleonsmith)

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## Write an article

We are always on the lookout for new content, so if you have a testing story you would like to share, a book you have written and planning to publish, a test technique you would like to evangelise or testing research you would like to publish, then The Tester is the place to do it. Simply email the Editor on [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)

# Students/ Apprentices

As part of the newly revived SIGiST community, we would be very interested in hearing from university students and apprentices who are interested in software testing, from manual testing, to automation and penetration testing. Do you have an story about how you are developing a career in the Tech Industry and software testing, do you have an article you have written which you would like to see published, do you have a question about software testing which you would like the SIGiST community to answer, then the Tester would be a great place to have this published.

BCS Student Chapters are also welcome to publicise events that have taken place, or will be taking place in the future. Maybe you have had a penetration testing workshop, a university hackathon which has taken place

Publication in a professional magazine like the Tester is great for your LinkedIn profile and adds to your CV and will help you during your career and at university, or on your apprenticeship and beyond.

Please email your articles to the following email: [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)





# Start-ups / Entrepreneurs, we want to hear from you!

As part of the newly revived SIGiST community, we would be very interested in hearing from start-up companies and entrepreneurs about anything testing related. If you have an approach you would like to mention, if you would like to speak at a future SIGiST event around the UK (including via a webinar), or publish an article in a future edition of the Tester, then the Tester is the place to publish your article, as well as to mention your talk/ event.

Please contact either one of the committee members on the SIGiST committee, or email [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org) if you are interested in speaking at a future event, or writing an article for the Tester.



# Interview with Nicola Martin

I, Andy Shaw, the new Editor of the Tester magazine, interviewed Nicola Martin, the Inclusion Officer for the Specialist Interest Group in Software Testing (SIGiST), who has developed a very interesting career in testing. I was interested to hearing how she has developed her career so far, her views on diversity within the testing industry and her advice for anyone who is interested in developing a career in the testing industry.

## How did you start your career in Software Testing?

Nicola: I started my career as a Conference Organiser, which I was unhappy with, so I moved and undertook an administration role within a different company. Whilst I worked as an administrator, I was reviewing documents and the software which was being handed to users, indicating whether or not the software was fit for purpose before signing these documents off. I did not realise at the time I was doing software testing, however colleagues told me that I was really good at it.

I started software testing in the late 1990s to early 2000s, in what was largely a male-dominated industry, resulting in feeling I had Imposter Syndrome. I gained the ISTQB Foundation in Software Testing qualification in 2003 and developed myself further, contracting in senior test roles on high-profile projects for different companies like Walt Disney, Sony, Government departments, The Home Office, Barclays (working on the PPI project), Shazam, and Sky. I took a career break for a while, when I returned to testing I started working in a permanent role which included a test consultancy.

## For software testing, concerning large companies versus small to medium organisations, what do you think the main differences are?

Nicola: Larger companies have stricter processes for testing software and more regulatory standards which need to be met. They would usually follow more of the structured methodologies such as Waterfall for developing software, and it can take a long time to change the approach within the organisation. Smaller organisations tend to be more agile and follow Agile approaches like SCRUM and KANBAN, where there is more room for involvement in making the processes work and changes are quicker to implement. Improvements to Agile processes for an organisation are easier to implement because they are flexible.

## What are your views on Software Testing Qualifications?

Nicola: Software Testing Qualifications are good because they show that you care about and are serious in developing your career as a Software Tester, and it also shows you understand the importance of software testing in the Software Development Lifecycle. Many large

organisations will also look to see if candidates have specific testing qualifications when interviewing them.

### **Who has inspired you in your career?**

Nicola: A SCRUM Master I have worked with, who has really helped Quality Assurance (QA) teams and Software Development teams to understand each other, how the software being developed and tested worked and work better together. He was always helpful and always asked “How can I be of service”, which I ask when I am working with colleagues and clients whilst working as a software tester.

Testing is also a service, and we need to think what is the software like for a customer, and always make sure we are customer-focused.

### **What ideas do you have to increase diversity within the software testing profession, in the workforce?**

Nicola: At present, there are potential barriers to attracting people from different backgrounds, including women and people with disabilities. Some of these barriers include childcare concerns and returning to work from maternity leave, which are a concern for women returning from maternity leave. Other issues include mentoring, management, not being included in conversations and lack of support for them.

In some of the software testing networking events, diversity is not high up on the list of priorities. This needs to be pushed up to a higher priority on the agenda, so we can break down barriers for people from all different backgrounds who wish to develop careers in software testing. Examples of what we can do include having a panel discussion events, encouraging people from different backgrounds, including women, people with disabilities. We can also include a survey in ‘The Tester’ magazine, asking what events they would like to see in the future and how we can include people from different backgrounds to increase diversity.

Some networking events within the testing industry, show a distinct lack of diversity within the industry and we need to encourage and include more women to get involved. We also need to encourage people to talk at events, who may not otherwise be able to deliver a talk, to help increase diversity.

### **What do you consider, to be a highlight in your career so far?**

Nicola: I have been able to stand out as a professional, regardless of changes occurring within the testing industry, because I have continually invested time to develop myself and learn new skills, discover new ways of working, and seeing how the learning I undertake is applied to the real world and put it into practice.

I enjoy learning about different areas of testing, including looking at new tools for automating tests, learning new disciplines like Artificial Intelligence and Data Sciences, and learning these areas and other areas of testing helps to future proof your career.

Other factors that have helped me to stand out as a professional include mentoring new testers, helping people up and not being afraid to share the knowledge I have with others.

### **What advice would you give someone, who was interested in developing a career in software testing?**

Nicola: Look at developing soft skills like presentation skills, be willing to deal with people within different teams and interpersonal skills, as these skills are vital for developing yourself as a software tester because your role may be a client facing role.

Also get involved with pair testing with a developer, be willing to co-operate with other teams and other colleagues because you can be working within teams consisting of developers, business analytics and product owners to deliver a quality product to the client. You should also develop a knowledge of the software you are testing, as software developers see testers as a knowledge base, and we should be seen as the bastions of knowledge.

Creativity is also important as testing is a creative, you can still apply the processes on how to test software, however different people and teams will have different and innovative ways of testing software.

The human factor with software testing will be even more essential in the future, when manual tests will be executed less than what they are now with the development of tools to automating tests and new disciplines like Artificial Intelligence and Data Sciences which will aid testing.

### **Do you have a goal outside of Software Testing, the BCS, which you have achieved, or planning to achieve?**

Nicola: I enjoy studying and continually learning, so I have been studying around Data Sciences and Artificial Intelligence, which I will plan to use to help me develop myself even further.

*Nicola Martin is the Inclusion Officer of SIGiST, and is interested in increasing diversity and inclusion in the Testing industry. During her career so far, Nicola has a wide range of experience in testing, working with both large scale companies like Sony, Walt Disney, The Home Office, Sky, as well as small to medium organisations. She is currently Head of Quality for Adarga.*



**bcsc** Personal Development Plan  
The Chartered Institute for IT

Your portable record of professional aspirations and activities



Desktop/Laptop      Tablet      Smartphone

## Did you get your Personal Development Plan email with suggested potential CPD activities?

The BCS Personal Development Plan (PDP) uptake is going well, with thousands of registered users already actively recording their CPD Development Goals, Activities and preferences. It's not just about recording details though, as there is a Resources section that shows live feeds of potential CPD activities, and a tailored email is sent every 2 months with details of the latest videos, articles, blogs, books and research in your specified field of interest. If you haven't registered yet, you can see the content from the latest PDP bulletin for topics relating to solution development and implementation by going to the CPD Portal at: <https://pdp.bcs.org/>.

The BCS Personal Development Plan is free to use; BCS members can use their Member Secure Area login and password to access it at <https://pdp.bcs.org/>, and non-members can use most of the facilities (using the same link) and registering to create their own user name and password. You can use it on a PC / laptop or compatible tablet PC or smartphone.

# THE TESTER

## Great opportunities so far!

### 65

#### IN THIS ISSUE

##### Conference

Successful SIGiST events so far ....2

Editor's Notes ...3

Lean Coffee .....4

Our June event 6

BCS Office .....7

Abstracts.....8

##### Articles

Neurodiversity and the IT Industry... 9

Quality Assurance and Machine Learning Models ..  
..... 14

Not Just COVID-19  
..... 20

COVID 19 Safe Paths .....24

##### Features

Interview with Wilson Lee .....29

#### From the Editor

Welcome to *The Tester*, the official magazine of *SIGiST*. Following the formation of the new SIGiST committee back in February 2020 and the success of our first event back in March, we have been making the best of the COVID-19 pandemic situation by hosting our first Lean Coffee breakfast event, which we plan to host more. This issue mentions the successful events we have hosted so far, including an event in April titled "Safe Paths" about an app to empower citizens to stay safe following the COVID-19 pandemic.

In *The Tester* review the abstracts for our event in June, but also read articles including a fantastic article on COVID-19 Safe Paths, with an invitation to volunteer on the project, and the success of our first Lean Coffee event that took place in May 2020.

There is also a fantastic article "Neurodiversity and the IT Industry", written by the BCS President Rebecca George OBE.

Andy Shaw  
The Tester Editor  
[andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)

Join us on social media:

Join our Linked-In Group:

[LinkedIn/BCS SIGiST](#)

Follow us [@SIGiST](#)

Facebook: [BCS SIGiST](#)

Book online for our June 30<sup>th</sup> 2020 event:

<https://www.eventbrite.co.uk/e/bcs-south-yorkshire-branch-and-sigist-special-interest-group-joint-event-tickets-109812249394>



## Successful SIGiST events so far..

Following the formation of the new SIGiST committee at the SIGiST AGM in February 2020, we have organised some really successful events over the last few months for the SIGiST community online, due to the COVID-19 pandemic. While this has been an uncertain and unusual time, the SIGiST committee saw the opportunity to deliver our events via a webinar to reach out to both the SIGiST and the software testing community, some of which may not have been able to attend event in person otherwise.

Our first event ran on the 31<sup>st</sup> of March, where we had 3 fantastic speakers delivering their talks:

- Lisa Crispin – Behaviour-driven development and continuous delivery – how do they fit together?
- Parveen Khan – Exploring a DevOps Transformation like a Tester
- Ian Howles – Getting to Grips with Artificial Intelligence in Robotics

The video of the event can be viewed on YouTube, on the BCS Member Channel, at the following link: <https://www.youtube.com/watch?v=Gghac3lUW1w&feature=youtu.be>

The next event took place on the 29<sup>th</sup> of April, and was a talk about a project that some of the SIGiST committee members were involved with, an MIT-sponsored privacy-first open-source contact tracing project titled “Safe Paths”. This project is designed to tackle the fight against the spread of COVID-19, by empowering citizens to keep themselves and their families safer through citizen-led, global, free technology. An article, written by Diarmid McKenzie about the Safe Paths project can be found on page 20.

We have also organised Lean Coffee breakfast events, starting with our first event run by Gita Malinskova (the Programme Chair) on the 20<sup>th</sup> of May, where attendees can network and discuss questions raised by the SIGiST community. Interesting discussions were had, from questions the attendees raised about software testing, and the answers to these questions can be found at page 5.

So far our webinars have been really interesting and we have some more webinars soon. Our events will all be online for the foreseeable future, until the COVID-19 pandemic is controlled/over, then our events will be both online and around the UK. We are putting additional focus on inclusion, encouraging people from all backgrounds to consider software testing as a possible career path, and running amazing events so BCS members and the public can learn about the latest developments in testing.

We welcome any ideas for events, workshops and articles relating to software testing and interesting contributions that anyone may have.



## Welcome notes from the Editor

Greetings everyone, hope you have enjoyed reading this issue of the Tester so far. Whilst I have been the new Editor of the Tester, it has been great being the Editor so far as well as getting involved with SIGiST and attending the webinars and Lean Coffee events that have taken place so far.

In this issue, there is an interesting article “Neurodiversity and the IT Industry” written by Rebecca George OBE, the BCS President, who is interested in promoting neurodiversity and inclusion within the IT Industry with an invitation to contribute ideas.

Whilst being the Editor of the Tester so far, I have also worked towards some of my aspirations and goals, including being a writer, meeting and learning from some amazing people online and learning about them, as well as developing myself as a public speaker with a webinar with a talk I am planning to deliver in June. The COVID-19 pandemic has also provided me the opportunity to organise and deliver webinars on mental health for the South Yorkshire BCS branch, which has been an addition to the work I have been doing with SIGiST so far, and helped

The Tester has also given me the opportunity to promote diversity and including within the software testing industry, an example being are the interviews I have had with some fantastic professions, to help promote great role models to others who are interested, or considering, developing a career in various areas of software testing.

I hope you enjoy this edition of the Tester magazine and if you have any ideas for article suggestions or submissions, event ideas, books you have written and like to be reviewed, please contact one of the SIGiST committee members or myself.





# Lean Coffee event 20<sup>th</sup> May 2020

## Breakout Rooms discussions

Our first Lean Coffee event, run by Gita Malinskova (the Programme Chair of SIGiST), took place on the 20<sup>th</sup> of May 2020 online. It was an opportunity for software testing professionals to network and discuss questions posed by attendees, then share the results of the discussion with all attendees. Below are some of the discussions posed by the questions asked:

### **What are good personal development activities during lockdown for testers?**

Some of the activities, discussed by testers, as good personal development activities to get into testing were:

- Read “Agile Testing” by Janet Gregory and Lisa Crispin
- Volunteer for Safe Paths
- Evil Tester Javascript course
- Learning Python

### **How can a lone tester in a company work with several teams?**

An interesting discussion with some really good suggestions about how a lone tester within a company can work well with different teams were:

- Developers to do more testing
- You are more like a quality advisor
- Can be a quality gatekeeper, but is this a bad term?
- Quality is the responsibility of the whole team
- Everything should be done in a collaborative way
- Encourage code reviews
- Get managers to sit with the team to listen to the conversations and discussions not to talk. They can listen to standups
- Cross functional meetings to enable everyone to know what is happening across the company
- Empower developers
- Build relationships with developers and product managers
- Gemba walks <https://kanbanize.com/lean-management/improvement/gemba-walk>

## How AI can be used to support testing?

There were some good suggestions on how AI can be used to support testing, which include:

- Test Optimisation/ Prioritisation
- Defect Triage
- Visual/ Fuzzy Object Recognition
- Visual Regression Testing
- Test Generation
- Synthetic Test Data Generation

At our first webinar 'Emerging Trends in Testing, DevOps and AI', which took place on the 31<sup>st</sup> of March, the SIGiST committee were asked a few questions by the attendees of both the SIGiST and wider testing communities. As there was not time to answer them at the webinar, the SIGiST committee members discussed their answers to the most asked questions during the Lean Coffee event.

## How have you developed your knowledge and skills in software testing, during the COVID-19 pandemic?

SIGIST committee members have been talking about good ways to develop skills during lockdown. Tosca Tricentis have made all their online training courses available until end of May for free [<https://bit.ly/2ArVhmJ>]. One committee member is busy with delivery but planning to improve her github profile. Another member has been improving his knowledge of javascript by using online resources from w3schools, and doing the eviltester course on manipulating the browser using JS rather than a language to create webapps [<https://bit.ly/2Ww5Ygo>]. Another member has been learning about OWASP testing practices for security testing and using them to do testing on open source projects, another way to improve your GitHub profile.

## How do you see the future of software testing, and what skills, tools do you think will be used post COVID-19?

SIGIST committee members have been discussing which tools and approaches they believe will be likely to be used, once the COVID-19 pandemic is over/controlled. Some members felt that companies will increase the use of DevOps tools, which will in turn encourage test teams to move towards continuous testing, aligning them with Development and Platform resources to deliver faster and better quality releases. They will increase use of various automated test tools to help ensure a decent coverage of functional and non-functional requirements for different releases.

Members felt that software like Microsoft Teams will be used more, to collaborate with other testers and developers about how software should be tested, as well as collaborating on documents, training, etc.

# Conference Agenda

BCS SIGiST (Joint event with South Yorkshire BCS branch) –  
June 2020 Conference – Tuesday 30<sup>th</sup> June 2020

This event will be online, due to the public health situation. Bookings can be made at the following link: <https://www.eventbrite.co.uk/e/bcs-south-yorkshire-branch-and-sigist-special-interest-group-joint-event-tickets-109812249394>

## *How to think like a tester – Version 2.0 online*

Time	Session
18:00	Start
18:00	<b>Welcome – Adam Leon Smith, Chair, SIGiST</b>
18:10	<b>How to think like a tester – Version 2.0 online</b> Andy Shaw
18:40	Break
18:50	<b>Scenario exercise</b> Andy Shaw
19:00	<b>How to think like a tester – Version 2.0 online</b> Andy Shaw
19:25	<b>Wrap up</b> Adam Leon Smith, Chair, SIGiST
19:30	<b>End</b>

The SIGiST committee reserve the right to amend the programme if circumstances deem it necessary.

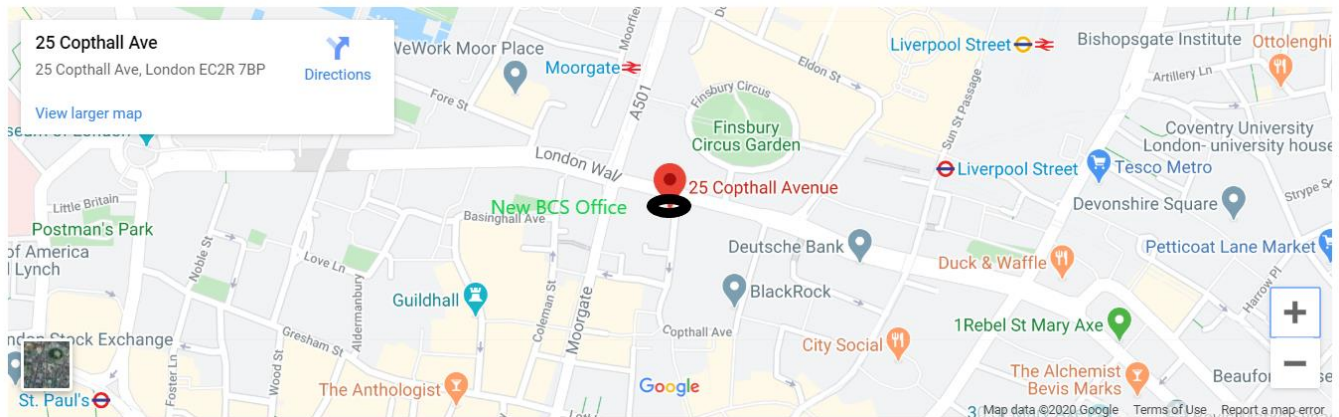
## **COVID-19**

Due to the current COVID-19 situation we are responding by looking to make our events online for the foreseeable future, the benefits include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community.

# BCS London Venue

When the pandemic is controlled/over, some events will be held at the new BCS London office.  
The location is below.

## London Office Guide



## Address

BCS, The Chartered Institute for IT  
Ground Floor  
25 Copthall Avenue  
London  
EC2R 7BP

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## Online events

We are responding by looking to make our events online for the foreseeable future, as a result of the coronavirus pandemic. The benefits of which include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community. It will also provide new and upcoming speakers with the opportunity to deliver a talk, some of which may not have the opportunity to do so. If you are interested in delivering a talk/ workshop/ etc online, simply contact one of the committee members or email the Editor at [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)

# Presentation Abstracts and Speaker Biographies

Keynote One

**Andy Shaw**

How to think like a tester – Version 2.0 online



Software failures are caused by different reasons, and software testing is crucial for a successful project. I am delivering a webinar about why software testing is essential for successful deployment for different systems, and how effective software testing strategies are for testing software.

I shall be explaining why exploratory testing can be beneficial and how having a creative mindset is beneficial as a tester, how automation testing can be used to test software, as well as the benefits and limitations concerning automation testing, and how software testers can further develop their skills.

In my talk, there will be a group exercise with a scenario on how to test specific scenarios, in order to gain an understanding of how they should be tested.

## Key Takeaways:

- Causes of software failures
- How exploratory testing can be beneficial, when utilising a software testing strategy
- The benefits and limitations of automated testing, when testing software
- Ways software testers, and other IT professionals can develop their skills, concerning software testing

*I'm **Andy Shaw** and I am a Test Engineer. I have focused on a career in Software Testing, following a redundancy in 2013 which turned out to be one of the best decisions I have made. I have gained experience in software testing within the following industries: Geological, Cargo and Shipping and Lone Working. I deliver talks about software testing, career development and mental health, both via online webinars and in person, and outside of work I enjoy practising martial arts, travelling, walking, editing the Tester magazine and am passionate about mental health awareness and working on ways to reduce the stigma concerning mental health.*

# Neurodiversity and the IT Industry

Rebecca George OBE – BCS President

June 2020

## This article – what it is and what it isn't

Like many people with a strong interest in diversity, I have been following the growing number of discussions about neurodiversity with interest. Following my own conversations on the topic with professionals within other sectors, it's become clear that neurodiversity is particularly important for the IT industry.

This article is my attempt to describe, in a non-technical and mainly anecdotal way, the opportunities that will come in further supporting colleagues with neurological conditions and recognising the value they bring to the IT industry. In preparation, I have talked to a doctor and professionals in a legal, finance and professional services companies. The first-hand perspectives I have included are from my own firm, Deloitte, as a wonderful colleague (Dan Harris) collected them for me.

## What is Neurodiversity?

Today, organisations and employees are on a long diversity journey. Most companies have been focussing on different areas of inclusions, such as gender, BAME, disability and neurodiversity concurrently.

While many organisations now have a number of schemes up and running to support diversity in the workplace, many initiatives to support cognitive diversity are just beginning. From the conversations I've had, it seems that when organisations do engage their employees on the subject, they receive enthusiastic responses as well as recommendations for the best ways to support colleagues with neurological conditions, and recognition of their contributions.

**John Elder Robison** - author of *Look Me In The Eye: My Life With Asperger's*, and *Be Different, Adventures of a Free-range Aspergian*, defines neurodiversity as: "... the idea that neurological differences like autism and ADHD are the result of normal, natural variation in the human genome. This represents a new and fundamentally different way of looking at conditions that were traditionally pathologized; it's a viewpoint that is not universally accepted though it is increasingly supported by science. That science suggests conditions like autism have a stable prevalence in human society as far back as we can measure. We are realizing that autism, ADHD, and other conditions emerge through a combination of genetic predisposition and environmental interaction; they are not the result of disease or injury."

This description seems a sensible place to start as it accepts, as with all forms of diversity, that difference is natural, with different groups bringing new ideas and perspectives to communities which we've come to depend on.

For the IT industry then, ensuring neurodiversity in the workplace will result in greater innovation. A larger number of organisations must foster a culture and working practices that allow people with neurological differences such as autism, ADHD and dyslexia, to thrive.

In saying that, it's worth remembering that according to the principles of the neurodiversity paradigm, the word 'neurodiverse' describes all of humanity as we carry neurological differences. For instance, while a person may identify themselves as a visual, audio or practical learner, and require a specific type of tools for their development, someone may disclose a neurodiverse condition, which may require other kinds of learning material in order to be effective.

It's crucial that colleagues feel comfortable to disclose their neurological differences and confident to express their requirements in order to work productively.

### Some stats

- [According to the CIPD](#), at least 10% of adults are neurodiverse.
- Meanwhile, their research showed that just 10% of HR professionals in the UK said consideration of neurodiversity was [included in their organisation's people management practices in 2018](#)
- According to [Autism.org.uk](#), 10% of autistic adults receive employment support but 53% say they would like to have this.
- One in 68 people are now diagnosed autistic, [according to the CIPD](#). The generally accepted ratio is 4:1 male-to-female, but recent research suggests there may be more undiagnosed women than undiagnosed men.

### Neurodiversity within education and the workplace

The comprehensive school system, the one I grew up in, tried to create uniform people who acted along specific social norms. Some people never fitted in, did brilliantly in one or two subjects but really struggled with others, or just got bored so quickly they looked for other outlets for their energy. While the situation in schools is improving, along with the rate of diagnosis, supporting children with neurodiverse conditions often requires one-to-one support which is often difficult for schools to fund with current budgets.

In the future, we need to make the most of every person, supporting them to be the best they can possibly be, celebrating and building on their natural talents. That may well require additional investment in all levels of education, as well as different approaches within the world of work.

Within the workplace, it's always been the case that teams need to be made up of individuals with a range of neurological make-ups to aid diversity of thought. If everyone is the same, then every company would come to the same conclusions. I have met people in certain professions, like architecture, physics and some medical specialists, actuaries, lawyers, musicians and ancient languages who think uniquely, differently. Meanwhile, enlightened employers focus on evolving the type of work with the right personality, to allow individuals to flourish in their roles.

Some roles are particularly suited to individuals with certain neurodiverse conditions, for instance roles that include tasks such as in planning, logistics and scheduling which require a mathematical brain; work that can be done from home, and service provision which doesn't require real time interaction. More communication is needed to help employers develop an understanding of how to recruit and support these individuals.

The usual recruitment techniques may need adjustment too – taking part in interviews, or interviewing by video, taking psychometric tests, and answering competency based questions can sometimes be challenging and intimidating for those with certain neurodiverse conditions.

People with neurodiverse conditions may also benefit from tailored on-boarding schemes. A legal firm I spoke to for instance offers those with some neurodiverse conditions to be paired up with a buddy to help them set them up their space, advise on where they sit, how to greet people and provide additional them with additional tools to aid there working. Their buddy can also interact with the rest of the team, helping them to understand and interact with their new colleagues. Like other employers, they have benefitted from employing those with neurodiverse conditions for the unique perspective they contribute to the team.

## Neurodiversity and IT

Many of the skill sets we typically understand as being useful in IT are commonly identified with certain neurodiverse traits such as attention to detail, a strong preference for things to be internally consistent and follow logically or a preference for repetitive work. Many people with certain neurodiverse conditions will grow up and find a career in IT will find they can make the most their strengths, create value and also find peers and community of people who share their interests and quirks.

As the IT industry becomes more conscious of the benefits individuals with neurodiverse conditions bring to teams and embrace a commitment to inclusivity, there are counterintuitive challenges facing how we do so sensitively. The risk is that organisations fall into repeating some of the more exclusionary experiences of people with some neurodiverse conditions, rather than acknowledging the unique perspectives they bring to teams.

Auticon is one IT consultancy I spoke to which exclusively employ adults on the autism spectrum as consultants. Their success is exemplar of neurodiverse traits being uniquely suited to this type of work, with many of their employees now sought after to meet the complex needs of Fortune 500 and blue-chip organisations. Ray Colye, Auticon CEO, said: *“These skills are of particular value in areas such as quality management, security, compliance and business intelligence – which is the main scope of our service portfolio. Put simply, our consultants are the very best at what they do. They work quickly and produce consistently excellent results.”*

IT organisations are increasingly becoming aware of the fact they have been benefitting from neurodiverse talent and the variety of skillsets this allows. One large technology organisation has already identified this as a competitive advantage, stating that forward-thinking organisations should look to hire neurodiverse individuals, for the skills they bring in terms of problem-solving and creativity.

Meanwhile at Oracle, diversity and inclusion Champion Jon Ford has been a lifelong diversity advocate and is channelling his passion and experience through the launch of Oracle UK's Neurodiversity Network. Jon added: *“Increasing evidence and media articles show how neurodiverse people can bring new ways of approaching problems with deep thinking, creativity, and true innovation, challenging the status quo. There are famous, historical change-makers who were probably neurodiverse, and it is exactly what modern business needs.”* The challenge is two-fold and recognising the contribution of our neurodiverse colleagues is only a positive step if we are able to simultaneously begin to remove stigma and exclusionary practices surrounding neurodiversity.



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**Below are some of the thoughts of my neurodiverse colleagues at Deloitte, reflecting on their experiences:**

### **Anthony Friel**

*In almost every place I've ever worked, my employer has worked hard to signpost their commitment to be inclusive of people's needs and respectful of the fact everyone is different. However, a lack of understanding of where the line between difference and disability begins and ends really means a lot of very enthusiastic and well-meaning managers end up making me feel less included and more 'otherised'.*

*Deloitte commits itself quite diligently to supporting all practitioners working how, where, and when they are most comfortable. When I want to work in a way that's different to my colleagues, the reason why doesn't come into it. Mainstream agile working measures of this kind have made my experience at Deloitte more positive because it avoids what is unfortunately my previous typical experience of 'We're all different! – but Anthony is a different kind of different', which feels like the opposite of inclusion.*

### **Becky May**

*I have spent my entire life giving excuses about how I tackle things and have often been the brunt of many jokes, most of which I made about myself. I have only recently been diagnosed whilst working at Deloitte, when I started to lose my vision in one eye, with the suggestion that I could also be dyslexic. Having completed several degrees and post-graduate qualifications, I have developed some interesting and creative coping mechanisms to adapt and now attribute some of that to the fact I am both dyslexic and dyspraxic. Not knowing I had these conditions has not prevented me from achieving things and like most people who are neurodiverse, I have a strong work ethic and resilience to challenges. It is interesting to consider whether the strengths I have are just me or whether they are because I have these co-existing conditions. For instance I have excellent visual memory, I am an abstract thinker and hugely empathetic; any of these could be from my experience within life and education or from being neurodiverse, (or both?).*

### **Dan Patel**

*I have Attention Deficit Hyper-Activity Disorder (ADHD). Since I started working for Deloitte I have adapted to working within a large HR team. Initially, I was unsure what to expect. Since working closely with my colleagues, I have adapted more easily to the company culture, values and working style. I am more open to talking about my neuro-diverse condition so that people can understand the spectrum.*

*I feel lucky to be working for a company which values its employees and contributions.*

### **Conclusion**

If your principles include supporting UK prosperity and working with purpose it's crucially important to recognise that all forms of diversity are necessary; that recognising the talent that individuals have and nurturing it will benefit the individual, the organisation and the wider economy. There are huge returns from investing time in understanding how to help all people achieve their full potential.

The people I have talked to have mentioned organisations such as Auticon, Scope, the National Autistic Society, and Autism Works. These organisations are providing great services to employers and to neurodiverse individuals. Our perception of what is 'normal' thinking is

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being challenger, by ensuring neurodiversity in the workplace we can ensure that more people and businesses are able to flourish.

### Thank you

I would like to thank the following people who have contributed, reviewed and commented.

Dr Gill MacLeod, Executive Director of Primary Care, HCA Primary Care

Dan Harris, Neurodiversity lead, Deloitte

Owen Clay, Partner, Linklaters

Ian Browne, Talent & Succession, People & Productivity, Lloyds Bank

If you would like to contribute your ideas and comments, please contact me [regeorge@deloitte.co.uk](mailto:regeorge@deloitte.co.uk) or Dan Harris ([djharris@deloitte.co.uk](mailto:djharris@deloitte.co.uk))

# Quality Assurance and Machine Learning Models

Klaus Hailer

## Abstract

Machine learning models are ubiquitous and impacts everyone. Online shops, for example, have features such as “customers who buy A, also buy B” to boost customer experience and sales revenues by suggesting (hopefully) matching products. While machine learning is crucial for many companies, machine learning models are often treated as magic, always correct black boxes not looked at by testers and quality assurance professionals. This poses a high risk. Thus, we elaborate in this article the core concepts that enable testers to discuss with data scientists about quality assurance in machine learning.

## 1 Understanding the Context

The idea behind machine learning algorithms is that applications predict outcomes – without being explicitly programmed so – after training them with historic data. [Bur20] Typical examples are:

1. Image classification: Does the picture contain a dog or a cat?
2. Object detection: What objects are on the picture and where are they?
3. Predicting sales opportunities: Whom should we try to sell a pink flamingo?
4. Sentiment analysis: Are the reviews positive or negative?

Machine learning models are rarely used stand-alone. They are often part of a larger software system, also referred to as embedded analytics. Gartner defines the term as a “... capability where data analysis occurs within a user's natural workflow, without the need to toggle to another application.” [Gar20]

Figure 1 provides a simplified example. Application are written in a programming language such as Java or Python, which – at defined points – call the machine learning model. Such a model is a mathematical function: It takes input values such as numbers, pictures, or text, does some computations, and returns one or more values, e.g., whether the picture contains a dog. For testers, testing the integration of various modules or code pieces and testing the traditional application code is nothing new. The main question is how to validate the “AI black box”: When does the machine learning model provide useful results? How can we measure this?

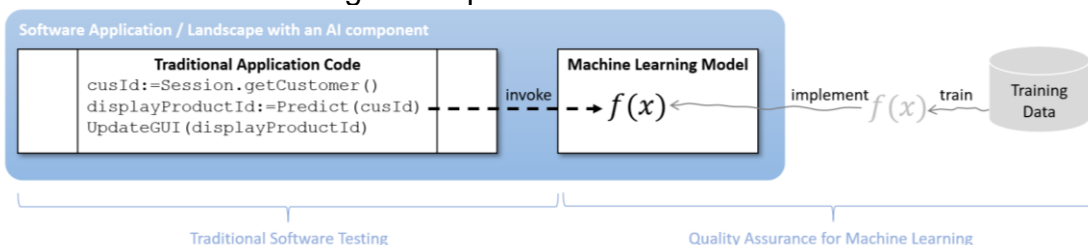
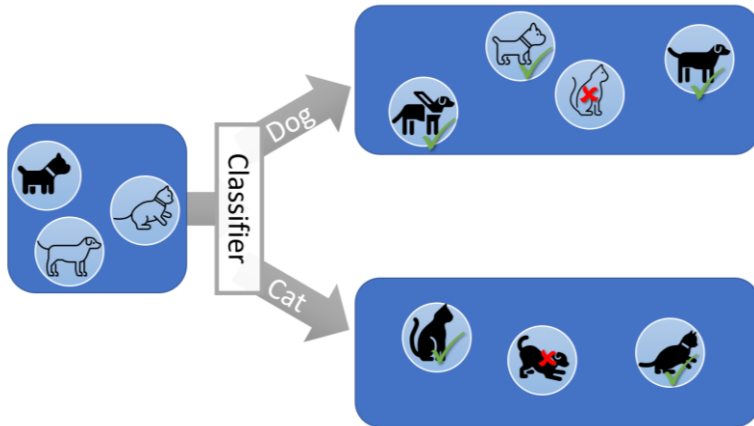


Figure 1: Simplified Architecture for Embedded Analytics

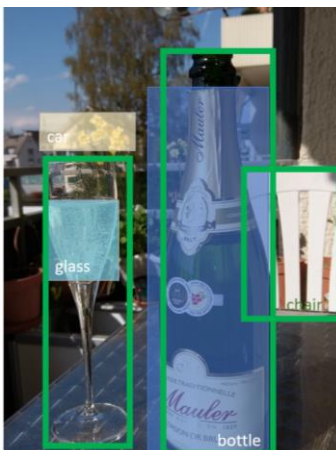
## 2 Quality Criteria

Machine Learning models are an approximation and simplification of reality. Thus, they are neither perfect nor completely wrong and different models have different strengths and weaknesses. Therefore, metrics are essential to reason about model quality and for comparing the quality of different models. A suitable metrics for image classification is the percentage of correctly classified images. In Figure 2, three of the four objects identified as dogs are really dogs, so are two of the three cats. Overall, 71% (5 out of 7) images are classified correctly.



**Figure 2: Image classification – look at an image and decide to which of the two classes it belongs, dog or cat.**

In object detection, the object class has to be correct and the shapes must be somehow matching. Typically, one demands 50% overlap of the shape identified and the actual shape. In Figure 3, the bottle is identified correctly, but not the glass. While the object class “glass” is correct, the overlap of the shapes is too low. Finally, the chair is not detected and there is no car where the algorithm detected one. Thus, one metric would be to divide 1 by 4 resulting in a value of 25% (Intersection over Union).



**Figure 3: Object detection - identify the objects on the image from image classes that were trained before. Green boxes are the expected result, the transparent boxes illustrate what the algorithm identified.**

Our final sample scenario is sales prediction. It illustrates that a nuance in the goal requires a different metric. We assume that sales managers have resources to call around 20% of potential customers for selling pink flamingos. Thus, they want to contact only the clients which are most likely to buy. The machine learning model has to deliver an ordered (!) list of potential customers, starting with the ones most likely to buy.

The quality criterion is whether (and how much) the machine learning model-based prediction is better than randomly calling customers. In Figure 4, the green curve represents the sales

success for randomly calling potential customers. The number of closed sales grows linear from the beginning till the end. This is different when using a good machine learning model. The curve is much steeper at the beginning and flatter later. In the pink flamingo example, the machine learning model results in three times as many closed sales when calling 20% of the customers. This is a big improvement if you have limited resources and do not want to call 100% of them. A more generic metric is the size of the area between the green and the blue line.



**Figure 4: Visualizing the benefit for a prioritizing task for machine learning**

The metrics discussed above are just a few of many possible variations. When we look at the example of dog / cat image classification, a post agency might rate classification errors five times as severe when dogs are classified as cats as the other way around. As a simple rule, testers have to be aware always of two aspects regarding metrics. First, the metric has to fit to the business question the machine learning model tries to solve. Second, the business has the last word about the metric.

### 3 Why Machine Learning Models Fail

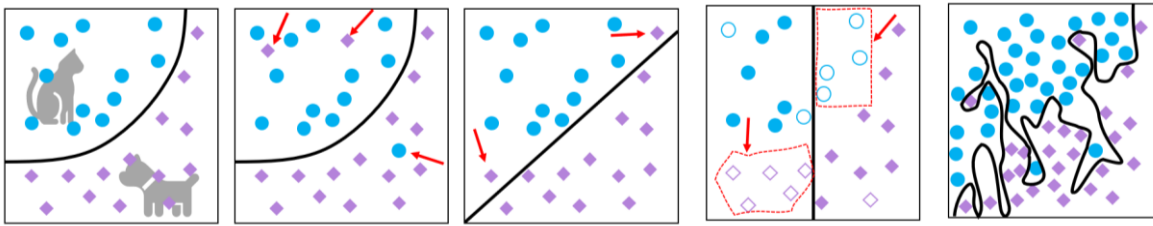
Training a machine learning means using an algorithm to interfere and extract general rules from the training set. Such a rule can be a curve that divides the data set in areas with cat and with dog images. In Figure 5 (a), cat images are in the upper left and middle part, dog images in the lower part. The machine learning algorithm identified a curve that nicely separates these two classes.

There are various reasons why models are not so perfect in practice. First, required information might be missing. A picture of a car on a parking lot is not sufficient to determine whether the car has enough gas to drive thirty kilometers. Thus, even if a distinction of two classes is possible in theory, models fail for certain data if they do not have all information (Figure 5, b).

Another reason for misclassification can be the used model / algorithm. When a model draws (only) one straight line to separate classes, but a curve is needed, this causes classification errors. As illustrated in (c), a straight line cannot separate all dog and cat images. This visualizes that the mathematical functions of the machine learning model impact the prediction quality.

Another reason for misclassification is non-representative training data. The metrics are good, but the model fails in practice (d). When training a model with the filled circles and rhombs, a vertical line separates the two classes perfectly. However, if also the non-filled shapes appear in practice, the model classifies many of them incorrectly.

Finally, there is overfitting. This model does generalize well and works (only) for the training data. As illustrated in (e), the division between the classes is an erratic curve. The model will fail for many images that were not in the training set.



**Figure 4: Scenarios for classifications. From left to right: (a) perfect separation of classes, (b) separation of classes fail due to influences not covered in the model/input parameters, (c) good separation of classes, but not perfect since a 100% correct separation of the two classes is not possible using a line only, (d) perfect separation on the trained examples (filled shapes), but not good in reality because the training set and reality (unfilled shapes) are too different, (e) both classes are perfectly separated, but the separation line is quite complex and it is questionable that it works well for other / new objects (overfitting)**

Obviously, verifying the quality of machine learning solutions is more complex than verifying whether a calculation in a piece of software works correctly. First, low metrics can have various root causes. A single metric does not enable projects to identify the exact root causes (b, c). Even if metrics look good for the training set, the solution can fail in practice (d, e). An additional complication is that the various scenarios are related to each other. If you optimize scenario (c) by allowing more complicated functions and overdue this, you end up in scenario (e) and vice versa.

However, for an in-depth analysis, testers have to understand the different datasets that data scientists use and how they relate to the scenarios discussed above.

#### 4 Identifying the Root-Cause

A key concept for quality assurance for machine learning is splitting your available data into three subsets: a training dataset, a validation dataset, and a test dataset.

The **training dataset** is for building the machine learning model. There are many ways to fine-tune the model, e.g., using various types of mathematical function(s), or changing the number of hidden layers for neural networks. Purpose of the **validation dataset** is to compare various models – and to check for overfitting. The final test before going live takes place using the **test dataset**. [Sha17]

The split of the dataset depends on the context. In predictive analytics and statistics, datasets might consist of several hundred or a few thousand datapoints. For them, a 60%/20%/20% **split for training / validation / test datasets** is typical. In big data, machine learning, and neural networks, there are often millions of data points. For such scenarios, a 98%/1%/1% split might be more helpful. Validation and test datasets of around ten thousand data points are sufficient for assessing the model quality. [DL20]

Having metrics for model quality for training and validation datasets (and test data sets) enables distinguishing the various problematic cases in Figure 5. However, the business has to define an acceptable error level. It has two purposes:

1. Clarify whether a model is useful. When a driver-assistance system in a car classifies 50% of red traffic lights as green, the system is better not shipped to the customers.

- Prevent over-engineering. Once the error is at an acceptable level, engineers can move to the next task instead of trying to optimize the model as much as possible.

In the following, we discuss how the different datasets help us to understand better the issues a model has and how to address them (The discussion bases heavily on [DL20]):

Situation	Explanation	Potential Solution Options
<b>High Bias/Underfitting</b> $p_{err}^{training} \gg p_{err}^{acceptable}$	The model is not useful for the business.	<ul style="list-style-type: none"> <li>- Perform more training steps</li> <li>- Adapt the function or neural network (e.g., add layers)</li> </ul>
<b>High Variance/Overfitting</b> $p_{err}^{training} \leq p_{err}^{acceptable}$ , but $p_{err}^{validation} \gg p_{err}^{acceptable}$	The model does not generalize well. It works for the training dataset, but not on other data.	<ul style="list-style-type: none"> <li>- Use more training data</li> <li>- Ensure that training and test datasets are from the same population (e.g., not Wikipedia pictures for the training and smartphone pictures for test dataset)</li> <li>- Regularization: prevent overfitting by penalizing complex functions by e.g. randomly varying data, or ignoring nodes</li> </ul>
<b>Fails with Test Set</b> $p_{err}^{training} \leq p_{err}^{acceptable}$ $p_{err}^{validation} \leq p_{err}^{acceptable}$ , but $p_{err}^{test} \gg p_{err}^{acceptable}$	The model is overfitted to the validation test set.	<ul style="list-style-type: none"> <li>- Increase the size of the validation test set</li> </ul>
<b>Fails in reality</b> $p_{err}^{training} \leq p_{err}^{acceptable}$ $p_{err}^{validation} \leq p_{err}^{acceptable}$ $p_{err}^{test} \leq p_{err}^{acceptable}$	All metrics look good, but the model fails in reality	<ul style="list-style-type: none"> <li>- Rethink the metrics used for optimization</li> <li>- Ensure that the validation and test datasets are helpful</li> </ul>

## 5 Discussion and Practical Remarks

In the discussion section, we focus on two practical aspects: methodological limitations and the **challenge of labeling test data**. Machine learning requires large sets with labeled data. For example, hundreds and thousands of images have to be classified by humans and given either a dog or a cat label. In more specialized areas such as language translation or X-ray analysis for medical purposes, this becomes an organizational and financial challenge. Labelled training data for autonomous cars is even on another level. Cars have to be driven around in cities and outside of them to create training data [Wig20]. Considering outsourcing the labeling of training data using services such as AWS GroundTruth. [AGT20]

Another practical aspect to be aware of are **methodological limitations**. In machine learning, there is no equivalent to boundary value analysis or equivalence classes, well known concepts in testing (see, e.g., [Eri12]). Testers do not know which data points really add to the quality of the machine learning model or increase the test coverage. There is research in this area, e.g., to identify difficult to label or classify pictures [PCY19], but such opportunities are not available for most projects. Also, the fragility of classification algorithms e.g. for images becomes obvious when considering the phenomenon of adversarial attacks [GMP18]: attackers can modify an image in a way not visible for humans resulting in misclassification. In short, quality

assurance for machine learning is – at this moment – on a less mature level compared to traditional software testing.

## 6 Conclusion

Experienced testers know how to test typical application functionality as well as how to test the integration of machine learning components into a complex solution. These are demanding, but every-day tasks for them. However, the spread of systems with machine learning components requires testers to validate the quality of these components as well. After reading this article, testers are familiar with the different types of datasets, metrics, and quality needs.

They are ready to talk with data scientists and to check whether they really know what is necessary from a quality assurance perspective.

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# Not just COVID-19: the challenges of keeping software quality high in enabling NHS digitalisation

Alan Giles

## Abstract

### Production incidents of gravest severity

Achieving a consistently high standard of product quality is a challenge for any software provider who cares about their customers, their reputation, and responding to the latest trends. Maintaining these high standards in healthcare is a bigger challenge than in other industries; production failures, outages and incidents can literally be a matter of life and death. Where many product owners in other industries treat reputational and financial loss as complete disasters, in HealthTech, the loss can be incapacitating or deadly.

On top of the elevated severity, there are many other challenges facing those responsible for software quality and testing digitalisation projects in the NHS, including responding to global pandemics like COVID-19. Before we go through the areas of greatest challenge, let's look at what digitalisation means for the NHS.

### Digitalising the NHS

The NHS has been going through a process of modernisation across primary, secondary, and community care for the last 10 years. The early projects focused on introducing on-site and on-premises digital solutions for medical and administrative systems; the mid-term and later projects are now focused on cloud-based, decentralised solutions. The areas now most in need of digital transformation are those that engage with the patient.

### Patient power

Since its inception and up to recent times, the interaction between the NHS and its patients has been controlled from the NHS side, particularly with booking appointments. Communication is often NHS led, especially when it comes to paper, its default processing method. The limitations of using paper are not just its speed and lack of feedback, but also financial, when cuts to NHS funding are a regular part of the political and economic cycle. Having a web portal that gives patients instant notifications of appointments, including any changes and reschedules, enables them to self-serve, bringing the clinician-patient relationship into the 21<sup>st</sup> century and on par with other industries like online shopping, online banking & online travel.

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## The cost of paper

Analysis estimates that it costs the average NHS Trust around £1 to send a paper appointment letter to patient. Considering a large trust could have hundreds of thousands of patients and any of them could require regular, repeat, or corrective correspondence, the total number of letters can easily reach over 1 million and sometimes into the millions. These costs, in addition to the lack of reliability of the traditional post, and its security and privacy vulnerabilities, have led to a move towards going paperless.

### NHS Digital, NHSX, and Zesty

Understanding the important role technology has in helping the NHS meet the challenges of 21<sup>st</sup> public healthcare, [NHS Digital](#), and more recently [NHSX](#) were created to focus on how the power of all technologies could be harnessed by both patients, doctors, staff and managers. NHSX and NHS Digital are now organised in functions to oversee how technology products and projects can be adopted and rolled out successfully on the front lines.

[Zesty](#) is one of the technology suppliers providing digital solutions to the NHS and private healthcare organisations. Being the Quality Assurance (QA) Lead at Zesty has opened my eyes to the challenges of integrating a patient portal into hospitals and how it can benefit from using and introducing testing techniques and processes and QA standards from other industries to help improve and maintain its quality of service to those who need it most.

## Testing and Quality Challenges

The toughest challenges that my team faces can be split into the broader areas of cultural, usability, medical, and technical. I deliberately leave technical last because at least from a testing point of view, technical issues are not the most significant when attempting NHS digital transformation, at least not compared to the wider world; what makes this area most challenging and therefore most interesting are the other elements of implementation.

### Cultural

#### *Pandemics and other crises – reactive and proactive*

In 2020 there is a lot of focus on the pandemic of COVID-19 and its impact on society and the economy, but in the healthcare ecosystem crises are regular challenges; managing resources surrounded by panic is the part and parcel of the reactive approach frontline staff and services often need to take.

However, with challenges come opportunities: the interesting difference with the current response compared to previous ones like [Wannacry](#) from healthcare providers is how quickly they have turned their attention to digital solutions. Whereas before they might be considered a long-term investment, now they are being seen more as an urgent solution to an urgent problem. As an example, Zesty has been approached far more in the past two months regarding telephone appointment options than ever before by healthcare organisations looking to adopt and implement our digital patient-facing solutions.

The challenge here is as an agile software team, you need to be able to react to change in demand by speeding up releases without impacting quality. This can only be achieved by strong communication within the team, focusing on keeping quality throughout the release cycle.

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*20<sup>th</sup> century attitudes to technology and change*

The NHS was formed in the twentieth century and much of its management, organisation, processes and culture are deeply entrenched in a pre-digital era. Offline processes dominate and rely significantly on paper. Introducing online tools and solutions, changing the 'way it's always been', without impacting on the quality and safety of care provided, can be a struggle.

Involving both medical and administrative teams in the software delivery lifecycle, particularly at the specification and User Acceptance Testing (UAT) stages, especially in an agile framework, is often an entirely new concept to hospital staff, and finding the balance between stimulating active engagement and tempering wish lists can be a tricky juggling act. Balancing time and quality is another issue: finding time for UAT potentially takes staff off frontline duties, but without that valuable real end user input, quality can be impacted.

## Usability

### *Patient users*

Modern software approaches put end user experience at the heart of the development process. In the case of hospital web portals the end user often has the following attributes: unwell, and/or incapacitated temporarily or permanently, and therefore naturally looking for simple reliable features; non-technical, to the level of being uncomfortable with or mistrusting of technology; older rather than younger.

The challenges presented by this kind of user base drive simple, clear functions on browsers and devices with which they are most familiar. Testing for accessibility and compatibility needs to be a priority. The features don't just need to work, but also need very low barriers to entry. Patience, and involving both user groups and organisations that represent disabled users are key to reducing potential barriers to use and adoption.

### *Hospital staff*

Ensuring efficient and intuitive end user and support admin experience of integrated software systems is an art form as much as a science. Within hospitals the challenges are most prominent in terms of time: time spent using the systems, time for training, time spent handling issues and support. Add to that the issues described in the culture section above, plus pressurised project delivery deadlines, and only by fortifying quality in the Software Delivery Life Cycle (SDLC) can you not lose out to time in the time-cost-quality triangle. The involvement of QA throughout the process is critical, no less so for staff functionality as for patients.

## Medical

### *Information Governance*

The General Data Protection Regulation (EU GDPR) 2016 is now treated as a standard that applies across all organisations in the UK, but within the NHS it is just one of a number of data privacy and protection protocols that need to be respected. Patient information is a special type of category data that naturally requires the highest levels of privacy and security. Breaches or errors in patient data can have direct and indirect repercussions, including the safeguarding of children. Systems that support digital patient activity must have one eye on keeping up to date with the latest security protocols and another on respecting privacy, both equally important and central to risk-based testing strategies.

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### *Clinical risk*

It goes without saying that in healthcare environments, clinical risk is central to any consideration of digital transformation. In any risk-based test approach, product risk analysis is a useful and productive process to include early in the SDLC. In HealthTech, clinical risk and associated hazard logs are key to assuring alignment with the overall risk exposure in clinical environments. The kind of issues that might arise from digital consultations and paperless appointments are that someone does not receive their notification and goes untreated, leading to further illness or worse, so having monitoring and analytics tools that can identify issues both in production and test environments is crucial for maintaining low risk levels.

### Technical

#### *Interoperability - standards are not that standard*

Historically, there was no central body controlling what systems could be implemented across NHS trusts. While there are sets of technical standards for systems like messaging (e.g. HL7, FHIR), how each clinical system implements these standards can be individual to the trust. Intertwining dependent and interconnected systems means that even those organisations that share standards don't necessarily have an easy time integrating with each other.

Teams developing and testing a system like Zesty's that integrates with a range of systems using a range of technical standards tend to have further integration challenges, simply due to the number of dependencies involved.

#### *Configurations are unique*

While there are transferrable and reusable similarities between clinical systems, NHS trusts are large organisations (2000 to 20,000 members of staff on average) with differing implementations, sizes, and needs. How they have implemented and combined Electronic Patient Record systems (EPR), Patient Access Systems (PAS), and Trust Integration Engines (TIE), or only some or none of these, makes integration testing tough.

The sheer number of configuration settings required for a single trust to convert to digital consultations and paperless appointment letters is in the hundreds. Maintaining reliable and robust regression testing, which also provides appropriate risk coverage is an ongoing battle.

### **TL; DR**

Digital transformation in healthcare is something that all of us can benefit from, especially in times of pandemics and social distancing, when real-time communication is critical to maintaining a healthy and safe society. The challenges for digital system providers and their healthcare-providing clients are many and complex, but by understanding the nature of the challenges and meeting them using effective, mature, and flexible software development and delivery techniques, quality can be achieved at the high level patients deserve.

# COVID 19 Safe Paths

## Diarmid McKenzie, the Test Lead for Safe Paths

### Abstract

There has been a lot of press in the UK recently about the NHSX Contact Tracing App, including a level of controversy about the centralized architecture, the decision not to use the Google/Apple Bluetooth technology, and speculation about the intentions and backgrounds of various parties involved in the development of the App.

While all this has been going on, since early April, I have been working as a volunteer, leading the testing efforts for a very different digital solution for contact tracing and exposure notifications.

COVID Safe Paths began in March, as an offshoot from a Digital Privacy research group at the Massachusetts Institute of Technology, and has rapidly grown into a global volunteer community.

### How did I get involved?

I've lived in Italy for the last 18 months, which has given me a front-row seat in watching the Coronavirus pandemic unfold in Europe.

By late March, three weeks into our lockdown, it was clear that the contagion in Italy was finally coming under control, but the obvious question (to which nobody seemed to have an answer) was "what next?". Looking to China and South Korea for answers, the solution appeared to be contact tracing, but delivered at an unprecedented level of speed and scale. But as I started to learn about both the scale of those efforts, and the invasions of privacy that had been involved, it seemed unlikely to me that the same approaches could be successful in the West.

So I became interested in looking at ideas for how technology could assist in the contact tracing process, and the MIT's Safe Paths project seemed to be one of the most promising options.

Initially I volunteered to test their app, expecting I'd spend a couple of hours one evening, and provide some feedback. I did some testing, and provided some feedback (quite a lot actually!), but it frustrated me that there was no back-end to test against, meaning that it was impossible to test some of the key functions.

I spent my weekend building a simple mock-up of the back-end, wrote up some more thoughts on testing strategy, and before I knew it, I had found myself in the position of technical lead of the testing team!

## What is COVID Safe Paths?

COVID Safe Paths provides a similar function to the NHSX Contact tracing app, but there are quite a few important differences.

- It has a Privacy-first architecture. Data collected by the App *never leaves a user's phone* without their explicit consent. If you test positive for COVID, you have the option to share the data with your local health authority (but this remains your choice).
- It is, and has always been, open source, developed by a global community of volunteers on a not-for-profit basis. This includes not only the app, but the entire supporting software ecosystem.
- Rather than operating as a “closed loop” system, the technology is designed to work together with traditional, proven, contact tracing methods, enhancing and accelerating them.
- It supports collection and sharing of location data, as well as proximity data (although what data a user shares is always up to them). This is based on the advice of epidemiologists and contact tracers about the information that they need to do their work effectively.
- Our mission is global (although each implementation involves working closely with health authorities at a local level). While many rich countries like the UK are developing their own national apps, there are many countries in the world who do not have those capabilities. We are in discussions with many of these about how they can deploy Safe Paths. We are also discussing with a large number of local health authorities in the United States.

For me, it's not a question of which of these choices is right or wrong (I believe that privacy concerns about the NHSX are more about perception than reality). This is a totally new endeavour, and I think the truth is that nobody knows what the best design is going to turn out to be.

It's vital that there are multiple different approaches being developed, because this increases the chances of a good solution to the problem. It doesn't matter to me much which design ends up being the most successful - I'm happy that my efforts are helping to increase the probability that one of these designs is successful.

## Looking back on the last five weeks

At the time of writing it is mid-May, and the five weeks since I joined the project have been extraordinarily fast-moving. My first 3 weeks consisted of evenings, weekends and public holidays, but I've now managed to arrange to take some time off from my day-job to make room for this, so I'm getting to see a bit more of my wife and kids again!

In those five weeks, Contact Tracing Apps have gone from a niche idea, to a mainstream topic, one on which it seems everybody has an opinion. This discussion has particularly brought into focus the importance of privacy for these applications - something that has always been a fundamental part of Safe Paths' approach.

Our product development team has changed beyond recognition as well. Many new volunteers have joined, from across the globe, and with minimal top-level direction, we've self-organized into distinct product, design, dev & test teams, that are now working effectively and efficiently together.

As the testing team, our role is to be "the headlights of the project". Our goal is to help the product, design & dev teams understand what they are building, and how it does & does not seem to be delivering the value we'd intended.

Testing a location-based service is never easy. But it becomes an even bigger challenge under the unique circumstances of lockdown: a globally distributed team, mostly with access to just one phone, and mostly confined to their homes! Fortunately we have had amazing support from Perfecto, Eggplant and 21labs, who have provided us with remote access to a wide range of different phones, and the ability to feed in synthetic location data, and to drive automated test scenarios. We've also had support from crowdsourced testing companies AppQuality and Applause, who have helped us to get access to testers in specific locations, and with specific language skills, that we'd otherwise not have had access to.

The product itself has developed from a basic prototype into a slick, functional and user-friendly app, together with the supporting infrastructure that we will deploy with healthcare authorities, and we've been working hard to make sure that privacy, security, reliability and scalability are all at the levels they need to be for production - both on the app itself, and on the back-end.

There's still a lot of uncertainty, and some things we won't learn until we get into real deployments. We are starting small with a handful of deployments in the US, and a few other small countries. Each deployment requires close engagement with the local health authority, to make sure that our technology can fit seamlessly alongside their existing contact tracing processes and systems. Based on our learnings from these initial deployments, we hope to iterate quickly, and scale up rapidly.

There are communities across the world who are in desperate need of an alternative to lockdowns, as a way to control this pandemic. Our hope is that the tools we are building, in combination with teams of trained & skilled contact tracers, can support these communities in returning to a more normal life, while continuing to control the spread of COVID. And critically, that we can do this in a manner that preserves and respects the consent and privacy of all the individuals concerned.

*If you'd like to help with our efforts in software testing, or in any other capacity, our volunteer form can be found here: <https://t.co/Qezm8NvnRS>*

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## Write an article

We are always on the lookout for new content, so if you have a testing story you would like to share, a book you have written and planning to publish, a test technique you would like to evangelise or testing research you would like to publish, then The Tester is the place to do it. Simply email the Editor on [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)

# Students/ Apprentices

As part of the recently revived SIGiST community, we would be very interested in hearing from university students and apprentices who are interested in software testing, from manual testing, to automation and penetration testing. Do you have an interesting story about how you are developing a career in the Tech Industry and software testing, do you have an article you have written which you would like to see published, do you have a question about software testing which you would like the SIGiST community to answer, then the Tester would be a great place to have this published and get your work recognised.

BCS Student Chapters are also welcome to publicise events that have taken place, or will be taking place in the future. Maybe you have had a penetration testing workshop, a university hackathon which has taken place, or are planning one.

Publication in a professional magazine like the Tester is great for your LinkedIn profile and adds to your CV and will help you during your career and at university, or on your apprenticeship and beyond.

Please email your articles to the following email: [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)





# Start-ups / Entrepreneurs, we want to hear from you!

As part of the recently revived SIGiST community, we would be very interested in hearing from start-up companies and entrepreneurs about anything testing related. If you have an approach you would like to mention, if you would like to speak at a future SIGiST event around the UK (including via a webinar), or publish an article in a future edition of the Tester, then the Tester is the place to publish your article, as well as to mention your talk/ event.

Please contact either one of the committee members on the SIGiST committee, or email [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org) if you are interested in speaking at a future event, or writing an article for the Tester.

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## CALL FOR PARTICIPATION

ISO/IEC has started a project to define a quality model for AI based systems as an extension to the SQuaRE series (In particular ISO/IEC 25010). SIGiST will be running a virtual peer conference in July to collaboratively provide input to this project.

This will be limited in attendance, so we are calling for members with related experience and expertise to submit an expression of interest before the end of June. To do so, please email the chair ([adam@wearedragonfly.co](mailto:adam@wearedragonfly.co)) with details of your relevant work.



# Interview with Wilson Lee

Apprenticeships are a very important area of our workforce and provides opportunities for people to learn whilst working, and beneficial to many organisations, from SMEs to large multinational companies in the UK. I interviewed Wilson Lee, a Software Testing apprentice at Piccadilly Group, about software testing, apprenticeships and how he has developed a fascinating and interesting career both at university and whilst undertaking an apprenticeship, so far and his plans for the future.

## **What encouraged you to develop a career in Software Testing?**

Wilson: I did a Higher National Diploma in Information Systems Engineers at St. Patricks, and was interested in Data Sciences and AI which was a dream of mine. Whilst at university, I was interested in Data Sciences, Neural Technologies and AI and was inspired by lecturers who were data scientists and experts in AI, which developed my passion. I initially started as an application developer, developing an app, however as a software tester it allowed me to gain a deeper understanding of the software, as well as analysing issues and errors which I have found. I have been making web application development as a side interest outside of work.

## **How long have you been on an apprenticeship and what do you feel, are the main skills you have learned as a software tester?**

Wilson: I am learning about Data Sciences as part of the apprenticeship, and have also been learning Python and Selenium Web Driver to automate tests. The apprenticeship is great because it has helped me to gain professional certification like the ISTQB in Software Testing, Microsoft certification, and I am learning from senior test professionals, who always teaching me new skills and how to test software in a different way. I have also gained skills in diagnosing problems with the software and working alongside the developers to solve them.

## **Has anyone inspired you so far in your career? And if so who?**

Wilson: From a young age I have looked up to the greats; Eilon Musk, Bill Gates, Jeff Bezos and even Mark Zuckerberg. For these visionaries all have innovation, drive and focus. As of my peer inspirations, I would like to consider my lecturers at university dedicated to AI Robotics and Neural Networks. Many of my friends were developers which helped me to think like a developer when I first developed my career, all of which have helped me developed as a software tester. Finally, as of my current peers, I have to thank CEO Dan Hooper, CTO Adam Leon Smith and our current principal consultant in AI Robotics at Piccadilly Group Klevis Voka, for the opportunity to be a part of this journey into the integration of AI in business intelligence of MI for the financial services.

**After you have completed your apprenticeship, what plans do you have to develop your career?**

Wilson: I plan to stay at Piccadilly, because it has and continues to provide me with many opportunities to develop, and there are courses that I can undertake. I am planning to undertake an online learning university degree, as well as professional certifications. I want to continue learning for the next 5 years to help develop myself as a software tester.

**Do you have any ideas, on how apprenticeships can be developed, to encourage more school/college/university leavers to consider undertaking an apprenticeship?**

Wilson: Apprenticeships to some people are not considered valuable by some people, and I believe apprenticeships should be promoted more in a positive life, and a better understanding of how apprenticeships work. If you know what you want to do, get an apprenticeship because it does not prevent you from learning other skills and qualifications, for example a university degree, or professional certification. There should be a designated place for people to apply for apprenticeships, and better promotion of apprenticeships as they give you certification and skills that you need, as well as the flexibility to develop, and can help fast track your career.

Better marketing of apprenticeships is needed, to help encourage people to consider apprenticeships. Software testing is a good career to get into because it broadens your horizons, you are continually learning, and provides a great work life balance. Normalising software testing, by mentioning the benefits like continual learning, the ability to mould your career how you want to, it provides a great work life balance

**Would you know how the BCS could help encourage apprentices during the early stages of their careers?**

Wilson: Many people I have met taking apprenticeships have been passionate about the money, so the BCS could promote the apprenticeships are well paid and a good career route.

**What advice would you have for anyone who is considering undertaking an apprenticeship when they leave school/college?**

Wilson: University provides theory, whilst apprentices provide the guarantee of a job, experience and the theory to help support it.

**Outside of software testing are there any interests you have? And do you have any goals you are pursuing?**

Wilson: I study social media marketing outside of work, as well as web application development, also learning languages like Python, and a whiteboard of how Python can benefit AI, Automation Testing, Data Sciences.

*Wilson Lee is a Software Testing Apprentice at Piccadilly Group, who is pursuing a career in software testing, as well as developing his knowledge and experience in Data Sciences, Neural Technologies and AI. He is also interested in web application development and a keen learner, continuing to developing himself both personally and professionally.*





Personal Development Plan

Your portable record of professional aspirations and activities



Desktop/Laptop

Tablet

Smartphone

## Did you get your Personal Development Plan email with suggested potential CPD activities?

The BCS Personal Development Plan (PDP) uptake is going well, with thousands of registered users already actively recording their CPD Development Goals, Activities and preferences. It's not just about recording details though, as there is a Resources section that shows live feeds of potential CPD activities, and a tailored email is sent every 2 months with details of the latest videos, articles, blogs, books and research in your specified field of interest. If you haven't registered yet, you can see the content from the latest PDP bulletin for topics relating to solution development and implementation by going to the CPD Portal at: <https://pdp.bcs.org/>.

The BCS Personal Development Plan is free to use; BCS members can use their Member Secure Area login and password to access it at <https://pdp.bcs.org/>, and non-members can use most of the facilities (using the same link) and registering to create their own user name and password. You can use it on a PC / laptop or compatible tablet PC or smartphone.

# THE TESTER

## We've reached Issue 66!

# 66

### IN THIS ISSUE

#### Conference

SISiGT, from strength to strength.....2

Editor's Notes ..3

SIGiST/AST Peer workshop .....8

QA during & post COVID event .10

AI & Testing event & SIGiST AGM12

BCS Office ....15

Abstracts.....16

#### Articles

How to think like a tester webinar notes. .... 4

#### Features

Testing skills post lockdown - Interview with recruiters ..23

### From the Editor

Welcome to *The Tester*, the official magazine of **SIGiST**. SIGiST is continuing to grow from strength to strength, following some successful webinars and a Lean coffee morning, with plans to do more. This issue mentions the successful events we have hosted so far, with 2 events already organised for September and a joint SIGiST/ AST workshop planned for November.

In *The Tester* review the abstracts for our events in September, but also read an interesting feature where 3 recruiters were interviewed about the skills testers need post lockdown. There are also calls to with an invitation to participate in testing standards on page 20, as well as a call for mentoring stories in software testing on page 19, which is planned to be included in the next edition of the Tester and beyond.

Andy Shaw  
The Tester Editor  
[andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)

### Join us on social media:

Join our Linked-In Group:

[LinkedIn/BCS SIGiST](#)



Follow us [@SIGiST](#)



Facebook: [BCS SIGiST](#)



Book online for our September 17th 2020 event:

<https://sigist170920.eventbrite.co.uk/>

Book online for our September 25th 2020 event

<https://www.eventbrite.co.uk/e/ai-and-testing-software-testing-sg-tickets-119898251899>



## SIGiST, going from strength to strength

The newly formed SIGiST committee, formed at the SIGiST AGM in February 2020, have organised some really successful events throughout 2020 so far, for the SIGiST community online, due to the COVID-19 pandemic. While this has been an uncertain and unusual time, the SIGiST committee identified the opportunity to deliver our events via webinars to reach out to both the SIGiST and the software testing communities, some of which may not have been able to attend event in person otherwise.

The first event ran on the 31<sup>st</sup> of March, where 3 fantastic speakers delivered their talks. The video of the event can be viewed on YouTube, on the BCS Member Channel, at the following link: <https://www.youtube.com/watch?v=Gghac3IUW1w&feature=youtu.be>

Subsequent events took place afterwards, including 2 successful webinars:

- A talk about an MIT-sponsored privacy-first open-source contact tracing project titled “Safe Paths”, delivered on the 29<sup>th</sup> of April.
- “How to think like a Tester”, which Andy Shaw, delivered on the 30<sup>th</sup> of June. This was a joint event with the South Yorkshire BCS branch.

SIGiST also organised Lean Coffee breakfast events, starting with our first event run by Gita Malinskova (the Programme Chair) on the 20<sup>th</sup> of May, where attendees could network and discuss questions raised by the SIGiST community. SIGiST are planning on running some more Lean Coffee breakfast events in due course.

There are 2 fantastic events lined up for September:

- QA Teams During and Post COVID, taking place on the 17<sup>th</sup> September, more details about the event can be found on page 10, with the presentation abstracts and speaker biographies on pages 10 and 11.
- A webinar in AI and Testing, including the SIGiST AGM, taking place on the 25<sup>th</sup> September, more details about the event can be found on page 12, with the presentation abstracts and speaker biographies on pages 16 to 18.

SIGiST continues to put additional focus on inclusion, encouraging people from all backgrounds to consider software testing as a possible career path, and running amazing events so BCS members, the SIGiST and software testing communities, and the public can learn about the latest developments in testing.

SIGiST welcomes any ideas for events, workshops and articles relating to software testing and interesting contributions that anyone may have.



## We've reached Issue 66, Welcome notes

Greetings everyone, we've reached issue 66 of the Tester so far! It's been great working on and creating the Tester so far, and developing it to promote and increase diversity and inclusion within the testing industry. The number 66 is an interesting number, with the infamous Route 66 in the USA, and the A66 bypass in the UK with a fantastic cafe. Some more facts about the number 66, and where it is also part of another number is as follows:

- In 1966, the TV serials Star Trek, Mission Impossible and Batman first appeared.
- 66 is the atomic number of the chemical element Dysprosium, a relatively hard metal which is silvery white, found in minerals.

Since being the Editor of the Tester back in February of this year, I have worked towards one of my aspirations, starting writing a novel outside of work and SIGiST, as well as working on a few articles for this edition of the Tester, including interviewing 3 recruitment consultants for their views on the skills testers need to develop, post COVID lockdown. Being the Editor of the Tester has helped me to achieve this.

I have also been attending different networking events around software testing, as well as attending a conference run by the Early Careers Initiative group, a new BCS group which includes modern apprentices, university graduates within their first few years after finishing university and professionals changing careers at some point in their lives. I look forward to helping to include these professionals within the SIGiST community, and see how they can help bridge the different specialist groups like SIGiST with the BCS Student Chapters as an example.

In this issue, I have interviewed 3 different recruiters to gain their views of how recruitment is changing post COVID-19 lockdown, and some steps software testing professionals can take to develop their skills. I shall return to interviewing more fantastic software testing professionals in the next issue, who I continue to be inspired by.

Enjoy this edition of the Tester magazine and if you have any ideas for article suggestions or submissions, event ideas, software testing questions you would like answering, books you have written and like to be reviewed, please contact one of the SIGiST committee members or myself.





# “How to think like a tester” webinar – Responses from the Questions and Exercises

In June 2020, Andy Shaw delivered a talk “How to think like a Tester” as a webinar for a joint BCS event, run by both the South Yorkshire BCS branch (which I am the Chair), and the SIGiST Specialist Interest Group of the BCS. During the talk, he ran an exercise using different scenarios to encourage the attendees to think of ways they would test them.

Here are the responses the attendees gave, for the different scenarios I gave during my talk:

## **Amazon Drones scenario:**

You are a group of testers within an organisation, which are working with the government to test a series of flying drones. These drones will be used to send parcels to houses within a specific radius, revolutionising the postal system and making it more efficient.

There have been concerns that have been raised about the flying drones, which include:

- No fly zones and how they will affect the drones.
- The drones could be hacked and used to steal things, including drugs.
- There are also privacy concerns, for example, filming people within a specific radius of the drones.
- The drones can be hacked for more malevolent purposes, which are a cause for concern for the public.

You are asked to test the software used for the flying drones, and come up with some good ideas on how to test the software for the drones.

## **Ideas for testing the ‘Amazon Drones’ scenario:**

- Embedding code to detect no fly zones
- If drones get hacked
- Radiowave frequencies, making sure the drones aren’t affected by anyone trying to hack them
- Test how the drones move, if there is a way to stop a drone moving when it is hacked. How a drone will react, when being hacked.
- How much weight the drone can carry. Detecting birds and flying creatures in the air.
- Testing what would happen in the event of a physical hardware failure.
- Testing the co-ordinates, so see if location can be mapped correctly.
- Testing how the internet connections will work, especially losing signal in areas like London.
- Testing the drone on rainy, windy, snowy, hot days, and how they would react will pollution.
- Testing time limits on drones.
- Drones identifying the height/storey for a house.
- Disgruntled employee attempting to hack into a drone for a malevolent purpose.
- Magnetic interference

**ToDoMVC scenario:**

You are a group of testers in an organisation, responsible for testing a website called ToDoMVC that hosts a number of applications providing a framework of Javascript applications to aid software developers develop Javascript applications. You are to test the website, making sure many users can access the site at a given time, that the Javascript applications can be used and test the security of the website.

Some concerns have recently arisen though:

- There are potential security concerns with the Javascript applications, where hackers are exploiting the opportunity to add malicious code to these applications
- Web applications using Javascript, with concerns over vulnerabilities like Server Side Javascript Injections becoming more common nowadays, as well as Cross Site Request Forgery, which need to be addressed.

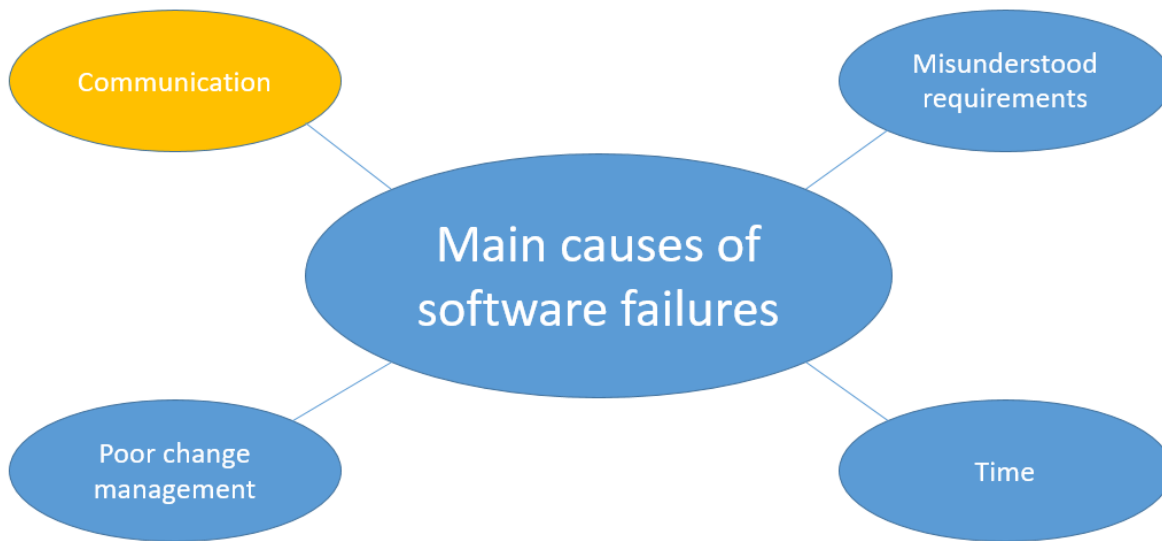
**Ideas for testing the ToDoMVC scenario:**

- Click on buttons and see if they match what they should be doing
- Load testing - some automation - focus on what will put load on the website - ask the developers to get some guidance
- Find out from the devs how to add malicious code
- Standard list of penetration test scenarios - reuse what is out there. NCSC has a list
- Test on the website to see if you can upload corrupt code - malware and/or badly written code
- Test all way to the page tree (depth)
- The website is not behind https (not secure)
- The CSRF issue is more commonly used for forms and relates to using the same session to exploit things.

During the webinar, Andy asked a couple of questions about software testing, using sli.do, in order to gain their understanding on specific areas, concerning their views on the cause of software failures and what they thought were the benefits and limitations of automated testing. Below are the responses they provided:

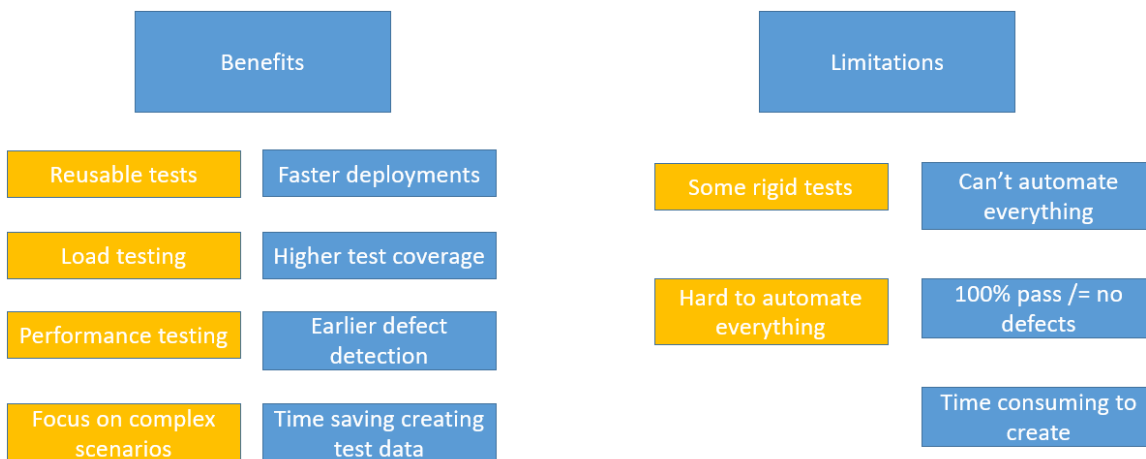
Here are the results of the questions he asked on Sli.do. For these questions he used diagrams to show the main answers the attendees gave for each question. The answers in gold, were the highest scoring answers for each question.

**What do you believe are the main causes of software failures?**



The attendees stated that communication issues, which includes poor communication between different teams, as well as the client, were the biggest causes of software or system failures. These tie into the other answers like misunderstood requirements and poor change management for a project, which are usually in my opinion a result of poor communication or a lack of communication between teams, the client and stakeholders.

**What are the benefits and limitations of Automated Testing?**



The attendees answered that reusable automated tests were beneficial for automated testing, allowing testers to focus on more complex testing scenarios which would be difficult to do by test automation alone. Load testing and Performance testing scored high on the responses the attendees gave on the benefits of automated testing, which I agree. I also felt all the benefits mentioned would increase the test coverage needed for testing a software release and increase the confidence of software being deployed to the client.

From the response to the limitations of automated testing, the attendees mentioned that rigid tests and that it would be difficult to automate everything were the main limitations. My view on automated testing is to look for the automated tests which will add value to the software being tested, and provide a good return on investment for the organisation concerning tests that can be automated (e.g. Smoke Tests, navigating around a web based system, creating/ editing/ deleting records).

With the “How to think like a tester” talk Andy has delivered at different universities and networking events, I usually give a few practical exercises for the attendees to undertake. This is so he can see how they would test something, which encourages them to be creative. Because of the COVID-19 pandemic though, some of these practical exercises have been omitted from the talks, however these will return when he delivers future events once the pandemic is over and face to face events resume. This is one of the areas of the talk Andy enjoys the most because he is interested to see how testing professions, as well as the general public will approach testing software.

Thank you to everyone who attended his webinar on the 30<sup>th</sup> of June, and Andy will be planning another event in due course. Stay tuned!



# BCS SIGiST/AST Peer Workshop on Testing and Society

BCS SIGIST, and the international Association for Software Testing will be holding a collaborative event. We found that our aims overlap in several areas, notably in promoting the value of testing to the wider public.

We are going to run a LAWST-style workshop, running for one day rather than two and online rather than in person because of COVID-19. It will run on Sunday 22nd November from 1500 to 2200 UK time.

This workshop will consider the question:

## **Should the public care about software testing?**

It's our contention that most people don't think very much about software development and software testing, despite software being deeply embedded in almost all aspects of our lives.

When there's a publicised issue such as a national bank failing to process customer orders for several days, a government IT project overrunning for years and then being canned, or a self-driving car causing a fatal accident, then society might take notice for a while.

However, even when that happens it's rare for the complexities and risks associated with the creation, integration, and maintenance of software systems to be front and centre in the discussion, and testing almost never makes it to the agenda at all.

In this workshop we aim to explore why that is, and what testers, testing organisations, software development companies, and governments could do to persuade the public that software testing is worth understanding and caring about.

Some of the areas we might cover include:

- Legal liability for software failure, for individuals and businesses.
- What testers can do to improve the impact of software on society and individuals.
- Regulation of software development and testing.
- Trust in software, and how this relates to perceptions of software quality.
- The merits of quality labelling schemes for software.
- Ethical considerations in software development and deployment.
- The challenges of "autonomous" or "intelligent" systems.
- Application areas such as self-driving cars, aeroplane control systems, finance, security, social media platforms, AI and ML, and government projects such as tax collection and voting.
- Technology factors such as complexity, distributed systems, machine learning, and open source.

Following the workshop, we intend to publish a joint summary.

**Would you like to participate?**

There will be places for five SIGIST members at the event. Delegates will be expected to do some personal research in advance and have a point of view that they are prepared to put forward. If you would like to join the delegation, please email the Chair ([adam@wearedragonfly.com](mailto:adam@wearedragonfly.com)) and outline your experience in testing, and a summary of the point of view you want to put forward.



# Joint BCS SIGiST/ QA in London event

## QA Teams During & Post Covid

As software testers, we have had to navigate through unprecedented times. Covid-19 has not only affected individuals and families, but has caused huge uncertainty within the economy.

Companies are now facing decisions on how projects goals can still be achieved. Maintaining and increasing quality is now front and centre. We are also in a unique time as people seize opportunities to change ways of working.

Join us for a [BCS SIGiST/QA in London](#) event as we discuss what effect this has had for teams involved in software testing during lockdown and what it means for us and the market going forward.

Hosted by **Nicola Martin** (Head of Quality, Adarga, BCS SIGiST)

Nicola has almost 20 years of experience in Software Testing working on high profile projects across different industries. She specialises in working with teams to create and set up test strategies and to continually improve processes and ways of working to deliver results.

Nicola is passionate about increasing diversity and inclusion in the Testing Industry. She has mentored professionals wanting to change careers and others wishing to develop a career in testing. She is also a committee member for the BCS Special Interest Group in Software Testing (SIGiST).

Nicola is currently working in the AI and Data Science field as Head of Quality at Adarga.

Nicola will be joined by panellists:

**Dono Greef** (Head of Software Delivery, Gelato)

Dono has been working within Quality Assurance for several years, helping to deliver software in many different methodologies. This journey has taken him through some epic experiences learning a lot about what works and what does not. A leader who enjoys empowering teams and helping them succeed.

**Stuart Day** (Head of Quality, Dunelm)

Stuart is highly experienced, versatile Software delivery and IT professional with strong business, analytical, communication, collaboration and coaching skills, with 20+ years' experience as an advocate and leader of Quality within Software Delivery, and specialising in Digital and Agile transformation.

Over the last 10 years he has been applying and adapting his trade within the Agile space. Leading, coaching and mentoring teams/organisations in Agile, Scrum & Agile, QA techniques and practices such as TDD, BDD, CI & CD. Focusing on influencing a mindset and culture shift in how QA is perceived and implemented, to drive it through the heart of delivery, and lead with quality.

He is also a co-founder and organiser of Agile Leicester and TAQfull meet-ups, host of MoT SWTC Notts, along with being a key note speaker and trainer at events.

**Alan Giles** (Test Lead, Zesty)

In the software industry for 15 years, first in Support but then finding a more suitable home in QA/Test/WhateverItsCalled for the past 10, hands on and strategic. Currently QA Lead at Zesty, a digital health company based near London Bridge offering a suite of patient facing digital tools to healthcare providers, including the NHS. Of particular interest: industry trends, writing articles, mentoring, hiring practices.

**Nuria Manuel** (Quality Assurance Technical Lead, Distributed)

Nuria Manuel is a Technical QA Lead working at Distributed who is on a mission to impact the world's understanding of quality.

She is an advocate for all aspects of diversity in Engineering and Technology and has spoken in secondary schools and universities to encourage students and to share her experience.

With a background in Chemical Engineering, Nuria started off having worked in multiple sectors such as wastewater treatment, oil and gas, engineering consultancy and diesel engine manufacturing where she found her passion for product and process improvement, product reliability and troubleshooting and optimisation.

**Callum Akehurst Ryan** (Senior Tester, Bloom & Wild)

With 13+ years experience, Callum Akehurst-Ryan has tested across multiple industries including Banking, Finance, eCommerce and Public Safety. Armed with a knowledge of psychology and the technical elements of software development he regards himself as a full stack tester and frequently talks / teaches people about different areas of test. He's also a kick ass Dungeon Master.

**Marie Drake** (Principal Test Automation Engineer, News UK)

Marie is a passionate tech blogger, where she talks about testing and test automation in general. Currently at News UK where she is responsible for setting up the overall QA strategy and ensuring that teams deliver high quality products. Part of her role is to also educate everyone about Software Testing and Test Automation so the responsibility of testing is shared across the team.

You can register for this event at the following link: <https://sigist170920.eventbrite.co.uk/>



# Conference Agenda

BCS SIGiST –  
September 2020 Conference – Friday 25<sup>th</sup> September 2020

This event will be online, due to the public health situation. Bookings can be made at the following link: <https://www.eventbrite.co.uk/e/ai-and-testing-software-testing-sg-tickets-119898251899>

## *Webinar in AI and Testing*

Time	Session
16:50	Start
16:50	<b>Welcome – Adam Leon Smith, Chair, SIGiST</b>
16:55	<b>The BCS SIGiST Annual General Meeting 2020</b>
17:00	<b>How to apply AI to testing</b> Dr. Jeremias Rößler
17:30	<b>Developing intelligent software using D7 R4</b> Joanna Olszewska
18:00	<b>Bias in AI</b> Dan Cowley
18:30	<b>Wrap up</b> Adam Leon Smith, Chair, SIGiST
19:00	<b>End</b>

The SIGiST committee reserve the right to amend the programme if circumstances deem it necessary.

### **COVID-19**

Due to the current COVID-19 situation we are responding by looking to make our events online for the foreseeable future, the benefits include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community.



## Specialist Group in Software Testing

### The BCS Specialist Group in Software Testing

# Notice of Annual General Meeting

Notice is hereby given that the Annual General Meeting of the BCS Specialist Group in Software Testing (SIGiST) will be held on Friday the 25<sup>th</sup> of September. The venue for this meeting will be .

## Agenda

- ❖ Welcome and Introductions
- ❖ Apologies for absence
- ❖ Minutes of the 2019 AGM (and matters arising)
- ❖ Reports
  - Chair
  - Treasurer
  - Standards Committee
  - Programme Secretary
- ❖ Committee elections
  - No elections during this period
- ❖ To consider any nominated business

Items for inclusion on the AGM agenda should be emailed to [phill.isles@bcs.org](mailto:phill.isles@bcs.org). Additions to the agenda must be received no less than fourteen days prior to the meeting. Nominations for committee posts should be submitted following the election process and should be emailed to [phill.isles@bcs.org](mailto:phill.isles@bcs.org).

# SIGiST Election process

Elections will normally take place at the SIGiST Annual General Meeting (AGM) in September. In extraordinary circumstances (e.g. early resignation) the SIGiST committee has the power to invite someone to take on any of the vacant roles until either the AGM or an Extraordinary Meeting when the role will be filled using the election process described here.

Elections are required in two sets of circumstances:

1. Automatically after a SIGiST Committee member(s) has held a position for 3 years.
2. If a SIGiST committee member resigns before the completion of their 3 year tenure.

The basic process to be adopted for any election follows:

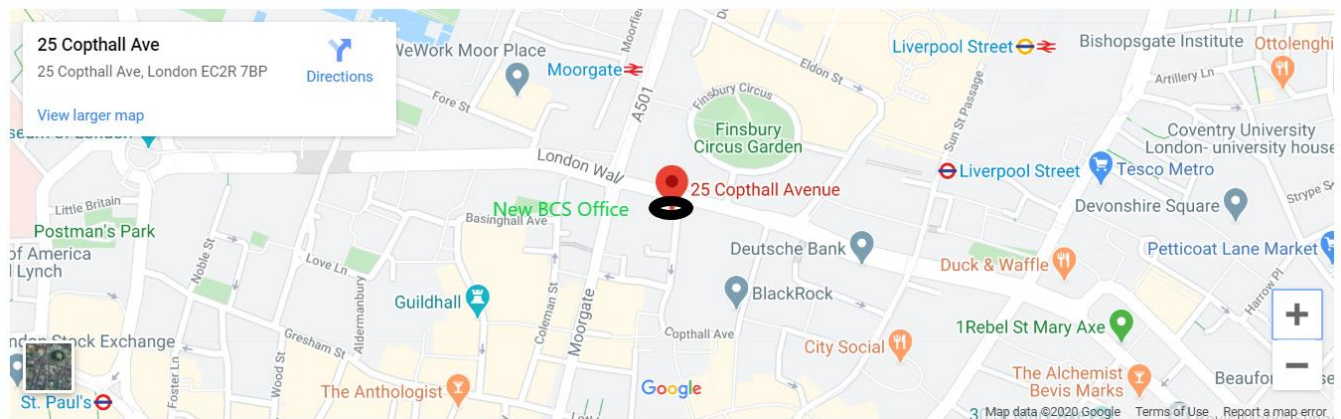
Task	Timescales
When an election is to take place at an AGM the available positions should be announced. Otherwise, for an Extraordinary Meeting, an email will be sent to all registered email addresses on the SIGiST database announcing the election(s).	No later than 30 days prior to the election.
The name of any member accepting nomination for election or re-election as an Officer or as a Committee member should be submitted in writing to the Secretary, with an accompanying short manifesto (no more than a page of A4) describing what they expect to bring to the role, by two members of the Group and with the written consent of the nominee. See the <a href="#">Member Group Rules</a> for further details.	At least 20 clear days prior to the election (after this point no more applications will be accepted).
A list of applicants for each job is released to the SIGiST members via email together with their manifestoes.	At least 10 days prior to election.
Election takes place during AGM or Extraordinary meeting.	At the AGM or Extraordinary Meeting.

Rules
1. Each candidate may stand for as many positions as they want (and can vote for every position available – subject to items 4 and 5 below), but may only hold one position. In the event that someone is elected to more than one position then they must immediately decide which position they wish to take up and vacate the other positions. The second-placed candidates for the vacated positions are then elected to those positions.
2. Should the nominations number equal to or less than the vacancies, the nominees will be deemed to have been duly elected without an election.
3. A simple majority is required to be elected to a position.
4. Only members as defined in <a href="#">Member Group Rules</a> may vote.
5. Voting is only allowed if the member is physically present at the AGM
6. The formal voting process will take place on the day of the meeting (a simple show of hands).

# BCS London Venue

When the pandemic is controlled/over, some events will be held at the new BCS London office.  
The location is below.

## London Office Guide



## Address

BCS, The Chartered Institute for IT  
Ground Floor  
25 Copthall Avenue  
London  
EC2R 7BP

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## Online events

We are responding by looking to make our events online for the foreseeable future, as a result of the coronavirus pandemic. The benefits of which include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community. It will also provide new and upcoming speakers with the opportunity to deliver a talk, some of which may not have the opportunity to do so. If you are interested in delivering a talk/ workshop/ etc online, simply contact one of the committee members or email the Editor at [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)

# Presentation Abstracts and Speaker Biographies

Keynote One

**Jeremias Rößler**

How to apply AI to testing

*Dr. Jeremias Rößler (Roessler) has a PhD in Computer Science from Saarland University and more than 10 years of experience as a software developer and tester — is the founder and CEO of @retest\_en (<https://retest.org>), a German-based startup that brings AI to test automation. His refreshingly unusual approach to test automation (difference testing) has many advantages over conventional test automation and he shows how to combine it with AI to overcome the oracle problem. He has been speaker at many international conferences, both in academia and industry, and attendees call his talks visionary and amusing. His talks are rated 4.28 out of five and ranked second best of the conference. He is a writer, blogger (<https://dev.to/roesslerj/>), developer & computer scientist.*



## Keynote Two

# Joanna Olszewska

### Developing intelligent software using D7 R4

Nowadays, software and systems are increasingly relying on Artificial Intelligence (AI). In particular, Intelligent Vision Systems (IVS) are using machine learning and computer vision techniques to process vast amounts of visual data such as images, videos for applications ranging from social media apps to m-health services, from street surveillance cameras to airport e-gates, from drones to companion robots.

Thus, IVS require effective and ethical data processing along with efficient signal processing and real-time hardware/software integration as well as User Experience (UX) and (cyber)security features. Consequently, IVS software development and testing necessitate an adapted software development life-cycle (SDLC) addressing these multi-domain needs, whilst being developer friendly. Hence, in this talk, we present the new SDLC called D7-R4 which allows developers to produce quality, new generation intelligent systems to be deployed safely in real-time and in real-world environments.

*Joanna Isabelle Olszewska BSc(Hons) MSc(EPFL) PhD(UCL) CEng CSci FBCS FHEA is a British Computer Scientist. She is an Assistant Professor (Lecturer) with UWS, UK, and leads research in Algorithms and Software for Intelligent Vision Systems.*

*She is a member of the IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems. She has been invited to be Panel Speaker at the University of Edinburgh Union Debate on 'The Future of AI'. She has given talks, e.g. at the University of Cambridge, at conferences such as ICRA, and at events such as EPSRC/BMVA Technical Days and DDD Scotland, as well as interviews, e.g. for the BBC Lunch Time 'Women in Engineering' Program. She has been TPC member of over 80 international conferences such as IJCAI and chaired over 60 conference/workshop sessions, e.g. at IROS.*

*She holds several awards, including the Silver Medal for her taught lectures on the Moodle e-learning platform, and she has authored more than 70 peer-reviewed publications.*



## Keynote Three

# Daniel Cowley

## Bias in AI

*Daniel Cowley is a Data Scientist at Adarga working on machine learning, knowledge graphs and natural language processing. He has a PhD in applied mathematics where he looked at the theory of information flow across networks and worked on models of biological networks. In his previous career he was secondary Maths Teacher.”*



# Mentoring in Software Testing

## Adventures & Inspiration – Call for stories

During his career as a tech professional, even before he decided to become a tester, the Editor, Andy Shaw, has been inspired by different professionals who have developed his career by mentoring him, and giving him guidance, advice and encouragement, helping him to develop his problem solving and analytical skills, become a better public speaker and providing him the opportunities to undertake a variety of tasks and activities, some of which he may not have had the opportunity to do otherwise.

Back in 2016, Andy participated in a mentoring scheme, ran by SIGiST, where he was mentored by a fantastic tester and international public speaker Dot Graham, and delivered a short talk about his experiences in automated testing at a National SIGiST Conference in London, in December 2016. He wrote an article about his experiences, which can be found in the March 2017 edition of the Tester (Issue 60), at page 13, which can be read at the following link: <https://www.bcs.org/media/2743/tester-2017.pdf>.

SIGiST is not just interested in mentoring stories about public speaking in software testing, they are interested in hearing stories about how mentoring has developed your career in software testing for example, how you have developed your skills in a specific area like automated testing, manual testing, learning a coding language to help you develop as a tester, as well as finding a role in software testing transitioning from another profession and lessons you have learned during your journey.

As well as being mentored, and currently continuing to be mentored by different professionals who have added an extra dimension to my life, Andy has mentored different professionals in software testing, from those who have been studying at university and looking for their first role, to those who are new to software testing and looking to gain experience. Everyone who he has mentored so far during my career, have also inspired his to further develop his skills as a software tester.

If anyone has an interesting story about how mentoring in software testing has helped develop their career, as well as any mentors who have also develop themselves as a result of mentoring others, please contact the Editor at [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org).





# Testing Standards – Influencing Practice

Adam Leon Smith, SIGiST Chair

## Abstract

Influencing practice is a key element of the BCS mission.

The Software Testing SG provided input to an upcoming ISO/IEC technical report - Software testing — Part 6: Guidelines for the use of ISO/IEC/IEEE 29119 in Agile projects, as well as Part 11 that explores testing techniques and issues relating to AI. Other technical reports in development relating to software testing include Testing of Automotive Software, Model-Based Testing, Games Testing, Biometric Systems Testing and Data Migration Testing. Integrating Agile and DevOps into existing or new standards is a priority for ISO/IEC SC 7 (Software & Systems Engineering).

They are working on a number of standards relating to Agile and DevOps. A technical report on Agile and DevOps principles and practices; a technical report on agile readiness and success criteria, and Agile and DevOps guidelines for very small entities (VSEs).

If you would like to join get involved, please email the Chair ([adam@wearedragonfly.com](mailto:adam@wearedragonfly.com))

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## Write an article

We are always on the lookout for new content, so if you have a testing story you would like to share, a book you have written and planning to publish, a test technique you would like to evangelise or testing research you would like to publish, then The Tester is the place to do it. Simply email the Editor on [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)



# Students/ Apprentices

As part of the recently revived SIGiST community, we would be very interested in hearing from university students and apprentices who are interested in software testing, from manual testing, to automation and penetration testing. Do you have an interesting story about how you are developing a career in the Tech Industry and software testing, do you have an article you have written which you would like to see published, do you have a question about software testing which you would like the SIGiST community to answer, then the Tester would be a great place to have this published and get your work recognised.

BCS Student Chapters are also welcome to publicise events that have taken place, or will be taking place in the future. Early Careers professionals, including professionals involved with the Early Careers Initiative run by the BCS, are also encouraged to submit articles, and get involved with the SIGiST community. Maybe you have had a penetration testing workshop, a university hackathon which has taken place, or are planning one.

Publication in a professional magazine like the Tester is great for your LinkedIn profile and adds to your CV and will help you during your career and at university, or on your apprenticeship and beyond.

Please email your articles, questions and ideas to the following email: [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)



# Start-ups / Entrepreneurs, we want to hear from you!

As part of the recently revived SIGiST community, we would be very interested in hearing from start-up companies and entrepreneurs about anything testing related. If you have an approach you would like to mention, if you would like to speak at a future SIGiST event around the UK (including via a webinar), or publish an article in a future edition of the Tester, then the Tester is the place to publish your article, as well as to mention your talk/ event.

Please contact either one of the committee members on the SIGiST committee, or email [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org) if you are interested in speaking at a future event, or writing an article for the Tester.

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# Testing skills needed – Post COVID-19 Lockdown Interviews

The COVID-19 lockdown has been a challenging time for Tech professionals, including testers, because many redundancies have been made, recruitment needs by different companies has temporarily been suspended because of the uncertainty caused by the pandemic, as well as employees being furloughed whilst lockdown has been taking place. There has even been news of industrial placements for university students, as an example, as well as roles for Tech and other professionals on LinkedIn, which have fallen through because of the pandemic.

SIGiST was interested in hearing recruiters' views about the pandemic, particularly despite the economic downturn, of the changes and challenges facing software testing professionals post COVID-19 lockdown, and how they can prepare and develop themselves to help them secure a software testing role.

Andy Shaw, the Editor, has interviewed 3 recruitment consultants, all with very interesting views about the pandemic, the challenges facing software testers and how they can develop themselves post lockdown. There are also interesting insights from all 3 recruiters, about how companies may change their ways of working, including more remote working, following the lockdown, and opportunities to increase diversity and inclusion.

The 3 interviews on the following 8 pages are with the following:

- Gabbi Trotter: Searchability
- Stacey Howard: Reco Group, Dragonfly
- James Riddett: Bytes Recruitment

Special thanks to all 3 recruiters for some very interesting interviews, and fantastic insights into how they feel the recruitment of Tech and testing professionals will change post lockdown, and how we as testers can further develop our skills, experience and knowledge.

Andy shall be interviewing more testers about how they have developed their careers in software testing in the following editions of the Tester, so watch this space!

## Gabbi Trotter: Searchability

**What have your experiences been during lockdown as a recruiter, and what trends have you seen for testers needing roles during lockdown?**

It's been a funny time, that's for sure! As you can imagine the world stopped for a little while, including recruitment, but we have been so lucky to have some key clients push on with remote recruitment, and things are starting to open back up. I have seen a massive increase in candidates being on the market, and obviously a lack of roles for them. Even automation testers who would normally be snapped up have been struggling to secure new roles. It is key at this time to stand out from the crowd as much as you can!

**As you have been involved with the testing community, including the Ministry of Testing (Manchester), QA Beginners' Club, what trends have you noticed about redundancies during lockdown, and how testers are developing their skills during and after lockdown?**

Yes, these two communities have been so great throughout lockdown running events online and keeping spirits up in the community. As mentioned we have unfortunately seen a big increase in redundancies, particular for those working in the travel sector. Many of those who have been let go have been super proactive using the time to upskill, and network, which has massively helped to increase their chances of securing something new. I have noticed lots of manual testers using this time out to pick up skills in automation

**What advice would you give testers looking for new roles, following lockdown?**

Be proactive! Don't just apply for a job and leave it there, follow up your applications, connect with the hiring managers on LinkedIn. Attend online meetups, essential do all you can to get your name and face in front of those hiring! Also if you can, do spend some time adding some new skills to your repertoire.

**What advice would you give to develop testing skills, and which skills would you recommend testers need to develop post lockdown, in order to help secure a role?**

I always highly recommend checking out Ministry of Testing's online resources as there is so much on there to help you learn and upskill. I'd highly recommend adding the following skills/knowledge if you have some time to do so: Automation testing with Selenium or Cypress, Agile Practises, API Testing with Postman. These are some of the key skills my clients tend to look out for.

**The lockdown is an opportunity to encourage more diversity within the Tech Industry, particular testing, therefore what steps would you recommend to encourage more women, people with disabilities, people from BAME backgrounds to consider careers in software testing?**

This is so important and it is all of our responsibility to do all we can to encourage more diversity in Tech, and Testing. As a company make sure you have a D&I policy in place, ensure you support minorities in your business, and if you can offer working from home and flexible hours to help encourage those with children, or certain disabilities to work for you. Its one thing getting these individuals through your door and another keeping them, make sure they are offered support through their careers with you! One of my clients Jaguar Land Rover

does this so well, having 5 or 6 internal networks for people to join such as one for BAME, LGBTQ, Women in Tech, etc.

**For anyone considering a career in testing, from a different industry, what advice would you recommend?**

Firstly check out QABC, the whole purpose of this meetup is this, to help those looking to make a career change. Secondly check out Ministry of Testing and start learning what you can in your own time! If you want to be given a chance to break into Testing you really need to show that you are passionate, and doing all you can to start learning in your own time. I'd also highly recommend trying to secure a Mentor, a senior tester to help you network and learn some basic skills. Again attending meetups will allow you to meet people who would be able to mentor you.

It's not essential, but it would also be helpful to try and get your ISTQB certification.

**As more people have started/ continue to work from home during the COVID-19 lockdown, how do you see organisations allowing more employees to work from home on a regular basis? How do you think organisations will work, more remotely, after lockdown? How do you think flexible working policies will develop, following lockdown?**

We have already started to see this shift towards more flexibility and more remote roles. 5 months ago I got a remote role once in a blue moon whereas now I have 3 live at once! I think it's great and I have only heard positive things from candidates who have been working from home. I like it when a company offers both, so you can drop into the office from time to time but there is no pressure to be there every day. I am hoping we will only see more companies adopting this model moving forward.

It massively opens up their reach and talent pools, so they can consider the best person for the job, not just who is based near to their office.

**Mental health of employees during and after lockdown? Have you been aware of mental health awareness of people working from home, in isolation, and what steps would you recommend to help employees manage their mental health?**

I think COVID/Lockdown has took its toll on us all at times, and can imagine it will have heighten some peoples pre-existing mental health issues. I know for myself when working from home, it was really helpful to have a daily to do list to keep my day structured, I'd include the simples of things, e.g. empty the dishwasher, but it helped me feel I had accomplished things each day. I also feel I always felt better on days I had made the effort to exercise!

I think its key companies take mental health seriously, and if they can ensure they have a mental health first aider in the business, and a policy in place to support those who are struggling.

*Gabbi Trotter is a digital recruitment consultant at Searchability in Leeds, West Yorkshire, specialising in placing software testing professionals from all levels into testing roles in Yorkshire and the North West of England. She is a co-organiser of the Ministry of Testing Manchester Meetup, sourcing speakers for events they host, and is involved with the QA Beginners Club (A meet up group for professionals who are looking to develop careers in software testing, as well as entry level/ junior software testing professionals who are developing their careers).*

## Stacey Howard: Reco Group

### **What have your experiences been during lockdown as a recruiter, and what trends have you seen for testers needing roles during lockdown?**

In general, the employment business saw a dramatic drop the moment lockdown was announced. We saw offers withdrawn and candidates turn down offers through fear of the unknown. June onwards confidence increased and hiring resumed. However albeit differently! The use of video and telephone calls to interview candidates is the new norm, and on-boarding in lockdown has been eventful!

The trend I don't believe has changed significantly for testers because of lockdown. There is still a huge need for developers in test. We have seen an increase in the need for SC Clearance on projects.

### **With testers and other professionals in the Tech Industry, how do you see different methods of interviews, like video interviews will affect recruiting of testers and other professionals going forward after lockdown?**

Interviewing over video or phone has been used for many years, the main difference is that the final stage is usually a face to face. Building rapport over a video is much harder than in person. And from a candidate's perspective, entering into an office and seeing other people in the office gives you more of an insight into a company than meeting 2-3 people throughout your interview process. So if anything, employers need to adapt more. They need to be able to create a culture that's virtual and also show prospective employees what it is like to work there.

There is more emphasis on technical tests now too. The one piece of advice I would give anyone who is considering a move is to ensure that they have a decent GitHub or portfolio they can show employers. It is harder to do whiteboarding exercises or paired programming. There is also an element of trust to complete tests remotely so the more you can show and employer the better.

### **For roles which are security vetted, or security clearance is needed, how do you see the change from working in a specific location, to working at a remote location or home following lockdown? Do you think this will remain long term? And if so, what measures do you think companies would need to put in place to maintain security?**

We are working on a number of SC Cleared programmes. Initially with lockdown it put a total stop on all new starters. However, we now have workarounds for most things now – we use a highly secure courier service of delivery of laptops. In fact, each consultant now has 2-3 laptops dependent on the task / level of clearance needed. Over the past few months we have proven that work can still be delivered in a secure manner so I do think there will be more flexibility for remote working when offices do open up. The main issue we have faced is the time to on-board. SC Clearance takes a while normally, it is now at least double the time.

### **What advice would you give testers looking for new roles, following lockdown?**

Get prepared – produce as much evidence of your work as possible whether that is on github, portfolios, projects you can show etc... You also need to think about the future IR35 regulation that will hit the private sector next year so as a contractor you have had an extra year of pain-free contracting, however I don't foresee the government delaying again. Potentially start considering permanent roles now before the rush in March next year?

**What advice would you give to develop testing skills, and which skills would you recommend testers need to develop post lockdown, in order to help secure a role?**

There have been many courses that are now free! Our biggest growth area is engineering in test (Dev in Test) so any development / coding courses you could do would be valuable. If you haven't already, Agile training would be good to have.

**The lockdown is an opportunity to encourage more diversity within the Tech Industry, particular testing, therefore what steps would you recommend to encourage more women, people with disabilities, people from BAME backgrounds to consider careers in software testing?**

One thing lockdown has shown is that working remotely can work! I am a working mum of two under two. It has been a godsend to not have to commute 1 hour every morning and evening as I don't have to rush around like a headless chicken getting ready for nursery and rushing back for pick up. I think it has shown employers you can employ people that need more flexibility like working mums and be very successful.

I would encourage people to network (albeit virtually) using channels like slack to meet other people. More than ever people are using on-line communities to connect and there are always opportunities published on those channels.

**For anyone considering a career in testing, from a different industry, what advice would you recommend?**

Testing I always believe is a mindset! If you generally want to break things, then testing may be for you! I would encourage joining some of the various webinars that people are doing to find out more, get involved in some test communities to immerse yourself in the industry.

**As more people have started/ continue to work from home during the COVID-19 lockdown, how do you see organisations allowing more employees to work from home on a regular basis? How do you think organisations will work, more remotely, after lockdown? How do you think flexible working policies will develop, following lockdown?**

I think part remote working will be the new norm. It's something candidates have been asking for, for many years and Covid-19 has forced the employers hand! It's one of the greatest things I believe that has come from lockdown. Employers by now should be completely set up for remote working and I can't see it returning back to full time office based roles.



**Mental health of employees during and after lockdown? Have you been aware of mental health awareness of people working from home, in isolation, and what steps would you recommend to help employees manage their mental health?**

This is something very close to my heart as I had a baby 2 days before lockdown which meant my maternity leave was pretty much non-existent and any of the plans we had for support went out the window. What was fantastic was the continuous communication from the team, online quizzes, virtual drinks etc. I think now people are a little bit over quiz night and zoom drinks so thankfully meeting in a socially distant way even just once a month I think is essential for your mental health.

*Stacey Howard is a Chief Commercial Officer (CCO) at Dragonfly, the Founder of the community 'Not Just a Mum' And Head of Reco, Reco Group, London, starting her career as a technical recruiter, she has grown a successful technology and data recruitment business, recently collaborated with a consulting and technology firm, forming Dragonfly.*



## James Riddett: Bytes Recruitment

### **What have your experiences been during lockdown as a recruiter, and what trends have you seen for testers, as well as other IT Professionals, needing roles during lockdown?**

It's certainly been quite an experience, with many changes affecting the industry! Obviously, some industries have been more affected than others and we've sadly seen a number of cutbacks and redundancies. As ever though, in the IT Industry, where opportunities diminish in one area others start to flourish. The industry is fluid and there's constant movement and changes of direction. If you had asked me last year if anything was going to change the "Candidate driven" market we were in, I would have said that nothing possibly could. Then, Coronavirus hit the world. "Candidate driven" is what the recruitment industry refers to as a market where candidate skill shortages exist. There are more vacancies than people to fill them. Typically, an accomplished application would be welcomed at just about any tech company using the technologies that they possess. The Covid-19 Pandemic has changed this, and we've seen candidates appear for the vacancies. We have seen companies exercise caution to their recruitment strategies and have noted an increase in short term contracts for Test engineers with permanent roles dipping off slightly.

### **What advice would you give testers, and IT Professionals, looking for new roles, following lockdown?**

I would have to say exercise some caution at the moment, do your homework and background check the companies you're applying for. If you're established in the industry, you may already have built a trusted relationship with several recruiters. Follow their advice and use them to help you target the opportunities you're interested in. We are free to use and are always there to help you. In many cases we have an established history with the hiring managers and can add tremendous value to the recruitment process.

Lockdown has been an ideal time to work on your CV if you are looking for work and these should be built to accurately and timely display your skills, level and ability. It's important to remember that your CV needs also to be 'skill-word' optimised not just for clarity for people screening in HR departments, but to make sure all the "search technology, spidering and crawling" etc. is able to pick your details up in the search engines.

### **What advice would you give to develop testing skills, or other skills, including software development, and which skills would you recommend testers, as well as other IT Professionals, need to develop post lockdown, in order to help secure a role?**

I think it's incredibly important to be an active part of the testing community. To be part of and contribute to various online groups on forums, to keep ahead of the market by reading literature obviously including "the Tester" magazine and to talk to your recruiters to learn about new tools and standards clients are asking for. I think this really is important across the board. Here at Bytes we recruit in all areas of IT and will work with clients to help build their teams.

Hiring Managers want to see from your CV that you are genuinely interested and passionate about what you do, so it's important not to forget to include this. It's often the difference in securing the interview so talk to your trusted recruiter about what they feel should be included for each application. Keeping "bang up to date" is vital and researching the latest things clients are after is important. Again, we can help with this. JavaScript technologies have been at the forefront of a lot of new projects for the last few years. Also, Node and React in web testing, so getting to grips with the Chais' and the Mochas of this world would be highly beneficial.

**The lockdown is an opportunity to encourage more diversity within the Tech Industry, particular testing, therefore what steps would you recommend to encourage more women, people with disabilities, people from BAME backgrounds to consider careers in software testing, as well as other roles within testing, as well as the Tech Industry?**

I think this comes down to communication, education and targeting the right communities from a young age. This has to be championed by the companies as well as the various affiliated groups and clubs. Testing has changed so much over the years and I think the dynamics in most tech teams have changed too. In many areas software testing has bridged the gap to Development and DevOps and there's far less of the "them and us" scenarios we used to see years ago in various tech teams. At Bytes, we are working on projects to help more people get into IT and feel strongly that this needs to be pushed in schools and universities as people just aren't aware of the vast number of very different roles that exist. People need to change as we believe every company is now an IT company and we have always felt this is such a shame.

There are certainly important roles to do that require different levels of technical detail and it's so important that people are educated to understand this and are not put off or worried that all roles in IT are programming related and require excellent Maths and Physics. When recruiting for our clients we look for the ability to complete the tasks necessary to fulfil the job to a high standard, we pay absolutely no attention to race, age, gender etc. We treat all people in the same way. I also think that the Testing Industry has always been quite diverse, more so than others which is really positive.

**For anyone considering a career in testing, or a career in the Tech Industry, from a different industry, what advice would you recommend?**

I'd say do not underestimate the amount of work and effort involved. But, if you're willing and able you'll be beginning an extremely exciting journey in a very dynamic and rewarding career. You need to go in with an open mind and do everything you can: learn, practice, contribute, read, research, blog, network, and be willing to do all it takes to get that first foot in the door.

Concentrate on the long-term rewards as the salary increments will come once you're on the ladder. Talk to recruiters, talk to other testers and join groups and forums online. Talk to us to help you get your CV right, identify what bridging skills you may have that will help you and add some degrees of personability into it too. Take stock of where you are and understand and learn what you need to do. It's not always easy to cross train and flexibility is key.

**As more people have started/ continue to work from home during the COVID-19 lockdown, how do you see organisations allowing more employees to work from home on a regular basis? How do you think organisations will work, more remotely, after lockdown? How do you think flexible working policies will develop, following lockdown?**

This has been a really interesting topic with a lot of fresh ideas coming out of the woodwork. Lockdown has been an ideal time for the country to test working from home and I don't think things will be the same again. Working from home has always been a personal choice and for some it is preferred, and we are starting to see a lot more flexibility from our clients which is great. Whilst some people have missed dressing in smarter clothes and even missed the 'dreaded commute', others have said they've had the opportunity to reconnect with their family and children and have managed to remain productive at home. I think that flexibility is the one thing that's emerged from this moving forward and working from home overall has been

successful. Our clients have already started amending contracts to reflect flexibility and working hours, allowing a mix of home working where applicable.

**Mental health of employees during and after lockdown? Have you been aware of mental health awareness of people working from home, in isolation, and what steps would you recommend to help employees manage their mental health?**

I think this is one of the cons of working from home and it's important to factor into your choices the type of person you are. I find it's important to stick to routines and to make sure you have regular breaks and definitely regular exercise and it's important to reach out and communicate to friends, family and peers if you are feeling cut off from the world.

*I'm James Riddett, Head of Consulting for Bytes Technology Recruitment and I've been recruiting for the IT Industry since 1999. Our "ever increasing" client list ranges from small to medium sized enterprises to Global Conglomerates. We are passionate, respectful, knowledgeable recruiters and above all love helping people and are always available to advise and assist, whether you're a candidate looking for a new opportunity or a client looking to build a team. You may need expert advice on your CV or require some up to date salary benchmarking. We really aren't your average recruitment agency in that we engage in technical IT projects too and even have our own CTO who has been embedded in the tech world for many years. He has cultivated some unique insider perspectives on the recruitment practices and strategies. Although Testing recruitment is only about 10% of our business, we have sourced Testers dating back to the Winrunner / Loadrunner , Mercury Days.*





**bcscs** Personal Development Plan  
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## Did you get your Personal Development Plan email with suggested potential CPD activities?

The BCS Personal Development Plan (PDP) uptake is going well, with thousands of registered users already actively recording their CPD Development Goals, Activities and preferences. It's not just about recording details though, as there is a Resources section that shows live feeds of potential CPD activities, and a tailored email is sent every 2 months with details of the latest videos, articles, blogs, books and research in your specified field of interest. If you haven't registered yet, you can see the content from the latest PDP bulletin for topics relating to solution development and implementation by going to the CPD Portal at: <https://pdp.bcs.org/>.

The BCS Personal Development Plan is free to use; BCS members can use their Member Secure Area login and password to access it at <https://pdp.bcs.org/>, and non-members can use most of the facilities (using the same link) and registering to create their own user name and password. You can use it on a PC / laptop or compatible tablet PC or smartphone.

# THE TESTER

## It's been a great year for SIGiST!

67

### IN THIS ISSUE

#### Conference

SISiGT, going from strength to strength .....2

Editor's Notes.....4

Using AI event . 10

BCS Office ..... 11

Abstracts ..... 12

What does testing mean today ..... 16

#### Articles

Should the public care about software testing .....6

Cracking Software Testing Interviews with ISTQB..... 19

#### Features

Apprentices & Career Transitions: Insightful Interviews .....24

### From the Editor

Welcome to *The Tester*, the official magazine of **SIGiST**. SIGiST is continuing to grow from strength to strength, following some successful webinars, with plans to do more. This issue mentions the successful events SIGiST have hosted so far.

In *The Tester* review the abstracts for our event in January, but also read an interesting feature where 2 apprentices were interviewed, following an apprenticeship related event in November, as well as career transitioning interview from 2 inspiring testers. There is an article, about "Using Terminologies and Cracking Software Testing interviews with ISTQB", following an interesting event delivered in November. There are also calls to with an invitation to participate in testing standards on page 21, as well as a call for mentoring stories in software testing on page 15, which is planned to be included in the next edition of the Tester and beyond.

Andy Shaw  
The Tester Editor  
[andrew.shaw@bcS.org](mailto:andrew.shaw@bcS.org)

### Join us on social media:

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Book online for our January 12th 2021 event

<https://www.eventbrite.co.uk/e/using-artificial-intelligence-tickets-129314114999>

## SIGiST, going from strength to strength

Since the newly formed SIGiST committee were formed at the SIGiST AGM in February 2020, they have organised some really successful events throughout 2020, for the SIGiST community online, due to the COVID-19 pandemic, and plan to continue delivering some outstanding events in 2021 and beyond. While this has been an uncertain and unusual time, the SIGiST committee identified the opportunity to deliver our events via webinars to reach out to both the SIGiST and the software testing communities, some of which may not have been able to attend event in person otherwise.

The first event ran on the 31<sup>st</sup> of March, where 3 fantastic speakers delivered their talks. The video of the event can be viewed on YouTube, on the BCS Member Channel, at the following link: <https://www.youtube.com/watch?v=Gghac3lUW1w&feature=youtu.be>

Different subsequent events took place afterwards, including the following webinars where the following videos can be viewed:

Webinar	Date	YouTube link
Testing Contact Tracing	29 <sup>th</sup> May 2020	<a href="https://www.youtube.com/watch?v=-u1mualoVoQ">https://www.youtube.com/watch?v=-u1mualoVoQ</a>
QA Teams during and Post Covid	17 <sup>th</sup> September 2020	<a href="https://www.youtube.com/watch?v=IV7llnm4SYk">https://www.youtube.com/watch?v=IV7llnm4SYk</a>
What Testing Means Today	20 <sup>th</sup> October 2020	<a href="https://www.youtube.com/watch?v=qoWQ1C1ry5s">https://www.youtube.com/watch?v=qoWQ1C1ry5s</a>

SIGiST also organised Lean Coffee breakfast events, starting with our first event run by Gita Malinskova (the Programme Chair) on the 20<sup>th</sup> of May, where attendees could network and discuss questions raised by the SIGiST community. SIGiST are planning on running some more Lean Coffee breakfast events in due course.

SIGiST have also been running events alongside different BCS branches, and other testing organisations like AST (Association of Software Testing), where a workshop was run between SIGiST and AST about why the public should care about software testing. The report from this event can be found on page.

SIGiST ran a successful event about modern apprenticeships to raise awareness about apprentices in testing, as well as highlighting the benefits an apprentice can bring to an organisation. There are interviews with 2 apprentices, Marissa and Kieran, which can be found on pages 25 to 29. SIGiST are also launching the “Testing apprentice of the year” award, to be announced alongside National Apprentice week in February 2020. There are also interviews with Chris Forsyth and Tracey Kerr, founders of the QA Beginners Club, on pages 30 to 34.

SIGiST was a professional sponsor for a four-day event, run by UNICOM, which started on the 1<sup>st</sup> of December and ended on the 4<sup>th</sup> of December, with a great line up of speakers

There is a fantastic event lined up for January:

- A webinar on 'Using Artificial Intelligence, including the SIGiST AGM, taking place on the 12<sup>th</sup> of January, more details about the event can be found on page 10, with the presentation abstracts and speaker biographies on pages 12 to 14.

SIGiST continues to put additional focus on inclusion, encouraging people from all backgrounds to consider software testing as a possible career path, and running amazing events so BCS members, the SIGiST and software testing communities, and the public can learn about the latest developments in testing.

SIGiST welcomes any ideas for events, workshops and articles relating to software testing and interesting contributions that anyone may have.





## My first year as Editor! Welcome notes

Greetings everyone, wow, 2020 has been an interesting year, being the first year I have been editing the Tester and so far I have really enjoyed it!. This has been an opportunity to focus on a few of my aspirations, which include:

- Promoting and increasing diversity and inclusion within the testing industry, which the Tester is helping me to do this.
- Writing a novel outside of work, which the storyline I have planned is becoming more interesting.
- Gaining some really interesting insights from many testing professionals, as well as learning from them.
- Writing articles about testing, an example of which can be found in Issue 66 of the Tester (the previous issue)

As well as being involved with SIGiST, I have also been attending different networking events around software testing, as well as attending BCS events and conferences. An example of which was a conference run by the Early Careers Initiative group, a new BCS group which includes modern apprentices, university graduates within their first few years after finishing university and professionals changing careers at some point in their lives. I look forward to helping to include these professionals within the SIGiST community, and see how they can help bridge the different specialist groups like SIGiST with the BCS Student Chapters as an example.

In this issue, following the apprentice event that took place in November, I have interviewed 2 different apprentices who give fantastic insights into how they have developed their careers as testers. In 2021, I shall continue interviewing more amazing software testing professionals, who I continue to be inspired by and learn from.

Enjoy this edition of the Tester magazine and if you have any ideas for article suggestions or submissions, event ideas, software testing questions you would like answering, books you have written and like to be reviewed, please contact one of the SIGiST committee members or myself.

I would like to wish you and your families the best for December, and all the best for 2021!



## “AI and Testing” webinar – Responses to Questions asked to the panel

In September 2020, the webinar “AI and Testing”, which was the first of a planned series of events exploring AI and how it can be used when testing, was delivered. Following the webinar, SIGiST asked the speakers who were on the panel for the webinar, some questions the attendees of the webinar were interested in finding more about.

Here are the answers provided by Dr. Jeremias Rößler following the webinar:

### **Is AI more appropriate to supplement testing of formal language code?**

AI can help in various areas to supplement testing. I assume this questions targets testing on the code level (i.e. unit testing). It appears that test generation on that level is much more challenging than on the UI level for a variety of reasons: parameters can be complex (i.e. a database connection), exceptions may be ok (i.e. NPE if you pass null) and the result is harder to verify.

### **What good analogs are there to help with training AI for testing?**

With the system I presented, essentially you need to show the AI what you would need to show a human that is new to the job: how the software works in unexpected, unintuitive or non-obvious ways. This can be a hard-to-follow use case or unknown username and password.

### **Can you recommend papers on testing with AI?**

Unfortunately, I didn't keep up-to-date with academic development, so I cannot recommend something sensible.



## Should the public care about software testing?

BCS SIGIST, and the international Association for Software Testing held a collaborative event on the 22<sup>nd</sup> of November 2020. We found that our aims overlap in several areas, notably in promoting the value of testing to the wider public. running a LAWST-style workshop, online rather than in person because of COVID-19.

This workshop considered the question:

### Should the public care about software testing?

This article was initially published by James Thomas, which can be read at the following link: <https://qahiccupps.blogspot.com/2020/11/who-cares.html>

Should the public care about software testing? That's the question that the [Association for Software Testing](#) and the [BCS Software Testing Specialist Group](#) asked at our first joint [peer conference](#) on 22nd November 2020. The remit was:

*It's our contention that most people don't think very much about software development and software testing, despite software being deeply embedded in almost all aspects of our lives.*

*When there's a publicised issue such as a national bank failing to process customer orders for several days, a government IT project overrunning for years and then being canned, or a self-driving car causing a fatal accident, then society might take notice for a while.*

*However, even when that happens it's rare for the complexities and risks associated with the creation, integration, and maintenance of software systems to be front and centre in the discussion, and testing almost never makes it to the agenda at all.*

*In this workshop we aim to explore why that is, and what testers, testing organisations, software development companies, and governments could do to persuade the public that software testing is worth understanding and caring about.*

As with so many events in these troubled times, we shifted an in-person experience online and were concerned that the buzz that comes from being in the same room as other people who are both knowledgeable and care deeply about the topic would be lost.

I'll blog about the way we set it up later, but I'm pleased to report that the buzz was still there. I'll also blog about the breadth and depth of the conversations we had around the presentations but here I'm just going to summarise what the speakers said.

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We kicked things off with [Fiona Charles](#) using [Qantas flight QF72](#) as an example of how well-intentioned automation, complexity, and fail-safe mechanisms can result in at best unwanted behaviour and, at worst, disastrous outcomes. In that incident, faulty sensors caused on-board systems to misinterpret the plane's attitude as dangerous and take unnecessary action to correct it. [Flight envelope](#) constraints prevented the pilot from overriding the manoeuvre, leaving him a helpless spectator as passengers were tossed violently around the cabin.

Fiona posed the question "what level of control should we keep for ourselves?" and suggested that we have to build products that keep people at the centre of operations, facilitating and enhancing skilled human decision-making and enabling the human operator to work in whatever way is best for them, not fight against a system built for its own convenience.

Many modern systems (particularly those labelled AI) rely heavily on data, but data is not knowledge, and it comes with biases. As an industry and a society we are increasingly recognising this, but we tend not to recognise that the way the data is collected is biased, the architecture of the systems is biased, the models underlying the design are biased, the decision processes are biased, and, in fact, anything humans create is likely biased in some way.

To help ourselves to see that bias and counteract it, Fiona said, we need to take seriously such questions as what could possibly go wrong, what possible outcomes there could be, and how does our product solve well-known concerns such as security or accessibility? Oh yes, and we should look to tune our bullshit detectors.

Harmful outcomes also concern [Amit Wertheimer](#). In his presentation he took the position that software testing as an activity in its own right is just one way to help to create working products that do no harm. He described a separate team of testers distinct from developers as a crutch, providing a way for the builders of a product to disengage from the need for checking their work.

For Amit, in general, developers should be reviewing what they create and should be ready to "feel the pain" of it being found wanting by its users. That's not to say that the critical thinking skills that we testers like to claim have no value, but rather that other people, directly involved in development, can provide them too. He makes an exception for highly-specialised fields where domain knowledge may be instrumental in understanding the desired and observed behaviour of a product.

The public should not care about these details, though, he says. The public should care whether their product works and does no damage, not whether testers were involved in its production, or how.

[Huib Schoots](#) offered this perspective too, and also the opposite: the public should not care about software testing because that's the responsibility of the producers, yet the public should care about software testing because they need to be able to trust products, particularly in safety-critical situations.

He asked us to consider what happens when there's some kind of significant software failure. People tweet about it for a while, it blows up in the news perhaps, and then we all forget about it. Where is the forum in which the public can ask questions and request improvements? How can regulation and the law evolve with rapidly-changing technology?

He called for efforts to make an environment in which the public and software producers can get together to discuss how people's needs and concerns can be met, but then also warned about the risks of these being overrun by fringe views and conspiracy theories and noise.

[Eric Proegler](#) had no qualms about coming down on one side of the question: the public must care about software testing because of the increasing dependency of our lives and lifestyles on software.

Testers also have something to think about, he says. With current technology, it's easier than ever to create an "AI solution" and push it out to innumerable devices at a terrifying pace with huge numbers of poorly-understood and dynamic dependencies.

Software testing is under siege, in Eric's view. One way forward is to find ways to incentivise better testing. Weak testing is motivated by short-termism, by getting to market, and by meeting quarterly targets. The business need trumps the societal need most times and Eric challenged us to wonder how we can change that.

The BCS are trying to change that, [Adam Leon Smith](#) claims, by engaging with government, the media, the public, and industry to highlight failures in IT and understand how they can be reduced both in frequency and impact. "We shouldn't hinder innovation" shouldn't be a popular opinion, in his opinion.

Regulation and certification is one avenue that can be explored. While this might seem like an anathema to some, Adam noted that software testing in some parts of some industries is already regulated, and cited the [UK gaming machine testing strategy regulation](#) as an example.

Acknowledging that testing is context-dependent, Adam speculated that there is scope for wider regulation of this kind. He would begin with high-risk scenarios where context could be restricted sufficiently that a non-generic standard for testing could plausibly be created. The high-level results of this kind of work could be communicated to consumers using a simple labelling scheme, similar to that used on food packaging to summarise the "healthiness" of the contents.

Take a step back, [Janet Gregory](#) urged us. We need to think about risks while producing our products and then find a way to communicate the risks to our users. A labelling scheme of the kind Adam suggested could certainly help, but Janet would like to see something like industry-wide checklists for things to consider on purchase, similar to the paperwork packaged with medicines that list potential side-effects.

She also asked for much tighter controls on the way in which products are advertised and cited self-driving cars as an example. For those kinds of products, adverts might claim "this model is an industry standard for safety" but consumers need to be aware that this doesn't mean getting in, pressing the *take-me-to-mother's-house* button and then going to sleep.

It's not enough to simply make this information available, of course. It needs to be made available in format that consumers can and, crucially, want to engage with. Techniques such as visualisations and analogy could be employed here. Bodies like AST and BCS can definitely be part of a dialogue around that.

[Lalit Bhamare](#) rounded things off for us with a call to action for consumers themselves. He talked about clean software — parallel to clean air — and said that unless consumers demand it, producers are unlikely to sacrifice convenience and profit to provide it.

What is clean software? Features that Lalit mentioned included reliability, quality, customer service, and a strong consideration of a product's impact on the world and not just the bottom line. Companies today largely take the public's acceptance of low-quality software for granted.

Testing is a crucial part of Lalit's idea. The public should care about software testing because testing helps them to have confidence that the software is clean, and if there's a public conversation about testing then manufacturers will be forced to pay attention to it.

*The material created at the conference is jointly owned by the participants: Lalitkumar Bhamare, Fiona Charles, Janet Gregory, Paul Holland, Nicola Martin, Eric Proegler, Huib Schoots, Adam Leon Smith, James Thomas, and Amit Wertheimer.*



## Conference Agenda

BCS SIGiST –  
January 2021 Conference – Tuesday 12<sup>th</sup> January 2021

This event will be online, due to the public health situation. Bookings can be made at the following link: <https://www.eventbrite.co.uk/e/using-artificial-intelligence-tickets-129314114999>

### *Using Artificial Intelligence*

Time	Session
18:00	Start
18:00	<b>Welcome – Adam Leon Smith, Chair, SIGiST</b>
18:00	<b>Introductions</b>
18:05	<p style="text-align: center;"><b>Productionising ML</b></p> <p style="text-align: center;">Dr. Larissa Suzuki, Hon. Associate Professor of University College London</p>
18:35	<p style="text-align: center;"><b>Live demo of using AI to support testing processes</b></p> <p style="text-align: center;">Adam Leon Smith, CTO at Dragonfly</p>
19:05	<p style="text-align: center;"><b>Wrap up</b></p> <p style="text-align: center;">Adam Leon Smith, Chair, SIGiST</p>
19:05	<b>End</b>

The SIGiST committee reserve the right to amend the programme if circumstances deem it necessary.

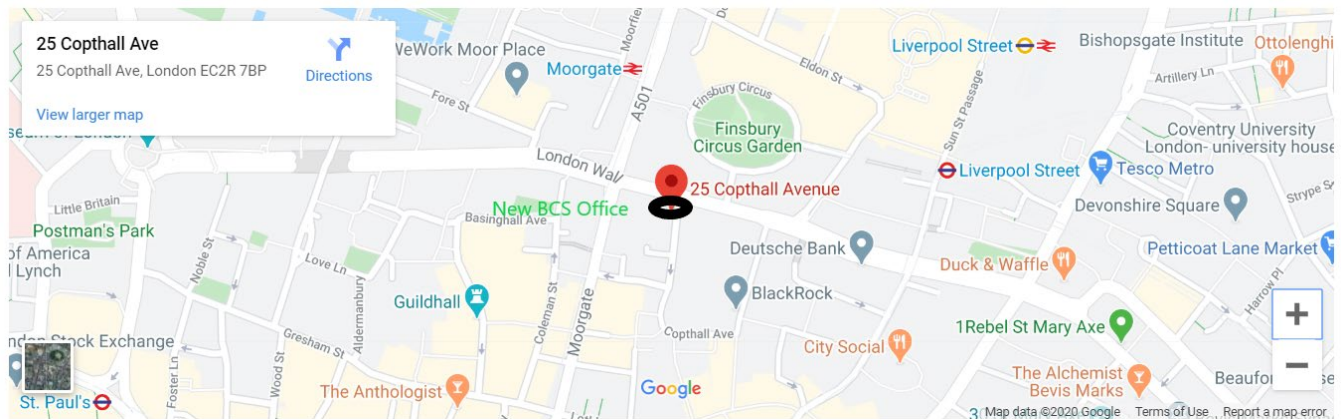
### COVID-19

Due to the current COVID-19 situation we are responding by looking to make our events online for the foreseeable future, the benefits include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community.

# BCS London Venue

When the pandemic is controlled/over, some events will be held at the new BCS London office.  
The location is below.

## London Office Guide



## Address

BCS, The Chartered Institute for IT  
Ground Floor  
25 Copthall Avenue  
London  
EC2R 7BP

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## Online events

We are responding by looking to make our events online for the foreseeable future, as a result of the coronavirus pandemic. The benefits of which include: a wider range of speakers, the events being non-London centric, more accessible and will increase inclusion in the testing community. It will also provide new and upcoming speakers with the opportunity to deliver a talk, some of which may not have the opportunity to do so. If you are interested in delivering a talk/ workshop/ etc online, simply contact one of the committee members or email the Editor at [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)





# Presentation Abstracts and Speaker Biographies

## Keynote One

***Dr. Larissa Suzuki, Hon. Associate Professor of University College London***

### Productionising ML



From writing your ML to serving reliable ML apps to customers there are many steps and hurdles to overcome. This talk will cover Open Source technologies and the steps in the journey of building, managing and deploying portable, scalable machine learning (ML) workflows based on Docker containers on K8S. The talk will cover what machine learning is.

*I am an award-winning, passionate computer scientist, inventor and Chartered Engineer. My career includes 16 years working in many fields of engineering, including: AI & Machine Learning, smart cities, data infrastructures, emerging technologies (AR, IoT, IIoT), ethics in many areas of computer science, business models, computing applied to medicine (cancer diagnosis and digital imaging processing), digital product design and management.*

*I hold a Ph.D. in Computer Science from UCL in a joint program with Imperial College London and the Massachusetts Institute of Technology. My continuing academic work is based at UCL where I serve as an Honorary Associate Professor in Computer Science. I am a Data/AI Practice Lead at Google. I was formerly a Director at Oracle, a Senior Program Manager for the Mayor of London leading on Data for London and technologies for London Infrastructure, Head of Data Science for Founders4Schools, and a Teaching Assistant in academic programs of UCL and Lancaster University, and a Visiting Lecturer at the University of Parana (MBA) and University Barao de Maua.*

*At the age of 21 I founded my first business (software house), and at age of 23 I became a University Lecturer teaching in BSc in Computer Science and in MBA programs.*

*I've received numerous awards, grants and recognitions from MIT, Intel, Google, IBM, ACM, Heidelberg Laureate Forum Foundation, Microsoft Research, Siemens, EPSRC, McKinsey & Co, among many others for my contributions to industry and international science. I am an Ambassador for the Queen Elizabeth Prize for Engineering, The Anita Borg Institute for Women and Technology, The IET, and Acer+ Google Chromebook.*

*I've published several research papers, academic journals, books and conferences, am a frequent Keynote, conference and panel speaker (including TEDx). I am a judge and reviewer of the ACM Global Research Competition, am a reviewer of grants for the Royal Academy of Engineering, IET Innovation Awards, Talent 2030 National Engineering Competition. I am a journal reviewer for IEEE and Springer, and the chair of the Tech London Advocates Smart Cities.*

*Since 2006 I've been actively working towards increasing the representation of women in CS and Engineering (e.g IET, UCL, ABI).*



## Keynote Two

# Adam Leon Smith, CTO at Dragonfly

Live demo of using AI to support testing processes



Adam will discuss and give a live demo of approaches to using AI to support testing processes.

*Adam Leon Smith is Chief Technology Officer of Dragonfly, a European consultancy, training and products firm that specialises in the intersection of AI and quality. Adam also runs regular training courses in testing, test automation and testing issues related to AI systems.*

*In addition, he is the current Chair of the British Computer Society's Special Interest Group in Software Testing, the biggest UK non-profit testing group.*

*In his past, Adam has held senior roles at multinational financial services institutions, as well as ambitious startups, focussed on applying verification and validation techniques to complex systems and emerging technologies.*

*He is very active in ISO/IECs Artificial Intelligence standardisation community, where he leads the ISO/IEC projects developing a technical report on AI bias, and a standard for extending systems quality models to cover AI. He is also a contributor to the IEEE's Ethically Aligned Design standardisation initiative.*

*Adam is a Fellow of the British Computer Society, and ForHumanity, an independent oversight body auditing the use of AI and contact tracing technology. He is a regular speaker at conferences and a resident podcaster for the Ministry of Testing.*



# Mentoring in Software Testing

## Adventures & Inspiration – Call for stories

During his career as a tech professional, even before he decided to become a tester, the Editor, Andy Shaw, has been inspired by different professionals who have developed his career by mentoring him, and giving him guidance, advice and encouragement, helping him to develop his problem solving and analytical skills, become a better public speaker and providing him the opportunities to undertake a variety of tasks and activities, some of which he may not have had the opportunity to do otherwise.

Back in 2016, Andy participated in a mentoring scheme, ran by SIGiST, where he was mentored by a fantastic tester and international public speaker Dot Graham, and delivered a short talk about his experiences in automated testing at a National SIGiST Conference in London, in December 2016. He wrote an article about his experiences, which can be found in the March 2017 edition of the Tester (Issue 60), at page 13, which can be read at the following link: <https://www.bcs.org/media/2743/tester-2017.pdf>.

SIGiST is not just interested in mentoring stories about public speaking in software testing, they are interested in hearing stories about how mentoring has developed your career in software testing for example, how you have developed your skills in a specific area like automated testing, manual testing, learning a coding language to help you develop as a tester, as well as finding a role in software testing transitioning from another profession and lessons you have learned during your journey.

As well as being mentored, and currently continuing to be mentored by different professionals who have added an extra dimension to my life, Andy has mentored different professionals in software testing, from those who have been studying at university and looking for their first role, to those who are new to software testing and looking to gain experience. Everyone who he has mentored so far during his career, have also inspired him to further develop his skills as a software tester.

The mentoring stories will coincide with an update to the BCS Mentoring Tool which will be deployed in January 2021. Andy Shaw has also been one of the testers who has been testing the tool and will also write about the experiences with testing it.

If anyone has an interesting story about how mentoring in software testing has helped develop their career, as well as any mentors who have also develop themselves as a result of mentoring others, please contact the Editor at [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org).



## “What does testing mean today” webinar – Perspectives after the webinar

A really interesting and thought provoking webinar titled “What does testing mean today?” which took place on the 20<sup>th</sup> of October, provided good insights into how testing has changed over the years and what testing means for testing professionals today. There is a video of this webinar, for anyone interested, which can be viewed at the following link:

<https://www.youtube.com/watch?v=qoWQ1C1ry5s>

Following the event, SIGiST were interested in hearing different views from the panellists from the webinar, about what testing means to them today. Here are the thoughts of some of the panel members on the “What does testing mean today?” webinar, of what testing means to them:

### **Maaret Pyhäjärvi (Principal Test Engineer in Vaisala), Finland**

“Testing today means more than getting lucky on a bad system just because someone hired a tester to patch some quality in. In fact, that approach never worked, and we’ve learned to build quality in with iterative and incremental approaches where testing means work shared by various roles. Personally for me it means focus on what is true and how we know it, using experiments in seeing how our software systems and our people systems could operate better. It’s what pays my salary, and it is what gives me joy as I connect with the international testing enthusiast’s community of software professionals.”

### **Paul Gerrard (Founder of Technology Leadership Forum), UK**

Paul has written his thoughts on testing today, in the form of a fantastic poem:

I’ve been asked, “What does testing mean today?”,  
One hundred words that cast a clear insight,  
I will share some ideas, if I may,  
And doing so, possibly shed some light.  
Testing has changed over thirty-odd years,  
But the essence of it is much the same,  
In projects, the task often ends in tears,  
For some testers, perhaps it’s just a game.  
We should split our perspective into two,  
Our thinking is at the heart of the test,  
Logistics help us do what we must do,  
But thinking rules all effort nonetheless.  
Our thoughts as testers defines what we are,  
Be a testing thinker and you’ll go far.

**Ileana Herrera (QA Lead and Scrum Master in JBKnowledge, Inc), Argentina**

“If we think about testing today, its essence has not changed from the past but the mindset towards testing continues to evolve. Nowadays, we see more and more cases of teams moving towards an 'introducing quality in' approach by understanding testing happens all the time and that all parties involved have to collaborate and cooperate for this approach to work. Testing today is about investigation, exploration, creativity, curiosity, showing risks to interested parties, and most importantly communication. By showing results over the years and understanding this approach, people also start to realize how valuable a tester's work is.”

**Alexander Pushkarev (a Senior Software Engineer at Xilinx), UK**

Testing has been around for quite some time. Yet, I think that many people still miss the essential parts of testing, which are the scientific method and reducing uncertainty. We hear many things about "test automation" taking over "manual testing", but that's not what is happening.

Instead, our testing toolset gets bigger and now we can effectively use software to (partially) reduce the uncertainty regarding the other software. With great power goes great responsibility, though. The software we use to test other software brings in its own share of uncertainty!

Testing today is even more complex, inspiring and exciting field than it has ever been before!

As well as the panellists for the “What does testing mean today?”, SIGiST were interested in hearing from testers and recruiters about what testing means to them today. Below are some interesting insights from them:

**Andy Shaw**

“Testing is an industry itself in the software development lifecycle, which is an ever evolving area and allows each tester to develop themselves continually, and define their own career path instead of following a set number of steps for progression. Each tester is unique in their abilities and thinking, seeing and analysing, investigating, exploring a system from a different perspective which needs to be encouraged, as well as asking questions, being curious and collaborating with different parties to understand more, present risks and incorporating quality in the system being tested.

The mindset of a tester continually evolves and develops, however the main principles of “Question everything, explore and learn, and assume nothing!” continually remain in my mind, the fundamentals of a good tester. With testing, there is more than meets the eye!”

**Nicola Martin (Head of Quality at Ardaga Limited, SIGiST Diversity and Inclusion Officer)**

“Today, quality is being taken more seriously than ever. With high-profile projects in the news, companies and projects are now ensuring that testing is again an important part of the process to getting high quality products to customers. What is great now is that the testing landscape is incredibly diverse. People, approaches and tools are allowing us to test faster and more efficiently, to integrate our knowledge with other team disciplines and to enhance our own personal skills so that we can show the value of testing.”

**Mike Harris (Tester at Geckoboard, SIGiST Co-Programme Chair)**

“The oldest book I have on testing was published in 1979. It is “The Art of Software Testing” by Glenford J. Myers, and in it he defines testing as “the process of executing a program with the intent of finding errors”. I found this definition a useful guide when I first started to test software twenty years ago. Today the testing I do is to enable the development teams I work with to release software to production quickly and often. This means that what testing means to me today is helping developers gain confidence to release the code they have written.”

**Gabbi Trotter (Digital Recruiter – Software Testing Team Lead at Searchability)**

“As a Recruiter its very interesting to sit down and think, what does testing mean today? I can only really speak from experience dealing with both my candidates and clients. Thinking about what my clients ask me to look for when hiring a new Tester, I think testing today means being adaptable, inquisitive and able to communicate efficiently. A tester in 2020 needs to be ready to pick up new skills at any time, as the world is moving so quickly. You’re a voice, sometimes the only voice, for Quality within a team/business so you need to be confident speaking up!”

From speaking to different testers and recruiters about what testing means to them, although every person has their own view about testing, there are common beliefs and values which are shared about testing. Although testing has evolved over time and has become more diverse in what it can do, many of the key skills of a testing including thinking and analysing, communicating, presenting the risks to different parties, and exploring what is being tested with an open mind, contribute to becoming a great tester, as well as continuous self-development.

Every tester is unique and their perspective of what testing means to them, as well as non-testers will differ from one individual to the next.



# Using Terminologies and Cracking Software Testing Interviews with ISTQB

Just imagine you are a fresh graduate going to your first software testing interview and they ask you “What is testing?”; there are 2 ways of answering this:

- Testing is checking if the product works properly.
- Testing is the process of **verifying** that the product works in the manner the user expects it to work.

Which one sounds better? Definitely the latter, as it holds the right terminologies and is what the company or interviewer wants to hear.

The ISTQB courses not only help individuals in identifying and understanding these terminologies, but also provide the confidence to use it at the right time and place. So, what are the key things you need to know?

- Why do we need testing and when should testing start?
- Confidence in the product and to mitigate risks.

**Mitigating risk** is a vital component for companies, as it helps them gain confidence that if things go wrong, they are aware of it and they have Plan B ready. Explaining that mitigating risk is the result of the testing process can also be of great importance in an interview session.

When can testing be considered as finished?

In an interview if you are asked the above question you could say “Testing can never be considered as finished” – Believe it or not this answer could be a game changer. Further explanation to this would be ‘**exhaustive testing is impossible**’ as all possible combination and scenarios cannot be tested - only all identified scenarios can be tested.

When should testing start?

As soon as the draft copy of the functional requirement document is ready, testers should start reviewing the document as a part of static testing. This helps in finding issues early in the software lifecycle which helps in minimising costs.

All the above questions are a part of the ISTQB foundation course. By doing the course individuals can be made aware of various terminologies that are used in the software industry and will help candidates in getting through the interviews easily.

If you wish to know more on this, please feel free to contact me.

**Sujata Sinha (Freelance Trainer) at Dronahut Limited.**

[Sujata\\_sinha2000@yahoo.com](mailto:Sujata_sinha2000@yahoo.com)

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## “Testing Times – The Voice of the Tester”

Now the Tester has a monthly email, informing both BCS SIGiST members and about events, calls for participation and submission of articles for future issues of the Tester. This email is an addition to the Tester and serves as a purpose to inform BCS SIGiST members of events which may not have been previously mentioned in the Tester, as well as any relevant and interesting information that may be of interest.

This email is called ‘Testing Times – The Voice of the Tester’ and is usually sent towards the last week of the calendar month. This is one of the developments implemented by SIGiST to continue communications with the BCS SIGiST members, the Tester readership and the public in addition to the Tester.

**Please Note** that if you are a BCS SIGiST member, you will automatically receive this email.

If you have any questions, please contact the Editor, Andy Shaw, at: [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)



# Testing Standards – Influencing Practice

Adam Leon Smith, SIGiST Chair

## Abstract

Earlier in the year The Software Testing SG reviewed new parts of the ISO/IEC 29119 standard for software testing. We provided input (through the British Standards Institute) to an upcoming ISO/IEC technical report - Software testing — Part 6: Guidelines for the use of ISO/IEC/IEEE 29119 in Agile projects, as well as Part 11 that explores testing techniques and issues relating to AI.

ISO/IEC is developing a number of other technical reports in development relating to software testing include Testing of Automotive Software, Model-Based Testing, Games Testing, Biometric Systems Testing and Data Migration Testing. We will input into these when they are ready.

Currently, SIGiST members co-ordinated by Jonathon Wright are meeting to review the work on Model-Based Testing and provide feedback to BSI.

Additionally, a new ISO/IEC project has started 25059 - an extension of the popular ISO/IEC 25010 SQuaRE standard for software / system quality models. A working group within this SG has met several times regarding this, and is expecting to provide feedback in the new year.

If you would like to join get involved, please email the Chair ([adam@wearedragonfly.com](mailto:adam@wearedragonfly.com))

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## Write an article

We are always on the lookout for new content, so if you have a testing story you would like to share, a book you have written and planning to publish, a test technique you would like to evangelise or testing research you would like to publish, then The Tester is the place to do it. Simply email the Editor on [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)



# Students/ Apprentices

As part of the recently revived SIGiST community, we would be very interested in hearing from university students and apprentices who are interested in software testing, from manual testing, to automation and penetration testing. Do you have an interesting story about how you are developing a career in the Tech Industry and software testing, do you have an article you have written which you would like to see published, do you have a question about software testing which you would like the SIGiST community to answer, then the Tester would be a great place to have this published and get your work recognised.

BCS Student Chapters are also welcome to publicise events that have taken place, or will be taking place in the future. Early Careers professionals, including professionals involved with the Early Careers Initiative run by the BCS, are also encouraged to submit articles, and get involved with the SIGiST community. Maybe you have had a penetration testing workshop, a university hackathon which has taken place, or are planning one.

Publication in a professional magazine like the Tester is great for your LinkedIn profile and adds to your CV and will help you during your career and at university, or on your apprenticeship and beyond.

Please email your articles, questions and ideas to the following email: [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org)



# Start-ups / Entrepreneurs, we want to hear from you!

As part of the recently revived SIGiST community, we would be very interested in hearing from start-up companies and entrepreneurs about anything testing related. If you have an approach you would like to mention, if you would like to speak at a future SIGiST event around the UK (including via a webinar), or publish an article in a future edition of the Tester, then the Tester is the place to publish your article, as well as to mention your talk/ event.

Please contact either one of the committee members on the SIGiST committee, or email [andrew.shaw@bcs.org](mailto:andrew.shaw@bcs.org) if you are interested in speaking at a future event, or writing an article for the Tester.

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# Apprentices & Career Transitions: Insightful Interviews

Apprenticeships are an interesting route into developing a career in the IT Industry as well as software testing, and the value they can bring to an organisation, as well as a professional's career, is high and more awareness of the apprenticeships is beneficial, including post COVID-19 lockdown and an opportunity for young people to consider them especially in this current pandemic. SIGiST ran an apprentice themed event in November 2020, to raise the profile of apprenticeships in organisations and to hiring managers, and to launch the "Testing Apprentice of the Year" award, which will be announced in February 2021 in line with National Apprenticeship Week.

Andy Shaw, the Editor, has interviewed 2 apprentices, who were on a panel on the apprenticeship event about their experiences of undertaking an apprenticeship, as well as advice they would give anyone, who were finishing school, college, etc, about undertaking an apprenticeship.

The 2 interviews on the following 5 pages (pages 25 to 29) are with the following:

- Kieran Marriott, Dragonfly
- Marissa Silver, Games Workshop

Many inspiring testers, have also transitioned from other careers and Andy Shaw has also interviewed two more amazing testers, Chris Forsyth, who transitioned from an online support agent in an online business travel company to becoming a tester, and Tracey Kerr, who transitioned from a retail and customer service career to becoming a tester. Both Tracey and Chris founded the testing community QA Beginners Club, which encourages and supports entry and junior level, testing professionals in their careers by organising interesting and insightful events and working alongside the wider testing community. Chris and Tracey's interview can be found on pages 30 to 34.

Special thanks to both apprentices, and to Chris and Tracey, for some very interesting interviews, and fantastic insights into how they have developed careers in software testing, their aspirations for the future, their insights on how apprenticeships can be developed, and how the BCS can help apprentices and testing professionals in the early stages of their careers.

Andy shall be interviewing more testers about how they have developed their careers in software testing in the following editions of the Tester, so watch this space!

## Kieran Marriott: Dragonfly

### **What encouraged you to develop a career in Software Testing?**

I really wanted to get my foot into the software development industry and software testing was just a natural fit. The work itself is appealing to me as it frequently involves learning new technical skills and is analytical in nature. There are also many areas to specialise into so there's always room for growth.

### **How long have you been on an apprenticeship and what do you feel, are the main skills you have learned as a software tester?**

I've been on the apprenticeship for just over a year and I am very close to completion. The main skill that stands out to me is all the test automation experience I have learned whilst on my apprenticeship. I started with minimal experience in programming but over the course of creating and maintaining several frameworks I have gained confidence in JavaScript, Java and Python. I've also learned all the essentials such as raising detailed bug tickets, creating test scripts and scheduling test execution.

### **Has anyone inspired you so far in your career? And if so who?**

Our CTO for Dragonfly, Adam, his ability to deploy and utilise new technologies such as AI and deep learning inspires me to learn more and to always stay on the cutting edge. As well as our CEO Dan and my apprenticeship lead Klevis, they inspire me with their vision and drive to build quality solutions.

### **After you have completed your apprenticeship, what plans do you have to develop your career?**

I hope to gain experience in security and performance testing as this would give me greater coverage in the software testing space. I want to keep working towards new testing qualifications so I can start building a portfolio and can keep myself up to date with the latest testing tools and techniques.

### **Do you have any ideas, on how apprenticeships can be developed, to encourage more school/college/university leavers to consider undertaking an apprenticeship?**

I think if potential career paths were shown alongside the content of the apprenticeship it would encourage a lot more people to choose an apprenticeship. I think a lot of prospective students look at the starting salary of graduate schemes and make their decision based on that. If they were shown their prospective career paths and potential salary, I think a lot more people would find an apprenticeship to be more suitable. I've found the content and experience of my apprenticeship to be spot on, but an improvement I would suggest is to communicate how the apprenticeship has changed. It was mentioned in the webinar that candidates now have the possibility for failure, this gives legitimacy to the award and can help quell previous assumptions about apprenticeships being too easy and not providing the relevant skills.

**You participated as a panellist on the ‘Testing Apprentice’ webinar, run by the Specialist Interest Group in Software Testing BCS group, that took place on the 3<sup>rd</sup> of November, how did you find the webinar and which messages would you like to mention to professionals who may be considering hiring more apprentices in the future?**

I found the webinar very insightful into how the apprenticeship program has changed since it's inception. I think the point to emphasise from the webinar is that there's plenty of quality prospective apprentices, they just need the environment to learn and develop their skills.

**Would you know how the BCS could help encourage apprentices during the early stages of their careers?**

I think if the BCS could recommend qualifications to pursue it would show apprentices potential career paths. I also think it would encourage apprentices to investigate a wider variety of roles in the technology industry.

**An Early Careers group has been recently established in the BCS, supporting professionals within the early stages of their careers. How would you like to see the Early Careers group support apprentices within the early stages of their career?**

In the current climate of the world, I think a support group would be massively beneficial, as I feel it's harder than ever to ensure apprentices are getting the support they need from the workplace and from apprenticeship providers. Having another avenue of communication open with other apprentices and with BCS would give apprentices the confidence that they are making good progress.

**What advice would you have for anyone who is considering undertaking an apprenticeship when they leave school/college?**

Have confidence in yourself and your own abilities and ask lots of questions. It can be daunting at first, but no one is expecting you to know everything on day one. If you are open minded and prepared to learn, nothing is stopping you from succeeding.

**Outside of software testing are there any interests you have? And do you have any goals you are pursuing?**

I'm currently working on a Python course as well as learning more about the Linux desktop. When I'm away from my computer, I like to watch lots of films, and I am currently missing visiting the cinema.

*Kieran Marriot is a software testing apprentice at Dragonfly. He has focused on test automation, creating frameworks using Java and Javascript. Kieran is a self-starter, learning about Python and Linux, as well as interested in gaining experience in other areas of testing, like security and performance testing, and an example of how an apprentice can develop their career and why apprentices can be an asset to any organisation.*



## Marissa Silver: Games Workshop

### **What encouraged you to develop a career in Software Testing? And how long have you been a software tester?**

I didn't really know about Software Testing until I applied for the job. I was working within the same team on a fixed term contract that was coming to an end when the Software Testing manager told me about Software Testing Apprentice role becoming available. It sounded really interesting; I've always been interested in development and kept trying to learn to code but never quite got anywhere with it. Software Testing seemed like a way I could be involved and develop my technical skills but it also seemed like a job I could be curious in, asking questions, and helping customers get the best experience when using our websites. All of the things I thought I would enjoy. Almost 3 years later and I still really love it and am able to do all of the things I thought I would be able to do and more.

### **How long had you been on an apprenticeship and what do you feel, are the main skills you have learned as a software tester?**

I was on the apprenticeship for roughly 2 years. My apprenticeship gave me the opportunity to learn a wide range of technical skills around Software Testing and the underlying techniques you need to use a Tester but it also focused a lot on the 'soft skills' that are used on a daily basis when working on a project. The 'competencies' I needed to show in the apprenticeship really required me to reflect on my activities and behaviours in order to evidence that I had met them. By doing this, I've learned the importance of reflection and how much you can learn from it. I find it really challenging sometimes but I think in Software Testing it's really important to look back at what you did, what went well and what didn't in order to improve quality the next time around.

### **Has anyone inspired you so far in your career? And if so who?**

I think the testing community as a whole has really inspired me. I found a career that seemed a lot more than a 9-5 job that is left in the office, but it's actually full of people who *really* love what they do and are very passionate about it. I have really valued having the Software Testing community out there, they have helped me learn a lot and at times it has a lovely family feel to it. This is something I never thought I would find in a job or realise I wanted but it really has suited me. The content, resources, experience, and effort put in from the Testing community have been constantly inspiring especially when I was struggling with parts of my apprenticeship there were always people to go to for help.

### **Now you have gained a Distinction in your Level 4 Software Testing Apprenticeship, what plans do you have to develop your career as a software tester after completing it?**

I still have a lot to learn in Software Testing – there is always more! The apprenticeship helped me direct my learning to understand and practice the activities involved in Software Testing and develop the core skills I needed but I feel there are a lot of areas I can gain more experience in and develop.

For my apprenticeship I touched on performance and security testing but I don't have much opportunity to focus on these areas in my day to day role. I'm really intrigued by security testing so that's something I'm planning to spend some time learning about further.



I'm also really interested in the Modern Testing Principles and being more involved in the other processes in the Software Development Lifecycle in order to help build in quality from the outset.

**Do you have any ideas, on how apprenticeships can be developed, to encourage more school/college/university leavers to consider undertaking an apprenticeship?**

Apprenticeships aren't discussed as a viable career or further education option to everyone – at least they weren't to me at 16 and 18. I think if you do reasonably well in school they are given a passing mention but you are encouraged to go to university. There used to be quite a stigma around any kind of vocational education, this is starting to change but there still needs to be more done. By showing that apprenticeships are available for a wide range of careers in many different areas and the progression and experience this can lead to, I think that would really help. People often get stuck in a rut of not being able to get a job through not having experience, but not able to get experience because they can't get the job. Apprenticeships should hopefully be able to solve this if it is more open to different career types.

I think the salary of some apprenticeships can be really off putting. I wouldn't have been able to do this with the standard apprenticeship salary, it's impossibly low for most people who have any financial responsibility or commitments. I think if they were all at least minimum wage – especially as the apprentice is still working and is an active and productive member of a team – or if at least there was funding similar to university students then many more people would feel encouraged and able to undertake one.

**You participated as a panellist on the 'Testing Apprentice' webinar, run by the Specialist Interest Group in Software Testing BCS group, that took place on the 3<sup>rd</sup> of November, how did you find the webinar and which messages would you like to mention to professionals who may be considering hiring more apprentices in the future?**

I really enjoyed taking part in the webinar. It was the first time I'd ever done anything like that and it wasn't nearly as daunting as I thought it would be!

I would really encourage people to look at hiring apprentices from a wide range of backgrounds, it's a great way to get diverse ideas and opinions into a team as often teams can be made up of people with similar backgrounds and levels of experience. I would also stress that it does require work from both the apprentice and employer but I think it's worth it. An apprentice can't always hit the ground running on a project and needs some guidance and support or mentoring in the role to be the best they can be. However, an apprentice is encouraged to be learning throughout the duration of their apprenticeship and they can bring these fresh ideas and knowledge into a team which can be really invaluable.

**Would you know how the BCS could help encourage apprentices during the early stages of their careers?**

For me, the main thing would to be more vocal about what the BCS can offer. Unfortunately, I didn't really understand what the BCS offering was when undertaking my apprenticeship and I am still trying to find out how I can access what I'm sure are really useful resources.

Running events and providing support specifically for those completing apprenticeships and being clear on ways an apprentice can get the most out of their experience would have been really useful to me.

**An Early Careers group has been recently established in the BCS, supporting professionals within the early stages of their careers. How would you like to see the Early Careers group support apprentices within the early stages of their career?**

As I said previously, I think the main thing is to be really vocal that this group is out there and get the message out to all apprentices and work places with apprentices. I would love to see some sort of 'Early Careers' networking and any articles, webinars etc. of how people can succeed in their apprenticeships and going forward. Some of the apprenticeship can be really tough, and to have a group of people you can connect with or get support from who are, or have been, in the same boat can be really invaluable.

**What advice would you have for anyone who is considering undertaking an apprenticeship when they leave school/college?**

Don't be scared. There's a lot of pressure to go to university but it isn't the right choice for everyone. It took me a while to realise that it wasn't right for me and I would really encourage everyone to weigh all of their options. An apprenticeship can be a great career building experience if it's the right experience for you.

**Outside of software testing are there any interests you have? And do you have any goals you are pursuing?**

I really enjoy finding new creative hobbies and finishing my apprenticeship has given me some more time to do them. I've recently bought a 3D printer so I'm enjoying exploring how it works and looking forward to making some interesting things!

*Marissa Silver is a software tester at Games Workshop, gaining a distinction for completing her Level 4 Software Testing Apprenticeship. Marissa is involved with the software testing community, which values creativity, curiosity and self-development, all qualities she demonstrates daily, as well as continually developing herself as a tester. She is also interested in furthering her knowledge of security testing, as well as developing quality and Modern Testing Principles into the Software Development LifeCycle. Her story serves as an inspiration for others who are interested in, or considering a career in software testing, and how apprentices can benefit an organisation.*



## Chris Forsyth: Music Magpie

### **What has inspired/ encouraged you to develop a career as a tester?**

The inspiration came from working as an online support agent for a business travel company. It was my job to handle calls from clients who were having 'technical' issues such as logging on, using the travel portal/booking system, functional issues with our website and investigating those issue. It was this element of the job I really enjoyed, and I wanted to follow on with and pursue. Unfortunately, the job role I was in would not allow me to progress any further. So, I took the leap and the opportunity of the foundation QA role and there is not a day I do not regret that discussion.

### **How has your career as a tester developed so far, since changing from a different role?**

It has massively changed or more happily say improved since I first started as a tester. I have learnt so much in the past near 4 years such as what the Agile Methodology is (where it all started), the different types of testing (functional and non-functional), started writing automated tests (from simple Selenium IDE point and click moving up to Cypress and now looking into Selenium Webdriver with Appium running with Browser Stack for native apps) and helping the Agile QA best practices within the teams.

### **As a tester, what has been the highlight of your career so far?**

Highlight so far is getting a decent automated suite up and running through our different environments. These are basic smoke/user journey tests so when a deployment is done, they can be run to check that the main functional user journey is not broken and help support testing.

### **Has anyone inspired you so far in your career? And if so who?**

Must be Ken Fulton without question. He helped to guide me from what I was already doing as an online support agent through to becoming a foundation QA. He provided me with useful documentation on testing types, what they are used for, Agile Methodology and support throughout the years.

### **What advice would you give someone, who is considering a career as a tester from a different role?**

I would advise to think what skills they already have, how they could be applied and expanded to becoming a tester. We probably already have the necessary skills without releasing it through work we already do or have done. Best suggestion is to join groups such as QABC (QA Beginners Clubs), Ministry of Testing and other tester groups to gain access to the amazing community to ask questions, seek support and guidance. This can help them decide if testing is right for them or potential a path to another career in and around that area (such a Business Analyst, Product Owner/Manager, Developer etc). They're companies such as Code ComputerLove that offer 'taster days' where they can come and sit in with testers (and other disciplines) to see what 'the day in the life of' is like.

**Youself and Tracey has started the QA Beginners Club in September 2019, how has the group developed since you both started?**

It has massively expanded since we first stated back in September 2019. We're close now to 200 members on Meet Up, 150 Followers on Twitter, recently created a Slack chat group (where people can ask for support, guidance, job opportunities, upcoming events and much more) and very recently started our YouTube channel (so people who couldn't attended aren't missing out). Hopefully in 2021 we will be able to go back to the offices (wherever that might be) and also have more exciting news/projects for QABC!

**How do you see yourself developing even further as a tester? And what plans do you have for further developing yourself?**

That is a good question as there are so many routes a QA/Test can go! Playing with different test automation tools has been quite fun (even if challenging at times to get my head around), then the BA (Business Analyst) part seems to come naturally to me (which I've been told I'm very good at) and continuing the QA Agile I consider myself working closely with PM/PO and Developers in writing tickets (user stories, acceptance criteria, scenarios, test cases/criteria). Maybe ask me again in 2021 and I will have a more defined answer for you (I'll classing 2020 as a write off unfortunately).

**What ideas do you feel, the testing community could undertake to develop diversity and inclusion in testing?**

That is quite a difficult one for me to answer, the reason being is I can say I have been fortunate enough to work in QA/Test teams that have been diverse at Code ComputerLove and musicMagpie. I am very happy to say the diversity we have in QA Beginners Club (or I believe) is amazing! We have people from all forms of backgrounds, across the world and it is an absolute honour to be part of that!

**Outside of software testing are there any interests you have? And do you have any goals you are pursuing?**

A Playstation 5 before the end of the year would be a great goal if I can get hold of one! However, I'm focused on my fitness (currently going through all the cycles of the Insanity workouts), revisiting my passion for playing the keyboard (and maybe rebuilding my studio) and continuing to upskilling myself at a bit C# coding (gave that a go during my redundancy period and quite enjoyed it).

*Chris Forsyth is a Quality Assurance Analyst at Music Magpie. He transitioned into a testing career, from an online support analyst at a business travel company and has not looked back. He is a co-founder of the community QA Beginners Club, a community helping and supporting entry level and junior level testers develop as software testers. Chris is also involved with the Ministry of Testing Manchester, being on the committee for the Ministry of Testing Manchester, and has helped inspire professionals to develop careers in software testing.*

## Tracey Kerr: OpenMoney

### **What has inspired/ encouraged you to develop a career as a tester?**

As someone who came from retail and customer services I was going nowhere with my career, 'dead man's boots' as they call it, until someone moves on to another position or leaves the company, there are no prospects for in-line promotion. My partner had been a software tester for around a year and suggested I attend QA/Test events and research roles that might suit my skill set that could be transferable, as he too came from a retail background. He inspired me to pursue a career in testing and to this day we are constantly challenging each other on practices and tools even on our lunchtime walks with the dog!

### **How has your career as a tester developed so far, since changing from a different industry?**

So I had a very quick introduction to QA, I started researching the role in December 2017, with help from the community and my own self-learning, I bagged my first QA job in May 2018. Trial by fire in my first role as not only was I the only QA in the company, I was the first QA in the company and the only woman on the team. So it was a challenge, applying soft skills from previous industries such as communication, planning, and problem-solving skills. I moved into a junior position at the BBC and then again at Code Computerlove. So fair to say I've experienced how these 3 companies on board a junior QA, some more successfully than others! I worked my way up to Professional QA and now aiming my sights towards senior. If you are ambitious, having a good manager and mentor is vital as they can help you develop those vital skills and work your way up the ladder.

### **As a tester, what has been the highlight of your career so far?**

Seeing a project from inception to release, while working at Code Computerlove we worked with a client to provide them with a whole new platform for offering personalised digital gift cards. It involved a lot of planning and investigations on how best to build the product, it was a complete success and we had it launched in time for Christmas 2019 to which we all celebrated after it passed the first £1million revenue mark! As a QA it was essential for me to be involved in every part of the build process, all the way from ideation, design, planning build, test and release. Having the ability to test and ask questions from the beginning made for a very stable and usable product.

### **Has anyone inspired you so far in your career? And if so who?**

My partner really inspired me to make the change in careers, without his support it would have been much more difficult a transition. In the community I've been inspired by the many people who have the confidence to get up and talk about their passion projects within test, whether it's Gem Hill (BBC) discussing Wellbeing in Test or Richard Bradshaw (Ministry of Testing) advocating for automation benefits.

**What advice would you give someone, who is considering a career as a tester from a different profession?**

Best advice I can give would be three fold:

1. Get out there, make yourself known, go to as many events as you can online or in-person (when it's safe to do so). Meet people and listen to their stories and advice.
2. Look at courses and tutorials on QA practices, but take them all with a pinch of salt, every company and every product is different.
3. Don't pay to learn, while many companies ask for ISTQB qualifications you can learn everything on the internet for free. You can even get paid to pick up crowd testing practice through companies like Utest and BugFinders.

**Youself and Chris has started the QA Beginners Club in September 2019, how has the group developed since you both started?**

We both started this as a passion project to give back to the community that was so vital to both of our career successes. It started just a conversation with Chris and I eating pizza in Crazy Pedros, gathering interest for our first meetup where we had around 20 people turn up to a meetup group, social channels, and even our own Slack group where anyone can come to ask questions or learn something new! We now have almost 200 members of our meetup group and we hope to be doing more online and face to face meetups in 2021 and beyond.

**How do you see yourself developing even further as a tester? And what plans do you have for further developing yourself?**

Currently, I work in the financial industry which is giving me a great insight into back-end testing alongside learning more about essential non-functional testing such as accessibility and security. I hope to bring my front end testing skills into this company as well as developing my skills in back end tools such as Postman and Ready API. Over the next year, I intend to develop as an all-round QA, improving my skills in varying areas until I discover my passion project.

**What ideas do you feel, the testing community could undertake to develop diversity and inclusion in testing?**

One major thing I think could be improved on is the visibility of QA as a career, many people in the industry talk about 'falling into testing' whereas someone like myself went to seek it out. I started my QA journey later in life, I was 30 before I started researching it, had I known that this was a potential career path, I would have explored it sooner. Being a child of the 80s / 90s it was discouraged for women to take any form of IT-based classes or even engineering. I know we have come a long way since then but Development is sometimes seen as a 'boys club' where women, trans\* and non-binary people may not feel safe.

What I would like to see from the community is diverse people from the industry going into schools, talking about their journeys to kids making their GCSE or A-level choices to show that this is a career path available to anyone. As a queer person myself, I would have greatly benefited from this, and to show that I was not alone.

**Outside of software testing are there any interests you have? And do you have any goals you are pursuing?**

Something I am passionate about is inclusivity, there are many industries that are geared towards cis straight white men which can cause anyone who differs from this to feel excluded - the tech industry included. My goal is to help people from different backgrounds to enter into the tech industry, whether its testing or otherwise, I believe anyone should be able to get their dream job regardless of their background, age, gender, sexuality, disability and race.

*Tracey Kerr is a Test Analyst at OpenMoney, who transitioned into a testing career, from a retail and customer service career. She is a co-founder of the community QA Beginners Club, a community helping and supporting entry level and junior level testers develop as software testers. Tracey is a self-starter who is continually developing as a tester, and passionate about diversity and inclusivity, and her story also serves as an inspiration that the skills learned and developed can from different industries can be transferred into a testing career, and hard work and anyone can accomplish anything they put their minds to.*





The image displays the BCS Personal Development Plan (PDP) interface across three devices: Desktop/Laptop, Tablet, and Smartphone. The BCS logo is in the top left, with the text 'The Chartered Institute for IT'. The main heading is 'Personal Development Plan' and the sub-heading is 'Your portable record of professional aspirations and activities'. The Desktop/Laptop view shows a dashboard with a navigation menu and a main content area. The Tablet view shows a similar dashboard with a pie chart titled 'Activities Report CPD Activity Type Analysis'. The Smartphone view shows a mobile-optimized version of the dashboard.

## Did you get your Personal Development Plan email with suggested potential CPD activities?

The BCS Personal Development Plan (PDP) uptake is going well, with thousands of registered users already actively recording their CPD Development Goals, Activities and preferences. It's not just about recording details though, as there is a Resources section that shows live feeds of potential CPD activities, and a tailored email is sent every 2 months with details of the latest videos, articles, blogs, books and research in your specified field of interest. If you haven't registered yet, you can see the content from the latest PDP bulletin for topics relating to solution development and implementation by going to the CPD Portal at: <https://pdp.bcs.org/>.

The BCS Personal Development Plan is free to use; BCS members can use their Member Secure Area login and password to access it at <https://pdp.bcs.org/>, and non-members can use most of the facilities (using the same link) and registering to create their own user name and password. You can use it on a PC / laptop or compatible tablet PC or smartphone.