

WMG and HVM Catapult Outreach

2021-2022 Academic Year

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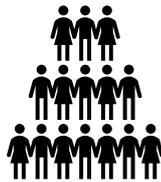
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WMG Outreach Activities in the 2021-2022 Academic Year

At a Glance

The year has been a phenomenally busy one, interacting with 12,000 people over 80 events and 91 different staff members being involved. We have built strong partnerships with Culture Coventry and shared events with them, enjoyed the successes of Warwick Institute of Engagement with celebration events like Resonate Festival, run a Christmas Lecture to an audience of 850 people, and secured funding to run a major project across the faculty. We have also returned to visiting schools in person after lockdown policies have lifted and have reiterated our commitment to widening participation in Higher Education.

12,000



attendees at our events

81



events

142,000



website views

91



different staff members involved

All figures counted between 01/10/2021 and 30/09/2022.

Our plans for the year ahead are equally ambitious, with a new role advertised to join the WMG Outreach team to expand our capacity, funding bids equating to roughly £100,000 submitted, an expansion of the Stitch in Time project into a new county, and many more ideas.

The following pages highlight our outputs from each quarter of the 2021-2022 academic year.

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Overview statistics

2022 Q3 period

Our events this quarter since the last report (counted between 01/07/2022 and 30/09/2022):

Number of events:	23
Events with young people:	13
Training sessions (staff/students/teachers):	10
Total audience:	4,143
In person event attendees:	2,778
Digital event attendees:	1,365
Website views 2022 Q3:	40,480
Staff involvement in 2022 Q3:	47

2021-2022 Academic Year

Our events this academic year (counted between 01/10/2021 and 30/09/2022):

Number of events:	81
Events with young people:	58
Training sessions (staff/students/teachers):	23
Total audience:	12,305
In person event attendees (young people):	5,364
In person event attendees (adults):	2,600
Digital event attendees:	3,046
Resource box users:	1,295
Website views 2021-2022:	142,797
Staff involvement since 2020:	
Staff members involved (at least once):	137
Staff members involved (multiple events):	57
Staff involvement in 2021-2022:	
Unique staff members involved in 2021 Q4:	34
2022 Q1:	23
2022 Q2:	35
2022 Q3:	47
Unique staff members involved in year to date:	91*

*Note that there is overlap in the staff who have been involved in multiple quarters so the year-to-date figure is less than the combined quarterly figures. The data are available in more detail at the end of this document.

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2021-2022 Academic Year Highlights

2021 Q4 Highlight

Event: Warwick Christmas Lecture

Reach: Science-engaged family audience, 850 attendees. Likely local families.

Phil delivered one of Warwick's 6 Christmas lecture slots, with an audience of 850 people. The event was supported by Eden O'Connell, Elias Khimasia, and Beth Haynes on stage, and Kevin Couling with high-speed camera operation before the show.

The event was featured in a [University of Warwick Community blog here](#). The University's Vice Chancellor also sent out thank you emails to all the staff involved in the shows.

The content of the lecture focused on simple mechanisms, engineering, and the value of technical crews to large projects. Selected quotes from the event include:

"It was so good, he talked about things which I thought were magic but he explained how they were engineering. Maybe I can be an engineer when I grow up, then it will be like I can do magic!"

"I brought my father to see the show, he has enjoyed the Christmas Lectures on the BBC for many years, so I thought he would enjoy it. I'm sure he was by far the oldest person in the room, 83 and he got as much enjoyment from the lectures as he did seeing so many young and enthusiastic little scientists in the making. The lecturers were superb, their enthusiasm for their subject shone through and we both had a thoroughly enjoyable evening. Please pass on our congratulation to all involved."



From left to right: Beth Haynes, a volunteer from the audience, Phil Jemmett, and Elias Khimasia on stage at the Warwick Christmas Lecture.

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Other highlights:

- Christmas resource boxes

We produced and sent out 45 Christmas resource boxes to local schools, reaching an estimated 1215 students. There was far more demand for boxes than we could supply, so widening participation schools were prioritised. A WMG news story about the project can be found here:

<https://warwick.ac.uk/fac/sci/wmg/mediacentre/news/newsitem?id=8a1785d87d765031017db366983f4acc&tag=HVM%20Catapult>



Boxes were packed by a group of staff working together with mince pies and festive cheer. The picture shows 22 of the total 45 boxes that were sent out.

- Our Future Moves exhibit closes

The exhibition closed at the end of October 2021. In the final days of the exhibition, WMG Outreach were at the museum delivering workshops for the Stitch In Time project. While there, Rohin Titmarsh, Beth Haynes and Phil Jemmett went down to see the robot arm in operation in the exhibition. While there, a young person visiting the museum was heard to say:

“This is the most futuristic example of a robot I have ever seen.”

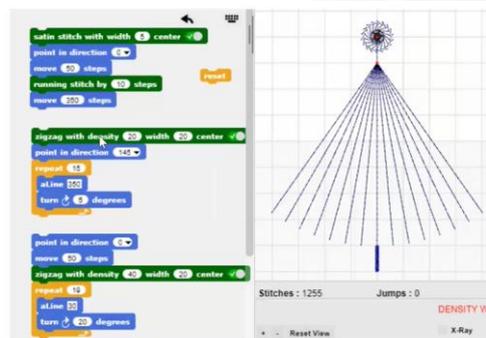
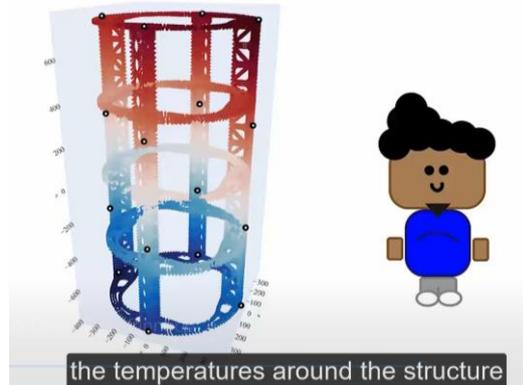
We introduced ourselves as the engineers who built the display and took questions from the student about how they could become an engineer themselves.

- Global Science Show – Warwick Takeover

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Continuing our support and engagement of the Global Science Show, WMG has put forwards 5 videos as part of the Warwick Showcase on December 14th. The videos received over 1500 views in the first week, and also led to an increase in website views on the Turtlestitch resource pages. We have a website of all the WMG videos that have featured on the Global Science Show here:

<https://warwick.ac.uk/fac/sci/wmg/about/outreach/resources/globalscienceshow/>



During the December 2022 Warwick Takeover of the Global Science Show WMG put together videos to show our engineers and research. Top left: Marfil Castillo-Duenas, Laura Downey, Kieran Batchelor and Jack Davis show a life in the day of an engineer, top-right: David Ross-Pinnock talks about metrology and his research, middle-left: Phil talks about the Warwick Christmas Lectures and slow-mo footage of a falling slinky (footage by Kevin Couling), middle-right: Phil interviews Lead Engineer Rohin Titmarsh about robotics and automation in industry, bottom: Margaret shows our Turtlestitch resources and how it can be used to make a Christmas tree pattern.

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2022 Q1 Highlight

Event: British Science Week

Reach: National – events for families in public venues

WMG Outreach were involved with several activities over the 10-day Science Week festivities.

- Slice of Science
- Royal Institution – For Your Inspiration
- Perton Library Science Fair

In total the events in this week reached more than 2000 students and were featured in [a WMG news item which can be found here](#).¹

Slice of Science looks set to become a regular fixture in the University's offerings to families and is organised at a key time of the year in March. The event provided a golden opportunity to introduce new staff to public engagement, as well as a testing ground for new demonstrations and ideas that showcase science and engineering.

The Royal Institution event was prestigious and an exciting place to show our robot arm demonstrators. This allowed us to attract students to the stand and then talk to them about careers in battery manufacture and automation.

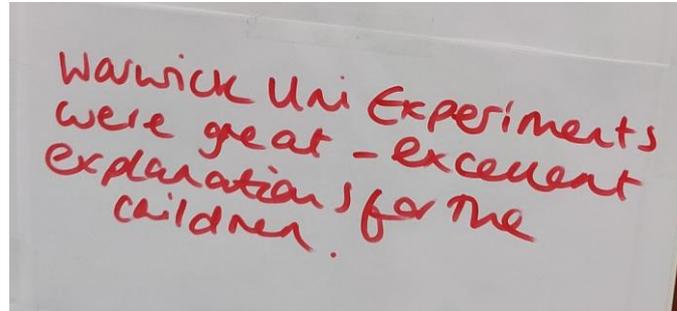


The table set up at the Royal Institution, in their beautiful library. The table had demonstrations of robotic arms, both electronic and a DIY hydraulic version, as well as an activity to understand how engineers 'talk' with robots for automation.

¹<https://warwick.ac.uk/fac/sci/wmg/mediacentre/news/newsitem?id=8a17841b7faca584017fe445a11e169a&tag=STEM>
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EXTERNAL VERSION

Working in partnership with cultural institutions such as libraries and museums has become a key element in our work. Perton Library Science Fair was another opportunity to use small experiments and demonstrations that families could recreate from household items (the kinds of projects detailed online at www.warwick.ac.uk/wmgexperiments).



Feedback from the Perton Science Fair

Other highlights:

- Global Science Show – Science in your Mother Tongue

A special edition of the Global Science Show featured scientists sharing their research stories in a language other than English. Mona Faraji-Niri recorded a video describing how Machine Learning can be used to accelerate the research into future battery materials in Farsi. [The video has been viewed hundreds of times and is available through the @wmgwarwick twitter account here](#). This was a fantastic opportunity to showcase the diversity of researchers in the engineering industry and the outreach team were delighted to be able to support.



Mona Faraji-Niri's Global Science Show – Science in Your Mother Tongue video.

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CATAPULT
High Value Manufacturing

2022 Q2 Highlight

Event: STEM Connections Schools Roadshow

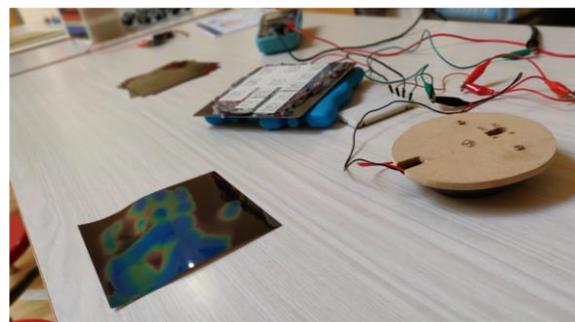
Reach: Local – events in school

Overview: The STEM Connections project has been funded by a Research England bid under the ‘Improving Research Culture’ call. We were awarded *ca* £45,000 and have been able to take 11 staff through the entire process – 9 of whom are WMG staff – from an initial pool of 17 interested staff. The products of this project are demonstrators and ‘props’ that have been used to explain WMG and Catapult research themes (as well as representation from across the faculty).

The props have been used in a school roadshow, reaching *ca* 400 young people, already. They have also been demonstrated to funders from the EPSRC at an event on campus and have been used by staff during filming by a TV company recording a documentary to support their explanation. The range of applications we have discovered already at this early stage clearly shows the potential for this style of working – collaborating with research and teaching staff and using our engagement expertise to make interactive equipment that aids explanation to any audience.

More detail about the STEM Connections project can be found here:

www.warwick.ac.uk/stemconnections



Activities in the schools roadshow phase of STEM Connections. Rohin Titmarsh (top-left), Mona Faraji-Niri (top right) and Antonia Betzou (bottom-left) are shown here. Other academics involved in the schools roadshow (not pictured): Tom Goodman, Magdalena Cieslak, Farah Villa-Lopez, Alex Baker, Tish Mehta, and Fanfu Wu.

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Other highlights:

- Resonate Festival

WMG had a strong presence at the Resonate Festival with a drop-in workshop on Stitch In Time, a talk for a family audience on materials science, and representation of the student projects in the Invention Zone.



Phil about to start his talk 'Harder Better Faster Stronger' talk. Rajvir Nagi of Warwick Racing supported the talk, covering the topic of 'faster'.



A banner from the Stitch in Time exhibition. The exhibition also featured work created by students from local schools and international groups.

- Coventry Transport Museum Home Educators Day

As part of the STEM Connections project we have built our partnership with Culture Coventry and have been able to support their Home Educators Day at Coventry Transport Museum. Margaret ran a Stitch In Time workshop while Phil demonstrated how robotic arms can be used to automate battery manufacture, following the outreach work of Rohin Titmarsh in the Automation Systems Group. We interacted with 149 guests on the day.



A robot arm on display in the transport museum. Home educators were able to interact with the robot and change the machine's code live during the session.

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2022 Q3 Highlight

Event: STEM Connections Showcase

Reach: Local – schools invited to Coventry Transport Museum

A replacement for the in-person showcase was rearranged for September. The event brought 110 students from 3 primary schools and 1 secondary school to Coventry Transport Museum where 12 different activities were being run at the same time for the students to rotate around.



Our rearranged showcase event at the Coventry Transport Museum positioned Warwick academics alongside Museum exhibition pieces that were related to their activity, building the excitement for the audience. Centre-left: Magdalena Cieslak, centre-right: Fanfu Wu

Other highlights:

- Royal Institution Summer Workshops

These are prestigious opportunities to show the work that WMG and engineers do. We hope that we have challenged student's preconceptions about what engineering is and inspired them to chase their ideas and aspirations.



Margaret and Phil outside the Royal Institution (left) and props from Ri Christmas Lectures that were displayed in the room the workshops were hosted in (right)

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EXTERNAL VERSION

Where is Engineering?

This large team challenge focussed on collaborative work, with students attempting to make as many Smart City technologies as possible in the time limit. The room was filled with a buzz and excitement all day.

Geometry, Code and Embroidery

Students created code that makes a pattern and then stitched onto fabric with a digital embroidery machine in front of the students. Margaret's workshops inspire people in a totally unique way to consider STEM, culture and art all at the same time.



Left: Programmable Smart Cities kit used in the Where is Engineering? workshop. Centre: the tables during the Where is Engineering? workshop showing a vehicle being programmed by a student. Right: the digital embroidery machine used in the Geometry, Code, and Embroidery sessions.

- WMG Summer School – Engineering A Sustainable Future

Each summer WMG Outreach work with the Widening Participation team to organise a summer school event for local students from areas or backgrounds that are under-represented in STEM.

To give the students the most authentic experience of engineering as a subject, we asked our engineers from the Graduate Trainee Scheme to design a project that would be linked to an area of engineering they currently work in. Their projects all link to sustainability and designing solutions to global challenges, such as transport electrification, smart vehicles, renewable energy, etc. The visiting students had a whole day of project-based work with our graduates, sat in an autonomous pod from David Evans' research group, and heard from our Pro Dean for Research Paul Jennings.

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Images of the activities the students got involved with. A smart vehicle following a line, a vehicle design challenge, a wind turbine model, and a battery degradation modelling challenge.

Many of the graduates designing the challenges had not worked on an outreach project before. The graduate scheme has a new cohort each year and the previous cohort has extensive outreach experience. We took a tiered approach to the content design for this project, with the WMG Outreach team supporting the project, the previous cohort of graduate engineers co-ordinating and mentoring and the new cohort of graduate engineers designing and developing the projects for the event.

- STEM Connections digital showcase

Following the decision not to have a physical showcase at the Transport Museum on safety grounds an alternative plan was put in place to have a social media based digital showcase. The plan was conceived and developed within a day, with the digital showcase occurring on the same day as the in-person event would have been. The model roughly followed the practice of the Global Science Show which members of the STEM Connection team have previously taken part in.

Twitter accounts representing the departments the academics work within, the Warwick Institute of Engagement, the Coventry Transport Museum learning team, and several accounts owned by academics themselves were involved with the day. The posts had a total of 399 likes across the day and there were 966 views of the videos either posted to twitter or linked from YouTube. A thread containing all the tweets from the day can be found here:

<https://twitter.com/warwickengages/status/1549325257701572608>

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