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Promoting microbiology in schools and colleges for more than 50 years

CHAIRMAN'S ANNUAL REPORT 2023-2024

Summary

In 2024, MiSAC's 36th UK annual competition, *Neglected Tropical Diseases and Climate Change*, was sponsored by the Wellcome Centre for Integrative Parasitology. The same competition was also held by the IAFSW in SE Asia. New publications have included MiSAC*methods* 2 *Sourcing, maintaining and using cultures*, a new MiSAC*matters* article *Extracting the last drops: Microbial Enhanced Oil Recovery from oil wells* and MiSAC*briefings* 6 *The rising threat of fungal diseases and antifungal resistance*. MiSAC initiated its first *Microbiology in Schools Grant* in which schools were able to bid for funds to improve their microbiology teaching. The 37th annual competition in 2025 will focus on *Human Fungal Diseases and Antifungal Drug Resistance*, sponsored by the British Mycological Society. MiSAC continued to offer authoritative advice to schools, colleges and other organisations in the UK and abroad, including continued collaborations with schools in SE Asia. The Committee held 4 meetings, one of which was face-to-face and involved judging competition entries; the others used Zoom.

MiSAC 36th UK Annual Competition 2024, *Neglected Tropical Diseases (NTDs) and Climate Change*

The aim of the 36th MiSAC Annual Competition, kindly sponsored by the Wellcome Centre for Integrative Parasitology (WCIP), was to increase an understanding among teenagers of the key roles of pathogens causing a wide variety of diseases in tropical countries. Many of these infect large numbers of people but, with limited resources and under-funded health systems, these neglected diseases proliferate and more than a billion humans are affected. Such **NTDs** provide an opportunity for students in the UK and elsewhere in the world to learn about global aspects of health which usually do not impact the well-being of populations in wealthier countries.

The requirements of the 2024 competition maintained the well-established approach of basing the competition on a topic that is associated with school curricula but with specifications that require students to explore material beyond the curriculum. As usual, there were two entry groups, KS3 and KS4 (S1/2 and S3/4 in Scotland). It was evident that students had enjoyed researching the topic and demonstrated their enthusiasm in producing an illustrated web-page report in a variety of imaginative ways.

The publicity flyer gave the background to the topic and suggested web-based articles, which included information from the **World Health Organization** (WHO) that had published a roadmap to the control of NTDs. This was a vital reference for students; it defined neglected tropical diseases and provided a list of **22** NTDs. The majority of students utilised this important resource although a few chose diseases not classed as NTDs, such as Malaria, Ebola, Mpox, or brain-eating amoebae. On the publicity flyer, the *Object of the competition* with its four bullet points, defined the structure of the students' entries. Only **one** NTD had to be selected. Most students followed the instructions but those choosing to describe more than one disease inevitably provided inadequate details.

Entrants were required to describe the **pathogen** causing the NTD. This was done well by the majority, although a few students described snakebite envenoming and seemed not to appreciate that this 'disease' involved a toxic venom rather than a pathogen. For this competition, snakebite envenoming, along with podoconiosis caused by exposure to irritant soils, are NTDs the students should have avoided.

The required discussion of the importance of **climate change** in students' web-page reports was not tackled so well, with performance in the KS4 group notably better than at KS3. Coverage was sometimes brief and unclear, with the implications not well explored or understood. The judges were surprised that some students failed to include *any* reference to the impact of global warming.

The vast majority of students selected from the provided WHO list of NTDs and almost all of them were represented among the entries. The most popularly-chosen NTDs were, in order: Chagas disease, Dengue, Rabies, Trypanosomiasis (Sleeping sickness), Hansen's disease (Leprosy), Schistosomiasis, Leishmaniasis, Onchocerciasis (River blindness), Lymphatic filariasis and Trachoma. The quality of the students' work was particularly impressive this year - especially at KS4. There were far more superbly-compiled entries than in previous competitions. The judges had to make some difficult decisions in deciding on the winners from a rather long shortlist!

Whilst MiSAC is always pleased to welcome back entries from regular school participants, we were delighted by the very large number of newcomers to the competition. Entries were received from a

total of **101** establishments in England (83), Wales (3), Scotland (6) and Northern Ireland (6) and also from Jersey, France and Indonesia. One school submitted entries in Cymraeg - the Welsh language.

22 schools submitted entries to both entry groups. In total, there were **485** separate entries consisting of **267** in the KS3 group and **218** at KS4. The most dramatic increase was in the numbers submitted at KS4 - more than double the entries in 2023. Many participants took the opportunity to work together in groups of up to 4, making a total of **790** students having entered the competition.

The judging took place at the Chesham head-quarters of CLEAPSS, one of MiSAC's sponsors, who hosted the event. The judging panel consisted of Emeritus Professor Anthony Whalley, Liverpool John Moores University, Dr. Tansy Hammarton, School of Infection & Immunity, University of Glasgow, a MiSAC member and representative of the competition sponsors (WCIP), together with officers & other members of MiSAC. The creation of a well-designed, eye-catching, illustrated entry is not an easy task. The 2024 cohort of prize winners, and those students who gained a commendation for their entries, are to be congratulated for the high standards they achieved. There were also many exceptional entries that just failed to gain sufficient credit for an award. The biggest challenge is deciding on the right amount of textual information to include, whilst allowing sufficient room for attractive illustrations which make an immediate and visual impact. In their online searches, many students found a great deal of interesting inform-ation. Some felt compelled to communicate *everything* they had learned. Inevitably, this result-ed in the use of a font that is too small, together with a reduction in size and number of Illustrations. Students should also be restrained in their choice of colours for their entries; multiple-background shades and too many different coloured fonts for the overlaid text will make the information extremely difficult to read.

The competition entry had to be printed on one A3 sheet (or two A4 pages attached side-by-side). Most entries were of the required format, but students should be discouraged from writing the necessary list of reference sources on the *reverse* of their entries; it need not take up much space but the list should be placed where it can be seen. Similarly, students who expand the available surface area by creating a series of flaps which the reader has to lift, should note that these are not appropriate for a web-page report and lose credit in the judging.

Many students should be congratulated for having learned how to write correctly genus and species names, such as *Schistosoma mansoni*; this can be abbreviated to *S. mansoni* after its first use. How-ever, for a number of their students, teachers still need to emphasise the use of an upper-case initial letter for the genus name and a lower-case initial letter for the species name. This should be in *italics* when printed and <u>underlined</u> when hand-written. The formal names of all organisms are written in this way.

The judges continued to be impressed by the imagination and creativity of the students as they created their entries. A number of the judges' favourites were highlighted *@MiSAC_UK* on X (formerly Twitter). Many students showed remarkable technical skills in using their computer to design their submission. In 2023, judges commended the skill of producing a *working* QR code with a smartphone to connect to URLs giving further information. This year, it was gratifying to find several entries that incorporated functioning QR codes. Students who were awarded the KS4 first prize this year digitally drew their parasitic organisms' images. They then produced a QR code to play an animation using their drawn creations. Those who chose to work by hand also achieved notable results. Some schools integrate the MiSAC competition into their science curriculum; teachers tell us of the pride of their students in the work that they do in producing their entries.

This year, MiSAC introduced a new entry form giving teachers more space for recording students' names. It was also designed to be downloaded and *completed digitally **before** printing* and so improve the legibility of entries. We thank the many teachers who did this, which helps in the preparation of personalised certificates of entry, by which we acknowledge and reward the students' contribution to the competition. However, some teachers printed the blank form and then completed it by hand. We encourage more forms in 2025 with **typed** student names.

We should also like to thank teachers for respond-ing to the request to record full identification details on the back of each entry which eases the admin-istration of the several hundred entries, many involving more than one student. A total of £1320 was awarded to prize winners and their establish-ments, and several entries gained a commendation for their design and creativity or artwork. Winning and commended entries are displayed on the MiSAC web site www.misac.org.uk which includes a list of the prize-winning students and their schools. MiSAC thanks all the students for making the 2024 competition an outstanding success and their teachers for their support.

Prizes and commendations were awarded to students from the following schools.

Key Stage 3 Group: *First Prize* - Kate Kamalarajah, The Wallace High School, Lisburn, Co. Antrim; *Second Prize (Joint)* - Sanduni Cooray, St Albans High School for Girls, Hertfordshire and Gabi Cullen, Colchester County High School for Girls, Essex; *Commended for Design and Creativity* - Mohammad Zayan Raja, Outwood Academy Adwick, Doncaster.

Key Stage 4 Group: *First Prize* - Kishi Jain, Maya Gurenko, Defne Kaymaklioglu and Daariyah Chagtai, Newstead Wood School, Orpington, Kent; *Second Prize* - Seojin Jung, British School Jakarta, Indonesia; *Third Prize* - Sophia Shaw and Emily Ernoult, Tonbridge Grammar School, Kent. *Commended for Artwork* - Ziqi Li, King's Ely, Ely, Cambridgeshire; *Commended for Design & Creativity* - Scarlett Bowcott, Bradfield College, Berkshire.

MiSAC/IAFSW 2024 Joint Competition: *Neglected Tropical Diseases and Climate Change*

In 2024, a partnership was set up between MiSAC and the International Association for the Future STEM Workforce (**IAFSW**), operating in ASEAN Plus Three countries, to conduct the well-respected MiSAC schools' competition in Asian countries. IAFSW considers MiSAC's competition topics, which frequently focus on issues of global importance, to be instrumental in increasing awareness amongst teenagers of the importance of microbes and their roles in our lives.

The 2024 competition topic, ***Neglected Tropical Diseases and Climate Change***, has particular relevance for the countries within the IAFSW network as so many NTDs are present in these countries. Technical information, in the form of video clips on selected NTDs, was prepared by medical experts. Aimed at Grades 7-9, the competition had to be completed in English - a non-native language - no mean feat for students of that age.

The competition received entries from Brunei, The Philippines, Indonesia & Thailand. The judges, chaired by Dr Margaret Whalley (MiSAC) along with members of IAFSW, SEAMEO SEPS and medical experts, were very impressed by the quality, scientific content and creativity of entries. First, second and third prizes were awarded with each student receiving $120, $60 and $30. Commendations were made for scientific content, visual impact and innovative design. Winning and commended entries can be viewed on the MiSAC website.

Prizes and commendations were awarded to students from the following schools.

First Prize: Leyah Dulsa, Alexa Lucille Tud, John Joshua Anac-anac and Shane Rose Galila - Salvacion National High School, The Philippines.

Second Prize: Queen Mary Lipaopao, Yaella Rose Briones, Mars Cheester Bulanon and Michaela Manzanero - Sagay National High School, The Philippines.

Third Prize: Bonaventura Khrisna Chrysologus - Sma Negeri 6 Purworejo School, Indonesia.

Commended for Scientific Information: Julie Jean Palcat, Jhonemar Diabakid, Rey Jauod and Rendel Batoc - Salvacion National High School, The Philippines.

Commended for Attractive Visual Impact: Kanza Czesarina Adhan, Lintang Candra Raharjanti and Dinda Wahyu Pangesti; - Smk Citra Medika Kota Magelang School, Indonesia.

Commended for Innovation: Mawali Ahmad Zuhdi Chrysologus - Mumtaza Islamic Junior High School, Indonesia.

MiSAC *Microbiology in Schools* Grant

90 schools in the UK applied for a grant to enhance their teaching of microbiology. The bids were 'open' with applicants itemising equipment, cultures and media or staff training that they needed. Schools were invited to bid for a grant up to £250 or one up to £1000. The MiSAC judging panel decided that any applicant submitting a bid substantially over £1000 should be deemed unsuccessful.

Schools submitted bids to improve the practical work they hoped to carry out. Some needed a new microscope and/or camera for observing microbes and projecting their images. Others required equipment such as incubators or equipment for sterilisation. Several planned investigations with specific microorganisms and required cultures and growth media. The need for microbiological training of technicians was evident in many bids.

Successful bids were made by the following establishments which were asked to compile an illustrated report of how the grant would be spent. This allows MiSAC to obtain evidence that the funding is being used appropriately.

Bids up to £1000:

The Community School, Auchterarder, Perth & Kinross PH3 1BL.

Bids up to £250:

Abraham Moss Community School, Manchester M8 5UF.

Dingwall Academy, Ross-shire IV15 9LT

Esland Grantham School, Lincolnshire NG31 9RT.

Harleston Sancroft Academy, Norfolk IP20 9DD.

John Masefield High School & Sixth Form Centre, Herefordshire HR8 2HF.

King Arthur's School, Somerset BA9 9BX.

Light Hall School, West Midlands B90 2PZ.

Queen Elizabeth 6th Form College, Durham DL3 7AU.

Sandbach High School & 6th Form College, Cheshire CW11 3NT.

MiSAC publications

Three series have recently been extended.

MiSAC*matters Articles*: Number 39, ***Extracting the last drops: Microbial Enhanced Oil Recovery from oil wells***, by Anthony Whalley, has been published.

MiSAC*methods* 2: *Sourcing, maintaining and using microbes* outlines laboratory methods and techniques for investigations with bacteria, fungi, protozoa and algae. Instructions are provided for the preparation of a minimum of two stock cultures, with advice on checking for growth of contaminants.

The sixth title in the **MiSAC*briefings*** collection: ***The rising threat of fungal diseases and antifungal resistance*** explores the topic of the

2025 annual competition and provides students essential research material if they are planning to submit an entry for the competition.

MiSAC web site

Work has continued with Indent Design Ltd to update pages on the site. New publications, described earlier, are now available for download. The Annual Competition page now includes details of both the UK and IAFSW 2024 competitions, a slideshow of their entries and a report of the outcome of the judging. The publicity flyer for the 2025 competition: *The rising threat of fungal diseases and antifungal resistance*, is now available to download. The Microbiology grant page names the successful schools that applied for a grant to improve their teaching of microbiology. The MiSAC News page includes an article warning of the risk of dengue fever, transmitted by the tiger mosquito at the Paris Olympics. Also featured is the ***Fungi Connect*** download, produced by the British Mycological Society, to promote its UK Fungus Day initiative in October 2024.

Advisory work

The collective range of experience in microbiology held by the members of the MiSAC Committee continued to provide expert advice in response to a wide range of enquiries. Margaret Whalley has continued to work with UNESCO South-East Asia Ministries of Education Organisation (SEAMEO) STEM-ED and IAFSW as the Senior Specialist in Microbiology and lead organiser in the production of microbiology materials for secondary schools in its partner countries. The focus of these programmes is producing the MiSAC competition in Asia.

Future activities

MiSAC is delighted to report that the British Mycological Society (BMS) will sponsor the 2025 UK annual competition. The BMS has also chosen October 5th 2024 as its **UK Fungus Day**. School children up to age 18 are encouraged to become inspired by fungi and to submit their own pieces of work to celebrate the fungal kingdom. The deadline for submissions to the BMS is October 1st 2024.

Finance and sponsorship

The special sponsorship provided for our competitions in 2023 and 2024 has consolidated MiSAC finances. Costs of the competition have been reduced by requiring schools to print the certificates that entrants receive.

MiSAC also relies on the much-appreciated support from its annual sponsors:

- *British Mycological Society (BMS),*
- *British Society for Parasitology (BSP),*
- *CLEAPSS,*
- *Microbiology Society (MS),*
- *NCBE,*
- *The Quekett Microscopical Club (QMC),*
- *SSERC.*

Their generosity provides an annual financial contribution, meeting rooms and laboratory facilities.

The annual return was made to the Charity Commissioners.

MiSAC Committee

Committee membership 2023-2024 (with affiliations)

Chairman:	John Grainger, MBE (University of Reading)
Vice-Chairman:	John Schollar (NCBE)
Secretary:	John Tranter (ASE)
Treasurer:	Margaret Whalley (BMS)
Lay members:	Christian Von-Trotha-Taylor (BMS) Jo Hamilton (BSP) Ai-Linh Tran/ Ben Chantrell (CLEAPSS) Tansy Hammarton (MS) Fiona Lane (NCBE) Phil Greaves (QMC) Annie McRobbie (SSERC)

Condolences

MiSAC wishes to extend its condolences to the family and colleagues at IAFSW, our partner organisation, following the sudden death of Dr Pornpun Waitayangkoon, President of IAFSW. Dr Pornpun was a visionary and inspirational educationalist who was passionate about improving educational opportunities in Asia. Her influence will be sorely missed.

Acknowledgements

MiSAC is most grateful to its sponsors for their continued support. The generous amount of voluntary time, willingly given by the MiSAC Officers and the other Committee members, is also gratefully acknowledged. In addition, we greatly appreciate the work of the Honorary Auditor, Mr Lindsay Hicks, who is soon to retire.