

Promoting microbiology in schools and colleges for more than 50 years

CHAIRMAN'S ANNUAL REPORT 2021-2022

Summary

Some activities were affected by the continuing influence of the Covid-19 pandemic. The judging of the 33rd MiSAC Competition, *Fungi and Climate Change*, was delayed until the autumn term of 2021, with winners announced in November. The 2022 34th Competition, *Microbes Made My Lunch*, was sponsored by MiSAC. A news page was added to the MiSAC web site and a *Twitter* account has been created to provide another avenue for publicising MiSAC initiatives. The British Society for Parasitology has agreed to sponsor MiSAC. Thames Water has also agreed to sponsor our 2023 35th competition: *Microbes and the water cycle*. 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 five meetings, two of which were face-to-face and involved judging competition entries; the other meetings used Zoom.

Covid-19 pandemic

The activities of MiSAC continued to be affected by the Covid-19 pandemic. The judging of the 33rd competition for 2021 was delayed until late autumn. Instead of face-to-face meetings, the work of the committee was conducted by e-mails and Zoom.

MiSAC 33rd Annual Competition 2021, *Fungi and Climate Change*

The MiSAC Annual Competition was generously sponsored by the British Mycological Society (BMS). The closing date for the competition was extended to 31st October and the award of prizes followed in November 2021.

The aim of the competition was to increase an understanding among teenagers of the inter-relationships between the activities of fungi and climate change. The requirements 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.

In addition to receiving entries from regular participants, we were again pleased to note the continuing growth in interest from newcomers to the competition. As usual, there were two entry groups, KS3 and KS4 (S1/2 and S3/4 in Scotland). Sixty group entries were received from 48 establishments throughout the UK, ie, 12 submitted entries to both entry groups. In total, there were 234 separate entries consisting of 141 in the KS3 (S1/2) group and 93 at KS4 (S3/4). Many participants took the opportunity to work together in groups of up to 4, making a total of 332 students having had the experience of contributing to the competition. MiSAC would like to thank teachers for providing information on the entry form about how they heard of the competition; it is useful to us in that it helps us target efficient advertising of future competitions.

Judging, which took place at the University of Reading, was hosted by the NCBE, one of MiSAC's

sponsors. The judging panel consisted of BMS representatives, Professor Naresh Magan from Cranfield University and Emeritus Professor Anthony Whalley, Liverpool John Moores University, and Dr Fiona Lane, Head of the NCBE, together with members of MiSAC.

The overall requirement was to produce information for a social-media web site for teenagers called *What you didn't know about climate change*. Areas to be considered were (1) the concept of climate change and its effects, (2) how the activities of fungi affect climate change and (3) how fungi themselves are influenced by climate change. Examples of relevant processes were provided for guidance but choice was not limited to those examples. Entrants were reminded that the judges would be looking for the scientific merit of an entry as well as it being informative, attractive and well-designed for the intended audience, ie, teenagers. The competition entry - two pages of a web site - had to be printed on one A3 sheet (or two A4 pages attached side-by-side) and could be prepared either by computer or by hand. Guidance on making an effective entry was provided: the first web page should briefly explain the scientific basis of climate change and describe one fungal activity which reduced greenhouse gases together with the special features which enabled the fungus to achieve this. On the second web page, entries were required to provide details of one fungal activity which increases greenhouse gases and its consequences and explain how climate change affects the activity and distribution of many fungi. Finally, entrants were required to briefly comment on whether fungal activity resulted in an overall increase or decrease in climate change.

As the judging procedure always examines how well students have paid attention to the requirements of the competition, it is important that entrants take careful note of the competition specifications and, this year, the judges found that entry requirements were generally well observed. Follow-

ing instructions on the flyer is essential for an entry to be successful. Judges were impressed by the commendable efforts made to tackle what is quite a complex topic for students who are not taught in school curricula about fungi, their fundamental importance in decomposition and their roles in nutrient cycling. Despite this, creditable attempts were made to understand the roles of fungi in nature, the ways in which fungi influence climate change and are themselves influenced by it.

The concept of climate change is familiar to students and was well covered although some ignored the instruction that only a 'brief' explanation of the science was required. Entrants are advised to think ahead and make an overall plan of their two web pages; many used too much space to 'briefly' explain climate change, thus leaving inadequate space for information required on fungi on the second web page. Others became side-tracked by issues of pollution and many discussed 'nitrogen pollution' rather than specifying nitrous oxides. The judges felt this to be a very loose term; with our atmosphere having approximately 78% nitrogen it suggests that students were quoting on-line sources of information, commonly found in their internet web searches. Much information came from 'googling', with many using the same web references. Not many students quoted their sources; bibliographies were in short supply and there was limited evidence of entrants using materials published by MiSAC (www.misac.org.uk) and BMS (www.britmycolsoc.org.uk) that were included on the flyer. These are written by mycologists and give reliable, accurate scientific information on the competition topic - which cannot be guaranteed on other web sites.

Nearly all students correctly stated that mycorrhizal fungi help to decrease the release of 'Green House Gases' (GHGs) but not very many were able to 'indicate the special features which enable the fungus to achieve this'. There are very large numbers of mycorrhizal fungi associated with the roots of about 90% of land plants, forming huge underground networks. Many of the fungi fruiting in woods in autumn are mycorrhizal. However, many entrants seemed to think there is only one fungus which is mycorrhizal. A majority of entrants gave good descriptions of the different mycorrhizal mechanisms of associating with plant roots.

Information for the second web page was tackled better by KS4 (S3/4) students. It was not well understood that an increase in the main activity of fungi (decomposition) resulting from increased temperatures would cause increased CO₂ emissions, therefore increasing global warming. Chytrids and herbivore gut archaea and the production of methane was, however, correctly quoted as 'one fungal activity which increases GHGs', though few entrants stated its consequences.

The better answers addressed 'how climate change affects the activity and distribution of many fungi'

although this presented problems for others. MiSAC references, quoted in the competition flyer, address this issue. Of those entrants who responded to 'comment on whether fungal activity results in an overall increase or decrease in climate change', most seemed to think it decreased climate change - based on their accounts of the activity of mycorrhizas. However, most fungal activity involves decomposition and nutrient cycling which, increasing with a rise in temperatures and humidity, would cause the production of more GHGs. If a rise in temperature is accompanied by drought conditions, however, the fungi could not survive, resulting in a decrease in both fungal activity and production of GHGs.

Many students used the words 'fungus' and 'fungi' without understanding whether they relate to single or multiple organisms. The same applies to 'mycorrhiza' - singular; 'mycorrhizas' - plural. With some exceptions, there were few examples of named fungi being used in the correct context, although this was asked for in the guidance to the competition (eg, *Amanita muscaria* - a mycorrhizal fungus).

Credit was given for illustrating a good factual account with photographs, diagrams or data and also for presenting a design which is appropriate for a web site. Although students were advised to choose colours carefully, the combinations used by a number of entrants made the text very difficult to read, with a pale font placed over a lighter background. The judges were pleased that a large number of entrants had adhered to the requirements of the competition and had also managed to create a visually-attractive commentary on the role of fungi in climate change.

We should like to thank teachers for responding to the request to record full identification details on the back of each entry which eases the administration of several hundred entries, many involving more than one student. We would also like to thank teachers for their support of the competition this year, despite disruption to life and education caused by COVID-19. A total of £1270.00 was awarded to prize winners and their establishments, and several entries were awarded a commendation for the design of their web pages. Winning entries are displayed on the MiSAC web site, which includes a list of the prize-winning students and their schools. All entries which did not receive an award will have their work acknowledged by receiving a certificate of entry. MiSAC warmly thanks the BMS for generously sponsoring the competition, the students for making the competition a success and their teachers for their support. We look forward to entries for the next MiSAC competition, *Microbes made my lunch*, details of which are on the MiSAC web site.

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

Key Stage 3 Group: *First Prize* - Lara Thompson, Olivia Forrest, Lauren Holmes-Cook & Mayuhha Bhatt, Colchester County High School for Girls, Essex; *Second Prize*

(Joint) - Susanna Conroy, The Wallace High School, Lisburn, Co Antrim and Halemma Khan, Bishopbriggs Academy, Glasgow. *Commended for design* - Aarthika Rajesh, Minha Fatima, Methlini Gunasera & Mekayla Hammond, Colchester County High School for Girls, Essex; Shifa Shahid, St. Francis' College, Letchworth Garden City; Will LeBrocq, The Grange School, Northwich; Sabine Singh, Leicester High School for Girls.

Key Stage 4 Group: *First Prize* - Abdullah Kassim, Herschel Grammar School, Slough; *Second Prize* - Charlotte Liu, Lymm High School, Cheshire; *Third Prize* - Inhoo Chun, St Bede's Inter-Church School, Cambridge. *Commended for science and design* - Jennifer Harrison, Polkington School, York; *Commended for art and design* - Olivia Wright, Newstead Wood School, Orpington.

MiSAC 34th Annual Competition 2022, Microbes Made My Lunch

The aim of the 34th MiSAC Annual Competition was to increase an understanding among teenagers of how the activity of microbes is involved in the production of many foods and drinks. The requirements 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. It was evident that many students had enjoyed researching the topic and demonstrated their enthusiasm in producing an illustrative poster in a whole host of bold and imaginative ways.

We welcomed back entries from regular school participants and were pleased to find the number of newcomers to the competition continued to increase. As usual, there were two entry groups, KS3 and KS4 (S1/2 and S3/4 in Scotland). Eighty two group entries were received from 72 establishments in England, Northern Ireland & Scotland and one from overseas, ie, 10 schools submitted entries to both entry groups. In total, there were 378 separate entries consisting of 249 in the KS3 (S1/2) group and 129 at KS4 (S3/4). Many participants took the opportunity to work together in groups of up to 4, making a total of 583 students having had the opportunity of entering the competition. MiSAC would like to thank teachers for providing information on the entry form about how they heard of the competition; it is useful to us in that it helps us target efficient publicity of the competition for the next year. Judging, which took place at the University of Reading, was again hosted by the NCBE, one of MiSAC's sponsors. The judging panel consisted of Emeritus Professor Anthony Whalley, Liverpool John Moores University, and Dr Fiona Lane, Head of the NCBE, together with officers of MiSAC.

The basic requirement was to produce information for a poster for teenage students on a catering or food microbiology course at a local college to show how microbes help to produce three types of food and one drink. Examples of relevant foods were provided for guidance but choice was not limited to these. The judges expected to find that the lunch

menu might consist of bread, cheese and yoghurt with accompanying quantities of coffee, soft drinks or beer. However, students were frequently much more adventurous in filling their lunch boxes. There were olives, pickled vegetables, sauerkraut & kimchi; salami and mouthfuls made from *Quorn* mycoprotein; miso soups, tempeh (fermented soybeans) flavoured with soy sauce, idli and dosa (fermented lentils & rice) with natto (soybeans) and desserts of jalebi and nata de coco. Some quaffed champagne with their lunch; others enjoyed a glass of ginger beer, kefir, kombucha or pu-erh tea, tepache (fermented pineapple), kvass (fermented cereal grain) or buttermilk. There was even a Ukrainian tribute poster, decorated in the familiar blue & yellow colours, featuring borscht, varenyky, syrnyky and washed down with a shot of horilka!

Just providing a cornucopia of microbe-assisted delicacies was not, however, sufficient. Students had to provide outlines of the production processes and explain how the metabolism of the bacteria, moulds and yeasts were responsible for producing the characteristic flavours, textures and nature of the foods and drink. This was a more-demanding requirement that some students found difficult. Entrants were reminded that the judges would be looking for the scientific merit of an entry. This was where students could impress by correctly naming the microbes involved. It became evident that teachers still need to emphasise how microorganisms are to be correctly named when typed or hand written. Judges commented on how many examples they had encountered of "a bacteria", "the fungus are" or even "the bacteriums". Many students are becoming more precise in correctly writing genus and species names, such as *Lactococcus lactis*, using an italic font and the appropriate initial letters of each word - but this skill is not always applied correctly. Some students used an italic font to type all microbe names and then underlined these names as well, which is only required if the words are hand written.

The format of the competition entry had to be printed on one A3 sheet (or two A4 pages attached side-by-side), using *only one side* of the paper and could be prepared either by computer or by hand. The judges were disturbed to find rather too many entries that did not obey these requirements. Some entries were on a single A4 sheet which cannot provide enough space for the detail needed to make an effective poster. This year, a substantial number of students wrote material on the *reverse* of their posters. It seems obvious to the judges that such information will never be read by someone studying a poster displayed on a notice board. The material on the reverse was usually a list of sources used in the student's researches - an admirable feature which all students should consider including - but not positioned where it cannot be seen! Some students were perhaps frustrated by the limited space that an A3 sheet offered for their

concept of a poster and created opportunities to expand the available surface area. They glued on pockets into which further sheets of paper were inserted, giving additional information. Alternatively, they created a series of flaps which the reader had to lift, or folded long strips of paper into a compact concertina stack which could then be pulled out to reveal the details of a microbial process. All very ingenious, but they are definitely *not* features of a good poster which the judges would recommend.

The creation of a well-designed, eye-catching, illustrated poster is not an easy task. The 2022 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 just the right amount of textual information to include about the chosen foods and drink, whilst allowing sufficient space for attractive illustrations to produce a poster which has an immediate and visual impact. In their online searches, many students found a great deal of useful and interesting information. Some felt compelled to communicate everything they had learned. Inevitably, this resulted in the use of a smaller font to fit in all the information and the reduction of illustrations, in size and number. Their posters often looked cramped and were visually unimpressive. Students should be restrained in their choice of colours for their entries; multiple-background shades and too many different coloured fonts for the overlaid text make the information extremely difficult to read and result in a not very effective poster.

The judges were impressed by the imagination, creativity and sense of humour of the students as they set about producing their posters. Many showed remarkable technical skills in using their computer to design their entries. The student commended for technological initiative included images of QR codes in her poster alongside information about bread, kimchi, yoghurt and wine which actually worked with a smartphone to connect to URLs giving further information about these foods and drink. Those who chose to work by hand could also achieve great results, worthy of an award. On one poster, the student appeared to have used paint for the illustrations!

We should like to thank teachers for responding to the request to record full identification details on the back of each entry which eases the administration of several hundred entries, many involving more than one student. Only one aspect sometimes causes problems: our ability to decipher teachers' hand writing of their e-mail addresses and in the spelling of their students' names. The latter is particularly important in the production of students' certificates of entry, by which we acknowledge their contribution to this competition. We would also like to thank teachers for their support of the competition this year, despite the continuing disruption to

life and education caused by Covid-19. A total of £1335.00 was awarded to prize winners and their establishments, and several entries were awarded a commendation for the design of their posters. 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 the students for making the competition a success and their teachers for their support. We look forward to entries for the next MiSAC competition in 2023. Prizes and commendations were awarded to students from the following schools.

Key Stage 3 Group: *First Prize* - Mieke Houghton, St Nicholas' School, Fleet, Hampshire; *Second Prize* - Gunveen Kaur, Herschel Grammar School, Slough; *Third Prize* - Zoe Dalakas, Morrison's Academy, Crieff, Perthshire. *Commended for Design & Creativity* - Shreyashi Tiwari, Herschel Grammar School, Slough; Toby Lynas, The Wallace High School, Lisburn, Co. Antrim; Tavi Sinha, Arya Kaimal & Yatee Sharma, Herschel Grammar School, Slough; Emma Hawkins, Tenbury High Ormiston Academy, Tenbury Wells, Worcestershire; Krishna Ankolekar, King Edward's School, Birmingham; Anurag Dastidar; King Edward's School, Birmingham; *Commended for Technological Initiative* - Rajashree Venugopal, Colchester County High School for Girls, Essex.

Key Stage 4 Group: *First Prize* - Luka Pendic, Bradfield College, Bradfield, Berkshire; *Second Prize* - Mariam Riyas, Herschel Grammar School, Slough; *Third Prize (Joint)* - Jenna Ferguson, St Dominic's Girls Grammar School, Belfast and Jeevan Kaur Dhanda, Herschel Grammar School, Slough. *Commended for Design & Creativity* - Tacita Twaddle, Eve Johnstone & Amelie Singer, Channing School, Highgate, London; Lauren Smith & Maddie Pickard, Channing School, Highgate, London; Aditi Kotwal & Judy Zou, Dartford Girls Grammar School, Kent.

MiSAC publications

MiSAC*matters* articles: Additional articles should be written to extend the current collection. Dr Tansy Hammarton is planning to produce an article on gene editing and CRISPR. Hannah Bialic, Public Engagement Manager, Wellcome Centre for Integrative Parasitology, will explore a parasitism topic.

MiSAC*methods* 1 & 2: Sourcing, maintaining and using microbes and Looking at microbes

These publications, which describe laboratory methods for investigations with bacteria & fungi and preparing materials and cultures for microscopic examination, should soon be ready for production and adding to the materials on the MiSAC web site.

MiSAC*activities* 5: Spoilage of oranges. This practical activity investigates the infection of orange tissues by the fungus *Penicillium digitatum*. This species is, however, not currently available from educational suppliers of cultures. The possibility of the NCBE providing the culture is being explored.

MiSAC*fun* microbiology. The materials, described in the *Advisory work* section for Margaret Whalley on page 5, after trials in SE Asia, will also be added

to the MiSAC web site for use in UK schools. The materials include a *Microbial Snakes and Ladders* game, a *Microbe Wordsearch* activity, *Building a Microbe Mobile* and *Does Size Matter?* which explores the sizes of microbes.

MiSAC web site

Work has continued with Indent Design Ltd to update pages on the site. Now that the British Society for Parasitology has agreed to sponsor MiSAC, the list of all sponsors on each web page has been updated. The annual competition page now includes details of the prize winners of the 2022 competition, a slideshow of their entries and a report of the outcome of the judging.

Indent Design has been instructed to develop a new "MiSAC News" page. This features news of the creation of MiSAC's *Twitter* account to provide another avenue for publicising MiSAC initiatives. Also featured are stories of microbes in the news. Five recent *New Scientist* articles describe (i) bacteria which make edible drinking straws, (ii) beating long covid, (iii) evidence which confirms that the Epstein-Barr virus triggers multiple sclerosis and (iv) using bacteriophages to destroy pathogens during food processing, preventing food from rotting, treating diseases on farms and (v) also those caused by bacteria that have evolved antibiotic resistance. In addition, information is given about the British Society for Immunology publication on *Vaccinations for Covid-19*, the Covid-19 worksheet collection produced by Mark Levesley and the Microbiology Society publication *Climate Change: Microbes as our Allies*.

Advisory work

The editor of the *MiSAC matters* Articles, Margaret Whalley, has conducted an ongoing dialogue with Prof. Margareta Wallin Peterson of Gothenburg University, Sweden, on the translation of articles into Swedish by Dr Elisabeth Stromberg.

Margaret Whalley has continued to work with UNESCO South East Asia Ministries of Education Organisation (SEAMEO) STEM-ED as the lead organiser in the production of a microbiology programme for secondary schools in its 11 partner countries. The programme consists of a schools' competition based on the MiSAC model, as carried out in the past in Thailand and China. This, however, is preceded by teachers' workshops on the topic of the immune system and vaccines, a relevant theme in the era of pandemics. Students will be tasked with producing a video to illustrate the function and importance of vaccines.

As an extension to the UNESCO SEAMEO STEM-ED programme, Margaret Whalley has been working with John Schollar to develop aspects of his *Fun Microbiology* materials which could be used in the SE Asia teachers' workshops. These units include *Microbe Wordsearch*, *Microbe Snakes, Ladders*, a *Microbe Mobile* and *Does Size Matter?*

Trials of these materials are planned in Bangkok by the Thai National Science and Technology Development Agency (NSTDA) and any changes recommended can be incorporated into new material to be added to the MiSAC web site.

Ai-Linh Tran, representing CLEAPSS, has reported that its *Supporting Safe Practical Microbiology* course has been temporarily suspended. In its place, a *Technical Support for Microbiology - Theory* course has been offered online for technicians. A follow-up, face-to-face *Practical Microbiology* course will be offered from September 2022, exclusively for participants who have completed the theory course.

Among the activities of the Microbiology Society reported on by Tansy Hammarton is the creation of a new hub of resources & advice on the rise of the new epidemic of monkeypox, together with the collection of case studies on the SARS-CoV-2 hub. A new briefing, *Climate Change: Microbes as our Allies*, discusses how microbes can be harnessed to our advantage. A project on antimicrobial resistance (AMR) has just begun, focusing on finding solutions to combat this 'silent pandemic'.

Fiona Lane has reported that the NCBE ran its first pharmacy session and resumed school/college visits, organising both microbiology and enzyme-based investigations carried out by students. The workshops have gone well, and the students have shown a high level of engagement with both the practical activities and the student-ambassador talks that are given during the workshops. The microbiology activities that were conducted with the students involved a transformation, "painting with bacteria" workshop using fluorescent red or green bacteria, together with a new session that focussed on introducing students to aseptic technique and plating of bacteria. The basis of this activity involved a hypothetical outbreak of the disease caused by the bacterium *Listeria* and investigated the factory from which the bacteria had originated. Samples from the contaminated production line developed white bacteria on non-selective agar plates and blue bacteria on the selective plates. This mirrored how scientists screen for *Listeria* in foods and the environment.

The NCBE will continue to run these practical sessions in new colleges and schools in the next academic year and hopefully include some new investigations. It is also waiting to secure funding to run an all-day workshop at the University, in collaboration with the departments of food and chemistry, for students from widening participation backgrounds from local schools and colleges.

Jo Hamilton, representing our new sponsor, the British Society for Parasitology, has reported that for the last seven years, she has been working on projects that bring science into schools in Wales. These have included a Schools University Partnership Initiative: *Sustainability Network Wales*

(*SusNet*) project and, more recently, as part of a large Welsh initiative, *Trio Sci Cymru*, that aimed to increase STEM interest in years 7-9.

www.aber.ac.uk/en/trio-sci-cymru/trio-sci-cymru/

Future activities

MiSAC is delighted to report that Thames Water has agreed to sponsor our 2023 35th annual competition which will focus on the vital role of *Microbes in the Water Cycle*, from the treatment of sewage to the provision of safe drinking water. Students will be required to produce information for pages on a web site for teenagers. The production of the publicity flyer will have been completed so that the services of JEM Education Direct can be used to distribute this to schools throughout the UK in November. The closing date will be April 3rd 2023. Further publicity for the competition will be provided by MiSAC sponsors. Thames Water will feature the MiSAC competition in its newsletter to schools. Looking further ahead to the annual competition in 2024, the Wellcome Centre for Integrative Parasitology has agreed to sponsor a parasite-themed poster competition.

As far as possible, some activities intended for 2021-22 that could not take place because of the effects of Covid-19, will be reinstated. For example, a microscopy workshop for teachers and technicians, arranged in association with the Quekett Microscopical Club.

Finance and sponsorship

MiSAC is delighted to report that the British Society for Parasitology has agreed to become a sponsor. The Society's representative on MiSAC will be Prof Jo Hamilton of Aberystwyth University. The Microbiology Society has agreed to increase its annual sponsorship contribution. Pharmig (formerly known as the Pharmaceutical Microbiology Interest Group) will contribute a one-off donation of £1000. In addition, the sponsorship of our competitions in 2023 and 2024, mentioned under '*Future activities*', has considerably improved MiSAC finances.

MiSAC 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.

Costs to sponsors of the annual competition have been reduced by requiring schools to print the certificates that entrants receive. This was reported last year, and appears not to have caused any problems with participants. It will therefore become the standard procedure.

The annual return was made to the Charity Commissioners.

MiSAC Committee

MiSAC is sad to report the death of Kit Brownlee who served as the representative of the Quekett Microscopical Club. Her commitment over many years to the work of the committee will be sorely missed.

Jason Harding has retired from CLEAPSS and is moving to the USA. However, his colleague Ai-Linh Tran has regularly contributed to the functioning of the committee and will continue to represent CLEAPSS on MiSAC.

Fiona Lane, the Head of the NCBE, has agreed to join the committee. She has served on the judging panel of our annual competitions since 2021 and we welcome her to the committee.

Annie McRobbie at SSERC has kindly agreed to open a MiSAC *Twitter* account which she has designed and set up. She will also manage the ongoing activity of the account.

Committee membership 2021-2022 (with affiliations)

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

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.