IBBS World

Newsletter of the International Biodeterioration & Biodegradation Society

https://ibbsonline.org **Twitter: @ibbs_online**

April 2020

IBBS18

International Biodeterioration and Biodegradation Symposium Bozeman, MT 7-10 September 2020

Updates by Joseph M. Suflita inside the Newsletter

IBBS 18 postponed until 2021 in light of the unprecedented global pandemic

The new dates for IBBS18 are:

7-10 September 2021

IBBS 18 will still be held on the campus of Montana State University (MSU) Bozeman, MT

IBBS Membership benefits

Reduced registration rates at IBBS and FEMS sponsored conferences, meetings, symposia.
IBBS national representatives in many countries can help members with the organization of small local meetings.
Eligible for annual IBBS Graduate and Postgraduate Bursaries (up to £1,000), IBBS Small Meetings Bursary, FEMS Research Grants, FEMS meetings grants. On page 15 details on membership and fees.

Welcome to the IBBS Newsletter!

This newsletter is usually sent out every 4 months. If you have any news, meetings you would like us to publicise on the IBBS Newsletter, or a cross-word on an appropriate topic, please contact us via our IBBS Hon. Secretary: secretary@ibbsonline.org
We need a text written in .doc, .rtf or .txt formats. The pictures should be of good quality (but not too big) in any of the usual formats (.jpg, .tif, .bmp), preferably not embedded into texts or other documents. Each image should be accompanied by a short caption. In case you add a link to websites, please check that the link and the website work.
Thank you!

Flavia Pinzari

IBBS18 Meeting Postponed until 2021

I hope that all of you are well and that you are staying safe in light of the unprecedented global pandemic. This is the message that I hoped I would not have to write, but the world has changed. Borders are closed, travel is restricted, economies are devastated, and many people are ill. These factors preclude the efficient implementation of an international gathering in the Fall of 2020. More importantly, given the remarkable stresses that our members are experiencing, it seems only prudent to postpone IBBS18 for a calendar year.

The new dates for IBBS18 are: 7-10 September 2021

Please make note of the new dates.

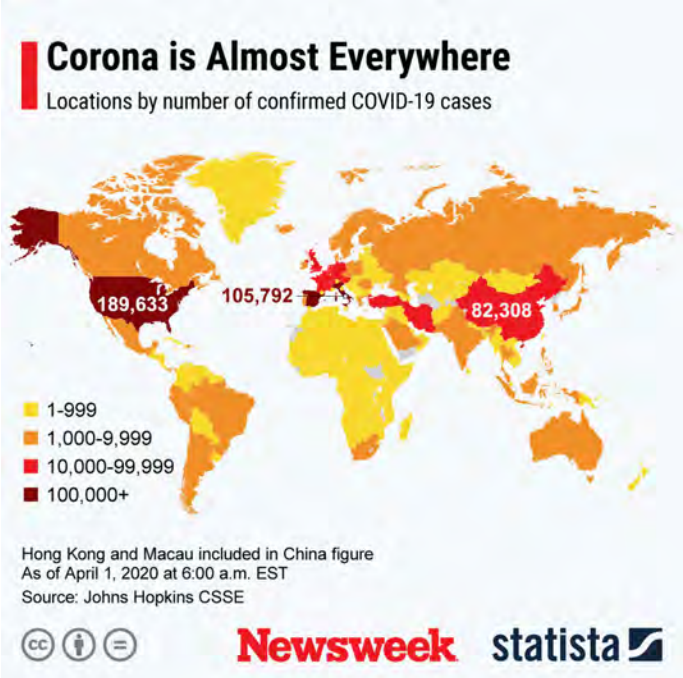
The meeting will still be held at Montana State University, in Bozeman, Montana, USA. The website (**https://www.ibbs18.org**) will remain open for periodic updates and for meeting logistics. New meeting announcements will be circulated closer to the conference dates. For those who have already paid for registration, please let me know by email (**jsuflita@ou.edu**) if you would like to be reimbursed or simply have us hold your registration until next year. The Hilton Garden Inn in Bozeman will also be retained as the conference hotel. Requests for return of deposits for hotel reservations should be made with the hotel management.

Thanks go out to the Scientific Advisory Committee, the Local Organizing Committee, the Meeting Sponsors and to Session Chairs for their continuing efforts on behalf of IBBS. Many of you have worked diligently behind the scenes in many different ways to help make the meeting a success. I greatly appreciate your efforts and hope that you will stick with us until next Fall 2021. I also want to acknowledge our committed speakers. I will be reaching out to you in the days ahead to check on your availability for next year. Lastly, I want to thank the IBBS leadership including President Brenda Little, Honorary Secretary Christine Gaylarde and the IBBS Council for their continued support and guidance.

I look forward to working with all of you when the current health crisis abates. Until then, I wish you and yours the very best.

Sincerely,

Joseph M. Suflita
Chair of the IBBS18 Meeting Organizing Committee



Our Public Health England IBBS member, Jimmy Walker, gives his views on COVID-19

So there was IBBS organising IBBS 18, the next triennial conference in Montana and before we knew it the world was in lockdown and IBBS18 rescheduled for 2021. All your freedoms taken away, isolated at home and practicing social distancing during the biggest pandemic in our lifetime. The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; previously named 2019 novel coronavirus or 2019-nCoV, now commonly COVID-19) in China at the end of 2019 has become the largest public health disaster in our lifetime (1). And now we the public may have to consider wearing a face mask. Or should we?

What is Covid-19?

Coronaviruses are enveloped viruses with a single-stranded RNA genome that were first recognised in the 1960s (2,3). They are roughly spherical and moderately pleomorphic and have the largest genomes of all RNA viruses. The name is derived from the Latin ”corona”, meaning "crown" or "wreath", and refers to the characteristic appearance of virions (the infective form of the virus), which are large bulbous surface projections that create an image reminiscent of a crown or a solar corona (4).

Jimmy Walker, IBBS member, Public Health England

Infection /transmission route

The disease origin was considered to be a large seafood and live animal market in Wuhan city. Main transmission routes are respiratory droplets produced during coughing, sneezing or talking, and contact with surfaces (5,6). The virus has been identified in respiratory tract specimens 1–2 days before the onset of symptoms and numbers peak around the time of symptom onset (7). Hence those droplets that we are expelling have received a lot of attention. Van Doremalen et al. (2020) demonstrated that SARS-CoV-2 was more stable on plastic and stainless steel than on copper and cardboard, and the viable virus was detected up to 72 hours after application to those surfaces (8). Meanwhile SARS-CoV-2 RNA was identified in cruise ships on a variety of surfaces in cabins of both symptomatic and asymptomatic infected passengers up to 17 days after cabins were vacated (9). Whilst there is much conjecture in on-line forums that aerosols may play a role in dispersal and transmission, an analysis of 75,465 COVID-19 cases in China did not identify airborne transmission (6,10,11). Chia et al. were only able to recover the virus from aerosols in rooms of two of 30 patients in a hospital (8,12). This does not mean the aerosol routes should be completely discounted; Van Doremalen et al. (2020) also showed that SARS-CoV-2 remained viable in aerosols for 3h (8).

The knowledge that droplets containing viable viruses can be expelled up to 2 metres and that these droplets land on surfaces has led to the the public health guidance for social distancing (2 m apart), respiratory etiquette (for example, coughing into a flexed elbow), rigorous hand washing (with soap and water or using an alcohol-based hand rub) after touching anything, and not touching the face (8). Healthcare professionals are trained in standard and isolation precautions, which will include wearing personal protective equipment (PPE) and an FFP3 respiratory mask to control virus transmission; each mask needs to be fit tested to the individual. We started receiving communications about work carried out by Anna Davis and led by Allan Bennett “Testing the efficacy of homemade masks: would they protect in an influenza pandemic?” (13).

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References

1.Lai C-C et al. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. Int J Antimicrob Agents [Internet]. 2020 Feb 17 [cited 2020 Apr 14]; Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7127800/

2.Lauber C et al. Mesoniviridae: a proposed new family in the order Nidovirales formed by a single species of mosquito-borne viruses. Arch Virol. 2012;157(8):1623–8.

3.Almeida JD, Tyrrell DAJ. The Morphology of Three Previously Uncharacterized Human Respiratory Viruses that Grow in Organ Culture. J Gen Virol. 1967;1(2):175–8.

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The conclusions were that improvised homemade face masks could help protect those at occupational risk from frequent close contact with symptomatic patients. However, these masks would give the wearers little protection from other persons infected with respiratory diseases. So would encouraging the public to wear face masks make a difference? Greenhalgh *et al.* have recently published a review on this question and were not able to find any conclusive publications in favour (14). However, despite this they felt that now was not the time to wait for randomised controlled trials and advocated the precautionary principle that the public should wear face masks. In the UK we have just finished our first three weeks of lockdown and now are set to stay put for another three weeks. Afterwards, we hope that there will be a Government strategy to manage a staged return to normality, bearing in mind that the rates for asymptomatic carriers vary. On board the Diamond Princess cruise ship, the proportion of asymptomatic individuals among those testing positive for SARS-CoV-2 was 17.9% [15]; of the Japanese citizens evacuated from Wuhan to Japan, 33.3% were considered to be asymptomatic [16]. However, the BMJ has reported that up to 78% of new coronavirus cases could be asymptomatic. In such circumstances and faced with such high numbers of asymptomatic carriers, it may be up to members of the public to decide whether they want to implement the precautionary principle and don their face mask or scarf. If you do not have any symptoms but are shedding the virus then clearly a face mask would significantly reduce dispersal of contaminated respiratory droplets (17). My own precautionary principle will stand by the scientific evidence, and will include social distancing, regular and rigorous hand washing, respiratory etiquette and not touching my face.

Jimmy Walker, wearing an improvised homemade face mask

How not to wear a facemask
(credits: John Gillatt photo)

by *Jimmy Walker*
(Public Health England)

References

5.Li Q, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. N Engl J Med. 2020 Mar 26;382(13):1199–207.
6.Chan F-W K et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster - ScienceDirect [Internet]. [cited 2020 Apr 15]. Available from: https://www.sciencedirect.com/science/article/pii/S0140673620301549
7.Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – seventh update:31.
8.van Doremalen N et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. N Engl J Med. 2020 Apr 16;382(16):1564–7.
9.Public Health Responses to COVID-19 Outbreaks on Cruise Ships — Worldwide, February–March 2020 | MMWR [Internet]. [cited 2020 Apr 19]. Available from: https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e3.htm?s_cid=mm6912e3_w
10.Liu J et al. Early Release - Community Transmission of Severe Acute Respiratory Syndrome Coronavirus 2, Shenzhen, China, 2020 - Volume 26, Number 6—June 2020 - Emerging Infectious Diseases journal - CDC. [cited 2020 Apr 15]; Available from: https://wwwnc.cdc.gov/eid/article/26/6/20-0239_article
11.Faridi S et al. A field indoor air measurement of SARS-CoV-2 in the patient rooms of the largest hospital in Iran. Sci Total Environ. 2020 Apr 6;725:138401.
12.Chia PY et al. Detection of Air and Surface Contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in Hospital Rooms of Infected Patients [Internet]. Infectious Diseases (except HIV/AIDS); 2020 Apr [cited 2020 Apr 17]. Available from: http://medrxiv.org/lookup/doi/10.1101/2020.03.29.20046557
13.Davies A et al. Testing the efficacy of homemade masks: would they protect in an influenza pandemic? Disaster Med Public Health Prep. 2013 Aug;7(4):413–8.
14.Greenhalgh T *et al.* Face masks for the public during the covid-19 crisis. BMJ. 2020 Apr 9;m1435.
15.Mizumoto K, Kagaya K, Zarebski A, Chowell G. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. Eurosurveillance. 2020 Mar 12;25(10):2000180.
16.Nishiura H, Kobayashi T, Miyama T, Suzuki A, Jung S, Hayashi K, et al. Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19). medRxiv. 2020 Feb 17;2020.02.03.20020248.
17.Day M. Covid-19: four fifths of cases are asymptomatic, China figures indicate. BMJ [Internet]. 2020 Apr 2 [cited 2020 Apr 17];369. Available from: https://www.bmj.com/content/369/bmj.m1375
18.Chughtai AA, Stelzer-Braid S, Rawlinson W, Pontivivo G, Wang Q, Pan Y, et al. Contamination by respiratory viruses on outer surface of medical masks used by hospital healthcare workers. BMC Infect Dis. 2019 Jun 3;19(1):491.

News from the President

IBBS President
Brenda Little

An IBBS Council meeting was held in London on 2 March 2020. The following members met in a hotel conference room: Chris Gaylarde, Honorary Secretary; Jo Verran, FEMS Representative; John Gillatt, Webmaster; Flavia Pinzari, Managing Editor IBBS Newsletter and myself. Other Council members attending the meeting via Skype were the following: Fred Passman, Vice-President; Joe Suflita, IBBS18 Meeting Chair; Asunción de los Rios, Programme Secretary; Jonathan Butler, Deputy Treasurer; Nuno Mesquita, Membership Secretary. I flew from Atlanta, USA, into Heathrow London. Flavia Pinzari flew from Rome, Italy, into London and came directly from the airport to the meeting. Because of travel difficulties, Flavia was a little late for the meeting. She arrived and immediately reminded us that she was coming from Italy and that we should practice some social-distancing because of reported cases of COVID19. I am writing this column on 4 April.

As of today, all of the attendees at the Council meeting are in good health. I provide these details to demonstrate how circumstances have changed in a few weeks. COVID19 has reached pandemic proportions and the numbers of cases in the US are the highest in the world, surpassing the numbers in China and Italy. The 2 March IBBS Council meeting could not be held today. The next IBBS Council meeting, scheduled for 15 June, will most likely be an electronic event. Importantly, IBBS18 has been postponed until 2021.

This newsletter includes a new feature – short technical articles written by IBBS members. The feature was designed to distribute information about IBBS members and their work- an introduction for many readers to IBBS researchers. The contributions in this issue were invited. Please consider contributing to future issues by submitting a 500-word abstract of your work with images or illustrations accompanied with a brief personal introduction, i.e., invitations are not required. The new feature was discussed and approved at the 2 March Council meeting, before the declaration of the pandemic and cancellation of scientific meetings around the world. Communication and collaboration, the hallmarks of professional societies, seem even more important now.

My sincere best wishes for your health and safety.

Brenda Little

Stay Safe !!!

Dr. Fred Passman, elected new Vice President (VP) of IBBS

Dr. Fred Passman,
Vice President (VP) of IBBS

I am delighted to introduce Dr. Fred Passman, Vice President (VP) of IBBS. Fred has a Ph.D. in marine microbiology and is the president of Biodeterioration Control Associates, Inc., a group specializing in bioremediation and microbial contamination control in industrial process-fluids. In addition to IBBS, Fred is a member of several professional societies, notably, the American Society for Testing Materials, the Energy Institute, National Association of Corrosion Engineers (NACE)- International, and the Society of Tribologists and Lubrication Engineers (STLE). Within these organizations, he has chaired numerous working groups and committees. Many of you will recognize Fred as a prolific author of technical papers and an associate editor for the journal, International Biodegradation & Biodeterioration. Fred is currently an active member of the IBBS Council. During the past year I have enjoyed working with him on several writing projects. I can now introduce Dr. Passman as a gentleman, a scholar and a grammarian. Typically the transition from VP to President takes place at the triennial IBBS meeting and was scheduled to take place in Bozeman, MT, later this year. Because of postponement of that meeting, I have agreed to continue in the position of President until IBBS18 in 2021, at which time there will be a formal recognition of Fred as the incoming IBBS President.

Brenda Little

Remember that....

IBBS is member of FEMS

FEMS is the Federation of European Microbiological Societies (FEMS)

It is an international European scientific organization, formed by the union of a number of national organizations.

Federation of European Microbiological Societies

Read the the latest news: https://fems-microbiology.org/news/

On the FEMS Website: "Expert update on the SARS-CoV2 coronavirus causing the COVID-19 outbreak" at this link: https://fems-microbiology.org/expert-update-on-the-sars-cov2-coronavirus-causing-the-covid-19-outbreak/

Members of FEMS Member Societies can apply for grants for research and training, or for support when organizing or attending a meeting – including our Member Societies' national and regional congresses. Every year FEMS supports meeting organizers and early career researchers and enables experts to share ideas and promote excellence in science.

Metallurgy and the localized corrosion of carbon steel

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With the availability of modern high-resolution imaging and spectroscopic techniques it has become possible to gain new insights into the role of metallurgy in the localized corrosion of carbon steel. The first 5-20 nm of the surface might be different from the bulk of the alloy. As an example Figure 1 shows a pair of manganese (Mn) and sulfur (S) elemental maps obtained from a manganese sulfide (MnS) stringer on a 1018 carbon steel cut and polished parallel to the rolling direction of the steel. The S and Mn elemental maps shown in the left column were obtained using a surface sensitive Auger nanoprobe, while the column on the right was obtained using characteristic X rays (EDX). Notice that the distribution of S is different from that obtained using X rays. This is due to surface sensitive Auger spectroscopy probing ~5-10 nm of the surface while X rays can probe 100s of nm deep. In this particular case, the missing S in the Auger map is replaced by O and excess S is associated with Fe.

Comparison of the results obtained using these powerful complementary techniques suggests that the localized residual strain that develops within the crystal structure of the steel results in accelerated localized biocorrosion due to the formation of anodic sites at these locations. These strained areas can easily be mapped using electron backscatter diffraction before the sample is exposed to a corrosive environment. These anodic sites are independent of the corrosive environment unless they are covered by corrosion inhibitors. The presence and activities of bacteria affect only the rate of corrosion, not where the localized corrosion initiates [1]. This process ultimately causes macroscopic corrosion pits leading to material failures. A micro-galvanic coupling forms between the strained areas where dislocations are concentrated and the unstrained ferrite grains. Examples of strained areas include the interfaces between MnS inclusions and ferrite grains in the steel, at grain boundaries between ferrite grains, and at boundaries in pearlite grains between intergrown cementite (Fe_3C) and ferrite.

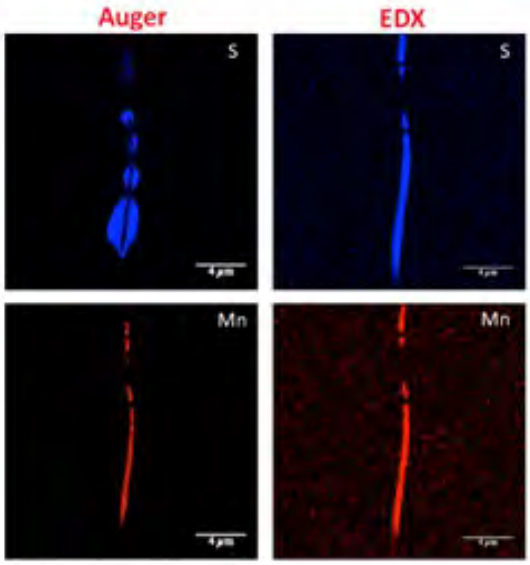

Figure 1: Mn and S elemental maps of polished 1018 carbon steel obtained using an Auger electron detector and, for comparison, an X-ray detector.

A comprehensive analysis using a bulk and surface-sensitive integrated Auger nanoprobe system shows that the surface morphology and composition of the MnS inclusions are highly heterogeneous. Some regions of MnS are covered with a thick (>20 nm) MnO film; others are covered with a thin (~5 nm) layer of Cu_2S. The so-called MnS inclusions contain 5-7% Fe and O intermixed with Mn and S. Interfaces between "MnS" and host ferric grains are highly disordered. We hypothesize that pitting is initiated and develops at these interfaces through a galvanic coupling between the strained and the unstrained ferrite grains.

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This hypothesis can be generalized: the accelerated biocorrosion in 1018 carbon steel finds its roots in the localized electrochemical potentials generated between the lattice defects and dislocations existing at interfaces formed between unstrained ferrite iron and such material phases as MnS inclusions, cementite lamellar structures, and grain boundaries distributed throughout the 3D network of the carbon steel. This hypothesis is supported by multiple micro- and nanoscale imaging and spectroscopic data [1,2].

Prof. Recep Avci

[1] Avci R et al. Role of Metallurgy in the Localized Corrosion of Carbon Steel. Journal of Minerals and Materials Characterization and Engineering 6, 618-646, doi:https://file.scirp.org/Html/4-2710677_88704.htm (2018).
[2]Riedersa N, Nandasiri M, Mogk D, Avci R, New Insights into Sulfide Inclusions in 1018 Carbon Steels, to be submitted to Corrosion Journal (2020).

Metabolomics used in the assessment of cultural heritage objects

Dr Justyna Szulc
Department of Environmental Biotechnology, Lodz University of Technology, Lodz, Poland

Dr Justyna Szulc

The following research was conducted by **Dr. Justyna Szulc** in cooperation with **Prof. B. Gutarowska**, both with Department of Environmental Biotechnology, Lodz University of Technology, Lodz, Poland; Prof. T. Ruman, Rzeszow University of Technology, Rzeszow, Poland; Drs. I. Beech and J. Sunner, Montana State University, Bozeman, USA, and conservators. The research, carried out at the Lodz University of Technology and Rzeszow University of Technology used new methods to assess the occurrence of microbial metabolites on cultural heritage objects. Laser ablation-remote-electrospray ionization mass spectrometry imaging (LARESI MSI) in selected reaction monitoring mode (SRM), and surface-assisted laser desorption/ionization mass spectrometry (MS) and mass spectrometry imaging (MSI), on silver nanoparticle enhanced target (109AgNPET MS and MSI) were used to examine damaged medieval beeswax seals from the Archdiocese Archive in Gniezno, archaeological silk from the burial crypts of the Church of St. Francis of Assisi in Kraków and 20th century Polish silver-gelatine photographs on baryta paper.
The LARESI MSI method detected metabolites including those of microbial origin (e.g. organic acids and mycotoxins), historical dyes, material composition and decomposition products, as well their distribution on surfaces of the historic objects. Moreover, the 109AgNPET MS method could be useful for the reconstruction of heavily damaged photographs (Fig.1). The LARESI method does not require object modification before analysis. The techniques are currently the only known method suitable for metabolite studies of photographs in MS/MS mode. Based on these initial results, the suitability of metabolomic methods should be considered for other historical objects.

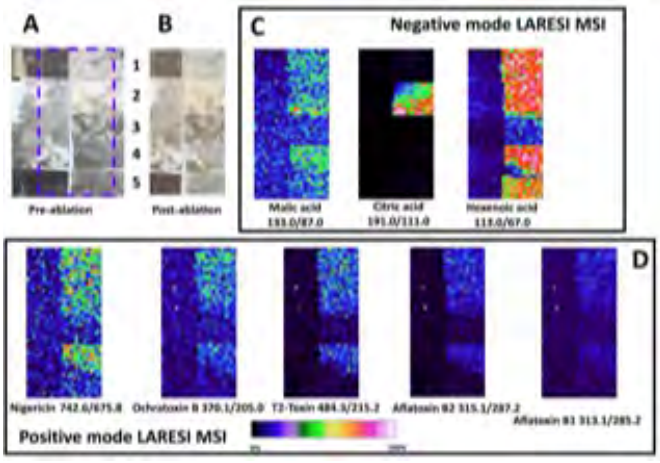

Fig. 1. LARESI MSI ion images of historic photograph samples (phot. by Tomasz Ruman)

Do you know that ....IBBS Council, our executive body, is made up of 50% men and 50% female; our current President is a woman. How many scientific societies can say that their members are equally divided between the sexes? We can!
Follow us on Twitter.. @ibbs_online

Biodegradation as a communication strategy

Suggested reading:
Article on line by *David Griner*

Why Burger King Is Proudly Advertising a Moldy, Disgusting Whopper
The chain's anti-preservatives pledge breaks jjust about every rule in advertising

https://www.adweek.com/creativity/why-burger-king-is-proudly-advertising-a-moldy-disgusting-whopper/

Here the time-lapse video:
https://youtu.be/oSDC4C3_16Y

IBBS Journal

The IBB journal is performing well compared with the same time period of last year. To date, more than 350 manuscripts have been received. A recent prediction made by Elsevier indicates that the new impact factor, to be released in June this year, will be higher than 4.0. I would like to bring the attention of our members and readers to the on-going Special Issues which are calling for submission of manuscripts now, namely Sustainable Environment and Energy (SI: SEE), and New Strategies in Bioremediation Processes (SI: BioRemid).
Lastly, I would like to use this opportunity to thank the associate editors, editorial board members, reviewers and also authors, who contributed in to the current status of this journal.

Ji-Dong Gu
Editor-in-Chief
The University of Hong Kong
e-mail: **jdgu.ibb@gmail.com**

Conferences going on despite the Covid-19 pandemic

British Mycological Society Annual Scientific Conference 2020, at Cranfield University, 15th to 17th of September 2020.

Theme: 'Fungi and the Environment'.

https://www.cranfield.ac.uk/events/events-2020/british-mycological-society-conference-and-agm

abstract submissions to: applied.mycology@cranfield.ac.uk.

15 June - Deadline for oral talks abstract submission

30 June - Deadline for poster communication abstract submission

15 July – Communication of the outcome to oral talk candidates

31 July – Communication of the outcome to the poster communication candidates

British Mycological Society promoting fungal science

QUARRY TESTING OF NEW TREATMENTS DESIGNED TO PREVENT OR MITIGATE THE BIODETERIORATION OF BUILDING STONES

Asunción de los Ríos Murillo, Microbial Ecology and Geomicrobiology Group (ECOGEO), National Natural Sciences Museum, CSIC, Serrano 115 dpdo, Madrid-28006, Spain

Dr. Asunción de los Ríos Murillo

Early in 2020, we conducted a set of new experiments at the Redueña Quarry (Madrid, Spain) as part of the TOP-HERITAGE-CM Project (S2018/NMT_4372). This multidisciplinary project, financed by Comunidad de Madrid, has the main goal of developing strategies to protect and conserve our Cultural Heritage, focusing especially on preventive measures. The main tasks of our group (ECOGEO Group) are the setting up of treatments to avoid biodeterioration processes in stone-built constructions. Our Cultural Heritage, and in general all our buildings, are threatened by aesthetic, mechanical and chemical damage provoked by the presence and activity of microbiota able to colonize building stones. These microorganisms occupy both external (epiliths) and internal (endoliths) zones. Fungi (lichenized and non-lichenized) are observed as the most frequent microorganisms occurring at sites showing signs of biodeterioration, although cyanobacteria, heterotrophic bacteria and algae are also present. To preserve these stone works, it is important to design treatments that will eliminate these microorganisms once they have become established without damaging the stone. Finally, but not least important, we need to find preventive treatments to reduce the bioreceptivity of building stones before their use in construction. Before any intervention is attempted, treatments should first be tested. We propose analysis first of the efficacy of new treatments directly in the stone quarry followed by their long-term follow up. A quarry is an ideal natural laboratory to assess new strategies as they are usually close to building places and stone is unlimited. Biological colonized areas will be used to test cleaning treatments (Fig. 1) and freshly cut and uncolonized areas to test preventive treatments.

Fig. 1: Set of experiments designed to test new cleaning treatments at Redueña Quarry (Madrid, Spain).

To find an effective, environmentally friendly, cleaning or properly preventive treatment, the direct and indirect effects of the specific treatments on all microbial colonizers (different taxa and ecological niche) need to be determined. The use of an inappropriate treatment could be worse than no intervention at all for building preservation. Cleaning strategies based on different combinations of biocide products and laser treatments will be tested during this project. The effects of epilithic colonizers on monuments, especially lichens, are usually obvious, but the presence and actions of endolithic forms within a stone may be underestimated in the absence of proper techniques. Presently, the combined use of in situ microscopy, which consists of simultaneously applying several microscopy techniques without separating the biological components from the mineral substrate (De los Ríos & Ascaso, 1995), and DNA metabarcoding techniques, is the best strategy to establish treatment efficacy.

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Using this strategy, not only will we be able to compare community structure and the composition of microbial communities before and after the given treatment (testing after different time periods to test the persistence of treatment effects), but this approach will also serve to simultaneously distinguish effects on epilithic and endolithic forms (Fig. 2). The removal of biological colonization from stone, especially endolithic microorganisms, is a difficult task. Accordingly, the best way to protect our stone buildings from biodeterioration is to focus on preventing microbial and lichen colonization. Hence, preventive treatments to avoid colonization will be tested on freshly cut areas of the quarries over the following months. Treated areas will be monitored long-term traced to determine the efficacy and persistence of these preventive treatments.

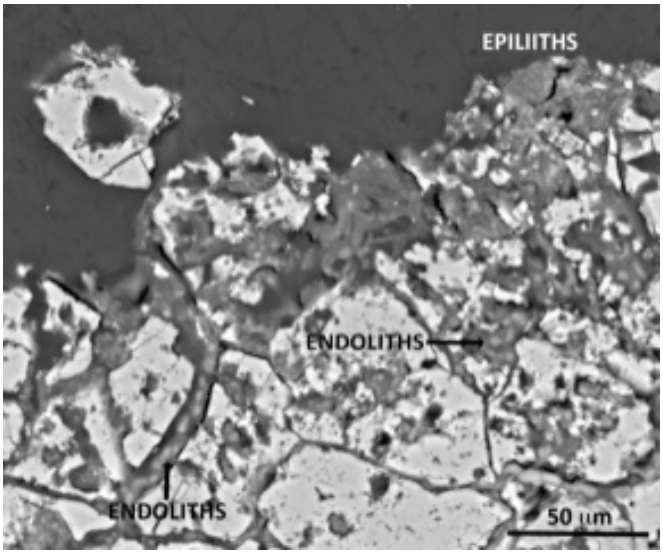

Fig. 2: Back-scattered electron scanning microscope image of fungi colonizing the surface (epiliths) and interior (endoliths) of dolostones.

Reference

De los Ríos & Ascaso (2005) Contributions of in situ microscopy to the current understanding of stone biodeterioration. International Microbiology 8(3), 181-188.

Acknowledgements

The Ecogeo Group members participating in these studies are Carmen Ascaso, Jacek Wierzchos, Esther Rodríguez and Asunción de los Ríos. This work will be performed in collaboration with Grupo LANAPAC (Instituto de Química-física Rocasolano, CSIC), Grupo PAP (Instituto de Geociencias, CSIC), Sergio Pérez Ortega (Real Jardin Botanico, CSIC) and Marta Urizal (Thor espcialidades S.A.). Biocide products were supplied by Thor Especialidades.

Conferences going on despite the Covid-19 pandemic

FoodMicro 2020,
Athens, Greece, Megaron Athens International Conference Centre,
on 7-10 September 2020

We have extended the Abstract Submission deadline until April 30, 2020 and the Early Registration deadline until May 31. FoodMicro2020, is going ahead as planned. The information mostly relies on external sources, so we encourage participants to periodically check the information pages of the Greek Public Health Authorities and WHO for up-to-date advice.

Dr Jonathan A. Butler – **Research Biography**

I am an early-career Principal Investigator, Senior Lecturer in Microbiology and core member of the Centre for Bioscience at Manchester Metropolitan University (Manchester, UK). My main research areas include (1) Developing novel metal-based antimicrobial treatment strategies and identifying the molecular mechanisms of antimicrobial activity, (2) Understanding the molecular mechanisms for antimicrobial resistance (AMR) and bacterial virulence factors, (3) Pathogenicity, detection and control of foodborne Campylobacter species. I previously held postdoctoral research positions at the Universities of Manchester and Sheffield (UK). My research has been presented widely at international conferences, including the Campylobacter, Helicobacter and Related Organisms conference (CHRO) (New Zealand, 2015), the Society for Applied Microbiology (SfAM) AMR symposium (2016), 17th International Biodeterioration and Biodegradation symposium (2017), and the 11th Healthcare Infection Society international conference (2018). I have acted as an applicant on funding proposals by successfully being awarded a number of grants, including as the Principal Investigator of a New Lecturer research grant (SfAM 2018). I hold cross-disciplinary research collaborations with academic, industrial and clinical colleagues. I am a committee member for the International Biodeterioration and Biodegredation Society and hold membership of the Society for Applied Microbiology, The Microbiology Society and The Biochemical Society.

Dr Jonathan A. Butler
Manchester Metropolitan University
(Manchester, UK)

In addition to other published work, I am an author of a number of publications in the antimicrobial metal research field, where we aim to develop novel treatment strategies that could be made available commercially to target the most serious of antibiotic resistant infections. Antimicrobial resistance (AMR) is an ever-increasing global problem with very few novel antimicrobial agents being introduced into the clinical setting. Compounds based on metals from the transition group, including ruthenium (Ru), rhodium and platinum, have previously been exploited for use in anticancer chemotherapy. Previous work has shown that Ru-based compounds also have potent antimicrobial properties and through the process of drug re-purposing, we are now applying Ru-based anticancer drugs as antimicrobial agents. In contrast to traditional antibiotics, these compounds are thought to have multiple sites of antibacterial activity, which will undoubtedly reduce the possibility of resistance evolution. My research group has identified three highly active Ru-based compounds, which individually demonstrate potent selective antibacterial activity against three multidrug resistant bacterial pathogens respectively, including methicillin-resistant Staphylococcus aureus (MRSA) and Pseudomonas aeruginosa. To progress key Ru-based compounds as candidate antimicrobial agents, physical, molecular, biochemical and in vitro techniques are now being employed, with particular focus on the cellular ultrastructure and DNA replication as candidate drug target sites. Crucially, compounds of this class have previously been used for both in vitro cytotoxicity studies and in vivo anticancer experiments. Re-purposing drugs which have passed through various stages of in vivo modelling presents a compelling advantage over identifying completely new compounds in terms of both timeframe and cost when evaluating the antimicrobial agent for potential commercial medicinal application. Our research will make a significant contribution towards the search for novel antibacterial agents to help combat the seemingly unstoppable rise of antimicrobial resistance.

Jonathan A. Butler

Microbially Influenced Corrosion Research at Swinburne University

Scott Wade
Swinburne University of Technology

Prof. *Scott Wade*

I am Associate Professor Scott Wade, leader of a research group investigating microbially influenced corrosion (MIC) at Swinburne University of Technology. Swinburne, based in Melbourne, Australia, was founded as a technical college in 1909 and gained university status in 1992. Today the university hosts over 50,000 students. Swinburne has a focus on emerging technologies and strong industry engagement, and frequently performs very well in the rankings of universities under 50 years old.

MIC describes corrosion processes that have been affected by the presence and/or activity of microbes. MIC can lead to accelerated corrosion of components and structures, with associated localised corrosion rates of up to 10's of millimetres per year. The rapid and unpredictable nature of MIC can lead to dangerous and costly failures and has been conservatively estimated to be responsible for ~20% of corrosion in aqueous systems.

At Swinburne we study various aspects of MIC ranging from fundamental microbial corrosion mechanisms to working with industry partners on applied research. A large proportion of the MIC research that we undertake is focussed on problems related to the maritime environment such as ports and ships. We have established a strong multidisciplinary team with expertise in metallurgy, microbiology and chemistry, and have spent over a decade developing the required experimental and analytical capabilities.

Currently there are no clear guidelines/standards for performing or reporting MIC experiments. For example, the majority of MIC laboratory experiments are performed using microbiological growth media and single strains of bacteria from culture collections or environmental sources. These test conditions are very different from the environmental conditions where MIC-associated structural/component failures occur and do not encompass the complexity of mixed microbial communities. Moreover, individual components used in microbiological growth media can affect the metabolism of microbes used in MIC tests and also abiotic and biotic corrosion processes.

Dr. Jennifer Wood performing sampling microbial communities in a ship bilge where rapid localised MIC can be a problem.

Orange growth/tubercles, typically associated with accelerated low water corrosion is one of the MIC topics studied at Swinburne.

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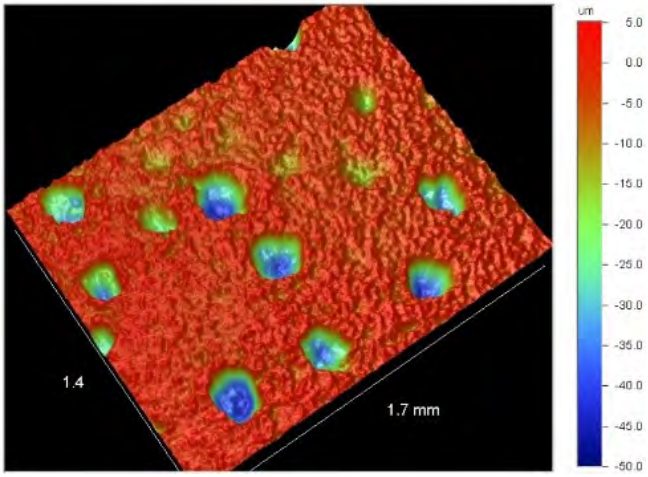
Hence a key focus of the MIC research at Swinburne is to investigate how testing arrangements can affect the outcome(s) of laboratory-based MIC experiments and the applicability of these tests to field-based research.

In relation to metallurgy we have performed studies on a range of different metal types (e.g. carbon steels, copper alloys, stainless steels, etc.), as well as on the effects of microstructure and composition (e.g. carbon steel grades). We maintain a broad range of microbiological stocks, including strains from culture collections e.g., model sulfate-reducing bacteria (SRB) and SRB isolated from MIC-relevant field sites. We also have access to model SRB strains that have undergone directed evolution, for example to increase biofilm formation. We use next generation sequencing (16S rRNA) and predictive functional analysis to understand the diversity and complexity of natural MIC-associated communities, e.g. pilings and ship bilges. In terms of chemistry aspects of MIC, we have studied how different media components can affect microbial metabolism, microbial attachment, as well as the resulting corrosion.

For further information about MIC research at Swinburne University please email swade@swin.edu.au

Localised corrosion of Monel immersed in sea water, evidence suggests that the rapid corrosion (~3 mm/yr) was due to MIC



3D optical profile image showing the localised corrosion of carbon steel from laboratory study using sulfate reducing

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We have a proud history of International Biodeterioration and Biodegradation Symposia going back to Southampton, UK in 1968, followed by Lunteren, Netherlands (1971), Rhode Island (1975), Berlin (1978), Aberdeen, Scotland (1981), Washington, DC (1984), Cambridge, UK (1987), Windsor, Ontario (1990), Leeds, UK (1993), Hamburg (1996), Crystal City, Virginia (1999), Prague (2002), Madrid (2005), Taormina, Sicily (2008), Vienna (2011), Lodz, Poland (2014), Manchester (2017), and in 2021, Montana!

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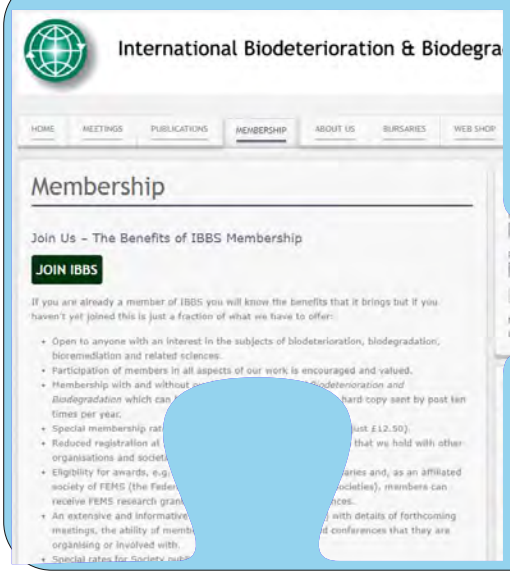
- Regular member contact via our newsletter "IBBS World", and frequent updates through our website and email network.
- Regular Society meetings and conferences - e.g. our triennial symposia - IBBS 18 in Bozeman, Montana, USA in 2021, is a three to four-day showcase event of the Society, although we usually have at least one shorter meeting each year, normally on a specific topic.



An Apology!

A few members who have been trying to renew their membership via the Society's online system may have had a problem with the website – www.ibbsonline.org – being reported as **"unsecure".** This was due to an oversight by our Webmaster and it has now been corrected, so please try your membership renewal again. If you have any further problems with the website or suggestions about how we could make it even better please contact webmaster@ibbsonline.org