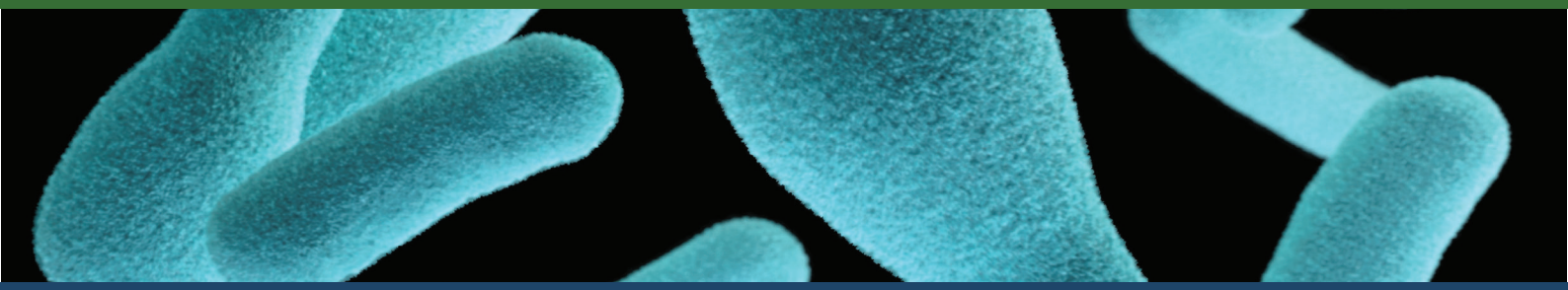
ISMET news

SUMMER 2022 :: issue 22



Biannual Newsletter

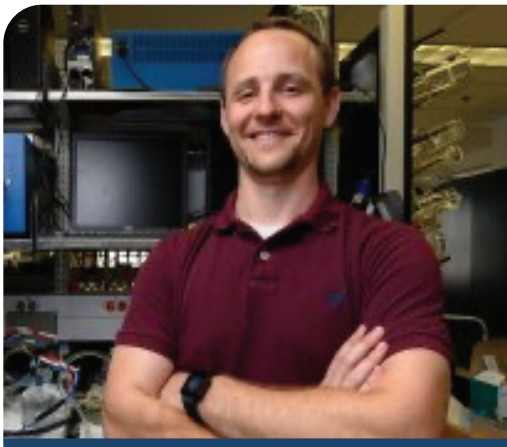
A MESSAGE FROM THE EDITOR

Greetings ISMET Community,

These past few months have been quite challenging globally, but the steady perseverance of this community toward making great scientific progress has been quite impressive to see.
As you may have seen there have been some changes to the structure of the ISMET community. There are now 5 chapters that span the globe and we are very excited to have a society that gives a voice to all of the regions of the world. In this edition of the Newsletter, we have a great collection of submissions from many of these ISMET regions. We have submissions from the ISMET Africa and Latin America chapters that detail some of the exciting work going on in those regions as well as some of the challenges that they are facing. We also have a great article from WISMET (Women in
ISMET) summarizing all of the seminars have held to date to highlight the work from women all across the ISMET community. In addition, we have stories from different ISMET regions detailing some of the challenges of transitioning out of the pandemic has brought. Last, but certainly not least, you can find more information about the ISMET8 Meeting in Chania, Greece as well as a new way to think about daily energy consumption, authored by Dr. Bruce Logan.

As you may have already noticed, there has been some changes in the Newsletter team as well these past few months. During this time, Liz's term as the Editor for the ISMET Newsletter has ended and I have moved into that role. We are all extremely grateful for the time and effort that Liz put into the Newsletter over the last 3 years. She has done a tremendous job leading the team to making the Newsletter a fantastic collection of all of the happenings within the community. While Liz is no longer the Editor, she has graciously agreed to remain part of the team. We are also very excited to welcome Catarina Paquete to the Newsletter team! Many of you know Catarina – her experience and insights have already been a wonderful addition to the team. I also want to take a moment to acknowledge another key member of the Newsletter team, Belén Barroeta. Belén has been involved with the ISMET Newsletter longer than I have and has made countless contributions over the years. Thanks to everyone who has made the Newsletter what it is today, and we will do our best to keep the momentum going!
Lastly, I hope you all are able to take some time to rest, relax, and enjoy the summer with family, friends, and loved ones.

Dr. Matt Yates
ISMET Newsletter Editor



Dr. Matt Yates

ISMET

In this Issue:

ISMET is (becoming) a real global society:

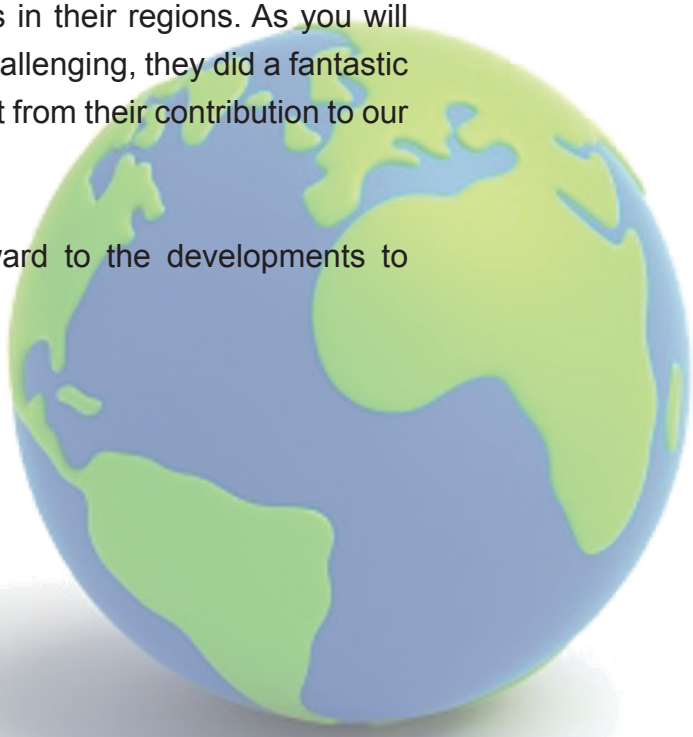
Dear ISMET members,

When founding ISMET about a decade ago researchers from all time zones were involved. These were based mainly in the Northern hemisphere, with the exception of Australia based researchers that were leading in the field at this time, as well. Consequently, ISMET constitutes of three chapters being Northern America, Europe and Asia-Pacific. This structure served the society very well and let it flourish.

Dr. Falk Harnisch

However, with the years it became more and more evident that there is ISMET-related research literally around the globe and not just in all time zones. It covers also the continents in the Southern hemisphere. Thus, it was more than natural to put the issue of this misbalance in the centre of my activities when becoming President-elect in 2019 and strive to make ISMET a truly global society. On this trajectory, the appointment of ISMET Ambassadors and ISMET Vice Ambassadors for Africa and Latin America by the ISMET Board of Directors was one key step. It was a real pleasure to see and support this team of highly motivated and very dedicated researchers to work for researchers in their regions. As you will read in the following, although times are challenging, they did a fantastic job and certainly all of us do already benefit from their contribution to our society.

Personally, I am very much looking forward to the developments to come.
Yours sincerely,



ISMET

News from LA-ISMET

Latin-American network to promote research in the region

Latin-American researchers working on microbial electrochemistry started a network in 2021 with the encouragement of ISMET. The first meeting of the network was held in June 2021 and at that point we had 40 members from 6 countries (Argentina, Brazil, Chile, Colombia, México and Uruguay). From that day, the network has grown, reaching today almost 60 researchers. We are still actively working to increase the number of researchers, in particular to involve researchers from other countries. In our first meeting, we established the aims of the network as follows 1) stimulate and increase the research within Microbial Electrochemistry in Latin America (LA), 2) promote interaction between researchers and research groups, and 3) encourage activities that provide the opportunity to learn, research and coexist in an international environment from educational institutions or research centers.

These were established after a deep discussion on what barriers were detected in our region that prevent the growth and development of microbial electrochemistry in LA. In order to raise the first two barriers, we planned two activities. First, a series of webinars where researchers from the different countries presented their work for the network members and other interested researchers. These webinars were excellent to know the work performed by the members of the network and to learn from their experience. We also reached people from outside the network and it was a way to spread our existence to other researchers. The webinars will continue this work with a focus on postgraduate students.

Second, a regional bioelectrochemistry course has been planned and will be held in June 2022, as “Primera Semana Latino-Americana de Bioelectroquímica (1SLAB)“. This is a very important milestone for our network. The course was organized by researchers from different universities in Brazil and includes lectures from Brazilian, Chilean, and Mexican researchers. It was included as a postgraduate course in three Brazilian universities.

We identified several barriers that the network should focus on removing in the next years.

1) Even though several groups in LA were performing research in microbial electrochemistry, very few collaborations between groups were undergoing and we barely knew each other and the research areas covered by the groups. In general, we have more collaboration with European or North-American researchers than within the region.

2) One of the difficulties limiting the development of this research area in LA is the complete absence of courses in the region addressing bioelectrochemical topics. This makes it difficult to train graduate students and to get them interested in this topic. The costs of doing courses abroad (Europe or NA) are not always possible financially.

3) Research funding is always a barrier in LA, whatever the topic of research we are involved in.

The postgraduate option includes one week of lectures and one week of asynchronous activities. Researchers and professionals (non-graduate students) can participate in the first week. The course covers the following topics:

1. BIOENERGETICS AND EXTERNAL ELECTRON TRANSFER: Electroactive biofilms, structure, mixed and pure inoculum and electron exchange mechanisms.

2. ARCHITECTURE, COMPONENTS AND MATERIALS OF BIOELECTROCHEMICAL SYSTEMS – BES: single chamber, double chamber, ion exchange membranes, preparation of membranes with catalysts.

3. FUNDAMENTALS OF ELECTROCHEMISTRY: basic concepts of electrochemistry. Electrochemical kinetics.

4. ELECTROCHEMICAL CHARACTERIZATION OF BIOELECTROCHEMICAL SYSTEMS (BES) Performance indicators voltage, current, current density, Coloumb. Polarization curve and power curve methodology, meaning and interpretation of results in biological systems

5. CYCLIC VOLTAMETRY: methodology, meaning and interpretation of results in biological systems

6. ELECTROLYTIC CELL TECHNOLOGY: Type of biofilms formed, electrochemical transfer mechanism and energy efficiency.

7. ELECTROCHEMICAL CONVERSION OF METHANE: Progresses into the conversion of methane using electrochemical methods

8. ELECTROFERMENTATION: Recent advances in electrofermentation processes

:: Written by :

Ignacio Vargas (Chile)

Valeria Reginatto Spiller (Brazil)

Angela Cabezas (Uruguay)

News from Africa-ISMET

COVID-19 outbreak two years ago has been a challenging period for both social and scientific activity. Many researchers were frustrated by the sudden stop of research and lost their research momentum. Funding allocated only to COVID-19 thematic areas left other researchers feeling left out and resulted in a period of pause.

However, despite the sudden stop of wet lab activities, in person participation, and face-to-face communication, the good side of the pandemic was that it highlighted the resilience and perseverance of scientists who found multiple ways to overcome this pause to communicate and complete their work. Writing review articles, finalizing unfinished manuscripts, participating or organizing online conferences and webinars have all been ways to overcome the imposed halt.

The comeback has been slow but things are getting back to normal, maybe slower in some African countries due to problems with purchasing of imported material and closed nurseries which affected the work of young mothers with kids.

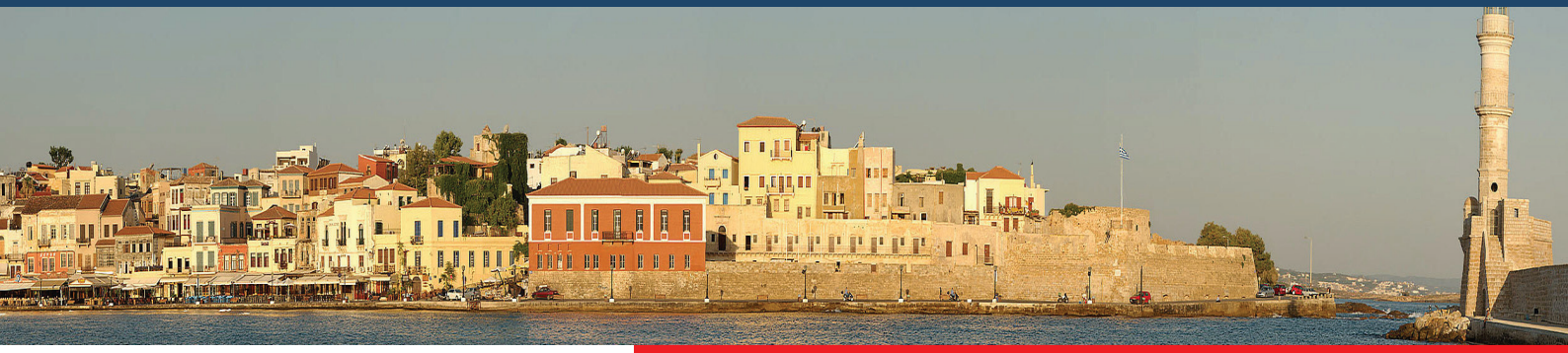
But one thing that came out of the pandemic, it's the renewed passion for the scientific work and the excitement of in-person travel and communication again.

As for the Africa-ISMET chapter, the pandemic provided time to contact African researchers in different countries and start communication about sharing our MET work via an online meeting. This meeting will take place early winter 2022 and will include not only researchers based in Africa, but also African researchers working or studying outside the continent to share the knowledge and experience and launch the first community of African researchers working in the MET field.

:: Written by :

Ola Gomaa (Egypt)

ISMET8 - GLOBAL CONFERENCE



19th-20th September, Chania, Crete, Greece

Dear ISMET members,

After more than two years of online meetings, we are delighted to invite you to join the International Society for Microbial Electrochemistry and Technology - GLOBAL Conference (ISMET8) to be held from 19 to 22 September 2022 in Chania, Crete, Greece.

Organised by the Technical University of Crete, the University of Ghent and the University of Alcalá, this in-person meeting aims at connecting researchers, industry and other stakeholders with an interest in Microbial Electrochemical Technologies (MET) topics from bioremediation and resource recovery to electrochemical, biological and systemic analysis of MET.

ISMET 8
2022 Global Conference
ISMET
THE INTERNATIONAL SOCIETY FOR MICROBIAL ELECTROCHEMISTRY AND TECHNOLOGY

The detailed programme will be available soon. For further details, please visit the ISMET8 website https://www.ismet8.org/en/home.

We are looking forward to welcoming you to Chania this September!

The Conference Chairs:
Prof Nicolas Kalogerakis (Technical University of Crete, Greece)
Dr Abraham Esteve-Núñez (University of Alcalá, Madrid, Spain)

Conference Topics:

1. Bioremediation, resource recovery and water treatment
2. Extracellular electron transfer processes
3. Electrochemistry of microorganisms and enzymes
4. Material science and reactor design
5. Microbial electrochemical synthesis and electro-fermentation
6. Microbial Electrochemical Technology (MET) based sensor technology
7. Electrochemical, biological & systemic analysis of METs
8. Scale-up of MET for commercialisation
9. Novel Applications of METs
10. Other topics / General Discussion

SCAN ME

Research during the Covid-19 pandemic

Part 1

It might not be an exaggeration to say that every human being has been directly or indirectly affected by the Covid-19 pandemic. Like any other field, the impact on the research community was severe, particularly during the early phase of the pandemic. Complete lockdown during the first Covid-19 wave had a tremendous impact on the ongoing research activities in laboratories.

Almost all academic/research institutes were shut down, with short notice to the students/researchers to wind up their lab work. Projects in various labs came to an immediate halt, and most researchers could not resume their work for several months. Although our institute allowed maintenance of essential equipment in the labs, most of the wet lab work had to be terminated.

The students who left the campus/city had difficulties returning to the institutes following the first wave due to the ongoing panic and travel-associated risks. Students who stayed on campus faced severe disruptions in lab resources/consumables/services supplies, which affected the pace of their ongoing work. All these hindrances resulted in considerable delays in research activities. Experiments that could have been completed in a few weeks were stretched over several months.

These challenges were not unique to students; the faculties were also affected in more or less similar ways leading to an apparent decline in the research progress and productivity. The on and off phases of lockdowns continued, and then came the deadly second wave with the delta variant. With the experiences from the previous wave, the institutes and labs were prepared beforehand for any possible disruptions in supplies; hence it had a minimal impact on research, especially for those who could stay back on campus and continue their research during this period. The third wave had an almost negligible impact on the research activities due to its less severity and, importantly, successful vaccination program and well-planned lab activities.

Although working around the constant paranoia and dearth of resources took a heavy toll on everyone at personal and professional levels, like all other things, research activities have resumed back to normalcy over the last year. Institutes like ours have taken measures like extending doctoral student fellowships by six months on a case-to-case basis to compensate for the lost time due to the pandemic. On the brighter side, the different good and bad experiences of the challenging pandemic times have inculcated considerable positive behavioral changes such as compassion, cooperation, and resource sharing amongst researchers, which will eventually benefit everyone in the long run.

Ms. Srishti, Mr. Ramandeep Singh and Dr. Sunil A. Patil (IISER Mohali)

Ms. Srishti

Mr. Ramandeep Singh

Dr Sunil A. Patil

Research during the Covid-19 pandemic

Gaia Salvatori

Lorenzo Cristiani

Clara Marandola

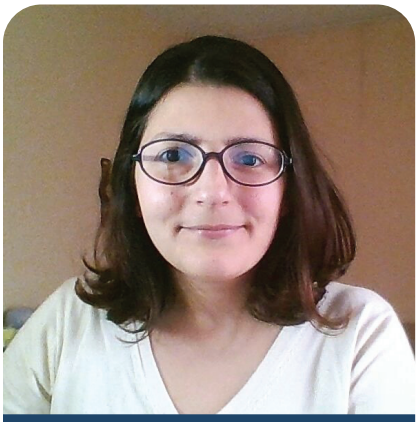
In the last couple of years, the entire world has experienced something that was hardly predictable: A pandemic. In human history many pandemics has passed by; Spanish Flu, Asian Flu, Polio, AIDS etc.
During the Pandemic emergency of SARS-CoV-2, the science world has witnessed a sudden freeze of laboratory activities.
The time usually spent on experiments has been redirected to different activities like writing and reading scientific papers.
While this difficult period limited the collection of data, it encouraged data sharing among researchers. The emergency allowed to improve the discussions among other research groups and support the collaboration which resulted in unprecedented international knowledge sharing. The "mandatory" sharing of knowledge and data has encouraged papers publication and webinar organization. The online discussions and disseminations were fundamental to continue the scientists' duty, which does not end with the laboratory activities. The virtual conferences permitted to enjoy each other's company without spreading the virus and, at the same time, permitted to participate at many more conferences than usual. Thus, not only for an economic cause but also for logistic and timesaving reasons. Obviously, a live conference is more enjoyable, and an oral presentation is more effective if made in presence, but the conveniences are not to ignore.
To conclude, the pandemic has changed the balance between laboratory activities and dissemination, but the scientific community can be proud of itself for the fast and outstanding reaction to this difficult and challenging period. Hopefully, the worst has passed, and it will be possible for everyone in the world to return to normality, but it is important to remember what we have learned:
Collaboration, discussion and dissemination were key words during the pandemic, and it is highly desirable that those words will continue to be crucial beyond the emergency.

Gaia Slvatori (PhD student at Sapienza University of Rome), Lorenzo Cristiani (Post Doc at Sapienza University of Rome) and Clara Marandola (PhD student at Sapienza University of Rome).

WISMET Seminars

The WISMET seminars were launched in 2021 during the pandemic to facilitate the communication and interaction of the female community of the ISMET. The lack of in person ISMET meetings during the pandemic decreased the interaction of the ISMET community, fragilizing the communication of young students and postdocs within the society. The WISMET seminars were created to provide the opportunity for female researchers to present their work across the ISMET international community, as well as to support them by creating professional connections and providing them with an opportunity to discuss the unique life demands of female scientists across the world.

To date, six young speakers presented their research on microbial electrochemistry and electromicrobiology:



Ezgi Ogun

May 2021 - Ezgi Ogun, PhD Student from Hacettepe University, Environmental Engineering Department, Ankara, Turkey, presented on the "Utilization of bioelectrochemical mechanisms in environmental engineering applications: treatment and remediation examples."

Veera Koskue

July 2021 - Veera Koskue, PhD student from Faculty of Engineering and Natural Sciences, Tampere University, Finland presented her work on "(Bio)electrochemical nitrogen recovery from digested sewage sludge reject water."

Sanne de Smit

October 2021 - Sanne de Smit, PhD student from Environmental Technology, Wageningen University & Research, Wageningen, The Netherlands, presented "Metals magic: What happens with metals from microbial growth medium in Microbial Electro Synthesis?"

WISMET Seminars

Sara Tejedor Sanz

December 2021 - Sara Tejedor Sanz, Senior Scientific Engineer Associate at the Advanced Biofuels Process Development Unit, Lawrence Berkeley National Lab, USA presented “Extracellular electron transfer in lactic acid bacteria: squeezing fermentation using electrodes as redox sink”.

Rehab Hamdy

March 2022 - Rehab Hamdy, Postdoctoral Researcher at Washington University, St. Louis, Missouri, USA, presented “Nanostructured based microbial fuel cell as a biosensor of algal-photosynthetic productivity”.

Yamini Jangir

June 2022 - Yamini Jangir, Postdoctoral Scholar Research Associate in Biology and Biological Engineering, California Institute of Technology, California, USA, presented “From chitin degradation to iron reduction: Living in the deep sea sediments”.

WISMET seminars are scheduled every two months and are open to the entire ISMET community. These seminars enable young researchers to present and discuss their work with their peers, with an informal discussion among the attendees at the end of the presentation. WISMET seminars recognize the ongoing research of junior scientists within the community, and foster opportunities for possible collaborations among the researchers across the world.

If you want to be part of these seminars and be the next WISMET speaker, please email Sarah Glaven (sarahglaven@gmail.com) or Catarina Paquete (cpaquete@itqb.unl.pt).

website

SCAN ME

ISMET Public Engagement Day kicks off

Within the aim of developing dissemination and pass on to all audiences the interest for the research into microbial electrochemical systems, the **1st Annual ISMET Public Engagement Day** was held on 20th June. The event consisted of a Twitter competition, which after several requests was extended till the 24th June.

The contest was open to all research groups working in the field of microbial electrochemical system. To participate they had to tweet an entry to disseminate to the world their research within the ISMET field. The nature of the post was completely open and included, but were not limited to, a video, an image, a drawing, the recording of an activity performed, a song, etc.

The organizing committee selected the awardees based on the effectiveness of dissemination and education for a broader audience (30 %), science rigorousness (30 %), creativity (25 %), and the number of likes and retweets (15%).

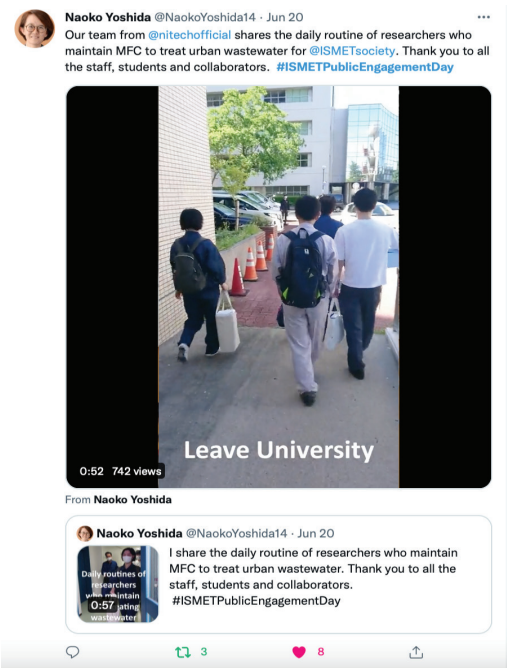
Naoko Yoshida, from Nagoya Institute of Technology-Nitech, was awarded the first prize with a video about the daily routine of researchers who maintain MFC to treat urban wastewater.

Paolo Dessi from University of Galway got the second prize as he showed the MFC music while reaching the open circuit voltage.

On third place, **Paniz Izadi**, form Helmholtz Centre for Environmental Research – UFZ, posted a picture of model applications of bio-electrochemical systems and their implementation in society.

In this first edition, participation was not very high, but the quality of the proposals was extraordinary. The ISMET hopes that the next event will have a massive turnout and extend the scope of our investigation.

The winners will be presented during the ISMET8 Global Conference to be held in Chania, Crete, Greece in September 2022.



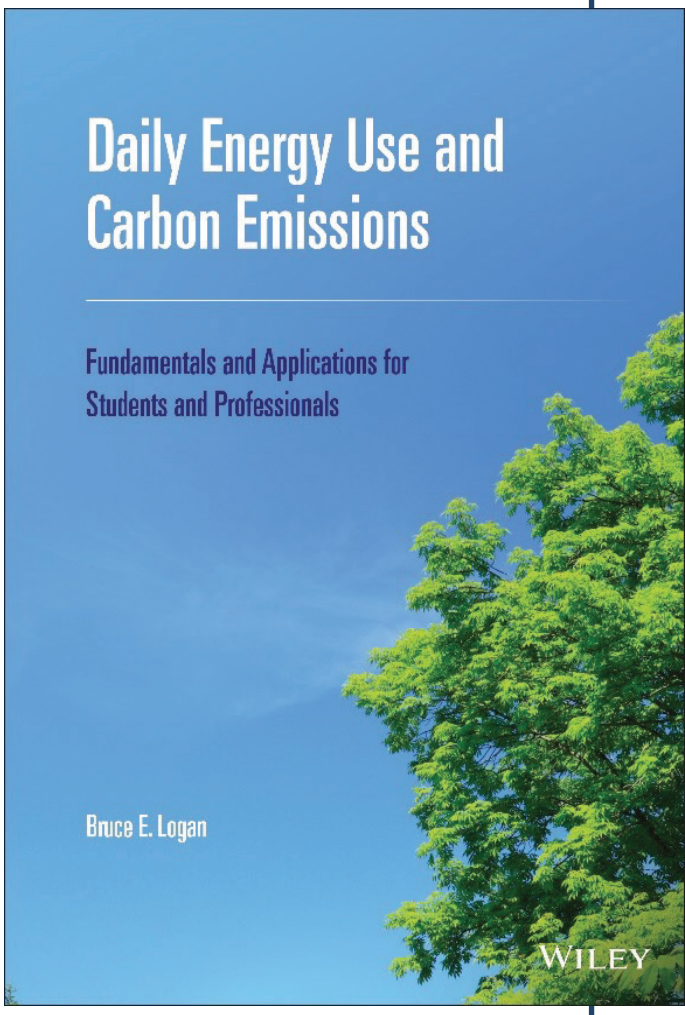
:: Written by :

Belén Barroeta (Spain)
Mirella di Lorenzo (UK)

“Daily Energy Use and Carbon Emissions”

By Bruce E. Logan

This new book by Bruce Logan at Penn State University (published by Wiley) addresses energy and water uses and carbon emissions from the perspective of individual consumption against a background of national and global averages. The idea advanced by Logan is that reducing fossil fuel consumption, carbon emissions, and other greenhouse gases can be more effectively facilitated through a better understanding of how much energy we use when the amount of energy is expressed in easy-to-understand terms, and without the need for large units that can make the information difficult to relate to in our daily lives. Thus, energy use is normalized to food energy for one day, called a daily energy unit D, carbon emissions are normalized to that carbon dioxide released from eating that food (1 C), and water use is expressed relative to that which we need to live (1 w). Once these numbers are normalized to these baselines it is easy to relate your own activities to national averages and see how your lifestyle contributes to climate change. For example, how much energy is used for your home compared to your car? How do carbon dioxide emissions compare from one overseas trip to a year of driving to work?



Environmental Engineers can use this book as the sole textbook for a course on energy use and climate change, or as a supplement to other courses. There are numerous examples, written out clearly with appropriate units, that show how we can calculate energy in gasoline versus our food, how much primary energy is used to produce electricity in the US, and how carbon emissions differ from electric vehicles due to the power plants used to produce that electricity compared to gasoline used by an internal combustion engine vehicle. This book will prepare the next workforce of engineers, scientists, and others to understand the challenges of modifying our energy and industrial infrastructure and help them to infuse low-carbon energy solutions into different engineered systems. The book can be used at virtually any undergraduate level, for example in a freshman seminar or a junior-level course focusing on energy, climate and sustainability related to the engineered infrastructure. Lectures, exams, book figures, and other course-related materials are available from the author and will soon be uploaded to the Wiley site.

The book is available electronically and in print (ISBN: 978-1-119-83102-0).

The cost of the e-book is $72, and the print version (in color) is $89.95.

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Online Newsletter
Involvement in the ISMET community
Full usage of the online platform, with available information on posting jobs, research information and protocols

For more information go to: https://is-met.org

Newsletter editorial board members

Contributors to this issue: Matthew Yates (US Naval Research laboratory, USA), Catarina Paquete (ITQB NOVA, Portugal), Elizabeth Heidrich (Newcastle University, UK), Belén Barroeta (IMDEA Water, Spain), Falk Harnisch (UFZ Leipzig, Germany), Ignacio Vargas (Pontificia Universidad Católica de Chile, Chile), Valeria Reginatto Spiller (Universidade de São Paulo, Brazil), Angela Cabezas (Technological University ,Uruguay), Ola Gomaa (Egyptian Atomic Energy Authority, Egypt), Nicolas Kalogerakis (Technical University of Crete, Greece), Abraham Esteve-Núñez (University of Alcalá, Spain), Ms. Srishti (IISER Mohali, India), Ramandeep Singh ((IISER Mohali, India), Sunil A. Patil (IISER Mohali, India), Gaia Salvatori (Sapienza University of Rome, Italy), Lorenzo Cristiani (Sapienza University of Rome, Italy), Clara Marandola (Sapienza University of Rome, Italy), Sarah Glaven (US Naval Research laboratory, USA), Bruce Logan (Penn State University, USA)