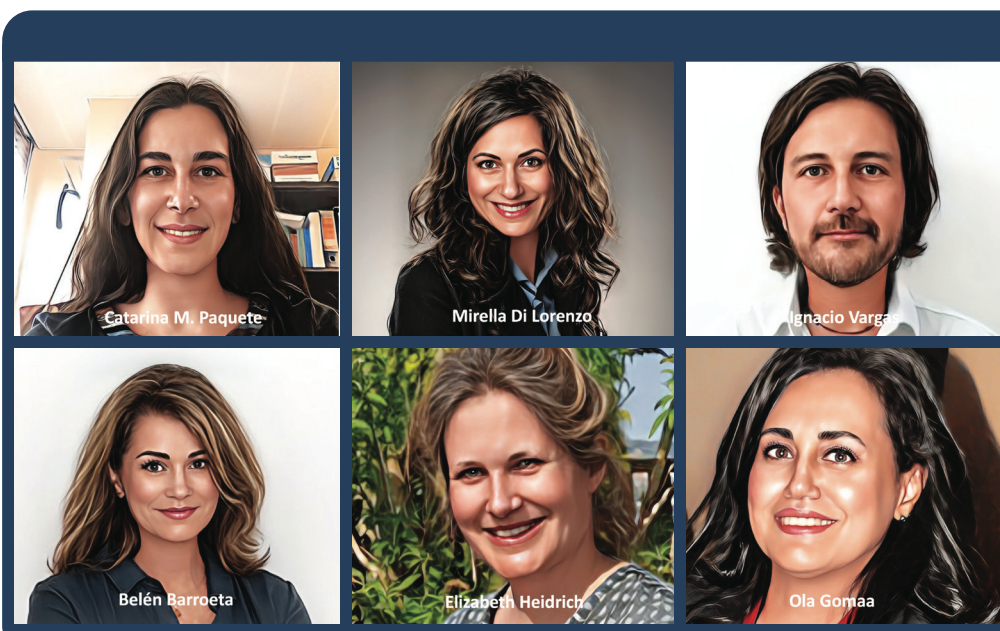


Biannual Newsletter

Dear ISMET news readers,

Hope you are doing great on the new year! We begin a new year with revised bylaws and diverse committees, including the ISMET Public Engagement and Outreach Committee, comprised by the following ISMET members:

Catarina M. Paquete (PT)
Mirella Di Lorenzo (UK)
Belén Barroeta (SP)
Elizabeth Heidrich (UK)
Ignacio Vargas (CL)
Ola Gornaa (EG)



We are thrilled to be part of this committee and offer you with comprehensive information on the Microbial Electrochemistry and Technology field. This will be performed through our bi-annual newsletter. It will be our responsibility to keep you updated on the latest news in the field, including upcoming events, meetings, workshops, and conferences, as well as newly completed PhD. We will also draw attention to outreach activities and continuous initiatives taking place globally within the ISMET community. Additionally, though our ISMET chapters, we aim to showcase the exciting science and activities happening globally within our community. To achieve this, news from ISMET regions will also be featured in the newsletter.

The field of Microbial Electrochemical Technologies has reached a point where interdisciplinary collaboration between disciplines, such as microbiology, electrochemistry, biochemistry, material science, engineer and physics is necessary for continued advancement and practical applications. Although preliminary prototypes pilot scales and pilot-scale systems have demonstrated the viability of these technologies, further research and development is required. This progress can only be achieved through collective efforts of the community. Though our newsletter and social channels, we will highlight the captivating science and initiatives taking place within our community, to disseminate this knowledge to a wider audience.

We encourage you to contribute to our newsletter and aid in promoting innovative activities, cutting-edge research, and significant achievements in the field of Microbial Electrochemistry and Technologies.

If you want to contribute or if you have any question, please contact us – ismet.outreach@gmail.com .

The ISMET Public Engagement and Outreach Committee

New Bylaws

ISMET is a Global Society!

We are scientists and thus legal documents are certainly not the favourite reading of most of us. At the same time, these legal documents are required for organizing how our diverse society can live together. This is true for entire states and unions as well as for an academic society like ISMET. For ISMET the bylaws are the written constitution. In the bylaws the rights and privileges of ISMET members as well as their duties are stated. The bylaws determine what committees we have and also define the rules for our interactions as written in the code of conduct. We encourage you to have a look at <https://is-met.org/bylaws/>.

As you are certainly aware of these bylaws were updated and came into effect by 01.01.2023. These were revised during a long process and finally approved with more than 95% of the votes by you, the members of ISMET, in summer 2022. In a nutshell the most important changes are:

- ISMET now has five Chapters (A-Africa, AP-Asia Pacific, EU-Europe, LA-Latin America, NA-Northern America).
- Two representatives per Chapter will be send as member to the Board of Directors that each serves for 4 years;
- Elections will take place for all Chapters (at the same time) every 2 years, all members of ISMET will vote for one Chapter, only. Here a transition period is in place, for which A- and LA-ISMET will elect their first member of the Board of Directors each in 2023.
- The President stays outside regional representation and will be elected from the members of the Board of Directors, to serve 2 years as President (meaning a maximum of 6 years in the Board) meaning the Board will have 10 members + 1 President
- A code of conduct is introduced.
- ISMET Fellows are introduced with the first class of Fellows being already appointed as <https://is-met.org/fellow/>

Finally, ISMET now has the following committees in place with the current chairs and composition:

Awards Committee: *Chair:* Jeffrey Gralnick (NA); *Members* are selected ad hoc by the committee chair

Public Engagement and Outreach Committee: *Chair:* Catarina Paquete (EU), *Deputy Chair:* Ola Gomaa (A) *Members:* Belén Barroeta (EU, Social media officer), Elizabeth Heidrich (EU), Mirella di Lorenzo (EU, outreach officer), Ola Gomaa (A) and Ignacio Vargass (LA), *Newsletter Editor:* Catarina Paquete (EU), *Deputy Newsletter Editor:* Belén Barroeta (EU)

Membership Committee: *Chair:* Deepak Pant (EU), *Deputy Chair:* Ricardo Louro (EU), *Members:* Sunil A. Patil (AP), Jason Ren (NA), Igor Vassilev (EU) and Ludovic Jourdin (EU), Kun Guo (AP)

Conference Committee: *Chair:* Annemiek ter Heijne (EU), *Members:* Kun Guo (AP), Bernardino Viridis (AP), Jeffrey Gralnick (NA), Bruce Logan (NA)

In addition, **WISMET**, our networking and mentoring collective to support female researchers in the field, is continuing its great activities. For more information on WISMET and how to participate, please visit <https://is-met.org/wismet/>.

We are confident that this new structure makes ISMET not only an inclusive and truly global society, but also forms and excellent foundation for the future!



Falk Harnisch (ISMET President)

Jeffrey Gralnick (ISMET President-elect)



I would like to start saying that in general attending a conference is a great way for students for presenting their work, but there is so much more to be gained from participating a conference that goes beyond a presentation and therefore students should be encouraged to participate.

Conferences are an essential part of students academic life, they are great opportunities to increase our networking life, our skills in communication and professional interactions but also learn a lot about the latest researches in our area. I think I have achieved all these objectives even if only partially, and this is certainly thanks to the excellent organization of the conference, the world of microbial electrochemistry encompasses such a wide diversity of disciplines that it is difficult to even imagine what the organization of such an event could mean.

One of the things that surprised me the most is the curiosity and desire to ask questions and learn that some members have demonstrated, the world of bioelectrochemistry is so deep and with so many applications that all this desire to know will never be fully satisfied.

In my opinion, what clearly emerged during the conference are the next megatrends in terms of future applications, for example: bioelectrochemical fermentation, biosensor, bioremediation but also the recovery of resources, all this supported by fundamental research such as extracellular electron transfer and phylogenetic studies. All this in order to say that it has been very interesting to understand the evolution that has taken place over the years and that the future looks very promising.

I conclude with a small criticism, five conference days are a lot, in fact I noticed a decrease in participants as the week progressed, but apart from this (it all depends on the commitments of the participants). I noticed that the time dedicated to networking after lunch was, in my opinion, not really exploited and resulted in the lengthening of the day, sometimes ending up a little too late with the presentations. I would suggest bringing the two sessions closer together (morning, afternoon) and perhaps including extra scientific activities such as sports or games to increase the engagement and participation of everyone, even the shyest ones, at the end of the day.

Anyway, everything has been very nice, seeing former colleagues, meeting new ones and surprisingly bonding more with laboratory colleagues.

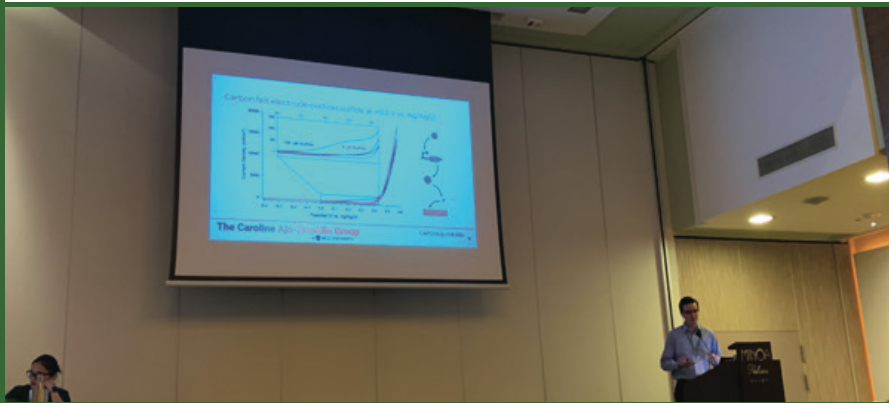
Like an electron looking for a place to rest, I will eagerly await the next ISMET9 conference, hoping to be able to participate, perhaps with interesting news.



ISMET 8

Report from participants

ISMET is one of my favorite organizations to interact with. From the local meetings to the recent worldwide meeting, I always find that the organization fosters research excellence, scientific advancement, and a strong sense of community.



Joe Tolar (Rice University, USA)



The conference this past year was an absolute blast! The location and venue were stunning and reasonably priced, even for those coming from the US. I loved how the conference organizers put together dinners and events at other locations because it allowed the attendees to interact and build relationships outside of the traditional conference setting. In my opinion, these interactions were just as valuable as the post and platform presentations.

I also really enjoyed the content presented at the conference. It was great to learn about parts of the field that I had never experienced. I especially enjoyed the fact that presentations were awarded to researchers at all stages of their career. As a graduate student, you don't often expect to get a full platform presentation at an international meeting, so I was ecstatic and nervous to get up and share my work. Luckily, the audience again reflected the characteristics of ISMET and provided constructive and encouraging feedback.



Overall, the ISMET meeting has been one of my most memorable and impactful conference experiences. I'd recommend attending their next local or global meetings to anyone in the field, regardless of career stage or project success.



ISMET 8

Report from participants

The conference provided a forum for scientists and engineers in Academia and Industry to come together and explore future trends and the latest advances in microbial electrochemistry research and applications of bio-electrochemical systems, covering topics from fundamentals to scale-up processes, electro-bioremediation, electromicrobiology, and resource recovery.

Last May, I have submitted an abstract to the conference portal for a flash. The submitted abstract (No. 212) has been accepted by the ISMET-8 organizing committee for ORAL/POSTER presentation. Accordingly, I was formally invited to participate in the conference and give a POSTER with a 5-minute flash oral presentation at this international event.

This conference was the largest dedicated to the field of my PhD research Bioelectrochemistry, attracting hundreds of academic and industry researchers from around the world. The International Society for Microbial Electrochemistry and Technology (ISMET) has an excellent reputation for providing this congress every 2 years.

The networking opportunities appealed to me, as did the opportunity to learn from some of the most celebrated scientists in the field such as Bruce Logan, whom I had a picture with him along with my colleague and lab partner Kyle Bowman.



Radwa Ibrahim
(University of Westminster, UK;
Alexandria University, Egypt)

I was particularly interested in sessions related to bioremediation and resource recovery, which is the wider scope of my research.

In addition to the conference sessions, the two workshops held before the welcome event in the morning of 19th September have been of utmost value to me; the chance to network with other researchers in similar situations was a very valuable experience. I was also able to interact with students at my stage of work. I was very happy to have made friends from around the globe, especially with Ph.D students at UK institutions. The opportunity to learn about the latest research new technologies and discuss current methods with the best in the field was very worthwhile. The constructive and valuable feedback I received from senior researchers helped me become clear on the next steps in my own upcoming experiments.

2022 Discovery award

Ricardo Soares, Nazua L Costa, Catarina M. Paquete, Claudia Andreini, Ricardo O. Louro: A new paradigm of multiheme cytochrome evolution by grafting and pruning protein modules, 2022, *Molecular Biology and Evolution*

Know the first author: Ricardo Soares has a Bachelor's degree in Biology and a Master degree in Microbiology. He is currently a PhD student in Biochemistry at the Inorganic Biochemistry and NMR laboratory at the Instituto de Tecnologia Química e Biológica António Xavier of Universidade NOVA de Lisboa in Portugal under the supervision of Prof. Ricardo O. Louro and Dr. Catarina M. Paquete. In parallel, he is also a specialized technician at the Institute for Agricultural and Veterinary Research INIAV, also in Portugal, where he works in research and development of biofertilizers based on the nitrogen fixing bacteria rhizobia.

In his PhD, he is studying novel multiheme cytochromes involved in the nitrogen, sulfur and iron biogeochemical cycles in terms of evolution, structure and function. He aims to combine different schools of knowledge that includes biospectroscopy, biochemistry, microbiology and bioinformatics to obtain a more complete understanding of multiheme cytochromes.

The research work: Multiheme cytochromes are key molecular players for the extracellular electron transfer process of electroactive organisms that couple their bioenergetic metabolism to the reduction of metals, such as iron and manganese oxides, and even electrodes. These proteins are also pivotal for the catalysis of some crucial reactions of the nitrogen and sulfur cycles. One of the biggest mysteries around multiheme cytochromes is to decipher how nature has played with protein sequences in order to produce a wide range of multiheme cytochromes with different folds, heme numbers, heme coordination environments and ultimately different functions! Up until very recently, we thought that evolution of multiheme cytochromes followed a process composed by a series of gene fusion events towards complexity with higher heme content per polypeptide chain. This modular evolution hypothesis of multiheme cytochromes was tested in detail. A multidisciplinary approach composed by a detailed phylogenetic analysis using structural and sequence information was used to study the evolution of the largest group of homologous multiheme cytochromes known, the ones involved in the nitrogen, sulfur and iron biogeochemical cycles. It was previously thought that in this group, the pentaheme nitrite reductase NrfA and the tetraheme cytochrome c_{554} were at the origin of the remaining, octa, nona and undecaheme cytochromes, by a gene fusion event. Using a novel approach, the researchers obtained data that supports a scenario where the last common ancestor was an octaheme cytochrome nitrite reductase and that grafting and pruning from this octaheme framework originated the extant diverse multiheme cytochromes. NrfA and cytochrome c_{554} belong to different clades and are rather a result from a gene fission event from the ancestral octaheme cytochromes that resembled ONR and MccA, respectively. This study opens a new perspective for the understanding of multiheme cytochrome evolution and their transformative role in the interplay between biology and geochemistry over large timescales, a step closer to understand nature's "script" regarding multiheme cytochromes.



Ricardo Soares (ITQB NOVA, PT)

2022 Innovation award

Ruggero Rossi, Andy Y. Hur, Martin A. Page, Amalia O'Brien Thomas, Joseph J. Butkiewicz, David W. Jones, Gahyun Baek, Pascal E. Saikaly, Donald M. Cropek, Bruce E. Logan: Pilot scale microbial fuel cells using air cathodes for producing electricity while treating wastewater, 2022, Water Research



Ruggero Rossi (John Hopkins Univ., USA)

Ruggero Rossi is assistant professor at Johns Hopkins University in the Department of Environmental Health and Engineering. Prior to joining Johns Hopkins, Dr. Rossi was an Assistant Research Professor at The Pennsylvania State University following a Postdoctoral fellowship under the direction of Dr. Bruce Logan in the same institution. Dr. Rossi graduated from the University of Bologna, Italy, in 2017. His current research efforts are in renewable energy production and the development of a sustainable water-energy infrastructure.

It is fantastic to see our paper receiving attention through the prestigious ISMET Innovation Award. In this work, an interdisciplinary team collaborated with the U.S. Army Corps of Engineers to scale-up a reactor configuration enabling wastewater treatment at a fraction of the cost of conventional wastewater treatment technologies. The study was carried out for approximately 10 months and at 850 liters, our system was one of the few installations at the pilot scale level, generating electrical energy while purifying domestic and industrial wastewaters.

ISMET AWARDS



The purpose of this award is to acknowledge the best technical innovation within the field of microbial electrochemical technologies as published between July 1st of the previous year and the reviewing deadline.

The award is open to all postgraduate students, postdoctoral researchers and industry affiliates who are ISMET members in good standing.

The nominations for both the Discovery Award for Best Scientific Paper and the Innovation Award for Best Technological Advancement are to be made throughout the year by the supervisor of the publication being nominated.

For more information check the webpage <https://is-met.org/awards/> or send an e-mail to ismet.awards@gmail.com.

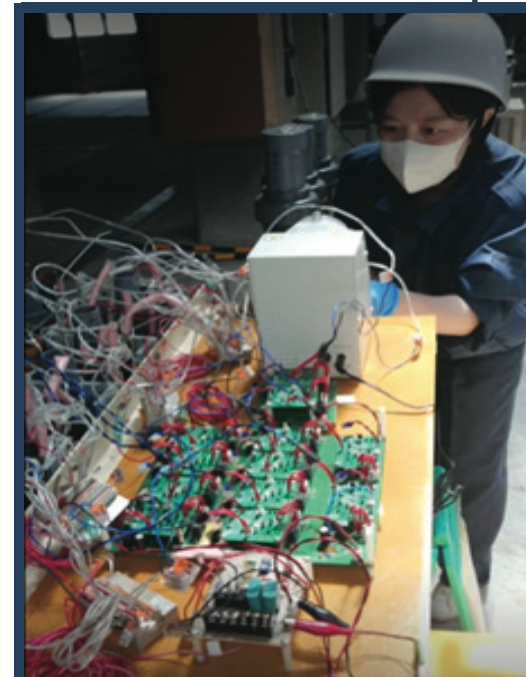
Public Engagement Awards



Is MFC sewage treatment research outdated?

It has been almost 10 years since I started MFC research. MFC research had already been actively conducted all over the world at that time, and our research was supported by many pioneering studies. I found the #ISMETPublicEngagementDay when I was starting out on Twitter and thought it would be a more effective way to let people know our research than being buried in many excellent published papers. I am very grateful to the ISMET committee planned this event.

I had a great time at ISMET-8 in Greece. Talking with young and energetic researchers, I could feel the atmosphere that sewage treatment research using MFC is old-fashioned, but I believe that we can reward the achievements of our pioneers by steadily making every conceivable improvement and evaluation. In order for sewage treatment MFCs to be put into practical use, the energy benefits must be commensurate with the cost of installation, organic matter and nitrogen must meet planned discharge levels, the unit must be able to withstand water pressure and sewage contamination for a long period of time, and predictive calculations must be able to be performed to propose an ideal design. Even though the work is quite tough and unspectacular, we sometimes encounter the wonders of microbial ecology and principles. I hope to continue to enjoy finding newness hidden in old trends.



Naoko Yoshida (Department of Civil Engineering, Nagoya Institute of Technology, Japan)

Hearing the microorganisms on a Microbial Fuel Cell



I am Dr Paolo Dessì, I have a PhD degree in Environmental Technology currently hold a Marie Curie individual fellowship and work as researcher at the University of Girona, Spain. My research focuses on bioelectrochemical CO₂ conversion to green chemicals and fuels. More precisely, we are developing in Girona a novel two-step process based on microbial electrosynthesis and fermentation to convert CO₂ to hexanoate with high selectivity. I am also co-leading a project in my former university in Galway, Ireland, where we are developing a scalable cell stack design to treat real CO₂ effluents from cement industry.

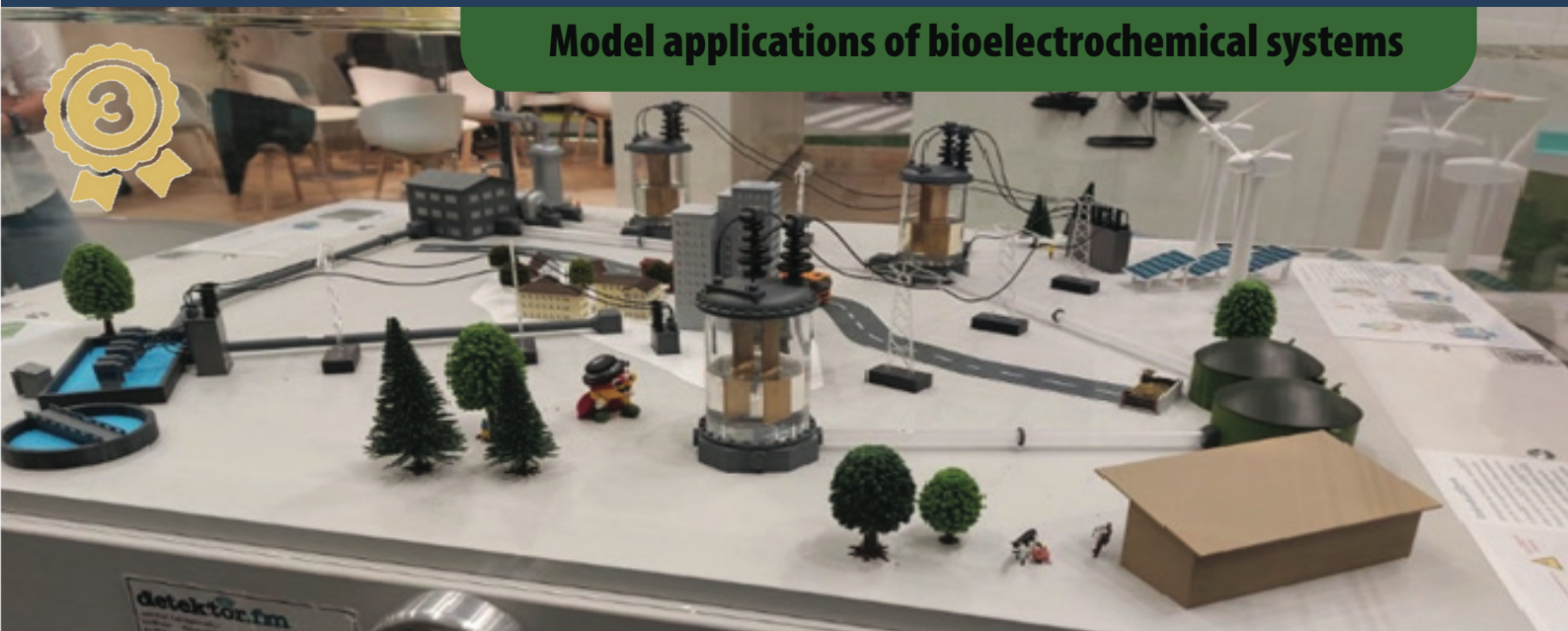
My entry for the ISMET engagement day is a sediment microbial fuel cell connected to a home made circuit that reproduces a different sound depending on the cell voltage in the range from 0 to 1 V. This was realized by me and my former colleague Dr Carlos Sánchez, in collaboration with the visual artist Margaret O'Brein, as part of her artistic exhibition INTERFERENCE IV, aiming at showing the link between nature and energy. Margaret added the lights, whose intensity is also modulated by the cell voltage. We also exhibited the "music cell" in Girona for the European Researchers' Night 2022, where it became very popular among kids. We are really proud of taking our research topic outside the lab, and exploit its full potential for artistic and educational purposes.

Paolo Dessi (University of Girona, Spain)

Public Engagement Awards



Model applications of bioelectrochemical systems



The model illustrates in a ludic way how different bio-electrochemical approaches can be integrated into existing urban and rural infrastructures to contribute to a bio-based circular economy. In bio-electrochemical systems, microbial processes are coupled with electrochemical reactions so that material and energy cycles that are separated today will be linked. For example, bio-electrochemical systems can be used to generate electric energy directly from wastewater. Furthermore, microorganisms can be applied to produce energy carriers or building blocks for the chemical industry from the industrial waste material CO_2 and renewable energies.

Paniz Izadi (Helmholtz Center for Environmental Research, Leipzig, Germany)

NEXT WISMET SEMINARS

On **March 23th**, 9 am PDT, 6 pm European time (CET)

Name of the speaker: Dr. Anaísa Coelho

Position and Affiliation: Postdoctoral Research at University of Southern California, USA

Title: "Unraveling the extracellular electron uptake pathway of *Sideroxydans lithotrophicus* ES-1"



On **July**

Name of the speaker: Dr. Ramya Veerubkotla

Position and Affiliation: Postdoctoral fellow at Aarhus University, Denmark

More information on these seminars can be found in: <https://is-met.org/wismet/>

The sustainable route of the ISMET8 conference!

The International Society for Microbial Electrochemistry and Technology Global Conference (ISMET 8) was held in Chania (Crete, Greece) from 19 to 22 September 2022, and it was a fantastic opportunity for scientists all around the world to meet (finally in person!) in a wonderful location talking about science and not only science! A main question that raised during the discussions was how to make the ISMET society more environmentally sustainable. So, since research needs to be complemented by practical actions, after few months of reflections the inspiration arrived on “what to do”!

In Crete there is a non-profit organization, the Orthodox Academy of Crete (OAC), established in 1968 as an International Conference Center that is also a Research Institution with a deep respect of nature and a focus on protection of the natural environment.

Indeed, the OAC presently covers about 1/3 of its energy needs through rooftop solar panels and considerable efforts are being made to increase this fraction. Therefore, some revenues from the ISMET8 Conference have been devoted to OAC to expand the number of solar panels on its rooftop with the objective to neutralize (at least partially) the CO₂ emissions of the flights of the Conference participants. Thanks to all the ISMET8 participants for their contribution to the expansion of the OAC’s photovoltaic project!!!

A special thank goes to Antonis Kalogerakis, head of the Institute of Theology and Ecology (Dep. of OAC) for supporting this initiative.

:: Written by :

Marianna Villano (ITALY)

Michaela TerAvest (USA)



Carbon neutral society

The ISMET Forest keeps growing

The ISMET forest has expanded with the recent plantation of 10 beautiful olive trees (*Olea europaea*). They were added to the existing 150 trees on the campus of the University of Alcalá (UAH) during the ISMET8 meeting and to offset CO₂.



Conference chairs of ISMET8 Nicolas Kalogerakis (TUC) and Abraham Esteve-Núñez (UAH) visited early February the plantation in the Royal Botanic Garden, Spain.

The ISMET Forest is a project launched in 2014, following EU-ISMET. Trees of native species (*Quercus ilex* and *Quercus faginea*) and ash trees (*Fraxinus*) were donated to make the meeting of 200 participants a CO₂ neutral event. The ISMET Council has decided to make it a permanent activity and financial support to the plantation to compensate the carbon footprint.

The Alcalá Royal Botanical Garden has participated in this initiative with both material and human resources.

Next EU-ISMET

Following the success of EU-ISMET5, the sixth European Meeting of the International Society for Microbial Electrochemistry and Technology (ISMET) will be back with a live audience. EU-ISMET6 will be hosted in the small but lively city of Wageningen, The Netherlands. We encourage scientists, industries, governmental organizations and other stakeholders that are interested in the world of microbial electrochemical technologies to participate in this conference. With the EU-ISMET6 conference, we like to contribute to the further development of an inspiring ISMET community.

The meeting will allow you to meet and interact with leading experts in the field of METs and to present your research in a unique setting. Besides lively keynote presentations, including those from **Catarina M. Paquete** (Universidade NOVA de Lisboa, Portugal) and **Lars Angenent** (Universitat Tuebingen, Germany), we have chosen to organize several interactive sessions and poster pitch sessions where many researchers are given the opportunity to present their work. Next to these more traditional presentation, there is also the option to sing or dance your research in a creative session or to present your vision on research and/or application of this beautiful technology. Of course there will also be a wide range of social activities, ranging from a pub quiz to the opportunity to get active during a Campus run or walk. And we hope to see many of you in Wageningen in September.



Wageningen, The Netherlands

Please check out our website for the full program and range of presenting possibilities.

<http://www.euismet2023.eu/>

ORGANIZING COMMITTEE: Annemiek ter Heijne, Tom Sleutels, David Strik, Sanne de Smit, Shih-Hsuan Lin and Philipp Kuntke



EUISMET
2023

September 6-8, 2023
Wageningen, Netherlands

www.euismet2023.eu

Abstract submission closes

April 1st!

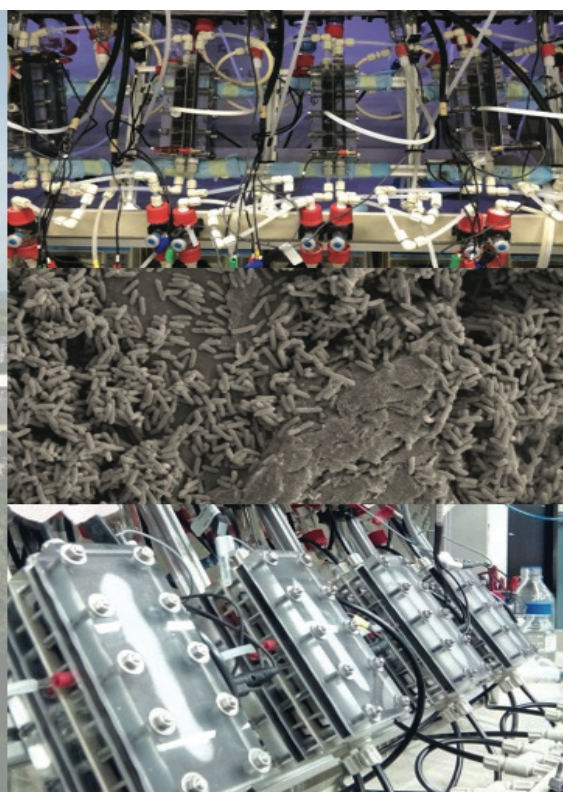


@EUISMET2023

WAGENINGEN UNIVERSITY

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Next AP-ISMET

The next AP-ISMET will be held on **July 27-28 in Seoul**, South Korea: The Korea Chamber of Commerce & Industry. Seoul is one of the symbolic megacities in the world, being full of dynamic culture, tourism and innovation: music, food, fashion, nature, and history - mixture of innovation & tradition. This AP-ISMET will be co-hosted with the Association for Carbon-neutral Circular Economy (ACCE) to better feature "carbon neutrality" and "circular (bio)economy" in the event. For the AP-ISMET, we will focus on (1) energy, and (2) carbon capture and utilization, which well aligns with future direction, as well as ACCE focus. We believe that this co-hosted event will benefit a diversity of attendees and improve engagement from academia to industry. Selected presentations in the AP-ISMET/ACCE international conference will be invited for Special Issues in Bioresource Technology and ACS ES & T Engineering. We are very excited to have you in Seoul and share our discoveries, opinions and perspectives on sustainable and resilient society.



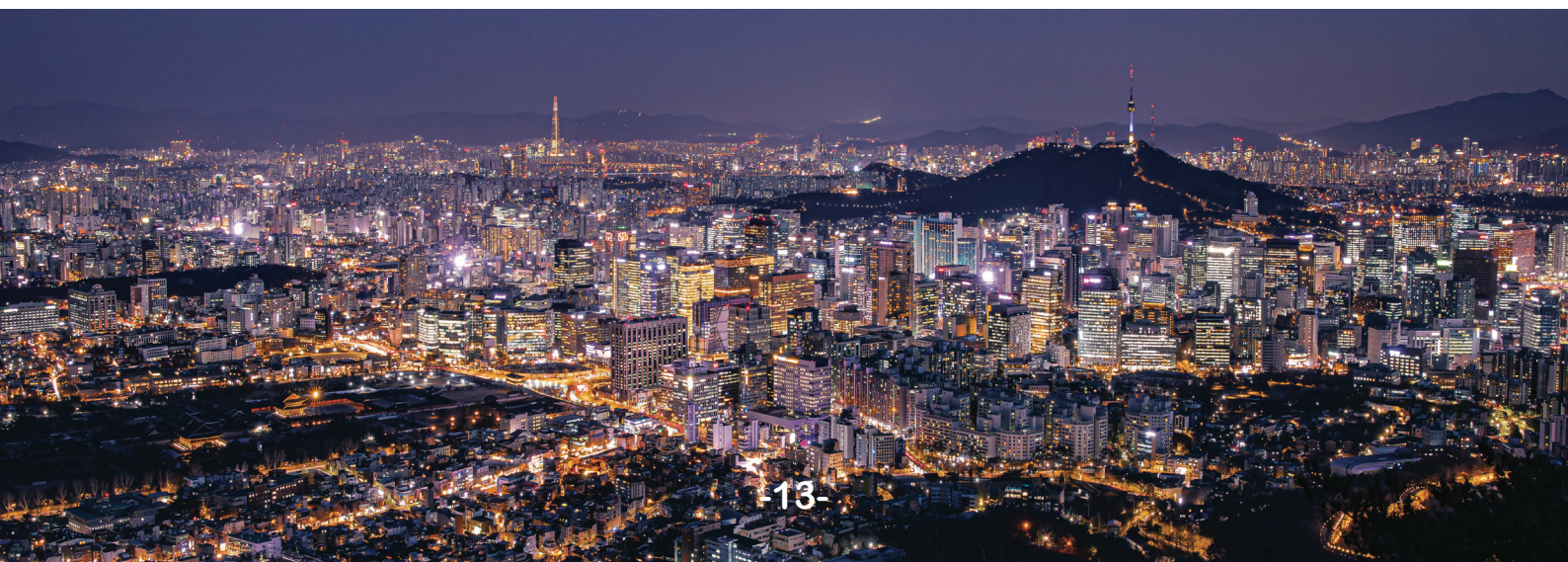
Seoul, South Korea

Highlighting information: AP-ISMET will be held together with the ACCE (Association for Carbon-neutral Circular Economy) international conference due to synergic effects.

Keynote speakers include:

Dr. Bruce Rittmann
Dr. Derek Lovley
Dr. Wang Aijie
Dr. Yujie Feng
Prof. Sunil Patil
Dr. Xiao Deng

Local committee members: Hyung-Sool Lee, Jung Rae Kim, Kyu-Jung Chae, Sang-Eun Oh, Sang-Hyoun Kim, Changsoo Lee, Joo-Youn Nam, Keunje Yoo, Taeyoung Kim, Soo Youn Lee, Hee-Deung Park, Taeho Lee, Changman Kim, Bongkyu Kim.



ISMET Fellow

Career journey by Sarah Glaven

I grew up in a small town in rural Massachusetts. It was the kind of place where you walked past cow pastures on the way to the school bus stop and it took 20 minute of driving to get almost anywhere. As a child expressing her boredom with the usual, "There's nothing to do!", my parents always responded with, "Go play outside!". And so I did and if I had to mark the beginning of my scientific journey it was the hours and hours of building forts in the woods, collecting minnows and tadpoles in the nearby stream, digging up worms, rescuing the wayward baby flying squirrel, and the many other adventures my brothers and I had with nature. I was already a scientist by the age of 8 even if I didn't realize it for another decade.

It was on a college tour (not the college I ultimately attended) that I knew for sure I wanted to be a scientist. I had grown very, very bored of my home town and wanted to explore the world. The tour group stopped by a geographic information system (GIS) laboratory studying fruit bats in Costa Rica, a place where the undergraduates visited and conducted research every summer. I couldn't believe my eyes; people got paid to play outside and study nature? I was sold and enrolled in the Environmental Sciences program at the University of Massachusetts, Amherst in 1996. Over the decade that followed I started my formal journey into my career as a researcher across a broad range of research topics including bioremediation, plant science, molecular genetics, analytical chemistry, electrochemistry, systems biology and synthetic biology.



Sarah Glaven (T-BRSC, USA)

Career journey by Sarah Glaven

It wasn't until 2006 that I first heard about microbial fuel cells. I had returned to UMA-SS-Amherst as a postdoc to work on a bioremediation project with Derek Lovley. At my first meeting with Prof. Lovley after joining the lab I found out that I would be working with electrodes to deliver power to the bugs for reductive dechlorination. I sat at my desk for a long time after that meeting thinking I was in the wrong place. What did I know about electrodes? After getting over the initial shock of my research project, I found that the lab was full of incredibly smart people with a huge wealth of knowledge in electromicrobiology. In my two years in the Lovley lab I learned an incredible amount about microbiology (I was coming from plant science), made lifelong friends that I still interact with personally and professionally, and most importantly, I met my best friend and husband, Richard.

Moving to Washington, DC, and the Naval Research Laboratory in 2009 afforded me incredible opportunities in research and to expand my career beyond the lab. For the last 14 years I have worked alongside the best scientists in the fields of microbial electrochemistry and electromicrobiology. I have had the privilege to lead research programs exploring the fundamental mechanisms behind direct electron uptake by biofilms, expanding the use of systems biology to understand such biofilms, and utilizing the tools of synthetic biology to manipulate them into engineered living electronic materials. One of the highlights of this part of my career was working with the ISMET community in my capacity as ISMET President, advocating for our female identifying members and establishing the Women in the ISMET group. Through the ISMET community I have had the opportunity to share research, lead, mentor, and learn.

Recently, I have taken on a new role outside of research to lead a major science and technology initiative called the Tri-Service Biotechnology for a Resilient Supply Chain (T-BRSC) program. As the T-BRSC Program Director, I am overseeing strategic investments in biotechnology and biomanufacturing in a range of topics including advanced materials, fuels, mobile manufacturing, and scale up infrastructure. This may seem far outside of my personal research interests, but my experience as a leader in ISMET have prepared me to lead broader topics in interdisciplinary science. If I had any career advice to give to budding scientists it would be to never limit your thinking or learning; always pursue your passion even if it takes you in new directions you had not anticipated. My career goal has always been to never be bored, so far I've been successful!

COMPLETED PHD THESIS IN THE MET FIELD

PhD thesis title: Microbial and Abiotic Fuel Cell Technology: Application to Environmental Analysis and healthcare

Supervisor: Aziz Amine and François Buret.

Affiliation: Hassan II University of Casablanca (Morocco) and the Ecole Centrale de Lyon, University of Lyon (France)

Dr. Abdelghani Ghanam is currently a Ph.D. in Electrochemistry and Biotechnology. The title of his thesis was "Microbial and Abiotic Fuel Cell Technology: Application to Environmental Analysis and healthcare". He obtained his Ph.D. degree in November 2022 from the Hassan II University of Casablanca (Morocco) and the Ecole Centrale de Lyon, University of Lyon (France) under the joint supervision of Prof. Dr. Aziz Amine and Prof. Dr. François Buret. The topic of his PhD thesis focused on the development of novel self-powered (bio) sensors based on Glucose and Microbial Fuel Cell technology, which can run at low electrical power for on-site applications in environmental monitoring, medical diagnostics and food safety. His PhD thesis also focused on the development of various new electrochemical sensors based on nanostructured materials. He authored and co-authored more than 10 scientific papers in highly rated journals, 1 book chapter with total citations of 119 and an h-index of 4, as well as 3 research papers in the submission process and more than 10 oral/poster communications in international conferences.



Abdelghani Ghanam

PhD thesis title: Importance of hydrogen-mediated mechanisms for microbial electrosynthesis: regulation at the molecular level

Supervisor: Lluís Bañeras Vives and Sebastià Puig Broch

Affiliation: University of Girona, Girona, Spain

Current position: Postdoctoral researcher at University of Girona



Elisabet Perona Vico

I am Elisabet Perona-Vico and I started my research career in molecular microbiology and electromicrobiology while pursuing my Master's degree Thesis and I continued in this field until the present day. My PhD work focused on the study of H₂ production in BES as the keystone, using model processes such as methanogenesis, bioelectro-H₂ production and homoacetogenesis. The purpose of the research was to contribute to a better understanding of the key role of H₂ in the field of Microbial Electrochemistry and Technology. I developed my PhD at University of Girona under the supervision of Dr. Lluís Bañeras Vives (Molecular Microbial Ecology group) and Dr. Sebastià Puig Broch (Laboratory of Chemical and Environmental Engineering). After some months away from research, I have recently the opportunity to be back as a Postdoctoral researcher in the same institution and research groups. Now I am focused on understanding at the fundamental level how microorganisms could be exploited by their versatile metabolism and high range of chemicals production and also, unveil the electron transfer mechanisms underlying the reactions during microbial electrosynthesis.

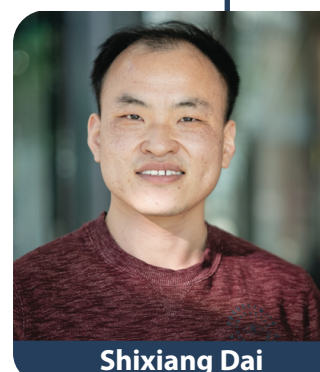
PhD thesis title: Microbial electrochemical removal of phenol and sulfate in anoxic environment

Supervisor: Falk Harnisch

Affiliation: Leipzig University, Germany

Current position: Postdoctoral Researcher at Ghent University

I finished my PhD in field of Microbial Electrochemistry and Technology in December 2022. I did my PhD at Helmholtz Center for Environmental Research-UFZ, and get the doctoral degree at Leipzig University under the Faculty of Life Sciences. My university supervisor was Prof. Dr. Falk Harnisch. The dissertation title is "Microbial electrochemical removal of phenol and sulfate in anoxic environment", which I investigated the microbial electrochemical phenol removal and sulfate reduction, and combination of both reactions in one system. My expertise is pollutant removal/remediation using bioelectrochemical system. I have published 3 publications so far on my PhD study, and 2 are coming later. I will be at the working group of Ramon Ganigué, in corporation with the working group of Marjan De Mey, at Ghent University.



Shixiang Dai

COMPLETED PHD THESIS IN THE MET FIELD

PhD thesis title: Biofilm Dynamics and Role of Electricigens under Stressful Conditions for Wastewater Treatment, Bio-Electricity Generation and Bio-Monitoring

Supervisor: Naeem Ali

Affiliation: Quaid-I-Azam University, Pakistan

Current position: Visiting faculty member at Quaid-I-Azam University Pakistan



Iqra Sharafat

Aim and objectives of Ph.D. project: The specific aim of the study was to develop integrated bioelectrochemical processes/systems for wastewater treatment, bio-electricity generation and biomonitoring with an improved performance and explore the electron transfer pathways used by electrochemically active bacteria (EAB). In this work, (1) electrochemical performance of microbial fuel cells (MFCs) and bacterial community profiles of associated anodic biofilms were characterized under the effect of trivalent iron [Fe(III)] using soil, sediment and wastewater as the inocula. Furthermore, electroactive bacteria from anodic biofilms were screened and characterized for their biofilm forming capabilities and identified using molecular methods (2) Microbial fuel cell (MFC) based electrochemical biosensors were developed for the detection and monitoring of biological oxygen demand (BOD) in wastewater and compared the efficiency of activated sludge and artificially designed consortia of different electrogenic bacteria for biosensing (3) The role of specific genes/proteins in respiration and extracellular electron transfer (EET) in *Listeria monocytogenes* was investigated using electrochemical techniques and bespoke glass single chamber bioelectrochemical reactors with template stripped gold (TSG) electrodes modified with self-assembled monolayers (SAM) of carboxylic acid terminated thiols. Part of research work was also carried out in the laboratory of Prof. Lars Jeuken as a visiting Ph.D. scholar at University of Leeds, Leeds, UK

Current Status: At present, I am working as a visiting faculty member at Quaid-I-Azam University Pakistan and actively looking for a postdoctoral or research position in Microbial Electrochemistry and Technology.

PhD thesis title: Unraveling the extracellular electron uptake pathway of *Sideroxydans lithotrophicus* ES-1

Supervisor: Catarina M. Paquete

Affiliation: ITQB NOVA, Portugal

Current position: Postdoctoral Associate at University of Southern California

My name is Anaísa Coelho and I have a Bachelor and a Master degree in Biomedical Sciences at the Universidade da Beira Interior, Portugal. In parallel with the first year of my Masters, I had the opportunity to enroll in a mobility program in Brazil. My fascination with electroactive microorganisms began during my PhD at ITQB NOVA, Portugal, under the supervision of Dr. Catarina M. Paquete. In my PhD thesis, the characterization of the key proteins involved in the proposed EET pathway of *Sideroxydans lithotrophicus* ES-1, a chemolithoautotrophic Fe(II)-oxidizing bacteria, was achieved by unraveling its biological function and probe the molecular mechanisms involved in the EET. This knowledge represents an important step to understand electron flow mechanisms performed by *S. lithotrophicus* ES-1 that will contribute to the practical biotechnological applications of Fe(II)-oxidizing bacteria. Currently I'm a Postdoctoral Research Associate at the El-Naggar Laboratory, University of Southern California (USC), United States. Elucidating the EET processes of electroactive microorganisms, unraveling the molecular basis of their electron transfer processes; characterizing metalloproteins involved in the pathways; and elucidating how different electroactive organisms have the ability to transfer electrons with an electrode, are some of the aspects I intend to pursue during my scientific career.



Anaísa Coelho

COMPLETED PHD THESIS IN THE MET FIELD

PhD thesis title: Microbial Electrochemical Technology for Perchlorate and Chlorate Reduction in Water

Supervisor: Ignacio Vargas Cucurella

Affiliation: The Pontificia Universidad Católica de Chile, Chile

Current position: Post doc position at San Sebastián University



Felipe Torres Rojas

In 2022, Felipe finished his work developing a biocathode for the degradation of perchlorate, an emerging contaminant in water. New electrochemically active perchlorate-reducing microorganisms were isolated from The Atacama Desert in northern Chile. After the electrochemical characterization, bio-electrocatalytic comparisons were made on an abiotic and biotic nano-modified electrode. The positive synergistic result between the bacterium *Dechloromonas agitata* and the chemical modification of the electrode improved perchlorate removal and current generation in the bio-electrochemical cells. Interestingly, one of the studied microorganisms, the bacterium (i.e., *D agitata*), also reduces chlorate, another emerging contaminant and intermediate in the perchlorate degradation pathway. The bacterium was successfully tested for chlorate degradation in an electrochemical bioreactor.

As part of his training, Felipe completed a six-month internship at the Center for Astrobiology in Madrid, Spain. The transcriptomic study on the perchlorate resistance of the strains isolated from northern Chile was developed during the internship. Subsequently, he visited Antarctica following the search for the presence of perchlorate in extreme sites. An acidophilic electrochemically active microorganism from this cold zone was isolated from acid rock drainage and tested for perchlorate reduction.

Finally, the work developed during the Ph.D. thesis was disseminated through scientific articles and presentations at regional and global ISMET conferences.

PhD thesis title: Investigation of bioelectrochemical transport mechanisms using different microorganisms in environmental engineering applications

Supervisor: Selim L. Sanin

Affiliation: Hacettepe University, Ankara, Turkey

I received my BSc degree in 2008 from Hacettepe University (HU), Biology Department, Ankara, Turkey. Afterwards I continued to Environmental Engineering, and I got my MSc. degree in 2013 and PhD degree in 2022 from that department in HU. During my master thesis I worked in a project title: "Measurement of nitrogenous species in a eutrophic lake release with microbiological activities in different media (air, water, sediment) and determination of their fluxes." which was a part of COST action "Assessing and Managing Nitrogen Fluxes in the Atmosphere-Biosphere System in Europe." During my PhD, I joined Dr. Filip Meysman's group in Antwerp University, Belgium as a guest PhD student in 2018. We investigated the CO₂ sequestration potential of cable Bacteria from coastal ecosystems by taking advantage of their long-distance electron transport capability. In 2019 and 2020, I joined Dr. Yifeng Zhang's group as a guest PhD student in Technical University Denmark, Environmental Engineering Department. Our research focused on developing a hybrid system: microbial electrolysis – photocatalysis cell for azo-dye removal. In Hacettepe University, we focused on nitrate removal from groundwater with MFC and using stabilized sludge as carbon source with Dr. Selim Sanin.



Ezgi Ogun

COMPLETED PHD THESIS IN THE MET FIELD

PhD thesis title: Development of low-cost components of bioelectrochemical systems (BES) for wastewater treatment and resource recovery

Supervisor: S. Gajalakshmi

Affiliation: Pondicherry University, Puducherry, India

Current position: Project Scientist at the Indian Institute of Technology

I am Dr. Gunaseelan Kuppurangan, carried out my Ph.D. research in an exciting project entitled "Development of low-cost components of bioelectrochemical systems (BES) for wastewater treatment and resource recovery." On 23.03.2022, successfully defended my final Ph.D. viva-voce, awarded the Ph.D. degree in Environmental Technology under the supervision of Prof. S.Gajalakshmi, Centre for Pollution Control & Environmental Engineering, Pondicherry University, Puducherry, India. Currently working as a Project Scientist, at the Environmental Engineering lab, Indian Institute of Technology, Palakkad, India, and this project focus on "Production of energy and resource recovery from source-separated urine by using Urine Mg air fuel cells (MAFC)".

I thoroughly enjoyed the journey of my doctoral research on developing low-cost components for the BES. My Ph.D. dissertation discusses the wide range of technical aspects to improve the overall performance of Biophotovoltaics systems (BPV), such as the development of clay composite separators on the aspects of composition and porosity for hexavalent Chromium reduction, enrichment of Biocatalyst by Super-Mixing and Immobilization, modification of anode and cathode (Gas diffusion electrode GDE) with nanocatalysts, usage of novel Hooper, Screw, and Torch type clay separators for scale-up of human urine treatment and resource recovery. Especially my supervisor Prof. S. Gajalakshmi provided me with the freedom to think, analyze and execute new ideas which made me establish a new laboratory called Sustainable Fuel Cells laboratory during my doctoral study along with several achievements and appreciation.

To survive, beat, and thrive in today's highly competitive research world, the circular economy model has to be incorporated. With my experience and understanding from nearly seven years of my Ph.D. research in developing low-cost components for BES operation, I got the opportunity to work as a Project scientist, which focuses on the usage of e-waste (LCD panel) as electrode material in BES, the development of the gas diffusion electrode (GDE) followed by designing, fabrication, and assessment of Urine MAFC (TRL 5) performance through electricity generation, pollutant treatment and valorization of recovered resources.



Gunaseelan Kuppurangan

COMPLETED PHDs

To contribute to the 'Completed PhD thesis in the field of Microbial Electrochemistry and Technology' section in the next ISMET newsletter, please provide us (ismet.outreach@gmail.com) a brief overview about yourself, including information about your PhD work, the institute and supervisor, and current position, to share information about your expertise and contribution to the field.



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