SEE INSIDE FOR INFORMATION ON THE MACUMBA MARINE MICROBIOME CONFERENCE IN JUNE 2016

MaCuMBA is a four-year research project that aims to uncover the untold diversity of marine microbes using cultivation-dependent strategies. This joint venture of 22 partner institutions from 11 EU countries is led by the Royal Netherlands Institute for Sea Research (NIOZ), and has a budget of more than €12 million, of which €9 million is funded by the EC Seventh Framework Programme.

MaCuMBA project news

www.macumbaproject.eu

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In this Issue of MaCuMBA Project News:

MaCuMBA Third General Assembly

Prof Lucas Stal, **MaCuMBA** Project Coordinator

MaCuMBA held its third General Assembly (GA) from 20-25 September in Reykjavik, Iceland. Here, MaCuMBA's Coordinator, Prof Lucas Stal reports on this year's meeting.

This year's GA was locally organised by our partner Matís and held in the Marine Research Institute located beside Reykjavik harbour. Approximately 65 participants attended the meeting and all of MaCuMBA's beneficiaries were represented. All members of MaCuMBA's Scientific Advisory Board also attended. For many of us it was our first visit to Iceland and several of us took the opportunity to explore this unique country seeing natural wonders such as the northern lights (*aurora borealis*). We were lucky with the weather, which is sometimes a bit unpredictable at this time of the year in Iceland.

Most of the participants arrived on Sunday because we had an early start on Monday morning with the official registration of the participants, a get-together over coffee and "breaking the ice". As at every GA there were many new faces to meet and of course it was also good to see the 'old' faces again.

I opened the GA by welcoming everybody and especially the members of the Scientific Advisory Board. I also thanked Viggó Marteinsson and his colleagues at Matís for organising the meeting locally and the Marine Research Institute for hosting us. The agenda of this year's meeting comprised of two days of research presentations and one day of individual Work Package meetings. This was complemented by a sampling expedition and workshop on 24-25 September.

Members of the **MaCuMBA** consortium at the project's General Assembly in September 2015, in Reykjavik, Iceland

It is tradition that during MaCuMBA's GA a member of the Scientific Advisory Board delivers the keynote lecture. This year Dr Anton Post of the Coastal Resources Center of the University of Rhode Island, USA, gave a lecture entitled: 'Two tales of genome adaptation: The molecular ecology of phytoplankton'. His lecture dealt with cyanobacterial phytoplankton and the nitrogen stress that many of these organisms experience in the ocean. He gave advice on how to identify and measure nitrogen stress and the mechanisms to overcome it. Interestingly, the ocean has a variety of different nitrogen sources and cyanobacteria have learned how to access them. The second 'tale' was about the bloom-forming eukaryotic algae *Phaeocystis* and how the transcriptome gave clues about the organisms' response to iron stress. Dr Post also described the metagenome of the bacterial community associated with this algae.

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The MaCuMBA logo includes an asterisk which represents both a microorganism and a reference to the full project title, which is Marine Microorganisms: Cultivation Methods for Improving their Biotechnological Applications

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Attendees at the General Assembly enjoying the engaging presentations

MaCuMBA partners ready to head out on a sampling expedition in Reykjavik harbour

MaCuMBA's GA is traditionally mainly a scientific meeting. We were lucky to have 30 excellent lectures from PhD students, post-docs and senior researchers, divided over seven sessions that were excellently, effectively and masterfully chaired by the Work Package leaders. The lectures covered a wide range of topics that are addressed in the **MaCuMBA** project and much exciting new information was shared.

The administrative session by Marcel van der Linden was concise. All partners were made aware of their obligations in terms of technical and financial reporting. The project is well on schedule with regard to the agreed milestones and scheduled deliverables.

Marieke Reuver and Pamela Cardillo of AquaTT informed the consortium about the progress of Work Package 9 on Dissemination and Knowledge Management. They reminded the participants about the importance of sharing knowledge outside the consortium. In addition to contributing scientific outputs to international journals, the consortium should also distribute this knowledge by other means and seek to transfer un-published knowledge. This becomes particularly important towards the end of the project. They further reminded the participants that **MaCuMBA** will organise a large event in June 2016 in Berlin to run concurrently with the final meeting, during which we will have ample possibilities to disseminate our products, research results and other project outputs.

Thomas Vanagt explained the policy briefs and **MaCuMBA** legacy brochure which are in development. As **MaCuMBA** enters its final year these are important documents. The results of **MaCuMBA**, which are important for future research and policy, need to be collected and distributed through the appropriate channels so that European DGs and national funding agencies become aware of them and attune their future research programmes towards these needs.

The first day of the GA was closed with a dinner at the Ocean Cluster House.

The scientific sessions continued on the second day of the GA. It was closed by reports of the Exploitation and Ethics Committees. The Exploitation Committee reminded all participants of the importance of collecting knowledge and distributing it to potential users. The Ethics Committee invited Thomas Vanagt to update the participants about the Nagoya protocol and the obligations associated with complying with it.

The Scientific Advisory Board gave an oral account of their observations. The main message was that the Board was extremely happy with the high level of the scientific presentations and the progress made by **MaCuMBA**'s research team. The advice was mainly regarding effective use and dissemination of results, which was highly appreciated.

I wrapped up the GA by announcing **MaCuMBA**'s final meeting next year in June in Berlin and asked all **MaCuMBA** colleagues to participate in that meeting and contribute to its organisation. The final event, entitled 'The Marine Microbiome - Discovery & Innovation', is a combined Industry Conference and Open Science Meeting. We will also have our last GA and Steering Committee meeting coinciding with this event.

In the evening there was a guided city walking tour, organised by Matís. The guide showed us many interesting places in Reykjavik all the while telling amusing stories about their historic background. The guide was a natural storyteller with an excellent sense of humor and we shared many laughs along the way.

Finally, Matís organised a sampling expedition and workshop. The sampling site for the third **MaCuMBA** workshop was in Faxaflói bay where Reykjavík is situated. The expedition started from the old harbour in Reykjavík and samples were successfully collected from three sites around the island Engey. Four **MaCuMBA** partners took part in this sampling workshop and collected surface water samples from three locations. Each partner filtered and fixed their water samples according to their research methods upon arrival at the Matís laboratories.

Best wishes,

Lucas

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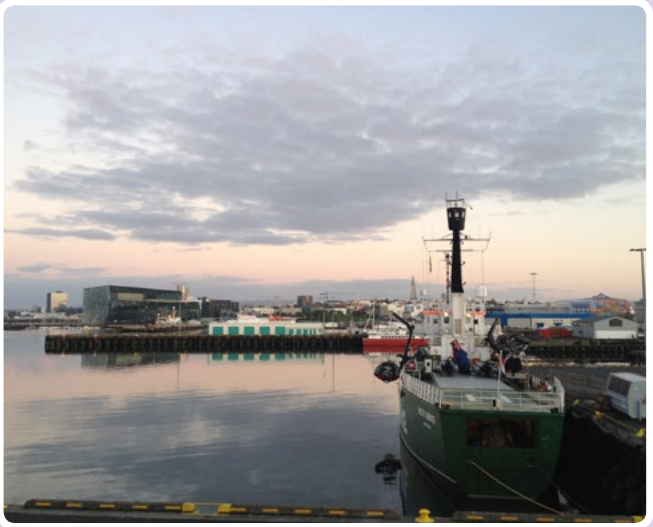
The Young MaCuMBA meeting

The Young MaCuMBA (PhD students and postdocs) meeting took place during the third day of the GA in Reykjavik and was organised by Silvia Cretoiu, postdoctoral researcher at the Royal Netherlands Institute for Sea Research (NIOZ). The informal discussion took the format of a round table and focused on summarising the scientific and personal activity of the group during the past three years and on planning the last year of the project, including participation at MaCuMBA's final event.

Given the profile and career stage of the group's members, perhaps inevitably the group composition had changed in the last year, as some members had completed their PhD work and left the project while others recently joined as postdocs. At the group's previous meeting in Cadiz, members were focused on exchanging scientific ideas and opinions, and making plans for collaborations. This year's hot topics included concerns about publications and applications for new positions as the project now draws to a close. One common issue which was raised was a concern that it might be difficult for young researchers to find new positions when the project concludes and therefore the support from the Principal Investigators (PIs) will be highly appreciated in this regard.

All participants noted their appreciation of the fact that the project had supported them not only to engage in research but also to travel to interesting congresses and training courses. The overall feeling was that MaCuMBA was a great project for a young researcher to be involved in and that it encouraged all those involved to grow not only scientifically but also personally. Young MaCuMBA members also hoped that the project PIs would seek to procure funding for a follow up project to continue and build upon the excellent work that has already been completed.



Reykjavik Harbour

Some members of young **MaCuMBA** at their meeting

Silvia Cretoiu

Some Young MaCuMBA members give their thoughts/insights about MaCuMBA

Silvia Cretoiu, NIOZ

1. What are you most looking forward to in the final year of MaCuMBA?

The final year of MaCuMBA is a challenging one for me with many activities already underway including publication of WP2 results, participation in the organising committee of our exciting final event in Berlin, co-editing the forthcoming MaCuMBA book and of course writing a project application where I would like to show how I have grown scientifically in this project.

2. What results are you most excited about as MaCuMBA enters its final year?

The most exciting for me personally is the transfer of the results from project reports to scientific papers.

3. What are the objectives of young MaCuMBA?

I initiated Young MaCuMBA after seeing at the first GA in Roscoff how many of the PhD students and post-docs often spend their time at meetings updating their Facebook and usually sitting with their lab colleagues or alone. The main objective I had was to help people in networking and exchanging ideas, which could in turn help them in developing their research in an informal environment, leaving them totally free in selecting the subject for discussion.

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It was also the reason I promoted the MaCuMBA Facebook page as a means of engagement (I wanted to encourage people to chat there about their research and other fun things). Unfortunately, there have been some challenges as it seems to me that people find it very difficult to be on their own, without their PIs and professors and to get out of their comfort zone even in an informal setting. After two Young MaCuMBA gatherings I feel that we perhaps missed the chance of "speaking with one voice" about our contribution to the project success. Although I feel the initiative could have been more successful, I want to challenge the young community one more time at the final project meeting and maybe propose an honorary award for the best PhD resulting from the project.

4. Why do you think it is important to have an initiative like this?

I think it is important to have initiatives like this because I think it is an effective way to make the PIs and professors (and perhaps even funding agencies) aware of the fact that PhD students and postdocs play a crucial role in producing high quality sound results. Therefore, I think that PhD students and postdocs should be more active in claiming their rights at the table for discussing future calls for scientific proposals and financial opportunities for research. However in order to achieve this, we need to meet and the best time and place to do so is at the projects meetings.


Clara Cardoso

Clara Cardoso, NIOZ-Yerseke

1. What are you most looking forward to in the final year of MaCuMBA?

I am excited about the upcoming MaCuMBA final event. I am sure it will be a good marriage between industry and research and it is important for us, as young scientists, to have contact with commercial applications of science. It is also the end of my PhD so I am hoping to get new insights into future possibilities for my career.

2. What are the objectives of young MaCuMBA?

The first objective is of course to learn a lot from very important people in the Marine Sciences field. MaCuMBA is a huge consortium with a diverse array of European countries and institutions involved, so the biggest objective is to take a little bit of knowledge from all these people we have the luck to work with (from accomplished scientists to young PhD students such as myself). The goal is to be able to do great science in the future when it is our own turn to form a successful consortium such as MaCuMBA.

3. Why do you think it is important to have an initiative like this?

It is important to remind ourselves and also society at large that these two worlds, science and industry, are together all the time. There is no science done without purpose and likewise no industry can be done without research. When the researchers are aware of it, the communication between this two worlds will be stronger and advances will be enhanced. When general society is aware of it too, the politicians and European citizens will be aware of the difficulties in the research world, and will advocate for more science support, which would help both parties.

I am looking forward to this final MaCuMBA year, it is a promising exchange of knowledge and points of view that will benefit everyone involved.

Interview with Marcel van der Linden, MaCuMBA project controller

Marcel van der Linden is the project controller of the MaCuMBA project, overseeing the financial management of the project in his capacity as right-hand man to MaCuMBA's Scientific Coordinator Lucas Stal. Since the start of the FP7 programme (2007), Marcel has financially coordinated many large R&D projects in diverse research areas ranging from renewable energy to marine sciences and microbiology. He has worked at NIOZ since March 2011, where he quickly became involved in MaCuMBA, working closely with Lucas and succeeding in bringing the MaCuMBA project from proposal to contract.

I understand that you have extensive experience managing European funded projects. What in your opinion makes for a smooth running, successful project?

The great challenge in ensuring success on a cooperative large scale research project like MaCuMBA, with lots of partners from different EU countries, is to encourage all partners to visit and work at the locations of the other partners to share their knowledge and research techniques, especially when there are industrial partners involved. To my mind, large projects such as MaCuMBA represent a great opportunity to bridge the gap between research

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and industry and ensure that technologies and techniques developed in the research phase have the potential to be replicated at industrial scale. Personally I think that in each research project applied technologies should also be promoted.

What are the main challenges facing trans-national projects such as MaCuMBA?

Trans-national projects with partners from all over Europe task the Coordinators of such projects with the responsibility of integrating a group of people with diverse cultures, working conditions, social aspects and languages; uniting and focusing them around a common goal. When this works successfully, such as in MaCuMBA, it is a great pleasure with all participants involved in the project cooperating successfully; learning and sharing not only project related knowledge, but also their different cultures, traditions and backgrounds. Within the MaCuMBA project we have 'Ice-breakers' during the meetings where people involved can meet and get to know each other in a more personal way and not only to talk about the research itself. In addition to this our more youthful researchers have formed their own 'Young MaCuMBA' group to discuss issues of specific relevance to young European researchers and to socialise too of course!

How is MaCuMBA research contributing to innovation in Europe?

Discovering novel microbes and DNA extracts during the collaborative research within MaCuMBA combined with the available industrial knowledge in high through put screening, the project hopes to 'uncover' interesting genomes which are suitable for further research and which have potential applications with high impact for example in medical applications as potential therapies for illnesses etc.

Ninth European Conference on Marine Natural Products (ECMNP), Glasgow, UK

MaCuMBA was represented at the ninth European Conference on Marine Natural Products (ECMNP) which took place in Glasgow, UK at the Technology and Innovation Centre of the University of Strathclyde from 31 August - 3 September 2015. The ECMNP is organised every two years alternating with the Gordon Conferences on Marine Natural Products. The ninth edition of the congress was held under the umbrella of three European FP7 consortia: PharmaSea, BlueGenics and SeaBiotech. Prof Dr RuAngelie Edrada-Ebel from SeaBiotech and Prof Dr Marcel Jaspars from PharmaSea chaired the event.

Almost 200 participants from around Europe as well as from America, Asia, Australia and Africa attended the scientific sessions under the theme "The Sea as sustainable source of new medicine and renewable energy". More than 50% of the participants were PhD students and postdoc researchers working in the marine bio-chemical research area.

The aim of the congress was to highlight news related to marine natural products not only in the field of product chemistry but also pharmacology, microbiology, biotechnology and ecology. Plenary sessions and invited speakers from both academia and industry presented the latest results on new biosynthetic pathways and enzymes, exploration of underexplored habitats, microorganisms as natural products sources, and chemical ecology.
The MaCuMBA project was represented by Silvia Cretoiu (NIOZ) who gave an oral presentation with the title "Bioprospecting microbial mats for novel compounds". The topic received great interest from the audience not only for revealing the potential of microbial mats but also for the opportunities that MaCuMBA could offer in terms of microbial systems and isolates, novel methods and technological platforms for seeking novel marine active compounds.

For the first time, a one-day, free pre-conference workshop was offered to 60 young participants. The workshop was hosted by the Strathclyde Institute of Pharmacy and Biomedical Sciences and organised by SeaBioTech and PharmaSea in collaboration with the MaCuMBA and Micro B3 projects. The workshop was organised in four sessions - Genomic Databases (Micro B3), Culture management (MaCuMBA), Dereplication and Chemical Databases (PharmaSea and SeaBioTech) and Bioprocessing and Biopolymers (Bluegenics and SeaBiotech). The aim of the workshop was to integrate and disseminate the objectives, methodologies and achievements of the projects and to promote "marine natural product research" to younger researchers.

MaCuMBA researchers Silvia Cretoiu (NIOZ), Cendrella Lepleux (DSMZ) and Birgit Kreiseder (SeaLifePharma) together with Prof Marie-Lise Bourguet-Kondracki (Bluegenics, MNHM, Paris) provided an updated view on microorganism isolation and cultivation aspects involved in natural products-screening. The presentations were followed by round tables (brainstorming and panel discussion) where the most discussed issues were: sponge-microbe associations, pharmacology and chemical ecology, novel cultivation strategies developed in MaCuMBA, high-throughput chemotaxis, and screening for anti-inflammatory compounds of marine bacteria.

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Silvia Cretoiu chaired the Young Scientist's Report of the round tables "Culture management" and "Bioprocessing and Biopolymers". All participants agreed that the workshop was a great initiative that allowed young researchers from different fields to exchange ideas, establish collaborations and moreover to discuss and debate on the present limitations of their research approach. The take home message was that young researchers are aware of their importance and responsibilities in big consortia such as MaCuMBA and PharmaSea and therefore they would like to have more similar opportunities for multidisciplinary interactions.

Here, Silvia, Cendrella and Birgit share their impressions from the event.

1. What are the current developments in Marine Natural Products?

The area of marine natural products is constantly evolving with new developments and discoveries being made on a continuous basis. At this conference, current trends in many exciting areas were discussed, such as: advances in the discovery and analysis of novel compounds for therapeutic approaches including structural analysis and chemical/biochemical synthesis; progress in the characterisation of organisms that produce these compounds and new fermentation strategies.

2. What uses for these products are being investigated?

The potential uses for marine natural products are manifold, they can be used for everything ranging from healthcare to cosmetics! Some of the really interesting developments presented at this conference; and arguably the applications with the most potential impact, were in the health care area. These included progress in the development of marine derived antibiotics, and the presentation of marine natural products with potential anti-cancer, anti-angiogenesis and anti-inflammatory applications. Compounds which could be useful in the treatment of diabetes and neurodegenerative diseases were also discussed.

3. How does the work of MaCuMBA fit into the world of Marine Natural Products?

Well as you know, marine microorganisms form a virtually untouched reservoir of biotechnological potential. They have possible applications in many diverse areas some of which are mentioned above but even as alternative energy sources! However, their use is hindered by the low success rate for isolating novel microorganisms and by poor growth efficiency.

MaCuMBA's work addresses both of these challenges as we not only seek to discover novel marine micro-organisms from extreme marine habitats but also to improve their isolation rates and growth efficiency by applying innovative methods and using automated high-throughput procedures.

By developing strategies to cultivate marine microorganisms we have been in a position to further unlock the potential of these fascinating creatures using fermentation strategies, changing of growth conditions and other techniques which lead to the production of different metabolites and other activities.

For further information on the conference you can visit the website here: **http://ecmnp2015.com**

ProBio – Making more of Bioeconomy R&D Results

6-7 October 2015, Brussels, Belgium

MaCuMBA was invited to participate in the first ProBIO project conference entitled "Making More of Bioeconomy R&D results". The meeting was structured around three major themes: "From Research to Market" which focused on presentation of results which are ready to bring to the market; "Knowledge Exchange" which consisted of round tables with short talks and discussions; and "Meet the ProBIO Experts" which involved round tables with the possibility to interact with experts from the project.

Silvia Cretoiu was in attendance representing MaCuMBA in a round table (two sessions of 30 minutes each) entitled "Marine microorganisms: Cultivation and screening for biotechnological potential". The session was very well received by the participants with the audience showing great enthusiasm in discussing marine microorganisms and the new methodologies that can be used to isolate them in laboratory cultures and to investigate their potential useful properties.

A specific point which was raised was the access to MaCuMBA culture collections and a means of establishing collaborations that could lead to final products with high potential value and impacts. Excellent feedback was received from Prof Lene Lange (DTU, Denmark) and from Ms Katharina Kell (Managing Director, Greenovate! Europe) who considered MaCuMBA a challenging project that can make a significant contribution to the European biotechnology sector. Also mentioned was the importance of projects such as MaCuMBA in producing scientific statements and letters that can be transferred to European policy makers. These statements/letters are important in bridging the gap between academia and industry and such

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statements would facilitate the valorisation of European funded research.

For the session "From Research to Market" Silvia presented her research from a previous project called 'MetaExplore – metagenomics for bioexploration – tools and applications' led by Prof van Elsas at University of Groningen and on which she performed her doctoral research. She reported on how an ecological study and a high-throughput methodology (metagenomics) resulted in a tangible product such as a novel enzyme.

Silvia was also interviewed by the ProBIO project press coordinator about the stringent matters related to the results transfer from scientific projects to the products with a market perspective and also regarding the contribution of the doctoral students in this process.

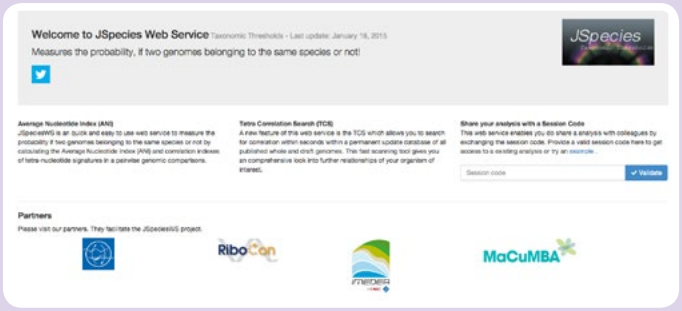
After the meeting Silvia was invited by the ProBIO project to integrate her 'MetaExplore' results in its annual evaluation and selection for market development. Silvia would like to propose that the **MaCuMBA** Consortium take on board the remarks of the ProBIO project and to support a policy letter that will help in promoting a future Horizon 2020 call on 'Marine microorganisms, cultivation and biotechnology'.

MaCuMBA Partner Develops Online Bioinformatic Tool

MaCuMBA partner Ribocon has developed a fantastic resource called "JSpeciesWS Online Service". This is a freely available online service accessible at **http://jspecies.ribohost.com/jspeciesws**

It was built within **MaCuMBA** for the comparison of genome sequences for advanced species differentiation. JSpeciesWS is free for academic and non-academic users and results can be used without any restrictions.

The service is created and maintained by the Ribocon GmbH. For questions/feedback contact **jspeciesws@ribocon.com**



Screenshot of JSpecies Web Service

Under the Microscope: Marine Microorganisms in the News

Microbes: the tiny sentinels that can help us diagnose sick oceans

The Conversation - 3 November 2015

Advances in genetics together with the development of molecular tools have allowed researchers to investigate marine bacteria in their natural environment and to use changes in bacterial community composition as an indicator of ocean health.

https://theconversation.com/microbes-the-tiny-sentinels-that-can-help-us-diagnose-sick-oceans-49205

Ocean's hidden green plankton revealed by fixing glitch in model

The rate at which phytoplankton are disappearing as oceans warm has been vastly overestimated by a glitch in the measuring method and model.

New Scientist - 26 October 2015

www.newscientist.com/article/dn28391-demise-of-the-worlds-plankton-has-been-greatly-exaggerated

Mining the microbial dark matter

Microbiologists are finding new ways to explore the vast universe of unknown microbes in the hunt for antibiotics.

Nature - 16 June 2015

www.nature.com/news/mining-the-microbial-dark-matter-1.17774

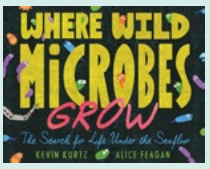
Scientists debate mega-microbiome initiatives

Research standards will advance the field, proponents say, but critics counter that they will stifle creativity.

Nature - 30 October 2015

www.nature.com/news/mining-the-microbial-dark-matter-1.17774

Where the wild microbes grow (Book)



A fantastic free ebook designed to get kids interested in the search for life under the seafloor- but we think inquiring minds of all ages will love this book!

http://joidesresolution.org/sites/default/files/Where%20Wild%20Microbes%20Grow%20-%20Final.pdf

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MaCuMBA PRESENTS

MARINE MICROBIOME DISCOVERY & INNOVATION

MARINE / BIOTECHNOLOGY / AQUACULTURE / BIOENERGY / PHARMACEUTICALS / FOOD / ENVIRONMENT / COSMETICS / HEALTH

International Marine Microbiome Conference

Next summer the **MaCuMBA** project will host a conference which will focus on the biotechnical application of marine microbes and will involve a joint industry conference and open science meeting. The conference - 'The Marine Microbiome - Discovery & Innovation' - will bring the industrial and scientific worlds together. It will take place in Berlin-Adlershof, Germany's leading science and technology park, from 27-30 June 2016. Please save this date in your diaries now.

Pre-registration for this exciting event is highly recommended and is now open!

This event should not be missed as it will feature: an interactive industry exhibition featuring **MaCuMBA** 'hardware'; round table discussions (on the cultivation of microorganisms, the potential of marine microbiology for industry, the future of synthetic microbiology and the global effects of legislation on marine biodiscovery); moderated panel discussions; one-to-one meetings; and excellent networking opportunities.

For all the latest updates as the event approaches please visit our conference webpage. Follow us on Twitter (**@MaCuMBAProject**) and Like us on Facebook (**www.facebook.com/MaCuMBAProject**).

Designed and developed by AquaTT

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