Editorial

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This special issue, entitled “Characterization of Microbiomes and Designing Environmental and Synthetic Biofilms for Process Intensification”, has been the official special issue of 2nd International Conference on Biofilms (ChinaBiofilms 2019), which was held during October 9–13 of 2019, in Guangzhou, China. As a major participating party, the Guangdong Academy of International Academic Exchange (AEIC), had first contacted the journal <Bioprocess and Biosystems Engineering> and requested to publish a special issue based on the ChinaBiofilms 2019.

Asia–Pacific Biofilms, previously known as China-Biofilms, is a series of biennial international conferences focusing on microbial biofilms, initiated by Dr. Mark Shirtliff from the University of Maryland and Dr. Zhenbo Xu from the South China University of Technology. Starting in October of 2017, the 1st International Symposium on Biofilms (ChinaBiofilms 2017) was held during October 20–22 of 2017, in Guangzhou, China. As both the founder and president of ChinaBiofilms, Dr. Shirtliff has contributed by organizing the workshop and symposium together with the organizing committee. Unfortunately, Dr. Shirtliff passed away in July of 2018. Thus, here we have included a brief introduction on the founder and permanent honorable president of Asia–Pacific Biofilms.

Dr. Shirtliff was a professor at the University of Maryland-Baltimore, where he held a primary appointment in the Department of Microbial Pathogenesis in the University of Maryland School of Dentistry (UMSOD) and a secondary appointment in the Department of Microbiology and Immunology in the University of Maryland School of Medicine (UMSOM). Mark was also the lead inventor and co-founder

of the vaccine company Serenta Biotechnology, LLC that was established in 2017. The license is based on a multivalent vaccine strategy against infections caused by *Staphylococcus aureus*. Further development of the vaccine is continued by Dr. Jan Harro in the Shirtliff-Harro Lab at UMSOD and by Birthe Kjellerup-Shirtliff as Chief Scientific Officer in Serenta LLC. Dr. Shirtliff was a leading expert in the field of biofilm in the US and internationally. His childhood in the foothills of the Canadian Rocky Mountains lead him to the University of Alberta, where he graduated with a bachelor in Geo-microbiology. After this, he moved to Texas, US to continue his education. Originally Mark wanted to pursue medical school to become a medical doctor, but he quickly learned that he over time would be able to help more people by performing research thus his goal became to develop diagnostics and vaccines to prevent biofilm infections. Mark graduated with his Ph.D. in 2001 from the University of Texas Medical Branch, Galveston TX in the Department of Microbiology and Immunology. His thesis was titled “*Staphylococcus aureus*: Roles in Osteomyelitis.” During graduate school Mark was introduced to a fellow Canadian biofilm researcher Dr. Bill Costerton, who at that time was the Director of Center for Biofilm Engineering (CBE) at Montana State University in Bozeman, Montana.

This was the beginning of an inspirational work relationship and friendship between Mark and Bill and a very prolific career in *Staphylococcus aureus* biofilm research for Mark—but it was way too short! Bill convinced Mark that she should move to Bozeman, Montana and the CBE in 2001 to continue working on biofilms and was initially funded to work on drinking water biofilms in Dr. Anne Camper’s lab. He quickly obtained his own funding and returned to *S. aureus* research that was so important for him. The years at the CBE were instrumental in developing molecular tools, having important biofilm-centered discussions and to get out in the wilderness to get great ideas. In 2003, Mark moved to Maryland and entered a tenure track position at UMB- Baltimore. Mark was actively involved in leading the biofilm field forward. His engaging and very energetic way of behaving made him easy to talk to both about biofilms, science and

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completely other topics. He was very interested in listening to the junior scientists and to connect with the next generation in science. Therefore, mentoring and training of the next generation of biofilm scientists was a mission that he took seriously. Over the years, Mark trained many scientists in his lab—both graduate students, post docs and visiting scientists from around the world. He also initiated many collaborations globally and many of these excellent scientists were present at ChinaBiofilms 2019. He also organized numerous biofilm workshops at international conferences such as ASM Biofilms (American Society of Microbiology), ECCMID (European Congress of Clinical Microbiology & Infectious Diseases), EuroBiofilms and of course ChinaBiofilms2017. Over the years, Mark was the author of more than 120 peer-reviewed scientific papers and book chapters on pathogenic microorganisms. He explored the biofilm mode of growth and the chronic diseases they cause. Mark never forgot his Canadian roots and was a proud and energetic hockey (i.e. ice hockey) fan, who would travel far distances to cheer on his favorite team Edmonton Oilers. He also loved to take his family back to the Canadian Rockies to climb on glaciers and to tell great stories from his childhood and about interesting tree-ring counting studies and field trips as a geology major in college. He also kept in touch with colleagues at the CBE, which allowed him (and his family) to spend time in Montana during the summers. This would recharge his batteries with lots of fly fishing, floats on majestic rivers and good times with friends and family.

In Dr. Shirliff's honor, we have also started the "Mark Shirliff Memorial Biofilm Foundation" (<https://markshirliffbiofilmfoundation.org/>). Donations can be made via the website. The goal of the foundation is to support and encourage junior biofilm researchers to travel and initiate collaborations with other biofilm groups on a global scale. The Board of Trustees include several members, who are present at ChinaBiofilms 2019: Dr. Birthe V. Kjellerup, Chair (Mark's wife), Dr. Garth D. Ehrlich, Secretary and Treasurer, Dr. Kendra Rumbaugh, Vice President, Dr. James Kaper, Dr. Zhenbo Xu and Dr. Annette Moter.

Although Dr. Shirliff passed away, the organizing of upcoming biofilm conferences did not stop. To make ChinaBiofilms 2019 a successful follow-up to ChinaBiofilms 2017 that Dr. Shirliff was the organizer for, Dr. Birthe Kjellerup (president) and Dr. Zhenbo Xu (co-president) led the organizing of ChinaBiofilms 2019. The 2nd International Conference on Biofilms (ChinaBiofilms 2019) was held during October 9–13 of 2019 in Guangzhou, China. ChinaBiofilms 2019 consisted of 4 workshops on Oct 10th and 3 days for the main conference from Oct 11–13. The conference program included day 1 focusing on Clinical Microbiology (Oct 11th), day 2 on Foodborne and Marine Microbiology (Oct 12th) and day 3 on Applied and Environmental Microbiology (Oct 13th). The goal of ChinaBiofilms 2019 was to bring together innovative academic and industrial experts in the field of biofilms,

to promote research and developmental activities in biofilms, and to promote scientific exchanges between researchers, developers, engineers, students, and practitioners working all around the world. Eventually, ChinaBiofilms 2019 had 52 invited speakers. As a continuously successful follow-up of ChinaBiofilms 2019, the 3rd International Conference on Biofilms (Asia-Pacific Biofilms 2021) will be held during May 11–16 of 2021, in Guangzhou, China. Asia-Pacific Biofilms 2021 will cover subjects including characteristics of biofilms, quorum sensing in biofilms, industrially- and clinically- relevant biofilms and emerging technologies on biofilms. In the relevant fields, distinguished scholars are invited for keynote or invited presentations, and young scientists with the latest research findings from various disciplines are also invited for oral presentations. This is undoubtedly the best opportunity for participants to present the recent progress and foster new collaboration, which also builds a bridge between Chinese and international universities.

- Based on the ChinaBiofilms 2019, this special issue has accepted a total of 7 manuscripts, including "High Flux Simultaneous Screening of Common Foodborne Pathogens and their virulent factors" (<https://doi.org/10.1007/s00449-019-02267-7>), "Addition of glyceryl monostearate affects the crystallization behavior and polymorphism of palm stearin" (<https://doi.org/10.1007/s00449-019-02251-1>), "One-Step" Characterization Platform for Pathogenic Genetics of *Staphylococcus aureus*" (<https://doi.org/10.1007/s00449-020-02449-8>), "Malassezia and Staphylococcus dominate scalp microbiome for Seborrheic Dermatitis" (<https://doi.org/10.1007/s00449-020-02333-5>), "Characterization on gut microbiome of PCOS rats and its further design by shifts in high-fat diet and dihydrotestosterone induction in PCOS rats" (<https://doi.org/10.1007/s00449-020-02320-w>), "Microbiome characterization and re-design by biologic agents for inflammatory bowel disease insights" (<https://doi.org/10.1007/s00449-020-02380-y>) and "Bioprocessing and integration of a high flux screening systematic platform based on isothermal amplification for the detection on 8 common pathogens" (<https://doi.org/10.1007/s00449-020-02423-4>). The manuscripts have shared novel progress and important findings within the topic as "Characterization of Microbiomes and Designing Environmental and Synthetic Biofilms for process intensification".

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