

Abstract for the Plenary Address "*Learning from cicadas: Bioinspired functional structures against multidrug-resistant bacteria*", BioINSP 2022: "6th International School and Conference on Biological Materials Science", DGM Deutsche Gesellschaft für Materialkunde, Bayern, Germany (21-24 March 2022)

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## **Learning from cicadas**

### *Bioinspired functional structures against multidrug-resistant bacteria*

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Multidrug-resistant bacteria such as hospital germs pose enormous challenges on patients and the health systems. Most antibiotic resistances are based on the respective chemistry of the pharmaceutical. On the other hand, antibacterials based on mechanical/structural mechanisms provide antifouling and/or bactericidal properties. Against such structures, bacteria cannot develop antibiotic resistances. The presentation will give an overview of such physical bactericides that are in various stages of technical development. Furthermore, current research that deals with bactericidal nanostructures on the wings of cicadas and dragonflies will be introduced. Positive and negative replicas of these nanostructures are produced in various materials using inexpensive protocols. *Escherichia coli* (gram-negative) and *Staphylococcus aureus* (gram-positive) are used to test and compare the resulting bactericidal effectiveness. Such research shall yield biomimetic low-cost, large-area antibacterial surfaces for application in, e.g., door handles, wall coatings and surgical instruments.