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**Anti-biofilm efficacy of triclosan-amphotericinB combination  
against filamentous fungus, *Aspergillus fumigatus***

**Tamimi, R., Kyazze, G. and Keshavarz, T.**

A poster presented at Biofilms 8, Aarhus University, Aarhus, Denmark, 27-29 May 2018.

<http://conferences.au.dk/biofilms8/home/>

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Programme & Abstracts

# BIOFILMS 8

27 - 29 May 2018

Aarhus University · Aarhus · Denmark

[www.conferences.au.dk/biofilms8](http://www.conferences.au.dk/biofilms8)



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## BIOFILMS 8

Nordre Fasanvej 113, 2nd floor  
2000 Frederiksberg C  
Denmark

info@cap-partner.eu  
www.conferences.au.dk/biofilms8



# SAVE THE DATE



7-11 July 2019

8th Congress of European Microbiologists  
Glasgow, Scotland | [www.fems2019.org](http://www.fems2019.org)

## WELCOME

Dear participant,

It is a great pleasure to welcome you to the Biofilms 8 conference in Aarhus, Denmark.

During the 2,5 conference days, you will experience a diverse programme that includes high level scientific presentations and networking activities - an excellent opportunity to exchange knowledge and experiences within biofilms.

Biofilms 8 is the 8th conference in a series that cover the topic of bacterial biofilms in the broadest sense. The conference focus is on the basic scientific question of how biofilms form, grow and interact with their surroundings. You will meet researchers from the natural sciences, engineering, and health science to exchange their research on how biofilms develop, how they interact with their surroundings, and how they can be controlled in a natural, industrial, or clinical setting.

The main subjects of the conference are:

- Molecular mechanisms in biofilm formation
- The biofilm matrix
- Bacterial attachment
- Modelling biofilms
- Biofilm ecology
- Evolution in biofilms
- Biofilm control
- Novel methods for biofilm characterization

We hope you will enjoy the conference and your stay in Aarhus!

Kind regards from the Local Organising Committee,



**Rikke Louise Meyer**

Associate professor, Interdisciplinary Nanoscience Center and  
Department of Bioscience, Aarhus University (Conference Chair)

# GENERAL INFORMATION

## CONFERENCE VENUE

**Aarhus University**  
Bygning 1412 (Building 1412)  
Nordre Ringgade 4  
8000 Århus, Denmark

## CONFERENCE LANGUAGE

The conference will be held in English.

## NAME BADGES

All participants and exhibitors must wear the name badge in the conference area at all times. The badge must be visible.

## LUNCH AND COFFEE BREAKS

Lunch is available in the poster area. Coffee is available in the exhibition area. See programme for exact time of breaks.

**Exhibition area:** Vandrehallen

**Poster area:** Stakladen & Richard Mortensen room

## SPEAKER INFORMATION

Please bring your presentation to the session room before your session starts. We recommend you upload your presentation at least 30 min before your session. A technician will be present to assist in the upload if necessary. Please bring your presentation on a USB.

Unless otherwise agreed all presentations will be deleted after the conference in order to secure that no copyright issues will arise at the end of the conference.

## WIFI

Free WiFi is provided throughout the venue by logging on the network "AU Guest". Open an internet browser and log on through one of the accounts.

## MOBILE PHONES

All mobile phones must be on silent mode during the sessions.

## CLOAK ROOM

A manned cloak room located in the basement under the auditorium "Aula" will be available throughout the conference.

## LOST AND FOUND

Found items should be returned to the registration desk. If you lose something, please report to this desk for assistance.

## CONFERENCE SECRETARIAT

CAP Partner  
Nordre Fasanvej 113  
2000 Frederiksberg C, Denmark  
Tel: +45 70 20 03 05

[www.cap-partner.eu](http://www.cap-partner.eu)  
[info@cap-partner.eu](mailto:info@cap-partner.eu)

## SOCIAL MEDIA

Find Biofilms 8 on Facebook (Search for "Biofilms Conference Series") and Twitter (@Biofilms8)  
Use #Biofilms8

## CONFERENCE WEBSITE

[www.conferences.au.dk/biofilms8](http://www.conferences.au.dk/biofilms8)

## SOCIAL EVENTS

**Welcome Reception** (included in the registration fee)

Date: 27 May 2018  
Time: 18.30 - 20.30  
Place: Poster area, Stakladen, Aarhus University

The welcome reception will take place in the poster area in Stakladen at Aarhus University from 18.30 - 20.30.

**Conference Dinner** (included in the registration fee)

Date: 28 May 2018  
Time: 19.00 - 00.00  
Place: Turbinehallen, Kalkværksvej 12, 8000 Aarhus C

The conference dinner will take place from 19.00 - 00.00 in Turbinehallen. The Turbinehallen is a rustic and vibrant venue full of atmosphere and character, centrally located in Aarhus in the urban harbour area in the heart of the Aarhus Film Town.

Join us at the dinner and catch up with colleagues and friends, and make new acquaintances! Please note that the dinner is included in the registration fee, but registration is required.

## HOW TO GET TO THE CONFERENCE DINNER VENUE:

To reach the dinner venue from the University, you can take bus 100, 200, 16 or 18 from the busstop "Aarhus Universitet. Randersvej/ Nordre Ringgade" at the intersection of Randersvej and Nordre Ringgade and get off at the Aarhus Central station. The dinner venue is located a 5-10 minutes walk from the central station.

## ORGANISATION

Rikke Louise Meyer  
Interdisciplinary Nanoscience Center  
and Department of Bioscience,  
Aarhus University (Chair)

Thomas Emil Andersen  
University of Southern Denmark,  
Denmark

Mette Burmølle  
Copenhagen University, Denmark

Matthew Fields  
Center for Biofilm Engineering,  
Montana State University, USA

Ákos Kovács  
Professor, Technical University  
of Denmark, Denmark

Per Halkjær Nielsen  
Aalborg University, Denmark

Daniel Otzen  
Aarhus University, Denmark

Trine Rolighed Thomsen  
Aalborg University, Denmark

## POSTER SESSIONS

The poster sessions are held during lunch breaks. Please be present at your poster during these times. See the exact time of your poster session here below:

	Categories	Presentation time	Poster number
<b>Sunday</b> <b>27 May</b>	The biofilm matrix	12.00 - 13.00	Uneven numbers
	Molecular mechanisms in biofilm formation Bacterial attachment	13.00 - 14.00	Even numbers
<b>Monday</b> <b>28 May</b>	Biofilm ecology	11.30 - 12.30	Uneven numbers
	Modelling biofilms	12.30 - 13.30	Even numbers
	Evolution in biofilms Other		
<b>Tuesday</b> <b>29 May</b>	Biofilm control	10.50 - 11.40	Uneven numbers
	Novel methods for biofilm characterization	11.40 - 12.30	Even numbers

## PRIZES AND AWARDS

Thanks to our 3 sponsors below, a number of prizes will be awarded during the closing ceremony on Tuesday 29 May 2018. The prizes will consist of 8 poster prizes and 1 Young Investigator Award. We deeply thank our sponsors for the support:

### JOURNAL OF MEDICAL MICROBIOLOGY

Journal of Medical Microbiology provides comprehensive coverage of medical, dental and veterinary microbiology and infectious diseases, including bacteriology, virology, mycology and parasitology.

Articles are published in the following areas:

Pathogenesis, Virulence & Host Response; Clinical Microbiology; Microbial and Molecular Epidemiology; Microbiome and Microbial Ecology in Health; One Health - Emerging, Zoonotic & Environmental Diseases; Prevention, Therapy and Therapeutics; Antimicrobial Resistance; and Disease, Diagnosis and Diagnostics.



### NPJ BIOFILMS AND MICROBIOMES

The journal hosts cross-disciplinary discussions and allows for our understanding of mechanisms governing the social behaviour of microbial biofilm populations and communities, and their impact on life, human health, and the environment, both natural and engineered.








### MICROORGANISMS JOURNAL

Microorganisms (ISSN 2076-2607) is an international, peer-reviewed open access journal which provides an advanced forum for studies related to prokaryotic and eukaryotic microorganisms, viruses and prions. Articles published in Microorganisms are indexed in PubMed (NLM).








# PROGRAMME SUNDAY 27 MAY

Time	Abs.	Title
07.30		Registration desk opens
09.00 - 09.15		Welcome & Opening Ceremony By Biofilms 8 Chair, Rikke Louise Meyer
9.15 - 10.00	O1	Bird's Eye Lecture: The biofilm matrix: strategies for protection and exploitation
10.00 - 10.40		Coffee/Tea Break
10.40 - 12.00		Session 1: The biofilm matrix Chair: Per Halkjær Nielsen & co-chair: Daniel Otzen
10.40 - 11.00	O2	Glycosylated amyloid-like proteins in the structural extracellular polymers of aerobic granular sludge enriched with ammonium oxidizing bacteria
11.00 - 11.20	O3	Formation of functional non-amyloidogenic fibres by recombinant Bacillus subtilis TasA
11.20 - 11.40	O4	Insight into the RapA lectin and its use in the study of biofilm matrix formation by rhizobia
11.40 - 12.00	O5	Secreted, Large-Scale, Extracellular Membrane Systems in Microbial Biofilms
12.00 - 14.00		Lunch & Poster session
14.00 - 14.30	O6	Invited Lecture: Molecular interactions of staphylococcal biofilm forming proteins
14.30 - 15.50		Session 2: Molecular mechanisms in biofilm formation Chair: Daniel Otzen & co-chair: Rikke Meyer
14.30 - 14.50	O7	Cytochrome Bd-I is used for energy production in uropathogenic E. coli biofilms
14.50 - 15.10	O8	Heat activates cyclic diguanylate production in bacteria
15.10 - 15.30	O9	Sortase-assembled pili of Enterococcus faecalis contribute to iron-mediated extracellular electron transfer and iron-augmented biofilm
15.30 - 15.50	O10	Physical determinants of amyloid assembly in biofilm formation
15.50 - 16.20		Coffee/Tea Break
16.20 - 16.50	O11	Invited Lecture: How do bacteria respond to their adhering state?
16.50 - 18.10		Session 3: Bacterial attachment Chair: Rikke Meyer & co-chair: Thomas Andersen
16.50 - 17.10	O12	Cell lysis prompts an early mechanical coupling and biofilm formation in dilute bacterial suspensions
17.10 - 17.30	O13	Bone environment and its relationships with bacterial biofilm
17.30 - 17.50	O14	The role of dynamic Tad pili in bacterial surface sensing
17.50 - 18.10	O15	A role for two-component systems in bacterial attachment and antibiotic tolerance in Listeria monocytogenes
18.10 - 18.30	O16	Invited Lecture: Are biofilms really the dominant way of life for prokaryotes on Earth?
18.30 - 20.30		Welcome Reception in the poster area (included in registration fee)

Speaker	Area	Sponsored by
	Auditorium Aula	
Nicola Stanley-Wall, UK	Auditorium Aula	
	Exhibition area	
	Auditorium Aula	
Yuemei Lin, The Netherlands		
Elliot Erskine, UK		
Patricia Abdian, Argentina		
Matthew Fields, USA		
	Poster & Exhibition area	
Joan Geoghegan, Ireland	Auditorium Aula	
		
Maria Hadjifrangiskou, USA		
Joe Harrison, Canada		
Kimberly Kline, Singapore		
Maria Andreasen, Denmark		
	Exhibition area	
Henny van der Mei, The Netherlands	Auditorium Aula	
		
Iztok Dogša, Slovenia		
Fany Reffuveille, France		
Yves Brun, USA		
Hüsnu Aslan, Denmark		
Hans-Curt Flemming, Germany	Auditorium Aula	
	Stakladen	

# PROGRAMME MONDAY 28 MAY



Time	Abs.	Title
08.00		Registration desk opens
09.00 - 09.40	O17	Bird's Eye Lecture: Cooperation and competition in biofilms
9.40 - 10.10		Coffee/Tea Break
10.10 - 11.30		Session 4: Biofilm ecology Chair: Mette Burmølle & co-chair: Ákos Kovács
10.10 - 10.30	O18	Biofilm architecture confers individual and collective protection against phage infection
10.30 - 10.50	O19	Effect of fluctuating environmental conditions on the spatial self-organization and emergent properties of a synthetic microbial biofilm
10.50 - 11.10	O20	AHL quorum sensing mediates species interactions in multispecies biofilms
11.10 - 11.30	O21	Biofilm thickness controls the contribution of stochastic and deterministic processes in microbial community assembly
11.30 - 13.30		Lunch & Poster session
13.30 - 14.00	O22	Invited Lecture: Multiscale analysis of microbial cross-feeding in biofilms: from Yellowstone hotspots to chronic wounds
14.00 - 15.20		Session 5: Modelling biofilms Chair: Matthew Fields & co-chair: Rikke Meyer
14.00 - 14.20	O23	Developing a novel understanding of E. coli K-12 pellicle formation, morphology, and physiology
14.20 - 14.40	O24	Increasing the Space-Time Yield in Lactic Acid Production by the Use of Biofilms
14.40 - 15.00	O25	Estimation of mechanical and hydraulic biofilm properties from optical coherence tomography measurements
15.00 - 15.20	O26	Optically patterned biofilms for synthetic microbial consortia
15.20 - 15.50		Coffee/Tea Break
15.50 - 16.20	O27	Invited Lecture: Why evolution in biofilms is different, and a few remarkable consequences
16.20 - 17.40		Session 6: Evolution of biofilms Chair: Ákos Kovács & co-chair: Mette Burmølle
16.20 - 16.40	O28	Long-term co-adaptation of Pseudomonas aeruginosa biofilms with amoeba affects virulence traits
16.40 - 17.00	O29	Evolution in changing environments: Specialist and generalist strategies during non-stable selection of the biofilm phenotype
17.00 - 17.20	O30	Cheating promotes evolution of hyper-cooperators by shifting phenotypic heterogeneity in biofilms
17.20 - 17.40	O31	Increased rate of mutation to antimicrobial resistance in polymicrobial biofilms
19.00 - 00.00		Congress Dinner at Turbinehallen, Aarhus (included in the registration fee, registration required)

Speaker	Area	Sponsored by
Kevin Foster, UK	Auditorium Aula	
	Exhibition area	
	Auditorium Aula	
Lucia Vidakovic, Germany		
Davide Ciccarese, Switzerland		
Sujatha Subramoni, Singapore		
Jane Fowler, Denmark		
	Poster & Exhibition area	
Ross Carlson, USA		
	Auditorium Aula	
Stacey Golub, UK		
Laure Cuny, Germany		
Morez Jafari, The Netherlands		
Xiaofan Jin, USA		
	Exhibition area	
Vaughn Cooper, USA		
	Auditorium Aula	
Diane McDougald, Australia		
Jonas Stenlökke Madsen, Denmark		
Marivic Martin, Germany		
Jeremy Webb, UK		
	Turbinehallen Kalkværsvej 12, 8000 Aarhus	



# PROGRAMME TUESDAY29 MAY

Time	Abs.	Title
08.30 - 09.00	O32	Invited Lecture: <b>Tuning biofilms architecture to control their functions</b>
09.00 - 09.30		<b>Coffee/Tea Break</b>
09.30 - 10.50		<b>Session 7: Biofilm control</b> <b>Chair: Thomas Andersen &amp; co-chair: Trine Thomsen</b>
09.30 - 09.50	O33	Characterization of anti-curli antibody based approaches to eradicate Salmonella Typhimurium biofilms
09.50 - 10.10	O34	A New Strategy for Biofilm Control Using Bioinspired Dynamic Surface Topography
10.10 - 10.30	O35	Biofilm control in cooling towers: the effect of biodispersants on freshwater biofilms developed in flow lanes
10.30 - 10.50	O36	Substrate Mediated Enzyme Prodrug Therapy (SMEPT) to combat implant-associated biofilms
10.50 - 12.30		<b>Lunch &amp; Poster session</b>
12.30 - 13.00	O37	Invited Lecture: <b>Interrogating the interplay of metabolism and structure in bacterial communities</b>
13.00 - 14.00		<b>Session 8: Novel methods for biofilm characterization</b> <b>Chair: Trine Thomsen &amp; co-chair: Per Halkjær Nielsen</b>
13.00 - 13.20	O38	Novel uses for Synchrotron Radiation in the study of Biofilms
13.20 - 13.40	O39	Introducing a novel, fully-automated cultivation and screening tool for the structural and mechanical investigation of biofilms by means of optical coherence tomography
13.40 - 14.00	O40	Nanoparticle-based chemical imaging in biofilms and tissues
14.00 - 14.30		<b>Awards Ceremony, Introducing Biofilms 9 &amp; Closing Session</b>

Speaker	Area	Sponsored by
<b>Romain Briandet,</b> France	<b>Auditorium Aula</b>	
	<b>Exhibition area</b>	
	<b>Auditorium Aula</b>	
Sarah Tursi, USA		
Dacheng Ren, USA		
Luciana Di Gregorio, Italy		
Signe Maria Nielsen, Denmark		
	<b>Poster &amp; Exhibition area</b>	
<b>Lars Dietrich,</b> USA		
	<b>Auditorium Aula</b>	
Ben Libberton, Sweden		
Luisa Gierl, Germany		
Michael Kühl, Denmark		
	<b>Auditorium Aula</b>	

[P100] ELECTROCHEMICALLY DEPOSITED SURFACES BASED ON COPPER AND SILVER WITH BIOCIDAL EFFECT AGAINST METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS

[Yijuan Xu](#)<sup>1</sup>, [Trine Rolighed Thomsen](#)<sup>2</sup>, [Lone Gram](#)<sup>3</sup>, [Nicole Ciacotich](#)<sup>3</sup>

<sup>1</sup>Danish Technological Institute, Aarhus, Denmark

<sup>2</sup>Aalborg University, Life Science Division, The Danish Technological Institute, Dept. of Chemistry and Bioscience, Aarhus, Denmark

<sup>3</sup>Technical University of Denmark, Department of Biotechnology and Biomedicine,, Kgs. Lyngby, Denmark

**Introduction:** Inert surfaces can be a reservoir for pathogenic agents and play an important role in the acquisition and spread of healthcare infections. Therefore, surface treatments that aim to provide the surfaces with antibacterial activity are receiving increasing attention and scientific interest. Copper can inactivate a multitude of bacteria, fungi and viruses and copper or copper alloys have been suggested as alternative to stainless steel to help reduce the occurrence of hospital-acquired infections. Silver also has antibacterial activity and it has been suggested to combine these for enhanced, potentially synergistic, antibacterial action.

**Aim:** The purpose of the present study was to investigate the antibacterial efficacy of a novel electroplated copper-silver alloy coating against methicillin resistant *S. aureus* (MRSA) with the aim of developing antibacterial surfaces for the medical and health care sector. We investigated if the alloy could prevent adhesion and biofilm formation.

**Methods:** The EPA Test Method for Efficacy of Copper Alloy Surface as a Sanitizer was carried out on Cu/Ag coating and stainless steel against MRSA. In a static biofilm model, four different surfaces were evaluated in parallel (Cu/Ag, Cu, Ag coatings and stainless steel) to estimate MRSA biofilm formation.

**Results:** Under dry conditions, the Cu/Ag coating reduced in numbers of MRSA on the surface with more than 99.9% after 2 hours of exposure as compared to numbers on stainless steel. When testing for MRSA biofilm formation, no difference was observed between silver and stainless steel coupons. However, compared with stainless steel, the most significant bacterial number reduction was found for the copper surface (close to 100 fold) followed by the Cu/Ag electroplated surfaces (10 fold) ( $P < 0.001$ ).

**Conclusions:** Pure copper-coated and copper-silver alloy surfaces were effective in killing bacteria and preventing MRSA biofilm formation *in vitro*. Further research is planned to determine the efficacy against other clinically relevant pathogens and to do *in vivo* test for biocidal and antibiofilm efficacy in healthcare settings.

[P101] ANTI-BIOFILM EFFICACY OF TRICLOSAN-AMPHOTERICIN B COMBINATION AGAINST FILAMENTOUS FUNGUS, ASPERGILLUS FUMIGATUS

[Roya Tamimi](#)<sup>1</sup>, [Godfrey Kyazze](#)<sup>1</sup>, [Tajalli Keshavarz](#)<sup>1</sup>

<sup>1</sup>University of Westminster, London, United Kingdom

Triclosan (TRC), an antimicrobial agent, has been reported to be safe for topical and surface-coating applications. It possesses a broad-spectrum of antimicrobial activity. The combination of TRC and DispersinB (DspB, a biofilm disruptor) displayed synergistic efficacy against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli*, and *Candida albicans*. There was a significant difference in the adherence of each of these microorganisms to TRC+DspB-coated silicone catheters compared with uncoated control catheter. Therefore, TRC+DspB has antibiofilm effect against both gram positive and gram negative, as well as yeast strains. Furthermore, for the first time, TRC effect against *Aspergillus fumigatus* biofilm formation on a glass surface was investigated alone and in combination with amphotericinB (AMB). AMB is effective against fungal infections. Viability was measured by determining colony forming units (c.f.u.) using 6-mm paper disks impregnated with TRC (0.5 to 32 mg/l) and AMB (0.125 to 16 mg/l). The diameters of the growth inhibition zone on agar plates were measured after incubation at 37° for 24 hrs. Determination of metabolic activity of hyphae was assessed using viability staining with FUN-1. Double-strength RPMI-2% glucose medium+MOPS containing 10<sup>6</sup> conidia/ml was incubated at 37° for 24 hrs. Subsequently, TRC and AMB at Minimum Inhibitory Concentration (MIC) doses were added and incubated at 37° for more 24 hrs. As control, *A. fumigatus* hyphae were incubated in the absence of TRC and AMB in the medium. Microscopic visualization and image acquisition of biofilms were conducted using a confocal laser scanning microscope (CLSM). Based on the optical microscopy and CLSM images, the number of hyphae structures as well as extracellular polymeric substances (EPS) formation were reduced in TRC and AMB/MICs treated samples in comparison with the non- treated control groups. Also, 3D surface plots showed the least biofilm depth in TRC/MIC treated sample in comparison with AMB/MIC treated, and control groups. Finally, Synergy Checkerboard Assay revealed that there is a synergistic activity when *A. fumigatus* was treated with TRC following by AMB.