



# Solution approaches to reduce the transport of tyre and road wear particles (TRWP) and other microplastics from road runoff into the aquatic environment

03.05.2022

TU Berlin, FG Siedlungswasserwirtschaft, Sekr. TIB1-B16, Gustav-Meyer-Allee 25, D- 13355 Berlin

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**Audi**  
Environmental Foundation

## Management

- **Prof. Dr.-Ing. Matthias Barjenbruch, Head of Department since 2006**
- Director TU Campus El Gouna, Egypt
- 25 scientific staff and doctoral students
- Chairman of the DWA FA KA 8 "Advanced Wastewater Treatment"
- Presidium Member DWA



## Co-worker

**Daniel Venghaus, M. Sc.; WiMi**

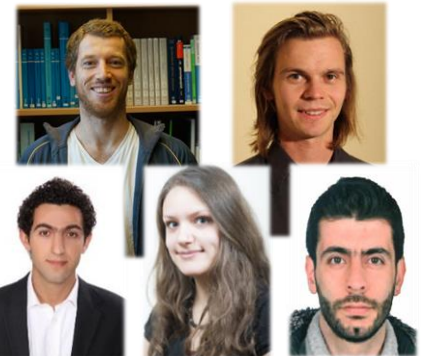
- URBANFILTER (Audi Environmental Foundation)
- Tire abrasion in the environment (RAU, Bmbf)
- Optimized materials and procedures for the removal of microplastic from the water cycle (OEMP, BMBF)
- Decentralized cleaning of roadways (DSWT, EFRE)






## Microplastic-colleagues

**Philipp Lau, Johannes Neupert, Luisa Reinhold, Salem Faroui, Iyad Al-Zreiqat.**

- URBANFILTER (Audi Environmental Foundation)
- EU Study "Microplastics"
- RAU (Bmbf)
- OEMP (BMBF)
- DSWT (EFRE)
- REPLAWA (BMBF)
- MikroSep (AIF Zim BMWI)
- Mikrograu (AIF Zim BMWI)



				
	<b>Urban</b>	<b>Rural</b>	<b>Motorway</b>	
<b>TWP (Germany)</b>	<b>29 %</b>	<b>33 %</b>	<b>38 %</b>	98.000 t/a
[Baensch-Baltruschat et al. 2020]				
<b>TWP (EU)</b>	<b>40 %</b>	<b>40 %</b>	<b>20 %</b>	500.000 t/a
[Eunomia et al. 2018]				

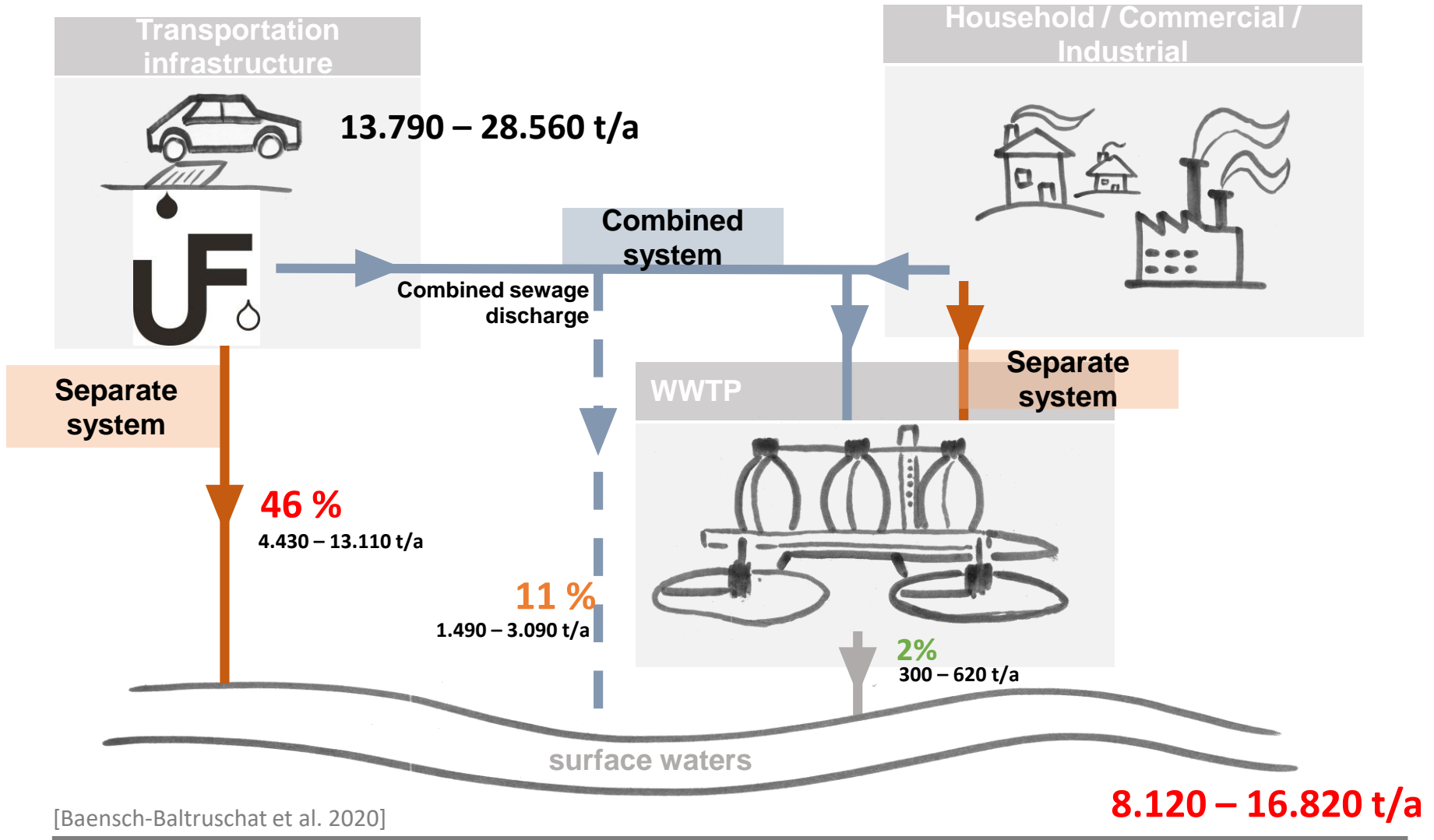
Surface Water	<b>17,1 %</b>	~ 0 %	3,0 %
Soil	2,8 %	32,5 %	34,0 %
Air	5%	5 %	5 %

[Baensch-Baltruschat et al. 2020]

TWP: Tyre Wear Particles



# Tyre Wear Entry path: City





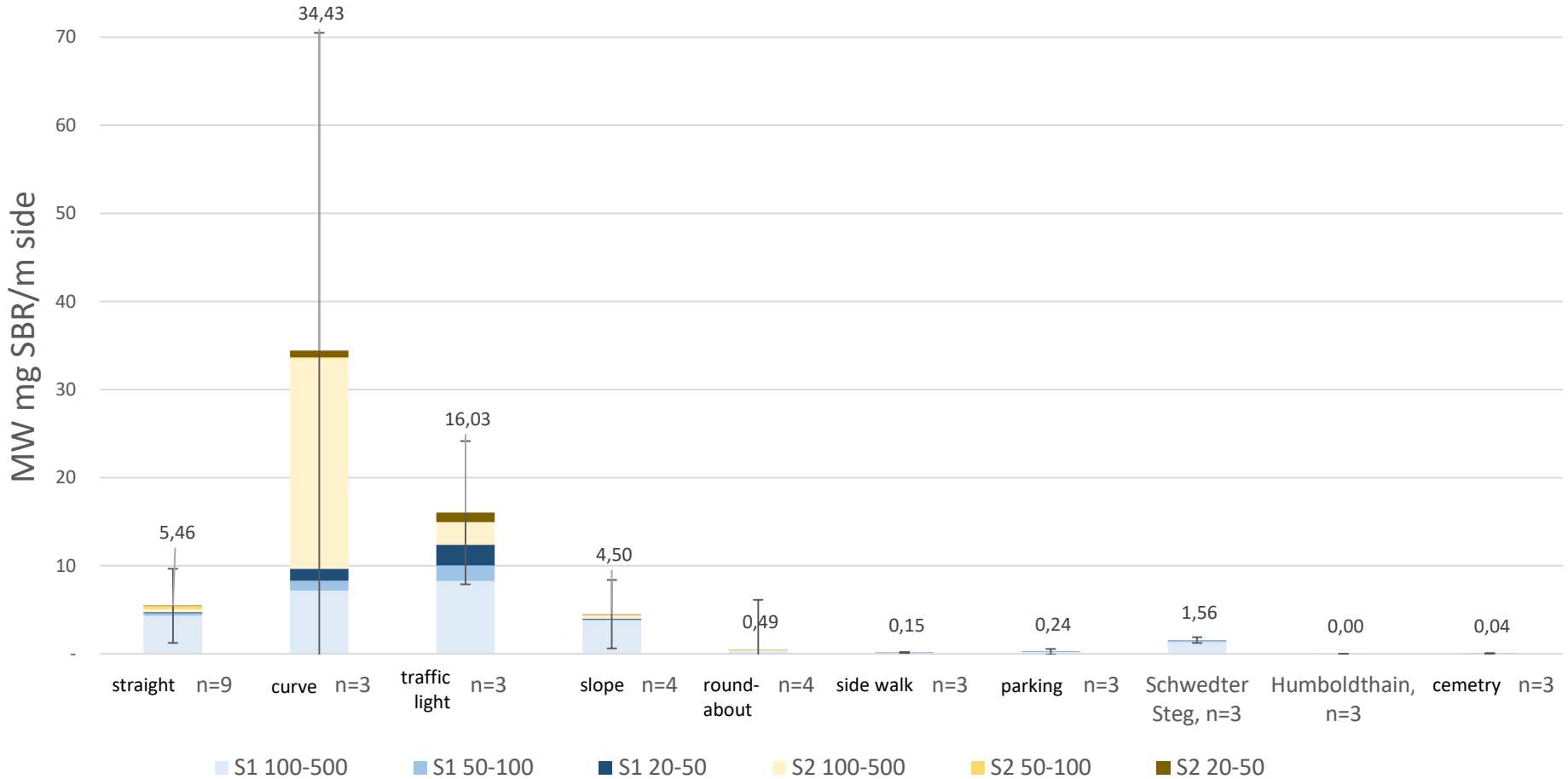
# Tracking





# Urban Hot Spots

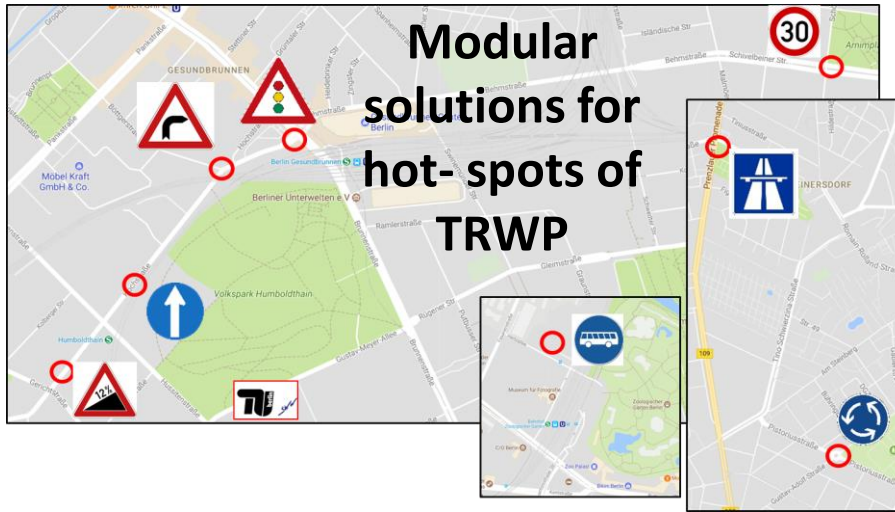
Total SBR 20-500µm



SBR: styrene-butadiene rubber



# Opportunities- URBANFILTER



## Intelligent networks



(1)



(2)

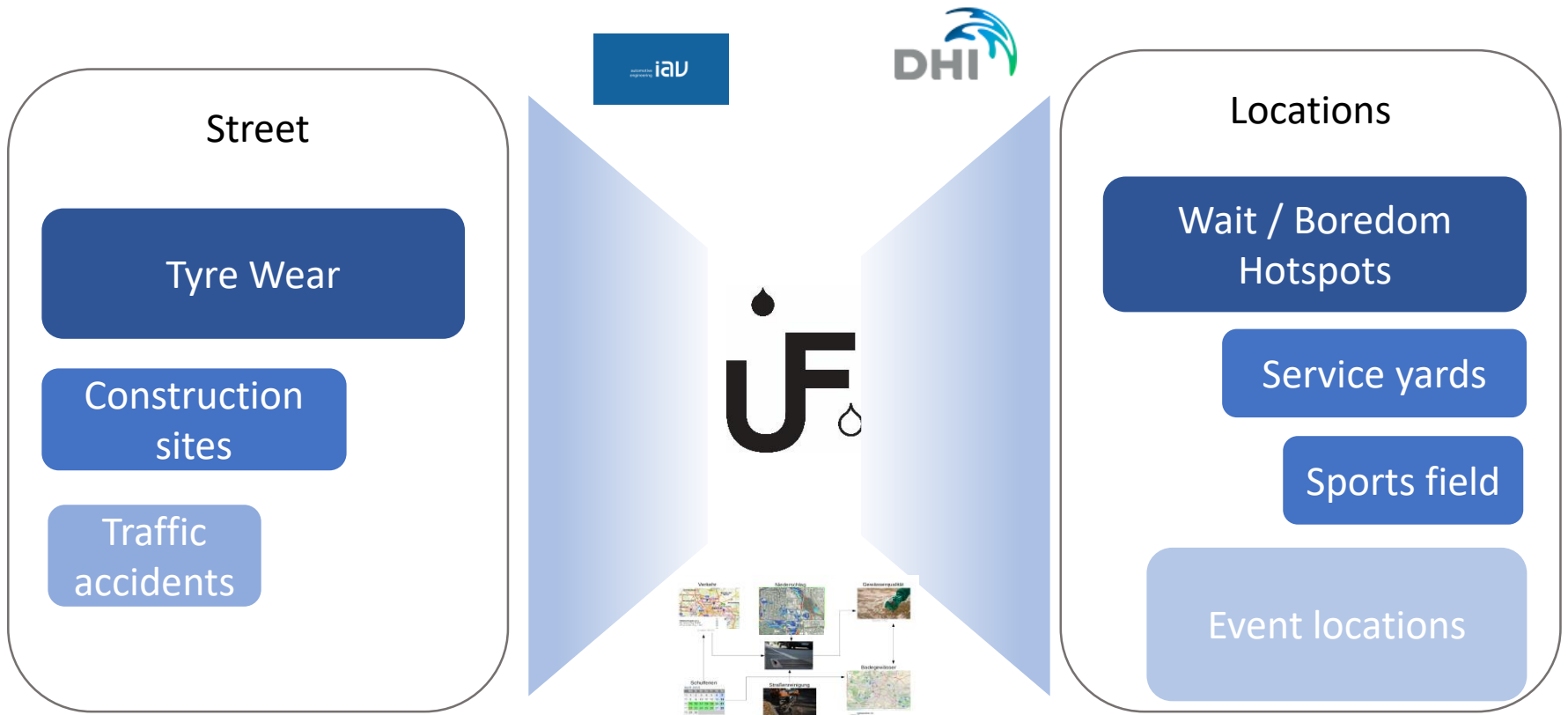
## Enlightenment of the citizens



# intelligent network

diffuse

local

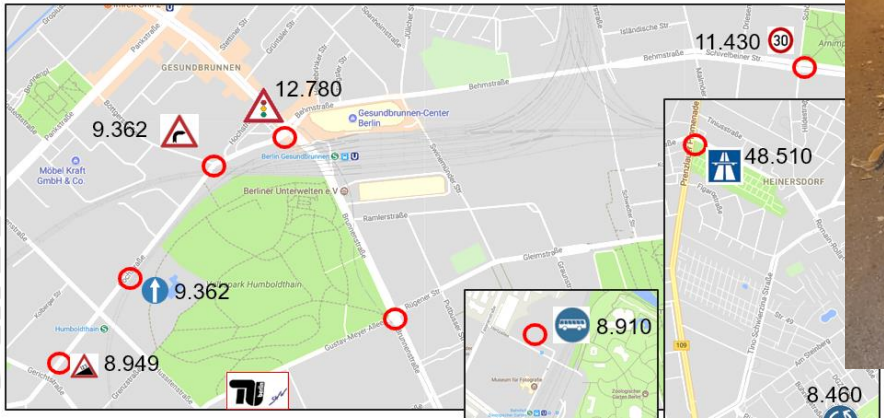






# Street I

## Tyre Wear



<https://www.thetyrecollective.com/>



Wait / Boredom Hotspots

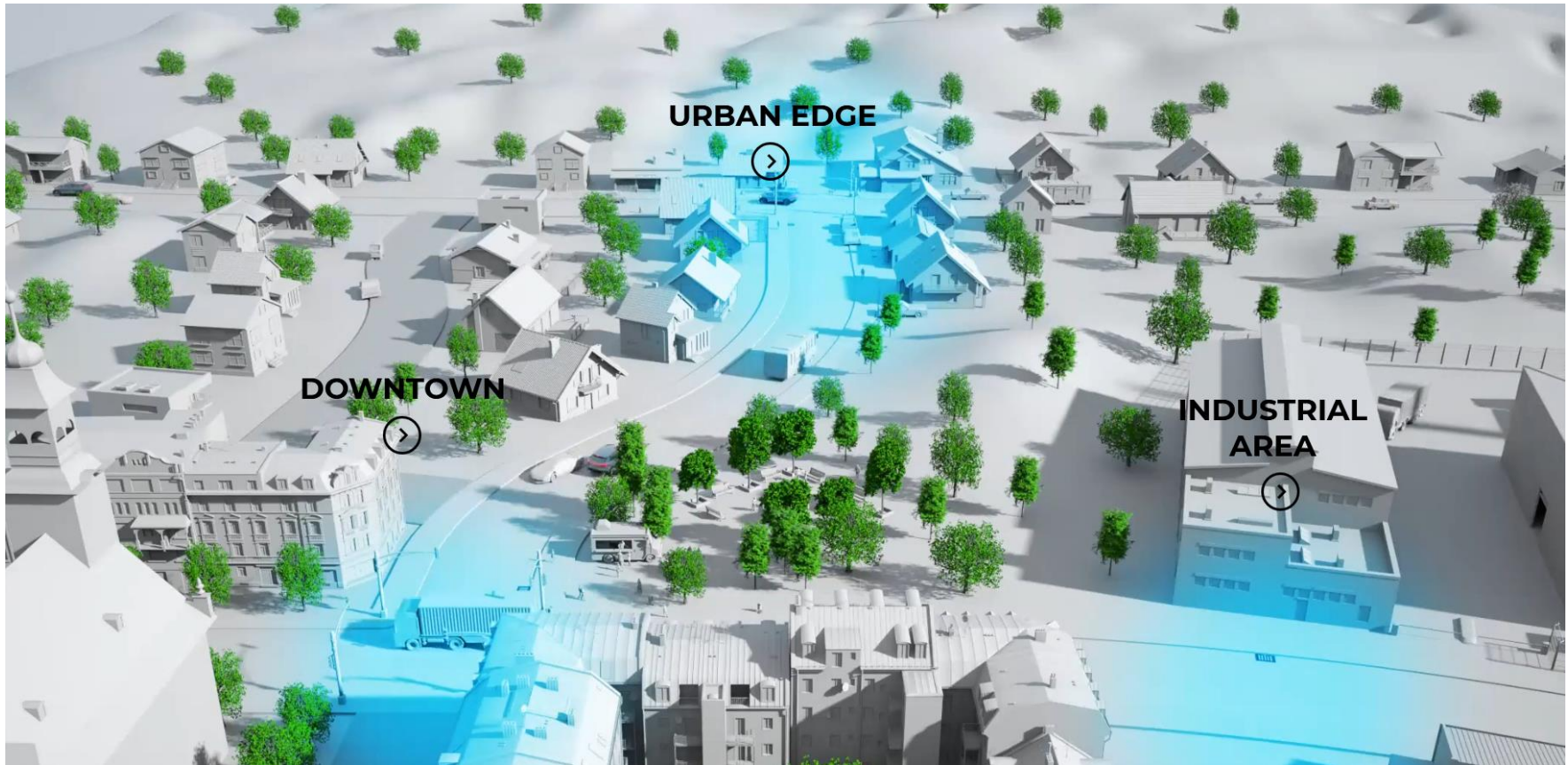


Construction sites



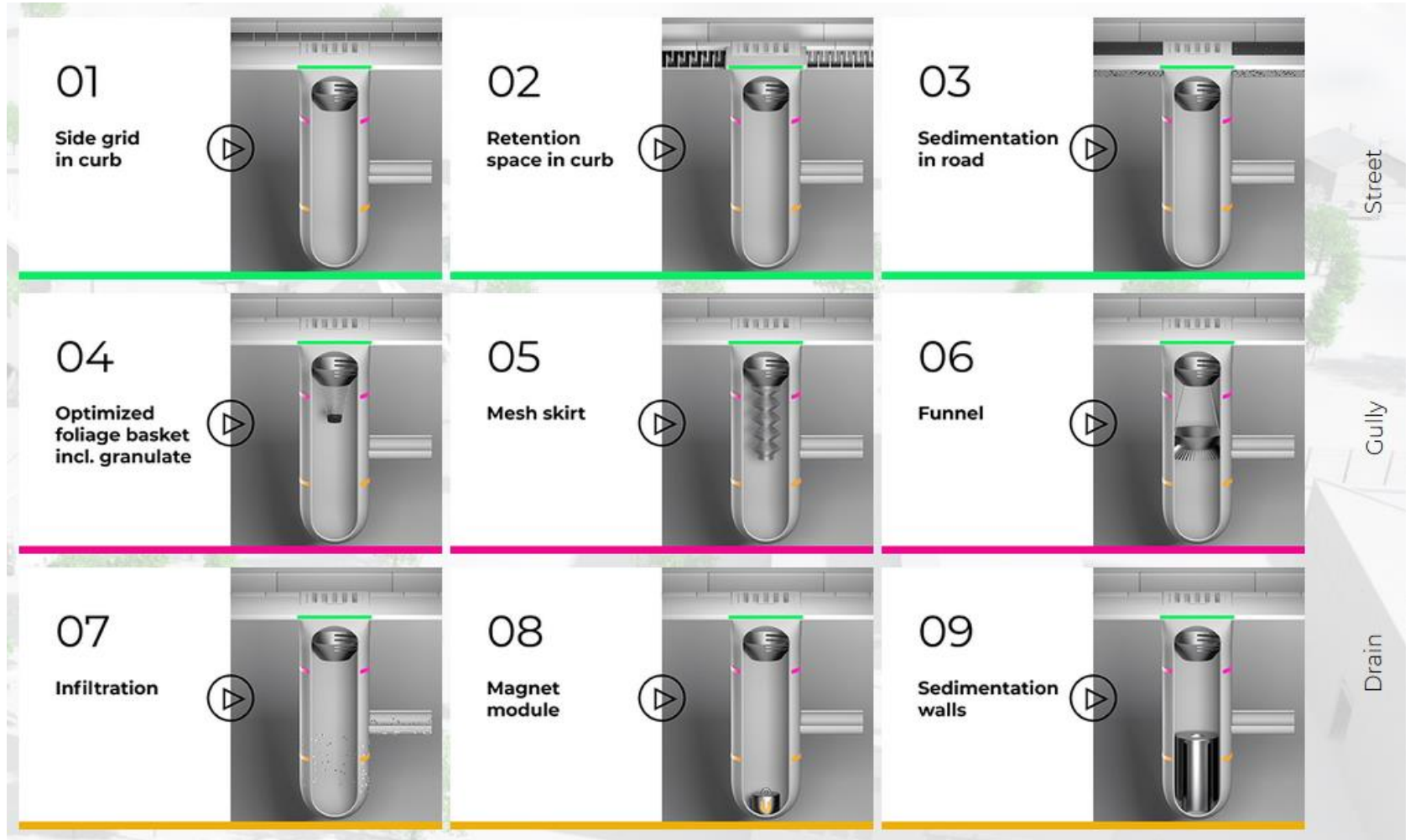


# Urban Hot Spots

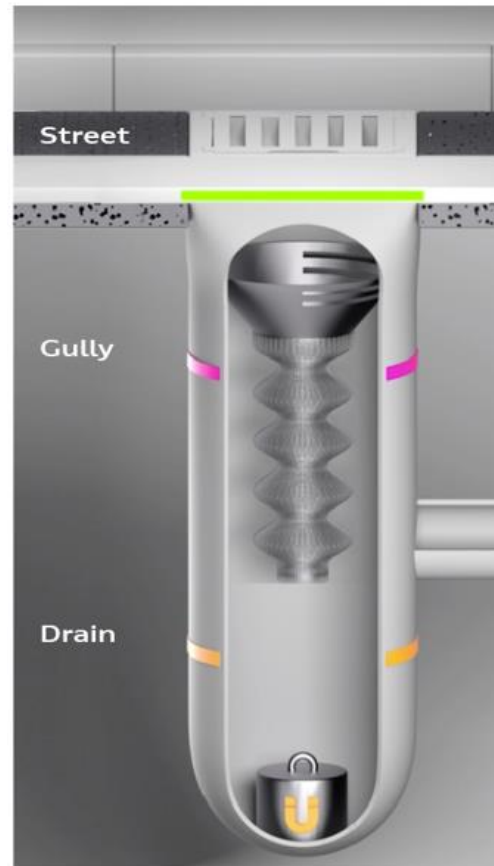
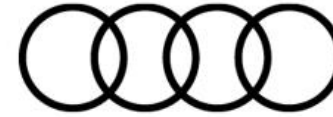




# 9 modules at 3 stages



## Urbanfilter: microplastics



### Porous asphalt

The Urbanfilter is partially integrated into the roadway – porous asphalt traps particles before they wash into the storm drain.

- Particularly good at trapping ultrafine particles
- Reduces the amount of fine debris washed off by rain
- Easy to clean with street sweepers
- Retrofittable

### Filter skirt

- Directs the water downwards so that it can collect there
- Stainless steel mesh
- High flow rate, easy to clean
- Traps particles of all sizes

### Magnet module

- Particularly binds fine and ultrafine particles
- Easy, simple maintenance
- Extremely easy to retrofit



Video: Cheng 2019

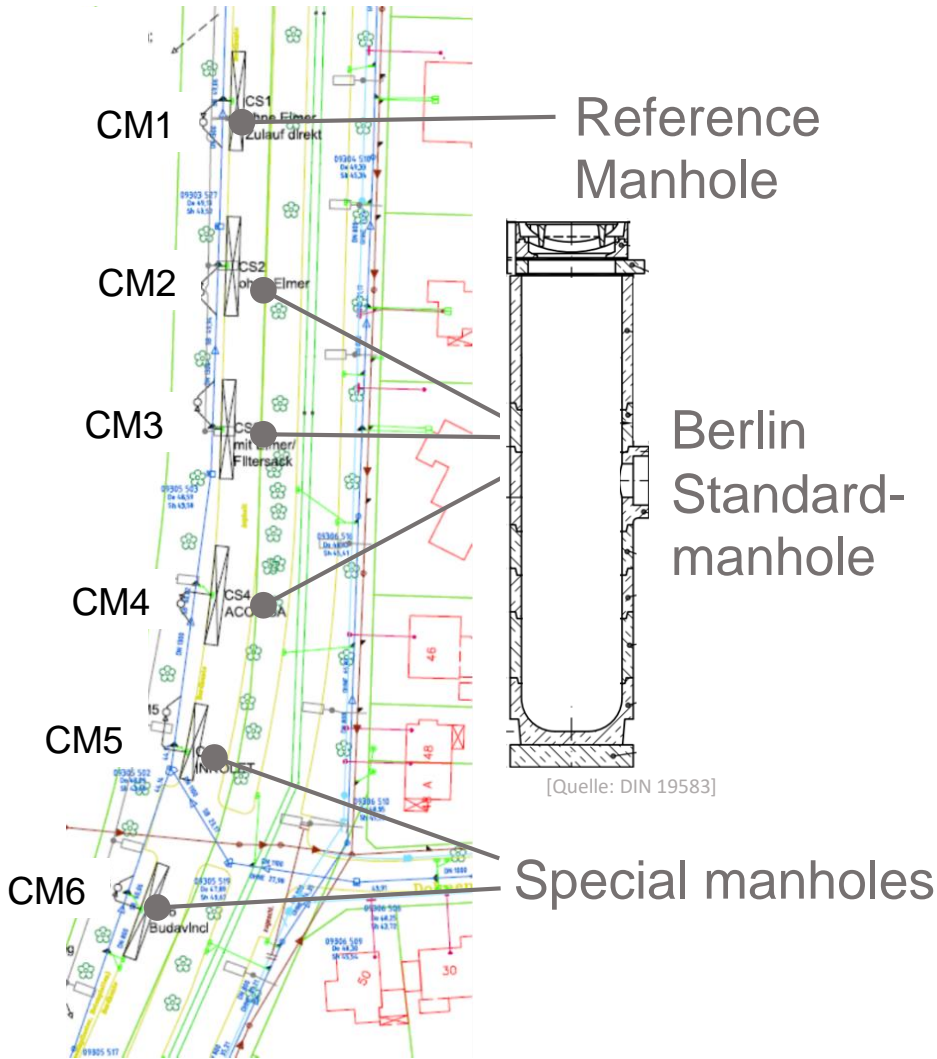








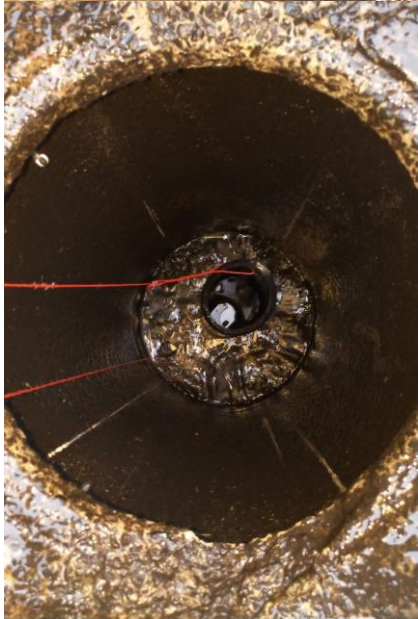
# In situ – Clayallee





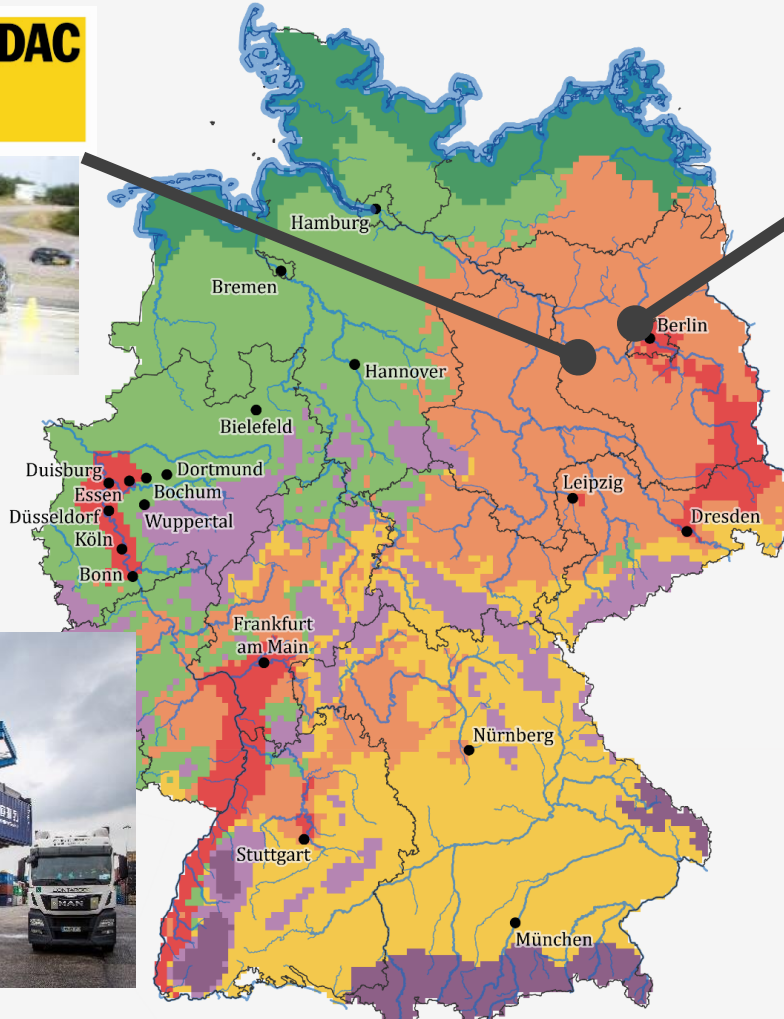


# Optimized leaf basket - in situ



**ADAC**

Fahrsicherheitszentrum  
Berlin-Brandenburg



**Absehbare klimatische Veränderung in den Klimaraumtypen**

Küsten		
Nordwesten		
Trockenste Region		
Wärmste Region		
Südosten		
Mittelgebirge		
Gebirge		

Trockenheit (Sommer)      Starkregen

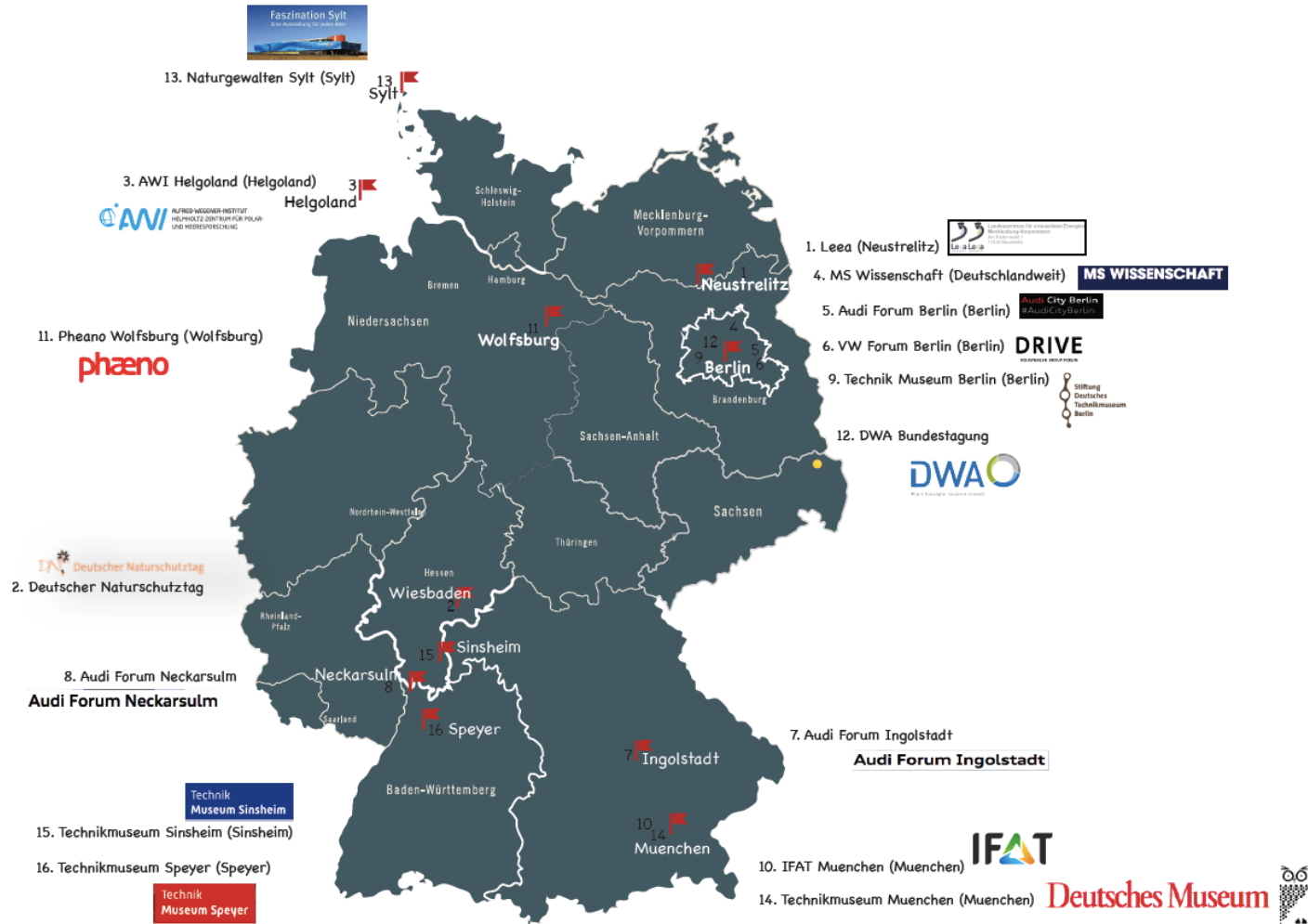
© adelphi, Eurac 2021 – Klimadaten: DWD – Berechnung Klimaraumtypen: Eurac Research – Verwaltungsgrenzen: BKG, Hydrologie: JRC, Städte, Küstenlinie: EuroGeographics Umweltbundesamt (KWRA 2021, Integrierte Auswertung, <https://www.umweltbundesamt.de/publikationen/KWRA-Teil-6-Integrierte-Auswertung>)



[www.gbcc.eu](http://www.gbcc.eu)



# 16 stops for exhibition





# Greentech Festival „Celebrate Change“

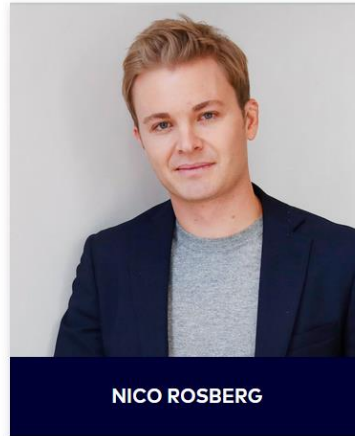
16-18.06.2021-Berlin



SVEN KRÜGER



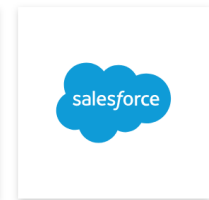
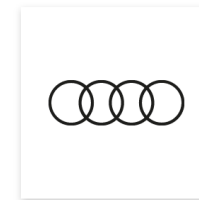
MARCO VOIGT



NICO ROSBERG

## „Sustainability“

FOUNDING PARTNER



## „Cooperation“



**Audi**  
Environmental Foundation

**TOGETHER WE CHANGE  
THE LIFE WE LIVE**

**22-24 JUNE 2022 BERLIN TXL**





# The European SDG Summit 2021



## EUROPEAN SDG ROUNDTABLE - Multi-stakeholder Actions to Address the Tyre Sector Sustainability Challenges

Monday, 11 October 2021  
14:00 – 15:30

[Google Calendar](#) · [ICS](#)



**The European SDG Summit 2021**  
FOR CLIMATE ACTION & A JUST TRANSITION



Co-Organized with: [European Tyre & Rubber Manufacturers Association](#), [Tire Industry Project](#)





# IFAT München 2022

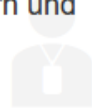


Weltleitmesse für Wasser-, Abwasser-, Abfall- und Rohstoffwirtschaft  
30. Mai–3. Juni 2022 | Messe München

## Die Key Facts der IFAT 2018 auf einen Blick

3.305

Aussteller aus 58 Ländern und  
Regionen



142.472

Besucher aus 162 Ländern und  
Regionen



260.000

Quadratmeter  
Ausstellungsfläche



30.05.- 03.06.2022 Projekt URBANFILTER mit Daniel Venghaus von der TU Berlin

- **Personal and exhibit**



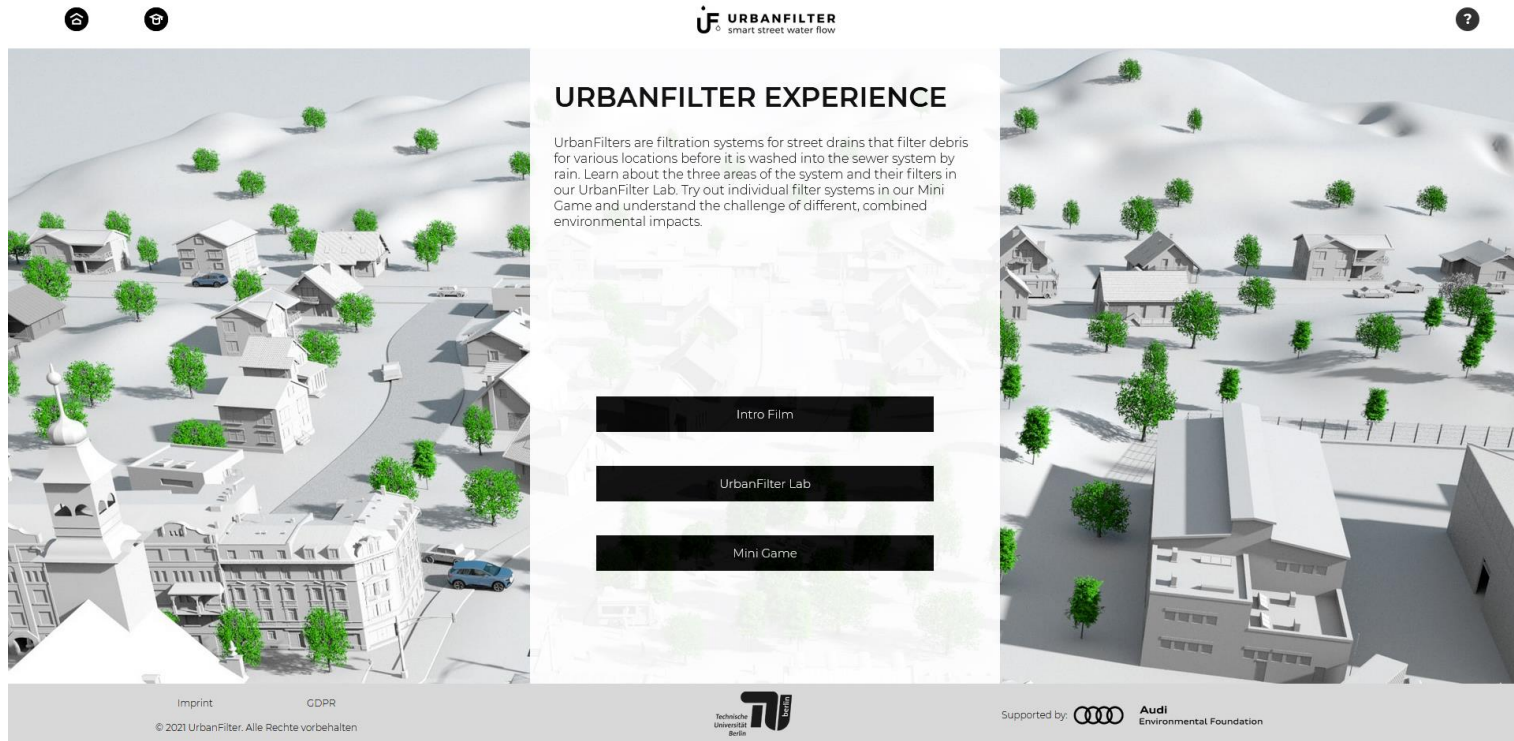
# Phaeno „Meet the scientist“



## meet the scientist: Eine grüne Innovation – der URBANFILTER: Mikroplastik herausfiltern, wo es entsteht

1. Mai 2022 | 11:00 Uhr - 16:00 Uhr





**URBANFILTER**  
smart street water flow

## URBANFILTER EXPERIENCE

UrbanFilters are filtration systems for street drains that filter debris for various locations before it is washed into the sewer system by rain. Learn about the three areas of the system and their filters in our UrbanFilter Lab. Try out individual filter systems in our Mini Game and understand the challenge of different, combined environmental impacts.

- Intro Film
- UrbanFilter Lab
- Mini Game

Imprint    GDPR  
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Technische Universität Berlin

Supported by: Audi Environmental Foundation

<https://URBANFILTER.org/urban-filter-lab>



Thank you  
for your  
attention