SKANDER HATHROUBI

Senior Research Scientist | R&D Microbiology | Biofilm Expert | Inventor | Author

39 years old
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- Microbiology and pathogenesis
- Antibiofilm treatments and preventions
- Antimicrobial biomaterials development
- Coatings and hydrogels development

in

Senior Research Scientist specializing in R&D microbiology, with a Ph.D. in veterinary science and deep expertise in biofilms. Currently leading the microbiology laboratory at SPARTHA Medical, where I develop antimicrobial coatings and hydrogels for medical devices. My research spans biofilm architecture, pathogenesis, and innovative treatment strategies. An inventor with multiple patents, I have also held research positions at Humboldt-Universität zu Berlin (Germany) and the University of California, Santa Cruz (USA). In addition to my scientific work, I am a writer and dedicated educator, actively contributing to the academic community through publications, teaching, and workshops.

EXPERIENCES

Senior R&D Scientist & Project Leader in Microbiology

Spartha Medical - Since July 2022 - Full-time - Strasbourg - France

- Leading multidisciplinary R&D on novel antimicrobial and antibiofilm coatings for medical devices, with a focus on personalized and versatile solutions. Managing industrial co-development projects and contributing to multiple high-impact national and European initiatives:
- ToxBox (HORIZON Europe) – Developing innovative tools for toxicology and risk assessment.
- KISSMat (Grand Est Region) – Creating infection-preventive materials for applications in food, cosmetics, and healthcare (human & animal).
- BIOFACE (RHU 2023 – France 2030) – Developing advanced biomaterials for facial reconstruction in oncology (PI: Prof. Agnès Dupret-Bories).
- 4D-EASLEE (Eurostars) – Co-developing biointelligent infection-preventive CRM pouches for cardiac implants with Hylomorph AG and 3DEUS Dynamics SAS.

Senior Research Associate and project leader

Humboldt-Universität zu Berlin - August 2019 to June 2022 - Berlin - Germany

- Investigating Esherichia coli macrocolony biofilms and their architectures. Role of cellulose and Curli. Interdisciplinary project (Cluster Matters of Activity)
  Laboratory of Prof. Regine Hengge
- Project leader: Bacterial cellulose from architectural and design perspectives :
  https://www.sciencedirect.com/science/article/pii/S2590207525000243
- Textile fermentation_Biofilm and textile microbiome. Collaboration with the anthropology expert Dr. Laurence Douny
- “La récolte des biofilms” exhibition at the Humboldt Labor at Humboldt Forum_2021 Active Curtain.« Humboldt Labor, Humboldt Forum Berlin. Since 29 April 2021.
  https://www.humboldt-labor.de/en/projects/clusters-of-excellence/active-curtain-project

  "DAOULA sheen". West African Wild Silk on Its Way. Exhibition at the Tieranatomisches Theater Berlin Germany and Ougadougou-Safané, Burkina Faso. 17 November 2022 - 31 December 2022.
  https://tieranatomisches-theater.de/project/ausstellung-ab-17-november-2022daoula-sheenwest-african-wild-silk-on-its-way/

  "Bacterial Cellulose: Co-Weaving Biofilms"
  An Installation for the Triennale XXIII: »Unknown Unknows, An Introduction to Mysteries« in the thematic exhibition »Alchemic Laboratory«, curated by Ingrid Paoletti, from July 15th to December 11th, 2022
  https://www.matters-of-activity.de/en/activities/8617/bacterial-cellulose-co-weaving-biofilms

- Book contribution:
  1. B. Beyer and S. Hathroubi. La récolte des biofilms. In: MàJ : design, environnements techniques & pratiques exploratoires. Éditions Cité du design. École supérieure d'art et design Saint-Étienne (ESADSE)/Cité du design, France. 2021
  2. B. Beyer, S. Hathroubi and R Hengge Bacterial Loom. In: Architectures of Weaving From Fibers and Yarns to Scaffolds and Skins. Christiane Sauer / Mareike Stoll / Ebba Fransén Waldhör / Maxie Schneider (eds.) Jovis ISBN 978-3-86859-739-4
  3. L. Douny, S. Hathroubi, A. Dialo, A. Séré, S. Sawadogo and R. Hengge. West African "fermented" textiles. Submitted to Bloomsbury Encyclopedia of World Textiles

Postdoctoral researcher

Univeristy of California, Santa Cruz - November 2016 to June 2019

- Investigated Helicobacter pylori biofilm formation and its potential role in pathogenesis.
- Employed transcriptomic and genetic approaches to identify genes involved in biofilm development.
- Utilized mouse models of H. pylori infection to study in vivo biofilm behavior.
- Applied confocal scanning laser microscopy (CSLM) and scanning electron microscopy (SEM) to characterize biofilm structure and composition.
- Publications:
  1. Hathroubi S., Servetas S.L., Windham I., Merrell D.S., Ottemann K.M. (2018). Helicobacter pylori biofilm formation and its potential role in pathogenesis. Microbiology and Molecular Biology Reviews, 82(2): e00001 18
  2. Hathroubi S., Zerebinski J., Ottemann K.M. (2018). Helicobacter pylori Biofilm Involves a Multigene Stress Biased Response, Including a Structural Role for Flagella. mBio, 9(5): e01973 18.
  3. Hathroubi S., Hu S., Ottemann K.M. (2020). Genetic requirements and transcriptomics of Helicobacter pylori biofilm formation on abiotic and biotic surfaces. npj Biofilms and Microbiomes, 6(1): 56.
  4. Hathroubi S., Zerebinski J., Clarke A., Ottemann K.M. (2020). Helicobacter pylori Biofilm Confers Antibiotic Tolerance in Part via A Protein Dependent Mechanism.Antibiotics, 9(6): 355
  5. Tachiyama, S. T.; Peterson, B.; Khan, M. F.; Liu, X.; Hathroubi, S.; Liu, J.; Roujeinikova, A.; Ottemann, K. M. (2022). The flagellar motor protein FliL forms a scaffold of circumferentially aligned subunits that is essential for torque generation in Helicobacter pylori. Proceedings of the National Academy of Sciences, 119(4), e2118401119.
  6. Elshenawi, Y.; Hathroubi, S.; Hu, S.; Liu, X.; Ottemann, K. M. (2025). Genetic Basis of Gap Formation Between Migrating Helicobacter pylori Colonies in Soft Agar Assays. Microorganisms, 13(5), 1087. DOI:10.3390/microorganisms13051087

Teaching experiences

University of California Santa Cruz _UdeMontreal_HU Berlin_University of Strasbourg - Since May 2018

- Lecture Biofilm and its role in pathogenesis Master degree graduates. University of Strasbourg, Dentistry medical School (Fall session 2022)
- Teaching Molekulare Mikrobiologie (Modul BXY-36,5. Semester)
  Institut für Biologie, AG Mikrobiologie, Humboldt-Universität zu Berlin, Berlin, Germany- 2019-2020 and 2020-2021
  Seminar training, reading and lectures.
  Lectures: Bacterial biofilm and Bacterial pathogenicity
- Guest lecture microbiology and pathogenesis for undergraduates and graduates: Biofilm, the social life of microorganisms. University of California, Santa Cruz (Winter-Spring session 2018 and 2019)
- Microbiology and pathogenesis METX 119-02 online, summer session online classes: Biofilm, the social life of microorganisms. Univeristy of California, Santa Cruz (Summer 2018)
- Teaching course microbial pathogenesis 2 for Master's degree, veterinary science: Surface polysaccharides and envelope (Part_1. Microbial envelope and Part_2. Surface polysaccharides). Université de Montréal (Fall session 2015)
- Laboratory demonstrator for Master's degree, veterinary science students: Basic practical microbiology. Université de Montréal. (2012- 2015)

Mentorship experiences

At differents locations - Since 2017

- Strasbourg University: Co-supervising a PhD student and supervising several master and bachelor students
- Humboldt-universität zu Berlin :
  Nicole Rackov for Bachelor thesis - December 2020 - June 2021
  Nils Jensen, Master thesis - December 2020 - July 2021
- UC Santa Cruz:
  Supervised undergrad student Yasmine E - August 2018 - July 2019
  Ph.D student Aaron C. (University of California, Santa Cruz) - October 2017 - July 2019
  Undergrad student Julia Z. (University of California, Santa Cruz) - October 2017-September 2018
  Summer student Tyler Dewitt (University of California, Santa Cruz) - June-July 2017

- University of Montreal:
  Supervised student internship Sarah-Eve Fontaine-Gosselin - January-May 2014

Oral communications

Conferences - Since 2010

INVITED SPEAKER AT ANNUAL CONFERENCE OF THE INSERM UNIT 1121 NOVEMBER 2022

INVITED SPEAKER AT THE NATIONWIDE CHILDREN'S HOSPITAL, COLUMBUS, USA MAY 2022

INVITED SPEAKER AT THE KAROLINSKA INSTITUTE, STOCKHOLM, SWEDEN MAY 2022

INVITED TALK AT BIOFILM10 INTERNATIONAL CONFERENCE, LEIPZIG, GERMANY MAY 2022

#Invited speaker for 'Textile: The Past and the Future of fashion', workshop Wissenschaftskolleg Berlin_ the concept of Fermented textile 5 May 2022

INVITED SPEAKER WORKSHOP 'SHELF LIFE, FERMENT-ACTIVITY', BERLIN; GERMANY. 10 DECEMBER 2020

INVITED SPEAKER WORKSHOP 'MATERIAL AS ENVIRONMENTAL DEVICE', BERLIN; GERMANY. 10-11 SEPTEMBER 2020

INVITED SPEAKER TO 5TH WORKSHOP ON BACTERIAL AND FUNGAL BIOFILMS, GHENT UNIVERSITY CONFERENCE CENTER. MAY 2019. UNRAVELING THE MYSTERY OF HELICOBACTER PYLORI BIOFILM.

INVITED SPEAKER TO INRS-INSTITUT ARMAND-FRAPPIER OCTOBER 2018. HELICOBACTER PYLORI BIOFILM AND THE UNEXPECTED ROLE OF FLAGELLA.

INVITED SPEAKER TO 2ND TECHNOLOGY SEMINAR-SANDBOX (UCSC_STARTUP INCUBATOR) SEPTEMBER 2018. TARGETING THE HELICOBACTER PYLORI IMPENETRABLE BIOFILM.

PBSE RESEARCH CONFERENCE 2018, FELTON, CALIFORNIA, USA. UNEXPECTED ROLE PLAYED BY FLAGELLA DURING BIOFILM FORMATION.

UC BIOSAFETY OFFICER MEETING 2018, SANTA CRUZ, USA. NEW INSIGHTS INTO HELICOBACTER PYLORI BIOFILM.

WCBP ANNUAL CONFERENCE, 2017, ASILOMAR, CALIFORNIA, USA. NOVEL GENES ASSOCIATED WITH HELICOBACTER PYLORI BIOFILM GROWTH.

CRIPA SYMPOSIUM, 2016, ST-HYACINTHE, QUÉBEC, CANADA. ACTINOBACILLUS PLEUROPNEUMONIAE BIOFILMS MITIGATE INNATE IMMUNE RESPONSE.

ASM BIOFILM, 2015, CHICAGO, USA. ACTINOBACILLUS PLEUROPNEUMONIAE BIOFILMS INDUCE LOWER RESPONSE OF PORCINE ALVEOLAR MACROPHAGES.

CRIPA SYMPOSIUM, 2015, ST-HYACINTHE, QUÉBEC, CANADA. EFFECT OF SUB-INHIBITORY CONCENTRATIONS OF PENICILLIN G ON ACTINOBACILLUS PLEUROPNEUMONIAE BIOFILM FORMATION.

PHD IN 180SEC (3MTMC) 2014, SCIENCE ON STAGE, FACULTÉ DE MÉDECINE VÉTÉRINAIRE, ST-HYACINTHE, QUÉBEC CANADA. BEST PRESENTATION 3RD PRIZE. RÔLE DU BIOFILM DANS LA PATHOGÉNICITÉ D'ACTINOBACILLUS PLEUROPNEUMONIAE.

CONGRÈS BISP 2013, UNIVERSITÉ LAVAL, QUÉBEC, CANADA. RÔLE DES POLYSACCHARIDES DE SURFACE DANS LA FORMATION DU BIOFILM CHEZ ACTINOBACILLUS PLEUROPNEUMONIAE.

Microbiology Research Internship

Groupe de recherche sur les maladies infectieuses du porc (GREMIP) - Since April 2011 - Internship - Saint-Hyacinthe - Canada

- Site-directed mutagenesis (allelic exchange)
  Immunodetection of extracellular polymeric substance (EPS)
  EPS extraction (eDNA...), Immunodot tests
- Biofilms culture in static and dynamic conditions: Drip flow reactor, BioFlux, MBEC assay, flowCell
- Enzymatic treatments on biofilms
- Macrophages in vivo Infection, PBMC isolation
- Lipid A extractions and structure analysis
- Microscopies

Microbiology Research Internship

Centre National de Greffe de Moelle Osseuse, Faculté de médecine de Tunis - October 2009 to June 2010 - Internship - Tunis - Tunisia

- Antibiotic susceptibility tests and serotyping assay of P. aeruginosa clincal strains
- Static biofilm formation and enzymatic treatments
  Curcumin and berberine chloride test on biofilm
- Biofilm genes identification
- Swarming et twitching motility

Microbiology Research Internship

Institut de Biologie Moléculaire et Médecine, Université Libre de Bruxelles - January 2009 to June 2009 - Internship - Bruxelles - Belgium

E. coli chromosomal toxin antitoxin systems identification by PCR
Sequencing
Phylogenetic analyses

Webmaster

www.bacterialbiofilms.com - 2014 to 2016 - Freelancer - SAINT HYACINTHE - Canada - Québec

- Moved to https://www.facebook.com/bacterialbiofilms/ since 2017
- Creating a website about the amazing world of biofilms www.bacterialbiofilms.com
- Developing a team of authors
- Interviews of several experts
- More than 550 monthly visitors

Library assistant

Université de Montréal - September 2012 to 2016 - Temporary Work - Saint-Hyacinthe - Canada - Québec

- Assist students and teachers in location of print and non-print resouces
- Check books and materials in and out to students and teachers using the computerized circulation system
- Monitor student use of the library
- Assist in maintaining the appearance of the library

Proctor

Université de Montréal - Since September 2012 - Part-time - Montréal - Canada - Québec

Monitoring students during the writing of tests/exams

SKILLS

Microbiology

•Microscopic identification, biochemical testing of bacteria ★★★★★ •Antibiotic susceptibility tests and serotyping assay ★★★★★ •Biofilms culture in static and dynamic conditions ★★★★★ •Enzymatic and chemicals treatments on biofilms ★★★★★ •Swarming et twitching motility tests ★★★★★

Cell biology

•Cell culture, macrophages culture ★★★★½ •Cytokines detections (PCR and ELISA) ★★★½☆ •PBMC isolation and proliferation ★★★½☆ •Gastric gland isolation and imaging ★★★★½

Microscopies

•Biofilm staining and EPS detection ★★★½☆ •3D analysis (biomass, volume and thickness) ★★★★☆ •SEM microscopy of biofilm and flagella detection ★★★★½

Molecular biology

•DNA and RNA extraction, PCR and RT-PCR •Site-directed mutagenesis, RNA-seq (Transcriptomic) •EPS extraction (eDNA...), LPS extractions, Lipid A micro-extractions •Immunodetection of extracellular polymeric substance (EPS)

Animal experiment

- Mice infection and treatments
- Gastric gland isolation

EDUCATION

PhD in Veterinary Science, Microbiology and Infectious Disease

FACULTÉ DE MÉDECINE VÉTÉRINAIRE, UNIVERSITÉ DE MONTRÉAL

May 2011 to September 2016

Study of micro-organisms in their natural environment. Development of techniques for culturing bacteria form biofilms. Effect of antibiotics on biofilm. Immune response towards biofilms. Phenotypic changes in biofilms cells.
GPA 3.85/4.3

Publications:

1_Bacterial biofilm derived-antigens: a new strategy for vaccine development against infectious diseases. A. Loera-Muro, A. Guerrero-Barrera, Y. D. N Tremblay, S. Hathroubi and C. Angulo. 2021. Expert Rev of Vaccines

2_ Actinobacillus pleuropneumoniae: Role of biofilm in pathogenicity and potential impact for vaccination development. S. Hathroubi, A. Loera, J.T. Bossé, P.R. Langford and M. Jacques. 2017. Animal Health Research Review. (Published,7:1-14)

3_ Actinobacillus pleuropneumoniae biofilms induce lower response of porcine alveolar macrophages. S. Hathroubi, C. Provost, C. A. Gagnon and M. Jacques. Innate immunity
(http://www.ncbi.nlm.nih.gov/pubmed/27226465)

4_ Biofilms: Bacterial shelters against antibiotics. S. Hathroubi, M.A Mekni, P. Domenico, D. Nguyen and M. Jacques. Microbial Drug Resistance
(http://www.ncbi.nlm.nih.gov/pubmed/27214143)

5_ Surface polysaccharide mutants reveal that absence of O antigen reduces biofilm formation of Actinobacillus pleuropneumoniae. S. Hathroubi, M.A. Hancock, J.T. Bossé, P.R. Langford, Y.D.N Tremblay, J. Labrie and M. Jacques. 2015. Infection and Immunity
(http://www.ncbi.nlm.nih.gov/pubmed/26483403).

6_ Sub-inhibitory concentrations of penicillin G induce biofilm formation by field isolates of Actinobacillus pleuropneumoniae. S. Hathroubi, S-È. Fontaine-Gosselin, Y.D.N. Tremblay, J. Labrie and M. Jacques. 2015. Vet Microbiology
(http://www.ncbi.nlm.nih.gov/pubmed/26130517).

7_ Les biofilms bactériens : leur importance en santé animale et en santé publique. Y.D.N. Tremblay, S. Hathroubi and M. Jacques. 2014. Canadian Journal of Veterinary Research (http://www.ncbi.nlm.nih.gov/pubmed/24688172).
Research Workshop Viral biofilms
Study of Actinobacillus pleuropneumoniae pathogen pork biofilm
Mutagenesis and characterization of biofilm mutant

Communication during PhD program
The "viral biofilms" Out Of Context Seminar
Research Workshop pharmacokinetic / pharmacodynamic

Certificate '' Bacteria biofilms in chronic infections''

FACULTY OF HEALTH SCIENCES, UNIVERSITY OF COPENHAGEN

September 2012 to November 2012

Distinguish biofilms from planktonic bacteria both in nature and in medical related situations. Examine health care problems caused by infections involving bacterial biofilms. Design and develop biofilm models. Strategies for future research.

Training/Certification program for animal experimentation

UNIVERSITÉ DE MONTRÉAL

Since September 2011

The Ethics of animal experimentation gives me the right to experiment on animals ifor laboratory research

Master Applied Microbiology, Environment and Health

UNIVERSITÉ PIERRE ET MARIE CURIE, PARIS 6, FRANCE

September 2008 to June 2010

A good understanding of microbiology ; bacteriology, virology, parasitology, environmental quality and health.
Project communication: GENOTYPIC AND PHENOTYPIC CHARACTERIZATION OF BIOFILM PRODUCTION IN PSEUDOMONAS AEROGINOSA STRAINS IN THE BONE MARROW TRANSPLANT CENTER OF TUNIS, TUNISIA
Training the Oceanological Observatory Banyuls-sur-mer
Biodiversity and biotechnology to microorganisms

Bachelor of Life Sciences

UNIVERSITÉ PIERRE ET MARIE CURIE, PARIS 6 FRANCE

September 2005 to June 2008

Scientific knowledge of biology and the general organisation of the animal and vegetable kingdoms as well as the functioning of organisms, from the molecular level to integrated biological systems.

INTERESTS

Informatics

- Photography; photo treatment Photoshop, ACDSee
- Adobe InDesign

Foreign trips

- 33 countries visited
- Road trips cross-country (Canada, USA)

Cryptocurrency

- Ethereum (ETH) mining
- Trading crypto

Exhibition at the Tieranatomisches Theater (Germany) and Ougadougou-Safané (Burkina Faso).

DAOULA | sheen. West African Wild Silk on Its Way. Exhibition. Tieranatomisches Theater, Ougadougou and Safané, Burkina Faso. 17 November 2022 - 31 December 2022.

Website

https://tieranatomisches-theater.de/project/ausstellung-ab-17-november-2022daoula-sheenwest-african-wild-silk-on-its-way/

Creation date

17 Nov 2022

XXIII Triennale International Exhibition_Unknown Unknowns: An Introduction to Mysteries

Website

https://www.matters-of-activity.de/en/activities/8617/bacterial-cellulose-co-weaving-biofilms

Creation date

08 Aug 2022

The Past and Future of Fashion 2022 at Wissenschaftskolleg

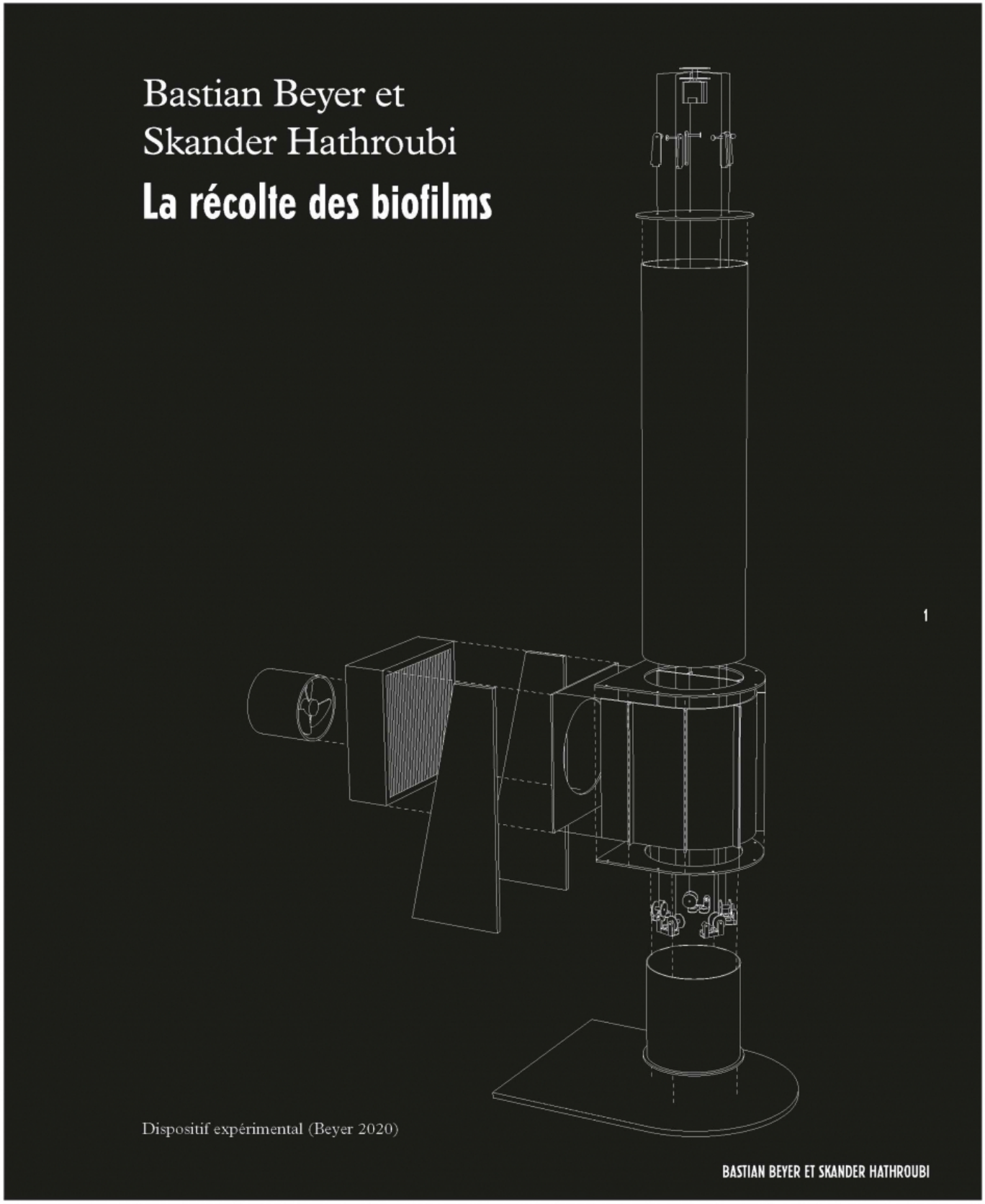
The concept of Textile fermentation and the role of bacteria in dyeing process. Photo credit goes to Laurence Douny

Website

https://www.wiko-berlin.de/veranstaltungen/workshops/2021/the-past-and-future-of-fashion

Creation date

05 May 2022



B. Beyer and S. Hathroubi. La récolte des biofilms. In: MàJ : design, environnements techniques & pratiques exploratoires. Éditions Cité du design. École supérieure d'art et design Saint-Étienne (ESADSE)/Cité du design, France. 2021

Website

https://www.humboldtforum.org/en/programm/dauerangebot/exhibition/after-nature-16464/

Creation date

01 Sep 2021