



Curriculum vitae

Christina Merakou

## PERSONAL INFORMATION

Christina Merakou

Date of birth  Nationality Greek

## POSITION

ECDC Fellowship Programme - EUPHEMpath

## WORK EXPERIENCE

14/05/2016–15/09/2020

Post-doctoral Research Fellow

Harvard University - School of Medicine/Boston Children's Hospital Boston (United States)

Division of Critical Care, Gregory P. Priebe (Gregory.priebe@childrens.harvard.edu)

**Research Work:** 1. Study of bacterial transmission from probiotic capsules to blood in ICU patients. 2. Deciphering the source of gram-negative bacterial CLABSI in critically ill pediatric patients. 3. Investigating the global and local selection acting on *Burkholderia dolosa* in a Cystic Fibrosis (CF) human lung together with transmission patterns to other patients. 4. Characterizing mutations found in patients with *Pseudomonas aeruginosa* acute infections. 5. Vaccine development against *P. aeruginosa* for critically ill and CF patients focusing on TH17 responses.

Main Activities:

- Cultured and genetically manipulated multiple gram- positive and gram-negative bacterial pathogens.
- Close collaboration, data presentation and manuscript preparation with multiple national and international centers (Broad Institute (USA), MIT(USA), Department of Defense (USA), Technion, Institute of Technology (Israel), Griffith University (Australia).
- Designed and prepared vaccine formulations, immunized mice, processed tissues, performed immunological assays and analyzed data to check their efficiency.
- Wrote and maintained IRB protocols and biosafety protocols.
- Managed projects which needed collaboration with the nursing personnel of the hospital.
- Processed blood, fecal, skin, oral, ETT and central line samples for bacterial colony collection
- Designed assays and performed RAPD for bacterial strain matching between different body sources of isolates
- Designed and produced multiple bacterial mutants
- Cloned, expressed and produced multiple bacterial proteins
- Designed and performed phenotypic assays characterizing bacterial SNPs obtained during evolution inside the human host.
- Was a member, produced and presented data in monthly meetings for the Translational Research for Infection Prevention in Pediatric Anesthesia and Critical Care program. (TRIPACC) consortium
- Used GraphPad Prism for statistics and visualization.
- Was awarded with 2 travel grants
- Prepared data for internal and external presentations, as well as manuscripts for publication.
- Directly Supervise one MD fellow and 3 Research Technicians
- Contributed as a Reviewer to World Journal of Microbiology and Biotechnology (Springer) and Metabolomics (Springer).
- Contributed to one Peer Reviewed Scientific Publication (Yelin, Flett & Merakou et al., Nature Medicine, 2019) and one invited Review Article (Merakou et al., Surgical Infections, 2017).
- Contributed to one published abstract (Merakou et al., the Journal of Immunology, 2020)



11/04/2011–31/01/2015

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**Industry PhD student – EIMID ITN fellow**

Novartis Vaccines &amp; Diagnostics, Siena (Italy)

Department of Microbial Molecular Genetics, Meera Unnikrishnan  
(M.Unnikrishnan@warwick.ac.uk)**Fellowship:** Marie Curie Actions Fellowship-EIMID INT (European Initiative for basic research in Microbiology and Infectious Diseases Initiative)**Thesis:** "Investigation of the biological role of surface proteins in *Staphylococcus aureus* pathogenesis"**Research Work:** Deciphering the role of *S. aureus* surface proteins with human host cells to identify new vaccine candidates.Main Activities:

- Set-up *in vitro* infection model of *S. aureus* wild type and mutants in human host cell lines.
- Applied assays to examine *S. aureus* intracellular survival and replication in human host cell lines.
- Performed confocal microscopy to bacterial fate in infected cells.
- Set up Tn-library transduction to different staphylococcal bacterial strains
- Characterized bacterial internalization/survival mechanisms in human host cell lines by CFUs, phosphorylation WB, use of host cell inhibitors and FACS flow cytometry.
- This work has led to the implementation of a screening strategy for optimized selection of protective antigens for a vaccine against *S. aureus*
- Cloned, expressed and purified potential vaccine candidates for mouse immunizations.
- Produced multiple genetically manipulated *S. aureus* strains for the *S. aureus* company's vaccine project.
- Was an active member of the *S. aureus* company's vaccine project team.
- Participated and presented in internal Lab meetings, Department Meetings, Staphylococcal vaccine project meetings and Annual Meetings of EIMID ITN Fellowship Program.
- Contributed to 2 Peer Reviewed Research Articles (Popov et al., PNAS ,2015; Korea et al, Infection and Immunity, 2014).
- Trained 2 master students and on PhD student in laboratory techniques and data analysis

01/06/2013–13/09/2013

**PhD Intern**

Imperial College, London (UK)

Department of Infectious Diseases, Andrew Edwards (a.edwards@imperial.ac.uk)

**Project:** "Investigation of the interaction of Small Colony Variants (SCVs) of *S. aureus* with human macrophages"**Research Work:** Investigation of the properties obtained by *S. aureus* by phenotypic changing into SCVs in human THP-1 cells.Main Activities:

- Performed human blood isolation of phagocytic cells and maintained them in culture.
- Produced *S. aureus* SCVs in human macrophages and further characterized their properties for survival *in vitro*.

01/11/2009–24/03/2011

**Research Intern**

Aghia Sofia Children's Hospital, Athens (Greece)

Molecular Endocrinology Laboratory, Amalia Sertedaki (aserted@med.uoa.gr)

**Research Work:** Detect mutations, SNPs, deletions and duplications in genes that cause Aldosterone Synthase Deficiency, Congenital Adrenal Hyperplasia and Primary HyperaldosteronismMain Activities:

- Designed and performed PCR, Sanger sequencing and MPLA on blood samples from patients with adrenal complications clinical phenotypes.
- Detected three newly described mutations in the *CYP11B2* (2) and the *KCNJ5* (1) genes.
- Collaborated with the physicians of the patients to correlate the genetic findings with their clinical phenotype.
- Presented in national and international conferences and prepared manuscripts.



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- Contributed to 2 Peer Reviewed Research Articles (Charmandari et al., Journal of Clinical Endocrinology and Metabolism, 2012; Merakou & Fylaktou et al, submitted in Journal of Clinical Endocrinology and Metabolism, 2020).

01/05/2010–01/10/2010

## Master Student

Erasmus Medical Center, Rotterdam (Netherlands)

Department of Clinical Genetics, Rob Willemsen (r.willemsen@erasmusmc.nl)

**Thesis:** "Characterisation of (inducible) transgenic mice for Fragile X-associated Tremor-Ataxia Syndrome (FXTAS)"

**Research Work:**Main Activities:

- Developed a PCR assay which could detect >300 CGG repeats in the promoter regions of the FMR1 gene.
- Developed a CGG repeat size detection assay using fragment analysis in sequencer machine.
- Mouse tissue harvest and DNA, RNA and protein purification.
- Expression of the FMR1 protein in mouse tissue by immunostaining.
- Participated and presented data in weekly lab meetings and monthly departmental meetings.

01/11/2007–31/01/2008

## Bachelor Student

Agricultural University of Athens, Athens (Greece)

Laboratory of General and Agricultural Microbiology, Dimitrios Georgakopoulos (dgeorga@aua.gr)

**Thesis:** "Determination of genes *Pseudomonas fluorescens* strain X involved in the suppression of damping-off of bean seedlings caused by the oomycete *Pythium ultimum*".

**Research Work:** Identify phenotypically on bean seedlings *P.aeruginosa* X transposon mutants that lost their capacity of preventing damping-off by *Pythium ultimum*. Loss of function genes were identified and further characterized.

Main Activities:

- Infection and disease progress caused by *Pythium ultimum* on bean seedlings.
- Bacterial culture, DNA purification and cloning.
- Bioinformatic identification of genes using the BLASTn algorithm.

## EDUCATION AND TRAINING

11/2019

**"Visual Communication workshop"**

Harvard Medical School, Office for Postdoctoral Fellows, Boston (USA)

A comprehensive workshop that covers communication with scientific and non-scientific audiences, visual perception and what humans find intuitive, colors and how to amplify them, visual organization and how to structure to simplify comprehension, teaches the eye-flow and how to effortlessly guide your audience through the design. Tutor: Dr. Jernej Zupanc, Founder of Seyens Ltd.

01-03/04/2019

**"Effectively communicating research"**

Harvard Catalyst Education program, Boston (USA)

A three-day, highly engaging, interactive, intensive course. The course is designed to provide skills necessary to express science clearly to diverse audiences; to prepare abstracts, manuscripts, and posters, and to speak effectively. With the guidance and expertise of the course faculty, including journal editors and leading scientists, participants acquire the tools necessary to convey their science effectively.

04/2018

**"OFT Spring-LEAD1 Future leaders"**

Boston Children's Hospital postdoc office, Boston (USA)

A 4-day, intense and highly engaging course which simply teaches you how a good leader acts and how to become one. Tutor: Claire Marré, MS-Senior Leadership Development Consultant

10/2017–11/2017

**"Analysing and Communicating Biomedical Research II: Statistics and**



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### **"Probability for Life Scientists"**

BCH post-doc association, Boston (USA)

10-weeks of online course, focused on origins of novel pathogens; analysis of the spread of infectious diseases; medical and public health countermeasures to prevent and control epidemics; panel discussions involving leading public health experts with deep frontline experiences to share their views on risk communication, crisis management, ethics and public trust in the context of infectious disease control.

09/2017–07/2018

### **"Certificate in Applied Biostatistics"**

Harvard Catalyst Education program, Boston (USA)

A 10-month online course that offers a comprehensive introduction to biostatistics in medical research. The course includes a review of the most common techniques in the field, as well as the manner in which these techniques are applied in standard statistical software ( ) Weekly lectures are combined with learning assessments and practicum exercises. Discussion boards, office hours, and journal club sessions are available in order to engage further with colleagues and faculty.

13/12/2016

### **"Difficult conversations"**

BCH, Boston (USA)

10/2017–11/2017

### **"Analysing and Communicating Biomedical Research II: Statistics and Probability for Life Scientists"**

BCH post-doc association, Boston (USA)

10-weeks of online course, focused on origins of novel pathogens; analysis of the spread of infectious diseases; medical and public health countermeasures to prevent and control epidemics; panel discussions involving leading public health experts with deep frontline experiences to share their views on risk communication, crisis management, ethics and public trust in the context of infectious disease control.

10/2017–11/2017

### **"Analysing and Communicating Biomedical Research II: Statistics and Probability for Life Scientists"**

BCH post-doc association, Boston (USA)

10-weeks of online course, focused on origins of novel pathogens; analysis of the spread of infectious diseases; medical and public health countermeasures to prevent and control epidemics; panel discussions involving leading public health experts with deep frontline experiences to share their views on risk communication, crisis management, ethics and public trust in the context of infectious disease control.

09-11/2016

### **"Scientists Teaching Science Online Course"**

Harvard Medical School, Office for Postdoctoral Fellows, Boston (USA)

The online course "*Scientists Teaching Science*" teaches about active learning, creating course objectives and test items, and improving your teaching, assessment, and communication techniques for students of all ages. It involves learning the latest research-based techniques used by model instructors around the world. It is appropriate for graduate students, post-doctoral researchers, current faculty members in the sciences, medical practitioners, engineers, and mathematicians who are interested in improving their teaching, training, mentoring, and/or communication skills.

11/2015

### **"Next Generation Sequencing: Whole Genome Sequencing Library Preparation-Illumina"**

EMBL, Heidelberg (Germany)

A three-day hands-on course that teaches the fundamentals of NGS library preparation and validation using the Illumina TruSeq DNA PCR-free sample preparation kit. An introduction into Illumina NGS technology and the library preparation workflow is provided. The main part includes the preparation of libraries from genomic DNA, with a focus on the critical steps and potential pitfalls of the protocol. Finally quantification and quality control of the prepared libraries is done and concludes with discussing solutions for whole genome sequencing data analysis.



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09/2015 **"Ion World Tour"**Ion Torrent<sup>TM</sup> by ThermoFisher meeting, Athens (Greece)

6-weeks of online course. The main aim of the course, is to describe and analyze variation in health between and within countries. This will provide an understanding of causes of the variation. The course includes measurements and determinants of health and offers a public health perspective of the global burden of diseases. The course specifically addressed: Maternal and Child Health; Sexual reproductive health and rights; Major infectious disease - malaria, TB, HIV, pneumonia; Non communicable disease; Mental health; Disasters; Injuries; Health systems and financing; and Health policy. Analysis will be done from a gender and equity perspective.

03-05/09/2012 **"Risk Management Communications"**

EIMID ITN training, Salzburg (Austria)

A three-day intensive course. The aims of the course are to make an introduction into risk communication, who to translate science to the public, who to write a press statement. Training is done by real time interviews in a studio both for the radio and the TV with a real Austrian radio producer and a real Austrian TV anchorman. Communication problems for research institutes is discussed, an introduction into communication in crisis situations is given. Exercises are performed to provide statements on crisis situations (scenarios provided beforehand, targeting different audiences).

02/2020-on going

**Master in Public Health**  
European University Cyprus, Nicosia (Cyprus)  
On-line, part-time

EQF level 7

01/02/2011–31/01/2015

**PhD in Molecular Biotechnology**  
University of Siena, Siena (Italy)

EQF level 8

01/09/2007–31/08/2009

**Master of Science**  
Wagenigen University, Wagenigen (Netherlands)  
Medical Biotechnology

EQF level 7

01/09/2001–31/07/2007

**Bachelor of Science**  
Agricultural University of Athens, Athens (Greece)  
Agricultural Biotechnology

EQF level 6

**PERSONAL SKILLS**

Mother tongue

Greek

Foreign languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Italian	B2	B1	B2	B2	A1
French	A2	A2	A1	A1	A1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

Common European Framework of Reference for Languages

Communication skills

Language and multicultural skills:

- Fluent in 3 European languages due to extensive work experience in English speaking countries (USA, UK) and in Italy.
- Very flexible and adaptable due to research work experience in 5 different countries and multi-cultural work environments.



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Excellent scientific communication and presentation skills:

- Frequent discussion and presentation of projects and data in group internal meetings or meetings with collaborators.
- Presentation of work at local and international conferences.
- Writing of scientific peer reviewed articles and grant applications.
- Communication through email, Zoom and phone about project lead and progress with national and international academic and industry collaborators.

Engagement in science communication with the public:

- Interviewed for the wbur radio station (Boston, USA) communicating in simple words what our published research focuses on.
- Volunteering as a judge for the High School Science & Engineering Fair of Boston in 2019

## Organizational/managerial skills

- Outstanding management skills due to my post-doctoral research work multiple projects with national and international collaboration partners in academia and industry.
- Organization of collection, shipping, storage and processing of thousands of biological samples.
- Writing and maintenance of documents for research purposes, such as IRBs, Consent Forms and MTAs.
- Strong leadership skills due to my supervision of an MD fellow at BCH and 3 Research Technicians.

## Job-related skills

- Extensive hands on experience in Microbiology, Molecular Biology and Genetics (BSc thesis, PhD training, post-doctoral training).
- MPH student in the EU with specialization in Infectious disease epidemiology.
- Infectious disease appassionato

## Digital skills

## SELF-ASSESSMENT

Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Independent user	Proficient user	Proficient user

Digital skills - Self-assessment gridExpertise in:

- Windows programs: Word, Excel, PowerPoint, Prism Graph Pad, Adobe Illustrator, FCS Express, Geneious, VectorNTI, MEGA, PyMOL, MapViewer, Ensembl, Galaxy, PATRIC.

Beginner in:

- STATA, Python, Matlab