Global Health: Vector-Borne Diseases

SEMINAR REPORT 2019
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SALZBURG INSTITUT PASTEUR GLOBAL HEALTH: VECTOR-BORNE DISEASES SEMINAR

September 3 - 8, 2019

- 34 fellows from 30 different countries and regions
- 11 faculty members from Czech Republic, France, Germany, Greece, Senegal and the Netherlands
- 16 lectures, conferences and round table discussions

Faculty Photo (L-R)

Willem Takken, PhD; Wolfgang Aulitzky, MD (Medical Director, AAF/OMI); Simon Cauchemez, PhD; Anna-Bella Failloux, PhD (Course Director); Petr Volf, PhD; Mawlouth Diallo, PhD-HDR and Stephanie Blandin, PhD

Not pictured: Sarah Bonnet, PhD; Sandra Junglen, PD, PhD; Georgette Kluiters, BSc Vet Sci, MSc, PhD; Steven Sinkins, PhD and John Vontas, PhD
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<th>Time</th>
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<td>07:00 – 08:00</td>
<td>BREAKFAST</td>
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<td>08:00 – 09:30</td>
<td>08:30 – 09:30</td>
<td>Introductions</td>
<td>Malaria: Transmission and</td>
<td>Mosquito Microbiome,</td>
<td>Ticks and Pathogen</td>
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<td>Pre-Seminar Test</td>
<td>Mosquito Immune Responses</td>
<td>Wolbachia and Transmission</td>
<td>Transmission</td>
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<td>Stephanie Blandin</td>
<td>Steven Sinkins</td>
<td>Sarah Bonnet</td>
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<td>09:30 – 11:00</td>
<td>Medical Entomology and</td>
<td>Sandflies as Vectors of</td>
<td>Resistance to Insecticides</td>
<td>Culicoides: Blue Tongue,</td>
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<td>Vectorial Transmission</td>
<td>Pathogens</td>
<td>John Vontas</td>
<td>Schmallenberg and Others</td>
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<td>Anna-Bella Failloux</td>
<td>Petr Volf</td>
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<td>Georgette Kluiters</td>
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<td>11:00 – 11:30</td>
<td>COFFEE BREAK</td>
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<td>11:30 – 12:30</td>
<td>11:30 – 13:00</td>
<td>Arthropod-Borne Viruses:</td>
<td>Conference: Mathematical</td>
<td>Conference: Importance of</td>
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<td>Dengue, Chikungunya, Zika...</td>
<td>Modelling in the Fight Against</td>
<td>Field Studies in Understanding</td>
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<td>Anna-Bella Failloux</td>
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<td>Simon Cauchemez</td>
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<td>12:30 – 14:00</td>
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<td>14:00 – 15:00</td>
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<td>Conference: Evolutionary</td>
<td>Round Table: How to Control</td>
<td>Round Table: From the Field to</td>
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<td>and Ecological Insights into</td>
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<td></td>
<td>the Emergence of Arthropod-Borne-Viruses</td>
<td>Vaccination or Vector Control?</td>
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<td>Globalization/ Climate</td>
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<td>Sandra Junglen</td>
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<td>Change and Vector-Borne</td>
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<td>15:00 – 16:00</td>
<td>Round Table: Globalization/</td>
<td>Round Table: Predict Emergences</td>
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<td>Final Discussion &amp; Wrap-up</td>
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<td>Climate Change and Vector-Borne</td>
<td>Vector-Borne Diseases</td>
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<td>Post-Seminar Test</td>
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<td>17:00 – 18:00</td>
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<td>OMI/AAF PRESENTATION</td>
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<td>19:00 – 20:00</td>
<td>Faculty Only Meeting to Review</td>
<td>DINNER</td>
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<td>the Week</td>
<td>Faculty Dinner in Private Home</td>
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<td>20:00 – 21:00</td>
<td>WELCOME RECEPTION &amp; DINNER</td>
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<td>CHAMBER MUSIC CONCERT</td>
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INSTITUT PASTEUR SEMINAR in SALZBURG

"Global Health: Vector-Borne Diseases"

September 3 – 8, 2019

FACULTY
Wolfgang Aulitzky, MD is the Medical Director of the American Austrian Foundation. He is Associate Dean for International Medicine and Distance Learning, Adjunct Prof. of Clinical Urology and Adjunct Prof. of Clinical Reproductive Medicine at the Weill Medical College of Cornell University/New York Presbyterian Hospital. In 2016, he was appointed Adjunct Professor of Pediatrics in the Associated Faculty of the Perelman School of Medicine at the Children’s Hospital of Philadelphia. He is also Associate Prof. of Urology at the Medical University of Innsbruck and Visiting Professor at the Medical University of Vienna. Amongst others he is a member of the American, German and Austrian Societies of Urology and was awarded the Zuckerkandlpreis of the Austrian Society of Urology in 1989. In 1995 he received the Silver Medal, in 2007 the Golden Medal for Merits to the Republic of Austria and in 2014 the cross of honor of the Land Salzburg. As Director of the Medical Program of the American Austrian Foundation he has initiated the Open Medical Institute, a scientific and educational collaboration of Weill Cornell and the NewYork Presbyterian Hospital, the Children Hospital of Philadelphia, Duke University, Columbia University, the Cleveland Clinic and leading hospitals in Austria. Dr. Aulitzky earned his medical degree at the University of Innsbruck in 1977, was a research associate at the University of Uppsala, Sweden and the Rockefeller University, New York. He received his training as an urologist at the University of Innsbruck and the General Hospital of Salzburg. He is the author of more than 140 publications on Urology, Andrology and Health Care issues and is co-author of books on basic and clinical urology/andrology.

Wolfgang Aulitzky, MD

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Anna-Bella Failloux, PhD (Course Director) is a medical entomologist and chief of the unit “Arboviruses and Insect Vectors” in the department of Virology at the Institut Pasteur in Paris. Her work mainly focuses on arbovirus–mosquito interactions in order to decipher the factors leading to the viral emergence. She did her first move in medical entomology at the Institut Louis Malardé in French Polynesia with a PhD on the adaptation of the vector *Aedes polynesiensis* to local parasite populations of the filaria *Wuchereria bancrofti*. Then she moved to the Institut Pasteur in Paris where as a post-doc, she developed genetic markers to uncover the complex genetic structure of the widespread mosquito *Aedes aegypti*, the primary dengue vector worldwide, dengue being the most important arboviral disease affecting humans. In 2011, she became the head of an independent group (tenured in 2014) which has been actively involved in defining finely the role of mosquito vectors in the last emergences of chikungunya and Zika. Her team has an international renown in transmission of human arboviruses and also for its unique expertise in experimental infections of mosquitoes with class 3 arboviruses. She collaborates tightly with the Institut Pasteur International network (33 institutes covering the 5 continents) to anchor her projects on arboviral emergences. She has authored over 150 scientific publications on vectors of alphaviruses, flaviviruses and phleboviruses. She participates actively in teaching medical entomology as co-director of the course “Insect Vectors and Pathogens Transmission” and the MOOC “Medical Entomology” of the Institut Pasteur.

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Stephanie Blandin, PhD is a French immunologist who specialised in mosquito/parasite interactions. She grew up in a farm in Burgundy where she had inspiring teachers who nurtured her love for science. She prepared highly competitive exams for two years and joined the “Ecole Normale Supérieure” in Paris where she studied chemistry and biology. After being awarded a Bachelor degree, she did a 6-month internship in the laboratory of Prof. Max Cooper in Birmingham, Alabama, USA. She then obtained a master in Immunology from the Institut Pasteur in Paris, and moved to the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany, for her PhD under the supervision of Prof. Kafatos, who was then the head of EMBL, and Prof. Hoffmann who was later awarded the Nobel prize in Medicine in 2011. It is at that time that she started to work on the major malaria vector, the mosquito *Anopheles gambiae*. During her PhD, the field underwent major advances, with the sequencing and the first transformation of the mosquito genome, and the development of functional genetic approaches. She contributed to some of these developments, provided the first proof that mosquitoes mount a potent antiparasitic response and identified a key mosquito antiparasitic gene. With exciting novel opportunities opened up by this series of developments, she decided to stay in the field and moved to the laboratory of Dr. Levashina in Strasbourg, France. She identified the first mosquito gene whose polymorphism determines mosquito resistance to malaria parasites. She is now leading her own lab at the IBMC in Strasbourg, where she continues to work on the dissection of the genetic basis of resistance, but also on the maintenance of redox homeostasis in mosquitoes and parasites, and on means to manipulate redox homeostasis to reduce malaria transmission. She was awarded the Young Biomedical Researcher prize from Sanofi & Institut Pasteur in 2012. Her lab is part of the Laboratory of Excellence ParaFrap and the international consortium Zikalliance. She has obtained additional financial support, notably from the European Research Council (ERC), the French National Research Agency (ANR) and the Alsace Region. She lives in Strasbourg with her two children. Her husband is a group leader in Cambridge, UK.

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Sarah Bonnet, PhD is a parasitologist and a medical and veterinary entomologist. She began her university studies at the Université des Sciences de Nantes in the west of France, and then obtained her PhD in parasitology at the Université Pierre et Marie Curie in Paris. She then graduated from Pasteur Institute in medical and veterinary entomology. Following her PhD on "Malaria transmission from Man to mosquito: measurement and potential blocking strategies" performed both in France (Pasteur Institute) and in Cameroon (IRD), she worked on a vaccine candidate against malaria as a postdoc researcher in Pasteur Institute. She was then recruited at INRA (French National Institute of Agronomy) in 2004 to develop research topics on the transmission of tick-borne pathogens by their vectors including epidemiological studies, laboratory competency analysis, tick-host-pathogen interactions studies, and anti-tick vaccines development. She now holds the position as research director at INRA and is the deputy head of the BIPAR unit. Recent publications include several reviews on tick-host-pathogen interaction and tick saliva, and the discovery of a potential anti-tick vaccine candidate as a tick salivary component having an immunomodulatory effect on the vertebrate host. Sarah Bonnet was a recent (2015) winner of the Alfred Kastler prize awarded by the Foundation LFDA. She is a peer reviewer for multiple journals. She has been teaching since several years at the University of Versailles-St Quentin, as well as within the framework of the “Medical entomology” course of the Pasteur Institute, and set up a university diploma on ticks and tick-borne pathogens in 2019.

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Simon Cauchemez, PhD is a mathematical modeler and epidemiologist specialized in the analysis of complex epidemic data. Dr. Cauchemez studied Statistics at ENSAE (National School for Statistics and Economic Administration) in 1998-2001 before obtaining a Master degree in Biomathematics in 2002 and a PhD in Biostatistics applied to Infectious Disease Epidemiology in 2005 at INSERM. In 2005, he moved to Imperial College London to work under the supervision of Prof Neil Ferguson. In 2007, he obtained a RCUK research fellowship. He was promoted Senior Lecturer in Statistical Infectious Disease Epidemiology at Imperial College in 2011 and Reader in 2013. In 2013, he moved to Institut Pasteur in Paris to become Head of Laboratory of the Mathematical Modelling of Infectious Diseases Unit he created. His main research objective is to develop state-of-the-art statistical and mathematical methods to address the many challenges epidemiologists are confronted to during epidemics, with the aim to increase our understanding of how pathogens spread in populations and the impact of interventions, to support policy making and optimize control strategies. He has been strongly involved in modelling activities during recent infectious disease outbreaks including the pandemic influenza in 2009, the emergence of chikungunya (2013-2014) and Zika (2015-2016) in the Americas, the West African Ebola outbreak (2013-2015) and a large urban outbreak of plague in Madagascar (2017). Dr. Cauchemez co-authored more than 100 research articles.

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Mawlouth Diallo, PhD-HDR is a vector biologist with 25 years of experience studying the mosquitoes borne arboviruses and malaria in Africa. His leadership abilities have helped to the conception and implementation at “Institut Pasteur de Dakar” of a brand new and well-equipped laboratory with facilities for classical and molecular entomology including a BSL-3 insectary in 2004. At the head of this unit, He has developed a basic research programmes on arboviruses (Dengue, Yellow Fever, Rift Valley Fever, West Nile, Chikungunya, Zika, other emerging arbovirus infections) and malaria vector bio-ecology, population genetics and virus–vector-vertebrate interactions. His research integrates also the impact of climate and environmental change on the vectors dynamic and associated viruses spill over. More recently he has integrated a modelling approach to analyse a long series of data gathered over years to predict the areas and periods at highest risks of vector pressure and further support decision-making. The last ten years, he has collaborated in several projects funded by the NIH, EU-FP6/FP7 and H2020 (EDEN, INFRAVEC_INFRASTRUCTURES-2008, QWeCi_ENV.2009, Emida-Era-Net), ANR, Welcome Trust, PMI/USAID, French Ministry of Environment, Senegalese Ministry of Research, UNDP/World Bank/WHO etc.). As a WHO expert, he was deployed in more than 17 African countries for arboviral disease outbreaks investigation and/or risk assessment. He is currently author of more than 100 publications in peer-reviewed international journals. He has also supervised 4 PhD, 4 masters and 7 Postdoc.

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Sandra Junglen, PD, PhD is a virologist who specializes in the ecology and evolution of arthropod-associated viruses. Dr. Junglen grew up in Western Germany and completed her diploma degree in biology at the Justus-Liebig University of Gießen, Germany. During her studies she did a six-month internship in the Taï National Park in Ivory Coast studying free-living chimpanzees, and where she returned to collect mosquitoes for her PhD. She then moved to Berlin where she obtained her PhD from the Technical University and the Robert Koch-Institute. After a short postdoc at the Robert Koch-Institute, she started her own research group at the Institute of Virology at the University of Bonn Medical Centre. She has recently moved with her team to the Institute of Virology at the Charité Universitätsmedizin in Berlin. The research of Sandra Junglen particularly focuses on the genetic diversity of arthropod-associated viruses and on ecological mechanisms that influence their geographic spread and emergence. She and her group have characterized numerous novel viruses including the discovery of novel RNA virus genera and families. She has made significant contributions to the discovery and characterization of insect-specific viruses. For example, her group was the first to describe insect-specific bunyaviruses and to detect a previously unknown clade of insect-specific flaviviruses within the pathogenic flaviviruses. Furthermore, she and her team could show that St Louis encephalitis virus existed in sylvatic habitats in Central America and spread to North America driven by anthropogenic ecosystem disturbance, where it caused numerous outbreaks and epidemics. She has published 50 papers and received grants from the German Research Foundation and the Federal Ministry of Education and Research.

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Georgette Kluiters, BSc Vet Sci, MSc, PhD is a veterinary epidemiologist and entomologist specialising in the biology and control of insect vectors of livestock diseases. Dr. Kluiters completed her undergraduate studies at the Royal Veterinary College in London, UK, and remained there for her Masters in the Control of Infectious Diseases in Animals. She was later awarded her PhD, at the University of Liverpool, in relation to the livestock disease bluetongue, and the dynamics of its midge vectors. Dr. Kluiters was employed by the Swiss Federal Veterinary Office, Berne, Switzerland, to investigate the spatial distribution of cases and surveillance for bluetongue disease in cattle and sheep within Switzerland when the disease first appeared in northern Europe. Following this, she returned to the UK, running the first nationwide surveillance scheme for a for Equine Grass Sickness, at the Animal Health Trust, Newmarket. She joined the Lucinda (Liverpool University Climate and Infectious Diseases of Animals) Group in 1999 and is experienced in designing and undertaking field-studies on disease vectors, including their ecology, flight dynamics and feeding behaviour as well as both morphological and molecular identification of these insects and their blood meals. Here she worked on projects aiming to improve projections for the future of bluetongue and its vectors under scenarios of climate and environmental change. Dr. Kluiters currently has funding from the BBSRC to determine the effect of a parasitic worm on the life history characteristics, vector competence and survival of Culicoides biting midges - thereby assessing their potential as biological control agents. She has recently project managed the design and completion of purpose-built insectary and BSL-3 facilities for insect studies at Liverpool Veterinary School. Along with her interests in vector-borne disease control, Dr. Kluiters has a commitment to impacting policy change. She has previously worked within the Research Service at the National Assembly for Wales – providing research briefings to support Assembly Members in Committee and in the scrutiny of legislation and policy, as well as proactive research outputs to help contribute to open and well informed debate.

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Steven Sinkins, PhD is a Professor at the MRC-University of Glasgow Centre for Virus Research in the United Kingdom. He completed undergraduate studies at the University of Oxford, a PhD at the London School of Hygiene and Tropical Medicine, and postdoctoral research at Notre Dame University in the USA. He has held academic positions at the Liverpool School of Tropical Medicine, where he was Head of Vector Biology, University of Oxford, and Lancaster University in the UK, and has been a Wellcome Trust Senior Research Fellow since 2006. Research in the Sinkins group focuses on Wolbachia symbionts in mosquitoes, especially their use to block transmission of mosquito-borne viruses and the mechanisms of this transmission blocking; currently he is lead PI on a Wellcome Trust-funded Wolbachia mosquito release programme in Malaysia for dengue control. He is also Director of the ANTI-VeC Network funded by the UK Global Challenges Research Fund, with members in over 40 countries; sits on funding committees for the Wellcome Trust and Royal Society; and is an Associate Editor of Insect Molecular Biology.

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Willem Takken, PhD is a university researcher and lecturer in medical and veterinary entomology, specialised in the biology, ecology, and control of vector borne diseases. These include malaria, dengue, sleeping sickness and Lyme disease. Much of his research was focused on host seeking behaviour of mosquitoes and development of non-chemical methods of vector control. Recently his group demonstrated the successful control of malaria with odour-baited traps in Kenya. He supervised >34 PhD students and published >275 scientific articles. Currently he is much interested in the effects of climate change on vector borne disease. In 2017 he was awarded the Harry Hoogstraal medal from the ASTMH for lifetime achievement in medical entomology. His hobbies are mountain walking, outdoor recreation, classical music and reading.

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Petr Volf, PhD is Professor of Parasitology at the Charles University in Prague since 2003. He trained in Biology (MSc, 1986) and Parasitology (PhD, 1991) and has worked for over 25 years on medical entomology, biology of vectors of infectious diseases and parasite-vector-host interactions. He is internationally recognized as an expert in the biology and ecology of sand flies and sand fly-Leishmania relationship. His research activities are focused on Leishmania development in sand fly midgut, immune response of hosts to sand fly bites, epidemiology of leishmaniases and other diseases transmitted by sand flies. Petr is the Head of the Laboratory for Vector Biology, presently constituted by three assistant professors, seven post-doc assistants and six PhD students, all on topics dealing with sand flies or sand fly-borne pathogens. The international projects of his team supported by EU (FP7 and H2020), BMGF and MRC included the field work in various endemic areas of leishmaniases (Mediterranean countries, east Turkey, Caucasus region and Ethiopia) as well experiments with sand flies and rodents in the laboratory conditions. He established a unique collection of sand fly colonies and CL2 laboratory for sand fly experimental infections by Leishmania and phleboviruses. He has published over 180 per-reviewed articles registered on WoS, 6 reviews and 5 book chapters.

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John Vontas, PhD has led molecular studies into the mechanisms of insecticide resistance in insects of public health and agricultural importance. His group has elucidated a number of detoxification enzymes/cytochrome P450 - based resistance mechanisms. He has published over 150 papers in international journals since 2000 (citations>8000; h=42), as well as given a large number of invited talks worldwide. He is on the Editorial Board of many journals and has organized number of conferences. He acts as reviewer and Panel/Board member for several funding organizations. His research has received funds from a range of national and international funding agencies, with total program budget for his lab >10M euros in the last 15 years. He has strong links and network with the vector control community, including participation in several EU projects, WHO working groups, IVCC (ESAC4 chair). His lab has currently 10 PDRAs and ~30 members in total http://www.aua.gr/vontas). He has supervised 7 PhD students who successfully completed their thesis, now pursuing careers in academia or industry, while he has another 5 PhD students currently as main supervisor. He has >15-years' experience in teaching Medical Entomology and Pharmacology (pesticide) courses.

John Vontas, PhD  
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INSTITUT PASTEUR
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in
SALZBURG

"Global Health: Vector-Borne Diseases"

September 3 - 8, 2019

FELLOWS
Fellow Booklet 696SIPS19 Global Health: Vector-Borne Diseases

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September 3, Tuesday. In the morning, I started my trip: leaving Tehran to Istanbul by plane. After some hours of stay in Istanbul airport, I departed towards Austria. I was lucky because my seat was near the window and I was able to see the sights of Salzburg before landing. A very beautiful city! At 18:15, the plane landed at the airport. Then, I bought a bus ticket and moved towards Schloss Arenberg. After arrival, I went directly to the reception, got the key, and moved into my room "518" to leave my luggage. At 20:00 the welcome reception started and I was honored to see the faculty members of the seminar and 33 colleagues coming from 29 countries. Wonderful! We had our first dinner together, giving us the opportunity to get to know each other more. All of the faculty, staff and colleagues were completely friendly.

September 4, Wednesday. At 8:30 am, Prof. Anna-Bella Failloux welcomed us to the seminar and introduced the agenda. Subsequently, we took a pre-seminar test. I tried to mark the true answers; however, some of the questions and the relative answers seemed to be a little doubtful. After the test, Prof. Failloux held her interesting and clearly explained lectures "Medical entomology and vectorial transmission" and "Arthropod-borne viruses". In the afternoon, we had a conference regarding evolutionary insights to the emergence of arboviruses by Dr. Sandra Junglen, and then, we had a very useful round table about the relation between climate change and vector-borne diseases. It was very interesting to hear the thoughts of students from many countries, trying to find solutions for control of vector-borne diseases. The seminar was followed by a presentation by Prof. Aulitzky, introducing the "American Austrian Foundation", "Open Medical Institute" and the main issues regarding the scientific organization of the masterclass. An Institute with so many connections and collaborations!

September 5, Thursday. In the morning we had a wonderful lecture by Dr. Stephanie Blandin. She gave us a lot of information about the immune responses of Anopheles mosquitoes to malaria parasites. Then, Dr. Petr Volf presented the role of sandflies in transmission of pathogens. Also, we had our group photo in the morning. In the afternoon, Dr. Simon Cauchemez talked about mathematical modelling in fight against infectious diseases. Finally, we had a round table to find a way to predict the emergence of vector-borne diseases.

September 6, Friday. At 08:00, Dr. Steven Sinkins had a lecture about mosquito-Wolbachia interaction. Then, the resistance to insecticides and its mechanisms was discussed by Dr. John Vontas. In the
afternoon, the interesting history of malaria control was presented by Dr. Willem Takken. Finally, the round table of this day was about the control of vector-borne diseases. We discussed to find the ways to combat these diseases: vaccinology or vector control? After dinner, at 20:30 we were invited to participate in a very nice chamber music concert in Schloss Arenberg. Everybody enjoyed it very much.

**September 7, Saturday.** The last day is a very busy day. We had an interesting lecture by Dr. Sarah Bonnet regarding the ticks and the pathogens they transmit. It was very strange for me to hear that some ticks are able to survive for several years even without the need for food! We will have another lecture by Dr. Georgette Kluiters about Culicoides and a conference by Dr. Mawlouth Diallo about the importance of field studies. As it is planned, we will have our round table regarding field and laboratory studies. The seminar will be followed by a post-seminar test. I think I will not have a very hard test compared to the pre-test, because I am sure this seminar has improved my knowledge about vector-borne diseases. Hope it will be fine! Our seminar will be finalized with a graduation dinner and awarding the certificates. I think every moment of this seminar was nice: one of my best experiences! All teachers were kind and they covered different aspects of vector-borne diseases. Of course, I will recommend this seminar to my friends because I think this way of learning will bring results. We really enjoyed the lectures, and all of us feel that our knowledge about vector-borne diseases has improved over the seminar. The lectures were never boring, and the teachers were more like friends helping you! I was completely impressed with the diversity of ideas of my colleagues in the round table. Finally, I would like to express my gratitude to everyone organizing this seminar.

*Hasan Bakhshi, PhD (Iran)*
September 3, Tuesday evening. I arrived in Salzburg by plane coming from Frankfurt with Austrian Airlines (with a very friendly and nice team of flight attendants), I was very impressed by the landscape in the first hours of the morning, it was a sunny and beautiful day. I fell in love with the beauty of the country from the sky till discovering the beauty of the city taking the bus N°10 to Schloss Arenberg.

The view from the plane

I arrived at the Schloss at about 11 o’clock and I was fascinated at first sight by the beauty of the place outside and then inside. After filling some papers, with the two nice ladies in the reception, I got to my room, which was nice with red decoration and the very awesome view from the window.
I left my luggage and quickly went outside to discover the garden, it was sunny and I took a look at the different statutes around and I liked very much the swing (the surprise, in French we said “la cerise sur le gâteau”). And I took a look behind the stairs.

It was difficult for me to leave all this beauty and go to sleep after an overnight flight. But it was really worth it! Then, I went out to discover the city after taking some information and guides from the reception. I went by foot, to see the Salzach river and discover the shops around. Then, in the hotel, I did some hit exercises in the sports hall, that I discovered, and I was very happy.

At 8 pm, we had our first meeting, at this time I met the other participants and the faculty in the hall of the Schloss. Just before the meeting, I already talked with some colleagues from Ukraine, Russia, Kazakhstan, Croatia, Belarus, Tanzania, Madagascar and Central Africa Republic. Professor Anna-Bella Failloux, the director of the course, introduced the program and the aim of this course in Vector-Borne Diseases (VBD). Then, we were introduced to each other, the Faculty and the participants. We are from 34 different countries (including the faculties members). Then, Professor Aulitzky, the director of the
OMI welcomed us and he gave us some information about the courses organized by the OMI in Salzburg.

Then we had dinner with two other colleagues that I met for the first time (from Kazakhstan), one from Czech Republic and another one from Latvia. Even though I was so tired, I enjoyed very much talking with them and we get to know each other, our field of research, our background and we discussed the situation of many infectious diseases in our countries especially measles and vaccines (because there were many outbreaks of this disease lately in many countries). It was a very friendly atmosphere.

**September 4, Wednesday.** After a very quick breakfast, we began at 8:30 am, we made our pre-seminar test (which was not difficult, but there were a few doubtful questions), but I was pretty sure that I will correct the false one after attending the masterclass. Prof. Anna-Bella Failloux began with introducing the program and how interesting it was to interact and ask questions. Then she began her very amazing lecture about Medical Entomology and vectorial transmission. She talked about the most important hematophagous arthropods vectors (beginning from Ixodidae going to Diptera) and the pathogenic agents that are transmitted of course through the blood meal. There were many interactions to clarify and to have more knowledge about specific cases. Being more specific later, Prof. Anna-Bella Failloux talked about arboviruses and the emergence of these Vector-Borne viruses (Dengue, Chikungunya, Zika...) due to the spread and the vectorial efficiency of the mosquito vectors in many countries.
It was very very interesting to gain new knowledge about arboviruses. We enjoyed the coffee break and the lunch and I got to know more new friends from the Netherlands, France and Iran (the last one, I promised to give some tips about fleas’ morphological identification). In the afternoon, Prof. Sandra Junglen from Germany gave us a lecture about evolutionary and ecological insight about the emergence of some new viruses in Tai National Park in Africa (specific mosquito viruses) and a new hypothesis about the evolution of the vectorial system in function of the loss of the diversity (dilution effect and amplification hypothesis). In the afternoon the lectures were followed by a round table discussion: a very important topic not only for scientific researchers but for all humanity: “the globalization and the climate changes for VBD”, and it was really a brainstorming about giving examples and finding solutions. In the end, Prof. Aulitzky gave us some insights about the program of the OMI founded in 1993 - Medical education beyond barriers, the main sponsors (American Austrian foundation, Open Society Foundations and Cornell University). Finally, how can we evolve in these OMI courses from being a participant to being a Faculty member?
Finishing at 6 pm, we went with some friends from Turkey, Lebanon, Iran, Laos, New Caledonia and Mongolia to visit the old city.

From the bridge

Coming back, we enjoyed a good dinner and a good tiramisu dessert. Then, participants from the Pasteur Institutes Network had a fast briefing with Prof. Anna-Bella Failloux, who is a very nice modest and respectful lady.

The briefing in Prof. Anna-Bella Failloux’s room

**September 5, Thursday.** In the morning, we had two interesting lessons about Malaria and Parasites and vector interaction given by Prof. Stephanie Blandin and the second one was given by Prof. Petr Volf from Czech Republic, Prague who talked about sandflies and Leishmaniosis and we talked about eventual collaboration since that they have produced a kit based in antibodies to detect Leishmania infantum in Phlebotomus pernicisus. In the coffee break, I had a talk with Lijiljana and Veasna from Cambodia about languages and the health systems in our countries. After a good coffee break this day and the group photo, we went back to the lectures to get more knowledge about modelisation with concrete examples of predicting reproduction number R0 with Pr. Simon Cauchemez.
In the beautiful garden and having beautiful weather, I took lunch with Prof. Mawlouth Diallo from Senegal and Prof. Simon Cauchemez and we discussed the importance of modeling but the most important thing was having the best modeler and the best collaboration to make sense of our predicted model. And I asked about the release of sterilized male mosquitoes in La Reunion, and just by asking and trying to gain more knowledge, I think that I created a new collaboration between him and my friend from New Caledonia who works on using Wolbachia for the biological control of Ae. aegypti. Continuing the discussion in the afternoon with the round table about modeling and predicting the emergence of VBD.

We had illustrated the factors that are essential for the prediction and what we can do if we have the right prediction and which are the most important factors that could trigger an outbreak of VBD.

At night, after having a good dinner with my friends Nur and Karlygash from Kazakhstan and Gulsum from Turkey, we had a discussion about ticks’ nomenclature and distribution. Then I had tea with Hasan from Iran (I gave him some information about the identification of fleas and also about a new collaborative project between Iran and Tunis about fleas).

September 6, Friday. Another good day, a breakfast with the very friendly Tanzanian (Raynald) colleague and then beginning the day with Prof. Steven Sinkins who give us new knowledge about Wolbachia and biological control of insect spread. The second lecture was given by Prof. John Vontas from Crete about a very interesting topic: insecticide resistance and we know now much more about mechanisms of resistance (detoxification and target site strategies).
After the coffee break, Prof. Willem Takken gave us an amazing talk about Malaria, history and the successful tools for Malaria control.

At lunch, I had a funny talk with Asif (Azerbaijan), Gulsum (Turkey), Hasan (Iran) and Elyes (Lebanon), the atmosphere was really familiar and we got used to each other.

At the round table, we had a discussion about the control of VBD (vaccination or vector control?). Many questions were relevant: Who should pay the bill of the costs of control? With or against GMOs mosquitoes.... we had a very fruitful discussion and it continued afterwards in the hall with Ljiljana and Mayank (Netherland).

In the late afternoon, I visited some shops with my new friends to buy some gifts and souvenirs. Coming back, a music concert was planned for us, everyone was well dressed, we entered the nice room, a large piano was waiting. We had a great dose of the extremely beautiful music of Bach, Mozart and Beethoven.

In the hall, we took some drinks and I enjoyed my talk with Nur, Karly (Kazakhstan), Elen (Georgia), Ioannis (Greece), Pei-Shi (France), about projects installation, P3 labs, biosecurity and the unfair judgment of projects sometimes...and Prof. Anna-Bella Failloux, as always, joined us and she was very friendly with the smile inviting us and having some small talks with all of us.
But I must leave this beautiful meeting this night to complete writing my diary about my stay in Schloss Arenberg, and I noticed that already 4 days just passed very fast, many feelings, many exchanged experiences, knowledge...I appreciate overall the mentality, the spirit, the enthusiasm of young researchers and that they share it with us...It lasts for one more day, I am quite sure that it will be as amazing as the days before and every day new stories, new experiences to be shared...I hope I will have the opportunity in the future to attend other interesting seminars with the OMI.

In the end, I want to express my gratitude to the organizers of this seminar, for the invitation and hospitality and also Prof. Anna-Bella Failloux, who gave us the opportunity to be here and also my acknowledgment goes to all the faculty that came to share their knowledge and science with us. I will never disremember this unforgettable experience, where I gained certainly new knowledge but also the intracultural exchanges and the new lovely friends!

Fatma Khrouf, PhD (Tunisia)