



MPI für terrestrische Mikrobiologie • Karl-von-Frisch-Straße 10 • D-35043 Marburg/Germany

Luis F. Larrondo PhD
Associate Professor
Departamento de Genética Molecular y Microbiología
Director of MN-FISB (Millennium Nucleus for Fungal Integrative and Synthetic Biology)
Facultad de Ciencias Biológicas
Pontificia Universidad Católica de Chile
Alameda 340
Casilla 114-D (ZIP Code)
Santiago
CHILE



Prof. Dr. Regine Kahmann
Direktorin der Abteilung
Organismische Interaktionen
Tel. : +49 (0) 6421 178 – 501
Fax: +49 (0) 6421 178 – 509
kahmann@mpi-marburg.mpg.de
<http://www.mpi-marburg.mpg.de>

Marburg, August 2nd, 2017

Millennium Institute for Integrative, Systems and Synthetic Biology

Dear Dr. Larrondo, and To Whom It May Concern:

Through this letter, I, Regine Kahmann, born on 20th October 1948, Passport No.: C5XMV3W67, want to manifest my interest to participate as a “Senior Investigator” at the **Millennium Institute for Integrative Systems and Synthetic Biology** (MISSB) that you direct.

As a *Senior Investigator* I will be happy to provide counseling and scientific & technical support to help steering the MISSB in its scientific mission, so it can succeed locally and internationally.

While I have not collaborated with MISSB labs in the past, I am familiar with the work conducted in previous years by some MISSB members (Dr. Larrondo and Dr. Canessa) in the context of fungal biology, and plant-pathogen interactions.

My group at the Max Planck Institute for Terrestrial Microbiology has been a leader in the study of plant pathogenic fungi publishing over 180 research papers in this and other topics. (A selection is provided in the attachment.)

Being trained as a microbiologist I was initially attracted by phages, the smallest entities one could study genetically in pre-molecular days. These ranged from the *Salmonella typhimurium* phage ES18 to the *Bacillus subtilis* phage SPP1 to the *E. coli* phage Mu. My main achievements in the Mu-field were the sequencing of its attachment sites and the demonstration that Mu generates a duplication of its target sequence, similar to transposable elements. I then shifted my interest to the site-specific recombination system responsible for inversion of the G-segment and contributed to demonstrating that this element controls the host range of phage Mu. I set up an in vitro system for G-inversion which allowed me to demonstrate that besides the Gin invertase a host factor, FIS, is required that binds to a recombinational enhancer sequence and stimulates the reaction. I studied a DNA modification system of phage Mu and showed that its expression was intricately controlled by site-specific DNA methylation as well as through an RNA-binding protein.

In 1992 I began my work on mating types of *Ustilago maydis* which had been defined genetically as biallelic *a* and multiallelic *b* loci. My work demonstrated that the *a* loci themselves encode a pheromone-receptor system for mating while the *b* loci encode homeodomain proteins which dimerize when derived from different alleles. These complexes then act as transcriptional activators for pathogenic and sexual development. This concept later proved to exist in all basidiomycete fungi. In my more recent work, my interest has shifted to understanding how fungi manage to infect plants. My prime model remains the biotrophic fungus *U. maydis* that induces tumors in infected corn plants. To establish itself, the plant tissue needs to stay alive to support the infection. This is accomplished through a battery of mostly completely novel secreted effector proteins. These effectors are used to suppress plant immune responses and to reprogram the metabolism of the host to benefit fungal needs. My goal is to determine where these effectors go after being secreted into the plant-fungus interface, what their molecular function is, how they have evolved in the arms-race between pathogen and host and how their expression is regulated.

In the context of my work I have supervised 52 PhD theses and have trained more than 30 postdocs. From the group leaders in my department 12 have moved on to professorships at German Universities and European Research Institutions.

During my career I have been elected to a number of fellowships and memberships: European Molecular Biology Organisation (since 1991); Bavarian Academy of Sciences (1995; since 2001 corresponding member); Academia Europaea (since 1999); Academy of Sciences Berlin-Brandenburg (since 2001); German National Academy of Sciences, Leopoldina (since 2008); Fellow of the American Academy of Microbiology (since 2012); Honorary membership in the German Botanical Society (2013)

In addition, I have served in a number of commissions of trust: Chair of ERC Advanced Grant Evaluation Panel LS9 (2009-2013); Member of the DFG Senate (2007-2013); Member of the Max Planck Senate (since 2009); Foundation council of caesar (center of advanced studies and research) in Bonn (since 2010); Member of the selection committee for the Gottfried Wilhelm Leibniz prize of the German National Science Foundation (2013-2016); Member of the EMBO Council (since 2014).

Editorial Boards: EMBO Journal (1999-2011); EMBO reports (1999-2009), FGB (2001-2010); Current Opinion in Microbiology (since 1997); Mycological Progress (since 2006); The Plant Cell (since 2011); mBio (since 2014); Advisory Boards: Otto Warburg Center, Rehovot, Israel (2003-2014); Minerva-Weizmann-Committee, Rehovot, Israel (2006-2013); Göttingen Graduate School of Neurosciences and Molecular Biosciences (since 2009), President IS-MPMI (since 2016).

I have received a number of awards and prizes: Leibniz-Prize awarded by the Deutsche Forschungsgemeinschaft, Germany (1993); Dannie-Heineman Prize awarded by the Academy of Sciences in Göttingen, Germany (1997); Medal of Merit (am Bande) of the Federal Republic of Germany (1998); Bavarian Maximilian's-medal for Science and Art (1999); Honorary doctorate of the Hebrew University, Jerusalem, Israel (2011); TUM Distinguished Affiliated Professorship, Technical University Munich, Germany (2011); Mendel medal of the National Academy of Sciences, Leopoldina, Germany (2011)

Therefore, I am confident that with my expertise I can provide guidance and counseling, when required, to the work conducted by the MISSB.

I look forward to working with you, Dr. Larrondo and all MISSB investigators.

Best regards,



Prof. Dr. Regine Kahmann

Attachment:

Schulz, B., Banuett, F., Dahl, M., Schlesinger, R., Schafer, W., Martin, T., Herskowitz, I. & Kahmann, R. (1990)

The *b* alleles of *U. maydis*, whose combinations program pathogenic development, code for polypeptides containing a homeodomain-related motif. *Cell* 60, 295-306.

Boelker, M., Urban, M. & Kahmann, R. (1992)

The *a* mating type locus of *Ustilago maydis* specifies cell signaling components. *Cell* 68, 441-450.

Gillissen, B., Bergemann, J., Sandmann, C., Schroeer, B., Boelker, M. & Kahmann, R. (1992)

A two-component regulatory system for self/non-self recognition in *Ustilago maydis*. *Cell* 68, 647-657.

Kaemper, J., Reichmann, M., Romeis, T., Boelker, M. & Kahmann, R. (1995)

Multiallelic recognition: nonself-dependent dimerization of the bE and bW homeodomain proteins in *Ustilago maydis*. *Cell* 81, 73-83.

Woesten, H. A., Bohlmann, R., Eckerskorn, C., Lottspeich, F., Boelker, M. & Kahmann, R. (1996)

A novel class of small amphipathic peptides affect aerial hyphal growth and surface hydrophobicity in *Ustilago maydis*. *Embo J.* 15, 4274-4281.

Kaemper, J., Kahmann, R., Boelker, M. et al. (2006)

Insights from the genome of the biotrophic fungal plant pathogen *Ustilago maydis*. *Nature* 444, 97-101.

Doehlemann, G., van der Linde, K., Assmann, D., Schwambach, D., Hof, A., Mohanty, A., Jackson, D. & Kahmann, R. (2009)

Pep1, a secreted effector protein of *Ustilago maydis*, is required for successful invasion of plant cells. *PLoS Pathog.* e1000290. Epub 2009 Feb 6. PMID: 19197359.

Lanver, D., Mendoza-Mendoza, A., Brachmann, A. & Kahmann, R. (2010)

Sho1 and Msb2-related proteins regulate appressorium development in the smut fungus *Ustilago maydis*. *The Plant Cell.* 22, 2085-2101.

Djamei, A., Schipper, K., Rabe, F., Ghosh, A., Vincon, V., Kahnt, J., Osorio, S., Tohge, T., Fernie, A.R., Feussner, I., Feussner, K., Meinicke, P., Stierhoff, Y., Schwarz, H., Macek, B., Mann, M. & Kahmann, R. (2011)

Metabolic priming by a secreted fungal effector. *Nature* 478, 395-398.

Schirawski, J., Mannhaupt, G., Münch, K., Brefort, T., Schipper, K., Doehlemann, G., Di Stasio, M., Rössel, N., Mendoza-Mendoza, M., Pester, D., Müller, O., Winterberg, B., Meyer, E., Ghareeb, H., Wollenberg, T., Münsterkötter, M., Wong, P., Walter, M., Stukenbrock, E., Güldener, U., & Kahmann, R. (2010) Pathogenicity determinants in smut fungi revealed by genome comparison. *Science* 330, 156-158.

Tanaka S., Brefort, T., Neidig, N., Djamei, A., Kahnt, J., Vermerris, W., Koenig, S., Feussner, K., Feussner, I. & Kahmann, R. (2014) A secreted *Ustilago maydis* effector promotes virulence by targeting anthocyanin biosynthesis in maize. *Elife.*;3:e01355. doi: 10.7554/eLife.01355.

Tollot M., Assmann, D., Becker, C., Altmüller, J., Dutheil, J.Y., Wegner, C.E. & Kahmann R. (2016) The WOPR protein Ros2 is a master regulator of sporogenesis and late effector gene expression in the maize pathogen *Ustilago maydis*. *PLoS Pathog.* 12(6):e1005697. doi: 10.1371/journal.ppat.1005697.