



# FLAM

## 2025

XX<sup>TH</sup> INTERNATIONAL MEETING  
ON THE BIOLOGY AND PATHOGENICITY  
OF FREE LIVING AMOEBAE

**Puerto Morelos, Quintana Roo, Mexico**

**November 3<sup>rd</sup> – 7<sup>th</sup>, 2025**



## Organizing committee

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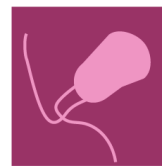
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## Scientific committee

|                                                                                                                                                    |                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
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| <b>Fernando Lares Villa</b><br>Instituto Tecnológico de Sonora, Sonora, México.                                                                    | <b>Fiona L. Henriquez</b><br>School of Health and Life Sciences, Glasgow, UK.                                                                       |
| <b>Isabel Marcelino</b><br>Institut Pasteur de la Guadeloupe, French West Indies.                                                                  | <b>Jacob Lorenzo Morales</b><br>Instituto Universitario de Enfermedades Tropicales y Salud Pública, Universidad de La Laguna, Tenerife, Spain.      |
| <b>Jesús Serrano Luna</b><br>Departamento de Biología Celular, CINVESTAV, IPN, México.                                                             | <b>Julia Walochnik</b><br>Institute for Specific Prophylaxis and Tropical Medicine, Vienna, Austria.                                                |
| <b>Lissette Retana Moreira</b><br>Centro de Investigación en Enfermedades Tropicales (CIET), Facultad de Microbiología, Universidad de Costa Rica. | <b>Maritza Omaña-Molina</b><br>Laboratorio de amibas anfitrónicas, Facultad de Estudios Superiores Iztacala, UNAM, México.                          |
| <b>Patrick Scheid</b><br>Central Military Hospital Koblenz, Germany.                                                                               | <b>Sutherland Maciver</b><br>Centre for Discovery Brain Sciences, Edinburgh, UK.                                                                    |



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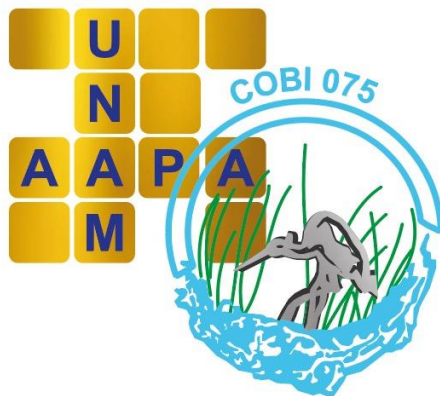
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# Program

|             |                                                                                                                                                     |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|             | <b>Monday, November 3<sup>rd</sup></b>                                                                                                              |
| 15:00-17:30 | Registration                                                                                                                                        |
| 17:30-18:00 | Opening session                                                                                                                                     |
| 18:00-19:00 | <b>Keynote lecture 1: Mexico's contributions to understanding the pathogenic mechanisms of amphizoic amoebae</b><br>Dr. Maritza Omaña-Molina        |
| 19:00-21:00 | Welcome cocktail and «Día de Muertos» offering                                                                                                      |
|             |                                                                                                                                                     |
|             | <b>Tuesday, November 4<sup>th</sup></b>                                                                                                             |
| 8:30-9:00   | <b>Keynote lecture 2: Exploring the molecular mechanisms of encystment in free-living amoebae</b><br>Dr. Ascel Samba-Louaka                         |
|             |                                                                                                                                                     |
|             | <b>Session I: Cell biology</b><br>Chair: Dr. Sutherland Maciver, Dr. Ismael Castelan-Ramírez                                                        |
| 9:00-9:15   | <b>Or1. SARS-CoV-2 reservoir: <i>Acanthamoeba</i> and its link to long COVID</b><br>Carmen del Aguila                                               |
| 9:15-9:30   | <b>Or2. Microsporidia-like parasites of amoebae</b><br>Elena Nassonova                                                                              |
| 9:30-9:45   | <b>Or3. Inhibition of cyst formation in <i>Acanthamoeba castellanii</i> by endosymbiosis with <i>Legionella pneumophila</i></b><br>Hye-Jeong Jo     |
| 9:45-10:00  | <b>Or4. Multidisciplinary approach to study interactions between host cells and free-living pathogenic amoebae</b><br>Jan Mach                      |
| 10:00-10:15 | <b>Or5. Molecular and cellular approach to understanding pathogenesis of <i>Balamuthia mandrillaris</i></b><br>Kasem Kulkeaw                        |
| 10:15-10:30 | <b>Or6. Hiding in plain sight comparative genomic evidence for the presence of peroxisomes in various heteroloboseans</b><br>Mónica González-Lázaro |
|             |                                                                                                                                                     |
| 10:30-10:45 | Coffee break                                                                                                                                        |
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|             | <b>Session II: Molecular biology</b><br>Chair: Dr. Donald Munson, Dr. Lissette Retana Moreira                                                                                                                                                                    |
| 10:45-11:00 | <b>Or7. A matter of life and death: contrasting alternative splicing during encystment and programmed cell death in <i>Acanthamoeba castellanii</i></b><br>Alvaro de Obeso Fernández del Valle                                                                   |
| 11:00-11:15 | <b>Or8. Multi-omics analysis of <i>Acanthamoeba</i> after contact with human corneal epithelial cells</b><br>Alvie Loufouma-Mbouaka                                                                                                                              |
| 11:15-11:30 | <b>Or9. Development of a novel diagnostic method, loop-mediated isothermal amplification (LAMP) for diseases caused by <i>Balamuthia mandrillaris</i></b><br>Christopher A. Rice                                                                                 |
| 11:30-11:45 | <b>Or10. <i>Acanthamoeba castellanii</i> genome annotation and transcriptomic and proteomic profiling of cyst formation for five days</b><br>John Samuelson                                                                                                      |
| 11:45-12:00 | <b>Or11. <i>Acanthamoeba</i> genotype T4 complexity at the molecular level</b><br>Julia Walochnik                                                                                                                                                                |
| 12:00-12:15 | <b>Or12. Reference genome for <i>Acanthamoeba</i> genotype T6 &amp; high throughput genotyping of full-length 18S rRNA directly from <i>Acanthamoeba</i> keratitis clinical samples</b><br>Richard Childs Hunt                                                   |
| 12:15-12:30 | <b>Or13. Simultaneous detection of causative agents of amoebic keratitis by qPCR from Schirmer strips</b><br>Angélica Domínguez-de-Barros                                                                                                                        |
| 12:30-12:45 | <b>Coffee break</b>                                                                                                                                                                                                                                              |
|             | <b>Session III: Environmental I</b><br>Chair: Dr. Ascel Samba-Louaka, M.Sc. Itzel Citlalli Rubio-Gutierrez                                                                                                                                                       |
| 13:00-13:15 | <b>Or14. <i>Lophomonas</i> spp. and <i>Acanthamoeba</i> sp. a protozoan in common cockroaches, as a possible symbiosis or a passive vector carrying non-tuberculous mycobacteria and <i>Mycobacterium tuberculosis</i></b><br>Bridgette Caroline Zarzosa-Mezzich |
| 13:15-13:30 | <b>Or15. Culture enrichment and metabarcoding as a powerful integrated approach to detect pathogenic free-living amoebae in freshwater systems</b><br>Yonas I. Tekle                                                                                             |
| 13:30-13:45 | <b>Or16. Isolation and molecular characterization of potentially pathogenic free-living amoebae from various aquatic sources</b><br>Katarína Trnková                                                                                                             |
| 13:45-14:00 | <b>Or17. Geographic distribution and genetic diversity of pathogenic free-living amoebae in the northern region of Mexico. Part II</b><br>Luis Fernando Lares-Jiménez                                                                                            |



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| 14:00-15:45 | Lunch                                                                                                                                                                                |
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|             | <b>Session IV: Environmental II</b>                                                                                                                                                  |
|             | <b>Chair:</b> Dr. Fernando Lares-Villa, Dr. Carlos Javier Bethencourt-Estrella                                                                                                       |
| 15:45-16:00 | <b>Or18. Detection and characterization of free-living amoebae using qPCR and culture-based methods in Tenerife, Canary Islands</b><br>Marco D. Peña-Prunell                         |
| 16:00-16:15 | <b>Or19. Protist-bacteria partnerships across ecosystems: a One Health view of <i>Acanthamoeba</i> and <i>Neoparamoeba</i> species as microbial reservoirs</b><br>Fiona L. Henriquez |
| 16:15-16:30 | <b>Or20. Molecular evidence of <i>Acanthamoeba</i> genotypes T2 and T4 in nasal mucosa of gardeners as healthy carriers in Lima, Peru</b><br>Yousel Melissa Quinto-Mamani            |
| 16:30-16:45 | <b>Or21. Morphological and molecular studies recover different communities of free-living amoebae from the same environmental samples</b><br>Alexey Smirnov                          |
| 16:45-17:00 | <b>Or22. Evolutionary origin of Amoebozoa from an ecological point of view</b><br>Alexey Smirnov                                                                                     |
|             |                                                                                                                                                                                      |
| 17:00-18:00 | Poster presentation I                                                                                                                                                                |
|             |                                                                                                                                                                                      |
| 18:30-20:30 | Mexican party                                                                                                                                                                        |
|             |                                                                                                                                                                                      |
|             | <b>Wednesday, November 5<sup>th</sup></b>                                                                                                                                            |
| 7:30-19:30  | Social day                                                                                                                                                                           |
|             |                                                                                                                                                                                      |
|             | <b>Thursday, November 6<sup>th</sup></b>                                                                                                                                             |
| 8:30-9:00   | Jordan Smelski Foundation                                                                                                                                                            |
|             |                                                                                                                                                                                      |
|             | <b>Session V: <i>Naegleria fowleri</i></b>                                                                                                                                           |
|             | <b>Chair:</b> Dr. Maritza Omaña Molina, Prof. Adriana Trujano Rodríguez                                                                                                              |
| 9:00-9:15   | <b>Or23. A comprehensive molecular analysis of virulence factor regulation in <i>Naegleria fowleri</i> and related species</b><br>Miguel A. Ramírez-Flores                           |



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| 9:15-9:30                                                                                             | <b>Or24. Cytokine expression, nitric oxide and reactive oxygen species production during primary amoebic meningoencephalitis in vivo</b><br>Jesús Serrano-Luna                                           |
| 9:30-9:45                                                                                             | <b>Or25. Immune response to intranasal immunization with <i>Naegleria fowleri</i>-derived immunogenic peptides in a mouse model of primary amoebic meningoencephalitis</b><br>Rubén Armando Herrera-Ceja |
| 9:45-10:00                                                                                            | <b>Or26. Characterization of the ubiquitin proteasome pathway in trophozoites of <i>Naegleria</i> genus</b><br>Itzel Citlalli Rubio-Gutiérrez                                                            |
| 10:00-10:15                                                                                           | <b>Or27. Characterization and role in contact-independent pathogenic mechanisms of <i>Naegleria fowleri</i> extracellular vesicles</b><br>Ismael Castelan-Ramírez                                        |
| 10:15-10:30                                                                                           | Coffee break                                                                                                                                                                                             |
| <b>Session VI: <i>Naegleria fowleri</i> II</b><br>Chair: Dr. Jesús Serrano Luna, Prof. Maryam Niyyati |                                                                                                                                                                                                          |
| 10:30-10:45                                                                                           | <b>Or28. Characterization and functional roles of extracellular vesicles secreted by <i>Naegleria fowleri</i></b><br>Lissette Retana Moreira                                                             |
| 10:45-11:00                                                                                           | <b>Or29. Establishment of a transfection system in <i>Naegleria fowleri</i> using ectopic expression vectors</b><br>Caroline M. Palmentiero                                                              |
| 11:00-11:15                                                                                           | <b>Or30. Beta-hydroxylactones as anti-<i>Naegleria fowleri</i> agents: insights into cell death mechanisms</b><br>Javier Chao-Pellicer                                                                   |
| 11:15-11:30                                                                                           | <b>Or31. Bio-guided isolation of compounds from <i>Argyranthemum frutescens</i> and <i>Salvia canariensis</i> and their efficacy against <i>Naegleria fowleri</i></b><br>Isabel M. Calero-Docina         |
| 11:30-11:45                                                                                           | <b>Or32. Enolase inhibitors as therapeutic agents for <i>Naegleria fowleri</i> infection</b><br>Jillian E. M. McKeon                                                                                     |
| 11:45-12:00                                                                                           | <b>Or33. The impact of drug pressure on life cycle progression and extrachromosomal DNA copy number in <i>Naegleria fowleri</i></b><br>Colm P. Roster                                                    |
| 12:00-12:15                                                                                           | Coffee break                                                                                                                                                                                             |
| <b>Session VII: Treatment I</b><br>Chair: Dr. Jacob Lorenzo-Morales, Prof. Alvie Loufouma Mbouaka     |                                                                                                                                                                                                          |



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| 12:15-12:30  | <b>Or34. Therapeutic potential of withaferin A derivatives against <i>Acanthamoeba</i> spp.: in vitro assays</b><br>Carlos J. Bethencourt Estrella                                                  |
| 12:30-12:45  | <b>Or35. Drug dose-response variability across <i>Acanthamoeba</i> strains in different media conditions</b><br>Chayan Sharma                                                                       |
| 12:45-13:00  | <b>Or36. Amoebicidal effect of synthetic peptides against <i>Acanthamoeba castellanii</i>: a study of cell death using fluorescence imaging systems</b><br>Ines Sifaoui                             |
| 13:00-13:15  | <b>Or37. Amoebicidal agent nitroxoline impairs functional encystment and induces transcriptional collapse in <i>Balamuthia mandrillaris</i> via copper and iron chelation</b><br>Kaitlin A. Marquis |
| 13:15 -13:30 | <b>Or38. Amebicidal effects of adamantane-azole gold(I) complexes: a study of cell death pathway in <i>Acanthamoeba castellanii</i> and toxicity profile</b><br>Karin Silva Caumo                   |
| 13:30-15:00  | <b>Lunch</b>                                                                                                                                                                                        |
|              | <b>Session VIII: Treatment II</b><br>Chair: Dr. Fiona Henriquez, Dr. Álvaro de Obeso Fernández del Valle                                                                                            |
| 15:00-15:15  | <b>Or39. Hylo® intense eye drops as a potential amoebicidal agent against <i>Acanthamoeba</i> spp.: induction of programmed cell death and anti-adherent effect</b><br>Rubén L. Rodríguez-Expósito  |
| 15:15-15:30  | <b>Or40. Small molecules secreted by <i>Pseudomonas aeruginosa</i> kill <i>Acanthamoeba castellanii</i></b><br>Rebecca I. Colón Ríos                                                                |
| 15:30-15:45  | <b>Or41. History and progress towards standardization of <i>Acanthamoeba</i> methods for contact lens care products</b><br>William Domm                                                             |
| 15:45-16:00  | <b>Or42. Efficacy of octenidine-containing mouthwashes on <i>Entamoeba</i> spp. and other protists in the oral cavity</b><br>Martina Köhler                                                         |
| 16:00-17:00  | <b>Poster presentation II</b>                                                                                                                                                                       |
| 17:00-17:30  | <b>Presentations for the next FLAM</b>                                                                                                                                                              |
| 19:00-22:00  | <b>Gala Dinner</b>                                                                                                                                                                                  |



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|                    | <b>Friday, November 7<sup>th</sup></b>                                                                                                                                                                           |
| <b>8:30-9:00</b>   | <b>Keynote lecture 3: Free-living amoebae in Guadeloupe: a 15-year journey through water, soil, and microbial ecology</b><br>Dr. Isabel Marcelino                                                                |
|                    | <b>Session IX: Diversity</b><br>Chair: Dr. Julia Walochnik, M.Sc. Miguel Angel Ramírez-Flores                                                                                                                    |
| <b>9:00-9:15</b>   | <b>Or43. Diversity and systematics of sibling species within the genus <i>Thecamoeba</i> (Amoebozoa: Discosea)</b><br>Yelisei S. Mesentsev                                                                       |
| <b>9:15-9:30</b>   | <b>Or44. Clinical presentation, genotypic diversity, and intracellular bacteria in <i>Acanthamoeba</i> keratitis patients treated at a quaternary referral eye hospital in Sydney, Australia</b><br>Nicole Carnt |
| <b>9:30-9:45</b>   | <b>Or45. Diversity of free-living amoebae in soil samples from Northwestern Spain revealed by culture and molecular techniques</b><br>Patricia Pérez Pérez                                                       |
| <b>9:45-10:00</b>  | <b>Or46. Free-living amoebae as reservoirs of other microorganisms</b><br>Patrick Scheid                                                                                                                         |
| <b>10:00-10:15</b> | <b>Or47. A long journey until the secrets were revealed: parasitic keratitis amoebae as vectors of the scarcely described “Pandoraviruses” to humans</b><br>Patrick Scheid                                       |
| <b>10:15-10:30</b> | <b>Or48. Role of free-living amoebae in the environmental persistence of pathogenic mycobacteria: a mesocosm-based approach</b><br>Pauline Hardouin                                                              |
| <b>10:30-10:45</b> | <b>Or49. The microbial Trojan horse: <i>Acanthamoeba</i> as a selective reservoir for multidrug resistant bacteria in polluted estuarine sediments</b><br>Ronnie Mooney                                          |
| <b>10:45-11:00</b> | <b>Closing session</b>                                                                                                                                                                                           |

## Poster presentation I

**P1.** Identification of amoebic strains in contact lenses and clinical cases of keratitis in Mexico City

**David Segura Cobos**

**P2.** Characterization of the first two clinical isolates of *Naegleria fowleri* in Costa Rica

**Elizabeth Abrahams Sandí**

**P3.** Adaptation of free-living amoebae to textile wastewater

**Elizabeth Ramírez-Flores**

**P4.** Comparative genomics and proteomics reveal strain-specific features in *Naegleria fowleri* clinical isolates from Costa Rica

**Isabel Marcelino**

**P5.** Characterization of the natural bacterial microbiota in *Acanthamoeba* spp. and *Naegleria fowleri* isolated from rivers and tap water in Guadeloupe

**Isabel Marcelino**

**P6.** Physicochemical and geoenvironmental characterization of freshwater bodies with capacity to host and promote the presence of potentially pathogenic free-living amoebae

**Johan Alvarado-Ocampo**

**P7.** Amplification, cloning and analysis of the gene encoding HSP70 of *Naegleria fowleri*

**Karla Alejandra Barrón-Graciano**

**P8.** Bilateral *Acanthamoeba* keratitis caused by two different amoebae of the genus *Acanthamoeba*

**Maritza Omaña Molina**

**P9.** Molecular identification of free-living amoeba isolated from medical devices and hospital environments: evidence from hospitals in Northwestern Iran

**Maryam Niyyati**



**P10.** Deciphering the molecular insights into amoeba-*Mycobacterium* interactions

**Pauline Hardouin**

**P11.** First identification of *Balamuthia mandrillaris* encephalitis in primates in Spain: two case reports

**Rubén L. Rodríguez-Expósito**

**P12.** Review on the importance of pathogenic *Acanthamoeba* and *Balamuthia* in soil communities of free-living amoebae

**Salvador Rodríguez Zaragoza**

**P13.** Seasonal distribution and biodiversity of free-living amoebae and their associated bacteria in a model of drinking water storage tower

**Sébastien Pomel**

**P14.** Pathogenesis review of *Naegleria fowleri* NFA1 associated with lectins

**Suk-Yul Jung**

**P15.** Cyclooxygenase-like activity is a potential target in *Acanthamoeba castellanii* pathogenesis

**Verónica I. Hernández Ramírez**

**P16.** Towards a genomic framework for understanding *Acanthamoeba* pathogenicity

**Michael Ansah**

## Poster presentation II

**P17.** Induction of apoptosis and inhibition of cyst formation in *Naegleria fowleri* by pan-histone deacetylase inhibitors: Vorinostat (SAHA) and quisinostat (JNJ-26481585)

**Hae-Ahm Lee**

**P18.** Repurposing NSAIDs against *Acanthamoeba castellanii*: molecular docking insights into leishmanolysin inhibition

**Verónica I. Hernández Ramírez**

**P19.** From anti-inflammatory to antiparasitic: *in silico* drug development prospects of NSAIDs targeting *Acanthamoeba castellanii*

**Verónica I. Hernández Ramírez**

**P20.** The 4-aminomethylphenoxy-benzoxaborole AN3057 as a potential treatment option for primary amoebic meningoencephalitis

**Jan Mach**

**P21.** Antiamoebic activity of Mexican propolis and its fractions on *Acanthamoeba* spp.

**Nelly Rivera-Yáñez**

**P22.** Water treatment and seasonality shape the microbiome of drinking water distribution systems in Guadeloupe (French West Indies)

**Isabel Marcelino**

**P23.** Knowledge, attitudes and practices regarding *Naegleria fowleri* infection among visitors to freshwater bodies with high prevalence of vahlkampfiids

**Johan Alvarado-Ocampo**

**P24.** Analysis of virulence factors in extracellular vesicles secreted by *Naegleria fowleri*

**Itzel Berenice Rodríguez-Mera**

**P25.** Development of two vaccines based on the membrane protein Mp2CL5 in mice immunized intranasally in the *Naegleria fowleri* meningitis model

**Mara Gutiérrez-Sánchez**

**P26.** Long-term protective immune response in the mouse model of meningitis caused by  
*Naegleria fowleri*

**María de la Luz Ortega Juárez**

**P27.** Analysis of the humoral immune response against a synthetic peptide derived from the HSP70  
protein of *Naegleria fowleri*

**María Maricela Carrasco-Yépez**

**P28.** Analysis of the innate immune response in BALB/c and CD1 mice in the early stages  
of *Naegleria fowleri* infection

**Saul Rojas-Hernández**

**P29.** Interaction of *Acanthamoeba castellanii* with bacteria by galactose and antibodies to a  
galactose-binding protein

**Suk-Yul Jung**

**P30.** Novel targeted anti-amoebic strategies using nanobody technology

**Thys Florence**

**P31.** Extracellular vesicles secreted by *Acanthamoeba culbertsoni* have COX and  
proteolytic activity and induce hemolysis

**Javier Alexis Pineda Flores**

**P32.** Metal and redox homeostasis in *Acanthamoeba-Stenotrophomonas* interactions

**Pablo Vinuesa**



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