The **AO Foundation** is a medically guided nonprofit organization led by an international group of surgeons specialized in the treatment of trauma and disorders of the musculoskeletal system. Founded in 1958 by 13 visionary surgeons, AO today fosters one of the most extensive networks of currently more than 12,000 surgeons, operating room personnel, and scientists in over 100 countries.

The **Swiss Institute of Allergy and Asthma Research (SIAF)** in Davos, Switzerland, is an academic institute with a distinguished tradition in clinical immunology research. The institute, associated with the University of Zürich, maintains the status of an independent foundation and is dedicated to basic and translational research in the fields of immunology, allergy and asthma.

The AO and SIAF are looking for a highly motivated PhD candidate to join a collaborative project as

PhD Student

Your project will include:

- Research into the emerging field of host-microbiome immunological interactions and its influence on bone health.
- A human study investigating the impact of antibiotic therapy on microbiome composition and function in orthopedic and trauma patients.
- Additionally, the project will include preclinical in vivo models to determine the impact of bacteria-derived products on bone health and to investigate the immunological mechanisms associated with these effects.
- The successful candidate will be jointly supervised by the AO Research Institute Davos, and the Swiss Institute of Asthma and Allergy (SIAF), Davos, including access to the extensive in-house facilities and expert collaborators at both institutions.

Your profile

- Masters degree in Microbiology, Cell Biology, Immunology, Biochemistry, or related field
- Specific experience in the fields of microbiome or bone biology is preferred
- Ability to work and communicate well within a team, complete project objectives and meet deadlines is essential
- A working level of spoken and written English
- Independent, structured and accurate way of working
- Flexible and team orientated

We offer an interesting, challenging and varied position in Davos. You will become part of a global network of dedicated professionals committed to innovation and excellence in patient care.
If you feel you meet the requirements of this challenging opportunity please send your complete dossier (motivation letter, CV, certificates, references, etc.) with photo to:
fintan.moriarty@aofoundation.org

The microbiome, immune regulation and bone health

Keywords: microbiota, probiotic, bone healing, antibiotic therapy, osteomyelitis.

An ever-growing number of studies have demonstrated an interplay between the composition of our microbiomes and numerous disease states, for example colorectal cancer and inflammatory bowel disease. It is also becoming increasingly evident that the gut microbiome can powerfully influence bone health. An important question, of relevance to orthopedic patients with osteomyelitis or fracture related infection (FRI), is whether prolonged therapeutic antibiotic regimens may negatively influence the microbiome and what the knock-on effects this may have with regards to immune function and bone healing. The possibility that the microbiome, immune function and bone healing may be impacted in a deleterious way by antibiotic therapy has not been studied to date, and will be the focus in part 1 of this project.

In part 2, we will advance this line of investigation by determining how we can influence the composition of the microbiome to the benefit of the patient with regards to bone loss and bone healing. By supplementing the microbiome with probiotic bacteria, others have shown that this can attenuate bone loss in preclinical models of post-menopausal osteoporosis (PMO) and Type 1 diabetes (T1D). In a recent study in our laboratories, we investigated the bioactivity of probiotic-derived factors and determined them to be potent modulators of bone health through immunoregulatory mechanisms. This suggests that microbiome-based strategies may provide a novel approach for preventing diseases associated with chronic inflammation, such as PMO and T1D. Therefore, in the second part of this study we will investigate the efficacy and mechanisms of probiotic supplementation in vitro and in preclinical murine models of PMO and T1D.