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Brief Summary

The Earth has experienced five mass extinction events in last 600 Ma, which caused the loss of more than 75 % of its population each time. The Chicxulub Impact crater was created ~66.5 Ma ago, is the third largest, but the only preserved large meteorite impact structure on earth. In 2016, Integrated Ocean drilling program (IODP) expedition 364 has drilled and recovered an 829.03 m (505.7 to 1334.73 mbsf) long core from the impact crater.

My research will focus on the recovery of microbial life in the fractured granitic interval located below the Cenozoic marine sediments (i.e. 783.57 – 1332.97 mbsf). I am using advanced molecular biological tools to study microbial diversity and their predicted physiological functions using amplicon and metagenomics sequencing approaches. Parallel electron microscopic analysis combined with elemental analysis will reveal the survival strategies of microorganism in this extreme environment and their role in C, H, N, S and metal cycling.

The output of this research will provide unprecedented details on the ability of subsurface microbial life to recover from major extinction events. This work will likely reveal novel information about metabolic pathways that only occur in the extreme deep biosphere environment. The results of this research will set direction to search for past or present microbial life in the subsurface of well-preserved Mars impact craters.

Education: M. Phil. Analytical chemistry, M. Sc., B. Sc. in Chemistry, University of the Punjab, Pakistan.

Research interests: Deep subsurface microbial life, Microbial mineral interaction

Thesis title: Recovery of the deep biosphere at the Chicxulub impact crater

Supervisors: A/Prof. Marco Coolen, Prof. Kliti Grice