The Ilkurlka magnetic ring anomaly: a new Australian impact structure?

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The Ilkurlka circular geophysical anomaly is a potential ~15 km diameter buried impact structure in Western Australia. The origin of the Ilkurlka regional magnetic and local gravity anomaly is unknown. As it is a ring feature the anomaly has been hypothesized to be one of >30 suspected buried impact structures in Australia and has been identified in planetary science literature as a possible impact structure.

My project consists of expanding an analysis program in collaboration with a private exploration company that recently drilled the geophysical anomaly. I will be carrying out petrography and microanalysis of suspected shocked quartz grains in search diagnostic shock metamorphic features, as well as conducting electron backscatter diffraction (EBSD) imaging of accessory minerals. The goal is to confirm the buried Ilkurlka structure as an impact structure. An integrated workflow that includes geophysical interpretation and numerical modelling will be conducted if the structure is confirmed. The work will contribute to the geological knowledge of the underexplored region. The confirmation of the Ilkurlka magnetic anomaly as an impact structure would further our understanding of Earth’s impact cratering record, as well as potentially establishing links between impact cratering and the formation of ore deposits.

The Barringer Family Fund for Meteorite Impact Research will be instrumental in progressing the project by supporting sample preparation and analytical work.

Personal Statement

My passion for the natural world started when I was kid and my parents took my sisters and I to explore the mountains, rainforest, and natural reserves of Puerto Rico. Later I developed an interest in geology and in Earth’s impact cratering record during my undergraduate course and research at the University of Puerto Rico–Mayagüez where I worked identifying shocked zircon in Vaal River sediments from the Vredefort structure drainage system. I then pursued a Master’s in geology from the University of Wisconsin–Madison where I used SIMS analysis of Oxygen isotopes in Zircon and Garnet to understand peraluminous magma genesis.

I am currently a PhD candidate at Curtin University’s Space Science Technology Centre in Perth, Western Australia. Prior to landing in Perth in 2019, I worked at BP-America for over 7 years as a Petroleum Systems Geologist for multiple sedimentary basins around the globe. My return to academia is fueled by a desire to partake and contribute in multidisciplinary geoscience research and teaching.