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Brief Summary

Roughly one third of known impact structures on Earth hold economic resources. The world's largest gold deposit is a Precambrian impact structure in South Africa (Vredefort) and Canada's largest nickel deposit is a Precambrian impact structure (Sudbury). Despite vast tracts of similar-aged Precambrian rocks in Australia, no comparable economic impact structures have yet been reported. One factor may be the lack of systematic study using modern methods. Few Australian impact structures have been studied in detail using accessory mineral approaches, numerical shock physics modelling, along with integration of geophysical data. I propose to study the record of known and suspect impact structures in Australia, then select sites of interest. The broad objective is to better understand and expand the Australian impact crater record, and to apply modern methods to constrain formation processes, level of exposure, and determine if any known sites are likely to have economic potential.

Education: MS Geology – University of Wisconsin, Madison, USA
BS Geology – University of Puerto Rico, Mayaguez, USA

Research interests: Impact cratering, shocked metamorphism, economic geology, igneous petrology, and geochemistry

Thesis title: Economic potential of Australian impact structures

Supervisors: Dr. Aaron J. Cavosie, Dr. Katarina Miljkovic, Dr. Chris Elders, and Dr. Allison Dugdale

Publications:

- Quintero, R.R., Cavosie, A.J., Cox, M.A., Miljkovic, K., and Dugdale, A., "The Australian impact cratering record: update and recent discoveries", in *Large Meteorite Impacts and Planetary Evolution VI*, Wolf Uwe Reimold, Christian Koeberl (Eds). [http://dx.doi.org/10.1130/2021.2550\(02\)](http://dx.doi.org/10.1130/2021.2550(02))
- Quintero, R.R., Lackey, J.S., Kitajima, K., Kozdon, R., Strickland, A., and Valley, J.V., 2021, "Oxygen isotope ratios in zircon and garnet: A record magmatic processes and contamination history in the Dinkey Dome peraluminous granite, Sierra Nevada Batholith," *American Mineralogist*, v. 106 (5), p. 715-729. <https://doi.org/10.2138/am-2021-7472>
- Cavosie, A.J., Quintero, R.R., Radovan, H.A. and Moser, D.E., 2011, "A record of ancient cataclysm in modern sand: Shock microstructures in detrital minerals from the Vaal River, Vredefort Dome, South Africa," *Geological Society of America Bulletin*, v. 122 (11-12), p. 1968-1980.

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