

## A 'GIRL'S ADDICTION TO USING GPR (GROUND-PENETRATING RADAR):

### Insights from Down Under on coastal evolution, climate change, geologic hazards, and gender bias

By Amy Dougherty

Ground-Penetrating Radar (GPR) can be thought of as x-ray vision for geologist, in that it is a geophysical technique that remotely senses the shallow subsurface in high-resolution, unearthing buried insights. The privilege of being introduced to GPR and the potential paleo-archives of coastal barriers over 20+ years ago enabled me to further my previous focus on studying Global Warming and specialized training in geochemistry as well as geochronology.

My GeoQuEST research demonstrates the potential (and pitfalls) of using GPR as well as other remote sensing and geochronological data. With respect to coasts and climate change, I currently have three initiatives that use an optimized **GOaL** methodology – which combines **GPR**, **OSL** (Optically Stimulated Luminescence), and **LiDAR** (Light Detection And Ranging). 1) **INSIGHTS FROM DOWNUNDER**: Images and date eroded paleo-beachfaces, intrinsically linked to wave-energy, to extend current storm frequency-intensity records from decades to millennia. 2) **LOOKING BACK TO THE FUTURE**: Understands the onset of interglacial highstands as analogues for sea level rise associated with anthropogenic global warming; from the pristine New South Wales coast to the developed New Jersey shore. 3) **ice2sand**: Demonstrates and develops a novel method that helps fill gaps in the global sea level atlas and refine existing records spanning minutes to millennia around the world.

My career has been evenly split between researching coasts as a student/hobby and geohazards as a professional/volunteer (conducting studies in various fields: e.g. geology, geography, environmental science,

archaeology, forensics, engineering, etc.). The only constant as I have chased my geologic curiosity around the world, dragging a GPR behind me, is that I have been a female scientist. I am in the process of completing a paper using the scientific method to prove unconscious (gender) bias that has led to three simple findings/suggestions that I am sharing and promoting. Previous GeoQuEST grants have specifically funded my coastal research, enabling this girl to pursue science.



Above are some photographs of GPR back through the years (1998-2019) and in different geologic settings around the world.