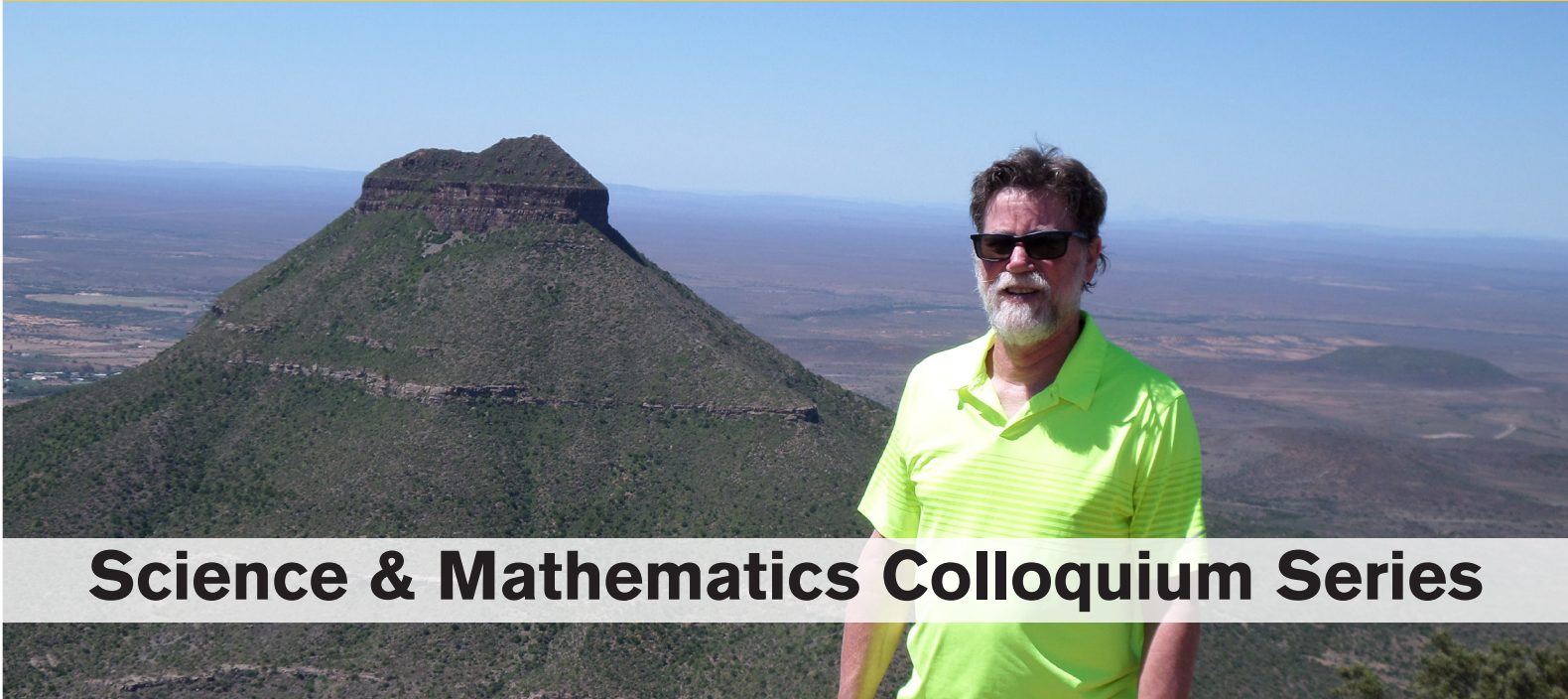


# *Portulacaria afra*: A study in Photosynthetic Plasticity in a Changing Climate



## Science & Mathematics Colloquium Series

### Presentation by Lonnie Guralnick

Professor of Biology, Roger Williams University

**Wed., March 29, 2017, 3 p.m.**

**Cooley Ballroom C, Student Union  
ASU Polytechnic campus**

*Portulacaria afra* is a dominant facultative CAM species growing in the Southeastern Cape of South Africa and well adapted to regions of the Spekboom thicket in areas of limited and sporadic rainfall. Carbon isotope composition ( $^{13}\text{C}/^{12}\text{C}$  ratios) can be used to determine the contribution of the CAM photosynthetic pathway (nocturnal  $\text{CO}_2$  uptake) to the overall carbon balance. Analysis of carbon isotope values for *P. afra* plants at different locations found no direct correlation with rainfall or maximum or minimum day/night temperatures in the summer or winter. The results provide evidence that CAM is a continuous trait in *P. afra* and operating at low levels during C3 photosynthesis, which may explain the high variability in its carbon isotope composition. *P. afra* populations illustrate a large phenotypic plasticity and further studies may indicate genotypic differences between populations. This may be valuable in ascertaining the genetic contribution to its water use efficiency and possible use in engineering higher water use efficiency in C3 plants. The results may explain *P. afra*'s ability to sequester carbon at high rates compared to more mesic species.

Faculty and practitioners discuss their current research and field projects in the college's Science and Mathematics Colloquium Series, held throughout the academic year at the ASU Polytechnic campus. All seminars are free and open to the public.

Lonnie Guralnick's area of research includes studying the ecological and evolutionary physiology of C4 and CAM photosynthesis, development of CAM photosynthesis of *Portulacaria afra*, the role of photorespiration in CAM plants, and the restoration of *Portulacaria afra* in the Spekboom thicket of South Africa and possible consequences of global climate change. Dr. Guralnick has received numerous NSF awards, including a \$586,000 NSF S-STEM award.

At Roger Williams University he served as interim dean of the Feinstein College of Arts and Sciences and was assistant dean of Math and Natural Sciences for five years. Guralnick earned a PhD in Botany with a specialization in plant physiology and ecophysiology from UC-Riverside.



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