ANNUAL SMITH MEMORIAL LECTURE

NRF- SAIAB LECTURE ROOM & ONLINE

22 OCTOBER 2026

11:00 –13:00

TEAMS LINK : https://l1nk.dev/bq6f8r4

GUEST SPEAKER

Dr Denise M Schael

"From Specimens to Systems: Reimagining Aquatic Science for a Changing World"

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science, technology & innovation
Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA

NRF National Research Foundation | SAIAB South African Institute for Aquatic Biodiversity

CMR COASTAL & MARINE RESEARCH

From Specimens to Systems: Reimagining Aquatic Science for a Changing World

Aquatic science begins with looking closely: collecting organisms, recognising differences, assigning names and understanding where species live and how they interact. These foundations remain essential, even as the field has expanded towards sophisticated technologies, large datasets, ecosystem models and increasingly transdisciplinary approaches. Drawing on a career that began with zooplankton and larval fish in the lakes of Wisconsin and later moved through reservoir fisheries, hydroacoustics, ecological modeling, South African rivers, macroinvertebrates, estuaries, temporary wetlands and, eventually, ocean and coastal science leadership, this lecture reflects on how the practice of aquatic science has changed. It considers the enduring importance of taxonomy, reference collections, identification keys, scientific illustration and the accumulated knowledge of specialists. These capabilities allow us to know what we are observing and to detect ecological change, yet many are becoming increasingly scarce.

At the same time, new technologies have transformed what scientists can see and measure. Molecular methods, eDNA, automated monitoring, remote sensing, hydroacoustics, modelling and artificial intelligence allow us to investigate aquatic environments at scales that were previously unimaginable. But technological capability does not remove the need for patient observation, field experience or reliable identification. Nor can ecological systems be understood by examining organisms in isolation from water flows, landscapes, climate, human activities and governance.

Moving from specimens to systems should therefore not mean abandoning the foundations of natural history. Rather, the future of aquatic science depends on bringing these ways of knowing together: retaining the ability to recognise and document life while connecting species, ecosystems and people across disciplinary and institutional boundaries. In the spirit of J.L.B. and Margaret Mary Smith, the lecture asks what aquatic science must preserve, what it must embrace, and what kinds of expertise and collaboration will be needed to understand and protect aquatic ecosystems in a rapidly changing world.