Automated spectrophotometric systems allow rapid and precise measurement of seawater pH. However, such systems are difficult to build and expensive. Here, we present a fully automated system with a **rugged construction, reliability, and exceptional precision** that makes it ideally suited for ocean acidification studies in the laboratory or field.

**The system:** Automated fluid handling, including sampling and dye mixing, is achieved with a high-precision syringe pump (Tricontinent, C3000) integrated with an optical flow cell and Ocean Optics spectrometer (STS-Vis). An **intuitive user interface** was designed to simplify the measurement and minimise operator error.

**Standardisation:** The system was standardised using tris buffer solutions and purified meta-cresol purple dye, which were obtained from the laboratories of Professors Andrew Dickson and Robert Byrne, respectively. Measured values were standardised to the assigned pH of the tris buffer solutions (N=28, 4 bottles, batch 27). In the future, an instrument-specific calibration will be developed by obtaining apparent molar absorptivity ratios and dissociation constant over a range of temperatures.

**Assessment:** pH measurements were made on Oceanic CO₂ CRMs (N = 54, 3 bottles, batch 130). The measured pH was compared with the pH calculated from the certified values of Aₜ and Cₜ using the dissociation constants of Mehrbach et al. (1973) as refitted by Dickson and Millero (1987):

\[
\Delta \text{pH}_{T, 297.2 \text{K}} \text{ (measured - calculated) } = -0.003 \pm 0.001
\]

The excellent agreement and low standard deviation suggests the system can be used reliably for the calculation of carbon system parameters.

The system was taken on a 2016 hydrographic cruise to the Southern Ocean (RV Investigator). The **precision (± 0.001)** and oceanographic consistency of the pH profile highlights the capabilities of the system.