Data legends:

Figure 1: The histograms found in (A) come from the parameters found in the data file Brady\_et\_al\_contrasts.xslx binned according to the relevant parameters. In (D) the histograms come from the average stokes vectors of the ocean background found in Brady\_et\_al\_contrasts.xslx where the radiance is I, the DoLP comes from sqrt(Q^2+U^2)/I, and the AoLP comes from (1/2)\*atan(U/Q). In (E) the numerical values are found in Brady\_et\_al\_Water\_Column\_Measurement.xlsx.

Figure 2,3: The numerical values are found in the file Brady\_et\_al\_contrasts.xslx. The data from Brady\_et\_al\_contrasts.xslx are sorted according to the relevant parameters and conditions to get the distributions found in the figure.

Figure 4: The proportions found in (A-C) come from the values found in Brady\_et\_al\_contrasts.xslx binned accordingly to the parameters mentioned in the figure. The numerical values for the guanine platelet distribution histograms found in (D) are in the file Brady\_et\_al\_Guanine\_platelet\_orientation.xlsx. (E)

Supplemental Section Materials and Methods S3: The Mueller matrices for individual bigeye scad are found in Brady\_et\_al\_Mueller\_Matrices.xlsx

Figure S1: The numerical values for (K-M) are found in Brady\_et\_al\_BRDF.xlsx

Figure S2: The numerical values for the figure are found in Brady\_et\_al\_Broad\_band\_reflection\_data.xlsx

Figure S3: The proportions found in (A-C) come from the values found in Brady\_et\_al\_contrasts.xslx binned accordingly to the parameters mentioned in the figure.

Figures S4-S6: The numerical values are found in the file Brady\_et\_al\_contrasts.xslx. The data from Brady\_et\_al\_contrasts.xslx are sorted according to the relevant parameters and conditions to get the distributions found in the figure.

Figure S7: In the top panel the numerical values are found in Brady\_et\_al\_Water\_Column\_Measurement.xlsx similar to Figure 1. The bottom two panels are 2D histograms of the U contrast values found in Brady\_et\_al\_contrasts.xslx using the relevant parameter bins mentioned in the figure.