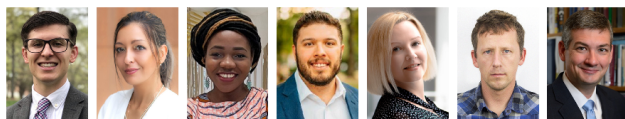


Ultra-Bright Near-Infrared Sulfonate-Indolizine Cyanine- and Squaraine-Albumin Chaperones: Record Quantum Yields and Applications



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<https://chemistry.olemiss.edu/>



www.usm.edu/biological-sciences



<https://www.jsu.edu/chemistry/>

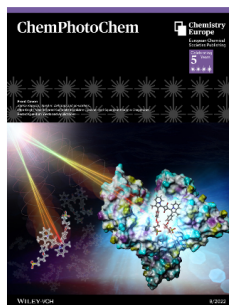
The Front Cover shows a single near-infrared dye being laser-excited and dimly fluorescing in an aqueous biological environment compared to a near-infrared dye bound to albumin fluorescing brightly in the same environment. Cover designed by Karina Kapusta. Read the full text of the Research Article at 10.1002/cptc.202200127.

What prompted you to investigate this topic/problem?

Several manuscripts in the literature have noted a unique fluorescence phenomenon in the presence of albumin with a few different dyes, and we had serendipitously discovered the same effect during prior studies. When certain dyes were mixed in solutions with albumin, large increases in fluorescence intensity were being observed to give a 2x to 200x or more increase in fluorescence quantum yield. We wanted to better understand these empirical observations, so we launched this study, and in doing so, found one of the most sensitive compounds known for albumin with a near 1000x increase in brightness in the presence of albumin compared to water.

What aspects of this project do you find most exciting?

One of the most exciting things about this project was finding principles that allow for the rational design of ultrabright emitting dyes in the NIR region where quantum yields are typically very poor due to the Energy Gap Law. The concept of hamoniously using one of nature's own architectures to allow for



better imaging and diagnostics is one we found quite exciting. We think this work has found a way to mitigate the effects of the Energy Gap Law, and we are excited to see if this research can be extended from the NIR into the SWIR region.

How did the collaboration on this project start?

The collaboration started with a discussion centered around trying to understand why we were seeing such a bright emission at a CEMOs National Science Foundation center grant meeting this team is a part of. We knew from other conference that others had seen this effect as well and empirically it to be special for sulfonate-containing dyes. The Jack-ate team approached the problem computationally and found data we could verify experimentally and eventually lead to the finding of several useful applications. The whole team contributed to this effort. Will and Karina especially worked

tirelessly to elevate this work with experimental and computational studies, respectively. We are fortunate to have them on this team.

Acknowledgements

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