Abstract: Uncovering novel excited state reactivity provides opportunities to build complex molecular architectures often with unique stereochemistry. A fundamental challenge in such a process involves controlling excited state reactivity of organic molecules due to the short lifetimes of the reactive species leading to stereo-enriched products. We have been interested in developing strategies for controlling the excited state reactivity as well as stereochemistry of products where the reactants reach the excited state(s) upon UV and/or visible light irradiations. This presentation will highlight our methodology of employing UV and/or visible light for performing photoreactions with excellent control over reactivity and selectivity. Based on photochemical and photophysical investigations, the presentation will highlight novel excited state reactivity of organic molecules, how to influence their excited state behavior towards productive reaction pathways and provide a mechanistic rationale for the observed reactivity in different systems. Time permitting the presentation will also highlight now novel excited state processes can be tailored for novel material properties.

Biographical Sketch Prof. Dr. Jayaraman Sivaguru (Siva) is the Distinguished University Professor and the Antonia and Marshall Wilson Professor at the Department of Chemistry, Bowling Green State University (BGSU), Bowling Green, Ohio. He also serves as the Associate Director for Center for Photochemical Sciences at BGSU. Prof. Sivaguru completed his bachelor’s (1996) and master’s (1998) degrees from St. Joseph’s College, Trichy, Tamil Nadu, India, and Indian Institute of Technology, Madras, Tamil Nadu, India, respectively. He came to the United States in 1998 to pursue his doctoral degree with Prof. V. Ramamurthy at Tulane University, New Orleans, LA, USA. For his doctoral work, he was recognized by Inter-American Photochemical society with the Closs award in 2003. In Fall 2017, he moved his research program to Bowling Green State University. In 2018 he was a visiting fellow of the Chinese Academy of Sciences under President’s International Fellowship Initiative. He serves as the American editor for the Journal of Photochemistry and Photobiology A: Chemistry (from 2013), published by Elsevier. From 2020, he serves as the co-editor-in chief of Journal of Photochemistry and Photobiology. He is also an international advisory board member of the photochemistry IUPAC symposium. In 2021, Prof. Sivaguru was named Honda-Fujishima Lectureship awardee by the Japanese photochemical association for extremely outstanding achievement in the study of photochemistry. In 2022, he was named as the Distinguished University Professor by BGSU. Currently his research program works on both basic and applied aspects of photochemical sciences. Currently his research program is investigating (a) Uncovering new excited state chemical reactivity, b) light induced axial to central chiral transfer in atropisomeric systems, (c) asymmetric organo-photocatalysis, (d) supramolecular photocatalysis with water-soluble nanocontainers, (e) light responsive materials and initiators, and (f) Designing light-initiated strategies for eye protection and ophthalmic applications (e.g. contact lenses, eyewear etc.). For details about Prof. Sivaguru’s research group visit https://www.bgsu.edu/sivagroup/