

Cantaurus

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☺ Recipients of Research Awards in the Natural Sciences

Cover “Blind spot” At the back of the eye is located a fault in vision – the blind spot. This seeming anomaly arises from the inside-out design of the “wallpaper” of the eye. Blood vessels and neural networks run through the layer of the retina closest to the inside of the eyeball, while photoreceptive cells lie underneath. At a point called the optic disc – the blind spot – vessels and nerves penetrate the retina and exit the eye, leaving this area unable to transduce light into an image. While the brain compensates for the blind spot, it can occasionally be perceived.

At the minimum, a photoreceptor can detect the energy inherent in a single photon. Light converts 11-*cis*-retinal into all-*trans*-retinal, triggering an enzyme cascade that sends a signal to higher-order neurons in the central nervous system. On a catholic scale however, the eye as a whole fails to grasp the universe. The human eye is sensitive only to wavelengths from 3.8×10^{-7} to 7.2×10^{-7} m, while the electromagnetic spectrum has no inherent upper or lower limits – leaving us with a blind spot indeed.

Nevertheless, the brain compensates: in the pursuit of science humans have uncovered energy resonating with wavelengths less than 10^{-14} m (cosmic radiation) and greater than 4×10^{11} m (the resonant frequency of the Earth). In all, the endeavor to discover material truth comprises more than 40 orders of magnitude, from sub-subatomic particles to the extent of the observable universe and beyond.

Purpose *Cantaurus* is the primary vehicle for written communication of senior research projects completed by seniors majoring the Natural Sciences at McPherson College, McPherson, KS. The research reported herein is in partial fulfillment of the requirements for a Bachelor of Science or Bachelor of Arts degree in the Natural Sciences from McPherson College.

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