



SENIOR DESIGN ORGANIZATION SYNOPSIS – FALL 2013

PROJECT: DESIGN OF A SELF-POWERED ELECTROLUMINESCENT BICYCLE
A PROJECT SPONSORED BY GLOBOL: GLOWING WHILE MOBILE

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Approximately 38,700 fatalities and reported injuries occurred in the United States due to bicycling in 2011, according to the National Highway Traffic Safety Administration. Although cyclist deaths accounted for only two percent of all U.S. traffic fatalities, it averaged to approximately 13 deaths per week. In addition, only a fraction of bicycle crashes causing injuries are actually recorded by police when compared to hospital records—possibly as low as ten percent. Almost a third, 27%, of cyclist fatalities occurred during nighttime hours, between 5:00 PM and 10:00 PM. In the United Kingdom, cyclist fatalities and reported injuries was 19,091 in 2012, where the most common contributory factor for collisions involving a bicycle and another vehicle recorded by the police is the car driver 'failing to look properly,' especially at junctions. 'Failed to look properly' was attributed to the car driver in 57% of serious collisions.

Cyclist safety is an issue that can be dealt with on the design level. Most cyclist fatalities can be prevented with the use of helmets, but in many states in the US, helmets are not enforced by law. Visibility is the key design factor in order to prevent crashes involving motorists, especially during evening and early morning hours. The ultimate goal of this project is to increase visibility for cyclists at night using active lighting on the bicycle.

GloBol—*Glowing While Mobile*—is a privately funded project focused on developing a bicycle prototype with a self-powered, illuminated frame. The frame is illuminated by Lumilor™, an electroluminescent coating system developed by Darkside Scientific, LLC based in Medina, Ohio. Lumilor™ has a luminance of up to 82 candelas per meter squared depending on the color, with a uniform Lambertian reflectance that will be visible to motorists at all angles. It is cool to the touch and safe for outdoor use. The GloBol electroluminescent bicycle frame is powered by the mechanical energy generated by the rotation of the wheels supplied through hub dynamos. The prototype is composed of lightweight Aluminum T-6063 intended for easy transport and commuting. In addition to an illuminated frame, the power generated by the hub dynamos can be used for auxiliary components such as a USB port for charging devices, turning signals, and brake lights.