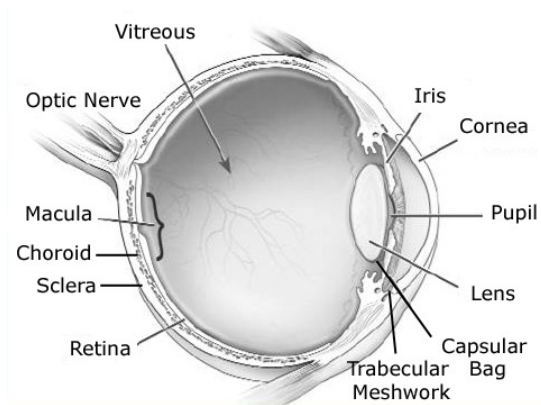


## Biomaterials in Ophthalmology



The eye is a complex and highly evolved organ. Components of the eye allow accommodative filtering and focusing of electromagnetic energy into photosensitive areas containing highly differentiated photoreceptor cells. The image formed is further processed by the brain into visual perception.

A schematic of the basic anatomy of the eye is shown above.

Common eye disorders may arise from anatomical changes to the cornea and lens that manifest as refractive errors. With age and a variety of other factors including genetic predisposition, the various components may fail leading to varying levels of loss in visual function. For example, in presbyopia the crystallin lens material hardens and causes loss of accommodation, in cataract the lens becomes opaque and lead to loss in vision, in glaucoma the optic nerves progressively loses its function, and in AMD the macula region progressively degenerates. Solutions for these common or other not so common eye disorders have come from a variety of fields including optics, cellular and molecular biology, biomedical engineering, and materials science and engineering.

Biomaterials research is a multidisciplinary approach to solve an ever increasing demand in finding better and more sustainable solutions. The ophthalmic biomaterials arena is a rapidly growing area for advanced biomaterials research with wide-spread clinical applications. The demand for advanced ophthalmic care (non-elective procedures such as cataract surgery, glaucoma surgery, age-related macular disease treatments) is growing at a rapid pace. The SIG agenda encompasses novel biomaterials technology in the ophthalmic arena including advanced biomaterials for functional replacements of ocular tissues; surface modification and protein adsorption of polymers used for refractive devices; synthetic corneas; next-generation contact lenses; vitreous replacement fluids; retinal tamponades; and glaucoma drainage devices for the regulation of intraocular pressure.