control of subjects' natural aberrations, (2) the in vivo LCA of pseudophakic subjects implanted with different designs and materials IOLs, and (3) the interactions between LCA and TCA of the human eye. Moreover AO has allowed us to study how the visual system is neurally adapted to the interactions between monochromatic and chromatic aberrations, and how vision is affected by them. In fact, imperfect optics may be the eye's protection against chromatic blur.

S3.04 **Visual simulators and programmable blur.**

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With presbyopia, the eye is no longer able to accommodate and loses the ability to focus at near objects. Ophthalmic corrections for presbyopia attempt to restore functional vision at all distances. Some presbyopic corrections implemented in the form of contact lenses and intraocular lenses provide the patients with new visual experiences in which sharpness has to coexist with blur. In monovision one eye is corrected for far and the other for near, producing an important interocular blur. In simultaneous vision, a multifocal image is created in the retina by combining sharp and blurred image components from different foci. It is not easy to predict the acceptance to these corrections in all cases. We have developed several programmable visual simulators based on optical manipulations to simulate the visual experience of presbyopic corrections. The visual simulators have been used in psychophysical experiments with observers and patients performing different visual tasks (through-focus visual acuity, image scoring, pairwise preferences between corrections, Multifocal Acceptance Score). The simulated multifocal lenses have been validated by direct comparison with real multifocal lenses projected onto the eye, fitted or surgically implanted. Subjects / patients are very consistent in their perceptual responses (STD in perceptual score less than 1 perceptual point in a 0-10 scale; preferences statistically significant across repetitions). This high intra-subject repeatability contrasts with significant inter-subject differences found in the perceptual responses to multifocallity. Visual simulators are a useful tool to include perceptual aspects in the design of presbyopic corrections and to help patients and practitioners choose the best correction according to the visual experience provided. The capability to generate programmable blur also make visual simulators suitable for fundamental research in blur perception.

T3.05 **Chromatic Structure of Graffiti.**

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The colours of traditional paintings have a specific structure that in general mimics the chromatic structure of natural scenes . Urban artists make extensive use of colours, especially when expressing in graffiti. Their colours have not been quantitatively characterized and it is unknown whether they follow the same structure as more traditional paintings. The goal was to characterize the colours of graffiti and to compare to that of traditional paintings. Photos of 228 graffiti of the city of Sao Paulo, Brazil, were taken in five different zones of the city with a Nikon d7000DSLR camera with a CMOS sensor of 16MB resolution (3264×4928 pixels). A X-Rite Macbeth ColorChecker Classic was included in each photo for calibration. The illumination on the colour chart was measured immediately before the photo with a portable spectro-colorimeter Everfine SPIC-200. The spectral reflectance of each ColorChecker sample was measured with a Minolta CM2600d. These data were used to correct the sRGB data using the Moore-Penrose pseudo-inverse transformation. CIELAB for each pixel were computed from the corrected set of tristimulus values. The colours were characterized by the properties of an ellipse. The distributions of these parameters were then compared with those obtained from spectral imaging data from traditional paintings. It was found that graffiti have chromatic