- Nombre de Tutor del proyecto

  Javier Portilla (nombre completo: Fco. Javier de la Portilla Muelas)

- Datos de contacto del Tutor del proyecto

  Instituto de Óptica, CSIC, C/ Serrano, 121, 28006 Madrid

  javier.portilla@csic.es

  Tfno: +34 647110113, +34 917040805, 915616800 x442415

- Nombre del Grupo de investigación asociado a AIHUB

  Ciencias de la Imagen y la Visión (IVIS)

- Ubicación del centro donde se disfrutará la beca

  Instituto de Óptica, CSIC, C/ Serrano, 121, 28006 Madrid

- Título del proyecto

  Building visual metrics via Deep Learning and Riemannian manifolds

- Descripción del proyecto (máximo dos párrafos)

Describing the impact that a perturbation in an ideal image (e.g., caused by blur, noise, quantizing, coding artifacts, etc.) has on its visual appearance is a long-lasted goal, both in visual science (for a better understanding of the human vision) and for engineering applications involving image processing. This is a difficult problem involving both statistics and visual models. These two aspects are connected under the usual assumption that the human visual representation has adapted, through evolution, to the statistics of the images projected on our retinas (the "natural images").

However, with the emergence of the deep learning revolution, both the visual and statistical aspects can be tackled in a new, more powerful, way, through the use of deep networks trained with many thousands or even millions of photographic images. In particular, on the statistical side, recent advances in deep learning have allowed the estimation of a probability density function (pdf) for natural images. This, in turn, opens the door to applying differential geometry concepts, in order to set new metrics adapted to the density distribution of the natural images.