

Polarization Michelson Interferometry for Fringe Projection Technique

**Amalia Martínez-García¹, Juan Antonio Rayas-Alvarez¹, David I. Serrano-García², Raúl
Ignacio Hernández-Aranda³, Joel Cervantes-L.²**

¹Centro de Investigaciones en Óptica A.C., Loma del Bosque 115 C.P. 37150, León, Guanajuato, México

²Electro-Photonics Department, University Center for Exact Sciences and Engineering (CUCEI),
Guadalajara University, Guadalajara, Jalisco, México

³Departamento de Física, Tecnológico de Monterrey, Monterrey, Nuevo León, México
amalia@cio.mx

High-resolution, real-time 3D shape measurement for objects has a huge potential for applications in many areas, including entertainment, security, design and manufacturing, etc. In this work, the implementation of the fringe projection technique in the evaluation of topography is presented. The projected fringes are generated interferometrically using a polarization Michelson interferometer where one of the mirrors is rotated and the fringes are detected by a pixelated polarization camera. The phase of the fringes is obtained using the phase shifting technique in a single shot manner due to the properties of the imaging detector. Polarization techniques and the pixelated camera are used to obtain the phase shift simultaneously. The main advantage is that the highest fringe density achieved with this technique could not be reached with the conventional fringe projection technique, which uses a projector. Experimental results will be presented as well as the operation of the technique. Advantages and disadvantages of this technique are discussed.

Short biography:



Dr. Amalia Martínez-García obtained the BS degree in physics from the Facultad de Ciencias Físico-Matemáticas, Universidad Autónoma de Nuevo León, M. Sc. in Optics at Centro de Investigación Científica y de Educación Superior de Ensenada, B. C. (CICESE) and PhD in Optics at Centro de Investigaciones en Óptica (CIO), México. She has been visiting researcher at Universidad de Santiago de Chile (Chile), University of Basilicata (Italia) and University of Utsunomiya (Japan). In 2002, she became a Titular Researcher at CIO. She had been before a researcher at the Department of Optics, Applied Physics Division, CICESE, from 1987 to 1996. She is member of the National System of Researchers (level III) at México.

Her interests in research are in the fields of electronic speckle pattern interferometry, structured light, shearography, interference microscopy and holography. She has been recognized as a senior member at SPIE and OPTICA (Formerly OSA) (August 2022), She has been honored as 2024 OPTICA FELLOW.