

Scientific Publications

a) Publications in international peer-reviewed journals (54)

1. “Optimized random phase only holograms”, A. Vélez, **J.F. Barrera R.**, Opt. Lett. **43**, 731-734 (2018).
2. “Fractional optical cryptographic protocol for data containers in a noise-free multiuser environment”, A. Jaramillo, **J.F. Barrera R.**, A. Vélez, R. Torroba, Opt. Laser Eng. **102**, 119-125 (2018).
3. “Cross-talk free selective reconstruction of individual objects from multiplexed optical field data”, **J.F. Barrera R.**, A. Jaramillo, A. Vélez, R. Torroba, Opt. Laser Eng. **100**, 90-97 (2018).
4. “Cryptographic salting for security enhancement of double random phase encryption schemes”, A. Vélez, J.F. Barrera R., R. Torroba, J. Opt. **19**, 105703 (2017).
5. “Experimental optical encryption of grayscale information”, A. Vélez, J.F. Barrera R., R. Torroba, Appl. Opt. **56**, 5883-5889 (2017).
6. “Innovative speckle noise reduction procedure in optical encryption”, A. Vélez, J.F. Barrera R., R. Torroba, J. Opt. **19**, 055704 (2017).
7. “Imaging with an extended depth of field by means of the peacock eye optical element”, W. Torres, J.F. Barrera, R. Henao, Z. Jaroszewicz, K. Kakarenko, A. Mira-Agudelo, K. Petelczyc, M. Sypek, A. Kolodziejczyk, Photon. Lett. Poland **9**, 128-130 (2017).
8. “Compensation of Presbyopia With the Light Sword Lens”, A. Mira-Agudelo, W. Torres-Sepúlveda, J.F. Barrera, R. Henao, N. Blocki, K. Petelczyc, A. Kolodziejczyk, Invest Ophthalmol Vis Sci. **57**, 6870-6877 (2016).
9. “Customized data container for improved performance in optical cryptosystems”, A. Vélez, J.F. Barrera R., R. Torroba, J. Opt. **18**, 125702 (2016).
10. “Optical field data compression by opto-digital means”, A. Vélez, J.F. Barrera R., S. Trejos, M. Tebaldi, R. Torroba, J. Opt. **18**, 125701 (2016).
11. “Roadmap in optical security”, B. Javidi, A. Carnicier, W. Chen, X. Chen, E. Pérez-Cabré, M.S. Millán, M. Naruse, T. Matsumoto, C. Guo, J.T. Sheridan, A. Carnicer, I. Juvells, G. Situ, N.K. Nishchal, W. He, X. Peng, A. Stern, Y. Rivenson, P.W.H Pinkse, A.P. Mosk, M. Yamaguchi, T. Nomura, R. Torroba, **J. Barrera**, A. Alfalou, C. Brosseau, A. Markman, E. Tajahuerce, J. Lancis, J. Opt. **18**, 083001 (2016).
12. “Optical approach for the efficient data volume handling in experimentally encrypted data”, S. Trejos, J.F. Barrera R., A. Vélez, M. Tebaldi, R. Torroba, J. Opt. **18**, 065702 (2016).
13. “Experimental analysis of a Joint Free Space Cryptosystem”, **J.F. Barrera R.**, A. Jaramillo, A. Vélez, R. Torroba, Opt. Laser Eng. **83**, 126-130 (2016).
14. “Three-dimensional joint transform correlator cryptosystem”, A. Vélez, **J.F. Barrera R.**, R. Torroba, Opt. Lett. **41**, 599-602 (2016).
15. “One-step reconstruction of digitally assembled 3D extended holographic scenes” A. Vélez, **J.F. Barrera R.**, R. Torroba, Opt. & Laser Technol. **75**, 146-150 (2015).
16. “Optimized and secure technique for multiplexing QR code images of single characters: Application to noiseless messages retrieval”, S. Trejos, **J.F. Barrera R.**, R. Torroba, J. Opt. **17**, 085702 (2015).
17. “Experimental scrambling and noise reduction applied to the optical encryption of QR codes”, **J.F. Barrera R.**, A. Vélez, R. Torroba, Opt. Express. **22**, 20268-20277 (2014).

18. "Experimental QR code optical encryption: noise-free data recovering", **J.F. Barrera R.**, A. Mira, R. Torroba, *Opt. Lett.* **39**, 3074-3077 (2014).
19. "Experimental optodigital processing of multiple data via modulation, packaging and encryption", S. Trejos, **J.F. Barrera R.**, M. Tebaldi, R. Torroba, *Journal of Optics* **16**, 055402 (2014).
20. "Experimental double random phase encoding technique under a joint transforms correlator architecture", **J.F. Barrera R.**, M. Tebaldi, R. Torroba, *Asian Journal of Physics* **22**, 135-152 (2013).
21. "Optical encryption and QR codes: Secure and noise-free information retrieval", **J.F. Barrera R.**, A. Mira, R. Torroba, *Opt. Express* **21**, 5373-5378 (2013).
22. "Experimental protocol for packaging and encrypting multiple data", **J.F. Barrera R.**, S. Trejos, M. Tebaldi, R. Torroba, *Journal of Optics* **15**, 055406 (2013).
23. "Experimental multiplexing protocol to encrypt messages of any length", **J.F. Barrera R.**, A. Vélez, R. Torroba, *Journal of Optics* **15**, 055404 (2013).
24. "Multiplexing of encrypted data using fractal masks", **J.F. Barrera R.**, M. Tebaldi, D. Amaya, W. D. Furlan, J. Monsoriu, N. Bolognini, R. Torroba, *Opt. Lett.* **37**, 2895-2897 (2012).
25. "Master key generation to avoid the use of an external reference wave in an experimental JTC encrypting architecture", E. Rueda, C. Ríos, **J.F. Barrera R.**, R. Torroba, *Appl. Opt.* **51**, 1822-1827 (2012).
26. "Experimental multiplexing of encrypted movies using a JTC architecture", **J.F. Barrera R.**, M. Tebaldi, C. Ríos, E. Rueda, N. Bolognini, R. Torroba, *Opt. Express* **20**, 3388-3393 (2012).
27. "Optical smart packaging to reduce transmitted information", L. Cabezas, M. Tebaldi, **J.F. Barrera R.**, N. Bolognini, R. Torroba, *Opt. Express* **20**, 158-163 (2012).
28. "Pure optical dynamical color encryption", F. Mosso, M. Tebaldi, **J.F. Barrera R.**, N. Bolognini, R. Torroba, *Opt. Express* **19**, 13779-13786 (2011).
29. "All-optical encrypted movie", F. Mosso, **J.F. Barrera R.**, M. Tebaldi, N. Bolognini, R. Torroba, *Opt. Express* **19**, 5706-5712 (2011).
30. "Experimental opto-digital synthesis of encrypted sub-samples of an image to improve its decoded quality", **J.F. Barrera R.**, E. Rueda, C. Ríos, M. Tebaldi, N. Bolognini, R. Torroba, *Opt. Commun.* **284**, 4350-4355 (2011).
31. "Experimental multiplexing approach via code key rotations under a joint transform correlator scheme", E. Rueda, C. Ríos, **J.F. Barrera R.**, R. Henao, R. Torroba, *Opt. Commun.* **284**, 2500-2504 (2011).
32. "Known-plaintext attack on a joint transform correlator encrypting system", **J.F. Barrera R.**, C. Vargas, M. Tebaldi, R. Torroba, N. Bolognini, *Opt. Lett.* **35**, 3553-3555 (2010).
33. "Simultaneous use of Amplitude and phase to improve the validation process in a Joint Transform Correlator", **J.F. Barrera R.**, J. Serna, R. Torroba, *Optik* **121**, 1885-1890 (2010).
34. "Chosen-plaintext attack on a joint transform correlator encrypting system", **J.F. Barrera R.**, C. Vargas, M. Tebaldi, R. Torroba, *Opt. Commun.* **283**, 3917-3921 (2010).
35. "One step multiplexing optical encryption", **J.F. Barrera R.**, R. Torroba, *Opt. Commun.* **283**, 1268-1272 (2010).
36. "Noise-free recovery of optodigital encrypted and multiplexed images", R. Henao, E. Rueda, **J.F. Barrera R.**, R. Torroba, *Opt. Lett.* **35**, 333-335 (2010).
37. "Optical encryption with a reference wave in a joint transform correlator architecture", E. Rueda, **J.F. Barrera R.**, R. Henao, R. Torroba, *Opt. Commun.* **282**, 3243-3249 (2009).

38. "Efficient encrypting procedure using amplitude and phase as independent channels to display decoy objects", **J.F. Barrera R.**, R. Torroba, *Appl. Opt.* **48**, 3121-3129 (2009).
39. "Multiplexing encryption technique by combining random amplitude and phase masks", **J.F. Barrera R.**, M. Tebaldi, R. Torroba, N. Bolognini, *Optik* **120**, 351-355 (2009).
40. "Digital encryption with undercover multiplexing by scaling the encoding mask", **J.F. Barrera R.**, R. Henao, M. Tebaldi, R. Torroba, N. Bolognini, *Optik* **120**, 342-346 (2009).
41. "Lateral shift multiplexing with a modified random mask in a JTC encrypting architecture", E. Rueda, **J.F. Barrera R.**, R. Henao, R. Torroba, *Opt. Eng.* **48**, 027006 (2009).
42. "Code retrieval via undercover multiplexing", **J.F. Barrera R.**, R. Henao, M. Tebaldi, R. Torroba, N. Bolognini, *Optik* **119**, 139-142 (2008).
43. "Discussion on Fresnel's mirrors and Young's double-slit interferometers", **J.F. Barrera R.**, F.F. Medina, J. Garcia-Sucerquia, *Optik* **118**, 402-406 (2007).
44. "Multiple-encoding retrieval for optical security", **J.F. Barrera R.**, R. Henao, M. Tebaldi, R. Torroba, N. Bolognini, *Opt. Commun.* **276**, 231-236 (2007).
45. "Diffraction criterion for a slit under spherical illumination", E. Rueda, F.F. Medina, **J.F. Barrera R.**, *Opt. Commun.* **274**, 32-36 (2007).
46. "Prevailing effects of interference or diffraction by multiple apertures", O. Quintero, **J.F. Barrera R.**, R. Henao, F.F. Medina, *Opt. Commun.* **266**, 558-561 (2006).
47. "Multiple image encryption using an aperture-modulated optical system", **J.F. Barrera R.**, R. Henao, M. Tebaldi, R. Torroba, N. Bolognini, *Opt. Commun.* **261**, 29-33 (2006).
48. "Multiplexing encrypted data by using polarized light", **J.F. Barrera R.**, R. Henao, M. Tebaldi, R. Torroba, N. Bolognini, *Opt. Commun.* **260**, 109-112 (2006).
49. "Multiplexing encryption-decryption via lateral shifting of a random phase mask", **J.F. Barrera R.**, R. Henao, M. Tebaldi, R. Torroba, N. Bolognini, *Opt. Commun.* **259**, 532-536 (2006).
50. "Fault tolerances using toroidal zone plate encryption", **J.F. Barrera R.**, R. Henao, R. Torroba, *Opt. Commun.* **256**, 489-494 (2005).
51. "Optical encryption method using toroidal zone plates", **J.F. Barrera R.**, R. Henao, R. Torroba, *Opt. Commun.* **248**, 35-40 (2005).
52. "Talbot effect for periodical objects limited by finite apertures: a new interpretation", **J.F. Barrera R.**, R. Henao, Z. Jaroszewicz, A. Kolodziejczyk, *Optik* **116**, 144-148 (2005).
53. "Minute details detection through Fresnel diffraction domain", J. Garcia-Sucerquia, F.F. Medina, **J.F. Barrera R.**, *Opt. Commun.* **253**, 250-256 (2005).
54. "Stokes Parameters Description for the Contrast Variations Observed in Fringes Generated by Digital Speckle Correlation", R. Henao, **J.F. Barrera R.**, R. Torroba, *Journal of Holography and Speckle* **1**, No. 2, 85-89 (2004).

b) Publications in international conference proceedings (19)

1. "Noise analysis and its reduction applied to optically encrypted data codes", R. Torroba, A. Vélez, **J.F. Barrera R.**, XXIV Congress of the International Commission for Optics (ICO 24), Proceedings of ICO XXIV, paper P4-01 (2017).
2. "Light Sword Lens as Effective Method of Presbyopia Compensation", K. Petelczyc, K. Kakarenko, A. Kolodziejczyk, Z. Jaroszewicz, M. Rękas, A. Mira-Agudelo, J.F. Barrera, R. Henao, *Frontiers in Optics 2016, OSA Technical Digest (online) (Optical Society of America, 2016)*, paper FW2A.4.
3. "Simulation of Vision Corrected by the Light Sword Lens", K. Kakarenko, K. Petelczyc, A. Kolodziejczyk, Z. Jaroszewicz, A. Mira-Agudelo, J.F. Barrera, R. Henao, *Frontiers in*

- Optics 2016, OSA Technical Digest (online) (Optical Society of America, 2016), paper JTh2A.182.
4. “Multiplexing three-dimensional optically encrypted data”, A. Vélez, J.F. Barrera R., R. Torroba, *Frontiers in Optics 2016, OSA Technical Digest (online) (Optical Society of America, 2016)*, paper JW4A.45.
 5. “Experimental scrambling technique to strengthen optical encryption”, R. Torroba, A. Vélez, **J.F. Barrera R.**, XXIII Congress of the International Commission for Optics (ICO 23): enlightening the future, *Proceedings of ICO XXIII*, paper Opt_Imag_63_87 (2014).
 6. “Information security using a joint transform correlator encrypting architecture”, **J.F. Barrera R.**, A. Mira, R. Torroba, XXIII Congress of the International Commission for Optics (ICO 23): enlightening the future, *Proceedings of ICO XXIII*, paper Opt_Imag_313_452 (2014).
 7. “Image enhancement in multiplexed data by using phase gratings in theta modulation encrypting techniques”, L. Cabezas, M. Tebaldi, **J.F. Barrera R.**, N. Bolognini, R. Torroba, *Frontiers in Optics Conference 2012, OSA Technical Digest (online) (Optical Society of America, 2012)*, paper FW3A.11.
 8. “Subsampling technique to enhance the decoded output of JTC encrypting system”, **J.F. Barrera R.**, E. Rueda, C. Ríos, M. Tebaldi, N. Bolognini, R. Torroba, XXII Congress of the International Commission for Optics: Light for the Development of the World, *Proc. of SPIE Vol. 8011, 80117C* (2011).
 9. “Multi-user multiplexed scheme for decoding modulated-encoded sequential information”, F. Mosso, M. Tebaldi, **J.F. Barrera R.**, N. Bolognini, R. Torroba, XXII Congress of the International Commission for Optics: Light for the Development of the World, *Proc. of SPIE Vol. 8011, 801173* (2011).
 10. “Optodigital protocol to avoid an external reference beam in a JTC encrypting processor”, Carlos Ríos, Edgar Rueda, **J.F. Barrera R.**, Rodrigo Henao, Roberto Torroba, *Laser Science 2010, OSA Technical Digest (CD) (Optical Society of America, 2010)*, paper JWA27.
 11. “Optical Image Multiplexing Encryption Using Digital Holography in a JTC Architecture”, E. Rueda, **J.F. Barrera R.**, R. Henao, and R. Torroba, *Digital Holography and Three-Dimensional Imaging 2009, OSA Technical Digest (CD) (Optical Society of America, 2009)*, paper JTUB3.
 12. “Encryption-Decryption in a four-wave mixing arrangement”, **J.F. Barrera R.**, R. Henao, M. Tebaldi, N. Bolognini, R. Torroba, *International conference on Optics and Optoelectronics, Proceedings of International conference on Optics and Optoelectronics, PP-OIP-4, 2005*.
 13. “Multiplexing optical encrypted images using an aperture channelling securing key”, **J.F. Barrera R.**, M. Tebaldi, R. Henao, N. Bolognini, R. Torroba, *International conference on Optics and Optoelectronics, Proceedings of International conference on Optics and Optoelectronics, PP-OIP-5, 2005*.
 14. “Optical encryption by means of the Talbot array illuminator”, **J.F. Barrera R.**, R. Henao, Z. Jaroszewicz, A. Kolodziejczyk, *SPIE International Congress in Optics and Optoelectronics, SPIE Proceedings, Vol. 5954, pp. 59540I-1-6* (2005).
 15. “Talbot effect for the periodical object limited by a finite aperture”, **J.F. Barrera R.**, R. Henao, A. Kolodziejczyk, Z. Jaroszewicz, *14th Slovak-Czech-Polish Optical Conference on Wave and Quantum Aspects of Contemporary Optics, SPIE Proceedings, Vol. 5945, pp. 59450C-1-6* (2005).
 16. “Optical encryption method using zone plates”, **J.F. Barrera R.**, Rodrigo Henao; Roberto Torroba, *RIA/OPTILAS 2004 – 5th Iberoamerican Meeting on Optics and 8th Latin*

- American Meeting on Optics, Lasers and Lasers and their Applications, SPIE Proceedings, Vol. 5622, pp. 1129-1132 (2004).
17. "Interference and diffraction effects generated by multiple apertures", O. Quintero, **J.F. Barrera R.**, R. Henao, F. Medina, RIAO/OPTILAS 2004 – 5th Iberoamerican Meeting on Optics and 8th Latin American Meeting on Optics, Lasers and Lasers and their Applications, SPIE Proceedings, Vol. 5622, pp. 1388-1392 (2004).
 18. "Distinguishing fine details by Fresnel domain diffraction", F. Medina, **J.F. Barrera R.**, J. Garcia, RIAO/OPTILAS 2004 – 5th Iberoamerican Meeting on Optics and 8th Latin American Meeting on Optics, Lasers and Lasers and their Applications, SPIE Proceedings, Vol. 5622, pp. 1119-1123 (2004).
 19. "Finite object Talbot effect as a lens produced image", **J.F. Barrera R.**, R. Henao y A. Kolodziejczyk, XIX Congress of the International Commission for Optics ICO XIX: Optics for the Quality of Life, SPIE Proceedings, Vol. 4829, pp. 40-41 (2002).

c) Publications in national peer-reviewed journals (18)

1. "Límites de velocidad y distancia en la transmisión de información por un enlace óptico de bajo costo con recuperación libre de ruido", S.A. Montoya-Castro, M. Herrera-Duran, **J.F. Barrera R.**, Dyna **84**, 234-240 (2017).
2. "Encriptación óptica de información con recuperación libre de ruido", **J.F. Barrera R.**, R. Torroba, Rev. Acad. Colomb. Cienc. Ex. Fis. Nat. **39**, 48-54 (2015).
3. "Protección de datos usando un sistema experimental de encriptación de correlador de transformada conjunta", R. Torroba, **J.F. Barrera R.**, Rev. Acad. Colomb. Cienc. Ex. Fis. Nat. **39**, 55-60 (2015).
4. "Encriptación óptica empleando llaves Weierstrass-Mandelbrot", F. Giménez, J. A. Monsoriu, **J.F. Barrera R.**, W. D. Furland, M. Tebaldi, N. Bolognini, R. Torroba, Modelling in Science Education and Learning **6**, No. 5, 55-65 (2013).
5. "Encriptación óptico-digital usando una arquitectura 4f", C.A. Vargas, **J.F. Barrera R.**, R. Torroba, Revista Colombiana de Física **44**, No. 3, 289-293 (2012).
6. "Análisis de la Sensibilidad de un Sistema Óptico de Encriptación Bajo Rotaciones de la Llave de Seguridad", C.A. Ríos, E.A. Rueda, **J.F. Barrera R.**, Revista Colombiana de Física **42**, No. 2, 227-231 (2010).
7. "Sistema óptico de encriptación de doble máscara de fase bajo arquitectura 4f", C.A. Ríos, E.A. Rueda, **J.F. Barrera R.**, Revista Tecno Lógicas, **Segunda Edición Especial**, 75-96 (2010).
8. "Manejo seguro de múltiples datos mediante una técnica de multiplexado de ocultamiento", **J.F. Barrera R.**, J.H. Serna, M. Tebaldi, N. Bolognini, R. Torroba, Revista Colombiana de Física **41**, No. 3, 645-647 (2009).
9. "Filtro Holográfico Adaptado", J. Serna, **J.F. Barrera R.**, Revista Colombiana de Física **41**, No. 1, 142-144 (2009).
10. "Criterio Generalizado para la Distinción entre Difracción de Fraunhofer y Fresnel", E.A. Rueda, **J.F. Barrera R.**, F. Medina, Revista Colombiana de Física **41**, No. 1, 128-130 (2009).
11. "Implementación de un filtro de muestreo como sensor de frente de onda tipo Hartmann", A. Mira, **J.F. Barrera R.**, C. Macias, Revista Colombiana de Física **38**, No. 2, 589-582 (2006).

12. “Fidelidad espacial en la encriptación óptica con placas zonales como llave de seguridad”, **J.F. Barrera R.**, R. Henao, R. Torroba, Academia Colombiana de Ciencias Exactas, Físicas y Naturales **9205-65-8**, 252-256 (2005).
13. “Propiedad de restauración en el efecto Talbot”, **J.F. Barrera R.**, R. Henao, A. Kolodziejczyk, Academia Colombiana de Ciencias Exactas, Físicas y Naturales **9205-65-8**, 247-251 (2005).
14. “Autoimágenes en Fraunhofer-Fresnel”, **J.F. Barrera R.**, R. Henao, C. Osorio, F.F. Medina, Revista Colombiana de Física **36**, No. 1, 101-104 (2004).
15. “Estudio de la calidad de las autoimágenes por el efecto pupila”, **J.F. Barrera R.**, R. Henao, A. Kolodziejczyk, Revista Colombiana de Física **35**, No. 1, 184-187 (2003).
16. “Patrón de interferencia producido por un par de Young en los dominios de Fresnel y Fraunhofer”, F. Medina, **J.F. Barrera R.**, C. Osorio, G. Matteucci, Revista de la Sociedad Colombiana de Física **35**, No. 2, 368-371 (2003).
17. “Features of phase wave front binary encoding and their potential utilization for alignment purposes”, **J.F. Barrera R.**, A. Kolodziejczyk, C. A. Rodriguez, Revista Colombiana de Física **34**, No. 1, 196-200 (2002).
18. “Hologramas generados por computador”, **J.F. Barrera R.**, R. Henao, A. Kolodziejczyk, Revista Colombiana de Física **33**, No. 2, 364-368 (2001).

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