

# Curriculum vitae

## ARISTIDES MARCANO OLAIZOLA

### Personal data

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### Education

1. Master of Sciences in Physics and Mathematics (**With Honors**), Moscow State University, M.V. Lomonosov, Moscow, Russia (1977).
2. Doctor of Philosophy (PhD) in Physics and Mathematical Sciences, Moscow State University, M.V. Lomonosov, Moscow, Russia (1980).

### Area of expertise

Applied and nonlinear optics, fluorescence, Raman, absorption spectroscopy, thermal lensing spectroscopy, characterization of dye solutions, nonlinear optical effects in absorption and fluorescence of dye solutions, high sensitivity detection system and measurement of ultra-low absorption, fiber optics sensors, four-wave mixing and polarization spectroscopy of dye solutions, nonlinear dynamic induced by lasers in liquids, characterization of photo-sensitizers and photodynamic therapy studies.

### Professional Experience

1. Research Professor, Department of Physics and Engineering, Delaware State University, July 1, 2007-present
2. Research Professor, Department of Chemistry, Delaware State University, April 4, 2016 – June 30, 2017.
3. Professor, Department of Physics and Engineering, Delaware State University, July 1, 2014 – April 4, 2016.
4. Associate Research Professor, Delaware State University, Dover, Delaware, February 06, 2006 – June 30, 2014.
5. Researcher at Venezuelan Institution for Scientific Research, 1998 to 2006.
6. Visiting Scientist at the Applied Optics Center, Delaware State University, Dover, Delaware, USA, December 1999 to June 2001.
7. Associate Researcher at Venezuelan Institution for Scientific Research, since 1990 till 1997.
8. Chercheur Associé CNRS, Laboratoire D'Optique P.M. Duffieux, Franche-Comté University, Besançon, France, April 1996 to September 1996.
9. Assistant Researcher at Venezuelan Institution for Scientific Research 1980 to 1990.
10. Part time consultant of the company Alfa Quartz C.A., Charallave, Venezuela, 1995.
8. Part time Professor at Graduate Studies of the Chemical School of the Central University of Venezuela, Caracas, 1992 to 1994.
9. Visiting scientist at Bell Communication Research, Morristown, New Jersey, USA, 1987-1988.
10. Part time Associate Professor at Physics Department of Simon Bolivar University, Caracas, 1986 to 1987, 1988 to 1992 and 1996 to 1999.
11. Part time Assistant Professor at Physics School of the Central University of Venezuela, Caracas, 1982 to 1986.

### Awards

- 1- CONICIT (Venezuelan scientific financial agency) Award for the best scientific paper in Chemistry for the year 1990.
- 2- CONICIT (Venezuelan scientific financial agency) Award for the best scientific paper in Physics for the year 1992.

- 3- Award Dr. Alejandro Calvo Lairer of the Venezuelan Society of Oncology as co-author of the work: "Photodynamic therapy of skin cancer". January 2007, Caracas, Venezuela.
- 4- Delaware State University Merit Award Recipient, April 2010.
- 5- Delaware State University Faculty Excellence Award in Research and Creative Activities May 2012, Dover Delaware.

#### **Administrative positions:**

1. Chair of the Personnel Committee of the Department of Physics and Engineering, Delaware State University 2015-2016.
2. Chair of the Department of Physics and Engineering, Delaware State University. 2012-2015.
3. Interim chairman of the Department of Physics and Pre-Engineering, Delaware State University, July 2011-2012.
4. Director of Graduate Programs of the Department of Physics and Pre-Engineering, Delaware State University, May 2010- June 2011.
5. Chairman of the Physics Center at the Venezuelan Institute for Scientific Research (IVIC) 1993-1996.
6. Director of the Laboratory of Quantum Optics at the Venezuelan Institute for Scientific Research (IVIC) (1989-2006).
7. Graduate Program Director of the Center of Physics of the Venezuelan Institute for Scientific Research (IVIC) 1985-1987.
8. Elected Member of the Academic Promotion Committee of the Venezuelan Institute for Scientific Research (IVIC) 1998-1999.

#### **Scientific Grants**

1. S1-1735 CONICIT 1983-1988. "Measurements of ultrashort relaxation times and nonlinear optical effects in electronic transitions", 17,600 USD.
2. PI-093 CONICIT 1993-1995, "Nonlinear optical effects induced by ultrashort pulses in optical fibers and liquids", 5,000 USD.
3. PI-096 CONICIT 1996-2001, "Measurement of nonlinear optical properties in thin films", 6000 USD
4. S1-95000587 CONICIT 1997-1999, "Measurement of the nonlinear susceptibility using the Z-scan technique", 100,000 USD.
5. PG-97000593 FONACIT 1999-2005, "Measurement of the optical properties using the method of the wave-front distortions of propagating beams", 350,000 USD.
6. Postgraduate Cooperative Program on Nonlinear Optics (PCP) FONACIT– Minister d'Affaires Etrangere de la Republique Francaise, 2001-2005, 30,000 USD.
7. Co-PI of the National Science Foundation (US) Grant No 0630388: Center for Research and Education in Optical Sciences and Applications (CREOSA), 2006-2011, 5,000,000.00 USD.
8. NASA URC-5 (2009-2015) "NASA Optical Science Center for Applied Research" Co-I, 5,000,000 USD.
9. NSF IIP-0646587 (2009-2010), Intelligent Instruction Systems using Augmented Reality, PI for Delaware State University, 149,093 USD.
10. NSF 09-502 (2009-2011) MRI Acquisition of a femtosecond laser spectroscopic system for the Center for Research and Education in Optical Sciences and Applications, PI, 48,178 USD.
11. NSF1156640 (2012-2013), "US-Mexico Collaborative Program on Photothermal Imaging and Photothermal Microscopy", PI 14,893 USD.
12. NSF CREST HRD-1242067 (2012-2017) National Science Foundation: "Center for Research and Education in Optical Sciences and Applications: Promoting Scientific Discoveries, technological Advances, and STEM Education". Role: Co-PI. 4,996,693USD.
13. DSU CIBER EPSCoR seed Grant, "Development of a practical low cost photothermal lens spectrophotometer for spectroscopic characterization of turbid samples", Role PI. Total awarded: 29,650 USD. Period Covered: Feb. 2013- July 2013.
14. NSF HBCU, "Targeted Infusion Project: A MakerLab at Delaware State University, Role Co-PI. Total awarded \$399,672. Period covered: October 2017-09/01/2020.
15. DoD HBCU/MI (BAA) W911NF-16-R-002, proposal No 70490-RT-REP: "Chemical and Electrical Properties Mapping by Nano FT-IR". \$ 497,700. September 2017-August 2018, Role Co-PI.
16. Preliminary Proposal NSF Includes: Expanding diversity in energy and environmental sustainability (EDEES). Role: PI. Invited April 2017.

17. “NSF INCLUDES DDLP: Expanding Diversity in Energy and Environmental Sustainability through the creation of learning opportunities for minority students in the Mid-Atlantic region.” Role: PI. Awarded, \$ 298,592, period covered: 09/15/2017-09/14/2019.

18. NSF HBCU “Excellence in Research: Investigation of Enhancer-Free Photogenerated Singlet Oxygen.” Role: PI. Awarded \$ 498,372, period covered: 09/01/2018-08/30/2021.

### **Memberships in Scientific societies**

- 1- Venezuelan Society for the Advance of Science, member since 1981.
- 2- Venezuelan Physical Society, member since 1987 (Founder Member).
- 3- Venezuelan Optical Committee, member since 1992 (Founder Member).
- 4- Optical Society of America, member since 1990. Senior member since 2010.
- 5- American Physical Society, 1990 to 1993.
- 6- The International Society for Optical Engineering, member since 1992.

### **Per-Reviewed Publications**

1. Bogdanova, M.V., Ylinova, T.M., Marcano O., A., Medvedev, G.N., “Influence of Vibrational Relaxation on Energy Characteristics of a Laser Pulse in a Molecular Amplifier”, Soviet Journal of Quantum Electronics, **7**, N° 6, p. 701-703. (1977) (Kvantavaya Elektron. **4**, 1243-1248 (1977)). Times Cited: 1.

2. Marcano, A., Platonenko, V.T., “Saturation of Light Absorption in Molecular Gases”, Soviet Journal of Quantum Electronics, **9**, N° 5, p. 563-565 (1979) (Kvantovaya Elektron. **6**, 955-959 (1979)). Times cited: 5.

3. Marcano, O. A., Platonenko, V.T., “Coherent interaction between a short optical pulse and a molecular amplifying medium allowing for magnetic number degeneracy”, Soviet Journal of Quantum Electronics, **10**, N° 4, p. 433-436 (1980) (Kvantovaya Elektron. **7**, 759-763 (1980)). Times cited: 11.

4. Marcano, O. A., Platonenko, V.T., “Calculation of the Saturation Kinetics of Vibrational-Rotational Transitions in the Diffusion Approximation”, Moscow University Physics Bulletin. vol. **35**, N° 5, p. 53-54 (1980) (Vestnik Moskovskogo Universiteta, Fizika, **35**, N° 5, pp. 50-56 (1980)). Times cited: 3.

5. Marcano, O.A., Platonenko, V.T., “Role of coherent effects in generation of short light pulses by a high-pressure CO<sub>2</sub> laser”, Soviet Journal of Quantum Electronics, **11**, N° 11, p. 1438-1441 (1981) (Kvantovaya Elektron. **8**, 2350-2356 (1981)). Times cited: 2.

6. Marcano, O. A., García Golding, F., “Induced Dichroism in Molecular Gases”, J. Opt. Soc. Am., **72**, N° 7, 957-959 (1982). Times cited: 1. DOI: 10.1364/JOSA.72.000957.

7. Marcano, A., Abreu, R., García Golding, F., (1984), “Electronic and Thermal Contributions to the Polarization Spectrum of DQCI”, J. Physics B. At. Mol. Phys. **17**, 2151-2157 (1984). Times cited: 6. DOI: 10.1088/0022-3700/17/10/018.

8. Marcano, A., García Golding, F., “Power Effects in Polarization Spectroscopy in a Water Solution of Malachite Green”, J. Chem. Phys. **82** (3), 1242-1245 (1985). Times cited: 30. DOI: 10.1063/1.448444.

9. Marcano, A. (1985), “Phenomenological models for reorientation relaxation”, Revista Mexicana de Física, **31**, 345-360 (1985). Times cited: 0.

10. García Golding, F. and Marcano O., A., “High Order Effects in Rayleigh Type Optical Mixing”, Phys. Rev. A **32**, 1526-1530 (1985). Times cited: 28. DOI: 10.1103/PhysRevA.32.1526

11. Marcano, A., García Golding, F. and Rojas F., R., “Pump power dependences of thermal grating and electronic component of a Polarization Spectroscopy (PS) signal of dye solutions”, J. Opt. Soc. Am. JOSA, **3**, 3-7 (1986). Times cited: 2. DOI: 10.1364/JOSAB.3.000003.

12. Marcano O., A. and Aranguren, L., “Absolute Values of the Nonlinear Susceptibility of Dye Solutions measured by Polarization Spectroscopy”, J. Appl. Phys. **62**, 3100-3103 (1987). Times cited: 0.

13. Paz, J.L., Franco, H.J., Reif, I., Marcano O., A. and García Golding, F., “Pump Power Dependence due to Parametric Amplification of the Rayleigh Type Optical Mixing Signal”, Phys. Rev. B **37**, 3381 (1988). Times cited: 15. DOI: 10.1103/PhysRevA.37.3381.

14. Marcano O., A. and Medina, R., “Optical amplification of a thermal grating polarization spectroscopy signal”, JOSA B, **5**, 1386 (1988). Times cited: 1.

15. Chung, K.P. and Marcano O., A., “Phase stabilization of Optical Sub-harmonic signals”, J. Opt. Soc. Am. B, **5**, 2524 (1988). Times cited: 5.

16. Franco, H.J., J.L. Paz, A. Marcano O., I. Reif and M. Salazar, “Symmetry properties of the homogeneous Rayleigh type optical mixing signal in frequency space”, J. Opt. Soc. Am. B, **7**, 57-63 (1990). Times cited: 21.

17. Marcano O., A., I. Reif, J.L. Paz and H.J. Franco, "Rayleigh type optical mixing spectra of homogeneously and inhomogeneously broadened two level systems", *Journal of Physics B: At. Mol. Opt. Phys.* **23**, 1257-1264 (1990). Times cited: 10.
18. Marcano O., A., L. Márquez, L. Aranguren and M. Salazar, "Polarization spectra of homogeneously and inhomogeneously broadened two level system", *J. Opt. Soc. Am. B*, **7**, 2145-2149 (1990). Times cited: 7. DOI: 10.1364/JOSAB.7.002145.
19. Marcano O., A. "Laser-induced bubble trapping and its effect on light thermal blooming", *Appl. Opt.* **31**, pp. 2757-2764 (1992). Times cited: 8. DOI: 10.1364/AO.31.002757.
20. Marcano O. A. and J. Castillo, "A new approach for a pump-probe photothermal experiment", *Bra. J. Phys.*, **22**, pp. 25-29 (1992). Times cited: 0.
21. Marcano O. A., G. Da Costa and J. Castillo, "Geometrical interpretation of the laser-induced thermal lens", *Optical Engineering*, **32**, pp. 1125-1130 (1993). Times cited: 8.
22. L. Márquez, I. Reif, H.J. Franco, A. Marcano O. and J.L. Paz, "High pump power effects on resonant nearly degenerate four-wave mixing signal for homogeneously and inhomogeneously broadened two level systems", *Phys. Rev. A*, **47**, pp. 4185-4192 (1993). Times cited: 17. DOI: 10.1103/PhysRevA.47.4185.
23. Marcano O. A. and L. Aranguren, "Laser-induced force for bubble-trapping in liquids", *Appl. Phys. B*, **56**, pp. 343-346 (1993). Times cited: 4. DOI: 10.1007/BF00324530.
24. J. Castillo, V. Kozich and A. Marcano O., "Thermal lensing due to one-and two-photon absorption studied with two-color time-resolved Z-Scan", *Optics Letters*, **19**, pp. 171-173 (1994). Times cited: 65. DOI: 10.1364/OL.19.000171.
25. Marcano O. A. and J. Castillo, "Distortions of the probe light wave front in a thermal lens pump-probe experiment", *J. European Optical Society, Pure and Applied Optics*, **3**, pp. 339-351 (1994). Times cited: 0.
26. V.P. Kozich, A. Marcano O., F.E. Hernández and J. Castillo, "Use of differential thermal lensing to study two photon absorption in solutions", *Appl. Spec.*, **48**, pp. 1419-1422 (1994). Times cited: 7. DOI: 10.1366/0003702944027994.
27. V.P. Kozich, A. Marcano O., F.E. Hernández and J. Castillo, "Dual beam time-resolved Z-Scan in liquids to study heating due to linear and nonlinear light absorption", *Appl. Spec.*, **48**, pp. 1506-1512 (1994). Times cited: 29. DOI: 10.1366/0003702944027741.
28. V.P. Kozich, F.E. Hernández and A. Marcano O., "Pulse-induced thermal lensing in Kerr media", *Applied Spectroscopy*, **49**, pp. 1804-1808 (1995). Times cited: 8. DOI: 10.1366/0003702953966019.
29. Marcano O. A., H. Maillotte, D. Gindre and D. Metin, "Picosecond nonlinear refraction measurement in single beam open Z-Scan by charged-coupled device image processing", *Optics Letters*, **21**, pp. 101-103 (1996). Times cited: 31. DOI: 10.1364/OL.21.000101.
30. Hernández F. E., A. Marcano O. and H. Maillotte, "Sensitivity of the total beam profile distortion Z-scan for the measurement of nonlinear refraction", *Opt. Comm.* **134**, pp 529-536 (1997). Times cited: 17.
31. Marcano O., A. and R. Escalona, "Measurement of the stationary thermal nonlinear refraction light-wave front distortions by image-processing", *Review of Scientific Instruments*, **68**, pp 1652—1656 (1997). Times cited: 6. DOI: 10.1063/1.1147972.
32. Calatroni, J., A. Marcano O., R. Escalona and P. Sandoz, "Visualization and measurement of stationary thermal lens using spectrally resolved white light interferometry", *Optics Communications* **138**, pp 1-5 (1997). Times cited: 11. DOI: 10.1016/S0030-4018(97)00058-8
33. A. Marcano O., F. E. Hernández and A. D. Sena, "Two-color near field eclipsing Z-scan technique for the determination of nonlinear refraction", *J. Opt. Soc. Am. B.*, **14**, pp 3363-3367 (1997). Times cited: 14. DOI: 10.1364/JOSAB.14.003363.
34. F. E. Hernández, A. Marcano O., Y. Alvarado, A. Biondi, H. Maillotte, "Measurement of nonlinear refraction index and two photon absorption in a novel organometallic compound", *Optics Communications*, **152**, 77-82 (1998). Times cited: 26. DOI: 10.1016/S0030-4018(98)00153-9.
35. Zoghbi, M. E. , Bolaños, P., Villalba-Galea, C., Marcano, A., Hernández, E. Fill, M. and Escobar, A. L., "Spatial Ca<sup>2+</sup> distribution in contracting skeletal and cardiac muscle cells", *Biophysical J.* **78** (1): 164-173 (2000). Times cited: 12. DOI: 10.1016/S0006-3495(00)76582-9.
36. Marcano O. A., N. Melikechi and G. Verde, "Shift of the absorption spectrum of organic dyes due to saturation", *J. Chem Phys.* **113**, 5830 (2000). Times cited: 11. DOI: 10.1063/1.1308110.

37. Yartsev V. M. and A. Marcano O., "Nonlinear optics of molecular donor-acceptor compounds", *Synthetic Metals*, **7423**, pp 1-4 (2000). Times cited: 2. DOI: 10.1016/S0379-6779(00)00355-6.
38. Marcano O. A. and I. Urdaneta, "Fluorescence quantum yield of the rhodamine 101 in the presence of absorption saturation", *Appl. Phys. B*, **72**, 207-213 (2001). Times cited: 10. DOI: 10.1007/s003400000423
39. Gupte S. S., A. Marcano O., R. J. Pradhan, CF. Desai and N. Melikechi, "Pump-probe thermal lens near-infrared spectroscopy and Z-scan study of Zinc (Tris) Thiourea Sulfate", *J. Appl. Phys.*, **89**, 4939-4943 (2001). Times cited: 53. DOI: 10.1063/1.1358325.
40. Y. M. Yartsev and A. Marcano O., "Calculation of nonlinear optical properties of molecular clusters", *Revista Mexicana de Física*, **47** suplemento 1, 48-53 (2001). Times cited: 0.
41. Marcano A. O., C. Loper and N. Melikechi, "High sensitivity absorption measurement in water and glass samples using a mode-mismatched pump-probe thermal lens method", *Appl. Phys. Lett.*, **78**, 3415-3417 (2001). Times cited: 68. DOI: 10.1063/1.1375835.
42. Marcano O. A., C. Loper and N. Melikechi, "Pump probe mode mismatched Z-scan", *J. Opt. Soc. Am.B*, **19**, 119-124 (2002). Times cited: 54. DOI: 10.1364/JOSAB.19.000119.
43. S. S. Gupte, R. D. Pradhan, A. Marcano O., C. F. Desai and N. Melikechi, "Laser Damage Studies in zinc (tris) thiourea sulfate: A nonlinear Optical Crystal", *J. Appl. Phys.*, **91**, 3125-3128 (2002). Times cited: 33. DOI: 10.1063/1.1436287.
44. Marcano O. A., A. Tiburcio y G. Aguilar, "Photothermal spectra in dye solutions", *Portal de la Ciencia Venezolana* **1** (1), 47-55 (2002). Times cited: 0.
45. H. Soscún, O. Castellano, Y. Bermúdez, C. Toro-Mendoza, A. Marcano O. and Y. Alvarado, "Linear and nonlinear optical properties of pyridine N-oxide molecule", *J. Mol. Struct.* **592**, 19-28 (2002). Times cited: 22. DOI: 10.1016/S0166-1280(02)00222-1.
46. Marcano O. A., L. Rodríguez and N. Melikechi, "Thermal lensing in extended samples", *Appl. Spectros.*, **56**, 1504-1507 (2002). Times cited: 15. DOI: 10.1366/00037020260377832
47. Marcano O. A., and Y L. Rodríguez, "Absorption measurement using a mode-mismatched thermal lens method", *Revista Venezolana de Química*, **25**, 17-23 (2002). Times cited: 0
48. J. Hung, J. Castillo and A. Marcano O., "Fluorescence spectra of Rhodamine 6G for high fluence excitation radiation", *J. Luminescence*, **101**, 263-268 (2003). Times cited: 14. DOI: 10.1016/S0022-2313(02)00548-3.
49. Marcano O. A., L. Rodríguez and Y. Alvarado, "Mode-mismatched thermal lens experiment in the pulse regime", *J. Opt. A: Pure Appl. Opt.* **5**, S256-S261(2003). Times cited: 15. Article Number: PII S1464-4258(03)56305-X.
50. Marcano O. A., J. Hung, L. Rodríguez and L. Borrero, "Differential thermal lensing in extended samples", *Appl. Spect.* **57**, 1278-1281 (2003). Times cited: 3. DOI: 10.1366/000370203769699162.
51. M. E. Zoghbi, J. A. Copello, C. A. Villalba-Galea, P. Velez, P. L. Daz Sylvester, P. Bolaños, A. Marcano O., M. Fill and A. L. Escobar, "Differential Ca<sup>2+</sup> and Sr<sup>2+</sup> regulation of intracellular divalent cations release in ventricular myocytes", *Cell Calcium*, **26**, 119-134 (2004). Times cited: 10. DOI: 10.1016/h.ceca.2004.01.023.
52. J. Hung, A. Marcano O., J. Castillo, J. Gonzalez, V. Piscitelli, A. Reyes and A. Fernandez, "Thermal lensing and absorbance spectra of a fluorescent dye solution", *Chem. Phys. Lett.* **386**, 206-210 (2004). Times cited: 8. DOI: 10.1016/j.cplett.2004.01.058
53. L. Rodríguez, J. Ramírez and A. Marcano O., "Thermal lens induced by a diode laser as a didactic experience for undergraduate physics laboratory", *Revista Mexicana de Física*, **51** pp 1-4 (2005). Times cited: 2.
54. F. Vargas, Y. Díaz, V. Yartsev, A. Marcano O., and A. Lappa, "Photophysical properties of novel photosensitizer Radachlorin in different media", *Ciencia*, **12**, 70-77 (2004). Times cited: 13.
55. M. Giffard, N. Mercier, G. Gabon, X. Nguyen-Phu, M. Sylla, P. Delhaes, H. Soscun, O. Castellano, J. Hernandez, L. Rodríguez, A. Marcano O. and V. Yartsev, "Chiral salts for nonlinear optics: prospect and achievements", *Microelectron. J.* **36**, 933-938 (2005). Times cited: 2. DOI: 10.1016/j.mejo.2005.05.011
56. L. Rodríguez, C. Simos, J. Hernández, H. Gutierrez, M. Sylla, M. Giffard, A. Marcano O., H. Soscun and X. Nguyen Phu. "Picosecond measurement of the nonlinear refractive index of new salts of carboxylate anions with chiral amines and ammonium cations", *Optical Materials*, **27/3**, pp 641-646 (2004). Times cited: 7. DOI: 10.1016/j.optmat.2004.09.010.

57. L. Rodríguez, C. Simos, M. Sylla, A. Marcano O. and X. Nguyen Phu, “New holographic technique for third-order optical properties measurement”, *Opt. Comm.*, vol 247/4-6 pp 453-460 (2004). Times cited: 7. DOI: 10.1016/j.optcom.2004.11.104.
58. L. Echevarría, L. Rodríguez, V. Karasiev, V. Piscitelli and A. Marcano O., “High efficiency stimulated Raman scattering from alcohols: Theory and experiments”, *J. Raman Spectroscopy*, **36**, 389-393 (2005). Times cited: 1
59. J. A. González, A. Marcano, L. Trujillo and B. A. Mello, “Controlled transport of solitons and bubbles using external perturbations”, *Chaos, Solitons and Fractals* **28**, pp 804-821 (2006). Times cited: 4. DOI: 10.1016/j.chaos.2005.08.073
60. Marcano O. A., H. Cabrera, M. Guerra, R. A. Cruz, C. Jacinto and T. Catunda, “Optimizing and calibrating a mode-mismatched thermal lens experiment for low absorption measurement”, *J. Opt. Soc. Am. B*, **23**, pp 1408-1413 (2006). Times cited: 39. DOI: 10.1364/JOSAB.23.001408.
61. A. Marcano O., J. Ojeda and N. Melikechi, “Absorption spectra of dye solutions measured using a white-light thermal lens spectrophotometer”, *Appl. Spectros.* **60** (5), 560-563 (2006). Times cited: 11.
62. H. Cabrera, A. Marcano O. and J. Castellanos, “Absorption coefficient of nearly transparent liquids measured using thermal lens spectrometry”, *Condensed Matt. Phys.*, **9**, 2, 385-389 (2006). Times cited: 36.
63. Marcano O. A. and N. Melikechi, “CW Achromatic thermal lens spectroscopy”, *App. Spectros.* **61**, 659-664 (2007). Times cited: 13. DOI: 10.1366/000370207781269864.
64. J. Castro Garcia, N. Rincon Duran, M. Gordon Parra, A. Marcano O. and L. Aranguren, “Photodynamic Therapy on skin cancer”, *Rev Venez. Oncol*, 19 (1), 3-19 (2007). Times cited: 0.
65. M. Guerra, A. Taouri, A. Marcano O., H. Cabrera, and M. Sylla, “Measurement of nonlinear absorption coefficient of organic materials by mode-mismatched Z-scan thermal lensing technique”, *Appl. Spectros.* **61**, 1025-1133 (2007). Times cited: 3. DOI: 10.1366/000370207782217716.
66. Marcano O. A., K. Williams and N. Melikechi, “Measurement of two-photon absorption using the photo-thermal lens effect”, *Opt. Comm.* **281**, 2598-2604 (2008). Times cited: 0.
67. S. Rock, A. Marcano O., Y. Markushin, C. Sabanayagam and N. Melikechi, “Elemental analysis of laser-induced breakdown spectroscopy aided by an empirical data base”, *Appl. Opt.* 47 (31), G99-G104 (2008). Times cited: 6. DOI: 10.1364/AO.47.000G99.
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70. Y. Markushin, A. Marcano O., S. Rock and N. Melikechi, “Determination of protein hydrogen composition by laser-induced breakdown spectroscopy”, *J. Anal. At. Spectrom.* **25**, 148-149 (2010), DOI: 10.1039/b920384b (Impact 4.028). Times cited: 6. DOI: 10.1039/b920384b.
71. T. Vance, D. Pokrajac, A. Lazarevic, A. Marcano, Y. Markushin, S. McDaniel and N. Melikechi, “Classification of LIBS Protein Spectra Using Multilayer Perceptrons”, *Journal Transactions of Mass-Data Analysis of Images and Signals (with applications in Medicine, Biotechnology, Chemistry and Food Industry)*, **2** (1), pp. 96-111, ISSN 1868-6451 (2010). Times cited: 0.
72. A. Marcano O., F. Delima, Y. Markushin, and N. Melikechi, “Determination of Linear and Nonlinear Absorption of Metallic Colloids using Photothermal Lens Spectrometry”, *J. Opt. Soc. Am. B* **28**, 281-287 (2011). Times cited: 6. DOI: 10.1364/JOSAB.28.000281.
73. A. Marcano O., “Optimized Photothermal Lens Determination of Nonlinear Absorption”, *International Journal of Thermophysics*. Published on line 18 November 2012. DOI: 10.1007/s10765-012-1359-x. Times cited: 1
74. A. Marcano O., Isaac Basaldua, Aaron Vilette, Raymond Edziah, Jinjie Liu, Omar Ziane, and Nouredine Melikechi, “Photothermal lens spectrometry measurements in highly turbid media”, *Appl. Spectros.* 67 (9), 1013-1018, 2013. DOI: 10.1366/12-06970. Times cited: 5
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47. J. Castro G, N. R. Durán, M. Gordón-Parra, J. Ceballos-Guevara, A. Marcano O. y L. Echevarría, "Photodynamic Project for skin cancer treatment", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).
- L. Echevarría, L. Rodríguez and A. Marcano O., "Stimulated Raman red-light generation for photodynamic therapy applications", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).
48. B. Blanco, J. A. Sorrentino, J. Kaiser, T. Couveia y A. Marcano O., "Hemodializer simulation", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).
49. F. Vargas, O. Estrada, A. Marcano O., L. Echevarría, Y. Díaz and I. Alexander, "Photophysical and photochemical properties of a new PDT photosensitizer", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).
50. L. Rodríguez, C. Simos, M. Sylla, A. Marcano O. and X. Nguyen-Phu, "Picosecond measurement of the third order nonlinear parameters of a novel material using a new holographic method", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).

51. A. Marcano O., L. Rodríguez and J. Ramírez, "Optical fiber detector based on Light diffraction", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).
52. O. Mendoza-Yero, H. Cabrera-Morales and A. Marcano O., "A Gaussian beam characterization in thermal lensing", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).
53. L. Echevarría, L. Rodríguez, A. Marcano O. and V. Piscitelli, "High efficiency stimulated Raman scattering from alcohols: Theory and experiments", 5th Iberoamerican Meeting on Optics and 8th Latinoamerican Meeting on Optics Lasers and their Applications, Porlamar, Venezuela (2004).
54. H. Cabrera, E. Marín and A. Marcano O., "Probing of thermal wave interference by means of the thermal lens effect", International Conference on Photoacoustic and Photothermal Phenomena", Rio de Janeiro, July 05-08 (2004).
55. A. Marcano O., R. A. Cruz, C. Jacinto, D. N. Messias and T. Catunda, "Thermal lens spectra of low absorbing materials", XXVIII Brazilian Meeting on Condensed Matter Physics, Santos, Brasil (2005).
56. D. N. Messias, C. Jacinto, T. Catunda and A. Marcano O., "Nonlinear refraction index measurement of Yb<sup>3+</sup> doped glasses under resonant excitation", XXVIII Brazilian Meeting on Condensed Matter Physics, Santos Brasil, (2005).
57. M. Guerra, A. Marcano O., H. Cabrera, X. Nguyen-Phu and M. Sylla, "Mode-mismatched thermal lens measurement of nonlinear absorption coefficient of organic materials", XXVIII Brazilian Meeting on Condensed Matter Physics, Santos, Brasil (2005).
58. K. Williams, A. Marcano O. and N. Melikechi, "Two-photon absorption measurement using thermal lens Z-scan in liquids", NSBP and NSHP Annual Conference, Boston, February (2007).
59. A. Marcano O., K. Williams and N. Melikechi, "High sensitivity photo-thermal lens method for measurement of two-photon absorption", 6653-07, SPIE Optics and Photonics, San Diego CA, August 2007.
60. S. Rock, M. Zelinskas, H. Ding, N. Melikechi and A. Marcano, "Elemental analysis of laser-induced breakdown spectra aided by an empirical spectral data base", First North American Symposium on Laser Induced Breakdown Spectroscopy (NASLIBS 2007), New Orleans, October 2007.
61. N. Melikechi, H. Ding, A. Marcano O and Denise Connolly, "Optical characterization of complex samples and applications for detection of spectroscopic differences in biological specimens", Iberoamerican Conference on Optics and Latinoamerican Conference on Optics, Lasers and Applications, Campinas, Brazil, October (2007).
62. H. Cabrera, A. Marcano O. and J. Ojeda "Absorption spectra of Nitrobenzene Measured with an Incoherent White Light Excitation", Iberoamerican Conference on Optics and Latinoamerican Conference on Optics, Lasers and Applications, Campinas, Brazil, October (2007).
63. A. Marcano O., H. Cabrera and M. Diaz, "Comparison between mode-matched and mode-mismatched thermal lens methods for absorption measurement in liquids", Iberoamerican Conference on Optics and Latinoamerican Conference on Optics, Lasers and Applications, Campinas, Brazil, October (2007).
64. R. A. Cruz, C. Jacinto, A. Marcano O., and T. Catunda, "High sensitivity thermal lens optimized technique to measure low linear absorption coefficient", Iberoamerican Conference on Optics and Latinoamerican Conference on Optics, Lasers and Applications, Campinas, Brazil, October (2007).
65. S. Rock, H. Ding, N. Melikechi, A. Marcano O. "Laser-Induced breakdown spectroscopy of whole blood and other liquid organic compounds", Conference 6863: Optical Diagnostic and Sensing VIII, SPIE Bio 2008, part of Photonics West, San Jose CA, January 2008.
66. A. Marcano O., Y. Markushin, N. Melikechi and D. Connolly, "Fourier Transform Spectroscopy of Deuterated Proteins", Conference 7049 Linear and Nonlinear Optics of Organic Materials VIII", SPIE Optics and Photonics, San Diego CA, August 10-14, 2008.
67. A. Marcano O., Aaron Zelinskas and N. Melikechi, "Pump-Probe Photothermal Lens Experiment for Measuring Thermal Diffusivity Coefficient of Organic Solvents", Conference 7049 Linear and Nonlinear Optics of Organic Materials VIII", SPIE Optics and Photonics, San Diego CA, August 10-14, 2008.
68. N. Melikechi, Y. Markushin, A. Marcano O. and S. Rock, "Identification of the elemental composition and ratios of macromolecules using laser-induced breakdown spectroscopy", LIBS 2008 Fifth International Conference on Laser-Induced Breakdown Spectroscopy, (22-26 September 2008), Berlin, Germany (Organized by the Federal Institute for Material Research and Testing (BAN) and the Institute of Analytical Sciences, www.libs2008.de).
69. N. Melikechi, Y. Markushin, A. Marcano O., S. Rock, Elizabeth Henderson, Natalie Smith, Chandran R. Sabanayagam and D. Connolly, "Optical classification and detection of complex molecules: Progress towards the early detection of ovarian cancer", International Conference on Optics, Photonics and their Applications, Algiers, Algeria, 12-15 December (2008).

70. Y. Markushin \*, N. Melikechi\*, A. Marcano O.\*, S. Rock\* and D. Connolly, “LIBS based multi-element coded assay for ovarian cancer application”, Photonics West, BIO 2009, paper PW09B-BO209-11, San Jose, CA (2009).
71. Aleksandar Lazarevic, Dragoljub Pokrajac, Aristides Marcano O., and Nouredine Melikechi, “Use of Principal Component Analysis for Interpretation of Fast Fourier Transform Spectroscopy of Proteins”, Photonics West, BIO 2009, San Jose, CA (January 2009).
72. M. Smith, A. Marcano, Y. Markushin and N. Melikechi, “Fourier Transform Spectroscopy of Deuterated Proteins and its use in detection of protein biomarkers”, CREST/HBCU-RISE JAM Conference, Washington, DC (June 2009).
73. T. Vance, D. Pokrajac, A. Marcano and N. Melikechi, “Neural Networks Classifier on High Dimensional Spectroscopic Data”, CREST/HBCU-RISE JAM Conference, Washington, DC (June 2009).
74. Aristides Marcano O., Franz Delima, Yuri Markushin, Chandran Sabanayagam and Nouredine Melikechi, “Detecting protein biomarkers using a photothermal lens method”, 2010 Joint Annual Meeting, NSF, Division of Human Resources Development, Washington DC, June 6-9, 2010.
75. Yury Markushin, M. Smith and A. Marcano O., "Integration of Piezo-Electrical Motor for Augmented reality Systems", Naval Academy Science and Engineering Conference (NASEC) , Annapolis MD November 8-10 , 2010.
76. F. Delima, A. Marcano O., Photothermal lens signature of nonlinear surface plasmon absorption of metallic colloids”, 13th Annual Philadelphia AMP Research Symposium and Mentoring Conference, Philadelphia, PA, October 16, 2010.
77. M. Smith, A. Marcano O and N. Melikechi, "Reconfigurable Optics for Augmented Reality Goggle Systems", Student Technical Symposium of the National Technical Association, INC. Washington DC, September 8-10, 2010.
78. F. Delima, A. Marcano O, Y. Markushin, C. Sabanayagam and N. Melikechi, “High Sensitivity Photothermal Lens Detection of Metallic Nanoparticles: Applications for Detection of Protein Biomarkers”, Annual meeting of the Optical Society of America (FiO/LS conference) Rochester, NY October 2010.
79. A. Marcano O., F. Delima, G. Gwanmesia and N. Melikechi, “Photo-thermal mirror method for determination of thermal diffusivity of nontransparent samples”, Annual meeting of the Optical Society of America (FiO/LS conference) Rochester, NY October 2010.
80. O. Ziane, A. Marcano O., H. Boukari and N. Melikechi, “Photothermal lens spectrometry in highly scattering samples”, 55 Annual Meeting of the Biophysical Society, March 5-9, Baltimore, MD (2011).
81. A. Marcano O., f. Delima, N. Melikechi and Y. Markushin, “Photothermal lens spectrometry of metallic nanoparticle colloids”, SPIE Photonic West, January 25-27, San Francisco, CA (2011).
82. A. Marcano O, O. Ziane , H. Boukari, and N. Melikechi, “Photothermal lens detection and imaging through highly turbid samples”, 2011 Joint Annual Meeting, National Science Foundation, Directorate for Education and Human Resources, Division of Human Resources Development, June 6-8, Washington, DC (2011).
83. N. Melikechi, A. Marcano O. and G. Pati, “The Center for Research and Education in optical Sciences and Applications, CREOSA”, 2011 Joint Annual Meeting, National Science Foundation, Directorate for Education and Human Resources, Division of Human Resources Development, June 6-8, Washington, DC (2011).
84. A. Marcano O., “Optimized Photothermal Lens Experiment: Applications and Perspectives”, Plenary Lecture at IV International Conference on Surfaces, Materials and Vacuum, Puerto Vallarta, Mexico, September 25<sup>th</sup>-28<sup>th</sup>, 2011.
85. T. Harper, A. Marcano O. and H. Boukari, “Photothermal studies of concentrated Ficoll solutions”, Canadian, American, Mexican Graduate Students Conference (APS) September 29-October 1, Washington DC, 2011.
86. Ryan Coote, A. Marcano, and N. Melikechi, “Photothermal lens microscope and Photothermal Imaging in Highly Scattering Samples”, 2011 Joint Conference of the National Society for Black Physicists and National Society of Hispanic Physicists, Austin TX, September 21 to September 24, 2011.
86. A. Marcano O., “Optimized photothermal lens determination of nonlinear absorption” (**Invited**), 16<sup>th</sup> International Conference on Photoacoustic and Photothermal Phenomena, Merida, Mexico, November 27-December 1, 2011.
87. I. Basaldua, A. Marcano and N. Melikechi, “Photothermal lens spectrometry of turbid samples”, 2012 Emerging Researches National (ERN) Conference in Science, Technology, Engineering, and Mathematics (STEM), Atlanta, GA. February 23-25, 2012.
88. Ryan Coote, Aristides Marcano, “Photothermal Lens Imaging and Detection System for Micro and Nano Dimension samples”, Emerging Researchers National (ERN) Conference in STEM, American

Association for the Advancement of Science (AAAS) and NSF Division of Human Resource Development (HRD), Directorate for Education and Human Resources (EHR), Washington DC, February 28-March 2, 2013.

89. A. Marcano O., "Graded-Index Optical Fiber Sound Sensor", Advanced Photonic Conference, Rio Grande, Puerto Rico, July 14-17, 2013.

90. A. Marcano O., S. Alvarado, and E. Marin Moares, "Detecting absorption spectra of turbid media using a white light photothermal lens spectrophotometer", Advanced Photonic Conference, Rio Grande, Puerto Rico, July 14-17, 2013.

91. A. Marcano O., "Advances on photothermal spectroscopy: Applications and scope" (**Invited**), XXII Symposium on Advanced technology, Mexico City, December 5-10, 2013, Mexico.

92. Z. Warren, A. Marcano, R. Tripathi, G. S. Pati, "Spectroscopic Characterization of Nanodiamond Solutions Using Photothermal and Fluorescence Measurements", Symposium PP Nanodiamonds: Fundamentals and Applications, Material Research Society Spring Meeting, San Francisco, California, April 21-25, 2014 (presented April 25).

93. S. Alvarado, A. Marcano, A. Calderon, and E. Marin, "Study of the photothermal effect using an optical fiber sensor and its applications for detection of absorbing species", 20<sup>th</sup> European Conference on The Thermophysical Properties", Porto Portugal, September 4<sup>th</sup>, 2014.

94. A. Marcano O., "Master of Science in Physics and Applied Optics as a Step to the Doctoral Degree at Delaware State University: Experience with Underrepresented Minorities", APS Bridge Physics program Summer Meeting, American Center for Physics, College Park, MD, June 25-27, 2014.

95. S. Alvarado Ramirez, E. Marin, A. Marcano, J. A. Calderon Arenas, "Optical fiber sensor application for detection of absorbing species improved by the photothermal lens effect", VII International Conference on Surfaces, Materials and Vacuum, October 6-10, Ensenada, Baja California, Mexico, 2014.

96. A. Marcano O., "Photothermal lens spectroscopy as a new tool for analysis of complex samples", Grad Map Spring Symposium, University of Maryland, College Park, MD, April 18, 2015.

97. May Hlaing and Aristides Marcano, "Time evolution of the photothermal signal of gold nanoparticle colloids in the pulse regime", 1<sup>st</sup> Delaware Optics Symposium (DOS), October 8-9, 2015, Dover, DE.

98. Bellsabel Gebear-Eigzabher, Cheng-Yu Lai, Aristides Marcano, Azael Roa, and Daniela Radu, "Photothermal lens characterization of Ag nanoparticle colloids and films" 251<sup>st</sup> American Chemical Society (ACS) National Meeting & Exposition, San Diego, California, March 13-17, 2016.

99. David Kingsley, Robinson Kuis, Anthony Johnson, and Aristides Marcano, "Laser Inactivation of Murine Norovirus", 35<sup>th</sup> Annual Meeting for the American Society for Virology, Blacksburg, Virginia, June 18-22, 2016.

100. May Hlaing, A. Roa, and A. Marcano, "White Light Pump Probe Photothermal Mirror Spectrophotometer", accepted for presentation at 47<sup>th</sup> Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics, Providence, Rhode Island, May 23-27, 2016.

101. A. Marcano, "Photothermal Spectroscopy: basic Principles and Applications" (**Invited**), Winter College on Optics, February 13-17, International Center for Theoretical Physics, Trieste, Italy (2017).

102. A. Marcano O., "National Science Foundation INCLUDES program at Delaware State University: Establishing a Baccalaureate Program on Renewable Energy Engineering", 3<sup>rd</sup> National Energy Education Summit: Education for Resilient Energy Systems, Washington D.C., January 25, 2018.

103. A. Marcano O., "NSF INCLUDES DDLP: Expanding Diversity in Energy and Environmental Sustainability through the Creation of Learning Opportunities for Minority Students in the Mid-Atlantic Region (Award 1744502)", NSF INCLUDES PI/Evaluator's Meeting, Alexandria VA, January 10, 2018.

104. A. Marcano O., "Expanding diversity in renewable energy and environmental sustainability", Gordon Research Conference, June 10-15, 2018, Bryant University, Smithfield, RI.

105. Electrochemical Reductive Grafting and Photothermal Properties Studies of bis(diazonium) gold(III) salts", Shehu Isah, Bizuneh Workie, Aristides Marcano, Seema Panicker, and Ahmed Mohammed, *Abstract of Papers, American Chemical Society 256<sup>th</sup> National Meeting, Boston, MA, August 19 -23, 2018.*

### **Teaching experience**

1- Part time Associated Professor at Physics School of the Central University of Venezuela (1982-1986)  
Undergraduate courses: Mechanics, Waves and Optics, Electricity and Magnetism.

2- Part time Associated Professor at the Physics Department of the Simon Bolivar University, Caracas, Venezuela (1986-1987, and 1988-1992).

Undergraduate courses: Laboratory of Mechanics, Laboratory of Electricity and Magnetism, Waves and Optics, Laboratory of Optics, Mechanics, Thermodynamics, Laboratory of Electronics, Electricity and Magnetism, Quantum Optics.

- 3- Part time Full Professor at the School of Chemistry of the Central University of Venezuela (1992-1994).  
Graduate courses: Molecular Spectroscopy, Nonlinear Laser Spectroscopy, Instruments for Optics and Spectroscopy, Photo-thermal Spectroscopy, Principles of Nuclear Magnetic Resonance.
- 4- Part time Full Professor at the Physics Department of the Simon Bolivar University, Caracas, Venezuela (1996-1999).  
Undergraduate courses: Laboratory of Mechanics, Quantum Optics, Mechanics, Laboratory of Optics, Advanced Laboratory for Physicists, Laboratory of Electricity and Magnetism.
- 5- Professor of Graduates Courses at Venezuelan Institution for Basic Research (1981-2004).  
Graduate courses: Classical Mechanics, Advanced Electromagnetism, Physical Mathematics, Quantum Mechanics, Physical Optics, Quantum Optics, Instrumentation for Optics and Spectroscopy, Physics for Biologists, Photo-thermal Spectroscopy, Nonlinear Optics, Laser Spectroscopy, Nonlinear Optics, Fluid Mechanics.
- 5- Associate Research Professor, Department of Physics and Engineering, Delaware State University.  
Undergraduate courses: Applied Physics Laboratory I (fall 2006-2007 and 2008), Applied Physics Laboratory II (spring 2007-2008 and 2009), General Physics I PHYS 201 (spring 2010, and spring 2011), General Physics II PHYS 202 (fall 2010), Analytic Mechanics I PHYS 313 (fall 2010), University Seminar I and II PHYS 191 and PHYS 192 (2012-2013-2014), Optical Electronics PHYS 310 (fall 2012).  
Graduate courses: Nonlinear Optics (spring 2009, spring 2011, spring 2012, spring 2013 and spring 2014), Modern Methods of Laser Spectroscopy (Fall 2009), Lasers and Optical Devices (Fall 2013).
- 6- Professor, Department of Physics and Engineering, Delaware State University.  
Undergraduate courses: Analytical Mechanics I (PHYS 313) fall 2014. General Physics I (PHYS 201) spring 2015. Engineering Mechanics: Statics (PHYS 313) fall 2015, General Physics II (PHYS 202) fall 2015, Engineering Mechanics: Dynamics (PHYS 314) spring 2016, General Physics I (PHYS 201) spring 2016, Sound and Acoustics (PHYS 141) fall 2017 and spring 2018, Experimental and Theoretical Research (PHYS 418) spring 2018.  
Graduate Courses: Fundamental of Laser and Optical Devices (PHYS 660) fall 2017.
- 7- Research Professor, Department of Chemistry, Delaware State University  
Undergraduate courses: Chemical Literature (CHEM 460) fall 2016, Probability (MTSC 341), Selected Topics in Chemistry (CHEM 416) spring 2017.  
Graduate courses: Advanced Probability Theory (MTSC 541) fall 216, Chemical Literature (CHEM 560) fall 2016, Applications of Spectroscopy (CHEM 519) fall 2016, Selected Topics in Chemistry (CHEM 511) spring 2017.

### **Thesis Adviser**

#### **Undergraduate Degree:**

- 1- Rafael Rojas (1984), "Power dependence of the thermal and electronic component of the polarization spectroscopy signal", University of Orient, Cumana, Venezuela.
- 2- Rafael Rodríguez 1987, "High order propagation effects of the polarization spectroscopy signal", Caracas, Central University of Venezuela.
- 3- Hector Canabal B. (1992), "Self interactions between a laser beam and a liquid film" (Maraven Award for the best Thesis of the year), Simon Bolivar University, Caracas, Venezuela.
- 4- Armando Sena (1995), "Profile distortions of a electromagnetic wave due to nonlinear optical effects", Central University of Venezuela, Caracas, Venezuela.
- 5- Adolfo Oquero (1996), "Image recording and processing system for the study of optical processes", Polytechnic Institution of the Armed Forces, Maracay, Venezuela.
- 6- Alejandro J. Solis Saldivia (1997), "Design and implementation of a hardware and software system for image digital processing for the determination of the absorption coefficient", Polytechnical Institution of the Armed Forces, Maracay, Venezuela.
- 7- Ines Urdaneta, (1999), "Photothermal and absorbance spectra of a rhodamine 101 solution", Simon Bolivar University, Caracas, Venezuela.
- 8- Gabriel Verde, (1999) "Study of the absorption saturation in dye solutions", Simon Bolivar University, Caracas, Venezuela.
- 9- Luis Borrero (2003). "Thermal lens differential method for absorption measurement below solvent background", Central University of Venezuela, Caracas, Venezuela.



- 10- Francisco Jose Torres, José Gregorio Andara and Alexander E. Ortíz (2005), "Proposal for a prototype of fiber optics microphone for the Armed Forces", Military Institute for Communications and Electronics of the Armed Forces , Caracas, Venezuela.
- 11- Jose Ojeda (2006), Absorption spectrum of Malachite Green measured using a white light thermal lens spectrophotometer", Zulia University, Maracaibo, Venezuela.
- 12- Sierra Harris (2016), Honors Program Thesis, "Photothermal characterization of silver nanoparticles", BS in Engineering Physics, Delaware State University April 27, 2016.

#### Master Degree:

- 1- Mary Carmen Salazar (1987), "Measurement of the Malachite Green parameters using the four wave-mixing technique", Venezuelan Institution for Scientific Research, Caracas, Venezuela.
- 2- José Antonio Tiburcio Moreno (1998), "Measurement of the absorption spectra using the thermal lens technique: Applications to fluorescent systems" Venezuelan Institution for Scientific Research, Caracas, Venezuela.
- 3- Luis Borrero (2006), "Study of stability of bubbles generated by a CW laser" "Venezuelan Institution for Scientific Research, Caracas, Venezuela.
- 4- Krystaufeux Williams (2008), "Measuring two-photon absorption using thermal lens spectrometry", Delaware State University, Dover, Delaware (co-adviser).
5. Maurice Smith (2011), "Variable focal length optics for augmented reality goggle system", Delaware State University, Dover, Delaware.
- 6- Franz Delima (2011), "Study of linear and nonlinear absorption of metallic colloids using photothermal lensing spectrometry", Delaware State University, Dover, Delaware.
- 7- Junwei Meng (2014), "Development of white light photothermal lens spectrophotometer", Delaware State University, Dover, Delaware.
- 8- Mark King (2015), "Determination of thermal diffusivity of non-transparent samples using a photothermal mirror method", Delaware State University, Dover, Delaware.
- 9- Isaac Basaldua (2015), (Non-thesis option), Research project: Photothermal lens spectrometry of highly scattering samples", Delaware State University, Dover, Delaware.

#### Doctorate Degree:

- 1- Jimmy Castillo (1994), "Thermal lens spectroscopy: theoretical models and comparison with the experiments", Central University of Venezuela, Caracas, Venezuela.
- 2- Florencio Eloy Hernández (1996), "Two-beams Z-scan implementation for studies of nonlinear refraction and linear and nonlinear absorption", Central University of Venezuela, Caracas, Venezuela.
- 3- Luis Rodríguez (2004), "Measurement of nonlinear optical properties using the thermal lens I-scan and nonlinear holography methods", Venezuelan Institution for Scientific Research, Caracas, Venezuela.
- 4- Mayamarú Guerra Acosta (2006), "Characterization of nonlinear optical materials", Venezuelan Institution for Scientific Research, Caracas, Venezuela.
- 5- Humberto Cabrera (2007), "Thermal lens spectroscopy and measurement of thermo-optical parameters in semitransparent media", Venezuelan Institution for Scientific Research, Caracas, Venezuela.
- 6- Salvador Alvarado Ramirez (2015), "Applications of the hot wire calorimetry and photothermal lens spectroscopy for characterization of complex liquids", PhD in Advanced Technology, Center of Research in Applied Science and Advanced Technology, Legaria Unit, National Polytechnic Institute (CICATA-IPN Mexico). Co-Adviser.

#### Postdoctoral fellows:

- 1- Eloy Hernandez (1996-1999) (currently Associate Professor, University of Central Florida).
- 2- Jannett Hung (2002-2005).
- 3- Lorenzo Echevarria (2003-2005) (currently Associate Professor, Simon Bolivar University, Venezuela).

#### Mentoring K-12 students research presentations at DSU

1. James Meade (Dover High School), "Research and educational experiments using the Red-Tide 650 spectrometer", sponsored by the Experimental Program to Stimulate Competitive Research, EPSCoR, Delaware State University Summer Research Symposium, Dover, Delaware July 27, 2012.
2. Brandon Smith, Mark King, Junwei Meng and Aristides Marcano, "3D printing of optical supplies", 2014 Summer Research Symposium, Delaware State University, Dover, Delaware, July 31, 2014.
3. Andrew Zerrad (DSU Early College High School). "3D printing lens holders", July 2015.

#### Mentoring undergraduate students research presentations at DSU

1. Aaron Zelinskas, "Photothermal lens spectroscopy of liquids", DSU 34th Honors Day, March 2007.
2. Krystaufeux Williams, "Measurement of Multi-photon absorption using photothermal lens spectrometry", 34th Honors Day, March 2007.
3. Maurice Smith, "Fourier Transform Spectroscopy of Deuterated Proteins", DSU 36th Honors Day, April 2, 2009).
5. Lowell Buford, "Spectral Characterization of an Optical Fiber Acoustic Sensor", DSU 36th Honors Day, April 2, 2009.
6. Cameron Hinderer: "Characterization of Highly Scattering Samples" DSU 36th Honors Day, April 2, 2009.
7. Leon Taleh: "Development of a Thermal Lens Microscope" DSU 36th Honors Day, April 2, 2009.
9. Aaron Zelinskas: "Liquid lens variable optics in head mounted displays for NASA EVA systems" DSU 37th Honors Day, March 31, 2010.
10. Yuri Markushin: "Development and implementation of one dimensional lens adjustment system" DSU 37th Honors Day, March 31, 2010.
11. Lowell Buford, and Ashley Thompson: "Study of the light pattern at the exit end of an optical fiber" DSU Summer Research Symposium, July 30, 2009.
12. Walter Scott-Williams, and Scott Snell: "A study of the applications of an optical fiber based flow meter" DSU Summer Research Symposium, July 30, 2009.
13. Whitlee Haymore: "Wavefront distortion of a beam of light due to thermal lensing", DSU Summer Research Symposium, July, 2011.
14. Junwei Meng, "Imaging in highly turbid environment", 39<sup>th</sup> Honors Day Students Presentations, Delaware State University, Dover, DE, April 12, 2012.
15. Aaron Villete, "Limits of sensitivity of the photothermal lens detection in highly scattering samples", Delaware State University Summer Research Symposium, Dover, Delaware 2012.
16. Gregory Jones and A. Marcano, "Light scattering in the presence of absorption", 40th Honors Day Students Presentations, Delaware State University, Dover, DE, April 4, 2013.
17. Aaron Villette, A. Marcano, S. Alvarado and R. Edziah, "Absorbance and photothermal spectra of scattering light dye solutions" 40th Honors Day Students Presentations, Delaware State University, Dover, DE, April 4, 2013.
18. Daniel Caballero and A. Marcano, "Absorbance, photothermal and scattering spectra of gold nanoparticle colloids", 2013 Summer research Symposium, Delaware State University, Dover Delaware, July 25, 2013.
19. Mark King and A. Marcano, "Imaging through a highly scattering medium based on spectroscopic analysis, 2013 Summer research Symposium, Delaware State University, Dover Delaware, July 25, 2013.
20. Daniel Caballero, A. Marcano, M. Rana and G. Gwanmesia, "Photothermal mirror determination of thermal diffusivity of transparent and non-transparent samples", 41th Honors Day Students Presentations, Delaware State University, Dover, DE, April 3, 2014.
21. Janae Cosby and A. Marcano, "Absorption characterization of metallic colloids", 41th Honors Day Students Presentations, Delaware State University, Dover, DE, April 3, 2014.
22. Aaron Villette, Junwei Meng, A. Marcano, G. Pati and R. Tripathi, "Photothermal lens characterization of nanodiamond samples", 41th Honors Day Students Presentations, Delaware State University, Dover, DE, April 3, 2014.
23. Christopher Debardeleben, Mark King, Aristides Marcano and G. Gwanmesia, "Thermal diffusivity determination of solids using a pump-probe photothermal mirror method, 2014 Summer Research Symposium, Delaware State University, Dover, Delaware, July 31, 2014.
24. Janae Cosby and A. Marcano, "Pump-probe photothermal lens Z-scan of metallic colloids", 2014 Summer Research Symposium, Delaware State University, Dover, Delaware, July 31, 2014.
25. Sierra Harris, "Photothermal lens characterization of silver nanoparticles", 43rd Honors Day Students Presentations, Delaware State University, Dover, DE, April 15, 2016.
26. Azael Roa, "White light photothermal lens spectrophotometer", 43rd Honors Day Students Presentations, Delaware State University, Dover, DE, April 15, 2016.

27. J. Patterson and A. Marcano, "Pump-probe photothermal mirror Z-scan experiment", 45th Honors Day Students Presentations, Delaware State University, Dover, DE, April 20, 2018.
28. A. Brown-Countess and A. Marcano, "Diode laser Raman Spectroscopy of Organic Solvents", 45th Honors Day Students Presentations, Delaware State University, Dover, DE, April 20, 2018.
29. D. Onifade and A. Marcano, "Solar Power for a Sustainable Humanity", 2018 Technical Research Exhibition at NSBE44 National Convention, Pittsburg PA, March 21-25, 2018, and 45th Honors Day Students Presentations, Delaware State University, Dover, DE, April 20, 2018.
30. N. Blakely and A. Marcano, "The incoming green energy revolution: Principles and Current Perspective of Wind Power Generation", 2018 Technical Research Exhibition at NSBE44 National Convention, Pittsburg PA, March 21-25, 2018, and 45th Honors Day Students Presentations, Delaware State University, Dover, DE, April 20, 2018.

#### Mentoring graduate student research presentations at DSU

1. Maurice Smith: "Various reconfigurable lens for focusing augmented reality images", 37th Honors Day, March 31, 2010.
2. Franz Delima: "Thermal lens detection of metallic particles at the ppb level", DSU 37th Honors Day, March 31, 2010.
3. Ryan Coote, "Single nanoparticle detection using a thermal lens microscope", First DSU Graduate Symposium, April 15, 2011.
4. Franz Delima, "Study of linear and nonlinear absorption of metallic colloids using photothermal lens spectrometry", First DSU Graduate Symposium, April 15, 2011.
5. Maurice Smith, "Reconfigurable optical elements for augmented reality head worn display", (First DSU Graduate Symposium, April 15, 2011).
6. Ryan Coote, "Photo-thermal Lens Microscopic Imaging" 2<sup>nd</sup> Annual Graduate Research Symposium, Delaware State University, Dover DE, April 20, 2012.
7. Isaac Basaldua, "Photothermal Lens Spectrometry of Turbid Media", 2<sup>nd</sup> Annual Graduate Research Symposium, Delaware State University, Dover DE, April 20, 2012.
8. Michael Williams, Junwei Meng, Aaron Villette, A. Marcano, G. S. Pati and R. Tripathi, "Absorption studies of diamond nanoparticles using photothermal lens spectroscopy", 4<sup>th</sup> Annual Graduate Research Symposium, Delaware State University, Dover, Delaware, April 25, 2014.
9. J. Meng, A. Marcano, S. Alvarado, D. Caballero, E. Marin and R. Edziah, "White light photothermal lens spectrophotometer for studies of absorption in complex samples", 4<sup>th</sup> Annual Graduate Research Symposium, Delaware State University, Dover, Delaware, April 25, 2014.
10. Mai Hlaing, D. Kingsley and A. Marcano, "Role of micro-heating in laser virus inactivation mechanism", Delaware State University Fifth Annual Graduate Research Symposium, Dover, Delaware, April 17, 2015.
11. Bellsabel Gebear-Eigzabher, Cheng-Yu Lai, Aristides Marcano, Azael Roa, and Daniela Radu, "Photothermal lens characterization of Ag nanoparticle colloids and films", 6<sup>th</sup> Annual Graduate Symposium, Delaware State University, Dover, Delaware, April 8, 2016.
12. Mai Hlaing, David Kingsley, and Aristides Marcano, "Continuous wave laser virus inactivation experiment", 6<sup>th</sup> Annual Graduate Symposium, Delaware State University, Dover, Delaware, April 8, 2016.

#### Experience as scientific referee

- 1- Project Reviewer, Fonacit (Venezuelan Scientific Agency).
- 2- Project Referee, Colciencias (Colombian Scientific Agency).
- 3- Project Reviewer – National Science Foundation NSF (US )
- 4- Project Reviewer - Defense Threat Reduction Agency DTRA (US)
- 5- Manuscript Reviewer, Journal of the Optical Society of America B (US).
- 6- Manuscript Reviewer, Applied Spectroscopy (US).
- 7- Manuscript Reviewer, Chemical Physics Letters (US).
- 8- Manuscript Reviewer, Optics Letters (US).
- 9- Manuscript Reviewer, Optical Materials (US).
- 10- Manuscript Reviewer, Applied Optics (US).
- 11- Manuscript Reviewer, Optics Express (US).
- 12- Manuscript Reviewer, Talanta (US)

- 13- Member of Editorial Board of OME Electronics (China).
- 14- Manuscript Reviewer, "Acta Científica Venezolana" (Venezuela).
- 15- Manuscript Reviewer, "Ciencia" (Venezuela).
- 16- Review of Book "Nonlinear Optics", Physics Today (October 2012).
- 17- Manuscript Reviewer, Photonic Journal (IEEE) (April 2015).
- 18- Manuscript Reviewer, Photochemistry and Photobiology B: Biology (July 2015).
- 19- Manuscript Reviewer, Chinese Optics Letters (April 2015).
- 20- Manuscript Reviewer, Journal of Luminescence (August 2015).
- 21- Manuscript Reviewer, Applied Physics B – Lasers and Optics (December 2015-April 2016)
- 22- NSF panelist October 2015.
- 23- Manuscript reviewer, Dyes and Pigments, March 2016.
- 24- Manuscript reviewer, European Physics Journal AP, September 2016.
- 25- Manuscript reviewer, Chinese Optics Letters, October 2016.
- 26- Manuscript reviewer, Chemical Physics Letter, February 2017.
- 27- Manuscript reviewer, The Scientific Pages of Photonics and Optics, March 2017.
- 28- Manuscript reviewer, Spectrochimica Acta, March 2017.
- 29- Manuscript reviewer, Review of Scientific Instruments, May 2017.
- 30- Manuscript reviewer, Applied Spectroscopy, July 2017
- 31- Manuscript reviewers, Chemical Physics Letters, July 2017.
- 32- Manuscript reviewer, Journal of Optics, September 2017.
- 33- Manuscript reviewer, Applied Spectroscopy, November 2017.
- 34- Manuscript reviewer, Talanta, December 2017.
- 35- Manuscript reviewer, Applied Spectroscopy, December 2017.
- 36- Manuscript reviewer, ACS Omega, February 2018.
- 37- Manuscript reviewer, Nature Communications, May 2018.
- 38- Manuscript reviewer, JOSA B May 2018.

#### **Member of Committees of Scientific Conferences**

1. First Symposium of the Venezuelan Physical Society (Chairman), Caracas 1989.
2. Second Symposium of the Venezuelan Physical Society (Chairman), Cumana 1990.
3. Third Symposium of the Venezuelan Physical Society (Chairman), Maracaibo 1991.
4. 9<sup>th</sup> Latinoamerican Symposium on Solid State Physics (National Committee) Caracas 1990
5. 2<sup>nd</sup> Workshop on Laser Spectroscopy (Organization Committee), Merida Venezuela 1992
6. 3<sup>th</sup> Workshop- School on Photonics and 4<sup>th</sup> Latinoamerican Meeting on Optics, Lasers and their Applications (International Advising Committee), Mexico 1993.
- 7- 3<sup>th</sup> Symposium on Laser Spectroscopy and Optics (Chairman), Caracas, Venezuela 1995.
- 8- Second Iberoamerican Meeting on Optics (Scientific Committee), Mexico 1995.
- 9- 4<sup>th</sup> Symposium on Laser Spectroscopy and Optics and First School on Photonics (Chairman) Caracas, Venezuela 1997.
- 10- 5<sup>th</sup> Iberoamerican Meeting on Optics and 8<sup>th</sup> Latinoamerican Meeting on Optics, Lasers and their Applications (Chairman), Porlamar, Venezuela 2004.
11. Chairman of the Session 3 Conference 6653, SPIE Optics and Photonics 2007, San Diego, CA 2007.