Professor Vassilia Zorba

Group Leader & Senior Scientist, Laser Technologies Group
Energy Storage and Distributed Resources Division
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RESEARCH AREAS

Leading research at the intersection between optical physics, photonics, and analytical chemistry, focusing on the development of the next generation of high precision ultrafast laser plasma spectroscopies, for applications in nuclear security, advanced manufacturing, and energy.

SUMMARY

- Head of the Laser Technologies Group, Energy Storage and Distributed Resources Division, Lawrence Berkeley National Laboratory.
- Associate Adjunct Professor, Mech. Engr. Dept., University of California, Berkeley.
- Overseeing and managing $5M/year of research funds on laser plasmas, spectroscopy, and the fundamentals of laser ablation (LBNL and UC Berkeley).
- 90+ publications in laser science, engineering, and spectroscopy journals; h-index: 34 (based on Google Scholar); 7 Journal Covers.
- >60 invited, keynote and plenary conference presentations (SPIE Photonics West, CLEO, CLEO Europe, OSA-Frontiers in Optics, Optica - Optical Sensors and Sensing Congress MRS, ACS, SciX, PITTCON, LPM, COLA, EWPC, WPC etc.).
- Senior Editor for the Springer-Nature Journal Applied Physics A.
- Editorial Board Member: Journal of Analytical Atomic Spectrometry, Applied Spectroscopy, Spectrochimica Acta Part B, Frontiers in Chemistry-Analytical Chemistry, Applied Sciences-Optics and Lasers.
- R&D 100 award winner for the development of antifogging coatings for energy saving windows.
- Fellow of the Royal Society of Chemistry.
- Reviewer for multiple science and engineering journals, and for several offices of the US Department of Energy.
- LBNL's Energy Technologies Area Liaison to the Office of National and Homeland Security.
- Extensive track record of leadership and outreach in STEM education and Diversity, Equity & Inclusion.

PROFESSIONAL EXPERIENCE

2023-present	**Physicist Senior Scientist, Lawrence Berkeley National Laboratory**
2015-present	**Group Leader, Laser Technologies Group, Lawrence Berkeley National Laboratory**
2020-present	**Associate Adjunct Professor, Mech. Engr. Dept., University of California, Berkeley**
2017-present	Guest Scientist, Chemistry Division, Los Alamos National Laboratory
2014-present	Career Physicist Staff Scientist, Lawrence Berkeley National Laboratory, Energy Storage and Distributed Resources Division
2012-2014	Career-Track Research Scientist, Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division
2010-2011	Project Scientist, Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division

2008-2010 Postdoctoral Fellow, Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division

RESEARCH AREAS

Next-generation laser spectroscopy for chemical imaging; Fundamentals of ultrafast laser-material interactions; Laser plasmas for elemental & isotopic analysis; Femtosecond laser filamentation for remote sensing; Quai non-diffracting beams; Ultrafast laser diagnostics for the analysis of Li-ion batteries; Femtosecond optical near-field phenomena; Ultrafast laser-based fabrication of novel materials for thermophotovoltaics; Laser fabrication of biomimetic smart superhydrophilic/superhydrophobic/water-repellent and self-cleaning surfaces; Pulsed laser deposition.

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EDUCATION AND TRAINING

Postdoctoral Fellow 2008-2010
Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA.
Environmental Energy Technologies Division
Advisor: Dr. Richard Russo

Ph. D. in Applied Physics (Atomic, Molecular, and Optical Physics-AMO) 2008
- LaserLab Europe – FORTH Ultraviolet Laser Facility, University of Crete, Greece.
  PhD Thesis: Laser micro/nano-structuring of Si: Optical, Electronic and Wetting Properties
  Advisor: Prof. Costas Fotakis
- Visiting Scholar, Laser Zentrum Hannover (LZH), Hannover, Germany 2006
  Advisor: Prof. Boris Chichkov

M. S. in Applied Physics (Microelectronics & Optoelectronics) 2004
LaserLab Europe – FORTH Ultraviolet Laser Facility, University of Crete, Greece.
MS Thesis: Laser structuring of Si for low-threshold field electron emission"
Advisor: Prof. Ioanna Zergioti

B. S. in Physics (Atomic, Molecular, and Optical Physics-AMO) 2002
LaserLab Europe – FORTH Ultraviolet Laser Facility, University of Crete, Greece.
Diploma Thesis: Low-temperature growth of NiMnSb by Pulsed Laser Deposition"
Advisor: Prof. Costas Fotakis

HONORS AND AWARDS

- **Fellow of the Royal Society of Chemistry.**
- 2011 R&D 100 Award for "*Nanostructured Antifogging Coating.*"
- CS-LIBS conference, Best Paper Award (2013).
- Berkeley Lab Emerging Leader Program (2012).
- Outstanding Oral Presentation Award, European MRS Spring meeting (2003).
- Herakleitos award fund for fundamental research (2002-2005).
- Undergraduate Scholarship IESL-FORTH (2000-2002).
- LBNL SPOT award *"in recognition of dedication to community engagement"* (2019)

LIST OF PUBLICATIONS AND PATENTS

As of June 8 2023, 4571 citations, h-index: 34 (Google Scholar)

Publications with >100 citations are underlined

Publications

92. M. Park, Y.Gu, X. Mao, C.P. Grigoropoulos, and V. Zorba, *"Mechanisms of ultrafast GHz burst fs laser ablation*" Science Advances **9**, eadf6397), (2023). https://doi.org/10.1126/sciadv.adf6397
91. X. Mao, J. Chirinos, and V. Zorba, *"Molecular Clocks for Isotopic Analysis*", *In press* Applied Physics A, (2023). https://doi.org/10.1007/s00339-023-06521-4
90. S. Mittelmann, K. Touchet, X. Mao, M. Park, S. Brezinsek, G. Pretzler, and V. Zorba**,** *"Hydrogen Isotope Analysis in W-Tiles using fs-LIBS"***,** Scientific Reports 13, 2285 (2023). https://doi.org/10.1038/s41598-023-29138-2
89. B. Lei, B. Xu, J. Wang, X. Mao, J. Li, Y. Wang, W. Zhao, Y. Duan, V. Zorba, and J.Tang, *"Large modulation of ions' dynamics for discharge-assisted laser-induced breakdown spectroscopy"*, Cell Reports Physical Science 4, 101267 (2023). https://doi.org/10.1016/j.xcrp.2023.101267
88. M. Park, Y. Gu, X. Mao, C.P. Grigoropoulos, and V. Zorba, "Ultrafast ablation dynamics of Cu by single pulse and GHz fs laser bursts," Proc. SPIE 12408, Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XXVIII, 124080I (17 March 2023). doi: 10.1117/12.2664731
87. A. Dopilka, Y. Gu, J. Larson, V. Zorba and R. Kostecki, *"Nano-FTIR Spectroscopy of the Solid Electrolyte Interphase Layer on a Thin-Film Silicon Li-ion Anode"*, ACS Applied Materials & Interfaces15, 5, 6755–6767 (2023). https://doi.org/10.1021/acsami.2c19484
86. C. Fang, A. Dopilka, Y. Gu, V. Zorba**,** R. Kostecki and G Liu, "*Molecular Langmuir–Blodgett Film for Silicon Anode Interface Engineering"* ACS Applied Energy Materials 5 (9), 11655-11661(2022). https://doi.org/10.1021/acsaem.2c02130
85. M. Park, M.M. Balkey, X. Mao, J.C. Jonsson, C.P. Grigoropoulos and V. Zorba**,** *"Mechanisms of graphite ablation by sub-millisecond ytterbium fiber laser pulses"*, Applied Physics Letters 121 (9), 094101 (2022). https://doi.org/10.1063/5.0109618
84. J Schille, JR Chirinos, X Mao, L Schneider, M Horn, U Loeschner, V Zorba, "*Formation of Nano-and Micro-Scale Surface Features Induced by Long-Range Femtosecond Filament Laser Ablation*", Nanomaterials 12 (14), 2493 (2022). https://doi.org/10.3390/nano12142493
83. M. Park, M.M. Balkey, X. Mao, C.P. Grigoropoulos and V. Zorba, *"Spatio-temporal ablation dynamics and plasma chemistry of aluminum induced by temporally modulated ytterbium fiber laser"*, Applied Physics Letters **119** (22), 224103 (2021). https://doi.org/10.1063/5.0076527
82. D. Wu, G.C.-Y. Chan, X. Mao, Y. Li, R.E. Russo, D. Hongbin, and V. Zorba, "*Temporal and spatial study of differently charged ions emitted by ns-laser-produced tungsten plasmas using time-of-flight mass spectroscopy"*, Plasma Science and Technology **23** (9), 095505 (2021). https://doi.org/10.1088/2058-6272/ac08e1
81. J. Chirinos, A. Spiliotis, X. Mao, G.C.-Y. Chan, R.E. Russo and V. Zorba, *"Remote Isotope Detection and Quantification using Femtosecond Filament-Laser Ablation Molecular Isotopic Spectrometry"* Spectrochim. Acta B. **179**, 106117 (2021). https://doi.org/10.1016/j.sab.2021.106117
80. V. Zorba, *"A look back at Rick Russo's inspiring career", Spectrochimica Acta Part B: Atomic Spectroscopy 179, 106140, (2021). https://doi.org/10.1016/j.sab.2021.106140*
79. C. Ramos, D. Chichester, W.J. Kernan, W. Ray, T. Weber, J. Urayama, and V. Zorba, "New Developments for Extended Containment and Surveillance of Safeguarded Materials in Geologic Repositories", Proceedings of the INMM & ESARDA Annual Meeting August 23-26 & August 30-September 1, 2021
78. F. Ma, X. Mao, V. Zorba, R.E. Russo, J. González and C. Du, "*Combination of high-resolution laser-induced breakdown spectroscopy and least square method for reducing soil carbon overestimation due to iron interference",* Geoderma **385**, 114881(2021). https://doi.org/10.1016/j.geoderma.2020.114881
77. Y. Zhu, J.J. Gonzalez, X. Yang, G.C. Chan, X. He, R. Kostecki, X. Mao, R.E. Russo and V. Zorba, "*Calcium fluoride as a dominating matrix for quantitative analysis by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS): a feasibility study*", Analytica Chimica Acta **1129**, 24-30 (2020). https://doi.org/10.1016/j.aca.2020.07.002
76. D. Wu, X. Mao, G.C.-Y. Chan, R.E. Russo, V. Zorba and H. Ding, *"Dynamic characteristics of multi-charged ions emitted from nanosecond laser produced molybdenum plasmas",* J. Anal. At. Spectrom. **35**, 767-775 (2020). https://doi.org/10.1039/C9JA00411D
75. C.S. Busso, J.J. Guidry, J.J. Gonzalez, V. Zorba, L.S. Son, P.J. Winsauer and R.R. Walvekar, *"A comprehensive protein profile analysis of sialoliths"*, Clin Proteom **17:**12 (2020). https://doi.org/10.1186/s12014-020-09275-w.

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73. B.B.S. Jaswal, P.K. Rai, T. Singh, V. Zorba and V.K. Singh, "*Detection and quantification of heavy metal elements in gallstones using X-ray fluorescence spectrometry*", X-Ray Spectrometry **48 (3)**, 178-187 (2019). https://doi.org/10.1002/xrs.3010
72. S. Jung, J. Gonzalez, X. Mao, G. Chan, R. Russo and V. Zorba, "A comparison on several calibration strategies for the determination of manganese contents in low-alloy steel by laser induced breakdown spectroscopy ", Report LBNL-2001242 (2019). https://www.osti.gov/servlets/purl/1577441
71. D. Oropeza, J. González, J. Chirinos, V. Zorba, E. Rogel and C. Ovalles, F. López-Linares, *"Elemental Analysis of Asphaltenes Using Simultaneous Laser-Induced Breakdown Spectroscopy (LIBS)–Laser Ablation Inductively Coupled Plasma Optical Emission Spectrometry (LA-ICP-OES)*", Applied spectroscopy **73 (5),** 540-549 (2019). https://doi.org/10.1177%2F0003702818819497
70. V.K. Singh, D.K. Tripathi, X. Mao, R.E. Russo and V. Zorba "*Elemental mapping of lithium diffusion in doped plant leaves using LIBS"*, Applied spectroscopy **73 (4)**, 387-394 (2018).
69. Y. Lee, X. Mao, G.C.-Y. Chan, J. Gonzalez, R.E. Russo and V. Zorba, "*Spatial and Temporal Distribution of Metal Atoms and their Diatomic Oxide Molecules in Femtosecond Laser-Induced Plasmas"*, J. Anal. Atom. Spectrom. J. Anal. At. Spectrom. **33**, 1875-1883 (2018).
68. J. Song, G.C.Y. Chan, X. Mao, J.D. Woodward, R.W. Smithwick III, T.G. Schaaff, A.C. Stowe, C.D. Harris, R. Zheng, V. Zorba and R.E. Russo, *"Multi-variable Non-linear Spectral Fitting for Uranium Isotopic Analysis with Laser Induced Breakdown Spectroscopy"* Spectrochim. Acta B. **150** 67-76 (2018).
67. R. Hai, X. Mao, G. C.-Y. Chan, R.E. Russo, H. Ding and V. Zorba, "*Internal mixing dynamics of Cu/Sn-Pb plasmas produced by femtosecond laser ablation"*, Spectrochim. Acta B. **148** 92–98 (2018).
66. H. Hou, B. Yang, X. Mao, V. Zorba, P. Ran, and Richard E. Russo, "*Characteristics of plasma plume in ultrafast laser ablation with a weakly ionized air channel"*, Optics Express, **26** 13425 (2018).
65. H. Hou, X.L. Mao, V. Zorba, R. E. Russo, *"Laser Ablation Molecular Isotopic Spectrometry for Molecule Formation Chemistry in fs-Laser Ablated Plasmas",* Anal. Chem. ***89***, 7750–7757 (2017).
64. J. W. Grate, J. J. Gonzalez, M. J. O'Hara, C. M. Niver, D. W. Koppenaal, G. C-Y Chan, X.L. Mao, V. Zorba, R. E. Russo, 2017, *"Solid Matrix Transformation and Tracer Addition using Molten Ammonium Bifluoride Salt as a Sample Preparation Method for Laser Ablation Inductively Coupled Plasma Mass Spectrometry"*, Analyst **142**, 3333 (2017).
63. L Cheng, H Hou, S Lux, R Kostecki, R Davis, V Zorba, A Mehta and M Doeff *"Enhanced Lithium Ion Transport in Garnet-type Solid State Electrolytes",* J. Electroceram. **38**, 168-175, (2017).
62. VK Singh, A Devi, S Pathania, V Kumar, DK Tripathi, S Sharma, D. K. Chauhane, V. K. Singh and V. Zorba, "Spectroscopic investigation of wheat grains (Triticum aestivum) infected by wheat seed gall nematodes (Anguina tritici)", Biocatal Agric Biotechnol. **9**, 58-66 (2017).
61. J Chirinos, D Oropeza, J González, V Zorba and RE Russo, "Analysis of Plant Leaves Using Laser Ablation Inductively Coupled Plasma Optical Emission Spectrometry: Use of Carbon to Compensate for Matrix Effects", Applied Spectroscopy, **71(4),** 709 (2017).
60. Y. Lee, J. Chirinos, J. Gonzalez, D. Oropeza, V. Zorba, X. Mao, J. Yoo, and R. E. Russo, "Laser-Ablation Sampling for Accurate Analysis of Sulfur in Edible Salts" Applied Spectroscopy, **71(4),** 651, (2017).
59. X Mao, GCY Chan, I. Choi, V Zorba and RE Russo "*Combination of atomic lines and molecular bands for uranium optical isotopic analysis in laser induced plasma spectrometry" J Radioanal Nucl Chem **312,** 121 (2017).*
58. L. Bush, V.Zorba, "*Lasers and Optics Interface: Laser Induced Breakdown Spectroscopy (LIBS) at the Submicrometer Scale"*, Spectroscopy **31(6**)*, 14-20 (2016).*
57. C Koral, A De Giacomo, X Mao, V Zorba and RE Russo, *"Nanoparticle Enhanced Laser Induced Breakdown Spectroscopy for Improving the Detection of Molecular Bands*", Spectrochim. Acta B **125**, 11 (2016).
56. U Fittschen, V Zorba, B Igne, R Ostendorf, M Baker, U Karst and SA Asher, "Spectroscopy in Real-World Applications: Current Trends in XRF, LIBS, NIR, QCLs, FT-IR, ICP-MS, and Raman", Spectroscopy 31 (8), 4-12 (2016).
55. G.C.Y. Chan, I. Choi, X. Mao, V. Zorba, O.P. Lam, D.K. Shuh and R.E. Russo, "Isotopic determination of uranium in soil by laser induced breakdown spectroscopy", Spectrochim. Acta B **122**, 31 (2016).
54. X Mao, GCY Chan, V Zorba and RE Russo, *"Reduction of spectral interferences and noise effects in laser ablation molecular isotopic spectrometry with partial least square regression–a computer simulation study",* Spectrochim. Acta B **122**, 75 (2016).
53. I. Barman, M. Baudelet, R.R. Hark, S.J. Rehse, V. Motto-Ros, R. E. Russo, Z. Wang, V. Zorba, "Analysis of the State of the Art: Laser-Induced Breakdown Spectroscopy", Spectroscopy 30, 6 (2015).

52. H. Hou, L. Cheng, T. Richardson, G. Chen, M. Doeff, R. Zheng, R. Russo and V. Zorba, *"Three-dimensional elemental imaging of Li-ion solid-state electrolytes using fs-laser induced breakdown spectroscopy (LIBS)",* J. Anal. At. Spectrom. **30**, 2295-2302 (2015).
51. V. Zorba, X. Mao and R.E. Russo, *"Femtosecond Laser Induced Breakdown Spectroscopy of Cu at the micron/sub-micron scale*", Spectrochim. Acta B **113**, 37 (2015).
50. H. Hou, G.C.-Y. Chan, X. Mao, R. Zheng, V. Zorba, and R. E. Russo, "Femtosecond filament-laser ablation molecular isotopic spectrometry", Spectrochim. Acta B **113**, 113 (2015).
49. B.Y. Cai, X. Mao, H. Hou, V. Zorba, R.E. Russo and N-H Cheung, *"Double-pulse laser ablation sampling: Enhancement of analyte emission by a second laser pulse at 213 nm"*, Spectrochim. Acta B **110**, 51 (2015).
48. H. Hou, G.C.-Y. Chan, X. Mao, V. Zorba, R. Zheng and R. E. Russo, *"Femtosecond laser ablation molecular isotopic spectrometry for zirconium isotope analysis",* Analytical Chemistry **87** (9), 4788 (2015).
47. J.S. Park, L. Cheng, V. Zorba, A. Mehta, J. Cabana, G. Chen, M.M. Doeff, T. J. Richardson, J. H. Park, J-W Son, and W-S Hong, *"Effects of Crystallinity and Impurities on the Electrical Conductivity of Li-La-Zr-O Thin Films"*, Thin Solid Films **576,** 55 (2015).
46. L. Cheng, E.J. Crumlin, W. Chen, R. Qiao, H. Hou, S.F. Lux, V. Zorba, R.E.Russo, R. Kostecki, Z. Liu, K. Persson, W. Yang, J. Cabana, T. Richardson, G. Chen and M. Doeff, *"The origin of high electrolyte–electrode interfacial resistances in lithium cells containing garnet type solid electrolytes"* Phys Chem Chem Phys. **16**, 18294 (2014).
45. H. Hou and V. Zorba, *"3D chemical imaging of Li-ion batteries using femtosecond laser plasma spectroscopy*" OSA Technical Digest, doi:10.1364/CLEO_SI.2014.SF2J.3 (2014).
44. J.R. Chirinos, D.D. Oropeza, J.J. Gonzalez, H. Hou, M. Morey, V. Zorba and R.E. Russo, "*Simultaneous 3-Dimensional Elemental Imaging with LIBS and LA-ICP-MS***",** J. Anal. At. Spectrom 29, 1292 (2014).
43. L. Cheng, J.S. Park, H. Hou, V. Zorba, G. Chen, T. Richardson, J.Cabana, R. Russo and M Doeff, "*Effect of Microstructure and Surface Impurity Segregation on the Electrical and Electrochemical Properties of Dense Al-substituted $Li_7La_3Zr_2O_{12}$*", J. Mater. Chem. A **2,** 172 (2014).
42. V. Zorba, J. Sysdek, X. Mao, R.E. Russo and R. Kostecki, "Ultrafast Laser Spectroscopy of Electrode/Electrolyte Interfaces", ECS Trans. 50 39 (2013).
41. R. E. Russo, X. Mao, J. J. Gonzalez, V. Zorba and J. Yoo *"Laser Ablation in Analytical Chemistry"*, Analytical Chemistry **85**, 6162 (2013).
40. Y. Lu, V. Zorba, X. Mao, R. Zheng and R.E. Russo, *"UV fs-ns Double-pulse Laser Induced Breakdown Spectroscopy for High Spatial Resolution Chemical Analysis"*, J. Anal. At. Spectrom. **28**, 743 (2013).
39. V. Zorba, J. Sysdek, X. Mao, R.E. Russo and R. Kostecki,*"Ultrafast laser induced breakdown spectroscopy of electrode/electrolyte interfaces"*, Appl. Phys. Lett. **100**, 234101 (2012).
38. E.L. Papadopoulou, V. Zorba, E. Stratakis and C. Fotakis, *"Properties of Silicon and Metal Oxide Electrowetting Systems",* J. Adhes. Sci. Technol. **26**, 2143-2163 (2012).
37. J.A. Stolee, B.N. Walker, V. Zorba, R.E. Russo and A.Vertes, *"Laser–nanostructure interactions for ion production"* Phys. Chem. Chem. Phys. **14**, 8453-8471(2012). ***Journal Cover***
36. R.E. Russo, T. W. Suen, A.A.. Bol'shakov, J. Yoo, O.Sorkhabi, X. Mao, J. Gonzalez, D. Oropeza and V. Zorba, *"Laser Plasma Spectrochemistry"* Journal of Analytical Atomic Spectrometry 1596, 26 (2011).
35. V. Zorba, X. Mao and R. E. Russo, *"Ultrafast Laser Induced Breakdown Spectroscopy for high spatial resolution chemical analysis"*, Spectrochimica Acta B-Atomic Spectroscopy **66,** 189 (2011).
34. V. Zorba, X. Chen and S. S. Mao, "Super-hydrophilic TiO_2 surface without photocatalytic activation" Appl. Phys. Lett. **96**, 093702 (2010).
33. V. Zorba, X. Mao and R.E. Russo, *"Optical far- and near-field femtosecond laser ablation of Si for nanoscale chemical analysis"* Analytical and Bioanalytical Chemistry 396**,** 173 (2010).
32. M. Barberoglou, V. Zorba, A. Pagkozidis, C. Fotakis and E. Stratakis, *"Electrowetting on superhydrophobic micro and nanostructured black silicon"*, *Langmuir* **26**, 13007 (2010).
31. E. Spanakis, M. Barberoglou, V. Zorba, P. Tzanetakis, C. Fotakis, *"Metal coated silicon spike cold-electron emitters show improvement of performance with operation",* Appl. Phys. Lett **96**, 033501 (2010).
30. V. Zorba, X. Mao and R.E. Russo, "Laser wavelength effects in ultrafast near-field nanostructuring of Si", Appl. Phys. Lett. **95**, 041110 (2009).
29. E.V. Barmina, M. Barberoglou, V. Zorba, A.V. Simakin, E. Stratakis, C. Fotakis and G.A. Shafeev *"Laser control of the properties of nanostructures on Ta and Ni under their ablation in liquids"*, Journal of Optoelectronics and Advanced Materials **12**, 495-499 (2010).
28. E. L. Papadopoulou, V. Zorba, A. Pagozidis, M. Barberoglou, E. Stratakis and C. Fotakis, *"Reversible wettability of ZnO nanostructured thin films prepared by Pulsed Laser Deposition",* Thin Solid Films 518, 1267 (2009).
27. E. Stratakis, V. Zorba, M. Barberoglou, C. Fotakis and G. A. Shafeev, *"Laser writing of nanostructures on bulk Al via its ablation in liquids"*, Nanotechnology **20** 105303 (2009).

26. E.L. Papadopoulou, M. Barberoglou, V. Zorba, A. Manousaki, A. Pagozidis, E. Stratakis, and C. Fotakis, *"Reversible Photoinduced Wettability Transition of Hierarchical ZnO Structures",* J. Phys. Chem. C **113,** 2891 (2009).
25. E.V. Barmina, M.Barberoglou, V. Zorba, A.V. Simakin, E. Stratakis, C. Fotakis, G. A. Shafeev, *"Surface nanotexturing of tantalum by laser ablation in water"* Qunatum Electronics **39**, 89 (2009).
24. V. Zorba, E. Stratakis, M. Barberoglou, E. Spanakis, P. Tzanetakis and C. Fotakis, *"Biomimetic artificial surfaces that quantitatively reproduce the water repellency of the lotus leaf",* Adv. Materials **20**, 4049 (2008).
23. V. Zorba, E. Stratakis, M. Barberoglou, E. Spanakis, P. Tzanetakis and C. Fotakis,*"Tailoring the wetting response of silicon surfaces via fs laser structuring",* Appl. Phys. A **93,** 819 (2008).
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20. E. Stratakis, V. Zorba, M. Barberoglou, C. Fotakis and G. A. Shafeev *"Femtosecond laser writing of nanostructures on bulk Al via its ablation in air and liquids",* Appl. Surf. Sci., **255**, 5346 (2009).
19. E. Spanakis, J. Dialektos, E. Stratakis, V. Zorba, P. Tzanetakis and C. Fotakis *"Ultraviolet laser structuring of SiC for cold cathode applications",* Phys. Status Solidi I **5**, 3309 (2008).
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16. C. Reinhardt, S. Passinger, V.Zorba, B. N. Chichkov, and C. Fotakis, *"Replica molding of picosecond laser fabricated Si microstructures"*, Appl.Phys.A **87**, 673 (2007).
15. C. Fotakis, M. Barberoglou, V. Zorba, E. Stratakis, E. L. Papadopoulou, A. Ranella, K. Terzaki and M. Farsari, "Applications of ultrafast lasers in materials processing: fabrication on self-cleaning surfaces and scaffolds for tissue engineering", Proc. SPIE 7027, 702702-1 (2008).
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6. E. György, V.S. Theodorescu, I.N. Mihailescu, A. Klini, V. Zorba, A. Manousaki, and C. Fotakis, *"Surface morphology studies of sub-ps pulsed-laser-deposited AlN thin films",* Journal of Materials Research **19**(3), 820 (2004).
5. V. Zorba, A. Klini, E. György, C. Ristoscu, V.S. Theodorescu, I.N. Mihailescu and C. Fotakis, *"Depedence of morphology of AlN thin films on laser irradiation in Pulsed Laser Deposition",* Laser Physics **13**(10), 1325 (2003).
4. C. E. A. Grigorescu, S. A. Manea , M. Mitrea, O. Monnereau, R. Notonier, L. Tortet, R. Keschawarz, J. Giapintzakis, A. Klini, V. Zorba, and C. Fotakis, *"Surface particularities in pulsed laser ablation/deposition of the ferromagnetic alloy NiMnSb"* , Appl. Surf. Sci. **212-213**, 78 (2003).

3. J. Giapintzakis, C. Grigorescu, A. Klini, A. Manousaki, V. Zorba, J. Androulakis, Z. Viskadourakis, and C. Fotakis, "*Pulsed-laser deposition of NiMnSb thin films at moderate temperatures*", Appl. Surface Science **197-198**, 421-425 (2002).
2. J. Giapintzakis, C. Grigorescu, A. Klini, A. Manousaki, V. Zorba, J. Androulakis, Z. Viskadourakis, and C. Fotakis, "*Low-temperature growth of NiMnSb thin films by pulsed-laser deposition*" Appl. Phys. Lett. **80**, 2716 (2002).
1. C. E. A. Grigorescu, O. Monnereau, , S. A. Manea, R. Notonier, A. Klini, V. Zorba, A. Manousaki, J. Giapintzakis C. Fotakis ; *"Stoichiometry issues in pulsed laser deposition of the ferromagnetic alloy NiMnSb",* Proc. SPIE Vol 4762, p. 260 (2001).

Book Chapters

B2. V. Zorba, J. Gonzalez, G. Chan, X. Mao and R.E. Russo, "*Applications of Laser Induced Breakdown Spectroscopy'* in "Encyclopedia of Spectroscopy and Spectrometry, 3rd Edition". Edited by D.W. Koppenaal, Elsevier (2016). ISBN: 9780128032244

B1. E. Stratakis and V Zorba, "*Biomimetic Artificial Nanostructured Surfaces*" in "Nanotechnologies for the Life Sciences: Biomimetic and Bioinspired Nanomaterials" edited by C. Kumar, Wiley-VCH (2010). ISBN: 9783527610419

Patents

P2. *"Anti-fogging and superhydrophilic technology",* S. S. Mao, V. Zormpa and X. Chen, US 9028958 B2 **(R&D 100 award winner)**

P1. "*Method of fabrication of ferromagnetic inter-metallic films*" C. Fotakis, J. Giapintzakis, C. Grigorescu, A. Klini, V. Zorba, WO 2002082479 A1

INVITED/KEYNOTE/PLENARY PRESENTATIONS

*****Invited speaker*** *unless noted otherwise (Keynote, Plenary)*

62. NAWLA 2023 conference, *"Emerging Ultrafast Laser Ablation Technologies for Remote Elemental and Isotopic Analysis"*, (June 2023- Notre Dame, IN)
61. Symposium on Advances in Atomic Spectroscopy, organized by *Spectroscopy* and the Society for Applied Spectroscopy (SAS), *"Elucidating the mechanisms of GHz femtosecond laser ablation for LIBS analysis"* (February 2023).
60. SciX 2022 Conference, *"Femtosecond LIBS Plasmas Induced by GHz Burst Mode Ablation"* (October 2022-Covington, KY).
59. LIBS 2022 International Conference, *"GHz Burst Mode Femtosecond Laser-Induced Plasmas for LIBS Analysis"* (September 2022-Bari, Italy).
58. Optica – 2022 Optical Sensors and Sensing Congress, *"Long-range femtosecond laser propagation for remote sensing of elements and isotopes in solids", June 2022*
57. ICASS 2022 (International Conference on Applied Surface Science), "*Emerging ultrafast laser technologies for elemental and isotopic materials analysis", April 2022.* ***Keynote Speaker***
56. 2022 Winter Conference on Plasma Spectrochemistry, *"Emerging Ultrafast Laser Sampling Approaches in Laser Plasma Spectrochemistry"* (January 2022-Tuscon AZ).
55. WPC 2022 (Winter Conference on Plasma Spectrochemistry), Invited Short Course Organizer, "Laser-Induced Breakdown Spectroscopy (LIBS)" (January 2022-Tuscon AZ).
55. Pacifichem 2021 Conference, "*Developing the next generation of laser ablation-based spectroscopies*, December 2021
54. EMSLIBS 2021 Conference, "*Emerging ultrafast laser ablation technologies for remote elemental and isotopic analysis"*, Gijón (Spain) December 2021. ***Plenary Speaker***
53. CLEO 2021*, "Combination of Femtosecond Filaments and Plasma Spectroscopy for Remote Isotope Sensing in Solids"*, May 2021
52. US DoD/DoE ultrashort pulse laser (USPL) COI colloquium, "Ultrafast laser-induced plasma technologies for nuclear security", April 2021.
51. Analytical Division Colloquium, Department of Chemistry-University of Florida**, "***Remote Sensing with Ultrafast LIBS and LAMIS*", March 2021.

50. JAAS Emerging Investigator Lectureship Online Seminar, "*Ultrafast laser filaments for remote sensing of isotopes in solids*", February 2021.
49. Society of Applied Spectroscopy Seminar, Department of Chemistry, University of Buffalo, "Ultrafast Laser-Matter Interactions in Plasma Spectrochemistry", February 2021
48. Featured session speaker, SciX 2020 Conference, "*Long-range Isotope Detection with Laser Plasma-Based Spectroscopy"*, (held virtually) October 12-15, 2020.
47. LIBS 2020 International Conference, *"Remote Isotope Detection with Femtosecond Filament Laser Ablation Molecular Spectrometry (LAMIS)"*, Kyoto, Japan (held virtually) September 2020.
46. UC Berkeley Nuclear Engineering Colloquium Series, *"Next-Generation Laser Plasma Spectroscopy Technologies for Nuclear Security"*, Berkeley CA (held virtually) September 2020.
45. CLEO 2020 (Conference on Lasers and Electro-Optics) V. Zorba. "*Emerging Femtosecond Laser Sampling Approaches in All-optical Plasma Spectroscopy*," (May 2020-Organized Virtually).
44. 2020 Winter Conference on Plasma Spectrochemistry, *"Emerging Ultrafast Laser Sampling Approaches in Laser Plasma Spectrochemistry"* (January 2020-Tuscon AZ). ***Plenary Speaker***
43. WPC 2020 (Winter Conference on Plasma Spectrochemistry), Invited Short Course Organizer, "Laser-Induced Breakdown Spectroscopy (LIBS)" (January 2020-Tuscon AZ).
42. EWPC 2019 (European Winter Conference on Plasma Spectrochemistry), "*New and emerging femtosecond laser sampling approaches in laser induced breakdown spectroscopy*" (February 2019- Pau, France). ***Keynote Speaker***
41. Material Research Society (MRS) 2018 meeting, "*Direct 3D Elemental Mapping of Li-Ion Batteries Using Ultrafast Laser Ablation Spectroscopy"* (November 2018-Boston, MA).
40. SciX 2018, Special SAS symposium: Past, Present and Future: Celebrating 60 Years of SAS and Spectroscopy Innovations, *"Novel laser ablation sampling technologies in Laser Induced Breakdown Spectroscopy (LIBS)"* (October 2018-Atlanta, GA).
39. SciX 2018, Lester W. Strock Award Symposium, "*Unconventional Ultrafast Laser Beams in LIBS Analysis"* (October 2018-Atlanta, GA).
38. LPM 2018 (19th International Symposium on Laser Precision Microfabrication)) "*Novel Ultrafast Laser Ablation Sampling Approaches in Chemical Imaging"* (June 2018-Edinburgh, Scotland).
37. 2018 ACS (American Chemical Society) Meeting**, "***Novel ultrafast laser ablation sampling technologies in optical emission elemental and isotopic imaging"* (Mar. 2018-New Orleans, LA).
36. PITTCON 2018, "*Femtosecond and Nanosecond LIBS Elemental Imaging: Fundamentals, Applications and New Sampling Approaches"* (Feb. 2018-Orlando, FL).
35. Photonics West 2018, "Three-dimensional elemental imaging of Li-ion batteries using ultrafast laser ablation optical emission spectroscopy" (Jan. 2018-San Francisco, CA).
34. ICALEO 2017 conference (International Congress on Applications of Lasers & Electro-Optics) "*Ultrafast laser ablation 3D chemical imaging of Li-ion batteries"* (October 2017- Atlanta, GA).
33. SciX 2017 conference, *"Femtosecond LIBS with Optical Vortex Beams"* (Oct. 2017-Reno, NV).
32 . SciX 2017 conference "*Ultrafast Laser-Induced Plasma Diffusion and Mixing Processes at Interfaces"* (Oct. 2017-Reno, NV).
31. FORTH-IESL colloquium*, "Ultrafast Laser Ablation Sampling Technologies in Optical Emission Elemental and Isotopic Imaging"* (September 2017-Heraklion, Greece).
30. International Conference on Instrumental Methods of Analysis (IMA) 2017, *"Novel Femtosecond Laser Ablation Sampling Technologies in Optical Emission Spectroscopy"*, (September 2017-Heraklion, Greece).
29. Pittcon 2017 conference, *"Femtosecond Filament-Laser Ablation Molecular Isotopic Spectrometry"*. (March 2017-Chicago IL).
27. SciX 2016 conference, *"Role of Interfacial Plasma Diffusion and Mixing Processes in 3D Chemical Imaging with Femtosecond LIBS"* (September 2016- Minneapolis, MN).
27. SciX 2016 conference, "Femtosecond Filaments in Remote Isotope Analysis" (September 2016- Minneapolis, MN).
26. PIERS 2016 conference, "*Femtosecond Filament Remote Isotope Sensing"* (August 2016-Shanghai, CN).
25. International Conference on Laser Ablation (COLA 2015*), "High-resolution ultrafast laser ablation-based chemical imaging of energy materials"*. (September 2015-Cairns, AU).
24. SciX 2015 conference, "*All-Optical Laser Ablation-based Analytical Techniques: Status, Achievements and Directions*". (September 2015-Providence, RI).

23. EMSLIBS (8th Euro-Mediterranean Symposium on Laser Induced Breakdown Spectroscopy), "*Femtosecond Filament-Laser Ablation Molecular Isotopic Spectrometry",* (September 2015-Linz, AT).
22. Pittcon 2015 conference, "*Ultrafast LIBS for 3D Chemical Imaging"* (March 2015-New Orleans, LA).
21. Julius Springer Forum on Applied Physics 2014 honoring Harry Atwater and Albert Polman, "*Ultrafast laser attogram sampling and characterization of activated surfaces"* (September 2014-Amsterdam, NL).
19. SciX 2014 conference, "*Three-dimensional chemical imaging with femtosecond LIBS" (*October 2014- Reno, NV).
18. CLEO 2014 conference, "*Femtosecond 3D laser plasma spectroscopy chemical imaging of Li-ion batteries" (*June 2014-San Jose, CA).
17. ICSLS 2014 conference, "*Femtosecond Laser Chemical Imaging in Li-ion Battery Systems"* (June 2014-Tullahoma, TN).
14. SciX 2013 conference, "*Ultrafast Laser Induced Breakdown Spectroscopy for 3-Dimensional Chemical Imaging,* (October 2013- Milwaukee, WI).
16. Pittcon 2013 conference, *Nanoscale Plasma Spectrochemistry* (March 2013-Philadelphia, PA).
15. Dr. Steven Chu's Sensors Workshop, *"Lasers zap rocks in earth and on Mars: New DOE sensor technology for science and industry",* Chicago, October 2012 (Invited Poster).
14. FACSS 2012 conference, *High Spatial and Depth Resolution Sampling in Ultrafast LIBS* (October 2012-Kansas City, MO).
13. 3rd International Workshop on Nanoscale Imaging for Energy Applications, *Optical near- and far-field femtosecond laser ablation for nanoscale chemical imaging* (September 2012-Oak Ridge, TN).
12. LPM 2012 (13th Laser Precision Microfabrication Conference), "*Nanoscale Laser Plasma Spectrochemistry"* (June 2012-Washington, DC).
11. 32nd Annual DOE/NNSA Analytical Managers Meeting, "*Laser Ablation Chemical Analysis"* (June 2012-Chicago, IL).
10. 11th International Conference on Laser Ablation "*Laser Induced Breakdown Spectroscopy for High Spatial Resolution Analysis and Isotopic Detection*" (México, November 2011).
9. FACSS 2011 conference "*Ultrafast near- and far-field laser ablation for high spatial resolution chemical analysis* (2-6 October 2011-Reno, NV).
8. Julius Springer Forum on Applied Physics "*Optical far- and near-field ultrafast laser micro/nano structuring and applications"* (October 2010-Stanford, CA).
7. LASERION conference, *Ultrafast near- and far-field laser ablation for nanoscale chemical analysis* (July 2010-Munich, DE).
6. SPIE Photonics West conference "*Optical far- and near-field femtosecond laser micro/nanostructuring and applications"* (January 2010-San Francisco, CA).
5. OSA (Optical Society of America)-Frontiers in Optics conference, "*Ultrafast laser surface micro/nano-structuring and applications",* (October 2009-San Jose, CA)
4. LASERION conference, "*Control of the wetting properties of laser structured Si"* (July 2007-Munich, DE).
3. CLEO Europe conference, "*Tailoring the Optical, Electronic and Wetting properties of Si surfaces by ultrafast laser microstructuring*" (June 2007-Munich, DE).
2. Indiana University, Chemistry Department Seminar "All-Optical Ultrafast Laser Ablation Chemical Imaging" (October 2015-Bloomington, IN).
1. Laser Zentrum Hannover, *Laser Microstructuring of Si: Optical, Field Emission and Wetting Properties* (June 2006-Hannover, DE).

PROFFESIONAL ACTIVITIES

Conference Organization Activities

- **Photonics West 2024** - Elected LASE 2024 Co-Chair (16 conference tracks): https://spie.org/conferences-and-exhibitions/photonics-west/program/conferences/lase
- Program Committee, *"Light-Matter Interactions and Materials Processing"* Symposium, Optical Society of America - Conference on Lasers and Electro-Optics (CLEO) 2023.
- Program Committee, "*Materials Processing with Lasers*" Symposium, Optical Society of America - Conference on Lasers and Electro-Optics (CLEO)/Europe-EQEC 2023

- Organizer, SciX 2022 session "*Applications of Laser Induced Breakdown Spectroscopy*" (October 2-7, 2022)
- Program Committee, "*Nanoscale and Quantum Materials: From Synthesis and Laser Processing to Applications 2022*", SPIE LASE, Photonics West, (22 - 27 January 2022).
- Organizer, 2022 Winter Conference Symposium, "Laser-Assisted Plasma Spectrochemistry" (Jan 17-22, 2022).
- Organizer, SciX 2021 session "*Analytical applications of LIBS*" (26 Sep 2021-1 Oct 2021).
- Program Committee, *"Materials Processing with Lasers"* Symposium, Optical Society of America - Conference on Lasers and Electro-Optics (CLEO)/Europe-EQEC 2021 (June 20-24, 2021).
- **General Chair, 15th International Conference on Laser Ablation (COLA) 2019, Maui-Hawaii, USA (Sept. 8-13, 2019).**
- Conference Co-Chair, 14th International Conference on Laser Ablation (COLA) 2017, Marseille, France (Sept. 3-8, 2017).
- Organizer, SciX 2017 session "*New methods and advancements in LIBS*" (Oct. 8-13, 2017).
- Organizer, Pittcon 2017 Symposium *"Advances in All-optical Plasma Spectroscopy"* (March 4 –9, 2017).
- Organizer, SciX 2015 session "*New hardware and novel methods in LIBS*" (Sept. 27 – Oct. 2, 2015).
- Co-organizer, 2014 MRS Fall Meeting, *"Symposium PP: Advances in Scanning Probe Microscopy for Multimodal Imaging at the Nanoscale"* (Nov. 30-Dec. 5, 2014).
- Organizer, SciX 2014 session "*Protocols and quantitative analysis by LIBS*" (Sept. 28 – Oct. 3, 2014).
- Scientific Program Committee, Photonics West 2011, *"Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM XVI)"* (22-27 Jan., 2011).

Editorial Activities
- **Senior Editor for the journal Applied Physics A (2017-present).**
- Member of the Editorial Board, Journal of Analytical Atomic Spectrometry (2019-present).
- Member of the Editorial Board, Applied Spectroscopy (2020-present).
- Member of the Editorial Board, Spectrochimica Acta Part B (2019-present).
- Review Editor, Frontiers in Chemistry-Analytical Chemistry (2021-present)
- Member of the Editorial Board, Applied Sciences-Optics and Lasers (2021-present)
- Member of the Editorial Board, Applied Physics A (2012-2016).
- Lead Editor, Special Issue "Laser Induced Breakdown Spectroscopy", Applied Spectroscopy (2022)
- Lead Editor, special issue "Current state-of-the-art in laser ablation", Springer Nature journal Applied Physics A (2020).
- Lead Editor, Appl. Phys. A special issue "Laser Ablation: Basics and Applications of a Key Enabling Technology" (2017).
- Co-Editor, 40-year Special Issue "*Short Pulse Laser Diagnostics and Processing of Novel Materials*" in Applied Physics A (2014).
- Co-editor, "*State-of-the-Art Developments in Materials Characterization*" Materials Research Society (MRS) Symposium Proceedings Volume 1754 (2014).
- Co-Editor of the Special Issue: *"Optics and Selective Diagnostics"* in Applied Physics A (2011).

Professional Societies
- **Fellow of the Royal Society of Chemistry (FRSC)**
- Board Member, NASLIBS (North American Society for Laser-Induced Breakdown Spectroscopy).
- Technical Committee, IEEE Nanotechnology Council: Nano-Optics, Nano-Photonics, and Nano Optoelectronics.
- Member, MRS (Materials Research Society).
- Member, Optica (Formerly Optical Society of America).
- Member, ACS (American Chemical Society).
- Member, SAS (Society for Applied Spectroscopy).
- Member, Laser Institute of America (LIA)
- Member, American Association for the Advancement of Science (AAAS).

Journal Reviewer Activities:
Technical reviewer for the following academic journals: Nature, Nature Communications, Scientific Reports, Physical Review Letters, Angewandte Chemie, Optics Express, Electrochimica Acta, Spectrochimica Acta B, Applied Optics, Applied Physics A, Applied Physics B, Optics Materials Express, Applied Surface Science, and Thin Solid Films.

Contributions to STEM, Diversity, Inclusion, Equity & Accountability

1. Diversity & Inclusion Representative for the Editorial Board of the Journal of Analytical Atomic Spectrometry (JAAS). (2019-present)
2. LBNL ETA Diversity & Inclusion Ambassador (2015-2016).
3. LBNL ETA Inclusion, Diversity, Equity and Accountability (IDEA) working group (2016-present).
4. LBNL ESDR IDEA committee (2020-present).
5. Lead of Experimental Demo Development, STEM "Introduce a Girl to Engineering Day (Girl Day)."
6. LBNL Representative, DOE International STEM Teacher Workshop (2016)
7. Mentor for the LBNL Mentoring Program (2014-2017 & 2022-).
8. Ambassador for Science and Berkeley Lab - Solano Stroll (2016-2019).
9. LBNL SPOT award *"in recognition of dedication to community engagement"* (2019).

Recent related speaking & panel engagements:

10. Invited Speaker, UC Berkeley Society of Women Engineers, "*Laser Technologies for Advanced Manufacturing and Chemical Imaging",* November 2020
11. Speaker, Mechanical Engineering Scholars Seminar, UC Berkeley. Aimed to assist *first generation high potential scholars* in the department early enough to create access points for them to do research and get exposure to faculty/research. April 2021
12. UC Berkeley Nuclear Engineering Department, Career Conversations. Aimed at exposing graduate students, undergraduate students, and postdocs to career tracks in the field of laser science, and career opportunities in academia, industry, and national labs (September 2020).
13. Panelist, SciX 2020 conference, "*Ask a Government Scientist (Almost) Anything"*, Focused on educating graduate students on career paths in the national lab system. October 2020.
14. LBNL speaker at ESDR monthly safety pause, presentation on "*Mental health of PhD students"*. Aimed at bringing awareness to mental health challenges that graduate students face and introducing resources at LBNL and UC Berkeley campus (February 2022).