



# LILIANA STAN

Engineering Specialist Senior

Nanofabrication and Devices Group

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## Education

M. S. Electrical Engineering, University of New Mexico

B. S. Physics, University of Bucharest, Romania

## Research interests

- Design and development of functional structures incorporating ferroelectric and piezoelectric thin films for device fabrication and processing-microstructure-property relationship studies.
- Synthesis and characterization of heterostructures and metamaterials for photonic applications.
- Epitaxial growth of complex oxide films using off-axis sputtering.
- Synthesis of dielectric materials using ALD and their applications to nanoscale devices.

## Professional Experience

Argonne National Laboratory - Center for Nanoscale Materials (CNM)  
Engineering Specialist Senior

*2010-present*

- Design and development of structures incorporating functional oxide thin films for device fabrication and processing-microstructure-property relationship studies.
- Scientific contact for CNM user projects performing training, supervision, and guidance to CNM users on thin film synthesis by sputtering and ALD.

Los Alamos National Laboratory - Superconductivity Technology Center  
Scientist

*2006-2010*

- Principal investigator of R&D project leading the design and development of a simplified template for high temperature superconducting (HTS) coated conductors (CC).
- Key contributor in HTS CC technology transfer from the laboratory scale to large scale production.

Los Alamos National Laboratory - Superconductivity Technology Center  
Research assistant

*2000-2006*

- Materials synthesis using physical vapor deposition techniques (sputtering, ion beam assisted deposition (IBAD), e-beam evaporation, pulsed laser deposition).
- Design, characterization, and optimization of multi-layered thin films for HTS CC and for electronic devices.
- Development of biaxially oriented (single crystal-like) thin films on amorphous substrates using IBAD.

"Mircea Eliade" High School, Bucharest, Romania  
Physics teacher

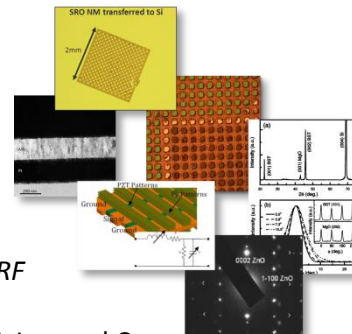
*1990-1997*

## Selected Publications

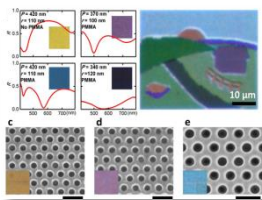
Selected from 50+ publications:

### Complex oxides, ferroelectric and piezoelectric, dielectric materials and functional heterostructures

1. D.M. Paskiewicz, R. Sichel-Tissot, E. Karapetrova, L. Stan, D.D. Fong, *Single-Crystalline SrRuO<sub>3</sub> Nanomembranes: A Platform for Flexible Oxide Electronics*, Nano Letters **16**(1), 534-542 (2016)
2. S. Tong, W. I. Park, Y.-Y. Choi, **L. Stan**, S. Hong, and A. Roelofs, *Mechanical Removal and Rescreening of Local Screening Charges at Ferroelectric Surfaces*, Phys. Rev. Applied **3** (2015)
3. B. M. Farid Rahman, R. Divan, **L. Stan**, D. Rosenmann, L. E. Ocola, and G. Wang, *Tunable Transmission Line with Nano-patterned Thin Films for Smart RF Applications*, IEEE Transactions on Magnetics **50** (2014)
4. C. M. Posada, E. J. Grant, R. Divan, A. V. Sumant, D. Rosenmann, **L. Stan**, H. K. Lee and C. H. Castaño, *Nitrogen incorporated ultrananocrystalline diamond based field emitter array for a flat-panel x-ray source*, J. Appl. Phys. **115**, 134506 (2014)
5. M. Zalazar, P. Gurman, J. Park, D. Kim, S. Hong, **L. Stan**, R. Divan, D. Czaplewski, O. Auciello, *Integration of piezoelectric aluminum nitride and ultrananocrystalline diamond films for implantable biomedical microelectromechanical devices*, Applied Physics Letters, **102** (2013)
6. Q.Q. Meng, R. Zhao, W.W. Li, J. Yang, H. Wang, **L. Stan**, H. Yang, *Ferroelectric properties of epitaxial Bi<sub>3</sub>.15Nd<sub>0.85</sub>Ti<sub>3</sub>O<sub>12</sub> films on SiO<sub>2</sub>/Si using biaxially oriented MgO as templates*, Thin Solid Films, **519** 8023 (2011)
7. B.S. Kang, **L. Stan**, I.O. Usov, J.K. Lee, T.A. Harriman, D.A. Lucca, R.F. DePaula, P.N. Arendt, M. Nastasi, J.L. MacManus-Driscoll, B.H. Park, Q.X. Jia, *Strain Mismatch Induced Tilted Heteroepitaxial (0001) Hexagonal ZnO Films on (001) Cubic Substrates*, Advanced Engineering Materials, **13** 1142 (2011)
8. M. Staruch, **L. Stan**, J.H. Lee, H. Wang, J.I. Budnick, M. Jain, *Magnetotransport properties of Pr<sub>0.5</sub>Ca<sub>0.5</sub>MnO<sub>3</sub> thin films grown by a solution route*, J. of Appl. Phys. **110** 013921 (2011)
9. Suvorova, NA; Usov, IO; **Stan, L**; DePaula, RF; Dattelbaum, AM; Jia, QX; Suvorova, AA; *Structural and optical properties of ZnO thin films by rf magnetron sputtering with rapid thermal annealing*, Applied Physics Letters, **92** 141911-1 (2008)



### Metamaterials for optical applications

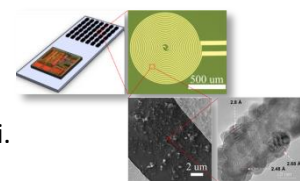


10. F. Cheng, J. Gao, **L. Stan**, D. Rosenmann, D. Czaplewski, and X. Yang, *Aluminum plasmonic metamaterials for structural color printing*, Opt. Express **23**(11), 14552-14560 (2015)

11. H. Deng, Z. Li, **L. Stan**, D. Rosenmann, D. Czaplewski, J. Gao, and X. Yang, *Broadband perfect absorber based on one ultrathin layer of refractory metal*, Opt. Lett. **40**(11), 2592-2595 (2015)

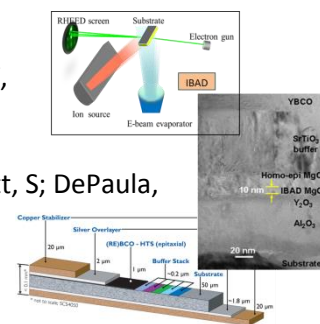
### Carbon nanotubes, Functionalized carbon nanotubes

12. Md Humayun, R. Divan, **L. Stan**, A. Gupta, D. Rosenmann, L. Gundel, P. A. Solomon, I. Paprotny, *ZnO Functionalization of Multi-walled Carbon Nanotubes for Methane Sensing at Single PPM Concentration Levels*, J. Vac. Sci. Technol. B **33** (2015)
13. Y. Zhang, G. Zou, S.K. Doorn, H. Htoon, **L. Stan**, M.E. Hawley, C.J. Sheehan, Y. Zhu, Q.X. Jia, *Tailoring the Morphology of Carbon Nanotube Array: From Spinnable Forest to Undulating Foam*, ACS NANO **3** 2157 (2009)
14. Y. Zhang, **L. Stan**, P. Xu, H-L. Wang, S.K. Doorn, H. Htoon, Y. Zhu, Q.X. Jia, *A Double-layered carbon nanotube array with super-hydrophobicity*, Carbon **47** 3332 (2009)



## Superconductivity

15. M.P. Paranthaman, T. Aytug, **L. Stan**, Q.X. Jia, C. Cantoni, S.H. Wee, *Chemical solution derived planarization layers for highly aligned IBAD MgO templates*, *Supercond. Sci. Technol.* **27** (2014)
16. M.P. Paranthaman, T. Aytug, **L. Stan**, Q. Jia, C. Cantoni, *YBCO-Coated Conductors*, *Applied Superconductivity: Handbook on Devices and Applications*, edited by Paul Seidel, (John Wiley & Sons), Hoboken, NJ, (2015), doi: 10.1002/9783527670635.ch3 - **book chapter**
17. **L. Stan**, Y. Chen, X. Xiong, et al., *Investigation of (Y, Gd)Ba<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> grown by MOCVD on a simplified IBAD MgO template*, *Supercond. Sci. Technol.* **23** 014011 (2010)
18. **L. Stan**, B.W. Tao, T.G. Holesinger, H. Yang, D.M. Feldmann, B. Maiorov, L. Civale, R.F. DePaula, Q.X. Jia, *The role of thermally and chemically stable composite Y<sub>2</sub>O<sub>3</sub>:Al<sub>2</sub>O<sub>3</sub> in the development of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> films on metal substrates*, *Supercond. Sci. Technol.* **23** 045012 (2010)
19. **L. Stan**, D.M. Feldmann, I.O. Usov, T.G. Holesinger, B. Maiorov, L. Civale, R.F. DePaula, P.C. Dowden, Q.X. Jia, *Composite Y<sub>2</sub>O<sub>3</sub>-Al<sub>2</sub>O<sub>3</sub> as diffusion barrier/nucleation layer for HTS coated conductors based on IBAD MgO*, *IEEE Transactions on Applied Superconductivity*, **19** 3459 (2009)
20. J.L. MacManus-Driscoll, A. Kursumovic, J.H. Durell, S. Harrington, S.C. Wimbush, B. Maiorov, **L. Stan**, H. Zhou, T.G. Holesinger, H. Wang, *High I<sub>c</sub> in YBCO films grown at very high rates by liquid mediated growth*, *IEEE Transactions on Applied Superconductivity*, **19** 3180 (2009)
21. **Stan, L**; Arendt, PN; Usov, IO; Wang, H; Foltyn, SR; Maiorov, B; Groves, JR; DePaula, RF; Li, Y; *Engineered reactive cosputtered Sm<sub>x</sub>Zr<sub>(1-x)</sub>O<sub>y</sub> thin films as buffer layers for YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub> coated conductors*, *Journal of Materials Research*, **22** 1082 (2007)
22. Feldmann, DM; Ugurlu, O.; Maiorov, B.; **Stan, L**; Holesinger, TG; Civale, L.; Foltyn, SR; Jia, QX; *Influence of growth temperature on critical current and magnetic flux pinning structures in YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub>*, *Applied Physics Letters*, **91** (2007)
23. Wang, H; Foltyn, SR; Arendt, PN; Jia, QX; MacManus-Driscoll, JL; **Stan, L**; Li, Y; Zhang, X; Dowden, PC; *Microstructure of SrTiO<sub>3</sub> buffer layers and its effects on superconducting properties of YBCO coated conductors*, *J. of Mater. Res.* **19**, 1869 (2004)
24. Arendt, PN; Foltyn, SR; Civale, L; DePaula, RF; Dowden, PC; Groves, JR; Holesinger, TG; Jia, QX; Kreiskott, S; **Stan, L**; Usov, I; Wang, H; Coulter, JY, *High critical current YBCO coated conductors based on IBAD MgO*, *Physica C* **412-414**, 795 (2004)
25. Foltyn, SR; Arendt, PN; Jia, QX; Wang, H; MacManus-Driscoll, JL; Kreiskott, S; DePaula, RF; **Stan, L**; Groves, JR; Dowden, PC, *Strongly coupled critical current density values achieved in YBCO coated conductors with near-single-crystal texture*, *Appl. Phys. Lett.* **82**, 4519 (2003)



## Patents

- No. 8,088,503 *Chemical Solution Deposition Method of Fabricating Highly Aligned MgO Templates*. Paranthaman, MP; Sathyamurthy, S; Aytug, T; Arendt, PN; **Stan, L**; Foltyn, SR
- No. 8,003,571 *Buffer Layers for Coated Conductors*. **Stan, L**; Jia, QX; Foltyn, SR
- No. 7,851,412 *Wide band gap semiconductor templates* Arendt, PN; **Stan, L**; Usov, IO
- No. 7,737,085 *Coated conductors* Arendt, PN; **Stan, L**; Foltyn, SR; Usov, IO; Wang, H
- No. 7,727,934 *Architecture for Coated Conductors* Foltyn, SR; Arendt, PN; Wang, H; **Stan, L**
- No. 7,553,799 *Chemical Solution Deposition Method of Fabricating Highly Aligned MgO Templates*. Paranthaman, MP; Sathyamurthy, S; Aytug, T; Arendt, PN; **Stan, L**; Foltyn, SR