

## PROCESS, SYSTEMS & APPLICATIONS ENGINEER/SCIENTIST

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PRODUCT DEVELOPMENT | STATISTICAL PROCESS CONTROL | APPLICATION ENGINEERING | YIELD IMPROVEMENT | PROJECT MANAGEMENT | DATA MINING  
| QUANTITATIVE ANALYSIS | DATA VISUALIZATION | NANOTECHNOLOGY | CAPITAL SEMICONDUCTOR EQUIPMENT

An increasingly influential thought leader in semiconductor engineering known for intelligence, innovation and hard work. Provided creative energy, problem solving and organizational skill critical to successful product development, commercialization and production yield improvements.

Co-authored more than **20 research papers** published in peer reviewed scientific journals (including such **high impact factor journals** as *Langmuir*, *Nanotechnology*, and *Optics Express*), nine of which as first author, including “Microfluidic hydrothermal growth of ZnO nanowires over high aspect ratio microstructures,” featured as a cover story by *Nanotechnology*.

**Two patents** in the area of microstructured devices for application in solar cells based on zinc oxide nanowires.

### AREAS OF EXPERTISE

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- High-volume semiconductor processing experience includes **Process** and **Application engineering** and development within a 14nm world-class chip manufacturing research facility.
- Qualified and experienced in the **Process Development** of new and modified techniques and methods applied in product manufacturing in semiconductor industry.
- Operations management and sustaining, process control (SPC), continuous process improvement (CIP), design of experiments (DoE), product development, advanced troubleshooting and quantitative analysis experience in a high-volume production environment.
- Have consistent technical and analytical skills and deep understanding of **Semiconductor Processing** and **Characterization** capital semiconductor equipment, with focus on Dry Etch and Photolithography.
- **Research** background spans from computational physics to complex semiconductor nanomaterials to innovative semiconductor devices and biomedical engineering on the border of solid state physics, optics, photonics, nanotechnology, bioimaging and microfluidics.
- **Hands on experience** with full cycle of semiconductor processing and device characterization in research environment.
- **Extensive experience** with characterization methods such as SEM, FIB, EDS, TEM, XRD and others.
- **Photolithography**: full cycle of contact photolithography, process optimization and CD control in research environment on Karl Suss and Quintel aligners. Development, support and CIP of Nikon dry and immersion scanners in HVM.
- **Dry Etch**: RIE and DRIE process optimization and CD control in research environment on Adixen and PlasmaTherm tools, process engineering and ramp\sustaining on Hitachi tools.

### ADVANCED TECHNIQUES QUALIFICATIONS

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- **Characterization**: Fourier Transform Infrared Spectroscopy (FTIR), Visible and UV Reflectance and Transmittance Spectroscopy, Raman Spectroscopy, Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), X-Ray Diffraction Spectroscopy (XRD), Focused Ion Beam (FIB), and Photoluminescence (PL).
- **Growth**: Sputtering, ALD, Electron Beam Evaporation, Thermal Evaporation, CVD, Hydrothermal
- **Etching**: Wet Etch, Deep Reactive Ion Etch, Reactive Ion Etch.
- **IC and MEMS fabrication and characterization techniques**: Profilometry, Ellipsometry, Photolithography, Lift Off, Electron Beam Lithography.
- **Data Analysis**: JMP, JSL scripting, MathCad
- **Programming/modeling/scripting**: JSL, PowerShell, Python, C/C#, Fortran, Bash, LabView, Opti-FDTD, SolidWorks, Coventor, ANSYS

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## PROFESSIONAL EXPERIENCE

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**NOVA MEASURING INSTRUMENTS – Senior Applications Scientist****January 2022 -present**

- Developed optical metrology applications for Nova’s products in semiconductor manufacturing

**NIKON PRECISION INC - Applications Engineer****July 2016 -January 2022**

- Worked with customer to provide Process development support and tool integration and automation in R&D and manufacturing environment. As Subject Matter Expert in Immersion concentrated on Defects and Immersion related issues.
- Provided support for Nikon Scanners performance improvement that is beyond specification or compliance to non-specified condition (CIP).
- Troubleshoot Scanner performance concerns through analysis of log file, test results and customer product or test information.
- Based on analysis or judgment, made recommendations on Scanner performance improvement
- Evaluated new Scanner functions or options

**INTEL CORPORATION - Process Engineer****February 2014 - March 2016**

- Engineered and managed 24/7 module operations at Intel’s primary semiconductor manufacturing facility at Class 10 cleanroom.
- Experience with tool/process matching, characterization, and monitoring volumes of production data using Statistical Process Control (SPC), Design of Experiments (DOE) and Continuous Improvement Process(CIP) methods for defining the process flow and equipment configuration.
- Developed the strategic initiatives to implement process and operation stability, drive quality/yield improvements and efficient manufacturability.
- Responsible for tool preventative maintenance, management of troubleshooting activities, regular monitoring of tool and process performance, defect analysis and reduction.
- Held full project ownership for improvements in safety, yield, cost, and improved manufacturability.

**UNIVERSITY OF SOUTH FLORIDA****August 2005 - December 2013****Post-doctorate Research Scholar, Department of Chemical & Biomedical Engineering**

- Conducted research in optoelectronics, bioengineering and device fabrication.
- Defined equipment and supplies requirements, experimental research workflows, purchasing and installing tools necessary for experiments,
- Responsible for lab safety and compliance to DEH&S requirements.

**Graduate Research Assistant, Department of Mechanical Engineering**

- Conducted research in fields of nano- and microstructures and device fabrication.
- Managed lab operations, including purchasing of necessary equipment and supply materials, compliance to safety standards, and daily operational oversight.

**Graduate Research Assistant, Department of Physics**

- Led the research into molecular dynamics simulations, shock-induced plasticity, and phase transformations.

**INSTITUTE OF SEMICONDUCTOR PHYSICS****September 2002 - May 2005****Engineer**

- Conducted the research and wrote scientific publications in fields of vibrational spectroscopy of periodic semiconductor nanostructures.

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## EDUCATION

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**2009 -2012****Ph.D. in Electrical Engineering GPA 3.84 - *ZnO nanostructures***

University of South Florida, Department of Electrical Engineering, Tampa, FL.

USF is a global research university classified by the Carnegie Foundation for the Advancement of Teaching in the top tier of research universities, a distinction attained by only 2.2 percent of all universities

**2005-2009:****M.Sc. in Applied Physics - *Phase Change memory cells***

University of South Florida, Department of Physics, Tampa, FL.

**1999-2005:****M.Sc./B.Sc. in Semiconductor Physics and Microelectronics - *Vibrational spectra of periodic nanostructures***

Department of Physics, Novosibirsk State University, Russia.

NSU is the **best Russian university** in scientific research efficiency according to QS World University Rankings.

## SELECTED PUBLICATIONS

1. **Mikhail Ladanov**, Surya Cheemalapati, Hao Wang, Yuan Yuan, Piyush Koria, Anna Pyayt, *Plasmono-magnetic material for precise photothermal heating*, RSC Advances, Vol. 8, Issue 5, pp. 2660-2666 (2018)
2. Surya Cheemalapati, **Mikhail Ladanov**, Bo Pang, Yuan Yuan, Piyush Koria, Younan Xia, Anna Pyayt, *Dynamic visualization of photothermal heating by gold nanocages using thermoresponsive elastin like polypeptides*, Nanoscale, Vol. 8, Issue 45, pp. 18912-18920 (2016)
3. **Mikhail Ladanov**, Surya Cheemalapati, and Anna Pyayt, *Optimization of light delivery by a nanowire-based single cell optical endoscope*, Optics Express, Vol. 21, Issue 23, pp. 28001-28009 (2013)
4. **Mikhail Ladanov**, Paula Algarin-Amaris, Garrett Mathews, Manoj Ram, Sylvia Thomas, Ashok Kumar, Jing Wang, *Microfluidic hydrothermal growth of ZnO nanowires over high aspect ratio microstructures*, Nanotechnology, 2013 *Nanotechnology* **24** 375301
5. **Mikhail Ladanov**, Paula Algarin-Amaris, Pedro Villalba, Yusuf Emirov, Garrett Matthews, Sylvia Thomas, Manoj K. Ram, Jing Wang, Ashok Kumar, *Effects of the Physical Properties of Atomic Layer Deposition Grown Seeding Layers on the Preparation of ZnO Nanowires*, Journal of Physics and Chemistry of Solids, **74** (11), 1578-1588, 2013
6. Pedro Villalba, Punya Basnayaka, **Mikhail Ladanov**, Beverly Liriano, Manoj Ram, Subhra Mohapatra and Ashok Kumar (2012), *Cholesterol Biosensor Based on Nanodiamond-Polypyrrole Conducting Nanocomposite Membrane*. MRS Proceedings, 1414, mrsf11-1414-hh02-03 doi:10.1557/opl.2012.428
7. **Mikhail Ladanov**, Manoj K. Ram, Garrett Matthews, Ashok Kumar, *Structure and Opto-electrochemical Properties of ZnO Nanowires Grown on n-Si Substrate*, Langmuir **27** (14), 9012-9017, 2011
8. **Mikhail Ladanov**, Kranthi Kumar Elineni, Manoj Ram, Nathan D. Gallant, Ashok Kumar, Garrett Matthews, *A Resistless Process for the Production of Patterned, Vertically Aligned ZnO Nanowires*, Mater. Res. Soc. Symp. Proc. Vol. 1302, 2011
9. **Mikhail Ladanov**, Manoj Ram, Ashok Kumar, Garrett Matthews, *Novel Aster-like ZnO Nanowire Clusters for Nanocomposites*, Mater. Res. Soc. Symp. Proc. Vol. 1312, 2011
10. McLaughlin, Keith; **Ladanov, Mikhail**; Oleynik, Ivan; Zybin, Sergey; Elert, Mark; White, C. T., *Anomalous elastic response of diamond single crystals to shock compression. American Physical Society, APS March Meeting, March 5-9, 2007, abstract #B21.003*
11. **M. Yu. Ladanov**, A. G. Milekhin , A. I. Toropov, A. K. Bakarov, A. K. Gutakovskii, D. A. Tenne, S. Schulze and D. R. T. Zahn, *Interface phonons in semiconductor nanostructures with quantum dots*, Journal of Experimental and Theoretical Physics **101-3**, 554-561 (2006).
12. A.G. Milekhin, A.I. Toropov, A.K. Bakarov, **M.Yu. Ladanov**, A.K. Gutakovskiy, D. A. Tenne, G. Zanelatto, J. C. Galzerani, S. Schulze, and D. R. T. Zahn, *Phonons in InGaAs/AlGaAs Quantum Dot Superlattices: a Raman study*, Proceedings of 12<sup>th</sup> Int.Conference on Narrow Gap Semiconductors, 3-7 July, 2005, Toulouse, France, invited talk, Institute of Physics Conference Series, eds., J. Kono, J. Leotin (Taylor & Francis, New York) **187**, 99-106, (2006) ISBN 0-7503-1016-2.
13. A.G. Milekhin, **M.Yu. Ladanov**, W.V. Lundin, A.I. Besulkin, A. Smirnov, V.Yu. Davydov, C. Himcinschi, M. Friedrich, and D.R.T. Zahn, *IR reflection of optical phonons in GaN/AlGaN superlattices*, Int.Conference Phonons-2004, St. Petersburg, Russia, 2004, Physica Status Solidi (c), **1**, Issue 11, Pages 2733 – 2736 (2004).
14. A.G.Milekhin, A.I.Nikiforov, **M.Yu.Ladanov**, O.P. Pchelyakov, D.N.Lobanov, A.V.Novikov, Z.F.Krasil'nik, S.Schulze, and D.R.T.Zahn: *Phonons in Ge/Si Quantum Dot Structures: influence of growth temperature*; Physica E, **21** (2-4) pp. 464-468 (2004).
15. A.G.Milekhin, A.I.Toropov, A.K.Bakarov, **M.Yu.Ladanov**, G.Zanelatto, J.C.Galzerani, S.Schulze, and D.R.T.Zahn, *Vibrational spectroscopy of InAs and AlAs Quantum Dot Structures*, Physica E: Low-dimensional Systems and Nanostructures, **21** (2-4) pp.241-246 (2004).
16. A.G.Milekhin, A.I.Toropov, A.K.Bakarov, **M.Yu.Ladanov**, G.Zanelatto, J.C.Galzerani, S.Schulze, D.R.T.Zahn, *Optical Phonons in InAs and AlAs Quantum Dot Structures*, Appl. Surf. Sci. **234**, p. 45 (2004).
17. A.G.Milekhin, A.I.Nikiforov, **M. Yu.Ladanov**, O.P. Pchelyakov, S.Schulze, and D.R.T.Zahn: *Resonant Raman Scattering by strained and relaxed Ge Quantum Dots*, Phys. of Solid State **46**(1) 92 (2004).
18. A.G. Milekhin, A.I. Nikiforov, **M. Yu. Ladino**, O.P. Pchelyakov, D.N. Lobanov, A.V. Novikov, Z.F. Krasil'nik, S. Schulze, and D.R.T. Zahn: *Vibrational spectrum of Ge/Si Structures with Quantum Dot: influence of growth temperature and substrate orientation*; Abstract book of VI Russian Conference of Semiconductor Physics, 27-31 October 2003, p.384
19. A.G. Milekhin, A.I. Nikiforov, **M. Yu. Ladanov**, O.P. Pchelyakov, S. Schulze, D.R.T. Zahn: *Raman Scattering by Strained and Relaxed Ge Quantum Dots*; 10th Seminar of Asia-Pacific Academy of Materials (APAM) 2-6 June, 2003, Novosibirsk, Russia, Proceedings of X Topical Seminar and III Conference "Materials of Siberia" "Nanoscience and technology" devoted to 10<sup>th</sup> anniversary of APAM, Novosibirsk, Russia, **273** (2003)