

Dr. Michael Reznikov,
Retired Scientist (Physics and Technology)

Dr. Michael Reznikov has more than 40 years of interdisciplinary experience in electrodynamics, electrostatics, solid-state and molecular physics, material science, electronics, heat transfer, phase-change processes, energy harvesting and conversion, and related technology processes. At the Ukrainian Academy of Science, he researched photo- and thermoactivated electron field emissions from silicon, and he developed technology for registering emitted charges at dielectric surfaces, for measuring insulation impedance, and for nondestructive testing. His devices for research on material degradation flew on the *Salyut 6* and *7* space stations from 1980 to 1986. At Intramedical Imaging LLC (Santa Monica, USA) from 1999, he designed scintillation-based miniature gamma probes for surgeons. Being with POC (later procured by Mercury Systems) from 2001, Dr. Reznikov served as Principal Investigator or Program Manager and successfully managed several government-sponsored projects by the integration of varied approaches of science and technology:

A) Applying the electrostatics, electrodynamics, and molecular physics, he developed an electrostatic dehumidifier, electrically enhanced dehumidification technology, an electrostatic coalescer for cleaning oil out of bilge water, a differencing electrostatic sensor, and the fast dielectric spectrometry technology applied to the detection of oil in the drilling mud, gauging the thickness and measurement of velocity of moving polymer films, and the detection of hidden object.

B) Utilizing the materials science and molecular physics, he developed the polymer-gel-based thermal detection technology, which was later further expanded to the low temperature thermoelectric power conversion and the thermally driven generation of hydrogen from the water. Using the same proton-conductive polymer, he developed the ionic transistor and built the sensor of electric fields in the sea water.

C) Combining the solid-state physics, electrostatics, and phase-change technology, he developed a silent cooler for UUVs, the vibration-less cooling for adaptive membrane optics, the hybrid electrical machining for polymer composites, and the personal cooling system for soldiers.

D) Applying the electrostatics and electrostatics-based technology, he developed an inertial energy harvester in spin stabilized small- and medium-caliber munitions, self-powered electric incapacitator, and electrostatic power generators for harvesting of wind and wave energy.

E) *Applying the physics of dielectrics to polymer-based composites*, he developed the novel material for high energy density capacitors, a two-photon photocuring for non-autoclave fabrication, a self-developing X-ray film, a capacitive output radiation detector, and a thermo-acoustic refrigerator.

F) *Combining the electrochemistry, molecular physics, and material science*, he developed such diversified devices as a portable capacitive desalinator, a vortex air precleaner, a chilling air jet, a cold plasma decontaminator, an advanced tumbler dryer, and a personal body ventilation system.

Dr. Reznikov received his Ph.D. in physics and mathematics, majoring in solid-state physics, from the Academy of Sciences of Ukraine (1980). He also holds an M.S.E.E. degree with a major in semiconductors and dielectrics from Kiev Polytechnic University, Ukraine (1972).

Dr. Reznikov holds 12 patents, and is the author or co-author of 43 papers and conference presentations. In 1986, he won the Ukrainian State Prize for Sciences and Technology, a highly respected award. He is a member of the American Physical Society (APS), Institute of Electrical and Electronics Engineers (IEEE), and Electrostatics Society of America (ESA). He is a U.S. citizen.

Recent Publications by Dr. Michael Reznikov:

1. M. Reznikov, A. Kolessov, R. Koziol, "Electrohydrodynamic Enforcement in the Heat and Mass Exchange," *Proc. of the ESA/IEG/IEEE-IAS/SFE Joint Conf. on Electrostatics*, P1.20, 2009.
2. M. Reznikov, A. Kolessov, "Space Charge Effects in the Electrolytes," *Proc. of the ESA/IEG/IEEE-IAS/SFE Joint Conf. on Electrostatics*, P2.16, 2009.
3. M. Reznikov, "Electrostatic Approach to Some Nontraditional Electrostatic Applications," *Proceedings of the ESA/IEJ/IEEE-IAS/SFE Joint Conference on Electrostatics 2006*, vol. 1, Laplacian Press, Morgan Hill, California, USA, p. 117, 2006.
4. M. Reznikov, "MEMS Electro-Optical Kelvin Probe," *Proceedings of the ESA/IEJ/IEEE-IAS/SFE Joint Conference on Electrostatics 2006*, vol. 1, Laplacian Press, Morgan Hill, California, USA, p. 147, 2006.
5. M. Reznikov, "Dielectrophoretic Dehumidification of Gas Stream in Low and Moderate Electrical Fields," *Electrostatics Society of America/IEEE, Joint Meeting*, June 2003.
6. M. Reznikov and S. Kobiljansky, "Spectrometry of Lubricant Dielectric Susceptivity: Influence of Lubricant Electrophysical Parameters to Process of Selective Transfer at Friction," *Pro II Intern. Congr. "Protection-95"*, Moscow, p. 146, 1995.
7. M. Reznikov, et al., "Dielectric Properties and Electron Spectra Chinons," *J. of Phys. Chem.*, Moscow, vol. 68, pp. 907-911, 1994.
8. M. Reznikov, S. Romaniji, T. Pleshakova, and L. Kovalenko, "Diagnostic Abilities of Dielectrometry of Prepregs," *Mechanics of Composite Materials*, Riga, N4, pp. 563-566, 1992.

9. M. Reznikov, "The Stability of Silver Clusters at Silver Halide Surface," (Russian), *Progress in Photogr. Sc.*, Moscow: Nauka, vol. XXIV, pp. 143-157, 1986.
10. M. Reznikov, "Coalescence of Silver Atoms on the Surface of a Silver-Halide Crystal in an Electric Field," *J. Inform. Recording Materials* (Berlin), no. 5, pp. 303-309, 1985.
11. M. Reznikov, "Electrotopographic Effect of Photoemulsions and Application of Them," (Russian), *Transact. of Physical Inst. of Academy of Sc. of USSR*, vol. 129, pp. 13-65, 1981.
12. M. Reznikov, P. Williams, "Corona Discharge in the Steam for Electrostatically Enforced Condensation," Proc. 2012 Electrostatics Joint Conference (ESA, IEJ, IEEE-IAS, SFE), Cambridge, Ontario, Canada, June 12–14, 2012.
13. M. Reznikov, "The Electrostatically Enforced Condensation Related to Effects of the Corona Discharge," Proc. 2012 Annual Meeting of the Industrial Applications Society of IEEE (Las Vegas, NV, Oct. 7–11, 2012), Session #23, Electrostatic Processes I, presentation 2012-EPC-321, 2012.
14. M. Salazar, K. Minakata, M. Reznikov, "Electrospray as an Enforcement of Steam Condensation," In proceeding of: ESA Annual Meeting on Electrostatics 2013
15. M. Reznikov, "Electrically enforced condensation related to effects of the corona discharge," In proceeding of: 2012 IEEE IAS
16. M. Reznikov, P. Wilkinson, "The electric power generation at low temperature gradients," In proceeding of: IEEE IAS 2012
17. M. Salazar, F. Richey, Y. Elabd, M. Reznikov, "The further improvement of the ionic thermoelectric generator," In proceeding of: Industry Applications Society Annual Meeting, 2013 IEEE
18. Ann M. Deml, Annette L. Bunge, Michael A. Reznikov, Alex Kolessov, Ryan P. O'Hayre, "Progress toward a solid-state ionic field effect transistor," *Journal of Applied Physics*, 04/2012; 111(7). DOI:10.1063/1.3702442
19. M. Reznikov, "Thermoelectric Power by the Diffusion of Protons in a Nanoporous Structure," *MRS Proceedings* 12/2010; 1325. DOI:10.1557/opl.2011.1116
20. A. E. Kravtsov, V. I. Pipa, M. A. Reznikov, M. V. Fok, "The nature of electrosensitivity of photographic emulsion layers," *Zhurnal Nauchnoi i Prikladnoi Fotografii i Kinematografii* 05/1977; 22:186-195.
21. M. Reznikov, P. Wilkinson, "Electric Power Generation at Low Temperature Gradients," *IEEE Transactions on Industry Applications*, Vol. 50, Issue 6, pp. 4233 – 4238, 2014.
22. M. Reznikov, "Electrically enhanced condensation I: Effects of corona discharge," *IEEE Transactions on Industry Applications*, Vol. 51, Issue 2, pp. 1137-1145, 2015
(Early access link <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6894554>).
23. S. Salazar, K. Minakata, M. Reznikov, "Electrically enhanced condensation II: Effects of the electrospray," *IEEE Transactions on Industry Applications*, Vol. 51, Issue 2, pp. 1146-1152, 2015
(Early access link <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6868229>).
24. M. Salazar, F. Richey, Y.A. Elabd, M. Reznikov, "The further improvement of the ionic thermoelectric generator," *IEEE Transactions on Industry Applications*, Vol. 51, Issue 2, pp. 1132-1136, 2015
(Early access link <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6857405>).

25. M. Reznikov, A. Kolessov, R. Koziol, "Electrohydrodynamic Enforcement of Evaporation and Gas Flow," IEEE Transactions on Industry Applications, Vol. 47 , Issue 2, pp. 1036-1042, 2011.
26. M.Reznikov, M.Salazar, M.Page, M. Rivera-Sustache, "Further Progress in the Electrostatic Nucleation of Water Vapor", Proceedings of the 2016 Electrostatics Joint Conference, June 13-18, 2016, Purdue University, 9 p., 2016 (access link <http://www.electrostatics.org/images/B2.pdf>)
27. M.Reznikov, M.Salazar, M.Page, M. Rivera-Sustache, "Further Progress in the Electrostatic Nucleation of Water Vapor", IEEE Transactions on Industry Applications, Vol. 54, Issue: 1, pp. 591-598, 2018