

Galyna V. Shustakova

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SUMMARY: Extensive R&D experience as engineer, scientist and group leader in designing, characterization and application of low temperature (super- and semi-conducting) infrared detectors and thermal imaging systems. Extensive expertise in low temperature experiments.

EDUCATION:

M.S. State Diploma in Cryogenic Technique, Physical Technical Department, Kharkov Polytechnic Institute (now National Technical University "Kharkiv Polytechnic Institute"), Ukraine, 1977

PROFESSIONAL EXPERIENCE:

2010-present: Leading engineer, Junior Researcher, Department of Superconducting and Mezzoscopic Structures (LTPE).

Actively participated in developing novel infrared imaging systems and thermal diagnostic methods for the Projects supported by NAS of Ukraine:

- (2011). *"Thermal field analyzer for scientific research"*.
- (2011) *"The hardware-software system for remote heat loss maps registration of heat power engineering objects for the purpose of energy-saving technology optimization"*.
- (2014) *"Thermal imaging system for medical applications and thermal imaging methodological procedure for the quantitative analysis of the dynamics of anomalous thermal field of human"*.
- (2016) *"Creating of the infrared diagnostic complex and the methods for the detection of the defects of composite elements of aircraft and its equipment"*.

2008-2009: Sr. Research Technologist, Biological Sciences Division, University of Chicago, The Researching Visitor, Materials Science Division, Argonne National Laboratory, USA.

- Adjusted and calibrated experimental infrared imaging system, studied the abnormal thermal fields of cancer patients treated with chemoradiotherapy to predict severe side effects. Project "Pilot Study of Functional Infrared Imaging for Early Detection of Mucositis in Locally Advanced Head and Neck Cancer Treated with Chemoradiotherapy" funded by US National Science Foundation.
- Participated in collaborative team for developing of polarization sensitive Transition Edge Sensors (TES) Bolometer Detector for CMB B-pol Measurement.

2003-2007: Group Leader, Department of Superconducting and Mezzoscopic Structures (LTPE)

Deployed infrared diagnostic methods to industry and medicine, studied thermal imaging metrology aspects and sensitivity limits. Took an active part in 6 projects supported by NAS of Ukraine.

8/2005-12/2005: Visiting scientist, Materials Science Division, Argonne National Laboratory, USA:

- Developed experimental setup for imaging over a broad spectral range based on laser activation of superconducting microbolometers (Project: "High-Sensitivity Infrared Imagers for Environmental and Energy Security/Safety Monitoring" funded by US Department of Energy)
- Characterized spatial sensitivity and noise of YBCO bolometer arrays.

1997-2003, Researcher, Scientific and Technical Center "Cryonics" at ILTPE.

- Tested and characterized infrared detectors and IR imaging systems.
- Developed and prototyped various IR imaging systems, based on liquid-nitrogen cooled single-pixel and one dimension (linear) array HgCdTe detectors with optical-mechanical scanning.
- Developed and investigated IR non-destructive diagnostic methods and metrology aspects.

1989-1996, Junior Researcher, Department of Superconducting Electronics (LTPE)

Investigated the possibility to use high temperature superconducting materials for IR detector:

- measured transport, noise, spectral and detecting properties of HTSC thin film structures;
- developed, fabricated and characterized *HTSC* thermal detectors;

- designed cryogenic and optical components.

1980-1989: Senior Engineer, Special Research and Development Bureau for Cryogenic Technologies at ILTPE.

- Researched transport, optical, noise and detecting properties of low temperature superconducting thin films and semiconducting structures.
- Designed and fabricated bolometric elements based on low temperature superconducting structures.

1977- 1980: Engineer, Department of Superconducting Electronics (LTPE)

- Studied Jozephson effect in superconducting structures (point contacts).
- Measured transport, noise and detecting properties of one-dimensional crystals.

MEMBERSHIPS, GRANTS and AWARDS:

Ukraine Physical Society,

Grant of International Science Soros Foundation (1992),

Grants of State Department of Science and Technology of Ukraine (1997, 1999)

PUBLICATIONS: 70 publications, including: 32 - articles in scientific journals, 17 - articles in conference proceedings, 13 - abstracts of conferences, 8 - inventors' certificates.

Languages: Russian, Ukrainian, English

SELECTED PUBLICATIONS:

1. **Nondestructive Testing of Composite Materials of Aircraft Elements by Active Thermography.** E.Yu. Gordiyenko, N.I. Glushchuk, Yu.V. Fomenko, G.V. Shustakova, I.I. Dzeshulskaya, and Yu.F. Ivanko. // Sci. innovation 14(2): 37 (2018).
2. **The Results of the Study of Human Anomalous Thermal Fields under Irradiation.** N.I. Glushchuk, E.Yu. Gordiyenko, Yu.V. Fomenko, G.V. Shustakova, L.G. Miroshnichenko and N.N. Kolotilov / Sci. innovation 13(2): 43 (2017).
3. **Study of Functional Infrared Imaging for Early Detection of Mucositis in Locally Advanced Head and Neck Cancer Treated With Chemoradiotherapy.** E. Cohen, O.Ahmed, M. Kocherginsky, G. Shustakova, E. Kistner-Griffin, J. Salama, V. Yefremenko, V. Novosad // Oral Oncology 49(10), 1025 (2013).
4. **Thermal Imaging System Based on a High Temperature Superconductor.** E.Yu. Gordiyenko, G.V. Shustakova, Yu.V. Fomenko, N.I. Glushchuk // Instruments and Experimental Techniques 56(4), 485 (2013).
5. **A Multi-element Thermal Imaging System Based on an Uncooled Bolometric Array.** E. Yu. Gordiyenko, N. I. Glushchuk, Yu.Ya. Pushkar, Yu.V. Fomenko, G. V. Shustakova // Instruments and Experimental Techniques 55(4), 494 (2012).
6. **A Broadband imaging system for research applications.** V.Yefremenko, V.Novosad, A.Datesman, J.Pearson, S.Bader, E.Gordiyenko, G.Shustakova, Yu.Fomenko. Review of Scientific Instruments 80, 056104 (2009).
7. **Optically activated high Tc superconducting microbolometer.** V.Yefremenko, E.Gordiyenko, G.Shustakova, S.D.Bader, G.Karapetrov, V.Novosad // Journal of Physics: Conference Series 43, 1342 (2006).
8. **Superconducting microbolometer with controllable coordinate sensitivity: an alternative approach to FPA design.** V. Yefremenko, E.Gordiyenko, G.Shustakova, S.D.Bader, V.Novosad // Infrared Technology and Applications XXXI, Proc. SPIE 5783, 967 (2005).
9. Observation of a non-ohmic component of spontaneous conductivity fluctuations in $YBa_2Cu_3O_{7-x}$ thin films. A.P. Brodyanskii, I.M. Dmitrenko, A.S.Garbuz, V.G.Efremenko, Yu.A.Klimovskii, A.V.Fomin, G.V.Shustakova, A.I.Erenburg // Low Temp. Phys. 21(3), 271 (1995).
10. **Bolometric and noise properties of HTSC structures.** B.B.Banduryan, S.V.Gaponov, I.M.Dmitrenko, V.G.Efremenko, Z.F.Krasilnik, A.Yu.Klimov, V.Yu.Lavreshin, D.G.Pavel'ev, A.Yu.Churin, G.V.Shustakova // Soviet Journal of Low Temperature Physics 16(1), 36 (1990)