

University	Saint Petersburg Electrotechnical University "LETI"
Level of English language proficiency	Advanced
The direction of training for which the graduate student will be accepted	Optical and Optoelectronic Devices and Systems Optical and Optoelectronic Devices and Systems Radioengineering, Including Television Systems
Code of the field of study for which the graduate student will be accepted	12.06.01 (2.2) 11.06.01 (2.2)
List of research projects of a potential supervisor (participation/guidance)	<p><u>Principle investigator</u></p> <p>2020 - R&D project "Investigation of Artificial Intelligence Technologies for Application in Laparoscopy Tasks" <i>according to contract with "InTheSmart" Co. Ltd (Republic Korea) and Seoul National University Hospital (SNUH)</i>;</p> <p>2019 - R&D project "Observer Dependent Color Imaging Workflow based on human eye perception model" <i>according to contract with "Huawei Technologies" Co. Ltd;</i></p> <p>2019 - R&D project "The Development of the Endoscopy Medical Image Analysis and Visualization Technology" realized <i>according the contract with Korean electro technological research institute (KERI)</i>;</p> <p>2018 - R&D project "The Development of the Endoscopy Medical Image Analysis Technology" realized <i>according the contract with Korean electro technological research institute (KERI)</i>;</p> <p>2016-2017 - R&D project "Computer aided image processing for endoscopy " realized <i>according to contract "LETI" with Korean electro technological research institute (KERI)</i>;</p> <p>2017 - 2019 - <i>Grant from Russian Foundation for basic research. Grant № 17-07-00045 «Methods of spatialtemporal signals processing and analysis in expert-consulting systems of medical diagnostics (systems for supporting clinical solutions)»;</i></p> <p>2015 - 2016 - <i>Grant from Russian Foundation for basic research. Grant № 15-07-00188 «Automatic methods of image analysis and processing in the television system for cervical cancer diagnosis»;</i></p> <p>2017 – 2018 The Long Term Grant from the Russian Innovation Support Foundation "Multispectral complex for PDT monitoring";</p> <p>2016 - 2018 R&D project "Mobile systems for documents</p>

	<p>verification” <i>according to the contracts with company “Mobile Inform Group” Co. Ltd (Russia)</i></p> <p><u>Senior researcher</u> 2016 - 2019 R&D project “AVR-PasCounter Software (Artificial Intelligence Solutions for Transport)” <i>according to the contracts with company “Infotech”. Co. Ltd (Russia)</i>; 2017-2019 R&D project “Development of a complex for passive detection, identification and suppression UAV to counter terrorist threats” according to State Program "Research and development in priority areas of development scientific and technological complex of Russia for 2014-2020"; 2019 - R&D project “Development of hyperspectral complex prototype for agriculture <i>according to the contracts with company “A3B5”. Co. Ltd (Russia)</i></p>
<p>List of possible research topics</p>	<ol style="list-style-type: none"> 1. Processing, visualization and analysis of multispectral and hyperspectral images in medical decision support systems: <ul style="list-style-type: none"> • colposcopy, • endoscopy, • lapraroscopy, • fundus analysis. 2. Smart technologies for image formation and processing, in particular a personalized conveyor for a smartphone camera.
	<p><u>Research Focus:</u> Computer vision and video analytics, machine learning and digital image processing, AI video systems and decision support systems (From 2009 digital processing of medical image, images processing and analysis in clinical decision support system (CDSS)). Smart imaging technologies (color constancy, image personalization)</p> <hr/> <p><u>Research highlights:</u> Opportunity to learn advanced digital image processing, machine learning and data mining.</p> <hr/> <p><u>Specific requirements:</u> Understanding digital image processing, machine learning, data mining and principles of modern video sensors. Experience in C / C++ / Matlab / Python sufficient to implement and run different algorithms of image processing</p>



Research supervisor:
Nataliia A Obukhova

2009 – Doctor of Science Degree from St. - Petersburg Electrotechnical University “LETI”. Russia. The thesis title is “ Methods of video observation, segmentation and tracking for moving objects”.

1996 - Ph.D Degree from St. - Petersburg Electrotechnical University “LETI”. Russia. The thesis title is “ Automatic estimation of TV system parameters”.

and machine learning tasks

Skills in OpenCV, OpenGL, etc

Skills in TensorFlow, Caffe, Keras

Working knowledge of English sufficient for scientific discussions and preparation of technical reports / publication drafts

PUBLICATIONS

A complete list of publications contains over 130 items: among them books, articles, conference papers and text books. 14 Russian invention certificates for application programs. IEEE member (from 2016).

THE MAIN PUBLICATIONS:

1. N Obukhova, A Motyko, A Pozdeev. Chapter «Methods of Endoscopic Images Enhancement and Analysis in CDSS,» in Intelligent Systems Reference Library, vol. 175, «Computer Vision in Control Systems -5: Advanced Decisions in Technical and Medical Applications», Springer, 2020, pp. 225-264, (Scopus, Web of Science)
2. N Obukhova, A. Motyko, A Pozdeev. Chapter «Two-Stage Method for Polyps Segmentation in Endoscopic Images» in Intelligent Systems Reference Library, vol. 186, «Computer Vision in Control Systems - 6 : Advances in Practical Application», Springer, 2020, pp. 93-105, (Scopus, Web of Science)
3. N. Obukhova, A. Motyko. Chapter « Image Analysis in Clinical Decision Support System» in Intelligent Systems Reference Library, vol. 136, «Computer Vision in Control Systems – 4: Real Life Application», Springer, 2018, pp. 261-297
4. N Obukhova, A Motyko, P Baranov «Synthesis and analysis of multispectral images in CCTV Systems»/ SPb LETI 2016 -170p MAIN ARTICLES (2015-2020)
5. Obukhova N.A., Motyko A.A. , Pozdeev A.A. (2019). Algorithms for Real-Time Endoscopy Image Processing Pipeline in Clinical Decision Support Systems. International Journal of Embedded and Real-Time Communication Systems (IJERTCS), 10(4), pp. 39-59. (Scopus)
6. Obukhova N.A., Motyko A.A., Pozdeev A.A. Research and development of methods for endoscopic (medical) images enhancement. Journal of the Russian Universities. Radioelectronics. 2019;22(2):22-30. (In Russ.)

	<p>https://doi.org/10.32603/1993-8985-2018-22-2-22-30 Russian Index Science Citation</p> <p>7. Obukhova N.A., Motyko A.A., Pozdeev A.A., Timofeev B.S. «Method of Endoscopic Images Analysis for Automatic leading Detection and Segmentation», Proc. of the 24th Conference of Open Innovations Association FRUCT (Finnish-Russian University Cooperation in Telecommunication) and ISPIT, April 2019, pp. 285-290. (Scopus)</p> <p>8. Obukhova N.A., Motyko A.A., Pozdeev A.A. «Automatic analysis of endoscopic images for polyps detection and segmentation», Proc. of the IEEE Russia North West Section Russia Young Researchers, 2019, Jan 2019, pp. 1216-1220. (Scopus)</p> <p>9. Obukhova N.A., L. I. Ivanov, P.S Baranov «Review of Modern UAV Detection Algorithms Using Methods of Computer Vision», Proc. of the IEEE Russia North West Section Russia Young Researchers, 2020, Jan 2020, (Scopus)</p> <p>10. Obukhova N.A., Motyko A.A., Pozdeev A.A. "Endoscopic images digital processing for clinical decision support system" Journal of the Russian Universities. Radioelectronics. 2018 №6 pp 54-65. Russian Index Science Citation</p> <p>11. N.A. Obukhova, A.A. Motyko , A.A. Pozdeev Review of Noise Reduction Methods and Estimation of their Effectiveness for Medical Endoscopic Images Processing, Proceedings of the 22th IEEE Finland Section Conference of Open Innovations Association FRUCT, 15-18 May, University of Jyvaskyla, Jyvaskyla, Finland, 2018, p. 204-210 (Scopus)</p> <p>12. N. Obukhova, A. Motyko «Image processing in clinical decision support system», "Proceeding of the IEEE Russia North West Section", 2017,pp775-779(Scopus).</p> <p>13. N. Obukhova, A. Motyko «Automated Image Analysis in Multispectral System for Cervical Cancer Diagnostic» "Proceeding of Conference of Open Innovations Association FRUCT (Finnish-Russian University Cooperation in Telecommunication) and ISPIT", 2017, pp 346-351(Scopus).</p> <p>14. N. Obukhova, A. Motyko, A. Pozdeev «Modern Methods and Algorithms in Digital Processing of Endoscopic Images» "Proceeding of Conference of Open Innovations Association FRUCT (Finnish-Russian University Cooperation in Telecommunication) and ISPIT",2017, pp 260-267(Scopus).</p> <p>15. N. Obukhova, A. Motyko, A. Pozdeev "Multispectral clinical decision support system for diagnosis of oncological changes in the cervix."// BioTechnoSphera №2, 2017, pp 47-58 Russian Index Science Citation</p>

Selected Inventions:

"Software of CDSS " RON-Colpo "for processing and analysis of colposcopic images obtained in fluorescence and white light". Certificate 2018662489 of Federal service intellectual property;

"High-performance camera color calibration procedure" Certificate 2019617464 of Federal service intellectual property;

"Software for automatic segmentation and tracking of moving objects in videodata." Certificate 2018662489 of Federal service intellectual property.