

Lighting Research Group

Keywords: biophotonic technologies; antibacterial photoinactivation; natural photosensitizers;



Research group activities

Vilnius University aims to establish itself as a regional hub of expertise for space-related R&D at certain fields of interest through collaboration between academia and industry.

- Optimization and application of LEDs and their systems for general and niche applications.
- Biophotonic light applications, such as greenhouse lighting, medical lighting, and for the control of bacteria biofilms and microfungi.
- Development and research of novel and safe antimicrobial strategies against resilient microbial forms: biofilms, spores.
- Antimicrobial strategies that are being researched and developed: antimicrobial photoinactivation, antibacterial ribosomally synthesized peptides (bacteriocins), biofilm quorum-quenching (QQ) enzymes and other QQ compounds.



Proposal

Looking for industrial and/or academic partners with space-related experience for collaboration in interdisciplinary fields of life sciences, biophysics, optoelectronics, wide-bandgap semiconductors etc.



Meet our team

Prof. dr. Pranciškus Vitta

Doc. dr. Alisa Gricajeva

Dr. Irina Buchovec





Research outcomes

- Inactivation of Gram (–) bacteria *Salmonella enterica* by chlorophyllin-based photosensitization: Mechanism of action and new strategies to enhance the inactivation efficiency, I. Buchovec, V. Lukseviciūtė, R. Kokstaite, D. Labeikyte, L. Kaziukonyte, J. Photochem Photobiol. B. 172, 1-10, 2017.
- Antimicrobial Photoinactivation Approach Based on Natural Agents for Control of Bacteria Biofilms in Spacecraft, I. Buchovec, A. Gricajeva, L. Kalėdienė and P. Vitta, Int. J. Mol. Sci. 21, art.no. 6932, 2020.
- Riboflavin- and chlorophyllin-based antimicrobial photoinactivation of *Brevundimonas* sp. ESA1 biofilms, A. Gricajeva, I. Buchovec, L. Kalėdienė, K. Badokas, P. Vitta, Front Cell Infect Microbiol. Sep 21;12:1006723, 2022.
- Investigation of amino acids related to *Staphylococcus saprophyticus* AG1 EstAG1 carboxylesterase catalytic function revealed a new family of bacterial lipolytic enzymes, A. Gricajeva, L. Kalėdienė. Int J Biol Macromol. 235:123791, 2023.



Resources

Light source characterization system with integrating sphere, spectrometer, power supply and temperature control; CamScan Apollo 300 electronic microscope/Scanning electron microscope (SEM) HITACHI SU8230; Optical fluorescence microscope Olympus BX51; UV-VIS-NIR spectrometer Perkin Elmer Lambda 950; Raman spectroscopy and more.



Contacts

Prof. dr. Pranciškus Vitta
E-mail: pranciskus.vitta@ff.vu.lt

More about the faculty: <https://www.ff.vu.lt/en/>

Department for Research and Innovation
E-mail: innovations@vu.lt

More information: <https://www.vu.lt/en/business>