LATVIJAS UNIVERSITĀTE
ATOMFIZIKAS UN SPEKTROSKOPIJAS INSTITŪTS

Biofotonikas laboratorija 2023

08.02.2024.

Pamatsastāvs-2023 (bold: Dr)

1. Anna Bērziņa
2. **(-) Aleksandrs Derjabo 09.09.**
3. **Sigita Kazūne**
4. Māris Kuzminskis
5. **Zbigņevs Marcinkevičs**
6. **Aleksejs Miščuks**
7. Daira Viškere
8. Mikus Melderis
9. **Jānis Liepiņš**
10. Studenti (5+)

1. **Cugmas Blaž**
2. **Grabovskis Andris**
3. **Kviesis-Kipge Edgars**
4. Laņģe Marta
5. **Ļihačova Ilze**
6. **Ļihačovs Aleksejs**
7. **Lukinsone Vanesa**
8. **Ošiņa Ilze**
9. Ploriņa Emīlija Vija
10. **Rubīns Uldis**
11. **Saknīte Inga**
12. **Spīgulis Jānis**
13. **Tamošiūnas Mindaugas**

PLE = 16.11
(2022: 17.9)

(+ Inga, Līga, Liene, Dace,Jeļena)

Studējošie, 2023.g.

- Bak. studējošie – S.Apaļka, FMOF; S.Kistkins, MF; K.Sauļus, MF
- Maģ. studējošais (1/2g.) – M.Melderis, BF
- Rezidenti – A.K.Krieviņa, E.Vasilišina, M.Briuks, K.Putka, K. Pētersons, E.Vasiļjevs
- Doktoranti (+ I.Balmages, RTU)

→ E.V.Ploriņa, "Biofotonikas metodes reto ādas slimību novērtēšanai" (LU, I.Ļihačova).

→ D.Viškere, «Biofotonikas iekārtu pielietojums ādas un zemādas struktūru un morfoloģijas novērtēšanai suņiem un kaķiem» (LLU, līdzvadītājs Blaž Cugmas)

Aizstāvēts maģistra darbs:

M.Melderis, "Jauno dzelzs oksīda/cinka oksīda un dzelzs oksīda/titāna dioksīda kodola un apvalka nanošķiedru raksturojums un bioloģiskā aktivitāte"

Aizstāvēti diplomdarbi un bakalaura darbi:

- A.K.Krieviņa, «ENDOSKOPISKO ATTĒLU KRĀSU ANALĪZE DEGUNA GĻOTĀDAS SLIMĪBU OBJEKTĪVAI DIAGNOSTIKAI», MF DD
- P.Lauska, «Novecošanās pazīmju novērtējums ar attēlveides fotopletizmogrāfiju asinsrites sistēmā», BF BD
- B.Baļļa, «Kapilāru pildīšanās laika izraisīto izmaiņu raksturojums jaunām veselām izmeklējamām personām, BF BD

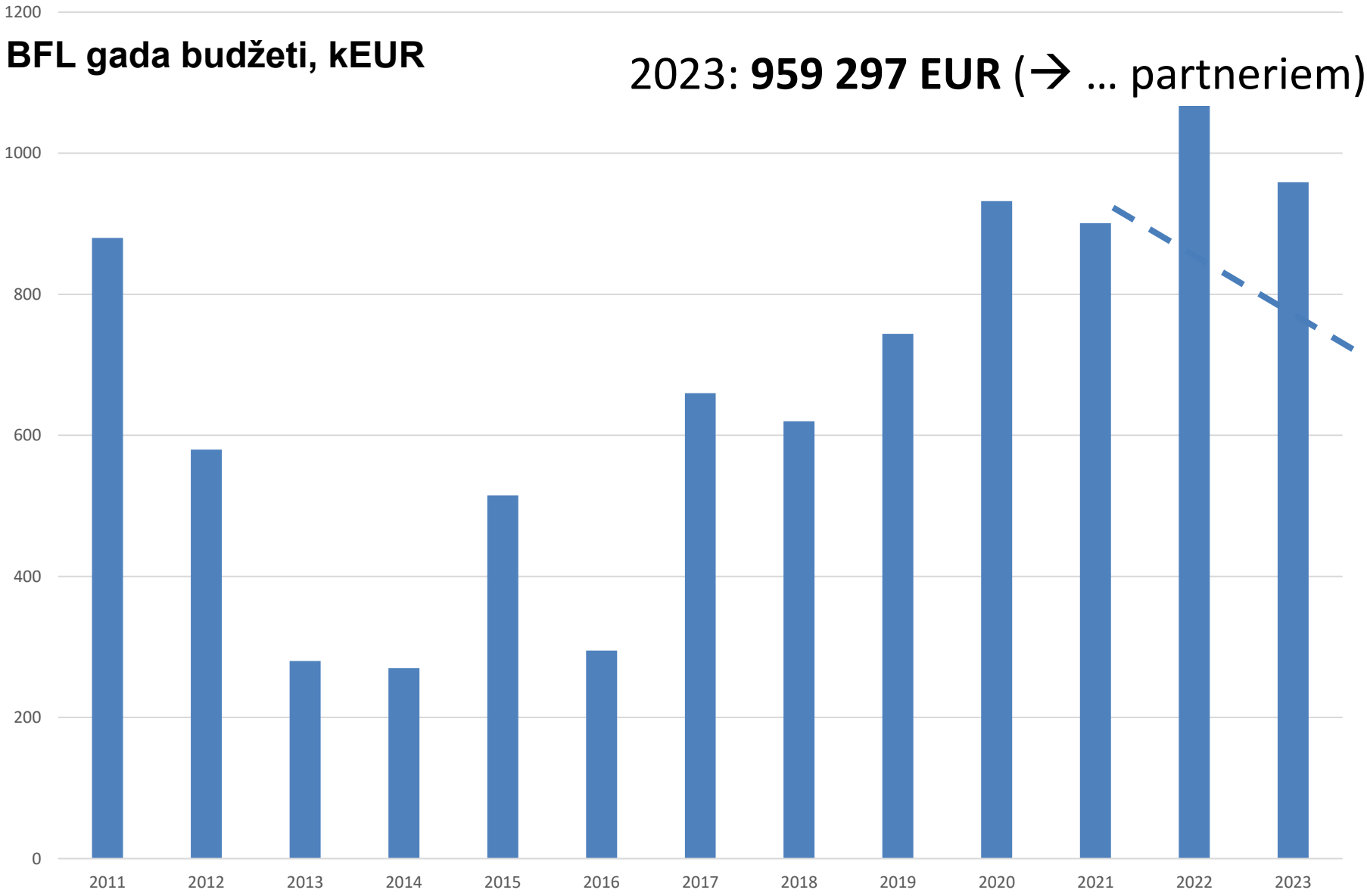
Aizstāvēts promocijas darbs

- Ilze Ošiņa, “Spektrāllīniju attēlveidošana bezkontakta ādas diagnostikai un viltojumu atklāšanai”, 21.09.2023.
- Apbalvojumi:
  - LZA Ludviga un Māra Jansonu vārdbalva fizikā
  - LU balva par izcilu promocijas darbu 2023. gadā (1 no 2)

2023: projekti kopā ~ 20

1. H2020 Laserlab Europe V: ādas fluorescences kinētika u.c. (Vanesa)
2. LV-LT-TW – pulsoksimetrija ar divu viļņu garumu NIR lāzeriem (Jānis)
3. ERAF1111-3 – sistēma mikroorganismu augšanas analīzei (Aleksejs) **P-pabeigts**
4. ERAF 1111-4 - reto ādas slimību diagnostikas sistēma (Aleksejs) **P**
5. ERAF 1111-5 - antibakteriālās rezistences novērtēšanas sistēma (Ilze Ļ) **P**
6. ERAF post-dok - biofotonika veterinārajā medicīnā (Blaž) **P**
7. ERAF post-dok - iekaisuma apjoma un līmeņa novērtējumam ādā (Inga S.) **P**
8. ESF/LU atbalsts doktorantiem (I.Ošiņa, M.Laņģe, E.V.Ploriņa) **P**
9. IF-NPP - “Fotonika un viedie materiāli, tehnoloģijas un inženiersistēmas”, 2 apakšprojekti DERMO un ENDO (Jānis)
10. LZP FLPP – dzīvnieku audzēju robežu noteikšana (Mindaugas/Blaž)
11. LZP FLPP – ādas vēža diagnostika ar AF fotoizbalēšanas metodi (Aleksejs)
12. LZP FLPP – multiparametriska medode Covid-19 pacientiem (Andris)
13. LZP FLPP – sēņu augšanas kontrole ar speklu attēlošanas metodi (Ilze Ļ.)
14. L/d (Leprosy Mission, UK) – spektrālā attēlošana lepras diagnostikai (Jānis) **P**
15. LU Fonda pr. #2282 – krāsu analīze endoskopijā (Jānis) **P**
16. COST CA21159 - PhoBioS (Jānis) + Snieguma & bāzes finansējums ~ 105 kEUR

Laboratorijas budžets – dinamika



14 raksti Q1 žurnālos (Scimago)

	Q1	Q2	Q3	Q4	kopā
J.Spīgulis	4	13			17

1. Saknite I, …, Spigulis J, …. “Hyperspectral imaging to accurately segment skin erythema and hyperpigmentation in cutaneous chronic graft-versus-host disease,” **J.Biophot**. e202300009 (2023). DOI: 10.1002/jbio.202300009.

2. Cronin A, …, Saknite I. “Effect of camera distance and angle on color of diverse skin tone-based standards in smartphone photos,” **J.Biophot.**, e202200381 (2023). PMID: 36772956.

3. Varga, N.N.; … Lihacova, I.; Lihachev, A.; …. Optically Guided High-Frequency Ultrasound Shows Superior Efficacy for Preoperative Estimation of Breslow Thickness in Comparison with Multispectral Imaging: A Single-Center Prospective Validation Study. **Cancers** 2024, 16, 157. https://doi.org/10.3390/cancers16010157

4. Plorina, E.V.; …, D.; Lihachev, A.; Lihacova, I. Multispectral Imaging Analysis of Skin Lesions in Patients with Neurofibromatosis Type 1. **J. Clin. Med.** 2023, 12, 6746. https://doi.org/10.3390/jcm12216746

5. Balmages I, Liepins J, Zolins S, Bliznuks D, Broks R, Lihacova I and Lihachev A (2023) Tools for classification of growing/non-growing bacterial colonies using laser speckle imaging. **Front. Microbiol.** 14:1279667. doi: 10.3389/fmicb.2023.1279667

6. Ghosh S, …., Saknite I, …"Rapid handheld measurements of skin and subcutaneous tissue stiffness in systemic sclerosis," **Rheumatology** (07/08 2023). PMID: 37549062.

7. Jumutc, V.; …. Lihachev, A. Hybrid Approach to Colony-Forming Unit Counting Problem Using Multi-Loss U-Net Reformulation. **Sensors** 2023, 23, 8337. https://doi.org/10.3390/s23198337

8. Balmages I, Reinis A, Kistkins S, Bliznuks D, Plorina EV, Lihachev A and Lihacova I (2023) Laser speckle imaging for visualization of hidden effects for early detection of antibacterial susceptibility in disc diffusion tests. **Front. Microbiol.** 14:1221134. doi: 10.3389/fmicb.2023.1221134

9. Balmages, I., … I.Lihacova, A.Lihachev. Use of the speckle imaging sub-pixel correlation analysis in revealing a mechanism of microbial colony growth. **Sci Rep** 13, 2613 (2023). https://doi.org/10.1038/s41598-023-29809-0

10. Avberšek M, …, Cugmas B, “Chromogenic culture media complements diagnostic cytology in the visual identification of pathogenic skin bacteria in dogs and cats”, **Front. Veterin.Sci.**, 10, 1152229, 2023, DOI: 10.3389/fvets.2023.1152229

11. Marcinkevics, Z., Rubins, U., Aglinska, A., Logina I., Glazunovs D., Grabovskis, A., “Contactless photoplethysmography for assessment of small fiber neuropathy”, **Frontiers in Physiology***,* **14**,1180288 (2023). DOI**:** 10.3389/fphys.2023.1180288

12. Parks, K., (...), Saknite, I., …, “Non-Expert Markings of Active Chronic Graft-Versus-Host Disease Photographs: Optimal Metrics of Training Effects”, **Journal of Digital Imaging,** 36(1), 373-378 (2023). **DOI:** 10.1007/s10278-022-00730-8

13. McNeil, A.J., …, Saknite I., …., “Counting Monkeypox Lesions in Patient Photographs: Limits of Agreement of Manual Counts and Artificial Intelligence”, **Journal of Investigative Dermatology**, 143(2), pp. 347-350.e4 (2023). **DOI:**10.1016/j.jid.2022.08.044.

14. Klibus M, Eunapu V, Marcinkevics Z, Rubins U, Grabovskis A, Vanags I, Sabelnikovs O, «Remote photoplethysmography and automated capillary refill time technique for microcirculation assessment in septic shock patients», **The British Journal of Anaesthesia***, 131(3), E88 (2023).* DOI:https://doi.org/10.1016/j.bja.2023.06.008

2 raksti Q2 žurnālos

1. Anker, P.; Fésűs, L.; Kiss, N.; Lengyel, A.; Pinti, É.; Lihacova, I.; Lihachev, A.; Plorina, E.V.; Fekete, G.; Medvecz, M. A, “Cross-Sectional Study of the Dermatological Manifestations of Patients with Fabry Disease and the Assessment of Angiokeratomas with Multimodal Imaging”, ***Diagnostics*** 2023, 13, 2368. https://doi.org/10.3390/diagnostics13142368
2. Kazune, S., Vasiljevs, E., Caica-Rinca, A., Marcinkevics, Z., Grabovskis, A., “Infrared Thermography Imaging for Assessment of Peripheral Perfusion in Patients with Septic Shock”, ***Bioengineering***, **10**(6),729 (2023). DOI: 10.3390/bioengineering10060729.

14 konferenču raksti (Scopus-citēti)

1. Tamošiūnas M, Kadikis R, Melderis M, Maliks R, Duplevska D, Viškere D, Matīse-van Houtana I, Cugmas B, “Wide-field Raman spectral band imaging of tumor lesions in veterinary medicine”, SPIE Proceedings, 12627, Eur.Conf. Biomedical Optics, Munich, Germany, Translational Biophotonics: Diagnostics and Therapeutics III, 1262737, 2023, DOI: 10.1117/12.2686917
2. Plavšić A, Mavrič T, Štruc E, Cugmas B, “Impact of an inexperienced operator on photoplethysmogram for bovine heat detection”, SPIE Proceedings, 12387, SPIE Photonics West BIOS San Francisco, Optical Diagnostics and Sensing XXIII: Toward Point-of-Care Diagnostics, 123870L, 2023, DOI: 10.1117/12.2650499
3. A. Lihachev, E. V. Plorina, K.Saulus, A.Rudzitis, N. Kiss, D. Bliznuks, I. Lihacova, "Multispectral imaging for assessment of Fabry disease," Proc. SPIE 12627, Translational Biophotonics: Diagnostics and Therapeutics III, 126272V (11 August 2023); https://doi.org/10.1117/12.2669923
4. I.Balmages, D..Bliznuks, A.Reinis, S.Kistkins, E.V. Plorina, A.Lihachev, I.Lihacova, "Laser speckle imaging-assisted disk diffusion test for early estimation of sterile zone radius," Proc. SPIE 12628, Diffuse Optical Spectroscopy and Imaging IX, 126281Y (9 August 2023); https://doi.org/10.1117/12.2670618
5. V. Jumutc, D. Bļizņuks and A. Lihachev, "Multi-Loss U-Net Reformulation as an Efficient Solution to the Colony-Forming Unit Counting Problem," 2023 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Sydney, Australia, 2023, pp. 1-5, doi: 10.1109/EMBC40787.2023.10340810.

Konferenču raksti -2

6. Lihacova, I. et al. (2023). «Dynamic Laser Speckle Imaging for Fast Evaluation of the Antibacterial Susceptibility by the Disc Diffusion Method». In: Dekhtyar, Y., Saknite, I. (eds) 19th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics. NBC 2023. IFMBE Proceedings, vol 89. Springer, Cham. https://doi.org/10.1007/978-3-031-37132-5_39

7. Plorina, E.V. et al. (2023). «Processing of Rare Skin Disease Multispectral Images». In: Dekhtyar, Y., Saknite, I. (eds) 19th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics. NBC 2023. IFMBE Proceedings, vol 89. Springer, Cham. https://doi.org/10.1007/978-3-031-37132-5_38

8. A.Lihachev, I.Balmages, J.Liepins, I.Lihacova, D.Bliznuks, "Dynamic laser speckle imaging for estimation of microbial colony growth in a noisy environment," Proc. SPIE 12572, Optical Sensors 2023, 1257220 (31 May 2023); https://doi.org/10.1117/12.2675953

9. J.Spigulis, E.Kviesis-Kipge, U.Rubins, I.Oshina, M.Mileiko, “RGB laser-illuminated spectral imaging: applications in dermatology and endoscopy”, *Proc.IFMBE,* v.**89***,* pp. 138-144 (2023). https://doi.org/10.1007/978-3-031-37132-5_18.

10. I.Oshina, J.Spigulis, "3D-representation of skin malformations using spectral line imaging and modified Beer-Lambert law", *Proc. SPIE* **12665**, 126650T (2023). https://doi.org/10.1117/12.2687959.

Konferenču raksti - 3

11. D. Dupļevska, R. Maļiks, M. Tamošiūnas, M. Melderis, D. Viškere, B. Cugmas, R. Kadiķis, I.Matīse-van Houtana. «Interpreting microscopic structures in virtually stained histological sections for veterinary oncology applications», Proc SPIE vol. 12831, Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XXII, 1283148 p. 1-16, 2024 (in press).

12. Rubins, U., Miscuks, A., Qawqzeh, Y., Marcinkevics, Z., Grabovskis, A., "Photoplethysmography imaging algorithm for real-time monitoring of skin perfusion maps", IEEE Computer Society Conference on Computer Vision and Pattern Recognition Workshops, 5950-5956 (2023).

13. M.Klibus, V.Eunapu, Z.Marcinkevics, U.Rubins, A.Grabovskis, I.Vanags, O.Sabelnikovs. "Assessment of Peripheral Perfusion Using Remote Photoplethysmography and Automated Capillary Refill Time Techniques in Severe COVID-19 Patients", *IFMBE Proceedings*, 89, 350 – 356 (2023).

14. M Briuks, S Kazune, «Comparison of microcirculatory changes in the first 24 and 48 h between survivors and non-survivors of septic shock», 42nd International Symposium on Intensive Care & Emergency Medicine, Critical Care 27(S1): P191 (2023).

+ Dalība konferencēs (tikai daži dati)

- Aigars Reinis, Ilya Balmages, Svjatoslavs Kistkins, Dmitrijs Bliznuks, Inese Polaka, Emilija Vija Plorina, Nityanand Jain, Alexey Lihachev, Ilze Lihacova, “Image-assisted disc diffusion test for rapid evaluation of antimicrobial susceptibility.” 33rd European Congress of Clinical Microbiology and Infectious Diseases, (April 15-18, 2023), Copenhagen, Denmark.
- Ilya Balmages, Dmitrijs Bliznuks, Aigars Reinis, Svjatoslavs Kistkins, Emilija Vija Plorina, Alexey Lihachev, Ilze Lihacova, “Laser speckle imaging-assisted disk diffusion test for early estimation of sterile zone radius.” European Conferences on Biomedical Optics (ECBO), Paper 12628-70, (June 25-29, 2023), Munich, Germany.
- Aigars Reinis, Ilya Balmages, Svjatoslavs Kistkins, Dmitrijs Bliznuks, Emilija Vija Plorina, Alexey Lihachev, Ilze Lihacova, "Laser Speckle Imaging Technology for Rapid Determination of Antibacterial Resistance." World Biotechnology Industry Conference (WBIC-2023) (November 15-17, 2023), Sapporo, Japan.
- + Ingas Saknītes 6 prezentāzijas Nešvilā, Čikāgā un Parīzē
- + Ulda prezentācija Sanpaulo, Vanesas Turcijā, …

<u>Ģeogrāfija:</u> ASV, Kanāda, Brazīlija, Austrālija, Japāna, Turcija, Vācija, Francija, Dānija, Ungārija, Itālija, Latvija, …

Vanesa: Komandējumi 2023. gadā (kā piemērs)

Jūnijs-Augusts, 2023 – Francija, Parīze un Nansi.

Sakaru dibināšanai, tikšanās ar kolēģiem no Ecole Polytechnique, Université de Lorraine

Rezultāts: Uzrakstīti un atbalstīti 2 Osmoze projekti, vienu vadīs J.Spīgulis, otru U.Rubīns, jo V.Lukinsone nevar vadot vienu piedalīties otrā, sakarā ar ko tika vadība piedāvāta kolēģiem.

Septembris, 2023 – Francija, Parīze.

Piedalīties konference «Biophotonics and Optical Angular Momentum 2023, Ecole Polytechnique» ar referātu «Photon propagation measurements through biological tissue utilizing the time-of-flight method»

Oktobris, 2023 – Turcija.

Piedalīties konference «17th International conference on Laser Applications in Life Sciences» ar referātu «Photons distribution and propagation in biological tissue».

Novembris, 2023 – Italija, Politecnico di Milano.

Staff exchange programma LaserLab Europe projekta ietvaros. Dalība “Workshop on diffuse optics”. Un pieredzes apmaiņa mērījumos PTOF (Photon time-of-flight).

THERMALEXPERTS

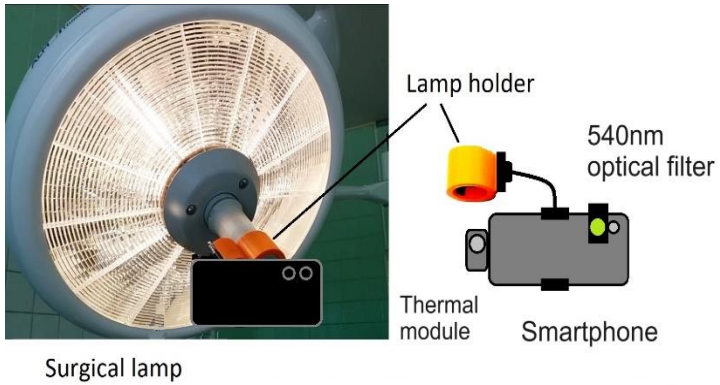
24 A 26 DE NOVEMBRO DE 2023

U. Rubīns un A. Miščuks pieredzes apmaiņas nolūkos tikās ar Termogrāfijas medicīnas ekspertu grupu, ko vada Prof. M.Brioschi (MD, PhD), Faculdade de Medicina da Universidade de São Paulo, Instituto de Ortopedia e Traumatologia.

U. Rubīns piedalījās starptautiskā kongresā São Paulo "Thermal Experts 2023" ar ziņojumu "Photoplethysmography imaging applied in medicine and the prospects of this technology", kur prezentēja metodi kas apvieno bezkontakta fotopletizmogrāfisko attēlveidi un termogrāfiju, pacientu perifērās asinsrites novērtēšanai.

Dual wireless rPPG/ TG imaging system

Mobile system



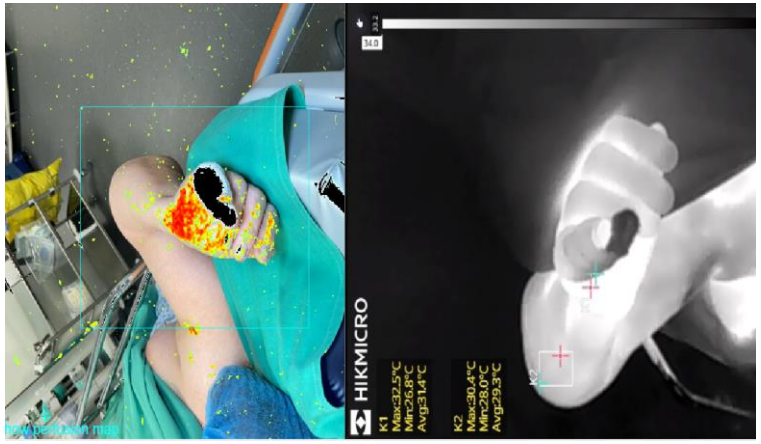
Surgical lamp

WiFi

Computer

Decision by trained Artificial Network

rPPG imaging + Thermal Imaging



Intelektuālais īpašums

Patenti

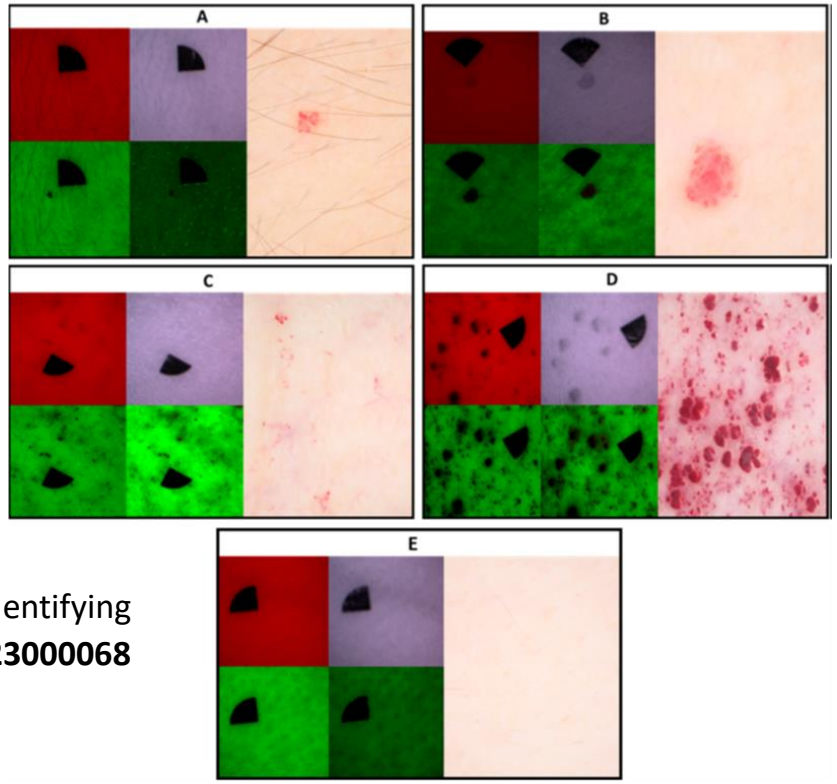
- LV 15705 B, 2023. “Paņēmiens un ierīce fotokameras relatīvās spektrālās jutības noteikšanai pie izvēlētiem viļņu garumiem” (J.Spīgulis, I.Ošiņa, I.Kuzmina, L.Dambīte).

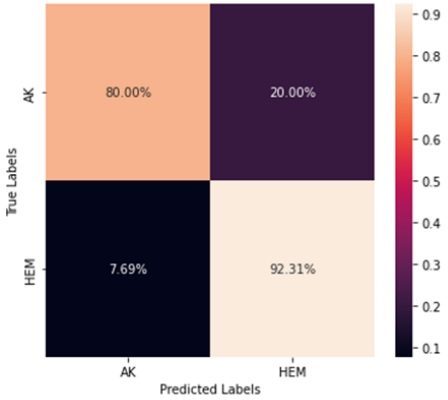
1. Method for Rapid Determination of Antibacterial Susceptibility in Solid Media in Disk Diffusion Tests," LVP2023000120 (2023).
2. Method and system for identifying Fabry angiokeratoma, LVP2023000068 (2023).

Zinātības:

1. Intelektuālā īpašuma objekts LU-2023-005 - zinātība (copyright.eu Sertifikāts 7360) “Ādas vēža neinvazīva diagnostikas sistēma” (licencēts 06.11.2023. uz 5 gadiem).
2. Intelektuālā īpašuma objekts LU-2023-016 – zinātība (copyright.eu Sertifikāts 7922) “Baktēriju koloniju veidojošo vienību skaitīšanas sistēma” (licencēts 12.12.2023. uz 5 gadiem)
3. “Optiska neinvazīva hibrīdmetode agrīnai sepses diagnostikai un terapijas vadībai” – Andra G. LIAA projekta licence, 08.02.2023.

ERAF 4. kārta «Reto ādas slimību efektīvas identifikācijas un multimodālas diagnostikas sistēma», LU, RTU & SIA LONGENESIS, sadarbība ar Semelveisas Universitāti, Ungārija, Budapešta. Emīlijas promocijas darba pētījums

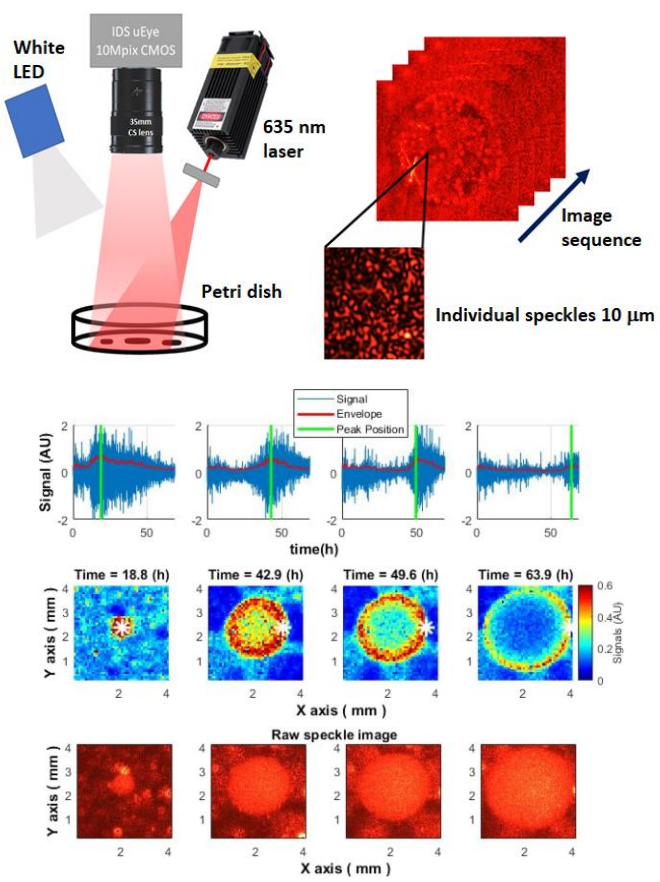


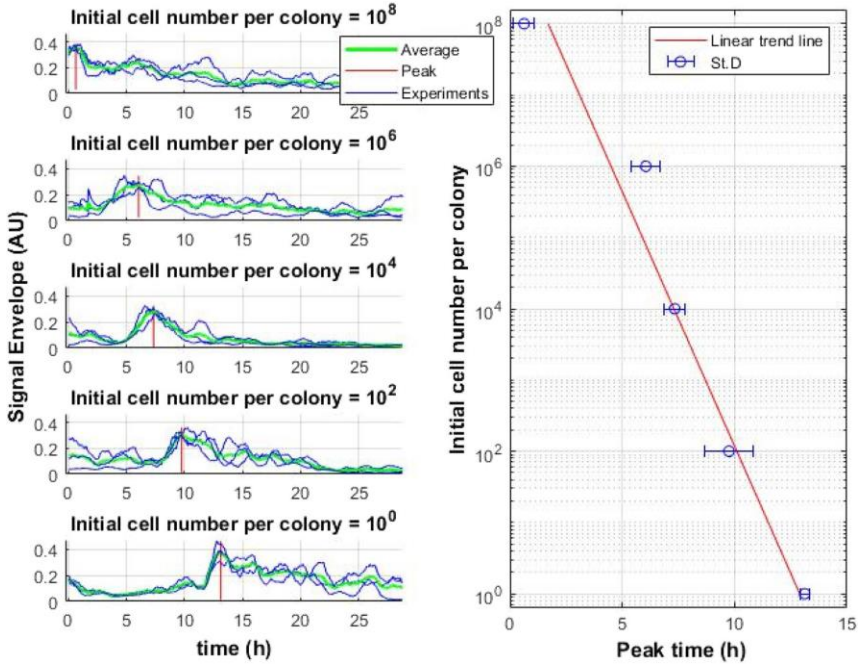


	precision	recall	f1-score
AK	0.89	0.80	0.84
HEM	0.86	0.92	0.89
accuracy			0.87
macro avg	0.87	0.86	0.87
weighted avg	0.87	0.87	0.87

Method and system for identifying Fabry angiokeratoma, **LVP2023000068** (2023).

Anker, P.; Fésűs, L.; Kiss, N.; Lengyel, A.; Pinti, É.; Lihacova, I.; Lihachev, A.; Plorina, E.V.; Fekete, G.; Medvecz, M. A Cross-Sectional Study of the Dermatological Manifestations of Patients with Fabry Disease and the Assessment of Angiokeratomas with Multimodal Imaging. **Diagnostics** 2023, 13, 2368. https://doi.org/10.3390/diagnostics13142368

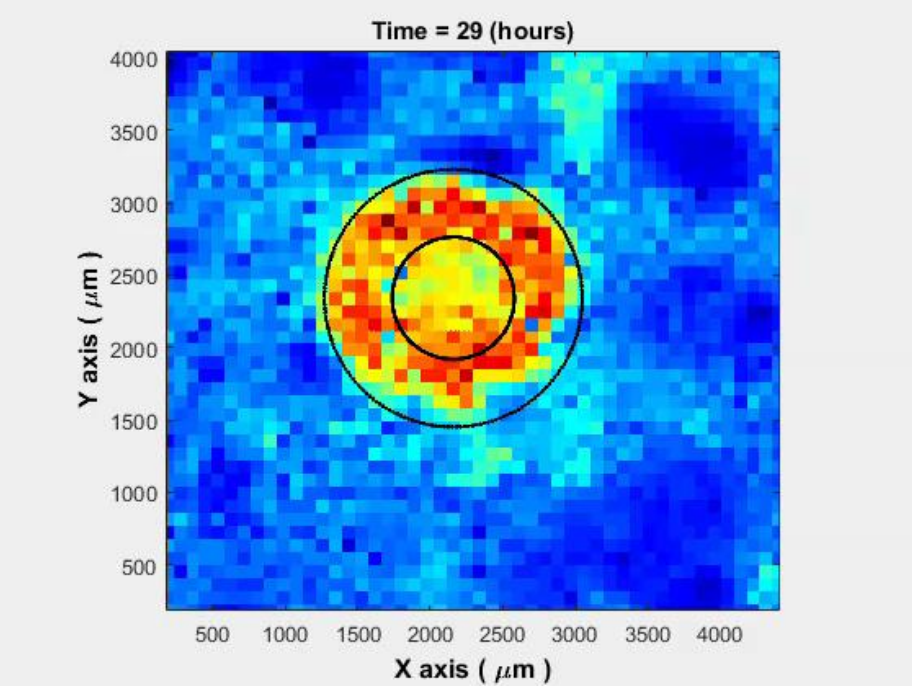




ERAF 3. kārta «Ātrā mikroorganismu aktivitātes noteikšana ar optisko bez-kontakta metodi», LU, RTU & SIA Laboratorija AUCTORITAS

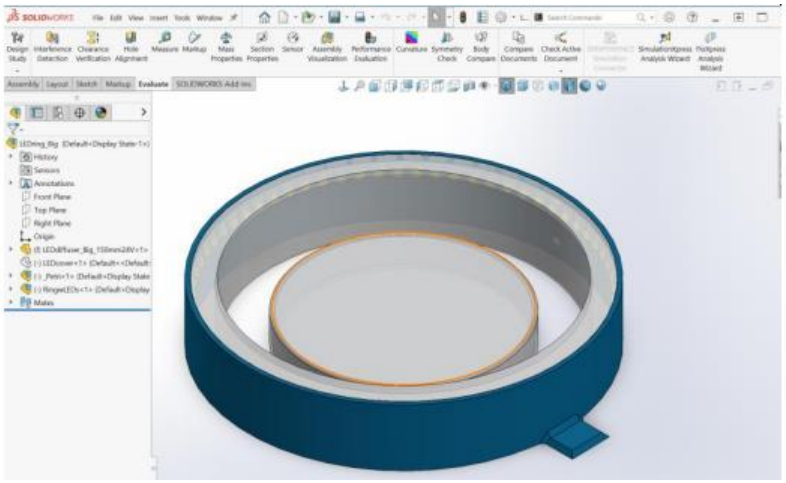
Balmages, I., Liepins, J., Auzins, E.T. et al. Use of the speckle imaging sub-pixel correlation analysis in revealing a mechanism of microbial colony growth. Sci Rep 13, 2613 (2023). https://doi.org/10.1038/s41598-023-29809-0

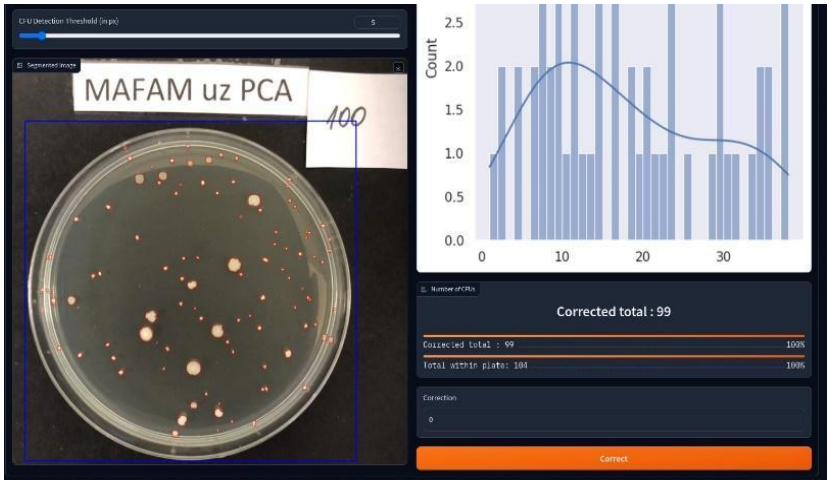
Laser speckle imaging revealing a mechanism of microbial colony growth



Balmages, I., Liepins, J., Auzins, E.T. et al. Use of the speckle imaging sub-pixel correlation analysis in revealing a mechanism of microbial colony growth. Sci Rep 13, 2613 (2023). https://doi.org/10.1038/s41598-023-29809-0

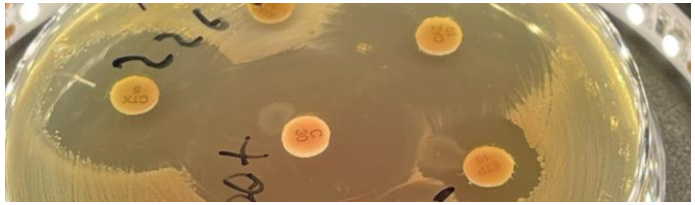
Baktēriju koloniju veidojošo vienību (KVV) skaitīšanas sistēma/ Apgaismojums un apmācīts ANN tīkls KVV skaitīšanai



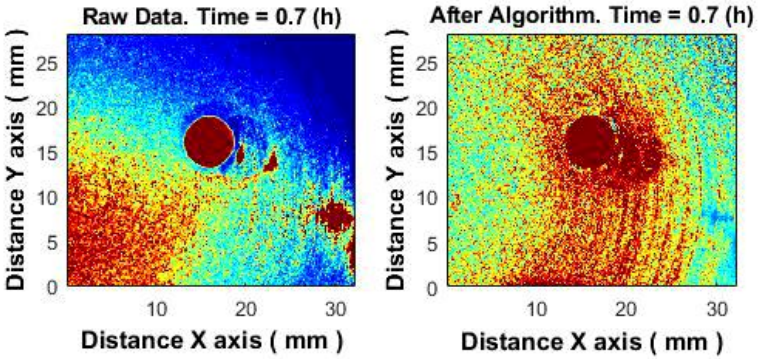


Intelektuālā īpašuma objekts LU-2023-016 – zinātība (copyright.eu Sertifikāts 7922) "Baktēriju koloniju veidojošo vienību skaitīšanas sistēma" (licencēts 12.12.2023. uz 5 gadiem), SIA Laboratorija Auctoritas

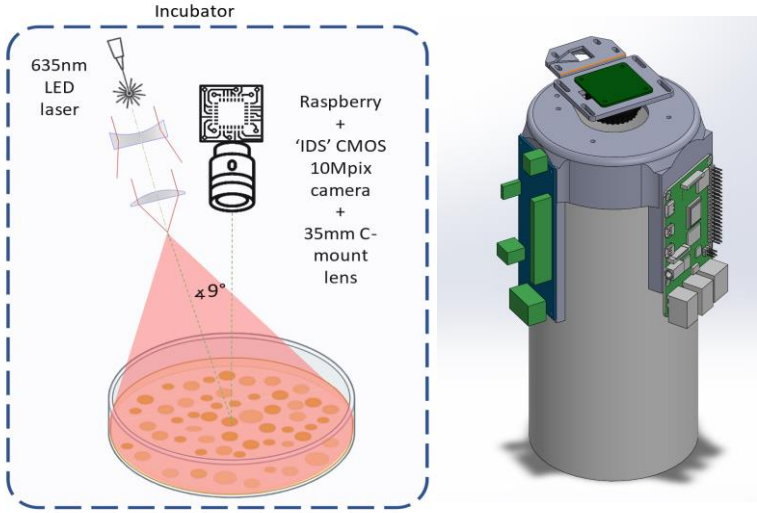
ERAF projekta «**Antibakteriālās rezistences ātras novērtēšanas sistēma pacientiem ar sekundārām bakteriālām infekcijām**» rezultāti:



Izveidots uz mašīnmācīšanos balstīts algoritms antibiotiķu disku klasificēšanai un lokalizācijas noteikšanai.

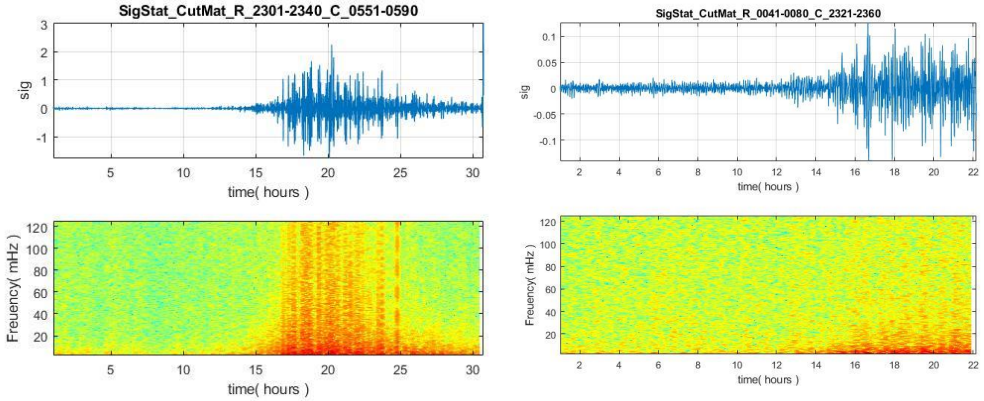


Video: Inhibīcijas zonas augšanas vizualizāciju salīdzinājums: reālā laika Raw attēli (pa kreisi) un ar izveidoto sub-pixel korelācijas algoritmu iegūtais rezultāts (pa labi).

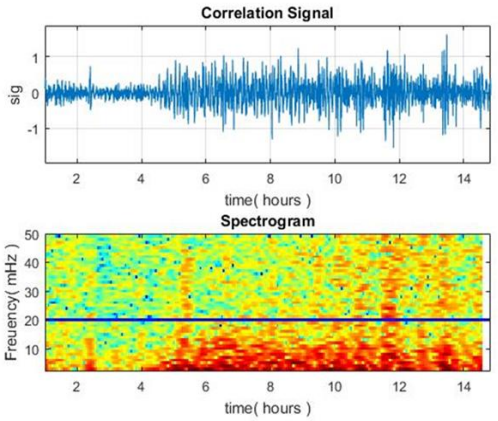


Laboratorijā izmantotā prototipa shēma (pa kreisi) un izveidotā prototipa rasējums (pa labi).

LZP FLPP projekta «Dinamisko lāzera speklu attēlošana sēņu augšanas aktivitātes novērtēšanai» rezultāti:



Sēņu- Penicilīna (pa kreisi) un Aspergillis Niger (pa labi) korelācijas signāla (augšējā rinda) dinamika un spektrogramma (apakšējā rinda).



Salīdzinājumam- baktēriju E.coli korelācijas signāla (augšējā rinda) dinamika un spektrogramma (apakšējā rinda).

Wide-field Raman spectral band imaging of tumor lesions in veterinary medicine

Authors: M. Tamošiūnas, R. Kadiķis, M. Melderis, R. Maliks, D. Duplevska, D. Viškere, Ilze Matīse-van

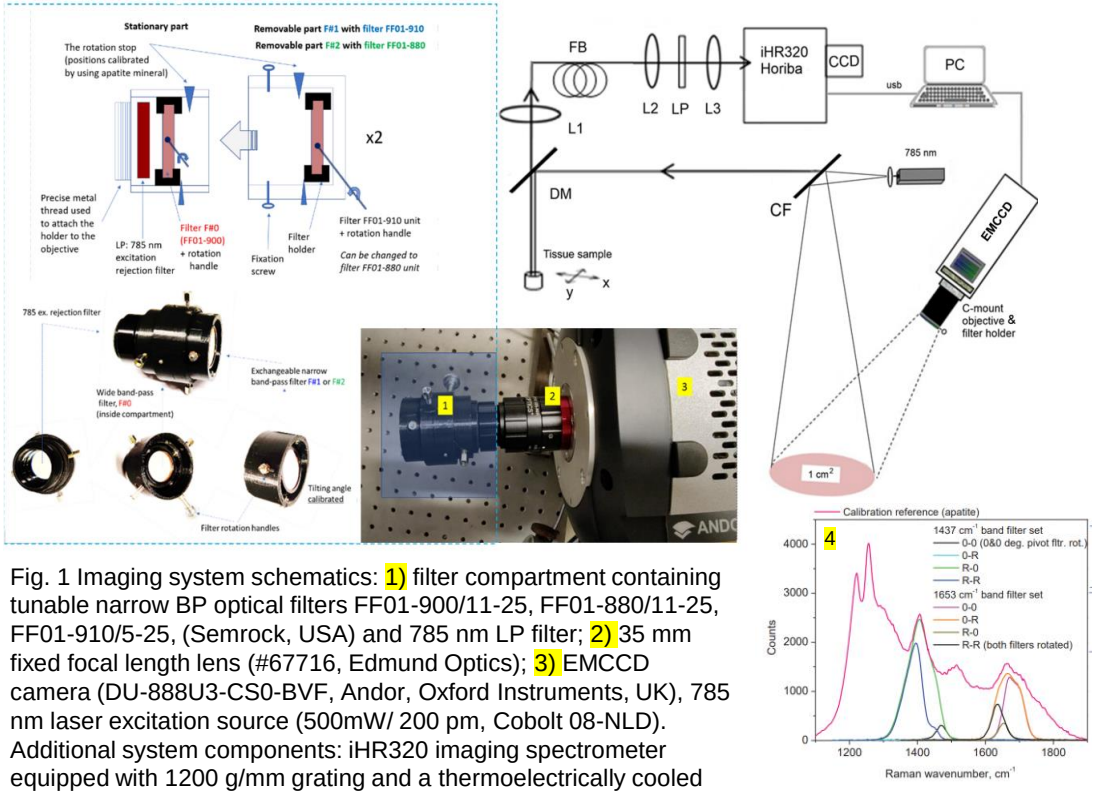


Fig. 1 Imaging system schematics: 1) filter compartment containing tunable narrow BP optical filters FF01-900/11-25, FF01-880/11-25, FF01-910/5-25, (Semrock, USA) and 785 nm LP filter; 2) 35 mm fixed focal length lens (#67716, Edmund Optics); 3) EMCCD camera (DU-888U3-CS0-BVF, Andor, Oxford Instruments, UK), 785 nm laser excitation source (500mW/ 200 pm, Cobolt 08-NLD). Additional system components: iHR320 imaging spectrometer equipped with 1200 g/mm grating and a thermoelectrically cooled Syncerity-CCD camera (Horiba, Japan); CF – laser clean-up filter; DM – dichroic mirror; L1 – fiber coupling lens; L2, L3 – collimating lenses; FB – fiber bundle. The spectra (4) show the calibration procedure for the filter rotation-stop enabling the separation between Raman spectral signal and NIR-AF (R – indicates calibrated rotation; 0 – filter is not rotated).

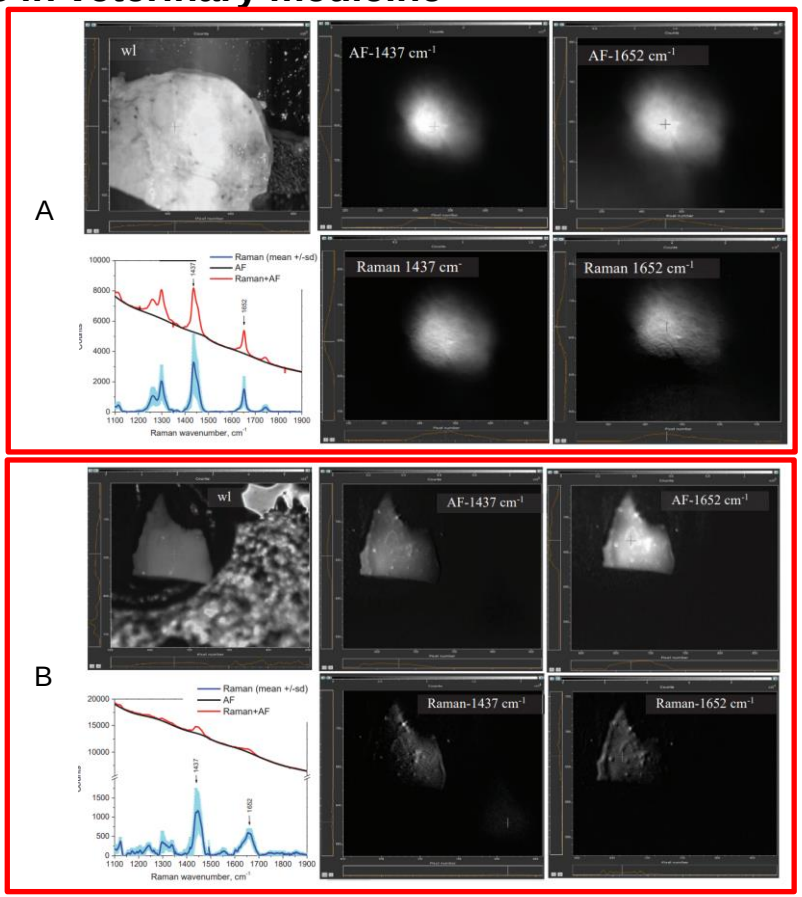


Fig. 2. Veterinary cancer spectral band images. A) Lipoma benign tumor from 8 y.o. dog. B) Mast cell tumor from 10 y.o. cat (mix breed), tumor locations – skin subcutis. White light (WL) image field of view is 2 cm × 2 cm. Autofluorescence (AF) or Raman signal images computed at 1437 cm-1 and 1652 cm-1 peak wavenumbers are displayed. To validate the imaging results, Raman spectral data (w/o autofluorescence) are included.

2023: pieteiktie un apstiprinātie projekti

- **Euramet**. ”Development of inertial cavitation dosimetry based on ultrasonic and optical imaging techniques”. Ultrasound Research Institute, KTU, Kaunas (2023-02-20). Project partner: University of Latvia (coordinator at ASI - M.Tamošiūnas). Not funded.
- **ERA4Health** “Establishing a non-invasive detection of cardiac damage after systemic chemotherapy in hepatocellular carcinoma». Vilnius University, Department Institute of Clinical Medicine, Faculty of Medicine, Vilnius (2023-02-20). Research partner: University of Latvia (coordinator at ASI - M.Tamošiūnas). Project not funded.
- Cugmas B, et al. Holographic microscopy- and artificial intelligence-based digital pathology for the next generation of cytology in veterinary medicine (VetCyto) (LZP-2023/1-0220), 2024-2026, Latvian Council of Science, €299,994 – ACCEPTED
- E.Kviesis-Kipge: Invisible multispectral imaging for non-contact assessment of tissues - noraidīts
- V.Lukinsone: Bimodal technology for diagnostics of biological tissue – noraidīts
- S.Kazūne: „Optiskās attēlveides metode personalizētai mikrocirkulācijas hemodinamiskā fenotipa noteikšanai septiskiem pacientiem” - noraidīts
- U.Rubīns. «FAETON - Fotonu lidojuma lAika mērījumi smadzEņu audos medicīniskai diagnosTikai: eksperimenti un mOdelēšaNa», OSMOZE (Paris), 2024-2025 - akceptēts
- J.Spīgulis “Multimodal spectral imaging and machine learning methods for bio-optical characterization of in vivo human skin”, OSMOZE (Nancy), 2024-2025 - akceptēts

2024

- LU konsolidācijas haoss («jānotur bura»)
- No «pamatsastāva» (13), 8 Dr.phys. nesanāk pilna slodze (0.45 … 0.75) → 2-4 d/ned
- Akceptēts jauns LZP FLPP projekts un 2x OSMOZE, būs postdoku uzsaukumi (5)
- Iesniegti un ir procesā vairāki raksti, piemēram:

M. Maciulevičius, R. Jurkonis, D. Jakovels, R. Raišutis, M. Tamošiūnas. The Evaluation of Microbubble Concentration Using the Techniques of Optical Spectroscopy. **Measurement**. Manuscript # MEAS-D-23-06488, Subm. 2023-09-11. Review 2nd round.

- Top monogrāfija (CRC Press, Taylor&Francis)
- Pieteikti/akceptēti konferenču referāti, piemēram:

Photonics Europe 2024

- I.Balmages, et.al., «Determination of operating parameters of fungal growth signals analyzed by laser speckle contrast imaging.»
- J.Spigulis, et al. «Diagnostic spectral imaging of skin and nasal mucosa by RGB laser-based prototype devices»

Optica-Biophotonics 2024:

I.Saknīte et.al. DAMAE video datu analīze … + ….

Latvija pārstāvēta OSA/Optica Biofotonikas kongresa orgkomitejā

Optica Biophotonics Congress: Biomedical Optics

07 - 10 April, 2024

The Westin Fort Lauderdale Beach Resort
Fort Lauderdale, Florida USA

Microscopy, Histopathology and Analytics

Nada Boustany
Rutgers University, United States,
Chair

Milind Rajadhyaksha
Memorial Sloan Kettering Cancer Center, United States,
Chair

DongKyun Kang
Univ of Arizona, Coll of Opt Sciences, United States,
Program Chair

Yang Liu
Univ of Illinois at Urbana-Champaign, United States,
Program Chair

Inga Saknite
University of Latvia, Latvia,
Program Chair

Yr - Riga - Langtidsvarsel | LU ASI pētniece ieguva d | Scopus - Results: AU-ID(" | Symposium - IEEE Interna | LSM.lv - Uzticamas ziņas
ieeenap.org/symposium/

Biophotonics - Riga

4th International Conference - Symposium, Sept. 10-11, 2024

At the symposium, following the traditions of three previous "Biophotonics Riga" conferences held in 2013, 2017, and 2020, will be discussed the novel aspects of biophotonics with a focus on three main topics:
(i) Biomedical tissue imaging,
(ii) Optical clinical diagnostics & monitoring,
(iii) Skin optics & spectroscopy.

Advances in these fields have increasing importance in public healthcare involving optical noninvasive technologies and improving quality of life. Papers related to the symposium theme are solicited, including theories, methodologies, and emerging applications. Contributions to theory and practice, including but not limited to the abovementioned areas, are invited.

Upon completing the registration process and fee payment, the Symposium participants will gain exclusive access to all technical sessions and networking events at the IEEE International Conference "Nanomaterials: Applications & Properties".

CALL FOR PAPERS

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Yr - Riga - Langtidsvarsel
Symposium - IEEE International
ieeenap.org/symposium/

Symposium Plenary & Invited Speakers

Stefan ANDERSSON-ENGELS
(PLENARY SPEAKER)
Tyndall National Institute
(Ireland)

Walter BLONDEL
University of Lorraine
(France)

Dror FIXLER
Bar-Ilan University
(Israel)

Boris MAJARON
Jožef Stefan Institute
(Slovenia)

Igor MEGLINSKI
Aston University
(United Kingdom)

Tatiana NOVIKOVA
CNRS/Ecole polytechnique
(France)

Ricardas ROTOMSKIS
National Cancer Institute
(Lithuania)

Santiago ROYO
UPC Barselona
(Spain)

Malgorzata SZCZERSKA
Gdańsk University of
Technology (Poland)

Göran SALERUD
Linköping University
(Sweden)

Bernhard ROTH
Hannover Centre for Optical
Technologies (Germany)

4°C
LAV
15:06
svētdiena
04.02.2024

Rezumējot

- Laboratorijas sastāvs un finansējums ~saglabāti
- Sekmīgi pabeigti 8 projekti, turpinās ~10
- Aizstāvēts 1 promocijas darbs, procesā Marta
- 30 Scopus publikācijas (t.sk. 14 Q1), 1+2 patenti
- Par rezultātiem plaši ziņots 4 kontinentos
- 2024: 3 jauni projekti, Rīgas konference septembrī
- Izaicinājumi: LU konsolidācija & superfakultāte (ASI statuss?); netiekam līdzi inflācijai un likmju paaugstinājumiem → daļslodzes, 2-4 dienu darba nedēļa? Risks pazaudēt cilvēkus, konkurenti nesnauž

PALDIES PAR UZMANĪBU!