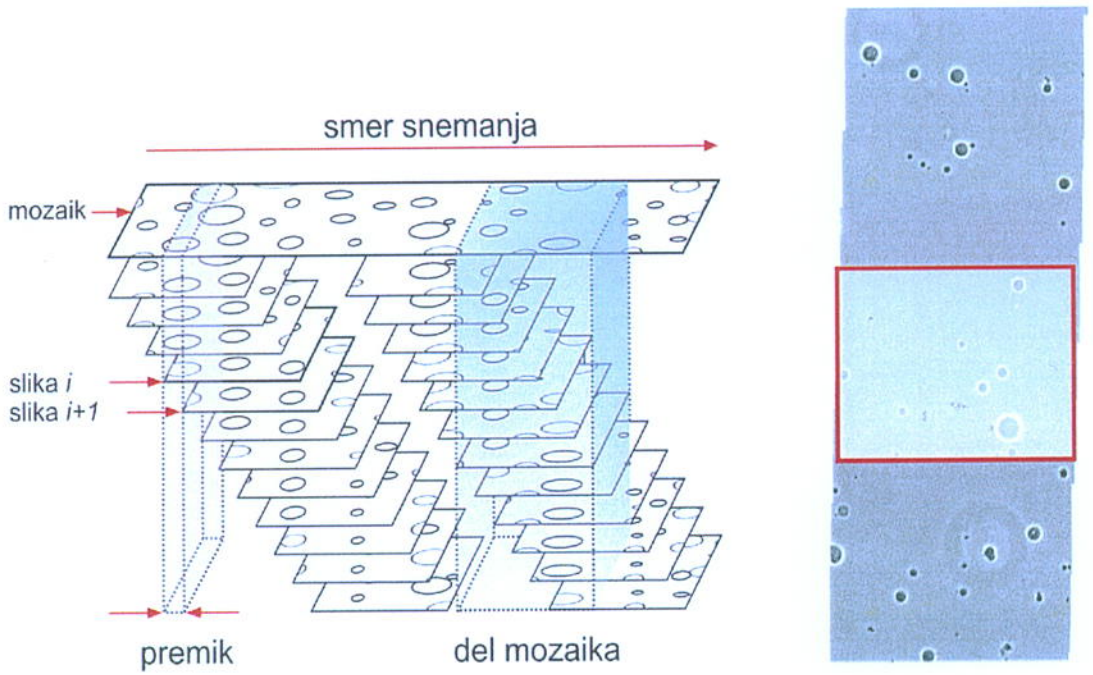
Področje: 2.21 – Tehnološko usmerjena fizika

Dosežek: Mozaičenje mikroskopskih videoposnetkov populacij orjaških lipidnih veziklov za študij bio-nano interakcij

Vir:

Zupanc Jernej, Dobnikar Andrej, Drobne Damjana, Valant Janez, Erdogmus Deniz, Bas Erhan, "Biological reactivity of nanoparticles: mosaics from optical microscopy videos of giant lipid vesicles", *Journal of biomedical optics*; 2011; Vol. 16, no.2; str. 026003; Impact Factor: 3.188



Kakovosten in reprezentativen mozaik populacije orjaških lipidnih veziklov je rezultat sestavljanja mozaika iz najostrejših delov slik videoposnetka.

Opis dosežka oziroma učinka:

V zadnjem času vse več študij prihaja do ugotovitev, da interakcije z nanodelci vplivajo na stabilnost celičnih membran. Namesto izpostavljanja živih organizmov se za preučevanje interakcij z nanodelci pogosto uporabljajo lipidni vezikli kot model lipidnih membran. Računalniško podprta metodologija, ki smo jo razvili, omogoča zaznavanje in kvantificiranje morfoloških sprememb tisočev orjaških lipidnih veziklov skozi čas izpostavljenosti nanodelcem. Metodologija zajema vse korake eksperimentalnega protokola, računalniškega obdelovanja mikrografij in analize pridobljenih podatkov. Z uporabo razvitih algoritmov, v laboratoriju na Biotehniški fakulteti raziskovalci preizkušajo učinke različnih nanodelcev. S predstavljeno metodo ugotovljeni rezultati učinka ogljikovih nanodelcev C60 pa so bili v letu 2012 predstavljeni tudi v ugledni reviji *Carbon*.

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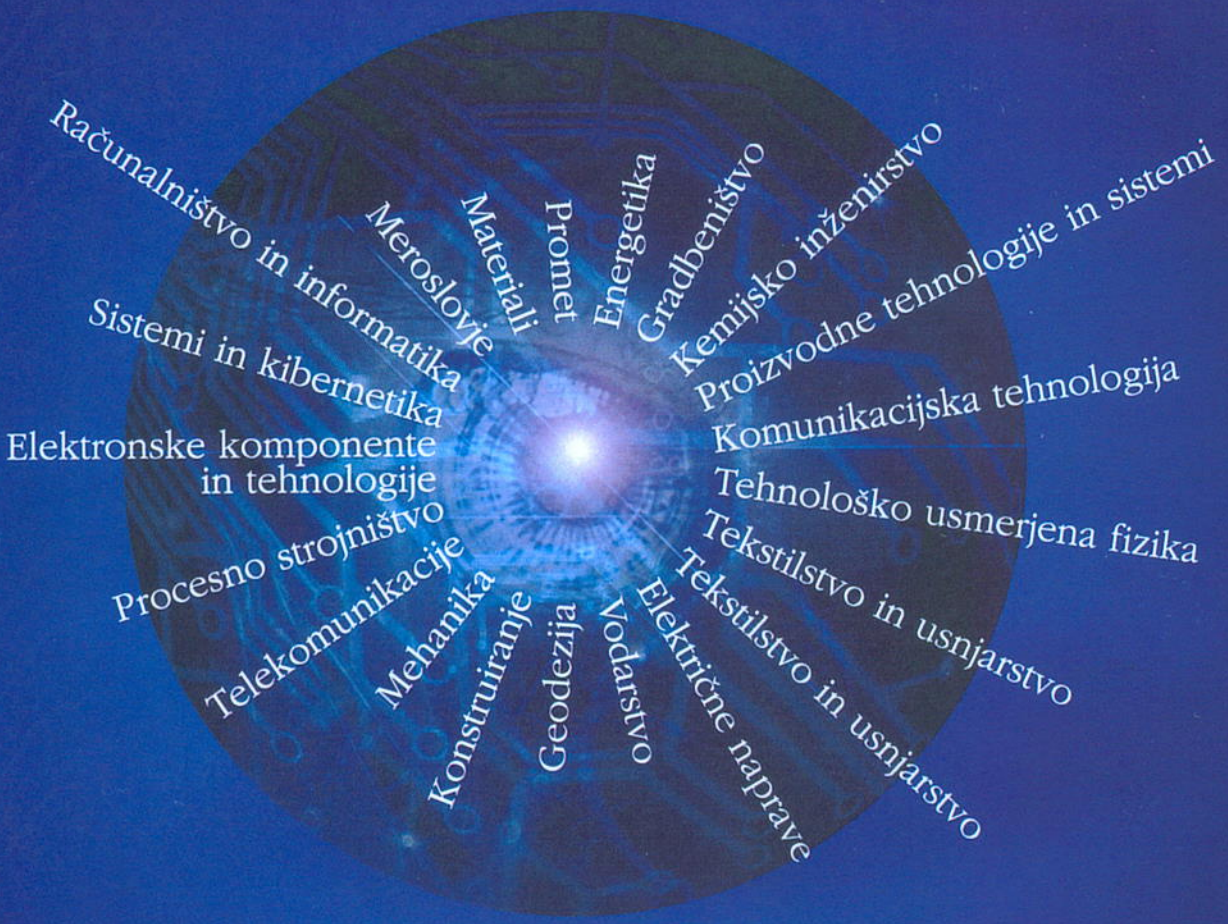

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Ljubljana, 2012

Journal of Biomedical Optics | Volume 16 | Issue 2 | Research Papers: Imaging >

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Research Papers: Imaging

Biological reactivity of nanoparticles: mosaics from optical microscopy videos of giant lipid vesicles

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J. Biomed. Opt. 16(2), 026003 (February 08, 2011). doi:10.1117/1.3533319 Text Size: A A A

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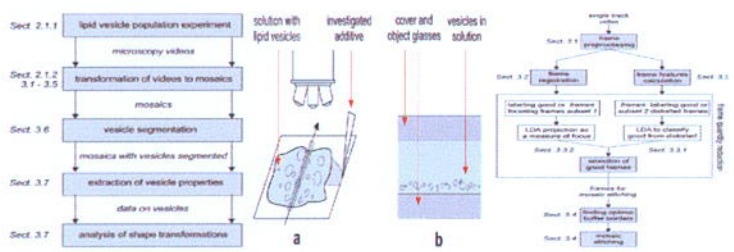
Abstract

Abstract | Introduction | Materials and Methods | Results | Discussion | Acknowledgments | References

Emerging fields such as nanomedicine and nanotoxicology, demand new information on the effects of nanoparticles on biological membranes and lipid vesicles are suitable as an experimental model for bio-nano interaction studies. This paper describes image processing algorithms which stitch video sequences into mosaics and recording the shapes of thousands of lipid vesicles, which were used to assess the effect of $CoFe_2O_4$ nanoparticles on the population of 1-palmitoyl-2-oleoyl-*sn*-glycero-3-phosphatidylcholine lipid vesicles. The applicability of this methodology for assessing the potential of engineered nanoparticles to affect morphological properties of lipid membranes is discussed.



Figures in this Article

Introduction

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