Biophotonics at Small Scales using Structure-mediated Light Robotics

Glückstad, Jesper

Publication date: 2018

Document Version
Publisher's PDF, also known as Version of record

Citation (APA):

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.
Biophotonics at Small Scales using Structure-mediated Light Robotics

Jesper Glückstad

DTU Fotonik, Dept. Photonics Engineering, Techn. Univ. Denmark
Ørsted Plads 343, DK-2800 Kgs. Lyngby, Denmark
Jesper.gluckstad@fotonik.dtu.dk


Abstract

Light robotics combines the latest developments in a variety of disciplines to achieve an all-optical toolbox for probing micro- and nano-environments in real-time 3D, opening up new avenues of applications of structure-mediated control of tiny biological constituents. Dynamic optical trapping is used for e.g. on-site assembly or disassembly of larger structures into component parts as well as their actuation to pre-determined sites with high precision. The optically manipulated and controlled structures of Light Robotics can be used to carry loads that can as well be functionalized to perform specific and predefined tasks. Structure-mediated transport provides convenience over direct particle trapping without compromising how precise particles can be moved and positioned. In cell trapping or transport, for example, damage due to direct irradiation can be substantially minimised by loading the cell into a prefabricated platform that is illuminated and moved around instead. Not only does this lessen the negative impact of high-intense radiation, but it also adds the benefit of having up to six degrees-of-freedom control over the robotic structure, hence on the specimen itself.

References