

# Advanced Light Sculpting in 3D real-time with applications in neurophotonics and optogenetics

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In OptoRobotix ApS we have invented and developed efficient phase-only light shaping modalities that can simultaneously control the distribution of multiple beams and shaping of these beams individually in a volume and in real-time. One such modality has been coined Holo-GPC and extends the capabilities of both Generalized Phase Contrast (GPC) and Holography. Holo-GPC can be considered as a hybrid combination of holography that can create extended 2D or 3D beam distributions and GPC that forms noise-free sculpting of the individual beams. I will discuss these modalities and how to combine them with pulsed lasers and advanced temporal focusing for efficient two-photon based optogenetics excitation and contemporary neurophotonics applications with you at the Institut de la Vision.



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## Biography

Jesper Glückstad (JG) established the Programmable Phase Optics [PPO.dk](http://PPO.dk) in Denmark two decades ago and has been holding a position as full Professor at the Technical Univ. of Denmark (DTU), and a position as 5-years Guest Professor in Biophotonics at Lund Institute of Technical in Sweden 2006-2011. Currently he is focusing 100 % on his spin-out company OptoRobotix ApS as Interim CEO, commercializing R&D developed partly during his academic career until Spring 2019. In 2004 he received the prestigious Doctor of Science (DSc) degree from DTU for the dissertation entitled "The Generalised Phase Contrast method". Together with a colleague he has authored a 315 pages Springer book on this topic (GPC). Prior to his achievements in Denmark, JG was a visiting scientist at Hamamatsu Photonics Central Research Laboratories and in the Physics Dept. at Osaka University in Japan. Since he obtained his PhD at the Niels Bohr Institute at Copenhagen University in 1994, he has published more than 300 journal articles and international conference papers and holds over 30 international patents/applications. He has published papers in *Nature Materials*, *Nature Methods* and *Nature Photonics* with the most recent in *Nature Publishing Group (LSA)* in 2016. He is the year 2000 recipient of the Danish Optical Society Award and was elected as «Scientist of the Year» in 2005 by Dir. Ib Henriksen's Foundation in Denmark. JG is a 2010 elected Fellow of the OSA and a Fellow of the SPIE as the first from Denmark. In 2012-2014 he was appointed for the prestigious SPIE Fellows committee together with an American physics Nobel laureate. In 2013 & 2016 invited to join the Editorial Boards of the European Optical Society journal *JEOS* and *De Gruyters ODPS*. JG was invited Plenary Speaker at the prestigious IEEE NANO 2016 held in Sendai, Japan. Invited as nominator for the highly prestigious 50 mill. yen Kyoto Prize 2017 (aka Asian Nobel Prize). A 482 pages Elsevier book on Light Robotics – the first on the topic - was published in the Summer 2017. JG is founder of OptoRobotix ApS [OptoRobotix.com](http://OptoRobotix.com) originally rooted in the Silicon Valley region in CA, USA. Also founder of the associated tech-transfer unit GPC Photonics now integrated as part of OptoRobotix.