

סמינר - SEMINAR

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 13.07.2020

(כ"א בתמוז תש"פ), בשעה 14:30 באמצעות הזום :

אודה לך אם תוכלי לעדכן את הקישור לקישור הבא :

<https://technion.zoom.us/my/mberco>

meeting i.d.: 625 353 7034

מרצה:

Dr. Valeri Frumkin

Postdoctoral fellow, Microfluidic Technologies Laboratory
Faculty of Mechanical Engineering, Technion

מנחה: פרופ"ח מורן ברקוביץ

על הנושא:

Fluidic Shaping of Optical Components

The seminar will be given in English

להלן תקציר ההרצאה:

Current methods for fabricating lenses or mirrors rely on mechanical processing - such as grinding, machining, and polishing. The complexity of these fabrication processes and the required specialized equipment prohibit rapid prototyping of optical components, and puts a very high price tag on large lenses and free-form optics.

I will present a theoretical and experimental study where we leverage the basic physics of wetting phenomena and hydrostatics for rapidly fabricating a variety of lenses (e.g., spherical, cylindrical, saddle, bi-focal, doublets, and aspheres) with optical-grade surface quality and without the need for any mechanical processing. A key component in the process is the elimination of body forces through neutral buoyancy conditions yielding a method that is scale-invariant: it can be used to produce lenses of any size, while preserving the surface quality. I will demonstrate that the steady-state shape of fluidic lenses near neutral buoyancy conditions can be obtained by minimizing the free energy functional of the system. Furthermore, I will show that generalizing the mathematical model to non-axisymmetric boundary conditions yields optical components of various shapes and topographies, similar to those studied in the emerging field of free form optics.

Lastly, time permitting, I will discuss the potential application of this technology for in-space construction of large telescope lenses, deployed from a liquid container. Such lenses can be solidified or remain in their fluidic state, with the latter allowing dynamic modification of their optical properties.

בברכה,

פול פ"א איתי סאס

מרכז הסמינרים