

Bachelor-/Masterthesis

Temperature-controlled retinal photocoagulation

Laser photocoagulation is one of the most frequently used treatment approaches for retinal diseases. However, it is still painful and time-consuming as the physician needs to set the laser power and exposure time manually for every irradiated spot due to the variance of retinal pigmentation and light scattering within the eye. Therefore, we are working on a temperature-controlled laser photocoagulation to obtain a uniform outcome irrespective of the pigmentation of the irradiated spot while reducing the duration of treatment.

In this context several topics are under investigation, e.g., the modeling of the heat diffusion, identification of the retinal pigmentation, observation of temperature increase inside the retina, model based control of the temperature (-distribution) and theoretical aspects of output feedback and model order reduction in model predictive control.

Possible topics for Bachelor-/Masterthesis are (parametric) model order reduction, modeling of PDEs, Kalman filter, adaptive control and model predictive control for retinal photocoagulation.

Each thesis includes in general a literature research, implementation in Matlab/Simulink and evaluation of the results.



Coagulated (whitish) spots at the retina
[www.mll-luebeck.com]

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