

## **Spectrally and time-resolved fluorescence imaging of amyloid deposits**

In collaboration with partners in Sweden, France and Japan we are studying molecular diagnostics systems for amyloid related diseases. These are diseases as Alzheimers, Parkinson's, etc. At the NTNU group we are developing and using advanced spectroscopy and microscopic imaging/imaging spectroscopy to learn how such diseases progress as amyloid deposits in brain sections, animal models, in vitro protein systems, and cells.

We design projects according to the interest of the student. Thus, you can have a biological or chemical orientation interested in e.g. protein structure, or prefer technical aspects such as development of new sensor modalities and associated signal processing. Thus, this topic is in between applied physics and biophysics.

### **A project usually progresses in 4 steps:**

Step 1: Learn and develop new spectroscopic techniques. Basic characterization of new molecular systems for biosensing, for example: excitation and emission spectra, life-times and quenching mechanisms, and multiphoton-processes.

Step 2: Study protein structures in vitro to deduced characteristic features, for example: A-beta, insulin, TTR. Collaboration with international partners.

Step 3: Carrying out spectroscopic and life-time imaging of sections of animal models to learn more of the related diseases. Collaboration with international partners.

Step 4: Signal processing, analysis and reporting. The results are usually published in scientific journals together with the relevant collaboration partners. We have a long tradition of collaboration with Linköping University (Sweden) and ENS-Lyon (France). Recently we re-established a joint project with Prof Zako at Ehime University, Matsuyama, Japan. We usually visit one or several partners for some week during the progress of a project/master-work.

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