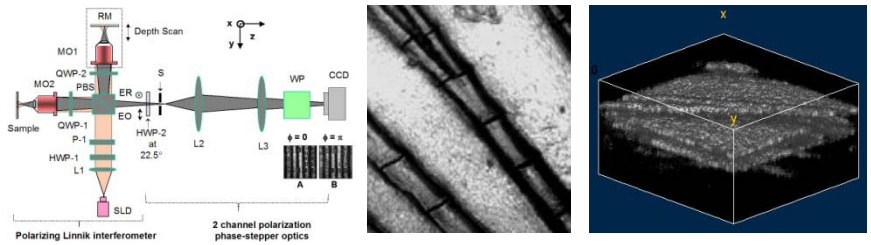
Functional Optical Measurements for 3D Scattering Media

Professor Manabu Sato



(a) OCTsystem (b) photograph of fish fin (c) 3D OCT image

Fig. 1 SS FF OCT system and OCT image.
Ref. M.S.Hrebesh et.al., BiOS2009 (2009).

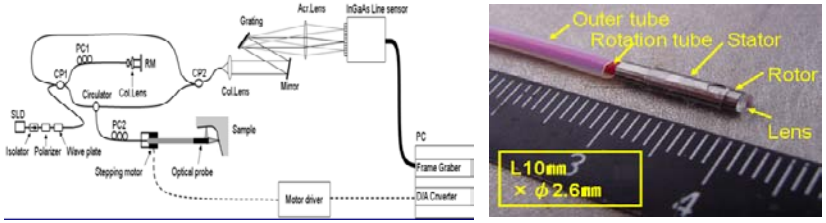
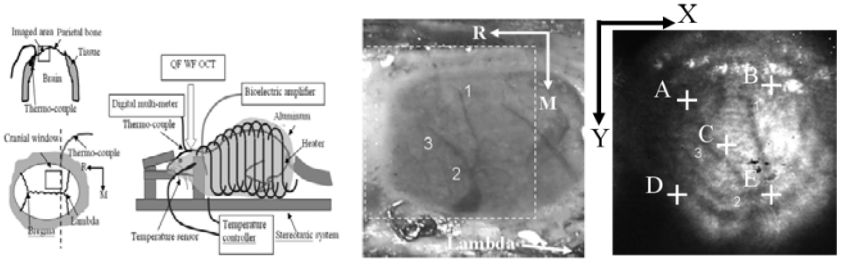


Fig. 2 Endoscopic SD OCT system and prototype OCT probe.
Ref. Y.Takahashi et.al., Jpn.J.Appl.Phys. **47**, 8 (2008) 6540.



(a) measurement system (b) polished skull (c) averaged OCT image

Fig. 3 OCT measurement system and OCT image
Ref. M.Sato et.al., Appl.Opt., **49**, 27 (2010).

Optical coherence tomogtaphy (OCT) to measure sectional images of biological tissues has been invented at Yamagata University at 1990*. OCT has advantages such as a high spatial resolution around 10 micron and non-invasions. OCT has been alreday used in the ophthalmology and its applications are spreading clinically including the field of general industries. At present main our subjects are as below.

1. Basics : Single shot full field OCT (SS FF OCT)

We have studied on SS FF OCT to obtain new information of biological samples. Using SS FF OCT the *en-face* sectional images parallel to a sample surface can be obtained with a single exposure without reducing the acquisition speed of camera. We propose more simple and sensitive SS FF OCT.

2. Application :Study to monitor viability of rat brain using OCT

We have tried to apply OCT to monitor the brain viability with 3D resolution. Using *in vivo* rat brain the correlations between physiological parameters such as tissue temperature and heart rate and OCT signal have been investigating.

We would like to widen OCT application areas using spectroscopy and optoelectronics techniques.

* : N.Tanno, T.Ichimura and A.Saeki, Japanese Patent, No.2010042 (1990)

Yamagata University Graduate School of Science and Engineering

Research Interest : Optical measurement and optoelectronics

E-mail : msato@yz.yamagata-u.ac.jp

Tel&Fax : 0238-26-3187

HP : http://msatolab.yz.yamagata-u.ac.jp/