

# Biofilm imaging facility hopes to unlock bacterial secrets



Photo credit: SCELSE

*Professor Yehuda Cohen, deputy director of SCELSE, explaining advanced research techniques in environmental life sciences engineering using ZEISS microscopes.*

The advanced biofilm imaging facility recently opened at the Singapore Centre on Environmental Life Sciences Engineering (SCELSE), in partnership with Carl Zeiss, hopes to further the understanding of bacterial interactions in different environments.

Single-celled organisms were perceived to be asocial until recently. But new research has revealed that when bacteria are under stress, they huddle together to form colonies shielded in biofilms that have a very complicated architecture.

Biofilms are responsible for persistent bacterial infections, including those associated with cystic fibrosis, infections of the urinary tract and the colonization of contact lenses, artificial heart valves and joint prostheses. Some external biofilms, such as chronic wounds and dental plaque, can be manually removed. But inaccessibility and increased resistance to antibiotics make internal biofilms more difficult to eradicate.

Also, the bacterial colonies behave differently in different environments and from individual bacterium. While the latter have

been extensively studied and understood, little is known about the biofilm structures and what seems to be a highly evolved inter-and intra-species communication systems, said Professor Yehuda Cohen, deputy director of SCELSE.

Understanding the structure and the communication system will help scientists devise ways to inhibit the process of biofilm's development or destroy the structures, said Cohen.

In addition to public health applications, the bacterial research employing Carl Zeiss high-resolution, high-sensitivity laser scanning confocal systems will be used in water treatment and environmental life sciences engineering research that SCELSE is already engaged in.

The new facility is the first one where Carl Zeiss is allowing customization of their imaging equipment to suit the research needs. In its long history, the optical and opto-electronic leader has always sold its equipment as is. The facility's S\$6.5 million value represents funding by SCELSE, office space and support by NTU and in-kind support from Carl Zeiss. – RK **MI**