**The International FISH Course 2019**September 9 – 13, Vienna, Austria

Although the diversity of microorganisms exceeds the diversity of all other life forms on planet earth, only approx. 10.000 archaeal and bacterial species have been isolated and validly described so far. This discrepancy reflects that most of the naturally occurring microorganisms are recalcitrant to cultivation. Since the advent of molecular and fluorescence microscopy approaches, it is possible to analyze the composition, dynamics, and functions of complex microbial communities *in situ* (without cultivation). While multiplexed amplicon sequencing is now a standard and valuable method for microbiota analysis, it is noteworthy that such endpoint-PCR based methods are inherently non-quantitative. It is the aim of this course to provide an **introduction to the fundamentals of fluorescence *in situ* hybridization (FISH)-based microscopy for identification, quantification, and co-localization of microorganisms and outline complementary techniques**. Practical work focuses (i) on the different basic aspects of FISH with rRNA-targeted oligonucleotide probes and (ii) on FISH analyses of the participants' own samples.

*The course includes seminars*:

* Principles of fluorescence *in situ* hybridization
* Application of FISH in microbial ecology
* Confocal laser scanning microscopy (CLSM)
* Computer-assisted image analysis
* Probe design and evaluation
* Advanced FISH techniques [e.g. CARD-FISH, DOPE-FISH, Clone-FISH, FISH-MAR, Raman-FISH, NanoSIMS-FISH]

*Laboratory course*: The main focus is practical work with own samples.

It is our mission to provide theoretical advice and practical help for FISH [CARD-FISH, DOPE-FISH] with the participants' own samples.

*All participants are asked to*:

* bring their own samples (instructions on preservation of samples will be provided)
* prepare a short presentation on their own research interests (PowerPoint, approx. 5 minutes)

Course fee: **€ 2000,-**

**[members of non-profit organizations, e.g. universities receive a 50% discount!]**

The fee includes the official course dinner on Tuesday and coffee/tea during the course but not other meals and accommodation. Payment only via bank transfer.

The course takes place at:

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| Division of Microbial EcologyDepartment of Microbiology & Ecosystem ScienceUniversität WienAlthanstr. 14, UZA 1A-1090 WienAustria | Phone: +43 1 4277 76619Email: fishcourse@microbial-ecology.netWebsite: www.microbial-ecology.net/international-fish-course |

Please understand that there is a limited number of participants for the course. If you are interested in participating, please fill out the application form. Participants will be selected based on the submitted abstracts. The application deadline is May, 17. Notification of acceptance: May, 24.

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| **Monday** |
| 09:00 | Welcome and coffee |
| 09:30 | *Seminar*: **FISH - An introduction** |
| 10:15 | Coffee break |
| 10:30 | *Seminar*: **The FISH protocol**  |
| 11:30 | **Lunch** |
| 12:30 | *Lab-course*: Principles of *in situ* hybridization |
| 14:00 | Coffee break |
| 14:30 | Seminar: **Participants present their research topics (part I)** |
| 16:30 | *Lab-course*: Epifluorescence microscopy |
| **Tuesday** |
| 09:00 | *Seminar*: **FISH - Novel methods**  |
| 10:00 | *Lab-course*: In situ hybridization of environmental samples and participants’ samples |
| 12:00 | **Lunch** |
| 13:00 | *Seminar*: **Participants present their research topics (part II)** |
| 14:00 | Coffee break |
| 14:15 | *Lab-course* contd. |
| 14:30 | *Seminar*: **Participants present their research topics (part III)** |
| 15:30 | *Lab-course*: Epifluorescence microscopy |
| 20:00 | *Dinner at a Viennese Restaurant* |
| **Wednesday** |
| 09:00 | *Seminar:* **Structure and function analysis of microbial communities using FISH**  |
| 10:30 | Coffee break |
| 10:45 | *Lab-course* (part I):Determining optimal hybridization conditions for new probes*or* Catalyzed reporter deposition (CARD-)FISH*or* Multicolor DOPE-FISH*or In situ* hybridization of participants’ samples |
| 12:00 | **Lunch** |
| 13:00 | *Lab-course* (part II):Determining optimal hybridization conditions for new probes*or* Catalyzed reporter deposition (CARD-)FISH*or* Multicolor DOPE-FISH*or In situ* hybridization of participants’ samples |
| 14:45 | Coffee break |
| 15:00 | *Seminar*: **Digital image analysis and visualization in microbial ecology: Introducing *daime***  |
| 16:30 | *Lab-course* contd. |
| **Thursday** |
| 09:00 | *Seminar*: ***In silico* probe design and evaluation**  |
| 10:30 | Coffee break |
| 10:45 | *Lab-course*: In situ hybridization of participants' samples |
| 12:00 | **Lunch** |
| 13:00 | *Demonstration* of Raman-FISH |
| 14:30 | *Lab-course* contd. |
| 16:00 | Coffee break |
| 16:15 | *Lab-course* contd. |
| **Friday** |
| 09:00 | *Lab-course*: In situ hybridization of participants' samples  |
| 10:00 | *Seminar*: **FISH – Problems and Solutions** |
| 11:00 | *Lab-course* contd. |
| 11:30 | **Lunch** |
| 12:30 | *Lab-course* contd. |
| 14:30 | Coffee break |
|  | *Short presentation of the results by the participants and final discussion* |
| 15:30 | End |