IMOTOX
Identification and Monitoring of Toxic Cyanobacteria

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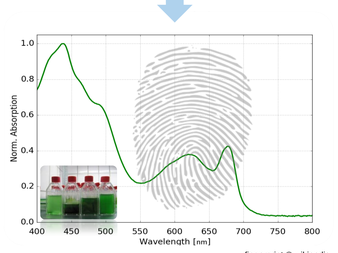
Inversion algorithm for remote sensing of cyanobacteria

Spectra as input for model based on radiative transfer theory



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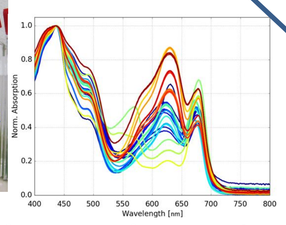
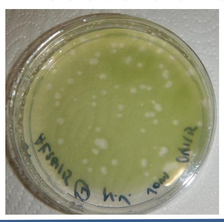
Culture collection of cyanobacteria

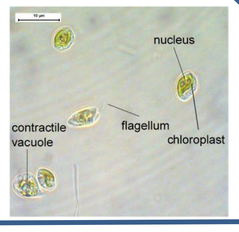
Colours depend on cyanobacterial pigments needed for photosynthesis



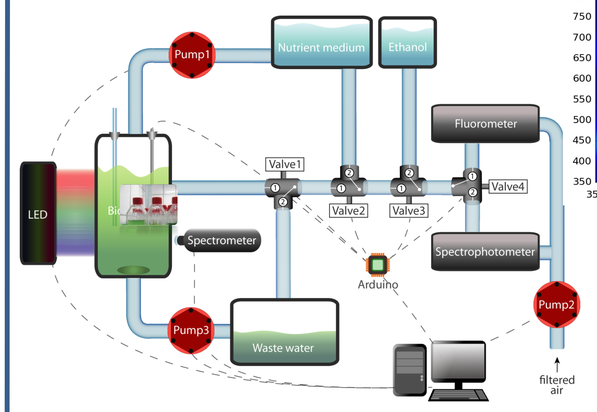
Predators and natural enemies

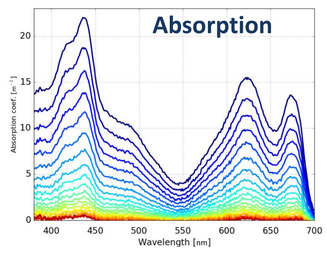


See how protozoa move during predation

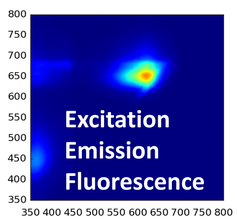


Spectroscopic experiments

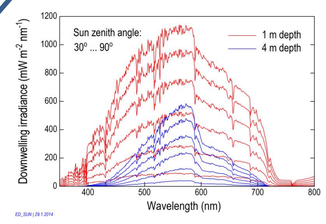




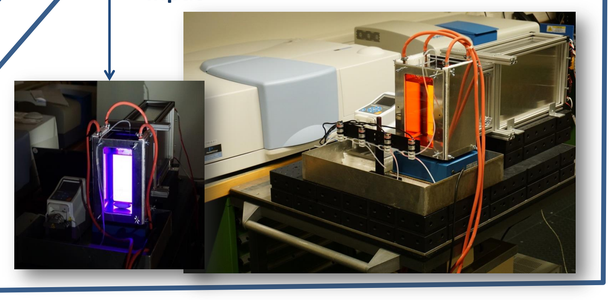
Studies on cyanobacteria and other optical significant water constituents



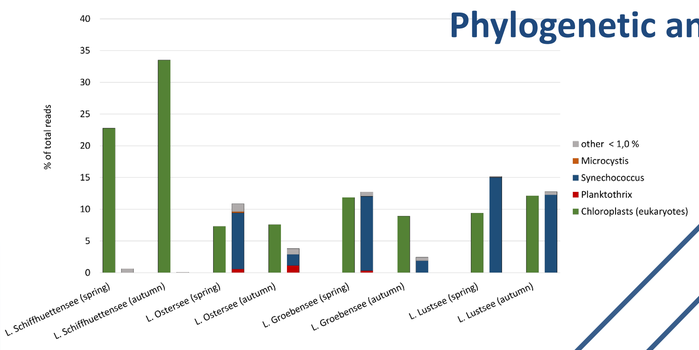
Simulating environmental conditions



Simulated spectra as input



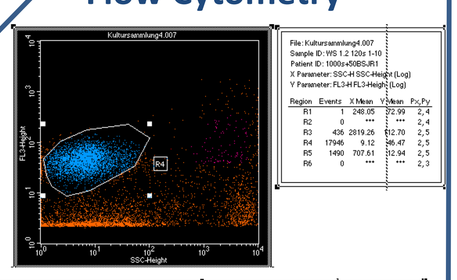
Phylogenetic analysis



eutrophic → oligotrophic

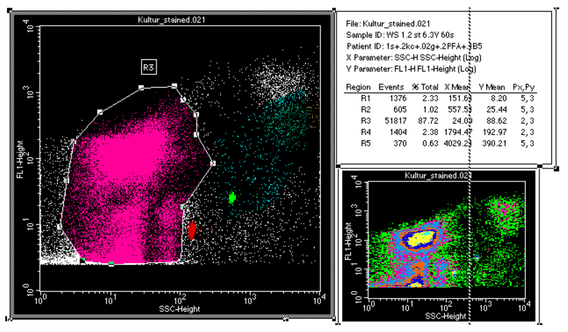
Distribution of cyano-bacteria along a trophic gradient in the Osterseen Lake District → the less nutrients in a lake, the more abundant harmless picocyanobacteria

Flow Cytometry



File: Kultursammlung4.007
Sample ID: WS 1.2 120s 1-10
Patient ID: 1000s+50BS-IR1
X Parameter: SSC-H SSC-Height (Log)
Y Parameter: FL3-H FL3-Height (Log)

Region	Events	X Mean	Y Mean	Px,Py
R1	1	248.05	372.99	2,4
R2	0	***	***	2,4
R3	426	2819.26	612.70	2,5
R4	17946	9.12	46.47	2,5
R5	1490	707.61	112.94	2,5
R6	0	***	***	2,3

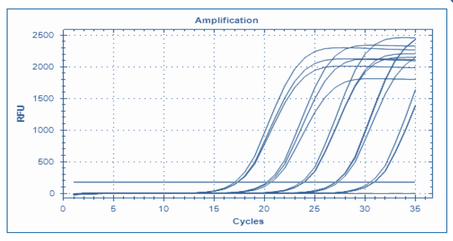


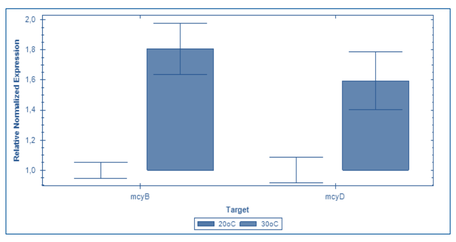
File: Kultur_stained.021
Sample ID: WS 1.2 st 6.3V 60s
Patient ID: 1s+.2kc+.02g+.2PFA+.3B5
X Parameter: SSC-H SSC-Height (Log)
Y Parameter: FL1-H FL1-Height (Log)

Region	Events	% Total	X Mean	Y Mean	Px,Py
R1	1376	2.33	151.63	8.20	5,3
R2	605	1.02	557.53	25.44	5,3
R3	51817	87.72	24.09	88.62	2,3
R4	1404	2.38	1794.42	192.97	2,3
R5	370	0.63	4029.23	390.21	5,3

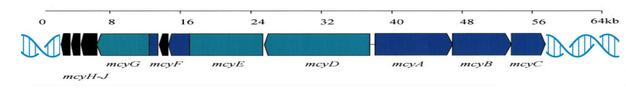
Counting and sorting cyanobacteria cells which have a autofluorescence with a flow cytometer (upper picture); cells without pigments have to be stained with a DNA dye (SYBR green) (picture below)

Molecular Biology



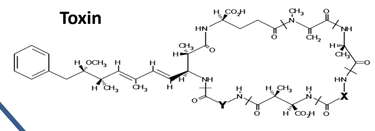


Genetics



RNA

Toxin



Synthesis of cyanotoxins

Quantification of RNA for toxinsynthesis by quantitaitve reverse transcription PCR (RT-qPCR)

Aims of the project:

- ❖Identify factors that induce a toxic cyanobacterial bloom
- ❖Develop algorithm for identification and monitoring of algae blooms with remote sensing
- ❖Investigate the interaction of toxic cyanobacteria with non toxin-producing cyanobacteria in the ecosystem as possible competitor to control the toxic ones

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