



## EAG-GS Outreach Program 2013

### Lecture Abstract:

### Chemistry for safer drinking water



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Currently about 1.1 billion people lack access to safe drinking water and 80% of them are living in a rural environment. This critical situation is the most important health risk in the global south and it is causing 1.6 million deaths per year. According to WHO records, waterborne diseases are the most important cause for disease outbreaks and it is alarming that, after an absence of almost 100 years, cholera reappeared in Africa. Multiple barriers between sewage and drinking waters are required to improve the situation. Often physical elimination of pathogens by sedimentation or filtration is combined with chemical methods such as chlorination, ozonation and irradiation with UV light. The lecture will focus on the chemical methods in more detail and review the redox chemistry and reaction pathways of powerful oxidants. Chlorination is still the most widely used disinfection technique because it maintains a disinfectant residual concentration in the distribution system at a reasonable cost. Inactivation of microorganisms by UV can be performed at the household level by exposing filtered water in plastic bottles to sunlight (solar water disinfection, SODIS). Recent work on new membrane technologies suggests that gravity driven ultrafiltration may become a valid option for low-cost production of drinking water even in rural areas with low-quality source water.



Solar water disinfection (from SODIS Manual)



Gravity driven membrane filtration ([www.eawag.ch](http://www.eawag.ch))

Schwarzenbach, R. P., Egli T., Hofstetter T.B., von Guten U., Wehrli B. 2010. Global Water pollution and human health. *Annu. Rev. Environ. Resources.* 35, 109-136.

SODIS project website: [http://www.sodis.ch/index\\_EN](http://www.sodis.ch/index_EN)