



## **Zuckerberg Institute for Water Research Seminar**

**February 17, 2010 - Wednesday 13:30**

### **An Institute Special Students Seminar**

#### **RES (Renewable Energy Sources) DES (Desalination) – current status**

***Alex Goldstein, Solar and environmental Physics***

The current status of RES (Renewable Energy Sources) desalination is reviewed. The reason why PV-RO (Photovoltaic Reverse Osmosis) and PV-ED (Electrodialysis) are used only in a small niche of desalination use (remote regions) is shown, together with comparative economic analyses. PV-ED has been hailed as a promising technology relevant for developing countries and disaster zones. However, one of the key issues in realizing this potential is achieving independence of all auxiliary energy sources (grid, batteries). The key optimization issues critical to allowing production of a prescribed amount of potable water despite direct connection to the inherently time-varying PV power source are presented.

#### **Desalination of Agricultural Drainage Water**

***Itai Gall, Zuckerberg Institute for Water Research***

Most of the areas within the San Joaquin Valley in California consist of extensively irrigated agricultural lands with an increased salinity of the shallow groundwater in the crop root zones. Drainage systems have been implemented in many parts of the valley in order to keep the saline groundwater below the root zone. The drainage water can be considered as a potential water source, and by desalting it one would regain product water for irrigation and minimize brine volumes for disposal. The seminar will focus on the challenges of agricultural drainage water desalination, which has been studied for both, nanofiltration and low-pressure reverse osmosis desalination techniques. High levels of calcium, sulfate and bicarbonate ions in the feed stream can potentially result in precipitation on the membrane surface as their concentration increases due to recovery and concentration polarization effects. Calcium sulfate precipitation is the more severe form of scaling, since it cannot be prevented by lowering the feed water pH as is the case in calcium carbonate scaling. Accelerated precipitation softening has been proposed as a way to minimize calcium sulfate scaling.