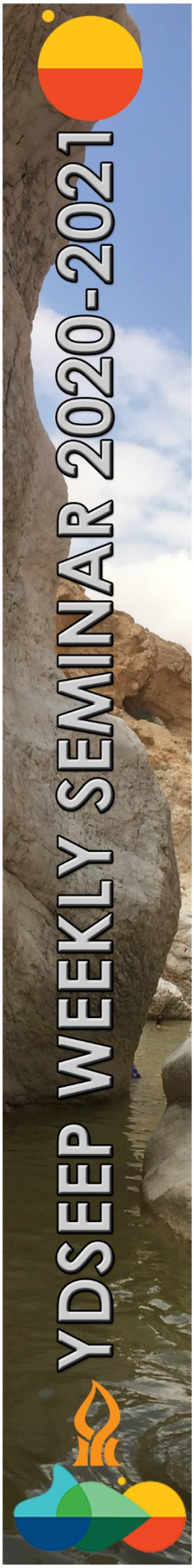

Ben-Gurion University of the Negev
Blaustein Institutes for Desert Research
The Swiss Institute for Dryland Environmental and Energy Research
Alexandre Yersin Department of Solar Energy and Environmental Physics

Title:

Optimization of thermoelectric materials and devices

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Abstract:

In the recent years, demands for energy efficiency have motivated many researchers globe-wide to seek for innovative methods capable of enhancement the efficiency of heat to electricity thermoelectric (TE) energy conversion. Many of these methods incorporated interfaces and sub-micron features, which are much more effective in phonon scattering (rather than electron scattering), for reduction of the lattice contribution to the thermal conductivity, κ_l, without adversely affecting the other involved electronic properties. Although such an approach resulted in increased TE efficiencies, stabilizing the nano-centers while preventing coarsening under practical operation conditions, combined with an additional electronic optimization, is still required.

The presentation will cover a combination of several novel methods approaching toward a higher technology readiness level (TRL) of TE devices. These methods include:

- Phase separation into the sub-micron scale with an enhanced thermodynamic stability.
- Co-doping of known thermoelectric compounds, while one doping element introduces vacancies which are occupied by another doping element, for optimizing the electronic TE properties.
- Functionally graded materials (FGM) generation, with an optimal *ZT* envelope over a wide temperature range.

Besides of the listed above approaches for optimizing the TE compositions, the presentation will cover some of the procedures required for development of practical TE devices.

Date & Location:

Tuesday, October 26, 2021, 11:00

A tentative zoom link (from moodle)