

## סמינר - SEMINAR

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 29.06.2020  
(ז' בתמוז תש"פ), בשעה 14:30 באמצעות הזום : <https://technion.zoom.us/j/98999682945>

מרצה:

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על הנושא:

### **Improving energy efficiency by thermochemical waste-heat recuperation**

The seminar will be given in English

להלן תקציר ההרצאה:

Thermochemical waste-heat recuperation (TCR) is a powerful technology for improving the energy efficiencies of fuel-consuming equipment, including the industrial furnaces, internal combustion engines, gas turbines. TCR is transformation of exhaust gases' heat into chemical energy of a newly produced synthetic fuel that has better calorific properties such as lower heating value, as compared to the available fuel. The main advantages of TCR highlighted in the lecture are (i) rational use of the conventional fuels by improving the technological cycles and (ii) replacement of an available original fuel with an alternative one combined with other energy resources to reduce pollutant emissions. Thermodynamic analysis as well as computational and experimental investigations show that the efficiency of TCR by hydrocarbon fuel reforming heavily depend on process variables such as temperature, pressure, and inlet fuel-to-oxidizer ratios as well as the construction of reformer and type of catalyst. The lecture will provide insight into the rational choice of the reactive fuel reforming process for TCR to ensure the maximal efficiency and minimum heat losses. In particular, the maximum efficiency of a forging furnace with TCR by steam methane reforming in the temperature range of 800-1000°C and the steam-to-methane ratio of 2 is shown to exceed by up to 25% compared to the furnace efficiency with traditional air-exchanger recuperation.

The lecture will specifically address using TCR for gas turbine cycles with specific features including thermodynamic analysis, investigation of heat and mass transfer in the fuel reformer, experimental and computational study of ignition and combustion of synfuel-air mixture and integration of the TCR system into the gas turbine unit. On the basis of the results of this study new ideas are put forward for designing gas burners for efficient combustion of synthetic fuels.

מארח: פרופ' מיכאל שפירא

בברכה,

פנולפ"א אתי סאס

מרכז הסמינרים