



Elbit  
Systems



Israel Aerospace  
Industries



Technion – Israel Institute of Technology  
Faculty of Mechanical Engineering  
Internal Combustion Engines Lab



Grand Technion  
Energy Program



Directorate of Defense Research  
& Development (DDR&D)  
Aeronautical Division



# 8<sup>th</sup> Conference on Propulsion Technologies for Unmanned Aerial Vehicles

## Conference Program

Thursday, January 31, 2019

Shirley and Manny Ravet Auditorium, D. Dan and Betty Kahn Building  
Faculty of Mechanical Engineering, Technion, Haifa

8:30 – 9:00	<b>Welcome and Registration</b>
<b>Opening session</b>	<b>Chairman: Leonid Tartakovsky, Technion</b>
9:00 – 9:30	<b>Welcome:</b> <i>Anath Fischer</i> , Deputy Executive Vice President for Research, Technion <i>Oleg Gendelman</i> , Dean, Faculty of Mechanical Engineering, Technion <i>Yigal Ben-Shabat</i> , Head, Propulsion Branch, Directorate of Defense Research & Development, MAFAT <i>Emanuel Liban</i> , Chairman, Israel Society of Mechanical & Aerospace Engineers
9:30 – 10:00	<b>Keynote lecture:</b> <b>Future engine fuels and their implications</b> <i>Jaal Gandhi</i> , Chairman, Department of Mechanical Engineering, University of Wisconsin-Madison, USA
<b>Plenary session 1</b>	<b>Chairman: Yitzhak (Itche) Hochmann, Edmatech</b>
10:00 – 10:30	<b>Using advanced batteries for propulsion: scope of options</b> <i>Doron Aurbach</i> , Bar-Ilan University
10:30 – 11:00	<b>Research Activities, Challenges, and Future Directions in UAV Propulsion</b> <i>Michael Kass</i> , Fuels and Engines Group, Oak Ridge National Laboratory, USA
11:00 – 11:30	<b>Coffee break</b>
<b>Plenary session 2</b>	<b>Chairman: Michael Shapiro, Technion</b>
11:30 – 12:00	<b>Guide to design of efficient UAV propulsion</b> <i>Emanuel Liban</i> , CEO, Edmatech, Israel
12:00 – 12:20	<b>High Power Density High Efficiency Mechanically Assisted Turbocharged Direct Injection Jet Ignition Engines for Unmanned Aerial Vehicles</b> <i>Albert Boretti</i> , Independent Scientist, Australia
12:20 – 12:45	<b>UAV propulsion from the viewpoint of an operator</b> <i>G. Sheffy</i> , Israel Air Forces, IDF, Israel

12:45 – 12:55	<b>Best Student Poster Award Ceremony</b>
12:55 – 14:00	<b>Lunch</b>
<b>Session "New Concepts "</b>	<b>Chairman: Ariel Dvorjetski, IDF</b>
14:00 – 14:20	<b>In-Cylinder Steam Reforming in UAV Diesel Engines</b> <i>Ilai Sher<sup>1</sup>, Eran Sher<sup>2</sup></i> , 1 – Ontario, Canada; 2 - Technion, Israel
14:20 – 14:40	<b>Laser Energy Transfer – Preliminary Experimental Results</b> <i>Igor Gerlovin</i> , Israel Aerospace Industries
14:40 – 15:00	<b>High-pressure thermochemical recuperation of exhaust gas energy in internal combustion engines</b> <i>Arnon Poran<sup>1,2</sup>, Leonid Tartakovsky<sup>2</sup></i> , 1 – Rafael, 2 – Technion, Israel
<b>Session "Engine Design &amp; Performance – 1"</b>	<b>Chairman: Jacob Feldman, Israel Aerospace Industries</b>
14:00 – 14:20	<b>The Elbit Systems 903 Next Generation Rotary Engine: From Simulation to Prototype</b> <i>Guy Ben-Haim, Nir Geva</i> , Elbit Systems, Israel
14:20 – 14:40	<b>Performance comparison of a direct-injection ICE in diesel and spark-ignition operation with methanol reforming products</b> <i>Andy Thawko, Leonid Tartakovsky</i> , Technion, Israel
14:40 – 15:00	<b>Mechanisms of rotational speed control for propellers with a constant pitch</b> <i>Aviv Turgeman</i> , Aeronautics, Israel
15:00 – 15:20	<b>Coffee break</b>
<b>Session "Alternative Propulsion Technologies"</b>	<b>Chairman: Igor Gerlovin, Israel Aerospace Industries</b>
15:20 – 15:40	<b>Fuel Cells Technology for UAVs</b> <i>Lior Elbaz</i> , Head of the Israeli Fuel Cells Consortium, Bar-Ilan University
15:40 – 16:00	<b>CFD simulation of ethanol steam reforming for external combustion engine</b> <i>Alon Davidy</i> , TOMER Co., Israel
16:00 – 16:20	<b>Maintenance of electric propulsion systems</b> <i>Erez Mosafi</i> , Ledico – Bosch, Israel
<b>Session "Engine Design &amp; Performance – 2"</b>	<b>Chairman: Benjamin Brinder, IDF</b>
15:20 – 15:40	<b>Propulsion System Availability Improvement by Advanced Health Monitoring Techniques</b>

	<b><u>Netanel Dabush, Idan Biner</u></b> , Aeronautics, Israel
15:40 – 16:00	<b>Electro-Magnetic Interference and the UAV Power Plant</b> <b><u>Jonathan Nassau, Menachem Lerer</u></b> , Elbit Systems, Israel
<b>Closing remarks</b> 16:20 – 16:30	<b>Leonid Tartakovsky</b> , Chairman Organizing Committee

\* The Program is subject to changes

Conference language – English

An exhibition will take place in the Conference lobby, where the leading industries will demonstrate their latest developments in the field of UAV propulsion.

**Participation in the Conference is free of charge, however early registration is required (email to [shimrit.w@me.technion.ac.il](mailto:shimrit.w@me.technion.ac.il)).**

**Conference Chairman:**

*Leonid Tartakovsky, Faculty of Mechanical Engineering, Technion – Israel Institute of Technology.  
Email address: [tartak@technion.ac.il](mailto:tartak@technion.ac.il)*

**Conference Secretary:**

*Ms. Shimrit Wagner-Lior, [shimrit.w@me.technion.ac.il](mailto:shimrit.w@me.technion.ac.il) Phone: +972-77-8871668, Fax: +972-4-8295710*

**Best Student Poster Selection Committee:**

Emanuel Liban, Israel Society of Mechanical Engineers – *Chairman*

Idan Biner, Aeronautics

Daniel Budianu, Israel Aerospace Industries

Ariel Dvorjetski, IDF

Jacob Feldman, Israel Aerospace Industries

Yitzhak (Itche) Hochmann, Edmatech

Nir Geva, Elbit Systems

Michael Shapiro, Technion

## Posters session

1. **Numerical Simulation and Parametric Investigation of Boron Loaded Gel Fuel Ramjet**  
David Diskin, Benveniste Natan, Technion - IIT, Israel.
2. **HCCI Combustion Process Management in ICE with TCR by Control of the Methylal Reforming Products Composition**  
D. Buntin, L. Tartakovsky, Technion – IIT, Israel
3. **Pump Based Hydrogen Generator**  
Michael Zolotih, Lev Zakhvatkin, Idit Avrahami, Alex Schechter, Ariel University, Israel
4. **Storage ageing of grease in sealed-for-life high speed rolling bearings**  
Y. Kligerman<sup>1</sup>, H. Kasem<sup>1,2</sup> and M. Varenberg<sup>3</sup>, 1 – Technion – IIT, Israel; 2 - Azrieli College of Engineering, Jerusalem, Israel; 3 - Georgia Institute of Technology, USA
5. **Optimization of Parameters of Internal Combustion Engine**  
A.L. Zhmudiyak<sup>1</sup>, L.M. Zhmudiyak<sup>2</sup> - 1 ,Octopol, Israel; 2 - Rehovot, 7645501, Israel
6. **Intake system for Formula SAE engine**  
Y. Kuhr, I. Barbul, Technion - IIT, Israel
7. **Cooling system for Formula SAE engine**  
L. Finkelman, I. Barbul, Technion - IIT, Israel
8. **Fuel system for Formula SAE engine**  
Y. Boim, I. Barbul, Technion - IIT, Israel
9. **Controlled Radical Production by Non – Thermal Plasma**  
Nir Druker, Gideon Goldwine, Barry Greenberg, Eran Sher, Technion - IIT, Israel
10. **A New Modified Diesel Cycle for Small Aircraft Operating at High Altitude Conditions – A Numerical Simulation**  
Kadmiel Karsenty, Eran Sher, Technion - IIT, Israel
11. **Reforming-Controlled Compression Ignition**  
Amnon Eyal, Leonid Tartakovsky, Technion - IIT, Israel
12. **The benefits of Inverted Brayton cycle and Concept for CHP plants based on Low-Power Micro Turbine Generators**  
Boris Arav<sup>1</sup>, Y. Sizov<sup>2</sup> 1 ,– TurboGEN Tech., 2 – Afeka College, Israel
13. **Particle emission characteristics of an ICE fed with hydrogen rich-reformate**  
H. Yadav, A. Thawko, M. Shapiro, and L. Tartakovsky, Technion - IIT, Israel

\* The Posters Session Program is subject to changes

\*\* A posters session will be open for audience during the whole Conference day. Poster presenters will make a 2-min presentation of their work at 08:00. *Three best student posters will be awarded by certificates and prizes of 1500, 1000 and 500 NIS for the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> places, respectively* donated by the Association of Engineers, Architects and Graduates in Technological Sciences in Israel.