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



9th Conference on Propulsion Technologies for Unmanned Aerial Vehicles

Conference Program

Thursday, January 30, 2020

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

8:30 – 9:00	Welcome and Registration
Opening session	Chairman: Leonid Tartakovsky, Technion
9:00 – 9:30	Welcome: Alon Wolf , Vice President for External Relations and Resource Development, Technion Oleg Gendelman , Dean, Faculty of Mechanical Engineering, Technion Yigal Ben-Shabat , Head, Propulsion Branch, Directorate of Defense Research & Development, MAFAT Emanuel Liban , President, Association of Engineers, Architects and Graduates in Technological Sciences in Israel
9:30 – 10:00	Keynote lecture: New Industry Expectations Drive New Technologies Jeff Ratcliffe , Chief Technical Officer, Northwest UAV, USA
Plenary session 1	Chairman: Yitzhak (Itche) Hochmann, Edmatech
10:00 – 10:30	What's your next invention in UAV propulsion? Innovation and the challenge of uncertainty Yakov Ben-Haim , Technion
10:30 – 11:00	Israel Air Force Quadrennial Defense Review Roadmap for UAS Propulsion Technologies Colonel Dr. A , Head of Engineering Department, Materiel Directorate, Israel Air Force, IDF, Israel
11:00 – 11:25	Coffee break
Plenary session 2	Chairman: Michael Shapiro, Technion
11:25 – 11:50	Using Engine Metamodeling Toward Fault Detection Ohad Gur , IAI – Israel Aerospace Industries, Israel
11:50 – 12:15	UAV Engines – Advanced Manufacturing Process Guido Zanzottera , Zanzottera Technologies Srl, Italy

12:15 – 12:40	Managing the Effects of Impulse Torque <i>Tom B. West</i> , CEO, HFE International, USA
12:40 – 13:05	Surface Engineering for Enhancing Performance of Propulsion Systems <i>Izhak Etsion</i> , Technion, Israel
13:05 – 13:15	Best Student Poster Award Ceremony
13:15 – 14:20	Lunch
Session "New Concepts "	Chairman: Nir Geva , Elbit Systems
14:20 – 14:40	Four-Stroke Diesel Engine with In-Cylinder Steam Reforming for High Altitude Operation <i>K. Karsenty, L. Tartakovsky and E. Sher</i> , Technion, Israel
14:40 – 15:00	Exploring the Use of Hydrogen-Enriched Fuel in an Internal Combustion Engine Powered UAV <i>Guy Ben-Haim, Michael Stanovsky</i> , Elbit Systems, Israel
15:00 – 15:20	Is a Hydrogen Fuel Revolution just around the corner? <i>Michael N. Kubi</i> , Kubigroup Technology and Strategic Consultation, Israel
15:20 – 15:40	Rate Limiting Constraints in Phase-Change-Materials (PCM) for Miniature Aircraft Propulsion Systems <i>Matan Feldman, Dan Michaels, Eran Sher</i> , Technion, Israel
Session "Engine Performance"	Chairman: Jacob Feldman , Israel Aerospace Industries
14:20 – 14:40	Long term maintenance and preservation of UAV propulsion systems <i>Ilay Lerner</i> , Elbit Systems, Israel
14:40 – 15:00	Improved Ignition for Small-scale UAV Engines <i>Joseph Lefkowitz</i> , Technion, Israel
15:00 – 15:20	Malfunction Detection – Parameters Relation Approach <i>Idan Biner</i> , Aeronautics, Israel
15:20 – 15:40	Centering and friction reduction between parts of the cylinder-piston group <i>Y. Kligerman and I. Cohen</i> , Technion, Israel
15:40 – 16:00	Coffee break
Panel session	Development trends in UAV Propulsion – where and when?
16:00 – 16:30	Moderator: Jacob Feldman , Israel Aerospace Industries Panelists: J. Ratcliffe (Northwest UAV), E. Liban (Edmatech), L. Tartakovsky (Technion), N. Geva (Elbit), I. Biner (Aeronautics)
Closing remarks 16:30 – 16:35	Leonid Tartakovsky , 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).

Conference Chairman:

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

Conference Secretary:

Ms. Shimrit Wagner-Lior, 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

Eran Sher, Technion

Posters session

1. **Akash Kalghatgi**, Porpatham E and Thangaraja J, Application of UAV for automated roadway system. Vellore Institute of Technology, Vellore, India
2. A.L. Zhmudiyak, L.M. Zhmudiyak, Method of Gas Exchange for Four-Stroke Engine with a Port in the Cylinder Sleeve. R&D, Natural Intelligence, Ltd., Israel
3. B. Arav¹, **Y. Sizov**², B. Gurevich³, Opportunities and prospects of hybrid solar powered and solar assisted conventional and self-driving e-vehicles. 1- Community of scientists and experts "RHV", Rehovot, Israel; 2 - Faculty of Mechanical Engineering, The Afeka Tel-Aviv Academic College of Engineering, Tel Aviv, Israel; 3 - Sami Shamoon College of Engineering (SCE), Ashdod, Israel
4. **Haibo Zhang**, Zhou Chen and Izhak Etsion, Model for Friction Reduction Effect of Soft Coating Materials. Department of Mechanical Engineering, Technion, Haifa, Israel
5. **Denis Buntin**, Leonid Tartakovsky, Reforming-controlled compression ignition with OME₁ synthetic e-fuel: engine simulations and heat-release rate investigation. Faculty of Mechanical Engineering, Technion, Israel
6. **Amnon Eyal**, Leonid Tartakovsky, Second-Law Analysis of the Reforming-Controlled Compression Ignition. Faculty of Mechanical Engineering, Technion, Israel
7. **Adi Zur**, Michael Shapiro, Leonid Tartakovsky, Development of a compact reformer for onboard hydrogen production in IC engine with High-Pressure Thermochemical Recuperation. Faculty of Mechanical Engineering, Technion, Israel
8. **David Diskin**, Leonid Tartakovsky, Reduction of combustion irreversibility through combining Fuel Cell and Internal Combustion Engine. Faculty of Mechanical Engineering, Technion, Israel
9. **Yahav Boim, Andy Thawko**, Leonid Tartakovsky, Study on Particle Formation from Hydrogen-rich Reformate Combustion Process in ICE. Faculty of Mechanical Engineering, Technion, Israel
10. **Asher Lichinitzer**¹, Leonid Tartakovsky², Development of a novel direct gaseous injector for IC engine with High-Pressure Thermochemical Recuperation. 1 - Rafael Advanced Defense Systems; 2 – Technion, Israel
11. **Karin Linshitz**¹, Joseph Lefkowitz¹, Moshe Berreby^{1,2}, Flow characterization of arc plasma wind tunnel by laser absorption spectroscopy of nitric oxide and water molecules. 1 – Technion, Israel; 2 - Rafael Advanced Defense Systems
12. **Galia Faingold**, Joseph K. Lefkowitz, A Numerical Investigation of NH-3/O₂/He Ignition Limits in a Non-Thermal Plasma. Faculty of Aerospace Engineering, Technion, Israel
13. **I. Laso, N. Rozin**, J. Van der Lee and J.K. Lefkowitz, A New Ignition Tunnel Design. Faculty of Aerospace Engineering, Technion, Israel

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