



The 61st Israel Annual Conference on **AEROSPACE SCIENCES** 9-10 March 2022

IACAS is an important annual event on the calendar of the aerospace community in Israel and arouses a great deal of interest abroad. Taking part in this yearly event are engineers, scientists, and experts in the field of aeronautics and astronautics, representing well-known local aerospace agencies and industries, as well as participants from major research centers worldwide.

The two-day conference covers new research, presents up-to-date technology, and provides a forum for exchanging new ideas.

Chair, Organizing Committee

Gila Ghilai, Israel Aerospace Industries

Chair, Program Committee

Prof. Avshalom Manela, Aerospace Engineering Faculty, Technion

Wednesday, March 9, 2022
Shefayim Conference Center
9:00-12:40

Time	Session	Speaker	Chair
9:00	Welcome Address	Ms. Ghilai Gila, Chair IACAS-61 st	
9:05	Keynote Lecture	Mr. Boaz Levi - CEO IAI	Ms. Ghilai Gila
9:50	Plenary Lecture I	Prof. Anthony M. Waas, Richard a. Auhl Department Chair, Department of Aerospace Engineering, University of Michigan	
10:40	Coffee Break		
11:00	Plenary Lecture II	Prof. Gil Iosilevskii – Faculty of Aerospace Engineering, Technion	Prof. Frankel Itzchak
11:50	Plenary Lecture III	Prof. Huang , Department of Mechanical Engineering, The University of Hong Kong	Prof. Manela Avshalom
12:40	Lunch		

Wednesday, March 9, 2022
Shefayim Conference Center
14:00-16:05

Guidance, Navigation, and Control - I			WeL1T1
#	Title	Authors	
1	Terrain Following of a Slung Load Carried by Multiple Multirotors	Levy, Tomer (Technion) 117116; Idan, Moshe (Technion - Israel Institute of Technology) 13801	
2	Control Scheme for Coordinated Transport of an Unknown Slung Load by a Team of Multirotors	David Marcovici*, Moshe Idan (66222*,13801)	
3	A Combined Linear-Quadratic /Bounded Controls Differential Game Guidance Law against Multiple Evaders	Turetsky, Vladimir (Ort Braude College) 18918; Weiss, Martin (Dept. Aerospace Engineering, Technion Institute, Haifa) 39797; Shima, Tal (Technion) 25656	
4	Differential Games Guidance with an Intercept Angle Constraint and Varying Speed Adversaries	Adi Mishly, Vitaly Shaferman* (117477,66529*)	
Combustion and Reactive Flows - I			WeL1T2
#	Title	Authors	
1	Numerical Investigation of Evaporating Droplets in Vortical Flows	Or Avni, Yuval Dagan* (117189,83143*)	
2	Defining a Laminar Flame Speed Relevant for Spray Flames – Effect of Reactive Initial Conditions on Flame Propagation in Sprays	Joseph KalyanRaj I., Yuval Dagan* (117191,83143*)	
3	Pulse Energy Effects in Nanosecond-Pulsed High-Frequency Discharge Ignition	Si Shen*, Iker Laso, Natali Rozin, Joseph Lefkowitz (117201*,103638,92941,93555)	
4	Ignition Studies on a Non-Toxic Hypergolic Hybrid Rocket Propellant	Syamantak Nath*, Iker Laso, Joseph Lefkowitz (103661*,103638,93555)	
5	Enhancement of Cold Plasma Reactions and Energy Deposition by Multi-Voltage Pulse Discharges	Druker, Nir (Technion) 74861; Goldwine, Gideon (Technion) 74862; Greenberg, J. Barry (Technion) 37637; Sher, Eran (Technion) 37862	
Autonomous Systems, Avionics and Human-Machine Interfaces			WeL1T3
#	Title	Authors	
1	Towards Efficient Belief Space Planning	Moran Barenboim*, Vadim Indelman (117397*,39607)	
2	Towards involve-MI: Informative Planning with High-Dimensional Non-Parametric Beliefs	Rotman, Gilad (Technion) 118059; Indelman, Vadim (Technion - Israel Institute of Technology) 39607	
3	Hybrid Belief Pruning with Guarantees for Viewpoint-Dependent Semantic SLAM	Tuvy Lemberg*, Vadim Indelman (118065*,39607)	
4	Consensus-Based Formation Control Using a Novel Signed Protocol	Tarra, Sudhakar (Indian Institute of Technology Bombay) 118062; Mukherjee, Dwaipayan (Indian Institute of Technology Bombay) 51093	
Fluid Mechanics, Flow Control, Turbulence and Transition - I			WeL1T4
#	Title	Authors	
1	Aerodynamic Active Flow Control using Hybrid, Momentum-Based Actuation	Michael DeSalvo, Ari Glezer* (82229,37652*)	
2	Large Scale Application of Suction and Pulsed Blowing to Separation Region in the Junction of Pylon and Swept Wing	Shay Monat*, Bar Mizrahi, Ofek Drori, Avi Seifert, Vitaly Soudakov (103406*,93479,93473,37635,117210)	
3	Airfoil with Integrated Distributed Propulsion	Ofek Katz*, Avi Seifert (117268*,37635)	
4	Linear Modal Instabilities Around Post-stall Swept and Tapered Wings	Anton Burtsev*, Vassilis Theofilis (92888*,52021)	
Student Paper - I			WeL1T5
#	Title	Authors	
1	On the operation of a microjet engine's vaporizer under steady-state conditions	Ori Kam*, Yeshayahou Levy (75113*,37811)	
2	Optimization of Flow and Reaction Models for Capturing Gas-Phase Cellular Detonation Properties	Zadok, Naor (Tel Aviv University) 117180; Oruganti, Surya Kaundinya (Tel Aviv University) 117179; Kozak, Yoram (Tel Aviv University) 117178	
3	Cornetto Missile Testbed	Arina Erivman* (117343*)	
4	Design, Analyses, and Flutter Testing of the Active Aeroelastic Aircraft Testbed (A3TB) Platform	Amit Gabay, Lucy Edery-Azulay, Daniella Raveh*, Tsoof Joels, Noam Yechieli, Yevgeni Grichanovsky, Matan Winter, Oren Montgomery, Saber Boulahjar, Yishai Glam, Guy Gordon Biberstein (117205,103318,37874*,93187,117305,117221,117227,117233,117232,117229,117234)	
5	Savior Student Project - Emergency E-VTOL aircraft for urban environment rescue	Sharon Ben Yishay* (117449*)	

Wednesday, March 9, 2022
Shefayim Conference Center
 16:25-18:05

Guidance, Navigation, and Control - II			WeL2T1
#	Title	Authors	
1	Robust Trajectory Tracking of a Multicopter Using Linear Quadratic Differential Game Approach	Bhargav Jha*, Ujjwal Gupta, Vladimir Turetsky, Tal Shima (82530*,117197,18918,25656)	
2	Optimal Impact-Time Control Guidance with Terminal Angle Constraint Using Quadratic Kinematics Approximation	Merkulov, Gleb (Technion) 103610; Weiss, Martin (Dept. Aerospace Engineering, Technion Institute, Haifa) 39797; Shima, Tal (Technion) 25656	
3	Analytical Description of Three-Dimensional Reachable Set for Dubins Car	Patsko, Valery, S. (Institute of Mathematics and Mechanics, Ural Branch of Russian Ac) 22392; Fedotov, Andrey Anatol'evich (Institute of Mathematics and Mechanics (IMM), Ural Branch of the) 60502	
4	State Dependent Coefficient Form Based Solution of the Quadratic Optimal Control for Nonlinear Systems	Rusnak, Ilan (RAFAEL) 16164; Levy, Maital (Technion - Israel Institute of Technology) 40050	
Astroynamics, Space Systems and Rarefied Gas Flows			WeL2T2
#	Title	Authors	
1	Continuous Thrust Rendezvous Maneuver of Satellites, While Reducing Close Proximity Risks	Mishne, David (Technion) 37549	
2	Autonomous Self-Stabilizing In-Spacecraft Tracker with Electrical Novel Thrusters (ASSISTENT)	Monat, Shay (Tel Aviv University) 103406; Korman, Melody (Tel-Aviv University, Israel) 117174; Seifert, Avi (Tel Aviv University) 37635; Steinmetz, Raz (Yerucham Science Center) 117175; Beutel, Moshe (Israeli Aerospace Industries) 117176; Kosarnovsky, Benny (Israeli Aerospace Industries) 117177	
3	Computation of hypersonic flow around a periodic array of roughness elements using kinetic theory	Angelos Klothakis*, Kamil Dylewicz, Vassilis Theofilis, Saurabh Sawant, Deborah Levin (117485*,117394,52021,103625,75219)	
4	Modeling of Inter-Planetary Orbits by Canonical Methods	Vladimir Martinusi*, Nir Vegh (117501*,117500)	
5	On the Linear Stability of a Compression Corner Flow Using Kinetic Methods	KARPUZCU, IRMAK TAYLAN (UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN) 117495; Cerulus, Nicolas (University of Liverpool) 92995; Levin, Deborah (University of Illinois at Urbana-Champaign) 75219; Theofilis, Vassilis (University of Liverpool) 52021	
Aerodynamics, Fluid Dynamics, and Aeroacoustics			WeL2T3
#	Title	Authors	
1	Three Dimensional Flowfield over Swept and Tapered Finite Span Wings at a Low Reynolds Number	Jacob Neal, Jack Ottinger, Brandon Gares, Miki Amitay* (117185,117186,117187,37893*)	
2	Multioutput Autoregressive Method for Aeroelastic System Identification and Flutter Prediction	Tomer Ben Asher*, Daniella Raveh (118060*,37874)	
3	Experiments in a hypersonic miniature Ludwig tunnel at different Reynolds numbers on a flat-face spiked-body at a freestream Mach number of 6	Karthick SK*, Soumya Ranjan Nanda, Jacob Cohen (118063*,118064,37502)	
Aircraft Structural Mechanics and Dynamics, Fatigue Life Evaluation			WeL2T4
#	Title	Authors	
1	Effects of Additive Manufacturing inherent defects on the Fatigue behavior of Ti-6AL-4V: An experimental study	Carmel Matias* (42211*)	
2	Failure Envelope for EA 9394 Paste Adhesive under Mixed Mode Stress Conditions for Composite Adhesive Joints	Aviad Levi Sasson*, Yuval Freed (93314*,37509)	
3	Phase-Field Model for Unidirectional Composite Materials	Shirly Cherevatsky*, Zohar Yosibash (117457*,61527)	
4	Equivalent Cavity Assumption – a Mathematical Model for Damage Identification and Quantification	Farajun, Itay (Technion) 66438; Durban, David (Technion) 43072; Karp, Baruch (Technion) 37854	

A

Student Paper - II		WeL2T5
#	Title	Authors
6	DroNet - a solution for intercepting hostile drones in an urban environment.	Yoel Lasry*, Achia Cohn, Amit Elharar, Eden Kahlon, Yaniv Amsellem (117464*,117465,117466,117467,117468)
7	Concept for use of modular parts for flight control systems	Deepon Roy*, SOUMYAJEET DEY (117285*,117293)
8	Vulture (Transformer	Gilad Timar*, Rotem Bracha, Nimrod Yasniger, Adi Mishly, Chaim Hyatt, Idan Ceausu (117473*,117475,117476,117477,117478,117479)
9	HUJI's Rocketry Student Club	zabari, michal (HUJI) 117496; jayson, Avital (HUJI) 118575
10	Elevator to horizon - Student Project	Yakir Tuson*, Ben Gad, Itay Reich, Nadav Navon, Shahar Lavi, Geva Nagar (117516*,117517,117522,117519,117520,117523)

Thursday, March 10, 2022
Churchill Hall, Technion, Haifa
9:00-13:30

Time	Session	Speaker
9:00	Opening Address	Aerospace Engineering Dean, Prof. Tal Shima
9:05	Technion Welcome	Technion President
9:10	Plenary Lecture I	Prof. Richard Miles - Princeton University and Texas A&M
10:00	Coffee Break	
10:30	Plenary Lecture II	Mr. Gideon Landa
11:20	Award Ceremony	Students Papers and Projects Award Ceremony
12:00	Lunch	

Thursday, March 10, 2022
Technion, Haifa
 13:30-15:35

Guidance, Navigation, and Control - III			ThL1T1
#	Title	Authors	
1	The Lady Going Home, the Bandit and the Body-Guard Game	Rusnak, Ilan (RAFAEL) 16164	
2	Decoy-Assisted Evasion Guidance	Weiss, Martin (Dept. Aerospace Engineering, Technion Institute, Haifa) 39797; Nivison, Scott (Air Force Research Laboratory, Eglin AFB) 117470; Shima, Tal (Technion) 25656; curtis, jess (air force research lab) 64234	
3	Delayed Decision Guidance Using Virtual Target Approach	Merkulov, Gleb (Technion) 103610; Weiss, Martin (Dept. Aerospace Engineering, Technion Institute, Haifa) 39797; Shima, Tal (Technion) 25656	
4	Deep Neural Networks for Spurious Harmonic Signal Filtering	Omer Cohen*, Isaac Yaesh, ADRIAN-MIHAIL STOICA (117685*,17472,16673)	
Regular Session - Combustion and Reactive Flows - II			ThL1T2
#	Title	Authors	
1	Feasibility of Electrically-Operated Solid Propellant Mini-Thrusters, 5 - 100 N, for Space Applications	Moshe Ben-Reuven*, Inna Zamir, Alon Gany, Dan Grinstein (117459*,50700,37597,82997)	
2	Thrust Vectoring and Aft Burner System for Increasing Survivability of Micro Jet UAVs	Shitrit, Dor (Technion) 60493; Levy, Yeshayahou (Technion) 37811	
3	A Simple Model of a Bi-Component Fuel Spray Diffusion Flame	Gershon Katz*, J. Barry Greenberg (37640*,37637)	
4	Study of Detonation in Oxygen and Liquid Ethanol Mixture for PDE Application	Hertzel Kadosh*, Dan Michaels (93477*,42894)	
5	Interactions of flow instabilities and chemical kinetics in reacting shear flows	Guy Arad Levi*, Yuval Dagan (117526*,83143)	
Aerospace Design, Manufacturing, and Maintenance			ThL1T3
#	Title	Authors	
1	Electrically Powered Landing Gear System for Transport Aircraft Taxiing	Berlowitz, Ilan (IBAero) 37547	
2	Aircraft High Power Avionics Cooling System	Berlowitz, Ilan (IBAero) 37547	
3	Novel Design Optimization Course at Aerospace Faculty - Teaching Experience	Khosid, Savely (Rafael) 38135	
4	Novel Scalable Vacuum Infusion Approach for Manufacture of One-Shot Omega Stiffened Panels	zvi deutsch* (117486*)	
5	A Preliminary Design Tool for a Flexible Wind-Tunnel Slender Body Model	Yaara Karniel*, Daniella Raveh, Ariel Drachinsky, Yaron Ben-Shmuel (92929*,37874,60472,103325)	
Industrial Projects - I			ThL1T4
#	Title	Authors	
1	Starting and Stopping Loads Validation in Israel's Aerospace Industries Supersonic High-Speed Wind Tunnel	Eliyahu Marko* (117188*)	
2	Development of Multifunctional Light weighted 3D printed Lattice Structures	Osnat Fried Hayun*, Dana Mezan (117339*,117341)	
3	Midcourse Guidance Using Neural Networks	Natan Grinfeld*, Isaac Yaesh, Joseph Z. Ben-Asher (37821*,17472,11751)	
4	The influence of bonding process environmental conditions and adhesive working life on the bond quality of an epoxy adhesive	Elie Bokobza*, Anthony Green (117313*,37560)	
5	SAFETY HAZARDS IDENTIFICATION USING AI	Efraim Feiglin* (117327*)	
Fluid Mechanics, Flow Control, Turbulence and Transition - II			ThL1T5
#	Title	Authors	
1	Miniaturization of Suction and Oscillatory Blowing Actuator Array in Water	Bruce VonNiederhausern*, Avi Seifert (117425*,37635)	
2	Rayleigh and Fanno Flows – An Optimal Control Approach	Joseph Z. Ben-Asher* (11751*)	
3	Bi-Global Stability Analysis of a Partially Filled Pipe Flow	Daniel Flanagan*, Helio Ricardo de Aguiar Quintanilha Junior, Robert J Poole, Vassilis Theofilis (117420*,82115,117446,52021)	

Thursday, March 10, 2022
Technion, Haifa
 16:00-18:00

Computational Fluid Dynamics, Meshing and Visualization			ThL2T1
#	Title	Authors	
1	Application of Lubrication Models of Gravity-Driven, Particle-Laden Flow of Non-Newtonian Fluid on a Vertical Wall	Shilav, Ramin (Rafael LTD) 74527	
2	Implementation of a time-stepping global stability analysis approach into compressible OpenFOAM™ solvers	Kamil Dylewicz*, Nicolas Cerulus, Vassilis Theofilis (117394*,92995,52021)	
3	A Preconditioned Krylov Method for Turbulent Flow Simulations on Unstructured Grids	Mark Wasserman, Yair Mor-Yossef, Ya'eer Kidron, Yuval Levy* (60378,41890,103687,37722*)	
4	Numerical Simulation of a Rotating Detonation Ramjet Combustor	Tuashi, Asaf (Technion IIT) 74782; Wasserman, Mark (Toga Networks) 60378; Michaels, Dan (Technion) 42894	
V/STOL and Rotary Wing Configurations			ThL2T2
#	Title	Authors	
1	Propeller Effect on Air-Vehicle	Gur, Ohad (Israel Aerospace Industries) 37674	
2	Hover-Propeller Full Design Cycle - Performance and Acoustic	Gur, Ohad (Israel Aerospace Industries) 37674; Silver, Jonathan (IAI) 93278; Dítě, Radovan (Mejzlik Propellers s.r.o.) 116847; Sundhar, Raam (Mejzlik Propellers s.r.o.) 116849	
3	Does Propeller Performance Depend on Airfoil Design?	Gur, Ohad (Israel Aerospace Industries) 37674	
4	Contra Rotating Hover Propeller Design	Gur, Ohad (Israel Aerospace Industries) 37674; Silver, Jonathan (IAI) 93278; Dítě, Radovan (Mejzlik Propellers s.r.o.) 116847; Sundhar, Raam (Mejzlik Propellers s.r.o.) 116849	
Parameter Estimation, Fault Detection, and Isolation			ThL2T3
#	Title	Authors	
1	Video Navigation and Its Integration with the Onboard Inertial Navigation System	Kolosov, Kirill (IITP RAS) 117471; Miller, Alexander (Institute for Information Transmission Problems, RAS) 48059; Miller, Boris (Institute for Information Transmission Problems RAS and Monash U) 15083; Popov, Alexey (Institute for Information Transmission Problems of the Russian A) 65844; Stepanyan, Karen (Institute for Information Transmission Problems) 65845	
2	Temperature-dependent Optimized Calibration of a MEMS Inertial Measurement Unit	Eden Meirovich, Daniel Choukroun* (117487,12355*)	
3	Novel Results on Mode Estimation in Jump Systems	Yair Harpaz, Daniel Choukroun*, Izchak Lewkowicz (117491,12355*,53940)	
4	Stochastic Interception Using Particle Filtering and Smoothing, and A Time-Varying Delayed-Information Game	Liraz Mudrik*, Yaakov Oshman (93313*,22240)	
Industrial Projects - II			ThL2T4
#	Title	Authors	
1	ITALY CAR CABLE CRASH 2021	Shay Idel, Ofer Doani* (93524,105524*)	
2	מתודולוגיה ביצוע ניתוחי בדיקות BIT (Built In Test) במערכות מורכבות	Igor Lukatsky* (82627*)	
3	מעבר התחזוקה משחקן ראשי לחדשני SmarTest	Elad Rosenbloom* (105528*)	
4	בראשית-1 למה כמעט נחתנו על הירח ולקראת בראשית-2	Maayan Gutman* (117371*)	