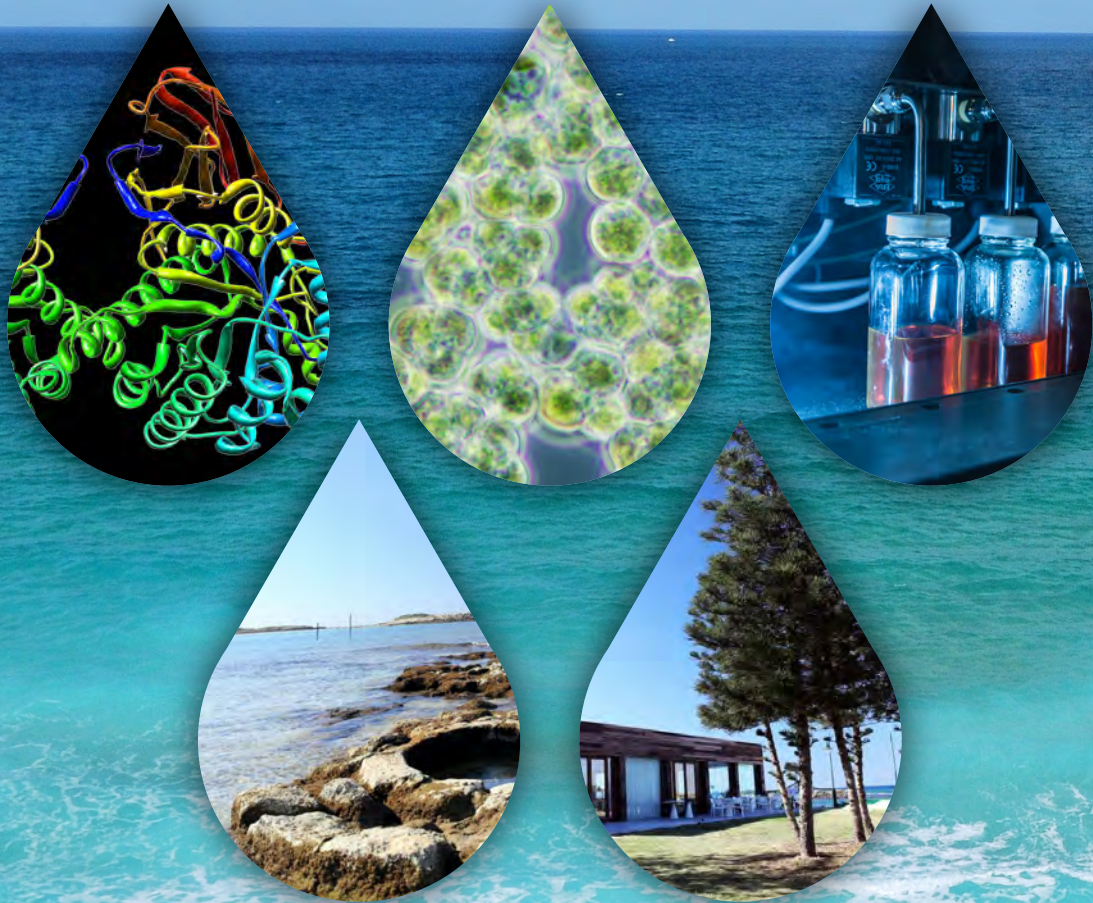


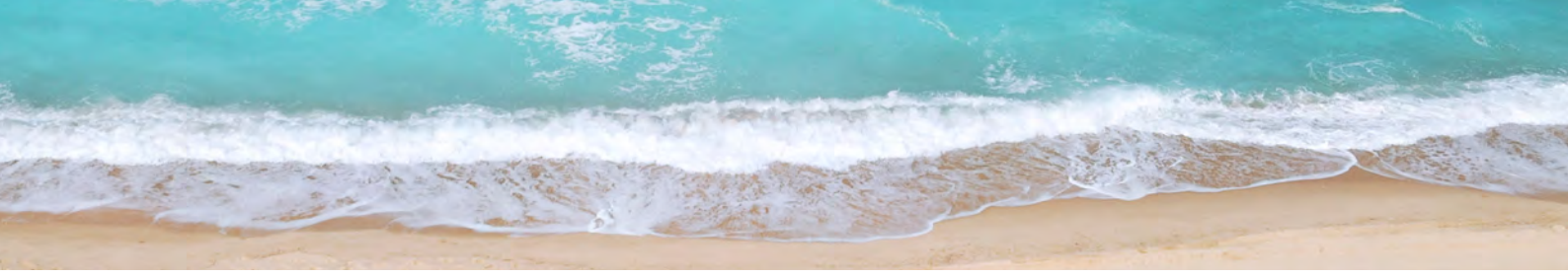


3rd Solar Fuels I-CORE Workshop

September 12th-15th, 2016

Kibbutz Nahsholim Hotel, Nahsholim, Israel





ORGANIZING COMMITTEE

Prof. Gideon Grader

Technion – Israel Institute of Technology, Scientific director of the Solar Fuels I-CORE

Prof. Ed Bayer

Weizmann Institute of Science, Scientific Chairman

Prof. Sammy Boussiba

Ben-Gurion University of the Negev

Prof. Moti Herskowitz

Ben-Gurion University of the Negev

Prof. Avi Levy

Weizmann Institute of Science, Chairman

Prof. Avner Rothschild

Technion – Israel Institute of Technology

Merav Miller

Technion – Israel Institute of Technology

SPONSORS

This workshop was supported by

The I-CORE Program of the Planning and Budgeting Committee
and The Israel Science Foundation (Grant No. 152/11)

The Solar Fuels Israeli Center of Research Excellence (I-CORE) is part of the Fuel Choices initiative program of the government of Israel to generate innovative solutions for the sustainable production of liquid fuels.

This workshop was partially supported by

The Grand Technion Energy Program (GTEP)

Thanks to the generosity of

The Leona M. and Harry B. Helmsley Charitable Trust Program in Alternative Energy

A scientific collaboration of The Technion – Israel Institute of Technology and

The Weizmann Institute of Science

And by the Alternative Energy Research Initiative (AERI)

at the Weizmann Institute





General information

SEMINAR VENUE

Kibbutz Nahsholim Hotel
04-6399533

REGISTRATION

Registration will be at the hotel entrance. Upon registration you will receive your seminar kit containing the program and a name tag. Please wear your name tag to all sessions and events.

ABSTRACTS AND PROGRAM

All abstracts and program can be viewed online at <http://solarfuels2014.net.technion.ac.il/program/>

INTERNET ACCESS

The hotel offers free internet access.

PROJECTION

Participants who will be giving a talk should bring their PowerPoint on a USB memory stick. Please load your presentation onto the seminar computer during the break before your session.

LUNCHEAS AND DINNERS

All meals are planned in the Rosemarin restaurant. The Gala dinner will be on the lawn.

LECTURES

All lectures will be in the Boutique restaurant.

POSTERS

There will be one poster session during the seminar which will take place in the deck porch of the Rosemarin restaurant. Presenters are requested to stand next to their posters.

SOCIAL PROGRAM

MONDAY, SEPTEMBER 12, 2016

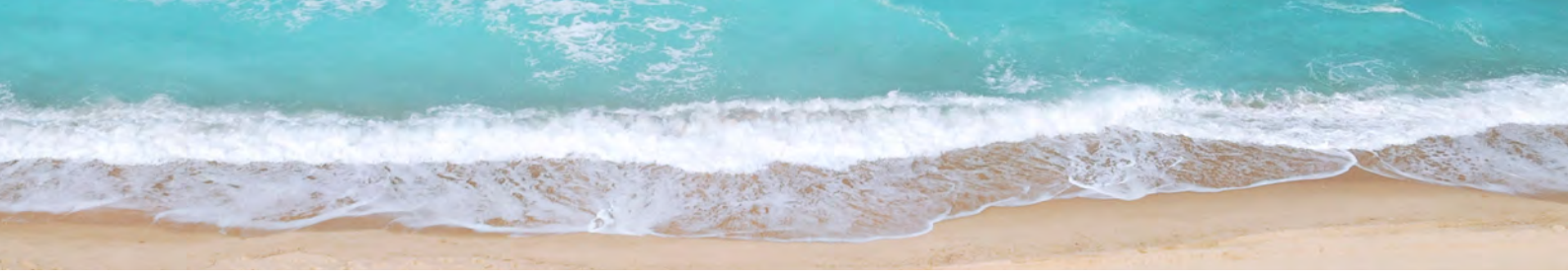
20:30-22:30

- > Lecture & Movie: Marine archeology of the site by Dr. Kurt Raveh.
All registered participants are welcome to attend.

TUESDAY, SEPTEMBER 13, 2016

14:00-16:00

- > Guided tour of Nahsholim (Kibbutz, museum and/or archeological excavations) or free time at the beach.
Glass Factory Museum, Kibbutz Nahsholim (Only for those who registered to the tour).



Many spectacular treasures have been discovered over the years at Dor beach, sea and land: deep sea divers uncovered shipwrecks and their contents, and on the beach in Tel Dor archaeologists uncovered the fascinating Old Town generation. All findings are presented in a unique and accessible labyrinth of the dark stone of Glass Factory Museum. The building itself, impressive two-story stone building, was part of a factory of glass bottles for Baron Rothschild winery during the First Aliyah. Today Dor permanent display of hundreds of archaeological findings, emphasizing the diversity of cultural, religious and material held in the city of ancient generation, reflected in the exhibit.

> TEL DOR (Only for those who registered to the tour)

Tel Dor (Kh. el-Burj), is a large mound located on Israel's Mediterranean coast, about 30 km south of Haifa. It is identified with D-jr of Egyptian sources, Biblical Dor, and with Dor/Dora of Greek and Roman sources. The documented history of the site begins in the Late Bronze Age (though the town itself was founded in the Middle Bronze Age, c. 2000 BCE), and ends in the Crusader period. The port dominated the fortunes of the town throughout its 3000-odd year history. Its primary role in all these diverse cultures was that of a commercial entry port and a gateway between East and West.

20:00-22:00

- > Gala Dinner, with Music by the "Old News" group.
All registered participants are welcome to attend.

WEDNESDAY, SEPTEMBER 14, 2016

14:00-17:00

- > Visit of Caesarea National Park or free time at the beach.
For those who pre-booked the tour to Caesarea, departure will be from the reception at 13:50.

The Caesarea Antiquities National Park presents a cultural continuity of 2,500 years of history, and therefore it is a site of national and international importance with impressive archeological sites from the Roman, Byzantine, Arab, Crusaders and Mamluk periods.

For more details, see: <http://www.parks.org.il/sites/English/ParksAndReserves/caesarea/Pages/default.aspx>



Secretariat:

Flying Carpet from the Imagine group,
PO Box 8079
Tel Aviv 6811421, Israel

Tel. +972 3 5139988

E-mail: office@flying.co.il



WORKSHOP PROGRAM

› Monday, September 12th, 2016

15:30-17:00 Registration and Room Check-In

17:30-19:00 ***Opening Session***

Chairman: **Avi Levy**, Weizmann Institute of Science

17:30-17:40 **Avi Levy**, Weizmann Institute of Science
Opening Remarks

17:40-18:00 **Gideon Grader**, Technion
Welcome Address and Project Overview

18:00-18:30 **Martin Keller**, National Renewable Energy Laboratory – NREL, USA
Using the power of the sun – the road ahead

18:30-19:00 **Ron Milo**, Weizmann Institute of Science
Sugar synthesis from CO₂ in E. coli

19:00-20:30 🍴 Dinner

20:30-22:30 **Lecture & Movie:**
Marine archeology of the site by **Dr. Kurt Raveh**



› Tuesday, September 13th, 2016

07:30-08:30  Breakfast

08:30-13:00 **Morning Session**
Chairman: **Ed Bayer**

08:30-09:00 **Paul Gilna**, BioEnergy Science Center – BESC, USA
Overcoming recalcitrance in the BioEnergy Science Center, BESC; how far have we come?

09:00-09:15 **Sergey Malitsky**, Asaph Aharoni's Group, Weizmann Institute of Science
Implementation of metabolomics in biofuel research

09:15-09:30 **Moran Oliva**, Gad Galili's Group, Weizmann Institute of Science
Utilizing metabolic engineering in plants to enhance pathways for biosynthesis of higher alcohols as potential biofuels

09:30-10:00 **Maytal Caspary Toroker**, Technion
Theoretical modeling of the metal/oxide interface

Jeremie Zaffran, Technion
Modeling catalysis of water oxidation

Natav Yatom, Technion
Modeling hematite water splitting with theoretical methods

10:00-10:30 **Avihai Danon**, Weizmann Institute of Science
Photosynthetic efficiency, insights from whole organism studies

Bat Chen Wolf, Weizmann Institute of Science
Fast disulfide-based control of photosynthesis

10:30-11:00  Coffee Break

Chairwoman: **Maytal Caspary Toroker**

11:00-11:30 **Blake Simmons**, Joint BioEnergy Institute, USA
Driving the future: Development of advanced biofuels at the Joint BioEnergy Institute

11:30-12:00 **Yifat Nakibli**, Lilac Amirav's Group, Technion
Sculpting Photocatalysts on the Nano Scale

Nathan Walton, Lilac Amirav's Group, Technion
Mechanistic studies of catalyst photodeposition



- 12:00-12:30 **Simon Barak**, Ben-Gurion University
Natural stress tolerance in extremophyte relatives of *Arabidopsis thaliana*
- Gil Eshel**, Ben-Gurion University
A systems biology analysis of multiple abiotic stress tolerance in *Anastatica hierochuntica*, True Rose of Jericho, a Negev Desert relative of *Arabidopsis thaliana*
- 12:30-12:45 **Efim Korytnyi**, Ben-Gurion University
Supercritical water gasification of carbonaceous waste materials for hydrogen production: Problems of heat recovery
- 12:45-13:00 **Natalia Kemper**, Ilana Kolodkin-Gal's Group, Weizmann Institute of Science
The metabolism and recycling of secondary plant cell-wall polysaccharides in *Bacillus subtilis* biofilms.

13:00-14:00 🍴 Lunch

14:00-16:00 **Guided tour of Nahsholim**, Kibbutz, museum + archeological excavations or free time at the beach

16:00-19:30 **Evening Session**
Chairman: **Ronny Neumann**

16:00-16:30 **Antoni Llobet**, ICIQ, Institute of Chemical Research of Catalonia
Molecular water oxidation catalysis within the energy context

16:30-16:50 **Roe Amit**, Technion
Genetically encoded synthetic RNA scaffolds

16:50-17:10 **Galia Maayan**, Technion
A biomimetic approach for the design of water oxidation electrocatalysts

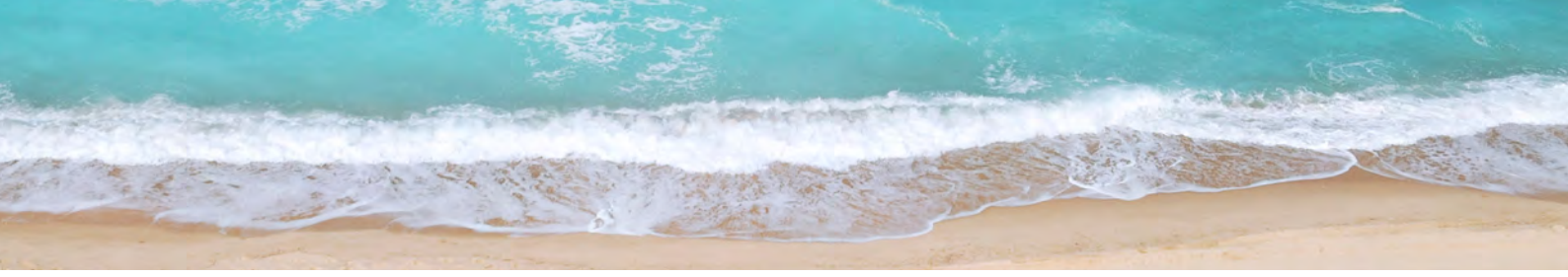
17:10-17:30 **Oded Beja**, Technion
Got energy? Marine metagenomics to the rescue!

17:30-18:00 ☕ Coffee Break

Chairman: **Sammy Boussiba**

18:00-18:30 **Natali Utsis**, Miron Landau's Group, Ben-Gurion University
Novel bifunctional catalysts based on crystalline multi-oxide matrices containing iron ions for CO₂ hydrogenation to liquid fuels and chemicals

Meital Amoyal, Ben-Gurion University
Fundamentals of the active catalytic phases of a novel high-performance spinel catalyst for carbon dioxide conversion to liquid fuels through hydrogenation



- 18:30-19:00 **Yuval Shoham**, Technion
The hemicellulolytic system in *Geobacillus stearothermophilus*
- Shifra Lansky**, Hebrew University of Jerusalem
Structure-function studies of an extracellular arabinanase suggests a unique “harpoon” mechanism of action
- 19:00-19:30 **Gideon Grader**, Technion
Synthesis of nanofiber catalysts by electrospinning
- Avigail Landman**, Technion
New approach for water electrolysis using photoelectrochemical cell
- 20:00-22:00 🍴 **Gala Dinner, with Music by the “Old News” group**
Opening remarks:
Anat Bonshtien, Prime Minister office, Fuel Choices Initiative Technology and regulation manager
Bracha Halaf, Ministry of National Infrastructures, Energy and Water Resources, Chief Scientist



› Wednesday, September 14th, 2016

07:30-08:30 🍴 Breakfast

08:30-13:00 **Morning Session**
Chairman: **Moti Herskowitz**

08:30-09:00 **Yong Wang**, PNNL & Washington State University
Catalytic conversion of biomass-derived oxygenates to olefins for fuel and chemical production

09:00-09:20 **Dror Noy**, MIGAL – Galilee Research Institute
New protein-based platforms for artificial photosynthesis

09:20-09:40 **Moshe Sheintuch**, Technion
Pure hydrogen production from ethanol and glycerol in a membrane reactor

09:40-10:00 **Assylay Kurmanbayeva**, Moshe Sagi's Group, Ben-Gurion University
Supplementation of sulfate to the growth medium enhances biomass and organic sulfur production in the halophyte *Salicornia*, but not in *Sarcocornia*

10:00-10:30 **Ira Weinstock**, Ben-Gurion University
Hydrogen evolution and water oxidation catalyzed by polyoxometalate complexes of metal-oxide nanocrystals

10:30-11:00 ☕ Coffee Break

Chairman: **Avihai Danon**

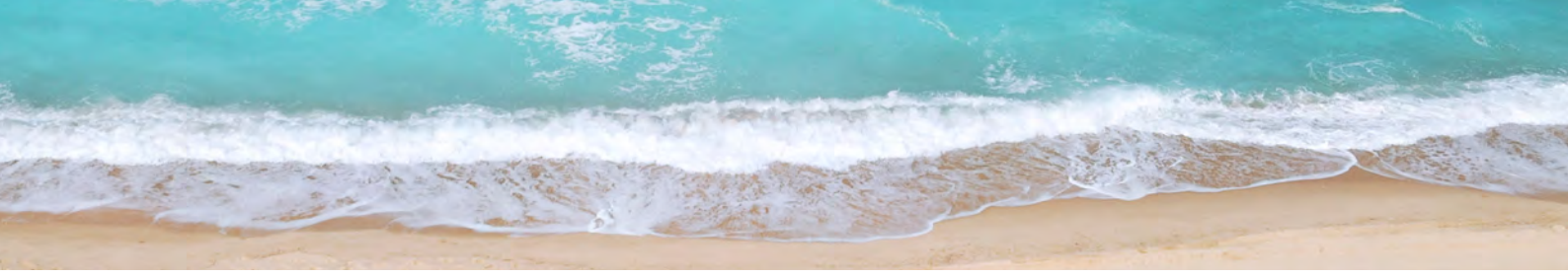
11:00-11:30 **Anup Tathod**, Oz Gazit's Group, Technion
Facile synthesis of catalytic layered double hydroxide nanoparticles

Christine Warwar, Oz Gazit's Group, Technion
Polymer-assisted dispersion of Ni on Zirconia through non-hydrolytic sol-gel method

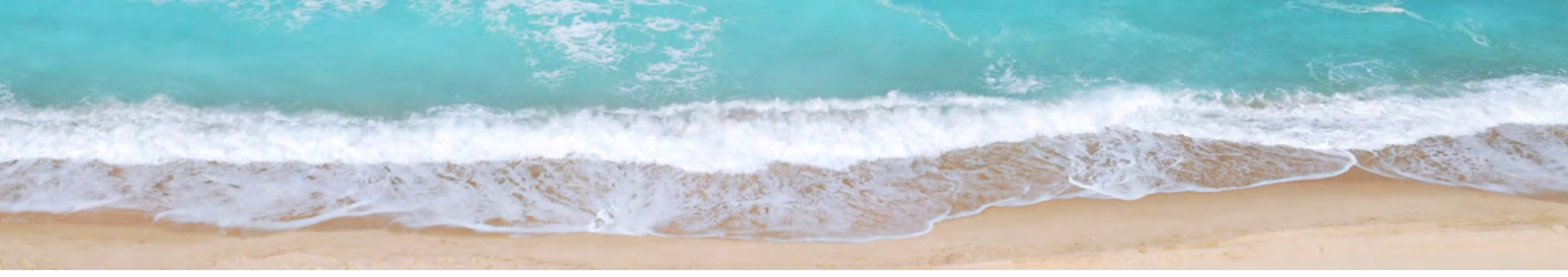
11:30-12:00 **Aviva Samach**, Avi Levy's Group, Weizmann Institute of Science
Wheat straw as a feedstock for biofuel

Dana Bar-Zvi, Naama Barkai's and Avi Levy's Groups, Weizmann Institute of Science
Hybrid vigour results from the perturbation of growth-limiting safeguard pathways

12:00-12:15 **Avi Niv**, Ben-Gurion University
Ray optics based light trapping beyond the lambertian limit



- 12:15-12:30 **Moti Herskowitz**, Ben-Gurion University
Eco-friendly catalytic processes for production of renewable and fungible liquid fuels and chemicals
- 12:30-13:00 **Shimon Gepstein**, Technion
Cytokinins improve biomass production under environmental stress by shutting down inhibitory processes related to “avoidance mechanisms” that have been favored by evolution over millions years
- Natali Shirron**, Technion
Cytokinins-induced transcriptional reprogramming under stress conditions lead to stress adaptation of Arabidopsis plants
- 13:00-14:00 🍴 Lunch
- 14:00-17:00 Visit of Caesarea archeological sites or free time at the beach
- 17:30-22:30 **Evening Session**
Chairman: **Avner Rothschild**
- 17:30-18:00 **Ian D. Sharp**, Lawrence Berkeley National Laboratory, USA
Functional semiconductors and interfaces for generating fuels from sunlight
- 18:00-18:15 **Yaron Paz**, Technion
Photocatalytic routes towards alternative fuels
- 18:15-18:30 **Dor Russ**, Technion
Selection of microbial communities at the level of a single grain
- 18:30-19:00 **Stefan Leu**, Ben-Gurion University
Sustainable microalgae biomass production and biorefinery for fuels and chemicals
- Aliza Zarka**, Ben-Gurion University
Maximizing TAG production for biodiesel production in *Nannochloropsis oceanica*
- 19:00-20:30 🍴 Dinner
- 20:30-22:30 📄 Poster Session, Drinks and Light Refreshments + beer and wine



➤ Thursday, September 15th, 2016

07:30–08:30 🍴 Breakfast

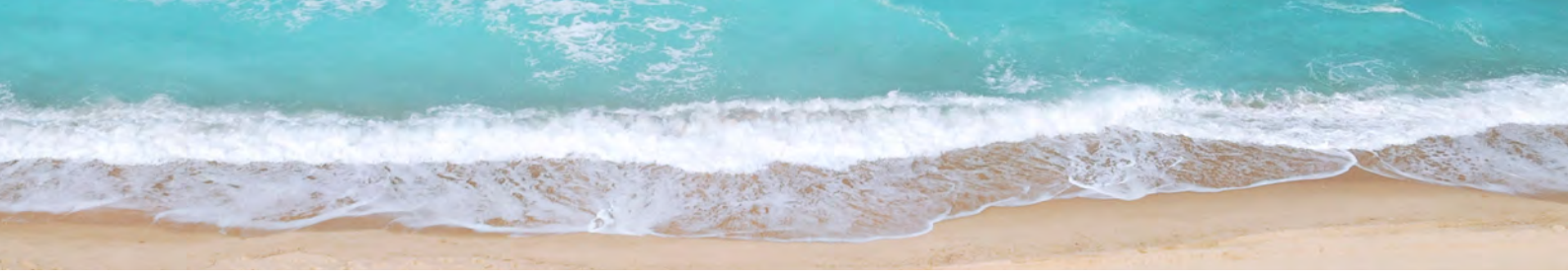
08:30–14:00 **Morning Session**
Chairman: **Yaron Paz**

- 08:30–09:00 **Noam Adir**, Technion
Harnessing photosynthesis for green energy and hydrogen production
- Dan Kallmann**, Technion
Cyanobacteria producing hydrogen from Photosynthesis-derived electrical current while maintaining cellular respiration
- 09:00–09:20 **Maya Bar-Sadan**, Ben-Gurion University
From metal atoms to metal tips on photo-catalysts for hydrogen production
- 09:20–09:40 **Naftali Lazarovitch**, Ben-Gurion University
Water flow and solute transport in the soil-plant-atmosphere continuum:
Upscaling from rhizosphere to root zone.
- 09:40–10:00 **Ronny Neumann**, Weizmann Institute of Science
Summary of I-CORE-inspired advances in alternative energy research:
Understanding O₂ formation, photo electrochemical reduction of CO₂ and new look on biomass conversion
- 10:00–10:30 **Avigdor Scherz**, Weizmann Institute of Science
Granting heat tolerance to photosynthetic cells; The impact of point mutations in photosystem II reaction centers

10:30–11:00 ☕ Coffee Break

Chairman: **Yuval Shoham**

- 11:00–11:30 **Daniel Grave**, Avner Rothschild's group, Technion
Hematite photoanodes for solar water splitting
- 11:30–12:00 **Ed Bayer**, Weizmann Institute of Science
Designer cellulosome technology: Where were we, where are we, and where do we want to be?
- Amaranta Kahn**, Ed Bayer's group, Weizmann Institute of Science
Engineering of hyperthermophilic designer cellulosomes



12:00-12:30 **Yeshayahu Lifshitz**, Technion
Record-breaking carbon-based photocatalyst for solar water splitting

12:30-13:00 ***Closing Remarks***

13:00-14:00 🍴 Lunch

14:00 🚶 Departure



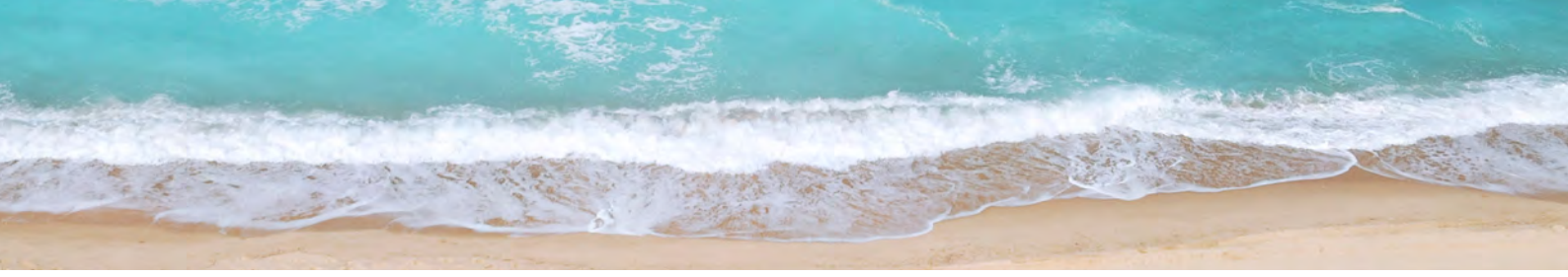
POSTER LIST

A - Biomass: Energy Crops and Algae

1. **Yana Kazachkova**, *Ben-Gurion University*
Growth Platform-dependent and Independent Phenotypic and Metabolic Responses of Arabidopsis Thaliana and its Halophytic Relative, Eutrema salsugineum/Thellungiella salsuginea, under Salt Stress
2. **Zachor Shemesh**, *Ben-Gurion University*
Inducible Expression of Haematococcus Oil Globule Protein in the Diatom Phaeodactylum Tricornutum: Association with Lipid Droplets and Enhancement of TAG Accumulation under Nitrogen Starvation
3. **Boris Zorin**, *Ben-Gurion University*
The Green Alga Lobosphaera, Parietochloris Incisa as a Source of High Value LC-PUFA

B - Solar Water Splitting and CO₂ Reduction; Artificial Photosynthesis

4. **Eran Aronovitch**, *Ben-Gurion University*
Stability and Activity of Bimetallic Tips as Reduction Co-catalysts
5. **Yair Bochlin**, *Ben-Gurion University*
Recycling of Carbon Dioxide by its Electrochemical Reduction to Fuels using Metalloporphyrin/Graphene Catalytic Systems
6. **Biswarup Chakraborty**, *Ben-Gurion University*
Polyoxometalates Complexes of α -Fe₂O₃ Cores in Water
7. **Naama Gluz**, *Technion*
Rational Design of a Water Soluble Manganese Cluster for Electro-catalytic Water Oxidation
8. **Eynat Haviv**, *Weizmann Institute*
Photoelectrochemical Reduction of CO₂ with Visible Light using a di-Rhenium Molecular Catalyst Combined With a Polyoxometalate as an Electron Shuttle and Photosensitizer
9. **Bhanu Prakash Jagilinki**, *MIGAL*
Design and Assembly of Artificial Four-iron Four Sulfur Clusters Proteins
10. **Dino Klotz**, *Technion*
Complementary Impedance Analysis of Hematite Photoanodes with Electrical and Optical Perturbation
11. **Vasu Kuraganti**, *Ben-Gurion University*
Tuning the Catalytic Properties of Ternary Nano-Flowers of Layered Materials
12. **Hadar Mor**, *Technion*
Using Underlayers as a Way to Improve Solar Water Splitting with Iron Oxide Photoelectrodes
13. **Satyabala Neelam**, *MIGAL*
In Vitro Reconstitution of the Fenna Mathews Olson Bacteriochlorophyll Protein



14. **Manoj Raula**, *Ben-Gurion University*
Tunable Inorganic Complexes of TiO₂ Nanocrystals
15. **Anton Tsyganok**, *Technion*
Catalyst Overlayers to Assist Water Splitting on Hematite Photo Electrodes
16. **Adam Weingarten**, *Ben-Gurion University*
Supramolecular Organization of Graphene-anchored Photosynthetic Nano-arrays

D - Biochemical Processing of Biomass

17. **Oleg Chmelnik**, *Technion*
The Crystallographic Structure of XynB2 Reveal the Crucial Residues Important in Glycosynthesis
18. **Sarah Morais**, *Weizmann Institute*
Enhancement of cellulosome-mediated deconstruction of cellulose by improving enzyme thermostability
19. **Rachel Salama**, *Technion*
Biochemical Characterization and Crystal Structure of a Novel GH127 β -L-arabinofuranosidase
20. **Andy Sand**, *Technion*
Alternative σ Factors are Involved in the Regulation of Cellulose - Utilization Genes in *Clostridium thermocellum*
21. **Smadar Shulami**, *Technion*
A Specific Oligopeptide Transporter Mediates Quorum-Sensing Regulation of the Extracellular Xylanase Gene in *Geobacillus Stearothermophilus*
22. **Idan Yelin**, *Technion*
Facilitation of Adaptive Evolution through Genomic Amplification of Antibiotic Resistance Genes
23. **Ning Yin**, *Technion*
Evolution of Self Recognition in Bacteriophage DNA Packaging
24. **Tal Zeltzer**, *Technion*
Effect of Growth-rate and the Limiting Factor on Carbon-utilization Genes in *Clostridium thermocellum*
25. **Olga Zhivin**, *Weizmann Institute*
Elucidating the architectural organization and diversity of the multifarious *Pseudobacteroides cellulosolvens* cellulosome system

E - Production of Liquid Fuels

26. **Liron Agmon**, *Ben-Gurion University*
Reconstruction of Surface Potential from Atomic Friction Measurements

