

Feel the
Energy



אוניברסיטת בן-גוריון בנגב
Ben-Gurion University of the Negev

Translating basic research into commercial applications

BGUEnergy
Initiative

M. Herskowitz
November 27, 2012

BGU scientists have conducted energy-related R&D for more than 3 decades

Researchers at Sede Boker and Marcus campuses have developed specific infrastructure and renowned expertise in energy R&D



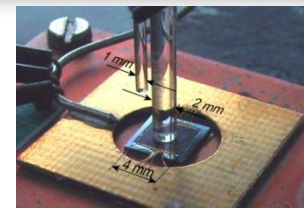
Energy R&D should be closely related to the outside world

- Bridge the gap between fundamental and applied research and facilitate applications
- Be attentive to the needs of individuals, society and industry
- Promote engines for enhanced interaction between academia, industry and society



The National Solar Energy Center at BGU integrates solar energy R&D

- Concentrated Photovoltaic Systems can handle 400 kW of sunlight to intensities up to 10,000 suns
- Thermal solar systems
- Unique test lab maps PV performance
- Solar Optics gets light from source to target with minimal loss and maximum concentration
- Meteorological Data Lab
- Inorganic and organic PV cells are prepared using nanomaterials and characterized by advanced methods



National Solar Energy Center developed technology for the Israeli ZenithSolar

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BGU technology fuels Israel's first solar farm

Unique system far more efficient than industry standards

By Andrew Lavin Special to The Advocate

BEER-SHEVA, ISRAEL - Zenith- Solar, an Israeli start-up company, launched its first solar farm near Tel Aviv on April 26, based on concentrated photovoltaic (CPV) systems developed by Professor David Faiman of Ben-Gurion University of the Negev.

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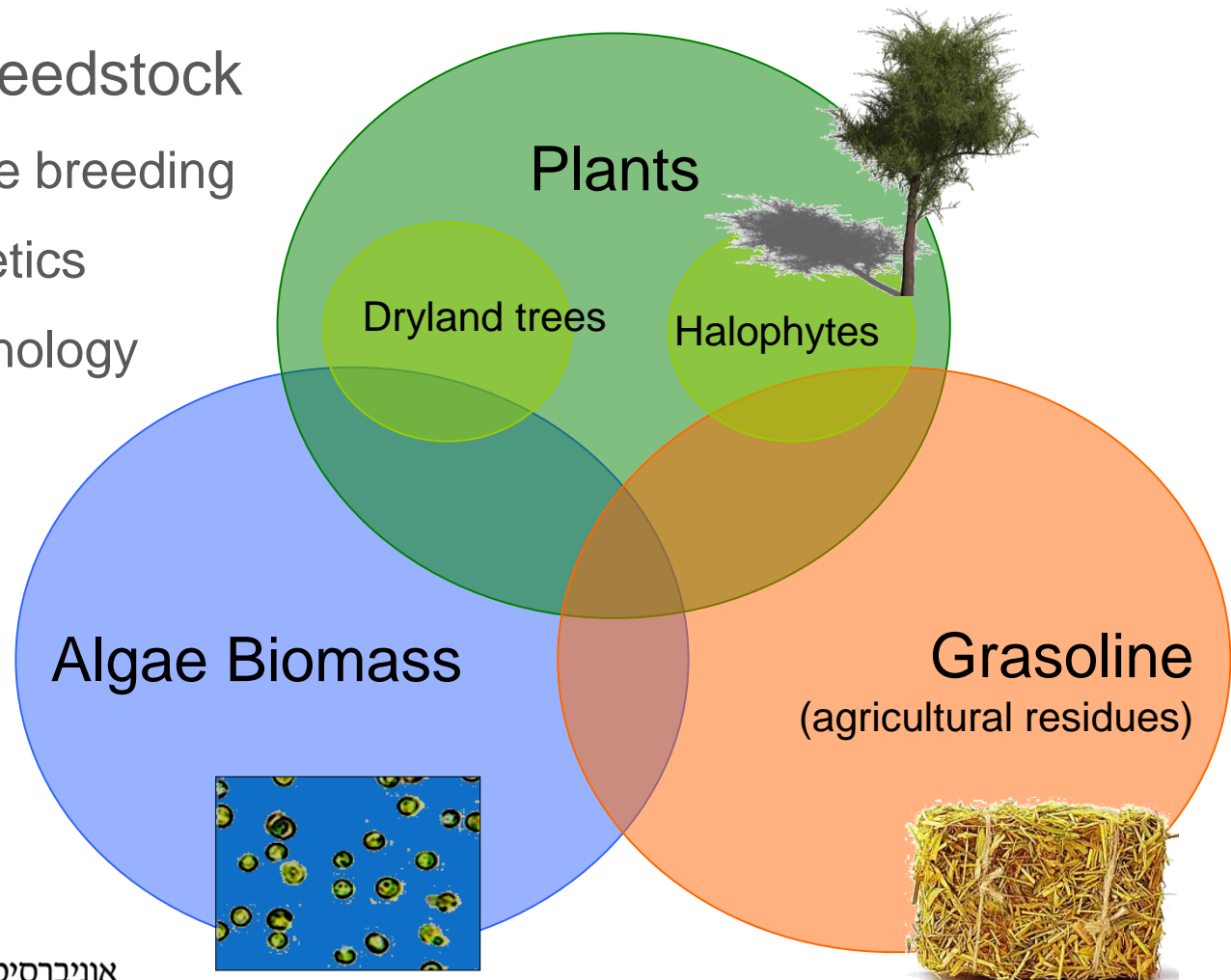
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BGU is a partner of Israel Center of Excellence in Solar Liquids

■ Biomass feedstock

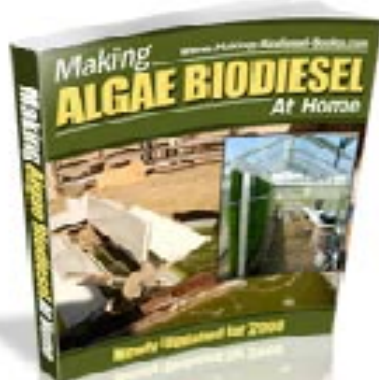
- Plant/algae breeding
- Plant genetics
- Agro-technology



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Making Algae Biodiesel at Home



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Primafuel to enter algae sector; licenses technology from Ben-Gurion University

In California, [Primafuel announced that it would enter the algae production sector](#) with a licensing agreement with Ben-Gurion University Microalgae Biotechnology Lab in Israel. The company's biorefinery technology team had previously been recognized as a Technology Pioneer by the World Economic Forum for transformational biomass processing technologies. Primafuel execs said that the company would combine upstream algae production and downstream biorefinery systems.

BGU is a partner of Israel Center of Excellence in Solar Liquids

- Biomass conversion technologies
 - Combustion and gasification
 - Carbon dioxide hydrogenation to liquid fuels
- Ultra-clean fuels
 - Removal of sulfur from diesel and gasoline
- Vegetable oils to green jet-fuel and diesel
 - Novel catalysts based on research of nano-materials
 - Development of advanced processes and reactors



ExxonMobil to Work with Blechner Center on-Vehicle Fuel System

REUTERS

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Dr. Emil Jacobs, Vice president of Research and Development at ExxonMobil Research and Engineering stated:

“There is long road ahead before this technology could be deployed on mass scale in passenger vehicles, but it has the potential to be up to 80% more fuel efficient than today’s internal combustion engine technologies and reduce CO₂ emissions by up to 45% ”

Universities Receive Funding for Math and Science Teacher Training

Girls Explore Exciting Opportunities, Problem-Solving at ExxonMobil Family Math...

REG-Exxon MobilCorp ExxonMobil's Shipping Affiliates Receive British Safety Council's Top Recognition

Union University that take liquid fuels -- gasoline, diesel, ethanol or biodiesel -- and convert them into hydrogen onboard the vehicle where it will be used in a fuel cell power train.

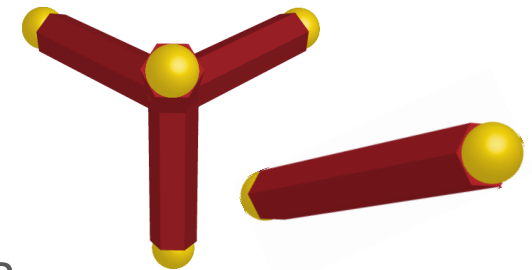
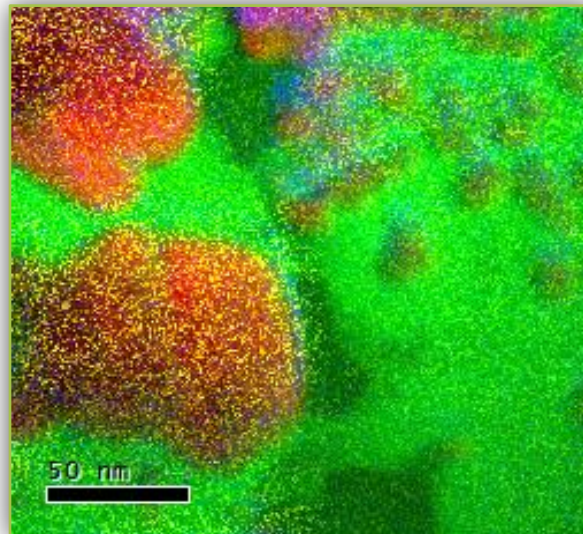
"By developing a system that converts liquid hydrocarbons into hydrogen directly on a vehicle without the need for storage, we hope to demonstrate significant infrastructure, logistics and cost advantages compared to other hydrogen vehicle systems, all while reducing the impact on the environment," said Dr. Emil Jacobs, Vice President of Research and Development at ExxonMobil Research and Engineering.

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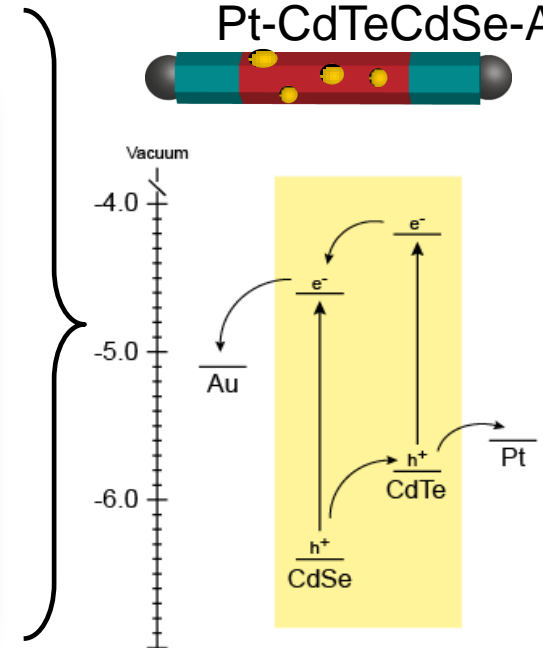
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Artificial photosynthesis

- Water splitting to hydrogen
- Carbon dioxide hydrogenation to liquid fuels
- Carbon dioxide and water to liquid fuels



Pt-CdTeCdSe-Au



BGU researchers are active in natural gas R&D

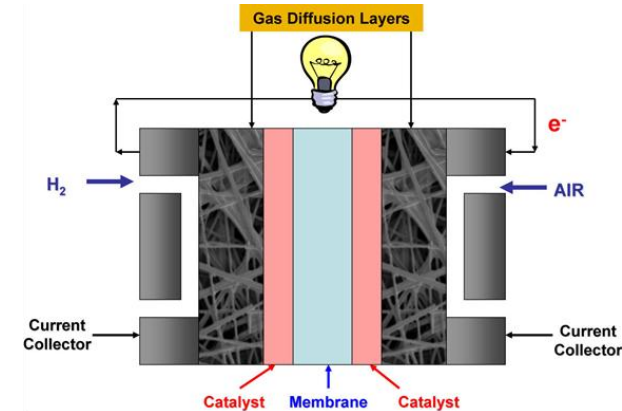
- Scientists at the Department of Geology are tracking the formation of oil and gas in a variety of environments
 - Hydrocarbons and sulfur transformations during generation of gas and oil
 - Multiple isotope fingerprints will give unique information on biogeochemical processes in the modern aquatic systems
- The Blechner Center has been working for many years on natural gas related projects
 - Conversion of natural gas to chemicals and fuels



BGU Energy initiative covers a wide range of fields

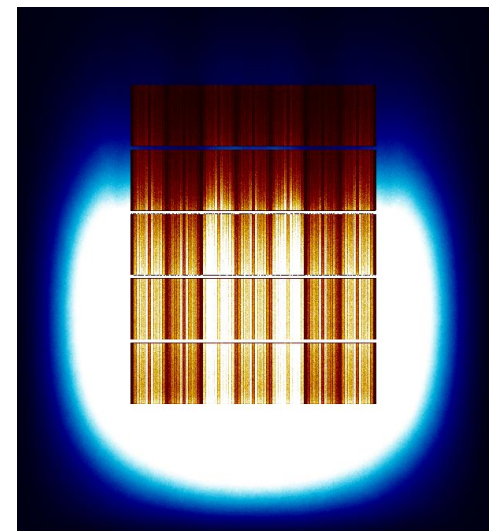
■ Fuel cells

- Membrane technology and catalyst
- Microbial biofuel cells



■ Advanced methods for nuclear reactor modeling

- New reactor designs
- Optimization of nuclear fuel cycle



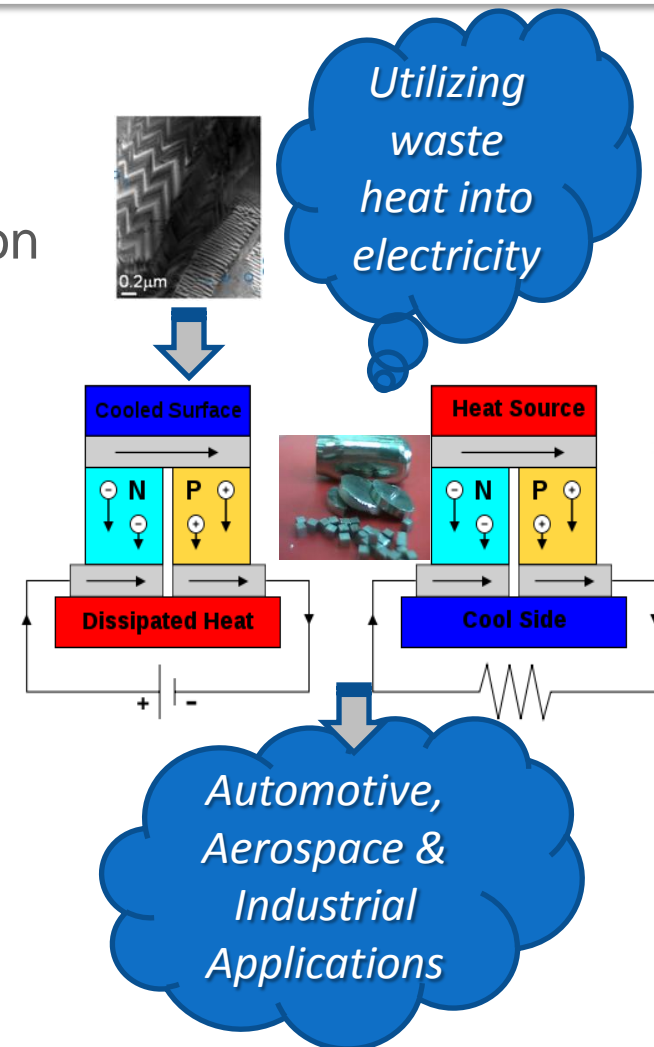
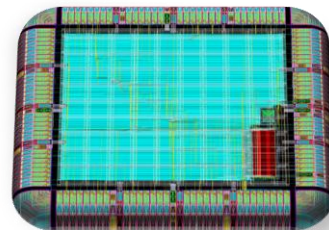
Energy utilization and efficiency are an important part of the BGU Initiative

■ Thermoelectricity

- Development of devices
- Nanostructuring & electronic optimization
- Advanced characterization & modeling

■ Energy Efficient VLSI Circuits

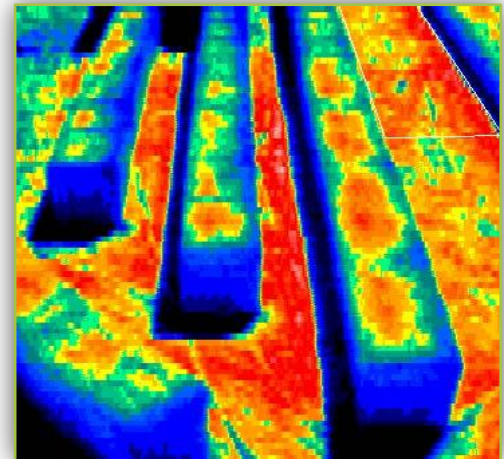
- Energy efficient VLSI memories
- Energy efficient VLSI digital design



Energy utilization and efficiency are an important part of the BGU Initiative

■ Regional and urban sustainable development

- Energy conserving, green architectural design
- Life Cycle Energy Analysis of materials, building
- Retrofit of existing housing stock
- Green building Cost-Benefit Analysis



■ Energy accounting and its interaction with society

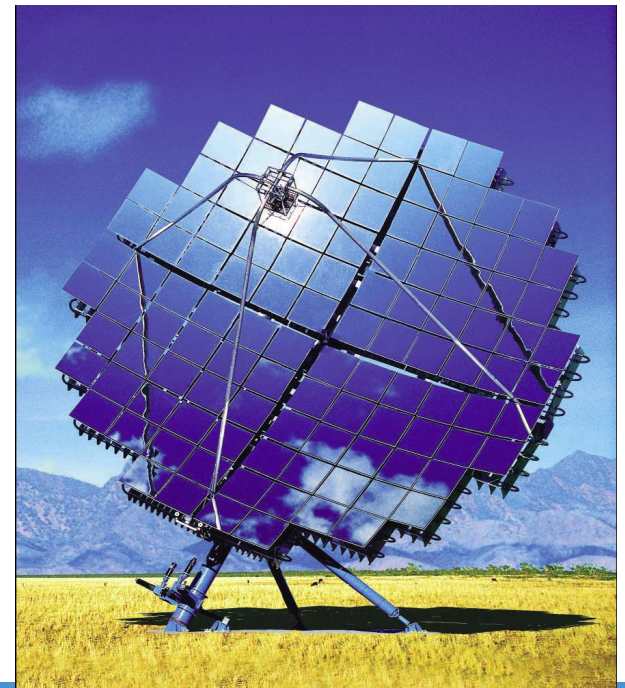
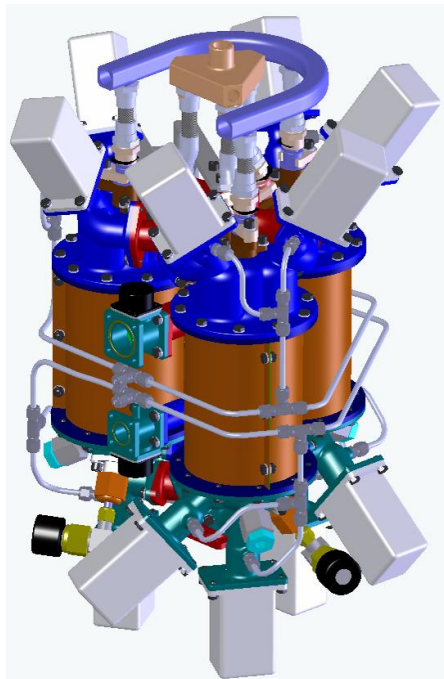
- Ecological and carbon footprint analysis
- Energy and Society
- Analysis of existing and emerging perceptions of energy security

BGU has and will invest in energy related infrastructure and staff

- Over \$20M will be spent over the next five year, about half from university resources and half from research grants
 - Physical infrastructure
 - Excellent faculty members in relevant research areas
 - Fellowships for graduate students and post-docs
 - Technical staff

- Undergraduate and graduate programs in energy
 - Graduate program in energy engineering
 - Undergraduate energy program in chemical engineering

Join BGU in this exciting endeavor to sustainable and attainable energy



Join BGU in this exciting endeavor to sustainable and attainable energy

