



ד"ר תומר כהן מציג בכנס אילנית 2023



# Future Scientists Center



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The Alpha research program for gifted and talented high school students

Dr. Tomer Cohen, Head of the Alpha Program



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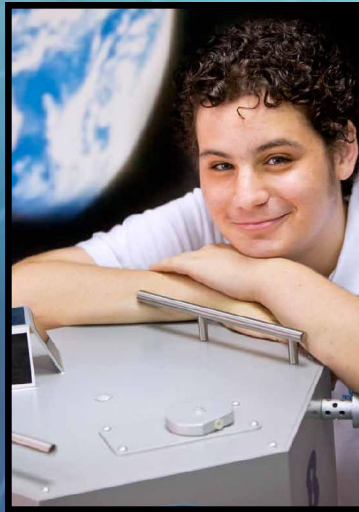


# Future Scientists Center

The Center for the Advancement of the Gifted and Talented

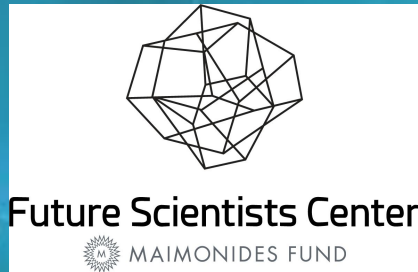
## Mission:

*To develop Israel's human capital – the gifted and talented –  
in order to guarantee its security and longevity*



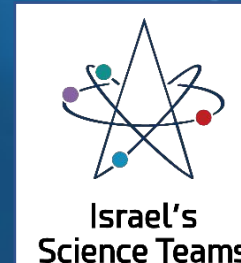
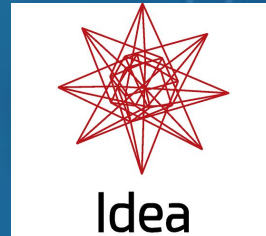
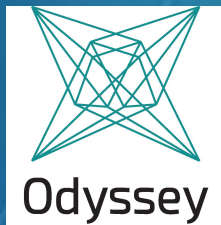
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# Gifted Programming as National Interest



8<sup>th</sup>-12<sup>th</sup> grades

18 years and up



## Joint ventures with:

The Ministry of Education's  
Division for Gifted and Talented  
Students and the Prime Minister's  
Office's National Cyber Directorate

## Joint venture with:

The Ministry of Education's  
Science and Technology  
Administration



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**Opening Israel's leading  
laboratories to the Alpha  
program as a key step to  
providing Israeli gifted and  
talented high school students  
with a 'hands on' academic  
research experience**

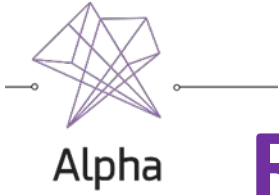


**אלפא**

תכנית למחקר בתחומים מדעיים

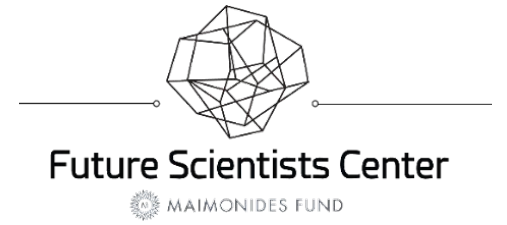
**Alpha**

Research Program in the Sciences



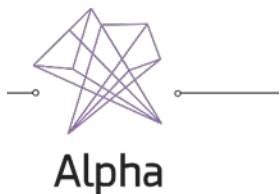
# Alpha

## Research Program in the Sciences



- The program exposes gifted students in 10<sup>th</sup> and 11<sup>th</sup> grades to the **foundations of scientific research** and provides them the necessary skills to conduct independent scientific research
- Students choose a research project and are mentored by researchers in **cutting edge laboratories** throughout the country
- **Students conduct in depth research at a level equivalent to the end of an undergraduate / beginning of masters' degree.** This research can also replace a matriculation exam in the relevant subject.
- The program offers a significant intellectual challenge, while **integrating social activities.**





# Academic Institutions in Alpha



- Weizmann Institute for Science



- Tel Aviv University



- The Hebrew University of Jerusalem



- Technion – Israeli Institute of Technology



- Ben Gurion University of the Negev



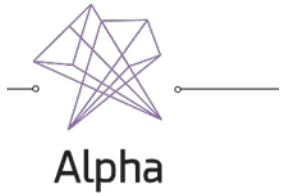
- Ariel University



- Bar-Ilan University







# Alpha Program Stages



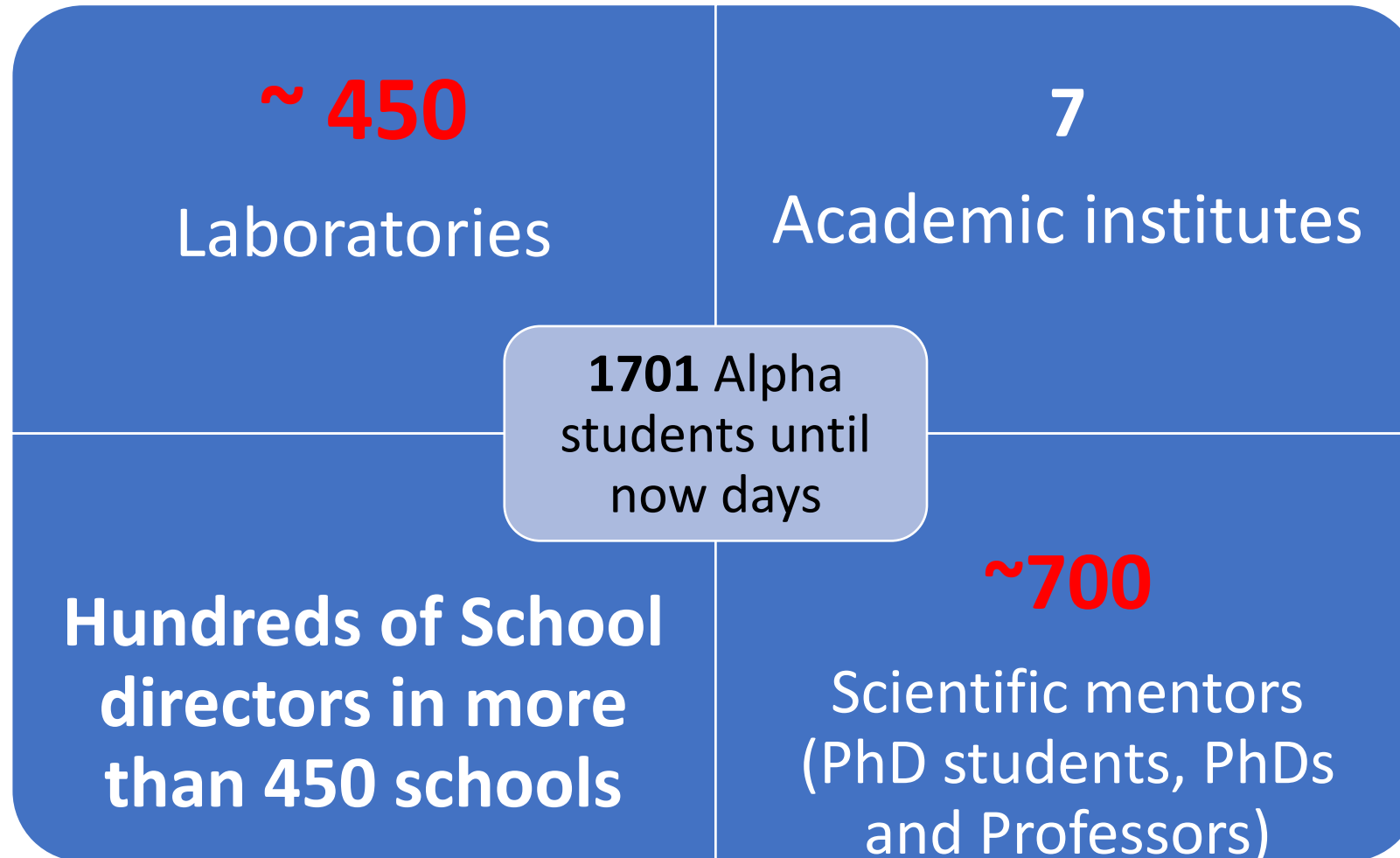
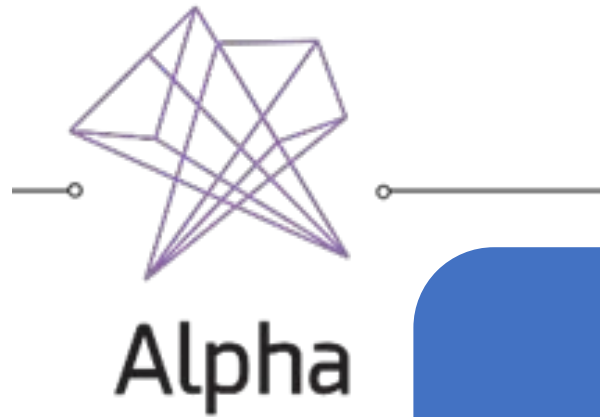
One of the main challenges is to **open Israel's leading laboratories doors to the Alpha program students**

**There are many reasons why not to open the laboratories' doors:**

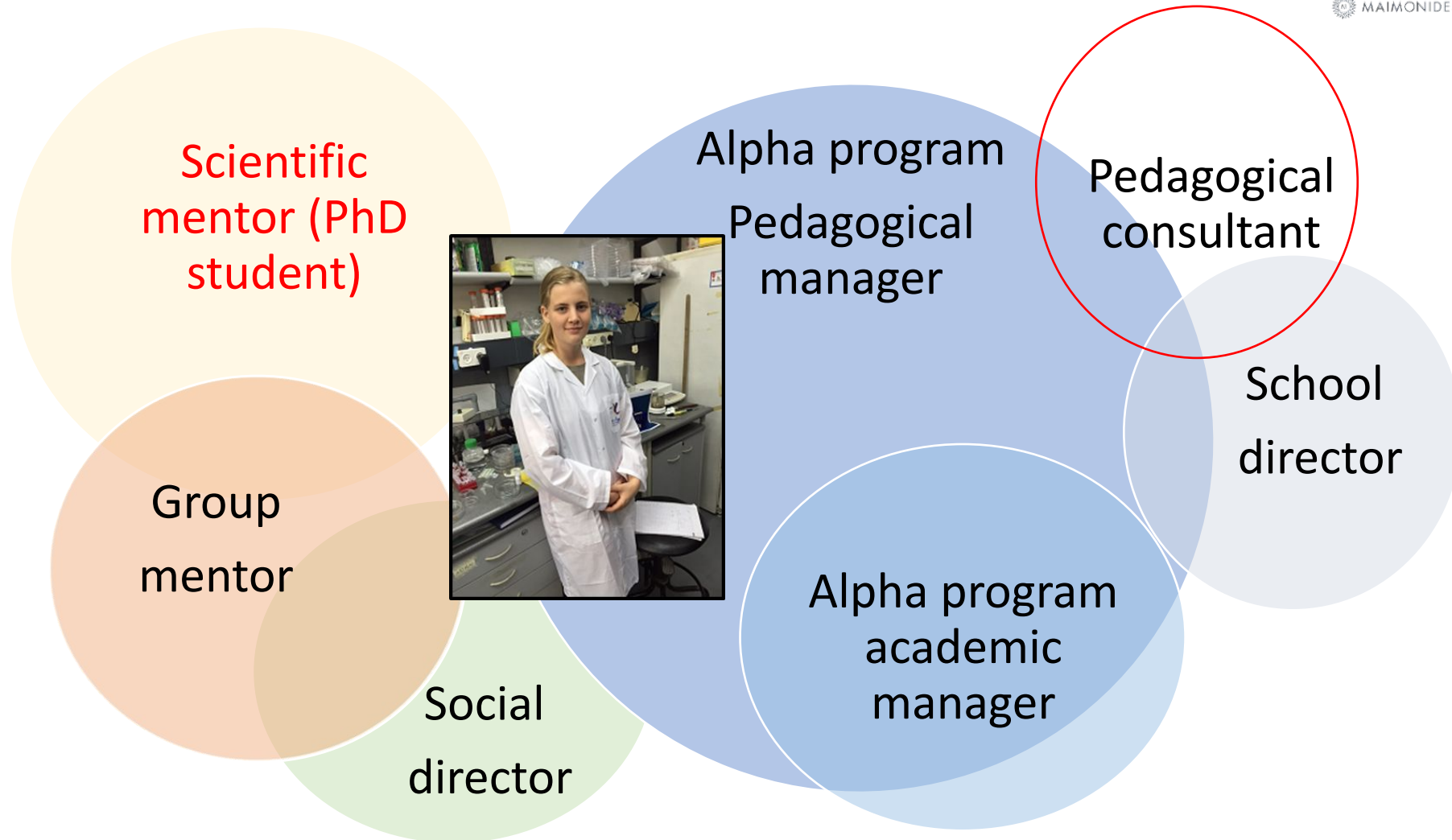
- PhD students are very busy
- Major knowledge gap between high school and academic research
- Working with high school kids

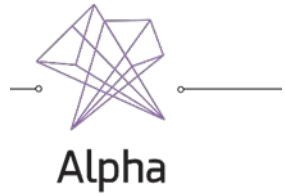


# Alpha Program



# Program structure - Circles of Support .1





## 2. The scientific mentor is an asset



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- The program structure reduce the pressure from the scientific mentor
- Several annual professional group meeting (lecture about gifted kids)
- Some institutes are doing social meeting for all the mentors





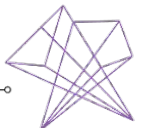
### 3. Getting the support of the academic institutes' managements

- CEOs
- Presidents
- Vice presidents
- Etc

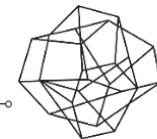
Getting academic credit in some universities



Prof. Moshe Lewenstein , Vice president BIU



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## 4. The quality of the Alpha students

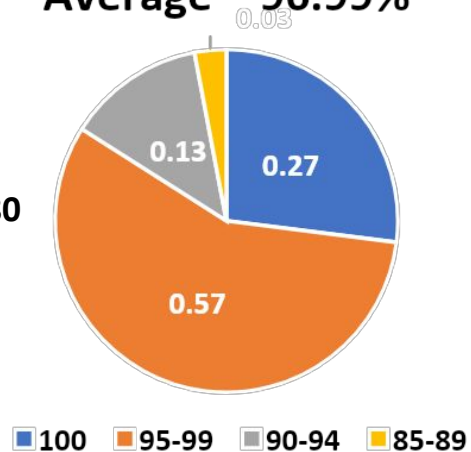
### The selection process, expectations and results

#### Alpha Research Grades 2021

##### Research Grades 2020

Average – 96.99%

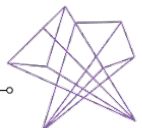
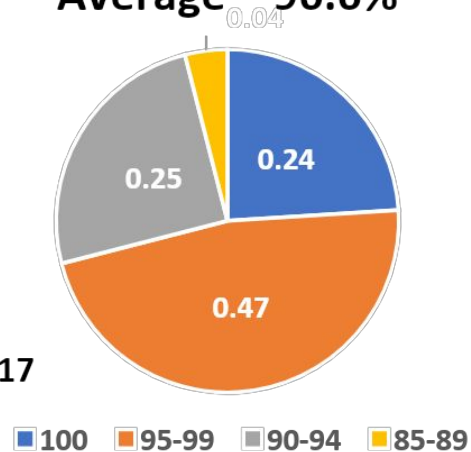
N=180



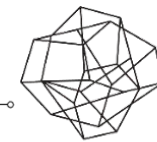
##### Research Grades 2021

Average – 96.6%

N=217



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# Alpha Academic Publications 2021

**Rotem Orad, Alpha @ Tel Aviv University**

[Differentiating dementia with Lewy bodies from Alzheimer's disease and Parkinson's disease dementia: an update on imaging modalities](#)

Authored with: Dr. Tamara Sheiner, Ichilov Hospital

Date of publication: January 2021

**Published in: Journal of Neurology**

**Yahel Manor, Alpha @ The Technion**

[Generating conjectures on fundamental constants with the Ramanujan Machine](#)

Laboratory: Dr. Ido Kaminer

Date of publication: January 2021

**Published in: Nature**



**Yahel Manor, Alpha Technion**

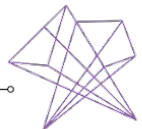
**Rotem Dror, Alpha @ Ben Gurion University**

[Protozoa populations are ecosystem engineers that shape prokaryotic community structure and function of the rumen microbial ecosystem](#)

Laboratory: Itzik Mizrachi

Date of publication: December 2021

**Published in: The ISME Journal**



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# Alpha Academic Publications 2021

**Alice Temkin, Alpha @ The Hebrew University of Jerusalem**

[Ultralight monolithic magnetite aerogel](#)

Laboratory: Prof. David Avnir

Date of publication: March 2021

**Published in: Applied Materials**

**Dana Venkert, Alpha @ Tel Aviv University**

[Improved sensitivity, safety, and rapidity of COVID-19](#)

In the framework of military service

Date of publication: April 2021

**Published in: PLOS ONE**

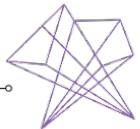
**Tomer Flaks and Itamar Liviatan, Alpha @ The Hebrew University of Jerusalem**

[The paleohydrological implications of aragonite precipitation under contrasting climates in the endorheic Dead Sea and its precursors revealed by experimental investigations](#)

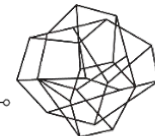
Laboratory: Prof. Yigal Erel

Date of publication: April 2021

**Published in: Chemical Geology**



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# Alpha Academic Publications 2021

**Ariel Brenner, Alpha @The Hebrew University of Jerusalem**

[3D Printing of Cellulose Nanocrystal-Loaded Hydrogels through Rapid Fixation by Photopolymerization](#)

Laboratory: Prof. Shlomo Magedasi

Date of publication: May 2021

**Published in: Langmuir**

**Sarit Mozes, Alpha @ The Hebrew University of Jerusalem**

[Reporter-Phage-Based Detection and Antibiotic Susceptibility Testing of Yersinia pestis for a Rapid Plague Outbreak Response](#)

Laboratory: The Biological Institute

Date of publication: June 2021

**Published in: Microorganisms**

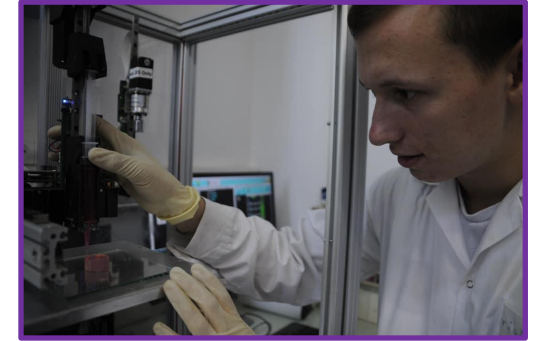
**Shai Karidi Heller, Alpha @ Tel Aviv University**

[Chemical Chaperones Modulate the Formation of Metabolite Assemblies](#)

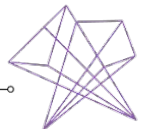
Headed by Dr. Dana Laor Ben Yoseph and Prof. Ehud Gazit

Date of publication: August 2021

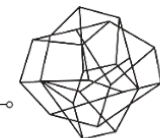
**Published in: International Journal of Molecular Sciences**



**Ariel Brenner, Alpha HU**



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# Academic Publications 2022

**Doron Fisher, Alpha @ Tel Aviv University**

[Transgenerational Regulation of Sexual Attractiveness in \*C. elegans\* Nematodes](#)

Laboratory: Prof. Oded Rechavi

Date of publication: January 2022

**Published in:** *Developmental Cell*



**Omer Watted, Alpha @ Tel Aviv University**

[Nutrient Utilization during Male Maturation and Protein Digestion in the Oriental Hornet](#)

Laboratory: Prof. Eran Levin

Date of publication: February 2022

**Published in:** *Biology*



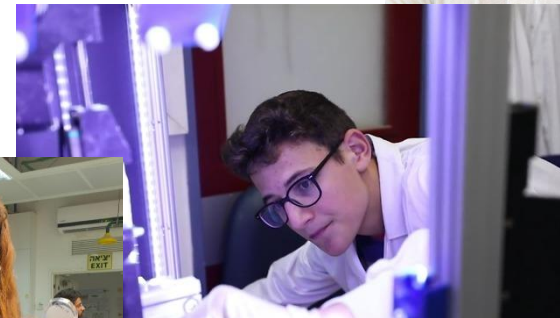
**Yinnon Kutner, Alpha @ The Hebrew University**

[Wood Warping Composite by 3D Printing](#)

Laboratory: Prof. Shlomo Magdassi

Date of publication: February 2022

**Published in:** *Polymers*



**Arava Ben-Natan, Alpha @ Ben Gurion University**

[What Worth the Garlic Peel](#)

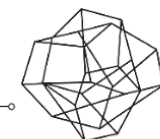
Laboratory: Prof. Gideon Grafi

Date of publication: February 2022

**Published in:** *International Journal of Molecular Sciences*



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# Young Scientists and Developers Competition

**2022: Alpha students - 16 of 24 finalists**

**1<sup>st</sup> place:** Omer Aryan (TAU)

**2<sup>nd</sup> place:** Maya Ben Shalom (Weizmann)

**3<sup>rd</sup> place:** Alon Lavie (Weizmann)

**Honorable Mentions:** Eviatar Azulay (BGU), Adam Marshek (HU), Noa Rozenblat (HU), Idan Zilcha (HU), Ido Nagler (TAU)

**2021: Alpha students - 33 of 44 finalists**

**2<sup>nd</sup> place:** Ariel Priel (Weizmann), Shira Klein (Ariel), Tamar Meshorer (HU)

**3<sup>rd</sup> place:** Adam Jabar (HU), Yahel Manor (Technion), Omer Eyal (HU)

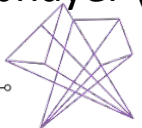
**Honorable Mentions:** Adam Bayley (HU), Adam Bransy (TAU), Anjam Abu Rafa (BG), Nir Gronovich (HU), Ilay Katz (HU)

**2020: Alpha students - 19 of 40 finalists**

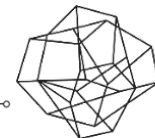
**1<sup>st</sup> place:** Uri Sadan-Yarchi (Technion), Noa Prisletz (Technion)

**2<sup>nd</sup> place:** Daniel Kalmanson (TAU), Maya Arieli (Weizmann)

**Honorable Mentions:** Loren Raymon (HU), Nur Abu El Hayja (Technion), Naama Shphayer (BG)



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# International Competitions

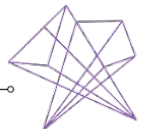


**Regeneron ISEF 2021**  
**Omer Eyal, Alpha @ The Hebrew University**  
**Won 1<sup>st</sup> prize in Chemistry at the prestigious Regeneron ISEF Science and Engineering Fair, as well as a Certificate of Honorable Mention from the American Chemical Society ACS**  
**Omer's research involved developing a novel aerogel made of nickel**



**32<sup>nd</sup> European Union Competition for Young Scientists 2021**  
**Uri Sadan-Yarchi, Noa Priselac, Tamar Meshorer - Alpha graduates**

- Uri Sadan-Yarchi – Expo-Sciences Luxembourg Prize
- Noa Priselac – Institute for Agrobiotechnology Research and Institute of Functional Biology and Genomics Prize
- Tamar Meshorer – Institute of Neurosciences and Castilla y Leon Prize



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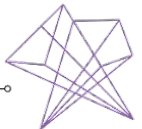


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# How Are we doing it?

- ✓ Program structure
- ✓ The Scientific mentor is an asset
- ✓ The quality of the Alpha students
- ✓ Getting the support of the academic institute management (CEOs, Presidents, Vice presidents etc)



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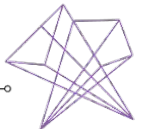
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Today, PIs and PhD students are approaching to the Alpha academic manager and asking her to take part in this program.

# Thank you



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