

Israel Nanotechnology Brief Overview

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February , 2018**

INNI

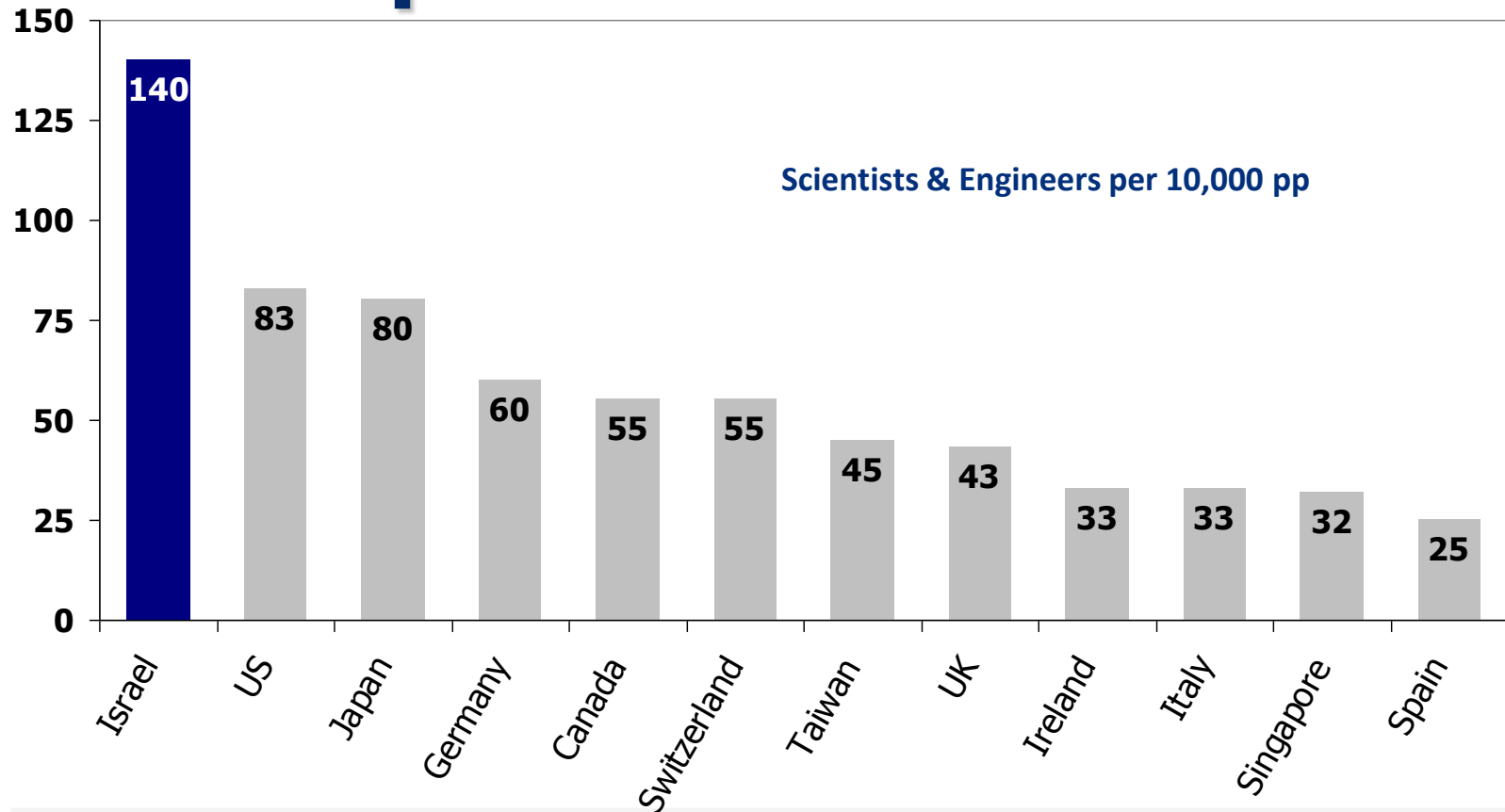
Israel
National
Nanotechnology
Initiative

Outline

- ▶ Israel Key Data
- ▶ Nanotechnology Global overview
- ▶ Israel Nanotechnology
- ▶ Future Outlook

Israel Key Data

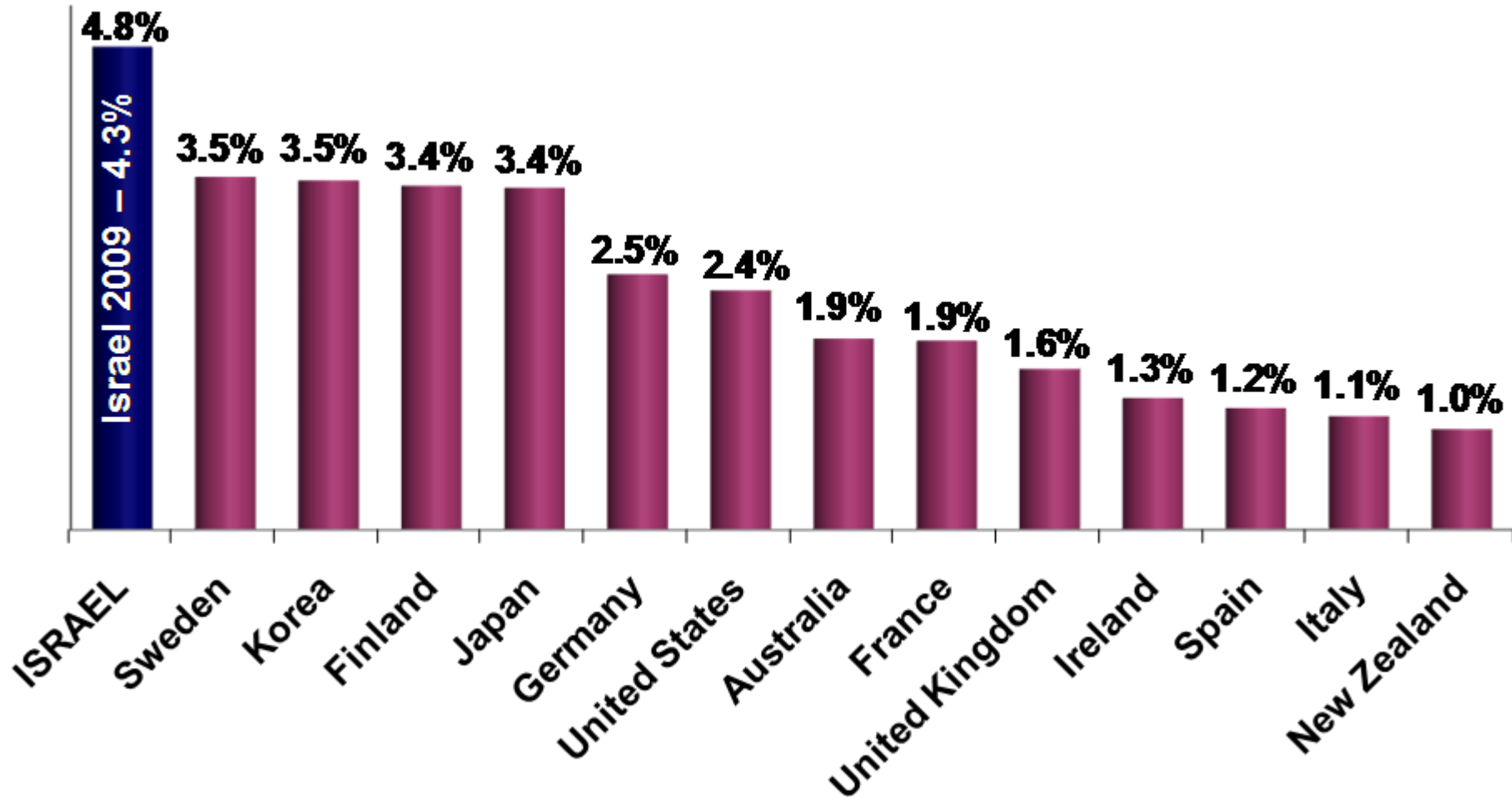
Israel's Key to Success: Manpower and Innovation



***Highest number in the world
of scientists and engineers per population***

World Leadership in Civilian R&D Investments

As Percentage of GDP



Source: OECD, Israeli CBS

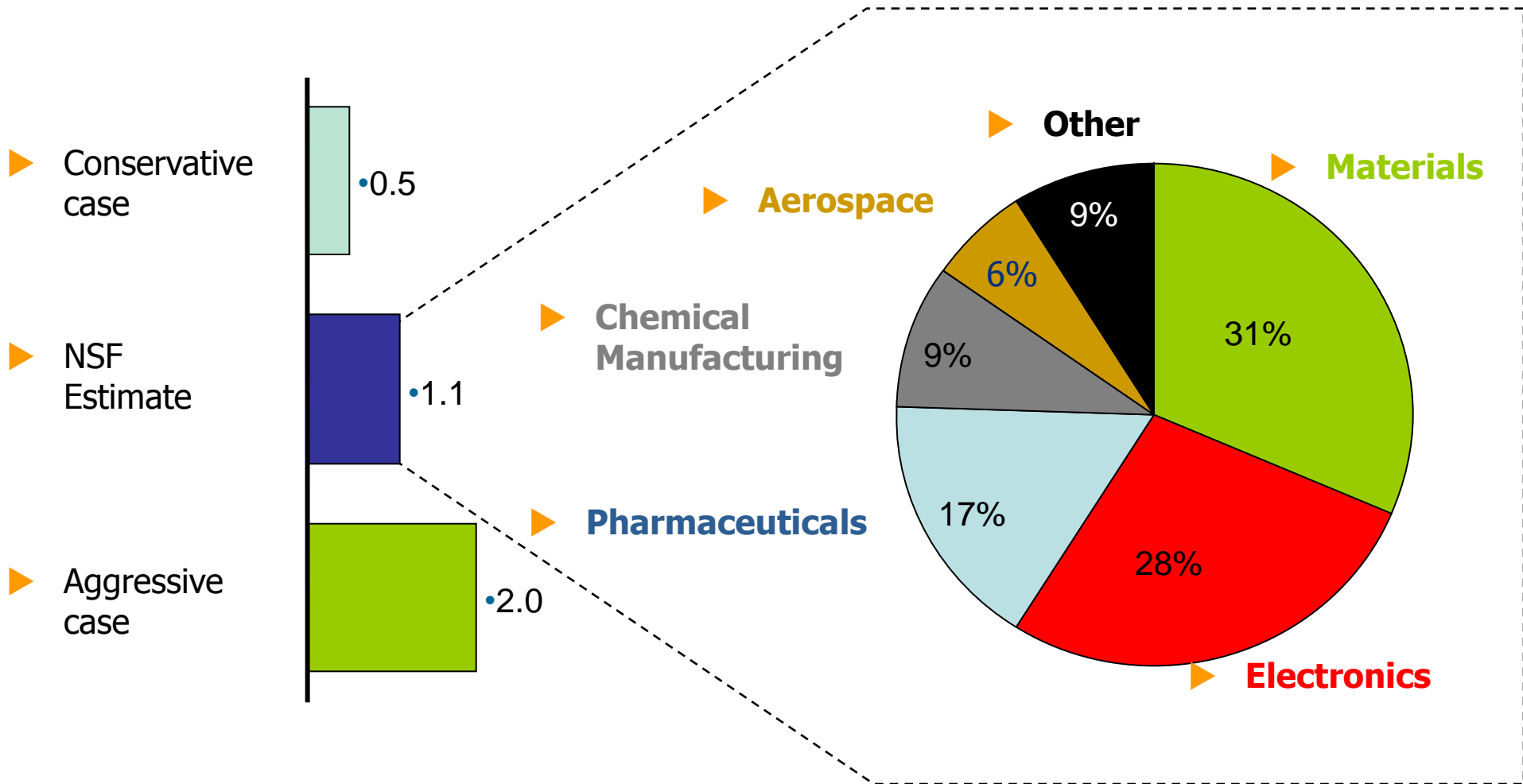
Foreign Subsidiaries in Israel (partial List)

- Intel
- Microsoft
- IBM
- Apple
- CA
- SAP
- DELL-EMC
- Cisco
- Google
- Yahoo
- 3M
- Alcatel
- Philips
- Ericsson
- Siemens
- Ford
- HP
- ST Microelect.
- BMC
- Analog Devices
- Vishay
- AVX (Kyocera)
- General Electric
- Huawei
- Medtronics
- Boston Scientific
- Motorola
- Lucent Tech.
- Avaya
- Nortel
- Kodak
- Marvel
- Facebook
- Qualcomm
- Applied Materials
- KLA - Tencor
- Kulicke & Soffa
- Bio-Rad
- BAE Systems
- Astronautics
- Sigma
- Invitrogen
- J&J
- Merck
- Deutsche Telekom
- British Telecom
- Daimler Chrysler
- Samsung

Global Overview

Nanotechnology Potential World Market Size

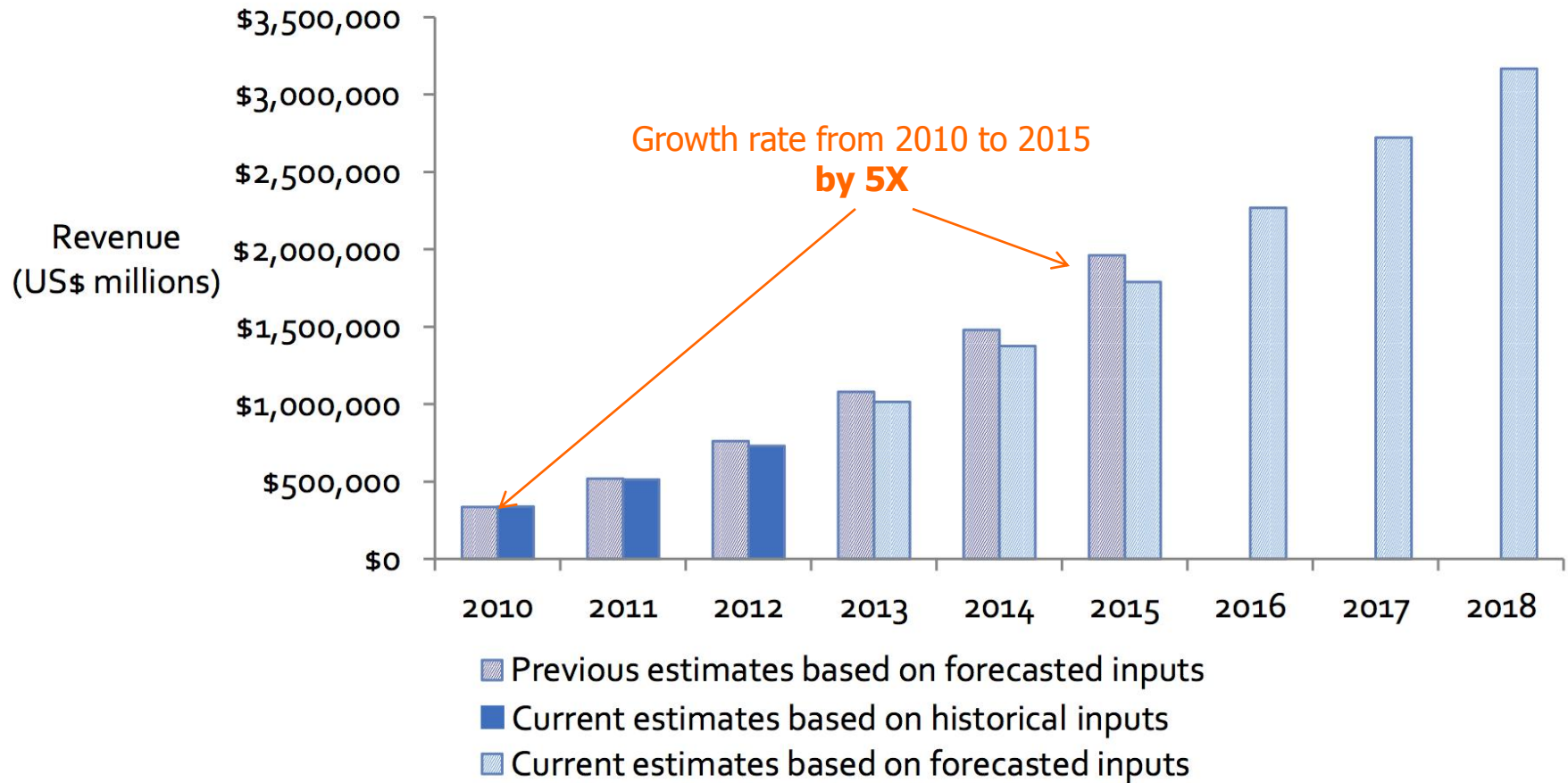
Nanotechnology related goods and services by 2015 (USD trillion)



NANO futures - EC Program Vision

- ▶ By 2015, Nanotechnology World Market Size would hit **3 trillion Euros** in a broad range of sectors.
- ▶ By 2025, nanotechnology is expected to be a mature and yet growing industry, with countless mainstream products **in all different industrial sectors**.
- ▶ The growth and commercialization of nanotechnology must be guided, taking care of **social and sustainability (EHS) aspects**.

Revenue from Nano-enabled Products Grows More Modestly than Previously Expected



Source – Lux research 2015

Israel Nanotechnology

INNI Objectives

(Israel National Nanotechnology Initiative)

- ▶ Sets national goals and priorities for advancing nanotechnology in Israel and **reach critical mass**.
- ▶ Formulate long range program for research & technology development and **world-class infrastructure**.
- ▶ Provide **leadership and guidance** throughout the implementation of the program.
- ▶ **Promote Academia-Industry Collaboration**.
- ▶ Become an important **global player**

Six World-Class Research Institutions

Programs in Nanoscience & Nanotechnologies:



▶ Bar Ilan University



▶ Ben-Gurion University of the Negev



▶ Hebrew University of Jerusalem



▶ Technion Institute of Technology



▶ Tel Aviv University



▶ Weizmann Institute of Science

Start-up companies from 9 years of INNI program (Total of 55 companies)

University	Company name	Initiator	Area of activity
Technion	ViAqua Therapeutics	Schroeder Avi	Therapeutics tailored for aquaculture
	NanoVation	Hossam Haick	Nanomaterial-based sensors, towards Medical application
	Eloxx Pharmaceuticals	Bassov Timor	Compounds for the compounds treatment of genetic diseases
	WellToDo	Moshe Sheintuch	Physical Chemical Process for converting Nitrate to Non-Polluting
	NanoSpun	Eyal Zussman	Fibrous mats and surfaces for biological processes
	Sealantis	Bianco-Peled	Tissue adhesives for clinical needs in surgical
	Advanced Mem Tech Ltd.	Eisen Moris	Membranes for wastewater treatment
	Applied Immune Tech	Yoram Reiter	Drug development company
	NewRocket Ltd.	Natan Benveniste	Environmentally friendly ("Green propulsion"), rocket engines
	Alberta Nano Monitoring	Joseph Shamir	Nano Partical Analyzer
Hebrew University	Ayana Pharma	Barenholz	Anti-cancer drug Doxil
	BioNanoSim	Benita	A technological platform for formulation and delivery of drugs
	Bond X*	Shoseyov	Environmentally friendly products to replace polluting chemicals
	ClearJet	Magdassi	Develops transparent touch screens
	Ficos	Domb	Novel fire detectors for electricity cabinets
	Fulcrum	Shoseyov	Genetic engineered protein for self assembly
	Granalix	Magdassi	Novel formulations for brain diseases

Start-up companies from 9 years of INNI program (continued)

University	Company name	Initiator	Area of activity
Hebrew University (continued)	Lipocure	Barenholz	Developing passively targeted liposomal drugs
	MacroBea	Benita	Nanoparticles dermal delivery of active cosmetic ingredients
	Melodea Ltd	Shoseyov	Process for the extraction of Nano Crystalline Cellulose
	Mercu Removal	Sasson	Process for efficient mercury removal from gas streams
	Moebius Medical	Barenholz	Liposome-based bio-lubricant for treatment of osteoarthritis
	Nano AF	Reches	Anti-fouling coatings for healthcare and industrial applications
	Neoprol	Garti	Advanced drug formulations for anesthesiology
	Neteera	Feldman	Remote Sensing of Biometric Signatures
	Omer Therapeutics	Shoseyov	Preventive treatment for allergic disorders
	OphRx	Garti	Advanced drug formulations for ophthalmology
	Paulee Cleantec	Shoseyov	Removes and does away with dog waste
	Photocell*	Wilner	Natural photosynthetic light-harnessing system
	Q-Ligh	Banin	Semiconductor nanocrystals for flat panel displays
	TrioxNano	Wilner	Nanoparticle based directed drug delivery
	Valentis Nanotech	Shoseyov	Reinforced polymers with new functional properties
	Voyager Medical	Cohn	Advanced self-absorbing surgical sutures
	Zion Pharma	Fredler	Drug therapy that eliminates HIV infected cells
Weizmann Inst	NovaTrans	Ron Naaman	Computer switching devices based on photo Nano tube
	ApNano	Reshef Tenne	Lubricants, coating and composites based
	SolarPaint	Chaen	Coating technology for solar power devices

Start-up companies from 9 years of INNI program (continued)

University	Company name	Initiator	Area of activity
Tel Aviv Univ.	NanoAir		Paper-thin active cooling for thin devices
	Cine'al	Shachar Richter	Jellyfish derived super absorbents
		Menachem	
	Honeycomb Battery	Nathan	3D concentric on-chip silicon microbattery technology
	NoAm ColorTech	Amihay Freeman	Hair coloring using unique strongly adhering coating
		Fernando	
	Savical Diagnostic	Patolsky	A cancer diagnostic kit.
		Fernando	
	Tracense System	Patolsky	Nanotech-based "electronic nose" to sniff out security threats
Ben Gurion Univ.	Rotec Ltd	Eli Koren	Sensing, Monitoring and Prevention of scaling on membran
	Lauren Sciences	Charles Linder	Bi-Pharma, Nanomedicines for central nervous system
	Graphene	Oren Regev	High quality and low cost graphene sheet
	Regeneration	Smadar Oren	Materials for controlled biological druges
Bar Ilan	Phinergy	Arie Zaban	Zeroemission, high energy density systems
	Z-square	Zeev Zalevsky	Multi-functional microendoscope,
	ContinUse Biometrics	Zeev Zalevsky	Remote sensing of biomedical parameters
	Bayonet	Shlomo Margel	Therapeutic compounds
	3G-Solar	Arie Zaban	Energy solutions for Indoor Applications
	GridOn	Yosef Yeshurun	Fault Current Limiter
	Rutledge Global	Shulamit Michaeli	Biomedical therapeutic for gene silencing

FTA Program - Focal Technology Areas

2012-2017

University	FTA Subject	Leader
TAU	Nano-Medicines for Personalized Theranostics	Prof. Dan Peer
BGU FTA 1	Bio-Inspired Nano-Carriers for Sub-Cellular Targeted Therapeutics	Prof. Joseph Kost
BGU FTA 2	Integrated Infrared Up-Conversion Devices Using Nano-Plasmonic Materials and Nano-Photonic Structures	Prof. Gabby Sarusi
BIU	Nano-Structured Oxides for Quantum Conversion of Solar Energy	Prof. Arie Zaban
HUJ	Hybrid Nanomaterials and Formulations for Functional Coatings and Printed Devices	Prof. Oded Shoseyov
TEC	Nano-Photonic Assisted Advanced Functional Detectors and Imagers	Prof. Gad Eisenstein
WIS	Inorganic Nanotubes: From Nanomechanics to Improved Nanocomposites	Prof. Reshef Tenne

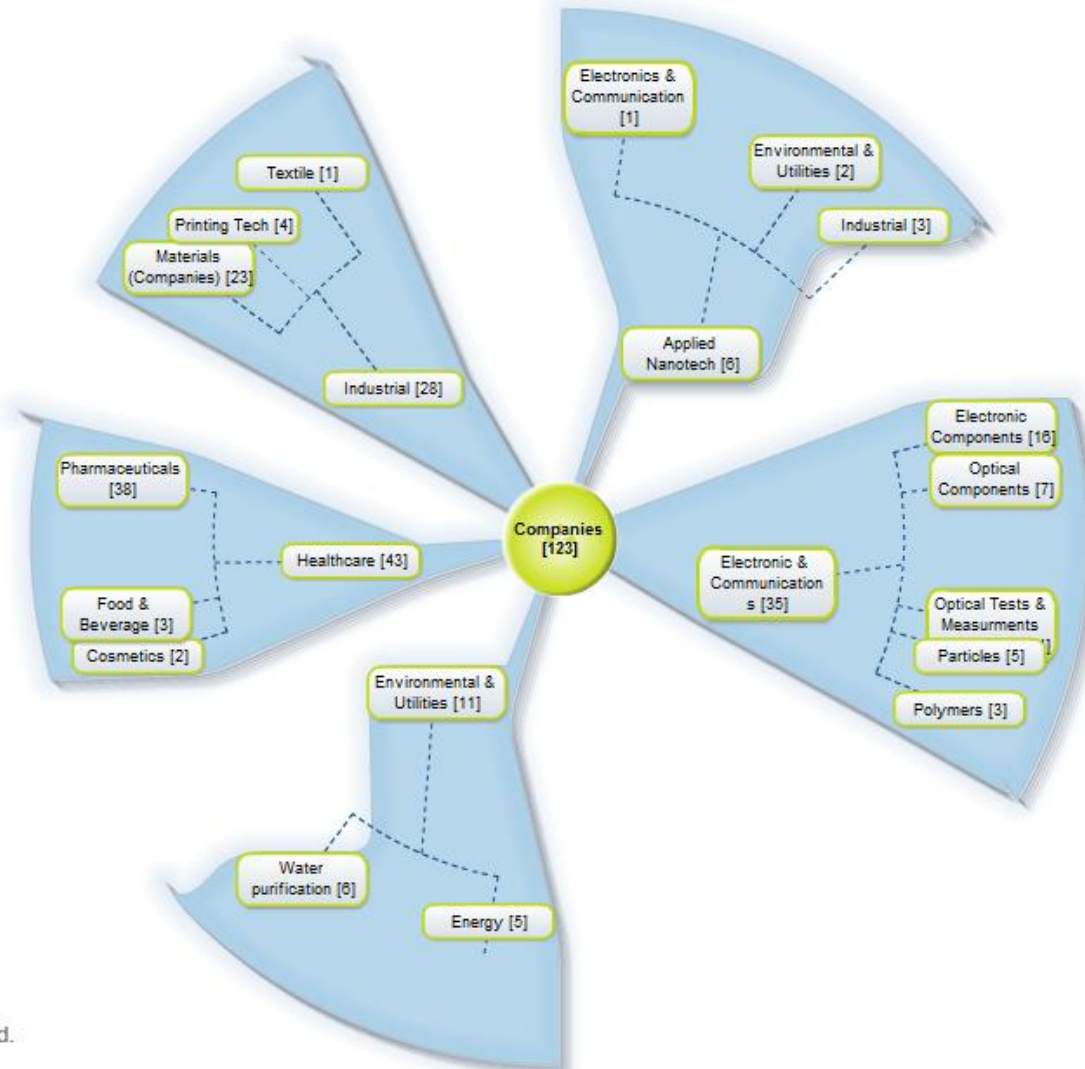
After 10 Years Achievements

- ▶ 1250 researchers, 150 world class faculty members
- ▶ About 200 nano based companies (65% startups)
- ▶ Formed 1,660 co-operations between academia and local or foreign industrial groups
- ▶ 1590 patents applications submitted
- ▶ 769 patents already approved
- ▶ 129 success stories (Start-up, IP license, etc)
- ▶ Over 12,000 published scientific articles
- ▶ National Database www.nanoisrael.org

National Database Sample

For full details: www.nanoisrael.org

Overview of Companies



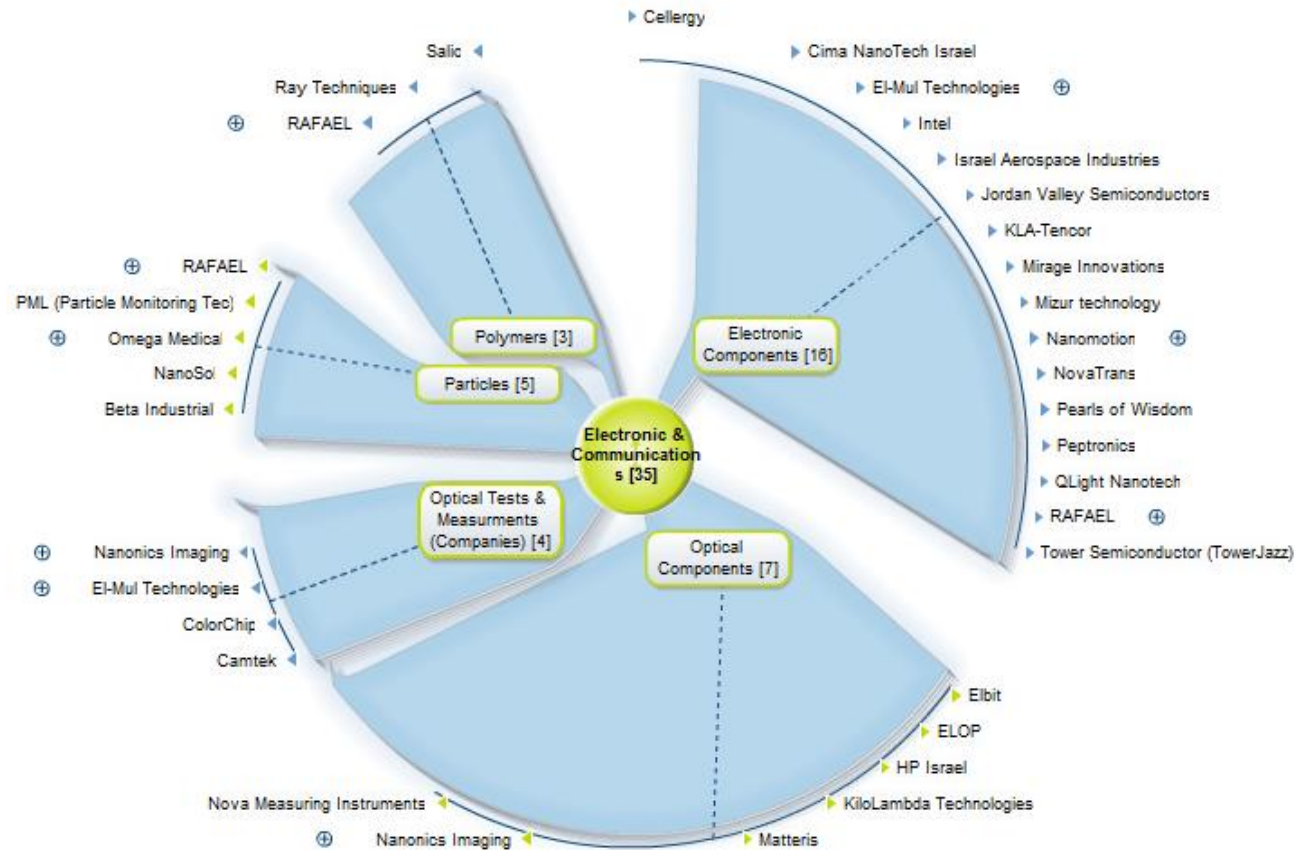
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INNI

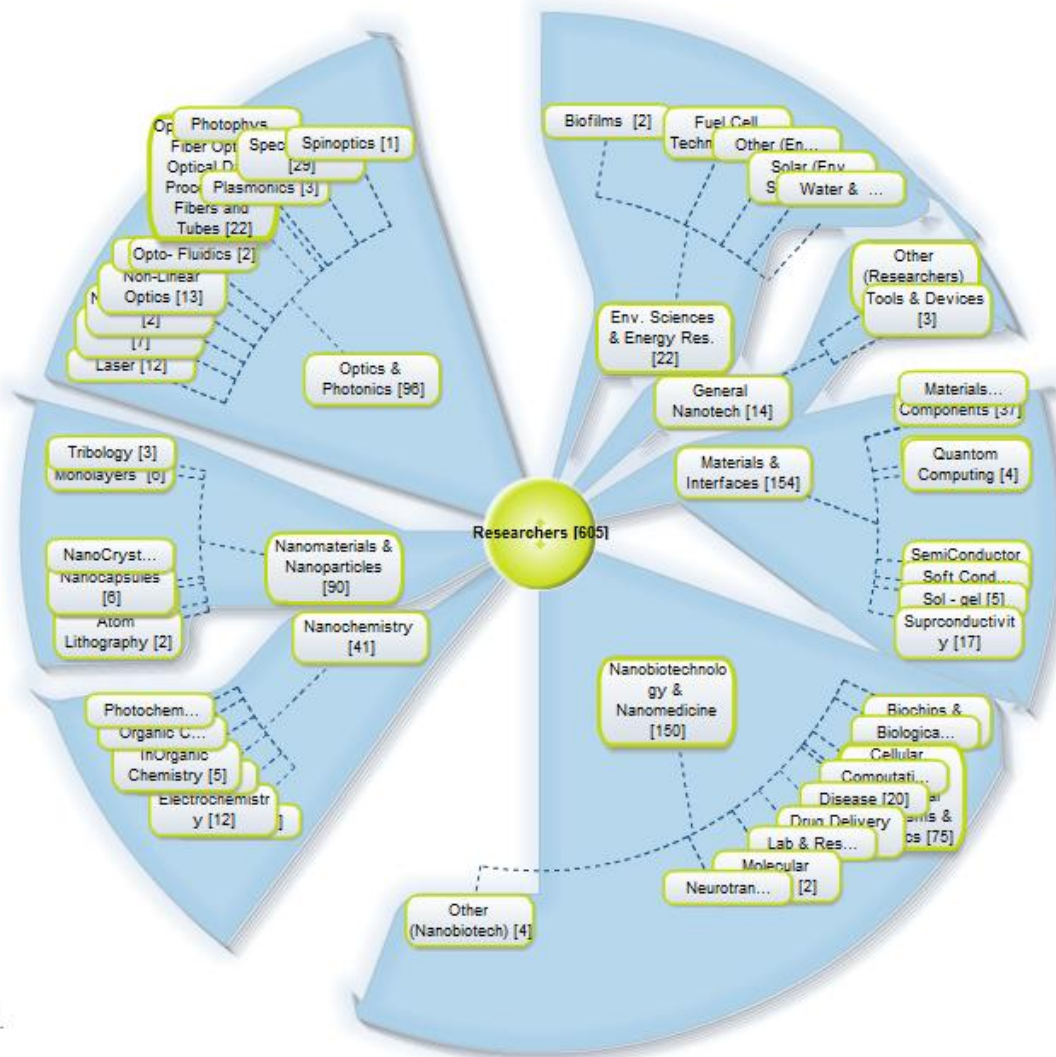
www.nanoisrael.org

Electronic & Communication - Companies



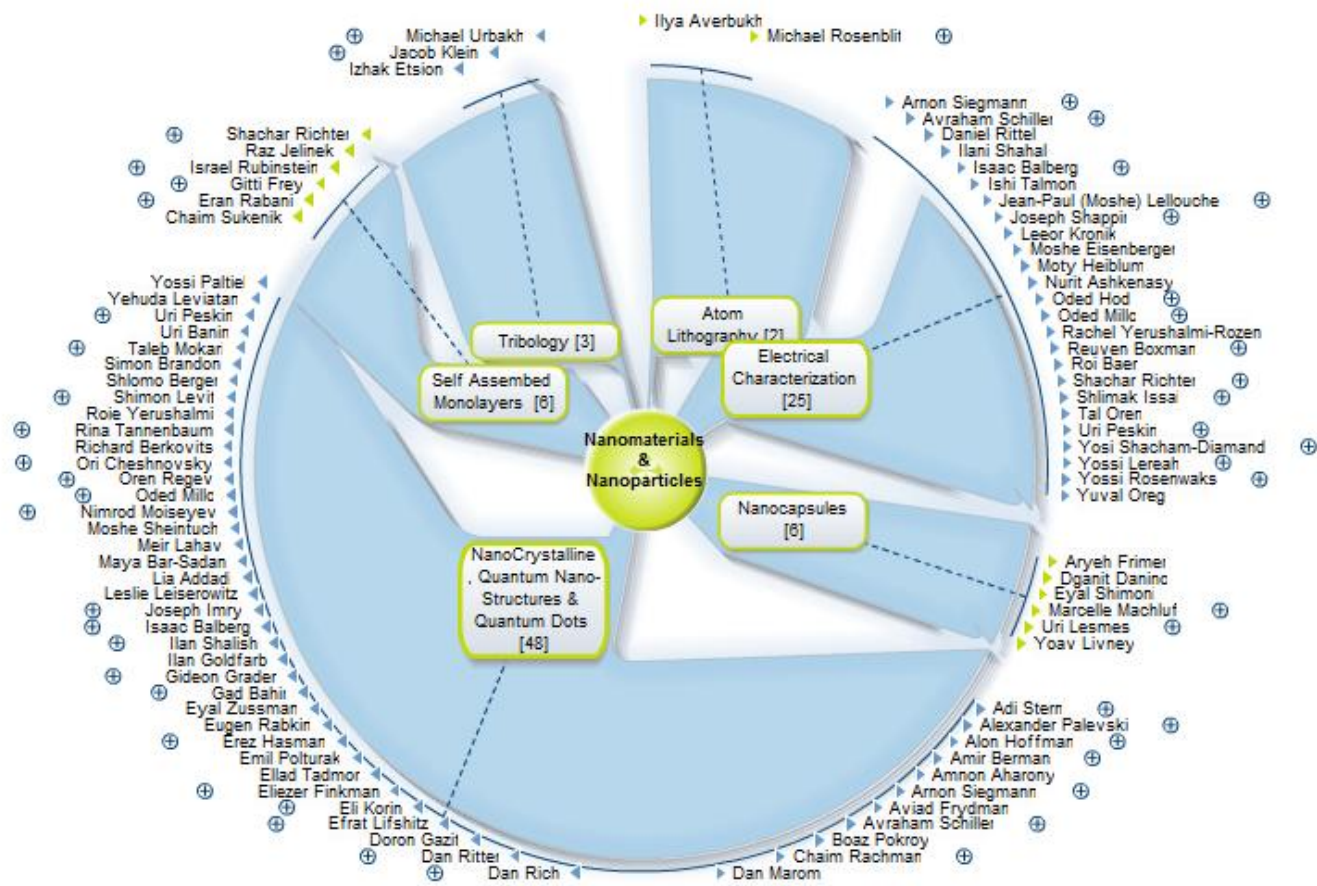
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Overview - Researchers



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Nanomaterial & Nanoparticles- Researchers



Future Outlook



NANO.IL 2018 | October 09-11, 2018 | International Convention Center, Jerusalem

SAVE THE DATE

9-11 October, 2018

**International Convention Center
Jerusalem**





Future Outlook

- ▶ **Continue leading in advanced academic research.**
- ▶ **Transform current research into commercial applications and products.**
- ▶ **Improve process and scale up capabilities to enable reproducibility and consistent performance.**
- ▶ **Utilize nanotechnology know how to upgrade the traditional industry and improve its position.**
- ▶ **Take active role in the international standards committee and conform to the EHS standards.**
- ▶ **Become global player in Nano and promote active collaborations with world's academy and industry.**

Thank You !
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