# Curriculum Vitae

March 2022

# Alon HOFFMAN

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I.D. 14685713

Date and place of birth: October 22, 1958; Argentina.

Citizenship: Israeli, Australian, Argentinean.

## Academic Degrees

1987 D.Sc. Physics Department, Technion - Israel Institute of Technology, Israel. Supervised by Prof. M. Folman.

1982 B.A. (Cum Laude) Physics Department, Technion - Israel Institute of Technology, Israel.

## Academic Appointments

2020- 2021: Deputy Vice President for Research of the Technion.

2018-2020: Deputy Senior Vice President of the Technion.

2012-2016: Dean, Schulich Faculty of Chemistry, Technion, Haifa 32000, Israel.

2007-: Full Professor, Schulich Faculty of Chemistry, Technion, Haifa 32000, Israel.

1997 – 2007: Associate Professor, Schulich Faculty of Chemistry, Technion, Haifa 32000, Israel.

1992-1997: Senior Lecturer, Schulich Faculty of Chemistry Department, Technion, Haifa 32000, Israel.

1988-1990: Australia National Research Fellow (Post-Doc), Applied Physics Department, RMIT, Melbourne, Australia.

1987-1988: Research Associate (Post-Doc), Surface Science Center, Chemistry Department, Pittsburgh University, Pennsylvania, USA.

1982-1987: Junior Faculty Member, Department of Physics, Technion, Haifa 32000, Israel.

**Visiting Academic Positions**

October 2021 – March 2022. (Sabbatical leave) Visiting Professor, Physics and Chemistry Departs, Hebrew University, Jerusalem. Sabbatical leave.

February 2012 Visiting Professor, Laboratory of Atomic and Molecular Collisions (LCAM), Bat 351, CNRS and University of Paris Sud, Orsay, France

August 2010 : Visiting Professor, Physics Depart. University of Melbourne, Victoria , Australia.

August 2008 –March 2009. (Sabbatical leave) International Research Fellow of the Australian Research Counsel. Visiting Professor, Physics Department, University of Melbourne, Victoria 3010, Australia. Sabbatical leave.

July 2007. Visiting Professor, Laboratory of Atomic and Molecular Collisions (LCAM), Bat 351, CNRS and University of Paris Sud, Orsay, France

February 2005 Visiting Professor, Laboratory of Atomic and Molecular Collisions (LCAM), Bat 351, CNRS and University of Paris Sud, Orsay, France

August 2004 Visiting Professor, Physics Depart. University of Melbourne, Victoria , Australia.

February 2004: Visiting Professor, Physics Depart. University of Melbourne, Victoria , Australia.

August 2003. Visiting Professor, Physics Depart. University of Melbourne, Victoria , Australia.

February 2003. Visiting Professor, Laboratory of Atomic and Molecular Collisions (LCAM), Bat 351, CNRS and University of Paris Sud, Orsay, France

July-August 2002. Visiting Professor, Department of Physics and Materials Science, City University of Hong Kong, China.

September 2000. Visiting Professor, Physics Department, Laboratory of Nanospectroscopy, La Sapienza, Roma, Italy. Sabbatical leave.

February – August 2000. (Sabbatical leave) Visiting Professor, Laboratory of Atomic and Molecular Collisions (LCAM), Bat 351, CNRS and University of Paris Sud, Orsay, France. Sabbatical leave.

September 1999. Visiting Professor, Laboratory of Atomic and Molecular Collisions (LCAM), Bat 351, CNRS and University of Paris Sud, Orsay, France.

February 1999. Visiting Scientist, Nirim, Tsukuba, Japan.

February 1998. Visiting Scientist, Research School of Physical Sciences. And Engineering. The Australian National University, Canberra, Australia.

September 1997. Visiting Scientist, Lure, University of Paris Sud, Orsay, France.

July – August 1996. Visiting Scientist, Lure, University of Paris Sud, Orsay, France.

April 1996. Visiting Scientist, Nirim, Tsukuba, Japan.

July 1994. Visiting Fellow, Applied Physics Dept., RMIT, Melbourne, Australia.

August 1994. Visiting Scientist, Applied Physics, CSIRO, Lindfield, NSW, Australia.

## Professional Experience

2001- : Consultant for the Israeli Space Program on the subject of properties of materials under upper atmosphere physico-chemical conditions.

1992 – Consultant for the Israeli microelectronic industry on subjects associated with surface science.

1990-1992: Research Scientist, Appl. Nuclear Physics, ANSTO. PMB 1 Menai,
2234 NSW, Australia.

## Current Research Interests

1. Physico-chemical processes and properties of surfaces.
2. Electron, photon, ion and thermal stimulated processes on diamond surfaces: ESD, SEE, QPY, TPD and IEEE.
3. Electron spectroscopy (EELS, XPS, AES, UPS, HREELS, NEXAFS) of carbon allotropes surfaces.
4. Nucleation and growth processes and mechanism of poly- and nano-crystalline diamond films.
5. Interaction of hydrogen, nitrogen and oxygen with single crystal, poly- and nano- crystalline diamond surfaces: content, bonding and thermal stability.

###### Teaching experience

1. *Teaching assistant* at the Department of Physics, Technion (1982-1987).

First year laboratory assistant – undergraduate level.

 Physics 3 – undergraduate level.

Quantum Mechanic 1 – undergraduate level.

Quantum Mechanic 2 – undergraduate level.

Physics of Atoms and Molecules – graduate level.

2. *Lecturer* at the Department of Chemistry, Technion (1992- ).

Physical Chemistry 2P ( for physics students) – undergraduate level.

Physical Chemistry 1B (for biology students) –– undergraduate level.

Physical Chemistry M (for medicine students) – undergraduate level.

Chemistry 2CE (for civil engin. students) – undergraduate level.

Physical Chemistry of Surfaces and Interfaces –graduate level.

Experimental Methods in Surface Science –graduate level.

Chemical Thermodynamics ( for Chemistry students) – undergraduate level

**Technion Activities.**

1992- to date: Member of the Solid State Institute.

1995- 2005: Member of the Wolfson Center for Interfaces.

2002- 2008: Member of the Committee of Patents at the Technion.

2002- 2008: Head of Chemical Center.

2010-2012: Member of the VAADA MECHINA SENATIT.

2012-2016: Dean of the Schulich Faculty of Chemistry – Technion.

2016-2018: Member of the VAADA MERAKEZET

2018-2020: Deputy Senior Vice President of the Technion

2020 -2021: Deputy Vice President for Research of the Technion

**Public Professional Activities.**

2009-2012 President of the "Israeli Vacuum Society".

1994-1997: Member of the board of the "Israeli Vacuum Society" - treasurer.

1992- to date: Referee for the scientific journals "Surface Science", "Applied Physics Letters", “Materials Research” and “ Diamond and Related Materials”.

1995- to date: Member of various “Vaadot Miktsoiot” of the Israeli Academy of Science and the Israeli Ministry of Science and Arts.

1995- to date: Referee for a number of national and international scientific funding agencies (ISF, BSF, GIF, etc.)

**Membership in Professional Societies**.

1. Israeli Vacuum Society.
2. Israeli Chemical Society.

## Honors

1982: First degree completed CUM LAUDE Technion, Israel.

1984: Guttwirth Fellowship. Technion, Israel.

1986: Guttwirth Fellowship. Technion, Israel.

1987: Award of distinction for outstanding research achievements, presented by the President of the Technion, Israel.

1997: David Ben-Aharony award for excellence in research.

2006: Alexander Goldberg award for excellence in research on the subject: “Nucleation and Growth of Diamond Films”.

2009: Joseph Szydlowsky Chair in Sciences

**Graduate students**.

**1. Completed Thesis**

#### a. Ph.D.

1. K. Bovrov, (1993-1998) (maslul yashir), “ Reactivity of Single Crystal Diamond Surfaces”. Present position: Research Scientist at the LCAM-CNRS, Orsay, France. 0033169154480

2.Y. Chaak,.(1994-1997), “Nucleation and Growth of Diamond Films”.

Present position: Technical Expert- Intel, Qiriat Gat, Israel. 0547886697

1. O. Glouzman, (1995-1999), “Diamond Deposition onto Ferrous Substrates”.

Present position: Researcher, Chemistry Department, Technion, Israel.04 6018019 (home)

4. I. Gouzman, (1995-1999), “Bias Enhanced Nucleation of Diamond Films”.

 Present position: Research Scientist, Soreq Nuclear Research Center, Israel. 08 9434412 (work)

5. R. Shima-Edelstein, (1995-1999), “Heterogeneous Chemical Effects of Nucleation and

Growth of Diamond Films”.

Present position: Research and Development Engineer, Tower Semiconductors, Migdal Ha-Emeq, Israel. 04-6506099 (work)

6. A. Heiman, (1998-2002 ), “Formation and Growth of Nano-Diamond Films Deposited by the DC Glow Discharge Method”.

Present position: Research and Development Engineer, Tower Semiconductors, Migdal Ha-Emeq, Israel.

7. A. Laikhtman, (1999-2003), “Chemical and Physical Processes on Diamond Surfaces Under the Influence of Electromagnetic Radiation”.

Present position: Lecturer at the Physics Department. HIC – Holon.

1. R. Intrater, (2000-2005). “Interaction of Ionizating Radiation with Polymer Surfaces” in collaboration with Soreq NRC and the Israel Space Program.

Present position: Research Engineer, Israel Aero Space Industry, Tel Aviv, Israel. 03 9358586 (work)

##### 9. S. Michelson, (2002- 2007), “Hydrogen Bonding in Nano-Diamond Films”

Present position: Research associate at the Chemistry Department, Technion

10. T. Kravchuk (2001-2006) (maslul yashir), “Study of Reactivity Cu-Al(100) Single Crystal Surfaces by XPS, UPS, ISS and STM” .

Present position: Research associate at the Chemistry Department, Technion.

11. O. Tarniak (2002-2007) (maslul yashir), “Initial Stages of Formation and Electronic Properties of Submicron Diamond CVD Films”.

Present position: Research engineer at the Microelectronic center- Technion.

12. Z. Shpilman (2006-2010), “Interaction of Activated Oxygen with Diamond Surfaces” (co-supervisor with Dr. I. Gouzman and Dr. J. Adler).

Present position: Research Scientist, Soreq NRC.

13. S. Elfimchev (2016-2019), “Incorporation of nitrogen and phosphorus in diamond films for thermionic energy conversion”

14. M. Attrash (2016-2021), “Interaction of Nitrogen with Diamond Surfaces”

b. M. Sc.

1. H. Shemen, (1993-1995), ”Influence of Low energy Ar+ Ion Irradiation of Carbon Allotropes Surfaces”.

2. H. Geller, (1994-1997), “Carbon Nitride Formation by High Energy and High Dose N+ Implantation Into Carbon Allotropes Surfaces”.

Present position: Research and Development Engineer, Tower Semiconductors, Migdal Ha-Emeq, Israel.

3. I. Gouzman,.(1993-1995), “ Interaction of Low Energy N+ Ion Bombardment into Carbon Allotropes Surfaces by in-situ Surface Electron Spectroscopy”.

Present position: Research Scientist, Soreq Nuclear Research Center, Israel.

4. A. Laikhtman, (1996-1999), “Absolute Quantum Photo-Yield of Diamond Surfaces”.

 Present position: Senior Lecturer, Holon Institute of Technology, Holon Iseael,

5. S. Michelson, (1999-2002), “Deposition and Electron Emission Properties of Sub-micron Diamond Films”.

Present position: Research and Development Engineer, Tower Semiconductors, Migdal Ha-Emeq, Israel

6.M. Ronen, (2000-2003)"Non linear vibration of micro-beams in atomic force microscopy", (co-supervisor with Dr. O. Gottlieb)

7. M. Tsaref (2001-2004), “Interaction of Activated Oxygen with Silicon Nano-structures”. Present position: Ph.D. student at the Technion.

8. O. Ofer (2002-2004) “ Hydrogen in Diamond : a Computational Study” (co-supervisor with Dr. J. Adler).

Present position: Ph.D. student at the Technion.

9. Z. Shpilman (2003-2005), “Field Electron Emission form Nano-crystalline Carbon Films”. (co-supervisor with Prof. R. Kalish).

10. O. Shwartz (2003-2006) “Study of the Primary Formation Mechanism of Nano Diamond Films”.

11. B. Zaknoon (2005-2008) “Properties of Silicon Nanostructures Studies by Scanning Probe Microscopy” (co-supervisor with A/Prof. G. Bahir).

Present position: Intel – Haifa.

12. R. Tesler (2004-2007) “Interaction of Hydrogen with InSb (100) Single Crystal Surfaces” (co-supervisor with Dr. Cecile Saguy).

Present position: R&D engineer, SCD Leshem, Israel.

13. E. Vershbosky (2005-2009) “Nano-Diamond: a Computational Study” (co-supervisor with Dr. J. Adler).

Present position: Software development in an Israeli industry.

14. A. Gisiansky (2007-2010) ”Physical Properties of Diamond Surfaces”.

Present position: Ph.D. candidate at the WI- Rehovot.

15. Y. Koenka (2009-2011) “Hydrogen in nano diamond films”.

Present position: Ph.D. candidate in German University

16. E. Baibich (2009-2012) “Temperature dependence of electron emission properties of diamond”.

Present position: Intel – Kiriat Gat, Israel.

17. E. Hojman (2010-2013) “ Diamond formation onto WC-Co fro tribological applicatios“.

Present position: R&D Enginner- SCD, Leshem.

18. Y. Ladov (2008-2013) “Surface properties of III-V semiconductors surfaces”

Present position: R&D Enginner- Tower, Haifa.

19. O. Rainhertz (2011-2014) "Influence of Structural and Chemical Effects on the Thermionic Electron Emission from Polycrsyatlline Diamond Films“.

20. M. Sasa (2012-2015) “Interaction of Low energy Nitrogen Species with Diamond Surfaces“

21. S. Elfimchev (2013-2015) “Photo –thermal Electron Emission from Polycrystalline Diamond Films“

22. Miriam Fisher (2013-2016) “Influence of Deposition Temperature and Microstructure of Cr-N Interlayer on the Adhesion of Diamond Coatings on WC-Co Substrates”

23. Dor Daniel (2016-2018) “Enhanced Colling of Electronic Chips Using Combined Diamond Coating and Microfluidics”. Army, co-supervised with Prof G. Usifon (Mechanical Engineering).

24. Yulia Shotsky (2018-2020) “ Investigation of the Interaction Between Nanoscale Gold Layers and Diamond Surfaces using Surface Sensitive Spectroscopies”

**2. Thesis in Progress**.

Ph.D.

M. Fisher (2017-)

Y. Zheng (GTIIT) (2019-)

M.Sc.

G. Dgani (2020-)

X. Huang (GTIIT) (2020-)

**Research Assistants – Post-docs**

1. A. Fayer, (1993-1995) Shapira.

2. Dr. B. Faisger, (1994-1997). Shapira

3 . R. Ahvaldiani, (1999- 2020). Mosad

1. Dr. R. Edrei, (1997-2009) Research associate. Mosad
2. Dr. V. Gridin (2003-2004) Kamea.
3. Eng E. Alagim (2005-)
4. Dr. S. Michaelson (2009-2016) Research associate. Mosad.
5. Dr. M. Chandran (2014-2017) Schulich Post-doctoral fellow from India.
6. Dr Fengnan Li (2017-2018) GTIIT Post-doctoral fellow from China
7. Dr Mohanm Kumar (2016-) Schulich Post-doctoral fellow from India.

##### Conferences

**1.Plenary or invited talks**.

1. “Advanced Materials 97”, Tsukuba, Japan, March 2-3, 1997, ”Deuterium Interaction with the Di(111) Surface Studied by TPD, EELS and LEED”. ***Invited*** lecture.

2. “Workshop on Ultra-Hard Coatings”, Gyeong – Nam, Korea, July 2-3, 1997, “Diamond Film Deposition onto Ferrous Substrates” and “ Bias Enhanced Nucleation of Diamond CVD” ***Invited***  lecture.

3. “Dynamical Processes in Physical Chemistry” Ein Gedi, Israel, February 1998 , “Adsorption-Desorption Phenomena of Hydrogen From Single Crystal Diamond Surfaces”. ***Invited*** lecture.

4. “Advanced Materials 99”, Tsukuba, Japan February 28- March 3, 1999, ”Absolute Quantum Photoelectron Yield from Diamond Surfaces”. ***Invited*** lecture.

5. “Currents Trends in Interface Chemistry”, Lublin - Krakow 3-7 July 2000, “Evolution and Properties of Nano-Diamond Films”. ***Invited*** lecture.

6. “13th International Workshop on: Inelastic Ion-Surface Collisions”, Argentina, Bariloche 20-24 November 2000, “Electron Stimulated Desorption of Hydrogen from diamond Surfaces” ***Invited*** lecture.

7. “International Conference on Materials Science and Technologies” Agil2000, Jerusalem, Israel, November 8-9/2000. “Mechanism and Formation of Nano-Diamond Films”. ***Invited*** lecture.

8. “The Second Israel – Japan Binational Workshop on Diamond Science and Technology” , Tosayamada-cho, Kochi, Japan, 6-7 December, 2001. ”Electron Photon and Thermal Stimulated Desorption of Hydrogen from Diamond Surfaces”. ***Invited*** lecture.

9. “Surface and Bulk Defects in CVD Diamond Films VII”, Limburgs, Belgium. March 13-15 2002. “Electron Stimulated Processes on Hydrogenated Diamond Surfaces: Desorption and Electron Emission”. ***Keynote*** lecture.

10. “Second Vacuum & Surface Science Conference of Asia and Australia”, Hong Kong, Hong Kong University, August 26-30, 2002. “Charge Trapping and Stimulated Desorption of H- by Resonance Electron Attachment on Hydrogenated Diamond Surfaces” . ***Invited*** lecture.

11. “NATO Advance Research Workshop: Syntheses, properties and applications of Ultra-nano-crystalline Diamond”, “Ultranano-crystalline Diamond 2004” , St Petersburg, Russia, June 2004. “ Mechanism and Visualization of Nano-Diamond Films Deposited by the DC-GD-CVD Process”. ***Plenary*** *lecture.*

12. “SPM2005”, June 2005, Holon, Israel. “Diamond films for Tribological Applications” . ***Invited*** *lecture.*

13. “16th European Conference on Diamond, Diamond-Like Materials, Carbon Nano-notubes & Nitrides”, Toulouse, France September 2005. “Hydrogen on Diamond Surfaces” . ***Invited*** *lecture.*

14. “Nanosmat2005 – International Conference on Surfaces, Coatings and Nano-structured materials” Aveiro, Portugal 7-9 September 20005. “Formation Mechanism of Nano-diamond Films: from Experiment to Theory”. ***Invited*** *lecture*.

15. “The France-Israel Symposium on Diamond, Carbon Nano-Structures and Related Materials”, March 6-7, 2006. Hod Hamidbar Hotel, Ein Bokek, Israel. “ Interaction of low energy electrons with diamond surfaces”. ***Invited*** lecture.

16. “Surface and Bulk Defects in CVD Diamond Films XIII”, Hasselt, Belgium. February 24-28, 2008. “Hydrogen in Diamond Films of Varying Grain Size in the Nanometer to Micron Range” ***Invited*** lecture.

17. “The 4th International Conference on New Diamond and Nano Carbon” NDNC 2010, May 16-20- 2010, Suzcho, China, “Hydrogen in Diamond Films”. ***Keynote*** lecture.

18. “ Adsorption of Water Molecules on Bare and Deuterated Diamond Surfaces: High resolution Electron Energy Loss Spectroscopy Studies”, Boston November 29-december 3, 2010, MRS 2010 Fall Meeting, ***Invited*** lecture.

19. “Electronic and Chemical properties of Nitrided Diamond Surfaces” Boston November 29-december 3, 2015, MRS 2010 Fall Meeting, ***Invited*** lecture.

20. “Interaction of Hydrogen with Diamond Surfaces” NDNC 2016, May 21-25-2016, Xian, China, ***Invited*** lecture.

**2. Contributed talks.**

1. “Diamond, Diamond – Like and Related Coatings 1991” Nice, France, September 2-6, 1991, ”Secondary Electron Emission Spectroscopy and Total Electron Yield measurements for the Assessment of near Surface Damage in Diamond”.

2. “Metallurgical Coatings and Thin Films 1994”, San Diego, CA, USA, April 25-29, 1994, “Carbon Nitride Formation by Low Energy Nitrogen Implantation into Graphite”.

3. “5th European Conference on Diamond and Related Materials”, Il Ciocco, Italy, September 25-30, 1994, “Nitrogen Implantation into Glassy carbon as an Attempt to Grow a Carbon Nitride Thin Film”

4. “7th European Conference on Diamond and Related Materials”, Tours, France, September 8-13, 1996. “Thermal Program Desorption of Deuterium from Di(111) Surface: Presence of two Adsorption States”

 5. “12th European Conference on Diamond, Diamond-Like Materials, carbon Nano-tubes, Nitrides & Silicon Carbide”, Budapest, Hungary, September 2-7, 2001. “The Effect of Atomic Deuterium on Chemical and Electronic Structure of Natural and Polycrystalline Diamond”

6. “Desorption Induced by Electronic Transitions DIET9”, France , 5-9 June 2002, “Elastic and Inelastic Exit Channel Dynamics of D- Desorption From Diamond Surfaces Via Dissociative Electron Attachment”

7. “Desorption Induced by Electronic Transitions DIET9”, France , 5-9 June 2002, “Low Energy Electron Stimulated Desorption of O- From Hydrogenated and Hydrogen – Free Diamond Surfaces Exposed to Activated Oxygen”.

8. “Second Vacuum & Surface Science Conference of Asia and Australia”, Hong Kong, Hong Kong University, August 26-30, 2002, “Interaction of Activated Oxygen with Hydrogenated Diamond Surfaces Studied by Ion Desorption Methods”

9. “Surface and Bulk Defects in CVD Diamond Films IX”, Limburgs, Belgium. February 2004***,*** “Hydrogen in Nano-crystalline Diamond Films”.

10. “17th European Conference on Diamond, Diamond-Like Materials, Carbon Nano-notubes & Nitrides”, Albeiro, Portugal, September 2006, “High Resolution Electron Energy Loss spectroscopy of Hydrogenated Diamond Surfaces”.

11. “Surface and Bulk Defects in CVD Diamond Films XII”, Limburgs, Belgium. February 2007***,*** “Crystalline Diamond Films Deposited from Isotopic Gas Mixtures”.

12. “Surface and Bulk Defects in CVD Diamond Films XIV”, Hasselt, Belgium. March 1-4, 2009. “Thermal Stability of Nano-diamond Films”.

**3.** **Participation in organizing conferences.**

1. Organized and headed a Korea-Israel bi-national conference on : “Ultra Hard Coatings” that took place in Seoul, Korea (1998).

2.Organizing committee of “The Second Israel-Japan Binational Workshop on Diamond Science & Technology and Diamond Electronics for Future Information Technology” Kochi University of Technology, Japan (2001).

3. International Organizing committee of “ IVC-16, IC-12, Nano-8, AIV-17” June 2004, Venice, Italy.

4. Organizing committee of SPM2005, June 2005, Holon, Israel.

5. International Organizing committee of “NanoSmat2005” International conference on surfaces and interfaces of nano-structured materials, September 2005, Aveiro, Portugal.

6. One-day Memorial Symposium for the late Professor **Mordechai Folman**”, Chemistry Department, Technion. November 1, 2005. Technion.

7. Organizing committee of “The France-Israel Symposium on Diamond, Carbon Nano-Structures and Related Materials”, March 6-7, 2006. Hod Hamidbar Hotel, Ein Bokek, Israel.