

CURRICULUM VITAE

• **Personal Details**

Date of birth: 08.04.1974
Work Address: Department of Materials Engineering, Ben-Gurion University of the Negev, Room 107, Bld. 59, the Marcus Family Campus, Beer-Sheva, 8410501, Israel
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• **Education**

B.A., 1992-5, Technion – the Israel Institute of Technology, Faculty of Chemistry

B.Sc., 1992-6, Technion – the Israel Institute of Technology, Faculty of Chemical Engineering

M.Sc., 1999-01, Technion – the Israel Institute of Technology, Faculty of Chemical Engineering

Adviser: Yaron Paz and Dan Ritter (Electrical Engineering)

Title of Thesis: Passivation of III-V Semiconductor and their Devices with Organic Self-Assembled Monolayers

Ph.D. 2006-9, Columbia University in the City of New-York, New-York, NY, USA, Department of Chemical Engineering

Adviser: Shalom J. Wind

Title of Thesis: Nanofabricated Molecular-Scale Devices for the Study of Cytoskeletal Protein Binding Interactions and Their Effect on Cell Motility

• **Employment History**

2014 - present Senior Lecturer
Department of Materials Engineering, Faculty of Engineering Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel

2009 –14 Postdoctoral Associate
Department of Materials and Interfaces, Faculty of Chemistry, Weizmann Institute of Science, Rehovot, Israel

2006-9 Chief Materials Scientist
More Energy Ltd, Lod, Israel

2001 - 4 Process Engineer and Project Leader
GWS-Photonics Ltd, Ramat-Gan, Israel

- **Professional Activities**

- (a) Positions in Academic Administration

- 2014 - present Member of User Committee, Nanofabrication Center, BGU

- 2015 - present Member of Advertisement Committee, Dept. of Materials Engineering,
BGU

- (b) Professional Functions outside the University

- 2017 Scientific Programme Committee –the 61th International Conference on
Electron, Ion and Photon Beam Technology and Nanofabrication,
Orlando, FL, USA

- 2016 Grant Reviewer for Israel Science Foundation

- 2016 Session chair - Annual Meeting of the Israeli Vacuum Society, Beer-
Sheva, Israel

- 2016 Scientific Programme Committee –the 60th International Conference on
Electron, Ion and Photon Beam Technology and Nanofabrication,
Pittsburgh, PA, USA

- (c) Significant Professional Consulting

- 2014 - 2105 RAFAEL, Optical Component Center, Manor – Advanced Defense
Technologies: Nanoimprint Lithography for Antireflective
Nanostructures

- (d) Ad-hoc Reviewer for Journals

- Journal of Vacuum Science and Technology A
 - Nanotechnology

- (e) Member in Professional/ Scientific Societies

- 2016 - present AVS - American Vacuum Society

- 2016 - present SPIE - Society of Photo-Optical Instrumentation Engineering

- 2009 - present IVS - Israeli Vacuum Society

- **Educational Activities**

- (a) Course Taught

- Polymers (Undergraduate)
 - Semiconductor Technology (Undergraduate)
 - Nanofabrication Processes (Graduate)

- Nanomaterials and their Technologic Uses (Undergraduate)
- Laboratory for Semiconductor Technology (Undergraduate)

(b) Research Students and Postdocs

2104 - 2106	Liran Menahem, M.Sc. Student, Thesis Title: “New Approaches for Hybrid Nano Imprint Lithography Molds”
2105 - present	Avichai Markovici, M.Sc. Student
2105 - present	Yossi Keidar, M.Sc. Student
2105 - present	Netanel Barhanin, M.Sc. Student
2015 - present	Andrey Nazarov (Jointly supervised with Ibrahim Abdulhalim, Electro-optical Engineering)
2015 -2016	Oren Ben-Nun, M.Sc Student (without thesis), Project title: “Air Gap Structures formation Using PECVD”
2015 -2016	Natali Ashkenazi, M.Sc Student (without thesis), Project title: “Lithography methods for fabricating "Moth-eye" antireflective structures on curved surfaces”
2015 -2016	Danit Vidger, B.Sc. Project Student
2015 -2016	Chen Ben-Lulu B.Sc. Project Student
2015 -2016	Alexander Kopnsky, B.Sc. Project Student
2106 - present	Dor Yehuda, M.Sc. Student
2106 - present	Natali Ostrovsky, Ph.D Student
2106 - present	Viraj Bingadrive, Ph.D Student
2106 - present	Guillaume Le Saux, Postdoc
2106 - present	Ophir Yeari, B.Sc. Project Student
2106 - present	Arkady Kaplan, B.Sc. Project Student

- **Awards and Fellowships**

2013	Ultratech/Cambridge NanoTech Best Paper Award for the year 2013
2009	Dean Fellowship - Faculty of Chemistry, Weizmann Institute of Science
2008	Best Invited Poster Award - The 52 nd Int. Conference of Electron, Ion and Photon beam Technology and Nanofabrication
1995	Dean List, Faculty of Chemistry, Technion

- **Scientific Publications**

(a) **H-index (Google Scholar): 11**

(b) Total # of Citations (Google Scholar): 514

(c) Total # of Citation Excluding Self-Citations:490

(d) Referred Articles in Scientific Journals:

^S-Student, ^{PD}-postdoc, ^T-Technician, ^C-Collaborator, ^{PI}-Principal Investigator

1. L. Menahem^S and M. Schwartzman^{PI} “Soft nanoimprint mold with rigid relief features for improved pattern transfer”, **J. Vac. Sci. Technol. B** 35, 010602 (2017)
2. L. Goren-Ruck^S, D. Tsivion^S, M. Schwartzman^{PD}, R. Popovitz-Biro^C, and E. Joselevich^{PI}, “Guided growth of Horizontal GaN Nanowires on Quartz and their Transfer to Other Substrates” **ACS Nano**, 8 (3), 2838 (2014) [8 citations, IF 13.3; 4/93.; Q1]
3. M. Schwartzman^{PD}, D. Tsivion^S, D. Mahalu^C, O. Raslin^T, and E. Joselevich^{PI}, “Self-Integration of Nanowires into Circuits by Guided Growth” **Proc. Nat. Acad. Sci. USA**, 100 (38), 15195 (2013) [24 citations, IF 9.4; 3/111; Q1]
* Highlighted in PNAS Commentary 110 (38), 15171, (2013)
* Received Ultratech/Cambridge NanoTech Best Paper Award for the year 2013
4. D. Tsivion^S, M. Schwartzman^{PD}, R. Popovitz-Biro^C, and E. Joselevich^{PI}, “Guided Growth of Horizontal ZnO Nanowires with Controlled Orientations on Flat and Faceted Sapphire Surfaces” **ACS Nano**, 6 (7), 6433 (2012) [41 citations, IF 13.3; 4/93; Q1]
5. D. Tsivion^S, M. Schwartzman^{PD}, R. Popovitz-Biro^C, P. von Huth^C, and E. Joselevich^{PI}, “Guided Growth of Millimeter-Long Horizontal Nanowires with Controlled Orientations” **Science**, 333 (6045), 1003 (2011) [106 citations, IF 34.6; 2/111; Q1]
* Highlighted in MRS Bulletin 36(10), 734 (2011)
6. M. Schwartzman^S, M. Palma^{PD}, J. Sable^C, J. Abramson^S, J. Hu^C, M. P. Sheetz^{PI}, and S.J. Wind^{PI}, “Nanolithographic Control of the Spatial Organization of Cellular Adhesion Receptors at the Single-Molecule Level” **Nano Lett.**, 11 (3), 1306 (2011) [106 citations, IF 13.8; 3/93; Q1]
7. M. Schwartzman^S and S. J. Wind^{PI}, “Robust Pattern Transfer of Nanoimprinted Features for Sub-5 nm Fabrication”, **Nano Lett.**, 9 (10), 3629 (2009) [35 citations, IF 13.8; 3/93; Q1]
8. M. Schwartzman^S and S. J. Wind^{PI}, “Plasma Fluorination of Diamondlike Carbon Surfaces: Mechanism and Application to Nanoimprint Lithography” **Nanotechnology**, 20 (14), 145306 (2009) [29 citations, IF 3.6; 26/93; Q2]
9. M. Schwartzman^S, K.Nguyen^{PD}, M. Palma^{PD}, J. Abramson^S, J. Sable^C, J.Hone^{PI}, M.P. Sheetz^{PI}, and S.J. Wind^{PI}, “Fabrication of Nanoscale Bioarrays for the Study of Cytoskeletal Protein Binding Interactions Using Nanoimprint Lithography” **J. Vac. Sci. Technol. B**, 27 (1), 61 (2009) [10 citations, IF 1.7; 241/1536; Q2]
10. M. Schwartzman^S, A. Mathur^S, J. Hone^{PI}, C. Jahnes^C, and S.J. Wind^{PI}, “Plasma Fluorination of Carbon-Based Materials for Imprint and Molding Lithographic Applications” **Appl. Phys. Lett.**, 93 (15), 153105 (2008) [19 citations, IF 3.1; 34/248; Q1]

11. M. Schwartzman^S, A. Mathur^S, Y. Kang^T, C. Jahnes^C, J. Hone^{PI}, and S.J. Wind^{PI}, "Fluorinated Diamondlike Carbon Templates for High Resolution Nanoimprint Lithography" **J. Vac. Sci. Technol. B**, 26 (6), 2394 (2008) [16 citations, IF 1.7; 241/1536; Q2]
12. M. Schwartzman^S, V. Sidorov^S, D. Ritter^{PI}, and Y. Paz^{PI}, "Passivation of InP Surfaces of Electronic Devices by Organothiols Self-Assembled Monolayers" **J. Vac. Sci. Technol. B**, 21 (1), 148 (2003) [30 citations, IF 1.7; 241/1536; Q2]
13. M. Schwartzman^S, V. Sidorov^S, D. Ritter^{PI}, and Y. Paz^{PI}, "Surface Passivation of (100) InP by Organic Thiols and Polyimide as Characterized by Steady-State Photoluminescence" **Semicond. Sci. Technol.**, 16, L68 (2001) [29 citations, IF 2.1; 173/1536; Q2]
14. S. Gosh-Mukerji^{PD}, H Haick^S, M Schwartzman^S, and Y Paz^{PI}, " Selective Photocatalysis by means of molecular Recognition" **J. Am. Chem. Soc.**, 123 (43), 10776 (2001) [61 citations, IF 13; 7/415; Q1]

- **Conference Proceedings**

1. L. Menahem^S, M. Schwartzman^{PI}, "Soft-substrate rigid-feature (SSRF) mold for nanoimprint lithography ", **Proc. SPIE** 9919, Nanophotonic Materials XIII, 99190P (2016)

- **Lectures and Presentations at Meetings and Invited Seminars**

(e) **Invited Lectures at Conferences/ Meetings**

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| 2017 | "Soft Thermal Nanoimprint Lithography", 7 th Annual Congress on Materials Research and Technology", Berlin, Germany |
| 2017 | "Nano-Lithographically Directed Organization at the Molecular Scale: from Inorganic Nano-Architectures to Bio-Interfaces" Annual meeting of Israeli Chemical Society, Tel-Aviv, Israel |
| 2016 | "Soft-Substrate/ Rigid-Feature for Nanoimprint Lithography", Annual Conference of Israel Polymer and Plastic Society, Jerusalem, Israel |

(f) **Presentations of Papers at Conferences/ Meetings**

* - presenting author

1. L. Menachem, M. Schwartzman*, SPIE Nanoscience and Engineering Conference, San-Diego, CA, Aug 2016, "Soft-Substrate Rigid-Feature Mold for Nanoimprint Lithography" - oral presentation

2. L. Menachem, M. Schwartzman*, The 60th Intl. Conference of Electron, Ion and Photon beam Technology and Nanofabrication, Pittsburgh, PA, May 2016, "Soft-Substrate Rigid-Features Nanoimprint Mold" (proceeding ref. unavailable) - poster presentation
3. M. Schwartzman*, D. Tsivion, and E. Joselevich, Nanowire 2013 Conference, Weizmann Institute, Rehovot, Nov 2013, "Self-Integration of Nanowires into Circuits via Guided Growth" (proceeding ref. unavailable) - poster presentation
4. M. Schwartzman*, D. Tsivion, and E. Joselevich, Annual Conf. of the Isr. Vac. Society, Oct 2013, " Self-integration of Nanowires into Circuits and Logic Devices via Guided Growth" (DW-03) - oral presentation
5. M. Schwartzman*, D. Tsivion, and E. Joselevich, Annual Conf. of the Isr. Vac. Society, Oct 2012, "Nanowires with Controlled Location and Direction by Surface-Guided Growth from Nanopatterned Catalyst" (VT-02) - oral presentation
6. M. Schwartzman*, D. Tsivion, and E. Joselevich, The 56th Intl. Conference of Electron, Ion and Photon beam Technology and Nanofabrication, Waikoloa Beach, HI, May 2012, "Nanowires with controlled location and direction by surface-guided growth from patterned catalyst" (P17-16) – oral presentation
7. M. Schwartzman*, D. Tsivion, and E. Joselevich The 3rd Nano Israel Conference, March 2012, "Nanowire based logic devices and circuits" (proceeding ref. unavailable) - poster presentation
8. M. Schwartzman* and S. Wind, The 53rd Intl. Conference of Electron, Ion and Photon beam Technology and Nanofabrication, Marco Island, FL, May 2009, "Fabrication of Sub-5nm Nanoscale Arrays by Nanoimprint Lithography Combined with an Angle-Evaporated Hard Mask and Lift-off" (5D-1) - oral presentation
9. M. Schwartzman*, K. Nguyen, J. Abramson, J. Hone, M. Sheetz, and S. Wind, MRS Annual Meeting, Boston, MA, Dec 2008, "Fabrication of Nanoscale Bioarrays for the Study of Cytoskeletal Protein Binding Interactions Using Nano-Imprint Lithography" (FF8.9) - oral presentation
10. M. Schwartzman*, K. Nguyen, J. Abramson, J. Hone, M. Sheetz, and S. Wind, AVS 55th Intl. Symposium, Boston, MA, Nov 2008, "Fabrication of Nanoscale Bioarrays for the Study of Cytoskeletal Protein Binding Interactions Using Nano-Imprint Lithography" (BO+NS+BI+NC+ThA1) - oral presentation
11. M. Schwartzman*, K. Nguyen, J. Abramson, J. Hone, M. Sheetz, and S. Wind, Gordon Research Conference - Nanostructure Fabrication, Tilton, NH, Jul 2008, "Nanoscale Bioarrays for the Study of Cytoskeletal Protein Binding Interactions Using Nano-Imprint Lithography" (proceeding ref. unavailable) - oral presentation
12. M. Schwartzman*, S. Wind, The 52nd Intl. Conference of Electron, Ion and Photon beam Technology and Nanofabrication, Portland, OR, May 2008, "Fluorinated

- Diamond Like Carbon (DLC) Templates For Ultra-Small Features NIL” (P-3A-03) - oral presentation
13. M. Schwartzman*, K. Nguyen, J. Abramson, J. Hone, M. Sheetz, and S. Wind, The 52nd Int. Conference of Electron, Ion and Photon beam Technology and Nanofabrication, May 2008 - “Fabrication Of Nanoscale Bioarrays For The Study Of Cytoskeletal Protein Binding Interactions Using Nano-Imprint Lithography” (5A-4) - oral presentation
 14. M. Schwartzman*, V. Sidorov, D. Ritter, and Y. Paz, Annual Conf. of the Israel Vacuum Society, Jun 2001, "Passivation of InP Surfaces of Electronic Devices by Organothiolated SAMs” (PB-4) - oral presentation
 15. M. Schwartzman*, V. Sidorov, D. Ritter, and Y. Paz, Eastern Mediterranean Chemical Engineering Conference, Ankara, Turkey, May 2001, "Passivation of InP Surfaces of Electronic Devices by Organothiolated Self-Assembled Monolayers” (proceeding ref. unavailable) - oral presentation
 16. M. Schwartzman*, V. Sidorov, D. Ritter, and Y. Paz, Annual Conference of the Israeli Chemical Engineers Association, Apr. 2001, "Passivation of InP Surfaces of Electronic Devices by Organothiolated Self-Assembled Monolayers” (proceeding ref. unavailable) – oral presentation

(g) Presentations at Conferences/ Meetings by Group Members

* - presenting author

1. Yossi Keydar*, Guillaume Le Saux, Orly Gershoni, Angel Progador, Mark Schwartzman, 2016, Heterogeneous sub-20nm nano-arrays by nanoimprint lithography, Annual Conf. of the Isr. Vac. Society, Beer-Sheva, Israel - poster presentation
2. Viraj Bhungardive*, Liran Menahem, Mark Schwartzman, 2016, “Soft Thermal Nanoimprint Lithography “, Annual Conf. of the Isr. Vac. Society, Beer-Sheva, Israel - poster presentation
3. L. Menachem*, M. Schwartzman, 2016, “Soft-Substrate Rigid-Features Nanoimprint Mold” Israel Materials Engineering Conference (IMEC), Ramat-Gan, Israel, - poster presentation
4. L. Menachem*, M. Schwartzman, 2015, “Soft-Substrate Rigid-Features Nanoimprint Mold” , Annual Conf. of the Isr. Vac. Society, Rehovot, Israel - poster presentation

(h) Seminar Presentations at Universities and Institutions

1. 2017, Department of Materials Engineering, Tel-Aviv University, “Lithographically Driven Nanoscale Assembly”
2. 2015, Intel, Kiriath-Gat, "Nano-Electronics from the Bottom-Up"

3. 2014, Faculty of Electrical Engineering, Technion, “Self-Integration of Nanowires into Circuits via Guided growth”
4. 2014, Department of Chemistry, Bar-Ilan University, “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
5. 2014, Department of Materials Engineering, Ben-Gurion University, “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
6. 2014, Faculty of Chemical Engineering, Technion, “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
7. 2014, Department of Chemistry, Tel-Aviv University, “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
8. 2014, Department of Chemistry, Ben-Gurion University “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
9. 2014, Department of Chemical Engineering, Ben-Gurion University, “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
10. 2014, Department of Applied Physics, Hebrew University of Jerusalem, “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
11. 2014, Faculty of Materials Engineering, Technion, “Lithographically Guided Organization of Nanostructures: a New Route to Functional Nanosystems and Biointerfaces”
12. 2012, School of Engineering and Applied Science, Columbia University in the City of New-York, “Nanowire based logic devices and circuits by guided growth from Nanoimprinted Catalyst”

- **Research Grants**

Project Title	Funding source	Amount (\$ US)	Period
Institutional equipment grant for SEM-FIB dual-beam tool (Together with Gabi Sarussi and Daniel Gitler)	Israel Science Foundation	290,000	09.2016
Nanoimprinted Anti-Reflective Nanostructures on the Curved Optical Surfaces of Chalcogenide Glasses	PAZY Foundation	300,000	06.2016 – 06.2020
Nano-biomimetic devices for the regulation	Internal Seed	30,000	01.2016

and Study of Signal Interaction in NK cell Response (Together with Angel Porgador, BGU)	Grant - BGU		– 01.2017
Molecular-scale biomimetic devices for the study of adhesive cross-talk and its effect on stem cell motility and differentiation (Together with J.C. Kuo, National Yang Ming University, Taiwan)	MOST- Israel-Taiwan Scientific Research Cooperation	70,000	11.2015 – 10.2017
Templated organization of 1D nanostructures	Israel Science Foundation - New Faculty Equipment Grant	562,500	06.2015 – 09.2017
Templated organization of 1D nanostructures	Israel Science Foundation – Personal Grant	308,000	10.2015 – 09.2019
Polymer solar cells with heterojunction morphology nanoimprinted at the scale of exciton diffusion length (Together with Nir Tessler, Technion)	Adelis Foundation for Research in Renewable Energy	50,000	05.2015 – 05.2016

- **Present Academic Activities**

Research in progress

Subject	Other Participants	Expected date of completion
Nanoimprinted Anti-Reflective Nanostructures on the Curved Optical Surfaces of Chalcogenide Glasses	Dr. Shay Joseph (RAFAEL)	2020

Nano-biomimetic devices for the regulation and Study of Signal Interaction in NK cell Response	Angel Porgador (BGU)	2018
Molecular-scale biomimetic devices for the study of adhesive cross-talk and its effect on stem cell motility and differentiation	Jean.C. Kuo, National Yang Ming University, Taiwan	2018
Templated organization of nanowires		2020
Templated organization of nanodumbbells	Taleb Mokari, BGU	2020
Polymer solar cells with heterojunction morphology nanoimprinted at the scale of exciton diffusion length	Nir Tessler, Technion	2017
Biomimetic nanodevices for the study and regulation of the CAR Immunological synapse	Saba Ghassemi, Michael Milone, University of Pensilvania	2018
Nanoplasmnic structures tailored gor biosensing applicatiосn	Ibrahim Abdulhalim, BGU	2019

Articles to be published

- L. Menahem^S, M. Schwartzman^{PI}, “Soft-substrate rigid-feature (SSRF) mold for improved nanoimprint lithography- submitted to Journal of Vacuum Science and Technology B
- V. Bhingardive, L. Menahem, M. Schwartzman, “Ultrahigh-resolution soft thermal nanoimprint lithography” – in preparation
- A. Markovici, T Mokari, M. Schwartzman, “Templated Assembly of nanodumbbells” – in preparation