

## CURRICULUM VITAE

### **Yoav Snir**

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Family status: married to Ayelet + 3 children

### **EDUCATION:**

**2022- Ph.D at the Department of Materials Engineering, Ben-Gurion University, Beer-Sheva, Israel. Approved 04/2022.**

Thesis: “*Hydrogen Interactions With High Strength Steels*” : The PhD research focuses on the complex interplay between the metallurgical features, of precipitation-hardened high alloy steels and hydrogen diffusion and trapping and its effect on the mechanical behavior. For the research the small punch test technique (SPT) and thermal desorption spectroscopy (TDS) along with advanced microscopy techniques are employed.

**Results of this study were already published in three peer – reviewed papers. The final thesis dissertation was approved 04/2022.**

**2003 M.Sc, Materials Science Engineering Ben-Gurion University, Beer-Sheva, Israel.**

Thesis: “*The Effect of Compression Deformation on Stored Energy and Corrosion Behavior of Mg Alloys*” : This research focused on the basic relation between the microstructure of three wrought Mg alloys (AZ31, AM50, ZK60) after compression deformation at various temperatures, and the corrosion behavior of these alloys. It was found that the stored energy (manifested by microstructural changes such as twinning) and its release by dynamic recrystallization processes had a dramatic effect on the corrosion behavior at different states.

**2000 B.Sc, Materials Science Engineering Ben-Gurion University, Beer-Sheva, Israel. (With excellence).**

**MAIN AREAS OF INTEREST** (Physical metallurgy, characterization and processing) :

- Hydrogen trapping mechanisms in advanced steels.
- High entropy and complex concentrated alloys
- Martensitic transformation in alloys, steels and shape memory alloys.
- Physical metallurgy of advanced solidification casting, metal additive manufacturing and welding – combining traditional casting techniques with advanced additive manufacturing structures.
- Advanced characterization techniques – metallurgical Non-Destructive Evaluation (NDE) techniques, synchrotron radiation x-ray diffraction (SR-XRD), advanced mechanical techniques such as the small punch test (SPT).

**EMPLOYMENT HISTORY:**

**A) Positions at the Nuclear Research Center Negev**

2017– **present** Head laboratory for materials processes.

2015– 2017 Research scholar at the Department of Materials Science and Engineering, University of North Texas, the X-lab group of Prof. Marcus Young.

2009 – 2015 Head of section at the Materials Science and Engineering Department, NRCN

2005 – 2009 Head of group at the Materials Science and Engineering Department, NRCN

2002 – 2005 Research scientist at the Materials Science and Engineering Department, NRCN

**B) Academic Professional Experience**

2000 - 2002 Graduate Laboratory Instructor, Department of Material Science and Engineering Ben-Gurion University of the Negev.

## **ADDITIONAL PROFESSIONAL ACTIVITIES:**

### **Research at the University of North Texas 2015-2017:**

- **Hydrogen effects on NiTi shape memory alloys (SMA)**– a study was conducted on the effects of hydrogen on the phase transformation and structural stability of Ti-rich NiTi SMA wires which are widely used in the medical industry. Through a simple immersion test a strong hydrogen effect was found which further studied with SR-XRD in-situ experiments and other techniques. These findings were published in three peer-reviewed papers and one patent and were also presented in three scientific conferences.
- **High entropy alloys** – high entropy or complex concentrated alloys (HEA/CCA) are a new class of materials which consist of at least 4 metallic elements mixed in high elemental atomic ratios. I led a preliminary study on Fe-rich FeCrNiCo HEAs to develop a new high strength hydrogen resistant alloy. The findings were presented in two scientific conferences and further work is ongoing.

### **Co-Advisor for Graduate students for B.Sc at Ben-Gurion University:**

- 2008 – Preliminary study of aging kinetics in PH–13-8Mo stainless steel by advanced Non Destructive Evaluation (NDE) methods, E. Amzaleg.
- 2009 – Ageing kinetics study of A286 PH stainless steel by Thermo-Electric Power (TEP) measurements, E. Vinegard (best project award 2009).
- 2009 - Friction Stir Welding (FSW) of magnesium and aluminum alloys, J. Amsellem.
- 2011 - Metallurgical characterization of PH-13-8Mo stainless steel by TEP measurements, M. Elgarissi, M. Morad

### **International collaboration of IAEC with the JRC: ODS steels for generation-IV nuclear reactors (2010 – 2015)**

- Development of advanced characterization methods for metallurgical changes under extreme service conditions with an emphasis on the identification of the so called 475°C embrittlement. Thermo-Electric Power (TEP) measurements and TEM were the main characterization methods.

### **Material Characterization (2006 – 2009):**

- Thermo Electric Power (TEP) measurement in precipitation hardened alloys was examined as a potential method for the non-destructive evaluation (NDE) of the metallurgical state in advanced steels. A thorough examination of several steels has shown a clear correlation between the metallurgical state of the alloy (characterized by microscopy techniques, XRD and hardness tests) and TEP measurements.

### **Advanced processing of materials (2005 – 2006) :**

- Friction Stir Welding (FSW) is a solid state welding technique. We have studied this technique in an attempt to better understand its implementation, especially for light and reactive alloys such as Mg alloys or dissimilar welding of Mg-Al alloys.

### **PRIZES AND SCHOLARSHIPS**

- **PAZI sabbatical scholarship for scientists 2015-2017**
- **KATZIR scholarship for Young Scientific Leadership 2004-2010.**
- **MSc. With Honors 2003.**
- **BSc. With excellence 2000.**
- **Best final project award for BSc projects at the Materials Science and Engineering Department Ben-Gurion University 2000.**
- **NRCN Scholarship 1999-2000.**
- **Excellence BGU Scholarship for a New Student 1996.**

## **PUBLICATIONS**

### **Refereed Journal Papers and Thesis**

1. Y. Snir, “hydrogen interactions with high strength steels” PhD thesis, 04/2022, Ben-Gurion University, Department of Materials engineering.
2. Y. Snir, D. Moreno, I. Silverman, S. Samuha, Y. Eisen, D. Eliezer, Y. Gelbstein, S. Haroush, “Mechanical Properties of Proton Bombarded SS316L Thin Foils Using the Small Punch Technique”, Journal of Nuclear Materials, 540 (2020), 152340.
3. Y. Snir, S. Haroush, A. Danon, A. Landau, D. Eliezer, Y. Gelbstein, “Aging condition and trapped hydrogen effects on the mechanical behavior of a precipitation hardened martensitic stainless steel”. Journal of Alloys Compounds, 805 (2019), pp. 509-516.
4. S. B. Murguia, A. Clauser, H. Dunn, W. Fisher, L. Mello, Y. Snir, M. L. Young, “NiTi shape memory alloy helices through the hydriding–dehydriding method”, Materialia 5 (2019), 100210.
5. Y. Snir, S. Haroush, A. Danon, A. Landau, Y. Gelbstein, D. Eliezer, “Metallurgical and hydrogen effects on the small punch tested mechanical properties of PH-13-8Mo stainless steel”. Materials, 11 (2018), 1966
6. S. B. Murguia, A. Clauser, H. Dunn, W. Fisher, Y. Snir, R. E. Brennan, M. L. Young, “Low-pressure and low-temperature hydriding–pulverization–dehydriding method for producing shape memory alloy powders”, Shape Memory and Superelasticity 4 (2018) pp. 313–326
7. Y. Snir, M. Carl, N.A. Ley, M.L. Young, Effects of hydrogen charging on the phase transformation of martensitic NiTi shape memory alloy wires, Shape Memory and Superelasticity. 3 (2017) pp. 443-456.
8. Y. Snir, G. Ben-Hamu, D. Eliezer, E. Abramov “Effect of Compression Deformation on the Microstructure and Corrosion Behavior of Magnesium Alloys”, Journal of Alloys and Compounds, vol. 528, (2012), pp. 84-90.
9. Y. Snir, M. Pinkas, Y. Gelbstein, A. Landau, “Applying TEP measurements to assess the Aging Stage of Maraging 250 steel”, Quantitative Nondestructive Evaluation, vol. 27, American Institute of physics 2008.
10. Y. Unigovski, A. Eliezer, E. Abramov, Y. Snir, E.M. Gutman,” Corrosion Fatigue of Die-Cast and Extruded Magnesium Alloys”, Materials Science Engineering A 360, (2003) pp. 132–139.

### **Patents**

11. M.L. Young, Y. Snir, “Techniques for Producing SMA Materials and Powders” US-Patent, US2020/0961A1, 01/2020.

## **Refereed research proposals to APS national laboratory**

12. Y. Snir, M.L. Young, High energy X-ray diffraction measurements of precipitation hardened steels to analyze in-situ hydrogen Effects on Phase Stability and Removal Kinetics during Charging and Heating & Cooling, GUP-53836, approved 2017.
13. Y. Snir, M. Carl, N.A. Ley, M.L. Young, High energy X-ray diffraction measurements of martensitic NiTi shape memory alloys during in-situ hydrogen charging and heating and cooling, GUP-51351, approved 2016.

## **PRESENTATIONS AT CONFERENCES:**

14. Y. Snir, M. Carl, N. Ley, Y. Gelbstein, A. Landau, D. Eliezer, and M.L. Young, “The Effects of Thermomechanical Treatments on a New Fe-rich Dual-phase Complex Concentrated Alloy (CCA)”, oral presentation: 1st International Conference on Technological Innovations in Metals Engineering (TIME), Haifa, Israel, May (2018).
15. M. Issa, S. B. Murguia, Y. Snir, and Marcus L. Young “Processing and characterization of porous high entropy alloy structures via freeze-casting”, oral presentation: 147th Annual TMS Meeting, March (2018).
16. S. B. Murguia, Y. Snir, A. Clauser, H. Dunn, W. Grogg, R. E. Brennan, and M. L. Young “Shape memory alloy powders from a low pressure, low temperature hydriding pulverizing-dehydriding process” MS&T2017 Materials Science and Technology Conference David L. Lawrence Convention Center Pittsburgh , PA , USA, 10/2017.
17. Y. Snir, M. Carl, N. Ley, Y. Gelbstein, A. Landau, D. Eliezer, and M.L. Young, “Exploring an Fe-rich eutectic complex concentrated alloy (CCA) with age hardening properties”, XXVI international Materials Research Congress (IMRC) 2017, Cancun Mexico, 08/2017.
18. S. B. Murguia, A. Clauser, H. Dunn, W. Grogg, Y. Snir, R. E. Brennan, and M. L. Young “Hydriding- pulverization- dehydriding method of preparing shape memory alloy powders “ ICOMAT2017 International Conference On Martensitic Transformations, Chicago, IL, USA, 07/2017.
19. Y. Snir, M. Carl, N.A. Ley, M.L. Young, “Effects of Hydrogen-charging on the Phase Transformation of Martensitic NiTi Shape Memory Alloy Wires”, SMST2017, Shape Memory and Superelastic Technologies, May 15-19, (2017) San Diego California.
20. M. Shmulevitsh, Y. Snir, R. Shneck “Self and interaction energy of  $\gamma'$  precipitate in A-286 steel” The 17<sup>th</sup> Israel Materials Engineering Conference, Bar-Ilan University, Israel, 02/2016.

21. Y. Snir, Y. Gelbstein, A. Landau “A Comparative Assessment Of The Aging Condition In Precipitation Hardened Steels By Thermo-Electric Power (TEP) Measurements”, Proceeding of the 15th Israel Materials Engineering Conference (IMEC 15) 2012, Dead-Sea Israel.
22. S. Avraham, G. Moshe, Y. Snir, M. Shmolevich, E. Khana, I. Edry “The Dissolution Kinetics Of Sn-Co Master- Alloy In Pure Sn”, Proceeding of the 15th Israel Materials Engineering Conference (IMEC 15) 2012, Dead-Sea Israel.
23. M. Pinkas, Z. Szaraz, Y. Snir, V. Krasjak, A. Landau, P. Hahner, “Advanced Non-Destructive Microstructural Assessment of ODS Steels”, Proceeding of DIANA 1st International Workshop on Dispersion Strengthened Steels for Advanced Nuclear Application 04/2011, Switzerland.
24. Y. Snir, M. Pinkas, Y. Gelbstein, O. Yehezkel and A. Landau, “Quantitative Non-Destructive Evaluation (QNDE) Tools for the assessment of precipitation hardened high strength steels”, Proceeding of IAEA-JRC workshop 2010, Ein-Gedi Israel.
25. O. Yehezkel, Y. Gelbstein, M. Pinkas, Y. Snir, A. Landau, “Elastic moduli measurements in metallic compounds”, JRC-IAEA, workshop 2010, Ein-Gedi, May 2010.
26. Y. Snir, Y. Gelbstein, E. Vinegard, S. Meir, M. Pinkas, A. Landau ”Thermo-Electric Power (TEP) measurements for studying ageing kinetics in PH Steels”, Proceeding of QNDE Conference July 2009, University of Rhode Island USA.
27. A. Landau, Y. Gelbstein, M. Pinkas, B. Herman, Y. Snir, D. Olson, “Application of Thermo-Electric Power measurement as an NDT Tool to assess microstructure evolution“, Proceeding of IMEC 13 2007, The Technion Israel.
28. Y. Snir, A. Landau, Y. Gelbstein, Y. Edry, E. Abramov, D. Eliezer, “Kinetic Study of Precipitation Hardening in High Strength Steels Followed by Thermoelectric Power Measurement”, Proceeding of IMEC 13 2007, The Technion Israel.
29. G. Ben-Hamu, Y. Snir, S. Haroush, A. Landau “Characterization of Corrosion Behavior of Mg Alloys Friction Stir Welded”, Proceeding of Advanced Materials and Processes in Industry Conference CAMPI 2007, Beer-Sheva Israel.
30. A. Rave, G. Moshe, M. Weiss, Y. Snir, Y. Iphlach, ”Oxidation of Tantalum by Inductive Radio-Frequency Plasma”, Proceeding of Advanced Materials and Processes in Industry Conference CAMPI 2007, Beer-Sheva Israel.
31. Y. Snir, A. Landau, Y. Gelbstein, E. Abramov, D. Eliezer, “TEP Measurements of Metallurgical Processes in Al Alloys“, Israel Materials Engineering Conference IMEC12 2006, The Technion Israel.
32. A. Landau, S. Haroush, M. Pinkas, M. Talianker, Y. Snir, S. Eden, “Light and Heavy Reactive Materials Welded by Friction Stir Welding”, Mechanical Engineering

Conference Ben-Gurion University 2005, Israel.

33. S. Haroush, Y. Snir, M. Pinkas, , S. Eden, A. Turgeman, A. Landau "Friction Stir Welding of Carbon Steel", The Welding and Joining Conference 2005, Tel-Aviv Israel.
34. Y. Snir, S. Haroush, S. Eden, M. Pinkas, A. Landau "Characterization of Friction Stir Welded Mg-Alloys", The Welding and Joining Conference 2005, Tel-Aviv Israel.
35. Y. Snir, D. Eliezer, E. Abramov, "Corrosion Of Wrought Magnesium Alloys", The First Israel Conference of Corrosion Processes & Advanced Materials NACE 2003, Israel. (Exceptional Poster)
36. Y. Snir, D. Eliezer, E. Abramov, "Residual Stresses In Wrought Magnesium Alloys", The 10th Israel Materials Engineering Conference (IMEC 10) 2002, Dead-Sea Israel.
37. A. Eliezer, E. Abramov, E.M. Gutman, A. Ben-Artzy, A. Shtechman, Y. Snir, B. Edelestein, "Corrosion Fatigue Of Extruded Magnesium Alloys", The 10th Israel Materials Engineering Conference (IMEC 10) 2002, Dead-Sea Israel.