Eran Edri November 2019

CURRICULUM VITAE

• Personal Details

Date and place of birth: December, 1979; Jerusalem, Israel.

Address and telephone number at work:

1 Ben-Gurion Blvd., Be'er Sheva, Israel 8410501; +972-8-6461765

Address and telephone number at home:

13 Ha'Chalutz, Avigdor, Israel 8380000; +972-50-3932999.

• Education

Ph.D - 2009-2014, Weizmann Institute of Science, Department of Materials and Interfaces.

Name of advisor: Prof. Gary Hodes

Title of thesis: High Open Circuit Voltage Solar Cells.

M.Sc. -2007-2009, Ben-Gurion University, Department of Chemical Engineering (*cum Laude*)

Name of advisor: Prof. Oren Regev

Title of thesis: Single walled CNTs dispersed by Bovine Serum Albumin – An experimental study.

B.Sc. - 2003-2007, Ben-Gurion University, Department of Chemical Engineering (*cum Laude*)

B.Sc. -2003-2007, Ben-Gurion University, Department of Chemistry (Dual degree program)

• Work Experience

2017 – pres. Senior Lecturer, Department of Chemical Engineering, Ben-Gurion University, Be'er Sheva, Israel.

2014 – 2017 Post-doctoral Fellow, Lawrence Berkeley National Laboratory, Berkeley, CA, USA.

2007 – 2009 Tutor, Department of Chemical Engineering, Ben-Gurion University, Be'er Sheva, Israel.

2005 – 2007 Research Assistant, Research and Development, TEVA Pharmaceuticals, Petach Tikva, Israel

• Professional Activities

a) Membership in professional/scientific societies

2016 – present, American Chemical Society

2012 – present, Materials Research Society

2009 – present, Israel Vacuum Society

b) Ad hoc reviewer

Journals:

Nature Communications; Journal of Physical Chemistry Letters; Chemical Reviews; Journal of Physical Chemistry C; Journal of Physical Chemistry; ACS Energy Letters; ACS Applied Materials & Interfaces; Journal of Applied Physics. Journal of Materials Chemistry A.

Dissertations:

Ben-Gurion University of the Negev

c) Organization of Academic Events.

i. Organizing committee of Israelectrochemitry 2019, a 2-day international meeting and workshop in Be'er Sheva, Israel.

ii. Chief-coordinator and organizer of the "Pre-ESPMI student workshop" that was held in the WIS in April 2013 (a two day international workshop for students and faculty studying electronic structures and processes at molecular interfaces).

iii. Weekly Departmental seminars (2019-2020)

CV - Eran Edri

- **Educational activities**

(a) Courses taught

Foundations of Chemical Engineering – Mass Transport (363-1-3011) B.Sc., Chemical Engineering, Faculty of Engineering, Ben-Gurion University.

Since 2017: Compulsory course, 4 credit points

Introduction to Materials Science for Chemical Engineers (363-1-3161), B.Sc., Chemical Engineering, Faculty of Engineering, Ben-Gurion University.

Since 2017: Compulsory course, 3.5 credit points

Introduction to Solar Energy and Photovoltaic Devices, (363-1-3481), B.Sc., Chemical Engineering, Faculty of Engineering, Ben-Gurion University.

2017: Elective course, 3 credit points

Undergraduate research project (363-1-4163), B.Sc. Chemical Engineering, Faculty of Engineering, Ben-Gurion University.

Since 2018: Elective course, 4.5 credit points

(b) Setup of Finite Elements Simulation Laboratory as part of Undergraduate Heat Transfer lab curriculum

(c) Research students

Anchal Vashishtha, Ph.D, 2024
Omer Vana, M.Sc. 2021
Meital Rahamim, M.Sc. 2020 (Na'amat Fellowship)
Eyal Wormser, M.Sc. 2020 (Interdisciplinary Fellowship)
Elad Salomon, M.Sc. 2019 (Dean Excellency Award; High Tech Fellowship)
Elad Levi-Zedek, Final year undergraduate research project, 2017
Chen Olewski, Final year undergraduate research project, 2017
Guy Reuveny, Final year undergraduate research project, 2018
Dana Zaslavski, Final year undergraduate research project, 2018
Adi Kaploun, Final year undergraduate research project, 2018

- **Awards, Citations, Honors, Fellowships**
  - Alon Fellowship, Israel Council for Higher Education, 2018
  - Energy and Water Resources Post-doctoral Fellowship, Israel's Ministry of National Infrastructure, 2016-2017
  - Career Development Award, Ben-Gurion University of the Negev, 2016
  - Career Development Award, Ben-Gurion University of the Negev, 2015
  - Best Poster Award MBIB Division Annual Retreat, LBNL, 2016
  - Best Poster Award Molecular Foundry User's Meeting, 2015
  - Alternative Energy Research Initiative (AERI) prize, 2012
  - MRS travel grant for the "Materials for Renewable Energy Summer School", Erice, Italy, 2012

- **Research Grants (awarded)**

BGU - Clean technologies 2019 (40k NIS); together with Dr. Muhammad Bashouti, BGU
BGU – UoC – NU trilateral water research 2019-2020 (108k NIS); together with Dr. Oded Nir, BGU

BGU - Water Technologies 2018 (87k NIS) together with Dr. Oded Nir, BGU
Israel Ministry of Energy Research Grant 2019-2021 (700k NIS)
Alon Fellowship 2018-2021 (170k NIS)
Research agreement with hp Indigo 2019 (100k NIS)

• Scientific Publications Summary

Number of peer-reviewed publications: 29
H-index from ISI/ Google Scholar: 18
Number of citations: 2820/3441 (ISI/Google Scholar).

• Lectures and Presentations at Meetings and Invited Seminars

Eran Edri, 2019, Nanometer Scale Membranes for Closing the Artificial Photosynthesis Cycle, Department of Chemical Engineering, Technion, Israel

Eran Edri, 2019, Nanometer Scale Membranes for Closing the Artificial Photosynthesis Cycle, Zuckerberg Institute for Water Research, BGU, Israel

Eran Edri, 2018. Particles vs. Rods: Structure and Function in SSSCs. Prof. Gary Hodes 70th Birthday Symposium, Weizmann Institute of Science, Israel (invited).

Eran Edri, 2018. Closing the Artificial Photosynthesis Cycle on a Nanometer Scale. Prof. David Cahen 70th Birthday Symposium, Weizmann Institute of Science, Israel (invited).

Eran Edri, 2018. Charge Transport Through Conjugated Molecules Embedded in Ultra-Thin Insulating Oxide Layer and Its Applications In Artificial Photosynthesis, Israel Vacuum Society, Ramat Gan, Israel (invited).

Eran Edri, 2018. Closing the Artificial Photosynthesis Cycle on a Nanometer Scale. Nuclear Research Center, Negev, Israel (invited).

Eran Edri, 2018. Closing the Artificial Photosynthesis Cycle on a Nanometer Scale. Center for Nanoscience and Nanotechnology, The Hebrew University of Jerusalem, Jerusalem, Israel (invited).

Eran Edri, 2017. Closing the Artificial Photosynthesis Cycle on a Nanometer Scale. Department of Materials Engineering, Ben-Gurion University of the Negev, Israel (invited).

Eran Edri, Heinz Frei. 2017. Core-Shell Micro-Tube Array for Closing the Artificial Photosynthesis Cycle on a Nanometer Scale. Materials Research Society Spring Meeting, Phoenix, USA.

Eran Edri, Heinz Frei. 2016. Charge Transport Through Organic Molecular Wires Embedded in Ultrathin Insulating Inorganic Membrane. American Chemical Society 252nd National Meeting, Philadelphia, USA. (*Invited*)

Eran Edri, Heinz Frei. 2016. Core-Shell Micro-Tube Array for Closing the Artificial Photosynthesis Cycle on a Nanometer Scale. Molecular Foundry 2016 User's Meeting, Berkeley, USA. *(Plenary)*

Eran Edri, Heinz Frei. 2016. Charge Transport Through Organic Molecular Wires Embedded in Ultrathin Insulating Inorganic Membrane. Materials Research Society Spring Meeting, Phoenix, USA.

Eran Edri, Saar Kirmayer, Lee Barnea Nehoshtan, Sabyasachi Mukhopadhyay, Michael Kulbak, Yaron Tidhar, Boris Rybtchinski, David Cahen, Gary Hodes. 2014. The Route Towards Low Cost Solution Processed High VOC Solar Cells. IEEE Photonics Conference, San Diego, USA. (*Invited*)

Eran Edri, Saar Kirmayer, Lee Barnea Nehoshtan, Sabyasachi Mukhopadhyay, Michael Kulbak, Yaron Tidhar, Boris Rybtchinski, David Cahen, Gary Hodes. 2014. From High V_{OC} ETA Solar Cells to High V_{OC} Perovskite Solar Cells: Matching Materials Properties with Device Design. Materials Research Society Fall Meeting, Boston, USA.

Eran Edri, Saar Kirmayer, Lee Barnea Nehoshtan, Sabyasachi Mukhopadhyay, David Cahen, Gary Hodes. 2014. Surface Photovoltage Spectroscopy Study of Organo Lead Perovskite Solar Cells. Materials Research Society Fall Meeting, Boston, USA.

Eran Edri, Saar Kirmayer, Sabyasachi Mukhopadhyay, Konstantin Gartsman, Gary Hodes, David Cahen. 2014. The Mechanism(s) of Photovoltaic Activity of Organic-Inorganic Lead Halide Perovskite Cells. Materials Research Society Spring Meeting, San Francisco, USA.

Eran Edri, Saar Kirmayer, Gary Hodes and David Cahen. 2014. High Open-Circuit Voltage Organic-Inorganic Lead Halide Perovskite Photovoltaic Cells. Materials Research Society Spring Meeting, San Francisco, USA.

Eran Edri, Saar Kirmayer, Gary Hodes and David Cahen. 2014. Organic-Inorganic Lead Halide Perovskite Solar Cells: Realizing High Open Circuit Voltage Solar Cells. NanoIsrael, Tel Aviv, Israel.

Eran Edri, Saar Kirmayer, Sabyasachi Mukhopadhyay, Konstantin Gartsman, Gary Hodes, David Cahen. 2014. How do $CH_3NH_3PbI_{3-x}Cl_x$ Perovskite Solar Cells work? Israel Materials Engineering Conference (IMEC16), Haifa, Israel.

Eran Edri, Saar Kirmayer, Konstantin Gartsman, Gary Hodes, David Cahen. 2013. How Do Perovskite Solar Cells Work? Materials Research Society fall meeting, Boston, USA.

Eran Edri, Saar Kirmayer, David Cahen and Gary Hodes. 2013. High Open Circuit Voltage Solar Cells Based on Organic-Inorganic Lead Bromide Perovskite. Electronic Structures and Processes at Molecular Interfaces VII (ESPMI VII), Rehovot, Israel.

Eran Edri, Hagai Cohen and Gary Hodes. 2013. Limitations to Open Circuit Voltage in ZnO/ZnS/CdS/CuSCN ETA Solar Cells: A Lesson Learned from Band Alignment in Partial and Complete Cells. Materials Research Society Spring Meeting, San Francisco, USA.

Eran Edri, Elena Rabinovich, Olivia Niitsoo and Gary Hodes. 2010. ZnO-based semiconductor-sensitized (ETA) solar cells: the importance of uniform absorber coverage for cell performance. The 1st Solar Energy Conversion and Storage, Student conference. Zikhron Ya'akov, Israel.

Eran Edri and Oren Regev, 2008. Protein Dispersed Nanotubes: pH effect, not only Electrostatic. 44th Conference of the Israel Institute of Chemical Engineers, Israel.

Eran Edri and Oren Regev, 2008. ChemOnTubes. Composition Evaluation of Carbon Nanotubes Suspensions, Zaragoza, Spain.

Eran Edri and Oren Regev. 2008. Composition Evaluation of Carbon Nanotubes Suspensions. 73rd Meeting of the Israel Chemical Society, Jerusalem, Israel.

(c) Presentations at informal international seminars and workshops

2012, International School of Solid State Physics 56th Course: Materials for Renewable Energy. Foundation and Centre for Scientific Culture Etorre Majorana. ZnO-based semiconductor-sensitized (ETA) solar cells: the importance of uniform absorber coverage for cell performance. Italy.

(d) Seminar presentations at universities and institutions

2019 Department of Chemical Engineering, Technion, Nanometer Scale Membranes for Closing the Artificial Photosynthesis Cycle

2019 Zuckerberg Institute for Water Research, Nanometer Scale Membranes for Closing the Artificial Photosynthesis Cycle

2018 Nuclear Research Center in the Negev, Core-Shell Micro-Tube Array for Closing the Artificial Photosynthesis Cycle on a Nanometer Scale

2018 HUJI Nanocenter, Hebrew University of Jerusalem, Core-Shell Micro-Tube Array for Closing the Artificial Photosynthesis Cycle on a Nanometer Scale.

2017 Materials Engineering, Ben-Gurion University, Core-Shell Micro-Tube Array for Closing the Artificial Photosynthesis Cycle on a Nanometer Scale.

2016 Molecular Biophysics & Integrated Bioimaging Division, Lawrence Berkeley National Laboratory, Division Seminar. Core-Shell Micro-Tube Array for Closing the Artificial Photosynthesis Cycle on a Nanometer Scale.

2016, Molecular Foundry, Lawrence Berkeley National Laboratory, Nanofabrication Group Seminar. Core-Shell Micro-Tube Array for Closing the Artificial Photosynthesis Cycle on a Nanometer Scale.

2013, Chemical Engineering, Ben-Gurion University, Organic-Inorganic Perovskite Solar Cells.

- **Other activities**

Since 2017, I have set up and organized a lab space equipped with four chemical hoods, an Ar and vacuum Schlenk line, a N_2-filled glove box for organic and inorganic synthesis, and acquired the equipment required for thin film syntheses (e.g., purified water system, spin coating setup, high accuracy programmable heating plate, calcination oven, equipment for handling of chemicals, heated bath for chemical bath deposition and single crystal growth, pH meter, analytical balance, dedicated glass for synthesis).

I have set up an ALD for deposition of oxides and nitride (Arradiance GEMStar XT system), with a costume-made hollow cathode plasma source designed for minimizing surface ion bombardment, and a quartz microbalance for online monitoring ALD and MLD processes. I have set up a home-built hot wall ALD system for deposition of sulfides. We have developed and characterized recipes for depositing (7 different metal oxides and one metal sulfide materials).

The lab space is divided to chemical sample preparation space and dark measurement room equipped with vibration isolation tables for vibrational spectroscopy and optoelectronic measurement. A PEM-FT-IRRAS (Nicolet s50R; Hinds Instruments) and polarized varying angle ATR-FTIR with several ATR elements. I have also set up an experimental station for surface enhanced IR spectroelectrochemistry.

We have set up electrochemical experimental setup for measuring fast electrochemical processes (Bio-logic SP-200 equipped with femtoAmp accessory) and for online monitoring of electrocatalytic products (O_2, H_2 and CO2rr products), we have set up a measurement system that includes a sensitive gas chromatograph ([an SRI Instruments GC Multiple Gas Analyzer MG#5, equipped with a TCD, two FID detectors, and a methanizer; the chromatograph can detect H2 (down to 200 ppm) and light carbons up to C_5 with CO and CO_2 (>1 ppm) are detectable)], an accurate gas flow control system (0-10.0 SCCM Alicat flow controllers and meters), and a dedicated gas tight electrochemical cell. In a standard experiment, we will separate the cathode and anode sides by an anion exchange membrane (e.g., fumasep® FAA-3-50) and purge both sides with CO_2 or Ar continuously.

As an active member of the Nanofabrication User's Community, I participated in handling the procurement of a deep reactive ion etching (DRIE) system for BGU clean room, and in setting up of a photovoltaic characterization lab at the IKI center.