

Curriculum Vitae (brief)**Yoav Y Broza**

Department of Chemical Engineering and Russell Berrie Nanotechnology Institute  
 Technion - Israel Institute of Technology  
 Haifa 3200003, Israel  
 Tel: +972-54-4818410, E-mail: [ybroza@technion.ac.il](mailto:ybroza@technion.ac.il)

**ACADEMIC EDUCATION**

**Technion - Israel Institute of Technology** (2009 – 2011) Haifa, Israel  
 Postdoctoral Researcher, Marie Curie Excellence Grant Fellow. The Laboratory for Nanomaterial-Based Devices, Department of Chemical Engineering and Russell Berrie Nanotechnology Institute.

**Technion, Israel Institute of Technology** (2009-2010) Haifa, Israel  
 Project management.

**Technion - Israel Institute of Technology** (2003-2009) Haifa, Israel  
 Ph.D **direct track** in Biotechnology, the Laboratory of Applied Genomics, the Department of Biotechnology & Food Engineering

**Technion - Israel Institute of Technology** (1999-2003) Haifa, Israel  
 B.Sc. in Biotechnology & Food Engineering, *Cum Laude*

**ACADEMIC APPOINTMENTS and RESEARCH INTERESTS**

**Technion - Israel Institute of Technology** (2015- to date) Haifa, Israel  
**Senior Researcher and Adjunct faculty** - The Laboratory for Nanomaterial-Based Devices, Department of Chemical Engineering  
 Senior Researcher, head of the Biochemical\Biological team and the head of the Analytical chemical platform in the Laboratory for Volatile Biomarker, headed by Prof. Hossam Haick. Currently: (i) Investigating disease diagnosis (mainly cancer and neurological disease) using analytical studies of organic compounds by mass spectrometry and a nanoparticle based sensor array; (ii) Studying chemical ‘odor-fingerprint’ of humans; (iii) Executing clinical trials in humans; (iv) Examining metabolic pathways of cancer; (v) Engineering novel breath and skin analysis technologies; (vi) Synthesizing GNP solution for producing chemiresistors sensors.

**Technion - Israel Institute of Technology** (2009- 2015) Haifa, Israel  
**Researcher A'**- The Laboratory for Nanomaterial-Based Devices, Department of Chemical Engineering

**PROFESSIONAL EXPERIENCE**

**1. NaNose Ltd.** (2011-2012) Haifa, Israel  
 Designed and implemented nano-array devices for diagnosis of cancer via breath samples, developed sampling methods protocol and tools, reviewed and assisted in analytical analysis of organic compounds, and guided clinical trials.

**2. Alfred Mann Institution for Biomedical Devices** (2009-2011) Haifa, Israel  
 Consultant, R&D team NaNose project. The work included design and implementation of nanoarrays for diagnosis of cancer.

**PUBLIC PROFESSIONAL ACTIVITIES**

- (i) **Executive Board** of the European MARIE SKŁODOWSKA-CURIE RESEARCH AND INNOVATION STAFF EXCHANGE (H2020-MSCA-RISE) Tropsense project (2015-)
- (ii) **Invited to be a Guest editor** for a special issue of the *Journal of Sensors* (2015); *Canadian Respiratory Journal* (2016)
- (iii) Reviewing board **Neural Computing and Applications**, Springer; **BMC Bioinformatics**; **Journal of Breath Research**; **The Journal of Applied Microbiology**; **Nature scientific reports**

**FELLOWSHIPS, AWARDS AND HONORS**

2009 – 2011 – Marie Curie Excellence Grant Fellowship (under prof Haick)  
 2008 – FEMS Meeting Attendance Grant Award for Young Scientists

- 2008 – The Gutvirt Fellowship, Special Excellence Scholarship  
 2007 – The Sidney & Vivian Konigsberg International Scientific Exchange Fund  
 2007 – Cogan Fund, supporting excellent research students  
 2007 – Litan Prize, excellence in academic research.  
 2003 – The Dr. Jacob Isler Foundation

## **PUBLICATIONS**

### **Refereed papers in professional journals**

1. Danin-Poleg Y, Cohen LA, Gancz H, **Broza YY**, Goldshmidt H, Malul E, et al. *Vibrio cholerae* Strain Typing and Phylogeny Study Based on Simple Sequence Repeats (SSR). *J.Clin.Microbiol* 45(3), 736-746 (2006).
2. **Broza YY**, Danin-Poleg Y, Lerner L, Broza M and Kashi Y.. *Vibrio vulnificus* typing based on Simple Sequence Repeats: insight to biotype 3. *J. Clin. Microbiol* 45(9), 2951-2959 (2009).
3. **Broza YY**, Danin-Poleg Y, Lerner L, Valinsky L, Broza M and Kashi Y. Epidemiological study of *Vibrio vulnificus* infections using variable number of tandem repeats (VNTR or SSR). *Emerging Infectious Diseases* 15(8), 1282–1285 (2009).
4. Raz N, Danin-Poleg Y, **Broza YY**, Eiji Arakawa, Balakrishnan S. Ramakrishna, et al.. Environmental Monitoring of *V. Cholerae* using Chironomids in India. *Environmental Microbiology Reports*. 2(1): 96–103 (2010), Epub 2009.
5. **Broza YY**, Raz N, Danin-Poleg Y, Lerner L, and Kashi Y. Genetic Diversity of the Human Pathogen *Vibrio vulnificus*: a New Phylogroup, *Int J Food Microbiol*. 15;153(3):436-43.(2012), Epub 2011
6. Peng G, Tisch U, Adams O, Hakim M, Shehada N, **Broza YY**, Billan S, Abdah-Bortnyak R, Kuten A, and Haick H. . Diagnosing Lung Cancer in Exhaled Breath Using Gold Nanoparticles. *Nature Nanotechnology* 4(10): 669-673 (2009)
7. Peng G<sup>§</sup>, Hakim M<sup>§</sup>, **Broza YY**<sup>§</sup>, Billan S, Abdah-Bortnyak R, Kuten A, Tisch U, and Haick H. . Detection of lung, breast, colorectal, and prostate cancers from exhaled breath using a single array of nanosensors. *Br J Cancer*. 103(4):542-551. (2010)  
<sup>§</sup> **Authors have contributed equally.**
8. **Broza Y**<sup>†</sup>, Ionescu R<sup>†</sup>, Shaltieli H, Sadeh D, Zilberman Y, Feng X, Glass-Marmor L, Lejbkovicz I, Mullen K, Miller A, and Haick H. Detection of Multiple Sclerosis from Exhaled Breath Using Bilayers of Polycyclic Aromatic Hydrocarbons and Single-Wall Carbon Nanotubes. *ACS Chem. Neurosci.*, 2 (12), pp 687–693 (2011)  
<sup>†</sup> **Authors have equal contribution to the manuscript**
9. **Broza YY**, Kremer R, Tisch U, Gevorkyan A, Shiban A, Anson Best L & Haick H.. A Nanomaterial-Based Breath Test for Short-Term Follow-Up after Lung Tumor Resection. *Nanomedicine* 2013 Jan;9(1):15-21, Epub 2012 Sep 8
10. Xu Z <sup>‡</sup>, **Broza YY**<sup>‡</sup>, Ionsecu R<sup>‡</sup>, Ding L, Liu H, Song Q Pan Y, Xiong F, Gu K, Sun G, Chen Z, Leja M, and Haick H. Breathprint of Benign and Malignant Gastric Cancer. *Br J Cancer* (2013) Mar 5;108(4):941-50  
<sup>‡</sup>**Authors have equal contribution to the manuscript**
11. Peled N, Barash O, Tisch U, Ionescu R, **Broza YY**, Ilouze M, Mattei J, Bunn P, Hirsch F, Haick H., Volatile Fingerprints of Cancer Specific Genetic Mutations. *Nanomedicine* 2013 Aug;9(6):758-66
12. Amal H, Leja M, **Broza YY**, Funka K, Liepniece-Karele I, Skapars R, Liu H, and Haick H. Geographical Variation in the Exhaled Volatile Organic Compounds of Gastric Cancer. *Int J breath* (2013) Dec;7(4):047102
13. Amann A, Mochalski P, Ruzsanyi V, **Broza YY**, and Haick H. Assessment of the exhalation kinetics of volatile cancer biomarkers based on their physicochemical properties. *Int J breath* (2014) Mar;8(1):016003
14. **Broza YY**, Zuri L, and Haick H. Combined volatolomics for monitoring of human body chemistry. *Nature Sci Rep* (2014) Apr 9;4:4611.
15. Nakhleh MK, Jeries R, Gharra A, Binder A, **Broza YY**, Pascoe M, Dheda K, Haick H. Detecting active pulmonary tuberculosis with a breath test using nanomaterial-based sensors. *Eur Respir J*. (2014) May;43(5):1522-5.

### **Refereed Reviews in professional journals**

16. Hakim M, **Broza YY**, Barash O, Peled N, Phillips M, Amann A, and Haick H, Formation of Volatile Organic Compounds Associated with Lung Cancer and Possible Biochemical Pathways *Chemical Reviews* 2012 Nov 14;112(11):5949-66
17. **Broza YY**, and Haick H. Nanomaterial-based Sensors for Detection of Disease by Volatile Organic Compounds. *Nanomedicine (Lond)* (2013) May;8(5):785-806
18. Haick H, **Broza YY**, Mochalski P, Ruzsanyi V, and Amann A. Assessment, origin, and implementation of breath volatile cancer markers. *Chemical Society Reviews* (2014) Mar 7;43(5):1423-49
19. Nakhleh MK<sup>†</sup>, **Broza YY**<sup>†</sup>, Haick H. Monolayer-capped gold nanoparticles for disease detection from breath. *Nanomedicine (Lond)*. (2014) Sep;9(13):1991-2002  
<sup>†</sup> **Authors have equal contribution to the manuscript**
20. **Broza YY**, Mochalski P, Ruzsanyi V, Amann A, and Haick H. Hybrid Volatolomics and Disease Detection. *Angewandte Chemie. Int Ed Engl*. 2015 Sep 14;54(38):11036-11048.
21. **Broza YY**, Mochalski P, Ruzsanyi V, Amann A, and Haick H. Hybride Volatolomik und der Nachweis von Krankheiten. *Angewandte Chemie*. 2015 Sep 14;127(38):11188-11201.

## **Patents**

USA Patent: 62/026,739 "Composition for direct breath sampling" Inventors: Yoav Broza, Hossam Haick. 2014