



## Ophir Vermesh

- Affiliate, Dean's Office Operations - Dean Other
- Resident in Radiology

### Bio

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#### BIO

With my background in medicine, microdevice engineering, and nanotechnology, my strengths lie in developing novel solutions to urgent problems in medicine and cancer research. Having developed a diagnostic microfluidic device at Caltech and initiated a clinical trial to test the device on glioblastoma patients at UCLA, I'm particularly interested in moving promising technologies past the proof-of-concept phase and into the clinic. My career goals are to continue to work at the interface of medicine and technology as an academic scientist, engineering new wearable and implantable technologies for earlier cancer detection and continuous monitoring.

#### CLINICAL FOCUS

- Residency

#### HONORS AND AWARDS

- Front cover: Science Translational Medicine (28 February), Science Translational Medicine (2018)
- Poster Award - First Prize, Stanford Bio-X Symposium, Stanford, CA (2017)
- Oral Presentation Award - Best Talk, SURPAS Postdoc Symposium, Stanford, CA (2016)
- Poster Award - First Prize, IEEE EMBS Micro/Nanotechnology in Medicine Conference, Waikoloa, HI (2016)
- Poster Award - First Prize, Canary Early Detection Summit, Palo Alto, CA (2016)
- Dean's Postdoctoral Fellowship, Stanford School of Medicine (2014)
- The Gerald S. Levey, M.D., Medical Science Scholarship, UCLA (2011)
- Lemelson-MIT Caltech Invention Prize, Caltech, MIT, and Lemelson Program (2009)
- Front cover: Nature Biotechnology (16 November), Nature Biotechnology (2008)
- Caltech Graduate Research Assistantship, Caltech (2006-2010)
- Letter of Distinction: UCLA GI, Endocrine, and Reproductive Health II Bloc, UCLA (2006)
- NIH Medical Scientist Training Program, UCLA (2004-2012)
- NSF Graduate Fellowship Honorable Mention, NSF (2004)
- Departmental Honors, Stanford Chemistry, Stanford (2002)
- Advanced Placement Scholar with Distinction, The College Board (1997)
- Advanced Placement Scholar with Honor, The College Board (1996)

#### BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Vice-President, American Medical Association, UCLA Chapter (2004 - 2005)
- President, American Medical Association, UCLA Chapter (2005 - 2006)

## PATENTS

- Ophir Vermesh, Sanjiv Sam Gambhir, Seung-Min Park, Tianjia Jessie Ge, Amin Aalipour. "United States Patent WO2016200900A1 Intravascular Magnetic Wire for Detection, Retrieval or Elimination of Disease Associated Biomarkers and Toxins.", Leland Stanford Junior University, Dec 15, 2016
- Ophir Vermesh, Brian KH Yen, James R. Heath. "United States Patent US20090053732A1 Microfluidic Devices, Methods and Systems for Detecting Target Molecules.", California Institute of Technology, Feb 26, 2009

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

My interests lie at the interface of medicine and technology, engineering new wearable and implantable technologies for earlier cancer detection and continuous monitoring. I am particularly interested in moving promising diagnostic technologies past the proof-of-concept phase and into the clinic.

### LAB AFFILIATIONS

- Sanjiv Gambhir (9/23/2013)

## Publications

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### PUBLICATIONS

- **An intravascular magnetic wire for the high-throughput retrieval of circulating tumour cells in vivo** *NATURE BIOMEDICAL ENGINEERING*  
Vermesh, O., Aalipour, A., Ge, T., Saenz, Y., Guo, Y., Alam, I. S., Park, S., Adelson, C. N., Mitsutake, Y., Vilches-Moure, J., Godoy, E., Bachmann, M. H., Ooi, et al  
2018; 2 (9): 696–705
- **Intraoperative Molecular Imaging in Lung Cancer: The State of the Art and the Future.** *Molecular therapy : the journal of the American Society of Gene Therapy*  
Rogalla, S., Joosten, S. C., Alam, I. S., Gambhir, S. S., Vermesh, O.  
2018; 26 (2): 338–41
- **Toward achieving precision health.** *Science translational medicine*  
Gambhir, S. S., Ge, T. J., Vermesh, O., Spitler, R.  
2018; 10 (430)
- **The Exosome Total Isolation Chip.** *ACS nano*  
Liu, F., Vermesh, O., Mani, V., Ge, T. J., Madsen, S. J., Sabour, A., Hsu, E. C., Gowrishankar, G., Kanada, M., Jokerst, J. V., Sierra, R. G., Chang, E., Lau, et al  
2017
- **High-Density, Multiplexed Patterning of Cells at Single-Cell Resolution for Tissue Engineering and Other Applications** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*  
Vermesh, U., Vermesh, O., Wang, J., Kwong, G. A., Ma, C., Hwang, K., Heath, J. R.  
2011; 50 (32): 7378-7380
- **Integrated barcode chips for rapid, multiplexed analysis of proteins in microliter quantities of blood** *NATURE BIOTECHNOLOGY*  
Fan, R., Vermesh, O., Srivastava, A., Yen, B. K., Qin, L., Ahmad, H., Kwong, G. A., Liu, C., Gould, J., Hood, L., Heath, J. R.  
2008; 26 (12): 1373-1378
- **Toward large arrays of multiplex functionalized carbon nanotube sensors for highly sensitive and selective molecular detection** *NANO LETTERS*  
Pengfei, Q. F., Vermesh, O., Grecu, M., Javey, A., Wang, O., Dai, H. J., Peng, S., Cho, K. J.  
2003; 3 (3): 347-351
- **Hysteresis caused by water molecules in carbon nanotube field-effect transistors** *NANO LETTERS*  
Kim, W., Javey, A., Vermesh, O., Wang, O., Li, Y. M., DAI, H. J.  
2003; 3 (2): 193-198
- **Low-frequency ultrasound-mediated cytokine transfection enhances T cell recruitment at local and distant tumor sites.** *Proceedings of the National Academy of Sciences of the United States of America*  
Ilovitsh, T., Feng, Y., Foiret, J., Kheirrolomoom, A., Zhang, H., Ingham, E. S., Ilovitsh, A., Tumbale, S. K., Fite, B. Z., Wu, B., Raie, M. N., Zhang, N., Kare, et al

2020

- **Photoacoustic clinical imaging.** *Photoacoustics*  
Steinberg, I., Huland, D. M., Vermesh, O., Frostig, H. E., Tummers, W. S., Gambhir, S. S.  
2019; 14: 77–98
- **Tracking T Cell Activation By OX40 Immuno-PET: A Novel Strategy for Imaging of Graft Versus Host Disease**  
Simonetta, F., Alam, I. S., Mayer, A. T., Murty, S., Vermesh, O., Hirai, T., Nobashi, T., Lau, K., Gambhir, S. S., Negrin, R. S.  
AMER SOC HEMATOLOGY.2018
- **Positron emission tomography imaging of activated T cells by targeting OX40 reveals spatiotemporal immune dynamics and predicts response to in situ tumor vaccination**  
Mayer, A. T., Alam, I. S., Sagiv-Barfi, I., Wang, K., Vermesh, O., Czerwinski, D. K., Johnson, E. M., James, M. L., Levy, R., Gambhir, S. S.  
AMER ASSOC CANCER RESEARCH.2018
- **Emerging Intraoperative Imaging Modalities to Improve Surgical Precision.** *Molecular imaging and biology : MIB : the official publication of the Academy of Molecular Imaging*  
Alam, I. S., Steinberg, I., Vermesh, O., van den Berg, N. S., Rosenthal, E. L., van Dam, G. M., Ntziachristos, V., Gambhir, S. S., Hernot, S., Rogalla, S.  
2018
- **PET imaging of OX40+activated T cells predicts therapeutic response in a murine cancer vaccine model**  
Alam, I., Mayer, A., Sagiv-Barfi, I., Vermesh, O., Wang, K., Johnson, E., Czerwinski, D., James, M. L., Levy, R., Gambhir, S.  
SOC NUCLEAR MEDICINE INC.2018
- **Imaging activated T cells predicts response to cancer vaccines.** *The Journal of clinical investigation*  
Alam, I. S., Mayer, A. T., Sagiv-Barfi, I., Wang, K., Vermesh, O., Czerwinski, D. K., Johnson, E. M., James, M. L., Levy, R., Gambhir, S. S.  
2018
- **Towards clinically translatable in vivo nanodiagnostics** *Nature Reviews Materials*  
Park, S., Aalipour, A., Vermesh, O., Yu, J., Gambhir, S. S.  
2017; 2
- **Molecular profiling of single circulating tumor cells from lung cancer patients** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Park, S., Wong, D. J., Ooi, C. C., Kurtz, D. M., Vermesh, O., Aalipour, A., Suh, S., Pian, K. L., Chabon, J. J., Lee, S. H., Jamali, M., Say, C., Carter, et al  
2016; 113 (52): E8379-E8386
- **Targeted superparamagnetic iron oxide nanoparticles for early detection of cancer: Possibilities and challenges.** *Nanomedicine : nanotechnology, biology, and medicine*  
Bakhtiary, Z., Saei, A. A., Hajipour, M. J., Raoufi, M., Vermesh, O., Mahmoudi, M.  
2016; 12 (2): 287-307
- **Gene expression profiling of individual circulating tumor cells from non-small cell lung cancer (NSCLC) patients via integrated nanotechnologies**  
Park, S., Wong, D. J., Ooi, C., Nair, V. S., Vermesh, O., Lee, S., Suh, S., Lee, L. P., Wang, S. X., Gambhir, S. S.  
AMER ASSOC CANCER RESEARCH.2015
- **Sol-Gel Synthesis and Electrospraying of Biodegradable (P2O5)(55)-(CaO)(30)-(Na2O)(15) Glass Nanospheres as a Transient Contrast Agent for Ultrasound Stem Cell Imaging** *ACS NANO*  
Foroutan, F., Jokerst, J. V., Gambhir, S. S., Vermesh, O., Kim, H., Knowles, J. C.  
2015; 9 (2): 1868-1877
- **A self-powered, one-step chip for rapid, quantitative and multiplexed detection of proteins from pinpricks of whole blood** *LAB ON A CHIP*  
Wang, J., Ahmad, H., Ma, C., Shi, Q., Vermesh, O., Vermesh, U., Heath, J.  
2010; 10 (22): 3157-3162
- **Fast Nonlinear Ion Transport via Field-induced Hydrodynamic Slip in Sub-20-nm Hydrophilic Nanofluidic Transistors** *NANO LETTERS*  
Vermesh, U., Choi, J. W., Vermesh, O., Fan, R., Nagarath, J., Heath, J. R.  
2009; 9 (4): 1315-1319
- **Self-powered microfluidic chips for multiplexed protein assays from whole blood** *LAB ON A CHIP*  
Qin, L., Vermesh, O., Shi, Q., Heath, J. R.

2009; 9 (14): 2016-2020

## **PRESENTATIONS**

- "The Integrated Blood Barcode Chip." UCLA-Caltech MSTP 2009 Annual Research Conference. University of California, Los Angeles. September 11, 2009. (September 11, 2009)
- "The Integrated Blood Barcode Chip." Lemelson-MIT Eurekafest 2009, Massachusetts Institute of Technology, Cambridge, MA. June 25, 2009.
- "The Integrated Blood Barcode Chip." 237th ACS National Meeting & Exposition, Salt Lake City, UT. March 26, 2009.
- "The Integrated Blood Barcode Chip." Materials Research Society Spring 2009 Meeting, San Francisco, CA, April 16, 2009.
- "The Integrated Blood Barcode Chip." Lemelson-Caltech Student Prize Ceremony, Caltech, Pasadena, CA. March 5, 2009.
- The "Integrated Blood Barcode Chip." Nanosystems Biology Cancer Center (NSBCC) Annual Retreat, Ventura, CA, April 3, 2009.
- "Integrated On-Chip Blood Separation and Detection." Nanosystems Biology Cancer Center (NSBCC) Annual Retreat, Ventura, CA, February 15, 2008.