

IOANNIS K. ZERVANTONAKIS, Ph.D.

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tel.: +1 (917) 518-0142, e-mail: ioannis_zervantonakis@hms.harvard.edu**EDUCATION**

- **Ph.D., Mechanical Engineering, Massachusetts Institute of Technology (MIT)** **Sept. 2007 – Dec. 2012**
Thesis: *Engineering the tumor microenvironment using microfluidics: Effects of cell-cell interactions and endothelial barrier function in tumor cell intravasation*
 - Advisor: Professor Roger Kamm
- **M.Sc., Dipl. Ing. Mechanical Engineering, Technical University of Munich (TUM)** **Oct. 2003 – Nov. 2005**
Thesis: *Computational Fluid Dynamic study of in-cylinder flow and mixing processes in internal combustion engines*
 - Advisor: Professor Georg Wachtmeister
- **B.Sc., Mechanical Engineering, National Technical University of Athens (NTUA)** **Oct. 2001 – May 2006**
 - Top 1% of the class
 - Advisor: Professor Dimitrios Hountalas

RESEARCH EXPERIENCE

- **Assistant Professor in Bioengineering, University of Pittsburgh** **Sept. 2019 -**
- **Instructor in Cell Biology, Harvard Medical School** **Sept. 2017 - Sept. 2019**
- **Postdoctoral Research Fellow in Cell Biology, Harvard Medical School** **Jan. 2013 – Sept 2017**
 - Department of Cell Biology, Laboratory of Prof. Joan Brugge
- **Graduate Research Assistant, Massachusetts Institute of Technology** **Sept. 2007 – Dec. 2012**
 - Department of Mechanical Engineering, Laboratory of Prof. Roger Kamm
- **Graduate Research Assistant, Columbia University** **Oct. 2006 – Aug. 2007**
 - Department of Biomedical Engineering, Laboratory of Prof. Elisa Konofagou
- **Undergraduate Research Assistant, GE Global Research Center/TUM** **May 2005 – Nov. 2005**
 - Department of Mechanical Engineering, Laboratory of Prof. G. Wachtmeister
- **Undergraduate Research Assistant, Bavarian Center for Applied Energy Research** **Apr. 2004 – Dec. 2005**
 - Division of Renewable Energy Systems, Laboratory of Dipl. Phys. M. Reuss

RESEARCH INTERESTS

- Systems biology approaches to cancer drug resistance and metastasis in breast and ovarian cancer
- Microfluidic and microfabricated assays to model the tumor microenvironment
- Tumor heterogeneity: single cell phenotypic decisions
- Localized drug release and gradients within the tumor microenvironment
- Endothelial permeability regulation and cell invasion: Role of immune microenvironment and cell-cell interactions

AWARDS & HONOURS

- **NIH Pathway to Independence (K99/R00), 2017-2022**
- **Department of Deference (DoD) Breast Cancer Postdoctoral Fellowship, 2014 – 2017, Harvard Medical School**
- **Doctoral Thesis Achievement Award, Circle of Hellenic Academics in Boston, January 2015, MIT**
- **Alexander S. Onassis Fellowship for graduate studies, 2007 – 2012, MIT**
- **AACR-Merck Scholar-in-Training-Award, 2009, AACR 100th Annual Meeting, Denver, CO**
- **National Foundation of Scholarships Award for ranking in the top 1% of the class, 2001-2006, NTUA, Greece**
- **Bavarian State of Germany Scholarship Award for academic excellence, 2003-2005, Munich, Germany**

JOURNAL PUBLICATIONS

1. A. Najafzadeh, **I.K. Zervantonakis**, A.K. Mookhtiar, P. Greninger, R.J. March, R.K. Egan, H.S. Luu, D.G. Stover, U.A. Matulonis, C.H. Benes, J. Yuan. "BRAF and AXL oncogenes drive RIPK3 expression loss in cancer", **PLoS Biology** 16(8). e20005756. (2018)
2. **I.K. Zervantonakis**, C. Iavarone, H.S. Chen, L.M. Selfors, S. Palakurthi, J.F. Liu, R. Drapkin, U. Matulonis, J.D. Levenson, D. Sampath, G.B. Mills and J.S. Brugge. "Systems analysis of apoptotic priming in ovarian cancer identifies vulnerabilities and predictors of drug response", **Nature Communications** 8(1): 365. (2017)
3. K. Funamoto, D. Yoshino, K. Matsubara, **I.K. Zervantonakis**, K. Funamoto, M. Nakayama, J. Masamune, Y. Kimura, R.D. Kamm. "Endothelial monolayer permeability under controlled oxygen tension", **Integrative Biology** 9: 529-538. (2017)
4. J.F. Liu, S. Palakurthi, Q. Zeng, S. Zhou, E. Ivanova, W. Huang, **I.K. Zervantonakis**, L.M. Selfors, Y. Shen, C. Pritchard, M. Zheng, V. Adleff, E. Papp, H. Piao, M. Novak, S. Fotheringham, G. Wulf, J. English, P.T. Kirschmeier, V. Velculescu, C. Paweletz, G.B. Mills, D.M. Livingston, J.S. Brugge, U.A. Matulonis, R. Drapkin. "Establishment of patient-derived tumor xenograft models of epithelial ovarian cancer for pre-clinical evaluation of novel therapeutics", **Clinical Cancer Research** 23 (5): 1263-1273. (2017)
5. **I.K. Zervantonakis** and C.D. Arvanitis. "Controlled Drug Release and Chemotherapy Response in A Novel Acoustofluidic 3D Tumor Platform", **Small** 12 (19), 2616-2626. (2016)
6. T. Kobus, **I.K. Zervantonakis**, Y. Zhang and N.J. McDannold. "Growth inhibition in a brain metastasis model by antibody delivery using focused ultrasound-mediated blood-brain barrier disruption", **Journal of Controlled Release** 238: 281-288. (2016)
7. M.P. Iwanicki, H.Y. Chen, C. Iavarone, **I.K. Zervantonakis**, T. Muranen, M. Novak, T.A. Ince, R. Drapkin, J.S. Brugge, (2016). "Mutant p53 regulates ovarian cancer transformed phenotypes through autocrine matrix deposition", **JCI Insight** 1 (10). (2016)
8. L. Gallegos, R. Ng, M. Sowa, L. Selfors, A. White, **I.K. Zervantonakis**, P. Singh, S. Dakal, W. Harper, J.S. Brugge. "A protein interaction map for cell-cell adhesion regulators identifies DUSP23 as a novel phosphatase for β -catenin" **Scientific Reports** 6, srep27114. (2016)
9. A. Spiegel, M.W. Brooks, S. Houshyar, F. Reinhardt, M. Ardolino, E. Fessler, M.B. Chen, J.A. Krall, J. DeCock, **I.K. Zervantonakis**, A. Iannello, Y. Iwamoto, V. Cortez-Retamozo, R.D. Kamm, M.J. Pittet, D.H. Raulet, R.A. Weinberg. "Neutrophils suppress intraluminal NK-mediated tumor cell clearance and enhance extravasation of disseminated carcinoma cells" **Cancer Discovery** 6 (6): 630-649. (2016)
10. I. Kandela and **I.K. Zervantonakis**. "Registered report: Discovery and preclinical validation of drug indications using compendia of public gene expression data" **eLife** 4: e06847. (2015).
11. A. Pavesi, G. Adriani, M. Rasponi, **I.K. Zervantonakis**, G.B. Fiore, R.D. Kamm. "Controlled electromechanical cell stimulation on-a-chip" **Scientific reports** 5 (2015)
12. P. Parthasarathy, **I.K. Zervantonakis** and C. R. Kothapalli. "Synergistic effects of 3D ECM and Chemogradients on Neurite Outgrowth and Guidance: A Simple Modeling and Microfluidic Framework" **PLoS One** 9 (6) e99640. (2014)
13. T.K. Schuessler, X.Y. Chan, H.J. Chen, K. Ji, K.M. Park, A. Roshan-Ghias, P. Sethi, A. Thakur, X. Tian, A. Villasante, **I.K. Zervantonakis**, N.M. Moore, L. Nagahara, N.Z. Kuhn. "Biomimetic Tissue-Engineered Systems for Advancing Cancer Research: NCI Strategic Workshop Report" **Cancer Research** 74, 5359-5363. (2014)
14. W.J. Polacheck, **I.K. Zervantonakis** and R. D. Kamm. "Tumor cell migration in complex microenvironments" **Cellular and Molecular Life Sciences**, 70 (8), 1335-1356. (2013)
15. J.S. Jeon, **I. K. Zervantonakis**, S. Chung, R.D. Kamm and J.L. Charest. "In Vitro Model of Tumor Cell Extravasation" **PLoS One** 8 (2) e56910. (2013)
16. **I.K. Zervantonakis**, S. K. Alford-Hughes, J. L. Charest, F. B. Gertler, J. C. Condeelis and R. D. Kamm. "Three-dimensional microfluidic tumor-vascular interface model: Tumor cell intravasation and endothelial barrier function" **PNAS** 109 (34), 13515-13520. (2012)
17. K. Funamoto, **I.K. Zervantonakis**, Y. Liu, C. Ochs, C. Kim and R. D. Kamm. "A Novel Microfluidic Platform for High-Resolution Imaging of a Three-Dimensional Culture under a Controlled Hypoxic Environment" **Lab on Chip**, 12 (22), 4855-63. (2012)

18. A.R. Aref, R. Huang, W. Yu, K.-N. Chua, W. Sun, T.-Y. Tu, J. Bai, **I. K. Zervantonakis**, J. P. Thiery and R. D. Kamm. "Screening therapeutic EMT blocking agents in a three-dimensional microenvironment" **Integrative Biology** 5 (2), 381-389. (2012)
19. J.M. Chan, **I. K. Zervantonakis**, T. Rimchala, W.J. Polacheck, J. Whisler and R. D. Kamm. "Engineering of In Vitro 3D Capillary Beds by Self-Directed Angiogenic Sprouting" **PLoS One** 7 (12) e50582. (2012)
20. Shin, Y., S. Han, J. S. Jeon, K. Yamamoto, **I. K. Zervantonakis**, R. Sudo, R. D. Kamm and S. Chung. "Microfluidic assay for simultaneous culture of multiple cell types on surfaces or within hydrogels" **Nature Protocols**, 7(7), 1247-59. (2012)
21. W.A. Farahat, L.B. Wood, **I.K. Zervantonakis**, A. Schor, S. Ong, D. Neal, R.D. Kamm and H.H. Asada. "Ensemble Analysis of Angiogenic Growth in Three-Dimensional Microfluidic Cell Cultures" **PLoS One**, (5), e37333. (2012)
22. C.K. Kothapali, E. van Veen, S. de Valence, S. Chung, **I.K. Zervantonakis**, F. Gertler, R. Kamm. "A High-throughput Microfluidic Assay to Study Axonal Response to Growth Factor Gradients" **Lab On Chip**, 11, 497-507. (2011)
23. Y. Luo, **I.K. Zervantonakis**, S. Baek Oh, R.D. Kamm, G. Barbastathis. "Spectrally resolved multidepth fluorescence imaging" **J. Biomed. Opt.** 16, 096015. (2011)
24. **I.K. Zervantonakis**, C.K. Kothapali, S. Chung, R. Sudo, R.D. Kamm. "Microfluidic devices for studying heterotypic cell-cell interactions and tissue specimen cultures under controlled microenvironments". **Biomicrofluidics**, 5(1): 13406. (2011)
25. S. Chung, R. Sudo, V. Vickerman, **I.K. Zervantonakis**, R. Kamm. "Microfluidic Platforms for Studies of Angiogenesis, Cell Migration, and Cell-Cell Interactions" **Annals of Biomedical Engineering**, 38 (3), 1164-1177. (2010)
26. **I.K. Zervantonakis**, S. Chung, R. Sudo, M. Zhang, J. Charest, R. Kamm. "Concentration gradients in microfluidic 3D matrix cell culture systems" **International Journal on Micro-Nano Scale Transport**, 1 (1), 27-36. (2010)
27. R. Sudo, S. Chung, **I.K. Zervantonakis**, V. Vickerman, Y. Toshimitsu, L. Griffith, R. Kamm. "Transport-mediated angiogenesis in 3D epithelial coculture" **FASEB J.** 23(7), 2155-64. (2009)
28. S. Chung, R. Sudo, **I.K. Zervantonakis**, T. Rimchala, R. Kamm. "Surface-Treatment-Induced Three-Dimensional Capillary Morphogenesis in a Microfluidic Platform" **Advanced Materials**, 21 (47), 4863-4867. (2009)
29. S.K. Das, S. Chung, **I.K. Zervantonakis**, J. Atnafu, R. Kamm. "A microfluidic platform for studying the effects of small temperature gradients in an incubator environment" **Biomicrofluidics** 2, 034106. (2008)
30. **I. K. Zervantonakis**, W-N. Lee, S.D. Fung-Kee-Fung and E. E. Konofagou. "A novel view-independent strain estimation method in myocardial elastography: Eliminating angle- and centroid-dependence" **Physics in Medicine and Biology** 52, pp. 4063-4080. (2007).

INVITED SEMINARS

1. "Modeling and perturbing the microenvironment using microfluidics, systems biology and localized drug release: cancer progression and drug resistance"; Department of Biomedical Engineering, **Rutgers University**, March 2018, Host Prof. A. Gormley
2. "Tumor microenvironment engineering: microfluidics, systems biology and localized drug release to study cancer progression and drug resistance"; Department of Bioengineering, **Northeastern University**, February 2018, Host Prof. G. Dai
3. "Controlling tumor progression and response to therapy using microfluidics, systems modeling and non-invasive drug delivery"; Department of Mechanical Engineering, **Northwestern University**, February 2018, Host Prof. H. Espinosa
4. "Modeling and perturbing the microenvironment using microfluidics, systems biology and localized drug release: cancer progression and drug resistance"; Department of Bioengineering, **University of Maryland**, February 2018, Host Prof. C. Jewell
5. "Engineering the tumor microenvironment: microfluidics, systems biology and localized drug release to study cancer progression and drug resistance"; Department of Bioengineering, **University of Pittsburgh**, January 2018, Host Prof. P. Loughlin

6. "Rational design of effective combination therapies in ovarian cancer using patient-derived xenografts"; Dana Farber Cancer Institute, **Harvard Medical School**, Boston, MA, February 2017. Host Prof. A. D'Andrea
7. "Systems analysis of apoptotic vulnerabilities to design effective combination therapies in ovarian cancer"; **Harvard Medical School**, Boston, MA, November 2016. Host Prof. F. Michor
8. "Engineering the tumor-microenvironment: Tumor-stroma interactions in cancer metastasis and drug resistance"; Department of Mechanical Science and Engineering, **University of Illinois at Urbana-Champaign**, Urbana, IL, April 2015. Host Prof. A. Vakakis & Prof. S. Hilgenfeldt
9. "Fibroblast-induced drug resistance in HER2+ breast cancer and ovarian cancer"; Cancer Center, **Northwestern University Medical School**, Chicago, IL. April 2015. Host Prof. A. Vassilopoulos
10. "Adaptive resistance to PI3K/mTOR inhibition and microfabricated-based tools to model the tumor microenvironment"; **Biomedical Research Foundation Academy of Athens**, Athens, Greece, September 2014. Host: Dr. Z. Cournia
11. "Modeling endothelial barrier function: Role of biochemical perturbations and interactions with macrophages"; Division of Newborn Medicine, **Boston Children's Hospital**, Boston, June 2014. Host: Dr. A. Mitsialis
12. "Role of Cell-cell interactions and endothelial barrier function in cancer cell intravasation"; Institute of Fluid Sciences, **Tohoku University**, Japan, January 2013. Host: Prof. K. Funamoto
13. "Engineering the Tumor Microenvironment of Cancer Cell Intravasation Using Microfluidics"; Dana Farber/BWCC Melanoma Lecture Series, **Harvard Medical School**, Boston, MA, May 2012. Host: Prof. J. Lin
14. "Cancer microenvironment microfluidic assays": National Center for Advancing Translational Sciences, NIH, Washington D.C., March 2012. Host: Dr. M. Ferrer
15. "Modeling the Tumor-Vascular microenvironment using 3D microfluidic matrices": Predictive Functional Human Tissue Models Conference, Boston, November 2011. Hosted by Cambridge Healthtech Institute

TEACHING EXPERIENCE

Training of undergraduate and graduate students

Department of Cell Biology (Harvard Medical School)

2016-present

Mentor

- Supervised and mentored undergraduate and graduate students in the Brugge Lab
- Michela Zaffagni (current: PhD candidate, Brandeis University)
- Benjamin Marks (current: Research Assistant, Brugge Lab, Harvard Medical School)

Cellular, Molecular and tissue Biomechanics (MIT 20.310)

Spring 2012

Teaching Assistant

- Head Teaching Assistant for undergraduate level course with 80 students
- Prepared and led recitation lectures and supervised term projects
- Class Instructors: Prof. A. Grodzinsky, Prof. R. Kamm, and Prof. K. Van Vliet

Cellular and Molecular Mechanics

with a focus on Biological Machines (GEM4 Summer School Georgia Institute of Technology)

June 2011

Lecturer

- Lecturer for a class of 60 students.
- Co-taught lectures and laboratory classes
- Course Instructor: Prof. G. Bao

MIT Undergraduate Research Opportunities Program (UROP)

2008- 2012

Mentor

- Supervised undergraduate students as part of MIT's UROP program
- Alice Brooks (current: Entrepreneur PlayMonster)
- Mengwen Zhang (current: PhD candidate, UIUC)
- Subhanu Samaragiva (current: Product Manager, Down to Lunch)
- Tim Chang (current: Postdoctoral Fellow, Georgia Institute of Technology)
- Eric Chang (current: Software engineer, Forward)

PATENTS

1. R. D. Kamm, H. H. Asada, W.A. Farahat, **I. K. Zervantonakis**, L. B. Wood, Y. K. Park, C. Kothapalli, S. Chung, J. Macklis, S. Tharin, J. Varner, K. H. Lee, L. T. T. Nguyen, C. Kim. 2012. "Device for high throughput investigations of cellular interactions." International Patent: PCT/US2011/054029
2. J.T. Borenstein, J.L. Charest, J.S. Jeon, R.D. Kamm, S. Chung, **I.K. Zervantonakis**, V. Vickerman. 2011. "Three-Dimensional Microfluidic Platforms and Methods of use and manufacture thereof." International Patent: PCT/US2010/051459.

PROFESSIONAL MEMBERSHIPS

- | | |
|---|--------------|
| - Hellenic Bioscientific Association in the USA (President) | 2012-2014 |
| - Hellenic Bioscientific Association in the USA (member) | 2010-2012 |
| - American Association for Cancer Research (Associate member) | 2009-present |
| - Biomedical Engineering Society (member) | 2009-present |
| - Greek Technical Chamber of Engineers (TEE) (member) | 2006-present |
| - German Association of Engineers (VDI) (member) | 2006-present |

PROFESSIONAL SERVICE

Grant Review Activities:

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| - Ministry of Science Technology and Space, Israel (Ad hoc Reviewer) | 2017 |
| - Dutch Technology Foundation, Netherlands (Ad hoc Reviewer) | 2016 |

Editorial Activities (Ad hoc Reviewer):

Nature; Cell; Cancer Cell; eLife; Proceedings of the National Academy of Sciences; Scientific Reports, EMBO Reports; Lab on Chip; Integrative Biology; Biotechnology and Bioengineering; Biofabrication; Journal of Tissue Engineering and Regenerative Biology; Microfluidics and Nanofluidics; Ultrasonics.