

NOVEMBER 1, 2024

CURRICULUM VITAE

VADIM BACKMAN

NORTHWESTERN UNIVERSITY

BIOMEDICAL ENGINEERING DEPARTMENT

2145 SHERIDAN ROAD, EVANSTON, IL 60208

VOICE: (847) 491-3536 FAX: (847) 491-4928 E-MAIL: V-BACKMAN@NORTHWESTERN.EDU

EDUCATION

Harvard University - Massachusetts Institute of Technology, Cambridge, MA

Division of Health Sciences and Technology,

Ph.D. in Medical Engineering and Medical Physics, 2001.

Massachusetts Institute of Technology, Cambridge, MA.

M.S. in Physics, 1998.

PROFESSIONAL EXPERIENCE

Northwestern University, Evanston, IL

November 2021 - present

Sachs Family Professor of Biomedical Engineering and Medicine

Biomedical Engineering Department and Feinberg School of Medicine

Robert H. Lurie Comprehensive Cancer Center,

September 2023 – present

Northwestern University, Evanston, IL.

Associate Director for Engineering and Technology

Robert H. Lurie Comprehensive Cancer Center,

October 2019 –2023

Northwestern University, Evanston, IL.

Associate Director for Research Technology and Infrastructure

ASP Health, Inc., Evanston, IL

April 2019 - present

Co-Founder

Center for Physical Genomics and Engineering

July 2018 - present

Director

Northwestern University, McCormick School of Engineering & Applied Sciences

Center for Developmental Therapeutics

July 2018 - present

Associate Faculty Director

Northwestern University, Chemistry of Life Processes Institute

Northwestern University, Evanston, IL

January 2018 - present

Professor of Biochemistry and Molecular Genetics

Feinberg School of Medicine

Northwestern University, Evanston, IL November 2017 - present
Professor of Medicine, Division of Hematology/Oncology
Feinberg School of Medicine

Preora Healthcare, Inc. Evanston, IL March 2015 - present
Chairman and Co-Founder

Northwestern University, Evanston, IL. September 2012 – November 2021
Walter Dill Scott Professor of Biomedical Engineering,
Biomedical Engineering Department.

Robert H. Lurie Comprehensive Cancer Center, December 2008 – present
Northwestern University, Evanston, IL.
Program Leader, Cancer and Physical Sciences Program

Nanocytomics, LLC, Evanston, IL April 2012 – present
Chairman and Co-Founder

American BioOptics, LLC, Evanston, IL June 2006 – present
Chairman and Co-Founder

Northwestern University, Evanston, IL. September 2006 – August 2012
Professor, Biomedical Engineering Department.

Evanston Northwestern Hospital, Evanston, IL. September 2002 – 2013
Member of Professional Staff, Department of Medicine, Section of Gastroenterology

Northwestern University, Evanston, IL. September 2001 – August 2006
Assistant Professor, Biomedical Engineering Department.

HONORS

Cozzarelli Prize, National Academy of Sciences (2017).
Fellow, Farley Center for Entrepreneurship and Innovation (2016, 2013).
Liz and Eric Lefkowsky Scholar (2015).
Dorothy Ann and Clarence L. Ver Steeg Distinguished Research Fellow (2015).
Faculty Honor Roll, Northwestern University Associated Student Government (2011).
Faculty Honor Roll, Northwestern University Associated Student Government (2010).
Fellow, American Institute for Medical and Biological Engineering (AIMBE) (2009).
Faculty Honor Roll, Northwestern University Associated Student Government (2008).
Faculty Honor Roll, Northwestern University Associated Student Government (2007).
Phi Beta Psi Cancer Research Award (2006).
Faculty Honor Roll, Northwestern University Associated Student Government (2005).
The Wallace H. Coulter Foundation Early Career Translational Research Award in Biomedical Engineering (2005, 2007).
Citation for “Research Excellence”, Northwestern University (2005).
Selected as one of the Top 100 Young Innovators in the World by MIT's Technology Review Magazine (2004).
NSF CAREER Award (2003).

NSF Young Investigator Best Paper Award in New Techniques in Biomedical Optics and Medical Imaging (2002).
 General Motors Cancer Research Scholar Award (2002).
 Phi Beta Psi Cancer Research Award (2002).
 Poitras Pre-doctoral Fellowship in Biomedical Engineering and Biophysics (2000).
 Lester Wolfe Fellowship in Biomedical Optics (1999).
 Becton Dickenson Fellowship in Medical Engineering (1998).
 George Soros International Science Foundation Fellowship in Physics (1995, 1996).
 National Contest for Outstanding M.S. Thesis in Physics (second prize, 1996).
 Informatics Olympiad (second prize, 1990).

PUBLICATIONS

Peer-reviewed Journal Publications

1. L.M. Almassalha, M. Carignano, E. Pujadas Liwag, W.S. Li, R. Gong, N. Acosta, C. Dunton, P. Gonzalez, L. Carter, R. Kakkaramadam, M. Kröger, P. Su, J. Frederick, I. Chae Ye, K. Medina, J. Pritchard, A. Skol, R. Nap, K.L. MacQuarrie, M. Kanemaki, V. Dravid, I. Szleifer, and V. Backman, “Chromatin conformation, gene transcription, and nucleosome remodeling as an emergent system”, *Science Advances*, submitted (2024).
2. J. Frederick, R.K.A. Virk, I. Chae Yi, L.M. Almassalha, G.M. Wodarczyk, D. VanDerway, R. Nap, V. Agrawal, J. Carinato, W.S. Li, C.L. Dunton, R. Kakkaramadam, P. Carrillo Gonzalez, S. Jain, S. Shahabi, G. Ameer, I. Szleifer and V. Backman, “Leveraging chromatin packing domains to target chemoevasion in vivo”, *PNAS*, submitted (2024).
3. L. Carter, R. Gong, N. Acosta, W.S. Li, E. Pujadas Liwag, T. Kuo, L.M. Uyen Phan, K. MacQuarrie, S. Huang, M.T. Kanemaki, L. Almassalha and V. Backman, "mRNA expression is co-regulated by non-nuclear RNA polymerase I", *Nucleic Acids Research*, submitted (2024).
4. N. Acosta, R. Gong, Y. Su, J. Frederick, K. Medina, W.S. Li, L. Almassalha, G. Wang and V. Backman, “Three-color single-molecule localization microscopy in chromatin”, *Light: Science and Applications*, submitted (2024).
5. W.S. Li, L. Carter, L.M. Almassalha, R. Gong, E. Pujadas Liwag, T. Kuo, K. MacQuarrie, M. Carignano, C. Dunton, V. Dravid, M. Kanemaki, I. Szleifer and V. Backman, “Mature chromatin packing domains persist after RAD21 depletion in 3D”, *Science Advances*, submitted (2024).
6. H. Sun, N. Kumari, M.E. Melzer, V. Backman and Y. Goyal, “Navigating non-genetic plasticity in cancer drug resistance”, *Annual Reviews on Cancer Biology*, accepted (2024)
7. Y. Wang, J. Frederick, E.T. Bartom, L.M. Almassalha, Y. Zhang, G. Wodarczyk, H. Huang, I.C. Ye, A. Duval, P. Carrillo Gonzalez, K. Medina, J. Pritchard, J. Carinato, Z. Ji, M. Adli, V. Backman and D. Matei, “Chromatin organization governs transcriptional response and plasticity of cancer stem cells”, *Advanced Science*, submitted (2024)

8. E.M. Pujadas Liwag, N. Acosta, L.M. Almassalha, Y. Su, R. Gong, M.T. Kanemaki, A.D. Stephens and V. Backman, "Nuclear blebs are associated with destabilized chromatin packing domains", *Journal of Cell Science*, accepted (2024).
9. M.D. Shahin Alom, A. Daneshkhah, N. Acosta, N. Anthony, E. Pujadas Liwag, V. Backman and S.K. Gaire, "Deep learning-driven automatic nuclei segmentation of live-cell chromatin-sensitive partial wave spectroscopic microscopy imaging", *Optics Express*, accepted (2024)
10. R.J. Nap, P. Carrillo Gonzalez, A.E. Coraor, R.K.A. Virk, J. de Pablo, V. Backman and I. Szleifer, "The impact of charge regulation and ionic intranuclear environment on the nucleosome core particle", *Journal of Chemical Physics, Special Issue on Chromatin Structure and Dynamics: Recent Advancements*, accepted (2024).
11. B. Yi Tew, G. Gooden, P. Lo, D. Pollalis, B. Ebright, A. Kalfa, A. Gonzalez-Calle, B. Thomas, D. Buckley, T. Simon, Z. Yang, E. Iseri, C. Dunton, V. Backman, S. Louie, G. Lazzi, M. Humayun and B. Salhia, "Transcorneal electrical stimulation restores DNA methylation changes in retinal degeneration", *Frontiers in Molecular Neuroscience*, accepted (2024).
12. F. Martins, A.L. Machado, A. Ribeiro, S.M. Oliveira, J. Carvalho, R. Matthiesen, V. Backman, and S. Velho, "KRAS silencing impacts chromatin organization and transcriptional activity in colorectal cancer cells", *EMBO Molecular Medicine*, submitted (2024).
13. S. Rao, J. Danes, K. Pulakanti, S. Jain, Y. Huang, F. Palma, D. Coelho, B. Gantner, M. Bonini and V. Backman, "Nuclear ROS are sufficient and required for EMT and metastatic dissemination of cancer cells", *Nature Cancer*, submitted (2024).
14. S. Bunner, K. Prince, K. Srikrishna, E.M. Pujadas, A.A. McCarthy, A. Kuklinski, O. Jackson, P. Pellegrino, S. Jagtap, I. Eweka, C. Lawlor, E. Eastin, G. Yas, J. Aiello, N. LaPointe, I.S. von Blucher, J. Hardy, J. Chen, V. Backman, A. Janssen, M. Packard, K. Dorfman, L. Almassalha, M.S. Bahiru, and A. D. Stephens, "DNA density is a better indicator of a nuclear bleb than lamin B loss", *Journal of Cell Science*, jcs.262082. doi: <https://doi.org/10.1242/jcs.262082> (2024)
15. A.R. Shim, J. Frederick, E.M. Pujadas, T. Kuo, I.C. Ye, J.A. Pritchard, C.L. Dunton, P.C. Gonzalez, N. Acosta, S. Jain, N.M. Anthony, L.M. Almassalha, I. Szleifer and V. Backman, "Formamide denaturation of double-stranded DNA for fluorescence in situ hybridization (FISH) distorts nanoscale chromatin structure", *PLoS One*, **19**(5):e0301000. doi: 10.1371/journal.pone.0301000. (2024) PMC11132451
16. E. Flowerday, A. Daneshkhah, Y. Su, V. Backman and S. Goldstein, "Necrotizing enterocolitis detection in premature infants using broadband optical spectroscopy", *Journal of Biophotonics*, 10.1002/jbio.202400273 (2024).

17. M. Carignano, M. Kroger, L. Almassalha, V. Agrawal, W.S. Li, E.M. Pujadas, R.J. Nap, V. Backman and I. Szleifer, “Local volume concentration, packing domains and scaling properties of chromatin”, *eLife*, **13**: RP97604. (2024). PMC11434620
18. A. Kant, Z. Guo, M.V. Neguembor, W.S Li, V. Agrawal, E. Pujadas, L. Almassalha, V. Backman, M. Lakadamyali, M. Pia Cosma, V.B. Shenoy, “Active transcription and epigenetic regulation synergistically regulate meso-scale genomic organization”, *Nature Communications*, **15**, 4338 <https://doi.org/10.1038/s41467-024-48698-z> (2024). PMC11109243
19. B.N. Gantner, F.R. Palma, D.R. Foltz, V. Backman, N. Kelleher, and A. Shilatifard, “Histone oxidation, a new epigenetic connection between cellular metabolism and gene expression regulation”, *Trends in Cancer*, S0168-9525(24)00134-3. doi: 10.1016/j.tig.2024.05.012 (2024).
20. S.K. Gaire, E. Flowerday, A. Daneshkhah, J. Frederick, R. Gong, L. Ying, H.F. Zhang, and V. Backman, “Deep learning-based spectroscopic single-molecule localization microscopy”, *Journal of Biomedical Optics*, **29**(6) 066501 (2024).
21. A.S. Chang, S. Prabhala, A. Daneshkhah, J. Lin, H. Subramanian, H.K. Roy and V. Backman, “Early screening of colorectal cancer using feature engineering with artificial intelligence-enhanced analysis of nanoscale chromatin modifications”, *Scientific Reports*, **14**, 7808 <https://doi.org/10.1038/s41598-024-58016-8> (2024). PMC10635240
22. F.R. Palma, D.R. Coelho, K. Pulakanti, M.J. Sakiyama, Y. Huang, J.M. Danes, A. Meyer, C.M. Furdui, D.R. Spitz, A.P. Gomes, B.N. Gantner, S. Rao, V. Backman and M.G. Bonini, “Histone H3.1 is a chromatin embedded redox sensor triggered by tumor cells developing adaptive phenotypic plasticity and multi-drug resistance”, *Cell Reports*, **43**(3):113897. doi: 10.1016/j.celrep.2024.113897 (2024)
23. E.M. Pujadas, X. Wei, N. Acosta, L. Carter, J. Yang, L. Almassalha, A. Daneshkhah, S.S.P. Rao, V. Agrawal, F. Seker-Polat, E. Lieberman Aiden, M.T. Kanemaki, V. Backman, and M. Adli, "Depletion of lamins B1 and B2 alters chromatin mobility and induces differential gene expression by a mesoscale-motion dependent mechanism", *Genome Biology*, **25**(77) doi: 10.1186/s13059-024-03212-y (2024). PMC10326988
24. J. Ibarra, T. Hershenhouse, L. Almassalha, D. Walterhouse, V. Backman and K.L. MacQuarrie, “Differentiation-dependent chromosomal organization changes in normal myogenic cells are absent in rhabdomyosarcoma cells”, *Frontiers in Cell and Developmental Biology*, **7**(11):1293891 (2023) PMC10197681
25. F.L. Teixeira, C. Sarris, Y. Zhang, D.-Y. Na, J. -P Berenger, Y. Su, M. Okoniewski, W.C. Chew, V. Backman, and J. J. Simpson, “Finite-difference time-domain methods”, *Nature Reviews Methods Primers*, **3**(75) <https://doi.org/10.1038/s43586-023-00257-4> (2023).
26. A. Daneshkhah, S. Prabhala, P. Viswanathan, H. Subramanian, J. Lin, A. Bharat, H.K. Roy, and V. Backman, “Early detection of lung cancer using artificial intelligence-

enhanced optical nanosensing of chromatin alterations in field carcinogenesis”, *Scientific Reports*, **13**, 13702 doi: 10.1038/s41598-023-40550-6 (2023). PMC10444865

27. W. Alvarado, V. Agrawal, W.S. Li, V.P. Dravid, V. Backman, J. de Pablo, and A.L. Ferguson, “Denoising autoencoder trained on simulation-derived structures for noise reduction in chromatin scanning transmission electron microscopy”, *ACS Cent. Sci.*, <https://doi.org/10.1021/acscentsci.3c00178> (2023). PMC10311656
28. X. Wang, V. Agrawal, C.L. Dunton, Y. Liu, R.K.A. Virk, P.A. Patel, L. Carter, E.M. Pujadas, Y. Li, S. Jain, H. Wang, N. Ni, N. Rivera-Bolanos, J. Frederick E. Roth, R. Bleher, C. Duan, P. Ntziachristos, T.C. He, R.R. Reid, B. Jiang, H. Subramanian, V. Backman, and G.A. Ameer, “Chromatin reprogramming and bone regeneration in vitro and in vivo the microtopography-induced constriction of cell nuclei”, *Nature Biomedical Engineering*, **7**(11):1514-1529 doi: 10.1038/s41551-023-01053-x (2023) PMC10804399
29. Y. Li, E. Roth, V. Agrawal, A. Eshein, J. Frederick, L. Almassalha, A.R. Shim, R. Bleher, V.P. Dravid, and V. Backman, “Analysis of three-dimensional chromatin packing domains by chromatin scanning transmission electron microscopy: ChromSTEM”, *Scientific Reports*, **12**, 12720 doi.org/10.1038/s41598-022-17293-x (2022) PMC9288481
30. Yadav, S., Virk, R., Chung, C.H. *et al.* Lipid exposure activates gene expression changes associated with estrogen receptor negative breast cancer. *npj Breast Cancer* **8**(1):59. doi: 10.1038/s41523-022-00422-0 (2022) PMC9068822
31. A. Shim, K. Huang, V. Backman and I. Szleifer, “Chromatin as self-returning walks: from population to single-cell, and back”, *Biophysical Reports*, **2**(1) <https://doi.org/10.1016/j.bpr.2021.100042> (2022). PMC9680733
32. Z. Ji, X. Wang, J. Frederick, H. Wang, S. Hui, V. Backman, “Spike-in normalization for single-cell RNA-seq reveals dynamic global transcriptional activity mediating anti-cancer drug response”, *NAR Genomics and Bioinformatics*, **3**(2) doi:10.1093/nargab/lqab054 (2021) PMC8210883
33. T.D. Swain, S. Lax, J. Gilbert, V. Backman and L. Marcelino, “A phylogeny-informed analysis of the global coral-symbiodinaceae interaction network reveals that traits correlated with thermal bleaching are specific to symbiont transmission mode”, *mSystems*, **10**.1128/mSystems.00266-21 (2021). PMC8269218
34. S. Prasad, A. Rankine, T. Prasad, P. Song, M.E. Dokukin, N. Makarova, V. Backman and I. Sokolov, “Atomic force microscopy detects the difference in cancer cells of different neoplastic aggressiveness via machine learning”, *Advanced NanoBioMed Research*, doi: 10.1002/anbr.202000116 (2021).
35. O. Butger, Y. Li, A. Wolters, V. Agrawal, A. Dravid, A. Chang, J. Hardillo, B. Giepmans, R. de Jong, A. Amelink, V. Backman and D.J. Robinson, “Early upper aerodigestive tract cancer detection using electron microscopy to reveal chromatin packing alterations in buccal mucosa cells”, *Microscopy & Microanalysis*, doi: 10.1017/S1431927621000507 (2021). PMC8939050

36. A. Eid, J. Winkelmann, A. Taflove, and V. Backman, “Origins of subdiffractional contrast in optical coherence tomography”, *Biomedical Optics Express*, **12**(6): 3630–3642 (2021). PMC8221934
37. Y. Li, A. Eshein, R.K.A. Virk, A. Eid, W. Wu, J. Frederick, D. VanDerway, S. Gladstein, K. Huang, N.M. Anthony, G.M. Bauer, X. Zhou, V. Agrawal, E. Pujadas, G. Esteve, J.E. Chandler, R. Bleher, J. de Pablo, I. Szleifer, V. Dravid, L.M. Almassalha, V. Backman, “Nanoscale Chromatin Imaging and Analysis (nano-ChIA) platform bridges 4-D chromatin organization with molecular function”, *Science Advances*, **7**, eabe4310 (2021). PMC7775763
38. A. Mohanty, A. Eshein, P. Kamineni, U. Avissar, C.M. Bliss, M.T. Long, R.C. Lowe, T.C. Moore, D. Nunes, V. Backman, H.K. Roy, “Quantification of gastric mucosal microcirculation as a surrogate marker of portal hypertension by spatially resolved subdiffuse reflectance spectroscopy in diagnosis of cirrhosis: a proof-of-concept study”, *Gastrointestinal Endoscopy*, DOI: <https://doi.org/10.1016/j.gie.2020.12.037> (2021). PMC8546777
39. A. Daneshkhah, V. Agrawal, A. Eshein, H. Subramanian, H.K. Roy, and V. Backman, “Evidence for possible association of vitamin D status with cytokine storm and unregulated inflammation in COVID-19 patients”, *Aging Clinical and Experimental Research*, doi: 10.1007/s40520-020-01677-y (2020). PMC7465887
40. A. Eid, A. Eshein, Y. Li, R. Virk, D. VanDerway, A. Taflove and V. Backman, “Characterizing chromatin packing scaling in whole nuclei using interferometric microscopy”, *Optics Letters*, **45**(17) 4810-4813 (2020). PMC7951997
41. K. Huang, Y. Li, A.R. Shim, R.J. Nap, V. Agrawal, R.K.A. Virk, A. Eshein, L.M. Almassalha, V. Backman and I. Szleifer, “Physical and data structure of 3D genome”, *Science Advances*, **6**(2), doi: 10.1126/sciadv.aay4055 (2020). PMC6954067
42. R.K.A. Virk, W. Wu, L. M. Almassalha, G. M. Wodarczyk, Y. Li, D. VanDerway, J. Frederick, D. Zhang, A. Eshein, H. K. Roy, I. Szleifer, and V. Backman, “Disordered chromatin packing regulates phenotypic plasticity”, *Science Advances*, **6**(2) doi: 10.1126/sciadv.aax6232 (2020). PMC6949045
43. A.R. Shim, R. Nap, L. Almassalha, H. Matsuda, V. Backman and I. Szleifer, “Dynamic crowding regulates transcription”, *Biophysical Journal*, doi: <https://doi.org/10.1016/j.bpj.2019.11.007>. (2019) PMC7202930
44. G. Spicer, A. Eid, D. Wangpraseurt, T. Swain, J. Winkelmann, J. Yi, M. Kuhl, L. Marcelino, V. Backman, “Measuring light scattering and absorption in corals with Inverse Spectroscopic Optical Coherence Tomography (ISOCT): a new tool for non-invasive monitoring”, *Scientific Reports*, **9**:14148 doi: 10.1038/s41598-019-50658-3 (2019). PMC6775107
45. A. Stephens, P. Liu, V. Kandula, H. Chen, L. Almassalha, C. Herman, V. Backman, T. O’Halloran, S. Adam, R. Goldman, E. Banigan, and J. Marko, “Physicochemical

mechanotransduction alters nuclear shape and mechanics via heterochromatin formation”, *Molecular Biology of the Cell*, doi:10.1091/mbc.E19-05-0286-T (2019). PMC6743459

46. X. Zhou, S. Gladstein, L. Almassalha, Y. Li, A. Eshein, L. Cherkezyan, P. Viswanathan, H. Subramanian, I. Szleifer, and V. Backman, “Preservation of cellular nano-architecture by the process of chemical fixation for nanopathology”, *PLOS One*, **14**(7) doi:10.1371/journal.pone.0219006. (2019). PMC6645510
47. S. Gladstein, L.M. Almassalha, L. Cherkezyan, J.E. Chandler, A. Eshein, A. Eid, D. Zhang, W. Wu, G.M. Bauer, A.D. Stephens, S. Morochnik, H. Subramanian, J.F. Marko, G.A. Ameer, I. Szleifer, and V. Backman, “Multimodal interferometric imaging of nanoscale structure and macromolecular motion uncovers UV induced cellular paroxysm”, *Nature Communications*, **10**:1652 (2019). PMC6458150
48. J.A. Winkelmann, G. Spicer, A. Eid, L.M. Almassalha, T.Q. Nguyen, and V. Backman, “Spectral contrast optical coherence tomography angiography enables single-scan vessel imaging”, *Light: Science and Applications*, **8**(7) doi: 10.1038/s41377-018-0117-7 (2019). PMC6333625
49. R. Liu, W. Song, V. Backman, J. Yi, “Quantitative quality-control metrics for in vivo oximetry in small vessels by visible light optical coherence tomography angiography”, *Biomedical Optics Express*, **10**(2) 465-486 (2018). PMC6377897
50. A. Eshein, Y. Li, B. Dong, L. Almassalha, J. Chandler, T.Q. Nguyen, K. Hujsak, V. Dravid, C. Sun, H.F. Zhang and V. Backman, “Sub-10nm imaging of nucleic acids using spectroscopic intrinsic-contrast photon-localization optical nanoscopy (SICLON)”, *Optics Letters*, **43**(23) 5817-5820 (2018). PMC6375679
51. T.D. Swain, S. Lax, N. Lake, H. Grooms, V. Backman, L. Marcelino, “Relating coral skeletal structures at different length scales to growth, light availability to Symbiodinium, and thermal bleaching”, *Frontiers in Marine Science*, **5**:450. doi: 10.3389/fmars.2018.00450 (2018).
52. S. Thompson, G. Spicer, L. Almassalha, G. Wodarczyk, R. Ellis, J. Chandler, S. Gladstein, D. Zhang, H. Subramanian, R. de la Rica and V. Backman, “Label free localization of nanoparticles in live cancer cells using spectroscopic microscopy”, *Nanoscale*, **10** 19125-19130 (2018).
53. R. Liu, J.A. Winkelmann, G. Spicer, Y. Zhu, A. Eid, G.A. Ameer, V. Backman, and J. Yi, “Single capillary oximetry and pericapillary ultrastructural sensing by dual-band dual-scan inverse spectroscopic optical coherence tomography”, *Light: Science and Applications*, **7**(57) DOI 10.1038/s41377-018-0057-2 (2018). PMC6113297
54. S. Ruderman, A. Eshein, V. Valuckaite, U. Dougherty, A. Almograbi, A. Gomes, A. Singh, B. Pabla, H.K. Roy, J. Hart, M. Bissonnette, V. Konda, and V. Backman, “Early increase in blood supply (EIBS) is associated with tumor risk in the azoxymethane model of colon cancer”, *BMC Cancer*, **18**(1):814 (2018). PMC6090821

55. J. Winkelmann, A. Eid, T.Q. Nguyen, T. Bui, J. Yi, and V. Backman, “In Vivo broad-band visible light optical coherence tomography probe enables inverse spectroscopic analysis”, *Optics Letters*, **43**(3) 619-622 (2018). PMC9680981
56. R. Kalman, A. Stawarz, D. Nunes, D. Zhang, M. Delacruz, R. Wali, H. Subramanian, V. Backman, H.K. Roy, “Biophotonic detection of high order chromatin alterations in field carcinogenesis predicts risk of future hepatocellular carcinoma: a pilot study”, *PLOS One*, **13**(5):e0197427 (2018). PMC5957524
57. S. Gladstein, D. Damania, L.T. Smith, V. Gupta, H. Subramanian, D.K. Rex, H.K. Roy, and V. Backman, “Correlating colorectal cancer risk with field carcinogenesis progression using Partial Wave Spectroscopic microscopy”, *Cancer Medicine*, 10.1002/cam4.1357 (2018). PMC5943438
58. S. Datta, R.M Sherva, M. De La Cruz, M.T. Long, P. Roy, V. Backman, S. Chowdhury and H.K. Roy, “Single nucleotide polymorphism facilitated downregulation of the cohesin stromal antigen-1: implications for colorectal cancer racial disparities”, *Neoplasia*, **20**(3) 289-294 (2018). PMC5883624
59. A.D. Stephens, P. Liu, D. Banigan, L. Almassalha, V. Backman, S. Adam, R. Goldman and J. Marko, “Chromatin histone modifications and rigidity affect nuclear morphology independent of lamins”, *Molecular Biology of the Cell*, **29**(2) 220-233 (2018). PMC5909933
60. T.D. Swain, E.C. Bold, P.C. Osborn, A.H. Baird, M.W. Westneat, V. Backman, and L.A. Marcelino, “Physiological integration of coral colonies is correlated with bleaching resistance”, *Marine Ecology Progress Series*, **586** 1-10 (2018) (Feature article).
61. A. Eshein, A. J. Radosevich, B. Gould, W. Wu, V. Konda, L. M. Yang, A. Koons, S. Feder, V. Valuckaite, H. K. Roy, V. Backman, T. Nguyen, “Fully automated fiber-based optical spectroscopy system for use in a clinical setting”, *J. of Biomedical Optics*, **23**(7), 075003 (2018). PMC8357326
62. L.M. Almassalha, G.M. Bauer, W. Wu, L. Cherkezyan, D. Zhang, A. Kendra, S. Gladstein, J.E. Chandler, D. VanDerway, B. Seagle, A. Ugolkov, D.D. Billadeau, T.V. O’Halloran, A.P. Mazar, H.K. Roy, I. Szleifer, S. Shahabi, and V. Backman, “Macrogenomic engineering via modulation of the scaling of chromatin packing density”, *Nature Biomedical Engineering*, **1**(11) 902-913 (2017). PMC5809134
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B. Books and Book Chapters

1. Scott Gladstein, Andrew Stawarz, Luay M. Almassalha, Lusik Cherkezzyan, John E. Chandler, Xiang Zhou, Hariharan Subramanian, and Vadim Backman, "Measuring Nanoscale Chromatin Heterogeneity with Partial Wave Spectroscopic Microscopy", in *Cellular Heterogeneity*, Natasha S. Barteneva, Ivan A. Vorobjev, eds. Springer Protocols, 2018. PMC5983358
2. Vadim Backman, Adam Wax and Hao Zhang, "*Biophotonics Laboratory Guide*", CRC Press.
3. Ilker R. Capoglu, Jeremy D. Rogers, Allen Taflove and Vadim Backman, "The Microscope in a Computer: Image Synthesis from Three-Dimensional Full-Vector Solutions of Maxwell's Equations at the Nanometer Scale", in *Progress in Optics*, Emil Wolf ed., Elsevier, 2012.
4. Ilker R. Capoglu, Jeremy Rogers, Snow H. Tseng, Kun Chen, Ming Ding, Allen Taflove, and Vadim Backman, "FDTD and PSTD Applications in Biophotonics", *Computational Electromagnetics*, 2012.
5. J.D. Rogers, Y. Kim, V. Backman, "Enhanced Backscattering for Tissue Characterization", in *Biomedical Applications of Light Scattering*, A. Wax, V. Backman eds, McGraw Hill Publishing, 2009.

6. A. Wax, V. Backman, "Overview of classical light scattering formalisms", in *Biomedical Applications of Light Scattering*, A. Wax and V. Backman eds, McGraw Hill Publishing, 2009.
7. I. Capoglu, J. Rogers, V. Backman, "Light Scattering from Continuous Random Media", in *Biomedical Applications of Light Scattering*, A. Wax and V. Backman eds, McGraw Hill Publishing, 2009.
8. S.H. Tseng, I.R. Capoglu, A. Taflove, V. Backman, "Modeling of Light Scattering By Biological Tissues Via Computational Solution of Maxwell's Equations", in *Biomedical Applications of Light Scattering*, A. Wax and V. Backman eds, McGraw Hill Publishing, 2009.
9. I. Georgakoudi, J.T. Motz, V. Backman, G. Angheloiu, A.S. Haka, M. Muller, R.D. Dasari, M.S. Feld, "Quantitative Characterization of Biological Tissue Using Optical Spectroscopy", in *Biomedical Photonics Handbook*, Tuan Vo-Dinh ed., CRC Press, New York, 2003.
10. L.T. Perelman, V. Backman "Light Scattering Spectroscopy: Theory and Applications", in *Optical Biomedical Diagnostics*, V. Tuchin, ed., SPIE Press, Bellingham, 2002.
11. A. Wax, V. Backman, C. Yang, M.S. Feld, "Light scattering spectroscopic techniques for examining cellular structure, organization and dynamics", in "*Biomedical Optical Engineering*", Fujimoto, ed., Oxford University Press, 2002.
12. V.Y. Backman, O.S. Vasyutinskii, "*Interaction of Polarized Light with an Analyzer*", Ioffe Physico Technical Institute Press, St. Petersburg, Russia, 1996.

C. Other Major Publications

1. A. Gomes, H.K. Roy, V. Turzhitsky, M.J. Goldberg, J. Rogers, S. Ruderman, Y.L. Kim, A. Kromine, R.E. Brand, M. Jameel, N. Hasabou, V. Backman, "Increased Microvascular Blood Supply as a Potential Biomarker of Field Carcinogenesis in the Colon", *The Journal: Robert H. Lurie Comprehensive Cancer Center Journal* (2009).
2. H.K. Roy, R.K. Wali, Y. Liu, Y.L. Kim, M.J. Goldberg, V. Backman, "Four-Dimensional Elastic Light-Scattering Fingerprinting for Early Detection of Colon Carcinogenesis", *The Journal: Robert H. Lurie Comprehensive Cancer Center Journal*, **9**(2), 15-20 (2004).
3. K. Badizadegan, V. Backman, C.W. Boone, C.P. Crum, R.R. Dasari, I. Georgakoudi, K. Keefe, K. Munger, S.M. Shapshay, E.E. Sheets, M.S. Feld, "Spectroscopic Diagnosis and Imaging of Invisible Pre-Cancer", 126th Faraday Discussion, *Applications of Spectroscopy to Biomedical Problems* (2003).
4. G. Popescu, C. Fang-Yen, L. Deflores, M. Chu, H. Iwai, M. Hunter, M. Kalashnikov, V. Backman, K. Badizadegan, C. Boone, G. Stoner, R. Dasari, M.S. Feld, "Seeing Small Biological Structures with Light", *Laser Spectroscopy*, World Scientific Publishing Co. (2003).

5. V. Backman, R. Gurjar, L.T. Perelman, V. Gopal, M. Kalashnikov, K. Badizadegan, A. Wax, I. Georgakoudi, M. Mueller, C.W. Boone, I. Itzkan, R.R. Dasari, M.S. Feld, “Imaging and Measurement of Cell Structure and Organization with Submicron Accuracy Using Light Scattering Spectroscopy”, *Optical Biopsy*, **4613**: 101-110 (2002).
6. L.T. Perelman, V. Backman, “Detection of Early Cancer and Precancer with Scattered Light”, Invited Internet Lecture, *International School for Young Scientists and Students on Optics, Laser Physics & Biophysics* (2000).
7. V. Backman, “Significant Breakthroughs in Early Cancer Detection”, *The American Institute of Physics Bulletin of Physics News*, **477**, March 31, 2000.
8. V. Backman, R. Gurjar, K. Badizadegan, G. Zonios, I. Itzkan, R.R. Dasari, J.M. Crawford, J. Van Dam, L.T. Perelman, M.S. Feld, “Light Scattering Spectroscopy for Early Cancer Diagnosis”, *Laser Spectroscopy*, World Scientific Publishing Co., Rainer Blatt *et al.* ed., 286-295 (1999).
9. M. Wallace, L.T. Perelman, V. Backman, J.M. Crawford, M. Fitzmaurice, M. Seiler, K. Badizadegan, S. Shields, I. Itzkan, R.R. Dasari, J. Van Dam, M.S. Feld, “Research Report on Endoscopic Detection of Dysplasia in Patients With Barrett’s Esophagus Using Light Scattering Spectroscopy: A Prospective Study,” *Spectrograph*, **15**, 2 (1999).

362 PEER-REVIEWED CONFERENCE PROCEEDINGS

RESEARCH GRANT SUPPORT

A. Active External Funding

1. Source: National Science Foundation
Title: 3D DNA Spectroscopic Photon-Localization Intrinsic-Contrast Nanoscopy (CBET-2430743)
Role: Co-PI
Period of Support: 09/1/2024 – 8/31/2027
Total Costs: \$649,999
2. Source: National Science Foundation
Title: EAGER: Biophotonic Technologies to Design New Strategies for Coral Reef Resilience to Warmer Oceans (CBET-2427519)
Role: Co-PI
Period of Support: 06/1/2024 - 05/31/2026
Total Costs: \$299,986
3. Source: National Institutes of Health
Title: Translating Buccal Nanocytology for Lung Cancer Screening into Clinical Practice (R02CA225002)
Role: Principal Investigator (MPI grant with A. Bharat, H. Subramanian)
Period of Support: 8/1/2024 – 7/31/2029
Total Costs: \$3,352,947

4. Source: National Institutes of Health
 Title: Northwestern University Center for Chromatin NanoImaging in Cancer (NU-CCNIC) (U54CA268084)
 Role: Principal Investigator (MPI with Matei, Zhang)
 Period of Support: 12/1/2021 – 11/30/2026
 Total Costs: \$7,784,069
5. Source: National Institutes of Health via MIT
 Title: Mechanical Determinants of Organ-Selective Metastatic Colonization, Dormancy and Outgrowth (U54CA261694)
 Role: Co-Investigator (PI: Kamm)
 Period of Support: 7/1/2021 – 6/30/2026
 Total Costs: \$912,995
6. Source: National Institutes of Health
 Title: Physical Genomics Training Program (T32GM142604)
 Role: PI
 Period of Support: 7/1/2021 – 6/30/2026
 Total Costs: \$1,840,587
7. Source: National Science Foundation
 Title: EFRI CEE: Engineered Retinal Epigenomics (EFMA-1933394)
 Role: Co-PI with M. Humayun
 Period of Support: 09/1/2019 – 02/28/2025
 Total Costs: \$600,000
8. Source: National Science Foundation
 Title: Epigenetic Cell Reprogramming In Situ: A Novel Tool for Regenerative Engineering (EFMA- 1830968)
 Role: Co-Investigator
 Period of Support: 9/1/2018 – 8/31/2024
 Total Costs: \$440,000 (Backman portion)
9. Source: National Institutes of Health
 Title: Reducing Cancer Transcriptional Heterogeneity through Regulation of Chromatin Structure (R01CA228272)
 Role: Principal Investigator (MPI grant with H.K. Roy, I. Szleifer)
 Period of Support: 4/9/2018 – 3/31/2025
 Total Costs: \$3,188,038

B. Completed External Funding

10. Source: National Institutes of Health
 Title: Translating Buccal Nanocytology for Lung Cancer Screening into Clinical Practice (R01CA225002)
 Role: Principal Investigator (MPI grant with H.K. Roy, H. Subramanian)
 Period of Support: 4/15/2018 – 3/31/2024

Total Costs: \$3,043,756

11. Source: National Science Foundation
Title: EFRI: Macrogenomic Engineering via Modulation of Chromatin Nanoenvironment (EFMA-1830961)
Role: Principal Investigator
Period of Support: 9/1/2018 – 7/31/2024
Total Costs: \$1,999,346
12. Source: National Science Foundation
Title: Epigenomic Regulation Over Multiple Length Scales: Understanding Chromatin Modifications Through Label Free Imaging and Multi-Scale Modeling (EFMA-1830969)
Role: Co-Investigator
Period of Support: 9/1/2018 – 8/31/2024
Total Costs: \$300,000 (Backman portion)
13. Source: National Institutes of Health
Title: Microvasculature in Colon Field Carcinogenesis: Clinical-Biological Implications (R01CA224911)
Role: Principal Investigator (MPI grant with H.K. Roy)
Period of Support: 3/1/2018 – 2/28/2024
Total Costs: \$1,271,945
14. Source: National Institutes of Health
Title: Unraveling Racial Disparities in Portal Hypertension: A Clinical, Spectroscopic and SNP Approach (R21MD013631)
Role: Co-PI with H. Roy
Period of Support: 09/1/2020 – 12/31/2022
Total Costs: \$130,618
15. Source: National Institutes of Health
Title: Minimally Intrusive Colorectal Cancer Risk Stratification with Nanocytology: Targeting Underscreened Populations (R33CA225323)
Role: Principal Investigator (MPI grant with H.K. Roy)
Period of Support: 9/01/2017 – 8/31/2022
Total Costs: \$681,281
16. Source: National Institutes of Health
Title: Risk-Stratification of Prostate Cancers via Field Carcinogenesis Nanocytology (R01CA200064)
Role: Principal Investigator (MPI with Roy)
Period of Support: 8/14/2015 – 7/31/2022
Total Costs: \$3,159,584
17. Source: National Institutes of Health

- Title: Biophotonics to Couple Pancreatic with Upper GI Screening via Ultrathin Endoscopy (R01CA183101)
 Role: Principal Investigator (MPI grant with H.K. Roy)
 Period of Support: 1/1/2015 – 12/31/2021
 Total Costs: \$3,772,075
18. Source: National Science Foundation
 Title: Spectroscopic Photon Localization Microscopy for Super-Resolution Molecular Imaging (CBET-1706642)
 Role: Co-Principal Investigator (with H. Zhang)
 Period of Support: 6/1/2017 – 5/31/2021
 Total Costs: \$586,217
19. Source: Kairos Ventures
 Title: Macrogenomic Engineering as a New Cancer Therapeutics
 Role: Principal Investigator
 Period of Support: 4/1/2019 – 3/31/2020
 Total Costs: \$100,000
20. Source: National Institutes of Health
 Title: Spatio-Temporal Organization of Chromatin and Information in Cancer (U54CA193419)
 Role: Leader, Nanocytometry Core (PI O'Halloran)
 Period of Support: 5/1/2015 – 4/30/2021
 Total Costs: \$579,370 (Backman portion)
21. Source: Chicago Biomedical Consortium
 Title: Chicago Center for Physical Science – Oncology Innovation and Translation
 Role: Leader, Nanocytometry Core
 Period of Support: 5/1/2015 – 5/31/2018
 Total Costs: \$615,992 (Nanocytometry Core)
22. Source: National Science Foundation
 Title: EFRI- BioFlex: Miniature, low-cost fiber-optics technology for measurement of tissue structure at sub-diffractive length scales: a platform for cancer screening (CBET-1240416)
 Role: Principal Investigator
 Period of Support: 08/01/2012 - 07/31/2018
 Total Costs: \$2,000,000
23. Source: National Institutes of Health
 Title: Nanoscale/Molecular Analysis of Fecal Colonocytes for Colorectal Cancer Screening (R01CA165309)
 Role: Principal Investigator (MPI grant with H. K. Roy)
 Period of Support: 09/01/2012 - 06/30/2018
 Total Costs: \$ 2,837,683

24. Source: National Institutes of Health
Title: High-throughput Molecular-specific Cell Nanocytology for Cancer Screening (R01EB016983)
Role: Principal Investigator (MPI grant with H. Subramanian)
Period of Support: 09/30/2013 – 08/31/2018
Total Costs: \$ 1,357,738
25. Source: National Institutes of Health
Title: An *in vivo* Metastasis Sensor (Transformative R01, R01CA173745)
Role: Principal Investigator (MPI grant with L. Shea)
Period of Support: 09/13/2012 – 07/31/2018
Total Costs: \$4,196,825
26. Source: Lungevity Foundation
Title: Lung Screening via Biophotonic Analysis of Nanoarchitecture of Buccal Cells (2015-04)
Role: Principal Investigator
Period of Support: 8/1/2015 – 7/31/2018
Total Costs: \$600,000
27. Source: National Institutes of Health
Title: Detection of 5-hmC as a Novel Screening Biomarker for Pancreatic Cancer (R21CA187869)
Role: Co-Investigator (PI Zhang)
Period of Support: 4/1/2015 – 4/30/2018
Total Costs: \$444,350 (Backman portion)
28. Source: National Institutes of Health
Title: Optical Nanoscale Analysis of Buccal Cells: Transforming Lung Cancer Screening (R01CA155284)
Role: Principal Investigator (MPI grant with H. K. Roy)
Period of Support: 09/26/2011 – 07/31/2017
Total Costs: \$ 2,375,698
29. Source: Lefkofsky Foundation
Title: Chromatin Protection Therapy: A New Paradigm to Combat Cancer Chemoresistance
Role: Principal Investigator
Period of Support: 12/1/15 – 11/30/16
Total Costs: \$75,000
30. Source: National Institutes of Health
Title: Transforming Colorectal Cancer Screening through Multimodal Spectral Markers (R01CA156186)
Role: Principal Investigator (MPI grant with H. K. Roy)
Period of Support: 12/15/2010 - 11/30/2016

Total Costs: \$2,839,531

31. Source: National Science Foundation
Title: EAGER: Biophotonic Detection of Field Carcinogenesis of Pancreatic Cancer (CBET-1340617)
Role: Principal Investigator (MPI grant with L. Hou)
Period of Support: 7/15/13 – 6/30/16
Total Costs: \$104,245
32. Source: National Institutes of Health
Title: Early Detection Research Network Core Funding (U01CA086402)
Role: Principal Investigator (PI H.K. Roy)
Period of Support: 1/1/2015 – 6/30/2016
Total Costs: \$250,531 (Backman portion)
33. Source: National Institutes of Health
Title: Spectral Markers for Early Detection of Colon Neoplasia. (U01 CA111257)
Role: Principal Investigator (MPI grant with H. K. Roy)
Period of Support: 8/18/10-6/30/15
Total Costs: \$3,299,302
34. Source: National Institutes of Health
Title: Spectral Markers for Early Detection of Colon Neoplasia (U01 CA111257)
Role: Principal Investigator (MPI grant with H. K. Roy)
Period of Support: 8/18/10-6/30/15
Total Costs: \$1,050,922
35. Source: National Institutes of Health
Title: Spectral Markers for Early Detection of Colon Neoplasia (U01CA111257-07S1)
Role: Principal Investigator (MPI with H. Roy)
Period of Support: 07/01/2011 – 06/30/2015
Total Costs: \$152,700
36. Source: National Institutes of Health
Title: Mechanisms of Light Scattering in Living Tissues (R01EB003682)
Role: Principal Investigator
Period of Support: 07/12/05-5/31/15
Total Costs: \$2,370,993
37. Source: National Institutes of Health
Title: Spectroscopy of Blood Supply Changes in Early Precancer (R01CA109861)
Role: Principal Investigator
Period of Support: 3/11/05-2/28/15
Total Costs: \$1,756,378
38. Source: National Institutes of Health

Title: Novel Biophotonics Methodology for Colon Cancer Screening (Bioengineering Research Partnership grant (R01CA128641)
Role: Principal Investigator
Period of Support: 5/05/08-2/28/15
Total Costs: \$7,572,902

39. Source: National Science Foundation
Title: EAGER: New Biophotonics and Computational Molecular Dynamics for Understanding Epigenetic Regulation of Gene Transcription (CBET-1249311)
Role: Principal Investigator
Period of Support: 09/01/2012 - 08/31/2014
Total Costs: \$ 300,000
40. Source: National Institutes of Health
Title: Spectral Markers for Risk Assessment of Pancreatic Cancer (U01CA111257)
Role: Principal Investigator (MPI grant with H.K. Roy)
Period of Support: 3/1/2011-2/28/2014
Total Costs: \$94,852
41. Source: National Institutes of Health
Title: Biophotonics Noninvasive Detection of Ovarian Cancer (R21CA156944)
Role: Principal Investigator
Period of Support: 02/07/2011 – 01/31/2014
Total Costs: \$ 632,876
42. Source: National Institutes of Health
Title: Physical Sciences Oncology Center: Coding, Decoding, Transfer, and Translation of Information in Cancer (U54CA143869)
Role: Co-Investigator (P.I.: Widom)
Period of Support: 09/25/09 - 07/31/14
Total Costs: \$ 317,705 (Backman portion only)
43. Source: National Science Foundation
Title: EAGER: BISH: Biophotonics Technique for Detection of Lung Cancer (CBET-0939778)
Role: Principal Investigator
Period of Support: 08/01/09 - 07/31/11
Total Costs: \$300,000
44. Source: National Science Foundation
Title: EFRI-BioSA: Photonic Technique for Sensing and Understanding Subcellular Structures at Nanoscale (CBET-0937987)
Role: Principal Investigator
Period of Support: 09/01/09 – 08/31/14
Total Costs: \$2,000,000

45. Source: National Institutes of Health
Title: Improving Flexible Sigmoidoscopy in Women by Optical Analysis of Microvasculature (R21CA140936)
Role: Principal Investigator
Period of Support: 7/1/2009 – 6/30/2011
Total Costs: \$382,175
46. Source: National Institutes of Health
Title: Spectral and Mucin Markers in Colon Carcinogenesis (U01CA111257)
Role: Principal Investigator, subcontract to Northwestern University (PI: Roy)
Period of Support: 4/1/2009-3/31/2010
Total Costs: \$40,000
47. Source: National Institutes of Health
Title: STTR Phase II: Improving colonoscopic miss rate by real time microvascular blood analysis (R42CA130508, PI: Roy)
Period of Support: 9/1/2008-8/31/2010
Total Costs: \$750,000
48. Source: National Science Foundation
Title: SBIR Phase II: Optical Spectroscopy for Colon Cancer Screening without Colonoscopy (PI: Cittadine)
Period of Support: 7/15/08 – 7/30/10
Total Costs: \$500,000
49. Source: The V Foundation
Title: Noninvasive Diagnosis of early Pancreatic Cancer: a Biophotonics Approach
Role: Principal Investigator
Period of Support: 11/01/06-10/31/09
Total Costs: \$600,000
50. Source: National Institute of Health
Title: Spectral Markers in Aspirin Chemoprevention of Colonic Neoplasia (N01CN35157)
Role: Co-Principal Investigator (PI: Bergan)
Period of Support: 09/30/2006 – 09/29/2010
Total Costs: \$1,200,000 (Backman portion: \$345,000)
51. Source: Bill & Melinda Gates Foundation
Title: Affordable Diagnostic Devices for Infectious Diseases
Role: Co-Investigator (PI: Kelso)
Period of Support: 08/01/06 - 08/01/10
52. Source: National Science Foundation
Title: MRI-R2: Development of biophotonics instrumentation for sensing subcellular structure at nanoscale (CBET- 0960148)

Role: Principal Investigator
Period of Support: 01/01/10 - 12/31/10
Total Costs: \$ 852,325

53. Source: National Institutes of Health
Title: Optical Spectroscopy for Minimally Invasive Pancreatic Cancer Risk-stratification (R21EB006742)

Role: Principal Investigator
Period of Support: 09/08/06-08/31/10
Total Costs: \$398,630

54. Source: Canary Foundation and the American Cancer Society
Title: Ultra-Early Detection of Cell Carcinogenesis via Partial-Wave Spectroscopy

Role: Principal Investigator
Period of Support: 09/01/07-08/31/10
Total Costs: \$138,000

55. Source: National Institutes of Health
Title: Towards Colonoscopy-free Colon Cancer Screening by Enhanced Light Backscattering (R33CA122017)

Role: Principal Investigator
Period of Support: 07/01/06-08/31/10
Total Costs: \$1,412,950

56. Source: National Institutes of Health
Title: Optically Monitoring Colon Microcirculation in Precancer (R01CA118794)

Role: Principal Investigator
Period of Support: 07/01/07-6/30/10
Total Costs: \$785,692

57. Source: National Institutes of Health
Title: Spectroscopic Markers to Risk-Stratify Colonic Neoplasia (R01CA112315)

Role: Principal Investigator
Period of Support: 07/01/05-6/30/10
Total Costs: \$1,498,853

58. Source: The Wallace H. Coulter Foundation
Title: Rectal Coherent Backscattering Spectroscopy to Screen for Colon Cancer: Phase II

Role: Principal Investigator
Period of Support: 08/01/07-7/31/09
Total Costs: \$260,000

59. Source: National Science Foundation
Title: CAREER: Optical spectroscopy and imaging for understanding the interrelation of molecular and ultrastructural changes in neoplastic cells (CBET-0238903)

Role: Principal Investigator

Period of Support: 07/01/03 - 06/30/09
Total Costs: \$ 401,310

60. Source: National Institutes of Health
Title: Biooptical Interrogation of the Buccal Mucosa for Lung Cancer Screening
Role: Principal Investigator, subcontract to Northwestern University (PI: Roy)
Period of Support: 03/01/2008 – 02/28/2009
Total Costs: \$36,284 (Backman only)
61. Source: National Science Foundation
Title: Biophotonics: Towards Nondestructive Optical Analysis of Nanostructures Using Photonic Nanojets (CBET-0522639)
Role: Principal Investigator
Period of Support: 07/01/05-6/30/08
Total Costs: \$200,000
62. Source: National Science Foundation
Title: Biophotonics for Diagnosis of Pancreatic Cancer (CBET- 0733868)
Role: Principal Investigator
Period of Support: 7/1/07-12/31/08
Total Costs: \$160,348
63. Source: National Institutes of Health
Title: Spectral and Mucin Markers for Detection of Cholangiocarcinoma
Role: Principal Investigator, subcontract to Northwestern University (PI: Roy)
Period of Support: 08/01/06-07/31/07
Total Costs: \$49,191 (Backman portion only)
64. Source: National Science Foundation
Title: Biophotonics Techniques for Accurate Diagnosis of Pancreatic Cancer (BES-0620303)
Role: Principal Investigator
Period of Support: 07/01/06 – 06/30/07
Total Costs: \$152,412
65. Source: National Science Foundation
Title: ITR: Fine-grain data management in computational grids and applications in network-enabled medical imaging for early cancer detection (CCF-0219925)
Role: Principal Investigator
Period of Support: 10/01/02-09/30/07
Total Costs: \$349,967
66. Source: National Institutes of Health
Title: Spectroscopic imaging and diagnosis of neoplasia (R01CA97966)
Role: Principal Investigator, subcontract to Northwestern University
Period of Support: 08/15/03 - 07/31/08

Total Costs: \$854,367 (Backman portion only)

67. Source: National Institutes of Health
Title: Mechanism of Increased Mucosal Blood Content as a Biomarker of Colon Cancer (R03CA119261)
Role: Principal Investigator, subcontract to Northwestern University (PI: Wali)
Period of Support: 07/01/06-06/30/08
Total Costs: \$150,284 (NU portion: \$32,000)
68. Source: National Institutes of Health
Title: Mucin and Spectral Markers for Gastric Carcinogenesis
Role: Co-investigator (PI: Roy)
Period of Support: 03/01/2007 – 07/31/2008
Total Costs: \$26,871 (Backman only)
69. Source: Illinois Institute of Regenerative Medicine Stem Cell Initiative
Title: Stem Cell-based Vascular Tissue Engineering
Role: Co-Principal Investigator (PI: Ameer)
Period of Support: 05/12/06 - 05/11/08
Total Costs: \$870,000 (Backman portion: \$144,000)
70. Source: National Institutes of Health
Title: STTR Phase I: Improving colonoscopic miss rate by real time microvascular blood analysis (R42CA130508, PI: Roy)
Period of Support: 9/28/2007-8/31/2008
Total Costs: \$100,000
71. Source: Phi Beta Psi Cancer Research Fund
Title: Towards Colon Cancer Screening Using Optical Imaging Without Colonoscopy
Role: Principal Investigator
Period of Support: 8/01/06-7/31/07
Total Costs: \$58,000
72. Source: The Wallace H. Coulter Foundation
Title: Rectal Coherent Backscattering Spectroscopy to Screen for Colon Cancer
Role: Principal Investigator
Period of Support: 08/01/05-06/30/07
Total Costs: \$240,000
73. Source: Cancer Research and Prevention Foundation
Title: Elastic Light Scattering Fingerprinting for Colorectal Cancer Screening
Role: Principal Investigator
Period of Support: 01/15/05-01/14/07
Total Costs: \$75,000
74. Source: The Steinkoler Pancreatic Cancer Foundation

- Title: Minimally Invasive Detection of Early Pancreatic Cancer
Role: Principal Investigator
Period of Support: 06/01/04-05/31/06
Total Costs: \$15,000
75. Source: National Science Foundation
Title: Noninvasive Detection of Pancreatic Cancer Using Biophotonics Techniques (BES-0547480)
Role: Principal Investigator
Period of Support: 9/1/05-8/31/06
Total Costs: \$152,000
76. Source: National Institutes of Health
Title: Nanoparticles for Multi-label Optical Molecular Imaging (R21EB003454)
Role: Principal Investigator
Period of Support: 03/01/04-02/28/06
Total Costs: \$365,195
77. Source: National Institutes of Health
Title: Spectral and micro/nanoscale markers of colon neoplasia (R21CA102750)
Role: Principal Investigator
Period of Support: 07/01/03-06/30/05
Total Costs: \$297,125
78. Source: National Institutes of Health
Title: A scaffold for cardiovascular tissue engineering (R21HL071921)
Role: Co-Investigator (P.I.: Ameer)
Period of Support: 10/01/02-09/30/05
Total Costs: \$328,993 (Backman portion only)
79. Source: National Science Foundation
Title: Development of Minimally Invasive Optical Technique for Early Detection of Pancreatic Cancer
Role: Principal Investigator
Period of Support: 06/01/04-05/31/05
Total Costs: \$155,000
80. Source: General Motors Cancer Research Foundation
Title: Novel spectroscopic methodologies for improved diagnosis, detection, and evaluation of preinvasive neoplasms in the organs of female reproductive tract.
Role: Principal Investigator
Period of Support: 01/07/02 - 01/06/04
Total Costs: \$108,000
81. Source: Charlotte Geyer Foundation
Title: Spectroscopic Markers to Risk-Stratify Colonic Neoplasia

Role: Principal Investigator
Period of Support: 12/01/04-8/31/05
Total Costs: \$75,000

82. Source: Phi Beta Psi Cancer Research Fund
Title: Minimally invasive diagnosis and detection of preinvasive neoplasms in the ovary and endometrium using light scattering spectroscopy.
Role: Principal Investigator
Period of Support: 07/01/02 - 06/30/03
Total Costs: \$51,000
83. Source: Phi Beta Psi Cancer Research Fund
Title: Detection of Preinvasive Neoplasms in the Ovary Using Light Scattering.
Role: Principal Investigator
Period of Support: 09/01/03 - 09/01/04
Total Costs: \$45,000
84. Source: Baxter Healthcare Corporation
Title: Towards Nanoscale Double Resonance Optical Imaging of Living Cells
Role: Principal Investigator
Period of Support: 12/1/03-11/30/04
Total Costs: \$50,000
85. Source: American Heart Association Midwest Affiliate
Title: In Vitro Assessment of an Elastomeric Scaffold for Potential Use in Cardiovascular Tissue Engineering
Role: Co-Investigator (P.I.: Ameer)
Period of Support: 07/01/02 – 06/30/05
Total Costs: \$ 123,750 (Backman portion only)
86. Source: American Cancer Society
Title: Light-Scattering Spectroscopy as an Intermediate Biomarker of Nonsteroidal Anti-Inflammatory Drug Chemoprevention of Experimental Colon Carcinogenesis
Role: Principal Investigator, subcontract to Northwestern University (P.I.: Roy)
Period of Support: 07/01/03-06/30/04
Total Costs: \$62,426 (Backman portion only)
87. Source: National Institute of Health
Title: Spectroscopic markers for colon cancer chemoprevention. (R03CA10549)
Role: Principal Investigator, subcontract to Northwestern University (P.I.: Wali)
Period of Support: 9/30/03 – 08/31/05
Total Costs: \$40,000 (Backman portion only)
88. Source: National Science Foundation
Title: SBIR Phase I: Optical Spectroscopy for Colon Cancer Screening without Colonoscopy (IIP 0712361)

Role: Co-Principal Investigator (PI: Cittadine)
Period of Support: 07/01/2007 – 12/31/2007
Total Costs: \$100,000

C. Internal Competitive Funding

1. Source: McCormick School of Engineering
Title: New Strategy for Cardiovascular Regenerative Engineering
Role: Co-PI (with G. Ameer)
Period of Support: October 1, 2021 – September 30, 2022
Total Costs: \$100,000
2. Source: McCormick School of Engineering
Title: Center for Nanoscale Imaging in the Biological Sciences
Role: Co-PI (with H. Zhang)
Period of Support: Ongoing
Total Costs: \$150,000
3. Source: McCormick School of Engineering, Feinberg School of Medicine, Northwestern University Office for Research
Title: Super Resolution Chromatin Nanoscopy and Nanomedicine for Malignant Brain Tumors
Role: Co-PI (MPI grant with C. Sun, H. Zhang, M. Lesniak)
Period of Support: 10/1/2016 – 9/30/2018
Total Costs: \$120,000
4. Source: McCormick School of Engineering
Title: Preventing Atherosclerotic Plaque Rupture
Role: Principal Investigator (MPI grant with G. Ameer)
Period of Support: 9/1/2014 – 8/31/2015
Total Costs: \$77,000
5. Source: Chemistry of Life Processes, Chairman's Innovation Award
Title: Use of Novel Optics Technology to establish susceptibility, resistance and recovery indicators of stony corals to bleaching
Role: Principal Investigator
Period of Support: 03/01/08 - 02/01/10
Total Costs: \$20,000
6. Source: Chemistry of Life Processes, Executive Advisory Board Award
Title: Use of Novel Optics Technology to establish susceptibility, resistance and recovery indicators of stony corals to bleaching
Role: Principal Investigator
Period of Support: 08/05/09 - 08/04/10
Total Costs: \$30,000

7. Source: CCNE
 Title: Single-cell Partial Wave Microscopy
 Role: Principal Investigator
 Period of Support: 10/01/06-09/31/07
 Total Costs: \$50,000
8. Source: Northwestern Medical Foundation
 Title: Mapping of Brain Tumors Using an Elastic-Light Scattering Hyperspectral Imaging System
 Role: Co-Investigator
 Period of Support: 4/01/06-3/31/08
 Total Costs: \$115,000
9. Source: Lurie Comprehensive Cancer Center
 Title: Noninvasive Risk-stratification of Early Colon Neoplasia (Program Project Planning Grant)
 Role: Principal Investigator
 Period of Support: 4/01/05-3/31/06
 Total Costs: \$50,000
10. Source: Northwestern Memorial Foundation
 Title: Optical Characterization of Epithelia
 Role: Principal Investigator
 Period of Support: 9/01/05-8/31/06
 Total Costs: \$10,000
11. Source: Institute for Bioengineering and Nanoscience in Advanced Medicine
 Title: Probing nano-organization of living tissues using ultraviolet light scattering
 Role: Principal Investigator
 Period of Support: 5/15/02-5/14/03
 Total Costs: \$35,000
12. Source: Institute for Bioengineering and Nanoscience in Advanced Medicine
 Title: Development of Molecular Imaging of Living Tissues with Light Scattering Spectroscopy
 Role: Principal Investigator
 Period of Support: 8/1/03-7/31/04
 Total Costs: \$20,000

PATENTS

1. V. Backman, H. Roy, "Myokines for Treating Cell Proliferative and Metabolic Diseases and Disorders", U.S. patent No. 11,560,414, Issue date: January 24, 2023
2. V. Backman, A. Cittadine, B. Gould, N. Mutyal, "A Pre-fabricated, On-demand Interface For Use In Providing Optical Coupling Between Disposable And Reuseable Members Of A Fiber-optic Probe", U.S. patent No. 10,881,273, Issue date: January 5, 2021.

3. V. Backman, F. Garrett, M. Garrett, B. Gould, N. Mutyal, T.Q. Nguyen, "Automated Calibration System for a Fiber-Optic Probe", U.S. patent No. 10,921,212, Issue date: February 16, 2021.
4. V. Backman, J. Yi, H.F. Zhang, W. Liu, K. Patel, "Devices, methods and systems of functional optical coherence tomography", U.S. patent No. 9,962,075, Issue date: May 8, 2018.
5. V. Backman, J.D. Rogers, B. Gould, N. Mutyal, A.J. Radosevich, "Probe Apparatus for Recognizing Abnormal Tissue", U.S. patent No. 9,885,834, Issue date: February 6, 2018.
6. V. Backman, J. Yi, "Biological Tissue Analysis by Inverse Spectroscopic Optical Coherence Tomography", U.S. patent No. 9,678,007, Issue date: June 13, 2017.
7. V. Backman, J. Yi, H.F. Zhang, W. Liu, "Devices, methods and systems of functional optical coherence tomography", U.S. patent No. 9,619,903, Issue date: April 11, 2017.
8. V. Backman, J. Yi, H.F. Zhang, Q. Wei, "Methods and apparatus for laser scanning structured illumination microscopy and tomography", U.S. patent No. 9,360,660, Issue date: June 7, 2016.
9. Y.L. Kim, V. Backman, H.K. Roy, M. Siegel, V. Turzhitsky, "Method of using the detection of early increase in microvascular blood content to distinguish between adenomatous and hyperplastic polyps", U.S. patent No. 9,314,164, Issue date: April 19, 2016.
10. V. Backman, H. Subramanian, D. Damania, H. Roy, D. Kunte, M. De La Cruz, "Cancer screening by detection of ultrastructural and molecular markers", U.S. patent No. 9,090,933, Issue date: July 28, 2015.
11. V. Backman, Y. Liu, Y. Kim, P. Pradhan, H. Subramanian, H. Roy, M. Goldberg, R. Brand, "Methods for Identifying Refractive-Index Fluctuations of a Target", Japan patent No. 5744403, Issue date: May 15, 2015.
12. V. Backman, H. Roy, Y. Kim, Y. Liu, V. Turzhitsky, J.D. Rogers, "Systems, Method, and Apparatuses of Low-Coherence Enhanced Backscattering Spectroscopy", Japan patent No. 5706948, Issue date: March 6, 2015.
13. V. Backman, H. Subramanian, D. Damania, H. Roy, D. Kunte, M. De La Cruz, "Cancer screening by detection of ultrastructural and molecular markers", U.S. patent No. 8,735,075, Issue date: May 27, 2014.
14. V. Backman, H. Subramanian, J. Chandler, C. White, J. Rogers, L. Cherkezyan, "High throughput partial wave spectroscopic microscopy", Serial No. 61/857,427, Application Date: July 23, 2013.
15. V. Backman, H. Subramanian, J. Chandler, M. Proenca, "Automated cell collection and smearing", Serial No. 61/786,802, Application Date: March 15, 2013.
16. V. Backman, H. Roy, R. Brand, Y. Liu, J. Rogers, V. Turzhitsky, "Systems, methods and apparatuses of elastic light scattering spectroscopy and low coherence enhanced backscattering spectroscopy", U.S. patent No. 8,131,348 (Serial No. 11/803,418), US Class 600/476; 356/303, International Class A61B 6/00; G01J 3/40, Issue date: March 6, 2012.

17. V. Backman, Y. Liu, Y. Kim, H. Roy, M. Goldberg, R. Brand, P. Pradhan, S. Hariharan, "Method for identifying refractive-index fluctuations of a target", US Patent No. 7,800,746, US Class 356/128, International Class G01N 21/41, Issue date: September 21, 2010.
18. V. Backman, Y. Liu, Y. Kim, "System for identifying refractive-index fluctuations of a target", US Patent 7,667,832, US Class 356/128, International Class G01N 21/41, Issue date: February 23, 2010.
19. V. Backman, H. Roy, Y. L. Kim, Y. Liu, V. Turzhitsky, "Systems, methods, and apparatuses of low-coherence enhanced backscattering spectroscopy", US Patent 7,652,772, US Class 356/497, International Class G01B 9/02, Issue date: January 26, 2010.
20. V. Backman, B. Gould, A. Cittadine, J. Rogers, H. Roy, "Probe apparatus for recognizing abnormal tissue", U.S. patent application No. 20100262020, (Serial No. 61/143,407), Submission date: January 8, 2010.
21. V. Backman, H. Roy, A. Gomes, S. Ruderman, J. Rogers, "Method of screening for cancer using parameters obtained by the detection of early increase in microvascular blood content", U.S. patent application No. 20090203977 (Serial No. 12/350,955), US Class 600/325, International Class A61B 5/1459, Submission date: August 13, 2009.
22. V. Backman, H. Roy, R. Wali, Y. L. Kim, M. Siegel, V. Turzhitsky, "Method of recognizing abnormal tissue using the detection of early increase in microvascular blood content", U.S. patent application No. 20070179368 (Serial No. 11/604,653), US Class 600/315, International Class A61B 005/00, Submission date: August 2, 2007.
23. V. Backman, H. Roy, Y. L. Kim, Y. Liu, "Apparatus for recognizing abnormal tissue using the detection of early increase in microvascular blood content", U.S. patent application No. 20070129615 (Serial No. 11/604,659), US Class 600/315, International Class A61B 005/00, Submission date: June 7, 2007.
24. V. Backman, H. Roy, R. Wali, Y. L. Kim, Y. Liu, G. Ameer, J. Yang, A. Webb, J. Allen, "Multi-dimensional elastic light scattering", US Patent application No. 20060155178 (Serial No. 261,452), US Class 600/315, International Class A61B 005/00, Submission date: July 13, 2006.
25. L.T. Perelman, V. Backman, M.S. Feld, G. Zonios, I. Itzkan, R. Manoharan, "Method for Measuring Tissue Morphology", US Patent 6,922,583, US Class 600/476, International Class 600/476, Issue date: July 26, 2005.
26. I. Georgakoudi, V. Backman, M.S. Feld, "Fluorescence, reflectance and light scattering spectroscopy for measuring tissue", US Patent 6,697,652, US Class 600/310, International Class G01N 21/64, Issue date: February 24, 2004.
27. V. Backman, R.R. Dasari, R. Gurjar, I. Itzkan, L. Perelman, M.S. Feld, "Polarized light scattering spectroscopy of tissue", US Patent 6,624,890, US Class 356/369, International Class A61B 5/00, Issue date: September 23, 2003.
28. V. Backman, R.R. Dasari, R. Gurjar, I. Itzkan, L.T. Perelman, M.S. Feld, "Polarized Light Scattering Spectroscopy of Tissue". US Patent 6,404,497, US Class 356/369, International Class G01J 004/00, Issue date: June 11, 2002.

29. I. Georgakoudi, V. Backman, M. Mueller, M.S. Feld, “Analysis of Chemical Composition and Structure of Tissues with Tri-Modal Spectroscopy”, US Patent Application, 2001.
30. L.T. Perelman, V. Backman, M.S. Feld, G. Zonios, I. Itzkan, R. Manoharan, “Measuring Tissue Morphology”, US Patent 6,091,984, US Class 600/476, International Class A61B 5/00, Issue date: July 18, 2000.

INVITED TALKS

1. “Biophotonics-guided biology: genome geometry as an intelligent system”, Dasari Lecture, Massachusetts Institute of Technology, Cambridge, MA, October 25, 2024.
2. “Chromatin conformation: reprogramming cells’ operating system”, BMES Conference, Baltimore, MD, October 24, 2024.
3. “Chromatin domains as an emergent property: how cells learn to regulate epigenetic memory and transcriptional reprogramming”, IUPAB Conference, Toyko, Japan, June 27, 2024.
4. “Do chromatin packing domains program transcriptional memory?”, Telluride Workshop on Physical Genomics and Transcriptional Engineering, Telluride, CO, February 27, 2024.
5. “Physical genomics and the reprogramming of the cell’s operating system”, Biophysical Society Annual Meeting, Philadelphia, PA, February 10, 2024.
6. “What can optical nanoscopy reveal about the structure and function of the genome?”, Advanced Optical Imaging Symposium, University of Illinois at Chicago, October 13, 2023.
7. “Can We Live to 120 and Beyond? The Convergence of Engineering and Medicine”, Northwestern University, April 22, 2023.
8. “The Science of Aging”, Telluride Science Research Center, February 22, 2023.
9. “What can optical nanoscopy reveal about the structure and function of the genome?”, Dartmouth University, April 22, 2021.
10. “What can optical nanoscopy reveal about the structure and function of the genome?”, Fitzpatrick Center for Biophotonics, Duke University, October 13, 2020.
11. “Physical genomics: What can we learn about 3-D chromatin packing as a regulator of transcriptional plasticity?”, Physical Sciences Oncology Network Investigators Meeting, September 21, 2020.
12. Health Disparities, American Association for Cancer Research Virtual Conference on COVID-19 and Cancer, June 20 – 22, 2020.
13. Parker Institute for Cancer Immunotherapy, San Francisco, December 2019.

14. “Bridging chromatin nanoimaging and molecular modeling: Chromatin packing as a regulator of transcriptional heterogeneity in carcinogenesis”, National Institutes of Health, October 25, 2019.
15. “Bridging chromatin nanoimaging and molecular modeling: Chromatin packing as a regulator of transcriptional heterogeneity in carcinogenesis”, Workshop on Genomes & AI: From Packing to Regulation, National University of Singapore, October 2, 2019.
16. Dialog Global 2019, Venice, Italy, August 15-18, 2019.
17. “Bridging chromatin nanoimaging and molecular modeling: Chromatin packing as a regulator of transcriptional heterogeneity in carcinogenesis”, University of Illinois at Chicago, April 26, 2019.
18. “Developing Novel Strategies for Chromatin Regulation to Fight Resistance in Cancer Chemotherapy”, Biotech Summit by the Lake, Kellogg School of Management, Northwestern University, March 27, 2019.
19. “Bridging chromatin nanoimaging and molecular modeling: Chromatin packing as a regulator of transcriptional heterogeneity in carcinogenesis”, Telluride Workshop: Physical Genomics and Transcriptional Engineering, February 25, 2019.
20. “Bridging Chromatin Nanoimaging and Molecular Modeling – What Can We Learn About Chromatin Packing as a Regulator of Transcription?”, Gordon Research Conference on Physical Science of Cancer, Galveston, TX, February 14, 2019.
21. “Chromatin Regulation to Fight Resistance in Cancer Chemotherapy”, The Mark Foundation, New York, November 13, 2018.
22. “Bridging Chromatin Nanoimaging and Molecular Modeling – What Can We Learn About Chromatin Packing as a Regulator of Transcription?”, University of Nebraska Medical Center, Omaha, NE, October 8, 2018.
23. “Chromatin Regulation to Fight Resistance in Cancer Chemotherapy”, Illinois Ignite Conference, Rosemont, IL, September 27, 2018.
24. “Chromatin as a regulator of transcription”, FASEB Conference: Transcription, Chromatin and Epigenetics, Florence, Italy, September 19, 2018.
25. “Bridging Chromatin Nanoimaging and Molecular Modeling – What Can We Learn About Chromatin Packing as a Regulator of Transcription?”, Telluride Workshop on Chromatin Structure and Dynamics, Telluride, CO, July 31, 2018.
26. “Driving Convergent Research”, NSF Conference on Convergent Research, Arlington, VA, May 14, 2018.
27. “Convergence of nanoimaging and biology: From decoding chromatin packing to cancer therapeutics”, H Foundation Symposium, April 21, 2018.

28. “Convergence of Nanoimaging and Biology: From Decoding Chromatin Packing to Cancer Diagnostics and Therapeutics”, Center for Structural Systems Biology, Hamburg, Germany, April 10, 2018.
29. “Nanotechnology in Gastroenterology: Small Steps for Large Gains”, Keynote address, AGA Tech Summit, Boston, MA, March 22, 2018.
30. “Convergence of Nanoimaging and Biology: From Decoding Chromatin Packing to Cancer Diagnostics and Therapeutics”, University of Notre Dame, South Bend, IN, February 2, 2018.
31. “Interferometric spectroscopy of scattered light for the quantification of nanoscale structure of chromatin”, SPIE Photonics West, San Francisco, CA, January 25, 2018.
32. “What optical nanoscopy reveals about the structure of the genome and its role in carcinogenesis”, SPIE Photonics West, San Francisco, CA, January 23, 2018.
33. Congressional Briefing Panel by United for Medical Research, Rayburn House Office Building, Washington D.C., November 15, 2017.
34. “Convergence of Nanoimaging and Biology: From Decoding Chromatin Packing to Cancer Diagnostics and Therapeutics”, Robert H. Lurie Comprehensive Cancer Center, Chicago, IL, October 12, 2017.
35. “Convergence of Nanoimaging, Physics and Biology: Can Engineering Lead to a Cancer Cure?”, University of Chicago Department of Pathology, Chicago, IL, September 14, 2017.
36. “Convergence of Nanoimaging, Physics and Biology: Can Engineering Lead to a Cancer Cure?”, CLEO Conference, San Jose, CA, May 16, 2017.
37. “Convergence of Nanoimaging, Physics and Biology: Can Engineering Lead to a Cancer Cure?”, Imperial College London, March 22, 2017.
38. “Label-Free Nanoscale Imaging: Uncovering a New Biological Code”, Massachusetts Institute of Technology, Cambridge, MA, November 22, 2016.
39. “Label-Free Nanoscale Imaging”, Columbia University, October 12, 2016
40. “Insights into hallmarks of early carcinogenesis using nanoscale-sensing optical microscopy”, BMES Annual Meeting, Minneapolis, MN, October 6, 2016.
41. “Convergence of Engineering, Physics and Biology: Insights into Hallmarks of Early Carcinogenesis, Early Cancer Detection and Therapeutics”, National Science Foundation Directorate of Engineering, Arlington, VA, July 19, 2016.
42. “Label-Free Nanoscale Imaging”, Massachusetts Institute of Technology, May 31, 2016.
43. “Nanocytology: Personalizing Cancer Risk Assessment in Primary Care Setting”, Midwestern Medical Director’s Association Annual Meeting, Chicago, IL, May 13, 2016.

44. “How To Win The War On Cancer”, Milken Global Conference, Los Angeles, CA, May 4, 2016.
45. “Insights into Hallmarks of Early Carcinogenesis Using Nanoscale-sensing Optical Microscopy”, Oregon Health Science University, Portland, OR, April 14, 2016.
46. “Insights into Hallmarks of Early Carcinogenesis Using Nanoscale-sensing Optical Microscopy”, University of Pennsylvania, Philadelphia, PA, April 7, 2016.
47. “Understanding Initial Stages of Carcinogenesis Using Label-Free Optical Nanoimaging and Nanosensing”, University of Wisconsin – Madison, Madison, WI, February 29, 2016.
48. “Understanding Hallmarks of Early Carcinogenesis Using Optical Nanoimaging and Nanosensing”, Northwestern University Feinberg School of Medicine, Department of Neurology, Chicago, IL, January 11, 2016.
49. “Optical Imaging Techniques in Early Cancer Detection”, 12th Annual Life Settlement and Longevity Conference, Washington DC, November 2, 2015.
50. “Improving Cancer Detection Methods”, Medical Breakthroughs at Chicago Ideas Week, Chicago, IL, October 17, 2015.
51. “Nanocytology: New Approaches to Cancer Screening”, University of Illinois-Chicago Department of Pathology, Chicago, IL, October 12, 2015.
52. “Partial Wave Spectroscopy Prostate Cancer Project: Update and Future Goals”, NorthShore University HealthSystem, Evanston, IL, October 9, 2015.
53. “In Vitro Nanocytology Test for Highly Accurate Early Cancer Screening and Prognostication in Primary Care Setting”, Point of Care Diagnostics Conference, San Diego, CA, June 12, 2015.
54. “Nanosensing and Functional Biophotonics to Study Initial Stages of Carcinogenesis”, LAAMP Seminar, Beckman Laser Institute, Irvine, CA, April 28, 2015.
55. “Nanoscale and Functional Optical Imaging for Colon Cancer Diagnostics and Risk-Stratification”, University of Southern California, Los Angeles, CA, April 27, 2015.
56. “Cancer Screening and Nanoscale Cytology”, SPIE Photonics West Hot Topics, San Francisco, CA, February 6, 2015.
57. “Nanocytology: Transforming Cancer Screening and Risk-Stratification”, NorthShore University HealthSystem Urological Research Group, Evanston, IL, December 5, 2014.
58. “Transforming Risk Screening in Primary Care Setting”, Point of Care Diagnostics World Congress, San Diego, CA, September 19, 2014.

59. V. Backman, "Polarization Gated Spectroscopy", Gordon Conference - Lasers In Medicine & Biology, Holderness, NH, July 14-18, 2014.
60. "Partial Wave Spectroscopy", Olympus Corporation, Tokyo, Japan, June 10, 2014.
61. "Photonics Meets Biology: From Nanoscale Imaging to Winning the War on Cancer", Japan-America Frontiers of Engineering (JAFOE) Conference, Tokyo, Japan, June 9, 2014.
62. "Elastic Light Scattering for Early Malignancy Detection in GI Tract", Digestive Disease Week 2015, Washington, D.C., May 19, 2015.
63. "Optical Imaging Detects Nanoscale Alterations in Early Carcinogenesis: Cost-Effective Risk-Stratification, Screening and Prognosis of Cancer", NCI-NIBIB Point of Care Technologies for Cancer Conference, Bethesda, MD, January 8, 2014.
64. "New Optical Imaging for the Detection of Nanoscale Biomarkers of Field Carcinogenesis: Risk-Stratification, Screening and Prognosis of Cancer", 26th EDRN Steering Committee Meeting, Seattle, WA, September 10, 2013.
65. "Nanoarchitectural Markers of Early Carcinogenesis", 8th EDRN Scientific Workshop, Bethesda, MD, March 13, 2013.
66. "Optical Nanocytology: Transforming Cancer Screening and Understanding Chromatin Modifications in Early Carcinogenesis", ASME 2nd Global Congress on Nanoengineering for Medicine & Biology, Boston, MA, February 6, 2013.
67. "Nanocytology: Transforming Colon Cancer Screening", Early Detection Seminar, Stanford University, Palo Alto, CA, October 25, 2012.
68. "Nanocytology: Transforming Colon Cancer Screening", Northwestern University Learning for Life Lectures, Chicago, IL, October 10, 2012.
69. Norgine, Inc., London, UK, April 17, 2012.
70. Roche, Inc., Basel, Switzerland, April 16, 2012.
71. "New Technologies for Colorectal Cancer Screening", Colorectal Cancer Screening Working Group, Orlando, March 2012.
72. "Physical Markers and Universal Parameters in Cancer", National Cancer Institute Think Tank on Integrating the Physical Science Perspective to Open a New Frontier in Oncology, Washington, D.C., Feb. 8, 2012.
73. "Cell Imaging at the Nanoscale: Detecting Nuclear Chromatin Alterations in Field Carcinogenesis", AACR Conference on Frontiers in Cancer Prevention Research, Boston, MA, October 22-25, 2011.
74. "Partial wave spectroscopic microscopy: detecting alterations in cell nanoarchitecture in early carcinogenesis", IEEE Photonics 2011, Arlington, VA, October 9-13, 2011.
75. "Clinical optical imaging & spectroscopy: Approaching the clinic", Advances in Optics for Biotechnology, Medicine and Surgery XII, An ECI Conference Series, Naples, FL, June 5-8, 2011.

76. "Alterations in nuclear nanoscale architecture: optical imaging and the role in early carcinogenesis", NCI PS-OC Network Investigators' Meeting, La Jolla, CA, April 10-12, 2011.
77. "Physics Meets Biology: Understanding the Role of Cell Nanoscale Structure in Carcinogenesis", American Physical Society (APS) March Meeting, Dallas, TX, March 21-25, 2011.
78. "Scattering From Mass Fractals: Modeling and Observation", SPIE Photonics West Conference, San Francisco, CA, Jan 22-27, 2011.
79. "Probing Cellular Nanoscale Organization", Life Science Symposium, Swiss Federal Institute of Technology of Lausanne (EPFL), Lausanne, Switzerland, September 2-4, 2010.
80. "Optical Imaging: Insights into Cell Nanoarchitecture", EECS Seminar, Northwestern University, May 12, 2010.
81. "Detecting Alterations in Cell Ultrastructure with Optical Imaging: Implications for Cancer Screening", Frontiers of GI Research Conference, University of Illinois at Chicago, Department of Medicine, February, 2010.
82. "Detecting Alterations in Cell Ultrastructure with Optical Imaging: Implications for Cancer Screening", Department of Physics, University of Wisconsin – Milwaukee, Milwaukee, December 11, 2009.
83. "Detecting Alterations in Cell Ultrastructure with Optical Imaging: Understanding the Role of Cell Morphology in Carcinogenesis", Future of Light Symposium, Boston University Photonics Center, November 16, 2009.
84. "Translating of Biophotonics Technologies into Clinical Practice: Challenges and Successes", Coulter Biomedical Optics Industry-Academia Collaborative Meeting, Boston University, November 10, 2009.
85. "A Translational Biomedical Research Model", Innovation Workshop Series, University of Chicago, October 29, 2009.
86. "Measuring cell nanoscale organization: partial wave spectroscopic microscopy", IEEE-EMBS Annual Meeting, Minneapolis, September 2-6, 2009.
87. "Cancer Screening via Biophotonics: A "Remote Sensing" Approach", University of Connecticut Health Center, April 9, 2009.
88. "Detecting alterations in cell nanoarchitecture with optical imaging", University of California Irvine, April 2, 2009.
89. "Detecting alterations in cell nanoarchitecture with optical imaging", University of Rochester, December 5, 2008.
90. "Optically sensing alterations in nanoscale cell architecture: a new paradigm for cancer screening", Biotechnology Seminar, Northwestern University, October 29, 2008.
91. "Detecting alterations in cell nanoarchitecture with optical imaging: Implications for cancer detection", Annual Optical Society of America Meeting, Frontiers in Optics (FiO)/Laser Science XXIV (LS) Conference, Rochester, NY, October 23, 2008.

92. "Optically sensing alterations in nanoscale cell architecture: a new paradigm for cancer screening", Illinois Institute of Technology, Chicago IL, October 11, 2008.
93. "Surrogate Anatomic/Functional Sites for Evaluating Cancer Risk", Physical Sciences & Oncology Mini-Symposium, Northwestern University, Chicago, IL, October 3, 2008.
94. "Alterations in Cellular Nanoarchitecture Is an Early Event in Carcinogenesis", IBiS Seminar Series, Northwestern University, Chicago, IL, September 30, 2008.
95. "Optically sensing alterations in nanoscale cell architecture: a new paradigm for cancer screening", University of Chicago Medical School, Chicago, IL September 18, 2008.
96. "Biophotonics for colon cancer screening", Keynote speaker, Midwest Colon Cancer Symposium, September 13, 2008.
97. "Probing tissue architecture at submicron scale: seeing beyond histology", 2008 Gordon Conference on Lasers in Medicine and Biology, Session on "Novel Techniques: Microscale to Nanoscale", New Hampshire, July 20-25th, 2008.
98. "Enhanced Backscattering for tissue characterization and diagnosis", APS/USNC/URSI 2008, San Diego, CA, July 5-11, 2008.
99. "Cancer Screening via Biophotonics: A "Remote Sensing" Approach", Clinical and Translational Research Seminar Series, Robert H. Lurie Comprehensive Cancer Center, Northwestern University, May 2008.
100. "Cancer Screening via Biophotonics: A "Remote Sensing" Approach", FDA, April 2008.
101. "Cancer Screening via Biophotonics: A "Remote Sensing" Approach", University of Chicago, Department of Chemistry Seminar, April 2008.
102. "Low-Coherence Enhanced Backscattering as a colon cancer screening technology", Midwest Biomedical Engineering Conference (MBEC), Chicago, IL, April 4, 2008.
103. "Rectal Coherent Backscattering Spectroscopy to screen for colon cancer", Invited talk, American Institute for Medical and Biological Engineering (AIMBE) 17th. Annual Event, Washington D.C, February 20-22, 2008.
104. "Single-cell partial-wave spectroscopic microscopy: early detection of cancer", Invited talk, SPIE - Photonics West, Symposium on Biomedical Optics, 2008, San Jose, CA, January 18-24, 2008.
105. "Cellular and Tissue Optical Measurements for the Detection of Colorectal Cancer – Does the Field Effect Exist", Biomedical Imaging Research Opportunities Workshop, North Bethesda, Maryland, January 18, 2008.
106. "Detecting alterations in tissue nanoarchitecture with optical imaging: implications for cancer screening", Chicago Biomedical Consortium, Chicago, IL, November 9, 2007.
107. "Analysis of nanoarchitecture of buccal epithelium for lung cancer screening", 15th EDNRN Steering Committee Meeting, Ann Arbor, Michigan, September 17-19, 2007.
108. "Low coherence Enhanced Backscattering", EMBS Annual Meeting, Lyon, France, August 2007.

109. "Partial wave microscopy: seeing beyond histopathology", Clinical Pathology Meeting, Rosemont, IL, June 9-10, 2007.
110. "Preneoplasia: Predicting the Behavior of the Early Lesion", The Educational Session, Annual Meeting of the American Association for Cancer Research, Los Angeles, CA, April 14, 2007.
111. Low-coherence Enhanced Backscattering: characteristics and applications for colon cancer screening", SPIE - Photonics West, Symposium on Biomedical Optics, San Jose, CA, January 20-25, 2007
112. "Utilizing the field effect for cancer screening", Northwestern University Cancer Center Board Meeting, Chicago, IL, November 2, 2006.
113. "Single cell partial wave spectroscopy: understanding alterations of intracellular nanoarchitecture in cancer", Invited Talk, Annual Meeting of the Optical Society of America: Frontiers in Optics, Rochester, NY, October 8-12, 2006.
114. "Biophotonics Techniques in Detection of Early Colon Precancer: Using Colonic Cells as Reporters of Carcinogenesis", NCI and DCTD Cancer Imaging Program Workshop on Imaging Science Development for Cancer Prevention and Preemption, Gaithersburg, MD, July 9-11, 2006.
115. "Low-coherence enhanced backscattering for biomedical applications", Optical Society of America Summer Topical Meeting on Coherent Optical Technologies and Applications (COTA), Whistler, British Columbia, Canada, June 28-30, 2006.
116. "Screening for Pancreatic Cancer", 2nd Annual Dinner of Alexander H. Steinkoler Foundation for Pancreatic Cancer Research, New York, NY, May 10, 2006.
117. "Biophotonics for Cancer Screening: Can Star Trek-like Diagnostics Become a Reality?", Northwestern University Alumni Association, May 3, 2006.
118. "Enhanced Light Backscattering for Non-invasive Early Detection of Colon and Pancreatic Cancer", Oncology Imaging Symposium, Chicago, April 19, 2006.
119. "Enhanced Backscattering Spectroscopy", Photomedicine Lecture Series, Wellman Center for Photomedicine, Massachusetts General Hospital, Boston, MA, November 2005.
120. "Detecting Pre-neoplastic Events in Colon Carcinogenesis with Optical Spectroscopy", NCI-NTROI Workshop, November 2005.
121. "Noninvasive Screening for Colon Cancer Without Colonoscopy", Mornings at McCormick Lecture Series, November 2005.
122. "Enhanced backscattering of light reveals the initial events in colon carcinogenesis", 27th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Pre-conference workshop on Biomolecular Photonics and Imaging, Shanghai, China, September 2005.
123. "Detecting Pre-Neoplastic Events in Colon Carcinogenesis by Means of Low-coherence Enhanced Backscattering Spectroscopy", Engineering Conferences International, Advances in Optics for Biotechnology, Medicine and Surgery, Copper Mountain, Colorado, July 2005.

124. "Intrinsic Sources of Optical Contrast are Better Than Extrinsic Sources for In Vivo Biomedical Applications", Debate partner, Engineering Conferences International, Advances in Optics for Biotechnology, Medicine and Surgery, Copper Mountain, Colorado, July 2005.
125. "Imaging of Early Cancer", Abbott, Inc., July 13, 2005.
126. "Detecting Invisible Precursors of Cancer with Scattered Light", Biomedical Engineering Seminar, University of Illinois, Urbana-Champaign, April 2005.
127. "Detecting Invisible Precursors of Cancer with Low-coherent Backscattering Spectroscopy", Biomedical Engineering Seminar, Tufts University, March 2005.
128. "Coherent Backscattering Spectroscopy: A new Technique for Tissue Diagnosis", Biomedical Engineering Seminar, Duke University, March 2005.
129. "Understanding Pre-Neoplastic Events in Colon Carcinogenesis Using Elastic Light Scattering", Biomedical Engineering and Electrical Engineering Colloquium, Boston University, February 2005.
130. "Early Detection, Diagnosis, and Therapy of Cancer", Keynote Presentation, BIOS Hot Topics Session, BIOS Symposium at Photonics West, January 22, 2005.
131. "Detecting Invisible Precursors of Cancer with Scattered Light", Illinois Microscopy Society, Chicago, IL, November 19, 2004.
132. "Understanding Pre-Neoplastic Events in Colon Carcinogenesis Using Light Scattering", Biomedical Engineering Seminar, University of Arizona, November 2004.
133. "Coherent Backscattering Spectroscopy: A new Technique for Tissue Diagnosis", BMES 2004 Annual Meeting, Philadelphia, PA, October 13-16, 2004.
134. "Detection of Pre-Dysplastic Stages of Colon Carcinogenesis Using Elastic Light Scattering Fingerprinting", Fourth Inter-Institute Workshop on Optical Diagnostic Imaging from Bench to Bedside at the National Institutes of Health, September 20-22, 2004.
135. "Coherent Backscattering Spectroscopy: A New Technique for Tissue Diagnosis", IEEE/EMBS Conference, San Francisco, CA, September 1-4, 2004.
136. "Detection of Pre-Dysplastic Stages of Colon Carcinogenesis Using Elastic Light Scattering Fingerprinting", NSF/NIH/NASA Image-Guided Interventions (IGI) for Medical Applications Workshop, Bethesda, MD, May 13-14, 2004.
137. "Increased Mucosal Blood Supply is an Early Preneoplastic Marker in Colon Neoplasia", Distinguished Abstract, Plenary Session, Digestive Disease Week (The American Gastroenterological Association), Orlando, May, 2004.
138. "Detection of Pre-Dysplastic Stages of Experimental Colon Carcinogenesis Using Light Scattering Fingerprinting", Preventive GI Oncology Conference, Northbrook, IL, October 25, 2003.
139. "Diagnosis of the Earliest Stages of Colon Carcinogenesis Using Light Scattering "Fingerprinting", Biological Sciences Seminar Series, Harvard School of Public Health, Boston, MA, September 2, 2003.

140. "Light Scattering Spectroscopy and Imaging of the Initial Stages of Carcinogenesis", CUBIC, Chicago, IL, March 7, 2003.
141. "How to Cheat the Diffraction Limit: Far-Field Measurement of Nanometer Structures", Spectroscopy at Nanoscale Seminar, Massachusetts Institute of Technology, Cambridge, MA, January 27, 2003.
142. "Spectroscopic Optical Imaging", BMES Annual Meeting, Houston, TX, October, 2002.
143. "Light Scattering Spectroscopy and Its Potential Applications in Clinical Medicine", Illinois Innovation Initiative, West Chicago, IL, December 14, 2001.
144. "Optical Spectroscopic Imaging: From Structural Analysis to Early Cancer Detection", Technology Update, Evanston, IL, December 6, 2001.
145. "Functional Imaging of Tissue Morphology with Light Scattering Spectroscopy". Invited Speaker, American Physical Society Annual Meeting, Seattle, Washington, March 2001.
146. "Biomedical Imaging with Light Scattering Spectroscopy: a New Tool for Early Cancer Detection", Invited Speaker, Biomedical Engineering Seminar Series, Northwestern University, February 2001.
147. "Functional Imaging of Early Cancer with Light Scattering Spectroscopy", BIOS 2001, Photonics West, SPIE Conference, San Jose, CA, January 2001.
148. "Functional Biomedical Imaging with Scattered Light". Invited Speaker, Modern Optics and Spectroscopy Seminar Series, Massachusetts Institute of Technology, Cambridge, Massachusetts, September 2000.
149. "Functional Imaging with Polarized Light Scattering Spectroscopy". Invited Speaker, Optical Imaging Festival, Massachusetts Institute of Technology, Cambridge, Massachusetts, March 2000.
150. "Early Detection of Precancer Using Polarized Light Scattering Spectroscopy", Invited Speaker, Press Conference at American Physical Society Meeting, Minneapolis, Minnesota, March 2000.
151. "Fourier Transform Reflectance Spectroscopy for Non-invasive Diagnosis of Dysplasia". Harvard-MIT Biomedical Engineering Seminar Series, Cambridge, Massachusetts, February 1998.
152. "Fourier Transform Reflectance Spectroscopy: A New Method of Dysplasia Diagnosis". Invited Speaker, Lester Wolfe Workshop on Biomedical Optics, Cambridge, Massachusetts, March 1997.
153. "Determination of Polarization of Vacuum-Ultraviolet Radiation by Fluorescence and Probe-Beam Techniques". Invited Speaker, International Workshop on Solar Polarization, St. Petersburg, Russia, 1995.

PROFESSIONAL AND UNIVERSITY SERVICE

Symposia Organization:

Conference Organizer & Chair, Annual Symposium on Physical Genomics, Chicago, IL, April 2024.

Conference Organizer & Chair, Telluride Workshop on Physical Genomics and Transcriptional Engineering, Telluride, CO, February, 2024.

Conference Chair, Biomedical Applications of Light Scattering XII, SPIE Photonics West, February 2024, San Francisco, CA.

Conference Organizer & Chair, Annual Symposium on Physical Genomics, Chicago, IL, April 2023.

Conference Organizer & Chair, Telluride Workshop on Physical Genomics and Transcriptional Engineering, Telluride, CO, February, 2023.

Conference Chair, Biomedical Applications of Light Scattering XII, SPIE Photonics West, February 2023, San Francisco, CA.

Organizer, The Monthly Seminar on Physical Genomics (remote, monthly), 2023

Conference Organizer & Chair, Annual Symposium on Physical Genomics (Virtual), April 2022.

Conference Organizer & Chair, Telluride Workshop on Physical Genomics and Transcriptional Engineering, Telluride, CO, February, 2022.

Conference Chair, Biomedical Applications of Light Scattering XII, SPIE Photonics West, February 2022, San Francisco, CA.

Conference Organizer & Chair, Annual Symposium on Physical Genomics (Virtual), May 2021.

Conference Organizer & Chair, Telluride Workshop on Physical Genomics and Transcriptional Engineering, Telluride, CO, February, 2021.

Conference Chair, Biomedical Applications of Light Scattering XI, SPIE Photonics West, January 2021, San Francisco, CA.

Conference Organizer & Chair, Telluride Workshop on Physical Genomics and Transcriptional Engineering, Telluride, CO, February 24- 28, 2020.

Conference Chair, Biomedical Applications of Light Scattering X, SPIE Photonics West, February 1-2, 2020, San Francisco, CA.

Program Committee, Imaging, Manipulation & Analysis of Biomolecules, Cells & Tissues XVIII, SPIE Photonics West, February 3, 2020, San Francisco, CA.

Organizer and Chair, First Annual Symposium on Physical Genomics, Northwestern University, May 31, 2019.

Conference Organizer & Chair, Telluride Workshop on Physical Genomics and Transcriptional Engineering, Telluride, CO, February 25- March 1, 2019.

Conference Chair, Biophotonics, Biology and Biophysics: Convergence (B3C) II, Photonics West, San Francisco, California, February 2019.

Conference Chair, H Foundation Basic Science Symposium: The Physics of Cancer Epigenetics, Northwestern University, Chicago, IL, April 20, 2018

Conference Chair, Biophotonics, Biology and Biophysics: Convergence (B3C) II, Photonics West, San Francisco, California, January 2018.

Conference Chair, Biophotonics, Biology and Biophysics: Convergence (B3C) II, Photonics West, San Francisco, California, February 2017.

Panel Leader, Optical Nanoscale Imaging: Unraveling the Chromatin Structure-Function Relationship, AAAS Annual Meeting, Boston, MA, February 2017.

Program Committee, 5th International Conference on Photonics, Optics and Laser Technology, Porto, Portugal, February 2017.

Advisory Board, Point of Care Diagnostics World Congress, San Diego, CA, September 2016.

Program Committee, OSA Biomedical Optics Congress, Hollywood, FL, April 2016.

Conference Chair, Biophotonics, Biology and Biophysics: Convergence (B3C), Photonics West, San Francisco, California, February, 2016.

Advisory Board, Point of Care Diagnostics World Congress, San Diego, CA, September 2015.

Conference Chair, Biomedical Applications of Light Scattering IX, Photonics West, San Francisco, California, February, 2015.

Advisory Board, Point of Care Diagnostics World Congress, San Diego, CA, September 2014.

General Chair, Biomedical Optics Congress, Miami, FL, May 2014.

Conference Chair, Biomedical Applications of Light Scattering VII, Photonics West, San Francisco, California, February, 2014.

Conference Chair, Biomedical Applications of Light Scattering VI, Photonics West, San Francisco, California, January, 2013.

Organizer, Colorectal Cancer Screening Working Group, Orlando, March 2012.

Program Chair, Optical Spectroscopy, OSA BIOMED, Miami, FL, April 29-May 2, 2012.

Co-Chair, Early Cancer Detection, World Molecular Imaging Congress (WMIC), San Diego, CA, September 7-10, 2011.

Program Committee, ECI Advances in Optics for Biotechnology, Medicine and Surgery XII, Chair for Clinical Optical Imaging and Spectroscopy session, Naples, Florida, June 5-8, 2011.

Conference Chair, Biomedical Applications of Light Scattering V, Photonics West, San Francisco, California, January, 2012.

Conference Chair, Biomedical Applications of Light Scattering IV, Photonics West, San Francisco, California, January, 2011.

Conference Chair, Biomedical Applications of Light Scattering III, Photonics West, San Francisco, California, January, 2010.

Program Committee, Bio-Optics in Clinical Application, OSA Biomed Topical Meeting, Miami, April 11-15, 2010.

Mini-symposium on Ultra-sensitive Biomedical Sensing Technologies, IEEE-EMBS Annual Meeting, Minneapolis, September 2-6, 2009.

Program Committee, Novel Optical Instrumentation for Biomedical Applications Subconference at the European Conference on Biomedical Optics, Munich, June 2009.

Conference Chair, Biomedical Applications of Light Scattering III, Photonics West, San Jose, California, January, 2009.

Conference Chair, Biomedical Applications of Light Scattering II, Photonics West, San Jose, California, January, 2008.

Program Committee, LEOS Annual Meeting, Florida, October 24, 2007.

Conference Chair, Biomedical Applications of Light Scattering I, Photonics West, San Jose, California, January 20-25, 2007.

Committee Member, LEOS Annual Meeting, Montreal, QC, Canada, October 29 – November 2, 2006.

Program Committee for the Optical Society of America Biomedical Optics Meeting: Optical Spectroscopic Imaging & Diagnostics, April, 2006.

Program Committee for Biophotonics, Lasers and Electro-Optics Society (LEOS) Annual Meeting, Montreal, Canada, October-November, 2006.
Chair, Subcommittee for Medical and Biological Applications, CLEO 2006.
Technical Program Committee for Medical and Biological Applications, CLEO, Baltimore, MD, May 23-27, 2005.

Session Chair:

Genomes & AI: From Packing to Regulation, Singapore, October 2, 2019.
Optogenetics, Opto-Immunology, and Opto-Oncology, SPIE Photonics West, San Francisco, CA, February 2, 2019.
Quantitative Spectroscopy and Optical Coherence Microscopy, SPIE Photonics West, San Francisco, CA, February 2, 2019.
New Technologies in Medical Diagnostics, Biophysics, Biology and Biophotonics III: the Crossroads, Photonics West, San Francisco, California February, 2018.
Theory I, Biomedical Applications of Light Scattering VIII, Photonics West, San Francisco, California, February, 2015.
Spectroscopy of Elastic Light Scattering, Biomedical Optics and 3D Imaging, Miami FL, USA, May 2, 2012.
Clinical optical imaging & spectroscopy: Approaching the clinic, Advances in Optics for Biotechnology, Medicine and Surgery XII, An ECI Conference Series, Naples, FL, June 5-8, 2011.
Nanoscale Measurements, Biomedical Applications of Light Scattering IV, Photonics West, San Francisco, California, January, 2010.
Enhanced Backscattering, Biomedical Applications of Light Scattering IV, Photonics West, San Francisco, California, January, 2010.
Recent Advances in Translational Biophotonics and Nanophotonic Imaging Technologies, IEEE-EMBS Annual Meeting, Minneapolis, September 2-6, 2009.
Numerical Simulation Studies, Biomedical Applications of Light Scattering III, Photonics West, San Jose, California, January, 2009.
In Vitro Applications, Biomedical Applications of Light Scattering III, Photonics West, San Jose, California, January, 2009.
Spectroscopy of Biomolecular Processes, Frontiers in Optics (FiO)/Laser Science XXIV (LS), Rochester, NY, October 2008.
Biomedical Applications of Light Scattering, Photonics West, San Jose, California, 2007.
Spectroscopic Signatures, OSA Annual Meeting, 2006.
Molecular and Cellular Sensing, CLEO, 2006.
Scattering and Absorption, CLEO, 2006.
Biomedical Optics: Living on the Edge, CLEO, 2006.
Light Scattering Spectroscopy and Imaging, CLEO, May 23-27, 2005.
Tissue Optical Diagnostics, BMES 2004, October 16, 2004.
Diffuse Optical Tomography and Spectroscopy, Frontiers in Optics/Laser Science XIX Conference, October 5 - 9, 2003.

Editorial Service:

Associate Editor, *Science Advances* (2017 - present)

Editor, *IEEE Journal of Selected Topics in Quantum Electronics - Issue on Biophotonics* (2019)
 Associate Editor, *Biomedical Optics Express* (2012)
 Editor, *Fundamentals of Biophotonics*, CRC Press (2018).
 Editor, *Biomedical Applications of Light Scattering*, McGraw Hill Publishing (2009).
 Honorary editorial board, *Reports in Medical Imaging* (2009).
 Guest Editor, *IEEE Journal of Selected Topics in Quantum Electronics*, Special Issue on Biophotonics (2007).
 Guest Editor, *Disease Markers*, Special Issue on Spectroscopic Markers (2006).
 Guest Editor, *Journal of Biomedical Optics* (2005).

Grant Review:

Chartered Member of NIH Instrumentation and Systems Development (ISD) Study Section (2018 – 2022)
 Chartered Member of NIH Biomedical Imaging Technology (BMIT) Study Section (2010 – 2014)

Other Grant Review:

NSF: CAREER Review Panel, Division of Bioengineering, (October 2021)
 NSF: Biophotonics Panel, CBET (May 2021)
 NSF: STC Site Visit (April 2020)
 NSF: STC Site Visit (October 2018)
 NSF: CAREER Review Panel, Division of Bioengineering, (September 2017)
 NSF: Biophotonics Panel, CBET (January 2015)
 NSF: CAREER Review Panel, Division of Bioengineering, (October 2014)
 NSF: CAREER Review Panel, Division of Bioengineering, (September 2013)
 NSF: Biophotonics Panel, CBET (December 2012)
 NSF: Physical Sciences and Cancer (May 2012)
 NSF: CAREER Review Panel, Division of Bioengineering, (October 2011)
 NSF: Biophotonics Review Panel, Division of Bioengineering, (December 2010)
 NSF: CAREER Review Panel, Division of Bioengineering (2010)
 NSF: Interdisciplinary Biocluster Panel, (February 2010)
 NSF: Biophotonics Review Panel, Division of Bioengineering, (December 2009)
 NSF: Biophotonics Review Panel, Division of Bioengineering, (May 2009)
 NSF: Biophotonics Review Panel, Division of Bioengineering, (Fall 2008)
 NSF: Biophotonics Review Panel, Division of Bioengineering, (Spring 2008)
 NSF: CAREER Review Panel, Division of Bioengineering (2007)
 NSF: Biophotonics Review Panel, Division of Bioengineering (2007)
 NSF: Biophotonics Review Panel, Division of Bioengineering (2006)
 NSF: Biomedical Imaging/Optical SBIR/STTR panel (2006)
 NSF: Biophotonics Review Panel, Division of Bioengineering (2005)
 NSF: CAREER Review Panel, Division of Bioengineering (2005)
 NSF: Biophotonics Review Panel, Division of Bioengineering (2004)
 NSF: CAREER Review Panel, Division of Bioengineering (2004)
 NSF: Nanotechnology Review Panel (2003)
 NSF: CAREER Review Panel, Division of Bioengineering (2003)
 NIH: BST Review Panel (June 2022)

NIH: P41 Site Visit (November 2021)
 NIH: Pioneer Award Review (April 2021)
 NIH: P01 Review (June 2020)
 NIH: Instrumentation and Systems Development (ISD) Study Section (June 2021)
 NIH: Instrumentation and Systems Development (ISD) Study Section (February 2021)
 NIH: Instrumentation and Systems Development (ISD) Study Section (October 2020)
 NIH: Instrumentation and Systems Development (ISD) Study Section (February 2020)
 NIH: Instrumentation and Systems Development (ISD) Study Section (October 2019)
 NIH: Instrumentation and Systems Development (ISD) Study Section (June 2019)
 NIH: Instrumentation and Systems Development (ISD) Study Section (October 2018)
 NIH: NCI Provocative Questions Review (October 2018)
 NIH: NCI Provocative Questions Review (November 2020)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (February 2018)
 NIH: Instrumentation and Systems Development (ISD) Study Section (February 2018)
 NIH: Instrumentation and Systems Development (ISD) Study Section (October 2017)
 NIH: Instrumentation and Systems Development (ISD) Study Section (June 2017)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (September 2016)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (February 2016)
 NIH: Chair, PS-OC U01 Study Section (July 2015)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (February 2014)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (June 2013)
 NIH: P41 Site Visit (November 2012)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (October 2012)
 NIH: Clinical and Translational Imaging Applications Study Section (June 2012)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (February 2012)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (October 2011)
 NIH: Advanced In Vivo Imaging to Understand Cancer Systems (NCI) (June 2011)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (February 2011)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (October 2010)
 NIH: Bioengineering Research Partnership (BRP) (June 22, 2010)
 NIH: RC4 and T-R01 Panels (April-May 2010)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (October 2009)
 NIH: Novel Imaging Study Section (SBIB-J) (June 2009)
 NIH: Challenge Grants Review (May 2009)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (October 2008)
 NIH: Quick Trials Study Section (October 2008)
 NIH: Novel Imaging Study Section (SBIB-J) (June 2008)
 NIH: Cellular and Molecular Imaging Centers (November 2007)
 NIH: Novel Imaging Study Section (SBIB-J) (October 2007)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (September 2007)
 NIH: Training grants (July 2007)
 NIH: Novel Imaging Study Section (SBIB-J) (June 2007)
 NIH: Study Section SBIB-P(02) (June 2007)
 NIH: Novel Imaging Study Section (SBIB-J) (March 2006)
 NIH: Novel Imaging Study Section (SBIB-J-1) (February and November 2006)

NIH: Biomedical Imaging Technology (BMIT) Study Section (February and October 2006)
 NIH: Novel Imaging Study Section (SBIB-J-1) (2005)
 NIH: Centers of Cancer Nanotechnology Excellence (CCNEs) Special Emphasis Study Section (2005)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (2005)
 NIH: SBIB Study Section (2005)
 NIH: Diagnostic Imaging (DMG) Study Section (2004)
 NIH: Biomedical Imaging Technology (BMIT) Study Section (2004)
 NIH: Sciences Special Study Section, National Institute of General Medical (2004)
 The Indiana 21st Century Research and Technology Fund (2009)
 Science Foundation Ireland
 Cancer Research UK (UK)
 The Wellcome Trust (UK): Molecular and Cell Biology Scientific Programme
 Association for International Cancer Research (UK)
 University of North Texas Excellence Fund
 CCSG Program, Northwestern University
 NUCATS, Northwestern University
 The Technology Foundation STW, Netherlands Organization for Scientific Research, NWO, and the Dutch Ministry of Economic Affairs

Book Peer-review:

Physiology for Engineering Students (Joseph Feher, Elsevier)
 Femtosecond Biomedical Optics (Cambridge University Press)
 Encyclopedia of Medical Devices and Instrumentation (John Webster, ed., Wiley, Inc.)

Journal Peer-review:

Nature Nanotechnology, Nature Medicine, Nature Materials, PNAS, Optics Letters, Applied Optics, Journal of Biomedical Optics, Journal of Physics D: Applied Physics, Journal of Optical Society of America, Journal of Optics A: Pure and Applied Optics, Biotechnology Progress, Physics in Medicine and Biology, Lasers in Surgery and Medicine, Optics Express, Technology in Cancer Research and Treatment, Journal of Orthopaedic Research, Review of Scientific Instruments, TPDSci: Journal on selected Topics of Particle and Dispersion Science.

Professional Societies:

Optica, American Physical Society, International Society for Optical Engineering, American Institute for Medical and Biological Engineering (AIMBE), Biomedical Engineering Society (BMES)

Professional Membership:

Associate Member, Network for Translational Research (NTR) (2009-present)
 National Institutes of Health Early Detection Research Network (2004-present)
 Network for Translational Research Optical Imaging (NTROI): Optical Spectroscopy for Management of Cancer Treatment (2004-2009)

Board Membership and Other Professional Service:

Telluride Science Research Center, Member of the Board (2021 – present)
The Steinkoler Pancreatic Cancer Foundation, Member of the Board (2008-present)
AIMBE Advocacy Committee (2010-present)

Consulting:

Johnson & Johnson, Inc.
Morningside Evaluations and Consulting
Round Table Group
Guidepoint Global Advisors

Northwestern University Service:

Promotion and Tenure Committee, McCormick School of Engineering and Applied Sciences (2010-present)
Biomedical Engineering Graduate Committee (2010-present)
One Northwestern Committee (2007)
Representative of McCormick School of Engineering and Applied Sciences, Admission Committee, Honors Program in Medical Education (2004-2006)
Chair of the Graduate Program Committee (2006-present)
Graduate Program Committee (2005-2006)
Programming Team, Proteomics and Nanobiotechnology Facility (2005-present)
Biomedical Engineering Department-Electrical and Computer Engineering Department Faculty Search Committee (2005)
Academic Standing Committee (2002-2004)

TEACHING

BME 302/402: Systems Physiology: Cardiovascular and Respiratory Physiology.
BME 333: Modern Optical Microscopy (new course, first offered in fall, 2001).
BME 495: Advanced Physical and Applied Optics (new course, first offered in spring, 2002).

POSTDOCTORAL FELLOW AND STUDENT SUPERVISION**Postdoctoral Fellow Supervision:**

Young Kim (2005-2007), currently Professor, Biomedical Engineering Department, Purdue University.
Xu Li, Ph.D. (2003-2005), after graduation became tenure-track Assistant Professor, Biomedical Engineering Department and Electrical and Computer Engineering Department, Northwestern University.
Kun Chen, Ph.D. (2002-2004), currently Professor at Shanghai Institute of Optics and Fine Mechanics, Shanghai, China.
Snow Tseng, Ph.D. (2005), currently Professor at Taiwan University.
Jianmin Gong, Ph.D. (2003-2005)
Soon-Cheol Kong, Ph.D. (2007-2009)
Alexander Heifetz (2005-2008), Research Scientist, Argonne National Laboratory
Prabhakar Pradhan (2005-2013), currently Professor at University of Memphis

Jeremy Rogers (2007-2013), currently Assistant Professor at University of Wisconsin-Madison
 Ilker Capoglu (2007-2012), currently Sensor Performance Modeling Engineer at Cruise
 Hariharan Subramanian (2009-2012), currently Research Assistant Professor at Northwestern University
 Vladimir M. Turzhitsky (2009-2010), currently Director of Data Science and Outcomes Research at Merck
 Seungmoo Yang (2009-2012)
 Teng Meng Tan (2011-2012), currently Electrical Engineer at University of Calgary
 Andrew Gomes (2013), currently Medical Writer at Ashfield Healthcare Communications
 Ji Yi (2013-2015), currently Assistant Professor, Biomedical Engineering Department, Johns Hopkins University
 Yolanda Stypula (2014-2015), currently Senior Scientist at Promega
 Qin Miao (2014-2015)
 Andrew Radosevich (2014-2015), currently Principal Scientist II at AbbVie
 Sebastian Thompson (2014-2016), currently Assistant Research Professor at IMDEA Nanociencia
 Lusik Cherkezzyan (2014-2018), currently Senior Scientist at GE Healthcare
 Greta Wodarczyk (2018 – 2019), currently Director, Program Management, Cour Pharmaceuticals
 Yue Li (2019 – 2020), currently Data Scientist at JPMorgan & Chase Co.
 Adam Eshein (2019 – 2020), currently Senior Medical Device Engineer at Dexcom
 Surbhi Jain (2020 – 2021), currently Scientist – Cell Engineering at Sana Biotechnology
 Sunil Gaire (2020 – 2022)
 Ali Daneshkhah (2020 – present)
 Cody Dunton (2020 – present)
 Geng Wang (2023 – present)

Clinical Fellows Training:

Vani Konda, M.D., University of Chicago Medical School (2008-2015)
 Lual Almassalha, MD, PhD, Feinberg Medical School, Northwestern University

Visiting Scientists

Yuki Shono, Olympus Corporation (2011-2013)
 Yoko Horino, Olympus Corporation (2013)

Graduate Student Supervision:

Young Kim (Ph.D., 2005), currently Professor, Biomedical Engineering Department, Purdue University.
 Yang Liu (Ph.D., 2006), currently Professor, University of Pittsburgh
 Shiv Tumkur (M.S., 2003)
 Amit Sharma (M.S., 2004)
 Michael Siegel (M.S., 2005)
 Zhigang Chen (Ph.D., 2005)
 Bo Liu (M.S., 2007)

Hariharan Subramanian (Ph.D., 2009), currently Research Assistant Professor at Northwestern University
 Vladimir M. Turzhitsky (Ph.D., 2009), currently Instructor at Harvard University
 Valentina Stoyneva (M.S., 2012)
 Wendy Yip (Ph.D., 2012), currently Data Scientist at The Data Incubator
 Charles Maneval (M.S., 2013), currently Research & Test Engineer at SpineFrontier
 Andrew Gomes (Ph.D., 2013), currently Medical Writer at Ashfield Healthcare Communications
 Nikhil Mutyal (Ph.D., 2013), currently Lifesciences Business Development Specialist at AVEO Oncology
 Ji Yi (Ph.D., 2013), currently Assistant Professor, Biomedical Engineering Department, Johns Hopkins University
 Dhwanil P. Damania (M.S., 2009; Ph.D., 2013), currently R&D Biomedical Engineer at Vital Connect, Inc.
 Lusik Cherkezyan (Ph.D., 2014), currently Senior Scientist at GE Healthcare
 Yolanda Stypula (Ph.D., 2014), currently Senior Research Scientist at Promega
 Andrew Radosovich (Ph.D., 2014), currently Principal Scientist II at AbbVie
 Sarah K. Ruderman (Ph.D., 2015)
 Ankit Gandhi (M.S., 2015), currently Assay Development Research Associate at T2 Biosystems
 Scott Young (M.S., 2015)
 Taylor Graff (M.S., 2016)
 Alexis Kendra (M.S., 2016)
 Ron Ellis (M.S., 2016)
 Andrew Stawarz (MS, 2017) Currently: Project Manager, Implementation & Delivery, GHX
 Yuting Dou (MS, 2017)
 John Chandler (Ph.D., 2016) Currently: Senior Scientific Software Engineer, Nanosting Technologies
 Di Zhang (Ph.D., 2018) Currently: Senior Software Engineer, MasterCard
 Xiang Zhou (MS, 2018)
 Mary Miller (MS, 2018)
 Luay Almassalha (Ph.D./M.D., 2018)
 Greta Bauer (Wodarczyk) (Ph.D., 2018) Currently: President, Wodarczyk Biotech Consulting
 Wenli Wu (Ph.D., 2019) Currently: Vice President, Goldman Sachs
 Adam Eshein (Ph.D., 2019) Currently: Staff Engineer, Dexcom
 Scott Gladstein (Ph.D., 2019) Currently: Manager, Statistics, AbbVie
 Graham Spicer (Ph.D., 2019) Currently: Scientists, Johns Hopkins Applied Physics Laboratory
 James Winkelmann (Ph.D., 2019) Currently: Chief Technology Officer, Presage Technologies
 Rongrong Liu (Ph.D., 2019) Currently: Imaging Scientist, Apple
 Yue Li (Ph.D., 2019) Currently: Data Scientist, Google
 Aya Eid, (Ph.D., 2021) Currently: Chief Scientist, Presage Technologies
 Anne Shim (Ph.D., 2021) Currently: Chief Data Officer, Focal Biosciences AG

Jonathan Timbrell (MS, 2021)
Ranya Virk (Ph.D., 2022) Currently: Postdoctoral Scholar at UCSF
Ethan Flowerday (MS, 2022)
Vasundhara Agrawal (Ph.D., 2023) Currently: Applications Manager, Spatial Biology
Image Analysis, Leica Microsystems
Emily Pujadas (Ph.D., 2024)
Jane Frederick (Ph.D., 2024)
Yuanzhe Su (Ph.D., expected 2025)
Andrew Chang (Ph.D., expected 2025)
Wing Shun Li (Ph.D., expected 2025)
Ruyi Gong (Ph.D., expected 2025)
Lucas Carter (Ph.D., expected 2026)
Nicolas Acosta (Ph.D., expected 2027)
Tiffany Kuo (Ph.D., expected 2027)
Karla Medina (Ph.D., expected 2027)
Rachel Ye (Ph.D., expected 2028)
Paola Carrillo Gonzalez (Ph.D., expected 2028)
John Carinato (Ph.D., expected 2028)
Rivaan Kakkaramadam (Ph.D., expected 2028)

NIH T32 Physical Genomics Training Program Participants

2021

Lucas Carter
Raymond Fang
Jorin Graham
Sam Hamilton
Sophia Lamperis
Sara Radecki

2022

Lucas Carter
Raymond Fang
Sophia Lamperis
Karla Medina
Tiffany Kuo
Esther Yoon

2023

Nicholas Bodkin
John Carinato
Paola Carrillo-Gonzalez
Delan Hao
Tiffany Kuo
Karla Medina
Katy Trampel
Esther Yoon

2024

Nicholas Bodkin
Madeline Masengarb
Paola Carrillo-Gonzalez
Delan Hao
Tiffany Kuo
Karla Medina
Abhi Ramakrishnan
Esther Yoon

NSF Research Experience and Mentorship Program Participants

2021

Jaleisha Valez-Velasquez
Paola Carrillo Gonzalez
Erica Albrigo
David Henry
Griffin Johnson
Melissa Rosales

2022

Irenosen Aboiralor
Sarah Alfaqih
Delan Xingyue Hao
Vanessa Huitron
Amber Rojas
Goravjit Saluja

Undergraduate Student Supervision:

Undergraduate Research Assistants:

Tina Amirtha, Daniel Saddawi-Konefka, Shawn Liu, Max Choi, Tarak Shah, Lawrence Chang, Hyung-Joo Yoon, Kenneth Liu, Thomas Kluz, Parmede Vakil, Robin Brusen, Catherine Cheng, Min Kim, Josphan Young, David Raslau, Vladimir Turzhitsky, Min Kim, Kevin Huang, Nikhil Mutyal (visiting pre-doctoral fellow), Soumya Bonthu, Nicholas Deep, Jay Hoogheem, Munira Karim, David Magill, James Spadaro III, Daniel Balikov, Antonio Roy Webb, Michael J Yung, Shivaprasad Daram, N. Rishall, Vishal S. Parikh, Aditya K. Thasan, Arun Ahuja, Andrew Radosevich, Sameer Maheshwari, Todd McCullough, Aditya Gupta, Vivek Patel, Samantha Strasser, Curie Chang, Yuanija Zhu, Dennis Blurer, Craig White, Daniel Park, Rohit Subramanian, Akhilendra Vohra, Charles Hwang, Johny Sun, Alfredo Osorio, Frank Cummins, Taylor Lee, Benjamin Tiano, Elizabeth Horcher, Varun Gupta, Arpa Mukherjee, Zita Hubler, Casey Blaha, Nick Boffi, Kellie Perkins, Brian Kennedy, Blake Burnstad, Joseph Lee, Anusha Vadlamanu, Molly Bird, Leah Bowen, Billy Frese, Christine Osorio, Michael Chen, Katerina Maria Cheronis, Ambuj Bhalla, Kim Hoang, Priyanka Mathur, Shoham Benmelech, Pranav

Bajaj, Avram Bar-Meier. Joshua Lawton, George Esteve, John Carinato, Vinay Durbhakula, Anika Gupta, Claudia Arriaga, Samantha Niemi.

Thesis Committee:

Young Kim (Ph.D., 2005), Zhigang Chen (Ph.D., 2005), Yang Liu (Ph.D., 2006), Vladimir M. Turzhitsky (M.S., 2006), Abhishek Mathur (Ph.D., 2007), Michael Siegel (M.S., 2005), Snow Tseng (Ph.D., 2005), Marissa Darmoc (M.S., 2005), Wendy Yip (Ph.D., 2012), Olga Lyandres (Ph.D.), Ke Ma (Ph.D., 2013), Kvar Black (Ph.D., 2012), German Picasso (Ph.D., 2014), Wenzhong Liu (Ph.D., 2017), Sean Allen (Ph.D., 2018), Joshua Moeller (Ph.D., 2020), Maalavika Pillai (Ph.D. expected 2027), Binjie Li (Ph.D. expected 2027).

SELECTED MEDIA COVERAGE

Title: Predicting the Risk of Cancer with Computational Electrodynamics
Source: Argonne National Laboratory
Posted: August 8, 2019

Title: Janet Lee Interviews Dr. Vadim Backman
Source: Conversations About Change Podcast
Posted: July 18, 2019

Title: Center for Physical Genomics and Engineering Launches
Source: Northwestern University News
Posted: June 4, 2019

Title: New Imaging Technique Reveals ‘Burst’ of Activity Before Cell Death
Source: Northwestern University News
Posted: April 11, 2019

Title: New Technology Gives Unprecedented Look Inside Capillaries
Source: Northwestern University News
Posted: January 23, 2019

Title: Racing Against Cancer: New Efforts to Save Lives with Early Detection
Source: Chicago Tribune
Posted: May 21, 2018

Title: Scientists Target Cancer’s ‘Achilles Heel’ to Stop Therapy Resistance
Source: WTTW – Chicago Tonight (Television Broadcast)
Posted: November 9, 2017

Title: New DNA Imaging Technique Breaches 10-Nanometer Resolution Threshold, Becomes First To See DNA “Blink”.
Source: International Business Times
Posted: February 20, 2017

Title: Enhancing Molecular Imaging with Light
Source: Science Daily
Posted: July 25, 2016

Title: Six New Medical Technologies Worth Watching
Source: Wall Street Journal
Posted: June 27, 2016

Title: Using Data to Protect Coral Reefs from Climate Change
Source: Science Daily
Posted: April 13, 2016

Title: Metastatic Cells Colonize Implantable Scaffold in Mice
Source: Oxford University Press Blog
Posted: February 2, 2016

Title: Prognosis: Proportionate Response
Source: Nature
Posted: December 15, 2015

Title: New Technique Might Identify Dangerous Prostate Cancers
Source: Chicago Sun-Times
Posted: April 10, 2015

Title: Nanotechnology Shows Promise for More Accurate Prostate Cancer Screening, Prognosis
Source: Medical Xpress
Posted: March 16, 2015

Title: First Screening Method to Detect Presence of Ovarian Cancer
Source: NSF 'Science Now'
Posted: May 23, 2013

Title: Nanotechnology May Aid Ovarian Cancer Detection
Source: Chicago Tribune
Posted: May 15, 2013

Title: Extra Scrutiny for 'Grandee' Grantees
Source: Nature
Posted: February 20, 2012

Title: Breakthrough in Early Cancer Detection
Source: NSF Science Nation & PBS News Hour
Posted: January 9, 2012

Title: Combined Technologies Offer Promise for Detecting Colon Cancer in Women
Source: NSF News, U.S. News & World Report
Posted: July 20, 2010

Title: New method shines light on pancreatic cancer screening
Source: Chicago Tribune
Posted: February 23, 2009

Title: Shining light on pancreatic cancer
Source: NSF, Year in News, 2007
Posted: August 1, 2007

Title: Lighting up cancer: Experimental test for colon cancer
Program: ABC 7 News, 10:00 pm
Station: ABC
Airdate: April 5, 2006

Subject: New Test for Colon Cancer
Program: CBS News, 5:00 pm
Station: CBS
Airdate: July, 2006

Subject: Colon Testing Made Easier
Program: NBC News, 4:30 pm and 10 pm
Station: NBC
Airdate: June 28, 2006
The story also aired by 180 NBC affiliates.

Title: "Shining a light on colon testing. Cheap, comfortable screening technique."
Newspaper: HealthBeat section in Tempo, Chicago Tribune
Publication date: June 13, 2006.

Subject: Colon cancer research
Program: WGN News at Nine
Station: WGN
Airdate: May 19, 2006

Media summary for publication of the development of partial wave spectroscopic (PWS) microscopy and its application for pancreatic cancer diagnosis in *Optics Letters* (February, 2009); NSF News: Feature # 1; *Current*, NSF Monthly News Letter (August 2009); *Chicago Tribune*; over 40 news articles reaching an audience of 1.4 million.

Media summary for publication of pancreatic cancer screening by biophotonics in *Clinical Cancer Research* (August 1, 2007): News National Science Foundation News, Forbes, Scientific American, U.S. News & World Report, WebMD, Los Angeles Daily News, Science Daily, United Press International, CNN, Photonics.com, yahoo.com news.

Media summary for publication of the development of partial wave spectroscopic (PWS) for lung cancer screening in *Cancer Research* (October, 2010): NSF News: Feature # 3 “Cheek Swab May Detect Lung Cancer”, Scientific American, US News & World Report, and multiple other media reports.