BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Terry Onichi Matsunaga	Research Professor of Radiology
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of California at Berkeley	A.B.	06/75	Biochemistry
University of California at San Francisco	Pharm.D.	06/80	Clinical Pharmacy
University of Michigan, Ann Arbor	Residency Certificate	07/81	Clinical Pharmacy Residency
University of California at San Francisco	Ph.D.	01/87	Pharmaceutical Chemistry
University of Arizona	Post-doctoral Fellow	09/92	Peptide Chemistry/Biophysics

A. Personal Statement

My background has encompassed the discovery, basic research, pre-clinical, clinical, and regulatory development of a microbubble approved by the FDA. Furthermore, I have spent over a decade designing and developing targeted microbubble formulations and phase-change contrast agent emulsions for both ultrasound imaging, ultrasound-mediated drug delivery, and vaporization. Over the last seven years, I have been involved with nanodroplet emulsion formulations chemistry and have designed perfluorocarbon/oil droplets for targeted drug delivery. My publication history is significant for having published in the areas of microbubbles, nanodroplets, targeted delivery, ultrasound imaging and ultrasound-mediated drug delivery.

B. Positions and Honors

Positions and Employment

1980 - 1981 Clinical Pharmacy Resident, Dept. of Pharmacy Services, University of Michigan Medical Center, Ann Arbor, MI
1981 - 1986 Graduate Research Assistant, Dept. of Pharmaceutical Chemistry, University of California at San Francisco, San Francisco, CA
1986 - 1992 NIDA Post-Doctoral Research Fellow, Dept. of Chemistry, University of Arizona, Tucson, AZ
1988 - 1991 National Institute on Drug Abuse, Post-Doctoral Fellow, Dept. of Chemistry, University of Arizona, Tucson, AZ
1992 - 1994 Director of Biophysics, Acoustics, External Affairs & New Prod. Dev., ImaRx Pharmaceutical Corp., Tucson, AZ
1996 - 1997 Director of Quality Assurance/Quality Control, ImaRx Pharmaceutical Corp., Tucson, AZ
1997 - 2004 Senior Director of New Product Chemistry, ImaRx Pharmaceutical Corp., Tucson, AZ
1995 - Development Team, MRX-115. Joint collaboration between ImaRx Pharmaceutical Corp. and DuPont-Merck Pharmaceutical Company
2003 - 2007 Vice President for Research, ImaRx Therapeutics, Tucson, AZ
2007 - Research Professor of Radiology, Dept. of Radiology, University of Arizona, Tucson, AZ
2010 - Chair, Southern Arizona Section, American Chemical Society.

Other Experience and Professional Memberships

1986 - Member, American Chemical Society

1993 -	National Institute on Drug Abuse, Special Review Committee, Small Business Innovation Research, Initial Review Group
1994 -	National Institutes of Health, Division of Research Grants, Small Bus. Innovation Res., Review Committee
1997 -	Present U.S. Army Breast and Prostate Cancer Research Study Session, Clinical and Experimental Therapeutics #3
1997 -	National Institutes of Health, Division of Research Grants, Special Ad Hoc Committee, Biological Chemistry & Natural Products Review Committee
2007 - 2009	NIH RAID (Rapid Access to Interventional Discovery) Study Section (Chair)
2010 -	NIH SMARRTT (Science Moving Towards Research Translation and Therapy Study Section (Chair)

Honors

2004	Excellence in Biotechnology Award for Outstanding Achievement in Drug Delivery. Genetic Engineering News.
2006	American Chemical Society Rocky Mountain Regional Industrial Innovation Award.
2011	Louis J. Kettel Faculty Mentor Award in Basic Sciences. University of Arizona

C. Selected Peer-reviewed Publications

Most relevant to the current application

Unger, E.C., Hersh, E., Vannan, M., Matsunaga, T.O., and McCreery, T. Local Drug and Gene Delivery Through Microbubbles. In: *Progress in Cardiovascular Diseases – Contrast Echocardiography*. (S. Kaul, guest editor) 2001;44:45–54.
http://hl2.bgu.ac.il/Users/www/15621/Local%20drug%20and%20gene%20delivery%20through%20microbubbles.pdf

Dayton, PA, Pearson, P., Clark, J, Simon, SI, Schumann, P, Zutshi, R, Matsunaga, TO, and Ferrara, KW. Ultrasonic analysis of peptide- and antibody-targeted microbubble contrast agents for molecular imaging of alpha-v beta-3 expressing cells. *Molecular Imaging* 2004;3:125-34. PMCID2481513

Shortencarier, MJ, Dayton, PA, Bloch, SH, Schumann, PA, Matsunaga, TO, Ferrara, KW. A method for radiation-force localized drug delivery using gas-filled lipospheres. *IEEE Transactions on Ultrasonics Ferroelectrics & Frequency Control.* 2004:822-31. PMCID15301001

Dayton, P.A. and Matsunaga, T.O. Ultrasound-Mediated Therapies Using Oil and Perfluorocarbon-filled Nanodroplets. In: *Drug Development Research* (Moos, W.H. and Barry, S.E. eds) Wiley-Liss, Inc. Publication, Hoboken, N.J. 20006;67:42–46.
http://www3.interscience.wiley.com/cgi-bin/fulltext/112610225/PDFSTART

Dayton, P, Zhao, S, Bloch, S, Schumann, P, Penrose, K, **Matsunaga, T**, Zutshi, R, Doinikov, A, Ferrara, K Application of ultrasound to selectively localize nanodroplets for targeted imaging and therapy *Molecular Imaging* 2006;5:160–74. PMCID1752274

Dayton, P.A., Zhao, S., Zheng, H., Zutshi, R., Schumann, P., Penrose, K., **Matsunaga, T.O**., and Ferrara, K.W. Acoustic Localization of sub-micron droplets for targeted imaging and therapy. *Proceedings of the 2006 IEEE Ultrasonics Symposium*. 2006;521 – 524. PMCID1752274

Xie, F., Slikkerveer, J. Gao, S., Lof, J., Kamp, O., Unger, E., Radio, S, **Matsunaga, T**., and Porter, T. Coronary and Microvascular Thrombolysis with Guided Diagnostic Ultrasound and Microbubbles in Acute ST Segment Elevation Myocardial Infarction. *J. Am Soc. Echocardiogr.* 2011;12:1400–08.

Lemmon, J.C.M, McFarland, R.J., Rybicka, J.M., Balce, D.R., McKeown, K.R., Krohn, R.M., **Matsunaga**' **T.O**., Yates, R. *In vitro* and *in vivo* transfection of primary phagocytes via microbubble-mediated intraphagosomal sonoporation. *Journal of Immunological Methods.* 2011;371:152–8. PMID: 21693123

Sheeran, P.S., Wong, V.P., McFarland, R.J., Ross, W.D, Feingold, S., **Matsunaga, T.O**., and Dayton, P.A. Decafluorobutane as a phase-change contrast agent for low-energy extravascular ultrasound imaging. *J. Ultr. Med. Biol.* 2011;37:1518-30. PMID 21775409

Sheeran, P.S, Luois, S., Dayton, P.A., and **Matsunaga, T.O**. Formulation and Ultrasound Studies of a New Pro-bubble (Phase-Shift agent) for Activation with Low Acoustic Intensities. *Langmuir* 2011;27:10412 –20. PMID: 21744860

Dayton, P.A., Sheeran, P.S., **Matsunaga, T.O**., and Borden, M.A. Formulation and Ultrasound Studies of a New Pro-Bubble (Phase-Shift Agent) for Activation with Low Acoustic Intensities (2011). U.S. Provisional Patent Serial No. 61/505,915. Filed: July 11, 2011

Banerjee B, McKeown KR, Skovan B, Ogram E, Ingram P, Ignatenko N, Paine-Murrieta G, Witte R, **Matsunaga T**. Ultrasound imaging of the mouse pancreatic duct. SPIE Proceedings 2012; 832018: 1-6

Sheeran, P.S., Luois, S., Mullin, L, **Matsunaga, T.O.**, and Dayton, P.A. Design of Ultrasonically-Activatable Nanoparticles using Low Boiling Point Perfluorocarbons. *Biomaterials* 2012;33:3262 – 69. PMID: 22289265

Matsunaga, T.O., Sheeran, P.S., Luois, S., Mullin, L.B., Streeter, J.S., **Banerjee, B**., and Dayton, P.A. Phase-change nanoparticles using highly volatile perfluorocarbons: Toward a platform for extravascular ultrasound imaging. *Theranostics.* 2012; 2(12):1185-98. PMID: 23382775

Phillips, L.C., Puett, C., Sheeran, P.S., Miller, W., **Matsunaga, T.O**., and Dayton, P.A. Phase-Shift Perfluorocarbon Agents Enhance High Intensity Focused Ultrasound (HIFU) Thermal Delivery with Reduced Near-Field Heating. (2013) *J. Acoust. Soc. Am.* In Press.

Sheeran, P.S., **Matsunaga, T.O**, Dayton, P.A. Toward Ultrasound Molecular Imaging with Phase-Change Contrast Agents: An In-Vitro Proof-of-Principle (2013) *J. Ultrasound Med and Biol* 2013;39(5):893-902. PMID: 23453380

Sheeran PS, **Matsunaga TO**, Dayton PA. Phase-transition thresholds and vaporization phenomena for ultrasound phase-change nanoemulsions assessed via high-speed optical microscopy. *Phys Med Biol.* 2013 Jul 7;58(13):4513-34.