

## BIOGRAPHICAL SKETCH, OTHER RESEARCH SUPPORT

Provide the following information for sponsor(s) and mentor(s).  
Follow this format for each person. **DO NOT EXCEED THREE PAGES.**

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| SPONSOR / MENTOR NAME<br>William Chi-Keung Tang, Ph.D. | POSITION TITLE<br>Professor & Interim Chair |
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| EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i> |                                  |         |                |
|---|----------------------------------|---------|----------------|
| INSTITUTION AND LOCATION  | DEGREE<br><i>(if applicable)</i> | YEAR(s) | FIELD OF STUDY |
| University of California at Berkeley, CA  | B.S.                             | 1980    | EECS           |
| University of California at Berkeley, CA  | M.S.                             | 1982    | EECS           |
| University of California at Berkeley, CA  | Ph.D.                            | 1990    | EECS           |

**A. Positions and Honors.** List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

**Employment**

- 1981–1982      Member of Technical Staff, TRW, Inc., Redondo Beach, CA.
- 1982–1984      Associate Engineer/Scientist, IBM Corp, San Jose, CA.
- 1986–1990      Postgraduate Researcher, UC Berkeley, Berkeley, CA.  
PI: Roger T. Howe, PhD, Professor, EECS.
- 1990–1993      Research Engineer Senior, Ford Motor Company, Ann Arbor, MI.
- 1993–1996      Sensor Research Manager, Ford Microelectronics, Inc. Colorado Springs, CO.
- 1996–1999      Technical Group Supervisor, Jet Propulsion Laboratory, Pasadena, CA.
- 1999–2002      Program Manager, Defense Advanced Research Projects Agency, Arlington, VA.
- 2002–present    Professor, Biomedical Engineering Department, University of California, Irvine, CA.
- 2005–present    Interim Chair, Biomedical Engineering Department, University of California, Irvine, CA.
- 2002–present    Joint Appointment in EECS, University of California, Irvine, CA.

**Professional Certification and Memberships**

- 2002–present    Senior Member, Institute of Electrical and Electronics Engineers.
- 2000–present    Fellow, Institute of Physics
- 2000–present    Chartered Physicist, Institute of Physics.

**Honors**

- 1997            Effective Leadership Award, Jet Propulsion Laboratory.

**B. Selected peer-reviewed publications (in chronological order, 1.5 page limit).** Do not include publications submitted or in preparation.

*Refereed journal articles:*

- [J1]      W. C. Tang, T.-C. Nguyen, and R. T. Howe, "Laterally driven polysilicon resonant microstructures," *Sensors and Actuators*, Vol. 20, pp. 25 – 32, 1989.
- [J2]      W. C. Tang, T.-C. Nguyen, M. W. Judy, and R. T. Howe, "Electrostatic-comb drive for lateral polysilicon resonators," *Sensors and Actuators*, Vols. A21–A23, pp 328–331, 1990.
- [J3]      W. C. Tang, M. G. Lim, and R. T. Howe, "Electrostatic-comb drive levitation and control methods," *IEEE/ASME Journal of Microelectromechanical Systems*, Vol. 1, pp 170 – 178, 1992.
- [J4]      X. Zhang and W. C. Tang, "Viscous air damping in laterally driven microresonators," *Sensors and Materials*, Vol. 7, pp. 415 – 430, 1995.
- [J5]      C. H. Mastrangelo, X. Zhang, and W. C. Tang, "Surface-micromachined capacitive differential pressure sensor with lithographically defined silicon diaphragm," *IEEE/ASME Journal of Microelectromechanical Systems*, Vol. 5, pp. 98 – 105, 1996.
- [J6]      C. I. Lee, A. H. Johnston, W. C. Tang, C. E. Barnes, and J. Lyke, "Total dose effects on microelectromechanical systems (MEMS): accelerometers," *IEEE Trans. Nucl. Sci.*, Vol. NS-43, No. 6, pp. 3127 – 3132, 1996.

**B. Selected peer-reviewed publications (continued).***Refereed archival conference proceedings:*

- [C1] W. C. Tang, T.-C. Nguyen, and R. T. Howe, "Laterally driven polysilicon resonant microstructures," *Tech. Dig., IEEE Micro Electro Mech. Syst. Workshop*, Salt Lake City, Utah, Feb. 20 – 22, 1989, pp. 53 – 59.
- [C2] W. C. Tang, T.-C. Nguyen, M. W. Judy, and R. T. Howe, "Electrostatic-comb drive for lateral polysilicon resonators," *Tech. Dig., Transducers '89*, Montreux, Switzerland, June 25 – 30, 1989, pp. 138 – 140.
- [C3] W. C. Tang, M. G. Lim, and R. T. Howe, "Electrostatically balanced comb drive for controlled levitation," *Tech. Dig., IEEE Solid-State Sensor and Actuator Workshop*, Hilton Head Island, SC, June 4– 7, 1990, pp 23 – 27.
- [C4] X. Zhang and W. C. Tang, "Viscous air damping in laterally driven microresonators," *Tech. Dig., IEEE Micro Electro Mech. Syst. Workshop*, Kanagawa, Japan, Jan. 25 – 28, 1994, pp. 199 – 204.
- [C5] C. H. Mastrangelo, X. Zhang, and W. C. Tang, "Surface micromachined capacitive differential pressure sensor with lithographically defined silicon diaphragm," *Tech. Dig., Transducers '95, Eurosensor IX*, Stockholm, Sweden, June 25 – 29, 1995, pp. 612 – 615.
- [C6] S. Li, Z. Yu, G. Gadde, P. J. Burke, and W. C. Tang, "Carbon Nanotube Growth for GHz Devices," *Proc. 3rd IEEE Conf. Nanotech. (IEEE-Nano 2003)*, San Francisco, CA, Aug. 12 – 14, 2003.
- [C7] G. Lin and W. C. Tang, "Towards MEMS microsystems for mechanical studies of neonatal and adult mammalian brain," *Ex. Abs., NanoTech 2003*, Montreux, Switzerland, Nov. 25 – 27, 2003, pp. A45 – A46.
- [C8] G. Y. Yang, V. J. Bailey, G. Lin, W. C. Tang, and J. H. Keyak, "Design of microfabricated strain gauge array to monitor bone deformation *in vitro* and *in vivo*," *Proc., IEEE 4<sup>th</sup> Symp. Bioinformatics Bioeng. (BIBE 2004)*, Taichung, Taiwan, May 19 – 21, 2004, pp. 30 – 37.
- [C9] L. Yan, W. Pang, J. Wu, W. C. Tang, and E.-S. Kim, "High frequency micromechanical piezo actuated disk resonator," *Tech. Dig., Solid-State Sensor, Actuator, and Microsyst. Workshop*, Hilton Head Island, SC, June 6 – 10, 2004, pp. 372 – 375.
- [C10] S. Li, Z. Yu, S.-F. Yen, P. J. Burke, and W. C. Tang, "Carbon nanotube GHz nano-resonator," *Tech. Dig., IEEE MTT-S Int. Microwave Symp.*, Fort Worth, TX, June 6 – 11, 2004, pp. 987 – 990.
- [C11] L. Yan, J. Wu, and W. C. Tang, "Piezoelectric micromechanical disk resonators towards UHF band," *Proc. 2004 IEEE Int. Ultrasonics, Ferroelectrics, and Frequency Control Joint 50th Anniversary Conf.*, August 23 – 27, 2004, Montréal, Canada, pp.922 – 925.
- [C12] L. Yan, J. Wu, and W. C. Tang, "High frequency filters based on piezoelectrically transduced micromechanical resonators," *Proc. 2004 IEEE Int. Ultrasonics, Ferroelectrics, and Frequency Control Joint 50th Anniversary Conf.*, August 23 – 27, 2004, Montréal, Canada, pp. 926 – 929.
- [C13] G. Lin, V. C. Wu, R. E. Hainley, L. A. Flanagan, E. S. Monuki, W. C. Tang, "Development of a MEMS microsystem to study the effect of mechanical tension on cerebral cortex neurogenesis," *Proc., 26<sup>th</sup> Int. Conf. IEEE Engineering in Biol. Med. Soc.*, San Francisco, CA, Sep. 1 – 5, 2004, pp. 2607 – 2610.
- [C14] J. A. Ayers, W. C. Tang, and Z. Chen, "360° rotating micro mirror for transmitting and sensing optical coherence tomography signals," *Proc., 3rd IEEE Int. Conf. Sensors*, Vienna, Austria, Oct. 24 – 27, 2004, pp. 497 – 500.
- [C15] G. Y. Yang, V. J. Bailey, Y.-H. Wen, G. Lin, W. C. Tang, and J. H. Keyak, "Fabrication and characterization of microscale sensors for bone surface strain measurement," *Proc., 3rd IEEE Int. Conf. Sensors*, Vienna, Austria, Oct. 24 – 27, 2004, pp. 1355 – 1358.
- [C16] L. Yan, J. Wu, and W. C. Tang, "A 1.14 GHz piezoelectrically transduced disk resonator," *Tech. Dig., 18th IEEE Int. Conf. Micro Electro Mech. Syst.*, Miami Beach, FL, Jan. 30 – Feb. 3, 2005, pp. 203 – 206.
- [C17] Y.-H. Wen, G. Y. Yang, V. J. Bailey, G. Lin, W. C. Tang, and J. H. Keyak, "Mechanically robust micro-fabricated strain gauges for use on bones," *Proc. 3rd Annual Int. IEEE EMBS Special Topic Conf. Microtechnologies in Med. and Biol.*, Kahuku, Oahu, HI, May 12 – 15, 2005, pp. 302 – 304.
- [C18] V. C. Wu, T. Law, C.-M. Hsu, G. Lin, W. C. Tang, and E. S. Monuki, "MEMS platform for studying neurogenesis under controlled mechanical tension," *Proc. 3rd Annual Int. IEEE EMBS Special Topic Conf. Microtechnologies in Med. and Biol.*, Kahuku, Oahu, HI, May 12 – 15, 2005, pp. 408 – 411.
- [C19] J. Wu, L. Yan, H. Xu, W. C. Tang, and F.-G. Zeng, "A curvature-controlled 3D micro-electrode array for cochlear implants," *Tech. Dig., Transducers '05*, Seoul, Korea, June 5 – 9, 2005, pp. 1636 – 1639.
- [C20] J. Wu, R. Hainley, and W. C. Tang "A high density micromachined electrode array for auditory nerve implants", *Proc. 2005 Summer Bioengin. Conf.*, Vail, CO, June 22 – 26, 2005, CD-ROM.
- [C21] W. C. Tang, "Microscale biomechanics: Studies of neurogenesis and stem cell differentiation under micromechanical influences," *Proc. 2005 IEEE Int. Conf. Robotics Biomimetics*, Hong Kong & Macau, China, June 29 – July 3, 2005, pp. 20 – 25.
- [C22] J. Wu, L. Yan, W. C. Tang, and F.-G. Zeng, "Micromachined electrode arrays with form-fitting profile for auditory nerve prostheses," *Proc. 2005 IEEE Engin. in Med. and Biol. 27th Annu. Conf.*, Shanghai, China, Sept. 1 – 4, 2005, Paper #0648, CD-ROM.

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**C. Research Support (1 page limit).** List selected ongoing or completed research projects (federal and non-federal support) during the past three years. Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects, your role (e.g. PI, Co-Investigator, Consultant) in the research project and whether the proposed project overlaps. If overlap exists with the proposed project, please explain. Do not list award amounts or percent effort in projects.

***Ongoing Research Support***

UC-MICRO Continuation Award 9/05 – 6/06  
“Piezoelectrically transduced resonators for wireless communications,”  
The objective of this project is to develop, design, fabricate, and characterize micro resonators that can be used for high-frequency wireless communications.  
Role: PI

DARPA Sub-contract [PI: Johns Hopkins Applied Physics laboratory] 2/06 – 1/10  
“Revolutionizing Prosthetics”  
The objective of this project is to develop, design, fabricate, and characterize a upper limb prosthetic with direct neural interfaces for both actuator controls and tactile sensory feedback.  
Role: subcontractor

***Completed Research Support***

DARPA Grant [Burke, Tang (Co-PIs)] 5/03 – 5/04  
“GHz Nano-Resonators Based on Single-Walled Carbon Nanotubes.”  
The objective of this project is to study the design, fabrication, and characteristics of single-walled carbon nanotubes for GHz resonator applications.  
Role: Co-PI

DARPA Sub-contract [PI: Alameda Applied Sciences Corp] 6/04 – 6/05  
“MEMS FEED thruster with adjustable ISP”  
The objective of this project is to develop, design, fabricate, and characterize micro-fabricated field-emission electric propulsion (FEED) engines with adjustable specific impulses.  
Role: subcontractor

MDA SBIR Sub-contract [PI: Alameda Applied Sciences Corp] 6/04 – 12/04  
“PFEED thruster with adjustable ISP”  
The objective of this project is to develop, design, fabricate, and characterize micro-fabricated pulsed field-emission electric propulsion (PFEED) engines with adjustable specific impulses.  
Role: subcontractor

UC-MICRO Award 8/04 – 6/05  
“Piezoelectrically transduced resonators for wireless communications,”  
The objective of this project is to develop, design, fabricate, and characterize micro resonators that can be used for high-frequency wireless communications.  
Role: PI