Gary W. Bohannan
Department of Physics and Material Science
University of Memphis, Memphis TN 38152

i) Professional Preparation:

Montana State University, Bozeman	Physics	Ph.D. 2000
Naval Postgraduate School, Monterey	Electrical Engineering	M.S. 1977
Washington State University, Pullman	Physics	B.S. 1971

ii) Appointments

Jan 2017 – Present	Adjunct Professor of Physics, University of Memphis
Jan 2011 – May 2016	Adjunct Instructor and Assistant Professor of Physics and Astronomy, St. Cloud State University, St. Cloud, MN
Nov 2008 – Apr 2009	Senior Controls/Electronics Engineer; Resodyn Corp.
Feb 2001 – Oct 2008	Senior Engineer; Wavelength Electronics, Inc.
Feb 2001 – Oct 2008	Affiliated Professor of Physics; MSU-Bozeman
Sept 1995 – Dec 2000	Student, Graduate Teaching Assistant and Research Assistant, Montana Space Grant Fellow; MSU-Bozeman
Feb 1992 – Sep 1995	Self-Employed, Part-time student; MSU-Bozeman
Feb 1972 – Feb 1992	Cryptologist; U.S. Navy (Retired at rank of Commander)

iii) Publications and patents

G. Bohannan, "Comments on time-varying fractional order," *Nonlinear Dynamics*, **90**(3), 2137-2143 (2017)

K. Biswas, G. Bohannan, R. Caponetto, A. M. Lopes, J. A. Tenreiro Machado, *Fractional Order Devices,* Springer (2017)

D. John, S. Banerjee, G. Bohannan, K. Biswas, "Solid-state fractional capacitor using MWCNT-epoxy nanocomposite", *Appl. Phys. Lett.* **110**, 163504(5) (2017)

G. Bohannan, B. Knauber, "A physical experimental study of the fractional harmonic oscillator", in 2015 *International Symposium on Circuits and Systems*, Lisbon, 2341–2344 (2015)

G. Bohannan, S. Hurst, L. Spangler, "Fractional order impedance device," two patent applications.

G. Bohannan, "Analog Fractional Order Controller in Temperature and Motor Control Applications," *Journal of Vibration and Control,* **14**(9–10), pp. 1487–1498, 2008.

T. Bhaskaran, Y.Q. Chen, G. Bohannan, "Practical tuning of fractional order proportional and integral controller (II): Experiments", *Proceedings of the ASME 2007 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2007*, Las Vegas, Nevada, 2007

G. Bohannan, "Analog fractional order controller in a temperature control application," in *Proc. of the 2nd IFAC Workshop on Fractional Derivatives and their Applications* (FDA'06), Porto Portugal, July 2006.

A. Vinogradov, G. Tuthill, V. H. Schmidt, G. Bohannan, "Damping and electromechanical energy losses in the piezoelectric polymer PVDF," *Mechanics of Materials*, 36(10) pp. 1007-1016, 2004.

G. Bohannan, "Non-exponential Relaxation in Piezoelectric PVDF," in *Fundamental Physics of Ferroelectrics 2001*, *AIP Conf. Proc*. **582**, ed. H. Krakauer, pp.175-184, American Institute of Physics, 2001.

G.W. Bohannan, *Application of fractional calculus to polarization dynamics in solid dielectric materials*, Ph.D. thesis, Montana State University, 2000.

G. W. Bohannan, V. H. Schmidt, R. J. Conant, J. Hallenberg, C. Nelson, A. Childs, C. Lukes, J. Ballensky, J. Wehri, B. Tikalsky, and E. McKenzie, "Piezoelectric polymer actuators in a vibration isolation application," *Proc. SPIE* **3987**, pp. 331-342, 2000.

V. H. Schmidt, G. Bohannan, D. Arbogast, and G. Tuthill, "Domain wall freezing in KDP-type ferroelectrics," *J. Phys. Chem. Solids* **61**, pp. 283-289, 2000.

G. Bohannan, V. H. Schmidt, D. Brant and M. Mooibroek, "Piezoelectric polymer actuators for active vibration isolation in space applications," *Ferroelectrics* **224**, pp. 211-217, 1999.

iv) Synergistic activities

I recently taught introductory physics and astronomy courses, intermediate electronics, and upper division thermal physics, quantum mechanics, and electrodynamics at St. Cloud State University. I also taught courses in fractional calculus and its applications with students from Physics, Chemistry, Mathematics, and Mechanical Engineering. I have ongoing collaborations with other researchers in Alabama, India, Portugal, and Italy.

While a graduate student at MSU-Bozeman, I taught undergraduate and graduate level classes. I was also faculty advisor to two *Reduced Gravity Flight Opportunities for Undergraduates* projects funded by NASA and the Montana Space Grant Consortium, one of which was a Vibration Isolation project involving students from the departments of mechanical and electrical and computer engineering, physics, and secondary education from MSU-Bozeman. The other was a multi-institution bioscience project involving MSU-Bozeman, MSU-Billings, and Dull Knife Memorial College (Northern Cheyenne Indian Reservation).

At Wavelength Electronics, I designed and tested several series of temperature controllers and high-stability current sources for solid state lasers for a wide range of applications. I also conducted market research for defining new products. While at Wavelength Electronics, I was principal investigator for a Phase 1 Small Business Innovation Research project demonstrating fractional order control of a robotic arm. This required managing subcontract efforts in the Physics, Engineering, and Chemistry departments of MSU-Bozeman and the ECE Department of Utah State University, Logan.

At Resodyn Corporation, I designed a complete control system to operate a resonant acoustic mixer (RAM) instrument with two independent mixer plates, along with humidity and temperature control. The design included an ARM processor providing interactive human-machine interface via a seven inch TFT touch screen display.

v) Collaborators and Other Affiliations

    a) Current collaborators on the Fractor project.
        a. YQ Chen   ECE, UC Merced, California
        b. Karabi Biswas   India Institute of Technology, Karagpur, India
        c. J. A. Tenreiro Machado   University of Porto, Portugal
        d. R. Caponetto   University of Catania, Italy

    b) Graduate advisor:
        a. George F. Tuthill, MSU-Bozeman
        b. V. Hugo Schmidt, MSU-Bozeman

    c) Thesis Advisor: None