

**The following bibliography of selected publications documents the experience of Dr. David Rigney in conducting research & development at the interface between the biological and physical sciences -- modeling in cell physiology and molecular biology, instrumentation development, software development, image processing for cell and molecular biology, cardiovascular and systems physiology, signal processing applications, and non-linear dynamics.**

### **Modeling in Cell Physiology and Molecular Biology:**

The following seven papers deal with fluctuations in gene expression in individual cells, cell growth and division, cellular senescence, and cell kinetics.

Rigney DR, Scheive WC. Stochastic model of linear, continuous protein synthesis in bacterial populations. *J Theor Biol* 1977; 69:761-66.

Rigney DR. Stochastic model of constitutive protein levels in growing and dividing bacterial cells. *J Theor Biol* 1979; 76:453-80.

Rigney DR. Note on the kinetics and stochastics of induced protein synthesis as influenced by various models for messenger RNA degradation. *J Theor Biol* 1979; 79:247-57

Rigney DR. Stochastic models of cellular variability. *Lecture Notes in Biomathematics* 1979; 29:237-80.

Rigney DR. Multiple-transition cell cycle models that exhibit transition probability kinetics. *Cell Tissue Kinet* 1986; 17:45-54.

Rigney DR, Wei JY. Note on the dispersion of generations among cells in senescing diploid fibroblast populations. *Mech Aging Develop* 1989; 47:187-197.

Rigney DR. Inherited rate model of the cell cycle: Kinetics of related cells, epi-genetics of ribosomal DNA transcription and the evaluation of cancer-therapy fractionation schedules and doses. *Comput Math Applic* 1987; 14:699-739. Reprinted in: M Witten, ed. *Mathematical Models in Medicine*, Oxford, Pergamon Press, 1988.

(The previous paper has an extensive bibliography on cell kinetics. It is particularly noteworthy because it contains the first calculation of the entropy of a cell population, as a Lyapunov function.)

### **Instrumentation development, software development, and image processing for cell and molecular biology:**

Rigney DR. A general-purpose system for the rapid acquisition and computer processing of optical and scanning electron microscope images. *Micron and Microscopica Acta* 1985; 16:125-33. II Software. *Micron and Microscopica Acta* 1986; 17:45-54.

(The previous paper describes the design and construction of the very first video-rate laser scanning microscope. It has fluorescence and multiple simultaneous imaging capabilities, as well as unprecedented dynamic range because the intensity of illumination is independently controlled at every pixel in the image, using acousto-optic modulation.)

Rigney DR, Velyvis J, Wei JY. PC interface and software for the ZONAX microscope-attachment controller. *Cytometry* 1990; 8(11):919-922.

<http://www3.interscience.wiley.com/cgi-bin/fulltext/110427813/PDFSTART>

(The previous paper describes a computer interface and driver software for microscope attachments.)

Rigney DR, Castor LN. A clear-air incubator for the cultivation and manipulation of cells at a constant temperature. *Jour Tiss Cult Meth* 1983; 8:83-5.

(The previous paper describes the design and construction of special apparatus for tissue culture.)

Chong X, Rigney DR, Anderson DA. Separation of human sperm membrane proteins by two-dimensional electrophoresis. *J Androl*, 1994; 15:595-602.

Rigney DR, Wei JY. A novel motion detection method for improving the quality of two-dimensional echocardiographic images. *J Am Soc Echocardiography* 1988; 1:127-134.

(The previous two papers describe experience with image processing applications.)

### **Cardiovascular and Systems Physiology, Signal Processing Applications and Software, and Non-linear Dynamics:**

Goldberger AL, Rigney DR, West BJ. Chaos and fractals in human physiology. *Scientific American* 1990; 262:42-49.

Rigney DR, Goldberger AL, Ocasio WC, Ichimaru Y, Moody GB, Mark RG. Multi-channel physiological data: description and analysis (data set B). In: Weigend AS, Gershenfeld NA, eds. *Time Series Prediction. Forecasting the Future and Understanding the Past. SFI Studies in the Sciences of Complexity XVII*. Reading MA, Addison-Wesley, 1993; 105-129 and 571-630.

Ocasio WC, Rigney DR, Clark KP, Mark RM. bpshape: A computer program that implements a model for analyzing the shape of blood pressure waveforms. *Computer Methods and Programs in Biomedicine* 1993; 39:169-194.

Rigney DR, Goldberger AL. Nonlinear mechanics of the heart's swinging during pericardial effusion. *Am J Physiol*. 1989 Oct;257(4 Pt 2):H1292-305.

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