



# Big Data Training for Cancer Research

## *Special Lecture Series*

### *Systems Biology Approaches to Understanding Cancer Complexity*

***Dr. Marian Waterman***

**July 8, 2025, 9:00 – 10:15 AM (PDT)**

**Sue Gross Auditorium, Susan & Henry Samueli College of Health Sciences**



#### **Speaker Bio:**

Marian Waterman received her Ph.D. degree from the University of California, San Diego followed by post-doctoral studies with Dr. Katherine Jones at the Salk Institute where she discovered Lymphoid Enhancer Factor-1, LEF/TCF HMG box transcription factor. In 1993, Dr. Waterman joined the faculty at University of California, Irvine and focused her research studies on LEF/TCF structure and function. Following the discovery that LEF/TCFs are downstream mediators of Wnt signaling, her research program broadened to include investigation of the actions and expression patterns of LEF/TCFs in

cancers derived from overactive Wnt signaling including the tumor microenvironment and the connection that Wnt signaling has to normal fetal and adult stem cell niches. The experimental tools used in her research program include molecular and cell biology, fluorescence lifetime imaging, biomedical engineering, mouse models and bioinformatics and mathematical modeling – the latter approaches informing a Systems Biology understanding of the patterning and complexity in tissues and tumors. Dr. Waterman has served the cancer research community as director of the basic science Cancer Research Institute at UCI (2015-2021), co-Director of the Cancer Systems Biology center at UCI (2018–2024), and Deputy Director of the Chao Family Comprehensive Cancer Center.

#### **Abstract:**

Cancer cells proliferate and evolve in complex environments that have been highly selected for robust control of growth and differentiation. Systems Biology is an approach to understanding that control, utilizing design principles from normal tissues and incorporating the complexity of distorted environments via multi-scale mathematical modeling. This lecture will cover a few basic aspects of oncogenesis that highlight the need for modeling, and it will provide vignettes of discovery that illustrate how systems modeling has led to new insights.

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