UCLA Engineering
HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

BIOENGINEERING

PRESENTS

Embryonic Blood Flow determines Cardiac Malformation

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1:00 – 2:00 PM
2101 ENGINEERING V

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ABSTRACT:

Congenital heart disease (CHD) affects about 1% of newborn babies and is the leading, non-infectious cause of death among children. Heart development depends on a finely orchestrated interaction between genetic pre-programmed events and environmental factors, and blood flow through the heart has been recognized as a key factor affecting cardiac development. Because the embryonic heart starts beating and pumping blood soon after formation of the primitive tubular heart, important cardiogenesis processes, such as formation of heart valves and chambers, occur under blood flow. Normal hemodynamic conditions are essential for proper cardiac development, and altered blood flow at early embryonic stages leads to congenital heart defects that resemble those of human babies. Since blood flow is affected by changes in cardiac tissues (e.g., morphological and contraction anomalies), regardless of cause, in CHD anomalous blood flow leads to detrimental effects further influencing heart development. However, nor the mechanisms by which blood flow modulate heart development, nor the dynamics of the normal beating heart and of normal blood flow inside the heart during early development have been fully elucidated. We use chicken embryos, and a combination of *in vivo* imaging, physiological measurements, immunohistochemistry, and computational techniques in an integrative approach to determine how blood flow affects heart development. This talk will describe some of our current efforts to understand normal cardiac development and how abnormal blood flow leads to congenital heart defects and CHD.

BIOGRAPHY:

Before joining the Biomedical field, **Dr. Sandra Rugonyi** was trained in Nuclear and Mechanical Engineering. She got a MS-equivalent degree from the Balseiro Institute, Argentina, in Nuclear Engineering; and a PhD from the Massachusetts Institute of Technology, MA, in Applied Mechanics (2001). Since then she has been applying her analytical skills in the Biomedical Engineering field. Dr. Rugonyi is currently Associate Professor of Biomedical Engineering at the Oregon Health & Science University in Portland, OR. Her interests are in heart development, and the effects of blood flow on the cardiovascular system.