

**System Dynamics Society
2011 Lifetime Achievement Award**

The System Dynamics Society occasionally recognizes outstanding contributions to the field through a Lifetime Achievement Award. This is the only award given by the society that is based on a body of work done over an extended period of time and not on a single work. The award has been given sparingly in the past – indeed only once – to R. Geoffrey Coyle, who pioneered system dynamics in the United Kingdom (Coyle 1998).

Thus it is a privilege for me to present the second lifetime achievement award in the history of the Society to Diana Fisher for her work bringing system dynamics to K-12 education.

The history of system dynamics in K-12 education goes back four decades. Professor Nancy Roberts, the co-recipient of the First Forrester Award, pioneered the development and testing of teaching materials for elementary education in the 1970s. Institute Professor Emeritus Gordon Brown, after retiring from MIT, worked in collaboration with Jay Forrester in the 1980s to introduce system dynamics to the K-12 schools in Tucson, Arizona. Later, in the public schools of Portland, Oregon, Diana Fisher went beyond qualitative systems thinking and introduced K-12 students to formal modeling and experiential learning through computer simulation over the following two decades.

Diana is not only a wonderful teacher but a lifelong learner. First in her family to attend college, she did not spend an extended period of time learning system dynamics herself before beginning to teach it to her class at Wilson High School in Portland, Oregon. She soon faced a momentous decision: teach the models she knew, or let her students work on problems that excited them, though she often knew little about those issues. Never one to take the safest course, she freed up her students to learn about issues from pandemic diseases to climate change to body temperature regulation and alcohol metabolism, learning from her students even as they learned from her. Over the course of her learning and teaching journey, she developed extensive materials that others could use for teaching and self-learning. Her two books, *Modeling dynamic systems, lessons for a first course* and *Lessons in mathematics, a dynamic approach*, are wonderful introductions to dynamic modeling. Easy to follow, they are at the same time rigorous, as you'd expect from a math teacher. Although originally written for K-12 audiences, they provide hands

on modeling experience for the practitioner while also serving as a resource for the college educator. They are designed as workbooks that guide the reader through the essential steps of modeling and experiment design and come with interactive disks containing the models, exercises, and other materials people need to immerse themselves in learning about dynamics. They not only help people learn how to build and analyze a model, but help with the more difficult and arguably more important task: recognizing dynamics, seeing system structure, and what Jay, in *Industrial Dynamics*, called “detecting the guiding policy” – that is, coming understand how people make decisions, how the states of a system feed back to change the flows that then alter the states. She uses examples including population growth, markets, urban management, drugs and addiction, and epidemics. In each case Diana also carefully outlines the transferability of the structure to other contexts, thus helping her students learn how to discern the pervasive feedback systems wherever they live, wherever they look.

Diana has led NASA-sponsored system dynamics workshops for math and science teachers and directed two National Science Foundation Projects where she taught system dynamics lessons for math, science, and social science teachers, serving as the lead Principal Investigator. She has been the recipient of the Presidential Award for Excellence in Teaching, Intel's Innovation in Teaching Award, and the Barry Richmond Scholarship Award given by Pegasus Communications.

Diana has never stopped her own learning quest in the system dynamics domain. She recently completed a Graduate Certificate in System Dynamics from WPI and is currently working on her doctorate in System Science at Portland State University. She has dedicated 20 years of her life in cultivating systems thinking and experimental learning in young minds. Through this Lifetime Achievement Award the System Dynamics Society recognizes her dedication bringing system dynamics to some of the most important people in our nation — K-12 teachers and their students.

Presented at the International System Dynamics Conference, 26 July 2011, Washington, DC by John Sterman, MIT Sloan School of Management, on behalf of the award committee.

Reference:

Coyle, R. G. (1998) The practice of system dynamics: milestones, lessons and ideas from 30 years experience. *System Dynamics Review*, 14(4): 343-365.