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Mapping the Future—Merging the Old with the New Across Disciplines

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The human genome is far from random. Much like the master craftsman of fine Persian rugs, nature has injected subtle variants into the genetic sequence, giving uniqueness to every rug and reminding us of the cosmic grand scheme of life. Unraveling the complexities of this system is akin to understanding and fluently speaking an alien language, should extraterrestrials one day land in our backyard. Deciphering this code and finding discernible patterns lies at the heart of cancer informatics. Developing the tools of the modern cancer informatician will encompass merging the ways of the old with the new, integrating ideas and concepts across disciplines, and taking risks to develop cutting-edge techniques and methodology.

Critically understanding the spontaneous and emergent behaviors of cancer both at the molecular and macro levels will involve dissecting the components of the system in the context of their evolutionary history and determining why certain traits favor or protect against cancer. The skill sets of probability and computational sciences will help guide our search for the Holy Grail. However, the future of cancer informatics, if it is to be successful in this journey, will need to creatively borrow ideas from other disciplines ranging from linguistics and genetic epidemiology to the seemingly distant science of cultural anthropology. Often the genetic code is compared with human language wherein the rules of Mendel and those of genetic recombination form the backbone and glue that holds together the letters of the genomic alphabet. Similar to the evolution of language, the human genome is a moving target with chromosomes constantly breaking and rearranging, sometimes duplicating or losing parts, and frequently acquiring new words and expressions from other languages (i.e., organisms). While languages throughout the world share a common structure intrinsic to human understanding, cultural variation over the course of thousands of years has led to a rich variety of dialects and ultimately new languages, just as billions of years of genomic evolution has brought about the unique sequence composition that distinguishes individuals from one another and orchestrates who does and does not succumb to cancer.

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The analogy to human language is fitting for the cancer informatician in their exploration of uncharted territory. Learning a new language is never easy and few achieve fluency in their quest to communicate with other cultures. However, perfection in language is not necessary for peoples of different countries and cultures to effectively communicate and convey the basic ideas, fears, likes, and mutual appreciation that form the bonds of all humans. Yes, it is important to strive for perfection but progress in science comes in incremental steps with the occasional serendipitous “big-bang” idea. Everyone hopes for the magic-bullet and “one fits all” vaccine that cures cancer. However, in order for science to advance, we must be willing to take risks and not to fear occasionally being wrong or misunderstood. This underlies the spirit and philosophy of Cancer Informatics. As the Editor-in-Chief of Cancer Informatics, I welcome bold ideas and novel approaches to solving problems in our field and encourage “thinking outside the box.” The object of fundamental respect is vital to

this journal’s life force, as it is to the laws of nature which permeates all life. This transformation in publishing involves breaking the shackles of our scientific egos and ultimately following the truth of the universe and understanding the simultaneity of cause and effect. As scientists, we will sometimes have a difficult time communicating our message to other scientists and the lay public, but this just means that the benefits we achieve through our patient efforts will be all the greater in time. Breakthroughs in science are rarely accepted initially, but eventually critics become astonishingly strong allies and supporters, healing the wound of dignity. As aptly stated by 2004 Nobel Peace Prize laureate Dr. Wangari Maathai, “Like a seedling, with sun, good soil, and abundant rain, the roots of our future will bury themselves in the ground and a canopy of hope will reach into the sky.”¹

Reference

1. Maathai W. *Unbowed: A Memoir*. Anchor Books: New York, 2007;p. 289.