



April 28, 2005

## Improved cancer treatments aim of new biology research program

*\$8.9 million research institute will use advanced computing power to expose the secret life of cells*

Calgary... Cancer research in Alberta is taking a major step forward with a new research program being housed at the University of Calgary. The Institute for Biocomplexity and Informatics will be led by Dr. Stuart Kauffman, a scientist known around the world for his exceptional genetic theories, who has now moved to Alberta to work on research that could offer new ways to treat cancer.

“Attracting someone of Dr. Kauffman’s calibre to Alberta speaks volumes about the quality and capability of our information and communications technology sector and of the good work being done by iCORE,” said Victor Doerksen, Minister of Innovation and Science. “High quality professionals are the backbone of Alberta’s innovation agenda and the key to our economic prosperity and improved quality of life.”

Originally a medical doctor, Dr. Kauffman’s primary work has been as a theoretical biologist studying the origin of life and molecular organization. He has added a new dimension to Darwin’s theory of evolution and has founding patents in chemistry for drug discovery. Kauffman is now using powerful computing resources to test some of his theories on the systems that regulate cell growth, division and differentiation. Understanding these systems may lead to the ability to control them, which could mean new cancer treatments using cell-based approaches rather than traditional treatments such as surgery, radiation and chemotherapy.

“We plan to set up a world-class research program that will marry theory and experiment in the exploding area of systems biology,” says Dr. Kauffman, the new iCORE Chair in Biocomplexity and Informatics, housed at the University of Calgary. “The opportunity here is unparalleled. We need to think big, and we have found the necessary support here. There is a wonderful collaborative environment, and the potential to mix theory and experiment is very good.”

Dr. Kauffman has received an iCORE Chair and Professor Establishment grant of \$850,000 per year for five years, plus a \$300,000 startup grant, for a total of \$4.6 million. The Institute of Biocomplexity and Informatics is being supported by the University of Calgary, in collaboration with the University of Alberta. Additional support is being sought from the Natural Sciences and Engineering Research Council of Canada, the Canada Foundation for Innovation, the provincial government, industry and philanthropists.

“Stuart Kauffman is a passionate scientist, with broad experience, enormous intellectual capacity, and a commitment to building excellent collaborative interdisciplinary teams. That passion and commitment creates the potential for highly innovative science,” says Dr. Randy Goebel, President and CEO of iCORE. “Dr. Kauffman’s award is a foundation for expanding a highly interdisciplinary research program that iCORE will be supporting over the coming years – bioinformatics.”

iCORE was established in October 1999 by the Government of Alberta to foster world-class university-based research that supports the ICT sector. Since its inception, 20 research chairs have been established to focus on emerging areas such as wireless communications, artificial intelligence, and quantum and nanocomputing. Visit [www.icore.ca](http://www.icore.ca) for more information.

**Editor’s Note:** See attached backgrounder for more information.

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**Dr. Stuart Kauffman**  
**iCORE Chair, Biocomplexity and Informatics**  
**University of Calgary**

Dr. Stuart Kauffman has received an iCORE Chair and Professor Establishment grant of just under \$1 million per year for five years, for a total of \$4.6 million, to lead a \$8.9 million research program that is creating the Institute for Biocomplexity and Informatics, housed at the University of Calgary. iCORE's investment represents roughly 50 per cent of the total budget. The University of Calgary is contributing roughly \$250,000 per year for a total of \$1.4 million in cash, and \$415,000 in kind over the five-year research program. The University of Alberta is also contributing \$415,000 in kind. Additional support over the initial five year period is being sought from the Natural Sciences and Engineering Research Council of Canada (\$575,000), the Canada Foundation for Innovation (\$700,000), the provincial government (\$335,000), and industry (\$150,000 and \$360,000 in kind).

**Biographical Information**

Stuart A. Kauffman is a professor at the University of Calgary with a shared appointment between biological sciences and physics and astronomy. He is also an emeritus professor of biochemistry at the University of Pennsylvania, a MacArthur Fellow and an external professor at the Santa Fe Institute.

Originally a medical doctor, Dr. Kauffman's primary work has been as a theoretical biologist studying the origin of life and molecular organization. Thirty-five years ago, he developed the Kauffman models, which are random networks exhibiting a kind of self-organization that he terms "order for free." Dr. Kauffman was the founding general partner and chief scientific officer of The Bios Group, a company (acquired in 2003 by NuTech Solutions) that applies the science of complexity to business management problems. He is the author of *The Origins of Order, Investigations*, and *At Home in the Universe: The Search for the Laws of Self-Organization*.

**Research Program Overview**

The field of genetic regulatory network research will explode in the coming decade. With the human genome spread before us, the genomes of many other organisms similarly sequenced, and others on the way, researchers have an unprecedented opportunity to establish a new quantitative science of genomics.

The world-class Institute for Biocomplexity and Informatics at the University of Calgary will conduct intense, coordinated, interdisciplinary research by developing theories and companion experiments in the fields of genetic and cell regulatory networks. In doing so, the full potentials of understanding such networks can be realized for the benefit of science and human health. Most importantly, the research program will focus on cancer cell differentiation, with enormous potential application in human health.

Steered by world-class leadership in the sciences of genetic regulatory networks under the direction of Stuart Kauffman, the Institute for Biocomplexity and Informatics and 20 international colleagues will drive this field. The Institute will draw together world-class expertise in the ensemble approach, machine learning, small genetic networks studies, bioinformatics, data mining, complexity, computational biology, genomics, signal processing mathematical statistics, gene expression, cellular mechanics, and tissue engineering among cell and molecular biologists, computer scientists, signal processing experts, engineers, physicists, mathematicians, and theoretical biologists to conduct new interdisciplinary research aimed at revealing and integrating much of the extent and nature of genetic

regulatory networks, generating useful software and knowledge products, and opening up new avenues for essential future research.

The work of the Institute will further the integration and development of biocomplexity and informatics. The University of Calgary will be the hub of an outstanding international group of researchers and scholars working to solve problems comprising the central tasks of understanding the integrated behavior of genetic regulatory networks. Through its focused interdisciplinary work, the returns will be in the form of cohorts of highly trained scientists, valuable intellectual property, useful and original knowledge products, and possible spin-offs.

The Institute is expected to produce a remarkable body of theoretical work, a body of groundbreaking experimental work, software for text and other data mining, and the training of postdoctoral fellows and graduate students in this important emerging interdisciplinary field.

### **Structure of the Institute**

The Institute will be led by Kauffman as its director and Bob Este as the deputy director. Three faculty members will join the Institute, specializing in physics, biology, computer science, computer and electrical engineering at the University of Calgary. Support will be provided by biochemistry and molecular biology. Expert computer science faculty members in machine learning will lead collaborative work on inferring network structure, logic, and dynamics from gene arrays and other data. Six initial postdoctoral fellows and approximately eight initial graduate students jointly funded by iCORE and the University of Calgary are planned. Programmers and data mining experts will be hired and affiliated faculty, experimentalists and theoreticians from around the world will complement the project's work. In addition, the Institute will work extensively with the larger medical and international research communities.

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