emerging

Book Review: *Deep Simplicity*

In a increasingly crowded field of texts on complexity theory, a few stand out for their ability to introduce the subject to the lay reader with clarity. Plexus member Thomas Clancy takes a look at one.
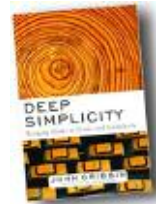
Michael Bleich on Complex Human Systems

Passionate, effective, and eternally optimistic, Michael Bleich is a model of complexity principles in action. In the process, he is transforming how some healthcare organizations approach nursing, healing, and collaboration.

Plexus in Action

Still a young organization, Plexus has had a remarkable year, which you can read about soon in our year-end report. Discover how you can help us continue our mission!

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A Simple Introduction to Complexity

Looking to take your first steps into the theories of complexity? *Deep Simplicity* may be the perfect place to start.

The essence of John Gribbin's new book *Deep Simplicity; Bringing Order to Chaos and Complexity* can be summed up his by following quotes in the Preface:

> *"I knew that I could explain the essence of relativity to people with no scientific background, and I was encouraged to take the obvious step of trying to explain chaos and complexity the simple way, from the bottom up for every body. The great insight is that chaos and complexity obey simple laws —— essentially the same laws that Isaac Newton discovered more than three hundred years ago. In a phrase attributed to Murray Gell-Mann, but echoing the speculation of Richard Feynman, the complicated behavior of the world we see around us is merely "surface complexity arising out of deep simplicity." It is the simplicity that underpins complexity, and thereby makes life possible, that is the theme of this book".*
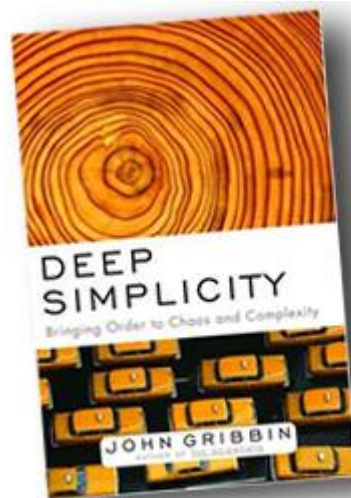
Gribbin remains true to his word by taking readers on a journey that traces the discovery of complexity and chaos at a level understandable by the general public.

The book's seven chapters cover an historical and comprehensive accounting of the scientific revelations leading up to the discovery of chaos and theories of complexity. Building upon the work of Sir Isaac Newton, Galileo Galilei, Pierre La Place, James Maxwell, Lord Kelvin, Albert Einstein and other notable scientists, Gribbin walks readers through the discovery of universal laws most

associated with chaos and complexity. These include the laws of motion, thermodynamics, relativity and electromagnetism. Once Gribbin has laid the theoretical foundations of chaos and complexity, he provides an in-depth yet understandable description of chaos using many real world examples. These include discussions of the "the three body problem", phase space, power laws, nonlinearity, landscapes, fractals, emergence and self-organization.

An astrophysicist by trade, Gribbin provides the theoretical foundations of chaos and complexity primarily through the context of physics, meteorology, biology and information sciences. Characteristics and features of chaos and complexity are identified in traffic flow behavior, animal population cycles, pattern formation on animal skin, earthquakes, the formation of the universe and the evolution of life. The book does not focus on the study of complexity and chaos in the social sciences.

Deep Simplicity; Bringing Order to Chaos and Complexity is an excellent book for the new student to complexity sciences. Gribbin has a talent for bringing clarity to difficult concepts. Rather than burdening the reader with mathematical formulas, Gribbin often uses metaphors found in nature. For instance Gribbin describes the idea of phase space in chaotic systems using the analogy of a river flowing through a landscape. Or, Gribbin's discussion of thermodynamics and the movement of gas particles uses simple diagrams that take the reader step-by-step through the underlying ideas.

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>
> *–John Gribbin*
> *from the Preface*

For those seeking a beginning but solid foundation in complexity sciences, John Gribbin's book *Deep Simplicity; Bringing Order to Chaos* is a good first step. By relating current theories supporting chaos and complexity through the historical development of universal laws, Gribbin brings credibility to this new area of science in a clear and concise manner. ∎

By: Thomas Clancy, Vice President of Professional Services
Mercy Hospital, Iowa City, IA

Nursing Systems to Health

Peter Drucker calls healthcare the most complex industry in the world. Discover how one practitioner learned to navigate the system with principles of simplicity and strong relationships.

Michael Bleich never forgot the last time he saw his grandmother. A nurse brought her to the window of her hospital room so that he and his two younger brothers, standing on the sidewalk below, could have one final glimpse of her. Even at age nine, he knew that was no way to say goodbye.

"She died a week later," Dr. Bleich recalls now. "That was 1961, and it couldn't have been otherwise back then. Rules and regulations were very restrictive. Children weren't allowed into hospitals, and even adults could only visit two hours a day."

Michael R. Bleich,
PhD, RN, CNAA, BC

In retrospect, Dr. Bleich sees that distant image of his grandmother – a warm, nurturing person who died in her 50s – as a pivotal influence in his life and one that would remain in place and grow in personal meaning through a healthcare career spanning more than 30 years. Now the associate dean of clinical and community affairs at the Kansas University School of Nursing, Dr. Bleich is also executive director of KU HealthPartners, Inc. a joint non-profit corporation operated by the KU Schools of Nursing and Allied Health. An experienced administrator, he believes strongly that healthcare professionals and patients are best served by simple rules that empower people to do what is right.

A Caregiver in the Making

His career was launched when, in his late teens, he worked in a psychiatric hospital in Central Wisconsin where he grew up. With only one nurse for three buildings of patients, he bore the sole responsibility for 32 patients. There were

no phones, and staffers relied on a wall-mounted speaker system for communication with the nurse's station a building away. "If I needed assistance, it was other patients who helped me," he says. "I learned to listen to the voices of the patients, and to be resourceful. Had I been older, I would have known of the risk associated with my assignment."

As the oldest of five siblings, with a father whose work involved travel, Dr. Bleich frequently took charge of home responsibilities, so the job's demands came naturally to him at age 18. Most patients were diagnosed as manic depressives and schizophrenics, but these labels belied their capacity to function. Looking past the label at the individual allowed his innate empathy to mature. He remembers "talking down" violent patients, and being dependent on several patients who could be relied upon for assistance with institutional routines. Rituals and routines provided important structure, yet he learned to find freedom within the constraints of order. "With the need to mop, clean and feed, and administer meds on time, you would never be able to finish your duties by the end of the shift if you didn't stick to routine," he remembers.

"I learned the importance of structure, but also the importance of reacting to the nonlinear events going on at the same time. One bad day for a patient, or one bad event, and the notion of control was lost; then you would have to interact to manage it. I realized then I could suggest and influence, but, ultimately that in healthcare, the challenge is that no day is routine and we have little control over where people are in their lives, or how they experience illness.

"So, you meet people where they are on their journey," he continues. "In a long term psychiatric hospital, I recall patients who would die in our care, because this was their 'home.' I was amazed at how sensitive patients were to the environment they lived in. If someone was dying, even severely compromised patients sensed what was happening and showed great respect."

> "I learned the importance of structure, but also the importance of reacting to the nonlinear events going on at the same time. In healthcare, no day is routine and we have little control over how people experience illness."

Interconnections in a Human System

Although he wouldn't have a name for it until years later, Dr. Bleich had been immersed in the principles of complexity. He was learning the vital importance of relationships in systems and organizations, a topic that would capture his permanent interest.

Dr. Bleich began college planning to teach music, but being a mental health nursing assistant changed his mind. He became a registered nurse and eventually earned a Masters in Public Health from the University of Minnesota and a

PhD in Human Resource Development from the University of Nebraska-Lincoln.

In his first management job as vice president for patient care at St. Mary's Medical Center, in Racine, Wisconsin, he was responsible for developing the clinical systems for this new hospital. The building was based on a design by Gordon Friesen, whom Dr. Bleich admires as a healthcare visionary. "Far earlier than our current awareness of these issues, he recognized the importance of patient-centered care and a nurse-centered environment to foster the nurse-patient relationship," Dr. Bleich says. "He had great respect for nurses, and he valued the intensity and quality of relationship nurses could have with patients. He advocated private rooms, so patients could have space and interact with their families. He examined the support needed by nurses and moved supplies, medications, and the chart to the bedside. And, he recognized the value of technology—Friesen supported the use of pagers and phones in every alcove. In retrospect, Friesen understood the principles of complexity science and through his wisdom, I, too, was profoundly influenced by his work."

Training the staff to support the move from the conventional hospital to the state-of-the-art facility brought several leadership challenges. The redesigned environment, for instance, eliminated the centrally located nurses' station, a noisy social hub where nurses clustered and where doctors went to find a nurse. The physical changes mandated the need to replace traditional communications. Dr. Bleich designated progressive and innovative clinical nurse managers for each unit and improved the paging system for physicians. Staff perceptions needed re-adjustment. Doctors had the impression there weren't enough nurses, he recalls, though actually there were more—they just not visible at the nurses' station because they were with patients. So a flagging system was installed to identify the rooms nurses were in so doctors could find them. A charge nurse posted daily assignments in a prominent place. Dr. Bleich was gaining continued insights into the interconnectedness of every element of a human system.

"Nothing had prepared us for the communications issues. It was unanticipated. We co-created solutions. It took a year of re-patterning," Dr. Bleich says. "But it was a good process, because we were serving patients better."
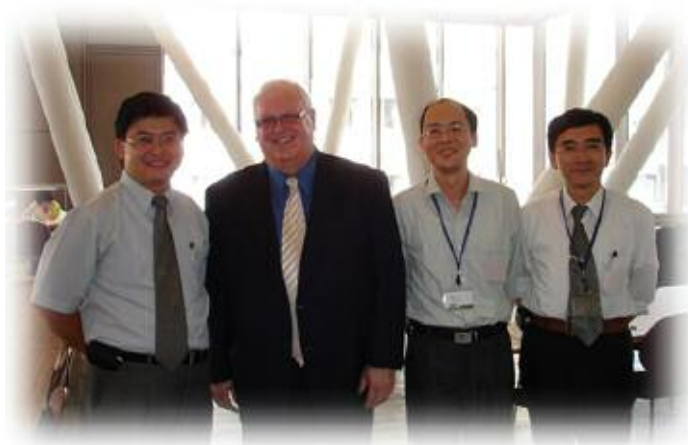
On a recent professional trip to Taiwan, Dr. Bleich visits the Kaohsiung Medical University new library complex. To his left is nurse Hung-Da (David) Dai, RN, MSN with other officials from the library.

Learning through Movies and Music

Dr. Bleich never lost interest in music. For many years he was the organist and choir director of St. Rita's Catholic Church in Racine, Wisconsin. He also plays piano, and sang tenor in the Milwaukee Symphony Chorus, and with a Nebraska group called *Abendmusik*, which is German for "night music". These days he prefers active listening to performing, he observes, though music still informs his work. His taste runs to such 20th Century impressionists as Gustav Mahler and Claude Debussy, but his appreciation is eclectic.

An innovative teacher, Dr. Bleich enlivens his courses with film clips and music. In his graduate-level course *Organizational Foundations for Leading Change*, the role of leadership and both linear and nonlinear approaches to change management, he stresses the notion that the most effective contributors to an organization are those who can forgo rigid hierarchies and barriers and learn the flexibility to move in and out of the roles of leader, manager and follower. He is also working on new doctoral courses on *Preparing the Doctoral Leader* and *Organizational and Clinical Quality*, both of which will include complexity science principles. "I want students to go away with the idea that it's all about relationships," he says. "In healthcare, you have to constantly nurture relationships, and understand the world is not linear and reductionistic. I want students to see the world as complex, and to have some sense of how hard it is to identify and create simple rules."

One of the movie clips he uses to demonstrate linear and nonlinear behavior comes from the 2003 version of *Henry VIII* when Henry leads his disheveled and discouraged crew into war against the well-equipped, well-managed French army. As Henry gives an impassioned speech, envisioning the future, highlighting relationships and galvanizing the disheartened, the orchestral score intensifies, capturing and punctuating the emotions of the moment. "I do find myself using music to accentuate key points," he says. "One of my favorite

Nursing leaders from throughout Taiwan extend their welcome to Dr. Bleich. Included in the group are Deans and Directors of the major hospitals and universities with nursing programs, the Minister of Health, and the Deputy Executive Officer of JCAHO-Taiwan. Teresa J.C. Yin, PhD, RN, Director of the Nursing Department at Taipei Veterans General Hospital and Professor at National Yang-Ming University hosted the event at the historic Grand Hotel.

movies is *The Mission*, which has what I believe is one of the most powerful soundtracks ever written. Two of the most beautiful songs are *Gabriel's Oboe* and *Brothers*—there you hear simple rules, and haunting simple melodies that absolutely capture the moment. And the score captures movement and change magically as it moves into African and South American rhythms."

From Reductionism to Innovation

Dr. Bleich is fascinated by how historical notions of reductionism and structure still influence healthcare organizations. Many modern facilities, he notes, are ideological replicas of Puritan notions that linearity, structure and routine would discipline and shape the mind. Eighteenth century institutions were designed with the idea that the poor and the mentally ill would improve with the highly formalized policies and processes that foster respect for hierarchy. "Hospitals are often built near a pond, because Puritan thinking fostered the belief that water was part of a soothing, therapeutic milieu. Trees were considered a part of that, too. Work is being done now to bring water to the hospital environment. Some of these ideas and simple rules are helpful. But others are antiquated, and yet we still use them."

"Many modern [healthcare] facilities are ideological replicas of Puritan notions that linearity, structure and routine would discipline and shape the mind."

When he was vice president of Bryan Hospital in Lincoln, Nebraska, he headed an initiative that focused on family-centered care and eliminated some ritualized behavior. "I had always been fascinated by systems work, and then I got into cybernetics and feedback loops and their importance in organizational decision making, and began to model different levels of complex problems," he explains. He had read complexity scholars and was especially influenced by Paul Plsek, whose work dealt with innovation and creativity. "Twenty years after working on hospital systems design, I once again found myself working with an interdisciplinary group to design a care delivery model; one thing I insisted on was that every discipline and support service have a voice in the process . . . We wanted to hear everyone's story."

Surprisingly it was volunteers who often had the most creative ideas to humanize patient care. "They felt they were underutilized," he says. "We had retired professors, executives, craftsmen, and they knew how they could make a difference for patients." They learned to do patient care assistance, work that regular staffers did not have the time to achieve. They read to patients, and their help extended beyond such conventional roles as mail delivery. "They were not as engaged in the system, so they had freedom to innovate, and they used stories about their own lives to help reshape an attitude," he says.

One result was a set of simple rules that described job roles—and freed people to do what was right. Primary jobs were ones that legally had to be done by a health professional. Secondary roles, such as patient teaching, could be done by more people, and courtesy roles were things that were not ritually assigned such as answering the phone. Traditionally, only a unit clerk could answer a call, and if she wasn't there, the phone would go on ringing. If a patient fell, a nurse might help the patient while several other able-bodied adults watched. "As long as a nurse was there to direct, it became the expectation that we would do it together, so there was a potential of having many staff attend to patient safety," he says. "In healthcare, it is often the case that we carry so many linear rituals that we honestly believe that there is only one way to problem solve. Freeing people to have a conversation to rethink that is very powerful. As people eagerly tell their stories we learn about many patterns of behavior that can be effective. Unfortunately many leaders don't take the time to listen, or the culture is one where organizational silence is the norm – staff just do not feel safe enough to share openly. It is through stories that attractors, and deeper values come through, and that you really learn what's driving behavior."

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"The beloved Peter Drucker was right when he called healthcare the world's most complex operation," Dr. Bleich asserts. There are so many legalistic, regulatory, mechanical and technological demands that it is sometimes very hard to conceive of or act on the right thing. "And that," he says, "is why nurses are to be admired. Of all the disciplines in most care systems, it is the nurse who is charged with integrating care from multiple disciplines."

For instance, he says, "I have seen people do extraordinary things to break rules so that a patient can be with a loved one at a critical time. Nurses are the ones who facilitate that. The paradigm you work under has a lot to do with how you see your role, your vision, and how you interact and relate."

In teaching students to see beyond ordinary conventions, Dr. Bleich speaks of "shadow systems"—the way things really are as opposed to the way the manual says they're supposed to be. "We want to believe that things are efficient and mechanical with everything tidily in place," he observes. "But reality is messy. Everything is fine until the physician doesn't answer the pager on sixth attempt. Do you risk calling the house staff? A senior nurse? Another physician? Or you are with a patient, who you know needs care you are not technically authorized to deliver. Suddenly, all the dynamics change."

"When you go to an organization and ask how the medication system works, you most often get an answer that's close to the written policies and procedures. Then you ask, how does this system work on the night shift, or on weekend, or outside of the nursing department, and you get a whole different story. You learn about the heroics of supervisors who manage the underbelly –

the shadow system – for when the system breaks down and you need back-up drugs. You find unacceptable variability in how the medications systems are not always designed to have point-of-service drugs on the scene when they are urgently needed. Are these shadow systems hazardous to patients? Absolutely. It's a safety issue. But healthcare workers develop elaborate and elegant systems to protect themselves from being caught without something they critically need to advocate for the patient's well-being. These are the staff stories that must be heard."

Vast effort and expense goes into to teaching about systems, Dr. Bleich says, "but only when leaders recognize that shadow systems exist and work to create an open environment to eliminate these systems can safe and effective care be delivered.

"We have to really understand the relational dynamics, be sensitive to a general set of principles that let us do the right things, and celebrate the values that emerge . . . we should be about anything that is life saving . . . anything that makes people whole, and makes relationships whole."

He recalls a dying patient who had no family and wanted to see her puppy. "Nurses made that happen," he says, "and it was the most meaningful thing that could have happened to her."

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Dr. Bleich, who has the gifts of high energy and divergent thought processes, is a divorced father of three adult daughters. He takes long drives to relax from a hectic schedule, and spends a couple of weekends a year with colleagues who discuss professional and theoretical ideas. His faith is strong, but he is seeking a spiritual orientation that permits growth and change from within and allows alternatives to strict hierarchical structure. "When I wake up each morning, I try to set priorities for the day," he says. "What good can I do today that will have the biggest impact for an individual, a group, a class? What is the best use of my time?" ∎

By: Prucia Buscell, Plexus Institue

Meet our New Members

A new group of fascinating and talented people has joined our journey. Take a moment to meet them!

Peter Bradford

I am currently the president of the *League of Women Voters* in my county and on the West Virginia state board of that organization. We actively sponsor debates between local and state political candidates as well as provide advocacy on issues ranging from increasing the use of alternative energy in local housing stocks to sustainable development. I just retired from local elective office after ten years on the town council. I chaired their historic landmark commission for five years before that, and owned and operated a historic woodworking business for ten years before that. We did museum work and high end commercial projects. I have been a registered nurse since 1975. I have worked on psychiatric wards, in emergency rooms, on medical units in hospitals, in homecare, as a supervisory contract and cost analyst for a large HMO in the late 90s, and in the past five years as a program specialist for accreditation in hospitals, and in the current role in a large, multi-specialty not-for-profit ambulatory care practice.

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Joan Brady, DNS, RN

I am on faculty in the Department of Nursing at D'Youville College in Buffalo, New York. The clinical areas in which I teach are mental health and community health. I also teach courses in nursing theory and research and education. Complexity holds an intuitive appeal that can be somewhat credited to my undergraduate nursing education in general, and a 200 level nursing theory course in particular. There I was introduced to systems theory,

holism as well as the notion of energy fields and launched on a trajectory that encouraged complexity thinking. It was at about that time—more than 20 years ago—that I stumbled across 'chaos' in a lay science magazine and recognized in the theory something important.

As a clinical nurse specialist (CNS) educating other clinical nurse specialists, I have been talking about nonlinear, complex, dynamic systems for several years because of my belief that the CNSs' key contribution is their expertise in dealing with system issues. My graduate and undergraduate classes are designed to foster the development of cognitive and psychosocial skills that are required in a constantly changing health arena. This spring, I followed a link from the American Academy of Colleges of Nursing to the Plexus Institute's web page. Complexity Science represents the convergence of the some of the most compelling ideas that I have encountered. But it does more. It extends these ideas to a world view and translates thought into action. It looks like hope, It sounds like change, it feels like promise…

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Cynthia Flynn Capers

Cynthia Flynn Capers, Ph.D., RN, has more than thirty-five years of experience as a professional nurse, educator, researcher, consultant and family therapist. She completed her initial nursing education at Freedmen's Hospital School of Nursing, and earned her baccalaureate degree from the University of Maryland, and masters and doctoral degrees and post-doctoral work from University of Pennsylvania. In 2001 she was a participant of the Harvard University Institute for Management and Leadership in Education. Her scholarship and professional interests are in the areas of cultural diversity, family interactions and organizational leadership. Her leadership roles include: dean and professor at The University of Akron College of Nursing (current), national advisor to the Johnson & Johnson Campaign for Nursing's Future (current), six-year gubernatorial appointee to the Pennsylvania State Board of Nursing in vice chair and vice chair positions; board director for the American Association of Colleges of Nursing (two terms), study panel to review grants for federal agencies, and member of publication committees and editorial boards. As dean she has participated on numerous committees and task forces charged to articulate initiatives associated with budgeting and planning, academic plans, The Balanced Score Card, leadership in higher education, and inclusive excellence.

Her commitment to be a servant leader is illustrated through positions held on several Akron community boards: American Red Cross, Akron Community

Foundation and The Summa Health Systems Hospital Board of Trustees, Western Reserve Girl Scouts Council, Summit-Portage Area Health Education Center, American Heart Association, and the Coming Together Project. Her leadership has been acknowledged through awards including recognition in the 15th Anniversary Issue of Black Issues in Higher Education published in August 1999 as one of 15 highly influential faculty. She is proud of being invited to speak for Akron Roundtable in 2002 on the topic: "The RN Shortage – Nursing the Deficit Back to Health" and serving as the 1998 M. Elizabeth Carnegie Visiting Professor at Howard University. Dr. Capers believes leaders need to be authentic, communicate openly and seek to realize a shared vision. She also believes "the best leaders are those who have learned to inspire those around them and then get out of the way."* Her personal motto is: "Live to Love, Love to Live."

In response to questions, Dr. Capers says:

Presently I hold the position of dean at The University of Akron College of Nursing. My interest has been directed to organizational leadership (through my role and responsibilities) and servant leadership (through my participation on community and professional boards).

I am particularly interested in understanding the complexities of social and professional systems. It has become increasingly apparent that collaborative relationships that purposefully use synergistic approaches for realizing visions and solving problem are much more effective in producing positive outcomes. I very much want to learn more about complexity science so that I might benefit from thinking more broadly and working more effectively in professional and personal roles of my life.

I can't recall my first introduction to Plexus but more recently it emerged through my involvement in the Clinical Nurse Leader Implementation Task Force of the American Association of Colleges of Nursing. However, for some time I have been curious about topics of open systems, social systems, organization behavior, and chaos theories. But, given significant time restraints I have not joined the network calls to share my thoughts and learn from others. I am hopeful that within the year such time will be available and I can more actively engage in conversations and scholarly pursuits with Plexus members.

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Thomas R. Clancy, MA, MBA, RN

Currently I serve as the Vice-President of Professional Services at Mercy Hospital in Iowa City, Iowa. During the last 30 years I have served a variety of roles in the healthcare field at the executive, director and staff nurse level. I have also served as a consultant for implementation of clinical information systems in hospitals. My interest in

complex system theory developed after witnessing a number of failed attempts at implementing clinical information systems in hospitals during my time as a consultant. Many of the characteristics common to complex systems such as nonlinearity, scaling, emergence, self-organization and unpredictability, resonated with my experience after the introduction of such applications as physician order entry, point of care medication bar-coding, clinical documentation and other systems. To learn more about the impact of information technology in a complex systems environment I entered the PhD. Program in Nursing Informatics five years ago at the University of Iowa and plan to graduate in May 2006.

At present I am concentrating my research on using computational models to simulate the effects of clinical information systems on complex hospital processes such as medication administration, documentation, care planning and decision support. Computational modeling takes a set of assumptions regarding a system and translates them into mathematical or logical relationships that can be represented on a computer. Typically models are built visually using standard flow-chart symbols. The completed model is then simulated or numerically exercised over time to see how the inputs effect the output measures of performance. Thus computational models act as a surrogate for the real system and allow inferences to be made when parameters are manipulated. Computational modeling and simulation allows:

> "Simulated models of pre- and post-clinical information system implementation often show unanticipated nonlinear growth in process delays, errors, and queues."

- Low cost scenario analysis and uncovering unexpected system behavior;
- System parameters to be exercised beyond capacity without inflicting harm or expense;
- Virtual prototype testing and improved information system implementation;
- Immediate feedback and reframed existing mental models. This assists in breaking barriers to policy resistance and promotes learning and more realistic expectations.

Computational modeling and simulation is ideal for analyzing complex, multi-scale processes where system decomposition is no longer feasible. Simulated models of pre- and post-clinical information system implementation often show unanticipated nonlinear growth in process delays, errors, and queues. I have used computational models extensively to teach nurses and other healthcare providers the concepts of feedback, the effects of initial conditions, emergence and scaling where process parts invariably do not add up to overall system behavior.

I am also studying the use of evolutionary computation, social network analysis and evolutionary engineering as applied tools for complex system analysis in hospitals.

- *Evolutionary computing* is a broad research area of computer science, which draws inspiration from the theory of natural evolution. A population of entities survives through reproduction and adaptation to achieve higher levels of fitness. In biology, fitness levels are improved through variation and selection. Variation is influenced by genetic recombination and mutation while selection acts as a force driving improvements in overall population quality. An analogy can be drawn between natural evolution and evolutionary computation. Populations of mathematical functions can be created in a computer and then mutated and recombined in a manner similar to biologic genetic processes. Through "survival of the fittest" an optimal set of functions evolves that may result in the best solution to a complex problem. Evolutionary computation is particularly useful for optimizing solutions for complex problems such as hospital-wide nurse staffing or operating room schedules.

- *Social network analysis* is a set of methods and analytical concepts that focuses on the structure and pattern of relations in a social network. Social network analysis is beneficial in workflow analysis because it can uncover explanatory factors or variables that influence individual and group behavior. Social network analysis software allows users to uncover patterns that may be hidden in large data sets. These patterns may include knowledge networks or key hubs that explain the hidden paths where information flows throughout the hospital

- *Evolutionary engineering* abandons conventional systems engineering strategies of well-planned and fully understood systems with the creation of a planned environment that fosters learning and unanticipated advances. Professor Yaneer Bar-Yam, President of the New England Complex Systems Institute, has pioneered the evolutionary engineering approach which includes an emphasis on parallel competitive development teams where coexistence of multiple types of components are possible. The evolutionary process is most commonly associated with the formation of complex biological processes through competition, cooperation and natural selection, but can also be used in social organizations as well.

Although I am not an expert in computer or information sciences I have found the relatively recent growth in computational power to be exceptionally important in enabling the applied application of complexity theory. I hope I can contribute to Plexus by sharing my experience with this fast-growing area.

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J. Christopher Cutler

I've been a governance consultant since 1990 after twenty years in hospital operations. My goal is to make the governing board of any not-for-profit organization smarter and more effective. My work always includes the executive officer, usually addresses organizational strategy, and emphasizes new concepts and practices for the board to try.

I see limited success with the old, traditional models of governance, of stimulating group behavior, of trying to forecast predictability. I see vast opportunity for self-organizing groups and improved expectations in adaptability. I sense that new leadership techniques and approaches are needed to lead people and organizations in an increasingly complex industry (healthcare) and time (info/tech age).

I have followed Curt Lindberg's progress from his VHA days, even been present when he and his learning colleagues were exploring Ralph Stacey, and the Santa Fe Institute, and other scholarship. I need to refocus my early interests to learn more, and more proactively apply complexity theories to my consulting work.

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Barbara Penprase, PhD, RN, CNOR

I have been interested in complexity science for the past seven years as it was the theoretical framework for my dissertation in anthropology. My research examined two large hospitals each undergoing a major change process. I collected data for two years using a descriptive qualitative research study that included ethnographic methods of fieldwork (interviews and focus groups), and participant observation (meetings). Through this process, I discovered relevant themes. Findings were then developed based on recurrent themes and the relationship to key concepts of complexity theory. Of special interest were attractors, spontaneous formations of groups and fitness landscape. Five main patterns emerged: hierarchical order of management, illusion of power, communication, resistance, and trust/distrust. I have since completed research in another hospital and analyzing patterns as they relate to my dissertation findings.

Presently, I am working with another colleague in researching complexity science and its application to nursing. Our research complements each other in behavior application of complexity science to nursing as well as application of systems using a complexity science framework.

My main interest is application of complexity science to understanding patterns of change in nursing and hospital administrative systems. Once

understood than how this knowledge can be applied to the change process to assist in positive outcomes with less resistance from staff.

I became familiar with Plexus when writing my dissertation. It was one of the rare organizations that focused specifically on complexity science at that time. It was, and continues to be, a site I visit frequently for updates in what is currently happening in complexity science as well as allowing me opportunities to network with other people–including nurses–interested in complexity science theory.

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Eli Sopow

As a living, breathing complex adaptive system I attempt to interweave my financially-paid work as a strategist with the Royal Canadian Mounted Police with my emotionally-rewarding home life and academically satisfying continuing study of complexity science.

I am interested in the power of networks, the beauty of spontaneous self-organization, and the inherently organic nature of organizations that replicate human behavior far more than mechanical systems.

My membership is an example of both self-organization and emergence. I completed both my MA and PhD after the age of 50 (utilizing complexity principles in both dissertations). The Plexus Institute in its early years helped me escape from 30 years of being held hostage by linear, reductionist management thinking. I re-found you on the Internet and am happy to be part of this glorious network.

And that's that!

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Plexus Fractals

Looking for the ultimate experience of complexity in action? Find a Plexus Fractal near you... and see what connections emerge!

Plexus DC Fractal:
Taking Complexity to Work:
The Dilemmas of Organizing "Knowledge Work"
Guest Speaker: Mark Addleson, PhD, George Mason University

Join us for a stimulating dialogue! Everyone with an interest is welcome -- there is no charge to attend.

According to Mark, "to do knowledge work effectively, people have to participate fully in organizing their work which means they have to be accountable to one another. Organizations, however, are relics of the industrial era and require people to comply with directives from 'the top.'

"There are deep tensions between compliance (control from the top) and accountability (where people are responsible to each other) and a shift to accountability means profound change. This is the dilemma organizations face today. Top-down control works only when problems are simple ('tame'). The problems of organizing knowledge work are enormously complex and that is what people find in their day-to-day work lives. People don't pay attention to the complexity of organizing, and complex problems ('wicked problems') don't respond to conventional management practices. People have to work together to resolve them but the top-down mindset and culture prevent this.

"Organizations are stuck between high control and participation. The result is that they don't function effectively. Knowledge work needs creativity but people don't create. Knowledge work requires collaboration but people don't collaborate. Instead, they have a sense of fragmentation, feel discouraged, and at work the mood is often one of resignation, not enthusiasm. So, the big question is how to resolve this dilemma.

"Solutions are probably more difficult than we imagine. To understand why, we need to distinguish between tame (simple) and wicked (complex) problems. The way to maintain the status quo in organizations and the considerable benefits to people at the top from having power concentrated at the top is to pretend that problems are tame. That keeps organizations stuck and prevents people from organizing in the way that knowledge work requires. In focusing on these issues, I'll talk about the implications for unsticking organizations."

Mark Addleson is a teacher, researcher and consultant in the School of Public Policy at George Mason University. He was born and raised in South Africa and taught at the Graduate School of Business Administration in Johannesburg. He directed the Organization Development and Knowledge Management Masters degree at GMU until this year. The program focuses on developing group- and team-based approaches to organizing. Mark also works with the Organizational Coaching and Learning Group (www.tenconversations.co) on changing the way people organize in order to deal more effectively with the tough problems of organizing knowledge work.

- *Place*: Van Ness East Social Room • 2939 Van Ness St. NW • Washington, DC 20008
- *Metro*: Red Line Van Ness/UDC
- *Parking*: Free – park in visitors' space and bring keys to desk

"There are deep tensions between compliance (control from the top) and accountability (where people are responsible to each other) and a shift to accountability means profound change. This is the dilemma organizations face today."

Toronto Fractal

On the heals of a very successful *Positive Deviance* workshop in early November, the Ontario Fractal group met November 24th for the first time this fall. Lively conversation centered on complexity and learning. Sean Park, a student at the Ontario Institute of Studies in Education (OISE) is doing a thesis on this theme. He shared his work in progress. Participants had a chance to give feedback and to share their own stories about introducing complexity into their own places of work. We often hear from people who attend Plexus conferences and workshops that the concepts are fabulous and make great sense in the moment but once they return to the workplace they have a hard time making headway. During our conversation we heard about one workplace that invites speakers for learning events and asks them not to prepare anything. Instead the speaker is engaged in dialogue with participants.

Learning is demand-driven, having employees ask the questions to focus on the areas they are interested in learning more about.

Sean is interested in understanding stories as complex adaptive systems. This premise underlies in part the basis of a dissertation by Christy Armentrout-Brazee in 2002 called *The Use of Organizational Stories as a Learning Tool Toward the Complexification of Knowledge* which was shared during the session. We also used two draft pieces by Sean which make for great reading and an article by Edgar Schein from Reflections, Volume One, Number One called: *Kurt Lewin's Change Theory in the Field and in the Classroom: Notes Toward a Model of Managed Learning.* Stories engage us all. We have come to understand and use stories as powerful tools to help people learn not just about complexity but about many things. Sean's work will help us understand more about the stories themselves, how we each experience those stories and how they adapt and shift and change to meet the many contexts in which they may be told (or formed). Watch for future updates on how the research is going!

The Ontario Fractal is planning meetings early in 2006 with Brenda Zimmerman to catch-up on her HIV/AIDS work and we hope to arrange a tour of the New MaRS Discovery District in Toronto. The MaRS Discovery District is a not-for-profit corporation founded by a group of business and community leaders to help foster research and innovation and take the discoveries from the lab to the marketplace. MaRS is at the heart of the District, two square kilometers in downtown Toronto. We are also working on plans for a session on physical environments and complexity. Other suggestions are always welcome.

For more information or to join the Ontario Fractal Email Mailing List please contact….same as always…Liz Rykert

E-mail: liz@metastrategies.com ■

PlexusCalls
Winter 2005-2006
Bringing People Together in Conversation

If you would like to listen to these provocative conversations:

- Dial (319) 256-0200
- Enter the access code 35243, followed by "#"

PlexusCalls are scheduled for Fridays from 1 PM to 2 PM Eastern Time. Please check www.PlexusInstitute.org for further details, additions or changes to the schedule.

E-mail your questions before or during the call to PlexusCalls@Plexusinstitute.org

January 20
Complexity and Organizational Leadership

Guests will include Henri Lipmanowicz and Grey Warner. Mr. Lipmanowicz recently retired after a distinguished career at Merck, where he was president of the Merck Intercontinental and Japan Division and a member of the Management Committee. Mr. Warner is senior vice president for Latin American Human Health at Merck. Both are experienced executives with practical and theoretical knowledge of complexity science and its applications to organizational management and leadership. Mr. Lipmanowicz also is chair of the Plexus Institute Board of Trustees.

January 27
Complexity and Human Services

Guests will include **William Waldman**, former director of Human Services in New Jersey and now a professor at Rutgers University; **Rita Saenz**, former director of Social Services in California, who is now the chief executive officer the Academy for Coaching Excellence; and **Liz Rykert**, a social worker by training who now heads MetaStrategies, Inc., a Toronto-based consulting firm organization that helps charitable, nonprofit and community organizations use the Internet and develop innovative web-based capabilities.

Other calls in 2006 will explore complexity and organizational leadership, the uses of positive deviance in medicine, and the value of storytelling in initiating social change. Check the Plexus website for details.

Recent PlexusCalls included:

- *Complexity, Self Organization and Ethics (November 11)*
  Guests were Dr. Douglas Griffin, associate director of the Complexity and Management Centre at the University of Hertfordshire in the UK, James Taylor, DMan, president of the University of Louisville Hospital, Louisville, Kentucky, and John Tobin, chief executive officer of Waterbury Hospital in Waterbury, Connecticut

- *End of Life Communication (December 2)*
  Guests were Linda Harris, PhD, senior health communication scientist at the National Cancer Institute and Jack Lannaman, PhD, associate professor at the University of New Hampshire's Department of Communications, who have researched and written about communications that take place among the dying and those close to them. ■

Learning at Mayo

When Plexus Institute offers opportunities for members to connect with complexity in action, the only predictable outcome is that there will be *learning.* Here is a report from one member who seized the opportunity.

The Plexus Institute sponsored a field trip to The Mayo Clinic on November 16 as part of the annual conference of the Organization Development Network held recently in Minneapolis. We boarded an executive coach in downtown Minneapolis and, during the 90 minute ride to Rochester, had a "rolling workshop" on complexity principles and how they might apply in managing organizations, delivered by Lisa Kimball.

Tour participants reflect on the complexity implications of the Chihuly chandeliers at the Mayo Clinic — just one piece in the organization's extraordinary art collection.

When we arrived at Mayo we started with a tour of the amazing Gonda building and Mayo's extraordinary art collection. We learned how Mayo thinks about the relationship of space and art to the overall feelings of hope and well-being of Mayo patients and their families.

Dr. Steven Hagedorn, a consultant in family medicine at Mayo, and a Plexus Trustee, was the Institute's connection for the session. Our guide stressed that Mayo considers every detail relevant to the overall healing experience. Mayo even has an institute for the humanities in medicine which focuses on complementing care by attending to the human spirit. One of the highlights was the phenomenal chandelier by American glass artist, Dale Chihuly, that hangs over the passageway that doctors and nurses use on their way to work each day.

After our tour, we were taken to a conference room where we met with Mayo leaders, including Denis Cortese, MD, President and CEO of Mayo Foundation. Cortese shared his ideas about the Mayo culture of collaboration and how that differs from most other medical establishments. Cortese credits Mayo's focus on the patient at the center and an integrated approach to information sharing that began with Mayo's groundbreaking invention of the unified medical record decades ago. He offered many insights about the challenges of leading a complex institution like Mayo, particularly the necessity to deal with ambiguity and change.

We had a fascinating panel of Mayo leaders including Eugene Dankbar, Continuous Improvement Coordinator; Prathibha Varkey, MD Preventative Medicine, Director of Quality; Todd Bille, Planning Consultant; and Ashok Patel, MD, Pulmonary & Critical Care Medicine. Each had a unique perspective on how they see some of the key notions from complexity science applying to their work. In particular, how the idea of managing by providing "minimum specs" rather than detailed instructions to staff results in greater creativity and better performance overall.

Field trip participants asked lots of good questions and we wanted to stay longer but we had to get back on the bus and return to the city. Luckily the "white out" snow conditions that we experienced on the way to Mayo were gone by the time it was time to return! Our many thanks to Katherine Reller, Mayo Office of Continuous Improvement, who put together all the arrangements for our visit. ■

By: Lisa Kimball • www.groupjazz.com

November, 2005

Dear Friends,

Plexus Institute is concluding an exciting year in which our mission of understanding, using and diffusing complexity concepts for the most beneficial purposes has been in clear focus. We have begun initiatives for complexity-inspired innovations in healthcare and community, organizational leadership, and we are seeking your generous support to help carry them to completion. Work underway includes:

- A drive to introduce positive deviance (PD), a novel and successful approach to social and behavioral change pioneered in the developing world, to the Plexus membership has led to: the first PD application in healthcare at Waterbury Hospital, an initiative to help patients effectively use prescribed medications; an effort to more fully engage employees in the Latin American division of Merck, and plans to confront a deadly epidemic of infections in hospitals.

- An effort to dramatically reduce the incidence of hospital acquired infections, 70 percent of which are caused by bacteria that resist treatment by common antibiotics. Methicillin resistant Staphylococcus aureus (MRSA) in particular is the fastest growing and most virulent of these dangerous pathogens. MRSA, left unchecked, has the potential to become a public health catastrophe. Using PD, lives, misery and money can be saved.

- Introduction of complexity theory into nursing education has the potential to change the delivery of healthcare in America. Research has shown that complexity-based management practices, which include increased participation by nurses in decision-making, can dramatically improve patient outcomes. Plexus initiatives in cooperation with professional nursing organizations and academic institutions can modernize nursing education through the infusion of new concepts from complexity science.

Our mission is *fostering the health of individuals, families, organizations and our natural environment by helping people use the concepts emerging from the new science of complexity.* With your help we can continue crossing the bridge from concept to reality. We are grateful to have come this far, and we will be grateful for any help you can give to continue this mission. Please consider a year-end, tax-deductible gift. Help us reach our goal of $140,000.

With thanks and appreciation,

Curt Lindberg
President

"We have never seen positive deviance spread so rapidly. Our connection with the Plexus community has been a breakthrough that enabled us to apply this critical approach for the first time to complex issues in US healthcare. It has been an enriching experience."

- Jerry & Monique Sternin
Pioneers in
Positive Deviance
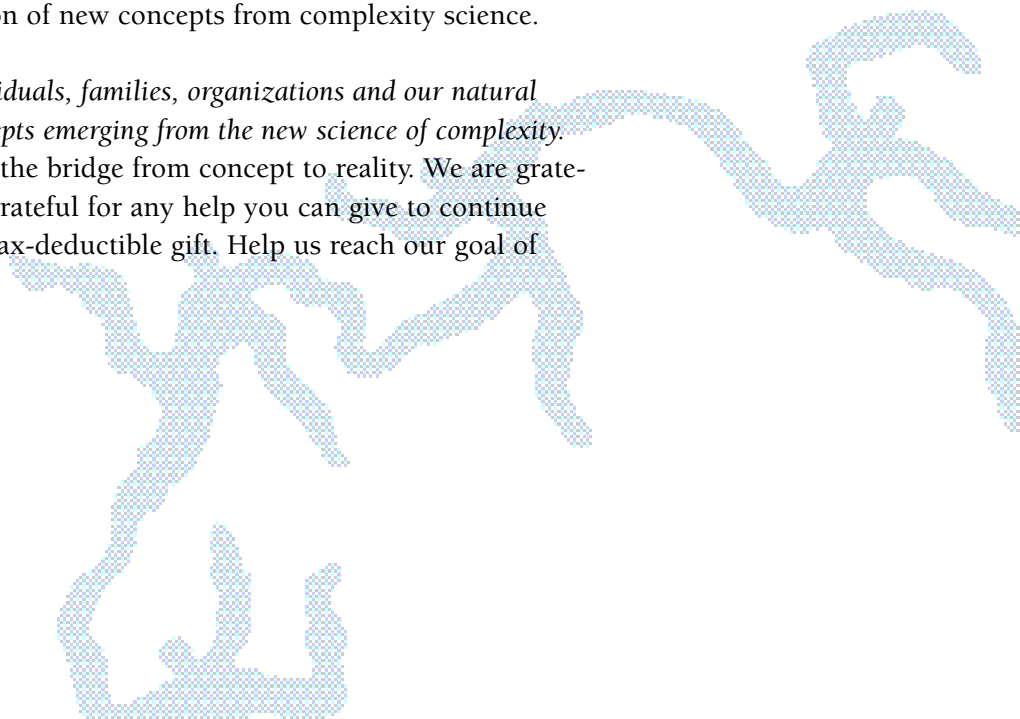
Support

Plexus is deeply grateful to the many individuals and organizations whose generous contributions have aided the Institute's mission over the past year. We thank you all and sincerely appreciate your support.

- Ruth Anderson
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- Sharon Benjamin
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- Henri Lipmanowicz
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- Merck, Employer Giving Campaign
- Merck & Co. Latin American Human Health
- Mindy Meyer
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- Norman Zanger
- Harry Zerler

Discover Plexus Institute in Action

Please watch for our year-end report, which will be available as a separate PDF document. In it, you will find more detailed information about the activities of Plexus Institute.