

Edward O. Wilson Speaks on Complexity



One of the world's greatest living scientists sounds off on complexity. Recently, Edward Wilson met with leaders of the Plexus Institute to talk about complexity and organizations. Then he challenged Plexus with a unique charge...

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The Mission of Plexus

Systems are defined by purpose. After much work, we have articulated the emerging purpose of Plexus. Learn more here.

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Introducing a New Lineup of Plexus Conferences

Looking for opportunities to extend your learning about complexity principles? Today, your opportunities are abundant. Take a look at our newest offerings.

[Click here or turn to Page 12.](#)

plus

“Plexus is Your Baby” -- Happy Birthday, Plexus! • Tour our new office space.

Welcome to *emerging*.

Welcome to the premier issue of *emerging*, the bi-monthly news journal of Plexus Institute. *Emerging* features news and articles designed to:

- Immerse you into the ideas of complexity in an understandable way.
- Report on the latest thinking of some of complexity science's leading practitioners.
- Share news about the work of Plexus Institute.
- Connect you to Plexus resources that can deepen your own complexity thinking.

Distribution of *emerging* will remain digital. If you wish, please feel free to print portions of this PDF document on your printer. And, please help the emergence of *emerging* by freely distributing it with any colleagues you think would find it interesting.

Welcome to *emerging*. Please [drop me a line](#) sometime and let me know what you think.

Cheers,

Curt Lindberg,
President

Plexus Finds a Home

“New ideas must use old buildings” writes Jane Jacobs. That’s why our new office goes back 300 years.

By Curt Lindberg, President, Plexus Institute

Plexus Institute has settled into its first home in The Olde Mill Allentown, a small bustling village in central New Jersey. In selecting this place we followed some advice Jane Jacobs conveyed in her classic book *The Death and Life of Great American Cities*.

“Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them... If a city area has only new buildings, the enterprises that can exist there are automatically limited to those that can support the high costs of new construction....As for really new ideas of any kind - no matter how ultimately profitable or otherwise successful some of them might prove to be – there is no leeway for such chancy trial, error and experimentation in the high-overhead economy of new construction. Old ideas can sometimes use new buildings. **New ideas must use old buildings.**”

Our building is old. Originally constructed in 1706, the Mill is on the National Register of Historic Places. Stop by for a visit some time.



▲
Our neighbors in The Olde Mill are artists, potters, craft-makers, and Trudy and Werner who run an old-style German restaurant on the ground floor. We’re on the third floor next to Lisa, the massage therapist.

Our space is wide open, filled with light, and an interesting mix of old and new. Our computers stand in the shadows of hug cogs, wheels and redundant machinery from the mill. Our desks need two-inch wedges to make them almost level. Through the window come sounds of water falling over the spillway. Check out our "complexity" library on the right.



Plexus Is Your Baby

Plexus is one year old...and the opportunities for involvement are greater than ever before.

By Henri Lipmanowicz,
Chairman, Plexus Institute

I have a granddaughter who is 16 months old. In the space of her very short life she has gone from a totally helpless newborn to a lively child who can walk, use a spoon, wave, kiss, point, grunt a few words and understand a great many. While she has gone through an amazing transformation she still is far from being self-sufficient but she is part of a complex support system that is wonderfully willing to be “adaptive”.

Plexus Institute is one year old. It too is still in a fragile phase of its life. To continue to grow, develop and thrive it needs the same kind of adaptive support from all of us who are interested in its success. Support means participation and contributions.

- Demonstrate your support by signing up as a [Plexus Professional Member](#) or, if you can't, as [a Personal Member](#). You'll soon receive information on how to sign up as a member.
- [Look through the list of Plexus Conferences](#) and sign up for one or more. If none appeals to you, [propose other themes](#) that would be of interest to you and we will do all we can to make your wish come true.
- If you think your organization might be a candidate for [Plexus Partner Membership, contact us](#).
- If you can afford it, send in a [tax-deductible donation](#).

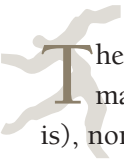
Plexus is your Institute. It is your involvement that will determine what you, in turn, will get back. On behalf of your hungry baby, thank you and happy 2002. ■

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Wilson Speaks on Complexity

The Plexus Institute is affirmed and charged by one of the world's greatest living scientists: "You have a grand responsibility before you."

The first thing that must be said of Edward O. Wilson is that he is a gentleman. Not that he is one of the world's greatest living scientists (which he is), nor that he has twice won the Pulitzer prize (which he has), nor even that he founded the field of science that is sociobiology (which he did). What is most striking about the man is his humility, his humanity.

This is significant, not just as idle hero worship (okay, it's that too), but as a testament to his tremendous care for human beings and all living things, and his preoccupation with the relationships that bond them. He is what he preaches.

In November of 2001, Dr. Wilson accepted the invitation of Roger Lewin and Curt Lindberg and met with Tom Kepler, Vice President for Academic Affairs at the Santa Fe Institute, and several members of Plexus Institute at the Faculty Club of Harvard University.

"What's the agenda?" one Plexus member asked Curt Lindberg as we waited for Dr. Wilson's arrival. "What are we going to accomplish in this session?"

"Oh, I don't know," responded Lindberg. "I thought we'd just talk, ask him some questions about complexity." We chuckled at this response, which at first blush seemed rather casual for a meeting with such an eminent figure... but on second thought bespeaks Curt's own embodiment of the principles of complexity, and his unwavering faith that meaning, if given sufficient berth, will emerge.

And so Wilson arrived and we did exactly as Curt had suggested. We just talked.

This is what we learned.

Complexity Matters

In his groundbreaking 1998 book *Consilience*, Wilson expressed reservations about complexity science. At that point, he asserted, it was a promising new theory with too little empirical data to support it.

His healthy skepticism had not escaped the Plexus Institute. So when Roger Lewin began the meeting by asking Wilson to elaborate on his stance, Wilson surprised us with his response: “Complexity science is where we are going,” he said, referring to scientific thought in the 21st century. “It is the future.”

Lewin asked: Why the turnaround?

“There is more data,” Wilson said simply. A lot is known in 2001 that was not known in 1998 – particularly in the supportive data from the study of ecosystems, social insects and cellular dynamics.

“Very few intellectual conceptions have the breadth and flexibility of complexity science,” he continued. He pointed out that most scientists are too specialized and too busy to contribute to any cross-disciplinary synthesis of emerging data, to nurture consilience. (He apologized for this, fearing that the reference to the title of his own book might appear self-serving. Ever the gentleman.)

“Today it is harder for a scientist to single-handedly make new discoveries,” he said. Rather, the future of science lies in a collaborative synthesis of existing data to understand interactions within complex systems at all levels... beyond the level of the single cell.

Consider as evidence the phenomenal advances in mapping the human genome. One of Wilson’s Harvard colleagues, Dan Brandon, is currently “blowing through” the process developing nanopore technology to automate the sequencing process, so that soon a person’s entire genome may be mapped in days or hours, rather than years and months.

This sort of advance in reducing the genome to its parts will allow more time to move on to the next challenge: understanding how the expression of the gene is regulated, how the proteins synthesized by DNA translation fold into three-dimensional structures; and how they interact with others to create cellular dynamics. This is the realm of *proteonomics*, and complexity will have much to contribute to this endeavor. The focus of science is shifting to the complexity at the cell and molecular level, and then on to the higher systems, e.g., microorganisms, social insects, humans, and the most complex systems of all, ecosystems. “Technology is providing us with brute force for complex analysis,” making complexity science a more realistic avenue to pursue.

“Complexity science is the future of scientific thought in the 21st century.”

Complexity in Biology

The appearance of complexity on Wilson’s radar screen is more than just a passing curiosity. Its influence is steadily creeping into the realm he knows and

loves: The biological sciences. One important new direction in biology is “community ecology” – and it finds, at its roots, complexity theory.

Wilson cites as another complexity example the BioDepth Project’s EcoTron initiative, which is designed to study the stability of ecosystems. “There was a time when it was believed that an increased number of species in an ecosystem produced increased *instability*,” he said. “Intuition told us that it should be the other way around: The more species you have in an ecosystem, the more stability there should be. But we were never able to back it up with data.” But now, thanks to computer power and analysis, it’s possible to process such complex data. Today, EcoTron’s evidence is supporting what intuition suggested all along: Increased diversity produces increased resilience.

“In the southern Appalachian Mountains, there is not the diversity that you would find in, say, the rain forest,” he illustrated. “And so when a new species of aphids intruded in the Appalachians, they did an enormous amount of damage. There just wasn’t a lot of resilience in the system” to accommodate the introduction of a new species. In biological systems, complexity produces viability. Diversity spawns health.

Consider another complexity-rich realm: sociobiology. It’s an intriguing science that is preoccupied with the interactions between biological and social forces in shaping human thought and behavior. If you want to understand human response, you can’t focus solely at the level of the neuron. Instead, scientists must look “one level up”, and look at the complex linkages in the mind, the “rules” that influence behavior. We are born with behavioral instincts that are a product of mammalian evolution. They provide us with an array of possible responses. Our behavior is a result of an interaction between these inherited rules and the culture we find ourselves within. The study of the mind therefore will require connecting heretofore-disparate disciplines, e.g. evolutionary anthropology and cognitive psychology. Cognitive neuroscience, or brain science, will help bridge the gap between the natural and the social sciences. How the brain works, and why it works that way — linkages will need to be made between different disciplines to figure this out.

It’s relatively easy to do the reduction part of science. The harder part comes next: to go back up through the different levels to understand the *complex interactions between the agents*. This is not to suggest that reductionism is the bad guy; It is absolutely valuable to isolate the discrete elements in all areas, and then to do the synthesis work – either with real data, or with mathematical modeling if necessary.

“Today, EcoTron’s evidence is supporting what intuition suggested all along: Increased diversity produces increased resilience.”

A Message to Plexus Institute

Before leaving, E. O. Wilson shared a few words of encouragement. Those within the complexity field have “a grand opportunity” to inform the public about human to nature interactions. Complexity theory can make contributions to natural resource conservation, by explaining the importance of diversity, interactions, interdependence, resiliency, and robustness to perturbations. Those who study complexity theory [and participate in Plexus Institute] “should be ardent conservationists,” he said with conviction, and people understand that we don’t want to risk decisions that have irreversible consequences for the planet. Wilson is urgent: today, human actions are destroying one tenth of one percent of the earth’s species each year; it takes one million years for a new species to emerge.

Wilson expressed enthusiasm for the Plexus Institute’s focus on systems at all levels, from the individual to the organization to society... and shared his hope that efforts would focus strongly on the area he is most passionate about: conservation. The two subjects go hand in hand. He suggested that Plexus link up with ecological researchers – “they are highly motivated, are doing very good science, and have taken a ‘Manhattan project’ type approach to their work.” The study of ecosystems will inform complexity science and vice versa.

Wilson affirmed Plexus’ vision to become an umbrella organization for initiatives, to nurture the science and its application along. He encouraged the institute to align with the best thinkers in many related fields, and to build a reputation as a central research enterprise.

He also suggested that there are potential enthusiastic recruits in the business community that could help fund programs. For business, the prospects are tantalizing: a scientific explanation of human nature and a richer understanding of what the human mind needs.

Wilson warned that in approaching social problems through complexity, we are tackling conventional wisdom and practice. He emphasized that the rules that have worked best over time are now the basis of much of our decision making. In other words, much of human nature arose from survival imperatives in our former lifestyle as hunter-gatherers and primates. Many of our innate tendencies are no longer appropriate to our world culture and are also contributing to the devastating impact we are having on the biosphere.

Making a switch from our current mode of thinking would undermine some thinking. This switch is good according to Wilson, but a difficult transition to make.

It was getting late in the afternoon. The sky was graying, and an unusually warm November wind was encircling the Harvard Faculty Club. Wilson – ever generous with his time – was nonetheless anxious to return home to his

“Those within the complexity field have a grand opportunity to inform the public about human-to-nature interactions.”

wife. As Wilson stood to put on his coat, we all stood too, challenged, affirmed and, frankly, *moved* by the kindness and conviction of this great man of science. Wilson was right: It was a grand opportunity. ■

Meeting: November 7, 2001, Harvard University, Cambridge, Massachusetts

Participants: Ryma Bielkus, Steven Hagedorn, David Hutchens, Tom Kepler, Roger Lewin, Curt Lindberg, Robert Lindberg, Henri Lipmanowicz, Birute Regine, Liz Rykert, John Sewell, Edward O. Wilson


Notes By: Robert Lindberg and David Hutchens

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The Mission of Plexus

Plexus has defined its organizational mission statement. Naturally, the process was inspired by complexity.

 Purpose is an attractor. For systems, it is a locus of organization and a cornerstone of structure.

Like much else in our organizations, *purpose* (or *mission*) takes on a very different flavor when viewed through a complexity lens. The student of complexity would recognize purpose as an emerging phenomenon. That is, rather than dictate an identity for the organization, we would instead listen to the organization's unfolding identity. Rather than tell the organization what we think it should be, we listen to its inherent wisdom as it reveals to us what it already is.

Over the past year, that is exactly what members of Plexus have been doing. Through a free exchange of ideas at Plexus gatherings, and via e-mail and listserv, Plexus members have explored who we are, what we do, and why we exist. Many drafts of mission statements were offered, massaged, rejected and resubmitted. Most importantly, through this sometimes messy process, members *listened* for emerging themes and patterns. Here are some ideas that continued to emerge:

- **Health and Well-being:** Plexus is attentive to the productive growth and adaptability of organizational systems. This idea was continually expressed in organic terms, like *health*, *well being* and *viability*.
- **Systems at all levels:** Plexus Institute doesn't recognize artificial boundaries between the worlds of business, society, families, ecosystems and individuals. Members of Plexus see the commonalities across these systems as

significant, and their interrelationships long overdue for exploration and nurturing.

- **Practical application:** New ideas are no good if people can't understand them or use them. More than a "think tank," members of Plexus are insistent that complexity thinking can and should make a practical difference in the ways people think, work, interact and live. In short, Plexus wants to put the ideas of complexity to work.

As these themes became clear, an articulation of the Plexus mission began to come into focus. After some last-minute polishing and debate over conjunction usage and comma placement, we present the mission of the Plexus Institute:

“To foster the health of individuals, families, communities, organizations and our natural environment by helping people use concepts emerging from the new science of complexity.” ■


Notes By: David Hutchens

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Planned Plexus Conferences

There have never been more opportunities to explore the principles of complexity. Deepen your learning today!

 Here you will find a working list of conferences to be offered by Plexus Institute in 2002 and 2003 and those under consideration. We hope you find this information helpful as you plan your “learning” and “complexity” calendar for the upcoming year. We also hope you find the conference themes relevant and stimulating and our growing cast of conference faculty – folks like Stuart Kauffman, Everett Rogers, Glenda Eoyang, Roger Lewin, Reuben McDaniel, Birute Regine – appealing.

More detailed descriptions of each of these events, as well as some conferences sponsored by others, [can be found at our Plexus Institute website](#).

The themes for these events were all suggested by Plexus members or emerged from conversations at Plexus gatherings. You are invited to suggest additions to the list of conference possibilities, a list under perpetual construction. You are also invited to share this list with colleagues and friends.

While each conference is organized around a specific theme, you can expect the learning to extend beyond the selected themes since you will have meaningful opportunities to interact with our special faculty and with a wide variety of people with experience using complexity in their work and in their lives. Given the scope of the themes most conferences are expected to be the first of a series of events that will gradually explore each issue in greater depth.

All the conferences are interactive forums for sharing experiences about the use of complexity science concepts, for experiencing complexity-inspired processes, and for building relationships.

There are no “prerequisites” for attending Plexus conferences; they are not aimed at specific positions or jobs. Rather, they are oriented around topics of

general interest and designed to appeal to a wide range of people. So, if a conference theme is appealing to you, sign up. A diverse group of participants will enhance the creative potential of the conference and enrich the learning experience for everyone.

2002 Programs

Unleashing the Story-Teller Within You: Tapping A New Leadership Skill

Faculty: Birute Regine, EdD, Roger Lewin, PhD, Stuart Kauffman, PhD.
Date: March 21-23, 2002, Santa Fe, NM

Healthy Organizations & Leadership: What We Can Learn From Complexity Science

Faculty: Glenda Eoyang, and Plexus members experienced in complexity-based leadership.
Date: April 29-30, 2002, Los Angeles, CA

Diffusing Innovations: Learning With Everett Rogers & Each Other In An MG Taylor Environment

Faculty : Everett Rogers, PhD.
Date: June 21-22, 2002, The Borgess Navigation Center, Kalamazoo, MI

Healthy Organizations & Leadership: What We Can Learn From Complexity Science

Faculty: Glenda Eoyang, Plexus members experienced in complexity-based leadership.
Date: September 20-21, 2002, Hunterdon Medical Center, Flemington, NJ

Planning In Uncertain Times: Complexity and Emergent Strategy

Date: Fall 2002, two-day conference plus a one-day pre-conference introduction to leadership and complexity, Ottawa, Toronto or Montreal, Canada

2003 Programs

Tapping Complexity Science, Making Better Sense of Health and Healthcare

Date: February 20-22, 2003, two-day conference plus a one-day pre-conference introduction to complexity, health and leadership on February 20, 2003, Rochester, MN

Healthy Organizations & Leadership: What We Can Learn From Complexity Science

Date: Spring and Winter 2003, two-day conferences, locations to be determined

Uncertainty and Surprise: New Research Questions On Working With The Unexpected

Faculty: Reuben R. McDaniel, Jr., EdD, and scientists from The Ilya Prigogine Center for Studies in Statistical Mechanics and Complex Systems, also at University of Texas at Austin.

Date: Spring 2003, two-day conference, University of Texas at Austin, Austin, TX

Health, Healthcare and Complexity in the UK

This special conference will build on the one held in February 2003 in the US (see above) and bring together people from both countries with the objective of expanding the diversity of participation while still focusing on the delivery of services within the British healthcare system. The conference is open to the same wide range of participants with and without medical backgrounds as were welcome to the US conference.

Date: Summer 2003, two-day conference plus a one-day pre-conference introduction to leadership and complexity, United Kingdom

Conferences Under Consideration

You are invited to suggest additions to the list of conference possibilities, a list being perpetually constructed by Plexus members.

- Exploring healthy families: what can we learn from complexity science?
- Plexus summit: learning from each other's experiences
- Education: looking at learning and educational systems from a complexity perspective
- Command and control, or imposed organization versus self-organization: conflict or co-existence?
- Ecosystems and complexity: implications for the environment
- Innovation: role of self-organization and diversity
- Healthy communities: factors affecting self-organization
- Trust and self-organization in human organizations
- Transmission of HIV in high incidence area: a complex interactive process
- Journalism: interpreting world events through a complexity lens

Document Links:

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