

Robin Chapman, professor emerita of Communicative Disorders at University of Wisconsin-Madison, is the author of eight collections of poetry, most recently (with J.C. Sprott) *Images of a Complex World: The Art and Poetry of Chaos* (<http://www.worldscibooks.com/chaos/5882.html>), Winner of the 2005 Posner Book-Length Poetry Award from the Council for Wisconsin Writers. Previous collections include *Once*, *Arborvitae*, *The Only Everglades in the World*, *The Way In* (1999 Posner Poetry Winner), *Banff Dreaming* (CD), *Learning to Talk*, and *Distance, Rate, Time*. Individual poems have appeared in *Poetry*, *The Hudson Review*, *The Southern Review*, and *The Iowa Review*, as well as numerous other journals and anthologies. Chapman's poems have been set to music and incorporated into paintings; in addition to her two Posner Awards, she has received two individual grants from the Wisconsin Arts Board. Chapman belongs to Prairie Fire Quartet, teaches a poetry workshop at The Clearing with Judith Strasser, and is the co-organizer of the Epidemic Peace Imagery Exhibit. She has two books of poetry forthcoming in 2007 and 2008. Chapman lives in Madison with her husband Will Zarwell, and has two grown sons. She operates a poetry blog at <http://robinchapmanspoemaday.blogspot.com/>.

**WV: *Images of a Complex World: The Art and Poetry of Chaos*, coauthored by Julien Clinton Sprott who is well-known around Madison for his annual “Wonders of Physics” show, won the Council for Wisconsin Writers’ Posner Award this spring; Professor Sprott provided the computer art for this volume, as well as explanations of the mathematical and scientific concepts which inform the book, while you provide poems that complement these images. A physicist and a poet seems like a somewhat unlikely combination: how did the two of you meet? Whose idea was the book, and how did it come about?**

RC: We've known each other for 20 years in the contra dance community, but about ten years ago I began participating in the interdisciplinary Chaos and Complex Systems Seminar that Clint had started; I was interested in how ideas about nonlinear dynamic systems could help researchers in child development reframe our theoretical questions about children's paths of learning and change, and I wanted to see more social and biological science represented in the weekly talks. The talks I heard sparked many poems, and eventually I put a manuscript of chaos poems together. And Clint, who came to chaos via plasma physics, had become fascinated by the beauty of visual displays of chaotic systems and set up an award-winning, most frequently-visited web page of computer-generated fractals; he proposed that the book include this wonderful art, and offered to write definitions.

**WV: I notice that both you and Dr. Sprott are from Tennessee. Is that a coincidence?**

RC: Yes, and no—we grew up in opposite ends of the state, Memphis and Oak Ridge, Mississippi River bustle vs. the foothills of the Smokies; but both of us have a connection to the scientific life of Oak Ridge, which was one of the Manhattan Project towns where uranium was processed for WWII. I worked for the labs as a summer computer

programmer in the days when memory was 64 K, and I think Clint worked there later as an MIT physicist.

**WV: Whom do the two of you consider your readership?**

RC: I think of anyone with curiosity about chaos as a reader, but especially women, who may be intimidated by academic treatments of the subject but already understand it in their own lives! When I started thinking about the project I was on an airplane; I asked the two women on either side if they'd read a coffee-table book like this. Their enthusiastic "yes!"es encouraged me. Now that the book is published, we find it filed variously in mathematics, science, art, and poetry; and teenage boys and their grandmothers are both buying it.

**WV: What would you like your readers to take away from the book?**

RC: I'd like readers to take away some new way of looking at the world—poem, fractal image, equation, or explanation—connected to a more familiar way. And I'd like a reader to learn that "chaos" doesn't mean the same thing as "random," that we all are familiar with chaotic systems in our everyday lives, that chaos is linked with unpredictability in time but a pattern of possibilities that the art represents; and that nonlinear change has very different dynamics from linear change—even small actions can make a big difference! In the book, all the varied art comes from just 3 equations with small changes in their parameters. In our lives, small shifts can make new patterns.

**WV: Do you anticipate the book being used as a text in college classes?**

RC: No. I see that a lot of University libraries are buying the book, but I don't expect it to become a text. Clint has written a textbook that's in use, *Chaos and Time-Series Analysis*, Oxford University Press, 2003.

**WV: Do you have a sense yet about how people—poets, artists, and scientists—are responding to the book?**

RC: Yes, it's wonderful to see the differences: poets spend time with an individual poem, thinking about its language and images, then glance at the art to see its imagistic, metaphorical connection. Artists leaf through the pages first, looking at the art and ask why the same rainbow palette appears in every image (as the text explains, its because that's the fourth dimension of display of the equations). The scientists tend to read the poems about the Chaos seminar topics first, or the foreword by Cliff Pickover discussing fractals, or the mathematical appendix where the method of generating the art is explained. And the coffee table browser will often read the questions, and Clint's explanatory boxes, to understand some particular concept, and than go on to the art and poetry. And someone, somewhere, must be taking the multiple choice test Clint made at the back!

**WV: What's your own math and science background? To what extent do you understand the mathematical aspects of the book?**

RC: I loved math and biology in high school and college, especially algebra; my graduate training in psychology, and research life afterwards, included statistical methods. I audited Clint's undergraduate physics course in Chaos at the outset of attending Chaos seminar meetings, and that's been most helpful; but I still have to check my understanding!

**WV: Have you worked with art and artists before?**

RC: Yes, I've collaborated with composers and visual artists—painters, papermakers, fiber artists—in a number of projects. I've always loved the creative energy that comes from using multiple ways of knowing or experiencing something, and from responding to other artists' work.

**WV: Why did the book need to be one volume, rather than two separate ones—your poems, Dr. Sprott's art?**

RC: It would have been more reasonable, of course, to make separate books—you can imagine the response of a publisher asked if she'd like to market 91 poems with full color art on every page!! But the art has an important conceptual function—it let's you see underlying pattern when the successive states are unpredictable, and how different those patterns can be with small changes, so it's very helpful to the understanding of dynamic systems. And it's beautiful in its own right.

**WV: Do you think the poems and images ever detract from one another?**

RC: Yes, some people find their attention far more drawn to one than the other (this was a problem for the Leonardo reviewer—the images sucked meaning out of the poems for him!), and the visual system is much speedier than language processing. But language links to the reader's emotional and life experience, with a little extra time.

**WV: Dr. Sprott says he "taught" the computer to discard images that humans would not find interesting.**

RC: Yes, he used artists' judgments, and his own, to tutor the computer in its sorting through millions of versions of equations; and found that a certain range of visual complexity, represented by a fractal dimension of about 1.3, typical of the organization in nature—clouds, waves, trees—was most pleasing to everyday viewers. Artists like a somewhat higher degree of complexity.

**WV: Could something similar ever be done for poems?**

RC: If we had a way of quantifying the complexity of poems, perhaps so—how much surprise the poem carried, how much organization at different levels of analysis. I think

our manuscript groups, critique groups, editors, anthology makers, and readers make these judgments everyday—and of course, we disagree among ourselves! But for computers to be really skilled they'd have to understand the language and the mind of the speakers, have “read” a lot of poetry, experienced life, and have acquired the same expectations about associations, allusions, contexts of use, metric patterning, metaphor and narrative as the reader...The statistical comparison of word counts I've seen computer analysts use to decide, for example, if a disputed poem were written by Shakespeare, get it all wrong, because they don't take lexical context, music, meaning, and metaphor into account.

**WV: Some of the poems in this volume express the tension between the world of humans and the world of numbers, e.g., “The Traveling Salesman’s Problem is NP-Difficult.” The resolution of that poem is that computers can’t always solve problems better than people can. Does it bother you to have your poetry paired with what some might consider a mechanistic art?**

RC: Yes, for years the philosophical question of free will vs. determinism bothered me—if we can explain life as part of a deterministic system, how can we be responsible for our actions, make poems, be creative? It's the study of complex systems that shows how: you can have a completely understood, deterministic nonlinear complex system—here's its fractal attractor showing its values—and have no ability to predict which of these will come next in time. This was a flat contradiction of what I'd read in philosophy seminars, and a wonderful freeing “Aha!” Sufficiently complex, nonlinear systems, such as the world, will evolve in unpredictable ways.

**WV: How did you go about writing or choosing poems for the book?**

RC: I wrote the poems over a period of about 10 years, some in response to Chaos Seminar talks (“When You Fall Into Dreamless Sleep,” “The Gorilla That Walks Through the Basketball Game”), most in response to daily experience (“Walking to Work”), some directly about chaos concepts (“Linear Systems”), and even one written to an equation, trying to imagine its dynamic in time (“The Volatile Wife”). Choosing was iterative, gathering candidates together, grouping by theme, regrouping, writing new ones, throwing out—and at one critical juncture, I asked longtime participants in the Chaos seminar to read the poetry manuscript and say which they found connected to the ideas—my thanks to them!

**WV: How was the book assembled?**

RC: I spent two different Januaries at the Banff Center for the Arts in an artist's residency, putting the book together from the poems, and my questions, and the 1000 images and 40 definitions that Clint gave me, with the mantra “Use Everything!!”—all my poet's feeling and scientist's thinking, all the images and words, all the intuition and logic, all of everyday experience and visualization in time and space—it made me very happy! And Clint put the CD-rom together with World Scientific Press when we found them as publishers.

**WV: You write accessible, often lyrical poems. Did you ever think that the images, or the subject of chaos, might suggest other kinds of language—i.e., more fractured or associative?**

RC: Yes, most of my poems have begun in the images and emotions of everyday encounters. To start with an idea—point, line, torus, strange attractor— was a new challenge for me. I was trying to understand what I was learning—and that shows in the poems, but one might equally use understanding to make chaos of old notions and expectations, as John Ashbery does in his poetry. It's that divide, in poetry, between the love of order and disorder—clarity and obscurity—that is always there. Interesting to think how we might mix it up in new ways!

**WV: Chaos, at least in the layman's sense, has some very dark connotations. What does a mathematician or scientist mean when they say "chaos"?**

RC: Sensitive dependence of a system on initial conditions, so that small uncertainties about those initial conditions lead to different outcomes. Or, technically, a positive Lyapunov number, or the statistician's "pink noise"—unpredictable in time, but an (infinitely small) set of all possible states. In Greek myth, of course, Chaos was the dark abyss from which all things came into existence.

**WV: To which meaning of chaos do your poems respond?**

RC: That of mathematician and scientist.

**WV: Do the poems that use mathematical terms or concepts require explanation? "The Pillars of Creation," for example and "Self-Organized Criticality Among the Chaos Theorists" both incorporate vocabulary explained in Dr. Sprott's comments, although another poem, "The Volatile Wife," about a damping effect in math if I'm remembering the right terminology, has an equation for it's epigraph whose relation to the poem is left for the reader to make out. Does it matter if the reader understands that relationship? Would you be comfortable having the more technical poems appear outside of this volume?**

RC: Yes, I thought the terms would need explanation; another reason to want this strange hybrid of text and poetry!

**WV: The poems, pictures, and explanations connect in various ways: sometimes there's a visual relation, sometimes the poems address a mathematical idea directly or incorporate the vocabulary of chaos, sometimes the poems enunciate a particular theme that resonates with the math and science, e.g., change, as in "Dynamical Systems" or "12/12 Madison," perspective and point of view, as in "The Gorilla that Walks Through the Basketball Game," and complexity, as in "A Moment of**

**Extreme Complexity,” just to name a few. How do you see the poems, with respect to either form or content, relating to the art and science of the book?**

RC: You rightly note that the poems connect to the ideas in various ways—some about instances of change in complex systems, some about the basic concepts. I tried to set up the chapters with a logical spine of questions that the poems in that chapter address, or provide examples of—linear vs. non-linear systems, for example; or time series vs. state space.

**WV: You obviously have a great affinity for the natural world, in your poetry and your personal life, reminiscent of the Transcendentalists, in fact. Many of these poems, “Walking to Work,” for example, describe and celebrate that world. In what way does this sensibility converge with the mathematical material?**

RC: Maybe they share the love of observation, of immersion in the world and curiosity about the unknown—of nature, very strongly, but also the fascination with numbers and their abstract properties.

**WV: Richard Dawkins in *Unweaving the Rainbow* (1998) lamented the lack of poetry about science, pointing to Keats, who in “Lamia” accuses Newton of destroying the rainbow’s beauty by explaining it. What do you think: do contemporary poets still run away from science as a subject? Do we have enough, or too little, scientific poetry? How can poets, many of whom are antipathetic to math and science, begin to approach this world?**

RC: I think it’s a fascinating challenge to the writer—partly because you have to think how to give the reader the necessary background information, or how to make the work accessible without it. And of course, there has to be some science or math that you understand! I had the good fortune to spend a week this summer with 20 creative writers, scientists, and mathematicians at a weeklong workshop that the Banff International Research Station ran at the Banff Center for the Arts in Canada. All of us, from our very different backgrounds in fiction, poetry, theatre, science writing were trying to connect with scientific content in mathematics, physics, ecology, and biology (and vice versa). It was invigorating and amazing to hear the varieties of work in progress—including a wonderful theatre piece based on Penrose tiling, geometric forms that cover the space without repeating the overall pattern. In “Delicious Rivers,” the playwright Ellen Maddow incorporated elements of dialog, plot, music, and gesture that all repeated in the way the tiling does—but it was subtle, and linked to a good plot. Lots of good theatre has incorporated science: *A Beautiful Mind*, *Arcadia*, *Inherit the Wind*. I think poets can do it too—as, indeed, the anthologies put together by Kurt Brown: *The Measured Word: On Poetry and Science*, and *Verse & Universe: Poems About Science and Mathematics*, show.

**WV: Are there any poets you'd recommend who write extensively about science & math?**

RC: Of course, Judy Strasser's new book deals with physics, for one example. And I particularly like Canadian philosopher's Jan Zwicky's work in *Songs for Relinquishing the Earth* and *Wittgenstein's Elegies*; and her bird-watching husband Don McKay, in *Camber* and *Another Gravity*. I'm drawn to the nature poets who include new science in their work (Gary Snyder is an example of a poet interested in nonlinear dynamic systems, Muriel Rukeyser a poet writing about physics and the bomb). Anne Coon and Marcia Birken at Rochester Institute of Technology co-teach a course, *Patterns in Poetry and Mathematics*, that looks not only at writing about math but the formal structures used in math and poetry that have correspondences, such as Fibonacci sequences, the golden ratio, spirals, tessellations, and fractals—on the one hand—and meter, rhyme scheme, poem form (e.g. sestina, sonnet, villanelle), and metaphor, on the other. To find writers that you're drawn to, I recommend Kurt Brown's anthologies, mentioned earlier. and Loren Eisley, a biologist, is an example of a scientist who also wrote poetry about his subject. Both *Kenyon Review* and *Nimrod* have had issues in the last few years devoted to poems about science—the genome, and chaos, respectively; and there are at least two journals that are focused on creative writing about science: *Isotope* and *ISLE*.

**WV: *Images of a Complex World* is a large book—175 8.5” x 11” pages, printed on coated, heavy weight paper, with full color illustrations on over half the pages—the printing costs must have been large. A CD with more images and poems you read out loud is also included. How did you find a publisher? Was that difficult? The book was printed in Singapore –was the printing process a smooth one?**

RC: It took us many inquiries to find a publisher—we went to science and math publishers, art book publishers, and small poetry presses. World Scientific had a particular interest in math and nonlinear science, and admired Clint's earlier work. Once we signed with them, they did a beautiful production job, with attention to font and book size and cover art; and they produced both the book, and the CD-Rom, in 9 months. And they've kept the Amazon's of many countries supplied with in-country copies!

**WV: Could you talk about any problems with such an interdisciplinary project? Did the two of you have any trouble communicating with each other about your vision for the book, or different ideas about what the book should be?**

RC: Clint was a great collaborator, in that he put together the pieces that we'd agreed he'd contribute, and left the book's organization to me, with constructive comment after. We also had the good fortune to have a graphic artist from the Netherlands in residence at Banff, Monika Schokkenbroek, look at the first draft and point out some principles of good graphic design to me; it was her suggestion that the images float on the page, rather than in frame boxes with colored backgrounds, and though that meant that Clint had to reprogram them all, it made a stunning difference in the art.

**WV: It seems unlikely to me that this volume could have been produced outside of a university environment, where such contacts are possible, if not commonplace.**

**What advice would you have for writers outside the university who might enjoy and benefit from this sort of interaction?**

RC: There are many creative alternatives, I think, to permit the combination of art and poetry—collaborations with fellow artists making one-of-a kind books, or hand-made books; or exhibits that combine the art and the text on the walls of exhibit spaces, as the “Text and Texture” exhibit of fiber artists and poets responding to each other’s work at the Overture Center did; or color Xerox street flyers; or, cheapest of all, a free blog combining poetry and graphics (I’ve started one with my own watercolors and published poems contributed by other poets). Of course the problem of finding readers & viewers remains!

**WV: Could you discuss your work as a visual artist? Is that new for you, or longstanding?**

RC: The watercolors are fairly new for me, starting some four years ago—though I carried paints around with me for a few years before that, and I’ve been falling in love with paintings and buying them for years! I made a promise to myself that I’d not throw any work away but just keep making the quick postcard sketches that I do, and numbered them sequentially to keep me honest—I’m somewhere in the 700s now! It’s very freeing and makes me happy to spend time in a space of color and no words--like being in first grade again!

**WV: Have any similar projects come out of the Chaos seminar you’re part of? Do you know of any other such work at the UW-Madison, or anywhere else, for that matter?**

RC: There’s a wonderful project in similar spirit funded by the Baldwin Wisconsin Idea Endowment that Dorothea Ledin and David Mladenoff are doing, pairing artists, educators, and scientists to create a traveling exhibit on “Climate Change in the Lake Superior Region: An Exhibit and Community Education Project.” Judith Strasser came to the Chaos seminar for awhile and went away with poems about chaos. And the Epidemic Peace Imagery project was born in the Chaos seminar, when Russell Gardner and I started talking about ways we could cause images of peace to spread exponentially! Which indeed they did, with poems and paintings and sculpture from over 300 artists at last count, including many pairs of poems and art pieces done in response to each other that Sandra Lindow in Eau Claire organized.

**WV: What did you learn from this collaboration? Would you do it again? Suggest it to others?**

RC: Yes, I loved doing it, I learned a tremendous amount, and I wrote poems that would otherwise not exist. I’ve loved seeing other collaborations too—Ted Kooser and Jim Harrison sending poem postcards back and forth; or a continuing Renshi I’m part of that Eleanor Wilner’s workshop students have continued with her, writing poems to the last line of the previous poem.

**WV: You've been involved in an impressive array of other collaborative poetic efforts over the years: the Prairie Fire Quartet; your courses with Judith Strasser at The Clearing; your retirement anthology currently in press, also co-edited with Judith; the Epidemic Peace Imagery exhibit, featuring the works of poets and artists, still touring Wisconsin, which you co-organized; one or two shows of poems and paintings in Canada—there may be others I'm forgetting or don't know about—could you tell me a bit about these various collaborations, and also talk about what collaboration, as opposed to working alone, can offer poets? Would you advise poets to pursue such relationships more often?**

RC: For me, collaborations have arisen out of being drawn to the other person's work—sometimes I was writing about the other's art or ideas, sometimes the composer or artist was work with my poem texts—so that the joint work rose out of the same impulse that gives rise to the poems written alone—the image, emotion, idea or language that's the start of the writing. It has to be a collaboration that works for you both, that builds on your different strengths. In the anthology of retirement poems that Judith Strasser and I have just read the proofs on, I've appreciated her skills in project management! And because we found we liked very different poems, we had to work out a way to trust each other—to include the ones each of us felt strongest about. Poets who write to photographs, or places, or paintings, or music are also, to my mind, collaborating with these artists!

**WV: Could you talk about your involvement with Fireweed Press and the Press itself, which produced a number of your early chapbooks?**

RC: Yes. Fireweed Press was begun 20 years ago, now, by Jeri McCormick and Lenore Coberly, who invited an initial group of 10 or so Wisconsin poets to form a collective and edit and collectively market our work, at a time when there was very little chapbook or poetry book publishing in Wisconsin. We've added members by invitation over the years, with current books out by Yvonne Yahnke, Eve Robillard, CX Dillhunt, Karen Updike, and Richard Swanson. Currently Jeri and Richard Roe and I do the editing for the series.

**WV: You've won two Posner Awards (the first in 1999 for your book, *The Way In*), received two grants from the Wisconsin Arts Board, and been published in a variety of prominent journals, like *Poetry*, *Hudson Review*, *The Southern Review*, and *Prairie Schooner*, among others. At the same time you're a professor (*emerita* now) in the Communicative Disorders Dept. and winding up an active research career in the Waisman Center at UW-Madison. Do you think of yourself as primarily a cognitive scientist or poet?**

RC: For long years I would have said both scientist AND poet; now, I'd say poet. They conflicted in the time demanded by each, but both ask for creativity. The cognitive scientist part of me looks at poetry and says "So *that's* how language works!!" and the poet part of looks at cognitive science and says "There's more to life than science!"

**WV: Are you still active as a scientist/researcher?**

RC: I'm just ending my research work on language development in teenagers with Down syndrome—one or two more papers to do. I'll continue to be part of the weekly Chaos and Complex Systems Seminar, and to read the science news.

**WV: To what extent have you worked and interacted with poets in the English Dept. at UW-Madison?**

RC: I've admired Ron Wallace's work for long years and attended English Dept. readings; and for some 10 years Jesse Lee Kercheval, who's on the creative writing faculty, has been a member of my poet's manuscript group.

**WV: Do you think it's desirable for a poet to work, as you have, in some field outside of literature as opposed to teaching writing to make a living? Which course would you advise a young poet or college student to take?**

RC: I think, alas, that all poets will need day jobs! And I can imagine it both ways—that teaching writing would feed your own craft, or would overwhelm your love of writing. I know poets who have deliberately gotten dull jobs in banks at the outset of their careers, who hungered to teach writing later. And other poets who thought factory work or fire tower observation would be the right stuff of poetry. And all wrote great poems!

**WV: What role have writing groups had for your poetry? Would such groups be more essential to someone writing outside an English Dept. job, or about the same?**

RC: Yes, I think you're right, it's very likely that writing groups would be more essential for someone without colleagues in literature, as was my case. Though individual preference must count, too; I know poets who work essentially alone, and literature and creative writing teachers who have manuscript groups outside the university. For me, my writing groups have been my lifeline, my pack, my tribe: kindred spirits, acute listeners, mentors, teachers, writers, and friends—each with a strong individual voice. I belong to two groups that have met for more than 15 years, every other week: one of women poets, the other of writers, men and women, of many genres—poetry, fiction, essays, and plays among them. I've learned much from their own writing, much from their critiques of mine—including what every poet has to learn, when to trust my own view of what the poem wants to be! And I also am part of round-robin critique groups in the mail and in email, full of diverse, energetic, quirky and accomplished voices. And among us, we have many new books to celebrate this fall and spring: Lenore Coberly's *Sarah's Girls: A Chronicle of Life on Big Ugly Creek*, Anne-Marie Cusac's *Silkie*, Susan Elbe's *Eden in the Rear-View Mirror*, Catherine Jagoe's Parallel Press chapbook, Jesse Lee Kercheval's *Film History as Train Wreck*, Lynn Patrick Smith's *These Little Scenes*, Shoshauna Shy's *What the Postcard Didn't Say*, Judith Strasser's *The Reason/Unreason Project*, Marilyn Taylor's *The Seven Very Liberal Arts*, Karen Updike's *This Holding On, This Letting Go*, and Jeannie Bergmann's *Aqua Regia*.

**WV: Who are your favorite poets?**

RC: I fell in love with Dylan Thomas and ee cummings when I was 18, for the music in their work; and I've been reading poets steadily ever since, working both backward and forward through the centuries. So I admire and read too many to count, including many fine Wisconsin poets—but I especially return to William Stafford's and Mary Oliver's work.

**WV: What projects, poetic or otherwise, are you working on now?**

RC: An anthology of retirement poems that I co-edited with Judith Strasser called, appropriately for googling, *On Retirement: 75 Poems*, is coming out from the University of Iowa Press in April 2007. And I've two poetry books in press—*The Dreamer Who Counted the Dead*, coming out in spring, 2007, and *Smoke and Strong Whiskey*, coming out in 2008, both from WordTech Editions, one of Kevin Walzer's press. And I'm working on new poems for a manuscript, *Abundance*, that's been a finalist in some of the national contests; and a new collection of poems and watercolors written and painted during two 120 mile canoe trips down the Green River in Utah, called *Green River, Red Rock*; and just starting a new collection of science-related poems called *Praying to the God of 61 Orders of Magnitude*. At least, that's my version of these projects today!