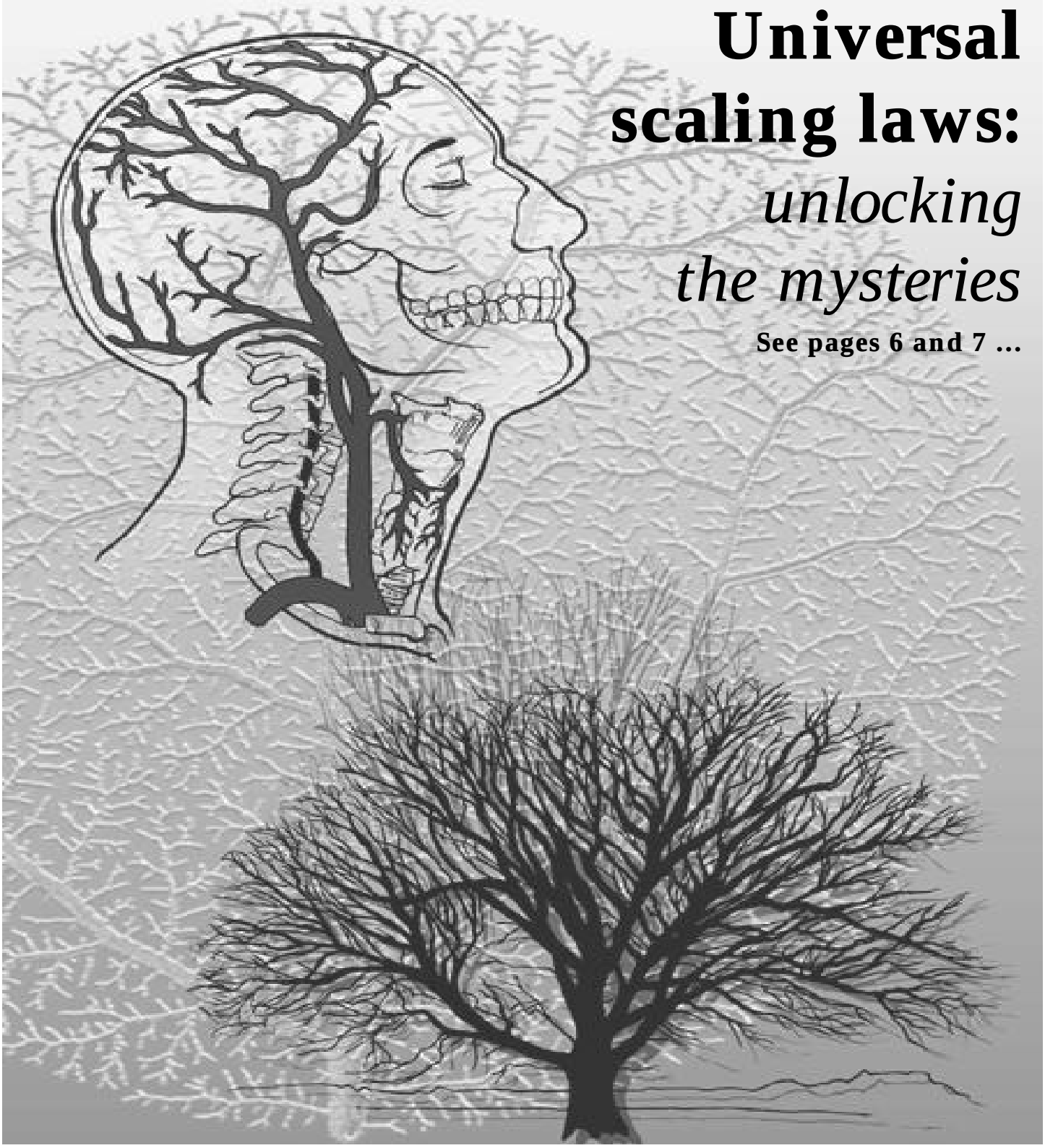
Reflections

Los Alamos National Laboratory Vol. 2, No. 7 • July 1997



Universal scaling laws: *unlocking the mysteries*

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Cover illustration by Zizi Kolshorn, Donald Montoya and Gloria Sharp, all of Comunication, Arts and Services (CIC-1)

Reflections

Reflections, the Laboratory monthly publication for employees and retirees, is published by Public Information (PA-1). The staff is located at TA-3, Building 100, and can be reached by e-mail at *newsbulletin@lanl.gov*, by telephone at 7-6103, by fax at 5-5552 or by regular Lab mail at Mail Stop C318. The individual telephone numbers are listed below.

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Printed on recyclable paper

editor's journal

Make the most of the summer-student experience

Summer usually brings a lot of new faces to the Lab, and this year is no exception. I'm told 1,600 students are working here this summer under the auspices of several Lab programs. Some may have worked at the Lab before; others are here for the first time. By now the students are settled in to Lab routine and most are deeply involved with their assigned organizations and projects. To them I say, go for it!

Working at the Lab is an opportunity few students in the country are afforded. The students here this summer have a unique opportunity to "earn as they learn" at one of the world's premier research facilities. And I hope each and every one of them takes full advantage of this opportunity.

But students aren't the only ones who gain from the Lab's summer student programs. Individuals in organizations hosting these young people can gain new perspectives through their interactions with the students, who often bring new insights and youthful enthusiasm to their work.

Lab employees mentoring students also have an opportunity — and in some sense an obligation — to provide a real learning experience for their charges, one that will help prepare the students for their chosen fields, whatever they might be.

While we don't have a student intern this summer in Public Information (PA-1) — our budget precluded this — we have had interns in recent years, and some of them were among the most eager and can-do individuals I've worked with at the Lab. One student in particular comes to mind. Her ability to ask the right questions, think on her feet and offer constructive suggestions, as well as her willingness to go that extra mile to complete an assignment on deadline, was an inspiration to some of the more seasoned members of the staff. I know I got a lift from working with her and hope she benefited equally from her Lab experience.

So, here's to a productive and mutually beneficial summer for students and staff at the Lab.

New-employee orientation begins at the museum

Garry Franklin of the Bradbury Science Museum, pointing to display, discusses an exhibit with new employees, including a number of summer students, during a new-employee-orientation session in June. The Lab recently added a half day to the previously day-long orientation for new employees. Employees now start their orientation at the museum, where they fill out various administrative and benefits forms, participate in lecture and multimedia presentations on specific periods and projects in the Lab's history, and tour the museum. The orientation concludes with a full day of General Employee Training at the Environment, Safety and Health (ESH) Division Training Center in White Rock. *Photo by Fred Rick*

On-the-job training

Program participants gain marketability

by Ternel Martinez

For some individuals in the Northern New Mexico region, obtaining a college degree isn't feasible, whether it be for financial or other reasons. Other high school graduates simply don't wish to pursue a higher education.

Yet, in today's business world where many companies hire only those who have experience in their fields, the usual result for these same graduates is low-paying jobs and little prospect for a meaningful career.

This was not acceptable to Marilyn Thomas, a staff assistant in Division Services (LANSCE-4).

Like many Lab employees, Thomas always had felt that the Laboratory had an obligation to pass on as much knowledge and skills to the communities as possible, thereby strengthening its ties to those communities. Unlike others, though, she had an idea on how to help do this.

With the blessings of then Accelerator Operations and Technology (AOT) Deputy Division Director Jerry Watson, Thomas took her idea to the four-member AOT Diversity Committee (of which she was a member) in February 1996, asking for help in making her idea a reality.

With the committee's help and the support of the University of New Mexico, Los Alamos; the Human Resources (HR) Division; the Science and Technology Base (STB) Programs Office; then-AOT Division Director Stan Schriber; and many others, Thomas' concept now is called the UNM-Los Alamos/Los Alamos National Laboratory Electro-Mechanical Technology Student Training Program.

The two-year certificate program is designed to help participants develop new skills that will make them more marketable in the business community. The diversity committee worked with UNM/LA to design the curriculum.

It also is meant to promote the concept of, and provide access to, higher education opportunities for those either entering the workforce for the first time or in need of retraining. The program began in January. While the focus of the new program is on Northern New Mexico residents, all Lab employees are eligible.

"The program does not guarantee participants a job at the Laboratory, but it does provide the Lab with a pool of qualified candidates should it need electro-mechanical technicians in the future," said Thomas. "The real focus is to give the students meaningful, hands-on training that they can take with them wherever they go."

Under the program, students' time is evenly split between studying at UNM/LA and receiving hands-on training at the Lab, under the guidance of assigned mentors. Upon successfully completing the program, students receive certificates in electro-mechanical technology, with the option of continuing their education to receive an associate's degree.

Nine students currently are involved in the program, and they work in such Lab areas as Actinide Process Chemistry (NMT-2), Subatomic Physics (P-25) and Design Engineering (ESA-DE). The Los Alamos Neutron Science Center (LANSCE) has six students in four groups involved in the program. "The number of those who wish to enter the program is limited only by the number of mentors available," Thomas stressed.

University of New Mexico, Los Alamos, student Aaron Archuleta of High-powered Microwaves, Advanced Accelerators and Electrodynamics (LANSCE-9) puts together a circuit board for mentor John Plato, also of LANSCE-9, as part of the UNM-Los Alamos/Los Alamos National Laboratory Electro-Mechanical Technology Student Training Program. Archuleta performed the work at the LANSCE-9 Electronics Laboratory. *Photo by Fred Rick*

Brandon Roller, a student from Santa Clara Pueblo who works in High Intensity Beam Lines, Experimental Areas and Remote Handling (LANSCE-7), learned of the program through one of his college instructors and has found the program invaluable. "There's a tremendous amount of work involved, but it's been great. My mentors, Felix Olivas and Michael Madrid, have truly been invaluable," said Roller. "And the on-the-job training is so important, because that's what employers are looking for."

UNM/LA academic adviser and program coordinator Carole Griego-Rutten said the program so far has attracted students with different interests and work backgrounds. "One student, for example, paints cars. Another student is a potter, so their backgrounds are very diverse," she said. "All of them have done such a superb job in the program. I think they've been ideal models, and they should feel very proud."

Thomas was particularly grateful for the effort and support that Schriber (who now is LANSCE deputy division director) gave to her regarding the electro-mechanical program. "There would not be a program today had it not been for Stan Schriber. He was the one who really convinced the Lab that the program deserved a chance," she said.

Both Thomas and Griego-Rutten said they hope the university will be able to offer the program each year in the fall. This will require attracting more mentors so that the program can continue to grow and flourish.

Lab strengthens outreach effort

by Steve Sandoval

In an effort to continue improving the Laboratory's corporate citizenship activities, four employees from the Industrial Partnership Office (IPO) have moved to the Community Involvement and Outreach (CIO) Office.

The move is designed to strengthen outreach efforts by combining the Lab's community relations and regional economic development activities, both important Lab programs for the region, according to CIO director Leroy Apodaca.

The four employees — Teresa Trujillo, Olivia Martinez, Loretta Vigil and Tonya Suazo — have offices on the second floor of the J. Robert Oppenheimer Study Center. Trujillo is now the group leader of Involvement and Outreach (CIO-1), the group responsible for community relations and outreach, said Apodaca. (See story on Page 9.)

One of the ways the Laboratory interacts with local communities is by participating in or sponsoring commmunity functions, such as the annual Española Fiestas. *Photo by Mike Kolb, Community Involvement and Outreach (CIO) Office*

"Since the activities of both organizations are so closely related, this will allow the Lab to coordinate similar outreach efforts," said Apodaca. "And although it will not initially save the Lab any money, it will ensure a more efficient allocation of resources. It also will help the Lab to be more responsive to the various community needs as they arise."

CIO-1 will consist of outreach teams assigned to nearby communities to work with elected officials, civic and other community leaders, businesses and residents in identifying needs and determining how the Lab might be able to assist, if appropriate.

The four new CIO employees, Apodaca said, will spend much of their time in the nearby communities meeting with people. Using a database of key customers CIO is developing, these "community principles" will work with those customers to "try to identify solutions and answers to their problems with which the Lab can help," said Apodaca.

He cited educational outreach; economic development; access to Lab information, programs and employees; corporate citizenship; and Lab employee participation in local communities as some areas in which community leaders have requested more Lab interaction.

But, Apodaca added, "There are some activities we will not be able to help with because of issues of allowability of costs. The Department of Energy has some very strict guidelines describing where we can and cannot become involved."

Apodaca said it is common practice in private industry for employers to require their employees to become involved in community activities and projects, serve on boards and commissions and volunteer their time.

Apodaca reminded that Lab employees' first responsibility is to their supervisors and their jobs. However, Lab managers can help by themselves becoming involved and by encouraging their associates to get involved in their communities.

"Our role is to show the communities of Northern New Mexico that besides doing good science, the Lab is a good neighbor, that we do care about the region, and that we're prepared to work with the communities for our mutual benefit," Apodaca said.

Obituaries

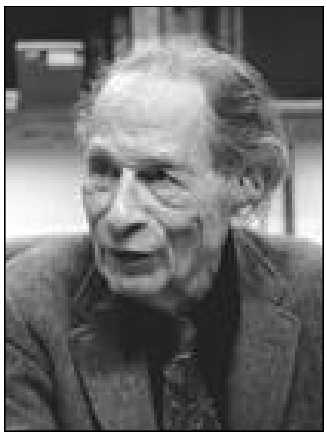
Manhattan Project physicist, Robert Serber, dead at 88

Manhattan Project scientist Robert Serber, 88, died last month in New York of complications following surgery for brain cancer.

Born March 14, 1909, in Philadelphia, Serber earned a bachelor's degree from Lehigh University in Bethlehem, Pa., in 1930 and a doctorate in physics at the University of Wisconsin in 1934. He then moved to the University of California, Berkeley, to work with J. Robert Oppenheimer.

An Oppenheimer protégé, Serber was among the first to be asked by Oppenheimer to work on the Manhattan Project following Oppenheimer's selection to head up the effort. Serber, who was then an associate professor at the University of Illinois,became Oppenheimer's assistant. He is the author of "The Los Alamos Primer," a summary of five lectures he presented in April 1943 to the scientists who came to Los Alamos to work on the atomic bomb. The lectures, which summarized all that was known at the time about designing and building an atomic bomb, became the first technical document issued by the Laboratory. The lectures were classified for 20 years after World War II ended and were published for the first time in 1992 by the University of California Press. Serber's first wife, Charlotte, who died in 1967, was Los Alamos' first librarian.

After the Trinity test showed the atomic bomb would work, Serber was sent to Tinian Island, in the Pacific, where atomic bombs were being prepared, to provide advice about any changes that had to be made. He also was part of the first American team to enter Hiroshima and Nagasaki after the atomic bombs were dropped. He was in Japan for five weeks to assess the damage and to collect debris for tests. Serber and the other scientists measured radiation levels and recorded the damage. From shadows that had been burned into walls by the blast, Serber was able to calculate how high the bomb had been when it had exploded and how large the fireball had been.



Robert Serber

Shortly after his return to Los Alamos, he left to work at the University of California's Radiation Laboratory in Berkeley. "The war was over and the work at Berkeley seemed much more exciting and compelling," Serber told the Newsbulletin in a 1993 interview, conducted while he was at the Lab attending a Nuclear Weapons Technology seminar series to commemorate the Lab's 50th anniversary. "I also had no great foresight about Los Alamos, although I expected it to continue as a weapons laboratory."

Serber joined Columbia University as a professor of physics in 1951. He became chair of the physics department in 1975, retired from Columbia in 1978, and later was named a professor emeritus at the university.

Serber is survived by his wife, Fiona, and two sons, Zachariah and William.

Robert Everett Watt

Laboratory retiree Robert Everett Watt died May 13 after a short illness brought on by respiratory failure. He was 79.

Watt, a physicist, already had made scientific contributions at the Massachusetts Institute of Technology Radiation Laboratory and the Texas Company Geophysical Laboratory before coming to the Lab in 1947.

For example, his radar-related inventions at MIT led to six patents for the U.S. government; his work on a sonic logging system to measure porosity led to two more patents for the geophysical laboratory.

Watt's first position at the Lab was in Water Boilers (P-2), working on the energy spectrum of neutrons from fission. While there, he developed an equation sometimes referred to as the "Watt Spectrum." He also helped redesign the water boiler reactor named Supo, among other accomplishments. Watt later became group leader for Special Problems (J-16) in 1951.

He returned to the Physics (P) Division in 1962 to work on developing an optically pumped polarized helium target for the Lab's Van de Graaff generator. In 1970, he participated in a project to explore the possibility of laser fusion. His work led to another government patent for a lens used in high-power laser systems. He retired in 1977.

In addition to being a fellow of the American Physical Society, Watt was actively involved in several other organizations, including the Los Alamos Choral Society and Light Opera. He also served as president of the Los Alamos Parent-Teacher's Association during the mid-1960s, and was an alternate member of the Working Group to Address Los Alamos Community Health Concerns.

Services were held May 17 at the United Church of Los Alamos.

Philip Martin Whitman

Former Manhattan Project mathematician Philip Martin Whitman died April 14. He was 80.

Whitman received a bachelor of science degree in astronomy from Haverford College in Pennsylvania and a doctorate in mathematics from Harvard University. He was teaching at Harvard when he accepted a position at the Lab (known then as Project Y) in 1944.

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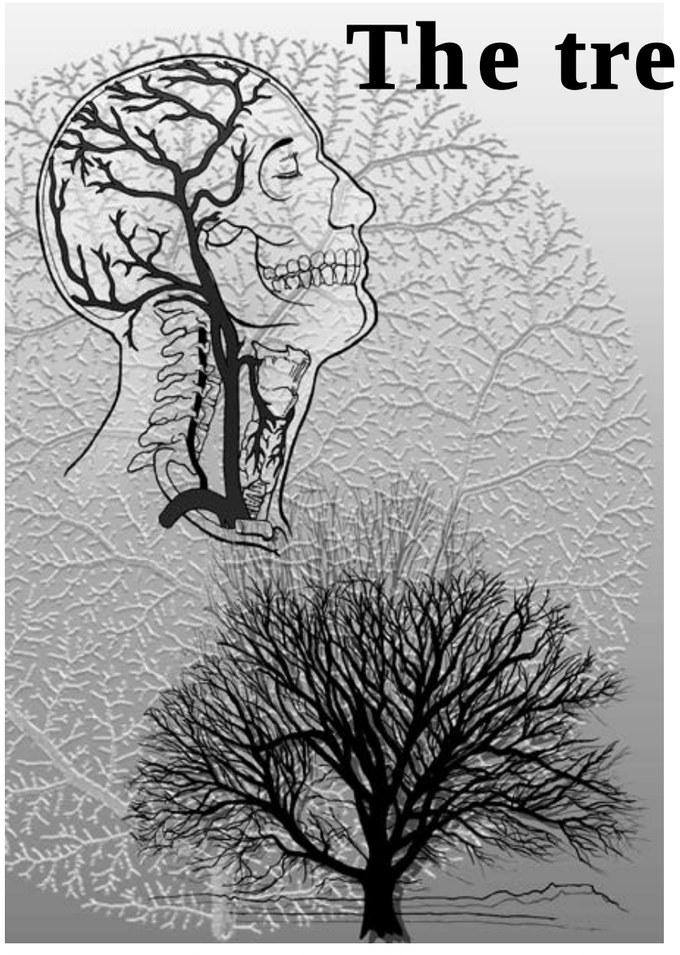
The tree of life



Fractal branching networks, like those shown here, are tree-like structures that carry nutrients to each cell of an organism. They are found in trees, human cardiovascular systems, plant vascular systems and elsewhere in nature.

by Diane Banegas

The words "drawn to scale" are familiar to non-scientists and scientists alike and their meaning is easily understood: that the proportions of the original structure are preserved in the artist's scaled-down representation.

Scientists have observed for more than 50 years that nature also preserves proportions in adapting biological features from species to species. Cardiovascular systems, respiratory systems, plant vascular systems and insect tracheal tubes all exhibit the same continuously branching structure that increases or decreases in scale as a power of body size; when expressed in terms of body mass, the power occurring in the scaling law is always a simple multiple of one-quarter. Research published by a Los Alamos researcher and his colleagues at the University of New Mexico for the first time presents a general model that explains the origin and prevalence in nature of "quarter-power scaling."

The model is the brainchild of Los Alamos physicist Geoffrey West and University of New Mexico biologists Jim Brown and Brian Enquist, who two years ago began a collaboration under the auspices of the Santa Fe Institute to study these universal scaling laws.

"We came to the same problem from very different angles," said West, a Laboratory Fellow in Elementary Particles and Field Theory (T-8). At Los Alamos, West was applying his high-energy physics background to the mystery of why all animals regardless of their body size obey the same simple scaling law for metabolic rate. The answer, he believed, was essential to understanding how evolution maximizes fitness.

"Metabolic rate — how much energy an organism consumes per second to maintain life — is proportional to body mass to the three-fourths power." West said, (To obtain three-fourths power of body mass, take the square root of the square root of an animal's weight and cube it.) The law, known as Kleiber's Law, had been around for decades but no one understood the reason for it, West said. "A cat is roughly 100 times heavier than a mouse, so you'd expect a cat's metabolic rate to be 100 times larger than a mouse's, but it isn't," West explained. "The metabolic rate is only about 30 times larger — a number predicted by Kleiber's Law."

For their part, Brown and Enquist were trying to solve the riddle of why the metabolic rate of plants exhibits the same quarter-power scaling phenomenon observed in animals. As ecolo-gists, they were interested in determining how population densities and other environmental laws related to the biological laws that govern individuals.

Lab physicist Geoffrey West of Elementary Particles and Field Theory (T-8), left, and University of New Mexico biologist Jim Brown at the Santa Fe Institute. *Photo by LeRoy N. Sanchez of Plans, Issues and Programs (PA-3)*

Like West, they proposed that quarter-power scaling laws arose from a common underlying mechanism: Living things are sustained by the transport of materials through a linear network that branches to supply all parts of the organism.

'When it comes to energy-transport systems, everything is a tree.'

"Jim and I knew that the structure and dynamics of the supply network would hold the answer but we didn't have the background in physics and math to carry out the calculations," Enquist said. "Working with Geoff was like having a mind extension for physics."

For West, the collaboration was a good way to study the bigger problem of scaling. "Jim and Brian didn't know the physical and mathematical details to build a precise model," he said, "but their intuition about living system was tremendous. I'd crank something through the model, obtain results, only to have them shake their heads and say, 'It really couldn't work that way in a living system.' They kept me from running up a lot of blind alleys."

The researchers built their model on three assumptions: that a space-filling fractal-like branching pattern is required to supply life-sustaining fluids to all parts of the organism; that the final branch of the network — the twigs of a tree or the capillaries of a circulatory system — are the same size regardless of a species' body mass; and, that the energy used to transport resources through the network is minimized.

The first assumption came from the researchers' observation that a space-filling branching network is a natural structure for transporting nutrients to every cell in an animal's body. Thus, the billion plus cells present in the human body are fed regularly through the cardiovascular system, which transports oxygenated blood through the aorta, decreasingly smaller arteries, and through about 10 billion capillaries, each of which feeds a small number of cells.

The second assumption arose from the researchers' knowledge that all living cells, the building blocks of life, are the same size regardless of an organism's species or body weight.

Lastly, to minimize the energy required to transport resources through the system, the network must be a "fractal branching network." Fractals are structures that exhibit self-similarity in the manner of Russian nested dolls or snowflakes. The smallest fraction of the system must be a miniature replica of the entire network, the only difference between the two being one of scale.

While fractal branching networks exhibit the same type of self-similarity as nested dolls and snowflakes, their organization is tree-like. Cardiovascular systems, respiratory systems, plant vascular systems, river systems and insect tracheal tubes are all examples of fractal branching networks. West said.

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people

Erwin named group leader for Accounting

Mary Erwin

Mary Erwin is the new group leader for Accounting (BUS-1). She assumed her new duties June 1 after former Group Leader Ron Butters left the Laboratory to work for Bechtel Corp. in Nevada.

Erwin, a certified public accountant, first came to the Laboratory in 1992 at the suggestion of her sister, who works at the Lab. "I was working as a controller for Gemcraft Corp. in Houston at the time," Erwin recalled. "My sister knew I wasn't too happy with my job and told me to apply for a position at the Lab."

She added, "One thing I've been afforded while working at the Lab is exposure to many different aspects of Lab business operations. This has broadened my perspective and allowed me to learn Lab finances in detail. That wasn't possible at Gemcraft."

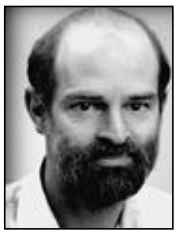
Her first position at the Laboratory was as a budget analyst for the program Recharge Office in the Business Operations (BUS) Division. In 1994, Erwin became business team leader for the Dynamic Experimentation (DX) Division.

The University of Texas graduate again changed positions 14 months later, this time becoming deputy group leader for Business Planning and Analysis (BUS-3). Now, just 15 months later, Erwin is BUS-1 group leader.

Concerning her new assignment, Erwin said, "The real challenge for the Accounting Group is to constantly balance the needs of external and internal customers. Each has unique requirements and demands, but my first focus is on satisfying our internal customers."

Glatzmaier named AGU Fellow

Gary Glatzmaier recently was named as a Fellow by the American Geophysical Union. He was honored last month at an awards ceremony during AGU's annual spring meeting.



Gary Glatzmaier

One of the highest honors bestowed by the AGU is the designation of Fellow — awarded to those scientists who have achieved widely acknowledged eminence in a branch of geophysics. Each year a committee of Fellows reviews nominations and conducts a rigorous selection process to choose new Fellows, a distinction conferred upon no more than 0.1 percent of AGU members in any given year. The Union has approximately 35,000 members.

The AGU chose Glatzmaier "for having added significantly to our understanding of mantle convection, the solar dynamo and particularly core convection and the geodynamo through sophisticated numerical simulations."

Glatzmaier of the Lab's Institute of Geophysics and Planetary Physics (IGPP) and Paul Roberts of the University of California, Los Angeles, recently used computer simulations to predict behavior of Earth's magnetic field, including reversal of the field's polarity. In addition, Glatzmaier's

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BUS division deputy garners Hammer Award

Don Bryson

Business Operations (BUS) Deputy Division Director **Don Bryson** recently received Vice President Al Gore's Hammer Award for his efforts as a member of the Federal/Contractor Purchasing Council to reduce procurement costs and improve business practices across the entire Department of Energy Complex.

The council represents all major DOE contractors and the federal contracting community. In its two years of existence, the council is credited with streamlining purchasing and other business activities, saving DOE about $20 million. DOE contractors purchase about $4 billion in goods and services each year.

Bryson, who represented the Laboratory and Lawrence Livermore and E.O. Lawrence Berkeley national laboratories on the council, received a $6 hammer (symbolic of the $400 that the U.S. government once paid for a hammer), a ribbon and a congratulatory note from Gore during a ceremony held last March in the Forrestal Building in Washington, D.C.

This also is the first time that nongovernment employees have ever received the Hammer Award.

"This was completely unexpected. It gave me and many in BUS Division a great feeling of satisfaction that we came up with ways to help the council be as successful as it has been so far," said Bryson.

One of the council's initiatives was to create a database where each DOE contractor could share its best business practices. For example, BUS shared information on how the division reduced the cycle time for major subcontracts from 275 days to 210, and on how it reduced the cycle time for small fabrication orders from 28 days to just five.

Bryson was so appreciative of several procurement teams' efforts that he has been circulating his award to various groups in the division. "I'm really grateful to those BUS employees who have done some extraordinary things to improve procurement operations across the entire DOE Complex," said Bryson.

June employee service anniversaries

35 years
Gerald Eagan, ESH-2
Ronald Harrison, DX-5

30 years
George Berzins, NIS-2
James King, DX-4
Robert MacFarlane, T-2
Karl Melendez, CIC-7
Dennis Mingo, FSS-6
Louis Morrison, DX-6

25 years
Robert Bollman, NIS-4
John Brownell, X-TA
Jeffry Casados, LANSCE-2
Harold Corn, DX-7
Edward Harvey, ESA-TSE
John Kammerdiener, X-TA
Martin Maley, MST-STC
Ronald McFee, X-TA
Arlene Merayo, NIS-5
R. Douglas O'Dell, ESH-6
Carol Phillips, HR-5
Dennis Vasilik, ESH-4
David Vieira, CST-11

20 years
Henry Anaya Jr., ESA-WE
Henry Atencio, NMT-8
William Bohl, TSA-10
Cecil Brown Jr., NMT-2
Joseph Brown, FSS-16
Lee Collins, T-4
Margaret Findley, T-3
Bobby Gonzales, NMT-5
John Greenman, ESA-WE
Francisco Guerra, ESA-EA
Fred Guyker, NIS-2
Jorlene Hanold, BUS-1
Richard Hoover, MST-4
Robert Kain, NMT-2
Phillip Lang, FSS-16
Yvonne Martinez, CIC-1
Margie Moore, CST-8
Edward Roemer, ESA-WMM
David Schmitt, NMT-8
Howard Stacy, DX-4
David Stahl, CS-1
James Straight, DX-5
Joseph Stone, P-22
Lorenzo Trujillo, NMT-7
Brenda Valdez, CIC-17

15 years
Fernando Algarra, ESA-WMM
Lawrence Auer, X-TM
Michael Barnes, HR-6
Michelle Bonner, CST-1
Ronald Butters, BUS-1
Louis Carrillo, NIS-5
Marion Cohen, CIC-12
Wayne Danen, CST-1
Dennis Derkacs, ESH-5
Catherine Hammock, NWT-PO
James Herring, BUS-3
Mathew Maltrud, T-3
Benjie Martinez, NMT-2
Sylvia Martinez, ESH-4
Clifford Oliver, DX-7
Denise Pelowitz, TSA-10
Raymond Romero, CIC-17
E. Duane Verley, FSS-9
Edwin Vigil, PA-1
David Williams, ESA-WMM

10 years
Loretta Archuleta, HR-3
Aloysius Arko, MST-10
Denise Bjarke, PA-1
Isabel Brackbill, CIC-14
Becky Cordova, NIS-5
J.T. Fabryka-Martin, CST-7
Eduardo Garcia, NMT-2
Terence Mitchell, MST-CMS
Pamela Reass, NIS-5
Thomas Ricketts, NMT-2
Lawrence Rybarcyk, L-6
Christine Siciliano, CIC-12
Milton Wyrick, LC-BPL

5 years
Elizabeth Abeyta, HR-5
James Albright, BUS-7
Kenneth Alvar, ESH-4
Henry Alvestad Jr., P-24
Cheryl Atencio, CIC-1
Linda Baker, BUS-5
Rose Baltrusaitis, X-TA
Richard Belian, ESH-4
Jessica Bronwyn, HR-5
Kenneth Collins, FSS-15
Thomas Cook, NIS-IT
Jean Dawson, ESH-12
Nina Gallegos, ESH-3
Pamela Garcia, BUS-5
Alan Gurevitch, CST-15
Larry Hill, DX-1
Elizabeth Holmsten, NMSM-SD
Christopher James, NMT-6
James Kamm, X-HM
Kathryn Karns, ESH-3
John Kennison, CST-9
Frances Knudson, CIC-14
Zena Kolshorn, CIC-1
Huijou Kung, MST-CMS
Kinghsi Kung, CST-7
Diana Lovato, EM-SWO
Lori Martinez, ESA-WE
Evelyn Mullen, NIS-18
Donna Osborn, BUS-7
Sam Padilla, ISH-4
Anton Rohlev, LANSCE-5
Lori Rohlev, DX-7
Julie Romero, BUS-5
Michael Roth, LC-GL
Deborah Roybal, IP-PO
Robin Roybal, EM-ER
Louie Salazar, CST-25
William Schueler, NMT-7
Billie Shull, P-FM
Alice Skehan, EM-ER
Garrick Snider, BUS-3
Carole Steinkruger, ESH-2
Tonya Suazo, IP-PO
Gary Sundby, ESH-4
Marilynn Thullen, ESH-2
Monica Walkord, HR-5
Timothy Wallstrom, T-13
Robert Warling, ESH-5

Glatzmaier ...

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modeling work predicted that Earth's inner core was rotating at a rate different than the surrounding solid Earth — a phenomenon that later was measured and confirmed by other researchers. His modeling work also predicted that Earth's inner core generates "winds" of molten metal.

Hirons new Yucca Mountain program manager

Tom Hirons

Tom Hirons is the new program manager for the Laboratory's Yucca Mountain program. Hirons' new responsibilities will be incorporated to his current duties as program manager for Environmental Management (EM) Programs' Integrated Science and Technology Program. These include science and technology projects for the Department of Energy, Department of Defense, Environmental Protection Agency and technical support to the Waste Isolation Pilot Plant, and the Hanford and Rocky Flats sites in the DOE complex.

Hirons has worked at the Lab 28 years. He has a bachelor's degree in mechanical engineering from Notre Dame and doctoral degree in nuclear engineering from North Carolina State University.

Trujillo named CIO-1 group leader

Teresa Trujillo

Teresa Trujillo is the new group leader of Involvement and Outreach (CIO-1). Trujillo has been at the Laboratory since 1983 when she was the Lab's Small Business Liaison officer in the Materials Management (MAT) Division.

In 1994, Trujillo moved to the Industrial Partnership (IPO) Office where she headed the Regional Economic Development Program.

Trujillo's new office will be on the second floor of the J. Robert Oppenheimer Study Center.

As CIO-1 group leader, Trujillo will oversee the Lab's consolidated outreach efforts in communities surrounding the Lab.

Trujillo, a Taos native and Taos High School graduate, earned a bachelor's degree in sociology/psychology from the University of New Mexico in 1979. Her master's degree is in public administration, also from UNM.

The tree of ...

continued from Page 7

"Given the physical and geometric constraints implicit in these three principles, out pops quarter-power scaling," West said. The model accurately predicts the structural and functional properties of the mammalian cardiovascular and respiratory systems. For example, given the body mass of an adult male, the model can churn out the length and cross-sectional area of his aorta. The researchers plan to test other predictions, but their work so far suggests that quarter-power scaling is perhaps the single most pervasive theme underlying all biological diversity.

"Scaling laws mean that organisms of different sizes use energy and other resources at different rates," Brown said. "They also operate at different spatial and temporal scales. For example, a bacterium lives fast and short with a lifespan measured in minutes and within a space measured in millimeters. Contrast that with a human whale that lives for decades and moves over space of hundreds or even thousands of kilometers."

The quarter-power scaling laws are obeyed with remarkable precision, for body sizes over 21 orders of magnitude, ranging from single-cell organisms to blue whales. The scaling laws are also unaffected by the exact details of a system's design as long as it has a fractal nature.

Although the model addresses fractal branching networks on the macrobiological level, the researchers predict that microscopic systems will exhibit the same fractal patterns and obey the same laws of quarter-power scaling. A paper describing their research results, titled "A General Model for the Origin of Allometric Scaling Laws in Biology," appeared in the April 4 issue of Science.

In the 1950s, physicist Francis Crick and biologist James Watson collaborated on research that unmasked the double-helical structure of DNA, the twisted ladder of chemicals that serves as the blueprint for all life. Like the double-helix, quarter-power scaling is an elegantly simple design principle from which an infinite number of biological variations are possible.

The researchers hope their work, and the publicity it has received, will stimulate more interactions between physicists and biologists.

"Scientists today are incredibly partitioned into their own disciplines," Enquist said. "Even within biology, we are partitioned into cell physiology, anatomy, ecology and so on — and each sub-partition has its own department, journal and language."

West nodded in agreement. "We need to return to seeing things as a whole," he said.

Whitman ...

continued from Page 5

Whitman served as an assistant to the division leader, working on cubic equations and numerical solutions to nonlinear differential equations systems, among other mathematical problems, in Computations (T-5). He left the Lab in February 1946 to teach at Tufts University in Massachusetts. Whitman's career also included working at the Applied Physics Laboratory at Johns Hopkins University and teaching at Rhode Island College in Providence.

Whitman was a fellow of the American Mathematical Society and a member of the American Association for the Advancement of Science, Operations Research Society and American Association of University Professors.

He is survived by a brother, Robert of Lexington, Ky.; and two nieces, Jill Whitman Marsee of Puyallup, Wash., and Gweneth Whitman Kaebnick of Minnesota.

Joe R. Maes Jr.

Lab retiree Joe R. Maes Jr. died last December. He was 76.

A cost estimating engineer, Maes began his career at the Laboratory in 1946 as a contractor. One of the many projects he was involved in during his career included testing at Bikini Island in 1946. He became a Lab employee in 1972, working in Design (ENG-2).

In 1978, Maes moved to Cost Engineering (ENG-8) as a construction and maintenance specialist. He retired in early 1985, only to return later that year as a Lab associate for ENG-8. Maes also was a Lab associate for Estimating (ENG-4). He fully retired in 1988.

Maes was preceded in death by his wife, Marie. He is survived by two sisters, Eva Oxandaburu of Santa Fe and Barbara Salas of La Junta, Colo.; three nieces, Anita Hyatt of Las Animas, Colo., Viola Navrot of Santa Fe and Cecilia Moody of La Junta; two nephews, Albert Salas of Kim, Colo., and Carlos Sandoval of Trinchera, Colo.; and other relatives.

Patrick Paiz

Laboratory retiree Patrick Paiz died April 4 in Santa Fe. Paiz was 79.

A World War II veteran, Paiz was a machinist in the former Mechanical Fabrication Division, retiring from the Lab in 1984.

Paiz graduated from Raton High School in 1937 and attended New Mexico Highlands University in Las Vegas, N.M. prior to serving in the U.S. Army, where he was honorably discharged as a staff sergeant in 1945.

Paiz is survived by his wife, Maureen of Santa Fe; son, Patrick of Denver; daughters, Francheska Angel of Santa Fe, Pam Jones of Raton and Penny Matsumura of Indianapolis, Ind.; nine grandchildren; brother, Louis, of Denver; and other relatives.

This month in history

July

1881 — Billy the Kid is killed by Sheriff Pat Garrett in Fort Sumner, N.M.

1943 — The first shipment of plutonium arrives at the Laboratory

1945 — The Lab successfully tests the first atomic weapon at Trinity Site, dramatically demonstrating the effectiveness of the implosion type of bomb

1947 — A rancher finds wreckage northeast of Roswell that some people point to as evidence of a visit to Earth by a UFO

1956 — The Laboratory's Omega West Reactor begins low-power operation as a research tool for studies in nuclear physics

1959 — The Lab's first Rover reactor, Kiwi A, has its first test run at the Nevada Test Site

1980 — The Laboratory's branch of the Institute for Geophysics and Interplanetary Physics (IGPP) is established

1981 — University House opens with a ribbon-cutting dedication

1982 — The National Flow Cytometry Resource is designated at the Laboratory by the National Institutes of Health and the DOE

1989 — BEAR (Beam Experiment Aboard a Rocket) is successfully launched and tested at the White Sands Missile Range

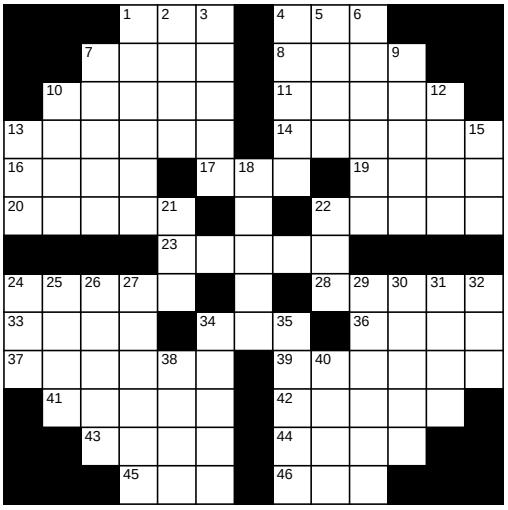
1990 — For one second in the afternoon of July 8, the time is 12:34:56, 7-8-90

1991 — President Bush signs the Strategic Arms Reduction Treaty (START) to reduce nuclear weapons stockpiles to 6,000 accountable warheads

1995 — Comet Hale-Bopp is discovered by amateur astronomers in New Mexico and Arizona

Syndicated material removed at the request of the syndicate

Crossword puzzle: The Manhattan Project



ACROSS

1 — -la-la
4 Poetic variation of open
7 Alcoholic drink diluted with water
8 Founder of Ranch School
10 Cursor controller
11 — Harbor
13 Implosion device
14 Permeates, inspires
16 Song, in opera
17 Golf ball holder
19 Waste cotton
20 Sicilian mountain (alt. sp.)
22 Roosevelt or bear
23 Satellites
24 Cloister
28 In a wrong way
33 Showing the effects of use
34 — Paulo
36 Old name of Idaho site
37 Become apparent or known
39 Army officer who scouted sites for Project Y
41 Cause to be, happen, appear
42 Concluded
43 Cicatrix
44 Medieval contest
45 "You — me $10," said Kistiakowsky to Oppenheimer after the Trinity Test
46 Saint (Fr., f., abbrev.)

Syndicated material removed at the request of the syndicate

DOWN

1 The man who made the big decision
2 Mountain on the Swiss-Italian border
3 Fuchs, e.g.
4 First Lab director
5 Composition in verse
6 Make possible
7 Finally understood
9 Member of ancient Celtic religious order
10 Sea
12 — Lease
13 Aviation control agency
15 Pigpen
18 — Gay
21 Name
22 Technical safety appraisal (abbr.)
24 Common reaction of Trinity observers
25 Gadget, device
26 Brothers, according to Harris
27 First name of "Henry Farmer"
29 — class
30 Small bay
31 Educational program at Lab
32 Devious
34 Leader of Radioactivity Group (P-5) formed in March 1943
35 U.S. playwright
38 Consume, wear away, corrode
40 One

spotlight

Fabricator turns tin into art

by Ternel Martinez

It's amazing what a phone call can do to bolster someone's confidence.

The phone call in question came one day last March from a representative of the Spanish Colonial Council, the governing board that determines who can and cannot display their art works in Spanish Market, an event that takes place each summer and fall in Santa Fe.

The representative was calling Martine Martinez, a tin fabricator in Weapon Materials and Manufacturing (ESA-WMM). The council had just accepted "Marty's" tin art work, wiping away about eight years of self-doubt about his abilities as an artist in the process. He always had felt he was good in his art craft. The question in his mind, of course, was whether he was good enough.

Martinez has been fabricating tin for more than 26 years, first learning the trade immediately upon leaving the U.S. Navy after six years in the service. "As part of helping me readjust to civilian life, the Navy placed me in a program where I learned how to do tin work in a refrigeration shop," explained Martinez. "I've been doing tin work ever since."

His art tools are the same as those he uses at work: a rubber and plastic mallet, soldering irons, a small torch, tin snips, scissors and a metal break. In all, Martinez has created more than 100 pieces of tin art.

"I have friends in the art community, many of whom sell their art works in Spanish Market," said the 17-year Lab employee. "Some of them encouraged me to continue honing my skills and display my works."

To do that, Martinez took some art classes at Northern New Mexico Community College and learned other techniques in places such as G.T. Glass and Tin in Albuquerque.

"I felt very comfortable when I took the classes," he recalled.

Still, Martinez had only placed his works in two galleries, the Mariposa Gallery in Alcalde (1994 to 1996) and Los Vigil's in Chimayo (1996). Other than that, Martinez showed his works only to his friends and acquaintances. But Spanish Market had lingered in the back of Martinez's mind for a long time.

"My wife and I did four years of research into Spanish Market to determine what we thought the jurors were looking for in art," he said. "This year, we decided it was time to try."

Martine Martinez

The selection process took place last March in Santa Fe. The Spanish Colonial Council invited 85 artists from New Mexico and parts of Colorado to submit their art for consideration. Of that number, 50 participated.

Martinez submitted three pieces for consideration (illustrated at left). His wife, Patricia, is an accomplished weaver. She separately submitted some of her weavings for Spanish Market consideration for the first time as well.

Three days after the council finished judging the entries, Patricia got a call from the council. She had been accepted. Another day passed, then another, and another still. No call came for Marty. And with each passing day, the disappointment and self-doubt loomed larger in his mind. Maybe he wasn't as good as he thought after all.

All of those dark emotions dissipated, though, on day number eight. The council called Martinez and informed him that he too would be one of only eight new artists who would be allowed to display their works in Spanish Market, which takes place July 26 and 27.

"Now I truly feel a part of the art community. I feel so honored," said Martinez who, in addition to participating in Spanish Market, would like to retire in about 10 years and sell his works while he and Patricia travel throughout the Southwest.

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