



MARSHALL STAR

Serving the Marshall Space Flight Center Community

May 9, 2002

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When galaxies collide: Chandra observes titanic merger

by Sherrie Super

NASA's Chandra X-ray Observatory has provided the best X-ray image yet of two Milky Way-like galaxies in the midst of a head-on collision.

Since all galaxies - including our own - may have undergone mergers, this provides insight into how the Universe came to look as it does today.

Astronomers believe the mega-merger in the galaxy known as Arp 220 triggered the formation of huge numbers of new stars, sent shock waves rumbling through intergalactic space and could possibly lead

to the formation of a supermassive black hole in the center of the new conglomerate galaxy. The Chandra data also suggest that merger of these two galaxies began only 10 million years ago, a short time in astronomical terms.

"The Chandra observations show that things really get messed up when two galaxies run into each other at full speed," said David Clements of the Imperial College, London, one of the team members involved in the study. "The event affects everything from the forma-

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NASA study of 'erratic' hurricane season offers hope for improved storm prediction, understanding

by Sherrie Super

Data gleaned from studies of the 2001 hurricane season may hold a key to improved hurricane prediction and understanding, according to scientists leading NASA's fourth Convection And Moisture Experiment, or CAMEX, study.

"This hurricane season was dramatically different from the season we monitored in 1998," said Robbie Hood, CAMEX mission scientist at the Marshall Center.

"This year, the storms were erratic, nontraditional and more difficult to predict," Hood said. "In general, they didn't form or dissipate in traditional timeframes, exhibit the same correlation between wind fields and rainfall, or follow typical patterns, such as having a well-defined eye."

This is good news for CAMEX researchers, who now have an entirely new set of data for use in improving hurricane modeling and prediction.

"The true value will be in comparing them," Hood said.

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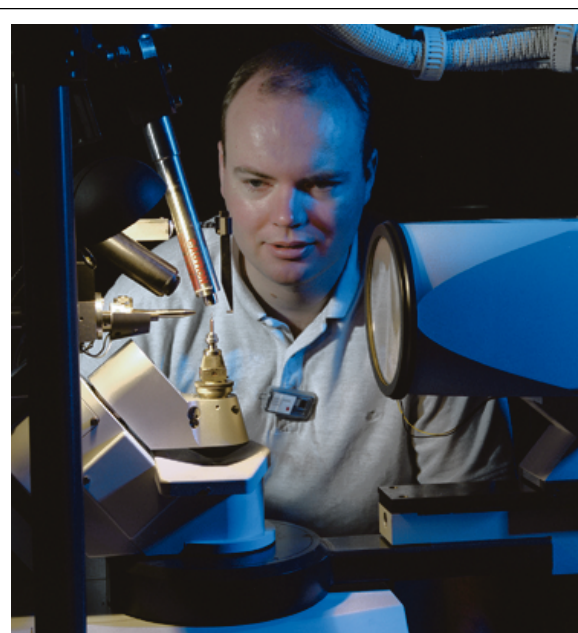


Photo by Danny Reeves

Understanding life's building blocks

Dr. Edward Snell prepares a protein crystal for analysis at the Marshall Center. Snell is collaborating with an Ohio biochemist studying protein crystals grown onboard the Space Station. The research is funded by the American Cancer Society. See story on page 4.

President Bush proclaims 'Asian Pacific American Heritage Month'

Our Nation's rich cultural diversity reflects our Constitution's core vision of freedom and justice for all. Throughout our history, Asian Pacific Americans have made great contributions to America's heritage and prosperity. During this month, we proudly celebrate Asian Pacific Americans, one of the fastest growing ethnic groups in the United States, for their remarkable role in our Nation's development.

Through the years, Asian immigrants and Pacific Islanders have enriched the American way of life. Nobel Prize winner Dr. Subrahmanyan Chandrasekhar's groundbreaking theories on the evolution of stars helped lay the foundation for modern astrophysics. Actress Anna May Wong was one of the first Asian Americans to achieve great fame in American

film. And the men of the 100th Infantry Battalion and the 442nd Regimental Combat Team, composed primarily of Asian Pacific Americans, valiantly served our Nation during World War II. These units are remembered as some of the most highly decorated in U.S. military history.

During the observance of Asian Pacific American Heritage Month, we celebrate the cultural traditions, ancestry, native languages and unique experiences represented among the more than 30 ethnic groups from Asia and the Pacific found here in the United States. We also recognize millions of Asian Pacific Americans whose love of family, hard work, and community has helped unite us as a people and sustain us as a Nation.

To honor the achievements of Asian Pacific Americans, the Congress, by

Public Law 102-450, as amended, has designated the month of May each year as "Asian Pacific American Heritage Month."

NOW, THEREFORE, I, GEORGE W. BUSH, President of the United States of America, do hereby proclaim May 2002 as Asian Pacific American Heritage Month. I call upon our citizens to learn more about the history of Asian Pacific Americans and how they have contributed so much to our national heritage and culture.

IN WITNESS WHEREOF, I have hereunto set my hand this first day of May, in the year of our Lord two thousand two, and of the Independence of the United States of America the two hundred and twenty-sixth.

GEORGE W. BUSH

CAMEX

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Based out of the Naval Air Station at Jacksonville, Fla., the mission united researchers from 10 universities, five NASA centers and the National Oceanic and Atmospheric Administration (NOAA).

CAMEX scientist Dr. Ed Zipser of the University of Utah, Salt Lake City, sees great potential for using the 2001 data to compare "model" storms with storms that occur in the real world.

"Theories and numerical models of hurricanes have been very successful in explaining how these storms often reach great intensity," Zipser said. "However, the inconvenient fact for forecasters and scientists studying these storms is that most real storms fail to reach their potential while most model storms do."

The 2001 data, Zipser believes, will help scientists investigate unconventional storm structures and identify the roles they play in a hurricane's failure to intensify as expected.

For scientists, a highlight of CAMEX-4 was realizing the goal of flying into the same storm for two or more consecutive days.

Together, CAMEX and NOAA scientists monitored Hurricane Humberto for three days while it intensified.

"These were the most comprehensive measurements of the structure of the hurricane ever recorded," said Gerry Heymsfield of NASA's Goddard Space Flight Center in Greenbelt, Md.

Another history-making achievement of CAMEX-4 was the successful wind-finding Dropsondes through the eye of two storms – Erin and Humberto – from an unprecedented 65,000 feet. This was accomplished through Global Positioning System Dropsonde experiments, conducted by the Goddard Center and the University of Maryland in Silver Springs.

Dropsondes resemble Pringles potato chip containers.

Released from aircraft via parachute, they measure wind, temperature, humidity and air pressure.

Another milestone was the first flights of unpiloted aerial vehicles for hurricane research. Managed in conjunction with the University of Colorado at Boulder, the Aerosonde Robotic Aircraft skimmed the ocean surface collecting data on atmospheric temperature, pressure, relative humidity, and winds – data that cannot be obtained by any other method from these very important near-surface altitudes.

Through the ground-based component of CAMEX, known as the Keys Area Microphysics Project, scientists for the first time intercepted a land-falling tropical cyclone with a truck-mounted Doppler radar, allowing them to document the landfall of Tropical Storm Gabrielle.

Despite buffeting from winds and torrential rain, the system observed winds slightly below hurricane force. The data acquired through this study has the potential to help improve estimates from equipment that detects precipitation and surface water by measuring natural microwave emissions from cloud water, cloud ice, rainfall and surface water.

"The database resulting from CAMEX-4 will provide riches from which many important advances can be anticipated," Zipser said.

The study is part of NASA's Earth Science Enterprise, a long-term research program dedicated to better understanding the total Earth system and the effects of natural and human-induced changes on our global environment.

The writer, employed by ASRI, supports the Media Relations Department.

America's first human space flight remembered

Alan B. Shepard Jr. rode Marshall's Mercury-Redstone rocket

by Bob Jaques

Sunday, May 5 marked the 41st anniversary of U.S. human space flight.

It was on that date in 1961, at 9:34 a.m. EST, that U.S. Navy Cmdr. Alan B. Shepard Jr., was launched aboard a Mercury-Redstone rocket to become the first American in space. Shepard named his Mercury space capsule "Freedom 7."

Although his flight was suborbital, Shepard reached an altitude of 112 miles and traveled 292 miles downrange from Cape Canaveral, now Kennedy Space Center, during the 15-minute flight.

Shepard was the first of seven astronauts selected in the Mercury Program to receive a flight assignment. As soon as his flight ended, he became a national hero.

The engines for the Mercury-Redstone rocket that launched Shepard were tested



Photos from NASA/Marshall Center archives

Freedom 7 launches May 5, 1961.

at the Marshall Center. That test stand is now a national historic landmark.

Shepard later commanded the Apollo 14 lunar mission — becoming the fifth man to walk on the Moon. He retired as a U.S. Navy admiral and spent his remaining years encouraging young people to become interested in the space program. He died on July 21, 1998.

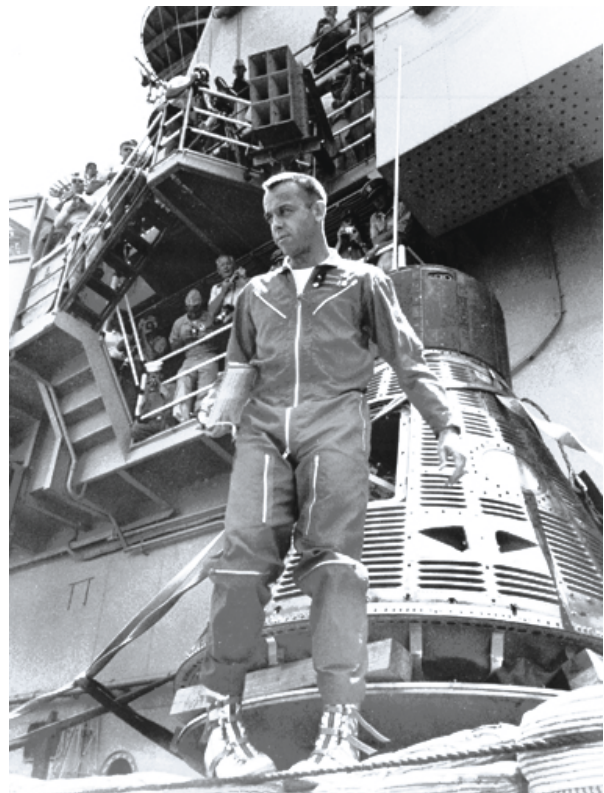
There have been hundreds of men and women who have traveled into space since Shepard's flight, but he has the honor of being this nation's first space pioneer.

Shepard visited the Marshall Center many times both during his years as an astronaut and afterward. His contributions to NASA, Marshall and to Alabama were further recognized when the state named a portion of Interstate 565 after him.

The writer, employed by ASRI, is a Marshall Center historian.



The Mercury-Redstone engines were tested at the Marshall Center. The test stand is now a national historic landmark.



Alan B. Shepard Jr., with Freedom 7 just after becoming the nation's newest hero.

American Cancer Society funds Space Station scientist who studies how good cells turn bad

by Tracy McMahan

Every second, your body's cells get instructions on what they are supposed to do from DNA — the double-helix strand of deoxyribonucleic acid that is the genetic ingredient essential for life.

In healthy cells, proteins manufacture DNA and remove or repair any broken strands. When proteins fail to repair damaged DNA, good cells may turn bad, resulting in diseases, including cancer.

To understand how these basic molecular processes cause breast cancer, the American Cancer Society has awarded a \$768,000, four-year grant to Dr. Gloria Borgstahl, a biochemist at the University of Toledo in Ohio. Borgstahl's grant proposal to the American Cancer Society was rated first of 57 submissions to the Genetic Mechanisms in Cancer grant selection committee.

"I am not discovering a cure for cancer," cautioned Borgstahl, "but the American Cancer Society and NASA recognize that understanding basic

molecular processes in the body will ultimately provide the knowledge researchers need to get closer to that cure."

Right now, Borgstahl is doing related experiments on the International Space Station. She is in her first year of research funded by a three-year, \$830,000 grant awarded by NASA's Office of Biological and Physical Research as part of the Macromolecular Biotechnology Program at the Marshall Center.

On April 19, the Space Shuttle Atlantis returned with the first biological crystals that she grew on the Space Station.

"Everyone thinks of protein as a nutritional requirement — like a steak," said Borgstahl. "But what we are talking about are the molecules of life. The chemistry of life is conducted by individual protein molecules that make up DNA and carry out cellular processes."

How do scientists see these microscopic interactions inside our cells?

"It is like cooking, you mix solutions A, B and C, and — if you're lucky — they form crystals of the protein you are studying," explained Borgstahl. "Then we

can use X-rays to study the crystal and determine the three-dimensional structure of the protein."

The difficult part is getting the recipe right. There are thousands of different types of proteins in the human body alone, and scientists have only been able to determine the structure of a mere 1 percent of them.

Scientists start with a purified, contamination-free protein, which is sometimes costly and difficult to prepare. The protein is mixed with a precipitant, usually a salt that removes water from the protein solution and causes crystals to form. Much in the same way rock candy is made.

The problem is, proteins — like people — are not alike. Finding exactly how much salt to mix with a protein, and the best way to mix the solutions to get a good crystal, is challenging.

"Different techniques work for different proteins," said Dr. Edward Snell, a crystallographer at the Structural Biology Laboratory at the Marshall Center, who collaborates with Borgstahl. "That is why

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Boeing Rocketdyne wins SSME contract

Marshall news release

NASA has awarded a \$1.14 billion contract to the Rocketdyne Propulsion & Power unit of the Boeing Company, Canoga Park, Calif., for maintenance and support of the Space Shuttle Main Engine for the next five years.

The contract calls for Rocketdyne to support the Space Shuttle flight manifest. Support includes on-going flight and test engineering, as well as engine refurbishment. In addition, the contract requires the manufacture, assembly, test and delivery of three additional Space Shuttle Main Engines.

The contract also provides engineer-



Photo by Emmett Given, Marshall Center

Seated from left, Archie Burds, director of contracts, pricing and estimating for Rocketdyne Propulsion Power of Boeing and Stephen Beale, director of the Marshall Center's Procurement Office, signing Space Shuttle Main Engine contract award.

ing support for Main Engine processing at NASA's Kennedy Space Center, Fla., and Main Engine test firing at NASA's John C. Stennis Space Center, Miss., as well as

engine design, manufacturing and engineering management at the Rocketdyne facility.

Rocketdyne has been providing Shuttle Main Engines since 1972.

Marshall safety team seeks members

The Marshall Safety Action Team is a volunteer organization, which promotes safety and health for Marshall Center team members.

Membership is open to all civil servant and contractor employees.

Meetings are held every other Wednesday in Bldg. 4200, Room P106. Visit the Web site at <http://msat.msfc.nasa.gov> for schedules and more information.

Anyone interested in becoming a part of the safety action team can contact Helen Eddleman at 544-4130 or e-mail h.Eddleman@msfc.nasa.gov



Courtesy photo

Marshall Director Art Stephenson, right, joins newly installed safety team officers. With Stephenson, from left, is treasurer Gary Hudson, chairperson Irene Taylor, deputy chairperson Glenn Owens and secretary Linda Myszka.

Chandra

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tion of massive black holes to the dispersal of heavy elements into the universe.”

Arp 220 is considered to be a prototype for understanding what conditions were like in the early Universe, when massive galaxies and supermassive black holes were presumably formed by numerous galaxy collisions. At a relatively nearby distance of about 250 million light years, Arp 220 is the closest example of an “ultra-luminous” galaxy, one that gives off a trillion times as much radiation as our Sun.

The Chandra image shows a bright central region at the waist of a glowing, hour-glass-shaped cloud of multimillion-degree gas. Rushing out of the galaxy at hundreds of thousands of miles per hour, the super-heated gas forms a “superwind,” thought to be due to explosive activity generated by the formation of hundreds of millions of new stars.

Farther out, spanning a distance of 75,000 light years, are giant lobes of hot gas that could be galactic remnants flung into intergalactic space by the early impact of the collision. Whether the lobes will continue to expand into space or fall back into Arp 220 is unknown.

The center of Arp 220 is of particular interest. Chandra observations allowed astronomers to pinpoint an X-ray source at the exact location of the nucleus of one of the pre-merger galaxies. Another, fainter, X-ray source nearby may coincide with the nucleus of the other galaxy remnant. The X-ray power output of these point-like sources is greater than expected for stellar black holes accreting from companion stars. The authors suggest that these sources could be due to supermassive black holes at the centers of the merging galaxies.

These two remnant sources are relatively weak, and provide strong evidence to support the theory that the extraordinary luminosity of Arp 220 - about a hundred times that of our Milky

Way galaxy - is due to the rapid rate of star formation and not to an active, supermassive black hole in the center.

However, in a few hundred million years, this balance of power may change. The two massive black holes could merge to produce a central supermassive black hole. This new arrangement could cause much more gas to fall into the central black hole, creating a power source equal to or greater than that due to star formation.

“The unusual concentration of X-ray sources in the very center of Arp 220 suggests that we could be observing the early stages of the creation of a supermassive black hole and the eventual rise to power of an active galactic nucleus,” said Jonathan McDowell of the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass., another member of the team Studying Arp 220.

Clements and McDowell were joined on this research by an international group of researchers from the United States, United Kingdom and Spain. Chandra observed Arp 220 on June 24, 2000, for approximately 56,000 seconds using the Advanced CCD Imaging Spectrometer (ACIS) instrument.

ACIS was developed for NASA by Pennsylvania State University, University Park, Pa., and the Massachusetts Institute of Technology, Cambridge, Mass.

The Marshall Center manages the Chandra program, and TRW Inc., of Redondo Beach, Calif., is the prime contractor. The Smithsonian’s Chandra X-ray Center controls science and flight operations from Cambridge.

Images and additional information about this result are available at: <http://chandra.harvard.edu> and <http://chandra.nasa.gov>

The writer, employed by ASRI, supports the Media Relations Department.

Scientist

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researchers are using a number of devices to grow crystals on the Space Station. Just as you bake some dishes and boil others, you process crystals in different ways to get the best results."

In ground-based laboratories, like Borgstahl's at the University of Toledo, researchers mix up and try out thousands of recipes at a time - trying to coax proteins to form crystals that will reveal how they are made.

So why use an orbiting laboratory hundreds of miles away in space?

Some proteins form crystals perfectly on the ground. Some form small, irregular crystals that are difficult to study and won't reveal how proteins are made. Some won't form crystals at all.

In the microgravity environment created as the Space Station orbits Earth, crystals float in their solutions - much like the astronauts float through the Station. On Earth, the heavy crystals sink to the bottom of flasks and often stick together. This sometimes results in small, cracked, poorly formed crystals.

Borgstahl and Snell got their first taste of success on the STS-95 Space Shuttle mission in October 1998, when U.S. Sen. John Glenn of Ohio helped grow crystals of insulin in microgravity for the Hauptman-Woodward Medical Research Institute in Buffalo, New York. Snell and Borgstahl analyzed the quality of the

insulin crystals. They found the space-grown crystals were 34 times larger than those grown on the ground.

"More importantly than being large, the crystals had better internal order," said Snell. "Our thorough analysis showed microgravity passed the test, providing the best environment for growing macromolecules of these proteins."

Better internal order means that scientists can fire X-ray beams at the crystal and learn how it is made at the atomic and/or electronic level. This produces a diffraction pattern that can be reconstructed to create a three-dimensional computer model of the protein's macromolecular structure. Scientists use the model to understand exactly how proteins work in the body or don't work - including how medicines interact with proteins.

Snell, Borgstahl and her team at the University of Toledo will soon be busy analyzing a new batch of 35 experiments fresh from the Space Station. These crystals are of Manganese Superoxide Dismutase, or MnSOD, an enzyme that is an anti-oxidant and plays a role in diseases associated with aging such as diabetes, cancer and neurodegenerative disorders.

Analysis in her Ohio laboratory and flying samples on future Space Station expeditions will bring Borgstahl closer to learning how good cells turn bad.

The writer, employed by ASRI, supports the Media Relations Department.

Obituaries

Boger, John C., 76, of Madison, died April 23. He retired from Marshall in 1982 where he worked as an aerospace engineering technician. He was a native of North Carolina and a World War II veteran. He was the father of the late Corrine Bentley. Boger is survived by his wife, Mary Boger; one daughter, Lucy Boger of Huntsville; one stepson, Mark Anthony Michael of Huntsville; three stepdaughters, Kelly Spencer of California, Donna Smith of Anniston and Julie Taylor of Huntsville; one sister, Nell Robinson of Cary, N.C.; eight grandchildren; and two great-grandchildren.

Simmons, Wayne J., 49, of Meridianville, died April 24. He retired from Marshall in 2001 where he was a contract specialist. He was a native of Carthage, Mo., a member of the Meridianville Athletic Association, Lions Club and a member of Plainview Church of Christ. He is survived by his wife, Sherry Simmons; three sons, Russell Simmons of Auburn and Tyler Simmons and Austin Simmons, both of Meridianville; and his parents, Joe and Magalou Simmons of Huntsville.

Swearingen, Jack C., 78, of Huntsville, died April 25. He retired from Marshall in 1986 where he worked as an electrical engineer. While at NASA, he received numerous awards and medals and was the Center's comptroller when he retired. In addition to working on the Saturn and Skylab projects, he also served as associate director of science and engineering. He was a member of First Presbyterian Church where he served as an elder, deacon and Sunday school superintendent. He served as an Army Air Force pilot during World War II. He is survived by his wife, Suzanne Leonhardt Swearingen; one son, Thomas Chandler Swearingen of Dallas; one daughter, Donna Ann Swearingen Lenox of Dubuque, Iowa; and one brother, Charles Nathan Swearingen of Huntsville.

Job announcements

MS02D0084, AST, Mission Operations Integration. GS-0801-14, Flight Projects Directorate, Payload Operations and Integration Department, Payload Operations Directors Office. Closes May 13.

MS02C0090, AST, Aerospace Flight Systems. GS-0861-15, Second-Generation RLV Program Office. Closes May 13.

MS02C0072, Industrial Property

Management Specialist. GS-1103-09, Center Operations Directorate, Logistics Management Department, Property Management Group. Closes May 17.

MS02D0086, AST, Technical Resources Management. GS-801-13, Space Shuttle Projects Office, Solid Rocket Booster Project. Closes May 15.

MS02D0056, AST, Technical Resources Management. GS-801-07/09/11, Space Shuttle Projects Office. No closing date.

Center Announcements

Official badge notification

All Marshall Center team members wearing an "I Think Safe Because" badge must not display it in front of their official employee badge.

Disney/Epcot area hotel package discount

Executive Tour and Travel Services, Inc., is offering a discount hotel package to Marshall employees, retirees and friends for Disney and Epcot area hotels. The package includes a four day and three night stay for two adults and two children up to 12 years old for \$139 a night. Travel to Florida is not included. For additional information contact Executive Tour and Travel Services Inc., at (800) 272-4707, or Candy Bailey at 544-7565.

Mail Handlers Health Plan rep at Marshall on Wednesday

The federal representative from Mail Handlers Health Benefit Plan will be at Marshall from 9-11 a.m. in Bldg. 4200, Room 341, to assist employees.

Spot bid sale set for Wednesday

Disposal Operations at the Marshall Center will host a Drop-by Spot Bid Sale on Wednesday from 9 a.m.-2 p.m. Laptop and desktop computer systems will be for sale as well as a projection-screen television and assorted furniture. The sale is at Intergraph Bldg. 21, 470 Dunlop Boulevard, Huntsville. For more information, call the NASA-Marshall sales hotline at 544-4667, call Greg Tate at 544-1774 or visit the GSA Web site at www.gsaauctions.gov.

Auction sale May 21

Disposal Operations at the Marshall Center will host an auction sale May 21 at 9 a.m. The auction will feature approximately 1,450 items including ADP equipment, test equipment and furniture. A preview will be May 20 from 8 a.m.-3:30 p.m. with a preview the day of the auction beginning at 7 a.m. For more information, call Greg Tate at 544-1774.

Clubs and Meetings

Property management group hosting 2002 training

The Marshall Center Property Management Group is hosting the National Property Management Association Rocket City Chapter on May 21 from 8 a.m. to 4 p.m. for spring 2002 training. The training is open to all Marshall team members associated with the National Contract Management Association, National Property Management Association, National Association of Purchasing Management or the International Facility Management Association. For more information, call Debie Grissom at 544-6572.

Engineering Society meeting is May 23

The American Society for Engineering Management (ASEM) will meet May 23 at Papa Lovetti's at University Drive and Sparkman. The topic for this month's meeting is "Business Incubation" featuring guest speaker Joanne Randolph, president and chief executive officer of BizTech. The meeting is from 11:30 a.m.—1 p.m. Upon arrival, please pay the cashier and ask for the ASEM meeting. For more information, contact Kenneth Sullivan at (256) 313-6172.

Weight Watchers open house

All Marshall employees are welcome to attend the Weight Watchers open house for anyone interested in joining or learning more about the program. The event will be held Thursday, May 9 at the Fitness Center from 11:15 a.m. to 12:45 p.m. A new 15-week series will begin May 23, which costs \$159 for new and non-lifetime members. For more information, contact Rachael Thompson at 544-1525.

MARS Ballroom Dance Club lessons

The MARS Ballroom Dance Club is scheduling tango and mambo dance lessons, every Monday night in May. The

lessons take place at St. Stephens Episcopal Church on Whitesburg Drive. Intermediate lessons are from 7—8 p.m. and beginners from 8—9 p.m. Tom Langford, certified dance instructor, will teach the classes. The cost is \$7 per person, per class. Call Woody Bombara at 650-0200 for more information.

'Leadership' topic of Marshall Association meeting in May

The 2002 Marshall Association's May luncheon will feature retired Marshall employee Jim Odom. The meeting will be Thursday, May 23, at the Redstone Officers' and Civilians' Club from 11:30 a.m. to 1 p.m.

Huntsville Genealogical Computing Society meets May 20

The Huntsville Genealogical Computing Society meets at 7 ap.m. May 20 in the auditorium of the main branch at the Huntsville-Madison County Library. Rhonda Larkin, archivist for the Madison County Court Records Office of Probate Judge, will present a program on "Archiving Madison County Alabama Records." Visitors are welcome.

Retired Federal Employee Association meets Saturday

The National Association of Retired Federal Employees meets at 9:30 a.m. Saturday at the Senior Center on Drake Avenue in Huntsville. Dan McDuffy, an independent insurance agent, will address the features of various long-term health insurance claims. For more information, call 881-4944 or 881-3168.

Control Systems Society Meeting

The IEEE Huntsville Control Systems Society Meeting will be from noon to 1 p.m. Friday at Papa Lovetti's at University Drive and Sparkman. Robert Skelton will discuss "Personal Perspectives on System Design and Structural Control." For reservations, call Dr. Christian Tournes at 327-3114.

Employee Ads

Miscellaneous

- ★ Nintendo-64 games: The World is not Enough, \$30; WCW/WWO Revenge, \$5; Army-Men Sarge's Heroes, \$15. 895-9050/655-4596
- ★ Honda HR214 self-prop mower w/bag, aluminum decking, runs but smokes, \$25. 650-5895
- ★ 2002 Haulmark race trailer, enclosed, 28', 10K# GVW, 42" side door, many extras, \$6,800. 837-5862
- ★ Ford tractor, 8N, original 6-volt system, \$2,800 obo. 860-2663 pager
- ★ Ram Accubar golf clubs, 1-3-5 woods, right-handed w/covers, \$20. 536-8951
- ★ Utility trailer, 5'x8', tilt-bed, brake lights and taillights, \$325. 256-351-7804
- ★ Craftsman table saw w/accessories, 10", \$175; woodworkers work bench w/integral vise, oak, \$200. 256-777-4716/iv. msg.
- ★ Larson I/O boat, 18', w/155HP Buick V6 engine, V-hull trailer, make offer. 881-0354
- ★ Folding tables, wood, 10 ea. 6', 2 ea. 8', \$10 each. 882-2918
- ★ Water ski equipment; oriental rug, navy & red, \$40; love seat, cream, \$50; barstools, \$25. 880-8008
- ★ Bass amplifier, Crate BX100, limiter & effects loop, 100-watt, 10 band EQ, \$300 obo. 256-355-6858
- ★ Kenmore LP gas grill with side burner and propane tank, \$120. 539-4508
- ★ Bedroom suite, bookcase headboard, dresser w/ mirror, solid wood, light brown, \$250 obo. 881-9567
- ★ Troy-Bilt tiller, battery start; black tuxedo, shirt w/tie, cummerbund, & shoes; brown upholstered electric lift-chair. 881-6040
- ★ Sears Craftsman table saw, 10" blade, \$75 obo; Coleman canoe, 16', \$300 obo. 837-3672
- ★ Wedding gown w/train and veil, size 6, \$250; long red evening gown, halter, size 5, \$75. 881-8674
- ★ TV armoire, coffee table, and end table, made from aspen and stained cherry, \$200. 350-7461
- ★ Full Mac systems, IICI & older, \$35; computers only, \$20; monitors, \$20; keyboards, \$5. 256-837-0066
- ★ 1992 Gibson Les Paul Classic Honeyburst, 60s patent-humbucker pickups, OHSC, \$1,200. 325-8377

- ★ Riding lawn mower, Dynamark, 12HP, 42" cut, 1 yr. old, \$550. 881-1328
- ★ Phase converter, 5HP, converts 240 to 3 phase, \$200. 256-852-5010
- ★ Brass floor lamp, \$20; antique Underwood electric typewriter, \$20; Nintendo 64 & Gameboy Color games. 851-2929
- ★ Wheel Horse riding mower, 12.5HP, 37" deck, hydro-transmission, 335 hrs., \$850. 830-6584
- ★ Two quarter ponies: 2-year old sorrel filly; yearling palomino stud colt; \$500 each. 931-732-4742
- ★ White metal day-bed w/trundle, new mattress, spread, dust ruffle & 4 pillow shams, \$350. 828-3442
- ★ Twenty games, steering wheel/pedals for Playstation 1; Dremel scroll saw, \$60; Epiphone Strat guitar w/hardcase, \$95. 851-8085
- ★ Gus Grissom/Liberty Bell 7 artifact; Certificate of Authenticity, Kansas Cosmosphere collector piece. 920-0000
- ★ Oriental rug, hand-knotted, wool, 9'x13', new, red/ivory/blue. 232-8804
- ★ Five compartment entertainment center, holds up to 27" TV, \$50. 726-9244
- ★ Wing back chair, rust, \$65; antique Oak desk w/matching chair, \$450. 256-837-0786

Vehicles

- ★ 1996 Chevy S-10 pickup, X-cab, auto, AM/FM cassette, ps/pb, 4-cylinder, short-bed, 83K miles, \$6,000. 256-882-2400
- ★ 1994 Honda Accord LX 51K miles, maroon/gray interior, automatic, AM/FM cassette, \$8,500. 895-9589
- ★ 1995 Pontiac Grand Am, aqua, 4-door, 4-cylinder, auto, 135K miles, \$3,200 obo. 256-586-5442
- ★ 2002 Chevy Tahoe LS, pewter, leather, fully loaded, 5K miles, \$32,000. 859-1002
- ★ 2000 Honda CRV EX, automatic, silver, 4WD, all service records, garage kept, \$16,000. 565-3022/day
- ★ 1995 Ford Ranger XLT, king-cab, 4-cylinder 5-speed, 95K miles, tilt, cruise, bedliner, \$4,950 firm. 256-753-2278
- ★ 1998 Dodge Grand Caravan, \$9,900 obo. 233 6197/564-6225 beeper

- ★ 1980 Dodge Fleetwood Class C motor home, sleeps 6, 75K miles, \$6,995. 464-9232
- ★ 1994 Honda Accord EX, loaded, \$7,995. 830-0854/508-7385
- ★ 1996 Pontiac Trans Am, manual 6-speed, t-top, black, loaded, 71K miles, \$11,900. 881-5088
- ★ 1982 Mustang GLX, 49.5K miles, one-owner, new tires, battery, \$2,850. 881-4105
- ★ 1995 Toyota Camry, 6 cylinder, 127K miles, \$7,300. 353-3229
- ★ 1989 Ford Crown Victoria, all power, 117K miles, \$1,950. 232-1171
- ★ 1996 Pontiac TransAM, 6-speed, black, loaded, T-top, 71K miles, \$11,990. 961-7891
- ★ 1996 Ford Windstar LX, 91K miles, non-smoker, loaded, white/gold/tan, \$7,500. 325-7542
- ★ 1973 Volkswagen Thing. 426-5475
- ★ 1998 Honda Accord EX, green, 4-door, automatic, sunroof, CD, 31K miles, \$14,500. 256-859-2667/pager 256-525-5414
- ★ 1998 Mazda 626 LX, one-owner, 79K miles, CD, auto, PW/PDL, \$7,500. 256-379-4760 evenings
- ★ 1995 Mazda MPV van, \$2,500. 830-5140

Wanted

- ★ Toyota Camry, 96-99, less than 75K miles, automatic. 883-2757
- ★ Car dolly in good shape. 353-2806
- ★ 100th Shuttle mission bookmark containing payload bay liner. 306-0700 evenings
- ★ To contact persons with tempur-pedic mattress system. 232-0188

Found

- ★ Key in parking lot of Bldg. 4203. Call 544-6052 to identify

Lost

- ★ Gold hoop earring, diamond cut, Bldg. 4200. 544-0457

Free

- ★ Old Beagle, needs good country home, female, spayed, all shots current. 971-1414
- ★ Mixed Lab puppy, black and tan, 3 months old, shots, smart, great with kids. 489-2747

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