

# **Llama Club Elects Officers**

Llama Club members recently elected new officers.

Lou Revnyak was elected president, succeeding Bonnie McBride. Paul Laisure is the new vice president, Althea Dillard, secretary, and Howard Roe, treasurer.

The club's next meeting will be held Wednesday, December 1.

The club's main interest is the improvement of the public speaking abilities of its members. If you would be interested in joining the group, telephone Althea Dillard, PAX 6136.

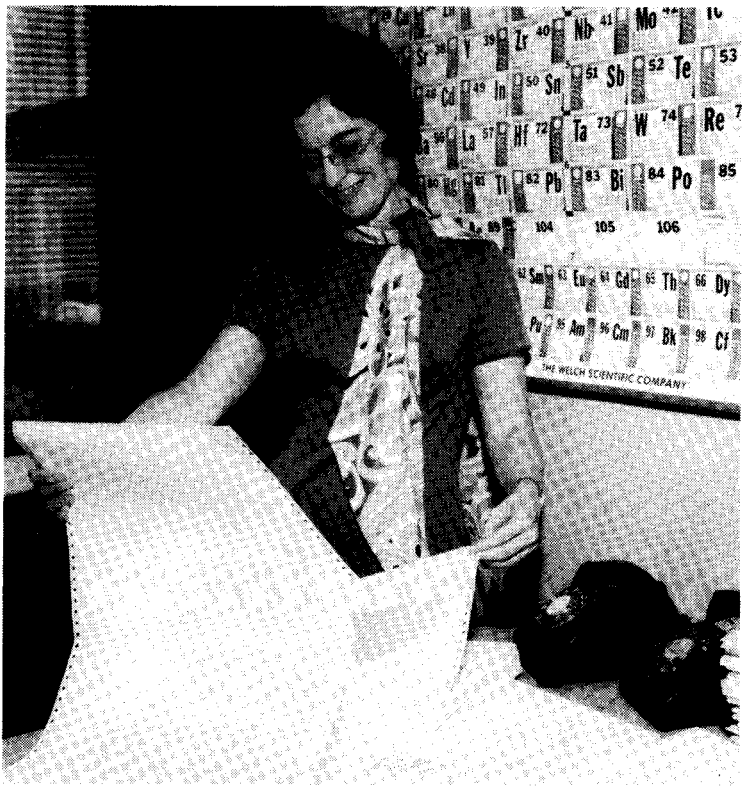
## **AIAA Student Chapter To Tour Center**

Members of the American Institute of Aeronautics and Astronautics' Student Chapter at Case Institute of Technology will be touring the Center next Tuesday afternoon, November 16.

Lewis News

November 12, 1965

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Bonnie McBride reads print-out of one of her computer programs. (John Marton photo)

## Women at Lewis

# Physicist sees study as key to success

(Second of a series)

You would think that a person, who among other high achievements, has developed a computer program used by 50 colleges, 77 industries, 22 government agencies, and in nine foreign countries would be temporarily content to rest on his or her laurels.

But not Bonnie J. McBride of the Physical Science Division. The articulate and intelligent physicist has continued to take graduate courses throughout her 15-year tenure at Lewis as she says, "to seek additional knowledge at every opportunity."

Bonnie McBride has walked the hallowed halls of three colleges in search of wide knowledge since graduating from Michigan State University with a Bachelor's degree in mathematics.

She has taken courses at Toledo, Cleveland State and come September, Case Western Reserve University. Her pursuit of higher education had to be sandwiched in between raising two children and being a housewife, no small achievement when the higher education consists of studying difficult mathematics and physics courses.

While at Lewis Bonnie McBride has specialized in calculating and reporting on thermodynamic properties of importance to propulsion and power systems. Considered a Center expert in that area, she has received requests throughout this country and abroad for her computer program on theoretical chemical equilibrium calculations. She has authored eight technical papers on the subject.

She also has developed programs for other applications such as simulation of the internal combustion engine processes in order to show the theoretical parameters on auto exhaust.

The busy physicist is not involved in many social activities, but she has taken the time to serve as past president of Lewis' Llama Club and is currently president of the Mid-view Women's Club in Grafton, Ohio.

Bonnie McBride sees a trend in the current women's lib movement whereby more and more women will be competing with men in the labor marketplace.

"Population experts are encouraging women to have fewer children. These women will have to do something with their lives, so the obvious inclination is to work, making for keener competition with males for the available jobs," she reasons.

**Yield to men's success**

## Innovations bring awards, praise to 21 employees here

Twenty-one members of Lewis' technical staff earned monetary awards and certificates of appreciation from the Technology Utilization program for published technical innovations that may have practical usefulness in non-aerospace business and

industry.

Dr. Walter T. Olson, Director of Technology Utilization and Public Affairs, who presented the awards earlier this month said, "The monetary awards and certificates are only a small way of acknowledging the extra mile you have gone in contributing to our national well being through these innovations."

The contributors and their tech briefs are William C. McNally, "Program for Calculating Laminar and Turbulent Boundary Layers in Arbitrary Pressure Gradients;" George E. Glawe, "Long-Term Drift of Thermocouple at 1600 K; Albert J. Juhasz and Cecil J. Marek, "Turbulent Mixing Film Cooling Correlation; Robert C. Johnson, "Computer Program for Natural Gas Flow Through Nozzles; William D. McNally and James E. Crouse, "FORTRAN Program for Computing Coordinates of Circular-Arc, Single and Tandem, Turbine and Compressor, Blade Sections on a Plane."

Robert L. Dreshfield and John C. Freche, "Advanced Alloy Design Technique - High Temperature Cobalt

Base Superalloy;" Walter L. Howes and Eileen A. LaSavia, "Loudness (Annoyance) Prediction Procedure for Steady Sounds;" Nelson L. Sanger, "Computer Programs for the Design of Liquid-to-Liquid Jet Pumps;" John A. Woollam, "Magnetometer Uses Bismuth Selenide;" Howard F. Hobart and Herbert L. Minkin, "An Optical Quality Meter Suitable for Cryogenic Liquids;" Lloyd N. Krause, George E. Glawe and Thomas J. Dudzinski, "A Multielement Probe for Coincident Temperature and Pressure Measurements."

Sanford Gordon and Bonnie J. McBride, "Computer Program for Calculation of Complex Chemical Equilibrium Compositions;" Steven M. Sidik, "Optimizing Designs of Two-Level Factorial Experiments Given Partial Prior Information (NAMER);" William D. McNally, "FORTRAN Program for Generating A Two-Dimensional Orthogonal Mesh between Two Arbitrary Boundaries;" and Anthony Fortini and George Tulisiak, "Joining Porous Components to Solid Metal Structures."

### Money identifier developed for blind persons

The cliché "money talks" will soon acquire a new literal meaning for blind business persons thanks to a simple paper money identifier developed from NASA technology.

The device will enable a blind person to identify paper money by its sound "signature." Until now no reliable paper money identifier for the blind has been available.

To determine its denomination, a bill is passed under a light source on the small, inexpensive device. A photo-transistor measures changes in the bill's light patterns. These changes are converted

*(Continued on page 3)*

# Ames first, Lab fifth in jogging

Ames Research Center won the second two-mile inter-Center jogging contest, edging Jet Propulsion Laboratory by three points and finishing 16 points ahead of Headquarters, winner of the first event.

Lewis finished fifth among the nine NASA Centers participating, two slot above the seventh place finish in the first race.

Bernard Hamrock and James Diedrich coordinated the contest at Lewis.

After the results from the various Centers were submitted, points were awarded to the 10 top fin-

ishers (10 points for first place, nine points for second and so on in these age categories: Men: 29 and under; 30-39, 40-49, and 50-59. Women: 29 and under, and 30 and over.

John Kring in the 29 and under age group finished second and earned nine points for Lewis. Randy Thompson came in seventh in the 29 and under category and earned four points for Lewis. Brian Blue, in the 30-39 group finished fourth and earned seven points for Lewis; and James Diedrich finished the men scoring, coming in fifth in the 40-49

age group for six points.

Both Lewis women earned points for Lewis. Bonnie McBride came in third in the over 30 category for eight points, while Virginia Bair finished 10th for one point.

"The 35 points for Lewis is a great improvement over the 12 point Lewis amassed in the first contest. However, in order to do even better, Lewis needs more women participants," Hamrock said. He added, "Of Ames' 69 points, 45 were scored by women."

The next agency-wide  
*(Continued on page 5)*



# Center finishes second in 4-mile, NASA-wide race

In addition to being the leading Center in several significant research areas, Lewis also held its own against eight NASA Centers and Headquarters in a recent NASA-wide jogging competition.

The Center tied for second place with Ames for overall points in the four-mile event and slipped to fourth place in the two-mile event.

Forty-six men and seven women competed for Lewis in the two-mile race while 29 Lewis men and four women challenged and finished the grueling four mile race.

David Rolandelli placed first in his age group in the two-mile event with a running time of nine minutes and 49 seconds. He competed against 43 runners from Lewis and the other Centers.

Bonnie McBride outdistanced all female runners in her category as she finished first in the four-mile race with a running time of 34 minutes and 46 seconds, and second in the two-mile race. Karen Povinelli finished second in her category in the four mile event.

James Modarelli won a first for Lewis in his age category in the two-mile event. John Kring also placed first in his category, finishing ahead of 24 others who competed in the four mile race. Kring's running time was 23 minutes and 50 seconds. Kring also emerged fourth in his age category in the two-mile event.


Points were awarded for the first ten finishers. Other Lewis employees who were awarded points in their respective categories in the two mile race

were Jim Janos, seventh place; Brian Bowles 10th place; Wayne Bartlett, ninth place; Dean Miller, 10th place; Brian Blue, sixth place; and Lonnie Reid, ninth place.

Lewis women finishing in the top ten positions in the two mile race were Karen Povinelli, fourth place and Kathy Povinelli, ninth place. Kathy also finished ninth in the four mile event.

Lewis men finishers in the top ten in their respective category in the four-mile event were Brian Bowles, fifth place; Michael Bowles, sixth place; Wayne Bartlett, sixth place; Dean Miller, ninth place; Randy Thompson, fifth place; Brian Blue, eighth place; Lonnie Reid, fourth place; and Jim Diedrich, eighth place.

### Physicist earns M.S.



Virginia L. Bair of the Physical Science Division, earned the Master of Science degree in physics from John Carroll University last month through a program administered by the Lewis Training Office.

She holds a Bachelor's degree in physics from Case Western Reserve University and began her Lewis career in the fall of 1975.

Instead of talking about her accomplishments, Mrs. Bair seemed more pleased about her husband, Dr. Robert Bair, who earned a degree in podiatry from the Ohio College of Podiatry a month earlier than she.

At Lewis Mrs. Bair is involved in research aimed at improving the efficiency of thermionics energy converters.

## Lewis choral group ends season, seeks new members

The Lewis Choral Group has elected a new slate of officers for the coming season. They are Vernon W. Klinect, president; George Foerster, vice president; Mary Jo Hoyman, secretary; Douglas E. Harrington, treasurer and Robert Friedman, publicity.

The past season concluded with a program on June 2 for residents of the Eliza Jennings Home, 10600 Detroit Avenue.

During the past year, the Choral Group presented several brief Bicentennial song medleys at the Lewis cafeterias and furnished traditional entertainment at the Lewis Childrens' Christmas Party.

Outside appearances included several nursing homes and an evening music program, at the West Shore Senior Activities Center, Bay Village.


The Lewis Choral group will resume meetings in September on each Thursday in the DEB Cafeteria from 5:00 to 6:15 p.m. Why not plan to join now? The group sings mostly popular music, and some interesting programs will be planned. There are no auditions. Join by coming

to a meeting. All it takes is an hour or so after work and an interest in singing. All Lewis employees, contractors, immediate families, men and women, are welcome. Call Klinect, PAX 7195, if you have questions or are interested in becoming a member.

**Give blood to sustain life.**



**Lewis Engineers and Scientists Association**



PAX 6241 PBX 5552

LESA will hold its monthly meeting July 14 at the Dollar Inn (Brookpark Road and West 220th St.) at 5 PM.

The Annual LESA Family Picnic will be held at the Lewis Picnic Grounds on Wednesday, July 13th from 5 to 10 p.m. Guests are invited if accompanied by a LESA member.

# LEWIS NEWS

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*Lewis women honored at the Federal Executive Board's Federal Women's Recognition Day are (front row, from left) Beverly F. Sage, Marilyn S. Edwards and Diane T. Cervinski. Second row (from left) are Loretta M. Shaw, Bonita J. Perzel and June E. Thompson. Top row (from left) are Carolyn K. Purvis, Pearl Wagasky, Betty-Jo Armstead, Margaret A. Reid and Bonnie J. McBride. Missing from picture are Genevieve M. Esgar and Patricia A. Cataldo. (Don Huebler photo)*

## **FEB sponsors women's day; thirteen from lab honored**

Thirteen Lewis women, along with women from other Cleveland area federal agencies, were honored by the Cleveland Federal Executive Board for exceptional accomplishments in their careers on August 12.

The program, the feature of Federal Women's Recognition Day, was held at the Anthony J. Celebreeze Federal Building and was co-sponsored by the Federal Women's Program Council and FEB.

This event marks the first program of its kind in this area to recognize women from all vocations—clerical, technical, professional and managerial—for excellence on the job or for succeeding despite personal hardships and for making significant contributions to the agency's missions and programs.

Program Chairperson Jane Arrington of the Internal Revenue Service said the event was aimed at focusing attention on the Federal Women's Program as we enter into the new decade.

Guest speaker for the occasion was Ellen Dye, Chief, Affirmative Employment Programs Branch, U.S. Office of Personnel Management, Great Lakes Region. She reviewed the accomplishments of the Federal Women's Program.

Lewis women receiving Federal Woman of Achievement Award certificates are Betty Jo Armstead, Carolyn K. Purvis, June E. Thompson, Bonnie J. McBride, Patricia A. Cataldo, Margaret A. Reid, Pearl Wagasky, Diane T. Cervinski, Beverly F. Sage, Marilyn S. Edwards, Bonita J. Perzel, Loretta M. Shaw and Genevieve M. Esgar.

**Staff managers 'XCHANCE'**

# Award winners...

*(Continued from page 3)*  
superior manner.

**David C. Liu, Communications Division**, established a thin film research program for microwave device application.

**Arthur V. Zimmerman, Launch Vehicles Division**, developed the technical plan for the integration of the Centaur stage with the Shuttle.

**John B. Nechvatal, Launch Vehicles Division**, managed the electrical systems and equipment used on launch vehicles merits special recognition.

**Alvin C. Hahn, Launch Vehicles Division**, directed the annual maintenance of P&WA rocket engine test facilities over the last two years.

## TEAM AWARD WINNERS

**Helicopter Transmission Facility Team.** Members: Robert Smith, Robert Horansky, Duane Fair, Paul

Weisenback, Clyde Pardee, David Herb, Harley White, Robert Baus, John Stock, Dianna Corso, Joseph Hanslik, Robert Gedeon, Raymonf Pettrime, Michael Fallon, Jacob Slone, and George Miterko. For high level team effort in completing helicopter test facility on schedule.

**Grant and Cooperative Agreement Team.** Members: Boyd Bane, Nancy Iorio and Steve Szabo. For raising on-time renewal rates for university grants from 58% to 95%.

**Management Operations Office Team.** Members: Charles Tiede, Richard Woelfle, George Novak, Jack Herman, Isadore Sonkin and Betsy Torres. For preparing Atlas/Centaur and Shuttle/Centaur operations plans.

**Modeling Internal Combustion Engine Team.** Members: Bonnie McBride and Frank Zeleznik. For developing computer

programs modeling chemistry and performance of internal combustion engine.

**NASA/DOE Combustor Projects Team.** Members: Julius Notardonato, Donald Schultz and Howard Yacubucci. For managing activities for using residual and coal-derived fuels.

**8x6 Laser Velocimeter Team.** Members: John Serafini, Robert Freedman, John Griessing, Harvey Neumann and Daniel Whipple. For installing and designing the laser velocimeter system.

**2D-CD Exhasut Nozzle Research Team.** Members: David Straight, Richard Cullom, Rudolph Grey, Charles Spuckler and Robert Solomon. For evaluation of complex, high-risk, experimental exhaust nozzle.

**Ion Auxiliary Propulsion Systems Flight Software Development Team.** Members: Charles Low and John Power. For work in developing flight software to control the thruster system.

# Lewis Newsline

**WOMEN OF ACHIEVEMENT**—Recently at a **Federal Women's Recognition Day** "Search for Excellence" program, 14 Lewis employees were honored for their outstanding contributions and achievements by the Cleveland Federal Executive Board and the Federal Women's Program Council. Lewis awardees were **Ruth Arnholt, Jo Ann Charleston, Diane Cento-Gomez, Gertrude Collins, Sandra Giorgio, Leslie Greenbauer-Seng, Gilda Jacinto, Carmela Lampkin, Bonnie McBride, Pat O'Donnell, Lucille Rhodes, Mary Tharp, Sandra Walters and Alice Whitlock.** And among those honored for having "achieved the status of the highest ranking woman in their local agency" was Lewis employee **Peggy Yohner.**

**BPW LEADERSHIP**—"You are indeed fortunate to have in your employ a true professional, a person who cares," said Patricia Molnar, president of **Ohio Federal Business and Professional Women,** in announcing Lewis employee **Theresa A. Horvath** as president-elect of that organization for the 1985-86 year. "By accepting this position, Theresa has demonstrated responsibility and leadership ability. She is indeed an asset to BPW, as I am sure she is to you at Lewis," said Molnar.

**FIRE PREVENTION WEEK**—During Fire Prevention Week, **Oct. 6-9,** the Center's Plant Services and Fire Protection Branch is planning an **Open House,** says Branch Chief **Ted Ermi.** Free hand-outs, a contest and live demonstrations are all planned for the event. Look for a flyer coming to your mail stop for more details.

**ANNUAL STEAK-OR-BAKE**—On **Sept. 27,** the **Facilities Operations and Maintenance Division** will hold their Seventh Annual Steak-or-Bake at the Picnic Grounds. "We are inviting all FOMD employees past and present and any FOMD retirees who would like to attend," says Edna T. Schleich, Division Secretary. Tickets are **\$8.50 per person** with extra clams at \$3 per dozen. Contact Edna at PAX 8078, MS 21-11; PBX 433-4000, ext. 250.



# Saluting Our Tech Briefs

## **HEY! HEY! HEY!**

## **Tali Spalvins**



**makes it  
56\*  
today**

\*Number of Lewis Staffers submitting approved Tech Briefs so far in 1985

### **The 55 others:**

Richard DeLombard • John Smithrick • Michelle Manzo • Olga Gonzalez-Sanabria • Daniel Soltis • James Gauntner • Albert Kaufman • Walter Merrill • Ronald Steinke • Michael Mirtich • James Sovey • Bruce Banks • Fredric Harf • Carl Daniele • Carl Lorenzo • Bonnie McBride • Irving Weinberg • Henry Brandhorst • Raymond Vannucci • Suzanne Gooder • Donald Schultz • Albert Weigand • Robert Cunningham • Sharon Rutledge • Eliseo DiRusso • Robert Frye • Bruce Steinetz • Stuart Lowenthal • David Ercegovic • Curtis Walker • Carl Norgen • Russell Jirberg • David Sagerser • Thomas Moore • Gary Roberts • Richard Lauver • Dale Arpasi • Jerrold Wear • Robert Jones • Arthur Trout • Bonnie McBride • Robert Buzzard • Bernard Gross • George Succop • Edward Generazio • Thomas Kascak • Donald Roth • Lorra Rieker • Mark Hoberecht • David Hull • Frank Zeleznik • Dennis Townsend • Erwin Zaretsky • Paul Aron and Herbert Scibbe.

Thanks to all from the  
**Lewis Technology Utilization Office**  
Dan Soltis (chief), Bill Waters, Steve Riddlebaugh

Lewis News: Nov 1, 1985  
MS 7-3, PABX 3-5568, 3-5563, 3-5571

## 1986 Lewis Tech Briefs Generate 2795 Inquiries

As part of its efforts to help American industry benefit from Lewis research and technology, the Technology Utilization Office, through NASA's Scientific and Technical Information Facility (STIF), last year distributed a total of 2795 Technical Support Packages. The packages were sent in response to requests for more information about 56 Lewis Tech Briefs. In addition, 559 Technical Support Packages were sent providing more information about the four Lewis-funded projects which won I-R 100 awards last year. Information about the I-R 100 projects appeared in Industrial Research and Development magazine, which sponsors the awards program.

The Tech Brief program disseminates ideas that can potential-

ly be used by industry, or local and state governments to improve their operations, reduce costs, or build better products. The TU Office submits approved Tech Briefs from Lewis and Lewis-funded projects to a Headquarters-funded contractor, which compiles Tech Briefs from all NASA centers for publication in NASA Tech Briefs magazine. The magazine, which reaches more than 125,000 qualified engineers and new product development personnel, was published six times in 1986 and will be published ten times this year.

As inquiries about specific Lewis Tech Briefs are received, the TU Office has the appropriate Technical Support Package sent out.

"Each package is designed to

help the potential user evaluate and apply the innovation described in the Tech Brief," says Dan Soltis of the TU Office. A typical Technical Support Package con-

tains detailed information, including drawings, charts, and the report from which the Tech Brief was abstracted.

The charts below show the ten

Tech Briefs that generated the most inquiries and the number of Technical Support Packages sent out for the I-R 100 award-winning projects.

### "Top Ten" Tech Briefs of 1986

A total of 2795 Technical Support Packages (TSP's) were sent out for 56 Lewis-produced Tech Briefs in 1986. Below are the ten Lewis Tech Briefs that generated the most inquiries.

#### TSP's

#### Sent Out

#### Title (Lewis Number)

488	Solution Of Non-Linear Coupled Differential Equations (14165) Source: Lewis Grant, Virginia Polytechnic
217	Computer Program For Calculation Of Thermodynamic And Transport Properties Of Complex Chemical Systems (14166) Source: Bonnie McBride
201	Improved Silicon Nitride Ceramic For High-Temperature Structural Applications (14193) Source: Dr. Sunil Dutta and Bruno Buzek
167	Feasibility Of Welding Of Silicon Carbide (14251) Source: Thomas Moore
116	Effect Of Gear Cutter Geometry On Performance (14243) Source: Lewis Contractor, Transmissions Tech
111	Computer Program To Determine Dynamic Tooth Loads For Spur Gears (14099) Source: Lewis Contractor, Hamilton-Standard
109	Variable Force Eddy-Current On Magnetic Damper (13717) Source: Robert Cunningham
103	Computer Program INHYD (14079) Source: Dr. Christos Chamis and John Sinclair
95	Oxide-Charge-Induced HLE Solar Cell (13618) Source: Lewis Grant, University of Florida
93	An Extremely Low Secondary Electron Emission Textured Carbon Surface Applied To A Copper Substrate (14130) Source: Arthur Curren, Michael Jensen, Robert Roman

### Inquiries About I-R 100 Award-Winning Projects

#### TSP's

#### Sent Out

225	NASA Lube PS200 Harold Sliney
175	Advanced Thermal Barrier Coating System Dr. Stephan Stecura, Jack Brown
153	Unducted Fan and Propfan Engines Edward Meleason, David Sagerser
56	Arc Spray Monotape Process Leonard Westfall, John Juhas

## Tech Briefs Help Generate Interest In Using Lewis Technology

There are thousands of businesses and organizations throughout the United States that could benefit by applying the technology developed at Lewis.

One of the most effective methods of keeping potential users informed about available technology is through "NASA Tech Briefs" magazine. Published for NASA 10 times a year, the magazine is sent to more than

130,000 engineering group leaders, design engineers, corporate managers, and other technology transfer agents at businesses throughout the United States.

Each issue includes short descriptions of specific technology developed at Lewis and other NASA Centers. These "Tech Briefs" are grouped into ten categories: computer programs, electronic components and circuits, electronic systems, physical sciences, materials, mechanics, machinery, fabrication technology, life sciences, mathematics, and information sciences.

Readers who believe they could use the technology described in a particular Tech Brief are encouraged to request a Technical Support Package (TSP), which provides more details about that technology.

Last year, readers of "NASA Tech Briefs" requested a total of 2,671 Technical Support Packages pertaining to 57 Tech Briefs from Lewis.

"The large number of requests for the TSP's indicates the high quality of the technical information contained in the Lewis Tech Briefs," says Joe Krysiak, of the Technology Utilization Office. "Keeping track of the number of TSP's requested for each Tech Brief is also helpful in determining the amount of outside interest in the technology."

The 12 Lewis Tech Briefs that attracted the most requests for TSP's in 1987 are listed at left. Forty-five other Tech Briefs from Lewis drew from 1 to 46 inquiries each.

### Top Twelve Tech Briefs In 1987

Requests For TSP's	Title/Author
469	<b>Solar Energy Thermal Receiver</b> Miles Dustin
391	<b>FLUID: A Fluid Properties Subroutine in Standard Fortran 77 for the IBM PC</b> Mark Klem, Margaret Proctor
358	<b>Fortran Algorithm for Image Processing</b> Don Roth, David Hull
176	<b>Modeling the Internal Combustion Engine</b> Bonnie McBride, Frank Zeleznik
168	<b>General Chemical Kinetics Code for Complex Homogeneous Ideal-Gas Reactions</b> Vincent Scullin, David Bittker
158	<b>Computer Program for Determining Flow Inspection Reliability in Nondestructive Evaluation</b> Don Roth
141	<b>Large Perturbation Flow Field Analysis and Simulation for Supersonic Inlets</b> Sverdrup Technology, Inc.
128	<b>Arc Spray Fabrication of High Temperature Metal Matrix Composite Monotape</b> Leonard Westfall
125	<b>ICAN: Integrated Composites Analyzer</b> Christos Chamis, Pappu Murthy
114	<b>Calculation of Multicomponent Convective Diffusion Deposit Rates</b> Suleyman Gokoglu, D.G. Rosner
114	<b>A Teach Computer Program for the Analysis of Turbulent, Swirling, Reacting Flow In A Research Combustor</b> United Technologies Research Center
77	<b>SHABERTH/NASA Computerized Bearing Design and Analysis</b> SKF Industries



Hal Sliney of the Materials Division displays a Stirling engine cylinder coated with his invention, PS 200. The coating was successfully tested in a four-cylinder automotive Stirling engine at an upper cylinder temperature of 750°C in a hydrogen atmosphere.

Since the first research report about PS 200 was presented, well over 1,000 requests for more information have been received from industries throughout the world.

## Patent Issued For High-Temperature Self-Lubricated Composite

A U.S. patent covering the PS 200 series of composites invented by Hal Sliney of the Surface Science Branch of the Materials Division was issued in March. Entitled "Carbide/Fluoride/Silver Self-Lubricating Composite," the patent covers an award-winning invention that has numerous potential aerospace and terrestrial applications.

The patented materials provide low friction and wear for sliding contacts from room temperature to about 900°C. The materials consist of a matrix of nickel alloy-bonded chromium carbide, which has excellent wear-resistance, with dispersed solid lubricating materials for low friction. The ratio of carbide to solid lubricants can be tailored to the requirements of the intended application.

These materials have been prepared as plasma spray-coatings on super alloy or

stainless steel substrates; free-standing forms such as high-temperature bushings can also be made by sintering or hot pressing.

PS 200 has already been successfully tested as a back-up lubricant for air bearings in turbomachinery and as a cylinder liner coating for the Stirling engine.

In 1986, PS 200 was judged one of the 100 most significant technological developments in the nation that year and received an I-R 100 Award from "Research and Development" magazine.

Since the first research report of PS 200 was presented, well over 1,000 requests for more information have been received from a wide variety of industries throughout the world. And, the Lewis Office of Chief Counsel has already received 10 inquiries from companies interested in becoming licensees of the patent.

## Admiral Richard Truly Is Guest Speaker

# 1991 NASA Lewis Honor Awards Roll Call

### OUTSTANDING LEADERSHIP MEDAL

Neal T. Saunders, director of Aeronautics.

### EXCEPTIONAL SCIENTIFIC ACHIEVEMENT

Dr. Khairul Zaman B.M.Q., Inlet, Duct and Nozzle Flow Physics Branch, Internal Fluid Mechanics Division.

### DISTINGUISHED PUBLICATION AWARD

Rebecca A. MacKay and Michael V. Nathal, Advanced Metallics Branch, Materials Division, for: "Coarsening in High Volume Fraction Nickel-Base Alloys."

### EXCEPTIONAL SERVICE AWARDS

Robert Baumbick, Engine Sensor Technology Branch, Instrumentation and Control Technology Division; Harvey Bloomfield, Power Systems Integration Office, Power Technology Division; Frank Brady, Electrical Systems Branch; Raymond Burns, Systems Engineering and Analysis Branch, Systems Engineering and Integration Division; Jean Chapman, Office of Chief Scientist; Russell Corso, Fluid Systems Branch, Propulsion and Fluid Systems Division; James Davis, Facility Planning Office; Dr. John W. Dunning, Jr., deputy chief, Systems Engineering and Integration; Robert Evans, Terrestrial Propulsion Office, Propulsion Systems Division; Thomas Finnegan, Management Information Systems Branch, Computer Service Division; Phyllis Geffert, Telecommunications and Networking Branch, Computer Services Division; Steve Goncezy, Electronic Systems Branch, Aeropropulsion Facilities and Experiments Division; William Groesbeck, Thermal and Fluids Analysis Branch, Propulsion and Fluid Systems Division; Louis Ignaczak,

Flight Projects Branch, Space Experiments Division; Kenneth Jensen, Communications and Electronics Branch, Test Installations Division; Bonnie McBride, Aerothermochemistry Branch, Internal Fluid Mechanics Division; Carl Monnin, Software Engineering Office, Engineering Support Division; Monica Palivoda, Office of the Director; Patricia Parker, Office of the Comptroller; Paul Prokopius, Electro-Chemical Technology Branch, Power Technology Division; Gary Sagerman, Mission and Vehicle Integration Office, Launch Vehicle Project Office; Bobby Sanders, deputy chief, Inlets Technology Branch, Propulsion Systems Division; Charles Slauter, deputy chief, Fabrication Support Division; Joseph Stephens, Engine Materials Project Office, Materials Division; Eugene Symons, chief, Cryogenic Fluids Technology Office; and Dr. Fred Teren, chief, Electrical Systems Division.

### EXCEPTIONAL ACHIEVEMENT MEDALS

Henry Geringer, Materials Development Branch, Test Installations Division; Arthur Laufman, Photographic and Printing Branch; Donald Packe, deputy chief, Computer Services Division; Vernon Parrish, Environmental Compliance Office, Office of Environmental Programs;

Laurence Petraus, chief, Materials and Engine Components Branch, Test Installations Division; Robert Schneider, chief, Project Control Office; and Thomas Tokmenko, Space Systems Branch, Procurement Division.

### EXCEPTIONAL ENGINEERING ACHIEVEMENT

Leo Franciscus, Mission Analysis Branch, Aeropropulsion Analysis Office; Dr. Patri-

berg, Carl F. Lorenzo, John J. Reinmann, Charles J. Trefny. Employees from other organizations include: Charles J. Bauer and John L. Leingang, USAF Wright Laboratories; Robert L. Berrier, Ernest A. Mackley, and Charles R. McClinton, NASA Langley Research Center; Victor Corsiglia, NASA Ames Research Center; Robert Dobrowolski, Guy Mangano, and Ed Stawski, Naval Air Propulsion Center; James L. Keirse and Paul J. Waltrup, JHU/Applied Physics Laboratory; James Loudigan and C. Franklin Markarian, Naval Weapons Center; William Rose, Rose Engineering; Raymond Shreeve, Naval Postgraduate School.

### Solid Surface Combustion Experiment Team:

In recognition of the sustained superior effort and achievement in the design, development, and flight of the Solid Surface Combustion Experiment. Team members include: Ralph J. Zavesky (project manager), Frank J. Barina, Kenneth M. Beno, William J. Bifano, Michael H. Brace, Daniel W. Buttler, James E. Cake, William M. Foster II, Christopher A. Gallo, Gary E. Gorecki, Daniel H. Haas, Robert L. Hauer, Thomas V. Hudach, Louis R. Ignaczak, Jean M. Johnson, Poppy Kalis, Gary N. Kotch, John M. Koudelka, John J. Logan Jr., William J. Masica, Richard D. Meden, Daniel P. Morilak, Eric S. Neumeann,

Scott A. Numbers, Sandra L. Olson, Angel M. Otero, Kimlan T. Pham, Howard D. Ross, Neil D. Rowe, Kurt R. Sacksteder, Jack A. Salzman, Raymond G. Sotos, Donald R. Striebing, Kenneth G. Ulicny, Daniel M. Vanto, James C. Williams, and William J. Wolf. Lewis contractor employees include: Robert E. Bryan, Michael Shuty, John C. Sturman, and Dan Williston, Analex Corporation; Jay C. Owens, Cortez III Service Corporation; Mark Brezenski, David J. Haydu, James H. McKim, and John J. Merry. Employees from other organizations include: Robert A. Altenkirch, Mississippi State University; Thomnas D. Akers, Charles E. Chassay, Kyle Fairchild, and Dawn A. Thomas, NASA Lyndon B. Johnson Space Center; Willie S. Beckham and Gary Deardorf, Lockheed; Richard Bradfield, The Bionetics Corporation; Bradley Carpenter, Warren G. Hodges, and James F. McGuire, NASA Headquarters; Beth A. Cerrato, Glenn C. Chin, Deborah J. Moates, and William J. Paton, NASA John F. Kennedy Space Center; Susan Freeman, Rockwell.

### FORTY-FIVE-YEAR SERVICE EMBLEM

Robert G. Deissler, staff scientist for Fluid Physics, Office of the Chief Scientist.

### FORTY-YEAR SERVICE EMBLEM

William P. Hassett, mechanical engineering technician, Facilities Operations Division; Leonard V. Pelka, electronics equipment specialist, Logistics Management Division; and Frank A. Zelko, lead electronics engineering technician, Test Installations Division.

### GROUP ACHIEVEMENT AWARD

**Lewis FY 1990 Construction of Facilities Team:** In recognition of outstanding implementation of the Construction of Facilities FY 1990 Minor Program resulting in substantial increases in mission capability and quality of life. The team includes: Daniel J. Keliher (team leader), Louis F. Bernhardt, Frances M. Borato, John Chovan, Pedro I. Colon, David S. Ebner, William D. Guthrie, Thomas J. Hinshaw, Robert F. Houk, William F. Hyde, Robert P. Jones, Paul A. Karla, Daniel F. Larson, Dallas Lauderdale Jr., Gene Pinali, Hugh A. Schoeffler, Michael C. Seaver, Paul B. Starner, Ronald A. Zurawski.

**Low-Speed Propulsion Team:** In recognition of an exceptional effort in low-speed propulsion technologies crucial for the National Aero-Space Plane Program. The team includes: Edward T. Meleson (team leader), John C. Aydelott, Bernard J. Blaha, David N. Bowditch, Robert E. Coltrin, Richard L. DeWitt, Ned P. Hannum, Erwin A. Lez-



Director of Aeronautics, Neal T. Saunders (center), received the Outstanding Leadership Medal. Center Director Larry Ross (left) and NASA Administrator Richard Truly (right) look on.

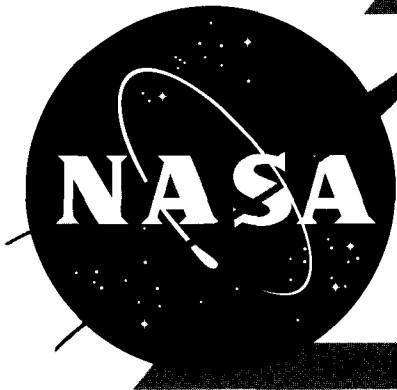
Photos by Quentin Schwinn



Rebecca A. MacKay and Michael V. Nathal (center) received the Distinguished Publication Award. Center Director Larry Ross (left) and NASA Administrator Richard Truly look on.



Khairul Zaman (center), Inlet, Duct and Nozzle Flow Physics Branch, received the Exceptional Scientific Achievement Medal. Center Director Larry Ross (left) and NASA Administrator Richard Truly (right) look on.



# Lewis NEWS

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## *\$10,000 Space Act Monetary Awards*

# McBride and Gordon honored for CET89 code



Gordon



McBride

TWO Lewis scientists were recently honored, each receiving a \$10,000 Space Act Monetary Award, two of the largest monetary award of their kind ever given at Lewis.

Bonnie McBride, Computational Methods for Space Branch, and Sanford Gordon, a retired Lewis employee who now works part-time, were recognized for their development of one of the most important and widely used computer programs in the aerospace industry, the CET89 code. For any set of reactants, this code calculates chemical equilibrium products as well as thermodynamic and transport properties for the resulting mixture. It includes a large products database for use with a wide variety of fuels and oxidants.

The CET89 code is currently being used at all NASA centers and by universities, government laboratories, and corporations worldwide in a wide range of applications, from Space Shuttle Main Engine design to exploration of new nuclear propulsion concepts. This code is used by numerous scientists and engineers involved in combustion. In addition to handling complex combustion problems, the code can also be applied to evaluate theoretical performance of rockets, incident and reflected shocks, and Chapman-Jouguet detonations.

The Space Act Monetary Awards Program was established to provide official recognition and equitable monetary awards for those inventions and other scientific and technical contributions that have helped to achieve NASA's aeronautical and space goals in the past, and to stimulate and encourage the creation and reporting of similar contributions in the future. The awards are given by the Inventions and Contributions Board at NASA Headquarters. ♦

# Lewis employees receive 1997 Honor Awards

**O**n July 7, Center Director Donald Campbell and Chairman, President, and CEO of the Geon Company William Patient presented plaques and medals to NASA Lewis employees and members of external organizations for their outstanding contributions.

## Forty-Year Service Awards

Presented to **Kenneth Bowles**, Polymers Branch; **Donald Brasted**, Scientific Applications Development Branch; **Richard DeWitt**, Fluid Flight Projects Branch; **Joseph Eisenberg**, Subsonic Systems Office; **Frederick Harris**, Engineering Technology Branch; **John Holloran**, Polymers Branch; **Robert Hendricks**, Research and Technology Directorate; **David Herb**, Construction Management Branch; **Daniel Larson**, Facilities Architectural Civil Structural Systems Management Branch; **Carl Lorenzo**, Instrumentation and Control Division; **Bonnie McBride**, Combustion Branch; **Roy Springborn**, Thermal and Fluid Systems Design and Analysis Branch; **Edward Stefonsky**, Combustion Flight Projects Branch; and **Erwin Zaretsky**, Structures and Acoustics Division.

## Forty-Five-Year Service Awards

Presented to **Robert Friedman**, Microgravity Combustion Science Branch, and **George Succop**, Life Prediction Branch.

## Distinguished Publication Award

Presented to **Paul Greenberg**, **Robert Klimek**, and **Donald Buchele** in recognition of the excellence and value to their publication titled, "Quantitative Rainbow Schlieren Deflectometry."

## Abe Silverstein Medal for Outstanding Research Leading to Practical Applications

Presented to **Don Roth** for exceptional achievement in advancing the development of and transferring the technology for an innovative ultrasonic imaging method for aerospace materials characterization.

## Presidential Rank Award

*Meritorious Executive*—Presented to **William Masica** for sustained superior accomplishment in management of programs of the United States government and for noteworthy achievement of quality and efficiency in the public service.

## Exceptional Service Medal



Presented to **Ronald Alexander** for outstanding leadership in promoting the managing and valuing of diversity, and demonstrating NASA Lewis' importance to key policymakers and stakeholders.

Presented to **Luis Beltran** for outstanding technical contributions to NASA's aeroacoustic research programs and exceptional outreach in the Cleveland Area Hispanic community.

Presented to **Stanley Borowski** for exceptional and

innovative advancement of space propulsion system readiness for the next chapter of human and robotic exploration of the solar system.

Presented to **Robert Friedman** for exceptional contributions to NASA's research program, policies, and practices toward assured fire safety onboard aircraft and habitable spacecraft.

Presented to **Herbert Gladden** for his unique, outstanding contributions to the understanding and solution of high temperature heat transfer problems in aeropropulsion systems.

Presented to **Jeffrey Haas** for outstanding leadership in promoting Total Quality principles within the Aeropropulsion Facilities and Experiments Division and exemplary management of the Aeronautics Directorate test facilities.

Presented to **Steven Johnson** for outstanding contributions to engineering and integration efforts for the Space Station Program and to risk mitigation in joint U.S./Russian programs.

Presented to **Mary Ann Meador** for her contributions toward understanding high temperature polymeric materials and her outstanding effort and participation in support of Center goals.

Presented to **Edward Meleason** for outstanding leadership and dedication in defining, managing, and conducting research in the advancement of U.S. airbreathing propulsion technology.

Presented to **Kathleen Needham** for outstanding service that significantly contributed to the quality of procurements at NASA Lewis.

Presented to **Joan Oravec** for exceptional leadership in delivering computational capability to NASA Lewis and for being a key player in many critical Center and Agency initiatives.

Presented to **Barbara Perkowski** for developing a system that allows the External Programs Directorate to respond to customers' needs and requests in a timely and more efficient manner.

Presented to **David Petrarca** for sustained outstanding performance in numerous space experiments.

Presented to **Richard Ranaudo** for outstanding technical contributions to NASA's icing and aeroacoustics flight research programs and the impact he has had on flight safety.

Presented to **Gloria Richards** for exemplary secretarial performance, initiative, and leadership, which significantly contributed to effective operation of the Aeronautics Directorate.

Presented to **Joseph Roche** for exceptional leadership and superb engineering in support of the Solar Dynamic Flight Demonstration and Rocket-Based Combined Cycle Vehicle projects.

## In Memory

# Bonnie McBride leaves behind an industry standard

**B**onnie McBride, 71, a physicist in the Combustion Branch, died on August 11, after a long illness. During her 48-year career with NASA, McBride earned numerous awards for her work including a NASA Honor Award for Exceptional Service in 1991 and a Federal Women of Achievement Award in 1985 from the Cleveland Federal Executive Board. She was also inducted into her high school's Hall of Fame as alumna of the year in 1995.



*McBride*

McBride spent her career at NASA working on thermodynamic databases and numerous versions of the NASA chemical equilibrium code that had been initially developed in the 1950s. She and her coworkers continually updated, improved, and provided support for these codes and databases. As a result, these codes have become an industry standard for the chemistry, combustion, and propulsion community. NASA's Inventions and Contributions Board named one of these codes, "Chemical Equilibrium with Transport Properties (CET89)," as one of NASA's Exceptional Scientific and Technical Contributions for the 1990s.

She was known and respected by her peers in and outside of NASA as a "kind, thoughtful, dedicated, and helpful colleague."

McBride received a bachelor's degree from Michigan State University in 1955 with additional course work at Wayne State, University of Toledo, and Cleveland State University. ♦

**Richard George Daniels**, 90, who retired in 1975 with 30 years of service, recently died. Daniels served as an aerospace services operator foreman prior to retirement.

**Ronald Frimel**, 73, who retired in 1994 with 40 years of service, recently died. Frimel worked as an electronic equipment fabricator prior to retirement.

**Roy Themes**, 86, who retired in 1979 with 32 years of service, recently died. He was a facility operator and construction inspector during his career. He served in the Army Air Corps during WWII.