

# REGISTRATION BOOKLET FOR



## THE SIXTH ANNUAL CONFERENCE OF THE SOUTHEAST SAS® USERS GROUP

Sheraton Norfolk Waterside Hotel  
Norfolk, Virginia  
September 13 - 15, 1998

## WELCOME TO SESUG '98

You have most likely heard the now popular line from the classic movie *Field of Dreams* that says “**If you build it, they will come.**” Well, back in 1992, several people had a dream to start a **regional users group** for the Southeast United States. Two of those people were **S. David Riba** and **Tamara Fischell**. They helped build the **SouthEast SAS Users Group (SESUG)** by chairing its first conference in **1993** at the **TradeWinds** in **St. Petersburg Beach, FL**. *And the people did come.*

In **1994**, **Frank Dilorio** and **Debbie Hoppe** continued the SESUG dream by hosting a second conference in **Charleston, SC**, at the **Omni Hotel at Charleston Place**. *And the people came again.*

The dream continued the following year when **Melissa Garreans** and **Andrew Parks** hosted **SESUG '95** at the **North Raleigh Hilton** in **Raleigh, NC**. This was followed by **Frank Dilorio** and **Grace Lossman** chairing **SESUG '96** at the **swissôtel Atlanta** in **Atlanta, GA**. And last year, the dream was still alive when **Dan Bruns** and **Andrew T. Kuligowski** took **SESUG '97** to the **Omni Jacksonville Hotel** in **Jacksonville, FL**. Throughout each of these years, *the people continued to come.*

This year, **F. Joseph Kelley** and **Randy C. Finch** (that's us!) will carry forth this six year dream when **SESUG '98** convenes at the **Sheraton Norfolk Waterside Hotel** in **Norfolk, VA**. Our sincere hope is that *even more people will come*. For those who do, we believe you will **not be disappointed**. Many **excellent papers** will be presented by many **excellent presenters**. The **abstracts** in this booklet should appeal to all SAS users, regardless of their field of interest.

As we have pointed out, SESUG has a **rich** history, albeit a **short** one. This year, SESUG will be held in **Norfolk, Virginia**; a city with a **long, rich** history that predates the establishment of the Republic by almost 100 years. Here is some information about the city.

Norfolk is located at the mouth of the **James, Elizabeth, and Nansemond rivers**, near the **Chesapeake Bay**. The nearby cities of Hampton, Portsmouth, and Newport News, along with Norfolk, form the port of **Hampton Roads**, one of the greatest natural harbors in the world. Norfolk is a **major seaport** and an important **military center**, having one of the world's largest concentrations of naval installations as well as important United States Navy, Marine, and Coast Guard facilities. The **Norfolk Naval Shipyard** is across the Elizabeth River, in Portsmouth. Norfolk is also the home of **Old Dominion University** (1930), **Norfolk State University** (1935), **Virginia Wesleyan College** (1961), and **Eastern Virginia Medical School** (1964).

During the **American Revolution**, Norfolk was **invaded and occupied** by British troops. During the war, every building except **Saint Paul's Church** (1739) was destroyed. Rebuilt after the war, Norfolk became an important **shipbuilding and maritime center**. On March 9, 1862, during the **American Civil War**, the famous battle between the ironclad warships **Monitor** and **Merrimack (C.S.S. Virginia)** took place at **Hampton Roads**. Two months later, Norfolk was **captured by Union forces**.

Norfolk's enormous **military growth** began during **World War I** (1914-1918). This growth continued until the early 1990s when **federal defense cuts** and **base closures** cost the city **military jobs** and **defense-related civilian jobs**. But **today**, Norfolk is on the **growth curve** again with many **construction and renovation projects** underway.

For over **three centuries**, Norfolk and the surrounding area (which includes **Jamestown, Yorktown, and Williamsburg**) have been very much a part of the **industry, trade, and commerce** of this country. It has also been the focus of a number of **historic events**, including armed **invasions!** This September, another **invasion** of sorts will take place, as **hundreds of SAS users come for SESUG '98**. This is an **invasion** the city will be looking forward to, and **so should you!** Don't miss out. Make your plans now to visit the historic city of Norfolk and be a part of **SESUG '98**.

F. Joseph Kelley

Randy C. Finch

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**Conference Registration Booklet:**

**"The Sixth Annual Conference of the SouthEast SAS Users Group"**

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**The SESUG '98 logo was designed by Randy C. Finch**

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## CONFERENCE PLANNING TEAM

### Conference Co-Chairs

<b>Randy C. Finch</b> Tennessee Valley Authority CEB-4C-M POB 1010 Reservation Road Muscle Shoals, AL 35662-1010 Phone: (256) 386-2197 ; FAX: (256) 386-3799 <a href="mailto:rcfinch@tva.gov">rcfinch@tva.gov</a>	<b>F. Joseph Kelley</b> University of Georgia UCNS Client Services Computer Services Annex Athens, GA 30602-1911 Phone: (706) 542-5359 ; FAX: (706) 542-0349 <a href="mailto:jkelly@arches.uga.edu">jkelly@arches.uga.edu</a>
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### Section Chairs

<b>Advanced Tutorials</b>	<b>Gerardette Furlow</b> North Carolina State University	<b>Elizabeth Hamilton</b> University of North Carolina
<b>All in Jest</b>	<b>Olivia Rud</b> Fleet	<b>Robert Passmore</b> Passmore Consulting Services
<b>Applications Development</b>	<b>Phil d'Almada</b> EDS	<b>Olivia Rud</b> Fleet
<b>Beginning Tutorials</b>	<b>Ian Whitlock</b> Westat, Inc.	<b>David Maddox</b> BellSouth
<b>Coders Corner</b>	<b>Maribeth Johnson</b> Medical College of Georgia	<b>Andrew T. Kuligowski</b> Nielsen Media Research
<b>Food Services</b>	<b>George Matthews</b> University of Georgia	
<b>Host Systems</b>	<b>Gregory Barnes Nelson</b> ASG, Inc.	
<b>I-Net Solutions</b>	<b>Caroline Bahler</b> ASG, Inc.	<b>Carl Haske</b> STATPROBE, Inc.
<b>Information Visualization &amp; Posters</b>	<b>Eric Brinsfield</b> Meridian Software, Inc.	<b>Matt Becker</b> STATPROBE, Inc.
<b>Registration</b>	<b>Kathy Finch (pre-conference)</b> Independent	<b>Greg Ashley (onsite)</b> University of Georgia
<b>PC Hands-on Workshops</b>	<b>Dana Rafiee</b> Destiny Corp.	
<b>Serendipity</b>	<b>Michael Riddle</b> Quintiles, Inc.	<b>Howard Schreier</b> U.S. Dept. of Commerce
<b>Shop Talk</b>	<b>Ron Coleman</b> LinksAnalytical, Inc.	
<b>Site Coordinator</b>	<b>Nancy Patton</b> ASG, Inc.	<b>John P. Morgan</b> Old Dominion University
<b>Statistics</b>	<b>Grace Lossman</b> Smith-Hanley	<b>Margaret Connolly</b> ShellSTAT, Inc.
<b>Sunday Program</b>	<b>Frank Dilorio</b> Advanced Integrated Manufacturing Solutions Corp.	
<b>Technology 2000</b>	<b>Robert Passmore</b> Passmore Consulting Services	<b>Ben Cochran</b> The Bedford Group
<b>Vendor Program</b>	<b>George Matthews</b> University of Georgia	<b>Gregory Barnes Nelson</b> ASG, Inc.

## CONFERENCE OVERVIEW

### Location and Dates

**SESUG '98** will be held at the **Sheraton Norfolk Waterside Hotel** in **Norfolk, Virginia** (see the **Accommodations** section for **important information** about this hotel). The conference dates are **Sunday to Tuesday, September 13-15, 1998**. You may want to arrive on Saturday to take advantage of lower airfares as well as the nearby museums, shopping, and dining. This would also allow you to participate in the optional **Weekend Workshops** or **CONSUG meeting**.

### Benefits

Every year, hundreds of SAS users from around the country gather at SESUG. If you would like to join together with your peers in Norfolk this September, we encourage you to reserve your place as soon as possible. Your registration fee for SESUG '98 entitles you to the following:

- ⇒ access to all **presentations** and **demonstrations**
- ⇒ access to a **reception** and a **mixer**
- ⇒ admission to **one luncheon** on either Monday or Tuesday
- ⇒ a copy of the **SESUG '98 Program** and the **SESUG '98 Proceedings**
- ⇒ **assorted mementos** of your SESUG '98 experience (this could include a T-shirt, a tote bag, and a number of other promotional items)

These benefits combine to make SESUG '98 a cost-effective investment of your travel and training budget.

### Registration

The **Regular Registration Fee** for SESUG '98 is **\$210**. The **deadline for receipt** of your **registration and payment** is **Friday, August 28, 1998**.

If your **registration and payment** are **received after August 28**, the **On-Site Registration Fee** of **\$250** will apply. On-Site registration is offered only on a space-available basis. In addition, we cannot offer a luncheon ticket with On-Site registration, nor can we guarantee that there will be sufficient Programs, Proceedings, etc. available for On-Site registrants.

Even though \$210 for a conference of this nature is a true bargain, we are making it even better by offering a special **Early Registration Fee** of **\$180**. To get this rate, your **registration and payment** must be **received by Friday, August 7, 1998**.

**Single Day Registrations** are **not available** for SESUG '98.

There is an **additional charge** for the **Weekend Workshops** and the **CONSUG meeting**.

The **Registration Form** can be found on **pages 71-72** of this Registration booklet. This form can be mailed, faxed, or phoned in. In addition, you can register for SESUG '98 by filling out the **Registration Form** on the **World Wide Web** at <http://www.uga.edu/~sesug>.

We are pleased to announce that starting this year, **registration fees** can be **paid by credit card**. Acceptable cards are **MasterCard, Visa, American Express, Discover, and Diners Club**. Since credit card payments are new this year, we do *not* yet have a way to accept this type of payment via a secure Web transaction. However, **credit card payments** can be **mailed, faxed, or phoned in**. **Check or money order payments** must be **mailed in**.

## Accommodations

At **press time**, the conference hotel is named the **Omni Waterside Hotel**. However, as of **August 1**, it will be renamed the **Sheraton Norfolk Waterside Hotel**. Throughout this registration booklet, it will be referred to by the latter name.

SESUG '98 has reserved a block of rooms for conference attendees at the **Sheraton Norfolk Waterside Hotel** for a special **SESUG '98 rate of \$99 per night** for either single or double occupancy. The Sheraton has indoor and outdoor dining, a bar with entertainment, a business center, and an outdoor pool. The **YMCA**, located near to the hotel, is available to hotel guests with a room key for **\$6.00 per visit**. It features a whirlpool, aerobic classes, Keiser Stations, lifecycles, lifesteps, exercise bikes, and more.

To make **hotel reservations at the Sheraton Norfolk Waterside**, you can do one of the following:

- ⇒ if **reserving before August 1**, call the Omni's National Reservation Number at **(800) THE-OMNI**
- ⇒ if **reserving on or after August 1**, call the Sheraton National Reservation Number at **(800) 325-3535**
- ⇒ call the Sheraton Norfolk Waterside Hotel directly at **(757) 622-6664**
- ⇒ fill out the **form on pages 69-70** of this booklet and mail or fax it directly to the Sheraton Norfolk Waterside Hotel

Remember, you must **identify yourself as a SESUG '98 attendee** to be eligible for the **special conference rates**.

The **Sheraton Norfolk Waterside Hotel** is also offering a limited number of **Government-Rate rooms** at the **prevailing government per diem rate** for SESUG '98 attendees. In order to receive the government rate, you must be currently employed by a recognized state or federal government agency and provide proof of that employment upon registration. The government rate is *only* available when contacting the Sheraton Norfolk Waterside Hotel directly at **(757) 622-6664**.

Do not wait. Our special SESUG rates at the Sheraton are only available until **August 24**, or until our room block has been filled. After that, the room rate will increase if the hotel still has additional rooms available.

For those who do not wish to stay at the conference hotel, SESUG '98 has arranged a special rate of **\$79 per night** at the **Clarion Hotel** (formerly known as the **Hotel Norfolk**). This hotel is **less than two miles from the conference hotel** and is currently being completely renovated. By the time of the conference, the hotel should look like a brand new hotel with new carpet, windows, and furniture. Each guest room will have a microwave/refrigerator, coffee maker, data port, iron, ironing board, and hair dryer. Reservations can be made by calling **(757) 627-5555**. The special conference rate is available until **August 24** or until the room block has been filled.

### Remember:

- ⇒ You are responsible for your own lodging arrangements.
- ⇒ When registering at the Sheraton Norfolk Waterside Hotel or the Clarion Hotel, identify yourself as a SESUG '98 attendee to obtain the special conference rate.
- ⇒ Make your reservations as soon as possible to ensure that the SESUG '98 rate is still available.
- ⇒ Rates do not include applicable taxes, which are currently 11.5%.

## Transportation Services

**Harbourside Travel Services, Inc.**, which has proudly and successfully served SESUG attendees since 1993, is returning as the official travel agency for SESUG '98. Contact **Roz Moore** by **phone** at **(800) 330-8646** or **(813) 724-9094**, by **fax** at **(813) 724-9247**, or by **e-mail** at **hts@intnet.net**. She can make travel arrangements to and from Norfolk and offers special discounted airfares on **Delta Airline**, the Official Airline of SESUG '98. Check out Harbourside's Web site at: <http://www1.tagonline.com/Ads/Harbourside/>.

Harbourside Travel Services, Inc. cannot reserve rooms for you. You must do this yourself.

## Air Transportation

**Delta Airlines** has been named the **Official Airline** of SESUG '98. Contact **Harbourside Travel Services, Inc.** at **(800) 330-8646** or the **Delta Airlines Convention Desk** at **(800) 241-6760** to take advantage of this discounted airfare.

## Ground Transportation

As of this writing, the **Sheraton Norfolk Waterside Hotel** provides a **free shuttle** to and from the **Norfolk International Airport** on an availability basis. An **airport shuttle** is available for a **round trip fee of \$22.00**. Up-to-date details about this, as well as driving directions and information about public transportation, will be sent to SESUG '98 attendees as part of their Registration Confirmation.

If you stay at the **Clarion Hotel**, a **12-15 passenger van** will be available for transportation to and from the conference hotel. The number of trips each day will be limited. For more details, call the Clarion Hotel at **(757) 627-5555**.

If you stay anywhere other than the Sheraton Norfolk Waterside Hotel or the Clarion Hotel, you will be responsible for your own transportation to and from the conference.

## Parking

**Parking** for the **Sheraton Norfolk Waterside Hotel** is available at the **Dominion Tower Parking Garage** adjacent to the hotel. The cost to registered guests is *currently* **\$3.00 per day**, which includes unlimited "in and out" privileges. **Valet parking** is available for **\$9.50 per day**. These rates are accurate as of the writing of this booklet. While no changes are anticipated, we cannot be responsible for changes in these parking rates.

**Parking** at the **Clarion Hotel** is **free**.

## Weekend Workshops

Due to the success of the Sunday Workshops in past conferences, SESUG '98 is proud to announce that these workshops have been expanded to **Saturday afternoon**, also. For a fee you can attend morning or afternoon workshops conducted by well-known SAS users and experts. The workshop fees include training materials that will be distributed at the workshop.

A **complete description** of the workshops and biographies of the instructors can be found beginning on **page 66**. **Sign up** for your preference using the Conference Registration Form on **pages 71-72**.

## Consultants SAS Users Group (CONSUG)

Consultants who use the SAS System, or individuals who are considering a move to consulting, will be interested in attending the **CONSUG Meeting on Sunday morning, September 13**. The agenda for this year's meeting has not been finalized as this booklet is going to press, however, in previous years the agenda has included such topics as Negotiating Techniques, Legal Issues, and the Quality Partners Program.

Information can be found at the CONSUG Web Site:

**<http://www.meridian-software.com/consug/consug.htm>**

For additional information, please contact **Frank Dilorio** at **fcd@aimsco.com** or **(919) 942-2028**. A **nominal fee** is charged for attendance at the CONSUG meeting, which traditionally includes a continental breakfast. This **fee is not included** in your SESUG '98 Registration.



## Warmup Session

What can I expect out of the SESUG '98 conference? Why do some attendees have colored ribbons on their badges? What's all this stuff in my bag I received at the registration table? What's a "BOF"? The answers to these and other questions will be addressed at the SESUG '98 Warmup session. **SESUG '99 Co-Chairs George Matthews** and **Gregory Barnes Nelson** will explain the conference format and answer questions. This session should prove especially useful to first time attendees of a SESUG conference, but anyone may attend.

## Opening Session

The **official start** of the conference will be on **Sunday evening** when the Sheraton Norfolk Waterside Hotel hosts the SESUG '98 Opening Session. **Conference Co-Chairs Randy C. Finch** and **F. Joseph Kelley** will introduce some of the key conference planners, discuss the activities of the SouthEast SAS Users Group over the past year, and provide a peek at some of the plans for the next 12 months.

We are pleased to announce that this year's **Keynote Address** will be given by **Ms. Carol Rigsbee** of the SAS Institute. Carol is a Principal Developer in the Windows User Interface Thin Client group at SAS Institute. She has been involved in the design and development of this project since its beginning. She has been at the Institute for the past twelve years, developing the SAS System for PC's since SAS Release 6.03. She has been working in the computer industry since 1980.

Carol's talk is entitled "**The Future Interface to the SAS System for PC's.**" It discusses a new user interface to the SAS System. This interface is a state-of-the-art Microsoft Window's user interface, providing a highly integrated interface with the Windows system, other Windows applications and the Web. This interface provides thin-client access to all V7 SAS System platforms, including PC, UNIX and mainframes. This interface dramatically improves the SAS System's ease of use. Transparent access to data and full access to the Output Delivery System, ODS, is also provided.

## Reception and Mixer

There will be a **reception** (snacks and beverages) immediately **after the Opening Session on Sunday evening**. This will provide a friendly "welcome" to Norfolk for SESUG '98 attendees. All you need to provide is the conversation.

A **mixer** (beverages only) will take place **late Monday afternoon** immediately after the last presentations. We hope this early start will provide a comfortable "wind-up" to the day's activities, and give everyone a chance to mingle in a relaxing setting.

The Registration Packet you receive at check-in will include **drink vouchers** that can be redeemed at the SESUG '98 reception and mixer.

## "Meet the Presenters" Luncheons

A **ticket** for either the **Monday or Tuesday luncheon** will be included in your **Registration Packet**. You can choose which day you prefer on the Registration Form. If you do not want a free lunch on either day, please indicate this on the Registration form so we can make your ticket available to someone else. During lunch, you will be able to chat with other attendees. There will be no pre-assigned seats or topics. Instead, attendees will have the opportunity to "Meet the Presenters" during lunch. SESUG '98 **speakers have volunteered to host tables** at the luncheons. You will be free to sit down at any table and discuss topics with a presenter.

**Seating** for the luncheons will be **limited** both days. Tickets will be assigned on a **first paid-and-registered, first served** basis. So, if you want a ticket to one of the luncheons, make sure you **register soon**.

## Shop Talk

Are you having a problem with a SAS routine? Is there some aspect of a particular SAS Procedure which has always eluded you? Well, help is on the way in Norfolk. Stop by the **Shop Talk table** in the **SAS Institute Demo Room** and discuss your situation with an experienced SAS professional. Your Conference Program will list the schedule for the people on duty and their areas of expertise. Look it over, determine the times when there will be a person available who can assist you, and stop by the Shop Talk table at that time. Feel free to bring your printouts or other documentation to assist in the discussion.

## SAS Futures Forum

The SAS Futures Forum provides a forum for SAS Users and SAS Developers to share **future directions** of the **SAS System**. This forum is scheduled for **Monday afternoon**.

## SAS Institute Formal Online Demos

SAS Institute is pleased to offer its popular and informative series of Formal Online Demonstrations (FODs) presented by Institute experts. FODs this year will **showcase demonstrations on new features and enhancements to the new release of the SAS System, Version 7** - especially related to the new **Output Delivery System, accessing data with the new long table and variable name options**, and the new **thin client offerings**. Other demonstrations will be done on the **Data Warehouse, Customer Relationship Management, Data Mining, Web Enablement, and OLAP solutions** available with Release 6.12 of the SAS System. Each demonstration will last **50 minutes**. A detailed description of the demonstrations will be printed in the Conference Program.

## SAS Institute Demo Room

**SAS Institute staff** will be on hand to discuss and demonstrate the latest software and services available from the Institute. Institute divisions that will sponsor booths include **Consulting, JMP Software, Professional Services, Quality Assurance, Quality Partners, Technical Support, and User Publishing and User Group Support**. You can also meet SAS Institute staff from selected regional offices at the Regional Office Booth. In addition, the **Publications Booth** in the Demo Area will offer a **15% discount on SAS documentation** ordered at SESUG '98. Stop by the booth to browse the latest in Institute documentation. You may also have an opportunity to chat with **Books by Users authors** about their books.

## Birds-of-a-Feather (BOF) Sessions

These **Monday evening** get-togethers allow attendees to discuss topics of mutual interest in an informal setting. The only BOF planned at this time is the **SESUG '99 Planning Meeting**. If you are interested in helping shape next year's conference, please attend this meeting.

A **sign-up board** describing the BOFs will be located **near the Registration Area**. If you don't see a topic of interest, you can create a new topic.

## All In Jest

**New this year** is the All In Jest session. Here, **papers with no serious content** will be presented to provide a bit of **comic relief** after two days of serious presentations. This session will take place on **Tuesday afternoon** before the Closing Session.

## Closing Session

We'll wish a fond farewell to SESUG '98 and Norfolk on **Tuesday afternoon** at the Closing Session. **SESUG '99 Co-Chairs Gregory Barnes Nelson and George Matthews** will preview what to expect when we reconvene in 1999. Plus, there will be **door prizes**. We can't guarantee what will be offered, but in 1997, SESUG attendees walked out of the Closing Session with T-Shirts, books galore, a Lynyrd Skynyrd CD, a

ship-in-a-bottle, and a free seat to an SI Training Course. Most awards require the attendee to be present at the Closing Session to win, so **be sure you are there!**

## Nearby Sites

If you are fortunate enough to have some free time while in Norfolk, you may want to take in some of the sites in the area. You may want to walk next door to the **Waterside Festival Marketplace** for shopping and dining. If you have transportation, you may want to drive east to **Virginia Beach** for dinner, or drive across the **Chesapeake Bay Bridge-Tunnel**, or go for a barefoot walk along the **Atlantic Ocean**. Many other areas of interest are also nearby.

Within **walking distance** are the: **Chrysler Museum, MacArthur Memorial, D'Art Center, St. Paul's Church, Historic Homes, Town Point Park, and Nauticus.**

**Tours** are available from The Waterside to the: **Norfolk Botanical Gardens, Hampton Roads Naval Museum, and Norfolk Naval Base.**

Within **driving distance** are: **Colonial Williamsburg, Yorktown, Jamestown, Busch Gardens, Chesapeake Bay Bridge-Tunnel, and Virginia Beach.**

Also, **river cruises** are available on: **The American Rover, a 135-foot topsail schooner; The Carrie "B", a reproduction of a 19<sup>th</sup> Century Mississippi Riverboat; or The Spirit of Norfolk, a dining and dancing cruise.**

## Vendor Participation

There will be opportunities for representatives from companies that offer products and services that complement the SAS System to be a part of SESUG '98. This year, we will once again make available **space in a vendor room** where attendees can come and see what you have to offer. This year, the **vendor room** is on the **same level as many of the break-out rooms** and will therefore be more accessible to the attendees that wish to visit it. A table will be provided to each vendor, but **vendor-supplied displays** can also be set up as long as they fit within their allotted space. We are also offering **space in the Conference Program for advertisements** from companies and individuals that offer SAS consulting, SAS-based software, or are looking for SAS programmers. In addition, each attendee at the conference will be offered a **packet of vendor articles** with their registration materials during check-in. Vendors may distribute brochures, keychains, pins, or other promotional material via this process. All of these methods are excellent ways to reach a motivated, receptive, and targeted audience. For more **information**, including rates and schedules, please contact **George Matthews** at [gmatthew@arches.uga.edu](mailto:gmatthew@arches.uga.edu) or (706) 542-5359 or **Greg Barnes Nelson** at [gbn@asg-inc.com](mailto:gbn@asg-inc.com) or (919) 467-0505.

All vendors attending SESUG '98 will be expected to abide by the **SESUG Policy on Vendor Participation**, which can be found on **page 73**.

## What Happens After I Register?

**After SESUG receives your Registration and Payment**, we will mail you a **Confirmation Packet** with additional information. This will include a **confirmation** of your registration and payment, **directions** to Norfolk and the Sheraton Norfolk Waterside Hotel, Norfolk **tourism information**, and other appropriate information. We'll be looking for you in **Norfolk!**

## WHAT YOUR PEERS SAID ABOUT SESUG '97

Each year we include a questionnaire in the conference program, asking attendees what they liked and didn't like about the conference. Here are some verbatim comments:

- ☺ "I have a new appreciation for SAS as a language and as a product. Thanks."
- ☺ "Good buffet [on] Sunday."
- ☺ "All speakers were well prepared."
- ☺ "Very useful information was presented."
- ☺ "Great job!"
- ☺ "Exceptionally excellent - SAS's [formal] online demos."
- ☺ "The general format was excellent."
- ☺ "Conference was informative and diverse. All session participants ... were pleasant and helpful."
- ☺ "Vendor's Area was a great idea."
- ☺ "... the size and energy of the conference are great."
- ☺ "Attendees and volunteers and everyone involved were fantastic."
- ☺ "Excellent selection of topics and speakers."
- ☺ "Very good organization."
- ☺ "Very informative."
- ☺ "Thank you all planners and coordinators - it was great."
- ☺ "SESUG 97 was a class act ..."
- ☺ "Keep up the great work."
- ☺ "Good, hard working conference leaders."
- ☺ "[I will] definitely attend [SESUG ' ] 98"

Of course, not all comments were so positive. The SESUG Executive Council carefully reviews **every** comment on **every** evaluation form and uses them to improve future conferences. Attendees have suggested a wide range of enhancements and improvements. Many have been implemented, some will take time to implement, and some are simply not feasible. If you have any suggestions, please forward them to the Conference Co-Chairs.

## CONFERENCE CHECKLIST

- ⇒ **Register and pay for the conference.** See the Registration Form on **pages 71-72** for details. This step is **required!**
- ⇒ **Arrange transportation** (see **page 2** for contact information for **Harbourside Travel Services, Inc.**).
- ⇒ **Make reservations** at the Sheraton Norfolk Waterside Hotel (see **pages 69-70** for reservation form), the Clarion Hotel, or another hotel of your choice.
- ⇒ **Sign up** for the **CONSUG meeting (page 3)**. This step is **optional**.
- ⇒ **Sign up** for your choice(s) of **Weekend Workshops (page 66)**. This step is **optional**.
- ⇒ Bring a credit card, personal check, cash, or purchase order to take advantage of the Conference's **15% discount on SAS Institute books**.

## DATES TO REMEMBER

June 15, 1998	Registration opens
August 7, 1998	Last day for discounted Early Registration rate
August 21, 1998	Last day to cancel your conference registration and receive a refund
August 24, 1998	Last day SESUG room rates are honored at the Sheraton Norfolk Waterside Hotel
August 24, 1998	Last day SESUG room rates are honored at the Clarion Hotel
August 28, 1998	Last day regular Registration rate is in effect
September 13-15, 1998	<b>SESUG '98!</b>

## PRELIMINARY CONFERENCE SCHEDULE

Per many of your requests from previous conference feedback forms, we have included a *preliminary* grid of what the conference will look like. Please be aware this grid could change due to events beyond our control.

Room	Saturday Morning	Saturday Afternoon	Saturday Evening
Eppington		<b>Workshop 1: Religion 101 - UNIX for Non-believers</b> (1:30-5:30pm)	
Montpelier		<b>Workshop 2: SAS Debugging Techniques</b> (1:30-5:30pm)	

Room	Sunday Morning	Sunday Afternoon	Sunday Evening
Coat Room		<b>Registration / Information</b> (2:00-5:00pm)	
Providence	<b>CONSUG Meeting</b> (8:30am-12:00pm)		<b>Opening Session</b> (7:30-9:00pm)
Stratford		<b>Section Chairs Meeting</b> (2:30-3:30pm)  <b>Presenters Meeting</b> (3:30-4:30pm)  <b>Warmup Session</b> (4:30-5:30pm)	
Claremont		<b>Vendor Area</b> (1:30-5:30pm)	
Eppington	<b>Workshop 3: Integrating SAS into an Intelligent Internet/Intranet Application</b> (8:00am-12:00pm)	<b>Workshop 5: Connecting SAS to the Internet at a Price You Can Afford</b> (1:30-5:30pm)	
Montpelier	<b>Workshop 4: A SAS Programmer's View of the SAS Supervisor</b> (8:00am-12:00pm)	<b>Workshop 6: Merging, Combining, and Subsetting Files (Tricks, Traps, and Techniques)</b> (1:30-5:30pm)	
Wilton	<b>Rehearsal</b> (9:00am-12:00pm)	<b>Rehearsal</b> (1:30-5:30pm)	
Monticello			<b>Reception</b> (9:00-11:00pm)

<b>Room</b>	<b>Monday Morning</b>	<b>Monday Afternoon</b>	<b>Monday Evening</b>
<b>Coat Room</b>	<b>Registration / Information</b> (8:00am-12:00pm)	<b>Registration / Information</b> (1:30-5:00pm)	
<b>Promenade</b>	<b>Posters</b> (8:00am-12:00pm)	<b>Posters</b> (1:30-4:30pm)	
<b>Poplar</b>	<b>I-Net Solutions</b> (8:00am-12:00pm)	<b>I-Net Solutions</b> (1:30-4:30pm)  <b>SAS Futures Forum</b> (4:30-5:30pm)	
<b>Providence</b>	<b>Beginning Tutorials</b> (8:00am-12:00pm)	<b>Beginning Tutorials</b> (1:30-4:30pm)	
<b>Stratford</b>	<b>Advanced Tutorials</b> (8:00am-12:00pm)	<b>Technology 2000</b> (1:30-4:30pm)	
<b>York</b>	<b>SAS Institute Demo Room</b> (8:00am-12:00pm)  <b>Shop Talk</b> (9:00am-12:00pm)	<b>SAS Institute Demo Room</b> (1:00-4:30pm)  <b>Shop Talk</b> (1:30-4:30pm)	
<b>Claremont</b>	<b>Vendor Area</b> (8:00am-5:30pm)		
<b>Eppington</b>	<b>Serendipity</b> (8:00am-12:00pm)	<b>Serendipity</b> (1:30-4:30pm)	<b>BOF</b> (7:00-9:00pm)
<b>Greenway</b>	<b>Applications Development</b> (8:00am-12:00pm)	<b>Applications Development</b> (1:30-4:30pm)	<b>BOF</b> (7:00-9:00pm)
<b>Montpelier</b>	<b>Statistics</b> (8:00am-12:00pm)	<b>Statistics</b> (1:30-4:30pm)	<b>BOF</b> (7:00-9:00pm)
<b>Riverview</b>	<b>Host Systems</b> (8:00am-12:00pm)	<b>Host Systems</b> (1:30-4:30pm)	<b>BOF: SESUG '99 Planning Meeting</b> (7:00-9:00pm)
<b>Brandon A</b>	<b>Formal Online Demos</b> (8:00am-12:00pm)	<b>Formal Online Demos</b> (1:30-4:30pm)	
<b>Brandon B</b>	<b>PC Hands-On Workshops</b> (9:00am-12:00pm)	<b>PC Hands-On Workshops</b> (1:30-4:30pm)	
<b>Wilton</b>	<b>Rehearsal</b> (7:00am-12:00pm)	<b>Rehearsal</b> (2:00-5:30pm)	
<b>Monticello</b>		<b>Luncheon</b> (12:00-1:30pm)	<b>Mixer</b> (5:30-7:00pm)

<b>Room</b>	<b>Tuesday Morning</b>	<b>Tuesday Afternoon</b>
<b>Coat Room</b>	<b>Registration / Information</b> (8:00am-12:00pm)	<b>Registration / Information</b> (2:00-5:00pm)
<b>Promenade</b>	<b>Posters</b> (8:00am-12:00pm)	
<b>Poplar</b>	<b>Technology 2000</b> (8:00-11:00am)  <b>I-Net Solutions</b> (11:00am-12:00pm)	<b>I-Net Solutions</b> (1:30-3:30pm)
<b>Providence</b>	<b>Beginning Tutorials</b> (8:00am-12:00pm)	<b>Beginning Tutorials</b> (1:30-3:30pm)
<b>Stratford</b>	<b>Advanced Tutorials</b> (8:00am-12:00pm)	<b>Advanced Tutorials</b> (1:30-3:00pm)  <b>All In Jest</b> (3:30-4:30pm)  <b>Closing Session</b> (4:30-5:30pm)
<b>York</b>	<b>SAS Institute Demo Room</b> (8:00am-12:00pm)  <b>Shop Talk</b> (9:00am-12:00pm)	<b>SAS Institute Demo Room</b> (1:00-2:30pm)  <b>Shop Talk</b> (1:30-2:30pm)
<b>Claremont</b>	<b>Vendor Area</b> (8:00am-3:30pm)	
<b>Eppington</b>	<b>Coders Corner</b> (8:00am-12:00pm)	<b>Coders Corner</b> (1:30-2:30pm)
<b>Greenway</b>	<b>Applications Development</b> (8:00am-12:00pm)	<b>Applications Development</b> (1:30-2:00pm)  <b>Statistics</b> (2:30-3:30pm)
<b>Montpelier</b>	<b>Statistics</b> (8:00am-12:00pm)	<b>Serendipity</b> (1:30-3:30pm)
<b>Riverview</b>	<b>Information Visualization</b> (8:00am-12:00pm)	<b>Information Visualization</b> (1:30-3:30pm)
<b>Brandon A</b>	<b>Formal Online Demos</b> (8:00am-12:00pm)	<b>Formal Online Demos</b> (1:30-2:30pm)
<b>Brandon B</b>	<b>PC Hands-On Workshops</b> (9:00am-12:00pm)	
<b>Wilton</b>	<b>Rehearsal</b> (7:00am-12:00pm)	
<b>Monticello</b>		<b>Luncheon</b> (12:00-1:30pm)



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**Enjoy the conference!**

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\* Certain restrictions apply. Please note that this offer does not apply to SAS Institute specialty items, SelectText, or the video-based training courses. No other discounts apply.

# HANDS ON WORKSHOPS AT SESUG

Presented by



Providers of SAS Software Training and Consulting for over eleven years

September 13-15, 1998 Sheraton Norfolk Waterside Hotel, Norfolk, VA

Topics Include:

## Monday, September 14th Workshops

**Merge Processing in SAS Software**

**9:00-10:20 a.m.**

This workshop is designed to demonstrate simple to advanced match merge processing. The use of contribution variables (IN=), selection of data and manipulation in the program data vector will be discussed.

**PROC Tabulate Basics**

**10:40-12:00 p.m.**

Attendees will gain experience with the Tabulate procedure by building it from scratch. Class, Var, and Table statements, along with operators will be demonstrated in detail.

**Interactive PROC Report**

**1:30-2:50 p.m.**

This session will teach attendees how to develop reports in an interactive environment without writing code. The report can be viewed as it is developed and saved for future use.

**Moving SAS Information to Word/Excel using DDE**

**3:10- 4:30 p.m.**

This workshop will demonstrate how to take data out of SAS to external applications such as Word or Excel. Hands on DDE applications will be built.

## **Tuesday, September 15th Workshops**

### **Beginning Macros**

**9:00-10:20 a.m.**

This workshop will introduce macro variables, call symput, and symget, along with %macro, %mend bundles of code. Attendees will understand how to macro-ize programs for simpler, more efficient processing.

### **SQL Basics**

**10:40-12:00 p.m.**

Attendees will get hands on experience writing Proc SQL code, typically used to simplify extraction and summarization of data. SQL code will be built from simple selects to complex joins.

**We asked former students what they liked about the workshop.**

*"Terrific class. Very very helpful! Now I can see the power of the language!"*

**Wells Fargo Bank**

*"Excellent Intro to SAS. The instructor geared it to our level and answered all questions thoroughly and willingly!"*

**USAA Insurance**

*"Things I've learned in this course will be immediately useful in my job!"*

**U.S. Airways**

*"Useful workshop exercises!"*

**Blue Cross/Blue Shield**

*"Great course!"*

**Bureau of the Census**

**Computer Seating is available by ticket only on Sunday, September 13<sup>th</sup> on a first come, first served basis.**

**See your conference packet for details.**

**Destiny Corporation  
1321 Silas Deane Highway  
Wethersfield, CT 06109-4302 USA  
Phone: 800-7TRAINING Fax: 860-721-9784  
Email: [destinycorp@compuserve.com](mailto:destinycorp@compuserve.com)  
Web Site: [www.destinycorp.com](http://www.destinycorp.com)**

## PAPER AND PRESENTATION ABSTRACTS

This section lists the abstracts received through mid-April 1998 and is therefore a **preliminary list**. Please visit our **Web site** periodically at <http://www.uga.edu/~sesug> for changes. The final list of presentations will appear in the Conference Program.

The **abstracts** are listed **alphabetically** by the **first-listed author's last name** in each section.

The **number to the far left** of an author's name is the **number of minutes scheduled for the presentation**. Note that because of turnaround time between speakers, a 50 minute paper takes a 60 minute time slot, and a 20 minute presentation takes a 30 minute time slot. Coders Corner and All in Jest presentations are 10 minutes, taking up a 15 minute time slot. The **letter (I or C)** to the **immediate left** of an author's name designates whether the paper is **Invited or Contributed**.

### Advanced Tutorials

**Section Chairs:** Gerardette Furlow  
North Carolina State University  
Raleigh, NC

Elizabeth Hamilton  
University of North Carolina  
Chapel Hill, NC

#### Hot-Deck Imputation: A Simple Data Step Approach

50 I Lawrence Altmayer; U.S. Bureau of the Census; Washington, DC

Hot-deck imputation is a means of imputing data, using the data from other observations in the sample at hand. This paper deals with a method of imputation we used for the Survey of Adults on Probation. In this method, we first attempt to impute race based on other variables in an observation. We impute the remaining missing race data, and age and gender, using the same variable in prior or latter observations in the data set. This method uses macro variables to subset the data into groups within which imputation is done. It also uses arrays to keep track of values to use for imputation.

*Lawrence Altmayer has been with the U.S. Census Bureau for nineteen years and is a computer specialist. He has more than eight years SAS programming experience, most recently with macros. He is currently using SAS to process National Crime Victimization Survey data. His programming experience has been mainly in the VMS, and more recently UNIX, operating systems. He has a BA in Statistics from the Univ. of Buffalo, and Master of Applied Statistics from Ohio State University.*

#### Building Bridges Between Oracle and SAS

50 I William (Bill) Calvert and Feng Zhou; Food and Drug Administration; Rockville, MD

In the context of a data-rich client-server environment, techniques are presented showing how to use SAS with SQL and ODBC to connect to Oracle databases, develop views, and extract working SAS data sets. In addition, ways to survey data tables, prepare output and format fields are shown. Emphasis is placed on automated approaches (using SAS/MACROS for example) to minimize otherwise laborious and time consuming tasks.

*Bill Calvert, as Chief of the Surveillance and Data Processing Branch in the Division of Pharmacovigilance and Epidemiology, CDER/FDA is working to improve drug safety monitoring information systems. Formerly he provided contract research services to pharmaceutical, health care, and insurance industries. Bill's broad background encompasses several years providing scientific computing support at the National Institutes of Health and a range of publications and presentations, including a book 'Concepts and Case Studies in Data Management'. With over 20 years of experience in the health field Bill has demonstrated a simultaneous grasp of clinical, statistical and information technology concepts.*

*Feng Zhou, as a staff fellow at the FDA, provides analytical and programming support in post-market drug safety surveillance activities. With over 7 years of SAS experience in high demand environments on several computing platforms, Feng has demonstrated skills in pharmacovigilance and epidemiologic studies, survey sampling and analysis, statistical computing and modeling, database development and data management. She holds an MA in Statistics and an MA in Mathematics from Michigan State University and is an expert in the use of SAS products such as BASE, STAT, SQL, and MACRO.*

## A Simple Framework for Sequentially Processing Hierarchical Data Sets for Large Surveys

50 | Richard L. Downs and Pura A. Perez; U.S. Bureau of the Census; Washington, DC

This paper explains a simple framework for applying traditional sequential processes (reformat, edits, imputation, etc.) to a hierarchical group of data sets. The framework merges the data sets using a series of layered data step views. It then shows how users can write data step code that processes the merged data sets and outputs updated versions of one or more of those data sets. The data step code uses a macro to help dynamically create a keep option for each output data set. The data step then uses a combination of checking for last.variables and missing values to determine the proper time to output to each data set. This framework largely isolates the complexity of relating the data sets from the complexity of the actual process, it maintains the data set hierarchy, and eliminates the need for any post-process processing (all output data sets are complete at the end of the process data step).

*Richard L. Downs, Jr. has a BS in Information Systems Management from the University of Maryland, Baltimore County and a MS in Computer Systems Management from the University of Maryland. He has worked at the U.S. Bureau of the Census for 10 years as an applications and systems programmer with 5 years programming experience in SAS.*

*Pura A. Perez has a BS in Mathematics and Computer Science from the Catholic University of Puerto Rico and a MS in Computer Systems Management with a concentration in Database Systems and Security from the University of Maryland. She has worked for the past 7 years at the U.S. Bureau of the Census as an applications programmer with 3 years experience programming in SAS.*

## MATCH-MERGING: 27 Plus Traps and How to Avoid Them

50 | Malachy J. Foley; University of North Carolina; Chapel Hill, NC

Match-merging is a common form of combining files. Yet, it has its pitfalls. This tutorial reviews more than 27 traps that can snarl even a seasoned programmer. It gives examples of many of these traps, and provides a comprehensive defensive strategy for avoiding most of them.

*Mal Foley started programming computers in high school and has never stopped. His career includes being an international computing consultant, a university professor, a manager of several computing departments, and the CEO of his own computing company. Mal's specialties are clinical trials, survey research, business applications development, and database management. He has programmed in SAS, FORTRAN, COBOL, PL/1, RPG, ALGOL, BASIC, REXX, and Assembler. He has consulted to IBM, Dow Chemical, Ford-Rockefeller Foundation, United Nations, U.S. Department of Agriculture, U.S. Agency for International Development, and many US and Latin American universities, government agencies and businesses. He has given presentations at SUGI and many other SAS user groups.*

## Creating Indexed Data Sets and Using Directed Access Queries

50 | John Charles Gober; Department of Commerce, Bureau of the Census; Washington, DC

When retrieving or mining information from a data warehouse consisting of a half terabyte of data, it is essential that one reduce processing time and temporary storage space to the smallest units available. By selectively retrieving records from one file based on keys created from another file, you can often increase the efficiency of data extraction by over 90 percent as compared with the usual "match/merge" process. This paper will walk the user through an application using data sets containing unique and non-unique indices, and cover how such indices can be used to extract data in an efficient and timely manner.

*John Gober is employed as a programmer/analyst by the Commerce Department, Bureau of the Census, Demographic Surveys Division. He has almost two decades of SAS experience on Mainframe, PC, VAX, and UNIX environments and specializes in the cleaning, extraction, manipulation, and transfer of data on multiple platform environments. Mr. Gober is proficient in the macro language, application development, creating user friendly interfaces, and is a frequent presenter at NESUG, SESUG, and SUGI.*

## A Statistician's Guide to Using SAS with MS Access and Excel Data

50 | Robert E. Johnson; Virginia Commonwealth University; Richmond, VA

Statisticians and statistical programmers often must analyze data from external sources which may arrive in the form of an MS Access table or an Excel workbook. While these data could be exported to a text file and then imported into SAS, this is a quick fix for isolated applications. A more useful solution is to use SAS software to read from and write to these media and a manner which may easily be repeated with new data become

available. In this tutorial, we will explore the various options for passing information between Access tables and spreadsheets.

*Robert E. Johnson (Bob) has been a SAS user for 22 years. He authored with Rick Langston (SAS Institute) and Dana Quade (UNC-CH) the Version 5 supplemental SAS procedure MATPAR. He has also made several presentations at SUGI and SESUG. Dr. Johnson is an associate professor of statistics at Virginia Commonwealth University. His research is in biostatistics and geometric linear models.*

## **An Overview of Techniques to Introduce External Data Into the SAS System**

80 | Andrew T. Kuligowski; Nielsen Media Research; Dunedin, FL

The SAS System has numerous capabilities to store, analyze, report, and present data. However, those features are useless unless that data are stored in or can be accessed by the SAS System. This presentation will provide a brief introduction to many of the different methods that can be used to pass data into the SAS System. Topics will include the menu-driven SAS Import Wizard, the INPUT and INFILE statements, DDE, ODBC, and many others as many as time and space will allow! The goal of this presentation is to provide information that will be useful to all users of the SAS System. Some topics are tailored to the novice, while others will be more applicable to the experienced user.

*Andrew T. Kuligowski has been a computer professional for well over 10 years (although he declines to admit just how many years over 10). He has been programming with the SAS System throughout his career. Andy joined Nielsen Media Research in 1986, after spending 5 years in the petrochemical industry. He has been involved in a myriad of projects since then, most of them dealing with the cable television industry. In his spare time, Andy also serves on the Executive Committee for the Southeast SAS Users Group. He was the Conference Co-Chair for SESUG'97, which was held in Jacksonville, Florida.*

## **Your Base SAS Dollars at Work - What's New and Useful in Version 7**

50 | Chris Olinger and Brian Schellenberger; SAS Institute

The BASE procedures group (IPD) at SAS Institute has been hard at work adding new and useful features to the heart of the SAS System. This talk describes this work and uses generic "business oriented" examples to place these features in a context that demonstrates their use in everyday programming. Covered are:

- New SUMMARY/TABULATE options like percentiles, independent ordering of class variables, and the pre-loading of the class-variable space using formats and/or data sets
- The ODS statement for producing output data sets and HTML output from all SAS procedures, High-Fidelity Printing and more
- ODS specific additions to PROC REPORT, PROC TABULATE, and the SAS/GRAPH Procedures that enhance the Web potential of these work-horse tools. Build trees of Web pages with graphics, embedded links and cell-specific formatting (like font and color) easily, repeatably from your current batch jobs.

*Chris Olinger, a veteran SAS employee, works in the Applications Division of Research and Development. He is one of the key ODS developers (he was partly responsible for the Version 6 ODS prototype) and now programs the bulk of the internal ODS infrastructure in the SAS System.*

*Brian Schellenberger, a veteran SAS employee, works in the Applications Division of Research and Development. He is responsible for the new High Fidelity printing technology (Postscript and PDF) in ODS. He recently returned to work on Base SAS Software after a stint where he worked on internal tools like compilers and debuggers.*

## **Programmatic Generation of Table Specifications Using the SAS Macro Facility**

50 | Dr. William Sun; Pharmaceutical Research Associates, Inc.

When preparing a data analysis plan for a clinical trial, we need to create table specifications prior to the availability of the data base. Many times, these table specifications are produced through a word processing, which may not be efficient. To increase efficiency, the following two steps have been tried to programmatically produce table specifications:

- generate dummy SAS data sets based upon the efficacy and safety variables defined in a protocol
- use a generic SAS macro and the REPORT procedure to produce desired tables based upon the

dummy data sets created

By the end of this process, not only the desired table specifications are produced, but also the table-production programs and a format library, which contains titles, footnotes, and variable formats as side products. When producing real tables, we need only to generate those analysis data sets which are in the same structure as the dummy data sets, and run the table-production programs on the real data sets. This method has been proved very efficient. There are two generic SAS macros, MDATSET and SUMCLIN, which may help users to produce dummy data sets and summary tables, respectively. This paper illustrates the design of the macros and demonstrates applications of these two macros to a real study.

*William Sun is employed as a biostatistician by Pharmaceutical Research Associates, Inc. He got his Ph.D. in Statistics from the University of Virginia in May, 1995. Dr. Sun has plenty of experience in scientific programming using SAS, C++, and FORTRAN. He had 6 years experience in developing a statistical software package when he was in China. During the past few years, he made special efforts on standardization of common practices of a variety of clinical trials and put great attention on the possibility of designing and developing generic macros to deal with a variety of statistical analyses and summaries of clinical data.*

## All In Jest

**Section Chairs:** Olivia Rud  
Fleet  
Wilmington, DE

**Bob Passmore**  
Passmore Consulting Services  
Durham, NC

### Advanced Suspended Animation Program (ASAP) Using SAS v32.09 for SpaceOS v7.58932

10 C Written by: Randy Finch II; SusAn Technologies; Spaceport 28, AL

Presented by: Randy Finch; Tennessee Valley Authority; Muscle Shoals, AL

Through temporal reversal techniques, we have obtained an excerpt from the Proceedings of SUGI 75 which will be held in New New-York, New York in the year 2050. This excerpt discusses what will then be a revolutionary new suspended animation technique.

*Randy Finch II will be a graduate of Internet 3 University, an online virtual reality school. He will be the Project Leader for the ASAP project at SusAn Technologies. At that time, he will have worked with SAS for 10 years. Randy Finch II is the grandson of Randy Finch, a Conference Co-Chair for SESUG '98.*

*Randy Finch is a graduate of the University of Louisville. He is currently employed by the Tennessee Valley Authority and has been using SAS for 18 years.*

### How to Impress an Interviewer That You are a SAS Software Expert

10 C Michael Raithel; Raithel Consulting Services; Garrett Park, MD

If you are a SAS programmer who is looking to add more pzaz to your job interviewing techniques, then this presentation is for you! In this session, you will learn a number of insightful phrases about SAS System software that are sure to make your interviewer sit up straight and think that you are "in the know." By carefully weaving these shrewd observations throughout your interview, you should be able to stun your interviewer, ace the interview, and drastically increase your starting salary. Note: Due to the nature of the material in this presentation, no technical recruiters or Personnel Department employees will be admitted to this session.

*Michael A. Raithel is a computer performance analyst that specializes in MVS performance, tuning, and capacity planning. He was co-chair of the NESUG '95 conference in Washington, DC, and has been a frequent invited speaker at SUGI and NESUG conferences. Michael is the author of "Tuning SAS Applications in the MVS Environment" published by the SAS Institute.*

### The SAS Travel Companion

10 C C. Olivia Rud; 'Conde SAS' Travel Magazine

As SAS users, we are all aware of the variety of tools available to us through the SAS system from versatile data manipulation to powerful analytic tools and processes. However, few of us are aware of the strong functionality of the SAS system as a travel guide. The purpose of this paper is to take you on a journey using the SAS Travel Companion. You are guaranteed to return refreshed and ready to go. It's just what Dr. Goodnight ordered for your bad code.

*C. Olivia Rud is a head writer and travel consultant for 'Conde SAS' Travel Magazine. She specializes in trips for the mentally unsound and has been a key resource for the planning of SESUG and SUGI conferences. She was instrumental in securing the most recent location for SUGI 23 in Nashville, TN. The Nashville location achieved her goal of equalizing and/or reducing the mental capabilities of the attendees through excessive exposure to country music. She has been a SAS programmer for 15 hours.*



## Applications Development

**Section Chairs:** **Phil d'Almada**  
EDS  
Atlanta, GA

**Olivia Rud**  
Fleet  
Wilmington, DE

### Calibrating Instruments Automatically with SAS Software

20 C Eric Brinsfield; Meridian Software, Inc.; Raleigh, NC

Most automated manufacturing processes use delicate instruments to monitor specific characteristics of raw materials or end-products. The information derived from these meters must be accurate in order to provide any benefit to quality and consistency. As a result, the instruments should be checked and calibrated regularly. Unfortunately, manual calibration can lead to significant downtime and therefore loss of productivity.

To alleviate this dilemma, we developed a SAS/AF application that evaluates historical data and provides recommendations for software-based calibration of instruments. The client-server application reads sample data from Informix, performs analysis within SAS, and permits user-initiated update of calibration parameters in Informix. The system offers audited exclusion of outliers in the data as well as ad hoc historical analysis.

*Eric Brinsfield is president of Meridian Software, Inc., a custom software development firm. He has been using SAS software since 1977 and specializes in project management, software system design, database design, and GUI design. Eric earned his BS from Duke University and his MS from North Carolina State University.*

### Building Macro-based Data Step Functions Using Random Macro Aliases to Simulate Local Scope of Internal Function Variables

20 C Paul Dorfman; Citibank Universal Card Services; Jacksonville, FL

In lieu of user-defined DATA step functions, SAS Macro facility is a powerful means of developing functions and language statements to be used in a DATA step. However, care should be taken to properly localize variables used inside such constructs, so they would not interfere with other variables used in the DATA step where they may be invoked. In this paper, issues related to developing macro-based DATA step functions are discussed, and a random technique of creating random macro aliases that practically eliminates interference between the variables is presented. The method is illustrated by real-world examples of building macro-based DATA step functions and language statements where local scope of internal variables is randomly simulated by a stand-alone macro.

*Paul Dorfman began using SAS more than 13 years ago as a scientific programmer for computational modeling of instabilities in ion beam plasma. Afterwards, he used SAS for application development, ad hoc data processing, data warehousing, and data analysis in electronic engineering, telecommunications, pharmaceutical, and credit card industries. His principal working environment, mainframe, is slightly contaminated with some PC impurities. He loves SAS and finds SAS programming aesthetically and professionally satisfying, but also admits to having been chronologically exposed to Algol, Fortran, Basic, Cobol, and C.*

### %FREQ1VAR: Frequency of One Variable with Format: a Macro to Standardize PROC FREQ Output Data Sets

20 C Ronald Fehd; CDC; Atlanta, GA

SAS software provides the ability to associate formats, or look up tables, with variables in a data set. Encapsulating the format labels in a summary data set provides a complete and independent set of information about a variable to other procedures.

This macro was written to standardize summary data sets and bring them into conformance with data sets produced by Fehd's (1997) CHECKALL and SHOWCOMB macros, which provide information about multiple response data. The standardized data sets, or objects, have the same structure and are used for quick and concise reporting of summary information of large survey questionnaire data sets. Their identical structure enables easy access by other methods and software.

*Ronald Fehd (pronunciation tip: FEHD rhymes with FEDERAL: Ron works for the \_federal\_ government) received his BS in Computer Science from the University of Hawaii-Manoa in 1986. He has been a SAS user for more than twelve years and has worked for the Centers for the Division of Laboratory Systems, Public Health*

*Practice Program Office, Centers for Disease Control and Prevention, Atlanta GA, for more than ten years. He has posted to SAS-L under the name the Macro Maven. He is a programmer/analyst, data manager, and data detective. His expertise is the macro language and advanced data step programming, with an emphasis on character variable manipulation. These routines are a part of his data manager's tool box.*

## **How to Use SAS Software from Beginning to (Almost) Ending for Your Data Warehouse**

50 I Akbar Golmirzaie; Independent Consultant; Fayetteville, AR

The University of Arkansas at Fayetteville began exploration of the development and implementation of data warehousing in November, 1995. In under two years, the Computing Services Department has moved from conceptual modeling to a working, evolving production system for data storage and retrieval - all at a substantial savings in time, money, and resources when compared to other systems built by and demonstrated to us at other facilities.

Fundamental in this endeavor has been the use of SAS software. From the system administration tools to those maintaining the secure server, the University of Arkansas development team found in a single software suite what previously had been available only as separate, much more expensive packages. In addition, the multiplatform capabilities of the software and the new SAS ODBC drivers ensure that end-users can directly retrieve, massage, and report from the now-centralized data with any ODBC-compliant software package, in addition to SAS itself.

This paper is primarily intended for facility management, MIS programmers and technical staff members. In it we shall present a review of the Fayetteville data warehouse, addressing its design, construction, and implementation.

*Akbar Golmirzaie was a project developer at the University of Arkansas and has over 17 years experience using SAS. He has been a SAS programmer, trainer, analyst, and representative for 13 years at the University of Arkansas. He was technical leader, developer, and trainer for the data warehouse at the University of Arkansas. He was the recipient of the 1997 Enterprise Computing Award for Academic Applications that was presented at SUGI 23.*

## **Developing Ratio Edit Parameters with SAS for the Economic Census**

50 I Richard W. Graham; U.S. Bureau of the Census; Washington, DC

In May 1995, a team of subject-matter specialists, processors, programmers, and mathematical statisticians was commissioned to develop a generalized edit and imputation system for the 1996 Annual Survey of Manufactures and the 1997 Economic Censuses. Out of that effort, the team developed a modularly-designed system consisting of three main editing components: a ratio module, a balancing module, and a verification or reference lookup module. While each module may be used independently, when used in combination, the system provides for a complete and consistent data set.

This paper briefly covers the underlying theory and framework of the ratio component, discusses the methodology for creating editing rules, and focuses on the development of the edit rules and imputation parameters within the SAS system. Specifically, the paper details an exploratory data analysis (EDA) approach developed in the macro language and the SAS/AF frame entry front-end developed as an interface to launch the macro application. The paper also discusses the SAS implementation for developing imputation parameters using PROC REG.

*Richard Graham is a survey statistician at the Bureau of the Census. He has been a SAS user for approximately 7 years and has developed a number of SAS/AF applications. His primary duties at the Bureau are the development, implementation, and coordination of the post-collection editing activities and outlier analysis methodologies for the Economic Census.*

## **Developing a Parameter Evaluation Methodology Using SAS**

20 C Richard W. Graham; U.S. Bureau of the Census; Washington, DC

This paper is a follow-up to the Developing Ratio Edit Parameters with SAS for the Economic Census. In this paper, the discussion covers the development of SAS/AF applications used for evaluating the previously-developed editing boundaries and the imputation parameters. The paper focuses on two SAS/AF applications. The first application launches a batch procedure which conducts a data analysis of the parameters, then graphs the failures using PROC GPLOT. The failure plots are stored for later review using PROC GREPLAY. The second application is a basic copy of the first except that in this application, the analyst has interactive control

over which industries to review and this application also allows for the review of accepted parameters.

*Richard Graham is a survey statistician at the Bureau of the Census. He has been a SAS user for approximately 7 years and has developed a number of SAS/AF applications. His primary duties at the Bureau are the development, implementation, and coordination of the post-collection editing activities and outlier analysis methodologies for the Economic Census.*

### **DATA Step in Version 7: What's New?**

50 I William F. Heffner; SAS Institute

This paper will discuss enhancements for Version 7 to the DATA step and its associated environment. These enhancements include name space and variable-handling improvements, new external I/O features, new built-in functions, an option for the SET statement which delays SAS data set opens until needed, the DATASTMTCHK= option, performance improvements, and new quasi-multiprogramming capabilities.

*William F. Heffner is a Principle Systems Developer in Core Supervisor Development at SAS Institute. He has been with the Institute for over thirteen years. For the past five years, he has been the lead developer for the DATA Step, supporting the compile, resolve, and execute phases, as well as the DATA Step view engine and the DATA Step debugger. Previous development work involved the SAS System for MVS and code generation subsystems.*

### **Harnessing the Power of SCL Lists**

50 I Lisa Horwitz; SAS Institute

SCL lists are ordered collections of data stored in memory and are a powerful tool for applications developers. The sources of this data can include hard coded values, SAS data sets, information retrieved from interaction with the application user or the current SAS session, or the FRAME entry's objects themselves. This paper explores how to create and populate SCL lists, how to retrieve and utilize information from lists, how to manipulate lists, and how to access some of the lists associated with FRAME entry objects. An assortment of ideas for using SCL lists will be suggested as well.

*Lisa Horwitz, Regional Training Center Manager, oversees training at SAS Institute's New York, Bedminster, NJ, Philadelphia, PA, Boston, MA, and Hartford, CT offices. Lisa also teaches classes and consults in her specialty areas, which include applications development and the Macro language. She is a frequent presenter at local and regional Users Group meetings and at SUGI.*

### **GUI Testing of SAS Software**

50 I Allen Malone; SAS Institute

Testing the graphical user interface (GUI) of SAS Software has many challenges. Testing the GUI on several different hardware configurations adds to the challenges. This paper will discuss the methods used in testing the GUI of SAS Software using tools developed with SAS Software as well as vendor supplied testing tools. The challenge of automating GUI testing will be discussed as well as creating and maintaining good GUI tests. The QA Division has many decades of testing experience within the ranks. The topic of testing the graphical user interface is a challenge that has faced all testers, as the SAS System has become more GUI oriented. The QA Staff would like to share that knowledge with the SAS User Community as they have increasing testing demands while developing SAS Applications.

*Allen Malone is a Quality Assurance Analyst at SAS Institute where he has lead testing efforts for SAS/CONNECT and SAS/SHARE in the past. He is currently working on SAS/AF, SCL and SAS/FSP for the upcoming Version 7 release. Allen also sits on the board of the Triangle Information Systems Quality Association coordinating lecturers on Software Quality topics in the Research Triangle Park, NC area.*

### **A Maintenance-Free, Menu-Driven Closure System**

50 C Stephen M. Noga; Rho, Inc.; Chapel Hill, NC

As a clinical trial nears closure, a series of data validation programs are run, sometimes individually, and sometimes in combination with one another. Of course, only those programs that are in existence at closure time can be run. This paper describes a menu driven closure system that was developed using SAS Frame, and takes advantage of what were once exclusively SCL commands, but which are now available in the data step. This system is maintenance-free because you can add new closure programs to it without ever having to update the menu.

*Steve Noga is currently a Senior SAS Programmer/Analyst at Rho. Before that, he was the statistical computing*

team leader on the Atherosclerosis Risk In Communities study at the University Of North Carolina - Chapel Hill, Department of Biostatistics, and was the Director Of Technical Programs and Services for the National Center For Charitable Statistics. He has been a SAS user in a professional environment for the past twelve years, working on various computer platforms and operating systems. Past SUGI and/or SESUG papers have been on factor analysis, maps, PROC LOGISTIC and PROC TABULATE.

## GUI KISSes: Tips and Strategies for Interface Design

20 C John A. Quarantillo; Westat, Inc.; Rockville, MD

This paper discusses Graphical User Interface (GUI) design. It is tempting for developers to build an interface using too many 'bells and whistles'. Such an interface, although technically appealing and challenging, can be difficult to develop and maintain, but most important, difficult to use. The acronym KISS (Keep It Simple, Stupid) applies well to interface design. A simple, effective interface should be designed with the users' needs taking first priority. Specific topics addressed include: which types of screen controls to use and when, keyboard and mouse support, designing with portability in mind, and testing. The audience level is beginner, and will focus more on the strategies used than the actual code to implement such interfaces.

*John Quarantillo is a Systems Analyst with Westat, Incorporated in Rockville, Maryland. He has worked with SAS for eleven years, using SAS for data manipulation, management, and data collection. In his spare time, John enjoys music, Web page design, 'net surfing and 'real' surfing.*

## STDINFO: Applications Development and Sexually Transmitted Diseases

50 I Ray L. Ransom and Sharon Hixon; CDC; Atlanta, GA

The Division of Sexually Transmitted Disease Prevention (DSTDP) of the Centers for Disease Control and Prevention is currently developing an application front-end to their data warehouse. The data warehouse includes morbidity, cost analysis, behavioral, demographic, programmatic, and administrative data related to STD control and prevention as well as warehouse and application metadata. The application, STDINFO, provides researchers, data managers, and operational and program staff desktop access to data and tools for querying, analysis, and reporting. STDINFO is currently in it's first production release phase. In this presentation, the authors will demonstrate development strategies and specific functionalities of STDINFO. Strategies demonstrated will include maintaining a common Windows "look and feel", building metadata, using SCL lists to unlock the power of your metadata, and using SCL sublists for improved application performance and efficiency. Demonstrated application functionality will include user feedback, Help tools, documentation, and data set creation and conversion across operating systems. Applicable SAS System components include SAS/AF, SAS/SCL, SAS/SHARE, and SAS/CONNECT. Operating systems and platforms include Windows 3.1, 95 and NT, UNIX, Novell 4.11, and SQL.

*Ray Ransom is a Systems Analyst for the Division of STD Prevention at the Centers for Disease Control and Prevention. He has been using SAS Software for 12 years and has presented at 5 SUGI conferences and 1 SESUG Conference. He has won 3 "Best Paper" awards at SUGI and was an Invited speaker in the Systems Architecture section at this year's SUGI in Nashville. Besides providing technical support for several national and international STD prevention projects, he is currently the project leader on a combined data warehousing and applications development project at the Centers for Disease Control and Prevention.*

*Sharon Hixon is a Programmer for the Division of STD Prevention at the Centers for Disease Control and Prevention. Her background is in training and support and she is a Certified Microsoft Product Specialist. She has been using SAS Software for 3 years and has presented at SUGI 22 in San Diego, where she won "Best Paper" award, and at SESUG 97 in Jacksonville. She is currently a developer on a combined data warehousing and applications development project at the Centers for Disease Control and Prevention.*

## CATALOGER©: An Application Development Tool to Search, Compare, and Document SAS Catalogs and Data Files

20 C Christopher A. Roper and Michael Gilman; Qualex Consulting Services, Inc.; Fairfax, VA

This paper will present an application written entirely in SAS that greatly enhances the developer's ability to develop, compare, and manage SAS catalog entries and data sets. This application has point and click capabilities for printing catalog entries, including images of frame entries and complete descriptions of associated widgets directly into Microsoft Word® documents, creating publication quality documentation at the push of a button. The batch printing facility allows for printing of all catalog entries of virtually any type, including Program, Source, SCL, and Slist (including expanded sublists) entries. The text searching facility will search through all text-based entries for character strings and allow point and click access to the locations in any catalog entry containing the text string. Additionally, interactive, side-by-side comparisons of catalog entries in

separate, independent windows on the same SAS/AF screen greatly enhances the application developer's ability to manage and compare different versions of SAS catalogs.

*Christopher A. Roper is a Senior Systems Consultant with Qualex Consulting Services, Inc. His areas of expertise include Base SAS, SAS/AF, SAS/FSP, Macros, Frame, and SCL, has been developing SAS applications for over ten years. Chris won Best Contributed Paper in Applications Development at last year's WUSS conference, and is an frequent presenter at SAS user groups across the United States and Europe. Chris has a BS in Business Administration with a Concentration in Economics from Christopher Newport University.*

*Michael Gilman has worked with the SAS system for almost 20 years. His expertise encompasses a broad range of industries including automotive, educational, financial, government, health, and industrial. Now as Senior Applications Consultant with Qualex Consulting Services, Inc., Michael continues to develop high quality SAS software solutions using Base SAS, SAS/FSP, Frame, SCL, and SAS/GRAPH. Michael has a M.Sc. (Computer Science) and B.Sc. (Major: Psychology; Minor: Computer Science) from McGill University in Montreal, PQ.*

## **A Methodology for Developing SAS Applications for Use In Multiple Languages**

- 20 C Christopher A. Roper, Gina M. Thomas, and Michael Gilman; Qualex Consulting Services, Inc.; Fairfax, VA

Developing SAS applications that will be used in several countries, each with its own native language, presents unique challenges for the SAS applications developer. This paper will present a methodology for developing a SAS application that may be used in any number of languages, without requiring a rewrite of the application code for each language translation. The application is developed once, the translation methodology is applied once, and then the application can be translated as often and to as many languages as is necessary, without having to rewrite any of the original application code.

*Christopher A. Roper is a Senior Systems Consultant with Qualex Consulting Services, Inc. His areas of expertise include Base SAS, SAS/AF, SAS/FSP, Macros, Frame, and SCL, has been developing SAS applications for over ten years. Chris won Best Contributed Paper in Applications Development at last year's WUSS conference, and is an frequent presenter at SAS user groups across the United States and Europe. Chris has a BS in Business Administration with a Concentration in Economics from Christopher Newport University.*

*Gina Thomas is a Software Applications Developer with Qualex Consulting Services, Inc - based out of Cleveland, Ohio. She has been working with SAS for about 3 years and has worked in a variety of areas such as BASE, AF, SCL, EIS, and MACRO's with the SAS system. She has a Master of Science from Ohio University in Industrial and Systems Engineering and has a specialization in Genetic Algorithms, Neural Networks, and Artificial Intelligence.*

*Michael Gilman has worked with the SAS system for almost 20 years. His expertise encompasses a broad range of industries including automotive, educational, financial, government, health, and industrial. Now as Senior Applications Consultant with Qualex Consulting Services, Inc., Michael continues to develop high quality SAS software solutions using Base SAS, SAS/FSP, Frame, SCL, and SAS/GRAPH. Michael has a M.Sc. (Computer Science) and B.Sc. (Major: Psychology; Minor: Computer Science) from McGill University in Montreal, PQ.*

## **Data Validation Using a SAS Format**

- 20 C Naoko Stearns; Research Triangle Institute; RTP, NC  
John R. Gerlach; Maxim Group; Plymouth Meeting, PA

Proper data analysis requires well-defined data that have been validated. Typically, the transition from raw data to a viable SAS data set requires more effort than just writing an INPUT statement. In fact, the quest for validated data often becomes a project in itself consuming tremendous resources. Considering that many validation checks can be written as Boolean expressions, it's possible that the checks can be stored in a user-defined format. The SAS solution described here involves a macro and a user-defined format that performs validation checks on a data set, then produces a report. Consequently, the validation checks are maintained by simply modifying the format and the validation process is performed, as needed, by invoking the macro. This paper explains an easy and self-documenting approach to this validation process.

*Naoko Stearns is a research programmer/analyst at Research Triangle Institute, RTP, NC. Naoko has been using SAS for 10 years. Her recent work focuses on implementing data dictionaries, code generators, and codebooks.*

*John Gerlach has been using the SAS System for over 10 years, specializing in the Macro Language and*

*relational databases, where he has worked mostly in the health industry, specifically epidemiology, clinical trials, and longitudinal patient data analysis. John has written and taught SAS seminars; and, recently, he has worked on a financial datamart project involving performance measures of credit card customers. Also, John holds a BA degree in Italian Literature.*

### **Automatic Referencing SAS Macro Variables Using Array Processing, CALL SYMPUT Routine, and DO Loops**

20 C Pei-Chun T. Wan; TRW, Inc.; Atlanta, GA

This paper illustrates how one can use the combination of array processing, SAS macro facility, CALL SYMPUT routine, and iterative DO loops to automatically assign titles and labels to address corresponding variables in the frequency tables.

In the Adult/Adolescent Spectrum of Disease (ASD) project of the Centers for Disease Control and Prevention (CDC), there is a need to produce frequency tables for each of the 23 1987-definition AIDS Opportunistic Illnesses (OI). By using the techniques described herein, one can set up an array with all 23 AIDS OI names, use SAS macro to set up macro variable for future reference, use CALL SYMPUT routine to assign value to macro variable which can be used later in the title statement and label statement for each AIDS OI name in the frequency table, and use DO Loops to perform this task repetitively for each of the 23 AIDS OI names.

This technique can be applied widely to any program which requires users to reference multiple variables repetitively in the title and label statement of the frequency procedure or tabulate procedure.

*Pei-Chun Wan has a Master's degree in Information and Computer Science from Georgia Institute of Technology and has been working with SAS for the last five years. She is the national data manager for the Adult/Adolescent Spectrum of Diseases (ASD) project at Centers for Disease Control and Prevention (CDC). She has co-authored many articles and abstracts in medical journals and at national and international conferences, and she has also presented this paper at SUGI 23.*

## Beginning Tutorials

**Section Chairs:** Ian Whitlock  
Westat, Inc.  
Rockville, MD

David Maddox  
BellSouth  
Birmingham, AL

### SAS/ASSIST Easy Access to the SAS System

50 | Arturo Barrios and Sally Muller; University of North Carolina; Chapel Hill, NC

SAS/ASSIST provides a simple and non-threatening, yet very capable, tool for using SAS and learning the SAS language. A "point-and-click" interface ASSIST has two distinct advantages over conventional methods of using the SAS System. First, although ASSIST doesn't require that you write a single line of SAS code, it is a very effective way of learning how to write SAS code. Each task that you accomplish generates a fully documented SAS program. The steps you take to then save the program are quite simple and you can then study and/or rerun the program anytime. Second, the learning curve with ASSIST is significantly shorter than the learning curve to use the SAS System with any other method -- you go straight to the work at hand and get your results immediately. Besides showing you common tasks that can be accomplished with ASSIST, this tutorial will show you how SAS/ASSIST differs from other "point-and-click" interfaces, such as DESKTOP, and when you would want to choose one of these products over the other.

*Arturo Barrios is a Computer Consultant for the Customer Services Division of Academic Technology and Networks (ATN) at the University of North Carolina. Arturo began using SAS as a graduate student in the Dept. of City and Regional Planning, in 1991. He progressed to supporting SAS as a Computer Consultant and teaching SAS Short Courses, including SAS/ASSIST, SAS/CONNECT, and "Putting Your SAS Applications on the Web". Arturo has presented papers at the last four SESUGs and most enjoys the "Beginning Tutorials" section.*

*Sally Muller is the Manager of the Statistical Support group, a division of Academic Technology and Networks (ATN), at the University of North Carolina. Sally began using SAS software in 1978 and in 1987 became a site representative. Since then she has answered over 20 million SAS user questions and taught several thousand SAS/ASSIST classes. Sally finds that SAS novices and even people with limited computing knowledge of any kind can learn to use (and love) SAS/ASSIST. A desire to show the advantages of ASSIST over other SAS interfaces and conventional methods of learning to use the SAS System is the motivation of this paper.*

### The Building Blocks of PROC TABULATE

50 | Ron Coleman; Links Analytical, Inc.; Jacksonville FL

There are 6 ways to do anything in SAS! Especially reporting. Which tool should you use? PROC TABULATE is the workhorse of reporting in SAS but is often complicated to use. The Building Block approach breaks down the complexity of TABULATE and shows you how to build powerful reports one block at a time!

*Ron Coleman has 14 years experience using SAS on mainframes, UNIX systems, and Windows. He is an independent consultant specializing in SAS training, productivity enhancement, and data warehousing/data mining. Ron founded Links Analytical, Inc. in 1996 and has worked for automobile, banking, credit, energy, and insurance industries. Ron has presented papers at SUGI, the Wisconsin/Illinois SAS Users Group, and the South Carolina SAS Users Group. He has also founded several company internal groups and is presently the President of the North Florida Users of the SAS System.*

### The SAS Debugging Primer

50 | Frank Dilorio; Advanced Integrated Manufacturing Solutions Corp.; Chapel Hill, NC

Meet an accomplished SAS programmer and you meet someone who s probably learned by making (and fixing) lots of mistakes along the way. The breadth of the SAS System s target applications, the variety of its "dialects" (Base SAS, macro, SCL, IML, SQL), and the quirky procedural/non-procedural environmental mix conspire to make the SAS System a slippery slope to ascend. Debugging is the art of gracefully recovering and learning from falls during the ascent.

This paper discusses techniques for debugging SAS programs. Its purpose is two-fold. First, it provides behavioral and technical tips for fixing code (how to read error messages in the SAS Log, knowing when there is a problem with the program even if SAS says there isn't, using the DATA step debugger, identifying system options, using PROCs for data validation, using macro variables to control debugging output, etc.) The second

focus of the paper is its presentation of design and coding methods that make the programming process more reliable, thus reducing the need for debugging in the first place.

The paper's target audience is relative newcomers to the SAS System. More seasoned users may find or rediscover some of the techniques and features being discussed. Emphasis is placed on Base SAS and the macro language, although the techniques themselves are applicable to SCL and other products.

*Frank Dilorio is Director, SAS System Development at AIMSCo (Advanced Integrated Manufacturing Solutions Corporation), a manufacturing systems integrator. He has over 22 years' experience with Base SAS and products such as SAS/GRAPH, SAS/AF, SAS/GRAPH, SAS/QC, and SAS/FSP. He has worked in educational, financial, pharmaceutical, and manufacturing environments, focusing on program efficiency, report-writing, the macro language, and user interface design issues.*

*Much of the knowledge gained from these varied work environments has been committed to paper — he has written many papers presented at local, regional, and international SAS user groups. Frank is also the author of two popular SAS programming texts, "SAS Applications Programming: A Gentle Introduction" and (co-authored with Kenneth Hardy) "Quick Start to Data Analysis with SAS." A third book, "The Elements of SAS Programming Style," is being developed.*

*Frank is active in the SouthEast SAS Users Group (SESUG). He was conference co-chair in 1994 and 1996, and is currently serving as President of the group.*

### Formats as a Programming Tool

- 50 | John R. Gerlach; Maxim Group; Plymouth Meeting, PA  
Alan Rinkus; Fleet Financial Group; Horsham, PA

The Format Procedure in SAS provides the means to create user-defined informats and formats for character and numeric data. Besides its typical use, however, this procedure offers much more as a programming tool. For example, the Format procedure can be used for facilitating table look-ups, data validation, and subsetting. Also, the Format procedure has the capability of creating formats, even dynamic formats, directly from SAS data sets. This paper offers a brief overview and discusses programming aspects of this powerful, under-utilized procedure.

*John Gerlach has been using the SAS System for over 10 years, specializing in the Macro Language and relational databases, where he has worked mostly in the health industry, specifically epidemiology, clinical trials, and longitudinal patient data analysis. John has written and taught SAS seminars; and, recently, he has worked on a financial datamart project involving performance measures of credit card customers. Also, John holds a BA degree in Italian Literature.*

*Alan Rinkus is currently Director of Information Management, Decision Systems, in Fleet Credit Card's Decision Support Group. Alan's experience includes prospect targeting and segmentation, and predictive model development related to credit card acquisition campaigns while working at Advanta Corporation and, previously, at MBNA America. Alan earned a BA degree in Psychology and an MA degree in Sociology; and, he has held several adjunct faculty positions teaching statistics. Alan has been using SAS for five years.*

### A Statistical Roadmap for the SAS System for Beginners

- 50 | Kenneth Hardy; University of North Carolina; Chapel Hill, NC

It doesn't take a trained statistician to figure out that PROC MEANS produces means and PROC REG is probably useful for regression analysis. But what PROC do you use to produce a box plot or a Tobit regression or Cronbach's Alpha or Bhapkar's test of marginal homogeneity? Finding out which PROC to use to create that statistical analysis your boss wants by 4:00 P.M. today can often be a daunting task even for a trained statistician just starting out with SAS. This beginning tutorial will help you out by giving an overview of many common and esoteric statistics produced by the SAS system and the documentation you need to read to program SAS to obtain them. It will also introduce you to a very useful SAS Technical Support Web page that can help you find out how to perform Bhapkar's test and many other advanced statistical analyses with SAS.

*Kenneth Hardy is Associate Director for Information Systems at the Institute for Research in Social Science of the University of North Carolina at Chapel Hill. He has been using and consulting on SAS for statistical analyses for over twenty-five years. In addition to academic research publications, he has presented many papers at SUGI and SESUG meetings. He has also co-authored books on topics ranging from the inequity of the death penalty to quantitative research methods for historians. His most recent book, written with Frank C. Dilorio, is "Quick Start to Data Analysis with SAS".*



## Fundamentals of FRAME: A Tutorial for Building Applications

50 | I Gregory Barnes Nelson; ASG, Inc.; Cary, NC

SAS/AF FRAME technology allows us to develop user interfaces that are friendly to use. They are the basis for many SAS applications in which end-users determine what happens with the click-of-a-button. This paper presents a framework for building intuitive user-based applications. Here we will develop a simple application, which builds on itself iteratively. By exploring some of the most common FRAME objects and understanding how events are handled in AF, we will build a simple interface for some common applications.

Through this step-by-step process, we will show you how to build an interface that collects user input, which can be used to front-end traditional SAS Macros. Despite its simplicity, this paper should give the reader a methodology for developing user-based applications that can serve to front-end most run-time, interactive macros. This paper is intended for both new users of SAS Software as well as experienced SAS programmers with little or no experience in SAS/AF. Examples in this paper will include both Version 6.12 and Version 7 of the SAS System.

*Greg Barnes Nelson is currently the Director of Technology Solutions at ASG, Inc., a SAS Institute Business Partner. A psychologist by training, Greg is a technologist at heart. His current area of expertise include designing complex data management systems, user interface modules, and data warehousing design (both business process and data modeling) and implementation (e.g., distributed architecture and front-end development).*

*Prior to joining ASG, Greg was the Director of SAS Education and Development at The Gallup Organization and Manager of Client Support at the University of Georgia. He has over 13 years of experience using the SAS System in a wide variety of applications and platforms.*

## PROC UPLOAD and DOWNLOAD: An Easy Way to Export SAS

50 | I Martin J. O'Connell

File transfer using PROC UPLOAD and DOWNLOAD (available through the use of SAS/CONNECT) represents a convenient way of transferring SAS data and program libraries from platform to platform. By doing this, subsequent development can be transferred from a restrictive environment to a more user-friendly one, such as a Windows PC. In addition, job processing can be performed from a remote SAS session using CONNECT. The use of SAS/AF to automate these processes can provide an almost transparent way of developing on a client PC, while processing on a more powerful remote server.

This paper should be particularly useful to those using a high-end PC as a terminal for mainframe SAS program development. It discusses:

- Overview of SAS/CONNECT
- Issues to consider before exporting development
- File transfer details
- Job control from the PC using SAS/CONNECT
- Development of a GUI interface using SAS/AF

*Martin J. O'Connell earned an MS in Mathematics from North Carolina State University in 1991. His area of study was Numerical Analysis and Optimization. He has 7 Years of SAS experience; 5 years on mainframes, 2 years with client server. He is currently working with SAS development on the GEICO Actuarial Data Warehouse. His areas of expertise include Base SAS and client server computing with the SAS system.*

## The DATA Statement: Efficiency Techniques

50 | I S. David Riba; JADE Tech, Inc.; Clearwater, FL

One of those SAS statements that everyone learns in the first day of class, the DATA statement rarely gets a second look. However, this Base SAS statement has evolved in recent releases of the SAS System. If you have not looked at the options on the DATA statement recently, you will probably be surprised.

This beginning tutorial examines the syntax of the DATA statement and the different options that are valid for use with it. Each option will be discussed and illustrated with examples of how (and when) to use them. Among the topics that will be discussed are data set indexing, compression, and views.

*S. David Riba is CEO of JADE Tech, Inc., a SAS Institute Quality Partner who specializes entirely in*

applications development, consulting and training in the SAS System.

Dave is the founder and President of the Florida Gulf Coast SAS Users Group. He chartered and served as Co-Chair of the first SouthEast SAS Users Group conference, SESUG '93, and serves on the Executive Councils of the SouthEast SAS Users Group and CONSUG, the Consultant's SAS Users Group. His first SUGI was in 1983, and he has been actively involved in both SUGI and the Regional SAS User Group community since then. He has presented papers and assisted in various capacities at SUGI, SESUG, NESUG, MWSUG, SCSUG, and PharmaSUG.

Dave is an unrepentant SAS bigot. His major areas of interest are efficient programming techniques and applications development using the SAS System. His SAS software product specialties are SAS/AF and FRAME technology, SAS/EIS, SAS/IntrNet, and CFO/Vision.

## Data Mining: An Overview of Methods and Techniques for Increasing Profits in Direct Marketing

50 | C. Olivia Rud; Fleet; Wilmington, DE

Data Mining is a new term for the common practice of searching through data for patterns which will predict future outcomes or define measurable relationships. Statistical and machine-learning methods are the favored tools of many businesses who utilize direct marketing. This paper will explore some of the typical uses of Data Mining in business with discussions and examples of measuring response, risk and lifetime customer value. The paper will conclude with highlights of the SAS Enterprise Minor and its ability to transform the Data Mining process.

C. Olivia Rud, VP is a lead analytic consultant for Fleet Credit Card Bank. Her primary responsibilities include data mining, modeling, and segmentation for acquisition, retention, risk, and portfolio management. She has worked in the financial services industry for 7 years.

Olivia has a BA in Mathematics from Gettysburg College and an MS in Decision and Information Systems with an emphasis in Statistics from Arizona State University. She has been a SAS user for 9 years.

## Getting Started with Dynamic Data Exchange

50 | Howard Schreier; U.S. Dept. of Commerce; Washington, DC

There are numerous ways to move information between SAS and third-party applications, such as spreadsheets and database packages, especially in the Microsoft Windows environment. Dynamic Data Exchange (DDE) is a versatile approach, because it provides a DATA step interface rather than data set conversion. This presentation will explain the basic techniques of using DDE to move data to and from SAS.

Howard Schreier is an economist by training. He serves the U.S. Department of Commerce in an information management role. He has used SAS since 1981 and has been a frequent SAS-L contributor.

## Changing the Shape of Your Data: PROC TRANSPOSE vs. Arrays

50 | Bob Virgile

To transpose your data (turning variables into observations or turning observations into variables), you can use either PROC TRANSPOSE or array processing within a DATA step. This tutorial compares variations on both methods, finding the advantages of each.

Bob Virgile is a SAS veteran, having participated in every NESUG and many SUGI, MWSUG, PharmaSUG, and SESUG conferences. Besides presenting papers, Bob creates the problem-solving contests for SUGI and NESUG, and has published two books through SAS Institute. Bob also develops and teaches an outstanding series of customized SAS classes.

## A SAS Programmer's View of SQL

50 | Ian Whitlock; WESTAT, Inc.; Rockville, MD

This tutorial introduces the traditional SAS programmer to PROC SQL. First some historical perspective is given to show the context in which SQL was developed. Then a set of examples is given showing areas where SQL is liable to be better (easier to code and/or more computer efficient). In the end the you should have a better understanding about how to use SQL and why you should want to.

Some of the later examples do involve the interaction of PROC SQL with the macro facility. But even these examples should be clear to the macro naive.

Ian Whitlock is a senior systems analyst at Westat, working on survey research problems. He has been

*programming largely in SAS since 1981 using an interactive environment to develop programs for execution in a batch environment. He is skilled in problem solving involving SAS macro, PROC SQL, reporting procedures and the DATA step. In addition to programming, he teaches SAS courses to Westat employees. He is active on SAS-L, and has presented many different papers at national, regional, and local SAS User Group meetings.*

### **The Program Data Vector as an Aid to DATA Step Reasoning**

50 | Marianne Whitlock; WESTAT, Inc.; Rockville, MD

The SAS DATA step is easy enough for beginners to produce results quickly. They can use a model from a manual or a colleague's program, and adapt it to their problems. Typically, they code a "SET" or "INPUT" statement and proceed with assignment statements, etc., to produce a new file from a previous one. They can easily print their results, or put the data into a statistical procedure, without ever troubling themselves with the program data vector (PDV).

When they want to accomplish something more complex, they find that familiarity with the typical DATA step pattern is not enough, and because they have not internalized the concept of the PDV, they are not well equipped to tell SAS what they want. Using increasingly complex problems, this talk will step through code from the PDV point of view. The goal will be to give people confidence to try more manipulative programming. A set of rules governs the PDV, and at each point in the compiling and execution of the DATA step, it is possible to know exactly what information the PDV holds and what it will do with that information. Understanding this enables the programmer to take control, and tell SAS precisely what he wants.

*Marianne Whitlock is a systems analyst and has been a SAS user for 16 years, the last 12 at Westat in Rockville, MD. She is experienced in statistical programming including sampling, survey research, health studies, data management, and report writing. She has presented papers at several SUGI's.*

## Coders Corner

**Section Chairs:** **Maribeth Johnson**  
**Medical College of Georgia**  
**Augusta, GA**

**Andrew T. Kuligowski**  
**Nielsen Media Research**  
**Dunedin, FL**

### PROC DATACHK Revisited: The DATACHK Macro

- 10 C Jeffrey M. Abolafia and Carry W. Croghan; University of North Carolina; Chapel Hill, NC

PROC DATACHK, a SUGI Supplemental Library procedure in Version 5 of the SAS System, provided a useful method for quickly checking numeric data in a selected SAS data set. The original DATACHK macro, presented at SUGI 22, attempted to simulate PROC DATACHK. For each numeric variable, the DATACHK macro lists the number of nonmissing observations, the number of missing observations, the five lowest values, and the five highest values. The DATACHK macro has been updated incorporating: 1) new SAS features to increase efficiency, 2) by group processing, and 3) additional formatting options.

*Jeff Abolafia is a member of the faculty in the Department of Biostatistics at the University of North Carolina at Chapel Hill as well as the Director of the Statistical Computing Division at the Collaborative Studies Coordinating Center. Jeff has used SAS for over fifteen years and is the author of several SUGI/SESUG papers. His areas of interest include clinical trials, statistical computing, and research data management.*

*Carry Croghan has been working at the University of North Carolina - Chapel Hill, Department of Biostatistics at the Collaborative Studies Coordinating Center for six years as an applications programmer. She has worked on several different studies during that time. Prior to that, she worked with the EPA as a research assistant and programmer. She has been using SAS for ten years.*

### New Data Step Functions in SAS 6.12 - Data Set and Variable Functions

- 10 C Caroline Bahler; ASG, Inc.; Cary, NC

The Data Step in SAS 6.12 is the recipient of 50+ new functions. These new functions are broken into the following groupings: data set functions, external file functions, library and catalog functions, special functions, variable functions, and statistical functions. The objective of this paper is to discuss the data set and their functions and to illustrate potential uses of the data set functions.

*Caroline Bahler is currently a senior technical consultant in the Advanced Solutions Group at ASG, Inc., SAS Institute Business Partner. Her SAS background stretches back over 18 years and many versions of SAS, including using SAS over a wide variety of platforms.*

### A Macro-Driven SQL Code Generator

- 10 C John E. Bentley; First Union National Bank; Charlotte, NC

SAS's SQL Pass-Through Facility is an efficient way for SAS to access data in a RDBMS database. It's a powerful tool for merging and subsetting data because it takes advantage of the inherent power of the RDBMS and minimizes I/O by returning only the data that's needed. Because of the syntax and style differences between SAS and SQL, for most SAS users it's almost painful to learn. For users of our Informix data warehouse, we've built a SAS FRAME application that uses the SAS Macro language to generate SQL code based on user input. This presentation will be a quick overview of that code. Some familiarity with SAS Macro would be useful.

*John E. Bentley is considered by some to be a SAS guru by virtue of 12 years experience with SAS. This can be interpreted as saying that he's proven the validity of most of Murphy's Laws of Technology. He's worked as a healthcare data analyst, managed a team writing cleaning and transformation routines for pension data prior to loading it into a Sybase database, and recently completed managing development and implementation of a SAS FRAME application to access financial data in an Informix data warehouse. Right now he's working to port that application to an Oracle data mart, developing another SAS application for decision support, and proving more of Murphy's Laws.*

### Automating Dates in SAS Code for Batch Processing

- 10 C Ron Coleman; Links Analytical, Inc.; Jacksonville, FL

You need a report run every month to include all of the days from the previous month. How do you do it? In

countless shops around the world someone goes into some piece of code to fill in date ranges for the program to use. Why??? Here is a quick macro technique to automate standard date ranges while allowing for overrides.

*Ron Coleman has 14 years experience using SAS on mainframes, UNIX systems, and Windows. He is an independent consultant specializing in SAS training, productivity enhancement, and data warehousing/data mining. Ron founded Links Analytical, Inc. in 1996 and has worked for automobile, banking, credit, energy, and insurance industries. Ron has presented papers at SUGI, the Wisconsin/Illinois SAS Users Group, and the South Carolina SAS Users Group. He has also founded several company internal groups and is presently the President of the North Florida Users of the SAS System.*

### **Developing an Hourly Profile from a Monthly Forecast**

- 10 C Thomas A. Fuchs; Louisville Gas and Electric Company; Louisville, KY

The LG&E Forecasting and Load Research Department develops a monthly forecast of sales volumes and revenues. After these forecasts are developed, the SAS program, LOADSHAPES.SAS, is run to create an hourly profile from the forecast information and historic hourly profiles. The resulting forecast profiles are used for operations planning.

The program performs data collection and creates average per unit duration curves for each month by averaging over the years in the history. Next, since sales have a weekly pattern, an average of consecutive 52-week periods in the history is created. This average profile is used to create the template for the forecast period. The monthly per unit duration profiles are manipulated according to the forecast and merged with the template to produce the forecast profile. This methodology is fairly simple, but the resulting profiles are reasonable for use in planning.

*Tom Fuchs is a Senior Analyst in the Forecasting and Load Research Department of the Louisville Gas and Electric Company (LG&E). In the 14 years Tom has been with LG&E he has worked in Engineering, Production Planning and Load Research. Tom received a Bachelors of Science in Electrical Engineering and a Masters of Business Administration from the University of Louisville. When Tom is not creating or modifying SAS code you can find him and his wife cheering for his three children at a Swim Meet or T-ball game. This is Tom's third SESUG.*

### **Arrays and Scoring Tests Involving Multidimensional Criteria**

- 10 C Imelda C. Go, Ph.D.; Richland County School District One; Columbia, SC

In educational applications, a step that is sometimes required after scoring responses to a test is looking up values of other measures that correspond to a test score. For example, scale scores can correspond to raw test scores. Scale scores can also depend on the test form that was used. There might even be the need to obtain several types of scale scores based on test sections. Unless you know how these scale scores are obtained computationally, these situations conjure images of multidimensional lookup tables. In either one-dimensional or multidimensional settings, temporary SAS arrays provide an elegantly simple and efficient means for storing test answer keys and large lookup tables required for such scoring processes. Using SAS arrays have definite advantages over using other SAS statements (e.g., SET, RETAIN, IF-THEN/ELSE, SELECT, etc.) to accomplish the same task.

*Imelda C. Go, Ph.D., has worked with SAS programs since 1989. Working in different computing environments that were not always equal in terms of computing power and resources led to an interest in efficiency. She resides in Columbia, SC, and works for a large school district as a researcher and SAS programmer.*

### **SYMPUT Routine: Painlessly Putting Parts and Pieces Together**

- 10 C Imelda C. Go, Ph.D.; Richland County School District One; Columbia, SC

The macro SYMPUT routine was useful in consolidating the same type of information from different sources. This particular use of the SYMPUT routine evolved from the need to combine the data (in the form of 50 different files) from 50 different schools in a large school district. Each school has a record in an external text file that contains as fields all values of parameters that are predictably needed for processing the data file from each school. The SYMPUT routine was used to access specific macro parameter values (from the external text file) for each school, which eliminated the need to explicitly type/retype these specific values in SAS program code for each set of files that needed to be consolidated. Other "freebies" resulted from using this system.

*Imelda C. Go, Ph.D., has worked with SAS programs since 1989. Working in different computing environments that were not always equal in terms of computing power and resources led to an interest in efficiency. She resides in Columbia, SC, and works for a large school district as a researcher and SAS programmer.*

## The Subtle Tyranny of Floating Point Numbers: When C has the Value X, But X NE C

10 C F. Joseph Kelley; University of Georgia; Athens, GA

Most programmers are taught never to test for equality between a floating-point (Real) number and a constant (or integer). The usual advice is to test for "greater-than-or-equal-to" (or "less-than ..."). Over time, this warning is often forgotten or avoided in one way or another. Many persons who write SAS programs have little or no background in compiler languages (where this is taught), and SAS itself, with only two "data types" ("numeric" and character) does not make the problem any clearer. But the problem did not go away; it can strike and have the most unexpected results. This paper will examine the problem, compare results on several platforms, offer some debugging techniques and possible solutions.

*Francis J. Kelley is a senior consultant in the Host Systems and Statistical Software Support group at University Computing, The University of Georgia. He provides assistance for the IBM and CDC mainframes at UGA (operating systems, compilers, editors and software packages) and provides SAS software support for all the systems it is available on at the University: MVS/TSO, VM/CMS, UNIX, OS/2, Windows, Macintosh, and DOS. He has used SAS extensively for about 15 years, and has both made presentations and chaired sections at previous SESUGs. He is SESUG '98 Conference Co-chair.*

## Automatically Creating SAS Macro Variables to Manage Unknown Values in Year/Month Variables for Year 2000 Issues

10 C Jianmin Li, Shelley Ren, and Pei-Chun T. Wan; TRW Inc.

This paper illustrates how one can use PUT statements, IF-THEN statements, and a CALL SYMPUT routine to automatically create SAS Macro variables and Macro statements. And one can use ARRAY processing and DO loops to summarize and convert unknown values in year/month variables to prepare for Year 2000 issues.

In the National HIV/AIDS Surveillance database at Centers for Disease Control and Prevention (CDC), "99" is used to code unknown values for year/month variables. To prepare for year 1999, character "99" for unknown years needs to be converted to character "..".

By using this technique, one can use the CONTENTS procedure to output month/year variable names to a SAS data set, use PUT statements to automatically create macro variables, and use FILE and %INCLUDE statements to place and locate files with a list of macro variables and macro statements. In addition, a CALL SYMPUT routine is used to count the number of year/month variables to automatically define ARRAY dimensions, and summarize and convert the unknown values in year/month variables using DO Loops.

This technique can be applied to programs which require the user to select a subset of variables with similar elements in their names, and manage the variables with SAS Macros, Arrays, and Do loops.

*Jianmin Li has a Master's degree in Educational Research Methods/Applied Statistics/Masurement/Evaluation and a Doctoral Degree in Movement Science.*

*Shelley Ren has a Master's degree in Computer Science.*

*Pei-Chun T. Wan has a Master's degree in Information and Computer Science.*

*All three authors have been computer programmers for National HIV/AIDS Surveillance at Centers for Diseases Control and Prevention (CDC) for the last 5 years. Both Jianmin and Pei-Chun have each coauthored a number of articles and abstracts in medical journals and at national and international conferences.*

## Using PROC FREQ and Remaining Data Driven

10 C Grace Lossman; Statcon Inc. / Smith-Hanley Consulting Group; South Orange, NJ

Output data sets from the procedure FREQ are used in many ways by the programmer and statistician alike. Sometimes, however, it can be frustrating fussing around with adjustments when cell sizes are too small for particular statistical options. The ensuing hardcoding in a program is not very pleasing when everything else runs in a data driven manner. This macro makes choices dependent upon the data and uses the appropriate statistic.

*Grace Lossman has a Master's degree in Physics and is completing her Master's in Statistics. She is a consultant working for Smith-Hanley Consulting Group and is CEO of Statcon, Inc. She has over 12 years experience with the SAS System and is currently working on a contracting assignment at Pfizer Pharmaceuticals in Manhattan. Grace has two books still in progress through the Institute's Books by Users Program: one dealing with statistics and graphics for scientists and engineers; the other dealing with problems*

*inherent to the pharmaceutical industry. She actually may finish one when she's not gardening, playing with the dogs or going to the opera. Grace co-chaired the 1996 SESUG conference in Atlanta with Frank Dilorio.*

### Using ARRAYS: The Basics

- 10 C George Matthews; University of Georgia; Athens, GA

George Matthews is a statistical software consultant in an academic environment. He often encounters novice users who need to process several variables in the same way. In the DATA step, you can put variables into a temporary group called an array. Arrays provide a very powerful tool for group processing. This paper will provide participants with the basics of Array Processing. This paper is intended for SAS users who have some experience with the DATA step and no or very little experience with arrays.

*George Matthews is a Statistical Software Consultant for the University of Georgia. He has been programming in SAS for over 10 years. He specializes in BASE SAS, SAS/ASSIST, and SAS/ACCESS.*

### IN & OUT of CNTL with PROC FORMAT

- 10 C Nancy Patton; ASG, Inc.; Washington, DC

CNTLIN=

If you are given account numbers in a data set and you are asked to identify all these accounts in numerous flat files, how might you approach this?

Using the SAS system and the CNTLIN= option in PROC FORMAT, a former can be defined where all the account numbers you want identified are set to a value of 'KEEP'. By using the PUT function to apply that format to the account numbers as you read the flat files, you could identify the records with the accounts you are looking for and control their destiny!

This example will make the look-up process simple to understand and easy to bring back to work!

CNTLOUT=

Have you ever hard-coded a 'dummy' data set to combine with your data in order to force all categories of a formatted CLASS variable in PROC SUMMARY be included in your output? You could have used CNTLOUT= option and created that data set quite easily!

You'll use this technique whenever you need to create a 'dummy' data set to force uniform output from PROC SUMMARY.

*Nancy Patton has been using SAS for about 15 years. She is currently a consultant with ASG on assignment with GE Capital in Stamford, CT. Her areas of expertise include MACRO and PROC REPORT. Most of her programming is done in an MVS/TSO batch environment.*

*Nancy has been attending SUGI since 1989, and has been active in both SUGI and NESUG (the NorthEast SAS Users Group) since 1992.*

### Yet Another More User-Friendly Text-Wrapping Algorithm

- 10 C Dorothy E. Pugh and Susan M. Lach; ClinTrials Research, Inc.; RTP, NC

In the clinical trials field which often involves reporting comment fields in the form of large text fields, it is important to have a text-wrapping algorithm which requires: 1) simple input, 2) minimal pre- and postprocessing on the part of the programmer, and 3) can handle an observation with multiple large text fields. This algorithm requires three input parameters, no pre-processing, and its output is a SAS data set containing the wrapped text and two new variables indicating 1) which lines were added to the data set as a result of the text-wrapping, and 2) which new observations were generated from the same old observation. The only postprocessing the user needs to do is to make output of each variable conditional on the value of these new variables.

*Dorothy E. Pugh is a Senior SAS Programmer/Analyst at ClinTrials Research Inc. In addition to programming, she develops detailed programming specifications based on data analysis plans and supervises their implementation with the aid of a programming checklist and QC programming tools she has developed. She co-authored the Zyban Final Study Report leading to the drug's FDA approval. She has special expertise in clinical trials, and in using the SAS Macro Language, SAS/GRAPH, and PROC REPORT.*

*Susan M. Lach is a SAS programmer at ClinTrials Research Inc. Prior to joining ClinTrials, Susan worked as a pharmacist for a retail chain and as a systems developer for SAS Institute Inc. Her areas of expertise include Base SAS, SAS/AF, SAS/FSP, Screen Control Language, PROC SQL, and PROC Report. Susan has a BS in Pharmacy from the University of North Carolina at Chapel Hill and a BS in Computer Science from North*

Carolina State University. She has been a SAS software user for nine years.

### **Applying A Robust Generalized Axis-Scaling Algorithm to the Use of SAS/GRAPH**

- 10 C Dorothy E. Pugh; ClinTrials Research, Inc.; RTP, NC

Generating high-quality plots quickly is an important task for the clinical trials programmer. Creating reasonable-looking axes for these plots presents a special challenge because of the mutually conflicting needs to: 1) make the number of tick marks moderate and consistent, 2) reduce the number of significant figures in the tick mark labels, and 3) minimize wasted space in the resulting plot. A solution is this simple axis-scaling algorithm, an enhancement to the default algorithm of SAS/GRAPH, achieves an optimal tradeoff among these criteria to produce a fairly consistent number (4 to 8) of evenly-spaced tick marks with labels that are always integers multiplied by powers of five or ten.

*Dorothy E. Pugh is a Senior SAS Programmer/Analyst at ClinTrials Research Inc. In addition to programming, she develops detailed programming specifications based on data analysis plans and supervises their implementation with the aid of a programming checklist and QC programming tools she has developed. She co-authored the Zyban Final Study Report leading to the drug's FDA approval. She has special expertise in clinical trials, and in using the SAS Macro Language, SAS/GRAPH, and PROC REPORT.*

### **What Sort of Input Should You Input to a Sort?**

- 10 C Michael A. Raithel; Raithel Consulting Services; Garrett Park, MD

Because the SAS System makes sorting so simple, some programmers sort an entire SAS data set without giving it a second thought. But, efficiency-minded programmers often pause to consider what portion of a SAS data set actually needs to be input to PROC SORT. What if only a specific subset of a SAS data set's fields are required in the final sorted data set? Is it really necessary for the entire data set to be sorted, or is there a more efficient alternative?

This paper discusses different methods of inputting a SAS data set to PROC SORT. It compares the efficiency of sorting an entire SAS data set with three methods of subsetting the data set's fields and inputting them to PROC SORT. This practical information can be used by SAS programmers to improve the efficiency of their sorts.

*Michael A. Raithel is a computer performance analyst that specializes in MVS performance, tuning, and capacity planning. He was co-chair of the NESUG '95 conference in Washington, DC, and has been a frequent invited speaker at SUGI and at regional SAS conferences. Michael is the author of "Tuning SAS Applications in the MVS Environment" published by the SAS Institute. His company is Raithel Consulting Services, a SAS Quality Partner.*

### **QUIZZER: A Fun, Fast Paced Game**

- 40 C Christopher A. Roper; Qualex Consulting Services, Inc.; Fairfax, VA

Quizzer is a fun, fast paced game in the format of the popular TV game show Jeopardy!® Written entirely using SAS/AF and Frame, this application offers the opportunity to have a little fun while demonstrating the range of capabilities in the SAS system. The questions and answers are all related to the SAS system and are geared to be challenging enough for even the most experienced SAS expert, and yet simple enough for novice SAS users to be able to participate. There are two rounds of twenty-five questions, and a final quizzer round of one question where a team can bet it all. Contestants test their knowledge of SAS in a competitive, yet friendly environment of fair play, and unwittingly may learn a little more about the SAS system in the process.

*Christopher A. Roper is a Senior Systems Consultant with Qualex Consulting Services, Inc. His areas of expertise include Base SAS, SAS/AF, SAS/FSP, Macros, Frame, and SCL, has been developing SAS applications for over ten years. Chris won Best Contributed Paper in Applications Development at last year's WUSS conference, and is an frequent presenter at SAS user groups across the United States and Europe. Chris has a BS in Business Administration with a Concentration in Economics from Christopher Newport University.*

### **Reading and Joining Key-Sequenced VSAM Data in the MVS Environment**

- 10 C Tina Tilman; Capital One; Glen Allen, VA

The sequence of data in a key-sequenced VSAM data set (KSDS) is determined by a unique value, the KEY. The primary key can be one or more fields within the file (usually the first field(s) in the file). It identifies the



record and establishes the order of the records within the file. This paper addresses reading data using SAS from a KSDS, based on the primary key, and then joining those records to other KSDS files where there are one-to-one and one-to-many matches on the key field or fields.

*Tina Tilman is currently with Capital One in Glen Allen, VA. She is an MIS Analyst working with Account Solicitations and Applications Processing and has 2 years SAS experience. She was formerly with Virginia Health Quality Center in Richmond, VA and spent 4 years as a Powerhouse Quiz report writer. Tina lives in Holly Grove, VA.*

## **The RESOLVE Function - What Is It Good For?**

10 C Ian Whitlock; Westat, Inc.; Rockville, MD

There are four DATA step functions that communicate with the macro facility.

1. CALL SYMPUT
2. SYMGET
3. CALL EXECUTE
4. RESOLVE

CALL SYMPUT and CALL EXECUTE send data step information to the macro facility. They are both very powerful tools. Numerous SUGI papers have been written on the wonders of CALL SYMPUT. The more powerful CALL EXECUTE is less well known, but again one can find SUGI papers documenting its use.

On the other hand, have you ever seen a paper on SYMGET or RESOLVE? These corresponding counterparts get information from the macro facility into the DATA step. One often sees SYMGET employed in macro code, but almost never in a place where the code would not be better written without it. Now RESOLVE is a stronger SYMGET, but I do not even remember one program that even uses RESOLVE, other than those provided by the SAS Institute for explanatory purposes.

This paper presents and solves a problem where RESOLVE is crucial to an easy solution.

*Ian Whitlock is a senior systems analyst at Westat working on survey research problems. He has been programming largely in SAS since 1981 using an interactive environment to develop programs for execution in a batch environment. He is skilled in problem solving involving SAS macro, PROC SQL, reporting procedures and the DATA step. In addition to programming, he teaches SAS courses to Westat employees. He is active on SAS-L, and has presented many different papers at national, regional, and local SAS User Group meetings.*

## Formal Online Demonstrations

Section Chair: SAS Institute Inc.

### Establishing a Repeatable Warehousing Process

50 | Tony Brown; SAS Institute

As part of its three-pronged approach to data warehousing, SAS Institute recognizes people as your company's number one corporate asset, provides technology that integrates easily and grows with your needs, and offers a tested and proven methodology to ensure success in establishing a repeatable warehousing process. All the while, you are building a new corporate asset in metadata which documents all the processes involved in deploying your warehousing strategy. This approach maximizes the effective use of existing hardware, software, data, and people resources.

*No biography available at press time.*

### Rapid Applications Development using SAS Component Object Model (SCOM) in SAS/AF Software

50 | Lisa Horwitz; SAS Institute

In this demo you will learn how to exploit the plug-and-play nature of SCOM components to develop business applications quickly with minimal coding. The new architecture allows for the development and deployment of re-useable components. You will learn how to use the new GUI interface to connect visual components with models using drag and drop. You will also see the new property sheet in action. This new Version 7 enhancement is a must if you are, or are considering becoming, a SAS/AF programmer.

*Lisa Horwitz, Regional Training Center Manager, oversees training at SAS Institute's New York, Bedminster, NJ, Philadelphia, PA, Boston, MA, and Hartford, CT offices. Lisa also teaches classes and consults in her specialty areas, which include applications development and the Macro language. She is a frequent presenter at local and regional Users Group meetings and at SUGI.*

### Using ODS with the Base Reporting Procedures in Version 7

50 | Chris Olinger; SAS Institute

All SAS procedures interact with the Output Delivery System (ODS) to give you more control over output. Some, like PROC REPORT and PROC TABULATE, have new syntax to specify this, but most rely on the features of PROC TEMPLATE. This presentation explores the ODS HTML reporting features available for SAS procedure output in general, and then highlights the extra "special effects" possible in the REPORT and TABULATE procedures.

*Chris Olinger, a veteran SAS employee, works in the Applications Division of Research and Development. He is one of the key ODS developers (he was partly responsible for the Version 6 ODS prototype) and now programs the bulk of the internal ODS infrastructure in the SAS System.*

### SAS Enterprise Miner

50 | Kristin Rahn; SAS Institute

This presentation will provide an overview of Enterprise Miner, an integrated software product that is an end-to-end business solution for data mining. A graphical user interface (GUI) provides a user-friendly process flow that empowers you to define your data mining process (sample, explore, modify, model, and assess). Enterprise Miner contains a collection of sophisticated analysis tools having a Common user-friendly interface that enables you to create and compare multiple models. Statistical and mining tools include clustering, variable selection, decision trees, linear and logistic regression, and neural networks. Data preparation tools include outlier detection, variable transformations, missing value imputation, random sampling, and the partitioning of data sets (into train, test, and validate data sets). Advanced visualization tools enable you to quickly and easily examine large amounts of data in multidimensional histograms, and to graphically compare modeling results. Enterprise Miner also allows you to manage, edit, export, and execute scoring code that is generated from a trained model. In addition, you can bring other SAS models or outside models into the Enterprise Miner environment via a modeling API. Finally, you can incorporate new or existing SAS code directly into the process flow.

*No biography available at press time.*

### **The Future Interface to the SAS System for PCs - A First Glance**

50 | Carol Rigsbee; SAS Institute

This presentation describes a new user interface to the SAS System. This interface is a state-of-the-art Microsoft Windows user interface, providing a highly integrated interface with the Windows system, other Windows applications, and the Web. It provides thin-client access to all Version 7 SAS System platforms including PC, UNIX, and mainframes and dramatically improves the SAS System's ease of use. Transparent access to data and full access to the Output Delivery System (ODS) are also provided.

*Carol Rigsbee, Institute Keynote, is a Principal Developer in the Windows User Interface Thin Client group at SAS Institute. She has been involved in the design and development of this project since its beginning. She has been at the Institute for the past twelve years, developing the SAS System for PC's since SAS Release 6.03. She has been working in the computer industry since 1980.*

### **Enterprise Reporter: Creative Reporting**

50 | Melodie Rush; SAS Institute

Titles, footnotes, report headers, page numbers, company logos, summaries, groupings, calculations, graphics, presentation-quality output as well as publishing output on the Web are just a few examples of what business users are looking for in a PC report package. The new Enterprise Reporter software provides reporting flexibility by allowing you to concentrate on designing business style reports -- without worrying about how to access your company's data. This presentation will demonstrate the many different types of reporting features found in Enterprise Reporter software.

*No biography available at press time.*

### **The Analyst Application**

50 | Maura Stokes; SAS Institute

The Analyst Application provides a point-and-click interface to the basic statistical analyses in the SAS System. This task-oriented approach is suitable for novices, experienced programmers, and statisticians alike--and a results tree makes managing the results very convenient. Ongoing interface work for the SAS System is based on the Analyst paradigm.

*Maura Stokes is Manager of the Statistical Applications R and D Department and has worked at SAS Institute for fourteen years. She is co-author of the book Categorical Data Analysis Using the SAS System. She holds a DrPH degree in Biostatistics from UNC/Chapel Hill and is now an adjunct member of the faculty.*

### **The New ADX Interface for Design and Analysis of Experimental Design Software**

50 | Maura Stokes; SAS Institute

The new ADX interface provides a point-and-click approach to the design and analysis of standard experiments -- an approach of particular benefit to quality engineers, researchers, and other non-statisticians. The interface offers a desktop for organizing designs, step-by-step guidance, interactive graphics, report generation, and HTML output. Available as an experimental product with Release 6.12 of the SAS System on UNIX and PC platforms, it will go production with Version 7.

*Maura Stokes is Manager of the Statistical Applications R and D Department and has worked at SAS Institute for fourteen years. She is co-author of the book Categorical Data Analysis Using the SAS System. She holds a DrPH degree in Biostatistics from UNC/Chapel Hill and is now an adjunct member of the faculty.*

### **Fine Tuning OLAP**

50 | Jennifer Torrisi; SAS Institute

You have used the SAS/MDDB Server and have explored the SAS System's OLAP Technology. You have taken it as far as you know how to take it. Join us for this presentation where we will show you how to take this OLAP technology to the limits and beyond. We will show you how to create more efficient multidimensional designs for delivering faster performance in OLAP reporting.

*No biography available at press time.*

**Second Generation OLAP: Beyond the Cube**

50 | Jennifer Torrisi; SAS Institute

SAS Institute has announced a new extension to its OLAP server. This extension can enhance scalability and performance in OLAP applications. With this extension, it is now possible to easily integrate RDBMS, MDDDB, and SAS data sets all into a single virtual OLAP view. With little or no change, applications can be extended to use any type of data on any machine. The extension also incorporates remote computing functionality so the application can use the power of the server, and includes richer caching and logging features. This demo will discuss the architecture for this new HOLAP environment, and will demonstrate the features and functions of the new extension.

*No biography available at press time.*

**Solving Business Problems with SAS/IntrNet Software**

50 | Barbara Walters; SAS Institute

This demonstration will focus on common business problems faced by many organizations, and show how SAS Institute's Web technology can be deployed to solve these problems and bring the power of the SAS System to desktops worldwide. See how SAS/IntrNet software can help with report distribution, application distribution and deployment of thin clients.

*Barbara Walters is project manager of the Java Web tools group in Cary. She created Java classes that provide access to SAS data as well as to compute services. She has been with SAS Institute since 1995. Prior to coming to the Institute, she developed a Web browser for OS/2 called Web Explorer.*

## Host Systems

**Section Chair:** Gregory Barnes Nelson  
ASG, Inc.  
Cary, NC

### SAS Client-Server Development: Tricks of the Trade

50 I Eric Brinsfield; Meridian Software, Inc.; Raleigh, NC

Client-server computing is not just a matter of trading data between host and client. Whether you are developing in a client-server environment or using a client-server application, the well-designed client-server system should optimize the location of processing and minimize the transfer of data. This paper offers tips to the SAS client-server developer by discussing traditional client-server techniques using SAS/CONNECT as well as clarifying the impact of thin-client Web development.

Where appropriate during this discussion, I will evaluate the pros and cons of performance strategies. Where possible during the presentation, I will demonstrate the results of interesting design choices.

*Eric Brinsfield is president of Meridian Software, Inc., as custom software development firm. He has been using SAS software since 1977 and specializes in project management, software system design, database design, and GUI design. Eric earned his BS from Duke University and his MS from North Carolina State University.*

### tAWKing About Migration: Using UNIX Utilities to Convert an MVS System

20 C Frank Dilorio; Advanced Integrated Manufacturing Solutions Corp.; Chapel Hill, NC

True, "SAS is SAS" in any system environment. Code can be designed so that it can be ported to virtually any environment with a minimum of system-dependent code. But how can existing ("legacy") systems be effectively migrated between environments? The prospect of moving large amounts of code and data that were never intended for life outside a particular system is not appealing.

This paper describes a large migration effort from an MVS system to a UNIX-based (SUN Solaris) platform. We focus on the role of operating system utilities and features such as awk, grep, and environment variables in facilitating the conversion and, in fact, producing a more reliable and robust environment on the target machine. Most importantly, virtually all of the migration effort took place outside the SAS System. The paper stresses the importance of both knowing the target operating system and having a willingness to step outside the SAS System "black box."

*Frank Dilorio is Director, SAS System Development at AIMSCo (Advanced Integrated Manufacturing Solutions Corporation), a manufacturing systems integrator. He has over 22 years' experience with Base SAS and products such as SAS/GRAPH, SAS/AF, SAS/GRAPH, SAS/QC, and SAS/FSP. He has worked in educational, financial, pharmaceutical, and manufacturing environments, focusing on program efficiency, report-writing, the macro language, and user interface design issues. Much of the knowledge gained from these varied work environments has been committed to paper – he has written many papers presented at local, regional, and international SAS user groups. Frank is also the author of two popular SAS programming texts, "SAS Applications Programming: A Gentle Introduction" and (co-authored with Kenneth Hardy) "Quick Start to Data Analysis with SAS." A third book, "The Elements of SAS Programming Style," is being developed.*

*Frank is active in the SouthEast SAS Users Group (SESUG). He was conference co-chair in 1994 and 1996, and is currently serving as President of the group.*

### Application Development for the New Host on the Block: Java Virtual Machine

50 I Brad Klenz; SAS Institute

SAS Institute is quickly moving forward on tools for SAS application development in the Java environment. What are these tools? How are they used? This paper will discuss the use of Jconnect and SAS JDBC classes within the 'Jazz/IDE' development tool now available from SAS Institute. The paper will also discuss the advantages and limitations of using a Java front end to SAS applications.

*Brad Klenz specializes in SAS application design and development. He has been doing consulting work for the past 6 years. Previous to that, Brad was an employee at SAS Institute in the Technical Support Division where he provided primary support for SAS/ACCESS to DB2 and SAS/Share. Brad's expertise is with application user interfaces including SAS/AF Frame, OOP, interfacing the SAS System with host platforms such as Windows NT*

and UNIX, and Web interfaces using SAS/IntrNet. The industry areas Brad has worked in include SPC analysis interfaces for manufacturing and clinical data management for pharmaceuticals. Brad has been a full time SAS user for the past 10 years.

### **A Methodology for Linking Heterogeneous Databases for Clinical Research**

- 20 C Sharon Kromhout-Schiro; North Carolina Trauma Registry, University of North Carolina at Chapel Hill; Chapel Hill, NC

Health care information is crucial to making decisions that will help to contain the costs of health care, and for improving the outcomes of medical care. The electronic medical record often is fragmented over multiple physical sites, and includes databases of differing structures. Access to the medical information requires the linking of these multiple databases. Due to the heterogeneity of the databases, the linking of the databases necessitates the translation of the data and data structures so that the data in the composite database have the same meaning.

This paper describes the principles behind the linking of multiple databases through the development of a platform of common data definitions. This platform of common data definitions is henceforth called the Foundation Library. The use of the Foundation Library reduces the effort required to develop code for the translation of data, as only one translation program needs to be developed for each database: the translation to the Foundation Library. This paper describes the Foundation Library concept and its use in a clinical research project.

*No biography available at press time.*

### **Power Techniques for Processing Large Tape Data Sets Using the SAS System in the MVS Environment**

- 50 I Michael Raithel; Raithel Consulting Services; Garrett Park, MD

Tape is one of the oldest and most dependable mediums for storing data sets in the MVS environment. SAS data libraries, OS data sets, and database backup files are a few of the many types of data sets commonly stored on tape. Because tape is a relatively inexpensive media, it is particularly well suited for storing large data sets. But, the subsequent processing of large data sets stored on tape can be costly in terms of computer resources and elapsed time.

If you work in an organization that runs MVS, it is very likely that you will have to process large tape data sets sooner or later. Perhaps you already do.

This paper focuses on strategies for optimizing your processing of large tape data sets using the SAS System. It provides techniques that you can use to reduce computer overhead and elapsed time. Optimum methods for processing large SAS data libraries as well as OS data sets are covered in this paper.

*Michael A. Raithel is a computer performance analyst that specializes in MVS performance, tuning, and capacity planning. He was co-chair of the NESUG '95 conference in Washington, DC, and has been a frequent invited speaker at SUGI and NESUG conferences. Michael is the author of "Tuning SAS Applications in the MVS Environment" published by the SAS Institute.*

### **Using 64-bit SAS to Your Advantage - SAS Configuration Guidelines on Digital UNIX**

- 20 C Carl Ralston; Digital Equipment Corp.; Cary, NC

This presentation will describe setup, installation, configuration, and tuning guidelines of SAS software on Digital UNIX. The SAS System on Digital UNIX is a 64-bit application. The SAS System will take advantage of the HUGE address space for things like data caches, in-memory sorts, code, I/O buffers, MDDB's and generated Alpha code. Configuration of the I/O subsystem, RAID tradeoffs, UNIX attributes and parameters, and various SAS options will be discussed. Comparison of SAS 6.12 and 7.0 will be done.

*Carl Ralston has over 25 years experience in Software Engineering, has developed 10 software products on four different operating systems, and was formerly an Adjunct Faculty member of Software Engineering and Management, consulting at companies like GE, Kodak, Corning Glass, and SUNY. He is a technical evangelist for 64-bits, kernel threads, file systems, and Windows NT Affinity. Carl is Digital's Senior Software Systems Consultant onsite at SAS Institute's Customer Technology Center in Cary, NC. He has a Ph.D. in research in Physics.*

## Getting the Most from Your SAS Environment on OpenVMS Alpha

20 C Carl Ralston; Digital Equipment Corp.; Cary, NC

This presentation will describe setup, installation, configuration, and tuning guidelines of SAS software on OpenVMS Alpha. Configuration of the I/O subsystem, RAID tradeoffs, OpenVMS process quotas and limits, OpenVMS sysgen parameters, and various SAS options will be discussed that effect performance and throughput. Comparison of SAS 6.12 and 7.0 will be done.

*Carl Ralston has over 25 years experience in Software Engineering, has developed 10 software products on four different operating systems, and was formerly an Adjunct Faculty member of Software Engineering and Management, consulting at companies like GE, Kodak, Corning Glass, and SUNY. He is a technical evangelist for 64-bits, kernel threads, file systems, and Windows NT Affinity. Carl is Digital's Senior Software Systems Consultant onsite at SAS Institute's Customer Technology Center in Cary, NC. He has a Ph.D. in research in Physics.*

## Thin Clients for the Windows - "Jazz Front" and "Jazz Reporter"

50 I Carol Rigsbee; SAS Institute; Cary, NC

"Jazz Front" and "Jazz Reporter" are the code names for two new Windows Thin Clients that are available with the Nashville release. "Jazz Front" provides a point and click, code based user interface to all the Version 7 SAS System servers. "Jazz Front" provides transparent data access to both SAS and non-SAS data, a customizable User Interface, the ability to export results to other Windows applications and the ability to schedule your project to run at a later time. "Jazz Reporter" provides a report based user interface to your SAS and non-SAS data.

*Carol Rigsbee, Institute Keynote, is a Principal Developer in the Windows User Interface Thin Client group at SAS Institute. She has been involved in the design and development of this project since its beginning. She has been at the Institute for the past twelve years, developing the SAS System for PC's since SAS Release 6.03. She has been working in the computer industry since 1980.*

## Forms and More: Getting What You Want from Your Printer

50 C Frank Roediger; Meridian Software, Inc.; Raleigh, NC

An annoying holdup to producing a final report is sometimes the printer itself: all your code works fine but you can't get the printer to produce a hardcopy that matches your finicky user's detailed report specs for margins, font, and pitch. When this happens, Release 6.12 for PC platforms like Windows/NT gives you a great deal of control in customizing how a document gets printed. However, if you're working on a UNIX system, many of the PC-based printer control features aren't available to you. There, the FORMS subsystem allows you to store customized settings and use them to control printed output repeatedly. Regardless of which platform you use, there are also situations such as when the printer jams in the middle of a long report and you want to print out only the part that it "ate", or when you need to use special characters (like "plus-over-minus"). This paper will walk you through these and other printing challenges and present solutions that can work for both UNIX and Windows/NT platforms.

*Frank Roediger is a Senior Programmer Analyst with Meridian Software, Inc. He has over 18 years experience using SAS in the fields of academic research, finance, health care, and pharmaceutical clinical trials.*

## I-Net Solutions

**Section Chairs:** **Caroline Bahler**  
**ASG, Inc.**  
**Cary, NC**

**Carl Haske**  
**STATPROBE, Inc.**  
**Ann Arbor, MI**

### **SAS/IntrNet and SESUG Registration: The Application Dispatcher Adds a New Dimension**

50 I Greg Ashley; University of Georgia; Athens, GA

At SESUG '97 the author, who was also the Conference Registrar, presented an application he had developed to handle SESUG Conference registration using the Web and SAS as his prime tools. They were not his only tools, however; several Perl scripts were used to connect various parts of the overall application together. This year, as Onsite Conference Registrar, the author has pursued this project and, with the SAS Application Dispatcher, has replaced the Perl scripts with a total SAS solution. This paper will review the previous registration and the scripts it employed and then move into the new opportunities afforded by the Applications Dispatcher.

*Greg Ashley is the Manager of Host Systems & Statistical Software Support, University Computing, at the University of Georgia.*

### **Dynamic Web Pages - Integrating JavaScript into a SAS Web Application**

50 I Caroline Bahler; ASG, Inc.; Cary, NC

The use of dynamic Web pages in either Internet or Intranet applications is rapidly becoming the hottest SAS application development topic. One component of a dynamic Web page is the use of the JavaScript language. JavaScript is a language that has tremendous potential for enhancing Web applications, especially client-side data validation. The objective of this paper is to introduce the JavaScript language, illustrate how Web page developers are using it, and discuss how the JavaScript language could be incorporated into a Web application powered by SAS.

*Caroline Bahler is currently a senior technical consultant in the Advanced Solutions Group at ASG, Inc., a SAS Institute Business Partner. Her SAS background stretches back over 18 years and many versions of SAS, including using SAS over a wide variety of platforms.*

### **Mass Producing Web Pages with SAS**

50 I Keith Brown; UNC; Chapel Hill, NC

With SAS' Web publishing macros, turning SAS output into a Web page is relatively simple. Problems arise, however, when instead of one Web page, you need to produce multiple pages, and be able to link them back to an index page. This presentation will examine the code needed to build an index page, or multiple index pages, with links pointing to the proper data pages; to output the data pages, either locally or on a remote server; and optionally, to produce hardcopy output rather than Web pages.

*Keith Brown began using SAS as a graduate student at UNC - Chapel Hill in 1982, and progressed to teaching it as an instructor and user service consultant. In 1994, he moved "down the hill" to UNC General Administration, which oversees all sixteen campuses of the UNC system. Currently, Keith is a programmer and data analyst in the Division of Program Assessment and Public Service, where he primarily uses Base SAS, SAS/GRAPH, and SAS/STAT on several systems, including UNIX and Macintosh.*

### **Casting PERL Before (and After) SAS -- Not Just a Bad Allusion**

20 C Kenneth Hardy; UNC; Chapel Hill, NC

One way to create dynamic Web pages that use SAS to produce reports or analyses on demand is to write the necessary CGI (Common Gateway Interface) programs that call SAS and communicates with the Web client in PERL. This paper will review the basics of Web client-server dialogues, provide a quick overview of Perl and explain why it's so popular for writing CGI programs. It will also give some pointers for using Perl to write CGI programs that call SAS to produce custom reports or analyses and display their output as Web pages.

*Kenneth Hardy is Associate Director for Information Systems at the Institute for Research in Social Science of*



the University of North Carolina at Chapel Hill. He has been a SAS user and consultant for over twenty-five years. In addition to academic research publications, he has presented many papers at SUGI and SESUG meetings. He has also co-authored books on topics ranging from the inequity of the death penalty to quantitative research methods for historians. His most recent book, written with Frank C. Dilorio, is "Quick Start to Data Analysis with SAS". For the past three years, he has been writing Web-based applications using CGI scripts that use SAS and text searching software.

### Using SAS and the Internet for Exploring Clinical Data

50 | Carl R. Haske, Ph.D.; STATPROBE, Inc.; Ann Arbor, MI

In the pharmaceutical setting, SAS is the primary tool for analyzing data. Traditionally, reports and analyses are delivered to the user in static paper format. With the advent of the Internet, the possibilities for information delivery and online analysis of data are boundless. Clinical information delivered dynamically to a browser running on the client machine provides the information consumer with real-time data access: data can be inspected, probed, and assimilated with an immediacy not conceivable for conventional methods. The result is faster product to market in a highly competitive industry. However, delivering a robust and usable browser interface that allows the user to interact intuitively with data is an exceptional challenge. This paper describes techniques and applications for exploring and analyzing clinical data stored in SAS data sets on an application server with distribution to thin clients via an Internet browser.

*Carl Haske received his Ph.D. in Mathematics from Rice University and serves as Director of the Research Information Systems Department of STATPROBE, Inc., a contract research organization in Ann Arbor, Michigan. Carl is involved in the process classification of clinical data management and report generation in order to standardize and integrate systems that condense the report development process. He has been a SAS applications developer for ten years and has given presentations at several SUGI conferences and regional SAS user group conferences.*

### Tales from the Front: Panel Discussion

50 | Moderator: Carl Haske, Ph.D.; STATPROBE, Inc.; Ann Arbor, MI

Panelists: not available at press time

No abstract available at press time.

*Carl Haske received his Ph.D. in Mathematics from Rice University and serves as Director of the Research Information Systems Department of STATPROBE, Inc., a contract research organization in Ann Arbor, Michigan. Carl is involved in the process classification of clinical data management and report generation in order to standardize and integrate systems that condense the report development process. He has been a SAS applications developer for ten years and has given presentations at several SUGI conferences and regional SAS user group conferences.*

*No other biographies available at press time.*

### How to Web Enable SAS Applications: An Online Demonstration of SAS/IntrNet Applications

50 | Brad Klenz; SAS Institute

SAS Institute now offers tools for Web enablement of SAS software applications. This paper guides you in selecting the correct SAS/IntrNet tool for the task you want to achieve by comparing the capabilities of the Application Dispatcher, HTML Formatting tools, Jazz/IDE Java development tool, and Dynamic HTML. Demonstration applications are presented to show the different tools in action.

There are multiple ways to 'Web enable' an application. The examples presented in this paper include: an application that generates, and regularly refreshes, a set of HTML pages to provide an alternative to standard report distribution; a remote data entry interface to a SAS database; and a GUI that provides the flexibility of Java, but also enables access to SAS data and runs SAS procedures for analysis.

*Brad Klenz specializes in SAS application design and development. He has been doing consulting work for the past 6 years. Previous to that, Brad was an employee at SAS Institute in the Technical Support Division where he provided primary support for SAS/ACCESS to DB2 and SAS/Share. Brad's expertise is with application user interfaces including SAS/AF Frame, OOP, interfacing the SAS System with host platforms such as Windows NT and UNIX, and Web interfaces using SAS/IntrNet. The industry areas Brad has worked in include SPC analysis interfaces for manufacturing and clinical data management for pharmaceuticals. Brad has been a full time SAS user for the past 10 years.*

## Real World Utilization of SAS/IntrNet Application Dispatcher

50 | Ruth L. Marinshaw, Sally S. Muller, and Joyce W. Tabor; UNC; Chapel Hill, NC

The University of North Carolina at Chapel Hill's Carolina Population Center (CPC) is one of the most active research centers at UNC-CH. With over 40 projects and 48 faculty fellows, the Center has many responsibilities including analysis of large population databases and producing and distributing large volumes of reports worldwide. One of the goals of the CPC's programming staff is to improve on the delivery, dissemination, and analysis of population data collected by the Center. CPC has found that the SAS System provides optimal tools for accomplishing this goal, and in 1998 they began providing access to their large population databases using SAS via the Web. This paper highlights their transition from using the static SAS HTML Web publishing macros to using a combination of these tools and the SAS/IntrNet dynamic tools as their current information delivery paradigm.

*Ruth Marinshaw is a Systems Programmer/Administrator at the Carolina Population Center, where she uses and supports SAS on several platforms. She has been a SAS user for about eleven years and learned much of what she knows about SAS from co-author Joyce Tabor.*

*Sally Muller is the Manager of the Statistical Support group, a division of Academic Technology and Networks (ATN), at the University of North Carolina. Sally began using SAS software in 1978 and in 1987 became a site representative. Since then she has answered over 20 million SAS user questions and taught several thousand SAS/ASSIST classes. Sally finds that SAS novices and even people with limited computing knowledge of any kind can learn to use (and love) SAS/ASSIST. A desire to show the advantages of ASSIST over other SAS interfaces and conventional methods of learning to use the SAS System is the motivation of this paper.*

*Joyce Tabor works for the Carolina Population Center at UNC-Chapel Hill. No other information available at press time.*

## Extending the Life of Your AF Application: Exploiting the Model-Viewer Paradigm

50 | Gregory S. Barnes Nelson; ASG, Inc.; Cary, NC

SAS/AF FRAME technology has long been the mainstay of our visual entrée into traditional SAS applications. The World Wide Web has taken a front-seat to most application development efforts in an attempt to surface more and more information to entire enterprises. This interest, in part, has forced developers to look more critically at not only what technology we use to develop, but also how we can capitalize on our recent investments in applications development.

This paper attempts to dispel the notions that SAS/AF FRAME may be an outmoded technology. Rather, here we show how we can exploit the lessons learned from these applications by surfacing the interface on the Web, while retaining the key business logic in SAS/AF. We will discuss the role that SAS/AF can still play in this new thin-centric world and how to surface this information across the enterprise.

*Greg Nelson is currently the Director of Technology Solutions at ASG, Inc., a SAS Institute Business Partner. There, his primary role is to partner with clients in developing systems and to bring technology to task. Prior to joining ASG, Greg was the Director of SAS Education and Development at The Gallup Organization as well as Manager of Client Support at the University of Georgia's computer center. He has over 13 years of experience using the SAS System in a wide variety of applications and platforms.*

## Overview of Java Components and Applets in SAS/IntrNet Software

50 | Barbara Walters; SAS Institute

This paper describes the Java components and the sample applets that are part of SAS/IntrNet software. This paper describes how to use the SAS/SHARE\*NET driver for JDBC, JConnect, and JTunnel to access information and services available from SAS servers, and also provides code examples to demonstrate these capabilities. Note that the code examples referenced in the text are presented in a separate section at the end of the paper.

*Barbara Walters is project manager of the Java Web tools group in Cary. She created Java classes that provide access to SAS data as well as to compute services. She has been with SAS Institute since 1995. Prior to coming to the Institute, she developed a Web browser for OS/2 called Web Explorer.*

## Information Visualization

**Section Chairs:** Eric Brinsfield  
Meridian Software, Inc.  
Raleigh, NC

**Matt Becker**  
STATPROBE, Inc.  
Ann Arbor, MI

### Producing Useful Survey Analysis Graphics with Efficient SAS Code

50 C Dr. Donald T. Gantz and Yan Yaun; George Mason University; Fairfax, VA

Analyzing and reporting survey data typically requires the generation of many graphical presentations where each graphic reveals relationships between several variables. Frequently, an analyst associates a good graphic vehicle with sets of variables and then settles down to grunting out many individual graphs. By cleverly designing the production process with flexible coding and use of the SAS Macro language, the SAS programmer can create an efficient path from raw data to analysis and presentation graphics. Writing reusable modules of code and utilizing the SAS Macro language are means to that end. This paper illustrates a particular application the authors have designed and implemented in their work supporting research on the database from a National Survey of Registered Nurses. The application is rooted in a very versatile core of graphics code that is easily modified to produce a varied menu of graphic structures via a front end program feeding it values for Macro variables. In addition to demonstrating the utility of SAS Macro Language and SAS/GRAPH, this paper makes available to readers a graphic form that the authors have found quite useful.

*Dr. Donald Gantz is a professor in the Department of Applied and Engineering Statistics, George Mason University, Fairfax, Virginia. He specializes in the use of visualization in data modeling and analysis. He teaches a SAS based graduate case studies course in data analysis; his presentations involve his solutions to real-world quantitative problems and the SAS applications he has developed to implement the solutions. He is an expert in SAS which has been his primary toolbox as a consultant in applied statistics for twenty years. He has presented invited papers concerning his SAS applications at SUGI 15 and NESUG '92.*

*Yan Yaun works in the Applied & Engineering Statistics Dept. at George Mason University in Fairfax, VA. No other information available at press time.*

### Using JMP for Design of Experiments and Variability Analysis for Semiconductors

50 I Bill Gjertsen; SAS Institute

Semiconductor devices are absolutely essential components of all electronic products. Without semiconductors and integrated circuit chips, electronic products and systems cannot be made or operated. This is a data rich industry with science and skill pressed to the limit to achieve quality. Excellent design and manufacturing are essential to meet tight specifications. With this in mind we show with examples such as a multiple response design of experiments and Gage R&R how JMP can be used to address some of these quality issues.

*Bill Gjertsen is a Senior Marketing Analyst for the JMP product. He has been involved with sales and marketing at SAS Institute for 21 years.*

### Achieving Graphical Excellence With SAS/GRAPH

50 I Dr. Archer Gravely; UNC Asheville; Asheville, NC

This paper will integrate the principles of graphical excellence (Tufte, 1983; and others) with the use of SAS/GRAPH to produce plots and bar charts. The use of these principles will enable users to create presentations that communicate complex ideas with clarity, precision, and efficiency while avoiding the pitfalls of "chartjunk", graphical decoration, unintentional "optical art", and other forms of bad graphical design. Guidelines for choosing among tables, graphs, and text as presentation devices are also discussed. Graphical excellence with SAS/GRAPH requires the use of customization features such as NOTE and AXIS statements. Examples of customized plots and bar charts that illustrate the principles of graphical excellence are provided. This paper is based on the book "Your Guide to Survey Research Using the SAS System" published by SAS Institute BBU in 1998.

*Dr. Archer Gravely is Director of Institutional Research and University Planning Officer at UNC Asheville. He has used SAS for over 17 years and has conducted approximately 100 survey research projects. For the last ten years, he has taught workshops on SAS and survey research at state, regional, and national institutional research conferences. His book, "Your Guide to Survey Research Using the SAS System" was published by the*

*SAS Institute Books by Users program in 1998.*

## **An Internet-based Visual Retrieval Model for Biological Sequence Information Databases**

50 I Simon Meng Lin, M.D.; University of North Carolina; Chapel Hill, NC

As the Human Genome Project (HGP) advances, sequence similarity searches are becoming routine work in biomedical research. There are two major difficulties that are hindering this process:

1. Valuable biological sequence information is spread over the Internet in a heterogeneous and distributed computing environment.
2. The result of the query is a list that may contain hundreds of statistically ranked, potentially homologous sequences; viewing this result in a text-editor is exceedingly time consuming and tedious.

An Internet-based intuitive Visual Sequence Retrieval Interface (VSRI) is planned to tackle these problems. Each resultant query sequence is treated as an object, and is visualized into a 3-D space; the end-user will be able to click on the objects in the 3-D visual space to access the gene query details directly.

Java is used as the programming language to provide an easy graphical interface and a strong cross-platform ability, while CORBA is used to integrate the critical steps:

1. Query the FASTA server or other retrieval system to get the similar objects and the relationship matrix describing the inter-object distances.
2. Projecting the objects into a 3-D visual space via SAS MDS procedure.
3. Visualizing the objects in the 3-D space and providing hyperlinks to the sequence databases by a Java viewer.

The model described here is object-oriented and awaiting more CORBA-compliant objects.

*Simon Meng Lin received the M.D. degree from Beijing Medical University in 1996 and completed the clinical internship in Beijing Hospital, specialized in medical informatics. He is currently working towards the double major M.Sc. degree (Biophysics and Pharmacology) at the University of North Carolina, Chapel Hill, and will graduate in 1998. He has a broad knowledge base and background in health science and computer programming. His primary career interest is the utilization of information technology and biostatistics in pharmaceutical and clinical research. Dr. Lin is a member of Sun JAVA Developer Connection.*

## **See Sally Work: Techniques for Designing and Evaluating User Interfaces**

50 I Judy Loren; UNUM Life Insurance Company of America

Systems are only as good as their user interfaces. Input screen design can affect accuracy and speed of data entry. Navigation flows can be aids to efficiency, or they can get in the way of doing real work. Users will find ways to work around systems that don't serve their needs. But how can you know in advance the best way to make your system serve its users? This paper describes two techniques used at UNUM to design and evaluate the interaction component of new or existing systems. Paper prototyping and usability methodologies have been around for a while, but UNUM is applying them in new ways to create better, more effective systems. As Kevin Frye, the pioneer of this approach at UNUM, says, "You pay for usability either way: by investing in prevention of defects, or by supporting defects during the life of the system."

*No biography available at press time.*

## **SAS/GRAPH - Dressing Up an Old Workhorse**

20 C Rob W. Phelps; Wake Forest University, Baptist Medical Center; Winston-Salem, NC

SAS/GRAPH has a long history of being able to generate a large quantity of output by using automated techniques like by-group processing and programmatic annotation. Although data could be clearly presented using GCHART, GPLOT, GMAP, etc., the resulting output has long been criticized as being unimpressive by desktop publishing standards.

The advent of HTML and Web technology has helped to change the way people relate to information. Web publishing and the need to generate graphs for data warehouse applications has given new life to an old reliable workhorse.

This paper will demonstrate some of the design principles and techniques that help to make Web-enabled

SAS/GRAPH not only a workhorse but also a contender in the race for better visualization of qualitative information. Work from the development of a browser based Intranet data warehouse application (DSSI - Decision Support System Intranet) will be used as examples. Emphasis will be given to the design principles used to display information and the techniques using a mixture of Web technologies and SAS/GRAPH that produce the results.

*Robert Phelps is a manager of systems development at Wake Forest University Baptist Medical Center. He has been a SAS programmer for over 15 years. Rob's major area of interest is in data warehouse applications and in using a variety of technologies to produce integrated systems. His major work includes a Decision Support System and an EIS system that he helped deploy at the Medical Center. Rob has presented for several IDS Conference Application Showcase at SAS Institute and has served on advisory teams for SAS as part of the Application Development Council and as part of the SAS/GRAPH software forum.*

## **Combating Chart Overload with Group Control Charts**

20 C Darren Stewart and Eric Brinsfield; Meridian Software, Inc.; Raleigh, NC

Traditional control charting techniques, such as Shewhart charts, are used to track changes in one variable over time. Often, when monitoring a manufacturing process, more than one variable is needed to represent the state of a process at any given point in time. For example, to monitor uniformity of thickness, you must take separate measurements at various locations across a manufactured unit. Traditional charting methods call for a separate chart for each location.

"Group charts", however, are used for plotting multiple characteristics on the same chart. Group charts make comparisons among the multiple characteristics much easier, while reducing to one the number of charts needed to monitor a particular process. Group charts can be used as exploratory tools or as formal control charts with statistical control limits. We will demonstrate how SAS/QC and SAS/GRAPH can be used to create these informative charts.

*Darren Stewart is a statistical programmer with Meridian Software, Inc. in Raleigh, NC. He has a Master's degree in Statistics from North Carolina State University in Raleigh and a Bachelor's degree in Mathematical Sciences from the University of Delaware in Newark, DE.*

*Eric Brinsfield is President of Meridian Software, Inc., a custom software development firm. He has been using SAS software since 1977 and specializes in project management, software system design, database design, and GUI design. Eric earned his BS from Duke University and his MS from North Carolina State University.*

## PC Hands-On Workshops

**Section Chairs:** Dana Rafiee  
Destiny Corp.  
Wethersfield, CT

All PC Hands-On Workshops will be presented by Dana Rafiee; Destiny Corp.; Wethersfield, CT. Admittance will be by ticket. The tickets will be distributed at the registration booth on a first come, first served basis. All workshops are 80 minutes long.

*Dana Rafiee is a recognized authority on the Mainframe and Micro SAS Software and IBM environments with many years of experience in the areas of applications development and design in 4th Generation Languages, Operating Systems, Communications, Consulting, and Training. His specific areas of expertise include SAS, MVS, JCL, IBM Utilities, CMS, TSO, ISPF, UNIX, VMS and Novell. He has worked accessing data with SAS Software from relational databases such as DB2, Datacom, Oracle, and Sybase.*

*Mr. Rafiee has been a consultant and trainer on many applications development projects and implementations for several concerns including Aetna, Inc., State of Connecticut, Hartford Steam Boiler Inspection and Insurance, U.S. Government, American Express, Bank of New England, U.S. Department of Transportation, NASA, Bradlees, Prudential, U.S. Army, USAirWays, Ocean Spray, Boston Gas, EUA Service Corp., AMA, GTE Shareholder Services, Ronson Management Corporation, Unisys Inc., Bank of Boston, First National Bank of Maryland, McClellan Air Force Base, Bristol-Meyers Squibb, NECA, DEC, and many others. He is also an active member of the NorthEast SAS Users Group and is an invited speaker at all regional conferences and SUGI.*

### Merge Processing in SAS Software

This workshop is designed to demonstrate simple to advanced match merge processing. The use of contribution variables (IN=), selection of data and manipulation in the program data vector will be discussed.

### PROC Tabulate Basics

Attendees will gain experience with the Tabulate procedure by building it from scratch. Class, Var, and Table statements, along with operators will be demonstrated in detail.

### Interactive PROC Report

This session will teach attendees how to develop reports in an interactive environment without writing code. The report can be viewed as it is developed and saved for future use.

### Moving SAS Information to Word/Excel using DDE

This workshop will demonstrate how to take data out of SAS to external applications such as Word or Excel. Hands on DDE applications will be built.

### Beginning Macros

This workshop will introduce macro variables, call symput, and symget, along with %macro, %mend bundles of code. Attendees will understand how to macro-ize programs for simpler, more efficient processing.

### SQL Basics

Attendees will get hands on experience writing Proc SQL code, typically used to simplify extraction and summarization of data. SQL code will be built from simple selects to complex joins.

## Posters

**Section Chairs:** **Eric Brinsfield**  
**Meridian Software, Inc.**  
**Raleigh, NC**

**Matt Becker**  
**STATPROBE, Inc.**  
**Ann Arbor, MI**

### Designing Accessible Help Systems

- C Cathy Brinsfield; Meridian Software, Inc.; Raleigh, NC

SAS GUI applications can benefit greatly from well-designed, integrated help systems. This poster uses WinHelp to show you how to design your help system using granular information and progressive disclosure. How many times have you opened the help for an application only to be overwhelmed by the amount of information you must sift through to get to the piece you need? Or you have spent so much time clicking on links that you are off somewhere in cyberspace?

This approach separates task information for a window from the overview information a user may need to understand the tasks. The help for each window presents the user with a selectable list of tasks and assistance with any navigational tools. The user can link to help for the task, or access overview information that provides a broader perspective on how the task in the window fits into the overall purpose of the application.

*Cathy Brinsfield is the Information Developer for Meridian Software, Inc., where she is responsible for designing, developing, and standardizing documents for client projects in both hard copy and online formats. She also develops and maintains marketing and internal documents for Meridian Software, including the Web site, information packets, and the company Intranet. Prior to joining Meridian Software, Cathy was at SAS Institute for 10 years. She was the Course Development Support manager in the Professional Services division, developing course materials for the Institute's training courses. Cathy has a BA from UCLA in Political Science.*

### Selectively Downloading Files from Remote Platforms

- C John Charles Gober; Commerce Dept. / Bureau of the Census; Alexandria, VA  
 Lawrence Altmayer; U.S. Bureau of the Census; Washington, DC

The Bureau of the Census is the preeminent collector and provider of timely, relevant, and quality data about the people and economy of the United States. This data can be stored in a variety of formats and across multiple platforms. From time to time simple applications need to be developed to aid internal staff members in the retrieval and presentation of this data. The application described here, even though simple, uses many SAS techniques which could be used either separately or together and applied across many areas of study.

*John Gober is employed by the Bureau of the Census, Demographic Surveys Division where he is in part responsible for the Current Population Survey. He has almost two decades of SAS experience on Mainframe, PC, and workstation environments and specializes in data cleaning, extraction, manipulation, and transfer. John is proficient in the macro language, application development, and has presented papers and posters at SUGI, NESUG, and SESUG.*

*Lawrence Altmayer has been with the U.S. Census Bureau for nineteen years and is a computer specialist. He has more than eight years SAS programming experience, most recently with macros. He is currently using SAS to process National Crime Victimization Survey data. His programming experience has been mainly in the VMS, and more recently UNIX, operating systems. He has a BA in Statistics from the Univ. of Buffalo, and Master of Applied Statistics from Ohio State University.*

### An Analysis of SAS Coding Techniques

- C Carl R. Haske, Ph.D.; STATPROBE, Inc.; Ann Arbor, MI

All SAS programmers develop a personal bag of tricks for solving complex programming problems. A good set of reusable programming tools will include useful utilities that can be applied repeatedly in virtually any application. In the SAS language, as in any other language or development platform, there is usually more than one way to code a solution to a particular problem - for example, there are several approaches to determining the existence of a data file, such as use of PROC CONTENTS, PROC SQL with the DICTIONARY tables, or SCL functions - and each method will have its own advantages in readability, maintainability, conciseness, and performance. This paper examines a number of different methods, which use an assortment of techniques, for coding a set of SAS utilities. Important attributes of the methods are measured: performance, by benchmark test results; conciseness and maintainability, by contrast of the methods with each other; and readability and

appeal, by results of a poll of SAS programmers.

*Carl Haske received his Ph.D. in Mathematics from Rice University and serves as Director of the Research Information Systems Department of STATPROBE, Inc., a contract research organization in Ann Arbor, Michigan. Carl is involved in the process classification of clinical data management and report generation in order to standardize and integrate systems that condense the report development process. He has been a SAS applications developer for ten years and has given presentations at several SUGI conferences and regional SAS user group conferences.*

### Using SAS to Calculate Tests of Cliff's Delta

C Kristine Y. Hogarty, Jeffrey D. Kromrey; University of South Florida; Tampa, FL

This presentation will demonstrate code written in SAS/IML that calculates three estimates for making statistical inferences regarding the Delta statistic. The Delta statistic (Cliff, 1993) may be used when testing null hypotheses about group differences on ordinal level measurements. This statistic and the inferential methods associated with it are addressed by considering data arranged in a dominance matrix. The program calculates the marginal values of the dominance matrix that are used in the inferential statistics associated with  $d$  (sample estimate of the population parameter). The three methods of inference for  $d$  include two estimates of the variance of  $d$ , and the confidence band around the sample value of  $d$ .

The delta statistic has been recommended for the analysis of ordinal level data because of increased power (relative to the chi-square test) or increased robustness (relative to tests of mean differences).

The presentation will provide a demonstration of the SAS/IML code and examples of application of the code to simulation studies in statistics.

*Kristine Y. Hogarty is a doctoral student in the Department of Education Measurement and Research.*

*Jeffrey D. Kromrey is an Associate Professor in the Department of Educational Measurement and Research.*

### X-12-Graph: Visual Diagnostics for Time Series Modeling and Seasonal Adjustment

C Catherine C. Hood; Bureau of the Census; Washington, DC

X-12-Graph is a SAS program developed at the Census Bureau to provide graphical diagnostics for the Bureau's X-12-ARIMA program, a publicly-available program used worldwide for time series modeling and seasonal adjustment. X-12-Graph comes in two versions, interactive and batch. Both versions are easy to use and require no previous SAS experience from our users. The interactive program uses SAS/AF and Screen Control Language, with SAS/GRAPH's GPLOT and GREPLAY procedures, templates, and annotate data sets. We have versions for both PC and UNIX. X-12-Graph allows the user to:

1. select from more than 12 types of graphs
2. compare different X-12 ARIMA adjustments
3. choose options for the graphs, such as starting and ending dates, scale, and colors
4. assemble a combination graph from previously produced graphs

The batch program uses SAS Macros and sends selected graphs for any number of series directly to a printer. It runs on any platform, including platforms without a Graphical User Interface.

*Catherine Hood currently works on the Time Series Staff in the Statistical Research Division of the Census Bureau. She has been programming in SAS for over 10 years.*

### Generating Item Responses Based on Multidimensional Item Response Theory

C Jeffrey D. Kromrey, Cynthia G. Parshall, Walter M. Chason, Qing Yi; University of South Florida; Tampa, FL

The purpose of this presentation is to demonstrate code written in SAS/IML that generates examinees' item responses (0/1s) based on multidimensional item response theory (MIRT) model. This program reads in a file of calibrated item parameters from the NOHARM computer program. NOHARM calibrates items parameters on multidimensional ability spaces.

The SAS/IML program calculates the probability of an examinee obtain a correct response based on the MIRT model, then compares this probability with a uniform random number to decide this examinee's item response. If the probability is larger than or equal to the random number, this examinee is credited a correct response (i.e.,



1) otherwise, a zero. This program allows user to specify the number of examinees and the number of items to which item responses generated. The SAS/IML code will be presented in the presentation.

*Jeffrey D. Kromrey is an Associate Professor in the Department of Educational Measurement and Research.*

*Cynthia G. Parshall is the Senior Psychometrician at the Institute for Instructional Research and Practice.*

*Walter M. Chason is a doctoral candidate in the Department of Educational Measurement and Research.*

*Qing Yi is a doctoral candidate in the Department of Education Measurement and Research.*

### **Modern Psychometric Theory: Using SAS to Calculate IRT Ability Estimates**

- C Jeffrey D. Kromrey, Cynthia G. Parshall, Walter M. Chason, Qing Yi; University of South Florida; Tampa, FL

This presentation will demonstrate code written in SAS/IML that provides maximum likelihood estimates of examinee ability under the 1, 2, or 3 parameter logistic models used in modern psychometric theory. The program reads a file of examinee scored responses (1/0) to a set of test items and estimates of parameters for the items that are obtained using the BILOG program. The program implements the Newton-Raphson algorithm to obtain maximum likelihood estimates of examinee ability, then outputs a file of ability estimates and warning flags for examinees with response patterns that did not provide convergence of the algorithm. The program is written so that the user may specify the convergence criterion or maximum number of iterations for the estimation.

Modern psychometric theory evaluates examinee responses to test items as probabilistic models based on logistic functions of item parameters (difficulty, discrimination, and guessing) and examinee parameters (abilities). The benefits of such models include computer adaptive testing, advances in test equating, and new developments in item bias analysis.

The presentation will provide a description of the SAS/IML code and examples of applications of the code to simulation studies in psychometrics.

*Jeffrey D. Kromrey is an Associate Professor in the Department of Educational Measurement and Research.*

*Cynthia G. Parshall is the Senior Psychometrician at the Institute for Instructional Research and Practice.*

*Walter M. Chason is a doctoral candidate in the Department of Educational Measurement and Research.*

*Qing Yi is a doctoral candidate in the Department of Education Measurement and Research.*

### **Effective Poster Presentations for SAS User Group Conferences: Recommendations and Techniques**

- C Helen-Jean Talbott; Commercial Credit Corporation; Baltimore, MD

Poster sessions at SAS\* User Group Conferences provide an excellent opportunity to present information such as detailed code and output in a display format, yet they can challenge those who may be uncertain about poster preparation. The purpose of this paper is to provide guidance on how to carry out poster ideas clearly and effectively with a minimum amount of time and effort. Practical suggestions are given on poster design, materials, color, lettering, graphics, and construction methods. Although the recommendations and techniques presented focus on preparation of posters for SAS User Group conferences, they are applicable to many other endeavors such as business presentations, showcase displays, scientific exhibits, and (for those with children) science fair backboards.

*Helen-Jean Talbott is Manager of Credit Policy MIS at Commercial Credit Corporation. Her areas of SAS expertise are BASE SAS software and SAS/FSP, with specialization in developing and managing tracking systems. Helen-Jean has BS and MS degrees in agronomy from the University of Maryland. She has been a SAS user for more than twenty years. In 1997, she was Conference Co-chair of the NorthEast SAS Users Group, Inc. conference held in Baltimore, Maryland which had over 1000 attendees.*

### **How To Convert A SAS Data Set To A Quicken QIF Format File**

- C Helen-Jean Talbott; Commercial Credit Corporation; Baltimore, MD

Registration activities for the NorthEast SAS Users Group (NESUG) annual conference make use of Quicken and SAS software on personal computers. Quicken software is very useful for managing financial data for home and small business applications. SAS/FSP and Base SAS software are very effective for validated data entry, data management, and report production. The difficulty lies in transferring data from SAS data sets to Quicken files. In order to import transaction data from software other than Quicken, the data must be available as an ASCII file in Quicken Interchange Format (QIF). The QIF file format is not one of the standard data conversion

formats for SAS software at this time. This poster demonstrates how to write SAS program code to create an ASCII file in QIF file format from a SAS data set.

*Helen-Jean Talbott is Manager of Credit Policy MIS at Commercial Credit Corporation. Her areas of SAS expertise are BASE SAS software and SAS/FSP, with specialization in developing and managing tracking systems. Helen-Jean has BS and MS degrees in agronomy from the University of Maryland. She has been a SAS user for more than twenty years. In 1997, she was Conference Co-chair of the NorthEast SAS Users Group, Inc. conference held in Baltimore, Maryland which had over 1000 attendees.*

### **How to Sort Production Reports Prior to Printing**

- C Helen-Jean Talbott; Commercial Credit Corporation; Baltimore, MD  
Earl R. Westerlund; Eastman Kodak Corporation; Rochester, NY

Each month the Credit Policy Department of Commercial Credit produces about 25 different reports to send to the 202 district, 48 region, and 8 division managers. These reports are produced using base SAS software in programs run in a production environment under MVS. Each district manager receives portions of the reports specific for that district. Similarly, region and division managers receive portions specific for the districts within regions and for regions within division. Due to the size of these reports and number of recipients, it would take 2 days for a person to sort and label them for distribution. There was a need for an automatic method to print reports in order by district so that they would not have to be sorted manually. The purpose of this poster is to show how to create SAS data sets and report modules and to use them in conjunction with the SAS macro language to produce reports sorted in district order prior to printing.

*Helen-Jean Talbott is Manager of Credit Policy MIS at Commercial Credit Corporation. Her areas of SAS expertise are BASE SAS software and SAS/FSP, with specialization in developing and managing tracking systems. Helen-Jean has BS and MS degrees in agronomy from the University of Maryland. She has been a SAS user for more than twenty years. In 1997, she was Conference Co-chair of the NorthEast SAS Users Group, Inc. conference held in Baltimore, Maryland which had over 1000 attendees.*

### **Are You Losing Records & Don't Know It? TEXTMERG: A SAS Macro that Handles Hidden Problems in Many-to-One Merges**

- C Debra H. Weiner; Family Health International; Research Triangle Park, NC

When doing a many-to-one merge, one can lose records without knowing it. For example, to assign classification codes to text fields, we merge a SAS data set containing a text field ("device moved & I had trouble getting it out") with a SAS data set containing classification codes for that field, merging on the text variable. We found that if (a) a single field had more than one code ("device dislodged", "problem removing device") or (b) the same text existed in multiple records (e.g. the same problem was reported more than once) SAS will not always return the correct number of records. No error or warning messages are given.

This presentation describes a SAS macro that performs accurate merges whether or not a many-to-one problem exists. The macro can be easily modified to handle merges on numeric variables.

*Debra Weiner, MPH, is a statistician at Family Health International, Research Triangle Park, NC, who has been programming in SAS since 1989.*

## Serendipity

**Section Chairs:** **Michael Riddle**  
**Quintiles, Inc.**  
**RTP, NC**

**Howard Schreier**  
**U.S. Dept. of Commerce**  
**Washington, DC**

### Creating Numeric Formats Based on Precision, Not Magnitude

20 C John R. Gerlach; Maxim Group; Plymouth Meeting, PA

Suppose you need to know the natural format, indicating full precision, of one or more continuous numeric variables. Perhaps you need to produce a codebook that indicates length and format, not like those attributes found in the CONTENTS procedure. Or, perhaps, you need to write a raw data file having a record layout that requires optimal precision. This paper discusses numeric data in SAS and explains a robust tool that creates a picture format for each numeric variable in a SAS data set.

*John Gerlach has been using the SAS System for over 10 years, specializing in the Macro Language and relational database issues. John has worked mostly in the health industry, involving epidemiology, pharmacology, and clinical trials. He has written and taught SAS seminars as well.*

### Survey Research Using SAS: Tricks of the Trade

50 I Dr. Archer Gravely; UNC Asheville; Asheville, NC

This paper will illustrate the use of SAS to conduct mail and telephone survey research projects based on principles of efficient survey practice. SAS techniques for accomplishing the following survey administration tasks will be reviewed:

1. calculating sample size requirements and error rates
2. selecting random samples
3. techniques for generating personalized survey communications to include advanced character data manipulation techniques
4. procedures for tracking respondents and reporting response rates

This session will also review the use of PROC TABULATE to report percentages and tricks for computing percentages with means. This paper is based on the book "Your Guide to Survey Research Using the SAS System" published by SAS Institute BBU in 1998.

*Dr. Archer Gravely is Director of Institutional Research and University Planning Officer at UNC Asheville. He has used SAS for over 17 years and has conducted approximately 100 survey research projects. For the last ten years, he has taught workshops on SAS and survey research at state, regional, and national institutional research conferences. His book, "Your Guide to Survey Research Using the SAS System" was published by the SAS Institute Books by Users program in 1998.*

### SAS Conferences: A View From the Inside

50 I Moderator: Neil Howard

Panelists: not available at press time

Conferences like SESUG and SUGI don't just happen. They are the culmination of a great deal of thought and effort on the part of leaders within the SAS user community. We have gathered a panel of veteran SAS conference organizers who will demystify the process, describe the ups and downs they have experienced, and contemplate future directions.

*Neil Howard was conference chair for SUGI 20 in Orlando (1995). She has been a SAS user since 1978, primarily in health/medical/epidemiologic/clinical applications. Neil taught numerous courses as a contract instructor for SAS Institute for seven years. She has helped to organize local SAS users groups in the Washington, DC area, North Texas, and Colorado, and has been active at different times in the Northeast and South Central regional groups.*

*Other biographies not available at press time.*

## Detection of Fraudulent Medicare Providers in the Medicare Program Using SAS Software

- 20 C Chuanchieh Hsu, Ph.D., J. Michael Hardin, Ph.D., Robert Orr, and Debbie Sartain, R.N.; Blue Cross and Blue Shield of Alabama

Hundred of million dollars have been illegally collected or stolen by dishonest physicians, hospital administrators, nursing home, and other providers of medical services and supplies every year. Medicare/Medicaid fraud and abuse occur in all states. The most important topic in Medicare/Medicaid program today is how to identify the fraud and to recoup the money back from them. The purpose of this paper is to demonstrate how to use SAS/Macro, SAS/STAT and SAS/GRAPH software to detect fraud in Medicare Part A program.

*Chuanchieh Hsu, Ph.D. is currently an independent, statistical, and SAS consultant. He received his Ph.D. in Biostatistics from the University of Alabama at Birmingham (UAB) in 1995. He also received his MS in Biostatistics from UAB in 1991. During his studies at UAB, Dr. Hsu worked as a research associate and statistician where he was responsible for data management and statistical programming for several very large NIH funded research projects. His areas of expertise include computational techniques for statistical applications and SAS application programming. He is the author or co-author of a number of papers.*

*J. Michael Hardin, Ph.D. is Professor of Health Informatics and Biostatistics at the University of Alabama at Birmingham. Dr. Hardin's interest is in the application of statistical techniques to health service research. In particular, he has been interested in using statistical procedures to assist administrators to detect potentially aberrant billing procedures and fraudulent behaviors. Dr. Hardin is also actively involved in the application of Data Mining techniques to the Healthcare industry. He often provides consultation to healthcare and other organizations in the areas of statistics and information technologies. He is a SAS Quality Partner.*

*Robert Orr is Manager, Part A for the Chahaba Government Benefit Administrators: A Division of Blue Cross and Blue Shield of Alabama. Mr. Orr has over 15 years experience with Blue Cross and with the Medicare program. He is actively involved in data analysis issues and is himself a SAS programmer.*

*Debra K. Sartain, R.N. is Manager, Medicare Medical Review for the Chahaba Government Benefit Administrators. She has 20 years experience in the healthcare field. For the last three years, she has concentrated on the use of data analysis to assist medical reviewers in selecting aberrant billing and utilization by providers. She has attended numerous training courses on data drill down software and on statistical methods for fraud detection.*

## Indexed Table Lookup Against Multiple Data Sets

- 20 C Lt. Col. Doug McAllaster; US Army; Washington, DC

This paper demonstrates indexed table look up against multiple data sets. This paper is given as an extension of an example 3.11 in the SAS manual "Combining and Modifying SAS Data Sets: Examples". The paper presents a typical example of finding the most recent good observation from a series of historical SAS data sets. The paper demonstrates the benefits of using indices on legacy data sets. It also shows the importance of the automatic SAS variable, `_IORC_`, and its potential pitfalls. It provides an excellent application of an explicit return statement as well as the importance of proper initialization.

*Lt. Col. Doug McAllaster is an operations researcher (statistician, programmer, and analyst) at HQ US Army Pentagon, Office of the Deputy Chief of Staff for Personnel. Doug has been using SAS for eight years in his work managing officer personnel and billets. Doug has a Bachelor's degree in civil engineering from US Military Academy at West Point and a Master's degree in operations research from the University of Texas at Austin. He has also taken graduate statistics courses at University of Kansas and George Mason University.*

## Creating an ADP Center of Excellence: A Miltonian Approach of Looking Through Two Decades of "Visible Darkness"

- 50 I Peter Parker; U.S. Dept. of Commerce; Washington, DC

After almost two decades of working with large then small computers, primarily with SAS software, I step back from my monitor and ponder what makes my ADP shop a Center for Excellence. In this paper, I'll inquire on what most becomes a computer guru, an unusual type of professional. As well, I offer my truths on how to handle users, management, and the constantly reinvented technology. I will use notes that I have amassed throughout my career, now at its midpoint. Rather than taking a dry totally technical approach, I prefer a more literary stylistic one, drawing on John Milton's "Paradise Lost" and other classic literature as descriptive aids to my argument. My observations may help you keep users satisfied and plan a prosperous career in information

processing and office automation.

*Peter Parker has been programming since 1979, mostly in SAS software, and is proficient in most hardware and software. He runs an ADP shop in the U.S. Department of Commerce. As well, he runs a consulting firm, Perfect Programming Enterprises, providing programming (again primarily SAS software), Office Automation, and Internet support. Peter has BA and MA degrees in Economics. He has presented other papers for SAS conferences, and they can be accessed through his personal home page, <http://members.aol.com/pparker923>.*

## A "Big Picture" Data Diagnostic Program for Clinical Trials Data

20 C Dorothy E. Pugh and Indrani Nandy; ClinTrials Research, Inc.; RTP, NC

One of the first things those performing clinical trials data cleaning need to do is to get an overview of the relationships of the visit sequence numbers and the dates at which the various assessments associated with those visits took place. The SAS program presented here helps show how to capture the relatively sparse anomalies in these relationships by comparing the date of each assessment to one or more user specified reference dates. This technique can be used to: 1) determine which assessment(s) should be used to determine the patient's first and last date in a protocol or on study drug, 2) determine which assessments were typically performed at unusual times, 3) catch obvious data errors, and 4) spot possibly serious protocol violations.

*Dorothy E. Pugh is a Senior SAS Programmer/Analyst at ClinTrials Research Inc. In addition to programming, she develops detailed programming specifications based on data analysis plans and supervises their implementation with the aid of a programming checklist and QC programming tools she has developed. She co-authored the Zyan Final Study Report leading to the drug's FDA approval. She has special expertise in clinical trials, and in using the SAS Macro Language, SAS/GRAPH, and PROC REPORT.*

*Indrani Nandy was born in Calcutta, India. She completed her Bachelor's and Master's in Statistics at Indian Statistical Institute, Calcutta. She received her Ph.D. from the State University of New York at Stony Brook in 1992. She joined the Louisiana State University Medical Center as statistician, and worked as Instructor and Assistant Professor in Biometry for eight years. There she taught statistics and SAS courses, collaborated with faculty on publications, and developed customized programs in SAS to grade scantron tests. She joined ClinTrials Research Inc. in 1997 as senior biostatistician. Her responsibilities include designing clinical trials and analyzing data.*

## A Day in the Life: The SAS Software Consultant

50 I Moderator: S. David Riba; JADE Tech, Inc.; Clearwater, FL  
Panelists: not available at press time

What does it take to be successful as an independent SAS consultant? What are the practical concerns in conducting a SAS consulting practice? What should clients understand? We have gathered a panel of distinguished SAS consultants to talk about the issues they face as independents.

*S. David Riba has provided independent SAS consulting and training services for over ten years.*

*No other biographies available at press time.*

## SQL Query Window Classes: How To Incorporate The SQL Where Expression Builder Class In Custom SAS/AF Applications

20 C Christopher A. Roper; Qualex Consulting Services; Fairfax, VA

SQL (Structured Query Language) is the standard language used for querying all major databases, including SYBASE, ORACLE, RED BRICK, DB2, and others. The SAS Query window creates SQL expressions using SAS/AF Classes that are available to the SAS/AF developer. One of these class entries is the Where Clause Builder Class, named QWWHERE.CLASS in the SASHELP.SQL catalog. This is the class used by both the Query window and SAS/ASSIST to build SQL where clauses. This class may be called by any SAS/AF entry to present the same interface the SAS Query window uses to build where clauses for SQL queries. This paper will cover what the Where Clause Builder Class is, how to incorporate it into a SAS/AF application, and the nuances of using this class effectively.

*Christopher A. Roper is a Senior Systems Consultant with Qualex Consulting Services, Inc. His areas of expertise include Base SAS, SAS/AF, SAS/FSP, Macros, Frame, and SCL, and he has been developing SAS applications for over ten years. Chris won Best Contributed Paper in Applications Development at last year's WUSS conference, and is a frequent presenter at SAS user groups across the United States and Europe. Chris has a BS in Business Administration with a Concentration in Economics from Christopher Newport University.*

## SQL Query Window Classes: How To Add The SQL Calculated Column Expression Builder Class In Custom SAS/AF Applications

20 C Christopher A. Roper; Qualex Consulting Services; Fairfax, VA

SQL (Structured Query Language) is the standard language used for querying all major databases, including SYBASE, ORACLE, RED BRICK, DB2, and others. The SAS Query window creates SQL expressions using SAS/AF Classes that are available to the SAS/AF developer. One of these class entries is the Expression Builder Class, named QWCLEXPB.CLASS in the SASHELP.SQL catalog. This is the class used by both the Query window and SAS/ASSIST to create calculated columns using SQL. This class may be called by any SAS/AF entry to present the same interface the SAS Query window uses to build calculated columns for SQL queries. This paper will cover what the Expression Builder Class is, how to incorporate it into a SAS/AF application, and the nuances of using this class effectively.

*Christopher A. Roper is a Senior Systems Consultant with Qualex Consulting Services, Inc. His areas of expertise include Base SAS, SAS/AF, SAS/FSP, Macros, Frame, and SCL, and he has been developing SAS applications for over ten years. Chris won Best Contributed Paper in Applications Development at last year's WUSS conference, and is a frequent presenter at SAS user groups across the United States and Europe. Chris has a BS in Business Administration with a Concentration in Economics from Christopher Newport University.*

## A Simplified Reporting Strategy: "Summary" Data Sets for Reporting on Data from Multiple Source Data Sets

20 C Steve Ross; ClinTrials Research, Inc.; Research Triangle Park, NC

In conducting analysis of clinical trials data, it is rare that all of your data will come from one source data set. In the interest of simplicity and disk space, a single "SUMMARY" file created early in the programming process and containing variables applicable to many tables is strategically beneficial to the programming and QC processes. For example, in a trial measuring a blood pressure lowering drug, demographic information will be drawn from a 'DEMO' data set, treatment assignment and start/stop dates from a 'DOSING' data set, and baseline and post-treatment vital signs from a 'VITALS' data set. Placing these values in a central location gives three advantages: 1) the summary file can easily be merged onto data sets for reporting and analysis, 2) a single data set is simpler to data-check and QC, and 3) the resultant data set is smaller than the cumulative effect of adding each of these variables to all data sets permanently. For this discussion, steps detailing the creation of this data set will be outlined, as well as examples and suggestions for its use in the QC process and in finished output reporting.

*Steve Ross has been employed as a SAS Programmer at ClinTrials Research, a contract research organization located in Research Triangle Park, North Carolina, for over two years. His current responsibilities include technical team leadership in creating, maintaining, and reporting on databases of clinical trials data. While learning SAS as a graduate student, Steve worked for the North Carolina Center for Urban Affairs, analyzing results of statewide standardized test scores of grade school students and maintaining a teaching Web site for North Carolina educators. Steve received his BA from Elon College in 1992 and his MA from North Carolina State University in 1997.*

## Institute Quality Partners -- Who are They?

20 C Loretta Jo Schlatzer; SAS Institute

Institute Quality Partners are independent consulting organizations whose primary business is in providing consulting services using SAS software. Quality Partners must meet specific criteria in order to participate in the program. In addition, they must adhere to additional program requirements to ensure continued participation in the program. This criteria includes minimum education, participation at user group & business meetings, sponsorship by an Institute employee and customer references. One of the goals of the program is to identify those consultants who have proven SAS skills as well as business and subject matter expertise. This helps to ensure the SAS user community that when an alternative resource is required, SAS expertise is available, and that by selecting a Quality Partner they are more assured of the quality of service that will be provided.

Quality Partners receive many benefits. These benefits include: access to technology, training discounts, publication discounts, referrals, advance information via the QP Listserv and QP Newsletter. Additional discussion on the role of the Quality Partner, availability of QP'ers (via the QP on-line registry), determining how to find the right SAS expertise for the job, etc.

*Loretta Jo Schlatzer is the Quality Partner Business Manager in the Professional Services Division at SAS Institute. She has been with the Institute for more than ten years. Currently Loretta manages the US Quality*

*Partner Program, which is a program that supports independent consulting organizations that provide SAS expertise.*

### **Data Dictionary Approaches to Edit and Validate Survey Data**

20 C Naoko Stearns; Research Triangle Institute; RTP, NC

The process of validating and editing survey data becomes crucial to an organization's reputation when the intended user is the general public. Also, these tasks require substantial resources, including experienced programmers and data analysts. Fortunately, using a data dictionary can facilitate that effort in two ways: using the dictionary for producing documentation about the data; and, for generating SAS code that precisely represents the data. The implementation of a data dictionary and code generators automates many of the mundane and error prone data cleaning tasks, such as assigning special missing codes and producing deliverable ASCII files. This paper discusses a method of using a Microsoft Excel data dictionary that is dynamically accessed via Dynamic Data Exchange (DDE) for the purpose of efficiently editing and validating survey data.

*Naoko Stearns is a research programmer/analyst at Research Triangle Institute, RTP, NC. Naoko has been using SAS for 10 years. Her recent work focuses on implementing data dictionaries, code generators, and codebooks.*

### **Using SAS Import/Export Wizards and SAS Macros to Automate Data Manipulation of External Data**

20 C Chris D. Thompson; Wachovia

This paper presents a situation in which data that was available in a series of 14 Microsoft Word documents needed to be converted to a different series of 24 Microsoft Excel documents. A PC SAS for Windows version 6.12 program was written on a Windows/NT platform to import the Word data, combine it into a single data set, slice and dice it into the 24 groupings needed for Excel, and finally export it into 24 Excel Workbooks without the user ever touching Word or Excel. SAS programming techniques include use of the Import/Export wizard (PROC ACCESS, PROC DBLOAD) and use of user written SAS Macros (creating loops for iterative processing).

*Chris Thompson first started using SAS in 1990 as an undergraduate Statistics major at North Carolina State University. Upon completion of his degree in 1994, he worked three years as a biostatistician at Bowman Gray School of Medicine before moving to Wachovia as a technical analyst in June, 1997. Chris has specialized in the automation of reports using SAS Macros and is currently working on a data warehousing project at Wachovia.*

## Statistics

**Section Chairs:** **Grace Lossman  
Smith-Hanley  
South Orange, NJ**

**Margaret Connolly  
ShellSTAT, Inc.  
Marion Station, MD**

### Beating the System: Adapting Exploratory Methods to the SAS Environment

110 | Facilitator: Margaret Connolly; ShellSTAT, Inc.; Marion Station, MD

Panelists: Douglass Chapman, David Dickey, Maribeth Johnson, Robert Miceli, Ken Pollock

Most SAS Statistics procedures are directed toward confirmatory data analysis - model based estimates, hypothesis tests, and confidence intervals. Output data sets of many procedures may include sophisticated diagnostic calculations. However, intelligent data displays provide the key to exploratory and diagnostic methods and SAS may not provide the best environment for developing data displays.

This panel discussion will cover a variety of approaches for making exploratory and diagnostic principles a part of the standard data analysis procedure. Panelists will describe methods which they have found relatively easy to implement in the routine analysis or methods which will generally repay the effort of designing the standard graphic display. For this discussion, exploratory methods include representations of raw data -- typical ranges, atypical observations, data clustering, and patterns imposed by the experimental or sampling design - and displays of diagnostic output. The panelists and audience will share their experiences of using exploratory methods in routine data analysis and including descriptive overviews as part of a study summary.

*Margaret Connolly is a consulting biostatistician with pharmaceutical clients and the occasional academic research project or government agency sub-contract. Over the past several years she has used SAS for pharmacokinetic calculations, assay validation, drug stability studies, and clinical trials. She has a Master's Degree in Dairy Science (animal breeding) from Michigan State and a Ph.D. in Biostatistics from the Johns Hopkins School of Public Health.*

*Doug Chapman is an Assistant Director in Biometrics at Pfizer, working on Phase IIIb and Phase IV clinical studies with Allergy, Arthritis, and Depression and Anxiety disease management teams. He has collaborated on many medical research projects sponsored by Pfizer and by his earlier employer, Memorial Sloan-Kettering Cancer Center. His first client for statistical services was Covenant House youth crisis center. Mr. Chapman's MS in Statistics is from Baruch College of City University in New York City.*

*David A. Dickey is a professor of statistics at North Carolina State University and a contract instructor for SAS Institute. He has co-authored several books including "SAS System for Forecasting" (SAS Inst., 1986), "Principles and Procedures of Statistics" (McGraw-Hill, 1997) and "Applied Regression Analysis" (Springer, 1998 in press). His research on stationarity testing resulted in the "Dickey-Fuller" test as discussed in several texts and implemented in several computer packages including SAS/ETS, PROC ARIMA.*

*Maribeth Johnson has been a research statistician in the Office of Biostatistic at the Medical College of Georgia for 5 years. She worked previously in the University of Georgia Department of Animal of Dairy Science for 11 years as a statistical programmer. She has MS degrees in Animal Breeding from VA Tech and in Statistics from UGA. She has been using SAS for 17 years.*

*Robert Miceli: No biography available at press time.*

*Kenneth H. Pollock is professor of Statistics, Biomathematics, and Zoology at North Carolina State University. His research interest is sampling fish and wildlife populations and he has published over 100 articles in scientific journals. He is a fellow of the American Statistical Association. His BS is from Sidney University in Australia, and his Masters and Ph.D. are from Cornell University.*

### Regression with Time Series Errors

50 | David A. Dickey; N. C. State University; Raleigh, NC

Ordinary Least Squares (OLS), the estimation method used in PROC REG and PROC GLM, is only valid under certain assumptions. One of these assumptions, independence of errors, is often violated when data are taken over time. Methods to test for violations are discussed. When the independence assumption is violated, alternative methods (Generalized Least Squares and Estimated Generalized Least Squares) are available. PROC AUTOREG is the simplest tool for this type of problem. PROC AUTOREG is illustrated with an example. A more sophisticated tool, PROC ARIMA with its INPUT option, will also be illustrated and its advantages discussed.



*David A. Dickey is a Professor of Statistics at North Carolina State University and a contract instructor for SAS Institute. He has co-authored several books including "SAS System for Forecasting" (SAS Inst., 1986), "Principles and Procedures of Statistics" (McGraw-Hill, 1997) and "Applied Regression Analysis" (Springer, 1998 in press). His research on stationarity testing resulted in the "Dickey-Fuller" test as discussed in several texts and implemented in several computer packages including SAS/ETS, PROC ARIMA.*

### **Beyond Factor Analysis: Can the Results Be Validated?**

20 C Rachel J. Goldberg; Mercedes-Benz Credit Corporation; Atlanta, GA

This presentation explores using different techniques to validate an initial set of factor analysis results. All of the factor analyses discussed are produced using the SAS System's PROC FACTOR procedure. An understanding of how to use the SAS System to run a basic factor analysis is needed, since this presentation will focus on how to interpret and compare PROC FACTOR results. First, the output from the original factor analysis solution is presented; this solution uses Principal Factor Analysis as the initial extraction method with a VARIMAX rotation. In an attempt to validate these original findings, the results are compared to four different factor solutions obtained by: 1) changing the initial factor extraction method, 2) changing the rotation method, 3) changing the number of factors analyzed, and 4) splitting the data set in half and running the same initial factor extraction method and rotation on both halves. The results of each factor analysis first will be displayed as the original PROC FACTOR output and then summarized in tables. All of the results discussed utilize Base SAS and SAS/STAT software.

*Rachel Goldberg works for Mercedes-Benz Credit Corporation (MBCC) in Atlanta, Georgia, where she is responsible for Credit Risk Management of lease and retail customers. She uses the SAS System to assist in the analysis and management of consumers' credit behavior throughout their lifecycle with MBCC. Prior to joining MBCC, Rachel worked as a project director in the Market Research industry for over two years and as a statistical consultant in the Financial industry for about five years. Rachel has a BS in Statistics from the University of Florida and has used SAS for the past eight years.*

### **Long verses Wide - A Different Way of Looking at Data Sets and SAS Coding**

20 C Richard Goldsmith; ASG, Inc.

SAS data sets tend to be created wide, i.e. a single observation has many variables. This intuitive approach makes the most effective use of data storage space and allows the simplest approach to writing SAS code. However, what happens if a long data set is used instead of a wide data set? Long data sets can increase the flexibility of the underlying data structure and can aid in the construction of reusable code when used with the SAS macro facility. A simple example showing how a long data set and the SAS macro facility can be used to construct a generalized SAS program for use with PROC GLM will be presented. This approach will demonstrate the use of the SAS macro indirect referencing facility (ever wonder what real use && has?) and show how indirect referencing can be used to generate metavariables for use in writing reusable code. The major disadvantages of this approach - increased data storage size, increased program complexity, and increased program execution time -- will be addressed and methods that can be used to reduce program complexity will be discussed.

*Rich Goldsmith, Dorothy, and Toto are all from Kansas. Rich and Toto are somewhat similar – neither of them has the slightest idea what their title is. The Wizard of ASG grants his wish for a paycheck. Rich had a Philosophy BA and, finding not much demand for philosophers in 1967, he then obtained a BS degree in Meteorology courtesy of the US Air Force. He has an MS in Computer Science. Rich's SAS experience dates back to 1980 and includes work for a mining company, a manufacturing company, a major bank, a health care company, and several pharmaceutical companies.*

### **The Effect of Missing Data on Repeated Measures Models**

50 I Maribeth Johnson; Medical College of Georgia; Augusta, GA

The MIXED procedure of the SAS System enables examination of correlational structures and variability changes between repeated measurements on experimental units across time. While PROC MIXED has the ability to handle unbalanced data when the data are missing at random, a question arises as to when the degree of sparseness jeopardizes inference. Simulation is a tool that can be used to address these types of questions. This paper shows the application of simulation to determine inference problems in a data set with a specific pattern of missing data. This technique is also applied to the topic of initial study sample size determination.

*Maribeth Johnson has been a research statistician in the Office of Biostatistic at the Medical College of Georgia for 5 years. She worked previously in the University of Georgia Department of Animal of Dairy Science for 11*

years as a statistical programmer. She has MS degrees in Animal Breeding from VA Tech and in Statistics from UGA. She has been using SAS for 17 years.

### **A SAS Macro Program to Perform Permutation Testing for Group\*Time Interaction in an Unbalanced Repeated-Measures Analysis of Variance**

- 20 C Mark S. Litaker; Office of Biostatistics, Medical College of Georgia; Augusta, GA  
Bernard Gutin; Department of Pediatrics, Medical College of Georgia; Augusta, GA

In a study to evaluate the effects of physical training on heart-period variability (HPV) measurements, 79 obese 7-11 year old children were randomly assigned to participate in an exercise program during the first or second 4 months of the study period. Measurements were made at months 0, 4, and 8 with the goal of identifying differences in patterns of change in HPV between the two groups across the study period. SAS' PROC GLM was used to calculate analyses of variance (ANOVA) with subject as a random effect and group and month as fixed effects. The statistical test which is of interest is the F-test for group\*time interaction. Distributions of residuals indicated non-normality, often due to a few relatively large residuals. Permutation testing provides a method for evaluating the statistical significance of the observed F-tests, while avoiding problematic distributional assumptions. A SAS macro program is presented which samples the permutation distribution of the F statistic under the null hypothesis, and prints percentile values for the empirical distribution.

*Mark Litaker, for the past nine years, has been a biostatistician for the Medical College of Georgia, Office of Biostatistics. His biostatistics training was done at the Medical University of SC (MS degree) and the University of SC (Ph.D.). He has used SAS for about 12 years.*

*Bernard Gutin: No biography available at press time.*

### **The Replication Method for Estimating Sampling Errors, Principles and Software**

- 50 I David Morganstein; Westat, Inc.; Rockville, MD

Researchers using clustered, stratified or unequally weighted data can not rely upon SAS or other standard statistical packages to provide accurate inferences. Standard statistical packages rely on the assumption of simple random sampling.

There are two commonly used methods for obtaining proper inferences from complex sampling: replication and linearization. In this paper, we describe how replication theory achieves objectives that are inherently difficult with linearization. The strengths of the replication method, as implemented in the WesVarPC program include: it is easy to explain replication to data users without special training in variance estimation for sample surveys; it can be applied to many designs and many statistics using the same procedure without modifying the software; it can handle a variety of estimation strategies; it is a consistent procedure for handling subsets of the data and missing data items; and, it is a simple and elegant method for handling longitudinal sample designs.

*Mr. Morganstein is a Senior Statistician and Vice President of Westat, Inc. His special areas of expertise are the design, implementation, and analysis of databases; design and application of sample surveys and systems of evaluation; statistical analysis; and estimation and quantification. He has designed and analyzed many national and local area RDD household surveys and was co-developer of PROC WESVAR and WesVarPC. In addition to his work with organizations in North America and overseas, teaching statistical process control for quality assurance, he is also an instructor at the Joint Program for Survey Methodology at the University of Maryland.*

### **An Application of Cluster Analysis in the Financial Services Industry**

- 50 C Satish Nargundkar and Timothy J. Olzer; May & Speh, Strategic Decision Services; Atlanta, GA

Analytical models are critical in the Financial Services Industry in every phase of the credit cycle - Marketing, Acquisitions, Customer Management, Collections, and Recovery. While such models are now commonplace, the search for competitive advantage requires continuous improvement in the models. Customization of the models for each segment of the population is a crucial step towards achieving that end. Segments in the population may be defined judgmentally using one or two variables, but Cluster Analysis is an excellent statistical tool for multivariate segmentation. The clusters may be used to drive the model development process, to assign appropriate strategies, or both.

This paper discusses the FASTCLUS procedure as a tool for segmentation of a population. The first phase involves preparing the data for clustering, which includes handling missing values and outliers, standardizing, and reducing the number of variables using tools such as the FACTOR procedure. The FASTCLUS discussion

emphasizes the assumptions, the options available, and the interpretation of SAS output.

Finally, the business interpretation of the cluster analysis is provided within the context of this specific industry. This enables the analyst to identify the appropriate number of clusters to use in model development or strategic planning.

*Satish Nargundkar joined CSM in April 1996, later becoming a member of the Training Steering Committee at May & Speh Strategic Decision Services. He was a programmer/consultant in AT&T's interactive products and services division and has held academic and teaching positions including appointments at Oglethorpe University, Mount Olive College and General Fortune Corporation. Nargundkar has published articles in The Journal of Business Research, the Journal of Global Strategies and the Journal of Managerial Studies. He received a Bachelor's of Engineering in Mechanical Engineering from India's Osmania University and a Ph.D. in industrial management from Clemson University.*

*Timothy J. Olzer: No biography available at press time.*

## **It Chops, It Dices, It Makes Julienne Slices! ODS for Data Analysis Output As-You-Like-It in Version 7**

50 I Chris Olinger and Maura Stokes; SAS Institute

This paper discusses advances made in the output generated by all Version 7 SAS software procedures. New features provided by the Output Delivery System (ODS) include automatic rendering of procedure output in HTML for the Web, rich-text, Postscript or PCL format, output data sets from any printed output, and the ability to edit the look and feel of most output. ODS also supports all legacy line-mode printing and supports a document feature to allow post-procedure replaying of output. This talk introduces ODS features to be delivered in Version 7 and provides some concrete examples of how data analysts and statisticians can take advantage of the feature set provided by ODS.

*Chris Olinger, a veteran SAS employee, works in the Applications Division of Research and Development. He is one of the key ODS developers (he was partly responsible for the Version 6 ODS prototype) and now programs the bulk of the internal ODS infrastructure in the SAS System..*

*Maura Stokes is Manager of the Statistical Applications R and D Department and has worked at SAS Institute for fourteen years. She is co-author of the book Categorical Data Analysis Using the SAS System. She holds a DrPH degree in Biostatistics from UNC/Chapel Hill and is now an adjunct member of the faculty.*

## **Computing a Test Statistic for Scale Parameters Based on a Jackknife Procedure**

20 C Jean G. Orelie; Research Triangle Institute; RTP, NC

It is well known that the F test is not robust when the assumption of normality no longer holds. One way to test for scale parameters when normality of the underlying distributions cannot be assumed is to use nonparametric methods. However, there are two problems with nonparametric tests for scale parameters. The computations can be laborious and there is less efficiency compared to the F test when the distributions are normal. In this paper, using the IML module in the SAS System, we implement a test for scale parameters for two independent samples based on a jackknife procedure that was proposed by R. G. Miller in 1969. The advantages of this test based on the jackknife is that it does not require any assumptions for the location parameters or equal sample sizes. When the distributions are normal, this test has an asymptotic relative efficiency equal to 1 with respect to the F test.

*Jean Orelie recently graduated with an MS in Statistics from North Carolina State University. She has worked as a teaching assistant and is now employed as a statistician at the Research Triangle Institute. She has a BA in Mathematics from Rutgers College of Rutgers University.*

## **Multiple Comparison Procedures with SAS**

50 I Dror Rom and Chung-Kuei Chang; Prosoft Software, Inc.

This presentation discusses some commonly used multiple comparison procedures available in SAS. We focus on the following methods: Modified Bonferroni Procedures, Dunnett's procedure for comparisons with a control treatment, with and without a covariate adjustment, step-down and closed testing procedures, adjusted p-values using Monte-Carlo simulation, and calculation of exact adjusted p-values for discrete data. We will cover PROBMC, PROC GLM, PROC MULTTEST, and some macros for various methods. Various settings will be used to demonstrate the procedures, including, multiple treatment comparisons, pairwise comparisons, dose response, and multiple endpoints in clinical trials.

*Dror Rom is a co-author with Peter Westfall, Yosef Hochberg, Randy Tobias and Russ Wolfinger on: "Multiple*

*Comparisons and Multiple Testing Using the SAS System*", a 'Book by Users' to appear next year. He has been two years at his own company, developing software and consulting on clinical trials. Previously, he worked at Rhone-Poulenc Rorer in clinical Phase I-III and pre-clinical areas and at Merck Research Labs in animal toxicology studies. He has a Ph.D. from Temple University for work in Discrete Multivariate Analysis.

*Chung-Kuei Chang: No biography available at press time.*

### **Software for GEE: PROC GENMOD and SUDAAN**

50 | Dr. Babubhai V. Shah; Research Triangle Institute; RTP, NC

Until recently, most of the statistical software was limited to analyzing data from simple random samples. Recently, some programs have become available to analyze correlated or clustered data. We shall review two such programs and discuss their strong points. We shall also present pointers to take the most advantage of both these programs. The major advantage of these methods is the use of robust sandwich estimators for the variances of parameter estimates.

The basic algorithm in these programs is iterative and some care is needed in applying these to fit a given model to a particular data sample. Occasionally, the iterative algorithms may converge (or fail to converge) incorrectly. The user needs to verify that the algorithm has converged correctly!

*Dr. Babubhai V. Shah is a Chief Scientist, Statistics Research Division, at the Research Triangle Institute. He completed his Ph.D. in Statistics at the university of Bombay, India. Dr. Shah's contribution to theoretical and applied statistics are demonstrated by his extensive published research. He has been honored as Fellow of the American Statistical Institute and is also a Fellow of the Royal Statistical Society and of the International Statistical Institute. He is an adjunct professor at the department of biostatistics, in the school of public health at University of North Carolina at Chapel Hill.*

### **Recent Enhancements and New Directions in SAS/STAT Software**

50 | Maura Stokes; SAS Institute

Version 7 of the SAS System brings major enhancements to the statistical software. All output is now handled by the Output Delivery System, which gives the user control over the printing of the results, allows all tables and statistics to be output to SAS data sets, and produces Web-browsable HTML output. New procedures provide tools for partial least squares analysis and spatial prediction. The GENMOD procedure now provides LSMEANS and ESTIMATE statements, and its GEE facility provides the alternating logistic regression algorithm and now handles the ordinal response case. Additional exact tests have been added to the FREQ and NPAR1WAY procedures, and numerous other updates to procedures are also included. In addition to new procedures for survey design and analysis, Version 7 also introduces experimental procedures for nonparametric modeling.

*Maura Stokes is Manager of the Statistical Applications R and D Department and has worked at SAS Institute for fourteen years. She is co-author of the book Categorical Data Analysis Using the SAS System. She holds a DrPH degree in Biostatistics from UNC/Chapel Hill and is now an adjunct member of the faculty.*

## Technology 2000

**Section Chairs:** **Bob Passmore**  
**Passmore Consulting Services**  
**Durham, NC**

**Ben Cochran**  
**The Bedford Group**  
**Raleigh, NC**

### Data Warehousing Efficiency Techniques with the SAS System

50 | Tony Brown; SAS Institute

This paper will be aimed toward mid-range to advanced users and warehouse administrators. It will cover the topics of technically implementing a subject-based star schema using the SAS System.

Supporting topics will be:

- Subject selection
- Star-schema modeling with SAS data sets
- Utilizing indexing for efficient query retrieval
- Using formats and other techniques to prevent table joins in star schemas
- Using advanced SAS functions to optimize SQL reporting, integration, and management
- Efficiency with the warehouse administrator

The paper will include a section on cost/performance of efficiency techniques.

*No biography available at press time.*

### Getting Started with the SAS Multidimensional Database (MDDB) Server

50 | Ben Cochran; The Bedford Group; Raleigh, NC

This is a paper on how to start from scratch and prepare the MDDB so that it can be used with the drill-down objects in SAS/EIS. We use a step-by-step approach to getting the data ready for these EIS objects. Then we look at ways in which the user can customize these objects at run-time as well as slicing and dicing your way to analyzing your data.

*Ben Cochran has over twelve years of experience with the SAS System. He was a former instructor with SAS Institute, then was the Marketing Manager for SAS/EIS before leaving the Institute to become a SAS Quality Partner. Ben has given numerous papers at previous SUGI and SESUG conferences on topics ranging from SAS/ASSIST and SAS/CALC, as well as SAS/EIS.*

### New Directions in SAS Software Version 7 Documentation

50 | Jim Sheedy; SAS Institute

This session will walk users through new features in the online information delivered with Version 7 of the SAS System. It will discuss SAS OnlineDoc--the CD-ROM application for viewing and searching reference books online. Also, it will discuss and demo changes in the SAS Help system.

*Jim Sheedy is a Technical Writer III in the Publications Division at SAS Institute. He is the project coordinator for all SAS/GRAPH Documentation and maintains the documentation for the graphics components in SAS/AF software.*

### SAS Enterprise Reporter vs. Microsoft Applications

50 | Vince Raimondi; GE Capital; Atlanta, GA

Joe Whitehurst and Mark Tabladillo; Whitehurst Associates Inc.; Atlanta, GA

The Enterprise Reporter is a relatively new SAS application. This presentation will evaluate the features and efficiency of the Enterprise Reporter (above the functionality in base SAS) as contrasted with Automation with Microsoft Applications (using SAS as the client and Microsoft Office '97 as the server). Features of key interest include: 1) ability to access SAS data sets on multiple platforms; 2) ability to run batch reports starting from transaction-level data; and 3) ability to produce electronic reports which users can modify.

Vince Raimondi is Manager of Commercial Information, GE Capital-RFS, and focuses on the design and implementation of Data Mart solutions and report automation. Vince has been coding in SAS for five years, three years of which has been dedicated to the Credit Card industry. Vince earned an MS in Statistics and Operations Research from New York University in 1992.

Joe Whitehurst is President of Whitehurst Associates, Inc., a SAS Institute Quality Partner. Since 1980, Joe has developed SAS Applications in the Banking, Health Care, Higher Education, Insurance, Manufacturing, and Telecommunications industries. In 1988, he founded the Virginia SAS Users' Group and served as elected President until 1991.

Mark Tabladillo has been a SAS user since 1992 and has programmed SAS in the Health Promotion, University, and Financial Services arenas. He has specific SAS experience with data mining techniques, a Ph.D. in Industrial Engineering from Georgia Tech, and teaching experience in Statistics and Quality Management.

### **It's Almost the Year 2000--Should I Panic?**

50 | Michelle Robinson; SAS Institute

This paper will address the most frequently asked questions about Year 2000 compliance for the SAS System. Topics include:

- Is the SAS System Year 2000 compliant?
- How can I test my SAS applications for Year 2000 compliance?
- Do I need special licensing in order to do Year 2000 testing?
- Where can I get more detailed information about SAS applications and the Year 2000?

*Michelle Robinson is a Technical Support Analyst at SAS Institute. She has worked at SAS Institute for 5 years.*

### **Replacing Oracle with the SAS Scalable Performance Data Server: Improved Performance, Enhanced Functionality, and Increased Efficiency**

50 | Jay L. Stevens; The Prudential Bank; Atlanta, GA

Although the SAS Institute has been very successful in building high functioning gateways to external database repositories, it is almost impossible to take full advantage of the SAS system through these interfaces. Many experienced SAS users have long recognized that SAS is vastly more efficient and functional when used against SAS data sets. Partially due to their origin as transaction processing systems, most of the existing relational databases are overly complex and inefficient when used as the repository for a data warehouse or datamart. With the advent of the SAS Scalable Performance Data Server, a viable high-performance alternative to Oracle and the other Relational Database Management Systems (RDBMS) is available to the enterprise. This paper will review the process and advantages of migrating from Oracle to SAS/SPDS including:

- Overcoming Obstacles to Migration
- Performance & Productivity Gains
- Data Loading and Transformation Efficiencies
- Security and Auditing Considerations

*Jay Stevens directs the Portfolio Analysis decision support group of Prudential Bank. His group is responsible for analysis and modeling for all of the bank's credit products. He has been using SPDS since it's introduction in beta and was an Institute invited presenter at SUGI 23. He has been working in decision analysis for credit for 8 years and has a degree in Decision Sciences from Georgia State University.*

## WEEKEND WORKSHOPS

The cost of these workshops is not included in the cost of the conference. Please see the **Registration Form on page 71** for signing up. Space in each workshop is limited, so **don't delay**.

**Section Chair:**        **Frank Dilorio**  
**Advanced Integrated Manufacturing**  
**Solutions Corp.**  
**Chapel Hill, NC**

### Religion 101 - UNIX for Non-believers

Grace Lossman; Smith-Hanley Consulting Group; South Orange, NJ

*Saturday Afternoon, 1:30-5:30pm*    **\$70**

UNIX is fun! Really. It can make your programming more meaningful and adventure filled than you can possibly imagine. Whatever you've dreamed of doing on a system and couldn't will now be simple. Want to run a job in the middle of the night without going into the office? Want to set up your own designer environment? Want to do true multitasking? Write real multithreaded applications? UNIX can do all this and far more. Even when you are some how able to do these things on another system they are cumbersome.

The class material is introductory. The student will be given the tools to begin your new life as a UNIX user.

#### **Who should attend:**

Anyone who has been - or thinks they might be - working in a UNIX environment but does not feel comfortable with UNIX commands.

*Grace Lossman has a M.S. in Physics and has been using SAS since the early 80's. Her love affair with UNIX started in the late 80's when she first saw the light and became a Unix convert. Later she acted in the capacity of System Administrator at NIEHS in Research Triangle Park, NC and then later at the Medical University of South Carolina in Charleston. She can offer the unique perspective of both UNIX Sysadmin and SAS programmer.*

### SAS Debugging Techniques

S. David Riba; JADE Tech, Inc.; Clearwater, FL

*Saturday Afternoon, 1:30-5:30pm*    **\$70**

From the novice SAS user to the seasoned SAS expert, all SAS programmers experience the ultimate thrill of debugging their software code. While debugging techniques may vary, everyone needs to understand how to debug their programs. Most programmers use a few simple techniques learned in their early exposure to SAS. However, the experienced programmer knows that different situations call for a variety of different debugging techniques.

- How do you determine if the problem is your code or your data?
- What are some simple techniques to test your program without processing reams of data?
- How can you define your programs so they error-check and modify themselves if errors occur?
- How can you trap errors and test your program logic "on-the-fly"?

This workshop will focus on several debugging techniques, from the very simple to the sophisticated, that will help you locate and resolve problems in your SAS programs. It is intended for all SAS users, from beginners to experienced users of the SAS System.

This workshop will concentrate on techniques for debugging Base SAS programs. Specific emphasis will be placed on the Data Step Debugger and how to use it. If time permits, part of the Workshop will be devoted to debugging SCL (Screen Control Language) and Macro language programs.

#### **Who Should Attend:**

Anyone who writes SAS programs. Some SAS experience required.

*S. David Riba is CEO of JADE Tech, Inc., a SAS Institute Quality Partner who specializes entirely in applications development, consulting and training in the SAS System.*

*Dave is the founder and President of the Florida Gulf Coast SAS Users Group. He chartered and served as Co-Chair of the first SouthEast SAS Users Group conference, SESUG '93, and serves on the Executive Councils of the SouthEast SAS Users Group and CONSUG, the Consultant's SAS Users Group. His first SUGI was in 1983, and he has been actively involved in both SUGI and the Regional SAS User Group community since then. He has presented papers and assisted in various capacities at SUGI, SESUG, NESUG, MWSUG, SCSUG, and PharmaSUG.*

*Dave is an unrepentant SAS bigot. His major areas of interest are efficient programming techniques and applications development using the SAS System. His SAS software product specialties are SAS/AF and FRAME technology, SAS/EIS, SAS/IntrNet, and CFO/Vision.*

## **Integrating SAS into an Intelligent Internet/Intranet Application**

Caroline Bahler; ASG, Inc.; Cary, NC

Sally Muller; UNC; Chapel Hill, NC

**Sunday Morning, 8:00am-12:00pm \$70**

Intelligent internet/intranet applications can be constructed utilizing Dynamic HTML and JavaScripts. This course will cover HTML, Dynamic HTML and JavaScript by taking the students through the steps required to create an interactive Web application. Section one of the course will cover all aspects of HTML and allow you to confidently create static Web pages. Section two of the course will cover all aspects of Dynamic HTML and the basics of using JavaScript to create interactive Web pages that submit SAS jobs and create static Web pages on the fly. The final section of the course will look at how to integrate HTML, Dynamic HTML and JavaScript to create an interactive and intelligent application.

*Caroline Bahler is a Senior Consultant in the Advanced Solutions Group of ASG, Inc. Her educational background is in ecology and she has a Ph.D. in Agronomy. Ms. Bahler has been using SAS for the past 18 years in both the research and business environments.*

*Sally Muller is the Manager of the Statistical Support group, a division of Academic Technology and Networks (ATN), at the University of North Carolina. Sally began using SAS software in 1978 and in 1987 became a SAS site representative. Since then she has taught over 20 million SAS introductory courses including "Putting Your SAS Application on the Web." Sally finds that even people with limited knowledge of HTML can learn to put their SAS applications on the Web. A desire to show the ease with which HTML, Dynamic HTML, and JavaScript can be used to create static and dynamic Web pages is the motivation of this paper.*

## **A SAS Programmer's View of the SAS Supervisor**

Ian Whitlock; Westat, Inc.; Rockville, MD

**Sunday Morning, 8:00am-12:00pm \$70**

Do you write SAS code without really knowing exactly how SAS will process your code? Then this mini-course is for you. It is intended to answer questions like:

- As a DATA step programmer, what do I need to know about the SAS supervisor and why?
- How does the SAS supervisor process DATA step code?
- How does a SAS MERGE work?
- What role should engines, indexing, and views play in my programs?
- What happens when my DATA step code contains macro variables?
- What if my DATA step invokes a macro or is contained in a macro?
- In short it is not intended to teach you SAS syntax, it is intended to help you think SAS.

For 10 years (1983-1992) Donald Henderson or one of his colleagues gave a fantastically successful tutorial about the SAS Supervisor at the SUGI conferences. Two years ago I presented a tutorial at SESUG building on those earlier articles and adding my own experience. In the words of one attendee, "The best session I went to was Whitlock's on the Supervisor. My only gripe was that it was way too short. I think this would make a good Sunday afternoon 2 hour session. For heaven's sake change the name of it - Supervisor sounds so dry. Call it something like "Why SAS Doesn't Do What I Tell it".

Are you ready for this course? Here is a test. Consider the code

```
data look ;
input x @@ ;
```



```

cards ;
1 1 2 2
;
data _null_ ;
  do while ( not last.x ) ;
    set look ;
    by x ;
    put _n_= ;
  end ;
run ;

```

What message is written to the log when this code runs? If you cannot answer the question without running the code, or want to know why after running the code, then this course is for you.

*Ian Whitlock is a senior systems analyst at Westat working on survey research problems. He has been programming largely in SAS since 1981 using an interactive environment to develop programs for execution in a batch environment. He is skilled in problem solving involving SAS macro, PROC SQL, reporting procedures and the DATA step. In addition to programming, he teaches SAS courses to Westat employees. He is active on SAS-L, and has presented many different papers at national, regional, and local SAS User Group meetings.*

## Connecting SAS to the Internet at a Price You Can Afford

Kenneth A. Hardy, Ph.D.; University of North Carolina at Chapel Hill; Chapel Hill, NC

Sunday Afternoon, 1:30-5:30pm **\$70**

Corporations, government agencies, educational institutions, and not-for-profits want to increase their use of the Internet to acquire and publish information. Organizations who use SAS to manage, analyze, and report information need to know how to interface SAS with Internet Web and FTP servers. This workshop will show you how to use SAS to read data from FTP sites and Web pages and write data directly to FTP sites. It will provide a brief overview of Web publishing using basic HTML and teach you how to turn SAS output into Web pages using the PUT statement and three page formatting macros freely available from SAS Institute. It will tell you which device drivers to use with SAS/GRAPH to produce graphs and maps for display on the Web. Most importantly, it will give you the knowledge necessary for creating dynamic Web pages with HTML forms and CGI scripts that run SAS tasks to create custom reports or analyses. It will also explain when using this "free" technique may be an alternative to paying for and using SAS/IntrNet.

*Kenneth Hardy is Associate Director for Information Systems at the Institute for Research in Social Science of the University of North Carolina at Chapel Hill. He has been a SAS user for over twenty-five years. In addition to academic research publications, he has presented many papers at SUGI and SESUG meetings. He has also co-authored books on topics ranging from the inequity of the death penalty to quantitative research methods for historians. His most recent book, written with Frank C. Dilorio, is Quick Start to Data Analysis with SAS. For the past three years, he has been writing Web-based applications using CGI scripts that use SAS and text searching software.*

## Merging, Combining, and Subsetting Files (Tricks, Traps, and Techniques)

Mal Foley; University of North Carolina at Chapel Hill; Chapel Hill, NC

Sunday Afternoon, 1:30-5:30pm **\$70**

This workshop is for anyone who manipulates SAS data sets. It covers a wide range of topics such as subsetting, concatenations, the IN= data set option, FIRST.variable, one-to-one merges, match merges, and fuzzy merges.

The workshop starts with the basics and continues to build up to complex and tricky examples of data set manipulation. The only prerequisite for the course is a working knowledge of the SAS DATA Step. Yet, this workshop will give intermediate and advanced programmers a great review and some surprises. Come see what mysteries lurk in manipulating SAS files!

*Mal Foley is a SAS Programmer/Analyst with the University of North Carolina at Chapel Hill. Mal has worked with clinical trial data for the past 10 years, and survey research data for more than 20 years. His career includes being an international computing consultant, a manager of several computing departments, and the CEO of his own computing company. He has taught dozens of computer programming courses at the undergraduate, graduate, and professional levels. He has published papers and given presentations at many regional SAS user's groups and SUGI.*

# SHERATON NORFOLK WATERSIDE HOTEL - RESERVATION REQUEST FORM

SESUG 98  
September 13 - 15, 1998

Guest Name :

(Last) \_\_\_\_\_

(First) \_\_\_\_\_ (M.I.) \_\_\_\_\_

Company / Affiliation : \_\_\_\_\_

Mailing Address : \_\_\_\_\_

City : \_\_\_\_\_

State : \_\_\_\_\_

Zip Code : \_\_\_\_\_

Address is (Check One) : \_\_\_\_\_ Home \_\_\_\_\_ Business

Daytime Phone: (\_\_\_\_\_) \_\_\_\_\_ Fax: (\_\_\_\_\_) \_\_\_\_\_

Arrival Date : \_\_\_\_ / \_\_\_\_ / 1998

Departure Date : \_\_\_\_ / \_\_\_\_ / 1998

Arrival Time : \_\_\_\_\_

Credit Card : (Type) \_\_\_\_\_

(Number) \_\_\_\_\_

(Expiration) \_\_\_\_\_

(Signature) \_\_\_\_\_

Room Type :

(Single) \_\_\_\_\_ ( \$99 / night )

(Club Single) \_\_\_\_\_ ( \$114 / night )

(Double) \_\_\_\_\_ ( \$99 / night )

(Club Double) \_\_\_\_\_ ( \$114 / night )

(Parlor Suite) \_\_\_\_\_ ( \$350 / night )

(Wetbar Suite) \_\_\_\_\_ ( \$450 / night )

(Government) Prevailing rates - call hotel for details and reservations

For Double Occupancy : (check one) \_\_\_\_\_

(King - 1 bed)

(Double Beds)

Name of Additional Person : \_\_\_\_\_

Smoking Preference : (check one) \_\_\_\_\_

(smoking)

\_\_\_\_\_ (nonsmoking)

**Sheraton Norfolk Waterside Hotel - Reservation Request Form**  
**SESUG 98**  
**September 13 - 15, 1998**

**Notes:**

- Rates are in effect from **September 4 - October 8, 1998**. Reservations must be made prior to **August 24, 1998** in order to take advantage of the special SESUG '98 rates. There are a limited number of rooms available at the special SESUG '98 rate. The rate for remaining rooms at the hotel will be higher - if any are available.
- All rooms are subject to applicable taxes, which are currently 11.5%.
- Check-in time is 3:00pm. Check-out time is 12:00 Noon.
- Failure to notify the Sheraton Norfolk Waterside Hotel of a change in arrival date or time may result in full cancellation.
- Reservations must be guaranteed on a major credit card or with first night's deposit. Reservations not guaranteed are subject to cancellation after 4:00pm. Cancellations must be made within 72 hours of arrival in order to receive a refund of deposit.
- For additional information or to make reservations by phone, please call the Sheraton Norfolk Waterside Hotel directly at (757) 622-6664. Alternatively, before August 1, call the Omni National Reservation Number at (800) THE-OMNI. After August 1, call the Sheraton National Reservation Number at (800) 325-3535.

Mail this form to:           **Sheraton Norfolk Waterside Hotel**  
  **Attn: Reservations Department**  
  **777 Waterside Dr.**  
  **Norfolk, VA 23510**

or fax to:                       **(757) 625-8271**

***IMPORTANT: Only hotel reservations should be mailed/faxed to this address !***

## SESUG '98 CONFERENCE REGISTRATION FORM

Sheraton Norfolk Waterside Hotel, Norfolk, Virginia September 13 - 15, 1998

Please complete **all** sections (**both sides**) of this form. Fill out one form per attendee. Use additional forms to register more than one person (a photocopy is acceptable).

The Conference Registration Fee entitles you to access to all SESUG '98 presentations and demonstrations, complimentary beverages at morning and afternoon breaks, access to a reception and a mixer, and admission to the Opening and Closing Sessions. It also includes a copy of the Conference Program and Conference Proceedings, other assorted giveaways, and beverage coupons for use at the reception and the mixer. The Conference Registration Fee **does not** include Weekend Workshops, the CONSUG meeting, lodging, or transportation.

### Section 1 : Fees

#### Conference Registration (*Required*)

<b>Early Registration</b>	<b>\$180</b>	_____
<i>(payment must be received by August 7, 1998)</i>		
<b>Regular Registration</b>	<b>\$210</b>	_____
<i>(payment must be received by August 28, 1998)</i>		
<b>On-Site Registration</b>	<b>\$250</b>	_____
<i>(if payment received after August 28, 1998)</i>		

#### Optional Events

<b>Saturday Afternoon Workshops (concurrent - select one):</b>	<b>\$ 70</b>	_____
_____ Religion 101: UNIX for Non-believers		
_____ SAS Debugging Techniques		
<b>Sunday Morning Workshops (concurrent - select one):</b>	<b>\$ 70</b>	_____
_____ Integrating SAS into an Intelligent Internet/Intranet Application		
_____ A SAS Programmer's View of the SAS Supervisor		
<b>Sunday Afternoon Workshops (concurrent - select one):</b>	<b>\$ 70</b>	_____
_____ Connecting SAS to the Internet at a Price You Can Afford		
_____ Merging, Combining, and Subsetting Files		

#### Total Amount Enclosed

=====

**Luncheon** (no additional charge - select preference) :

\_\_\_\_\_ **Monday**    \_\_\_\_\_ **Tuesday**    \_\_\_\_\_ **Don't want a free lunch**

## Section 2 : Payment

Payment must be made in U.S. currency. Please make checks payable to "SouthEast SAS Users Group". The SESUG Federal Tax Identification Number is 59-3122815.

Full refunds of all fees identified in Section 1 will be made if written notification is received by **August 21, 1998**. Please contact the Registrar at the address below. No refunds will be issued after **August 21, 1998**.

Check One:  Purchase Order is enclosed  
 Money Order is enclosed  Check is enclosed  
 Credit card payment, circle one: MC Visa AmEx Discover Diner s  
 Card Number: \_\_\_\_\_  
 Exp.Date: \_\_\_\_\_ Signature: \_\_\_\_\_

## Section 3 : Demographics

**Note:** First Name, Last Name, Company / Affiliation, City, and State will appear on your conference badge as you list them.

First Name : \_\_\_\_\_ Last Name : \_\_\_\_\_

Company / Affiliation : \_\_\_\_\_

Mailing Address : \_\_\_\_\_  
 \_\_\_\_\_

City : \_\_\_\_\_ State : \_\_\_\_\_ Zip Code : \_\_\_\_\_

Daytime Phone : (\_\_\_\_) \_\_\_\_\_ Fax : (\_\_\_\_) \_\_\_\_\_

E-mail : \_\_\_\_\_ Number of SESUG conferences attended: \_\_\_\_\_

Please let us know of any special needs you might have, such as hearing, mobility, or sight impairment. Attach a separate sheet to this Registration Form with details.

Return this form with payment to: <b>SESUG 98</b> Attn: Kathy Finch 122 West Oak Hill Dr. Florence, AL 35633-1013	<b>OR</b> fax this form to: <b>SESUG 98</b> Attn: Randy Finch (256) 386-3799	<b>OR</b> fill out the Web registration form at: <a href="http://www.uga.edu/~sesug">http://www.uga.edu/~sesug</a>  If using fax or Web registration, mail payment to address at left.
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If **paying by credit card**, you can **register by phone at (256) 764-1726**. Use this **same number for questions** about registration. This registration and information telephone line can be used from **9:00 AM to 5:00 PM CST Monday through Friday**.

NOTE: Only Conference Registration Forms and Fees should be sent to this address. **CONSUG and hotel reservation requests are to be sent to their respective addresses.**

# SESUG POLICIES AND PROCEDURES

## CONFERENCE PARTICIPATION GUIDELINES

The annual SouthEast SAS Users Group (SESUG) Conference is primarily an educational gathering for the benefit of its attendees. SESUG recognizes that the majority of attendees are present as representatives of their employers for this purpose. Accordingly, SESUG does not condone, endorse, or encourage activities that may conflict with the educational nature of the conference. All attendees and vendors are expected to abide by the Policies and Procedures set forth in this document.

### Paper Content

Users are urged to present papers describing real world applications using SAS Institute software. SESUG also accepts a limited number of theoretical and general overview papers. Acceptance of all presentations is at the discretion of the Conference Co-chairs.

Oral presentations and written papers describing products or services of a commercial nature may only be presented at the conference if:

1. They describe how that product relates to the use of SAS Institute software
2. They do NOT include price lists, support commitments, or other material of a promotional or sales nature.

### Right of Withdrawal

The SESUG Executive Council and the Conference Co-chairs reserve the right to determine if any activity is in violation of these Guidelines. They may, at their option, direct the withdrawal of a presentation or demonstration or the dismissal of a SESUG attendee from the conference.

### Marketing and Recruiting

Any person or entity wishing to market their products / services or whose presence is primarily to recruit attendees at the annual SESUG conference must register as a vendor. Registered vendors are expected to conduct themselves with professionalism. The SESUG Executive Council (EC) reserves the right to refuse any or all vendor registrations.

In addition to, or in lieu of, a physical presence at the annual SESUG conference, vendors may choose to have a virtual presence through means of advertising. Advertising opportunities are delineated below and do not require separate registration of the vendor.

1. The Conference Program may include printed vendor advertisements. All advertising is accepted at the discretion of the SESUG Conference Co-chairs. A fee may be assessed.
2. Sales literature and promotional items may only be distributed to conference attendees in an approved manner. Items for distribution must be submitted to a designee of the Conference Co-chairs and are subject to approval of form and content. A fee may be assessed.
3. Vendors who wish to sponsor the goals and aims of SESUG may be recognized publicly at the discretion of the Conference Co-chairs.

Distribution of sales literature and other promotional items will be limited to the above procedures. The Conference Co-chairs will issue specific requirements (e.g.- content, deadlines, and costs) for these vendor promotional opportunities.

SESUG does not condone, endorse, or encourage unauthorized hospitality suites or other similar unauthorized activities. In the event of any questions of interpretation, the decision of the Conference Co-chairs will apply.

Non-registered vendors may not engage in any direct marketing or sales effort at the conference.

## CONFERENCE CHECKLIST

- ⇒ **Register and pay for the conference.** See the Registration Form on **pages 71-72** for details. This step is **required!**
- ⇒ **Arrange transportation** (see **page 2** for contact information for **Harbourside Travel Services, Inc.**).
- ⇒ **Make reservations** at the Sheraton Norfolk Waterside Hotel (see **pages 69-70** for reservation form), the Clarion Hotel, or another hotel of your choice.
- ⇒ **Sign up** for the **CONSUG meeting (page 3)**. This step is **optional**.
- ⇒ **Sign up** for your choice(s) of **Weekend Workshops (page 66)**. This step is **optional**.
- ⇒ Bring a credit card, personal check, cash, or purchase order to take advantage of the Conference's **15% discount on SAS Institute books**.

## DATES TO REMEMBER

June 15, 1998	Registration opens
August 7, 1998	Last day for discounted Early Registration rate
August 21, 1998	Last day to cancel your conference registration and receive a refund
August 24, 1998	Last day SESUG room rates are honored at the Sheraton Norfolk Waterside Hotel
August 24, 1998	Last day SESUG room rates are honored at the Clarion Hotel
August 28, 1998	Last day regular Registration rate is in effect
September 13-15, 1998	<b>SESUG '98!</b>

## **SESUG 97 ATTENDEES SAID:**

- ☺ **"Overall, I learned a great deal at the conference."**
- ☺ **"I really enjoyed and learned a lot from Shop Talks."**
- ☺ **"As a beginning SAS user I was really impressed with all I learned."**
- ☺ **"Thank you! Well done! Organized, well executed. Had a great time. Good balance between sessions and free time."**
- ☺ **"SAS Institute sent exceptionally knowledgeable people. In smaller group [they were] easier to access."**
- ☺ **"Loved it."**