SIGAda '99

Redondo Beach, CA
October 17-21, 1999

The Engineering of Industrial Strength REAL-TIME Software & DISTRIBUTED Systems Using Ada and Related Technologies

Sponsored by ACM's Special Interest Group on the Ada Programming Language, In Cooperation With Ada-Europe (approval pending)

ACM SIGAda's Annual International Conference:

Preliminary Advance Program

Tutorials, Keynoters, and Workshops
Registration Form enclosed

The Conference Theme

Continuing breakthroughs in the hardware arena, coupled with steady advances in network connectivity, are not only opening new opportunities for application developers, but also are presenting major challenges for their designers. This conference will address these opportunities and challenges as it focuses on the engineering of real-time software and distributed systems using Ada and related technologies. This conference will specifically address the complexities of developing reliable, robust, and efficient distributed and/or real-time applications. It will include technical papers, experience reports, panels, and workshops that should help you better address the complexities you are facing with your real-time and distributed systems. The full conference program will be available mid-June and will also be found on the SIGAda'99 Conference Home Page.

TUTORIALS

SIGAda '99 will offer two days of outstanding technical tutorials led by some of the most respected technical leaders in the industry. More than a dozen half and full-day sessions have been selected to meet the needs of software developers in today's demanding environments.

Our tutorial program features a full line-up of Ada 95 and object-oriented technology sessions and covers a broad range of disciplines including systems and software engineering, software process standards-based development, architecture, software tools, reuse, and the World Wide Web.

(See page 2 for Tutorial Descriptions)

WORKSHOPS

Focused workshops will be conducted at varying times during the five days of the conference. Workshops currently in planning include Real-time Design Issues, Pattern Reuse, and ASIS Full workshop descriptions will be on the conference website in mid-June, and workshop participation will be free to conference registrants.

EXHIBITORS

SIGAda '99 will include vendor participation, featuring presentations on their products and services. For specific information, please contact the Exhibits Chair:
Dr. Ben Brosgol Tel: +1 781 221-7317
Fax: +1 781 270-6882

Email: Brosgol@aonix.com

GRANTS TO EDUCATORS

As in past years, SIGAda is offering grants to educators to attend the conference. Grants cover the registration and tutorial fees; travel funds are not available. Details on the grant program are available from:
Prof. Michael B. Feldman Tel: +1 202 994-5919
Fax: +1 202 994-0227
Email: mfeldman@seas.gwu.edu or see:
http://www.acm.org/sigada/conf/sigada99/grants.html

Full Conference Program available mid-June
http://www.acm.org/sigada/conf/sigada99

CONFERENCE KEYNOTE SPEAKERS

John McCormick (University of Northern Iowa)

Ada, Model Railroading, and Software Engineering Education

Computer science educators can help recruit and educate good students by providing sound academic projects that put a real thrill into computing. But how can a small student team specify, design, code, and test a 15,000 line real-time project in just 15 weeks? By using Ada of course! And using it to control a large model railroad.

Bran Selic (ObjecTime)

Architectural Patterns for Complex Real-Time Systems

The architecture of a software system refers to the highest form of organization within a system, including identification of the principal components, mutual relationships, and rules that constrain their behavior. This talk describes a set of complementary design patterns suitable for defining the architectures of dynamic multi-layered real-time systems, and demonstrates how the Unified Modeling Language (UML) can be used as a formal architectural description language.

Barry Boehm (University of Southern California)

Predicting the Future of Computer Systems and Software Engineering

Barry will summarize trends, key needs, and predictions distilled from the 21st International Conference on Software Engineering (ICSE 99) in May, with special focus on the findings from his closing "Futures" panel featuring well known experts and influence-makers.

CONFERENCE OFFICERS

General Chair, **Hal Hart,**
TRW (Hal.Hart@acm.org) +1-310-764-6880

Program Committee:
Co-Chair, **Tucker Taft**,
AverStar (stt@averstar.com)

Co-Chair, **Franco Gasperoni**,
Ada Core Technologies & ACT-Europe
(gasperon@gnat.com)

Exhibits Chair, **Ben Brosgol**,
Aonix (brosgol@aonix.com)

SIGAda Vice Chair
for Meetings and Conferences, **Currie Colket**,
Consultant (colket@acm.org)

Tutorial Chair, **David Cook**,
C.S. Draper Laboratory (cookd@software.hill.af.mil)

Publicity Chair, **David Harrison**,
Consultant (dharrison@acm.org)

Publicity Co-Chair, **William Thomas,**
MITRE (bthomas@mitre.org)

Conference Treasurer, **Ed Colbert**,
Absolute Software (colbert@abssw.com)

Proceedings Editor, **Clyde Roby**,
Institute for Defense Analysis (roby@IDA.org)

Workshops Co-Chair, **Judy Kerner**,
The Aerospace Corporation (Judy.Kerner@aero.org)

Workshops Co-Chair, **Frank Belz**,
TRW (Frank.Belz@TRW.com)

Education WG Chair, **Michael Feldman**
George Washington University (mfeldman@seas.gwu.edu)

Local Arrangements Chair, **A. Winsor Brown**,
USC (AW.Brown@sunset.usc.edu)

SIGAda '99 TUTORIAL PROGRAM

Sunday Full-Day Tutorials (Noon – 7:00pm)

SF1: High Integrity Ada Tasking, *John S. Harbaugh*

The outlook for embedded systems has never been more exciting! Fast processors and cheap memory are fueling an explosion of sophisticated applications, from "smart cards" to drive-by-wire automobiles to integrated e-phones. Recent research has led to a compact and reliable tasking model, the so-called Ravenscar profile, designed specifically for high-integrity, efficient, real-time systems. In this tutorial, attendees will learn how to write concurrent (multi-threaded) applications that are consistent with the Ravenscar profile, while using Ada95. Students will also learn how to assure that real-time programs will meet their deadlines using Rate Monotonic Analysis.

SF2: Implementing Design Patterns in Ada95, *Matthew Heaney*

The patterns movements, made popular by the book *Design Patterns*, is sweeping across the software community. In this tutorial, attendees will learn how to implement design patterns in Ada95. This tutorial is illustrated with myriad idioms for module structure, object-oriented programming, data synchronization, and inter-process communication. In essence, participants will learn techniques that facilitate the construction of large software systems written in Ada 95, including patterns for distribution and real time.

SF3: Introduction to the Personal Software Engineering Project Management Process (PPMP), *A. Winsor Brown*

PPMP is a provenl way to expose software engineers to the software management activities of estimating, planning, and tracking, also covering the popular Personal Software Process (PSP) approach to process definition and development. PPMP, like PSP, focuses on individual skills, these scale up across trained developers to provide excellent organization performance in the Software CMM's Key Process Areas (KPAs). This tutorial includes seven simplified in-class exercises to reinforce the training, and also provides participants with tools and techniques to increase personal productivity in other areas such as writing and software development. *(See Monday tutorial MF3 for a logical follow-on.)*

SF4: SW-CMM Version 2- The New Capability Maturity Models & CMM-Integration Initiative Status, *Rick Hefner*

Software-CMM Version 2 and the CMM Integration (CMMI) initiative are changing the rules of the game about "Level 3" etc. For almost a decade the SW-CMM has been a business imperative for improving and assessing contractor and commercial organizations' software processes and capabilities. The joint industry-Government CMMI project is developing a suite of integrated capability maturity models (CMMs) to support multi-discipline (software, systems engineering, integrated product development, etc.) process and product improvement. These models are planned to replace the disparate CMMs currently used by industry sometime in 2000. Fall'99 will be the right time to assess impacts on organizations already comforming to SW-CMM Ver.1.1 and previous System Engineering models. This tutorial will cover the current state of the CMMI project, including the changes in models' content and structure (with emphasis on SW-CMM Version 2), assessment methods, available training materials, and strategies for transition to the new CMMI framework.

SF5: From Here to UML: The New "Standard" for OO, *Shan Barkataki*

The Unified Modeling Language (UML), the result of collaboration by Booch, Rumbaugh & Jacobson to merge their OO notational methods, is a new ANSI and ISO standard modeling language for software development, and is certain to play a significant role in future software projects. Participants in this tutorials will gain an understanding of the UML concepts and techniques, and be able to convert and augment existing OMT/Booch/Coad-Yourdon models to UML. In addition, attendees will be able to create analysis and design models using UML, and perform critical evaluation of UML work products. Participants should be familiar with any 3rd generation object-oriented method.

SF6: Java for Ada Programmers, *Ben Brosgol*

This tutorial will consist of four parts: Part One will cover Java fundamentals, basic properties of classes, and run-time models. Part Two will cover lexical properties, expressions and statements, data type topics, and OOP (inheritance, polymorphism, dynamic binding, and interfaces). Part Three will cover exceptions, threads, and advanced OO features (such as cloning and inner classes). Part Four will cover the Abstract Windowing Toolkit and applets. Participants will know how to write Java applications and applets after this tutorial, and also will understand how Java conpares with other languages, particularly Ada. Knowledge of Ada 83 or Ada 95 is useful for this tutorial.

SF7: Introduction to the Ada95 Programming Language, *David A. Cook and Leslie Dupaix*

This tutorial is designed to be a gentle introduction to the Ada 95 programming language. It assumes no knowledge of the language, although some experience in another high-level language would be helpful. Rather than focusing on the syntax of Ada, this tutorial focuses on the concepts of the language, such as: typing; tasking (parallel processing); exception handling; object-oriented programming; and packaging. This tutorial is designed to inform participants about the strength of the Ada language, and to discuss why Ada should be used for code that requires reliability and maintainability.

FREE For SIGAda Volunteers

(7:30-10:00pm):* Introduction to Web Technologies for Effective Dissemination of Information, *Currie Colket, Clyde Roby, Brad Balfour, and John McCormick

This tutorial is oriented towards providing the basic information to effectively disseminate information using the World Wide Web. The tutorial addresses effective designs for web pages, the use of html for developing web pages, incorporation of graphics, and using ftp and automated tools (both UNIX and PC-based) to streaming the dissemination process. Strategies for announcements, configuration management, mailing lists, and databases are addressed. The ACM host machine will be used as a model. Although this tutorial is specifically designed to support the needs of SIGAda Working Groups and SIGAda Chapters, the information will be useful to all interested in learning how to set up a WWW home page. (Send email to: colket@acm.org if interested in participating.)

Monday Full-Day Tutorials (9am – 5:30pm)

MF1: Embedded-Real-Time Ada 95, *Pat Rogers*

This tutorial focuses on the use of Ada in applications in which reliability and timeliness are of utmost importance. This tutorial examines the approaches, advantages, and problems of Ada for real-time systems, and examines the role of the compilation and runtime support system. The course covers models for reliable storage management, and the two most popular strategies for dealing with processor management: Cyclic Executive model and the Rate-Monotonic Analysis (RMA) model. Other topics include Ada's user-defined storage management capabilities, RTSE tailoring, and the Real-Time and systems Programming Annexes.

MF2: Real-Time and Non-Real-Time CORBA Programming for Ada 95, *Brad Balfour*

This tutorial is aimed at Ada 95 developers interested in using CORBA technology in their Ada 95 applications to create high-performance distributed client/server applications and/or to mix Ada 95 with other languages on heterogeneous computing platforms. Familiarity with object-oriented programming in Ada 95 will be helpful, but not required. No experience or knowledge of CORBA is assumed.

MF3: A Guided Tour of the Personal Software Process for Ada (PSPA), *A. Winsor Brown*

PSPA teaches the popular Personal Software Process (PSP) using Ada, for which PSP is especially well suited. PSP, generally taught as independent of language and design technique, demonstrates in the small the integration of process and product engineering, with explicit activities aimed to enhance reuse, high-quality development, and software evolution. PSPA exploits Ada's source code structuring and strong typing to accelerate PSP's productivity and quality improvements. Via a combination of lecture, discussion, and in-class exercises, participants jump start their understanding of PSP's advanced tools and techniques, including faster personal reviews. *(See Sunday tutorial SF3 for a complement to this tutorial -- not a prerequisite.)*

Monday Morning Tutorials (9am – 12:30pm)

MA1: Using GNAT for the Java platform, *Gary Dismukes*

The objective of this tutorial is to teach how to write Ada applications for the Java platform using JGNAT (the GNAT Ada 95 toolchain for the Java Virtual Machine). Topics covered will include GNAT basics, concurrency, real-time programming, and interfacing native Ada code to Java. In addition, attendees will understand how to achieve seamless interoperability between Ada and Java, along with use of the Java API (Applications Programming Interface). Attendees should have a reasonable understanding of Ada, and knowledge of object-oriented programming in Ada is helpful, but not required.

MA2: Systems Programming in Ada, *Bryce Bardin*

This is a comprehensive tutorial on the elements of real-time systems programming in Ada. Attendees will learn how to write low-level, hardware-dependent programs in Ada95. Topics will include how Ada addresses some of the many concerns of real-time systems programming. Some of the concerns are: dealing efficiently with hardware and external devices; memory leaks and storage management; control over data structures and the representation of data; interfacing with other languages; timing; and techniques for maximizing portability within the systems programming domain. Attendees should have knowledge of Ada83 or Ada 95.

MA3: Software Metrology Basics, *Hans-Ludwig Hausen*

The overall aim of this tutorial is to make attendees familiar with the methods and principles of software metrics for procedural, object-oriented, and agent systems. Attendees will exercise proven techniques for goal directed measurement. Topics covered also include scaling and assessment as part of an industry proven, standardized procedure for concurrent software quality assurance and final evaluation for certification. This tutorial includes basic principles of measurement and metric, metrics-based quality engineering, and language-based metrication (how metrics can be effectively integrated into compilers or interpreters).

Monday Afternoon Tutorials (2-5:30pm)

MP1: Building Ada Development Tools with ASIS-for-GNAT, *Sergey Rybin and Vasily Fofanov*

This tutorial will explain how you can build your own development and program analysis tools when working with GNAT. The existing GNAT toolset and different approaches to tool development will be presented. The use of the Ada Semantic Interface Specification (ASIS) as a tool-building technology is covered in detail. The discussion will also provide examples of ASIS-based tools and the ASIS implementation for GNAT. Participants should have a good understanding of Ada semantics. Basic experience in programming with GNAT is helpful, but not required.

MP2: Windows Development with Ada, *Orjan Leeringe*

This tutorial demonstrates how Microsoft Windows applications can be developed using Ada95. The working principles of Windows are presented, by showing how Windows programs traditionally are built using C. The tutorial goes on to show how these programs can be written just as well (or better) using Ada and the Win32Ada binding. Since OO frameworks like the Microsoft Foundation Classes (MFC) provide access to Windows on a higher (and more structured) level than programmer-managed loops, MFC principles and an Ada binding are also featured. Other tools and bindings for Windows applications (such as Claw from R&R software, and GUIBuilder from Aonix) are presented.

MP3: MetaH, an Architecture Description and Implementation Language and Toolset, *Bruce A. Lewis*

MetaH is a powerful technology for rapidly developing and evolving high assurance systems in Ada. MetaH was developed by DARPA and Honeywell, and is the basis for a standard Avionics Architecture language by the Society of Automotive Engineers. Attendees will understand how to use MetaH to specify: how code modules are combined to form an application; target behavior; the hardware target system; and how the software is allocated to the hardware. This tutorial assumes a general understanding of embedded time-critical system and software development methods. Expertise in Ada is not required.

For more detailed information, select "Tutorials" from http://www.acm.org/sigada/conf/sigada99/

To register online, select "Registration" from http://www.acm.org/sigada/conf/sigada99/

SIGAda '99

Advance Registration Form

October 17 - 21, 1999

First Name (Dr/Mr/Mrs/Ms.) Middle Initial Last Name

Title

Badge Name (as you wish it to appear)

Organization/Affiliation

Address

City State/Province

Zip/Postal Code Country

Telephone Fax

E-mail

Sponsoring or Cooperating Society Member No. _____

You must provide your membership number above to qualify for discount. If you are not a member, join ACM & SIGAda now, and save money!

ACM & SIGAda Membership

- ☐ ACM Associate Membership (special rate) $67
- ☐ SIGAda Membership Only (non-ACM) $25
- ☐ Add SIGAda to ACM Membership $25
- ☐ ACM Student Membership $27
- ☐ Add SIGAda Student to ACM Student Membership $10

Total Membership Dues $_____

"To advance the sciences and arts of information processing, to promote the free interchange of information about the sciences and arts of information processing both among specialists and among the public, and to develop and maintain the integrity and competence of individuals engaged in the practice of information processing. As an ACM member, I subscribe to the purposes of ACM".

Signature _____ Date _____

RATE SCHEDULE (circle the applicable fees)

	Member		Non-Member		Full-Time Student	
	On/Before Sep 18	After Sep 18	On/Before Sep 18	After Sep 18	On/Before Sep 18	After Sep 18
Conference - Three Days	$350	$495	$500	$600	$50	$50
Conference - Any One Day	$225	$225	$225	$225	$50	$50
☐ TUE ☐ WED ☐ THU						
Tutorials - Two Days	$425	$525	$500	$600	$50	$50
Tutorials - One Day or 2 Half Days	$300	$400	$375	$475	$25	$25

Tutorials are assigned first-come, first-served. Please circle the chosen tutorials in the Tutorial Selections box. Avoid scheduling conflicts.

TUTORIAL SELECTIONS PAP

(circle tutorial numbers)

Sunday Full-day

SF1 SF2 SF3 SF4 SF5 SF6 SF7

Monday Full-day	MF1	MF2	MF3
Monday Half-day AM	MA1	MA2	MA3
Monday Half-day PM	MP1	MP2	MP3

Alternate tutorials will be assigned only if you provide a prioritized list of alternative tutorials

Conference: Includes entry to all conference sessions, exposition, Tuesday Evening Reception, and one copy of Proceedings.
Conference - Any One Day: Includes entry to conference sessions, exposition, Tuesday Evening Reception, and one copy of Proceedings.
Tutorials - Two Days: Includes tutorial sessions totalling 2 days, exposition, and a Full Tutorials Book.
Tutorials - One Day: Includes entry to one full-day or two half-day tutorial sessions, exposition, and a Full Tutorials Book.

- ☐ Special Needs (please specify if any):
- ☐ Check here if you do NOT want your address distributed.

Cancellation Policy: Confirmed registrants who cannot attend, and do not send a substitute, are entitled to a refund of paid fees (less a $50 processing fee) if a request is received in writing on or before September 18, 1999. Registrants are liable for their full fees after that date.

Those registered before 15 September 1999 will receive confirmation by fax or mail.

PAYMENT COMPUTATION

- ☐ Conference Fee ..... $ _____
- ☐ Tutorials Fee ..... $ _____
- ☐ Membership Dues ..... $ _____
- ☐ Additional Full Tutorials Book: _____ copies x $75 ..... $ _____
- ☐ Additional Proceedings: _____ copies x $50 ..... $ _____
- ☐ Additional Tuesday Evening Reception: _____ tickets x $40 ..... $ _____

TOTAL FEES ENCLOSED $ _____

Mail Form with payment to:
ACM SIGAda '99
c/o Registration Systems Lab
2060 Goldwater Court
Maitland, FL 32751

Fax to: +1-407-628-3186

Faxed forms must include credit card payment information. Phone registrations are not accepted. For registration inquiries only, please call +1-407-628-3602 or e-mail: mann@regmaster.com

For additional information or to **register on-line**, visit our web site at:

http://www.acm.org/sigada/conf/sigada99/

PAYMENT OPTIONS

IMPORTANT: Your signature indicates your agreement to pay the conference fees with the credit card number you specified below. Please be advised that this transaction will be described on your monthly statement as a charge from **REG.SYS.LB/CONFERENCE FEE.**

Card Nr. _____ Good Thru: _____

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Please return this form **with full payment or it cannot be processed**.

- ☐ Check payable to **ACM SIGAda '99**
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HOTEL RESERVATIONS

A block of rooms has been set aside for SIGAda '99 Conference attendees at the rate of **$119** (USD) single/$129 double per night. A portion of this block will be available at the then-prevailing Government rate. Rooms in this block will be available at this rate until September 18, 1999, after which the Conference rate or room availability cannot be guaranteed. Register early to obtain the Conference rate. Please make your Hotel reservations directly with the hotel. **Crowne Plaza Redondo Beach & Marina Hotel, 300 North Harbor Drive, Redondo Beach, CA 90277 (800) 369-9760 (US & Canada) +1.310.318.8888 (all Others)**

ACM *SIGAda'99*

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SIGAda '99

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October 17-21, 1999
Tutorials: Sun/Mon, Oct. 17-18
Conference: Tue/Thu, Oct. 19-21

Annual International Conference

PRELIMINARY ADVANCE PROGRAM

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Registration opened
1 May 1999

For the latest updates, please visit the *SIGAda '99* Website:
http://www.acm.org/sigada/conf/sigada99/