SIGAda 2011 Final Program

ACM Annual International Conference on Ada and Related Technologies: Engineering Safe, Secure, and Reliable Software

Magnolia Hotel
Denver, Colorado 80202 (USA)
November 6-10, 2011

Sponsored by the ACM Special Interest Group on the Ada Programming Language (SIGAda)
in cooperation with Ada-Europe, Ada Resource Association, and ACM Special Interest Groups on Embedded Systems, Programming Languages, Computers and Society, and Computer Science Education

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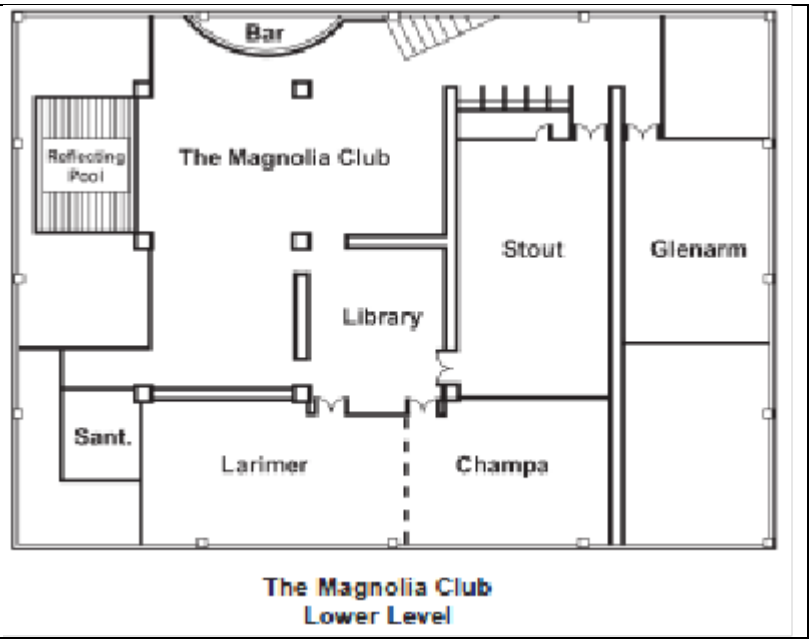
Conference Center and Meeting Room Map



The Magnolia Club
Lower Level

ACM SIGAda Annual International Conference
Conference At A Glance

Sunday, November 6, 2011 – Conference Tutorials	
08:00 am – 09:00 am	**Registration**
09:00 am – 05:30 pm	Tutorials
Monday, November 7, 2011 – Conference Tutorials	
08:00 am – 09:00 am	**Registration**
09:00 am – 05:30 pm	Tutorials
07:00 pm – 10:00 pm	SIGAda Extended Executive Committee (EEC) Meeting, open to all
Tuesday, November 8, 2011 – Main Conference	
08:00 am – 09:00 am	**Registration**
09:00 am – 05:30 pm	Conference Program
10:30 am – 04:30 pm	Sponsor Exhibits
07:00 pm – 10:00 pm	Evening Reception - Denver Art Museum
Wednesday, November 9, 2011 – Main Conference	
08:00 am – 09:00 am	**Registration**
09:00 am – 05:30 pm	Conference Program
10:30 am – 02:00 pm	Sponsor Exhibits
07:00 pm – 10:00 pm	Workshops
Thursday, November 10, 2011 – Main Conference	
08:00 am – 09:00 am	**Registration**
09:00 am – 12:00 noon	Conference Program
12:00 noon	Closing Comments & Conference Adjournment

Join the SIGAda Extended Executive Committee meeting
on Monday November 7, from 7 pm – 10 pm in the Larimer Room
Open to All Attendees

Get the maximum visibility of your hard work and research! Publish in ACM Ada Letters.

ACM (100,000 members), the world's largest educational and scientific computing society, delivers resources that advance computing as a science and a profession. ACM provides the computing field's premier Digital Library and serves its members and the computing profession with leading-edge publications, conferences, and career resources.

ACM Ada Letters journal is a great place to submit articles on your experiences with the language, tips on usage, as well as success stories using Ada. ACM Ada Letters issues (except the most recent one) are available free of cost on the ACM Digital Library website.

Ada Letters is published three times a year. You can submit a Microsoft Word or Adobe PDF file (with 1" margins and no page numbers) to the Technical Editor: Pat Rogers, Ph.D. (AdaCore); Rogers@AdaCore.Com
For other questions, please contact the Managing Editor: Alok Srivastava, Ph.D. (TASC Inc.); Alok.Srivastava@auatac.com

Welcome to SIGAda 2011
From the SIGAda, Conference and Program Committee Chairs

Welcome to the 2011 Annual International Conference of ACM's Special Interest Group on Ada (SIGAda), being held in Denver, Colorado - USA.

We offer you a conference featuring a top-quality technical program focused on important strengths of Ada: distributed, real-time, and embedded systems. The visions of these systems reflected in Ada's original requirements in the 1970s have expanded in almost unimaginable ways with Ada 95, Ada 2005, and the soon to be finalized Ada2012 and continue to be objects of envy by those in the programming language community who understand what the strengths of a language bring to implementers in terms of efficiency, reliability, and effectiveness.

Software challenges remain dominant in these domains with rapid hardware advances. Most other languages fail to meet the needs identified as far back as the 1978 Steelman, being able at best to do only 3/4 of the needed functions while Ada performs over 95%. Ada's track record of reliability, efficiency, robustness and all-around success is unparalleled at solving real-time and/or distributed system challenges. Ada is used in air traffic control systems, space/satellite systems, most modern jetliner avionics, high-speed ground transportation systems, and battle automation systems. As such, it is an important part of world's economies, transportation and defenses.

Three days of technical papers, keynotes, and invited presentations will report how these successes are achieved and where remaining issues are leading. We are fortunate to have leaders in the software engineering community to provide keynote addresses to set the tone for our conference. Beyond the formal conference of selected papers and presentations, SIGAda 2011 also offers workshops and tutorials with the same duality of on-theme and complementary topics. SIGAda's tutorials provide full-day or half-days on selected topics to enhance one's professional development. SIGAda's workshops allow those working the same issues to share with each other and leverage everyone's accomplishments; workshop products are "delivered" to the community.

The broad offerings of career-enhancing tutorials include basic Ada 2005 introductions for software engineers new to Ada, intermediate and advanced Ada topics for practitioners striving to expand their Ada expertise, and several language-independent technology topics. These topics are often coupled with Ada technology because only Ada's full and complete definition allows one to indicate what is expected, and to show that it can be achieved.

Join us in understanding how these topics mutually support the disciplined development and evolution of serious, high quality software systems. Finally, we hope SIGAda 2011 provides you an outstanding opportunity for rewarding affiliation with colleagues in industry, academia, and government — discussions "in the hall," informal meal-time meetings, and even during the more relaxed moments we make for socializing. These associations can be as valuable as the technical program at professional conferences, and often extend the experience after you return home.
We take this opportunity to thank our Corporate Sponsors. Our Platinum-level sponsor is AdaCore. Our Silver-level sponsors are Ellidiss Software, LDRA and Rapita Systems. And thanks to The Mathworks, National Center for Women & Information Technology (NCWIT), Vector Software, and Wind River Systems for exhibiting.

SIGAda 2011 Conference Chair	*SIGAda 2011 Program Chair*
	
Ricky E. Sward The MITRE Corporation rsward@mitre.org	**Lt. Col. Jeff Boleng, USAF** US Air Force Academy jeff.boleng@usafa.edu

Acknowledgements

Thank you to all Conference Committee members!

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Thank you to all Program Committee members!

Jeff Boleng *US Air Force Academy*	Julien Delange *European Space Agency*	Dan Eilers *Irving Compiler Corp.*
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Stephen Schwarm *S2 Security Corporation*	Frank Singhoff *University of Brest, France*	Alok Srivastava *TASC Inc.*
	Ricky E. Sward *The MITRE Corporation*	

Keynote Addresses and Panel Chairs

Tuesday November 8, 2011 9:30 am – 10:30 am

Everything I Know I Learned from Ada
Grady Booch (IBM Fellow; Chief Scientist for Software Engineering, IBM Research)

Abstract: I entered the world of Ada at a most impressionable time in my career: I knew enough to be dangerous, but not so much that I was unwilling to try new things. Ada was full of new things that have informed much of what I do today. The role of abstraction, the meaning of beauty in design, the nature of delivering ultra-large software intensive systems, collaboration across geographic and cultural boundaries, the joys and frustrations of standards building, the process of revolution: these are all things I have learned from Ada. In this presentation, I'll offer some war stories from the past and offer speculation on the future.

Bio: Grady Booch is a software engineer, and Chief Scientist, Software Engineering in IBM Research. He is best known for developing the Unified Modeling Language with Ivar Jacobson and James Rumbaugh.

He earned his bachelor's degree in 1977 from the United States Air Force Academy and a master's degree in electrical engineering in 1979 from the University of California, Santa Barbara.

He is former Chief Scientist of Rational Software (acquired by IBM on February 20, 2003), where he worked until March 18, 2008. Afterwards he became Chief Scientist, Software Engineering in IBM Research, and series editor for Benjamin Cummings.

In 1995 he was inducted as a Fellow of the Association for Computing Machinery. He was named an IBM Fellow in 2003, soon after his entry into IBM, and assumed his current role on March 18, 2008. He was recognized as an IEEE Fellow in 2010.

Booch is best known for developing the Unified Modeling Language with Ivar Jacobson and James Rumbaugh. He also developed the Booch method of software development, which he presents in his book, Object Oriented Analysis and Design. He advises adding more classes to simplify complex code. Booch is also an advocate of design patterns. (For instance, he wrote the foreword to Design Patterns, an early and highly influential book in the field.) In the 1980s, Booch wrote one of the more popular books on programming in Ada.

Tuesday November 8, 2011 2:00 pm – 3:30 pm

Panel: How to Make Ada go "Viral"
Chair: JP Rosen (AdaLog), with Brad Moore (General Dynamics Canada), David Sauvage (AdaLabs, Mauritius), Tucker Taft (Sofcheck)

Abstract: Every Ada user wonders why Ada does not enjoy the popularity it deserves. Experience shows that once people have been properly trained to it, they generally don't want to return to other languages – but getting the word to the public-at-large – marketing – has always been a weak point of Ada.
Can we change this situation? Recent indicators, like the independent market research studies on language popularity, shows some positive indication, with Ada's popularity fast rising. This panel brings together experts with various backgrounds to share their views on how to make Ada more mainstream.

Bio: Jean-Pierre Rosen is a professional teacher, teaching Ada (since 1979, it was preliminary Ada!), methods, and software engineering. He runs Adalog, a company specialized in providing training, consultancy, and services in all areas connected to the Ada language and software engineering. He is chairman of AFNOR's (French standardization body) Ada group, AFNOR's spokeperson at WG9, member of the Vulnerabilities group of WG9, and chairman of Ada-France. Adalog offers regularly on-site and off-site training sessions in Ada. J-P Rosen is a consultant for companies involved in high reliability systems, such as Ansaldo for Railway systems and Thales Avionics for Airborne/OO systems.

Wednesday November 9, 2011 9:30 am – 10:30 am

Why I Came Back To Ada
Martin Carlisle, Ph.D. (US Air Force Academy*)*

Abstract: After the Air Force Academy switched its curriculum to Java, I extracted myself from the Ada community and moved on to other research interests, particularly computer security. In this talk, I'll explain the new developments that brought me back to Ada and how Ada and SPARK may be a secret weapon in the 21st century.

Bio: Martin C. Carlisle, Ph.D., is a professor of computer science at the United States Air Force Academy. He has a Bachelor of Science in mathematics and computer science from the University of Delaware, and a Master of Arts and Doctor of Philosophy in computer science from Princeton University. He has made numerous contributions to the Ada community, and is most well known for AdaGIDE, an integrated development environment for GNAT on Windows, and A#, which compiles Ada to .NET. He has received both the SIGAda Outstanding Community Contribution and Distinguished Service awards. He has been named an ACM Distinguished Educator, the CASE Colorado Professor of the Year and the US Air Force Academy Outstanding Science and Engineering Educator and was awarded the US Air Force Exemplary Civilian Service Award.

Thursday November 10, 2011 9:30 am – 10:15 am

Invited Presentation: Software Safety, and Related Language Considerations
Jim Rogers (MEI Technologies, Inc.*)*

Abstract: The programming languages currently most popular among software engineers for writing safety critical applications are C and, more recently, C++. The Ada language has been designed with software safety in mind. Although Ada is not perfect concerning safety critical programming, it is far better than C or C++. There have been definitions of subsets of C for safety critical applications, such as MISRA C. Similarly, there are several attempts at defining a safe subset of C++, including MISRA C++ and the Joint Strike Fighter (JSF) Avionics C++ coding standards. The most commonly used safety critical subset of Ada is SPARK. SPARK provides a statically provable fully deterministic subset of Ada. The C and C++ safety critical subsets attempt to achieve a level of safety similar to the full Ada language. That attempt generally fails. This paper concentrates on a comparing the C++ language, including portions of the JSF C++ standard and those features inherited from C, with the full Ada language.

Bio: James (Jim) Rogers has been involved in development of software since taking his first course in computer programming in 1970 at the University of Santa Clara in Santa Clara, California, USA while working toward his Bachelor of Science degree in Chemistry. After several years working as a chemist in the California wine industry and in chemical processing industries, Jim became a professional software engineer, working for many industries in the Silicon Valley and in Colorado, including manufacturing process controls, telecommunications, engineering analysis tools, robotics, and aerospace. Jim learned to program in the C language in 1985 and in the Ada language in 1994. Jim has worked as a software safety engineer for MEI Technologies since 2002. In 2008 Jim presented a paper at the 3rd Conference of the International Association for the Advancement of Space Safety in Rome, Italy titled Software Safety for Manned Spacecraft.

Tutorial Schedule

Sunday, November 6, 2011 – Conference Tutorials		
07:00 am – 10:00 am	**Complimentary hotel breakfast buffet - Magnolia Club Room**	
09:00 am – 10:30 am	**Larimer Room**	
	SF1: Introduction to Ada Michael B. Feldman (The George Washington University (ret.))	
	Champa Room	**Glenarm Room**
	SA1: Service-Oriented Architecture (SOA) concepts and implementations Ricky E. Sward (The MITRE Corporation) Jeff Boleng (US Air Force Academy)	SA2: How to measure and optimize reliable embedded software Andrew Coombes (Rapita Systems)
10:30 am – 11:00 am	**Morning Break and Beverages - Library**	
11:00 am – 12:30 pm	**Larimer Room**	
	SF1: Introduction to Ada (continued)	
	Champa Room	**Glenarm Room**
	SA1: SOA Tutorial (continued)	SA2: Measure and optimize (Continued)
12:30 pm – 02:00 pm	**Mid-day Break – Lunch on your own**	
02:00 pm – 03:30 pm	**Larimer Room**	
	SF1: Introduction to Ada (continued)	
	Champa Room	**Glenarm Room**
	SP1: DO-178C: The next avionics safety standard Ben Brosgol (AdaCore)	SP2: Improving the quality of Ada software with range analysis Jeff Chapple (The Mathworks, Inc.)
03:30 pm – 04:00 pm	**Afternoon Break - Library**	
04:00 pm – 05:30 pm	**Larimer Room**	
	SF1: Introduction to Ada (continued)	
	Champa Room	**Glenarm Room**
	SP1: DO-178C (continued)	SP2: Improving quality (continued)

Monday, November 7, 2011 – Conference Tutorials	
06:00 am – 09:00 am	**Complimentary hotel breakfast buffet - Magnolia Club Room**
09:00 am – 10:30 am	**Larimer Room**
	MF1: Building Embedded Real-Time Applications John W. McCormick (University of Northern Iowa) Frank Singhoff (University of Brest, France)
	Champa Room
	MA1: Experimenting with ParaSail – Parallel Specification and Implementation Language Tucker Taft (SofCheck, Inc.)
10:30 am – 11:00 am	**Morning Break and Beverages - Library**
11:00 am – 12:30 pm	**Larimer Room**
	MF1: Building Embedded Real-Time (continued)
	Champa Room
	MA1: ParaSail (continued)
12:30 pm – 02:00 pm	**Mid-day Break – Lunch on your own**
02:00 pm – 03:30 pm	**Larimer Room**
	MF1: Building Embedded Real-Time (continued)

Monday, November 7, 2011 – Conference Tutorials - (continued)	
02:00 pm – 03:30 pm	**Champa Room**
	MP1: Ada coding standards Jean-Pierre Rosen (Adalog)
03:30 pm – 04:00 pm	**Afternoon Break - Library**
04:00 pm – 05:30 pm	**Larimer Room**
	MF1: Building Embedded Real-Time (continued)
	Champa Room
	MP1: Coding standards (continued)
05:30 pm – 7:00 pm	**Free Time**
07:00 pm – 10:00 pm	**Glenarm Room**
	SIGAda Extended Executive Committee (EEC) Meeting, open to all

Main Conference Schedule

06:00 – 09:00 am	**Complimentary hotel breakfast buffet - Magnolia Club Room – Every morning**
08:00 – 09:00 am	**Registration - Every morning**
Tuesday November 8, 2011 Technical Program - Larimer Room	
09:00– 10:30 am	**Greetings from SIGAda and Conference Officers**  **Keynote Address: Everything I Know I Learned from Ada** Grady Booch (IBM Fellow; Chief Scientist for Software Engineering, IBM Research)
10:30 – 11:00 am	**Mid-Morning Break / Exhibits Open - Library**
11:00– 12:30 pm	**A Parallel Programming Model for Ada** Hazem Ali (CISTER Research Centre) and Luis Miguel Pinho (Polytechnic Institute of Porto, Portugal) **Stack Safe Parallel Recursion with Paraffin** Brad Moore (General Dynamics, Canada) **AdaCore Sponsor Presentation** Ben Brosgol (AdaCore)
12:30 – 02:00 pm	**Lunch Buffet and Exhibits - Magnolia Club / Library**
02:00– 04:00 pm	 **Panel: How to Make Ada Go "Viral"** Chair: JP Rosen (AdaLog), with Brad Moore (General Dynamics Canada), David Sauvage (AdaLabs, Mauritius), Tucker Taft (Sofcheck) **Ellidiss Sponsor Presentation** Tony Elliston (Ellidiss TNI Europe)
04:00 – 04:30 pm	**Afternoon Break and Exhibits - Library**
04:30– 05:30 pm	**BoF: ParaSail** Tucker Taft (SofCheck, Inc.)
07:00– 10:00 pm	**Tuesday Evening Reception - Denver Art Museum**

Wednesday November 9, 2011 Technical Program - Larimer Room	
09:00 – 10:30 am	**Announcements** **SIGAda Awards** Ricky E. Sward  **Keynote Address: Why I Came Back To Ada** Martin C. Carlisle (US Air Force Academy Department of Computer Science)
10:30 – 11:00 am	**Mid-Morning Break / Exhibits Open - Library**
11:00 – 12:20 pm	**Software Vulnerabilities Precluded by SPARK** Paul E. Black (National Institute of Standards and Technology), Chris E. Dupilka (US DoD), F. David Jones and Joyce Tokar (Pyrrhus Software) **Enhancing SPARK's Contract Checking Facilities Using Symbolic Execution** John Hatcliff, Jason Belt, Robby (Kansas State University), Patrice Chalin (Concordia University), David Hardin (Rockwell Collins Advanced Technology Center), and Xianghua Deng (Google, Inc.) **LDRA Sponsor Presentation: Managing and Migrating Existing Applications to the DO-178B Standard** Jay Thomas (LDRA)
12:20 – 02:00 pm	**Lunch Buffet and Exhibits - Magnolia Club / Library**
02:00 – 03:30 pm	**An Ada Design Pattern Recognition Tool for AADL Performance Analysis** V. Gaudel, F. Singhoff, A. Plantec, S. Rubini (University of Brest, France), P. Dissaux (Ellidiss Software), and J. Legrand (Ellidiss Software) **Improving the Quality of Ada Software with Range Analysis** Jeff Chapple, Christian Bard, Jay Abraham, Patrick Munier and Cyril Preve (The Mathworks) **Making the Non-executable ACATS Tests Executable** Dan Eilers (Irving Compiler Corp.) and Tero Koskinen
03:30 – 04:00 pm	**Afternoon Break - Library**
04:00 – 05:30 pm	**Rapita Sponsor Presentation: Introducing RVS: on-target software verification tools for DO-178B and ISO 26262** Andrew Coombes (Rapita Systems) **Birds of a Feather: GNAT** Greg Gicca (AdaCore)
05:30 – 07:00 pm	**Dinner Break**
07:00 – 10:00 pm	**Workshops**

Thursday November 10, 2011 Technical Program - Larimer Room	
09:00 – 10:15 am	**Announcements** **Best Paper and Student Paper Awards** Jeff Boleng  **Invited Presentation: Software Safety, and Related Language Considerations** Jim Rogers (MEI Technologies, Inc.)
10:15 – 10:30 am	**Mid-Morning Break - Library**

Thursday November 10, 2011 Technical Program - Larimer Room - (continued)	
10:30 – 12:00 noon	**Towards Ada 2012, An Interim Report** John G.P. Barnes (John Barnes Informatics) **Ada-Europe'2012 Conference Announcement** **SIGAda 2012 Conference Announcement** Alok Srivastava, SIGAda Vice-Chair for Meetings and Conferences
12:00 noon	**Closing Comments & Conference Adjournment**

Thursday November 10, 2011 Afternoon - WG9 Meetings - Larimer Room	
2:00 pm – 8:00 pm	**WG9 Meetings (invitation only)**
Friday November 11, 2011 - ARG Meetings – Glenarm Room	
9:00 am– 8:00 pm	**ARG Meetings (invitation only)**
Saturday November 12, 2011 - ARG Meetings – Glenarm Room	
9:00 am– 8:00 pm	**ARG Meetings (invitation only)**
Sunday November 13, 2011 - ARG Meetings – Glenarm Room	
9:00 am – 2:00 pm	**ARG Meetings (invitation only)**

Reception Dinner and Entertainment

The SIGAda 2011 reception and dinner will be held at the Denver Art Museum. This will be full three course meal and will have the Western art gallery open for attendees to visit before or after the meal. The reception and dinner is another great opportunity to network with other professionals in the Ada and high-reliability software development community in a relaxing atmosphere.

DENVER ART MUSEUM

The DAM's Petrie Institute for Western American Art oversees an active program of acquisitions and exhibitions. The collection includes work by western masters such as George Catlin, Frederic Remington, Charles M. Russell, John Mix Stanley, Alfred Jacob Miller, and others. The crown jewel in the institute's collection is Charles Deas's Long Jakes, "the Rocky Mountain Man," the single most influential image in Rocky Mountain iconography.

The western American art collection was greatly enhanced in 2001 with a gift of more than 800 works of art from Bill and Dorothy Harmsen, longtime Colorado residents and founders of the Jolly Rancher Candy Company.


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