

CONNECT

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ACM Special Interest Group on High Performance Computing

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SC2011 from the Perspective of the George Michael Memorial HPC Fellows

The SC Conference Series established the George Michael HPC Fellowship in 2005. Since the first awards in 2007, 10 Fellows and 9 Honorable Mentions have been designated. The Fellowship supports travel to the SC conference the year the recipient is awarded the Fellowship and the following year when the recipient gives a technical talk on his/her research. As the 2011 Fellowship recipients, Ignacio Laguna of Purdue University and Xinyu Que of Auburn University, share their personal highlights of the SC11 Conference. Returning 2010 Fellowship recipients, Amanda Peters Randles of Harvard and Aparna Chandramowlishwaran of the Georgia Institute of Technology, also shared their highlights.

Xinyu Que

It was really cool that I had chance to attend the private discussion with Nvidia's CEO Jen-Hsun Huang, where I met a lot of top researchers. During the one-hour discussion, people shared very informative and insightful opinions. It was very beneficial in that both industry and research participants exchanged ideas. The discussion spanned every corner of the current research progress. Not only did they review the problems, but they also touched on future trends and potential opportunities. It is very important for me to explore in my future research.

I was impressed by the presentations given by previous Fellows. They gave very informative talks, through which I learned from my peers and was able to understand the specific challenges they were trying to address.



SC11 was the ultimate forum for the Fellows to communicate and compete. Most importantly, it gave them the opportunity to demonstrate the value of research to the community.

Ignacio Laguna

The SC information booths were very helpful in locating quickly the locations of events. On one occasion, I wanted to attend a talk that was about to begin, and instead of looking for the room in the map, I asked a person in an information kiosk how to arrive there. She gave me directions to get there quickly and I didn't miss the beginning of the talk.

The level of organization of the conference is amazing. I was provided with several maps and descriptions of the technical talks, workshops, tutorials, and the events during the conference.



From the Editor

Welcome to the first issue of SIGHPC Connect, the newsletter of the special interest group on high performance computing! In this issue you'll find a welcome from the Chair of SIGHPC and two articles: a book review by John West and a view of last year's SC conference by the recipients of the George Michael Memorial HPC Fellows. A reminder of the upcoming deadlines for SC12 is also included; there are many opportunities still available to participate in this year's SC conference.

As editor, my goal is to make this your newsletter. While SIGHPC Connect will include information about upcoming events, I am looking for contributions in any area of high performance computing. Do you have a favorite list of papers or books that you think everyone in HPC should read? Write that up and explain why you picked those papers? Heard a great speaker? Attended a conference that changed your view of HPC? Let me (and the SIGHPC community) know. Want to get a discussion started on whether Exascale computing is a good idea? Write a letter to the editor. Have an idea but don't know how to put it into words? Let me help. The goal of SIGHPC Connect is to help foster our community by creating and strengthening connections between the members. To contribute, email me at communications@sighpc.org. I'm looking forward to hearing from you!

Bill Gropp
SIGHPC Newsletter Editor

The quality of the information given (including brochures and maps) is the highest I have seen among the technical conferences I have attended before. I did not notice delays in any of the events that I attended—all of them began and terminated on time. Considering the amount of people that attended this conference, the level of organization is impressive.

The Boopsie application was very beneficial in helping me track events from my smart-phone. It allowed me to check the events that I wanted to attend and it would tell me the events that would start in the next hours. Since there are so many things one wants to see and do at the conference, this application helped keep me organized and allowed me to concentrate on the important things that I wanted to attend.

I appreciate the help given by the organizers of the George-Michael HPC Fellowship; in particular the support given by Barbara Horner-Miller, Bruce Loftis, Scott Lathrop, and Bill Kramer. Through them, I was introduced to other researchers and experts that allowed me to exchange ideas about my research and current trends in the field. They also gave me advice on how to take advantage

of different activities throughout the conference. This really made SC11 a richer personal and professional experience to me.

Amanda Peters Randles

The SC11 conference was incredibly beneficial for me. It was a great chance to talk with key people involved with cutting-edge research in high performance computing, as well as learn more about the trends of the field. I was able to attend a lot of talks that were relevant to my research. As an applied physics student working on a particular application that leverages large-scale computing, the SC conference provided a great opportunity to not only learn about current hardware, but also about methods others are using to achieve higher-efficiency in their codes. I attended the IBM Blue Gene consortium meeting that offered a great platform to meet other users and discuss issues relating to application performance on systems like Blue Gene. I was also able to gain more insight on the direction for next-generation systems.



Through the HPC Fellowship, I was able to meet with Rick Stevens of ANL and discuss biomedical research being done at Argonne and potential overlap with my interests. The conference brings together people from industry, academia, and national laboratories, offering a great perspective on future job opportunities and collaborations. My group is already working with visualization experts from ANL that I met at SC to help us with the data from our blood flow simulations.

Aparna Chandramowliswaran

Although I wasn't able to attend all the sessions I found interesting due to conflicts, I found the technical papers and poster sessions the most interesting. There were many intellectually stimulating presentations and discussions. Listening to talks in my field raised new research questions that helped further my research. The poster session was well-attended and provided a platform for informal lively discussions with the presenters—a different atmosphere from typical paper presentations. Overall, SC11 provided an excellent opportunity to keep in touch with current research and also meet with leading researches in the field.



*Barbara Horner-Miller
SIGHPC Student Programs*

SC12 Deadlines

SC12 Submission Site: In order to make or review a submission you need to have an account; but you may view the sample submission forms without an account. <https://submissions.supercomputing.org/>

Submission	Date
Exhibitor Forum	July 20
ACM Student Research Competition Poster	July 31
Birds-of-a-Feather	July 31
Doctoral Showcase - Dissertation Research Showcase	July 31
Doctoral Showcase - Early Research Showcase	July 31
HPC Undergraduate Application	July 31
Poster and Electronic Poster	July 31
Scientific Visualization Showcase	July 31
Student Volunteer Application	July 31
Broader Engagement - Student Application	August 11
Broader Engagement - Faculty/Professional	August 11
HPC Educator Application	August 14

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From the Chair

What an exciting – and rewarding – experience we’ve had, working with you to get ACM’s new SIG launched and off the ground. Although a few of us had discussed the idea before SC10 (New Orleans), SIGHPC really formed as a result of the enthusiastic, and very well attended, town hall meeting at that conference. We went in unsure if our community saw a need for a year-round community, but the sense of excitement you brought sent a clear message that the time was right.

SIGHPC launched formally at SC11, and by April we’ve already exceeded our three-year membership goals!

As you know, SIGHPC is the first international group within a major professional society that is devoted exclusively to the needs of the HPC community. Our goals are to help spread the use of HPC, raise the standards of the profession, and ensure a rich and rewarding career for people involved in the field. During these early days, we’ve focused on building some basic infrastructure. Our website features several ways to connect with the SIG through Facebook, LinkedIn, and Twitter, along with promotional materials that will help you promote SIGHPC to your colleagues through your own work and web activities. Check out <http://sighpc.org/connect/> for these materials, and keep an eye on that space as we develop tools to help you evangelize the benefits of HPC.

We’ve also been actively developing relationships between SIGHPC and HPC community events. Starting this year, we share sponsorship of the annual SC conference with SIGARCH and IEEE Computer Society. In addition, we are joining with a variety of conferences and workshops that are held “in cooperation with” SIGHPC. In addition to reduced registration costs and other benefits, materials from these events will go into the electronic archive of HPC materials that SIGHPC is creating through the ACM Digital Library; these materials will be accessible as part of your SIGHPC membership. You can learn more about the events SIGHPC partners with at sighpc.org.

Finally, this newsletter itself is a new activity. It is the first of a regular series that we hope will grow into a valuable resource for our members, but we need your feedback to make sure we reach that goal. Please take a moment to tell us what you like and how we can improve going forward by reaching out to us on Facebook ([facebook.com/sighpc](https://www.facebook.com/sighpc)), Twitter (twitter.com/sighpc), or via email at communications@sighpc.org.

*Cherri Pancake
Chair, SIGHPC*

Book Review

Introduction to Elementary Computational Modeling: Essential Concepts, Principles, and Problem Solving

*José M. Garrido
Chapman and Hall/CRC Press (2012)
ISBN 1439867399*

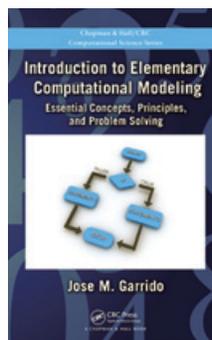
I just recently finished reading *Introduction to Concurrency in Programming Languages*, one of the latest books in CRC’s Computational Science Series (check out the http://www.crcpress.com/ecommerce/product/book_series.jsf?series_id=1775 for a list of current and forthcoming titles).

I picked this book out of my large-ish stack of books waiting, mostly patiently, to be reviewed because of its lineage (CRC’s series editor, Horst Simon, is doing an excellent job gathering interesting titles) and because it promised to address a topic area in

which I’d like to further develop my own skills. Because of the elementary nature of the material, I didn’t make much progress there; but in the process I did find a text that offers a solid first step into scientific and technical computing for those just getting started.

The author, José M. Garrido, was a professor of computer science at Kennesaw State University at the time of publication. His research areas include: computational modeling, formal specification of real-time systems, language design and processors, software security, and object-oriented modeling and simulation—clearly a reasonable foundation from which to build an introductory modeling book.

As Garrido outlines in his preface, the goal of this book is to introduce readers to the basic principles of computational modeling. The material is aimed at a



beginning undergraduate level, and because the mathematics discussed are elementary and no prior programming experience is assumed, the book could also be used to in an advanced high school course.

Through simple examples that are both easy to conceptualize and straightforward to express mathematically (something that isn’t trivial to achieve), Garrido methodically guides readers from problem statement and abstraction through algorithm design and basic programming. His approach offers those beginning in a scientific or technical discipline something unique; a simultaneous introduction to programming and computational thinking that is very relevant to the practical application of computing many readers will experience later in their academic training, or early in their professional career.

What you won’t find

This is not a book about supercomputing or high performance computing, per se. You won’t find any discussion of coding

tuning and optimization, no Message Passing Interface (MPI) or OpenMP, no coverage of FORTRAN and C or C++, and no calculus or differential equations. All of those things will come later. The goal of this text is to develop a basic facility with “computational thinking”, teaching straightforward, practical examples how to explore physical phenomena that can be mathematically modeled and then simulated using a computer.

With that said, if you’ve already been through a reasonable BS program in a technical area and are already familiar with the concepts of using a computer to evaluate simple models of some phenomenon of interest, you will probably find this text is too elementary for you. But, if you are teaching a survey of computation, mentoring young students in a Science, Technology, Engineering, and Mathematics (STEM) program, or if you have been faced with answering the question “how do I learn how to use computers to understand the world around me,” this book offers a good place to start.

The lay of the text

Garrido begins with an overview of problem solving, and there are three chapters that cover understanding of word problems, how computing and problem solving interact, and an overview of MATLAB and Octave. He then moves on to a gentle introduction to mathematical modeling that uses simple motivating examples (such as temperature change and calculation of the area under a curve) to both explore the construction of the mathematical model and of simple programs that implement that model. The next several chapters discuss algorithm design and the basic structures of programming languages (functions, repetition, conditionals, etc.). The bulk of the remaining chapters address problems that require slightly more sophisticated mathematical models, covering quadratic growth and polynomials

along with geometric growth. The book concludes with a look at more sophisticated data types, including vectors and matrices, text and strings, and simple linked lists.

The book also has two appendices that provide additional material on MATLAB and Octave, along with an introduction to computer hardware and software that may prove worthwhile to shore up an anecdotal understanding of how computers work for the uninitiated.

The last word

Introduction to Elementary Computational Modeling is aimed at those new to computational thinking, focusing on the fundamentals to create an effective resource in developing the next-generation of computational and HPC professionals.

John West
SIGHPC Member Communications

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