THE SOCIETY FOR
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Fig. 1 Get together breakfast before the talk. Left (back to front): Ms. Ülken Kasapoğlu (Organizer of the Student Chapter), Tuncer Ören, Rahmi Ünalan and Mustafa Kılınç (Engineers from HAVELSAN); Right: Mehmet Akalın and Ms. Merve Şenel (from the Student Chapter); Mr. Bilge Yeşil (Project Manager, Simulation and Training Systems, HAVELSAN); and Ms. Esra Karagöz (Engineer, HAVELSAN)

News and Development in M&S

M&S CAREER DAY AT METU STUDENT CHAPTER

METU (Middle East Technical University, Ankara, Turkey) Student Chapter of the SCS was formed on December 25, 2008, after my visit to the University to give a series of six **lectures** on modeling and simulation. Information about the current Student Executive Committee as well as the Academic Mentor can be found at the **list** of the SCS Student Chapters.

This year, I had another occasion to visit METU to deliver the opening keynote speech on: "Increasing importance of modeling and simulation in civilian and military applications" at the **USMOS 2013 conference**. The students had organized a special career day before the Conference. The day started with a breakfast organized by the Student Executive of the Chapter (Fig. 1).

The organizers honored me by scheduling me as the first speaker. I shared with them some of my enthusiastic views about the very promising possibilities that M&S offers. Then a pragmatic part of the talks started with representatives of **HAVELSAN**. Mr. Bilge Yeşil, Mr. Mehmet Can Başkan, and Ms. Esra Karagöz presented several interesting projects being carried out at HAVELSAN. Their presentations were informative and inspirational for the attendees (Fig. 2).

Fig. 2. Students and the Speakers at the M&S Career Day at METU

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I would also like to share with you a picture of the posters prepared by the students for the occasion (Fig. 3). One of the things I learned from the Executive of the METU Chapter was that they were in touch with many other Student Chapters through Social Media. This is a very commendable activity worth also posting on the respective websites.

Fig 3. Posters prepared by the students.
(The one at the right says, in Turkish: "M&S – Your own reality")

General information about as well as guidelines to establish an SCS Student Chapter can be found at **SCS website**. One of my suggestions to the METU Chapter was to take advantage of the existence of many eminent M&S academics at the universities as well as many talented M&S professionals in several high-tech companies in their own city. Most of them could spare an hour to share their experience and wisdom, should they be invited to address to the members of the SCS Student Chapter. This suggestion would also be applicable to all Student Chapters to organize events useful to the membership. Amazingly, to be resourceful and useful to your members, you may not need any financial resource.

After accepting, in 2004, the privilege to be the founding Associate Vice President of SCS Student Chapters, and after being influential in the establishment of many Chapters, I sent, this year, a farewell letter to academic mentors and informed SCS Executive. Knowing that there are many talented young colleagues, I believe another colleague will carry the flag even to higher grounds. Until the appointment of such a colleague, I would gladly collect any information sent to me, to pass them to the colleague in charge.

As is expressed at the beginning of the SCS Student Chapters **website**: "At the Society for Modeling and Simulation International (**SCS**), we perceive current students of Modeling and Simulation (M&S) as our future colleagues. Accordingly, we encourage involvement of students at the activities of the SCS through Student Memberships and/or through Student Chapters."

I hope that the academic mentors of existing Chapters will continue to keep active and useful to the student members the Chapters that they were influential in their establishment and to see establishment of many more SCS Student Chapters.

To those who would like to be useful to M&S students, I would like to end with my finishing statement of my **introductory presentation** (in Turkish) in 2008: "Since the aim is clear, as the Carthaginian general **Hannibal Barca** (247-187 BC) said: 'We shall find a way or we shall make one.'"

-This news item is contributed by Tuncer Ören.

SEMINARS ON NEW ADVANCES IN M&S IN CHINA

Some seminars organized by Chinese Association for System Simulation (CASS) were held recently. Some new advances in modeling and simulation in China were discussed. These advances include:

1. A prototype of high performance simulation computer with the peak speed of 100T FLOPS has been developed. The simulation computer will be used for modeling and simulation of variety complex systems for two kinds of users, i.e. computing intensive high-end users and massive amount of users with cloud simulation mode. 5 set of benchmark has been developed for test and validation of performance of the simulation computer and the system and application software.

2. A configurable Intelligent Algorithm Library for parallel simulation has been developed. This algorithm library integrates diverse intelligent parallel algorithms to support simulation in different resolutions. It can provide dynamic parameter-based configuration, operator-based configuration and algorithm-based configuration according to system environments to implement dynamic high-efficient parallelization of simulation projects.

3. As for the research in high-performance visualization, some real-time and realistic algorithms have been proposed based on the powerful hybrid computing architecture comprising multiple GPUs and multi-core CPUs. The algorithms can accommodate the high-fidelity representation of many sophisticated phenomenon. All the proposed algorithms have been preliminary verified in the simulation systems of tactical training, which proves the algorithms' ability to enable high-performance visualization of complex virtual scenarios.

-This news item is contributed by Bohu Li.

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THE CHINESE ACADEMY OF ENGINEERING (CAE) CARRIES OUT THE SIMULATION INDUSTRY DEVELOPMENT STRATEGY RESEARCH IN CHINA

Simulation technology is one of the key technologies to promote the development of modern high-tech and to build an innovation-oriented country. With the development of simulation technology, the industry of simulation has become a considerable size of the new industry. Simulation technology is playing an increasingly important role in various fields, including Chinese national economy, National defense, natural science, social science, and so on.

Now, the Chinese simulation industry has been rapidly developed, nevertheless, there is still a big gap compared with developed countries, China's simulation industry has a great potential for development. How to rapidly promote the development of system modeling and simulation technology, and boost the industrialization process of simulation technology, has become the major concerns of researchers and administrators.

For this purpose, the CAE will cooperate with the Chinese Association for System Simulation (CASS) to carry out the simulation industry development strategy research. This research project is based on development demands and trends of simulation industry in China, to take the incubation of independent intellectual property rights of simulation industry as the core, and targeted at enlarging the scale of high-end simulation industry. The project will construct the technical framework of Chinese simulation industry, and provide strategic-consulting and policy suggestion to push forward the simulation industry from low-end to high-end.

The main research contents of the project include:

- How the development and requirements of Chinese simulation technology will influence the simulation industry;
- How applications of simulation science and technology will benefit the simulation industry;
- What are the demands of technical personnel training for the simulation industry;
- How to develop the simulation industry based on the independent intellectual property rights, etc.

-This news item is contributed by Bohu Li.

Upcoming SCS Conferences

2014 POWERPLANT SIMULATION CONFERENCE

January 20 - 23, 2014

Astor Crowne Plaza, New Orleans, LA, USA

The 2014 Power Plant Simulation Conference (PowerPlantSim'14) is an annual conference sponsored by The Society for Modeling and Simulation International. This conference focuses on the special needs of the nuclear and fossil power plant simulation community and includes presentations by technology and industry leaders, technical sessions, panel and roundtable discussions, and vendor exhibits. The primary goal of the conference is to promote open exchange of simulator related information between all attendees.

Who should attend?

All individuals associated with the maintenance, management, regulation, or application of nuclear and fossil power plant simulators are encouraged to participate by submitting original presentations.

Topics of interest include but are not limited to:

- Next Generation Simulators
- Post Fukushima Extended Blackout Modeling
- Severe Accident Simulation
- Simulator Knowledge Retention
- Advanced Fuel Pool Modeling
- Fleet Coordination – Does it Work?
- Recent Simulator Projects
- Thermal-Hydraulics
- Post Event Testing
- Virtual Simulation
- Control of Virtual Simulation Technologies
- mart Grid and Cyber Security Impacts
- ANSI/ISA 77.20 Fossil Functional Requirement Strategies
- Workforce Development, Re-staffing, and Knowledge Transfer/ Retention

Please submit your suggested presentation title directly to the track chairs below:

Fossil Track

Chair: William H. Talbot, Ameren

PPFossil@scs.org

Nuclear Track

Chair: Scott Cupp, Entergy,Arkansas

(479) 858-6858

PPNuclear@scs.org

2014 SPRING SIMULATION MULTI-CONFERENCE

April 13 - 16, 2014

Grand Hyatt Tampa Bay, Tampa, FL, USA

The Spring Simulation Multi-Conference 2014 (SpringSim'14) brings leading experts in various domains of Modeling and Simulation together. The following symposia are organized under SpringSim'14:

- Annual Simulation Symposium (ANSS)

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- Symposium on Theory of Modeling and Simulation (TMS/DEVS)
- Agent-Directed Simulation (ADS)
- Communications and Networking Symposium (CNS)
- High Performance Computing Symposia (HPC)
- Symposium on Simulation for Architecture and Urban Design (SimAUD)
- Posters session and Student Colloquium

Important Dates

Abstract Submission: September 13, 2013

Paper Submission: October 25, 2013

Notification: December 6, 2013

Ready-Camera Paper Due: January 6, 2014

Read more: http://www.scs.org/springsim

2014 SUMMER SIMULATION CONFERENCE

July 6-10, 2014

The Hyatt Regency Monterey, Monterey, CA, USA

The 2014 Summer Simulation Multi-Conference (SummerSim'14) focuses on modeling and simulation, theories, methodologies, tools, and applications and provides a forum for the latest R&D results in academia and industry. Take this opportunity to experience the tutorials, presentations, demonstrations, and workshops that will be available. Current events include Summer Computer Simulation Conference (SCSC'14), Grand Challenges in Modeling and Simulation (GCMS'14), International Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS'14), and International Conference on Bond Graph Modeling (ICBGM '14).

Topics Covered:

- Modeling, Simulation and Test for Cyber-Physical Systems
- Modeling and Simulation for Intelligent and Adaptive Systems
- Parallel and Distributed Simulation
- Use of Modeling and Simulation for Sustainability Emergency Management
- Modeling and Simulation in Medicine
- Bioinformatics and Multi-Agent Systems

Upcoming Conferences

THE 45TH ISAGA CONFERENCE

July 7 – 11, 2014

Dornbirn, Austria

The conference is being held jointly by ISAGA (International Simulation and Gaming Association) and SAGSAGA (Swiss Austrian German Simulation and Gaming Association). It is the first ISAGA conference in Austria.

The Program of the ISAGA 2014 will include:

- Presentation of state of the art developments in the gaming domain, including research, evaluation, facilitation, debriefing and design.
- Plenary keynote lectures and keynote actions and panel discussion sessions.
- Thematic research sessions and poster presentations focus on gaming related to academic research and analytical science traditions (with best paper and best poster award; peer-review process).
- Active gameplay and open space interactive sessions with a focus on gaming as part of an art, craft and design science tradition.
- A game for a real client will be designed throughout the conference and the design process will be documented. Participants can actively design or observe the design process and the prototype game will be played in a plenary action session.
- Special conference games will be exclusively developed for the event and played during ISAGA 2014. One game will use traditional haptic game materials. It is highly interactive and will involve all participants for the whole duration of the conference. Another game will use newest mobile phone and app technology. It will be a GPS- based adventure conference game.

More information is available at the conference website:

http://www.isaga2014.com/isaga2014/

-This news item is contributed by Omid Roozmand.

Publications

Guide to Modeling and Simulation of Systems of Systems (Simulation Foundations, Methods and Applications)

By Bernard P. Zeigler (Author) , Hessam S. Sarjoughian (Author) , Raphaël Duboz (Contributor) , Jean-Christophe Soulié (Contributor), 393 pages

Publisher: Springer; 2012 edition (November 24, 2012)

A Review by Saurabh Mittal, Ph.D.,

Founder and Principal Scientist, Dunip Technologies, USA

The book describes the fundamentals of the Discrete Event System Specification (DEVS) and System Entity Structure (SES) formalisms, the pillars of DEVS systems engineering. This book is divided in three parts. The first part deals with basics of DEVS and SES formalisms that leads on to advanced concepts in the second part. The ideas presented in the first two parts of the book have been implemented in many real life projects successfully as described in the third part of the book. Various DEVS-based

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integrated development environments are showcased along with real world applications that they help engineer. The book is an important contribution to the model-based systems engineering paradigm and is appropriate for novices, practitioners and advanced students. The book guides them to various DEVS-based tools currently in practice.

The first chapter provides a remarkable review of DEVS legacy, state-of-the-art, and various books that have been published since 1976 in the System of Systems (SoS) modeling and simulation area, including the books by one of the authors and DEVS pioneer, Bernard Zeigler. The list also includes the reviewer's book on "Netcentric systems of systems engineering by DEVS Unified Process" [1]. The chapter introduces the SoS concepts and the central theme of the book: 'virtual build and test" cycle in SoS design. The second chapter provides an overview on integrated modeling and simulation environments, such as MS4Me, CoSMoS, DEVS-Suite and Virtual Laboratory Environment (VLE), currently in use today by various practitioners from academia, industry and government.

Chapters 3-8 on SES and DEVS fundamentals present numerous examples on how system requirements proceed towards a system design. They highlight the expressive power of SES formalism and various methodologies to construct families of simulation models and prune to generate executable simulations using the MS4Me environment. The reader is encouraged to review the fundamentals of SES theory in Zeigler and Hammonds book on modeling simulation-based data engineering [2]: to appreciate the automation achieved in MS4Me environment. This concludes the first part of the book.

Second part on advanced concepts begins with Chapter 9 on DEVS Simulation Protocol that demonstrates the robust nature of natural language Finite Deterministic DEVS (FDDEVS) and SES as implemented in MS4Me toolset. FDDEVS is used to develop an executable model of the fundamental DEVS simulation protocol that separates model and the underlying simulator explaining the promise of DEVS-based interoperability in a simple way. Chapter 10 goes more in depth of the DEVS simulation protocol in a variable structure environment within the publish/subscribe architecture. After addressing the basics of structural modeling with SES and behavioral modeling with DEVS, the book kicks into data engineering with Chapter 11 that presents a distilled version of Zeigler and Hammonds book, cast in MS4Me toolset. Chapter 12 wraps up the second part of the book with the design features of DEVS description languages. It describes the strengths and limitations of constrained languages such as FDDEVS that is based on XML-based XFD-DEVS developed in collaboration with the reviewer in 2007, as acknowledged by the authors.

The foundational ideas on model-based systems engineering as implemented in MS4Me are provided in sufficient detail in the first two parts of the book to be understood by novices and experts alike. The last part presents various applications that employ model-based engineering and kicks into high gear with the overall M&S-based design process for SoS engineering in Chapter 13. This chapter describes a Modeling Support Environment that provides flexibility to adapt workflows, tools and models to diverse stakeholders. It illustrates the use of DEVS and SES capabilities in a complex project. Chapter 14 addresses service-based software systems and how their simulation counterparts can be developed using the DEVS systems approach. An emphasis is made on SOA-compliant DEVS models that can communicate with Service-oriented systems. Chapter 15 discusses the issue of hardware/software co-design and formulates it as a SoS engineering challenge for cloud-based systems. It aims to bring the virtual build and test process towards designing and analyzing cloud-based systems. It uses CoSMoS and DEVS-Suite modeling environments. Chapter 16 goes more in detail in CoSMoS architecture and suggests a complementary framework that can be effectively utilized for hardware software co-design and data engineering.

Shifting from artificial systems, Chapter 17 provides a perspective on living systems as SoSs, modeled using VLE by the French Research Institute in Agronomy (INRA). This contributed chapter illustrates how multiformalism SoS can work with MS4Me toolset. The book would not have concluded better without the last chapter that brings together the concepts of activity, information and energy with respect to the entire modeling paradigm as applicable to SoSs. It further elaborates on the quantization principle and the engineering of actual hardware components from DEVS model specifications. To the best of reviewer's knowledge, this is the first exposition of linking time, energy, information and activity with the modeling discipline.

This book is an important addition to the DEVS library and is a great reference material to Zeigler's classic text on the theory of modeling and simulation [3], a kind of handbook for its application to real problems. Besides it opens up whole new areas of DEVS and SES-based research in modeling and simulation.

References

1. Netcentric System of Systems Engineering with DEVS Unified Process. CRC-Taylor & Francis Series on System of Systems Engineering, by **Saurabh Mittal** and **José L. Risco-Martín**. 712 pages CRC Press; 1 edition (February 22, 2013)

2. Modeling and Simulation-Based Data Engineering: Introducing Pragmatics into Ontologies for Net-Centric Information Exchange, by Bernard P. Zeigler and Phillip E. Hammonds,, Academic Press, NY, 2007.

3. Theory of Modeling and Simulation: Integrating Discrete Event and Continuous Complex Dynamic Systems, by Bernard P. Zeigler, Herbert Praehofer, and Tag Gon Kim, 2nd Edition, By, Academic Press, NY, 2000.

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An Agent-Based Competitive Product Diffusion Model for the Estimation and Sensitivity Analysis of Social Network Structure and Purchase Time Distribution

Reducing the risk of investment in new products and increasing their success in highly competitive markets are of high importance for firms. Social interaction among consumers within their social network is one of the influential factors affecting their purchasing behavior. This paper proposes an agent-based competitive product diffusion model to cope with the problem of how a firm can determine the social network appropriate for a target product market. **Full paper is available at: http://jasss.soc.surrey.ac.uk/16/1/3.html**

-This news item is contributed by Omid Roozmand.

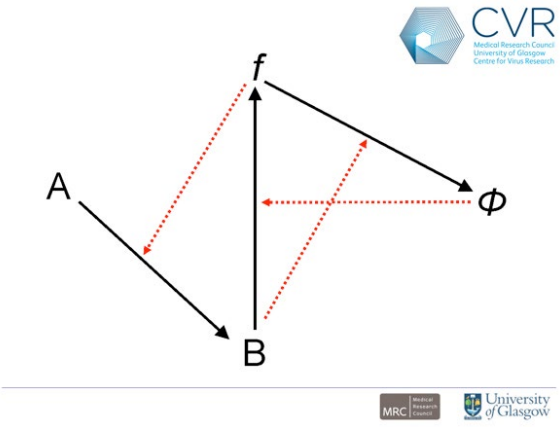
News from SCS Networks

A SIMULATIONAL CHALLENGE

Is there anything you cannot simulate? When asked this question, most computer scientists might answer that there are some systems that are simply too complex to be simulated in the normal timeframe of a project. If the simulation's runtime isn't to exceed the lifetime of the programmer, then simplifications must be found. Most of us have probably been in that situation.

But is there anything you cannot simulate in principle? Even with an infinitely powerful computer and personal immortality, are there still some aspects of the world that would illude simulation?

Back in the 1960s, biologist and mathematician Robert Rosen claimed to have identified a simple self-referential network that cannot be simulated (Figure attached). Rosen named the system M,R (Metabolism-Replacement). The black arrows represent sequences of production: A is made into B, B into f and f into phi. The red dotted arrows describe functions: the making of A into B requires f, the making of B into f requires phi, and the making of f into phi requires B.



By expressing this system using the mathematics of category theory, Rosen identified impredicative sets and claimed that such impredicativity would prevent simulation of M,R on any Turing machine. Furthermore, if such network structures existed in real biological systems (and they probably do), any efforts to simulate life on computers with Turing architecture would run into real problems.

Twenty years after Rosen's death, M,R is once again a hot topic. Systems biologists, armed with the latest supercomputers and vast compendia of biological data derived from genome projects, are in a position to start attempts to simulate some aspects of life in realistic detail. With perfect timing, a new exposition and further development of Rosen's ideas has been authored by one of his former students, and a website has been created to promote the revival of Rosen's ideas (**http://www.panmere.com/**).

Until now, the controversy has only involved systems biologists and the mathematicians of Rosen's school. But given the importance of systems biology for the future of medicine, it is time that general computer simulation specialists became involved. Over to you.

Further reading:

Rosen R: Life Itself: A Comprehensive Inquiry into the Nature, Origin, and Fabrication of Life. New York: Columbia University Press; 1991.

Louie AH: More than Life Itself. A Synthetic Continuation in Relational Biology. Frankfurt: Ontos Verlag; 2009.

Cardenas ML, Letelier JC, Gutierrez C, Cornish-Bowden A, Soto-Andrade J: Closure to efficient causation, computability and artificial life. Journal of Theoretical Biology 2010, vol 263: pp.79-92.

-This news item is contributed by Derek Gatherer.

AGENT-BASED MODELING OF CRIME

Dr. Nick Malleson, lecturer in Leeds University, is working on spatial computer models. His PhD work built a computer simulation that can be used to simulate the behaviour of virtual people in a realistic urban environment (a virtual space with houses, roads, communities, railways etc). He is also interested in other forms of spatial analysis (clustering methods, spatial statistics etc) and how new social data can influence research.

Dr. Nick Malleson's research and publications can be found at:

http://nickmalleson.co.uk/

http://crimesim.blogspot.com/

-This news item is contributed by Omid Roozmand.