HISTORY OF THE WINTER SIMULALTION CONFERENCE:
RENAISSANCE PEROD (1975 – 1982)

Robert G. Sargent   Paul F. Roth

Syracuse University   5600 Munhall Road
Department of Electrical Engineering and   Apartment 1004
Computer Science   Pittsburgh, PA 15215, USA
4-206 Center for Science & Technology
Syracuse, NY 13244, USA

Thomas J. Schriber

The University of Michigan
Stephen M. Ross School of Business
Ann Arbor, MI 48109-1234, USA

ABSTRACT

This paper discusses the history of the Winter Simulation Conference (WSC) during the period 1975–1982. This includes the collapse of the WSC in 1975, the rebirth of WSC in 1976, and the subsequent annual conferences and other significant WSC events for the period of 1976 through 1982. This was a period of great change for the WSC, with an emphasis on developing procedures to insure the long-term continuity and success of the conference.

1   INTRODUCTION

This paper discusses the history of the Winter Simulation Conference (WSC) during its Renaissance Period, 1975 through 1982. A series of (almost) annual simulation conferences began in 1967 with different names until 1971 when the name became the WSC. This series of simulation conferences collapsed in 1975 and the reasons for this collapse are given in Section 2. Fortunately, the WSC had a rebirth in 1976 and has continued since. This rebirth and the 1976 WSC are discussed in Section 3. The rebirth established a Board of Directors for the WSC. Section 4 contains a description of the establishment of a set of Bylaws for the Board of Directors. Section 5 discusses the operations of the Board of Directors and the Renaissance Period conferences. Section 6 contains the WSC innovations that occurred during the Renaissance Period and Section 7 lists the Renaissance Period Keynote Speakers. Section 8 contains a special discussion on the "WSC Iron-Man", Harold Joseph Highland, and Section 9 has the Concluding Remarks.

2   THE COLLAPSE OF THE 1975 WSC

Robert G. Sargent replaced A. Alan B. Pritsker at the conclusion of the 1974 WSC as the person representing AIIE (American Institute of Industrial Engineers, now known as the IISE, the Institute of Industrial and Systems Engineers) to the WSC. Pritsker took Sargent to a meeting regarding WSC held in the hotel suite of Michael F. Morris, the General Chair of the 1974 WSC, at the termination of the 1974 WSC. WSC was being run in an ad hoc fashion as there was no formal organization for WSC. Some of the individuals attending the meeting were representatives of the co-sponsoring societies and others were

members of WSC conference committees. There was no agenda for the meeting. After numerous suggestions that the meeting should start and with considerable delay, the meeting began. There was no report on the 1974 WSC and Morris did not participate in the meeting. (He stayed in another area of his suite.) While not discussed, Harold Steinberg, the Program Chair of the 1974 WSC, was to be the General Chair of the 1975 WSC because the procedure being followed since the beginning of these conferences was for the Program Chair of a conference to become the General Chair of the following year's conference. (However, this did not occur for the first time for the 1974 WSC as both the General and Program Chairs were new individuals, and also a new position of Proceedings Editor was added.) The meeting began with a discussion of where the 1975 WSC should be held. Several cities were discussed as one city after another was rejected. As time moved on, attendees of the meeting, including Pritsker, were leaving to catch their planes. Finally, Sargent and two other attendees said they had to leave to catch their planes. It was then suggested that Harold Steinberg as General Chair select the city for the 1975 WSC. The meeting now ended. It was Sargent's understanding that Harold Joseph Highland was to be the Program Chair and also the Proceedings Editor for the 1975 WSC. Highland was not at this meeting. Sargent came away from the meeting knowing (1) this ad hoc way was not a way to run a conference, (2) some formal organization was needed for WSC, and (3) there was much uncertainty about what was going to happen regarding the 1975 WSC.

What transpired regarding the 1974 WSC was that the financial books for the conference were never closed. The co-sponsoring societies never received their "seed" money back or any financial or other reports on the 1974 WSC. Both Prikster and Sargent received several requests from AIIE for a report on the 1974 WSC and on the status of its seed money. No information could be supplied to AIIE as nothing was available from the 1974 conference committee. This caused the co-sponsoring societies not to be keen to support future WSCs even though all of the previous conferences had been highly successful and the seed money with a surplus had been returned after each previous conference to the societies.

The 1975 WSC did not take place. The General Chair, Harold Steinberg, who worked for **IBM,** was transferred to another position at a new location within IBM and his new superiors would not give him release time to serve as General Chair of the 1975 WSC. In the early years of the WSCs, the General and Program Chairs handled much of the work for the WSCs. The loss of the General Chair and with no procedure to handle such an event due to the ad hoc method of how the WSC was being operated, along with the co-sponsoring societies not willing to support WSC due to the failure to close the books for the 1974 WSC, resulted in no WSC for 1975. Thus it appeared that this series of simulation conferences would end as there was no mechanism for it to continue. However, WSC did continue as it was born again in 1976 as is discussed in the next section.

Since the 1975 WSC did not take place, how then is there a set of proceedings called the Proceedings of the 1975 WSC? When it became clear (sometime during 1975) that the 1975 WSC was not going to occur, one of the co-sponsoring societies of WSC, the Society for Computer Simulation (SCS), proceeded to run a conference that used the name of Winter Computer Simulation Conference (WCSC) for at least the Call for Papers. SCS had for several years run the Summer Computer Simulation Conference (SCSC). The agreement had been that SCSC would be for continuous simulation and WSC would be for discrete-event simulation. Orlando S. Madrigal was General Chair of this 1975 conference, who also served as Program Chair of the 1982 WSC, told Sargent the reason that the conference was originally called WCSC was to avoid any issues regarding the WSC. However, at some point in time the WCSC became WSC and that was how the Proceedings of the 1975 WSC came about. The conference papers were split about equally between discrete-event simulation and continuous simulation. This 1975 conference is not considered to be part of the WSC series.

3   THE 1976 REBIRTH OF WSC

Sargent had met and become a friend of Paul F. Roth through the Symposium on Simulation of Computer Systems that began in 1973 and was held annually until it ended in 1976. Roth was a co-chair of the first

three of these symposiums. This series of symposiums was sponsored by the National Bureau of Standards (NBS, now called NIST, the National Institute of Standards and Technology) and the Association for Computing Machinery/Special Interest Group on Simulation (ACM/SIGSIM). Roth worked at NBS in computer sciences and served as Chair of ACM/SIGSIM for 1975-1977 (and again for 1985-1987). What was nice about NBS being a co-sponsor of these symposiums was that they had a staff of people to run conferences. Thus, having NBS as a co-sponsor of a conference could considerably reduce the effort required of an organization sponsoring a conference.

Since the collapse of the 1975 WSC, Sargent was trying to figure out a way to get the WSC started again. It occurred to him why not have NBS become a co-sponsor of WSC. Having NBS as a co-sponsor could resolve many of the issues facing WSC such as handling the finances, mailings with franking privilege for the Call for Papers and the Primary Program, meeting rooms for the conference at their Gaithersburg, Maryland facilities, etc. Sargent approached Roth with the idea of starting the WSC again with NBS as a co-sponsor. This idea appealed to Roth as he was also interested in getting WSC started again, being Chair of ACM/SIGSIM, which was one of the co-sponsors of WSC. Roth said he would discuss this with Dr. Ruth M. Davis, director of the Institute of Computer Sciences and Technology of NBS. Dr. Davis approved and was very supportive of having NBS become a co-sponsor of WSC.

Sargent had also suggested to Roth a planned approach to getting WSC started again when he brought the idea of NBS becoming a co-sponsor of WSC to him. This approach had Roth phoning the six previously co‑sponsoring societies and their representatives to WSC to say that NBS was initiating the restarting of WSC. In these phone calls, Roth would emphasize that NBS would become a co-sponsor of WSC, NBS would establish the budget and run the finances, and NBS had staff to run conferences. Roth's outstanding work in making these phone calls accomplished getting all of the previous co‑sponsors agreeing to sponsor WSC again and to having a representative attend a meeting to reestablish WSC.

The representatives of the previous six co‑sponsoring societies and Roth met in early 1976. These representatives were Sargent for AIIE, Julian Reitman for Systems, Man and Cybernetics Society of the Institute of Electrical and Electronic Engineers (IEEE/SMC), Donald Deutsch for ACM/SIGSIM, Hebron E. Adams for the Operations Research Society of American (ORSA), Paul Berthiaume for SCS, Richard E. Nance for The Institute of the Management Sciences (TIMS), and Roth for NBS. Roth ran the meeting. Sargent had been instructed by AIIE that WSC needed to become formally organized and have a Set of Bylaws. (These requests from AIIE came as a result of discussions that Sargent had with AIIE regarding issues of the 1974 and 1975 WSCs.) This group organized itself into a Board of Directors for WSC with Roth as the Chair. Sargent was asked to draft a Set of Bylaws when he said AIIE requested they be developed. Roth suggested a 1976 WSC be held in Gaithersburg with NBS handling the conference and this was readily agreed to by the Board. Since Harold Joseph Highland would have been the General Chair of the 1976 WSC if the 1975 WSC had occurred, the Board decided he should be offered the General Chair position for the 1976 WSC. Roth was to contact Highland to offer him this position. Thus, WSC was reborn and a plan laid out for the 1976 WSC.

Highland accepted the offer to be the General Chair of the 1976 WSC. Sargent had suggested to Roth that Highland consider Thomas J. Schriber for Program Chair and indicated that Sargent was willing to serve as Associate Program Chair if the various parties were interested. Schriber accepted Highland's request to be Program Chair and also accepted Sargent as Associate Program Chair. Sara Torrence, who was in charge of the staff who ran conferences for NBS, became the Arrangements Chair and handled much of the administrative work of the 1976 WSC. Roth became the Publicity Chair, Larry Hull the Business Chair, and Herbert Maisel the Registration Chair. This was the 1976 WSC Committee. The conference was to be held at NBS's Gaithersburg facilities and the attendees would stay at a nearby hotel with bus transportation between the two locations provided by NBS at the beginning and end of each day.

Highland, Schriber, and Sargent met soon thereafter (perhaps in March or early April) to plan the 1976 WSC. Highland decided to call this conference the 1976 Bicentennial Winter Simulation Conference because 1976 was the USA Bicentennial year. Since it was going to be late for sending out the Call of

Papers due to the late start for the planning of the 1976 WSC, it was determined that much of the WSC conference would have to be custom-built by Schriber and Sargent. In the early years of WSC those who desired to present papers had to submit a short summary of their proposed paper and those who desired to organize a panel or present a tutorial had to submit a proposal, from which the Program Chair with help selected the papers, etc., for the conference. A Call for Papers was handled by Roth and Torrence with a due date for submissions of May 24, 1976.

Schriber and Sargent met in June to establish the conference program. After the quality submissions were selected and organized into sessions, they proceeded to lay out the remainder of the program. It was decided to have two tutorial sequences: a Fundamental Tutorial Sequence for those new to simulation and an Advanced Practitioners Sequence. The speakers for these sequences were selected and invited by Schriber and Sargent. Previously there had been only some tutorials on simulation languages with no organization among them. They also decided to have a closing session as well as the opening session. Schriber selected R. E. D. (Gene) Woolsey as the Keynote Speaker for the opening session. For the closing session a team of world modelers headed by Mihajlo Mesarovic of Case Western Reserve University System Research Center was selected to discuss the latest in world modeling. World modeling was a "hot topic" in the Nineteen-Seventies. Between the opening and closing sessions there were sixteen research and application sessions, two panel sessions, and the two tutorial sequences. Some of these sessions were entirely "hand-built" and some partially "hand-built" by Schriber and Sargent by arranging for more papers and panels than had been obtained through the Call for Papers. The papers were due in September and Highland proceeded to develop the Proceedings for the conference with himself, Schriber, and Sargent as Co-editors.

The Proceedings were delivered to the hotel to be given to the conference attendees with their registrations packages prior to the start of the conference. However, the Proceedings were almost confiscated at the hotel by the Department of Defense (DoD) Security. The reason for this was because there was a paper in the Proceedings that contained classified information. It was fortunate that Highland, the General Chair and Proceedings Co-editor, had considerable knowledge about and major relationships with DoD. As a result, Highland was able to reach an agreement with DoD to black out certain words in the paper containing the classified information. (See page 161 of the 1976 WSC Proceedings to see part or all of the seven lines that have been blacked out.) Thus the attendees were able to obtain the Proceedings with their registration packages.

This conference with Highland as the General Chair and with Dr. Davis of NBS giving a welcome turned out to be successful both financially and technically with sixty four papers, with an attendance of 306. Thus, WSC was back on the road to take us to the 50th WSC.

4 ESTABLISHING THE WSC BOARD OF DIRECTORS BYLAWS

The WSC Board of Directors requested that Sargent develop a draft set of Bylaws when the WSC Board of Directors was established in early 1976. Sargent collected charters from several other conferences and used ideas from them to develop a draft set of WSC Bylaws. With the inevitable time delays and the requested and suggested changes to the drafts, the third draft of the set of Bylaws was passed by the Board of Directors at its April 1979 meeting. These Bylaws were then provided to the co-sponsoring societies for their approval. After some delay the responses were received from the societies with objections by virtually every society. Saul Gass, who had joined the WSC Board of Directors in 1980 as the ORSA representative, proceeded to rewrite the set of Bylaws in a way to satisfy the various objectives of the societies. This new set of Bylaws was submitted to the co-sponsoring societies. Their responses had new objections that were incompatible with each other making it impossible to write a set of Bylaws that would satisfy all of the co-sponsoring societies simultaneously. Since (1) the Board of Directors had been operating satisfactorily with the current set of Bylaws and (2) the co-sponsoring societies were not creating any problems for the Board by the way they had been operating, the Board decided to operate with the current set of Bylaws and hoped the issue of receiving approval of the Bylaws by the co-sponsoring societies would fade away. This

approach worked as no co-sponsoring society asked when they would receive another set of Bylaws for approval.

5   THE WSC BOARD OF DIRECTORS AND THE ANNUAL CONFERENCES

Roth served as Chair of the WSC Board of Directors from when it was established in 1976 through the 1979 WSC, and he as Chair handled the duties of the Board. The Board decided in 1976 to have NBS handle the 1977 WSC, to have the 1977 WSC located again at NBS in Gaithersburg, to have Sargent as the 1977 General Chair, and to have Sargent's choice of J. William Schmidt of Virginia Tech as the 1977 Program Chair. In 1977 the Board decided with the success of the 1976 WSC and with the 1977 WSC being on track to be successful to start weaning itself away from NBS (but not weaning itself away from NBS as a co-sponsor). They decided to have the 1978 WSC in Florida with Larry Hull as General Chair, who had been the Business Chair for the 1976 WSC and 1977 WSC, and Norman R. Nielsen as Program Chair. Roth agreed to find a hotel for the 1978 WSC, which turned out to be The Deauville Hotel in Miami Beach. The Board also decided in 1977 that the General Chair should be the Associate General Chair of the previous year's WSC. This implied that the General Chair had to be selected earlier. The Board proceeded to select Mitchell G. Spiegel as General Chair of the 1979 WSC and thus he became the Associate General Chair of the 1978 WSC. The SCS representative to the WSC Board in 1977 became Per A. Host. The 1977 WSC with Sargent as the General Chair was successful financially, technically with 105 papers, and attendance-wise, with 465 attendees. Thus, the two conferences held at NBS went well, and the 1977 WSC had an increase in both the attendance and the number of papers over the 1976 WSC. (See Figure 1.)
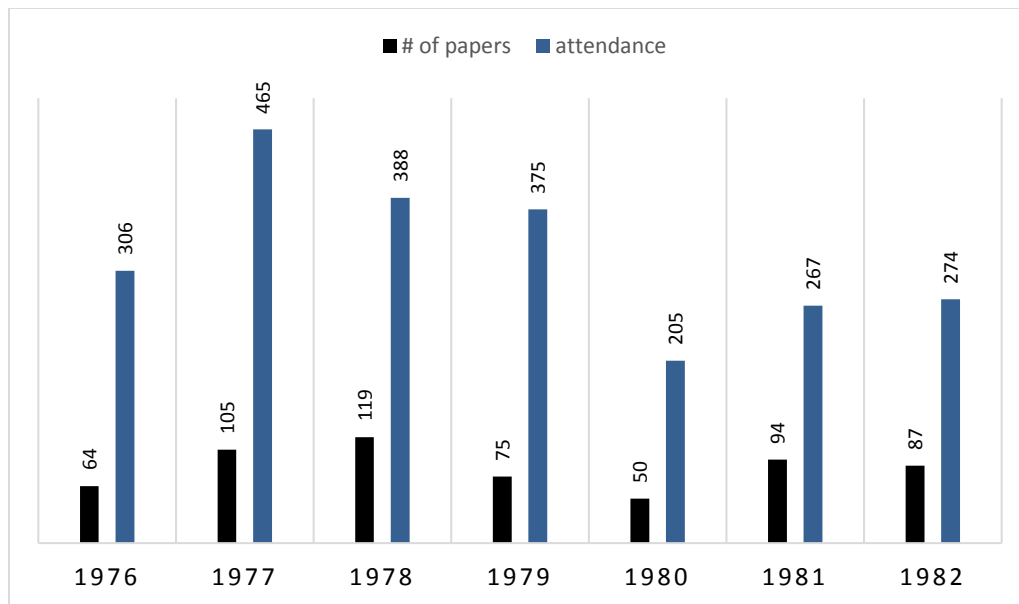

Figure 1: Yearly attendance and number of papers for 1976–1982.

The Board of Directors in 1978 decided that the Program Chair should be selected earlier like the General Chair so that the Program Chair would be the Associate Program Chair the year prior to serving as Program Chair. The Board selected Roth as the 1980 General Chair, Robert E. Shannon as the 1979 Program Chair, and Tuncer I. Oren as the 1980 Program Chair. The Board decided to hold the 1979 WSC on the West Coast in California and Roth found the Holiday Inn Embarcadero in San Diego for this conference, which was used again for the 1982 WSC. In 1978 Thomas J. Schriber became the ACM/SIGSIM representative to the WSC Board, Donald Martin became the SCS representative, and George S. Fishman became the TIMS representative. The Board was functioning well with the changes that were occurring in

the Board membership. The 1978 WSC held in Miami Beach with Hull as the General Chair followed the 1976 WSC and 1977 WSC in being successful financially and technically with 119 papers, and was enjoyed by the 388 attendees.

In 1979 the Board of Directors selected John C. Comfort as the General Chair and Charles M. Shub as the Program Chair for the 1981 WSC and thus they served as Associate Chairs for the 1980 WSC. The Board with mixed views decided to hold the 1980 WSC in Orlando, Florida. Roth found the Orlando Marriott as the hotel for the 1980 WSC. At the Board meeting held at the 1979 WSC, Roth stepped down as Chair of the WSC Board and Sargent was elected as the new Board Chair. Furthermore, the Board decided to have the Past, Current, and Next General Chairs along with the Current Program Chair attend and participate in the WSC Board Meetings and this continued throughout the Renaissance Period of the WSC. Also at this meeting the Board decided that full papers had to be submitted for the Call for Papers starting with the 1980 WSC, instead of only Summaries that was the practice in the past, and also that papers should be refereed. There were no changes in the Board membership in 1979. The 1979 WSC held in San Diego with Spiegel as General Chair, with 375 attendees and 75 papers continued the string of successful conferences having financial, technical, and attendance success.

The Board of Directors decided in 1980 to have Don M. Warner as the 1982 WSC General Chair and thus he became the Associate Program Chair for the 1981 WSC. There is a lack of knowledge of when Orlando Madrigal was selected to be the Program Chair of the 1982 WSC. He had served as Associate Program Chair for the 1979 WSC. Saul I. Gass became the ORSA representative and Lawrence Sashkin the SCS representative to the Board in 1980. Towards the end of 1980 Comfort informed the Board that he was not going to be able to serve as the General Chair of the 1981WSC. The Board proceeded to select Claude M. Delfosse as the 1981 WSC General Chair; he had served as the 1979 Business Chair and the 1980 Public Relations Chair. It was a straightforward process for the Board to select a new General Chair. It was decided to hold the 1981 WSC in Atlanta and Jerry Banks found the Peachtree Plaza Hotel for the conference. The Board also decided to hold the 1982 WSC in San Diego again and was able to use the same hotel where the 1979 WSC was held, the Holiday Inn Embarcadero. The 1980 WSC with Roth as the General Chair was a financial success; however, the number of papers decreased to fifty and attendance went down to 205 attendees. Holding the WSC in Orlando did not work out as well as had been hoped. The 1980 WSC further weaned WSC away from NBS by not having any staff member of NBS be a member of the Conference Committee for the first time since its rebirth. There was a problem with the 1980 Conference Proceedings as Tuncer Oren, who was both the Proceedings Editor and the Program Chair, split the 1980 WSC papers into two sets and had one set published as the *Proceedings of 1980 Winter Simulation Conference* and the other set published as a softbound book named *Simulation with Discrete Models: A State-of-the-Art View*, with both edited by Tuncer I. Oren, Charles M Shub, and Paul F. Roth. Splitting the WSC papers into two sets and producing two separate publications was not authorized and was not known to anyone until the conference. The General Chair of the conference had a rubber stamp made and each of the softbound books were stamped on their front cover and their on first page with "Proceedings of 1980 Winter Simulation Conference Volume 2 December 3-5, 1980 Orlando, Florida Sponsored by ACM AIIE IEEE ORSA SCS TIMS". The Board of Directors was not happy with this action and decided to monitor more closely the work of the conference committee members.

In 1981 a number of actions occurred. Perhaps the most important change that took place was that Roth was replaced by Patsy Saunders as the NBS representative to the Board. Also Prikster became the TIMS College on Simulation and Gaming (TIMS/CSG) representative. Furthermore, the IEEE Computer Society (IEEE/CS) joined the IEEE/SMC as the IEEE co-sponsor of the WSC with Ricardo Garzia as the IEEE/CS representative to the Board. Sargent brought to the Board a proposed structure for the Board. Sargent's proposal had a Chair, a Vice Chair, and a Secretary for the Board with appropriate duties for each. This Board structure was approved and thus this new structure would reduce the workload for the Board Chair. Sargent was elected Board Chair and Schriber was elected Vice Chair until the 1982 WSC. (It is believed that Patsy Saunders was elected Board Secretary, but it is not known with certainty.) The Board selected

Yen W. Chao as the General Chair of the 1983 WSC and Bruce W. Schmeiser as the Program Chair; both would serve as Associate Chairs for the 1982 WSC. The Board also decided that a Board Liaison position should be established for each WSC to work with that year's WSC Committee. Prikster volunteered to serve in this position for the 1983 WSC, the first WSC for which this position would take effect. The Board also moved to having each year's committee select the hotel in conjunction with the Board's approval and to have the planning horizon for future conferences be three years instead of the current two that was being used. Jerry Banks was selected as General Chair for the 1984 WSC. The Board decided that the 1983 WSC should be in the Washington DC area. The Crystal Gateway Marriott Hotel in Arlington, Virginia was the hotel selected for the 1983 WSC. The 1981 WSC with Delfosse as the General Chair was a success financially, technically with 94 papers, and attendance-wise with 267 attendees.

In 1982 there were no membership changes to the Board of Directors. However, very early in the year a serious problem occurred. The General Chair for the 1982 WSC just *disappeared* with respect to any communication or contact of any kind. He had been at the 1981 WSC and was arranging for people to help with the 1982 WSC. Members of the 1982 Conference Committee were not receiving any communications from him and were unable to reach him. Sargent, after much effort and being unable to make any contact with him, decided with time going by that a replacement was required. Sargent contacted the WSC Board with a request to replace the General Chair. Some members of the Board were opposed to replacing the General Chair and the result was the Board decided to wait prior to taking any action. After a couple of more weeks and still no communication with the General Chair by anyone, Sargent decided a replacement was absolutely necessary. Sargent contacted the Board again and informed them that action was absolutely required regarding a replacement for the General Chair. After much discussion and with some members reluctant to do so, the Board approved Sargent's request to replace the 1982 WSC General Chair. Sargent contacted the Associate General Chair Yen W. Chao and asked him to be the General Chair. He immediately said yes and said that he was glad that the Board took action as he was very concerned about what was happening. Sargent contacted the other members of the 1982 Conference Committee to inform them of the new General Chair and several of them said they were pleased some action had been taken. The WSC Board of Directors proceeded to ask Banks to be the General Chair of the 1983 WSC (replacing Chao) instead of the 1984 WSC and he agreed to do so. The Board later selected Udo W. Pooch to be the General Chair for the 1984 WSC and C. Dennis Pegden to be the Program Chair. At the 1982 WSC Board meeting, Schriber was selected to be the new Board Chair, Pritsker selected to be the new Board Vice Chair, and Saunders to be Board Secretary. The 1982 WSC under the General Chair Yen W. Chao was a success financially, technically with 87 papers, and attendance-wise with 274 attendees. However, a problem arose regarding the papers for the conference proceedings. One of the papers was found to have some inappropriate remarks in it; i.e., the remarks had nothing to do with simulation and expressed specific views on an 'incorrect' topic. Thus, this paper was rejected. Furthermore, this caused the Board of Directors to establish the policy that every paper must be read prior to it being accepted for the proceedings to ensure there is no inappropriate content in it. This policy continues to date.

What can be observed from this detailed discussion of the various years of the Renaissance Period? Regarding the WSC Board of Directors we observe that the Board functioned extremely well. It had yearly membership changes, it had leadership changes, it developed and handled long range planning for WSC, it handled changes to the General Chair with a short time notice and also when there was no notice causing a crisis, it handled a change in the IEEE co-sponsorship, and it handled the yearly conferences successfully. Looking at Figure 1, which contains the number of papers and the attendance for each of the WSC held during the Renaissance Period, one can readily see that the number of papers given at the WSCs varied between 50 and 119 and attendance varied between 205 and 465 during the Renaissance Period. What is most impressive about this widely varying attendance was that every conference was financially successful meaning that each conference had a surplus to return to the conference co-sponsors. We also observe that the conference attendance stabilized the last couple of years in the upper two hundreds, each conference had a quality technical program even while the number of papers for the conferences varied considerable,

and there were sufficient volunteers for each conference. Our last observation is a very important one; namely, that the multi-society approach to WSC is working exceptionally well.

6   WSC INNOVATIONS DURING THE RENAISSANCE PERIOD

There were other innovations to the WSCs during the Renaissance Period that were not discussed in Section 5. We will first describe two innovations that occurred in the 1976 Bicentennial WSC. The first innovation was developing a program structure for the WSC. The WSC (under other names) was established as a conference on applications and the papers in the early WSCs were not organized in any particular way. Schriber and Sargent introduced the idea of having sequences or tracks of papers organized with respect to specific topics. For this WSC there were two tutorial sequences (tracks): a Fundamental Tutorial Sequence for those new to simulation and an Advanced Practitioners Sequence with tutorials at an advanced level. Both of these sequences contained some tutorials on simulation languages. These sequences evolved over the years into the Introductory Tutorial Track, the Advanced Tutorial Track, and the (Vendor) Software Track as the simulation software was placed in a separate track. Furthermore, over time other tracks were developed, such as tracks for Analysis Methodology, Modeling Methodology, Manufacturing Applications, and Military Applications.

The second innovation that occurred at the 1976 WSC was having coeditors for the Proceedings. Earlier conferences only had the person who physically developed the Proceedings as the editor; e.g., Highland was the only editor for the 1974 WSC Proceedings. Schriber and Sargent discussed between themselves that they believed they should be co-editors of the Proceedings along with Highland who was the Editor for the Proceedings in addition to being the General Chair. Schriber sent an email to Highland containing reasons why he and Sargent should be co-editors of the 1976 WSC Proceedings. Highland immediately replied that he agreed. Since 1976 the Program Chair and the General Chair have been co-editors of the WSC Proceedings along with the Editor.

Innovations to improve the quality of the WSC programs occurred during the Renaissance Period. Instead of having summaries of proposed papers submitted for the conference in the Call for Papers, the requirement that a full paper must be submitted became the policy. Secondly, the submitted papers were to be refereed. Only those papers of quality based on the reviews were to be accepted. Furthermore, the distribution of papers in the Renaissance Period between application papers and methodology papers stabilized at about an equal number of each.

Other innovations to improve WSC that occurred during the Renaissance Period were based on using new technology. Presentations at the 1978 WSC were strongly encouraged to use 35mm slides and 35mm slide projectors were provided in each conference presentation room along with the traditional overhead projectors. Word processing systems became available during the Renaissance Period and this provided a way to improve the quality of the WSC Proceedings, especially with personal computers becoming available toward the end of the Renaissance Period.

There were two innovations initiated during the Renaissance Period that were implemented at the 1984 WSC. James O. Henriksen discussed with Sargent and Schriber as members of the WSC Board of Directors at the 1982 WSC that there should be exhibits at WSC. Henriksen had carefully prepared for this discussion by developing very specific reasons why there should be exhibits at WSC. Sargent and Schriber were impressed by what Henriksen had developed and suggested that he submit to the WSC Board of Directors a written proposal containing his suggestion. Henriksen did write to the Board and the Board asked board member Reitman to study this proposal and report back his evaluation of the proposal, which Reitman did. Based on the proposal and Reitman's evaluation of it, the Board decided to have exhibits at the 1984 WSC and evaluate the results. As we know the exhibits continue to this day and are a major component of WSC. The other innovation initiated during the Renaissance Period was by Udo W. Pooch, the General Chair of the 1984 WSC. He came to Sargent during the 1982 WSC to discuss his desire to have hardback covers on the 1984 WSC Proceedings. All of the WSC Proceedings since the beginning of the WSCs were softbound. Hardback covers cost more than softbound covers. It was suggested that the 1984 WSC budget presented

to the Board include the extra cost for the hardback covers and provide reasons for this expense. This budget was approved by the Board and the 1984 WSC Proceedings had hardback covers.

7   THE RENAISSANCE PERIOD KEYNOTE SPEAKERS

The mix and quality of the seven WSC keynote speakers for the Renaissance Period were exceptional.

7.1   The Two Rabble Rousers

R. E. D. (Gene) Woolsey was the Keynote Speaker for the 1976 Bicentennial WSC. Woolsey was somewhat of a character and he enjoyed being a rabble rouser in the OR/MS community by saying and believing that the emphasis in OR/MS education and journals should be on solving real-world problems. He was Editor of the TIMS/ORSA *Interfaces* and was a Principal Scientist of the Institute for Operations Research at the Colorado School of Mines.

   Harvey M. Wagner, Dean of the School of Business at the University of North Carolina at Chapel Hill, was the Keynote Speaker for the 1977 WSC. Wagner became a rabble rouser for the simulation community by publishing in the first edition (1969) of his well-known text *Principles of Operations Research* on page 890 that when "ALL ELSE FAILS…" and "...simulation is a method of last resort." These statements were a bitter issue in the simulation community for many, many, years.

7.2   The Two Industrial Executives

Philip Tenkhoff, Vice President for Engineering and Communication at Computer Sciences Corporation, was the Keynote Speaker for the 1978 WSC. He spoke on using simulation in real-world environments.

   G. R. Wagner was the Keynote Speaker for the 1982 WSC. Wagner was the Founder and Chief Executive Officer of Execucom Systems Corporation. Previously he was Director of Corporate Operations Research for Swift and Company and Professor and Head of Operations Research at The University of Texas.

7.3   The Two Polymaths

K. D. Tocher was the Keynote Speaker at the 1979 WSC. Tocher worked for the British Steel Company, developed the three-phase method for simulation time advance, and wrote the first book on discrete-event simulation, *The Art of Simulation*, 1963.

   Harry Markowitz, recipient of the 1989 John von Neumann Theory Prize and the 1990 Nobel Memorial Prize in Economic Sciences, was the Keynote Speaker at the 1981 WSC. Markowitz was a co-developer of SIMSCRIPT and a co-founder of CACI. The topic of his talk was "The Barriers to Practical Use of Simulation".

7.4   The European Academic

Maurice S. Elzas was the Keynote Speaker at the 1980 WSC. Elzas was a Professor of Computer Science at the Wageningen Agricultural University in The Netherlands. His talk was titled "Simulation and the Processes of Change".

8   THE WSC IRON-MAN: HAROLD JOSEPH HIGHLAND

Harold Joseph Highland was a one-of-kind individual who made numerous contributions to the simulation community. He was the General Chair of the 1976 Bicentennial WSC. He was the editor of six WSC Proceedings: 1974, 1976, 1977, 1978, 1979, and 1982; the latter five in the Renaissance Period. He was the editor for the four Proceedings of the Symposium on Simulation of Computer Systems and for proceedings of other conferences for a total of twenty-two sets of proceedings. He was the editor for thirty-two issues of the ACM/SIGSIM *Simuletter* during 1972-1980. He was the Keynote Speaker at the 1983 WSC. These

are the reasons why Harold Highland is referred to as the WSC Iron-Man in the simulation community. Harold Highland was also a renaissance man and often facetiously referred to himself as a "dinosaur". He received numerous awards including the Institute for Operations Research and the Management Sciences (INFORMS) Simulation Society (I-SIM) Distinguished Service Award and being elected a Fellow of ACM. See his Memoriam in the 1997 WSC Proceedings, the WSC Proceedings he edited, and the 1983 WSC Proceedings for more information about him.

9   CONCLUDING REMARKS

It was discussed in the last paragraph of Section 5 that the management system consisting of a Board of Directors and its Bylaws that was developed for WSC during its rebirth in 1976 worked extremely well during the Renaissance Period. There is now additional evidence that this management system is working extremely well because we are celebrating the 50th Anniversary of WSC in 2017**,** having used this management system for some forty-one years. Most impressive is this management system has been able to provide conference innovations, to handle widely varying conference attendance, to handle changing number of papers accepted, to have each conference be financially successful, and to have several WSC co-sponsors. Let's hope the WSC enjoys another 50 years of success.

AUTHOR BIOGRAPHIES

ROBERT G. SARGENT is a Professor Emeritus of Syracuse University. He has made numerous contributions to the simulation community in the forms of both service work and scholarly publications. His many honors and awards include being a recipient of the 1988 Distinguished Service Award and the 2002 Lifetime Professional Achievement Award from I-SIM, the 2010 Board of Directors James R Wilson Award and the 40th Anniversary Landmark Paper Award from WSC, and the 2012 Distinguished Contributions Award from ACM/SIGSIM; and being elected a Fellow of INFORMS in 2005. His email address is rsargent@syr.edu.

PAUL F. ROTH was a pioneer in computer modeling and simulation which he utilized during a career in industry, government, academe, and consulting. From 1955 through 1965 he was involved with continuous system simulation employing analog computers. From 1966 forward, he was involved with discrete-event simulation using GPSS, SIMSCRIPT and BOSS, which he and others at Burroughs developed for simulating operating systems. Following retirement from Virginia Tech as an Associate Professor of Computer Science, he became a consultant developing simulations for shipping, train scheduling, and chemical processing. He served the WSC in many capacities and two terms as Chair of ACM-SIGSIM. In his retirement he has became known as a musicologist, both in adult education venues and as a radio/TV broadcaster. His email address is pr.productions@yahoo.com.

THOMAS J. SCHRIBER is a Professor Emeritus of Technology and Operations in the Stephen M. Ross School of Business at the University of Michigan. He has served on the WSC Board of Directors, chairing the Board for two years, has spoken as a "Titan of Simulation" at the WSC, has received the Lifetime Professional Achievement Award from the INFORMS Simulation Society, and has presented one or more times at each WSC from 1968 through 2017. He has also been designated to be a "Pioneer of Simulation" (<http://d.lib.ncsu.edu/computer-simulation>). Email: <schriber@umich.edu>.